

FLORA NEOMEXICANA

III : AN ILLUSTRATED IDENTIFICATION MANUAL

SECOND EDITION

**PART 1 : INTRODUCTION, SPORE PLANTS, GYMNOSPERMS,
MONOCOTYLEDONOUS PLANTS, GLOSSARY**



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Illustrated by Robert DeWitt Ivey

With contributions by **Max H. Licher, James McGrath, William R. Norris,
Glenn R. Rink, & Robert C. Sivinski**

From Kelly W. Allred ~

Dedicated to my sons:

Nathan Kelly, Jesse Asa, Brady W, and Corby Spencer.

“Stand firm, be faithful and true!”

From Eugene M. Jercinovic ~

Dedicated to my wife, Betty Griffin, and children, Jason Jercinovic
and Jessica Jercinovic-Anaya

From Robert DeWitt Ivey ~

Dedicated to Vivian Porter Ivey

Front Cover: Organ Mountains, with *Eschscholtzia californica* subsp. *mexicana*

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INTRODUCTION

THIS IS THE THIRD VOLUME IN THE FLORA NEOMEXICANA SERIES. Volume I presents a verified, annotated, and updated checklist of the names of vascular plants occurring in the state. Volume II introduces the meaning and etymology of each of these names. Volume III provides a means of identifying the vascular plants to which those names belong. Updated editions of Volumes I and II are published concurrently with this second edition of Volume III so that all three volumes agree as to the names and occurrence of the vascular plants of New Mexico.

Part 1 of FLORA NEOMEXICANA III (this book) treats the **Spore Plants** (Lycophytes & Monilophytes), **Gymnosperms**, and **Monocotyledonous Plants** of the Angiosperms. It also contains an outline of the classification of New Mexico vascular plants.

Part 2 of FLORA NEOMEXICANA III treats the **Dicotyledonous Plants** of the Angiosperms.

Volume I (Annotated Checklist) of the series gives brief accounts of the climate, geologic history, soils, ecoregions, vegetation types, and botanical history of New Mexico, as well as data on endemic, exotic, and noxious plants of the state, and a detailed statistical summary of the flora, so that information is not repeated here.

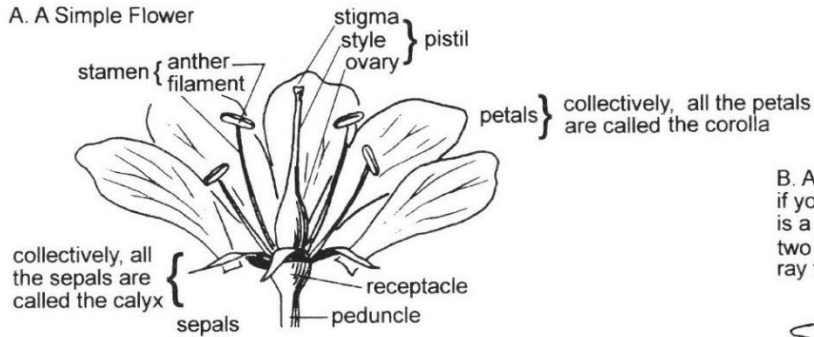
It is anticipated that a future Volume IV will comprise an illustrated treatment of the mosses of the state.

Volume III is really two books in one. Beginning in 1983, Robert DeWitt Ivey illustrated in masterful fashion the plants of New Mexico, his exceptional line drawings appearing in five editions of FLOWERING PLANTS OF NEW MEXICO (Ivey 1983-2008). We are pleased and gratified that DeWitt agreed to combine his outstanding illustrations with our text and commentary. It is hoped that the resulting collaboration exceeds in value each of its two components.

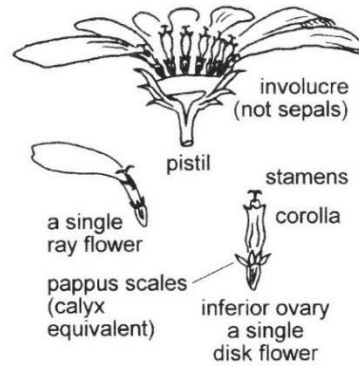
Nearly all the illustrations are by Robert DeWitt Ivey, and are taken from his last edition of FLOWERING PLANTS OF NEW MEXICO (Ivey 2008). A few additional illustrations are by Eugene Jercinovic, indicated by GJ. Approximately 1600 species are illustrated.

Illustrated Plant Parts and Terms

A. A Simple Flower

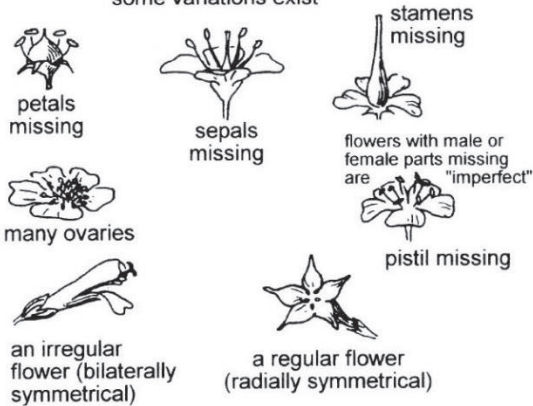


B. A Composite Head:
if you suspect that your flower is a composite, break it into two halves to reveal disk or ray flowers

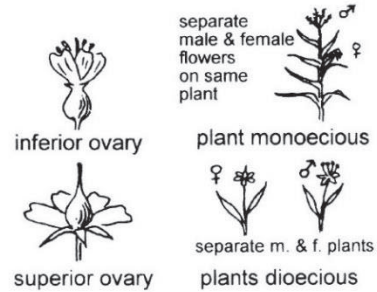
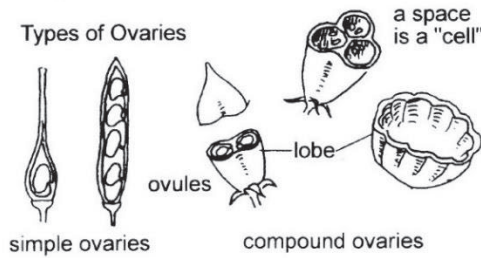


see: family Compositae

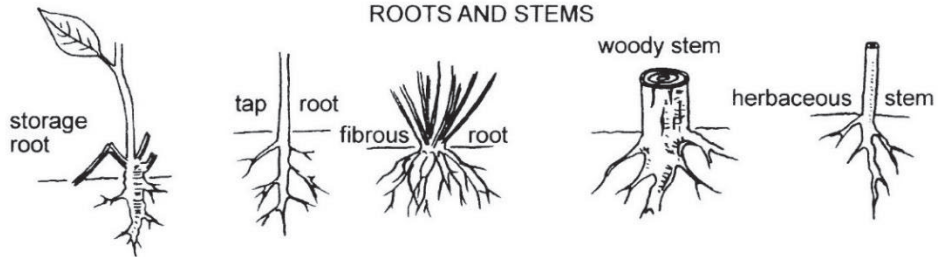
some variations exist



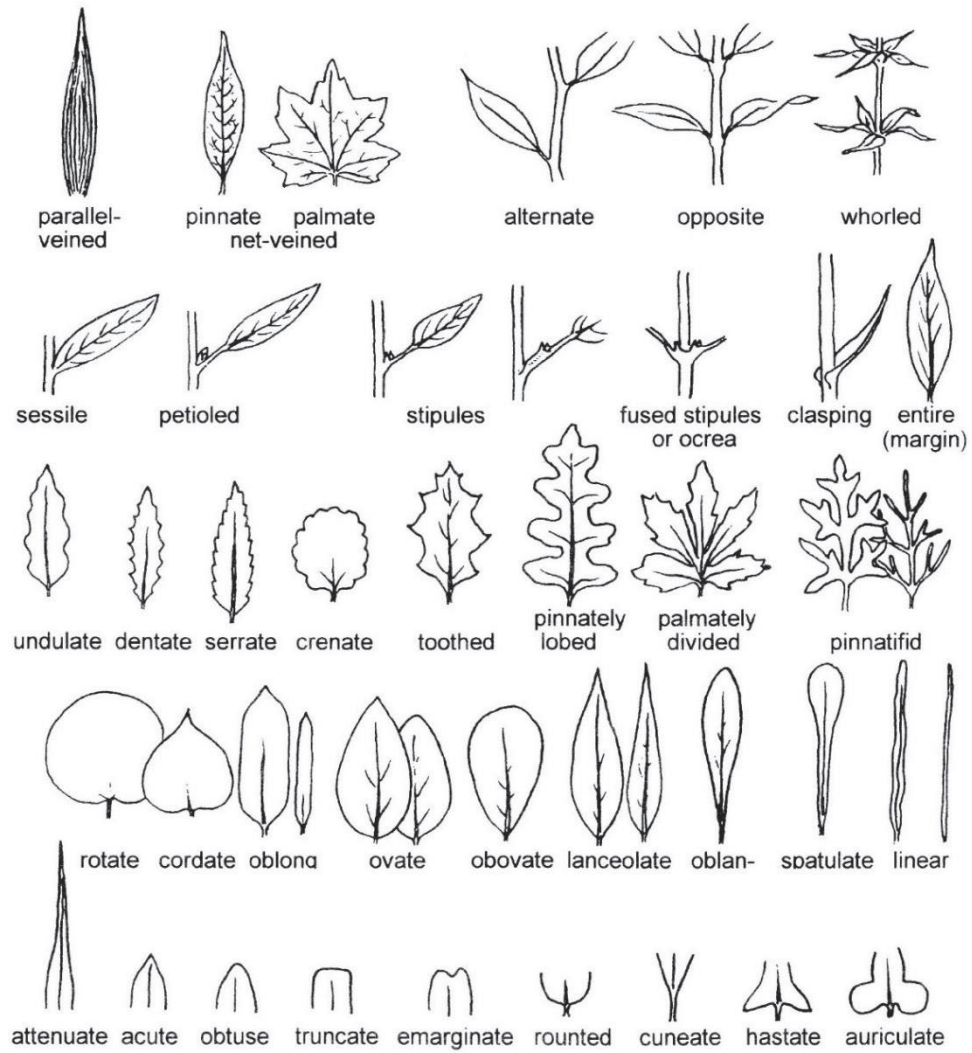
Types of Ovaries



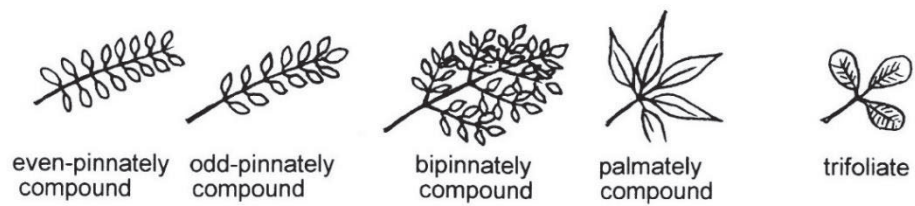
ROOTS AND STEMS



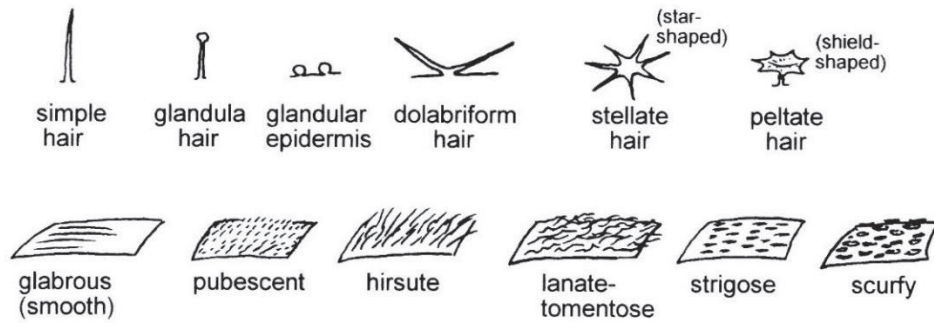
SIMPLE LEAVES AND LEAFLETS



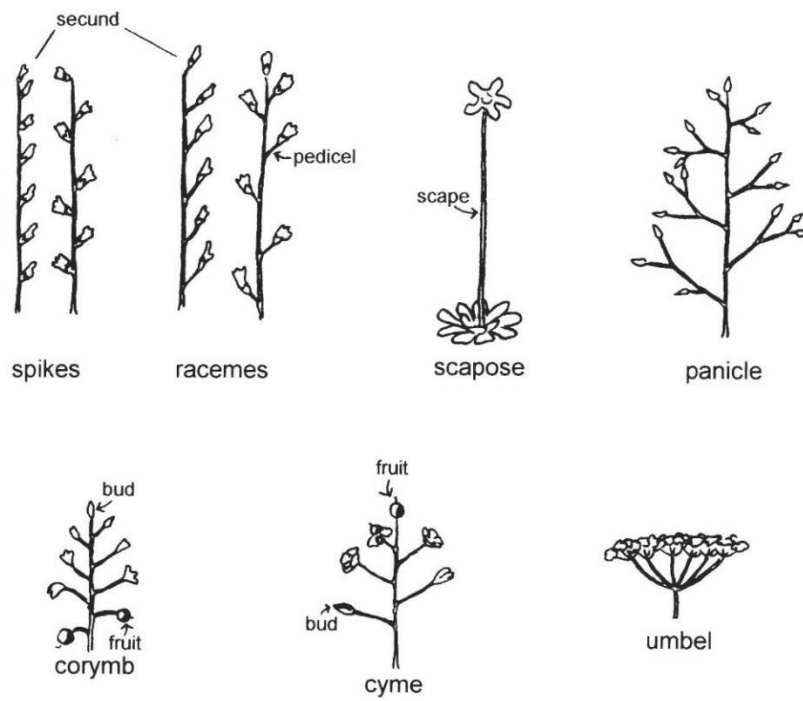
COMPOUND LEAVES



HAIRS AND OTHER EPIDERMAL STRUCTURES



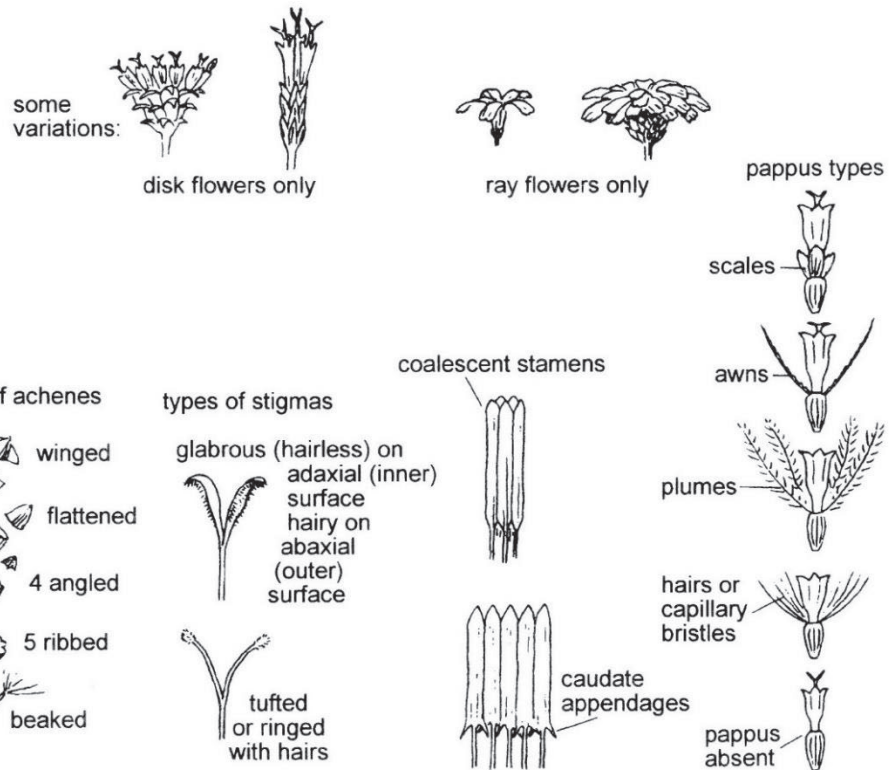
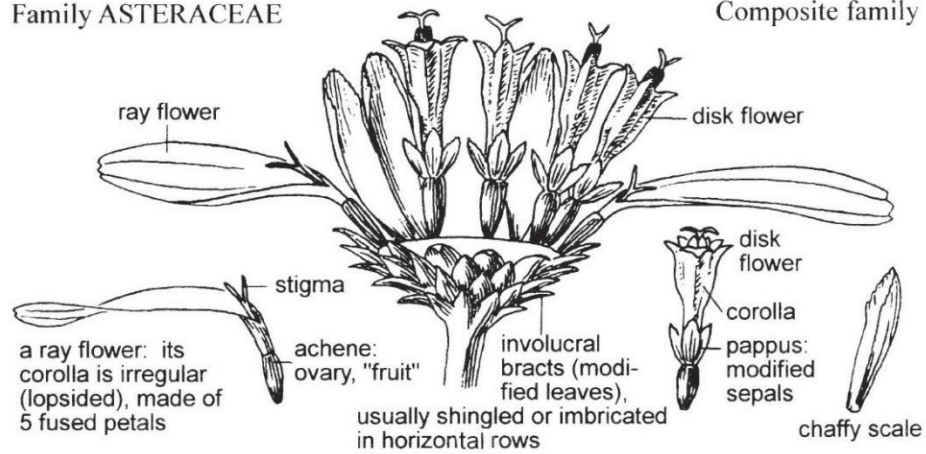
INFLORESCENCE TYPES



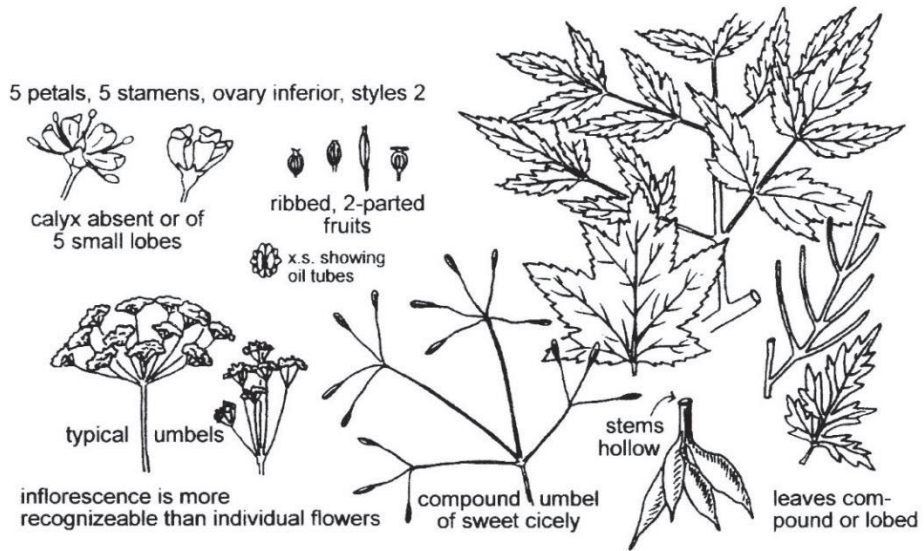
Recognizing Common Families

Family ASTERACEAE

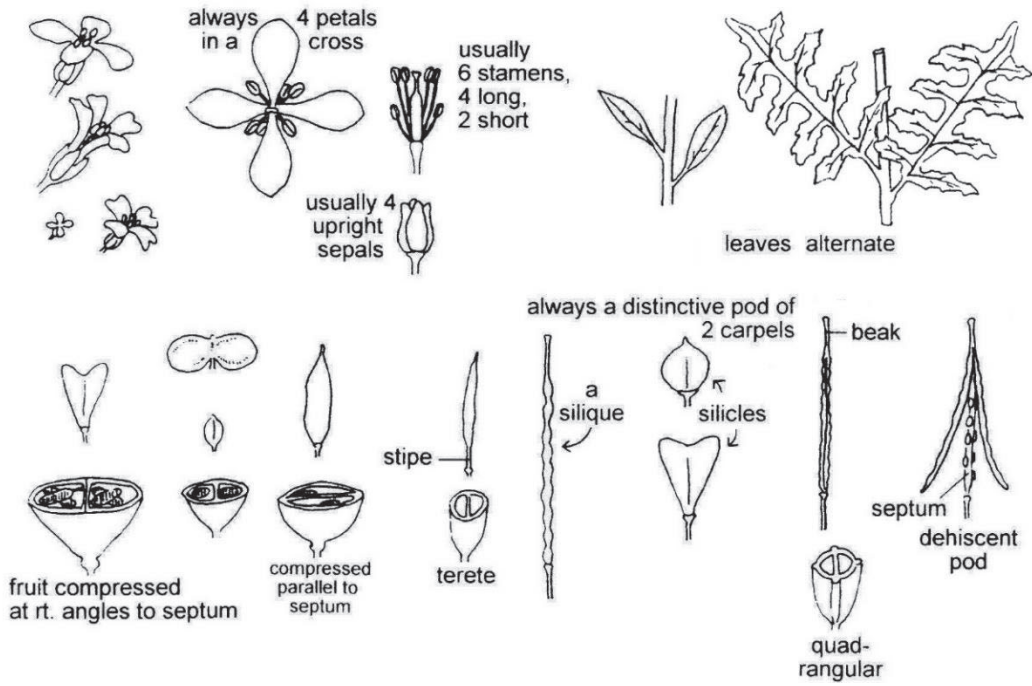
Composite family



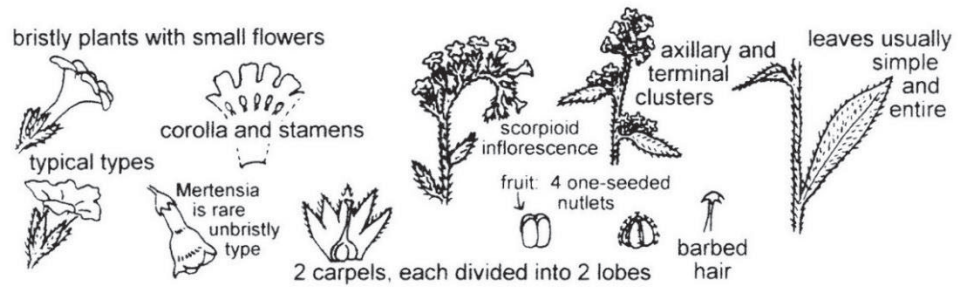
Family APIACEAE Parsley family



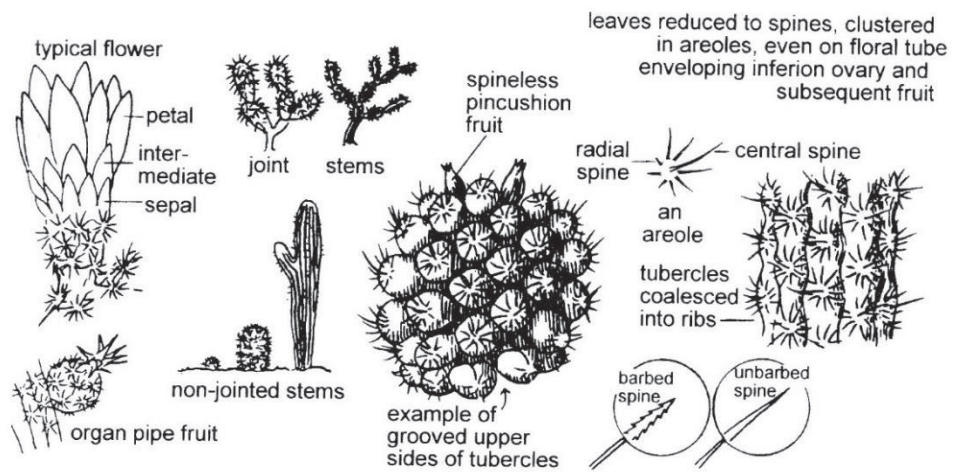
Family BRASSICACEAE Mustard family



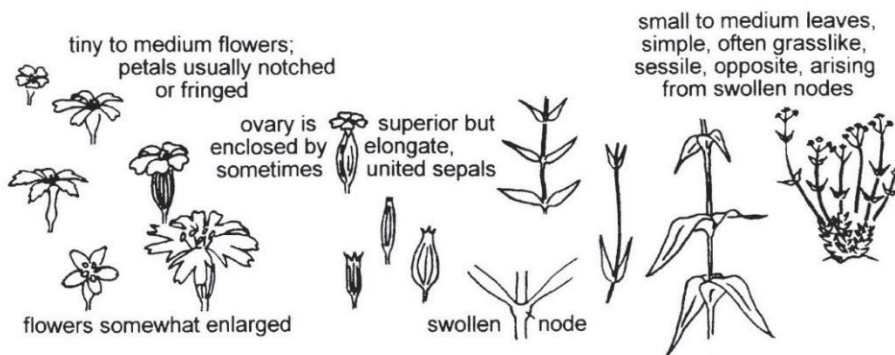
Family BORAGINACEAE Borage family



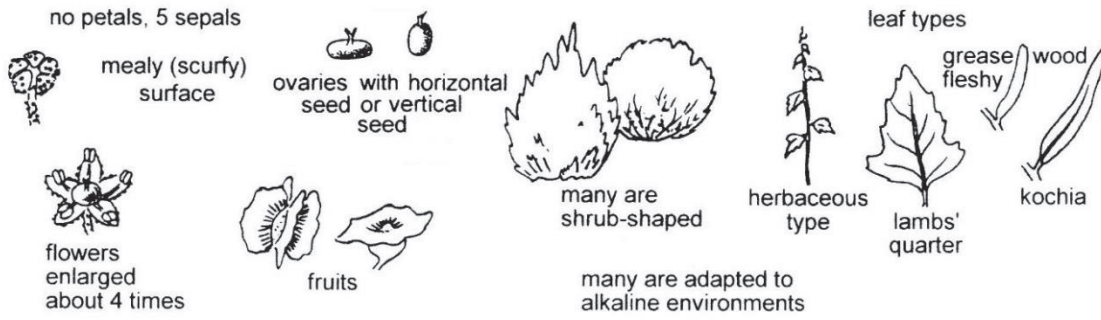
Family CACTACEAE Cactus family



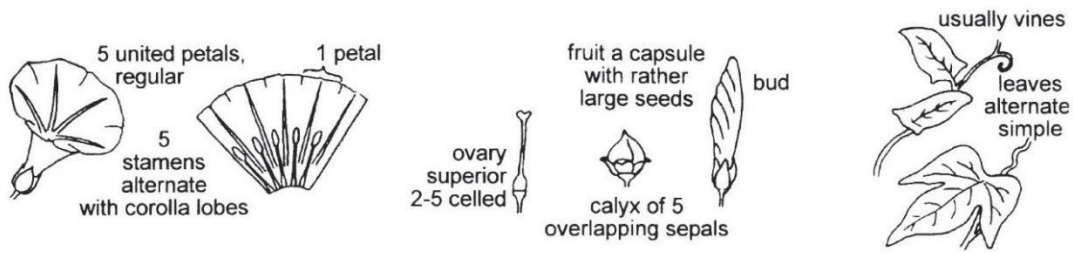
Family CARYOPHYLLACEAE Pink family



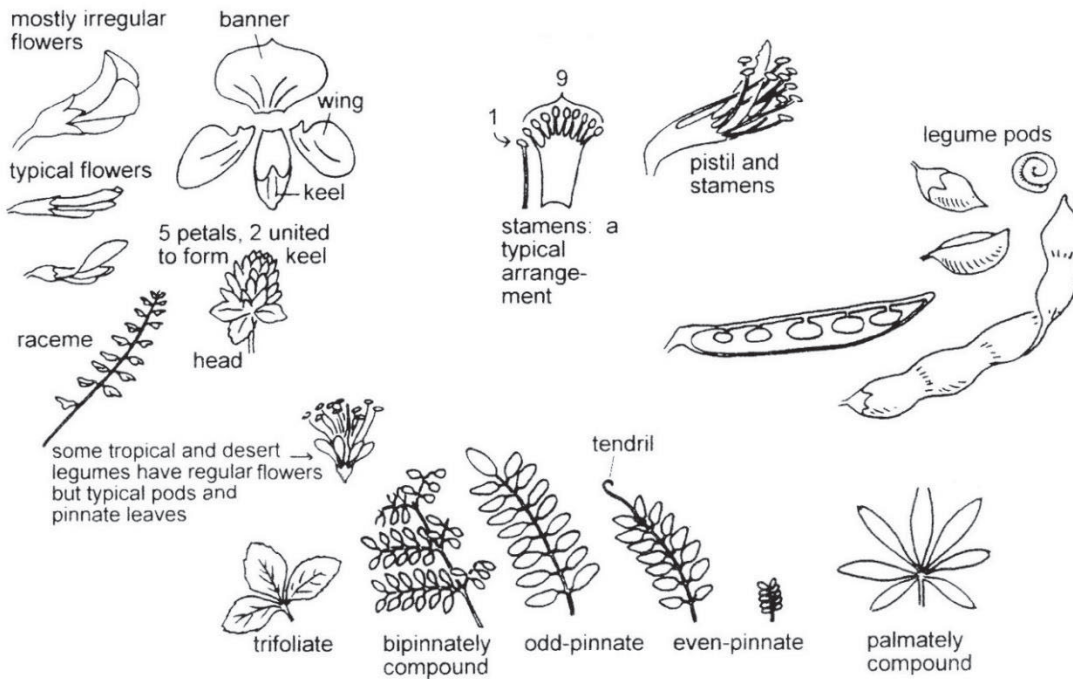
Family CHENOPODIACEAE Goosefoot family



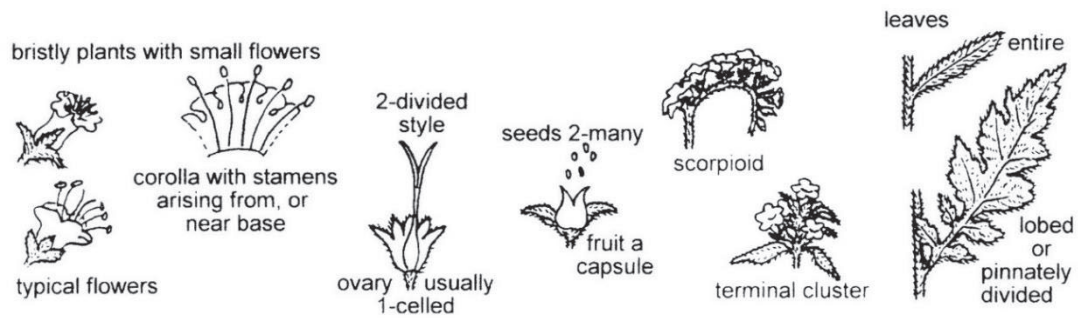
Family CONVULVULACEAE Morning glory family



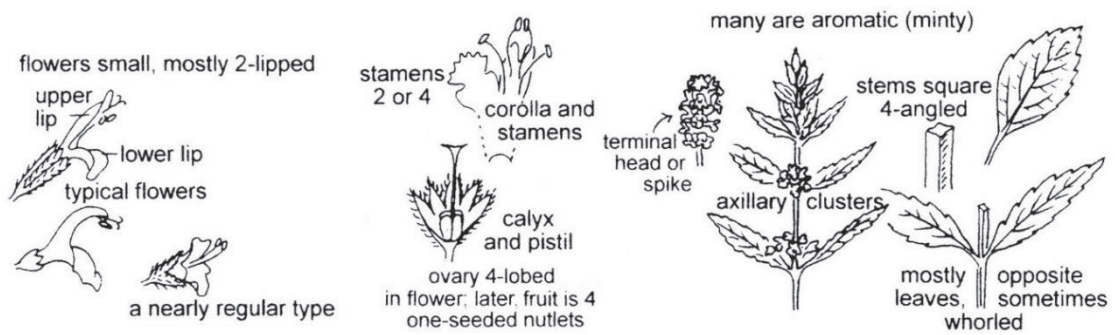
Family FABACEAE Bean family, legumes



Family HYDROPHYLLACEAE Waterleaf family

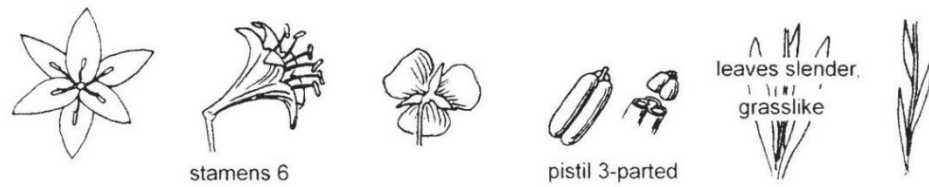


Family LAMIACEAE Mint family



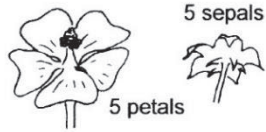
Family LILIACEAE Lily family

flower parts radially symmetrical, or "regular"
 typically 3 sepals and 3 petals, all alike, separate or united;
 sometimes in unlike groups of 3



Family MALVACEAE Mallow family

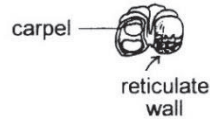
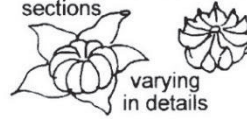
always a flower shaped about like this, various sizes and colors



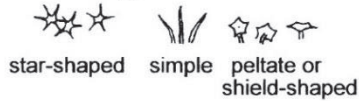
always a column of united stamens surround pistil



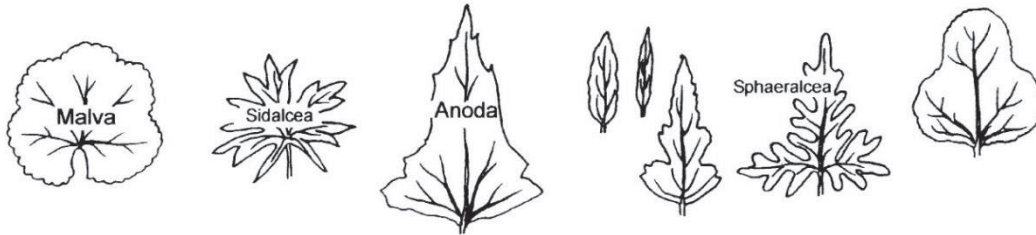
always a compound ovary with carpels like tangerine sections



types of hairs

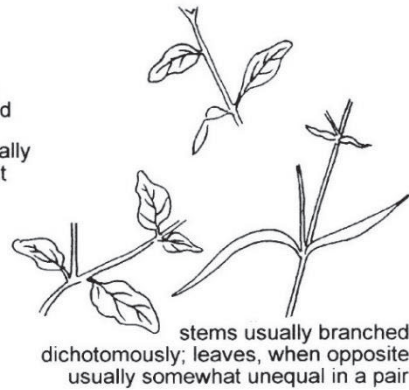
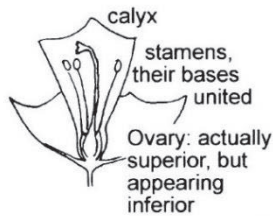
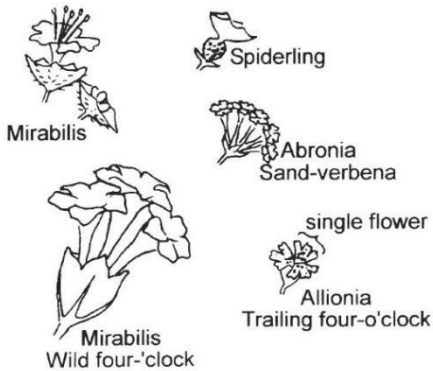


stigmas



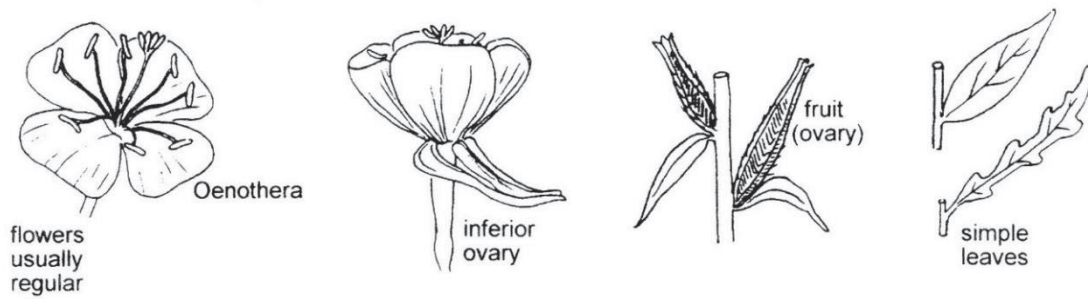
Family NYCTAGINACEAE Four o'clock family

petals absent; sepals united and petal-like: an involucre often holding one to several flowers



Family ONAGRACEAE Evening primrose family

usually 4 petals, 4 sepals, 4-lobed stigma, ovary of 4 carpels, 8 stamens

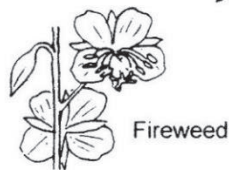


sepals often hang downward and remain attached at their ends, in pairs



exception to typical characters listed above: *Circaea*, the Enchanter's nightshade

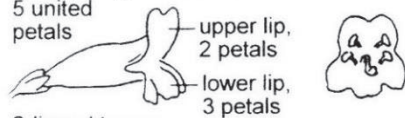
petals are sometimes displaced to sides, as in *Gaura* and *fireweed*



2 petals each 2-lobed
2 sepals
2 stamens
1 or 2 carpels sl. 2-lobed stigma
ovary bristly with hooked hairs

Family PLANTAGINACEAE Snapdragon family

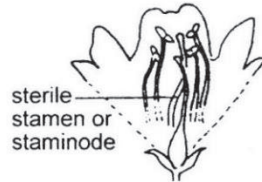
mostly irregular flowers
5 united petals



2-lipped types:



Penstemon



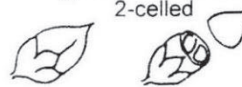
sterile stamen or staminode

regular type



Monkeyflower

typical fruit - usually 2-celled



anther sacs



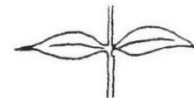
parallel



divergent



explanate



leaves opposite, alt., entire or



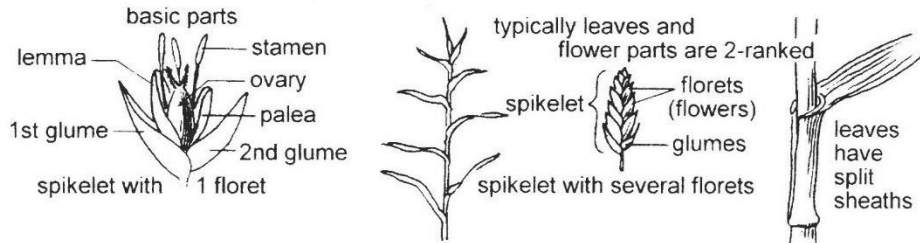
pinnatifid



flowers in racemes or spikes

POACEAE Grass family

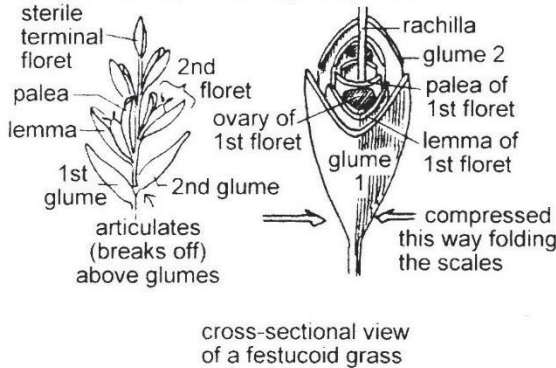
our second largest family, after the Asteraceae
 instead of sepals and petals, grasses have specialized scales



grasses are divided into two major subfamilies:

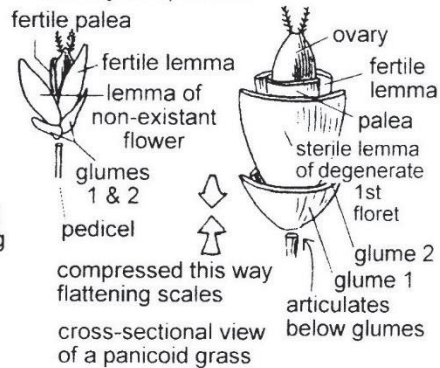
Subfamily Festucoidea

one or more florets per spikelet,
 the lower ones fertile, infertile
 florets above; laterally compressed



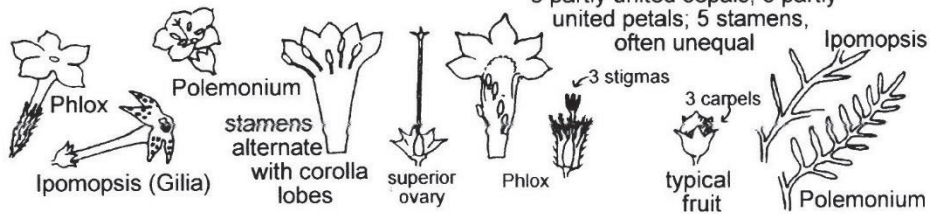
Subfamily Panicoidea

one perfect terminal floret, with
 a second infertile lemma below;
 dorsally compressed

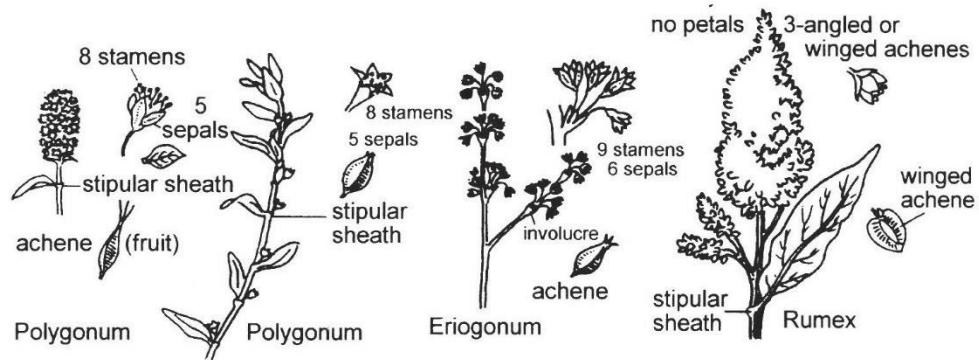


POLEMONIACEAE Phlox family

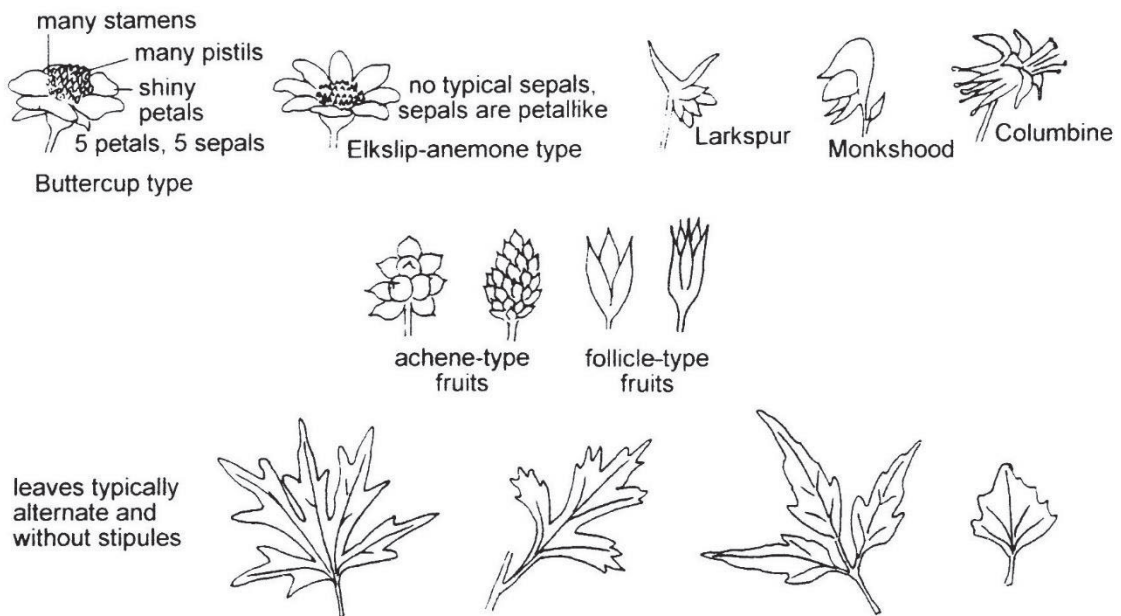
5 partly united sepals; 5 partly
 united petals; 5 stamens,
 often unequal



POLYGONACEAE Buckwheat family



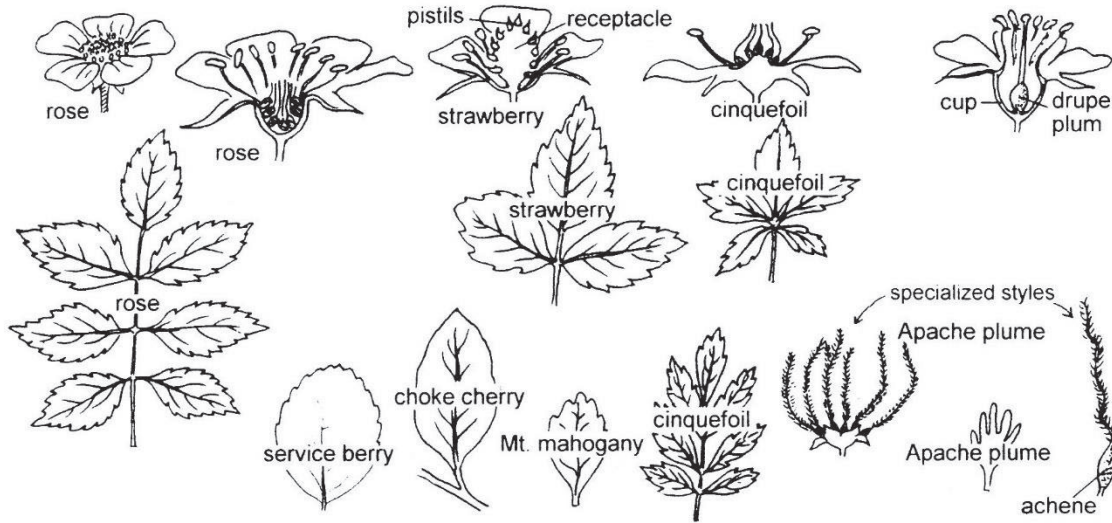
RANUNCULACEAE Buttercup family



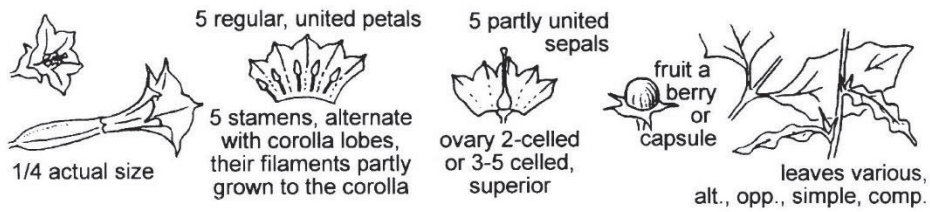
Family characteristics are inconsistent and difficult to define or recognize. These plants may perhaps best be learned as genera or species.

ROSACEAE Rose family

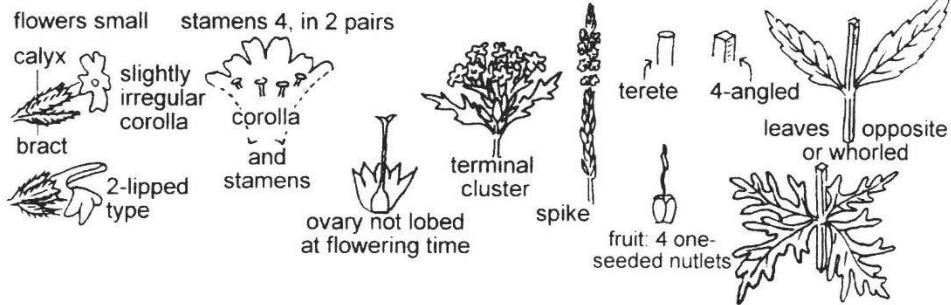
typically 5 petals, 5 sepals, 5 to many stamens, 1 to many simple pistils; ovary superior to inferior; a floral cup



SOLANACEAE Potato family



VERBENACEAE Verbena family



Acknowledgments

No effort such as this arises on its own, but, rather, stands firmly on a foundation built by scores of others, who have willingly given their support and shared their expertise, advice, and enthusiasm.

First and foremost, we thank our wives, Lynda and Betty, for their unflagging sustenance, patience, encouragement, and cheer throughout our lives. They have contributed far more than they realize to this work. In addition, we give thanks for our children, Nathan, Jesse, Brady, and Corby; and Jason and Jessica. They, too, have been a blessing and source of excitement through the years.

Several botanists graciously provided, at no small investment in time and effort, treatments of particular groups of plants. We thank them for their excellent contributions: **Patrick Alexander** (*Boecheera*, *Erysimum*, *Heuchera*, *Mertensia*, *Thelypodium*, key to Pteridaceae genera); **Max H. Licher & Glenn R. Rink** (Cyperaceae, Juncaceae); **Max H. Licher, James McGrath, William R. Norris, & Glenn R. Rink** (*Carex*); **Timothy Lowrey** (Asteraceae, *Persicaria*), **John J. Schenk, Josh Brokaw, & Larry Hufford** (Loasaceae); **John C. Semple** (*Solidago*); and **Robert C. Sivinski** (*Allium*, Boraginaceae, Ehretiaceae, Ephedraceae, Heliotropiaceae, Hydrophyllaceae, Namaceae, key to *Hieracium*). Without exception, these friends of New Mexico botany were prompt, collegial, and scholarly.

Zachary Rogers generously provided hundreds of suggestions and corrections to the nomenclature and classification of our flora and to the typography of the manuscript; his contribution has been invaluable, and we thank him profusely.

Richard Felger called attention to numerous issues of nomenclature, distribution, and classification. His probing questions and suggestions were always welcome.

John T. Kartesz generously made available to us private distribution and reference data from his extremely useful *Synthesis of the North American Flora*, version 2.0.

Patrick Alexander kindly provided an online resource for generating the distribution maps, and spent many valuable hours tweaking it so those untrained in such things could use it.

Richard Worthington likewise provided plentiful comments, suggestions, identifications, range expansions, and called our attention to potential taxonomic problems that only a keen eye would notice.

In many cases, keys were adapted from the excellent work of others. They and their work are noted and acknowledged within the text.

Uniformly helpful curators and staff at herbaria with significant holdings of New Mexico plants aided enormously by providing access to specimens and checking identifications and locality information: Biology Herbarium (NMC) and Range Science Herbarium (NMCR) at New Mexico State University; Rocky Mountain Herbarium (RM); San Juan College Herbarium (SJNM); Dale A. Zimmerman Herbarium (SNM) at Western New Mexico University; and University of New Mexico Herbarium (UNM).

We also gratefully acknowledge online plant databases that have aided in wondrous fashion our search for specimens, localities, distributions, nomenclature, publications, and collectors: Biodiversity Heritage Library (biodiversitylibrary.org), the International Plant Names Index (ipni.org), SEINet Arizona-New Mexico Chapter (swbiodiversity.org), the Plants Database (plants.usda.gov), Southwest Biodiversity Consortium (swbiodiversity.org), and The Biota of North America Program (bonap.org).

Many others have made contributions great and small, and we gratefully recognize the help of each of the following: David Lee Anderson, Donovan Bailey, Mary Barkworth, George Cox, David Ferguson, Ron Hartman, Ken Heil, Tim Hogan, Chick Keller, Kim Kersh, Ben Legler, Ernie Nelson, Guy Nesom, Steve O'Kane, Roger Peterson, Mark Porter, Anton Reznicek, Al Schneider, Richard Spellenberg, Victor Steinmann, Phil Tonne, Gordon Tucker, Dieter Wilken, Michael Windham, Richard Worthington, Scott Zager, Peter Zika, and Dale A. Zimmerman.

Notwithstanding the superb assistance from each of the persons mentioned above, any errors remaining are ours alone, for which we humbly take credit. By now, we're used to it.

IDENTIFICATION KEYS TO THE FLORA OF NEW MEXICO

Scope and Organization

As in Volume I of the **FLORA NEOMEXICANA** series, this work treats only the vascular plants of New Mexico. For convenience, the plants are arranged by broad taxonomic groups: **Part 1** (this book) treats the **SPORE PLANTS** (Lycophytes and Monilophytes, ferns and their allies), the **GYMNOSPERMS** (conifers), and finally the **Monocotyledonous Plants** of the Angiosperms (flowering plants). Part 2 treats the true Dicotyledonous Plants and other non-monocots. We have attempted to include all taxa known to occur in the state, as documented in Volume I.

The initial keys (below) lead first to the cacti, then to two artificial groups of plants (aquatic and parasitic plants), and then to the major taxonomic groups (spore plants, gymnosperms, and angiosperms). Further keys to families are found within each of these taxonomic groups, followed by the families in alphabetical order. Headers at the top of each page will help inform the user as to the group and family found on that page.

The classification scheme herein corresponds to that presented concurrently in the 3rd edition of Volume I, and is adapted from the system presented in Judd et al. (2016), modified here to the use of New Mexico vascular plants, and integrating the many recent advances in phylogenetic classification with a more practical and simplified presentation necessary for identification purposes. Differences with Judd et al. (2016) in the classification of families and genera are noted in the text. An outline of the higher levels is presented below.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Outline of the Classification of New Mexico Vascular Plant Families

[adapted from Judd et al. 2016]

SPORE PLANTS

- Lycophytes – Lycopodiophyta Division
 - Isoetaceae
 - Lycopodiaceae
 - Selaginellaceae
- Monilophytes – Polypodiophyta Division
 - Aspleniaceae
 - Dennstaedtiaceae
 - Dryopteridaceae
 - Equisetaceae
 - Marsileaceae
 - Ophioglossaceae
 - Polypodiaceae
 - Pteridaceae
 - Salviniaceae

SEED PLANTS

- Gymnosperms – Pinophyta Division
 - Cupressaceae
 - Ephedraceae
 - Pinaceae
- Angiosperms – Magnoliophyta Division
 - Monocotyledonous Plants
 - All traditional monocot families
 - Dicotyledonous Plants
 - ANITA Grade
 - Nymphaeaceae
 - Magnoliid Complex
 - Aristolochiaceae
 - Saururaceae
 - Ceratophyllaceae
 - Eudicots
 - All other traditional dicot families

Statistical Summary of New Mexico Vascular Plants

Detailed statistical elaboration is available in *FLORA NEOMEXICANA I*.

Group	Families	Genera	Species	Infraspecific Taxa	Total Taxa
Lycophytes	3	4	15	1	16
Monilophytes - Ferns	12	27	75	3	78
Gymnosperms	3	7	29	1	30
Monocotyledonous Plants	26	206	766	62	828
Dicotyledonous Plants	115	830	2928	295	3228
Totals	159	1074	3813	362	4180

Genera with 20 or more species: *Carex* 94, *Astragalus* 80, *Euphorbia* 54, *Erigeron* 51, *Muhlenbergia* 46, *Penstemon* 43, *Eriogonum* 43, *Oenothera* 34, *Dalea* 31, *Salix* 25, *Juncus* 25, *Asclepias* 25, *Phacelia* 24, *Cyperus* 24, *Potentilla* 23, *Mentzelia* 23, *Poa* 20, *Cuscuta* 20, *Castilleja* 20.

Conventions Used in the Keys and Family Treatments

- All keys are dichotomous and indented, with two contrasting leads. Keys to the groups, families, genera, and species begin with numbers (1, 2, 3, etc.). Keys to infraspecific taxa (subspecies, varieties, forms) begin with letters (a, b, c, etc.). After making a choice of one of the contrasting leads, the next pair of leads will be found immediately below that choice.
- Following the family heading, the number of genera, species, and total taxa (species, subspecies, varieties, and forms) for that family will be given in brackets (e.g., [37/67/69]).
- Names for **documented plants** that occur in the wild in New Mexico are in ***bold-italic***, followed by the names of the botanical authors (not abbreviated).
- Names of plants not definitely known in the wild in New Mexico, but included in the key for clarification or because they will be likely found in the state, are in *italics*, but not bolded. These taxa are not included in the statistical totals.
- COMMON NAMES are in ALL CAPS, and are provided for most genera and for occasional species where genuine common names are in use.
- *Synonyms* are in *italics*, not bolded, and placed within [brackets] following the botanical authorities or common name.
- Names of endemic taxa are preceded by a plus sign (+).
- Names of exotic taxa are preceded by an asterisk (*).
- Names of ×hybrid plants or hybrid populations that have been given formal taxonomic status are preceded by an ×.
- The names will be followed by short statements about habitat, distribution, and variation. The abbreviations M&H and W&S refer to the preceding works of W.C. Martin & C.R. Hutchins (*A Flora of New Mexico*), and E.O. Wooton & P.C. Standley (*Flora of New Mexico*), respectively.
- Plants that are illustrated are marked with §. The illustrations will be found a few pages subsequent to the symbol.
- The county distribution maps are based on actual occurrences based on specimens or observations.
- The term **phase** is used in a non-taxonomic, non-nomenclatural sense, to call attention to notable variation that does not meet the criteria for formal systematic recognition, but that is conspicuous and well-known, and might seem significant until placed within the context of the complete variation of the species. It is most similar to the rank of *forma* in the taxonomic hierarchy.

An explanation of the use of *ex* and *in* is appropriate. When a publishing author of a name ascribes the origin of the name to another person, that person may be cited after the epithet, followed by *ex*, followed by the name of the publishing author. For example, Humboldt & Bonpland coined the name *Aristida divaricata* for our poverty threeawn, but never validly published the name. Willdenow adopted that name for the same taxon, acknowledging Humboldt & Bonpland in his description. Hence, the full citation of authorities is *Aristida divaricata* Humboldt & Bonpland *ex* Willdenow. The name may be shortened to *Aristida divaricata* Willdenow, and still be correct. Note that it is the names before the *ex* that may be dropped, not the names after (this is counter-intuitive for English speakers).

If a plant name is validly published by one author within a larger work of another, then the term *in* may be used to explain the situation. For example, Englemann described the cactus *Cereus pectinatus* within Gray's *Plantae Fendlerianae*. Since Gray had no involvement with the description of the name, the correct citation is *Cereus pectinatus* Englemann *in* Gray, or more simply, *Cereus pectinatus* Englemann.

Keys to the Groups and Families

- 1 Stems thick and succulent; leaves reduced to spines and barbs and grouped in definite clusters on the stem; plants cactus-like..... (Part 2) CACTACEAE
- 1 Stems and/or leaves other than above; plants not cactus-like
 - 2 Plants truly aquatic, at least most of the plant submerged or floating on the water.....GROUP I
 - 2 Plants not truly aquatic, growing on dry land, or if growing in mud or shallow water then most of the plant extending up out of the water
 - 3 Plants parasitic or epiphytic on stems, branches, or roots of other plants, generally without chlorophyll and not green, or if green then clearly growing on and attached to a host plant GROUP II
 - 3 Plants not obviously parasitic on other plants, but producing chlorophyll and greenish in color
 - 4 Spore Plants: Lycophytes (quillworts, clubmosses, spikemosses) and Monilophytes (ferns): plants reproducing by spores, which are borne on the underside of the leaves, in the axils of the leaves, or in cones; seeds not produced; plants moss-like, fern-like, or horsetail-likeSPORE PLANTS, p. 21
 - 4 Seed Plants: plants reproducing by seeds, which are borne in cones or in flowers; spores not produced; plants grasses, forbs, or woody plants of various habits
 - 5 Conifers or Gymnosperms: leaves needle- or scale-like; plants evergreen trees or shrubs; seeds borne in woody or fleshy (berry-like) cones, never borne in true flowers.....GYMNOSPERMS, p. 39
 - 5 Flowering Plants or Angiosperms: leaves various, generally not needle- or scale-like; plants often not evergreen; seeds borne in true flowers
 - 6 Monocotyledonous Plants: Leaves simple, often sheathing the stem, usually parallel-veined and mostly alternate (rarely opposite or whorled), lacking stipules; flower parts in multiples of 3; vascular bundles scattered throughout the stem, lacking a cambium ring; root system adventitious and fibrousMONOCOTYLEDONOUS PLANTS, p. 49
 - 6 True dicots (eudicots) and other non-monocots: Leaves simple or compound, generally not sheathing the stem, usually net veined, alternate, opposite, or whorled, with or without stipules; flower parts in multiples of 2 or 5 (rarely 3); vascular bundles usually joined in a cambium ring; root system various ... DICOTYLEDONOUS PLANTS, go to Part 2

GROUP I: Plants Aquatic

- 1 Plants floating on the water or completely submersed, not rooted in the soil, the entire plant generally less than 6 cm long
 - 2 Plant body disc-shaped, not differentiated into stems and leaves(Monocots) ARACEAE
 - 2 Plant body differentiated into stems and leaves(Spore Plants) SALVINIACEAE
- 1 Plants floating or rooted in the soil, the entire plant body generally much longer than 6 cm
 - 3 Plants not differentiated into stems and leaves..... various algae, not treated further here
 - 3 Plants clearly differentiated into stems and leaves
 - 4 Leaves all scale-like or narrowly linear, generally very thin (one or two cells thick) and entire, alternate, often densely overlapping; roots absent various mosses, not treated further here
 - 4 Leaves various, but in some or all ways different from above; roots generally present
 - 5 Leaves compound or very deeply divided into several segments
 - 6 Leaflets 3-4, palmately arranged
 - 7 Leaflets 3, acutish at the tips (*Menyanthes*)..... (Part 2) MENYANTHACEAE
 - 7 Leaflets 4, rounded at the tips, resembling 4-leaf clover (*Marsilea*) (Spore Plants) MARSILIACEAE
 - 6 Leaflets more numerous, pinnately arranged
 - 8 Leaf segments lanceolate or wider, mostly ascendant into the air (*Rorippa*) (Part 2) BRASSICACEAE
 - 8 Leaf segments linear, at least on submersed leaves
 - 9 Plants free-floating; roots absent or rarely produced
 - 10 Leaves alternate with numerous small bladders borne on the leaf segments(Part 2) LENTIBULARIACEAE
 - 10 Leaves mostly whorled, without bladders(Part 2) CERATOPHYLLACEAE
 - 9 Plants rooted in the soil
 - 11 Primary leaf divisions pinnate (*Myriophyllum*).....(Part 2) HALORAGACEAE
 - 11 Primary leaf divisions palmate (*Ranunculus*)..... (Part 2) RANUNCULACEAE
 - 5 Leaves simple, the margins entire to shallowly lobed, toothed, or notched, but leaflets or segments not produced
 - 12 Leaves peltate, sagittate, or deeply notched, but remaining simple
 - 13 Leaves to 6 cm across/long, peltate, the petiole attached near the middle of the blade rather than at the margin or in the sinus (*Hydrocotyle*) (Part 2) APIACEAE
 - 13 Leaves commonly more than 10 cm across/long, sagittate or deeply notched, the petiole attached in the sinus of the notch
 - 14 Leaves pinnately veined, floating flat on the water or slightly submersed (Part 2) NYMPHAEACEAE
 - 14 Leaves reticulate veined, generally ascendant out of the water..... (Monocots) ALISMATACEAE
 - 12 Leaves not peltate, sagittate, or deeply notched
 - 15 Leaves in whorls
 - 16 Flowers numerous on the stem, whorled, sessile, and emergent in the axils of nearly all the upper (aerial) leaves; leaves branched pinnate-veined, thick and opaque (*Hippuris*) (Part 2) PLANTAGINACEAE
 - 16 Flowers few, found only in a few of the leaf axils and mostly submersed, sessile (pistillate) or on long stalks (staminate); leaves single-veined, thin and nearly translucent..... (Monocots) HYDROCHARITACEAE
 - 15 Leaves not whorled, clearly either alternate, opposite, or basal
 - 17 Leaves floating or emergent out of the water
 - 18 Leaves opposite

- 19 Flowers showy, usually more than 5 mm long, often yellowish
 - 20 Petals free from each other; ovary inferior; flowers actinomorphic; leaves mostly entire (Ludwigia) (Part 2) ONAGRACEAE
 - 20 Petals united; ovary superior; flowers zygomorphic; leaves entire or toothed
 - 21 Sepals free, a calyx tube not developed (*Bacopa*) (Part 2) PLANTAGINACEAE
 - 21 Sepals connate into a well-developed tube (*Erythranthe*)..... (Part 2) PHRYMACEAE
- 19 Flowers not showy, often minute, less than 4 mm long, white or clear-colored
 - 22 Stipules absent; blades linear to narrowly spatulate (*Callitriche*) (Part 2) PLANTAGINACEAE
 - 22 Stipules present; blades lanceolate to elliptic (Part 2) ELATINACEAE
- 18 Leaves alternate or basal
 - 23 Small annuals 3-10 cm tall; leaves all basal (*Limosella*)..... (Part 2) SCROPHULARIACEAE
 - 23 Perennial plants other than above
 - 24 Leaves with pinnate venation (*Polygonum*).....(Part 2) POLYGONACEAE
 - 24 Leaves with parallel or reticulate venation
 - 25 Plants usually a meter or more tall, the shoots and flowering stems stiffly erect; cattails..... (Monocots) TYPHACEAE
 - 25 Plants less than a meter tall, the shoots and flowering stems often lax or limp
 - 26 Mid-vein not at all evident..... (Monocots) PONTEDERIACEAE
 - 26 Mid-vein distinct and prominent
 - 27 Flowers in axillary or terminal spikes, perfect (Monocots) POTAMOGETONACEAE
 - 27 Flowers in unisexual globose heads arranged laterally along a zig-zag rachis (*Sparganium*).....(Monocots) TYPHACEAE
 - 17 Leaves all or mostly submersed under water
 - 28 Leaves alternate or basal (occasionally opposite toward the tips of the stems)
 - 29 Leaves all basal, the stems not elongate(Monocots) ALISMATACEAE
 - 29 Leaves borne on elongate stems
 - 30 Leaves extremely filiform, about 0.5 mm wide; mature fruits in umbels on long coiling peduncles (Monocots) RUPPIACEAE
 - 30 Leaves mostly wider than 2 mm; mature fruits in spikes, the peduncles stout and stiff..... (Monocots) POTAMOGETONACEAE
 - 28 Leaves opposite
 - 31 Leaves prominently arranged in right-angle pairs one above the other (decussate); flowers on long thread-like stalks extending to the water's surface (*Elodea bifoliata*).....(Monocots) HYDROCHARITACEAE
 - 31 Leaves not prominently decussate; flowers completely contained in the leaf axils
 - 32 Leaf blades abruptly broadened at the base to sheath the stems (*Najas*) (Monocots) HYDROCHARITACEAE
 - 32 Leaf blades of about equal width throughout, only weakly clasping the stem if at all
 - 33 Fruits mostly 2-4 per node, crescent-shaped, with a persistent style; leaves 1-6 cm long (*Zannichellia*)..... (Monocots) POTAMOGETONACEAE
 - 33 Fruits mostly 1-2 per node, globe-shaped, the style deciduous; leaves mostly less than 2 cm long (*Callitriche*)(Part 2) PLANTAGINACEAE

GROUP II: Plants Parasitic or Epiphytic on Host Plants

- 1 Plants tiny, no more than 5 mm tall or wide, the vegetative parts embedded within the host plant with only small reddish-brown flowers and a few scale-like leaves evident on the surface of the host; parasitic on *Dalea* (Part 2) APODANTHACEAE
- 1 Plants larger and not as above
 - 2 Stems vine-like, not stiffly erect but elongate and twining over the host plant (*Cuscuta*) (Part 2) CONVOLVULACEAE
 - 2 Stems not at all vine-like, mostly stiffly erect or woody, never twining
 - 3 Plants stem parasites or epiphytes, growing on the aerial portions of a host plant, not growing in the soil
 - 4 Plants growing in tight grayish balls about the size of a softball; leaves filiform, 3-15 cm long and about 2 mm wide; true epiphytes, growing on the stems of the host plant but not penetrating its tissues..... (Monocots) BROMELIACEAE
 - 4 Plants in bushy yellowish or greenish growths much larger than above; leaves scale-like to broadly ovate, but not filiform as above; parasites, penetrating the tissues of the host plant (mistletoes) (Part 2) VISCACEAE
 - 3 Plants root parasites, growing in the soil and attached to the roots or decaying matter of a host plant
 - 5 Flowers zygomorphic
 - 6 Petals united into a tube; ovary superior (Part 2) OROBANCHACEAE
 - 6 Petals separate; ovary inferior..... (Monocots) ORCHIDACEAE
 - 5 Flowers actinomorphic
 - 7 Plants with chlorophyll, green, not obviously parasitic (Part 2) COMANDRACEAE
 - 7 Plants lacking chlorophyll, not green (Monotropoideae)..... (Part 2) ERICACEAE

SPORE PLANTS: LYCOPHYTES and MONILOPHYTES

[quillworts, clubmosses, spikemosses, ferns, horsetails]

■Christenhusz, M.J., X.C. Zhang, & H. Schneider. 2011. A linear sequence of extant families and genera of lycophytes and ferns. *Phytotaxa* 19: 7-54. ■Christenhusz, M.J. & M.W. Chase. 2014. Trends and concepts in fern classification. *Ann. Bot.* 113(4): 571-594. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Pteridophyte Phylogeny Group. 2016. A community-derived classification for extant lycophytes and ferns. *J. Syst. Evol.* 54(6): 563-603.

Key to the Families

- 1 Entire plant body floating in or on the surface of water, not rooted in the soil SALVINIACEAE
 1 Plants rooted in soil or rock crevices, though sometimes growing in the water or parts of the plants floating on the water's surface
 2 Stems green, hollow and tubular, jointed, prominently ridged longitudinally; leaves brownish and scale-like, forming a circular sheath around the node..... Equisetaceae
 2 Stems and leaves not as above
 3 Plants moss- or grass-like; leaves scale-like or linear, less than 3 mm wide (Lycophytes)
 4 Plants grass-like; leaves long and linear; spore-bearing structures embedded in the leaf bases at the base of the plant Isoetaceae
 4 Plants moss-like; leaves short and scale-like; spore-bearing structures in the leaf axils or at the branch tips
 5 Leaves 1-5 mm long; fertile leaves 4-ranked, the cluster appearing square when viewed from above; spore-bearing sacks (sporangia) of two kinds, some with 4 large spores (female megaspores) and some with numerous smaller spores (male microspores)..... Selaginellaceae
 5 Leaves 5-11 mm long; fertile leaves not in well-defined ranks, the cluster appearing round when viewed from above; spore-bearing sacks (sporangia) all of one kind, producing only one kind of spore Lycopodiaceae
 3 Plants fern- or clover-like; leaves not scale-like or linear, more than 3 mm wide
 6 Blades resembling 4-leaf clovers, divided into 4 palmate, deltoid, entire segments Marsileaceae
 6 Blades not resembling 4-leaf clovers and not so divided
 7 Plants with a single leaf borne on an erect, above-ground stem Ophioglossaceae
 7 Plants with several leaves from below-ground stems (rhizomes)
 8 Clusters of sporangia borne along the margins of the leaves
 9 Rhizomes and petiole bases covered with hairs only one cell wide; petioles strongly grooved (*Pteridium*) Dennstaedtiaceae
 9 Rhizomes and petiole bases bearing linear to ovate scales several cells wide; petioles round or nearly so Pteridaceae
 8 Clusters of sporangia borne away from the margins of the leaves on the undersurface of the blades
 10 Sporangia scattered along the veins and not grouped into distinct clusters; indusia absent Pteridaceae
 10 Sporangia grouped into distinct clusters (sori); indusia absent or present
 11 Indusia absent
 12 Blades only once pinnately lobed or divided, the primary lobes not lobed themselves Polypodiaceae
 12 Blades two or more times pinnately lobed or divided, or at least some of the primary lobes with lobes themselves Cyrtopteridaceae
 11 Indusia present
 13 Sori elongate, straight or horseshoe-shaped
 14 Blades simple or once pinnate Aspleniaceae
 14 Blades two or more times pinnate-pinnatifid Athyriaceae
 13 Sori round
 15 Indusia round or round-reniform, attached from within the sori Dryopteridaceae
 15 Indusia otherwise
 16 Indusia of filaments or scale-like segments arranged in a cup-like fashion from underneath the sorus Woodsiaceae
 16 Indusia hood-like (sometimes inconspicuous in mature leaves), basally attached under one side of sorus Cyrtopteridaceae

ASPLENIACEAE SPLEENWORT FAMILY [1/5/5]

Plants terrestrial, epiphytic, or growing on rocks; stems (rhizomes) creeping to semi-erect, covered with clathrate scales; fronds simple and either undivided or lobed to 1-3-pinnate; vernation circinate; veins free or rarely anastomosing; sori elongate; indusium elongate and membranous when present. ♦With 2 genera and more than 770 species nearly worldwide.

Asplenium [Greek *splen*, spleen, the plants thought to be useful for treating spleen diseases] SPLEENWORT [5].

Terrestrial perennial plants; stems erect or short-creeping, bearing basally attached scales; leaves diverse, monomorphic or dimorphic, simple to pinnately compound; sori oblong to elongate, borne on veins, the indusium arising from one side of the sorus.

♦Species about 700; worldwide.

■Alexander, P. 2006. Two ferns not occurring in New Mexico [*Asplenium palmeri*]. *The New Mexico Botanist* 35:2. ■Bennett, W. & G. Fischer. 1993. Biosystematics and evolution of the *Asplenium trichomanes* complex. *Webbia* 48:743-760. ■Mickel, John T., & Alan R. Smith. 2004. *Asplenium*, pp. 72-127. *The Pteridophytes of Mexico*, The New York Botanical Garden Press. ■Wagner, W.H. Jr., R.C. Moran, & C.R. Werth. 1993. *Aspleniaceae*, pp. 228-245. IN: *Flora of North America*, vol.2. Oxford Univ. Press.

1 Fronds simple, broadly ribbon- to grass-like

2 Fronds less than 3 mm wide, linear, frequently forking with 1-3 small narrow projections *A. septentrionale*

2 Fronds more than 10 mm wide, linear-lanceolate to lanceolate *A. scolopendrium*

1 Fronds pinnate with definite leaflets

3 Apex of the blade gradually reduced to a whip-like rooting tip with a terminal bud *A. palmeri*

3 Apex of the blade not whip-like nor rooting

- 4 Pinnae alternate *A. platyneuron*
- 4 Pinnae appearing mostly opposite (often alternate distally)
- 5 Pinnae mostly 10-20 mm long, bases notably asymmetric, with a lobe pointing toward frond tip *A. resiliens*
- 5 Pinnae mostly 3-8 mm long, asymmetrically cuneate at the base *A. trichomanes*

Asplenium palmeri Maxon [for Edward Palmer (1829-1911), prominent British botanist-ethnologist]. Stems short-creeping, unbranched, scales black with lighter margins; fronds monomorphic; blades once pinnate, pinnae appearing opposite, 4-9 mm long, 2-4 mm wide, oblong; rachis purplish black, lustrous, in some blades much prolonged and naked with a bud or rooting plantlet at the tip. ●Shaded rocky slopes, crevices of cliffs; reported for New Mexico, but no valid specimens have been located.

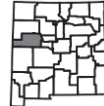
Asplenium platyneuron (Linnaeus) Britton, Stearns & Poggenburg [broad-nerved] [*Acrostichum platyneuron* Linnaeus] Stems short-creeping, unbranched, scales dark brown to black throughout; fronds dimorphic, the fertile taller, darker, and erect, the sterile shorter, lighter, and spreading or prostrate; blades once pinnate, pinnae 10-25 mm long, 3-6 mm wide, alternate, lustrous; often auriculate on one side of the base; rachis reddish or purplish brown, lustrous; sori elliptic to linear-oblong, nearer to the midvein than the margins. ●Forest floor and among rocks, often on poor and sandy soil; northeast corner of the state. ◆*Asplenium platyneuron* also occurs in southern Africa. No other North American fern shares this distribution.



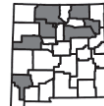
Asplenium resiliens Kunze [springing back, resilient]. Stems erect, unbranched, scales black throughout; fronds monomorphic; blades once pinnate, pinnae oblong, appearing opposite, sometimes imperfectly, 10-25(-30) mm long, 3-5 mm wide, 3-5 times longer than wide, base notably asymmetric, usually with an auricle pointing towards the frond tip; rachis black throughout, lustrous, glabrous. ●Terrestrial or in rock crevices, often on limestone, pine-oak forests; mostly southern.



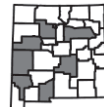
Asplenium scolopendrium Linnaeus [millipede-like, an allusion to the rows of sori]. Stems erect, unbranched, scales brown; fronds monomorphic; petioles 1/8 to 1/4 length of the blade; blade glabrous, 8-35 cm long, 2-4 cm wide, base deeply cordate; margins entire; sori numerous, linear, ± perpendicular to rachis, usually restricted to the distal half of the blade. ●On calcareous rocks in sinkholes, at cave entrances, always in deep shade. ◆This rare (in New Mexico) fern was discovered in 2017 in a cave in Cibola County. Our material belongs to var. *americanum* (Fernald) Kartesz & Gandhi [of the Americas] [*Phyllitis scolopendrium* (Linnaeus) Newman var. *americanum* Fernald]; other varieties do not naturally occur in North America.



Asplenium septentrionale (Linnaeus) Hoffman [northern] [*Acrostichum septentrionale* Linnaeus]. Stems erect, much branched to produce many-stemmed tufts bearing numerous fronds, scales dark reddish brown to black throughout; fronds monomorphic; blades 2-3 mm wide, grasslike, undivided or forked or with 1 or 2 narrow, flattened pinnae; rachis green glabrous; pinnae linear, flattened, ascending, sometimes forked; sori 2+, parallel to pinna margins. ●Cliff crevices, cracks of boulders; scattered locations, mostly northern.



Asplenium trichomanes Linnaeus [with a hairy cup]. Stems short-creeping to erect, scales black throughout or with brown margins; fronds monomorphic; blades once pinnate, pinnae broadly oblong, appearing opposite (often alternate distally), 3-8 mm long, 2.5-4 mm wide, 1-2 times longer than wide, asymmetrically cuneate at the base; rachis reddish brown, lustrous, glabrous; sori noticeably longer than wide. ●Cliff crevices and ledges, talus slopes; scattered areas in mountains. ◆Our plants belong to subsp. *trichomanes*, the small-spored diploid cytotype. The tetraploid subsp. *quadrivalens* occurs in the northeastern United States.



ATHYRIACEAE LADY-FERN FAMILY [1/1/1]

Terrestrial or epiphytic perennial plants; stems creeping to ± erect, unbranched; blades simple to 3-pinnate-pinnatifid; veins usually ending before margins of ultimate segments; sori elongate, often J- or U-shaped; indusia shaped like sori. ◆In New Mexico this family is represented only by the genus *Athyrium*, which was formerly included in a polyphyletic Dryopteridaceae; we follow Judd et al. (2016) in segregating the monophyletic groups corresponding herein to Athyriaceae, Cystopteridaceae, Dryopteridaceae, and Woodsiaceae. ◆With about 600 species in 5 genera; worldwide.

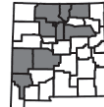
■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Athyrium [doorless] LADY-FERN [1].

Plants usually terrestrial; stems short-creeping to erect; leaves monomorphic; blade 1-3-pinnate-pinnatifid, reduced distally to a pinnatifid apex; rachises and costae grooved adaxially; sori in one row, round to elongate, straight or curved to hooked; indusia persistent, attached laterally. ◆*Athyrium* is a cosmopolitan genus with about 220 species.

■Kato, M. 1993. *Athyrium*, pp. 255-258. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Athyrium filix-femina (Linnaeus) Roth ex Mertens [lady-fern] [*Polypodium filix-femina* Linnaeus]. Petioles straw-colored distally; blades 2-pinnate to 2-pinnate-pinnatifid; pinnae sessile to short-stalked; pinnules pinnatifid; sori straight, hooked at distal end, not located near pinnule margins. ●Moist woods, meadows, stream banks in mountain areas. ◆This is a large, showy fern, variable, with several varieties in North America. Our plants belong to var. *californicum* Butters [of California], with petiole scales longer than 1 cm, blades twice as long as petioles, and linear-oblong to linear-lanceolate pinnules.



CYSTOPTERIDACEAE BLADDER-FERN FAMILY [2/5/5]

Terrestrial perennial plants; stems often long-creeping, scaly; leaves monomorphic, blades 2-3 pinnate-pinnatifid; veins extending to margins of ultimate segments; sori round; indusia hood-like and basally attached or absent. ◆Our genera were formerly included in a polyphyletic Dryopteridaceae; we follow Judd et al. (2016) in segregating the monophyletic groups corresponding herein to Athyriaceae, Cystopteridaceae, Dryopteridaceae, and Woodsiaceae. ◆Cystopteridaceae is a nearly cosmopolitan family, but is more common in the Northern Hemisphere. It contains 3 genera and 36 species.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

- 1 Indusia laterally attached..... *Cystopteris*
- 1 Indusia absent *Gymnocarpium*

Cystopteris [bladder fern] BLADDER-FERN [4].

Plants terrestrial or on rock; stems short-to long-creeping; petioles with 2 vascular bundles; blades 2-3-pinnate-pinnatifid; reduced distally to a pinnatifid apex; rachises and costae grooved adaxially; sori in one row between midrib and margin of pinnules; indusia hood-like, arching over sori towards the pinnule margin. ♦Species 25; worldwide.

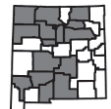
■Haufler, C.H., R.C. Moran, & M.D. Windham. 1993. *Cystopteris*, pp. 263-270. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Lellinger, D.B. 1985. A Field Manual of the Ferns & Fern-Allies of the United States & Canada [*Cystopteris tenuis*]. Smithsonian Institution Press. 389 pp. ■Mickel, John T., & Alan R. Smith. 2004. *Cystopteris*, pp. 240-241. The Pteridophytes of Mexico, The New York Botanical Garden Press.

- 1 Rachises densely covered with gland-tipped hairs; bulblets frequently borne along the rachis..... *C. bulbifera*
- 1 Rachises mostly without gland-tipped hairs; bulblets absent
 - 2 Fronds 2- to 3-pinnate; stems usually long-creeping..... *C. reevesiana*
 - 2 Fronds mostly once pinnate or pinnatifid; stems short-creeping
 - 3 Pinnae at acute angle to the rachis, often curving toward the blade apex, the margins crenulate or with rounded teeth *C. tenuis*
 - 3 Pinnae perpendicular to the rachis, not curving toward the apex, the margins with sharp teeth..... *C. fragilis*

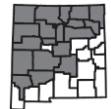
Cystopteris bulbifera (Linnaeus) Bernhardt [bulb-bearing]. [*Polypodium bulbiferum* Linnaeus] Petioles green or straw-colored; blades 2-pinnate to 2-pinnate-pinnatifid, widest at the base; rachises and costae with dense gland-tipped hairs, often with bulblets; pinnae perpendicular to rachis, margins serrate; indusia usually with gland-tipped hairs. ●Forming streamer-like, hanging clumps on moist limestone cliffs and ledges; known only from Los Alamos County.



Cystopteris fragilis (Linnaeus) Bernhardt [fragile, easily broken] [*Filix fragilis* (Linnaeus) Gilib, *Polypodium fragilis* Linnaeus]. Petioles green to straw-colored, darker at the base; leaf blades 1-2-pinnate-pinnatifid, widest near middle; axils of pinnae lacking gland-tipped hairs; pinnae mostly perpendicular to rachis, margins serrate to sharply dentate; veins directed mostly into teeth. ●Mostly on cliff faces in the northern mountains; easily confused with *C. reevesiana* which prefers boulders or soil over cliffs. ♦A number of specimens of *C. fragilis* were identified before *C. reevesiana* was described in 1981; some of these might well be *C. reevesiana*.



Cystopteris reevesiana Lellinger [for Timothy Reeves (1947-x), New Mexico botanist] [*Cystopteris fragilis* (Linnaeus) Bernhardt subsp. *tenuifolia* Clute]. Petioles often uniformly dark purple at base, grading to straw-colored at junction with blade; leaf blades 2- to 3- pinnate, widest near middle; axils of pinnae with occasional gland-tipped hairs; pinnae mostly perpendicular to rachis, margins dentate to crenate; veins directed into teeth and notches. ●Commonly in soil or in a thin soil layer of rocks; widespread in the state.



Cystopteris tenuis (Michaux) Desvaux [slender] [*Cystopteris fragilis* (Linnaeus) Bernhardt var. *mackayi* G. Lawson, *Nephridium tenue* Michaux]. Petioles mostly green to straw-colored; leaf blades 1-to 2- pinnate-pinnatifid, widest near middle; axils of pinnae lacking gland-tipped hairs; pinnae usually at acute angle to rachis, curving toward blade apex, margins crenulate; veins directed into teeth and notches. ●Shaded rock, cliff faces, and also the forest floor; barely entering New Mexico in the Four Corners region. ♦Another close relative of *C. fragilis* (with *C. reevesiana*) that has been segregated at the specific level.

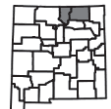


Gymnocarpium [naked fruit] OAK-FERN [1].

Plants terrestrial; stems long-creeping; leaves monomorphic; petioles 1.5-3 times blade length with 2 vascular bundles; blade 2-3-pinnate-pinnatifid; proximal pinnae longest, usually inequilateral with pinnules pointing towards the base longer than pinnules pointing towards the apex; rachises and costae adaxially grooved; sori in one row between midrib and margin; indusia absent. ♦Species 8; northern temperate regions, North America, Eurasia.

■Pryor, K.M. 1993. *Gymnocarpium*, pp. 258-260. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Gymnocarpium dryopteris (Linnaeus) Newman [resembling *Dryopteris*] [*Dryopteris linnaeana* C. Christensen, *Polypodium dryopteris* Linnaeus]. Leaf blade broadly deltate, abaxial surface and rachis glabrous or with sparse glandular hairs, adaxial surface glabrous; proximal pinnae facing the frond base with sessile first basal pinnules, these pinnules with the basal pinnulet equaling or longer than the adjacent pinnulet. ●Cool, shady forests in montane areas; northern mountains. ♦This fern is very uncommon in both New Mexico and Arizona.



DENNSTAEDTIACEAE BRACKEN FAMILY [1/1/1]

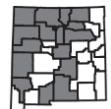
Terrestrial perennial plants generally in forested habitats; stems short- to long-creeping; leaf blades monomorphic, 1- to 4-pinnate, rachises and costae often grooved adaxially; sori marginal; the true indusium cup-like (rarely absent), often obscured by a false indusium formed by revolute leaf margins. ♦Represented in New Mexico by one genus. The family contains about 10 genera and about 240 species distributed worldwide.

Pteridium [resembling *Pteris*] BRACKEN-FERN [1].

Stems long-creeping, bearing fine hairs; lacking scales; leaves broadly deltate; blades 2-4-pinnate, rachis and costae grooved adaxially; nectaries present at bases of proximal pinnae; segments of pinnae pinnately divided, hairy abaxially, margins entire; sori ± continuous along margins of abaxial surface. ♦Species 1, worldwide.

■Jacobs, C.A. & J.H. Peck. *Pteridium*, pp. 201-203. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Mickel, John T., & Alan R. Smith. 2004. *Pteridium*, pp. 529-533. The Pteridophytes of Mexico, The New York Botanical Garden Press.

Pteridium aquilinum (Linnaeus) Kuhn [eagle-like] [*Pteris aquilina* Linnaeus]. Fronds 0.5-1 m in length; petioles scattered on stems, grooved adaxially; blades sparsely to densely hairy abaxially; pinnae often opposite to subopposite; inner indusia, if present, hidden by reflexed margins of pinnules and maturing sporangia. ●Mesic, montane forests; widespread. ♦Perhaps our most common fern, large and coarse, appearing early in the year and producing leaves all season, but wilting rapidly with the first frost. Used by indigenous people for food, but it is also poisonous. Our plants belong to var. *pubescens* Underwood [downy, hairy], having abaxial blade surfaces with abundant, lax and spreading hairs, and pinnules at nearly 90° to costae.



DRYOPTERIDACEAE SHIELD-FERN FAMILY [3/3/3]

Perennial homosporous plants, terrestrial or on rock; stems erect to creeping, covered with scales; leaves monomorphic or dimorphic; blades simple or once to multi-pinnately compound; sori usually round, sometimes elongate, borne on the veins or at vein tips, but usually not on the margin; indusia present or absent. ♦The family formerly included several other genera in a polyphyletic arrangement; we follow Judd et al. (2016) in segregating the monophyletic groups corresponding herein to Athyriaceae, Cystopteridaceae, Dryopteridaceae, and Woodsiaceae. Dryopteridaceae contains about 34 genera and about 1700 species.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

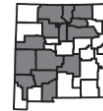
- 1 Blades pinnate-pinnatifid to twice-pinnate, the pinnae pinnatifid-lobed nearly throughout; indusia attached laterally at the sinus.....*Dryopteris*
- 1 Blades primarily once-pinnate, the pinnae toothed or pinnatifid only basally; indusia attached at the center (peltate)
 - 2 Pinnae 1-3 cm long; sori scattered in ± single row on both sides of midvein.....*Polystichum*
 - 2 Pinnae 2-9 cm long; sori in ± 2 longitudinal rows on both sides of midvein.....*Phanerophlebia*

Dryopteris [oak fern] MALE FERN [1].

Plants terrestrial and mesophytic; stems short-creeping to erect; petioles with 3 or more vascular bundles; blade 1-3-pinnate-pinnatifid, gradually reduced to a pinnatifid apex; rachis and costae adaxially grooved; sori in one row between pinnule midrib and margin, round; indusia plumply U-shaped, attached at a narrow sinus. ♦Species about 250; mostly in the Northern temperate regions.

■Mickel, John T. & Alan R. Smith. 2004. *Dryopteris*, p. 274. *The Pteridophytes of Mexico*, The New York Botanical Garden Press. ■Montgomery, J.D. & W.H. Wagner, Jr. 1993. *Dryopteris*, pp. 280-288. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

Dryopteris filix-mas (Linnaeus) Schott [male-fern] [*Polypodium filix-mas* Linnaeus]. Petioles much shorter than blades, scaly, at least at the base, with a mixture of broad and hairlike scales; blade green, pinnate-pinnatifid to 2-pinnate, widest near the middle; pinnule margins serrate to lobed; sori midway between pinnule midvein and margin. ●Moist, shady sites in mountain to subalpine forests, widespread.



Phanerophlebia [with evident veins] VEINY-FERN [1].

Plants usually terrestrial, sometimes on rock; stems short-creeping to erect; leaves monomorphic; petioles with more than 3 vascular bundles; blades 1-pinnate; pinnae margins serrulate or spinulose, the bases somewhat equilateral or lobed on the side facing the frond apex; costae adaxially grooved; costae and veins on pinnae abaxial side with filiform scales; sori in 2 or more rows between midrib and margin; indusia peltate. ♦Species 9; southwestern United States to northern South America, also Hispaniola.

■Mickel, John T., Alan R. Smith & Ivan A. Valdespino. 2004. *Phanerophlebia*, pp. 455-456. *The Pteridophytes of Mexico*, The New York Botanical Garden Press. ■Yatskievych, G. 1993. *Phanerophlebia*, pp. 300-301. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

Phanerophlebia auriculata Underwood [with an ear-shaped appendage] [*Cyrtomium auriculatum* (Underwood) C.V.Morton]. Pinnae 5-12 pairs, ovate to lanceolate, obliquely cuneate at the base, usually lobed on the side facing the frond apex; indusia attached at center, flat or concave centrally. ●In soil or rock crevices in canyons and ravines; southwestern to south central areas. ♦Because of its sumac-like appearance, this species does not seem like a fern.

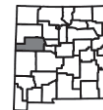


Polystichum [many rows] SWORD FERN [1].

Plants terrestrial; stems decumbent to erect, stolons absent; leaves mostly monomorphic, evergreen; petioles much shorter than equaling the blades, the vascular bundles more than 3; blades 1-3-pinnate (ours mostly 1-pinnate), gradually reduced distally to a pinnatifid apex; pinnae margins spinulose-toothed, the bases usually inequilateral; costae adaxially grooved; sori mostly in a single row on both sides of the midrib, round, the indusia peltate. ♦About 180 species, worldwide. Online reports of “*Polystichum aquilinum*” are errors for *Pteridium aquilinum*.

■Wagner, D.H. 1993. *Polystichum*. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

Polystichum scopulinum (D.C. Eaton) Maxon [of rocky places] [*Aspidium aculeatum* (Linnaeus) Swartz var. *scopulinum* D.C. Eaton]. Stems ascending; leaves green, erect, 10-50 cm long; petioles to 1/3 the length of the leaf, densely brown-scaly; leaves 1-pinnate except for the basal portions of the pinnae, which may be lobed; pinnae strongly over-lapping, folded inward and twisted horizontally, 1-3 cm long, the bases oblique, the margins serrulate, the teeth inward-curving.



●Bases of boulders and in rocky crevices; known from a single collection in Cibola County.

EQUISETACEAE HORSETAIL FAMILY [1/6/6]

Terrestrial to aquatic, rhizomatous, homosporous perennials; stems usually less than 1 m tall, with swollen nodes, strongly ridged and grooved, hollow, branched or not; leaves whorled, fused into a sheath at the bases, tips free, toothlike, withering brown when mature; sporangia borne in well-differentiated strobili terminating the stems; sporangia borne on peltate sporophylls. ♦This family contains one genus and 20 species, with features of the family.

Equisetum [horse tail] HORSETAIL [6].

■Hartman, R.L., B. Reif, B.E. Nelson, & B. Jacobs. 2006. New vascular plant records for New Mexico [*Equisetum nelsonii*]. *Sida* 22(2):1225-1233. ■Hauke, R.L. 1993. *Equisetaceae*, pp. 76-84. IN: *Flora of North America*, vol. 2. Oxford Univ. Press. ■Heil, K.D. & S.L. O’Kane, Jr. 2003. *Catalog of the Four Corners flora: Vascular plants of the San Juan River drainage, Arizona, Colorado, New Mexico and Utah* [*Equisetum variegatum*]. *Harvard Papers in Botany* 7(2):321-379. ■Mickel, John T., & Alan R. Smith. 2004. *Equisetum*, pp. 317-319. *The Pteridophytes of Mexico*, The New York Botanical Garden Press.

- 1 Stems of two kinds, sterile and fertile, the sterile highly branched and bushy, the sterile unbranched*E. arvense*
- 1 Stems all alike, unbranched
 - 2 Spores white, misshapen
 - 3 Sheaths green; teeth prominent*E. ×nelsonii*
 - 3 Sheaths dark-girdled; teeth usually deciduous.....*E. ×ferrissii*
 - 2 Spores green, spherical
 - 4 Sheaths dark-girdled at most of the nodes; teeth usually deciduous, articulation line visible.....*E. hyemale*
 - 4 Sheaths green or obscurely girdled at the nodes; teeth deciduous or persistent, articulation line lacking
 - 5 Cone apex rounded, aerial stems annual *E. laevigatum*
 - 5 Cone apex pointed or rounded, aerial stems perennial

- 6 Sheath teeth usually shed; cone apex rounded to apiculate with blunt tip; stem ridges flattened or ± convex... *E. laevigatum*
- 6 Sheath teeth usually persistent; cone apex sharply apiculate; stem ridges minutely grooved *E. variegatum*

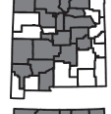
Equisetum arvense Linnaeus [growing in cultivated fields]. Aerial stems dimorphic; vegetative stems green, branched, branches in regular whorls, ascending; fertile stems brown, unbranched, shorter than vegetative, ephemeral; cones terminal on fertile stems, cones rounded at the apex. ●Riverbanks, stream sides, marshes; widespread in mountain areas except for eastern plains and southern border counties. ♦The bushy sterile stems are distinctive and easily gathered for scouring camping pots, and have been boiled in water to make a fungicide against mildew.



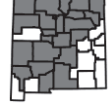
Equisetum ×ferrissii Clute [for Roxana Judkins (Stinchfield) Ferris (1895-1978), California botanist]. Aerial stems not dimorphic, persisting more than a year, unbranched; sheaths elongate, becoming dark-girdled, teeth usually deciduous; spores white, misshapen. ●Riverbanks, stream banks, lake shores; scattered locations. ♦*Equisetum ×ferrissii* is a sterile hybrid between *E. hymale* and *E. laevigatum* with somewhat intermediate features; it propagates by vegetative means.



Equisetum hymale Linnaeus [of the winter] Aerial stems not dimorphic, persisting more than a year, unbranched; sheaths dark-girdled when mature, brown to gray above the girdle, teeth usually deciduous, articulation line visible; cone apex pointed, cones maturing in summer; spores green, spherical. ●Riverbanks, lakeshores, woodlands; widespread. ♦Our plants belong to subsp. *affine* (Engelmann) Calder & R.L. Taylor [similar or related to] [*Equisetum robustum* A Braun var. *affine* Engelmann]; subsp. *hymale* is found in Europe and Asia.



Equisetum laevigatum A. Braun [smooth or slippery] [*Equisetum kansasum* Schaffner]. Aerial stems not dimorphic, lasting less than a year or sometimes overwintering, usually unbranched, ridges on stem flattened or ± convex; sheaths green, elongate, teeth 10-32, early deciduous, leaving a dark rim on sheath; articulation line lacking; cone apex rounded to apiculate with a blunt tip, cones maturing in spring or early summer; spores green, spherical. ●Riverbanks, along streams, moist prairies; very widespread.



Equisetum ×nelsonii (A.A. Eaton) J.H.Schaffner [for Nelson Lawrence T. Nelson (1862-1932), bryologist and mycologist] [*Equisetum variegatum* Schleicher ex F. Weber & D. Mohr var. *nelsonii* A.A. Eaton]. Aerial stems not dimorphic, lasting less than a year or sometimes the base overwintering; unbranched; sheaths green, elongate, teeth 6-14, persistent, centers brown and margins white, with a long brown filiform tip; cones with a pointed apex, maturing in early summer but spores not shed; spores white, misshapen. ●Riverbanks, lakeshores; known from Bandelier National Monument, Sandoval County. ♦This is the sterile hybrid between *E. laevigatum* and *E. variegatum*.



Equisetum variegatum Schleicher ex F. Weber & D. Mohr [marked with different colors]. Aerial stems not dimorphic, persisting for more than a year, unbranched, stem ridges minutely grooved; sheaths green with a black apical band, teeth 3-14, persistent, erect, with prominent white margins; cones pointed at the apex, maturing in late summer or overwintering and shedding spores in spring; spores green, spherical. ●Wet woods, riverbanks, lakeshores; known only along the San Juan River in San Juan County.



ISOËTACEAE QUILLWORT FAMILY [1/1/1]

Plants aquatic to ephemeral, terrestrial, perennial, heterosporous; stems erect, corm-like, having secondary growth; leaves simple, linear, quill-like, with four longitudinal air chambers; sporangia ovoid, solitary, embedded in leaf bases; ligule present on the inner surface of the leaf above the sporangium; sporangia partly to entirely covered by a membranous flap (velum); the megaspores, necessary for distinguishing the various species, appear as tiny, salt-like granules. ♦This family contains a single genus *Isoëtes*, with about 192 species, with features of the family.

Isoëtes [throughout the year] QUILLWORT [1].

■Keeley, Jon E., Cindy M. Walker and R. Patrick Matthews. 1983. Crassulacean acid metabolism in *I. bolanderi* in high elevation oligotrophic lakes. *Oecologia* 58(1): 63-69. ■Taylor, W.C., N.T. Luebke, D.M. Britton, R.J. Hickey, & D.F. Brunton. 1993. Isoëtaceae, pp. 64-75. IN: *Flora of North America*, vol. 2. Oxford Univ. Press. ■Troia, A., J.B. Pereira, C. Kim, & W.C. Taylor. 2016. The genus *Isoëtes* (Isoëtaceae): a provisional checklist of the accepted and unresolved taxa. *Phytotaxa* 277(2):101-145.

Isoëtes bolanderi Engelmann. [for Henry Nicholson Bolander (1831-1897), California State botanist]. Plants generally submerged, sometimes emergent; rootstock globose, usually conspicuously 2-lobed; leaves terete, looking like small aquatic chives, pale brown towards the base; ligule small, cordate; velum covering less than half of sporangium; megaspores whitish, with tubercles, these sometimes aggregated into wrinkles ●High altitude persistent lakes or ponds, uncommon; known only from McKinley and Rio Arriba Counties. ♦Crassulacean acid metabolism has been reported in *I. bolanderi*.



LYCOPODIACEAE CLUB-MOSS FAMILY [2/3/3]

Terrestrial, perennial, homosporous plants usually 5-20 cm tall with dichotomously branching stems; leaves (microphylls) simple, less than 2 cm long, with a single vein, often densely covering the stem, alternate or opposite; sporangia ± kidney-shaped to globose, solitary in the leaf axils or clustered into strobili. ♦This cosmopolitan family contains about 3 genera and about 400 species.

1 Horizontal stems present, creeping, the aerial branches not bunched but arising singly; spores borne in cones *Lycopodium*

1 Horizontal stems absent, the aerial branches bunched together; spores borne in axils of unmodified leaves, not in cones *Huperzia*

Huperzia [for Johann Peter Huperz (1771-1816), German physician and fern horticulturalist] CLUBMOSS [1].

Plants terrestrial or on rock, erect to decumbent, ± perennial, glabrous; horizontal stems absent; stems terete, dichotomously branched; leaves not in distinct ranks, appressed or ascending to spreading, less than 10 mm long; gemmiferous branchlets and attached gemmae formed among leaves, gemmae jointed and breaking away at maturity, deltoid with 4 leaves flattened into a plane; sporangia kidney-shaped, borne in axils of normal leaves. ♦Species about 300; worldwide.

■Field, A.R., W. Testo, P.D. Bostock, J.A.M. Holtum, & M. Waycott. 2016. Molecular phylogenetics and the morphology of the Lycopodiaceae subfamily Huperzioideae supports three genera: *Huperzia*, *Phlegmariurus* and *Phylloglossum*. *Mol. Phylogenet. Evol.* 94(B): 635-657. ■Sivinski, R., T. Lowrey, & C. Keller. 1995. Additions to the floras of Colorado and New Mexico [*Huperzia lucidula*]. *Phytologia* 79(5):319-324. ■Wagner, W.H., Jr. & J.M. Beitel. 1993. Lycopodiaceae, pp. 18-37. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

Huperzia lucidula (Michaux) Trevisan [somewhat clear or shining]. [*Lycopodium lucidulum* Michaux] Shoots erect, indeterminate, becoming long-decumbent, with the trailing senescent portion becoming brown, not rooting; juvenile growth erect; leaves spreading to reflexed, lustrous, lanceolate to narrowly obovate, margins papillate, with 1-8 irregular teeth, stomata on abaxial surface only; gemmiferous branchlets in one pseudo-whorl at end of each year's annual growth; spores 0.23-0.29 µm. ●Mountains, foothills; known only from a single collection from a piñon-juniper woodland in Santa Fe County. ♦*Huperzia* species freely interbreed; the resulting hybrid entities reproduce by gemmae.



Lycopodium [a wolf's foot] CLUBMOSS [2].

Plants trailing on the ground; horizontal stems on substrate surface or subterranean, long-creeping, with scattered upright shoots; shoots unbranched or with 1-4 lateral branchlets; leaves linear to linear-lanceolate; leaves on horizontal stems appressed, membranous; leaves on branchlets in 6-8 ranks; gemmiferous branchlets and gemmae absent; sporangia segregated in strobili; strobili single and sessile or multiple and pedunculate, peduncles leafy; sporophylls much reduced; sporangia reniform in axils of sporophylls. ♦Species about 65; temperate and subarctic regions.

■Mickel, John T., & Alan R. Smith. 2004. *Lycopodium*, p. 376. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Sivinski, R., T. Lowrey, & C. Keller. 1995. Additions to the floras of Colorado and New Mexico [*Lycopodium clavatum*]. *Phytologia* 79(5):319-324. ■Wagner, W.H., Jr. & J.M. Beitel. 1993. Lycopodiaceae, pp. 18-37. IN: Flora of North America, vol. 2. Oxford Univ. Press.

- 1 Cones single and sessile at the stem tips; leaves rarely ascending*L. annotinum*
- 1 Cones 2-3 at the end of a peduncle extended beyond the stem tips; leaves ascending.....*L. clavatum*

Lycopodium annotinum Linnaeus [of the previous year] [*Spinulum annotinum* (Linnaeus) A. Haines]. Horizontal stems on substrate surface; upright shoots unbranched or sparsely branched mostly at base, annual constrictions conspicuous; lateral branchlets few, without annual constrictions; leaves linear-lanceolate, spreading or somewhat reflexed, up to 10 mm long, margins regularly toothed, apex sharply acute; strobili solitary, sessile, terminal on shoots; sporophylls abruptly narrowed to a pointed tip. ●Moist mountain forests, exposed grassy or rocky areas; north central mountains. ♦Stiff and somewhat prickly, smaller and more delicate than *L. clavatum*.



Lycopodium clavatum Linnaeus [like a small club]. Horizontal stems on substrate surface, sparsely rooting; upright shoots clustered, dominant main shoot with 3-6 branches mainly in lower half; lateral branches like upright shoots, terete, ascending to erect, annual constrictions abrupt; leaves spreading to ascending, linear, up to 8 mm long, margins entire, apex tapering to a long, narrow, hair-like tip; strobili 2-3, on a branched terminal peduncle; sporophylls abruptly reduced to a hair-like tip. ●Moist fields and forests, bogs, north central mountains; Sandoval County; uncommon. ♦Horizontal stems run along the ground surface, giving rise to the erect and more noticeable fertile shoots.



MARSILEACEAE PEPPERWORT FAMILY [1/1/1]

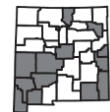
Aquatic or amphibious, perennial, heterosporous plants with creeping stems rooted in mud; leaves resemble blades of grass (*Pilularia*) or four-leaved clover at the end of a long petiole (*Marsilea*); sporangia enclosed in a hard sporocarp formed from a specialized leaf; both megasporangia and microsporangia within the same sporocarp. ♦The family contains 3 genera and about 50-80 species, nearly worldwide in tropical and subtropical areas; represented in New Mexico only by the genus *Marsilea*.

Marsilea [for Luigi Fernando, Count of Marsigli (Latinized as *Marsilius*) (1658-1730), Italian naturalist] WATERCLOVER [1].

Roots arising at nodes, sometimes on internodes; leaves emergent or floating, with 4 similar leaflets attached at the apex of a long petiole; leaflets clover-like, cuneate at the base, broadly rounded at the apex, bearing fine, short hairs or glabrate; sporocarps borne on short stalks at or near bases of petioles, attached laterally to stalk apex, the tip of stalk often protruding as a bump or tooth, sometimes two; sporocarps often hairy. ♦Species about 45.

■Johnson, D.M. 1993. Marsileaceae, pp. 331-335. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Mickel, John T., & Alan R. Smith. 2004. *Marsilea*, pp. 381-386. The Pteridophytes of Mexico, The New York Botanical Garden Press.

Marsilea vestita Hooker & Greville [clothed, as with hairs] [*Marsilea fournieri* C. Christensen, *Marsilea minuta* Fournier, not Linnaeus, *Marsilea mucronata* A. Braun]. Sporocarp stalks erect, unbranched, attached at base of petiole, not hooked at the apex; stalk tip with two teeth, the proximal blunt, the distal acute, often hooked at the apex. ●In ponds, wet depressions; numerous scattered locations. ♦*Marsilea ancylopada* A. Braun is perhaps present in ponds in Hidalgo County; it may be distinguished as follows:



- a Stalk of sporocarp recurved or prostrate, 3-11 mm long; sporocarps subterranean, the distal tooth up to 0.4 mm long...*M. ancylopada*
- a Stalk of sporocarp erect, 0.5-25 mm long; sporocarps above-ground, the distal tooth 0.4-1.2 mm long...*M. vestita*

OPHIOGLOSSACEAE ADDER'S TONGUE FAMILY [4/13/13]

Terrestrial, homosporous, perennial plants from tubers or rhizomes; leaves 1 per plant (rarely more), simple or much divided, not circinnate in *Ophioglossum*, but circinnate in *Botrychium*, *Botrypus*, and *Sceptridium*; leaf divided dichotomously into 2 axes joined at their bases, one a photosynthetic sterile blade (trophophore), the other fertile, bearing sporangia (sporophore), the blade simple to ± palmately compound or many times pinnately compound; sporangia not clustered into sori, exposed on branches of the sporophore or embedded in a spike-like sporophore. ♦Genera 5, with 70-90 species, worldwide, especially temperate and tropical regions.

■Farrar, D.R. & S.J. Popovich. 2010. Unpublished manuscript for a workshop of the Annual Meeting of the Native Plant Society of New Mexico, August 11-12, 2010, Silver City, New Mexico. ■Farrar, D.R. & S.J. Popovich. 2012. Ophioglossaceae, pp. 24-35. IN: Weber, W.A. & R.C. Wittman. Colorado Flora, Western Slope, Fourth Edition. University Press of Colorado Press, Boulder.

[Key adapted from Farrar & Popovich 2010]

- 1 Trophophore simple, entire; veins reticulate; sporophore with sporangia clearly sunken in axis.....*Ophioglossum*
- 1 Trophophore compound (rarely simple and entire in *Botrychium simplex*); veins forked; sporangia not sunken in axis, exposed as sessile to short-stalked clusters
 - 2 Trophophore no more than twice divided, usually less than 4.5 cm wide, mostly temate to pinnate (rarely simple).....*Botrychium*
 - 2 Trophophore temate, 3- to 4-times divided (less in very small plants), generally more than 6 cm wide
 - 3 Leaf persistent and evergreen for one year; trophophore and sporophore joined ± at ground level; trophophore stalked; pinnae thick and leathery*Sceptridium*
 - 3 Leaf withering away in the fall, not persistent nor evergreen; trophophore and sporophore joined well above ground level; trophophore sessile; pinnae thin and delicate..... *Botrypus*

Botrychium [a small bunch of grapes] MOONWORT [10].

Stems subterranean, erect, forming a caudex; leaves 1 (rarely 2) per stem; leaf bud glabrous; trophophore ascending to perpendicular to stem, sessile or stalked; blade linear, oblong, or deltate, simple to 2-pinnate; pinnae ascending to spreading, fan-shaped to lanceolate to linear, margins entire to dentate or lacerate; sporophores usually 1 per leaf, 1-3 pinnate, long-stalked, borne at ground level or high on a stalk shared with the trophophore. ♦All species of *Botrychium* in New Mexico are little-collected and poorly known. Species 45-60; nearly worldwide.

■Dauphin, B, J. Vieu & J.R. Grant. 2014. Molecular phylogenetics supports widespread cryptic species in moonworts (*Botrychium* s.s., Ophioglossaceae). *Amer. J. Bot.* 101(1):128-140.
 ■Dauphin, B, D.R. Farrar, A. Maccagni & J.R. Grant. 2017. A worldwide molecular phylogeny provides new insight on cryptic diversity within the moonworts (*Botrychium* s.s., Ophioglossaceae). *Syst. Bot.* 42(4):620-639. ■Farrar, D.R. 2011. Systematics and taxonomy of the genus *Botrychium*. Website www.public.iastate.edu/~herbarium/botrychium/Moonwort-Systematics. ■Farrar, D.R. & A.V. Gilman. 2017. Relationships in the *Botrychium campestre* (Ophioglossaceae) complex. *Brittonia* 69(3):265-275. [*B. campestre* var. *lineare*]. ■Farrar, D.R. & S.J. Popovich. 2010. Unpublished manuscript for a workshop of the Annual Meeting of the Native Plant Society of New Mexico, August 11-12, 2010, Silver City, New Mexico. [*Botrychium hesperium*, *B. lineare*, *B. "neolunaria"*, *B. minganense*, *B. pinnatum*, *B. "furculatum"* (as *B. "redbank"*)]. ■Hauk, W.D., L. Kennedy, & H.M. Hawke. 2012. A phylogenetic investigation of *Botrychium* s.s., (Ophioglossaceae): evidence from three plastid DNA sequence datasets. *Syst. Bot.* 37(2):320-330. ■Heil, K. 2007. Plant distribution reports [*Botrychium campestre* var. *lineare*]. *The New Mexico Botanist* 37:7. ■Isaacs, B. 1977. Native Plant Society of New Mexico News [*Botrychium lunaria*]. Oct:1-2. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Botrychium hesperium*, *B. lineare*, *B. minganense*, *B. multifidum*, *B. pinnatum*, *B. tunix*]. *J. Bot. Res. Inst. Texas* 4(2):777-784. ■Lellinger, D.B. 1985. A Field Manual of the Ferns & Fern-Allies of the United States & Canada. Smithsonian Institution Press. 389 pp. ■Spellenberg, R. 2004. Plant distribution reports [*Botrychium echo*]. *The New Mexico Botanist* 29:7. ■Stensvold, M.C. & D.R. Farrar. 2017. Genetic diversity in the worldwide *Botrychium lunaria* (Ophioglossaceae) complex, with new species and new combinations [*B. neolunaria*]. *Brittonia* 69(2): 148-175. ■Wagner, W.H., Jr. & F.S. Wagner. 1993. Ophioglossaceae, pp. 85-106. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

[Key and drawings adapted and redrawn from Farrar & Popovich 2010, 2012].

- 1 Trophophore blade width (at the base) greater than or approximately equal to the blade length
- 2 Sporophore absent or tiny (mostly less than 2 mm) and undeveloped
 - 3 Pinnae apices cuneate to narrowly acute, acute, forming an angle of $\pm 45-60^\circ$, sharply pointed; pinnae thin and delicate..... go to **Botrypus**
 - 3 Pinnae apices broadly acute to obtuse, forming an angle of $\pm 75-100^\circ$, rounded or bluntly pointed; pinnae thick and leathery go to **Sceptridium**

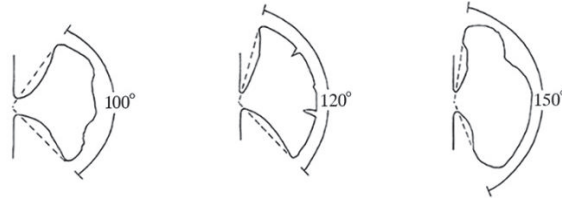


Botrypus

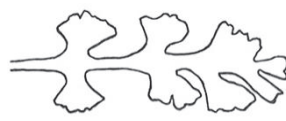


Sceptridium

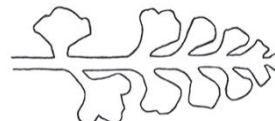
- 2 Sporophore present and conspicuous
 - 4 Trophophore sessile or short-stalked, joined to the sporophore well above the ground at the top of the common stalk
 - 5 Pinnae thin and delicate; plants lustrous when fresh; sporophore pinnately branched; sporophore stalk length longer than the total trophophore length..... go to **Botrypus**
 - 5 Pinnae firm, not delicate; sporophore usually ternately branched; sporophore stalk length shorter than to nearly equal to total trophophore length
 - 6 Lobes of basal pinnae elongate and pointed; all but the uppermost pinnae acutely lobed; plants never glaucous **B. lanceolatum**
 - 6 Lobes of basal pinnae elongate or not; pinnae above the basal pair often undissected; plants usually glaucous when fresh ... go to 14
 - 4 Trophophore long-stalked, joined to the sporophore near or below ground level
 - 7 Pinnae above the basal pair mostly pinnately compound or lobed go to **Sceptridium**
 - 7 Pinnae pairs above the basal pair absent or mostly simple and fan-shaped, sometimes palmately lobed **B. simplex**
- 1 Trophophore blade longer than wide
 - 8 Basal pinnae entire or palmately dissected (trophophore undivided in small *B. simplex*), broadly to narrowly fan-shaped, wedge-shaped, or linear in outline, clearly broadest at the outer margin
 - 9 Trophophore and sporophore joined near ground level; sporophore stalk at maturity usually much longer than the total trophophore length, stalk lax, often arcuate; plants of wet areas **B. simplex**
 - 9 Trophophore and sporophore joined well above ground level; sporophore stalk length various, stalk erect



- 10 Spans of basal pinnae less than 120° (often less than 100°)
 - 11 Sporophore stalk approximately $\frac{1}{2}$ or less the length of the trophophore; trophophore sessile or with stalk shorter than the average of the distances between the first (basal) and second, and second and third, lowermost pinnae pairs **B. campestre**
 - 11 Sporophore stalk $\frac{1}{2}$ or more the length of the trophophore; trophophore stalk \pm equal to or longer than the average of the distances between the first (basal) and second, and second and third, lowermost pinnae pairs
 - 12 Plants green to yellow-green when fresh; pinnae entire to symmetrically 3 or 5 (odd) lobed, middle lobes often larger; stalks of lower pinnae appearing narrow, stalk widths approximately $\frac{1}{4}$ the pinnae widths; lower sporophore branches stalked, sporangia not obscuring the sporophore rachis..... **B. minganense**
 - 12 Plants pallid (pale) or whitish blue-green when fresh; pinnae entire to crenate to asymmetrically cleft into two principle lobes, upper lobe larger and more developed; stalks of lower pinnae not appearing narrow, stalk widths approximately $\frac{1}{3}$ or more the pinnae widths; lower sporophore branches usually not stalked, sporangia partially obscuring the sporophore rachis **B. "furculatum"**



B. furculatum



B. minganense

10 Spans of basal pinnae greater than 120° (often greater than 150°)

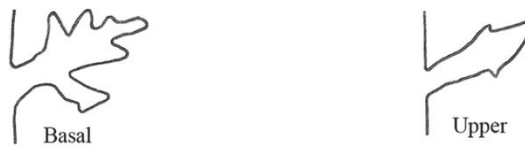
13 Fresh plants deep green, dull to somewhat lustrous; pinnae symmetrically fan-shaped with abrupt differentiation between outer and side margins; sporophore stalk at maturity (spore release or later) equal to or longer than the length of the trophophore; basal sporophore branches generally ascending and not twisted *B. neolunaria*



13 Fresh plants green to yellow-green, lustrous; pinnae ± round without abrupt differentiation between outer and side margins, basal pinnae often asymmetrical with lower half of the outer margin extended outward and downward; sporophore stalk at maturity less than the length of the trophophore; basal sporophore branches ± spreading and twisted so that sporangia point outward or downward *B. tunux*

8 Basal pinnae pinnately dissected to (rarely) entire, ovate to elliptic in outline, broadest at the base or middle

14 Lobes of basal pinnae divergent (like spread fingers); upper pinnae and lobes of lower pinnae narrowly elliptic-clongate with mostly acute apices (less than 90°)



15 Trophophore broadly triangular or pentangular in outline, ± as long as broad; lustrous dark green when fresh; sporophore ternately branched; sporangia bright yellow before spore release *B. lanceolatum*

15 Trophophore ovate to narrowly triangular in outline, longer than broad; somewhat lustrous to dull green when fresh; sporophore usually pinnately branched; sporangia dull yellow before spore release *B. echo*

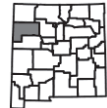
14 Lobes of basal pinnae parallel to convergent (not spreading); upper pinnae and lobes of lower pinnae ovate with mostly obtuse apices (more than 90°)



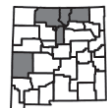
16 Fresh trophophore lustrous green; all but the uppermost pinnae dissected or lobed on both the upper and lower margins; sporophore pinnately divided; common stalk, if not entirely green, uniformly maroon toward the base *B. pinnatum*

16 Fresh trophophore weakly to distinctly glaucous blue-green, not lustrous; pinnae above the basal pair often entire or shallowly dissected (often only on the lower margin); sporophore ternately divided; common stalk, if not entirely green, with a maroon stripe extending downward from the base of the trophophore *B. hesperium*

Botrychium campestre W.H. Wagner & Farrar [of fields or plains]. Plants 6-18(-21) cm tall; trophophore sessile to short-stalked, raised on a common stalk 3-8(-10) long; blade oblong to linear-oblong, once pinnate with 3-6 pairs of pinnae; pinnae usually ascending, mostly remote, linear to wedge-shaped, apex often lobed; sporophore generally once pinnate, 1-2 times the length of the trophophore, with a single major axis. ● Meadows, fen-like seeps, gravelly roadsides; known only from McKinley County. ♦ Our plants belong to var. *lineare* (W.H. Wagner) D.R. Farrar [narrow and line-like] [*Botrychium lineare* W.H. Wagner], characterized by its narrow pinnae with parallel margins, separated by 2-5 times the width of the pinnae.



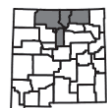
Botrychium echo W.H. Wagner [resembling other species]. Plants 3-15 cm tall; trophophore sessile to short-stalked, raised on a common stalk 2-10 cm long; blade broadly oblong or ovate to narrowly triangular, once pinnate with up to 5 pairs of pinnae; pinnae narrowly attached to the rachis, remote to approximate, lanceolate to oblanceolate, lobed or cleft to subentire; lower pinnae often have a small lower lobe like a mitten thumb; sporophore 1-2 pinnate, 1-2 times length of trophophore ● High elevations mostly in the northern mountains, disturbed gravelly flats, meadows, clear-cut areas.



Botrychium "furculatum." [small forked]. Plants mostly less than 15 cm tall; trophophore stalk 2-8 mm long, raised on a common stalk 3-6 cm long; blade oblong, up to 4 cm long, folded lengthwise when alive, once pinnate with up to 5 pinnae pairs, pinnae small, ascending, approximate, fan-shaped to spatulate, strongly asymmetric, tending toward 2 lobes, margins often irregularly toothed or scalloped; trophophore and sporophore stalks meeting in a wishbone-like "V"; sporophore 1-2-pinnate, 1.5-4 times length of trophophore. ● Subalpine meadows and forest openings in the northern mountains. ♦ This species is a newly discovered allotetraploid, the name awaiting publication; we use the manuscript name that was used by Dauphin et al. (2017) and Farrar & Popovich (2010, 2012). ♦ Note: no publication of the name *Botrychium furculatum* is intended herein; it is used only for reference.



Botrychium hesperium (Maxon & R.T. Clausen) W.H. Wagner & Lellinger [western] [*Botrychium matricarifolium* (Döll) W.D. J. Koch subsp. *hesperium* Maxon & R.T. Clausen]. Plants up to 20 cm tall; trophophore mostly short-stalked, raised on a common stalk 3-13 cm long; blade short-stalked, oblong to subdelatate, up to 6 cm long, 1(-2)-pinnate, gray-green and dull when alive; pinnae to 6 pairs crowded to commonly overlapping, ovate to lanceolate with rounded apices, repand to lobed; basal pinnae often enlarged, lobed to pinnatifid; sporophore 3-10 cm tall, mostly with one or more long basal branches. ● Grassy slopes, old roads, other moist ground at high elevation in the northern mountains.



Botrychium lanceolatum (S.G. Gmelin) Angström [spear-shaped] [*Osmunda lanceolata* S.G. Gmelin]. Plants 5-35 cm tall; trophophore sessile or nearly so, raised on a common stalk 3-25 cm long; blade deltate, 1-2-pinnate, up to 7 cm long; pinnae up to 5 pairs, ascending, crowded, linear to broadly lanceolate, lobed to pinnatifid; lobes of basal pinnae elongated and pointed; all but the uppermost pinnae acutely lobed; sporophore usually ternately branched, stalk length shorter than to nearly equal to total trophophore length. ●High elevations in the northern mountains. ♦Plants of this species in the southwestern United States belong to subsp. ***lanceolatum***. This subspecies occurs in two phenotypes:

- a Common stalk maroon (at least at the base) or maroon-stripped; basal pinnae asymmetric with the innermost lower lobes clearly longer than opposing upper lobes, midribs usually upwardly curved...the **Red phenotype**
 a Common stalk completely green; basal pinnae ± symmetrically lobed, midribs usually straight...the **Green phenotype**



Red phenotype



Green phenotype



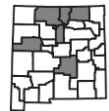
Botrychium minganense Victorin [from the Mingan Islands of Quebec] [*Botrychium lunaria* (Linnaeus) var. *minganense* (Victorin) Dole]. Plants 5-20 cm tall; trophophore stalked 0-2 cm, raised on a common stalk 3-11 cm long; blade lanceolate to oblong, once pinnate, up to 10 cm long; pinnae up to 10 pairs, horizontal to slightly spreading, approximate to remote, nearly circular, fan-shaped or ovate, margins nearly entire, shallowly crenate, sometimes pinnately lobed or divided; sporophore 1-pinnate (2-pinnate in robust plants), 1.5-2.5 times length of trophophore ●Disturbed ground at high elevations, often old logging roads, ski runs, clear cuts, mostly in the northern mountains, but also in Lincoln County.



Botrychium neolunaria Stensvold & Farrar [similar to *Botrychium lunaria*] [*Botrychium lunaria* of most North American reports]. Plants 5-25 cm tall; trophophore stalked 0-3 cm, raised on a common stalk 2-7 cm long; blade narrowly oblong to narrowly ovate, once pinnate; pinnae 3-8 pairs, remote to somewhat overlapping, usually sessile, fan-shaped to lunate, usually symmetrical, outer margins entire to undulate, sometimes shallowly cleft; sporophore 1-2-pinnate, 2-17 cm long (stalk 1-8 cm long), branches strongly ascending. ●Poorly to moderately well-drained open areas dominated by perennial, herbaceous vegetation; mostly northern mountains, but also from Lincoln County. ♦Specimens of *Botrychium lunaria* (Linnaeus) Swartz in the continental United States actually belong to this newly defined species (Stensvold & Farrar 2017).



Botrychium pinnatum H. St. John [like a feather]. Plants 3-12 cm tall; trophophore sessile to short-stalked (large plants), raised on a common stalk 3-7 cm long; blade oblong or somewhat narrowed at the tip, once pinnate (twice pinnate on larger plants); pinnae 7-11 pairs, sessile and decurrent on rachis, ovate to elliptical, entire or often with rounded pinnate lobing; sporophore erect, narrow, with ascending branches, 1-3-pinnate, 1-2 times length of trophophore. ●High elevation disturbed grassy slopes, old logging roads, woods; mostly northern mountains.



Botrychium simplex E. Hitchcock [simple, undivided]. Plants 3-15 cm tall; trophophore stalk 0-3 cm, arising at ground level or on a common stalk to 3 cm long; blade linear to oblong to ovate-oblong or triangular, simple to 2(3)-pinnate, up to 7 cm long; pinnae if present, up to 7 pairs, approximate to overlapping, cuneate to fan-shaped, asymmetric, divided or undivided; basal pair commonly much larger and more complex; sporophore mainly once pinnate, 1-8 times length of trophophore. ●Dry fields, marshes, moist to dry meadows, roadside ditches; northern mountains. ♦Our plants belong to var. ***simplex***, with the trophophore and sporophore joined near ground level and the trophophore simple or with undivided basal pinnae. This variety is often found in riparian-influenced areas or saturated substrates.



Botrychium tunux Stensvold & Farrar [a Native Alaskan warrior]. Plants 6-12 cm tall; trophophore stalk 0-1 cm long, raised on a common stalk 0-3 cm long; blade narrowly ovate to ovate, once pinnate, up to 7 cm long; pinnae 4-6 pairs, separated to slightly overlapping; basal pinnae asymmetric with expanded basal portions, middle and upper pinnae rounded; sporophore stalk shorter than or equal to total trophophore length, branching portion of sporophore about equal to stalk length, 1-2-pinnate, branches ascending to spreading, lowermost twisted and pointing downward and outward. ●Very high elevations near tree line, loose scree slopes; known only from Taos County.



Botrypus [grape-foot, alluding to the tuber-like gametophytes] RATTLESNAKE-FERN [1].

Plants more than 12 cm tall; leaf bud densely hairy; leaf absent in winter; sporophore and trophophore joined, arising from middle to distal portion of common stalk; trophophore sessile, blade deltate to ternately triangular, generally 3-4-pinnate, thin, herbaceous; first pinnule on basal pinnae usually borne on the side of the pinna facing the blade apex (acrosopically); sporophore long-stalked, 1-3-pinnate, commonly absent in young plants ♦2-3 species, worldwide.

Botrypus virginianus (Linnaeus) Michaux [from Virginia] [*Botrychium virginianum* (Linnaeus) Swartz, *Osmunda virginiana* Linnaeus]. Plants 12-80 cm tall, the common stalk 7-40 cm long; trophophore blade up to 25 cm long, 30 cm wide; pinnae up to 12 pairs, approximate to overlapping, herbaceous; pinnules lanceolate, with a midrib, deeply lobed, lobes narrow, serrate, apex pointed; sporophore 2-pinnate, 0.5-2 times length of trophophore. ●Moist shady forests in the northern mountains; known only from Los Alamos County. ♦This is the largest and most conspicuous of the grape-ferns (*Botrychium* and *Botrypus*), easily told by the large, highly divided, thin-textured, and lacy-cut leaves.



Ophioglossum [snake-tongue] ADDER'S TONGUE [1].

Leaves 1-2(-3), glabrous, erect to prostrate, common stalk absent to nearly as long as the trophophore; trophophore sessile or stalked; blade lanceolate or ovate to elliptic, simple, entire; venation profusely reticulate; sporophore simple, stalked, erect, borne at the base of the trophophore; sporangia in 2 rows, deeply sunken in the simple, linear or oblong sporophore tip. ♦25-30 species, nearly worldwide.

- Wagner, W.H., Jr. & F.S. Wagner. 1993. Ophioglossaceae, pp. 85-106. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Ophioglossum engelmannii Prantl [for Georg Engelmann (1809-1884), distinguished German-born botanist of St. Louis]. Plants 5-25 cm tall; common stalk 0-10 cm long; trophophore sessile to very short-stalked; blade ovate to narrowly elliptic, up to 10 cm long, 4 cm wide, commonly folded when alive; veins complex-reticulate with primary and secondary areoles; sporophore long-stalked, up to 2.5 times length of trophophore. ●Clayey depressions among limestone ridges. ♦The broadly ovate, succulent leaf mimics the hood of the adder, the sporophore appearing as the tongue. ♦Once collected in Doña Ana County; no specimens known currently.

Sceptridium [a staff or sceptre] GRAPE-FERN [1].

Plants more than 12 cm tall; leaf bud densely hairy; leaf evergreen for one year; sporophore and trophophore joined, arising from near ground level on a short common stalk; trophophore long-stalked, blade deltate to ternately triangular, generally 2-3-pinnate, herbaceous or leathery; first pinnule on basal pinnae usually borne on the side of the pinna facing the blade base (basiscopically); sporophore long-stalked, 1-3-pinnate, commonly absent or represented by a hairy rudiment. ♦15-20 species, worldwide.

Sceptridium multifidum (S.G. Gmelin) M. Nashida ex Tagawa [with many lobes or divisions] [*Botrychium multifidum* (S.G. Gmelin) Trevisan, *Botrychium multifidum* (S.G. Gmelin) Trevisan subsp. *coulteri* (Underwood) Clausen]. Plants 12-30 cm tall; common stalk 2-4 cm long; trophophore stalk 2-15 cm long, less than half to slightly longer than rachis; blade up to 25 cm long, 35 cm wide; pinnae up to 10 pairs, approximate to remote, thick and leathery; pinnules obtusely ovate, subentire to crenulate or lobed, lobes and apex rounded; sporophore long stalked, 2-3-pinnate, 5-15 cm long. ●Marshy streamside meadows, moist forests in the northern mountains.



POLYPODIACEAE POLYPODY FAMILY [1/2/2]

Plants perennial, homosporous, terrestrial, on rock or epiphytic; stems long- to short-creeping, bearing scales; leaves monomorphic or dimorphic; blades simple to pinnatifid or pinnate; sori borne on veins, round to oblong, paraphyses present or absent; sporangia on a short stalk; indusia absent. ♦The family contains 50-80 genera and about 1500 species; widespread in tropical areas and with a few temperate representatives. The status of this family is far from settled. In New Mexico the family is represented by one genus.

Polypodium [many-footed] POLYPODY [2].

Plants on rock, sometimes terrestrial; stems usually branched, sometimes with a waxy, whitish coating; leaves monomorphic, pinnatifid (sometimes 1-pinnate at the base); sori usually confined to distal region of leaf, circular to oval when immature, borne at tips of single veins, in 1-3 rows on either side of midrib. Species 100-125; worldwide, 2 in New Mexico.

■Haufler, C.H., M.D. Windham, F.A. Lang, & S.A. Whitmore. 1993. *Polypodium*. pp. 315-323. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Mickel, John T. & Alan R. Smith. 2004. *Polypodium*, pp. 477-494. The Pteridophytes of Mexico, The New York Botanical Garden Press.

1 Rhizome scales entire and symmetric, concolorous; blades to 7 cm wide; modified sporangia (and indument) absent ***P. hesperium***
 1 Rhizome scales toothed and contorted distally, with a dark median band; blades up to 4 cm wide; modified sporangia (sporangiasters) forming an indument ***P. saximontanum***

Polypodium hesperium Maxon [western] [*Polypodium vulgare* Linnaeus var. *columbianum* Gilbert, *Polypodium vulgare* Linnaeus var. *hesperium* (Maxon) A. Nelson & J.F. Macbride]. Stems sometimes with waxy coating, scales concolorous, brown or slightly mottled, lanceolate, usually symmetric; sori oval when immature; sporangiasters absent in mature sori, but occasional misshapen sporangia may be present. ●Cracks and ledges on non-calcareous substrates in forested mountains; scattered locations.



Polypodium saximontanum Windham [from rocky screes or talus, or the Rocky Mountains]. Stems often with waxy coating, scales weakly bicolored, lanceolate, contorted distally; sori circular when immature; sporangiasters present, usually less than 40 per sorus, heads with a few glandular hairs (rarely none). ●Cracks and ledges on rocks, usually granitic; known only from Rio Arriba county. ♦The presence of sporangiasters distinguishes this species from the very similar *P. hesperium*.



PTERIDACEAE BRAKE FAMILY [9/31/34]

Plants perennial, homosporous, on rock or terrestrial, generally small; stems compact to creeping, bearing hairs and/or scales; leaves monomorphic to dimorphic; blades 1-6 pinnate; indument on petioles, rachises, costae, and blades of hairs, glands, and/or scales, sometimes of white or yellow farina; sori borne abaxially in lines along veins or along the margins of the ultimate segments which are recurved or revolute forming a false indusium. ♦The family contains about 44 genera and about 1150 species; widely distributed, most diverse in the tropics. A number of species are adapted to arid regions.

■Gastony, G.J. & D.R. Rollo. 1998. Cheilantheid ferns (Pteridaceae: Cheilantheoideae) in the southwestern United States and adjacent Mexico – a molecular phylogenetic reassessment of generic lines. *Aliso* 17(2):131-144.

[Key to genera by Patrick J. Alexander]

- 1 Blades whitish- or yellowish-farinose on the lower surface
 - 2 Leaves palmatifid or pinnate-pinnatifid; smallest divisions of the leaf sessile, generally not distinctly separate
 - 3 Sporangia only along the leaf margin, which is reflexed to form a false indusium ***Notholaena***
 - 3 Sporangia scattered along veins, leaf margin not forming a false indusium..... ***Pentagramma***
 - 2 Leaves twice-pinnate or more compound; leaflets stalked, clearly distinct..... ***Argyrochosma***
- 1 Blades glabrous, pubescent, or scaly on the lower surface, but not whitish- or yellowish-farinose
 - 4 Sporangia scattered along veins, leaf margin not forming a false indusium
 - 5 Leaves once-pinnate to pinnate-pinnatifid, linear..... ***Astrolepis***
 - 5 Leaves palmatifid, pentagonal or deltate in outline ***Bommeria***
 - 4 Sporangia only along the leaf margin, which is reflexed to form a false indusium
 - 6 Rachis green or yellowish; fertile and vegetative leaves strongly dimorphic; alpine or subalpine habitats..... ***Cryptogramma***
 - 6 Rachis brownish to black; fertile and vegetative leaves not or only slightly dimorphic; various habitats but rarely alpine or subalpine
 - 7 Rachis pubescent or scaly
 - 8 Surfaces of the leaflets pubescent or scaly or, if glabrous, then the leaflets toothed to pinnatifid ***Myriopteris***
 - 8 Surfaces of the leaflets glabrous (rarely with a few scattered hairs on the central vein); leaflets not toothed or pinnatifid..... ***Pellaea***
 - 7 Rachis glabrous
 - 9 Leaflets toothed or shallowly lobed ***Adiantum***
 - 9 Leaflets entire
 - 10 Stem scales bicolored ***Pellaea***

10 Stem scales not bicolored (*A. microphylla*) *Argyrosma*

Adiantum [unwetterable] MAIDEN-HAIR FERN [1].

Plants terrestrial or on rock; stems suberect or short-to long-creeping, bearing scales; leaves monomorphic to somewhat dimorphic; petioles dark in color, grooved adaxially; blades 1-4-pinnate; ultimate segments round, fan-shaped, rhombic, or oblong; sori borne submarginally on abaxial surface on lobes which fold back forming a flap over the abaxial surface with the sori on the underside.

◆Nearly worldwide with 150-200 species.

■Mickel, John T., & Alan R. Smith. 2004. *Adiantum*, pp. 21-28. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Paris, C.A. 1993. *Adiantum*, pp. 125-130. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Adiantum capillus-veneris Linnaeus [the hair of Venus]. Stems short-creeping, scales concolorous, golden to medium brown; blades 2-pinnate or more divided; rachises glabrous; ultimate leaflets fan-shaped, rhombic, to nearly round, margins toothed to lobed, dark color of stalks extending into base of ultimate segments. ●Often found hanging on wet rocks, ledges, and canyon walls; scattered locations, mostly southern.



Argyrosma [silver powder] CLIFFBRAKE [4].

Plants usually on rock; stems compact, usually unbranched, scales concolorous, narrowly lanceolate; leaves monomorphic; petiole brown or black, mostly glabrous; blades 2-6-pinnate, abaxially glabrous or covered by whitish farina, adaxially glabrous or sparsely glandular; rachises glabrous; ultimate segments less than 4 mm wide, margins plane or recurved forming false indusia. ◆About 20 species, in the Americas.

■Mickel, John T., Alan R. Smith & Ivan A. Valdespino. 2004. *Argyrosma*, pp. 64-69. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Windham, M.D. 1993. *Argyrosma*, pp. 171-174. IN: Flora of North America, vol. 2. Oxford Univ. Press.

1 Lower surface of blades glabrous, lacking whitish mealy covering *A. microphylla*

1 Lower surface of blades obscured by whitish mealy covering

2 Ultimate leaf segments jointed, the dark color of the stalks stopping abruptly at the base of the segment, the margins of the segments flat, not recurved *A. incana*

2 Ultimate leaf segment not jointed, the dark color of the stalks continuing into the base of the segment on the lower surface, the margins of the segments recurved

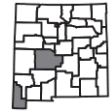
3 Rachises flexuous, zig-zag *A. fendleri*

3 Rachises ± straight, not zig-zag *A. limitanea*

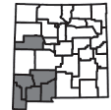
Argyrosma fendleri (Kunze) Windham [for Charles Augustus Fendler (1813-1883), German-born botanical collector] [*Notholaena fendleri* Kunze, *Pellaea fendleri* (Kunze) Prantl]. Stem scales brown; petioles dark brown; blades pinnate proximally, abaxially covered by whitish farina; pinnae costae distinctly flexuous, branches arising from angles; ultimate segments not jointed, stalk color continuing into segment base. ●Rocky slopes and cliffs, usually on granite or basalt; scattered mountain locations.



Argyrosma incana (C.Presl) Windham [ash-colored]. [*Notholaena incana* C. Presl] Stem scales brown; petioles black; blade 3-4-pinnate; blades abaxially covered by dense, white farina; pinnae costae straight or nearly so, branches not arising from angles; ultimate segments jointed at the base, stalk color stopping abruptly at bases; segment margins plane, not concealing sporangia. ●Volcanic ledges and canyon walls; southwestern. ◆*Argyrosma incana* is a mostly Mexican species.



Argyrosma limitanea (Maxon) Windham [on the border]. Stem scales brown; petioles reddish brown to black; blades 3-5-pinnate proximally; abaxially covered by dense white farina; pinnae costae straight to slightly flexuous, branches not arising from angles; ultimate segments not jointed at base, stalk color continuing into segment bases, segment margins recurved, often concealing sporangia. ◆There are two subspecies.

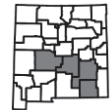


a Leaf blades broadly deltoid-ovate, 4- to 5-pinnate; proximal pinnae at least ½ as long as blades...subsp. *limitanea* [*Notholaena limitanea*

Maxon, *Pellaea limitanea* (Maxon) Morton]. ●Rocky slopes and cliffs, usually on calcareous or volcanic substrate; southwestern.

a Leaf blades lanceolate to oblong, 3- to 4-pinnate; proximal pinnae ¼ - ½ as long as blades...subsp. *mexicana* (Maxon) Windham [of Mexico] [*Notholaena limitanea* Maxon subsp. *mexicana* Maxon]. ●Rocky slopes and cliffs, usually on calcareous or volcanic substrates; southwestern.

Argyrosma microphylla (Mettenius ex Kuhn) Windham [small-leaved] [*Pellaea microphylla* Mettenius ex Kuhn, *Pellaea pulchella* sensu W&S]. Stem scales brown; petioles brown; blade 3- to 4-pinnate proximally, glabrous; pinnae costae straight to slightly flexuous, branches rarely arising from angles; ultimate segments jointed at base, stalk color stopping suddenly at segment bases, segment margins recurved to revolute, often concealing sporangia. ●Rocky limestone hillsides and cliffs in the southeastern region.



Astroblepis [star-like] CLOAKFERN [4].

Plants usually on rock; stems compact to short-creeping, sparingly branched; scales tan to chestnut brown, concolorous or weakly bicolored; leaves monomorphic; petioles chestnut brown or straw-colored, with scales; blades 1-pinnate, leathery, abaxially covered with overlapping, ciliate scales, adaxially with sparse to dense stellate or ciliate scales; pinnae stalked or sessile, usually more than 4 mm wide, segment margins plane, not recurved to form false indusia. ◆About 8 species, in the Americas.

■Benham, D.M. & M.D. Windham. 1993. *Astroblepis*, pp. 140-143. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Mickel, John T. & Alan R. Smith. 2004. *Astroblepis*, pp. 132-135. The Pteridophytes of Mexico, The New York Botanical Garden Press.

1 Largest leaf segments 4-7 mm long; most scales on the upper blade surface circular to elliptic and attached in the middle, those on the lower surface ovate and 0.5-1 mm long *A. cochisensis*

1 Largest leaf segments 7-35 mm long; most scales on the upper blade surface elongate and attached basally, those on the lower surface lanceolate and 1-1.5 mm long

2 Scales on the upper leaf surface dense, persistent; largest leaf segments asymmetrically lobed or entire *A. integerrima*

2 Scales on the upper leaf surface sparse, often deciduous; largest leaf segments usually symmetrically lobed

3 Upper leaf surface sparsely scaly, at least some scales persistent, the scales 2-4 cells wide; scales of lower leaf surface ciliate with coarse marginal projections; leaf segments shallowly lobed *A. windhamii*

3 Upper leaf surface sparsely scaly to glabrescent, most scales deciduous with age, the scales 1-2 cells wide; scales of lower leaf surface ciliate-dentate with delicate marginal projections; leaf segments usually deeply lobed *A. sinuata*

Astroblepis cochisensis (Goodding) D.M. Benham & Windham [from Cochise County, Arizona]. Stems compact; blades 1-pinnate to pinnate-pinnatifid; pinnae oblong, largest 4-7 mm long, entire or asymmetrically lobed, lobes 1-4; abaxial scales completely concealing surface; adaxial scales sparse, deciduous, stellate to ciliate, mostly circular to elliptic, peltate. ●Limestone cliffs and rocky slopes mostly in the southern portion of the state below 6500 ft. ◆There are two

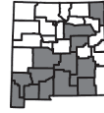


sympatric subspecies in New Mexico:

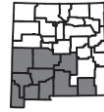
a Sporangia with 32 spores...subsp. *cochisensis* [*Notholaena cochisensis* Goodding, *Notholaena sinuata* (Lagasca) Kaulfuss var. *cochisensis* (Goodding) Weatherby].

a Sporangia with 64 spores...subsp. *chihuahuensis* D.M. Benham [of Chihuahua, Mexico].

Astrolepis integerrima (Hooker) D.M. Benham & Windham [entire] [*Notholaena sinuata* (Lagasca) Kaulfuss var. *integerrima* Hooker]. Stems compact; blades 1-pinnate to pinnate-pinnatifid; pinnae oblong to ovate, largest usually 7-15 mm long, entire or asymmetrically lobed, lobes 2-7, broadly rounded; abaxial scales concealing surface, ciliate with coarse marginal projections; adaxial scales abundant, stellate to coarsely ciliate, attached at base, mostly 5-7 cells wide. ●Rocky hillsides and cliffs, usually on limestone or other calcareous substrates; widespread, but more commonly southern.



Astrolepis sinuata (Lagasca ex Schwartz) D.M. Benham [wavy margined]. Stems compact to short-creeping; blade pinnate-pinnatifid; pinnae deltate to ovate, largest 7-35 mm, symmetrically and deeply lobed, lobes 6-14, often acute; abaxial scales concealing surface, ciliate with delicate marginal projections; adaxial scales, sparse, deciduous, elongate, stellate, body narrow, 1-3 cells wide. ●Rocky slopes and cliffs on calcareous and non-calcareous substrates; southern.

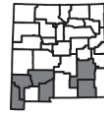


◆There are two subspecies in New Mexico:

a Sporangia with 32 spores; widespread across southern New Mexico...subsp. *sinuata* [*Acrostichum sinuatum* Lagasca ex Swartz, *Notholaena sinuata* (Lagasca ex Swartz) Kaulfuss].

a Sporangia with 64 spores; rare in southeastern New Mexico...subsp. *mexicana* D.M. Benham [of Mexico].

Astrolepis windhamii D.M. Benham [for Michael E. Windham, American botanist and student of the western flora]. Stems compact to short-creeping; blade pinnate-pinnatifid; pinnae ovate to deltate, largest 7-15 mm long, usually symmetrically but shallowly lobed; abaxial scales concealing surface, ciliate with coarse marginal projections; adaxial scales sparse, mostly persistent, elongate, usually stellate, body 2-4 cells wide. ●On calcareous and non-calcareous hillsides, cliffs, and rocky slopes; southern third of the state. ◆This species is derived from at least three other southwestern ferns, and is somewhat intermediate between *A. sinuata* and *A. integerrima*.

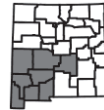


Bommeria [for Joseph Edouard Bommer (1829-1895), French botanist] BOMMERIA [1].

Plants terrestrial; stems prostrate, long-creeping; leaves monomorphic, scattered; blade pentagonal, divided into 3 segments, deeply pinnate-pinnatifid; abaxially with scales, coiled hairs, and straight hairs; margins not recurved to form false indusia. ◆Five species; North America to Central America.

■Haufler, C.H. 1993. *Bommeria*, pp. 151-152. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Mickel, John T. & Alan R. Smith. 2004. *Bommeria*, pp. 158-160. The Pteridophytes of Mexico, The New York Botanical Garden Press.

Bommeria hispida (Mettenius ex Kuhn) Underwood [shaggy, rough] [*Gymnopteris hispida* (Mettenius) Underwood, *Gymnogramma hispida* Kuhn]. Petioles generally rounded (sometimes distally grooved); blade about as long as wide, ultimate segments rounded at apex. ●Shady rocky ledges and rock crevices in the southern foothills and dry mountains. ◆This may be confused with *Notholaena standleyi* and *Pentagramma triangularis*, which have dense farina covering the lower surface of the leaves. This is the only species of the genus occurring north of Mexico.



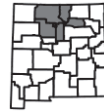
Cheilanthes...go to **Myriopteris**

Cryptogramma [hidden line, an allusion to the hidden sori] ROCKBRAKE [1].

Plants on rock; stems decumbent to erect, or creeping; leaves dimorphic, sterile leaves shorter than fertile leaves; petioles dark at the base, green to pale brownish distally, grooved adaxially; blades 2-4-pinnate, abaxially glabrous, adaxially glabrous or sparsely pubescent; segments of sterile leaves elliptic, or ovate to fan-shaped, usually less than 4 mm wide, margins flat; fertile segments lanceolate to linear, usually less than 2 mm wide, margins reflexed to form false indusia. ◆Species 8-11; North & South America, Eurasia.

■Alverson, E.R. 1993. *Cryptogramma*, pp. 137-139. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Cryptogramma acrostichoides R. Brown [resembling *Acrostichum*] [*Cryptogramma crispa* (Linnaeus) R. Brown var. *acrostichoides* (R. Brown) C.B. Clarke]. Stems decumbent to erect, many branched; blade 2-3-pinnate, somewhat leathery; segments of sterile leaves oblong to ovate-lanceolate, margins crenate to dentate; segments of fertile leaves linear, margins revolute, covering sporangia. ●Non-calcareous cliff faces, talus, and rocky slopes; northern forests, often at high elevation.



Myriopteris [with many wings] LIPFERN. [12].

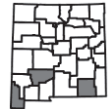
Plants on rock or terrestrial; stems compact to long-creeping, with concolorous or bicolored scales; petioles reddish brown to black, scaly and/or pubescent to almost glabrous; rachises terete, somewhat flattened, or grooved, with indument like petioles; blades 2-4-pinnate, adaxial surfaces glabrous or pubescent, abaxial surfaces scaly and/or pubescent to almost glabrous; ultimate segments round to oblong-ovate or spatulate, veins obscure, margins usually recurved forming a false indusium; sporangia in sexual species with 64 spores, in apomictic species with 32 spores. ◆The North American members of *Cheilanthes* have been removed to a monophyletic *Myriopteris*, following Grusz & Windham (2013). Species 47, North America to Central America.

■Grusz, A. & M.D. Windham 2013. Toward a monophyletic *Cheilanthes*: The resurrection and recircumscription of *Myriopteris* (Pteridaceae). *PhytoKeys* 32: 49-64. ■Grusz, A. 2013. *Myriopteris windhamii* sp.nov., a new name for *Cheilanthes villosa* (Pteridaceae). *American Fern Journal* 103(2): 112-117. ■Mickel, J.T. & A.R. Smith. 2004. *Cheilanthes*, pp. 176-213. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Todsén, T.K. 1980. A report on the survey for rare plant species at the Bioresearch Ranch, central Peloncillo Mountains, Hidalgo County, New Mexico [*Cheilanthes pringlei*]. New Mexico State Heritage Program, Department of Natural Resources. ■Wagner, W.L. 1979. New records to the Animas Mountain flora, New Mexico [*Cheilanthes pringlei*]. *Southw. Naturalist* 24(2):291-296. ■Windham, M.D. 2011. Plant distribution reports (*Cheilanthes horridula*). The New Mexico Botanist 53:4. ■Windham, M.D. & E.W. Rabe. 1993. *Cheilanthes*, pp. 152-169. IN: Flora of North America, vol. 2. Oxford Univ. Press.

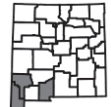
- 1 Midveins with multiseriate scales on the lower surface, sometimes intermixed with hairs; venation not circinate, the expanding leaves hooked but not coiled at the tips
 - 2 Rachises grooved on one side; ultimate segments spatulate; sori discontinuous, confined to the lobes.....*M. pringlei*
 - 2 Rachises rounded to slightly flattened, not grooved; ultimate segments round, elliptic, or oblong; sori ± continuous around the margins
 - 3 Ultimate laminar portion of segments scabrous, covered with stiff hairs; largest fertile ultimate segments 3-5 mm long*M. scabra*
 - 3 Ultimate laminar portion of segments smooth, lacking stiff hairs; largest fertile ultimate segments less than 3 mm long
 - 4 Midvein scales linear, inconspicuous, the largest less than 0.5 mm wide*M. tomentosa*
 - 4 Midvein scales lanceolate to ovate, conspicuous, the largest 0.4-1.5 mm wide

- 5 Margins of midvein scales entire to erose or denticulate, not ciliate
- 6 Ultimate segments glabrous on the upper surface; stems long-creeping; stem scales mostly uniformly colored *M. fendleri*
- 6 Ultimate segments pubescent on the upper surface; stems compact; stem scales mostly bicolored with a dark central portion and a lighter margin
- 7 Segments densely tomentose with fine hairs on the lower surface in addition to the midvein scales, which do not conceal the segment..... *M. rufa*
- 7 Segments nearly glabrous below except for the midvein scales that usually nearly conceal the segment. *M. windhamii*
- 5 Margins of midvein scales ciliate, especially near the base
- 8 Segments appearing densely tomentose on the upper surface, the midvein scales with fine curly cilia forming an entangled mass *M. lindheimeri*
- 8 Segments appearing glabrous or sparsely pubescent above, the midvein scales with coarse cilia that are not strongly entangled
- 9 Segments appearing glabrous above; midvein scales often ciliate only in the basal ½; stem scales usually brown, uniformly colored..... *M. wootonii*
- 9 Segments appearing sparsely pubescent above; midvein scales usually ciliate the entire length; stem scales dark brown, often bicolored..... *M. yavapensis*
- 1 Midveins lacking multiseriate scales, but pubescent or glabrous, or midvein absent; veneration circinate or not, the expanding leaves tightly coiled at the tip in most species
- 10 Rachises and segments essentially glabrous; petioles grooved for most their length *M. wrightii*
- 10 Rachises and often the segments pubescent or glandular; petioles never grooved below the middle
- 11 Rachis hairs of two different kinds, long divergent hairs and tortuous appressed hairs; segments nearly glabrous below *M. alabamensis*
- 11 Rachis hairs all the same; segments conspicuously pubescent
- 12 Ultimate segments elongate, not beadlike, the largest 1-7 mm long; blades pinnate-pinnatifid throughout *M. aurea*
- 12 Ultimate segments round to slightly oblong, beadlike, the largest 1-3 mm long; blades 3-pinnate at the base..... *M. gracilis*

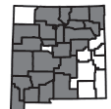
Myriopteris alabamensis (Buckley) Grusz & Windham [from Alabama] [*Cheilanthes alabamensis* (Buckley) Kunze, *Pteris alabamensis* Buckley]. Vernation noncircinate; petioles black, rounded; blades 2-pinnate; rachises rounded adaxially, lacking scales, abaxially with long divergent hairs, adaxially with tortuous appressed hairs; costae mostly green adaxially, without scales; ultimate segments not beadlike, sparsely hirsute to glabrescent above and below. ●Limestone ledges in the southern mountains; uncommon.



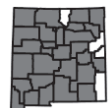
Myriopteris aurea (Poiret) Grusz & Windham [golden] [*Acrostichum bonariense* Willdenow, *Cheilanthes bonariensis* (Willdenow) Proctor, *Notholaena aurea* (Poiret) Desvaux, *Notholaena bonariensis* (Willdenow) C. Christensen, *Pellaea ferruginea* Nees, *Pteris aurea* Poiret]. Vernation noncircinate; petioles dark brown, rounded, not grooved below the middle; blades pinnate-pinnatifid; rachises rounded adaxially, lacking scales, densely pubescent; pinnae jointed at the base, costae absent; ultimate segments not beadlike, elongate, largest 1-7 mm long, abaxially densely tomentose, margins recurved forming weakly defined false indusia. ●Cliffs and ledges, rarely on limestone; southern border areas.



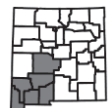
Myriopteris fendleri (Hooker) E. Fournier [for Augustus Fendler (1813-1883), German-born botanical collector] [*Cheilanthes fendleri* Hooker]. Stems long-creeping, 1-2 mm in diameter, scales mostly concolorous; vernation noncircinate; petioles usually dark brown, rounded adaxially; blades 3-4-pinnate, rachises somewhat scaly, not pubescent; pinnae not jointed at the base, costae green with conspicuous imbricate scales which are not ciliate; ultimate segments beadlike, glabrous above, mostly glabrous below. ●Widespread on rocky slopes and ledges.



Myriopteris gracilis Fée [graceful, slender] [*Cheilanthes feei* T. Moore]. Stems compact to short-creeping; scales brown, some with dark central stripe; vernation circinate; petioles dark brown to black, rounded, lacking scales but pubescent; blades 3-pinnate at base; pinnae not jointed; costae mostly brown adaxially, lacking scales below; ultimate segments round, beadlike, 1-3 mm, densely villous below, sparsely hirsute to glabrescent above. ●Cliffs and ledges, usually on limestone or sandstone; widespread. ♦The small fronds and tiny beadlike segments of this fern are distinctive.



Myriopteris lindheimeri (Hooker) J. Smith [for Ferdinand Jakob Lindheimer (1801-1879), German-Texan botanist] [*Cheilanthes lindheimeri* Hooker]. Stems long-creeping; vernation noncircinate; petioles dark brown, rounded; blades 4-pinnate at base; rachises with linear-lanceolate scales, also sparsely pubescent, not grooved; pinnae not jointed, appearing densely tomentose above, costae mostly green, abaxially with conspicuous lanceolate scales 0.4-1.5 mm wide, marginally long-ciliate, cilia fine, curly, tangled; ultimate segments beadlike less than 1mm long, surfaces mostly glabrous, obscured by tangled cilia. ●Cliffs and ledges on a variety of substrates; southwestern. ♦Confused with *Myriopteris wootonii* and *M. yavapensis*, which do not have fine curly cilia on the midvein scales.



Myriopteris pringlei (Davenport) Grusz & Windham [for Cyrus Guernsey Pringle (1838-1911), American botanical collector] [*Cheilanthes pringlei* Davenport]. Stems long-creeping, 1-3 mm in diameter; vernation noncircinate; petioles dark brown, grooved distally; blade 3-pinnate-pinnatifid at the base; rachises grooved, with scattered lanceolate scales, not pubescent; pinnae not jointed; costae mostly green, not pubescent, abaxially with conspicuous lanceolate scales not concealing ultimate segments, margins not ciliate; ultimate segments not beadlike, spatulate, adaxially glabrous. ●Rocky slopes and ledges, usually on igneous substrates. ♦Often reported for New Mexico, but this is a strictly Sonoran Desert fern; perhaps to be found in the bootheel region, if at all.

Myriopteris rufa Fée [rusty, reddish brown] [*Cheilanthes eatonii* Baker]. Stems compact, 4-8 mm in diameter, scales with dark central stripe, pale margins; vernation noncircinate; petioles dark brown, rounded; blades 3-4-pinnate at base; rachises rounded, not grooved, pubescent and with scattered linear-lanceolate scales, scales not ciliate; pinnae not jointed, appearing tomentose to glabrescent above, costae mostly green below, with linear to lanceolate scales less than 1 mm wide, not concealing ultimate segments; ultimate segments beadlike, densely tomentose below, pubescent to



glabrescent above. ●Cliffs and ledges on a variety of substrates throughout the state.

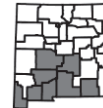
Myriopteris scabra (C. Christensen) Grusz & Windham [rough] [*Cheilanthes horridula* Maxon, *Cheilanthes scabra* C. Christensen]. Stems short-creeping, 4-7 mm in diameter; vernation noncircinate; petioles dark brown to black, rounded; blades pinnate-pinnatifid to 2-pinnate at the base; rachises rounded with scattered linear-lanceolate scales, sparsely hirsute abaxially, adaxially with tortuous appressed hairs; pinnae not jointed; costae mostly green, with somewhat inconspicuous lanceolate scales, margins not ciliate; ultimate segments narrowly elliptic, not beadlike, largest 3-5 mm, both surfaces scabrous with usually pustulose hairs. ●Rocky plains and bluffs in the southeastern region, usually on limestone; not common.



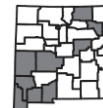
Myriopteris tomentosa (Link) Fée [tomentose] [*Cheilanthes tomentosa* Link]. Stems compact, 4-8 mm in diameter, scales mostly bicolorous; vernation noncircinate; petioles dark brown, rounded; blades usually 4-pinnate at base; rachises rounded, pubescent, with scattered inconspicuous linear scales; pinnae not jointed; costae mostly green, abaxial scales inconspicuous, linear, less than 0.5 mm wide, usually entire, not concealing ultimate segments; ultimate segments oval, beadlike, the largest 1-2 mm, abaxially densely tomentose, adaxially pubescent with fine hairs. ●Rocky slopes and ledges on a variety of substrates, including limestone and granite, in the southern third of the state.



Myriopteris windhamii Grusz [for Michael D. Windham (1954-x), American botanist] [*Cheilanthes villosa* Davenport ex Maxon, *Cheilanthes myriophylla* Desvaux]. Stems compact, 4-8 mm in diameter, scales bicolorous with dark central stripe and pale margins; vernation noncircinate; petioles dark brown, rounded; blades 3-4-pinnate at base; rachises rounded, not pubescent, with scattered filiform to lanceolate scales; pinnae not jointed, appearing villous adaxially; costae mostly green, abaxially with conspicuous lanceolate to ovate scales, often concealing ultimate segments, not ciliate; ultimate segments beadlike, the largest 1-2 mm, abaxially nearly glabrous, adaxially villous with coarse hairs. ●On limestone cliffs and ledges in the southern third of the state.



Myriopteris wootonii (Maxon) Grusz & Windham [for Elmer Ottis Wooton (1865-1945), premier New Mexico botanist] [*Cheilanthes wootonii* Maxon]. Stems long-creeping, 1-3 mm in diameter, scales mostly uniformly brown; vernation noncircinate; petioles dark brown, rounded; blades 3-4-pinnate at base; rachises rounded, pubescent, with scattered linear-lanceolate scales; pinnae not jointed, appearing glabrous adaxially; costae mostly green, abaxial scales conspicuous, lanceolate-ovate, often concealing ultimate segments, ciliate, usually in the basal 1/2; ultimate segments beadlike, largest 1-3 mm abaxially nearly glabrous, adaxially glabrous. ●Widespread on usually igneous cliffs and ledges.



Myriopteris wrightii (Hooker) Grusz & Windham [for Charles Wright (1822-1885), outstanding American botanical collector] [*Cheilanthes wrightii* Hooker]. Stems long-creeping, 1-3 mm in diameter, scales mostly uniformly brown; vernation circinate; petioles brown, grooved; blades 2-pinnate-pinnatifid at base; rachises grooved, not scaly or pubescent; pinnae not jointed; costae mostly green, without scales abaxially; ultimate segments oblong to linear, not beadlike, glabrous on both surfaces. ●Ledges and rocky slopes on igneous substrates; southwestern.



Myriopteris yavapensis (T. Reeves ex Windham) Grusz & Windham [from Yavapai County or region, Arizona] [*Cheilanthes yavapensis* T. Reeves ex Windham]. Stems long-creeping, 1-3 mm in diameter, scales often bicolorous with dark central stripe and brown margins; vernation noncircinate; petioles dark brown, rounded; blade 4-pinnate at base; rachises rounded, pubescent, with scattered linear-lanceolate scales; pinnae not jointed, appearing sparsely pubescent above; costae mostly green, with conspicuous lanceolate scales, often concealing ultimate segments, ciliate, cilia usually on entire length of scales; ultimate segments beadlike, largest 1-2 mm, mostly glabrous on both surfaces. ●Rocky slopes, cliffs, and ledges of igneous origin; southwestern. ♦Easily confused with *Myriopteris wootonii*, from which it was recently segregated.



Notholaena [false cloak] CLOAKFERN [2].

Plants usually on rock; stems short-creeping to compact, with subulate to lanceolate scales; leaves monomorphic; blades pinnate-pinnatifid to 4-pinnate, abaxially with yellowish or whitish farina; ultimate segment margins recurved to form false indusia. ♦Species 25, North America to South America.

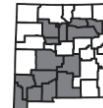
■Mickel, John T. & Alan R. Smith. 2004. *Notholaena*, pp. 411-424. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Windham, M.D. 1993. *Notholaena*, pp. 143-149. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Kao, T.-T., C.J. Rothfels, A. Melgoza-Castillo, K.M. Pryer, & M.D. Windham. 2020. Intraspecific diversification of the star cloak fern (*Notholaena standleyi*) in the deserts of the United States and Mexico. *Amer. J. Bot.* 107(4): 658-675.

- 1 Frond linear-lanceolate in outline; lower blade surfaces with scales and a whitish mealy covering; upper surfaces with glandular hairs *N. grayi*
- 1 Frond maple leaf-shaped in outline (pentagonal); lower blade surfaces without scales but with a dense yellowish mealy covering; upper surfaces without glandular hairs..... *N. standleyi*

Notholaena grayi Davenport [for Asa Gray (1810-1898), preminent American botanist of the 19th century] [*Cheilanthes grayi* (Davenport) Domin]. Stem scales concolorous to weakly bicolorous; petioles equal to or shorter than blades, rounded, glandular-farinoso, with scattered hairs and scales; blades 2-pinnate-pinnatifid, 3-6 times longer than wide, with conspicuous whitish farina below along with lanceolate, entire scales scattered along rachises and costae, distinctly glandular above. ●Rocky slopes and cliffs in the arid southwestern mountains. ♦Only subsp. *grayi* with 16 spores per sporangium occurs east of Arizona.



Notholaena standleyi Maxon [for Paul Carpenter Standley (1884-1963), North American botanist and scholar of the New Mexico flora] [*Notholaena hookeri* D.C. Eaton]. Stem scales strongly bicolorous, with dark centers and brown, well defined margins; petioles equal to or longer than blades, glabrous except for a few scales at base; blades pentagonal, deeply pinnatifid but not fully pinnate above base, 1-2 times longer than wide, with conspicuous yellowish farina below but without scales, glabrous above. ●Rocky slopes and cliffs on a variety of substrates, widespread. ♦Our populations comprise diploid (common on various substrates) and tetraploid (uncommon on limestone) races.



Pellaea [dusky or dark-colored] CLIFFBRAKE [5].

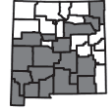
Plants usually on rock; stems compact to long-creeping, with linear-subulate to lanceolate scales; leaves monomorphic to dimorphic; blades 1-4-pinnate proximally, often leathery, glabrous above, below glabrous, pubescent, or with scales; ultimate segments usually stalked, more than 4 mm wide, margins reflexed forming false indusia. ♦About 40 species, mostly in the Western Hemisphere.

■Mickel, John T. & Alan R. Smith. 2004. *Pellaea*, pp. 443-452. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Windham, M.D. 1993. *Pellaea*, pp. 175-186. IN: Flora of North America, vol. 2. Oxford Univ. Press.

- 1 Petioles and rachises straw-colored, tan, or gray, rarely shiny *P. intermedia*

- 1 Petioles and rachises dark brown to black, usually shiny
 - 2 Stem (rhizome) scales bicolored, with a dark central region (like a midrib) and a lighter marginal region
 - 3 Pinnae with 3-9 ultimate segments *P. wrightiana*
 - 3 Pinnae with 9-25 ultimate segments *P. truncata*
 - 2 Stem (rhizome) scales uniformly colored
 - 4 Leaf segments glabrous or nearly so on the lower surface; rachis nearly glabrous *P. glabella*
 - 4 Leaf segments sparsely pubescent on the lower surface on the midvein; rachis with short curly hairs, at least on one side *P. atropurpurea*

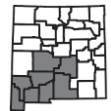
Pellaea atropurpurea (Linnaeus) Link [dark purple] [*Pteris atropurpurea* Linnaeus]. Stem scales uniformly reddish brown or tan, linear-subulate; leaves somewhat dimorphic, sterile, shorter and less divided than fertile leaves; petioles dark, lustrous, rounded; blades 2-pinnate at base; rachises reddish purple, rounded, densely pubescent adaxially with short, curly, appressed hairs; ultimate segments leathery, sparsely villous near costae; costae often longer than ultimate segments; sporangia long-stalked. ●Widespread in the state, often on calcareous cliffs, ledges, and rocky places.



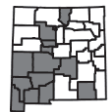
Pellaea glabella Mettenius ex Kuhn [somewhat glabrous] [*Pellaea suksdorfiana* Butters]. Stem scales reddish brown, linear-subulate; leaves monomorphic; petioles brown, lustrous, rounded; blades 1-2-pinnate at base; rachises brown, rounded, nearly glabrous; proximal pinnae with 3-7 lobes or ultimate segments; ultimate segments essentially glabrous; sporangia long-stalked containing 32 spores. ●Limestone cliffs and ledges. ♦Our material is subsp. *simplex* (Butters) A. Löve & D. Löve [undivided, single] [*Pellaea glabella* Mettenius ex Kuhn var. *simplex* Butters], with ultimate segments essentially glabrous and with sporangia containing 32 spores. It occurs from northern Arizona through Utah and eastern Colorado to Wyoming and South Dakota as well as in the far northwest and British Columbia; in New Mexico it is known from one specimen in Grant County.



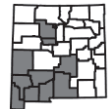
Pellaea intermedia Mettenius ex Kuhn [intermediate in some feature]. Stems slender, creeping, scales mostly bicolored with black center and brown margins; leaves monomorphic; petioles straw-colored, tan or gray, not lustrous; blades usually 2-pinnate at base; rachises tan, rounded, pubescent; pinnae perpendicular to rachises; ultimate segments ovate to elliptic, leathery, margins recurved on fertile segments. ●Southern third of the state on rocky slopes and ledges. ♦The light colored petioles and rachises and the ovate to elliptic ultimate segments of this fern are distinctive.



Pellaea truncata Goodding [chopped off square, as in a sawed trunk] [*Pellaea longimucronata* Hooker, *Pellaea wrightiana* Hooker var. *longimucronata* (Hooker) Davenport]. Stem scales linear-subulate, bicolored with black, thick centers and thin brown margins; leaves mildly dimorphic, sterile shorter and less divided than fertile leaves; petioles dark brown, lustrous, flattened or somewhat grooved; blades 2-pinnate at base; rachises brown, glabrous, shallowly grooved; pinnae with 9-25 ultimate segments; costae much longer than fertile ultimate segments; ultimate segments leathery, glabrous; apices mucronate. ●Widespread on cliffs and rocky slopes, but rarely on limestone.



Pellaea wrightiana Hooker [for Charles Wright (1811-1885), outstanding American botanical collector] [*Pellaea ternifolia* (Cavanilles) Link var. *wrightiana* (Hooker) Tryon]. Stem scales linear-subulate, bicolored with black thick centers and thin brown margins; leaves monomorphic; petioles dark brown, lustrous, flattened or somewhat grooved; blades 2-pinnate at base; rachises brown, glabrous, shallowly grooved; pinnae with 3-9 ultimate segments; costae shorter than ultimate segments; ultimate segments leathery, glabrous, apices mucronate. ●Nearly throughout the state on arid cliffs and rock faces.



Pentagramma [five lines, for the pentagonal leaf blades] GOLDFERN [1].

Plants terrestrial or on rock; stems short-creeping, scales narrowly lanceolate, bicolored with a black, hard, central stripe and tan margins; leaves monomorphic; blades triangular-pentagonal, 1-2-pinnate-pinnatifid at base, farinose below, glabrous or glandular above; margins of ultimate segments not recurved to form false indusia. ♦Species 2; North America and Mexico.

■Mickel, John T., Alan R. Smith & Ivan A. Valdespino. 2004. *Pentagramma*, pp. 453-454 The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Schuettpelz, Eric, Kathleen M. Pryer & Michael D. Windham. 2015. A unified approach to taxonomic delimitation in the fern genus *Pentagramma* (Pteridaceae). *Systematic Botany* 40(3):629-644.

■Yatskievych, G. & M.D. Windham. 1993. *Pentagramma*, pp. 149-151. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

Pentagramma maxonii (Weatherby) Schuettpelz & Windham [for William Ralph Maxon (1877-1948), U.S. fern specialist] [*Gymnogramma triangularis* Kaulfuss, *Pentagramma triangularis* (Kaulfuss) Yatskievitch, Windham & Wollenweber subsp. *maxonii* (Weatherby) Yatskievitch, Windham & Wollenweber, *Pityrogramma triangularis* (Kaulfuss) Maxon var. *maxonii* Weatherby, *Pityrogramma triangularis* (Kaulfuss) Maxon]. Petioles reddish to dark brown, glabrous or white-farinose at base; blades herbaceous, densely white-farinose below, with scattered yellow, capitate glands above; sporangia scattered along veins. ●Pine-oak woodlands in the bootheel. ♦*Pentagramma maxonii* resembles *Notholaena standleyi* and *Bommeria hispida*; *Notholaena standleyi* has strictly marginal sori and false indusia; *Bommeria hispida* is never farinose abaxially.



SALVINIACEAE FLOATING-FERN FAMILY [2/3/3]

Small, heterosporous aquatic, free-floating plants; Stems slender, branching, glabrous or hairy; roots either long and pendent or absent; leaves either monomorphic and bilobed with the upper lobe aerial and green and the lower colorless and floating, or dimorphic in whorls of three with two floating and one submerged; sporocarps either attached to the low lobes of bilobed leaves, or to the submerged leaves, each sporocarp bearing either a megaspore in each megasporangium or numerous microspores in each microsporangium. ♦The family contains 2 genera and about 20 species; nearly worldwide.

We follow current circumscription in including Azollaceae in the Salviniaceae.

■Allred, K.W. 1999. New plant distribution records. *The New Mexico Botanist* 13:7. [*Salvinia minima*]. ■Lumpkin, T.A. 1993. Azollaceae, pp. 338-342. IN: *Flora of North America*, vol. 2. Oxford Univ. Press. ■Mickel, John T. & Alan R. Smith. 2004. *Azolla*, pp. 139-141. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Mickel, John T. & Alan R. Smith. 2004. *Salvinia*, pp. 546-547. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Nauman, C.E. 1993. Salviniaceae, pp. 336-337. IN: *Flora of North America*, vol. 2. Oxford Univ. Press.

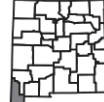
- 1 Roots simple, unbranched; leaves uniform, alternate, with each leaf papillate and divided into an upper aerial lobe and a lower submerged lobe..... *Azolla*
- 1 Roots absent; leaves dimorphic in whorls of three with two lateral and floating, and the third submerged and dissected into filiform, hairy segments..... *Salvinia*

Azolla [alluding to death] MOSQUITO-FERN [2].

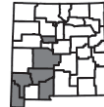
Small, feather-like, plants; stems horizontal, usually not green, with hanging, unbranched roots; leaves sessile, alternate, each leaf bilobed, upper lobe green or red with narrow pale margins, lower lobe colorless; sporangia in nut-like unisexual sporocarps; microsporocarps globose, containing numerous microsporangia; megasporocarps globose, containing one megasporangium producing one megaspore. ♦Species about 6. Plants in this genus have a symbiosis with the nitrogen-fixing cyanobacterium, *Anabaena azollae*, which is present in cavities in the upper leaf lobes.

- 1 Largest hairs on upper leaf lobes unicellular; megaspores warty with raised angular bumps *A. filiculoides*
- 1 Largest hairs on upper leaf lobes with 2 or more cells; megaspores pitted but not warty with raised angular bumps *A. mexicana*

Azolla filiculoides Lamarck [resembling a small fern]. Tiny aquatic ferns forming dense mats on still water; leaves green to yellowish green or dark reddish; largest hairs on upper leaf lobes strictly unicellular; megaspore surface warty with raised angular bumps, each with a tangle of filaments. ●Still water, sometimes on mud; known only from Hidalgo County.



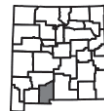
Azolla mexicana Schlechtendal & Chamisso ex Kunze [from or pertaining to Mexico]. Minute aquatic ferns capable of forming dense mats across still water (supposedly smothering mosquito larvae); leaves green to blue-green, often red in full sun or when under stress; largest hairs on upper leaf lobe near stem 2(-3) celled; megaspore surface pitted and sparsely covered with a few long filaments. ●Still or barely moving water, sometimes on mud; scattered riparian areas, mostly southwestern.



Salvinia [for Antonio Maria Salvini (1653-1722), Italian poet and scholar] WATER-SPANGLES [1].

Stems with many hairs; submerged leaves give rise to chain-like clusters of sporocarps, both megasporocarps (few, proximal) and microsporocarps (numerous distal) attached to the same leaf; megasporocarps with 10-40 sporangia, each producing only one mature megaspore; microsporocarps with 100 or more microsporangia. ♦About 10 species, 7 from North America to South America, 3 from Eurasia and Africa.

**Salvinia minima* Baker [smallest]. Floating leaves elliptic to suborbicular, obtuse or notched at tip, upper surface with numerous conical papillae, the apex of each with 4 spreading hairs, free at their tips; sporocarps sessile. ●Known only from a single collection from a pond on the campus of New Mexico State University; definitely adventive there.



SELAGINELLACEAE SPIKE-MOSS FAMILY [1/11/12]

Plants perennial, heterosporous, terrestrial, on rock, sometimes epiphytic, usually less than 5 cm tall; leaves (microphylls) less than 1 cm long, with a single vein, monomorphic or dimorphic; sporangia borne in the axils of overlapping sporophylls clustered to form strobili; strobili 4-angled (rarely cylindrical), sometimes flattened; sporophylls usually monomorphic, slightly or highly differentiated from sterile leaves. ♦The family contains 1 genus and about 750 species worldwide.

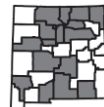
Selaginella [resembling *Lycopodium selago*] SPIKE-MOSS [11].

Stems leafy, regularly or irregularly forked or branched; modified leafless shoots producing roots usually present; if leaves monomorphic, then linear to narrowly lanceolate and spirally arranged; if leaves dimorphic, then round to lanceolate and arranged in 4 ranks, 2 lateral and spreading and 2 median, smaller, appressed, and ascending.

■Mickel, John T., Alan R. Smith & Ivan A. Valdespino. 2004. *Selaginella*, pp. 550-602. The Pteridophytes of Mexico, The New York Botanical Garden Press. ■Valdespino, I.A. 1993. Selaginellaceae, pp. 38-63. IN: Flora of North America, vol. 2. Oxford Univ. Press.

- 1 Leaves of the aerial stems arranged in 4 distinct ranks; axillary leaves present at branching points
 - 2 Leaves without a bristle-tip, the margins with a wide transparent portion *S. lepidophylla*
 - 2 Leaves with a bristle-tip 1/3 to 1/2 the length of the leaf, the margins with a narrow transparent portion *S. pilifera*
- 1 Leaves of the aerial stems not in distinct ranks; axillary leaves absent at branching points
 - 3 Stems prostrate, the two sides (under- and upper-) differentiated; leaves at least slightly dimorphic
 - 4 Upper-side leaves 2-3 mm long; underside leaves decurrent *S. peruviana*
 - 4 Upper-side leaves 3-4 mm long; underside leaves abruptly adnate or slightly decurrent *S. wrightii*
 - 3 Stems pendent, erect, ascending, or rarely prostrate, radially symmetric or the two sides only slightly differentiated
 - 5 Aerial stems erect or ascending; bud-like arrested branches usually present on rhizome
 - 6 Base of leaf decurrent *S. weatherbiana*
 - 6 Base of leaf abruptly adnate
 - 7 Leaf bristle 0.6-2 mm long; all cilia of the leaf long and spreading outward *S. rupincola*
 - 7 Leaf bristle 0.3-0.5 mm long; cilia at the apex of the leaf short and ascending, those at the base long and spreading *S. ×neomexicana*
 - 5 Aerial stems creeping or decumbent, never erect; bud-like arrested branches absent
 - 8 Leaves of main stem adnate to the stem and distinct from the stem in color, the bases usually rounded *S. mutica*
 - 8 Leaves of main stem decurrent and not distinct from the stem in color, the bases cuneate or oblique
 - 9 Main stems radially symmetric, the leaves equal in size *S. underwoodii*
 - 9 Main stems with the two sides slightly differentiated, the leaves unequal in size
 - 10 Leaf bristle 1-2 mm long, conspicuously puberulent; leaf margins usually long-ciliate (the cilia nearly microscopic, however) *S. densa*
 - 10 Leaf bristle 0.5-1 mm long, hardly puberulent; leaf margins short-ciliate *S. scopulorum*

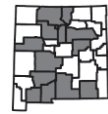
Selaginella densa Rydberg [compact]. Plants terrestrial or on rock; stems creeping or decumbent, never erect, mat-forming; upper-side leaves smaller than underside ones; underside leaf bases oblique, long decurrent; upper-side leaf bases oblique, slightly decurrent; leaf apices abruptly long-bristled, bristles 1-2 mm long, conspicuously puberulent; leaf margins long-ciliate; sporophylls with margins ciliate the entire length, apices usually long-bristled. ●Dry rocky slopes, rock crevices, gravelly or sandy or clay soils, often at high altitudes in the mountains. ♦Distinguished with difficulty from *S. scopulorum*, which may be conspecific.



Selaginella lepidophylla (Hooker & Greville) Spring [scaly-leaved] RESURRECTION PLANT [*Lycopodium lepidophyllum* Hooker & Greville]. Plants terrestrial or on rock; stems flat when moist, curled up when dry, axillary leaves present at branching points; leaves thick, stiff, in 4 ranks, 2 median, 2 lateral; lateral leaves somewhat longer and wider than median, lateral leaves rounded at the apex, median leaves abruptly acuminate; all leaves with a wide transparent margin. ●Dry rocky soil and limestone talus in the southern mountains. ♦Known from a single collection in Sierra County.



Selaginella mutica D.C. Eaton ex Underwood [cut-off]. Plants terrestrial or on rock; stems radially symmetric, forming loose mats; leaves monomorphic, main stem leaves distinct from stem in color; leaves tightly appressed to stems, lanceolate to linear-lanceolate, margins ciliate to denticulate, bases usually rounded. ♦New Mexico has two varieties:



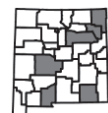
a Margins of sporophylls long-ciliate, seldom denticulate, the cilia spreading; apex of leaves with or without a bristle; leaf margins long-ciliate...var. ***mutica*** ●Widespread throughout the state on limestone, sandstone, or igneous rock.

a Margins of sporophylls very short-ciliate to denticulate, the cilia and teeth ascending; apex of leaves with a bristle; leaf margins short-ciliate to denticulate...var. ***limitanea*** Weatherby [on the border]. ●Sheltered igneous cliffs and rock faces; known from Doña Ana, Luna, and Taos counties.

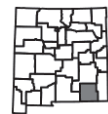
Selaginella* ×*neomexicana Maxon [of New Mexico]. Plants on rock, forming clumps; stems radially symmetric, subterranean and aerial, often with bud-like, arrested branches; aerial branches erect to ascending; aerial stem leaves linear-lanceolate, appressed, bases abruptly adnate to stems, margins with long, spreading cilia proximally and short, ascending cilia distally; leaf apices with a short bristle 0.3-0.5 mm long. ●Infrequent on canyon rock in Doña Ana County. ♦This is a presumed hybrid, with misshapen microsporangia and lacking megasporangia.



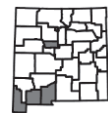
Selaginella peruviana (Milde) Hieronymus [from Peru] [*Selaginella rupestris* (Linnaeus)Spring forma *peruviana* Milde, *Lycopodium rupestris* Linnaeus]. Plants terrestrial or on rock; stems prostrate, forming loose mats, upper-sides and undersides different; leaf apices with a bristle 0.3-0.8 mm long, leaves linear-lanceolate; underside leaves decurrent, longer than upper-side; upper-side leaves less than 3 mm long, bases abruptly adnate to stems. ●Igneous and sandstone cliffs and ledges; mostly central and eastern portions of the state.



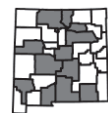
Selaginella pilifera A. Braun [hairy] RESURRECTION PLANT [*Selaginella pringlei* Baker, *Selaginella pilifera* A. Braun var. *pringlei* (Baker) Morton]. Plants terrestrial or on rock, forming rosettes; stems prostrate, flat when moist, nearly flat when dry, axillary leaves present at branching points; leaves thick, leathery, in 4 ranks, 2 median, 2 lateral, with narrow transparent margins and an apical bristle 1/3 to 1/2 the leaf length; median leaves peltate with rounded to truncate bases; lateral leaves with cordate bases with 2 ciliate lobes. ●Dry rocky soil, cliff faces, and limestone talus; known from Eddy County.



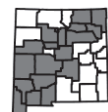
Selaginella rupincola Underwood [rock-dwelling] [*Selaginella rupestris* (Linnaeus)Spring var. *rupincola* (Underwood) Clute]. Plants terrestrial or on rock; stems subterranean and aerial, radially symmetric, bud-like arrested branches often present; aerial stems with linear-lanceolate leaves with bases abruptly adnate to the stems; leaves ascending, appressed, margins with long spreading cilia and tipped with a bristle 0.6-2 mm long. ●Exposed ledges, cliffs, and gravelly ground mostly in the southern regions near the border.



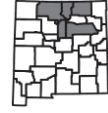
Selaginella scopulorum Maxon [of the Rocky Mountains] [*Selaginella densa* Rydberg var. *scopulorum* (Maxon) R. Tryon]. Plants terrestrial or on rock, forming mats; stems decumbent or creeping; upper side leaves somewhat smaller than underside; underside leaf bases oblique, decurrent; upper-side leaf bases oblique, slightly decurrent to adnate; leaf apices abruptly bristled, bristles 0.5-1mm long, slightly puberulent to entire; leaf margins usually short-ciliate; sporophylls with margins short-ciliate to denticulate proximally, lacking cilia apically, apices short-bristled. ●Rock crevices, rocky slopes, meadows, often at high altitudes; widespread in mountain areas. ♦This species has been treated as a variety of *S. densa*.



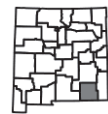
Selaginella underwoodii Hieronymus [for Lucien Marcus Underwood (1853-1907), American fern specialist] [*Selaginella fendleri* Hieronymus (non Baker)]. Plants on rock; stems short-to long-creeping or pendent, radially symmetric; main stem indeterminate; leaves monomorphic, linear to linear-lanceolate, bases cuneate and decurrent; margins short-ciliate or denticulate to entire; apices slightly attenuate, short- to long-bristled; sporophylls lanceolate to ovate-lanceolate, base glabrous with very prominent auricles. ●Throughout the state on a variety of cliffs, outcrops, and ledges.



Selaginella weatherbiana R. Tryon [for Charles Alfred Weatherby (1875-1949), American fern specialist]. Plants on rock; stems rhizomatous and aerial, radially symmetric; rhizomatous stems with bud-like arrested branches; aerial stems erect or ascending; leaves on rhizomatous stems scale-like, loosely appressed, often incurved; aerial stem leaves narrowly lanceolate, tightly appressed, bases cuneate and decurrent, apices bristle-tipped. ●Uncommon on granitic rock outcrops ledges, and cliffs in the northern forested mountains.



Selaginella wrightii Hieronymus [for Charles Wright (1811-1885), outstanding American botanical collector]. Plants on rock; stems prostrate, branches with upturned tips, upper-sides and undersides different; upper-side leaves linear-lanceolate, 3.3-3.9 mm long, bases abruptly adnate to stems; underside leaves narrowly linear-lanceolate, 3.5-4.5 mm long, bases abruptly adnate (sometimes slightly decurrent); all leaf apices yellowish bristle-tipped. ●On limestone cliffs; known only from Eddy County.



WOODSIACEAE CLIFF-FERN FAMILY [1/5/5]

Plants terrestrial or on rock; stems compact to creeping, ascending to erect; leaves monomorphic; petioles shorter than blades, with 2 vascular bundles; blades 1-2-pinnate-pinnatifid; pinnae sessile, bases nearly equilateral, margins entire to dentate, sometimes with translucent projections; veins ending before reaching margins of ultimate segments; sori, round, in one row between midrib and margin along veins; indusia basal, dissected into filamentous or scale-like segments. ♦This family contains a single genus, which was formerly included in a polyphyletic Dryopteridaceae; we follow Judd et al. (2016) in segregating the monophyletic groups corresponding herein to Athyriaceae, Cystopteridaceae, Dryopteridaceae, and Woodsiaceae.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Woodsia [for Joseph Woods (1776-1864), English architect, botanist] WOODSIA [5].

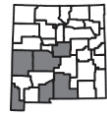
With the features of the family.

■Heil, K.D. & S.L. O’Kane, Jr. 2003. Catalog of the Four Corners flora: Vascular plants of the San Juan River drainage, Arizona, Colorado, New Mexico and Utah [*Woodsia scopulina*]. Harvard Papers in Botany 7(2):321-379. ■Mickel, John T. & Alan R. Smith. 2004. *Woodsia*, pp. 686-691. The Pteridophytes of Mexico, The New York Botanical Garden Press.

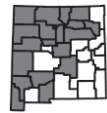
■Windham, M.D. 1993. *Woodsia*, pp. 270-280. IN: Flora of North America, vol. 2. Oxford Univ. Press.

- 1 Indusia composed of relatively broad segments, these multiseriate for most of their length, but often branched or divided distally
 - 2 Vein tips enlarged and visible as whitish lines showing through on the upper surface; petiole light brown or straw-colored (sometimes darker at the very base)..... *W. cochisensis*
 - 2 Vein tips not enlarged; petiole reddish brown to dark purple *W. plummerae*
- 1 Indusia composed of narrow, usually filamentous segments, these uniseriate for most of their length
 - 3 Pinnule margins (viewed from below) smooth to somewhat ragged but usually lacking translucent projections or filaments; lower portions of petioles reddish brown or dark purple
 - 4 Pinnae with flattened, multicellular hairs along the midrib *W. scopulina*
 - 4 Pinnae lacking flattened, multicellular hairs along the midrib *W. oregana*
 - 3 Pinnule margins (viewed from below) with translucent projections or filaments on the teeth; lower portions of petioles light brown or straw-colored
 - 5 Translucent projections on pinnule margins mostly 1- or 2-celled, occasionally filamentous; largest pinnae divided into 3-7 pairs of closely spaced pinnules *W. neomexicana*
 - 5 Translucent projections on pinnule margins mostly multicellular, often prolonged to form twisted filaments; largest pinnae with 7-18 pairs of discrete, widely spaced pinnules *W. phillipsii*

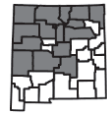
Woodsia cochisensis Windham [from Cochise County, Arizona]. Petioles light brown or straw-colored throughout when mature; blades pinnate-pinnatifid or 2-pinnate, sparsely to moderately glandular; largest pinnae with 4-9 pairs of pinnules; pinnule margins usually thickened, lustrous, lacking cilia but sparsely glandular with occasional 1-2-celled translucent projections; vein tips enlarged and visible as whitish lines showing through on the upper surface; indusia of relatively broad segments but usually divided distally. ●Moist, shaded ledges and protected sites near seeps and springs; central and southwestern mountains.



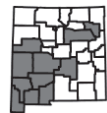
Woodsia neomexicana Windham [of New Mexico]. Petioles light brown or straw-colored; blades pinnate-pinnatifid or 2-pinnate, subglabrous or sparsely glandular; largest pinnae with 3-7 pairs of pinnules; pinnule margins not lustrous nor thickened, lacking cilia but sparsely glandular, with 1-2-celled projections; vein tips sometimes enlarged and visible on the upper surface; indusia of narrow filamentous segments. ●Cliffs, crevices of rocks, ledges often on igneous substrates; mountain forests throughout the state. ♦This and *W. phillipsii* replace *W. mexicana* in New Mexico.



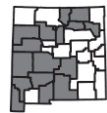
Woodsia oregana D.C. Eaton [from or pertaining to Oregon] [*Woodsia cathcartiana* B.L. Robinson]. Petioles reddish brown to dark purple proximally; blades pinnate-pinnatifid or 2-pinnate, sparsely to moderately glandular, largest pinnae with 3-9 pairs of pinnules; pinnule margins not lustrous nor thickened, lacking cilia, with occasional glands, rarely with 1-2-celled projections; indusia of narrow, filamentous segments. ●Cliffs and rocky slopes on various substrates; widely distributed in mountain areas except for the far southeast. ♦Our plants belong to the tetraploid subsp. *carthcartiana* (B.L. Robinson) Windham [for Ellen Weir Cathcart (1836-1916), bryologist] [*Woodsia carthcartiana* B.L. Robinson]; the diploid subsp. *oregana* occurs in the Pacific Northwest of the United States and western Canada, differing in spore size and the microstructure of pinnule margin cells.



Woodsia phillipsii Windham [for Walter Sargeant Phillips (1905-1975), fern botanist of Arizona]. Petioles light brown or straw-colored; blades usually 2-pinnate, sparsely to moderately glandular; pinnae much longer than wide with 7-18 pairs of pinnules; pinnule margins often lustrous adaxially with occasional glands, appearing ciliate due to presence of translucent projections that are often prolonged; vein tips usually enlarged and visible adaxially; indusia of narrow filamentous segments. ●Cliffs and rocky slopes in the southern mountains, also Cibola, San Miguel and Harding counties.



Woodsia plummerae Lemmon [for Sara Allen Plummer Lemmon (1836-1923), California botanist-artist] [*Woodsia pusilla* E. Fournier var. *glandulosa* (Eaton & Faxon) Taylor]. Petioles reddish brown to dark purple; blades usually 2-pinnate, densely glandular, often viscid; largest pinnae with 5-11 pairs of pinnules, both sides glandular, lacking scales and non-glandular hairs; pinnule margins non-lustrous, lacking cilia but with occasional translucent projections; indusia of relatively broad segments divided distally. ●Cliffs, ledges, and rocky slopes in the mountains throughout the state, often on loose granite.



Woodsia scopulina D.C. Eaton [of cliffs, crags, and rocky places] [*Woodsia obtusa* (Sprengel) Torrey var. *lyallii* Hooker, *Woodsia oregana* D.C. Eaton var. *lyallii* (Hooker) Boivin]. Petioles reddish brown to dark purple proximally, brittle; blades 2-pinnate proximally, moderately glandular; largest pinnae with 5-14 pairs of pinnules; pinnule surfaces with flattened, multicellular hairs along midribs, pinnule margins lacking translucent projections; indusia of filamentous segments. ●Cliffs and rocky slopes. ♦This fern has been reported for New Mexico, but no specimens are known.

GYMNOSPERMS

■Earle, C.J. 2015 and onwards. The Gymnosperm Database: <http://www.conifers.org/index.php>. Accessed 15 Feb 2016. ■Eckenwalder, J.E. 2009. Conifers of the World. Timber Press, Portland, Oregon. 720 pp. ■Christenhusz, M.J.M., J.L. Reveal, A. Farjon, M.F. Gardner, R.R. Mill, & M.W. Chase. 2011. A new classification and linear sequence of extant gymnosperms. *Phytotaxa* 19: 55-70.

Key to the Families

- 1 Shrubs with green photosynthetic stems; leaves reduced to small brownish papery scales and separated by very long (2-10 cm) internodes EPHEDRACEAE
 1 Large shrubs or trees without green photosynthetic stems; leaves needle-like, or if scale-like then green and membranous and overlapping on very short (less than 0.5 cm) internodes
 2 Cones woody when mature; foliage leaves needle-like, borne singly or in fascicles, falling from the twigs in age..... PINACEAE
 2 Cones woody or berry-like when mature; foliage leaves scale-like or needle-like (one species), borne singly, remaining on the twigs and usually the entire twig falling from the plant in age..... CUPRESSACEAE

CUPRESSACEAE CYPRESS FAMILY [2/8/8]

Evergreen trees and shrubs, monoecious and dioecious, highly branched; bark exfoliating in fibers or plates; buds lacking scales; leaves needle-, scale- or awl-shaped, often covering the branches, opposite or whorled, shed with the shoots; male cones small and inconspicuous; female cones with the ovule scales fused, woody or fleshy when mature. ♦This is the most widespread of all gymnosperm families, being found on all continents except Antarctica. *Taxodium distichum* (Linnaeus) L.C. Richard var. *mexicanum* Gordon was reported for the state by St. Hilaire (2001), based on nursery seed, but no trees are known in the wild.

■Farjon, A. 2005. A monograph of Cupressaceae and Sciadopitys. Royal Botanic Gardens, Kew. 643 pp. ■St. Hilaire, R. 2001. Seed coat treatments influence germination of *Taxodium mucronatum*. *Desert Plants* 17(1):15-18. ■Watson, F.D. & J.E. Eckenwalder. 1993. Cupressaceae, pp. 399-422. IN: *Flora of North America*, vol. 2. Oxford University Press.

- 1 Branchlets arranged in conspicuously flattened sprays, these vertical to horizontal; plants known only in cultivation
 2 Branchlets typically in vertical sprays; cones fleshy, the scales strongly curved, greenish or yellowish at maturity *Platycladus*
 2 Branchlets typically in horizontal, or at least not vertical, sprays; cones not fleshy, more woody, brown at maturity..... *Thuja*
 1 Branchlets not arranged in flattened sprays; plants wild or cultivated
 3 Seed cones usually fleshy and somewhat berry-like, occasionally dry and mealy but not woody, the scales not opening and the seeds not released; plants monoecious or dioecious..... *Juniperus*
 3 Seed cones becoming woody at maturity, the scales opening and releasing the seeds; plants monoecious
 4 Plants known only in cultivation; growth form narrowly columnar, the canopy rarely as much as 2 m in diameter *Cupressus*
 4 Plants known in cultivation or in the wild; growth form open and spreading, the canopy 3-many m in diameter.. *Hesperocyparis*

Cupressus [ancient Greek name] CYPRESS [0].

Monoecious trees and large shrubs, the bark fibrous or platey, the twigs round or 4-angled, spreading or in flattened sprays; leaves scale-like, green to glaucous, usually with a central gland; seed cones globose to oblong, composed of 3-6 opposite pairs of thick woody scales, with 5-20 winged seeds per scale. ♦About 14 species of subtropical to temperate regions of the Northern Hemisphere. See *Hesperocyparis* for our native species formerly included in *Cupressus*.

Adams, R.P., J.A. Bartel, & R.A. Price. 2009. A new genus, *Hesperocyparis*, for the cypresses of the western hemisphere. *Phytologia* 91(1): 160-185.

Little, D.P. 2006. Evolution and circumscription of the true cypresses (Cupressaceae: Cupressus). *Syst. Bot.* 31(3):461-480.

**Cupressus sempervirens* Linnaeus [evergreen] ITALIAN CYPRESS. Evergreen tree to 30 m tall, tall and narrow, the crown no more than 2 m in dia; cones globose, glossy, brown to gray, woody when mature, 2-3 cm long, found in the upper reaches of the tree; seed flattened, minute. ●A very popular ornamental tree in residential areas; not known in the wild in New Mexico; native to Eurasia. ♦This is the tree featured in Van Gogh's *The Starry Night*.

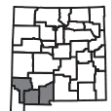
Hesperocyparis [western cypress] CYPRESS [1].

Evergreen trees or shrubs; leaves opposite, 4-ranked, the adult leaves scale-like, appressed to divergent, rhomboidal; seed cones persisting closed for many years or until opened by fire, 1-4 cm diam, the scales persistent, thick and woody. ♦The genus *Hesperocyparis* accommodates all the New World members of *Cupressus*. *Hesperocyparis glabra* (Sudworth) Bartel (*Cupressus glabra* Sudworth), with the trunk bark cherry-red, flaking in thin plates, fresh herbage pleasant-smelling, pine-like or citrus-like, and native to Arizona, is sometimes found as an ornamental, but is not known in the wild in New Mexico.

■Adams, R.P., J.A. Bartel, & R.A. Price. 2009. A new genus, *Hesperocyparis*, for the cypresses of the western hemisphere. *Phytologia* 91(1): 160-185. ■Adams, R.P. & J.A. Bartel. 2009. Geographic variation in *Hesperocyparis* (*Cupressus arizonica* and *H. glabra*): RAPDS analysis. *Phytologia* 91(1):244-250. ■Hamilton, T. 2017. *Cupressus arizonica* in New Mexico. *Bull. Cupressus Conservation Proj.* 6(3): 62-70. ■Little, D.P. 2006. Evolution and circumscription of the true cypresses (Cupressaceae: Cupressus). *Syst. Bot.* 31(3):461-480.

Hesperocyparis arizonica (Greene) Bartel [of Arizona] ARIZONA CYPRESS [*Callitropsis arizonica* (Greene) D.P. Little,

Cupressus arizonica Greene, *Neocupressus arizonica* (Greene) de Laubenfels]. Tree to 23 m tall; trunk bark smooth at first, sometimes becoming rough and fibrous, not flaking into thin strips; fresh herbage malororous, stinky or skunky; leaves scale-like, about 2 mm long, usually glaucous-green, the adaxial resin gland not conspicuous; seed cones globose, 2-3 cm dia, dark reddish brown, with 6-8 scales; seeds 4-5 mm long. ●Uncommon in piñon-juniper woodlands and canyon bottoms in the southwestern mountains, at mid-elevations. ♦Few populations are known in the wild in New Mexico: one, of perhaps hundreds of trees in the Cooke's Range (Luna County), are definitely a native population; another, of two trees in the San Andres Mountains (Doña Ana County), was most likely a deliberate human introduction of the past 60 years or so; and, a third, of numerous saplings and young trees thriving at Fort Bayard (Grant County) from ornamental trees planted there. We find both this species and the related *Hesperocyparis glabra* (Sudworth) Bartel (with smooth bark) in cultivation as ornamental trees.



Cupressus arizonica Greene, *Neocupressus arizonica* (Greene) de Laubenfels]. Tree to 23 m tall; trunk bark smooth at first, sometimes becoming rough and fibrous, not flaking into thin strips; fresh herbage malororous, stinky or skunky; leaves scale-like, about 2 mm long, usually glaucous-green, the adaxial resin gland not conspicuous; seed cones globose, 2-3 cm dia, dark reddish brown, with 6-8 scales; seeds 4-5 mm long. ●Uncommon in piñon-juniper woodlands and canyon bottoms in the southwestern mountains, at mid-elevations. ♦Few populations are known in the wild in New Mexico: one, of perhaps hundreds of trees in the Cooke's Range (Luna County), are definitely a native population; another, of two trees in the San Andres Mountains (Doña Ana County), was most likely a deliberate human introduction of the past 60 years or so; and, a third, of numerous saplings and young trees thriving at Fort Bayard (Grant County) from ornamental trees planted there. We find both this species and the related *Hesperocyparis glabra* (Sudworth) Bartel (with smooth bark) in cultivation as ornamental trees.

Juniperus [classical Latin name] JUNIPER [7].

Evergreen, monoecious or dioecious shrubs or trees; branchlets not in flattened sprays; leaves opposite in 4 ranks or whorled in 3 ranks; adult leaves scale-like to needle-like, with an abaxial gland; seed cones terminal (axillary in *J. communis*) maturing in 1-2 years, globose, berry-like, remaining closed, usually glaucous, the scales persistent, fleshy or fibrous or obscurely woody. ♦Cultivars of many species are used in ornamental landscaping, and some of these are keyed below the regular key. *Juniperus ashei* Buchholz and *J.*

coahuilensis (Martinez) Gaussen ex R.P. Adams have been reported for the state by various workers, but all supposed specimens have been determined as either *J. monosperma* or *J. arizonica* (pers. comm. R.P. Adams 2015, 2016).

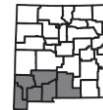
- Adams, R.P. 1993. *Juniperus*. pp. 412-420. IN: Flora of North America, vol. 2. Oxford Univ. Press.
- Adams, R.P. 1994. Geographic variation and systematics of monospermous *Juniperus* (Cupressaceae) from the Chihuahu Desert based on RAPDs and terpenes. *Biochem. Syst. Ecol.* 22(7):699-710.
- Adams, R.P. 2008. Taxonomy of *Juniperus communis* in North America: Insight from variation in nrDNA SNPs. *Phytologia* 90(2): 181-197.
- Adams, R.P. 2016. *Juniperus arizonica* (R.P. Adams) R.P. Adams, new to Texas. *Phytologia* 98(3):179-185.
- Adams, R.P. & T.A. Zanon. 1979. The distribution, synonymy, and taxonomy of three junipers of southwestern United States and northern Mexico. *Southw. Natural.* 24(2):323-329.
- Adams, R.P., S. Nguyen, J.A. Morris, & A.E. Schwarzbach. 2006. Re-examination of the taxonomy of the one-seeded, serrate leaf *Juniperus* of southwestern United States and northern Mexico (Cupressaceae). *Phytologia* (Dec 2006) 88(3):299-309.
- Adams, R.P. & A.E. Schwarzbach. 2013. Taxonomy of *Juniperus deppeana* varieties and formas based on nrDNA (ITS), petN-psbM, trnS-trnG, trnD-trnT, trnL-trnF sequences. *Phytologia* 95(2):161-166.

- 1 Mature leaves needle-like, 6-12 mm long, spreading; cones axillary..... ***J. communis***
- 1 Mature leaves scale-like, triangular, less than 5 mm long, appressed; cones terminal
 - 2 Margins of leaves entire (at 20x); bark exfoliating in rectangular plates..... ***J. scopulorum***
 - 2 Margins of leaves denticulate (at 20x); bark exfoliating in rectangular plates or in thin strips
 - 3 Seed cones with 3-6 seeds; bark exfoliating in rectangular plates ***J. deppeana***
 - 3 Seed cones with 1-3 seeds; bark exfoliating in thin strips
 - 4 Glands on leaves inconspicuous because they are embedded in leaf; seed cones somewhat dry and mealy at maturity; plants monoecious ***J. osteosperma***
 - 4 Glands on leaves conspicuous; seed cones usually somewhat fleshy at maturity; plants dioecious (rarely monoecious)
 - 5 Seed cones reddish blue to brownish under the glaucous bloom; fewer than 1/5 of whip-leaf glands with evident white exudate..... ***J. monosperma***
 - 5 Seed cones rose to pinkish or copper to copper-red under the glaucous bloom (if present); 1/4 or more of whip-leaf glands with evident white exudate
 - 6 Seed cones rose to pinkish, with a glaucous coating; inner surface of leaves glaucous..... ***J. arizonica***
 - 6 Seed cones copper to copper-red, without a glaucous coating; inner surface of leaves not glaucous ***J. pinchotii***

◆Several juniper species are commonly cultivated throughout the state. The following may help in identification:

- a Plants trees or tree-like
 - b Scale leaves obtuse; needle-like leaves in whorls of three; cones 6 mm or more in diameter...**J. chinensis* Linnaeus ‘*torulosa*’ HOLLYWOOD TWISTED JUNIPER.
 - b Scale leaves acute; needle-like leaves mostly opposite (in 3s on vigorous twigs); cones less than 5 mm in diameter
 - c Bark of main trunk and larger branches exfoliating in flattened plates; branchlets usually drooping; berries bitter...*J. scopulorum* Sargent ROCKY MOUNTAIN JUNIPER. Uncommon in cultivation.
 - c Bark of main trunk and larger branches exfoliating in thread-like and stringy strips; branchlets usually not drooping; berries sweet...*J. virginiana* (Linnaeus) Antoine EASTERN RED CEDAR.
- a Plants shrubby, not tree-like (numerous cultivars here, difficult to identify, many of them belong to *J. chinensis*)
 - d Crushed leaves with a strong disagreeable odor...**J. sabina* Linnaeus SAVIN JUNIPER.
 - d Crushed leaves not malodorous
 - e Plants usually taller than 25 cm, the stems semi-procumbent to erect and widely branched...**J. chinensis* Linnaeus CHINESE JUNIPER. This species is notoriously variable, and many of the taller forms will fall here.
 - e Plants very low, rarely more than 20 cm tall, the stems procumbent
 - f Foliage bluish...**J. horizontalis* Moench CREEPING JUNIPER.
 - f Foliage greenish...**J. chinensis* Linnaeus var. *procumbens* Endlicher CHINESE JUNIPER.

Juniperus arizonica (R.P. Adams) R.P. Adams [of Arizona] ARIZONA JUNIPER [*Juniperus coahuilensis* (Martinez) Gaussen ex R.P. Adams var. *arizonica* R.P. Adams, *Juniperus erythrocarpa* of western NM locales]. Dioecious shrubs or trees to 8 m tall, sprouting after burning or cutting; trunk bark exfoliating in long fibrous strips, not in plates; leaves 3-ranked; whip-leaves 4-6 mm long, the margins denticulate, the glands about ½ the sheath length; scale-leaves 1-3 mm long; seed cones maturing in 1 year, globose, 6-7 mm dia, rose to pinkish, with a glaucous coating, with 1 or rarely 2 seeds.

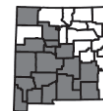


●Grassland-woodland ecotones and conifer woodlands of foothills, bajadas, and plains; mostly southwestern region, with a few outliers eastward. ◆This is the common juniper of the dry southwestern low mountain slopes of New Mexico and Arizona, formerly passing as *J. monosperma*, which occurs generally more northward or on the upper elevations of the foothills. It was formerly classified as a variety of *J. coahuilensis*, which is not known from New Mexico (Adams 2016), but occurs in west Texas and Mexico and has whip-leaf glands about ⅓ as long as the sheath.

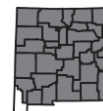
Juniperus communis Linnaeus [common] COMMON JUNIPER. Dioecious low shrubs with prostrate to ascending stems and branches, to 3 m tall (more when rarely tree-like); bark fibrous, exfoliating in thin strips; leaves green to silvery, the adaxial surface with a glaucous stomatal band about as wide as the green marginal band, the abaxial glands very elongate; seed cones maturing in 2 years, globose, 6-9 mm dia; seeds 4-5 mm dia. ●Mixed conifer or subalpine forests at high elevations. ◆Our plants belong to var. *depressa* Pursh [pressed down]. Seed cones are used to flavor gin. §



Juniperus deppeana Steudel [for Ferdinand Deppe (1794-1861), German naturalist] ALLIGATOR JUNIPER [*Juniperus deppeana* Steudel var. *pachyphloea* (Torrey) Martinez, *Juniperus deppeana* Steudel forma *sperryi* (Correll) R.M. Adams, *Juniperus pachyphloea* Torrey]. Dioecious trees to 10-20 m or more tall, single-stemmed; bark brown, exfoliating in rectangular plates; leaves green or appearing silvery, the abaxial gland ovate to elliptic and conspicuous, the margins denticulate; whip-leaves 3-6 mm long; scale-leaves 1-2 mm long; seed cones maturing in 2 years, globose, 8-15 mm dia, reddish brown, glaucous, the seeds 6-9 mm. ●Mostly in the western mountains; rather common with piñon, other junipers, oaks, and ponderosa pine. ◆Our plants belong to var. *depeana*; 4 other varieties in Mexico. Easily recognized by the distinctive platy bark, but not to be confused with *Juniperus scopulorum*, which has similar bark, at least on the branches. §



Juniperus monosperma (Engelmann) Sargent [one-seeded] ONE-SEED JUNIPER [*Juniperus gymnocarpa* (Lemmon) Cory, *Juniperus mexicana* Sprengel var. *monosperma* (Engelmann) Cory, *Juniperus occidentalis* Hooker var. *monosperma* Engelmann, *Sabina monosperma* (Engelmann) Rydberg]. Dioecious shrubs or trees to 10 m or more tall; bark gray to brown, exfoliating in thin strips; leaves green, the margins denticulate, the abaxial glands elongate, fewer than 1/5 of the glands on whip-leaves with exudate; whip-leaves 4-6 long; scale-leaves 1-3 mm long; seed cones maturing in 1 year, globose, 6-8 mm dia, reddish blue to brownish blue under the glaucous bloom, with 1(3) seed; seeds 4-5 mm long. ●Widespread and common on plains, foothills, dry mountain slopes, and mesas, merging into grasslands at lower elevations and forests at upper elevations; generally at higher elevations or more mesic sites than *J. arizonica* when in the same area. ◆One of the most common junipers in the state, much



used for fenceposts and fuel. Because of the recent clarification of *Juniperus arizonica* and *J. coahuilensis*, distributional data from literature and online databases can be problematic in terms of specific localities of this species. *Juniperus monosperma* seems to be absent from the southwest corner of the state, being replaced there by *J. arizonica*; although both species are reported for the same southwestern counties, *J. monosperma* tends to occur north of I-10 and *J. arizonica* south of that interstate. §

Juniperus osteosperma (Torrey) Little [bony seeded] UTAH JUNIPER [*Juniperus utahensis* (Engelmann) Lemmon, *Juniperus megalocarpa* Sudworth, *Juniperus tetragona* Schlechtendal var. *osteosperma* Torrey, *Sabina osteosperma* (Torrey) Antoine]. Monoecious shrubs or trees to 7 m or more tall; bark gray to brown, exfoliating in thin strips; leaves light yellow-green, the margins denticulate, the abaxial glands inconspicuous and embedded in the leaf, exudate absent; whip-leaves 3-5 mm long; scale-leaves 1-2 mm long; seed cones maturing in 1-2 years, globose, (6)8-12 mm dia, bluish brown to tan beneath the glaucous bloom, with 1(2) seeds 4-5 mm long. ●Dry slopes, hills, low foothills on the western side of the state; overlapping with *J. monosperma*. ♦Plants are monoecious with rather large mealy cones mostly 8-12 mm dia and a single seed. §



Juniperus pinchotii Sudworth [for Gifford Pinchot (1865-1946), first Chief of the U.S. Forest Service] REDBERRY JUNIPER [*Juniperus erythrocarpa* Cory, *Juniperus monosperma* (Engelmann) Sargent var. *pinchotii* (Sudworth) Van Melle]. Dioecious shrubs to 6 m tall, multi-stemmed, the crown often flattened; bark ashy gray to brown, exfoliating in long strips, sometimes in plates on the branches; leaves yellow-green, the margins denticulate, many of the abaxial glands with a white exudate; whip-leaves 4-6 mm long; scale-leaves 1-2 mm long; seed cones maturing in 1 year, globose, 6-8(10) mm dia, copper to copper-red, without a glaucous bloom. ●Almost entirely in the southeastern portion of the state, with a few outliers in eastern Otero County and southern Quay County. Plants from Grant and Luna counties identified as this belong to *J. arizonica* (but there is a valid *J. pinchotii* just across the border in extreme southeast Arizona (pers. comm. R.P. Adams 2016). §



Juniperus scopulorum Sargent [of the Rocky Mountains] ROCKY MOUNTAIN JUNIPER [*Sabina scopulorum* (Sargent) Rydberg]. Dioecious trees with a single trunk (rarely multistemmed), to 20 m tall; bark brown, the larger branches and often the trunk exfoliating in thin rectangular plates; leaves light to dark green, often glaucous, the margins entire, the abaxial glands conspicuous but exudate absent; whip-leaves 3-6 mm long; scale-leaves 1-3 mm long; seed cones maturing in 2 years, generally globose, 6-9 mm dia, dark blue-black beneath the glaucous bloom when mature, tan when immature, with mostly 2 seeds 4-5 mm long. ●Widely scattered throughout the mountains and higher foothills. ♦Drooping foliage and rectangular plates of bark are characteristic. Plants are uncommon in cultivation. §

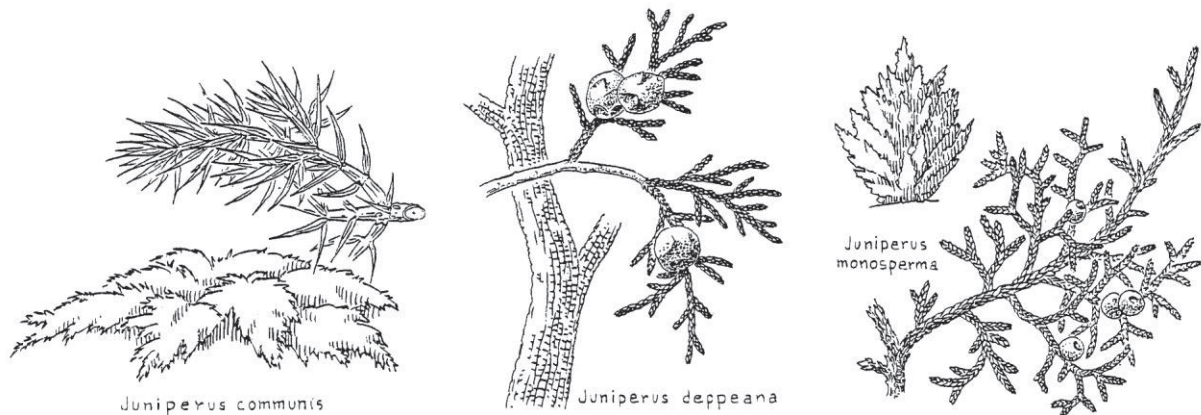


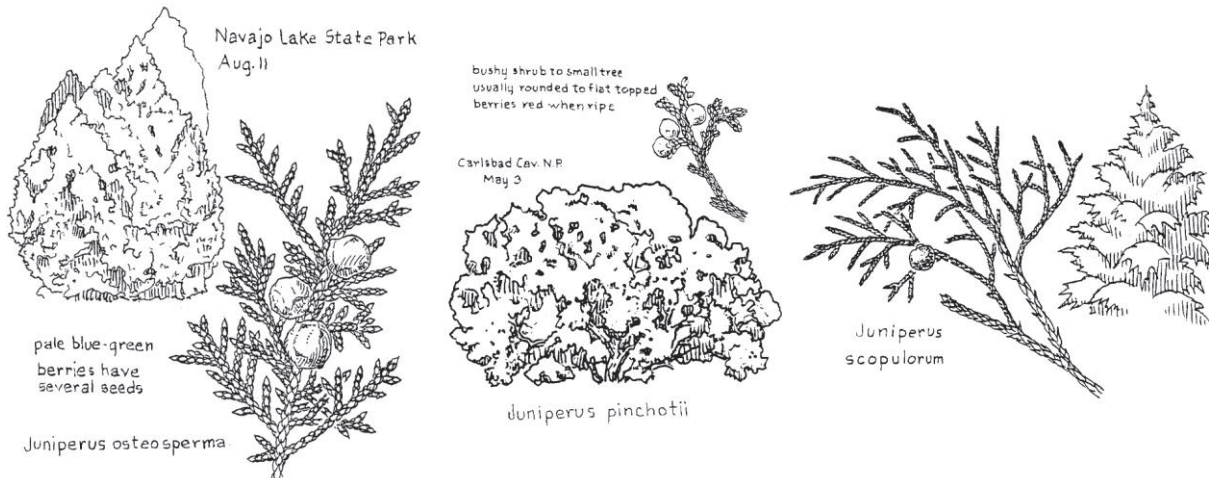
Platycladus [flat-branched] ARBORVITAE [0].

**Platycladus orientalis* (Linnaeus) Franco [eastern] ORIENTAL ARBORVITAE [*Thuja orientalis* Linnaeus]. Monoecious evergreen trees to 20 m tall; bark flaking in long strips; branchlets arranged in flattened vertical sprays; leaves decussate, 4-ranked, scale-like, 1-3 mm long, dimorphic, the lateral leaves overlapping the facial ones and boat-shaped, the facial leaves rhomboidal with glandular groove at center; seed cones terminal, red-brown when ripe, ovoid, remaining somewhat fleshy, the cone scale decussate. ●A commonly cultivated ornamental, not known in the wild.

Thuja [ancient Greek name] ARBORVITAE [0].

**Thuja occidentalis* Linnaeus [western] AMERICAN ARBORVITAE. Monoecious evergreen trees to 25 tall; bark flaking in long strips; branchlets arranged in flattened sprays, these horizontal or various orientations but not vertical; leaves scale-like, 1-4 mm long; seed cones ovoid, 9-14 mm long, becoming woody. ●A commonly cultivated ornamental, not known in the wild.





EPHEDRACEAE EPHEDRA or JOINT-FIR FAMILY [1/6/6]

Contributed by Robert C. Sivinski

Shrubs (ours) or vines; dioecious (very rarely monoecious); solitary or spreading in rhizomatous patches; stems jointed, many, terete, green and longitudinally ridged when young; leaves opposite or whorled at the nodes, scale-like, ephemeral and not photosynthetic; pollen cones 1-10 in whorls at the nodes, composed of 2-8 sets of membranous bracts that usually subtend a sporangiophore bearing 2-15 sessile or stalked pollen-producing microsporangia; seed cones 1-10 in whorls at the nodes, composed of 2-10 sets of opposite or whorled overlapping bracts that are papery, membranous or fleshy; seeds 1-3 per seed cone, yellow to dark brown, smooth to variously roughened. ♦Ephedraceae has only one genus, *Ephedra*, with more than 40 species scattered throughout the arid regions of the globe.

■Ickert-Bond, S.M. and M.F. Wojciechowski. 2004. Phylogenetic relationships in *Ephedra* (Gnetales): Evidence from nuclear and chloroplast DNA sequence data. *Syst. Bot.* 29: 834-849.

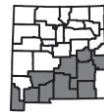
Ephedra [ancient Greek name] EPHEDRA, MORMON TEA [6].

Characteristics of the family. ♦Several species have been used as a beverage or medicinally to treat respiratory ailments, syphilis, or as a stimulant.

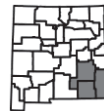
■Cutler, H.C. 1939. Monograph of the North American species of the genus *Ephedra*. *Ann. Missouri Bot. Gard.* 26:373-427. ■Powell, A.M. 1988. Trees and Shrubs of Trans-Pecos Texas. Big Bend Natural History Assoc. ■Sivinski, R.C. 2010. *Ephedra coryi* in central New Mexico? *The New Mexico Botanist* 52:1. ■Sivinski, R.C. 2011. Plant distribution reports [*Ephedra coryi*]. *The New Mexico Botanist* 53:4. ■Stevenson, D.W. 1993. Ephedraceae, pp. 428-434. IN: *Flora of North America*, vol. 2. Oxford University Press.

- 1 Leaf scales whorled, 3 at a node; ovulate cone bracts in whorls of 3, papery
 - 2 Leaves 5-15 mm long; twigs ending in sharp points.....*E. trifurca*
 - 2 Leaves 2-5 mm long; twigs blunt-tipped.....*E. torreyana*
- 1 Leaf scales mostly opposite, 2 at a node; ovulate cone bracts opposite, papery, membranous or fleshy
 - 3 Plants strongly rhizomatous, forming low, clonal patches in rather deep sands
 - 4 Twigs viscid; mature ovulate cone bracts membranous.....*E. cutleri*
 - 4 Twigs not viscid; mature ovulate cones berry-like, bracts fleshy.....*E. coryi*
 - 3 Plants not rhizomatous; woody shrubs in various habitats, but usually not deep sand
 - 5 Seeds 1 (rarely 2) per cone*E. aspera*
 - 5 Seeds 2 (rarely 1) per cone*E. viridis*

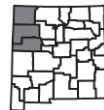
Ephedra aspera Engelm. [rough] [*Ephedra nevadensis* S. Watson var. *aspera* (Engelm.) L. Benson]. Solitary shrubs with gray woody stems, 5-15 dm tall; twigs pale to dark green, becoming yellowish with age, not viscid; terminal bud obtuse; leaves opposite (rarely in whorls of 3), 1-3(5) mm long, connate to half or more their length, not, or slightly, thickened at the base; pollen cones sessile or rarely on short peduncles; staminate bracts opposite, yellow or red-brown; seed cones sessile or on short peduncles; ovulate bracts opposite, membranous with brown thickened center and base; seeds usually 1 (rarely 2) per cone, ovate-acute, 5-8 mm long, smooth to slightly scabrous. ●Dry ridges and rocky slopes in Chihuahuan Desert scrub. ♦Sterile plants in the south-central part of the state are (inconsistently) distinguished from *E. viridis* by shorter, less thickened leaf scales. *Ephedra antisiphilitica* Berlandier in adjacent Texas also has single-seeded ovulate cones, but its inner cone bracts are red and fleshy.



Ephedra coryi E.L. Reed [for Victor Louis Cory (1880-1964), Texas botanist]. Rhizomatous shrubs, 1-5 dm tall, forming patches of slender green stems from red-brown rhizomes; twigs blue-green, becoming yellow-green with age, not viscid; terminal bud conic; leaves opposite (rarely in whorls of 3), connate 1-2 mm, tips acute and 1-2 mm or subulate and up to 10 mm, bases becoming thickened and dark; pollen cones on 2-10 mm peduncles or sessile; staminate bracts opposite, yellow or reddish; seed cones on naked peduncles 5-25 mm long; ovulate bracts opposite, initially membranous then becoming fleshy; mature ovulate cones berry-like, pale yellow or orange; seeds 2 per cone, elliptic, 5-8 mm long, usually smooth. ●Sandy soil, usually with shinnery oak scrub in some southeastern counties. ♦The report of this species in the San Andres Mountains (Stevenson 1993) is a misidentification of *E. viridis*. A recently discovered, and thus far undetermined, species of rhizomatous, fleshy-coned *Ephedra* in Sandoval County will key to this species, but differs by shorter and not thickened leaf scales, scarlet ovulate cones, and roughened seeds.

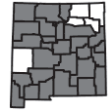


Ephedra cutleri Peebles [for Hugh Carson Cutler (1912-1998), ethnobotanist and student of *Ephedra*] [*Ephedra coryi* E.L. Reed var. *viscida* Cutler, *Ephedra viridis* Coville var. *viscida* (Cutler) L. Benson]. Rhizomatous shrubs, 2-10 dm tall, forming patches of slender green stems from brown or red-brown rhizomes; twigs yellow-green or blue-green, viscid; terminal bud conic; leaves opposite, 2-5 mm, connate 1-3 mm, tips acute or subulate, bases becoming thickened and dark; pollen cones on short scaly peduncles or sessile; staminate bracts opposite, yellow; seed cones on 5-25 mm long peduncles from a basal



pair of bracts; ovulate bracts opposite membranous with a yellow center and base; seeds 2 per cone, ovate, 5-8 mm long, smooth. ●Sandy soil with sagebrush scrub and juniper savanna in some northwestern counties.

Ephedra torreyana Torrey ex S. Watson [for John Torrey (1796-1873), distinguished American botanist]. Solitary shrubs with gray woody lower stems, 3-10 dm tall; twigs blue-green, glaucous; terminal bud conic; leaves in whorls of 3, 2-5 mm long, connate to half or more their length, becoming tattered, gray; pollen cones sessile; staminate bracts whorled, pale yellow or pale red; seed cones sessile; ovulate bracts whorled, papery with a yellow-orange or brownish center and base; seeds 1-3 per cone, lanceolate-acuminate, 5-8 mm long, brown or yellowish, papillate or transversely lamellar.



●Widespread throughout New Mexico from piñon-juniper woodland down to desert scrub. ♦A rare hybrid of this species with *E. trifurca* from Sierra County has been named *Ephedra ×intermixta* Cutler.

Ephedra trifurca Torrey ex S. Watson [3-forked]. Solitary shrubs with gray woody stems, 0.5-3 m tall; twigs green or yellow-green; terminal buds spine-like; leaves in whorls of 3, 5-15 mm long, initially connate up to half their length, quickly becoming tattered, not basally thickened; pollen cones on short, scaly peduncles; staminate bracts whorled, yellowish or reddish brown; seed cones on short, scaly peduncles or sessile; ovulate bracts whorled, papery-translucent with a brownish center and base; seeds usually 1, rarely 2 or 3 per cone, lanceolate-acuminate, 8-15 mm long, pale brown, smooth. ●Rocky and sandy places in Chihuahuan Desert scrub. ♦A rare hybrid with *E. torreyana* from Sierra County has been named *Ephedra ×intermixta* Cutler, and distinguished by its spiny terminal buds, shorter leaves and scabrous seeds. §



Ephedra viridis Coville [green]. Solitary shrubs with gray woody stems, 5-15 dm tall; twigs bright green or yellow-green, not viscid; terminal bud obtuse; leaves opposite, 2-5 mm long, connate to half or more their length, becoming swollen and dark at the base; pollen cones sessile; staminate bracts opposite, pale yellow or reddish; seed cones sessile or on scaly peduncles; ovulate bracts opposite, membranous with yellowish center and base; seeds usually 2 (rarely 1) per cone, ovate, 5-8 mm long, smooth. ●Sedimentary outcrops and rocky slopes in piñon-juniper woodland or sagebrush scrub. ♦Sterile plants in the south-central part of the state are (inconsistently) distinguished from *E. asper* by bright yellow-green twigs and longer leaf scales with dark thickened bases.



PINACEAE PINE FAMILY [4/15/16]

Small to large usually evergreen monoecious trees with whorled branches, the buds enclosed in bud scales; leaves needle-like, single, spirally attached to the branch or in sheathed clusters of 2-5; pollen cones small and papery, shed annually; seed cones woody with persistent scales or fleshy and deciduous (*Abies*), with two ovules on each scale, taking 1-2 years to develop. ♦With about 11 genera and 235 species, worldwide. This is an extremely important family, both ecologically and economically, covering vast expanses of forested land and producing much of the world's softwood timber and wood products.

- 1 Leaves in clusters of 2-5, surrounded by a basal sheath (which may be early deciduous).....***Pinus***
- 1 Leaves borne singly, not in clusters
 - 2 Leaves ± square in cross-section; twigs roughed by peg-like projections that persist after the leaves fall ***Picea***
 - 2 Leaves flattened, not squarish; twigs lacking peg-like projections
 - 3 Leaves sessile, leaving a circular leaf-scar; seed cones erect, the scales falling from the persistent main axis, the subtending bracts not 3-toothed ***Abies***
 - 3 Leaves petiolate from a short stalk that lies flat against the twig, leaving an elliptic leaf-scar; seed cones drooping, the entire cone falling when mature, the subtending bracts conspicuously 3-toothed ***Pseudotsuga***

Abies [the classical Latin name] FIR [2].

Monoecious evergreen trees; branches whorled; leaf scars circular to elliptic; leaves needle-like, single, sessile, flattened, often appearing 1-ranked, with 2 stomatal bands abaxially; pollen cones borne on current year's growth, ephemeral; seed cones borne on year-old growth, erect, generally on the upper branches, the axis persistent and the scales falling away with the seeds; seeds 2 per scale, winged. ♦With 47 species, mostly Northern Hemisphere. Erect cones with deciduous scales are diagnostic.

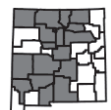
■ Hunt, R.S. 1993. *Abies*, pp. 354-362. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■ Adams, R.P., C.J. Earle, & D. Thorburg. 2011. Taxonomy of infraspecific taxa of *Abies lasiocarpa*: leaf essential oils and DNA of *Abies lasiocarpa*, var. *bifolia* and var. *arizonica*. *Phytologia* 93(1):73-87.

- 1 Branchlets glabrous; leaves mostly 3-5 cm or more long, the tips rounded to pointed..... ***A. concolor***
- 1 Branchlets pubescent; leaves mostly 2-3 cm long, the tips notched to rounded..... ***A. arizonica***

Abies arizonica Merriam [of Arizona] CORK-BARK FIR [*Abies bifolia* A. Murray bis var. *arizonica* (Merriam) O'Kane & K.D. Heil, *Abies lasiocarpa* (Hooker) Nuttall var. *arizonica* (Merriam) Lemmon]. Steeple-shaped trees to 50 m tall, forming krummholz growth in harsh timberline environments; bark gray, smooth, thick and corky, with resin blisters; branchlets pubescent; leaves glaucous, 10-30 mm long, 1-2 mm wide, flat, upper surface grooved, J-shaped at the base and curved upward; seed cones 5-12 cm long, 2-4 cm wide, resinous; scales about 2.5 cm long and 15 mm wide; seeds 5-7 mm long, the wing ½ again longer. ●Forested mountains throughout the state, generally above 8,000 ft, but descending down to 7,200 ft, commonly with *Picea engelmannii*. ♦The taxonomy of cork-bark fir is controversial, being recognized as a variety of *A. lasiocarpa*, of *A. bifolia*, or being submersed in *A. lasiocarpa* without formal placement. New Mexico plants fall within a single taxon, and we treat it as a geographically separated species, pending further clarifying studies. §



Abies concolor (Gordon & Glendinning) Lindley ex Hildebrand [of the same color] [*Picea concolor* Gordon & Glendinning]. WHITE FIR. Steeple- to cylindrical-shaped tree to 60 m tall; bark gray, thin, usually corky, developing deep longitudinal furrows; branchlets glabrous to sometimes pubescent; leaves glaucous, 2-6 cm long, 2-3 mm wide, attached to the twig by a round mouth-like stalk, rounded apically, flat, the upper surface sometimes grooved; seed cones 7-12 cm long, 3-4.5 cm wide, olive-green and turning dark; scales 2.5-3 cm long and slightly wider; seeds 8-12 mm long, the wing twice as long. ●Forested mountains throughout the state, generally below 9,000 ft, but ascending up to 9,800 ft, often with *Pinus* species. ♦Our plants belong to var. *concolor*. §



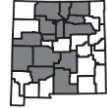
Picea [pitch] SPRUCE [2].

Evergreen monoecious trees, single-stemmed; branches mostly whorled; bark thin and scaly; twigs with persistent peg-like leaf bases; leaves needle-like, 4-angled, stiff, often sharp-pointed, persisting many years; pollen cones borne on current year's growth, ephemeral; seed cones hanging from upper branches, usually falling when mature; scales flexible, the bracts not visible; seeds winged. ♦Stiff angular needles arranged all around the twigs and abundant soft cones with rounded scales help to recognize this genus.

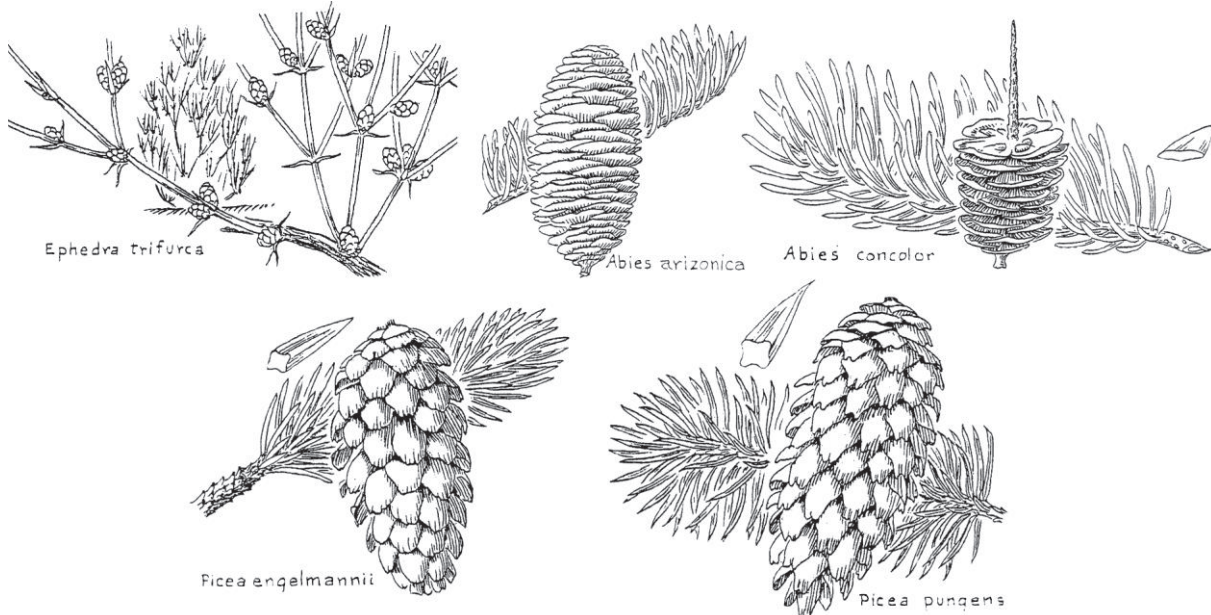
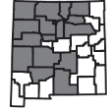
■Taylor, R.J. 1993. *Picea*, pp. 369-373. IN: Flora of North America, vol. 2. Oxford Univ. Press.

- 1 Twigs or leaf bases of current year's growth finely pubescent; seed cones mostly less than 7 cm long *P. engelmannii*
- 1 Twigs and leaf bases of current year's growth glabrous; seed cones mostly more than 7 cm long *P. pungens*

Picea engelmannii Parry ex Engelm. [for Georg Engelmann (1809-1884), distinguished German-born physician and botanist of St. Louis] ENGELMANN'S SPRUCE. Trees to 60 m tall, narrowly columnar; bark scaly, gray to reddish brown; twigs usually finely hairy; leaves 1.5-3 cm long, 4-angled, stiff, sharp, blue-green; seed cones 3-7 cm long, ellipsoid to cylindrical; scales diamond-shaped, the apex rounded, about 2/3 longer than wide; seeds 2-3 mm long with a wing 10-12 mm long. ●Dominant with cork-bark fir in the high elevation forests of our mountains, generally above 8,000 ft. ♦Our plants belong to var. *engelmannii*; var. *mexicana* (Martínez) R.J. Taylor & T.F. Patterson occurs in Mexico. The squarish needles have a skunk-like odor when crushed. §



Picea pungens Engelm. [sharp pointed] BLUE SPRUCE [*Picea parryana* Sargent]. Trees to 50 m tall, broadly columnar to ovoid; bark scaly, gray to brown; twigs stout, glabrous; leaves 1.5-6 cm long, 4-angled, stiff, sharp-tipped, dark green to blue-green; seed cones 6-11 cm long, ellipsoid to cylindrical; scales elliptic to diamond-shaped, widest below the middle, about 2/3 longer than wide; seeds 3 mm long with a wing 6-9 mm long. ●At mid- to high elevations in the mountains, usually with white fir, generally above 8,200 ft. ♦The sharply pointed, stiff needles have a resinous odor when crushed. Ornamental trees are usually bluer than those found in the wild. §



Pinus [classical Latin name] PINE [9].

Evergreen trees and shrubs, with short shoots bearing fascicles of needle-like leaves, the fascicles sheathed basally; leaves in clusters of 1-6 per fascicle; pollen cones in dense spike-like cluster at the ends of branchlets; seed cones maturing in 2(3) years, sessile or stalked, dropping whole, the scales persistent; seeds winged or wingless. ♦About 100 species in cool temperate and mountain tropical areas of the world. Our species are all members of mountain forests and upland woodlands. *Pinus strobiformis* Engelm. (as construed herein) is not found in New Mexico; it is represented by our widespread *P. reflexa*. *Pinus coulteri* D. Don was planted at Fort Bayard (Grant County, near Silver City), and persists there with some younger trees emerging, but is not known outside of that occurrence; it is easily identified by its long needles (15-30 cm) in threes, persistent leaf sheaths 2-4 cm long, and massive cones 20-40 cm long, which can weigh as much as 11 pounds (capable of piercing a tent roof or severely damaging a skull).

■Bailey, D.K. & F.G. Hawksworth. 1979. Pinyons of the Chihuahuan Desert region. *Phytologia* 44:129-133. ■Bisbee, J. 2014. Cone morphology of the *Pinus flexilis-ayacahuite* complex of the southwestern United States and Mexico. *Bull. Cupressus Conservation Project* 3(1):3-33. ■Callaham, R.Z. 2013. *Pinus ponderosa*: Geographic Races and Subspecies Based on Morphological Variation. USDA Forest Service PSW RP-265. ■Callaham, R.Z. 2013. *Pinus ponderosa*: A Taxonomic Review with Five Subspecies in the United States of America. USDA Forest Service PSW RP-264. ■Conkle, M.T. & W.B. Critchfield. 1988. Genetic variation and hybridization of ponderosa pine, pp. 27-43. IN: D.M. Baumgartner & J.E. Lotan (eds.), *Ponderosa pine – the species and its management*. Symposium proceedings. Washington State University, Pullman. ■Farjon, A. & B.T. Styles. 1997. *Pinus* (Pinaceae). *Flora Neotropica*, Monogr. 75. New York Botanical Garden. ■Frankis, M. 2008. The high altitude white pines of Mexico and the adjacent SW USA (*Pinus* L. subgenus *Strobus* Lemmon, Pinaceae). *International Dendrology Society Yearbook 2008*: 64-72. ■Gernandt, D.S., S.Hernandez-Leon, E. Salgado-Hernandez, & J.A. Perez de la Rosa.. 2009. Phylogenetic relationships of *Pinus* subsection *Ponderosae* inferred from rapidly evolving cpDNA regions. *Syst. Bot.* 34(3):481-491. ■Kral, R. 1993. *Pinus*, pp. 373-398. IN: Flora of North America, vol. 2. Oxford Univ. Press. ■Landry, P. 1992. A revised synopsis of the pines 4: The chihuahuan pine (*Pinus*, section *Leiophylla*). *Phytologia* 72(5):373-377. ■Little, Elbert L., Jr. 1968. Two new pinyon varieties from Arizona [*Pinus monophylla fallax*]. *Phytologia* 17(4):329-342. ■Montes, J.R., P. Pelaez, A. Willyard, A. Moreno-Letelier, D. Piñero, & D.S. Gernandt. 2016. Phylogenetics of *Pinus* Subsection *Cembroides* Engelm. (Pinaceae) Inferred from Low-Copy Nuclear Gene Sequences. *Syst. Bot.* 44(3): 501-518. ■Perry, J.P., Jr. 1991. The Pines of Mexico and Central America. *Timber Press*, Portland, Oregon. 231 pp. ■Willyard, A., D.S. Gernandt, K. Potter, V. Hipkins, P. Marquardt, M.F. Mahalovich, S.K. Langer, F.W. Telewski, B. Cooper, C. Douglas, K. Finch, H.H. Karamera, J. Feller, P. Lea, & A. Woff. 2017. *Pinus ponderosa*: A checkerered past obscured four species. *Amer. J. Bot.* 104(1): 161-181.

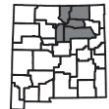
- 1 Leaves mostly 1-3 in a cluster
 - 2 Leaves mostly 1-2 per cluster, 2-4 cm long..... *P. edulis*
 - 2 Leaves mostly 2-3 per cluster, 3-40 cm long
 - 3 Leaf sheaths early deciduous
 - 4 Leaves mostly 6-12 cm long; plants monoecious..... *P. leiophylla*

- 4 Leaves mostly 3-6 cm long; plants nearly dioecious.....*P. cembroides*
- 3 Leaf sheath persistent
- 5 Leaves mostly 10-22 cm long; sheaths 1-2 cm long *P. ponderosa*
- 5 Leaves mostly 25-45 cm long; sheath 2-3 cm long *P. engelmannii*
- 1 Leaves mostly 5 (occasionally 4) in a cluster
- 6 Leaves mostly 10-22 cm long.....*P. arizonica*
- 6 Leaves mostly 3-8 cm long
- 7 Needles sticky from tiny resin droplets, usually strongly curved; leaf sheaths persistent, coiled back but still present even on older clusters; cone scales with prickles (or bristles) 4-10 mm long, easily visible at least on basal scales even on old cones.....*P. aristata*
- 7 Needles lacking resin droplets, straight or nearly so; leaf sheaths early deciduous, absent on older clusters; cones scales lacking any kind of prickle or bristle
- 8 Whitish stomatal lines visible only on the inner (adaxial) surfaces of the needles; needles 4-10 cm long, serrulate on the distal margins; cones 15-25 cm long, sometimes shorter *P. reflexa*
- 8 Whitish stomatal lines visible on both inner and outer surfaces of the needles; needles 3-7 cm long, entire; cones 7-15 cm long *P. flexilis*

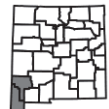
◆Several pines are commonly used in landscaping. The following key might help in the identification of some of them:

- a Leaves in fascicles of 3
- b Needles 6-10 cm long...**P. halepensis* Miller ALEPPO PINE
- b Needles 20-30 cm long...**P. roxburghii* Sargent CHIR PINE
- a Leaves in fascicles of 2
- c Needles 1 mm or less thick, green or dark green
- d Needles 6-10 cm long...**P. halepensis* Miller ALEPPO PINE
- d Needles 10-15 cm long...**P. brutia* Tenore subsp. *eldarica* (Medwedew) Silba AFGHAN PINE
- c Needles about 1-1.5 mm thick, yellowish green
- e Bark orange-brown to reddish gray; crown rounded, dome- or umbrella-shaped on older trees; needles 7.5-18 cm long...**P. pinea* Linnaeus ITALIAN STONE PINE, UMBRELLA PINE
- e Bark gray to blackish; crown irregular, pointed; needles 6-10 (12) cm long...**P. thunbergii* Parlature JAPANESE BLACK PINE

Pinus aristata Engelmann [awned] BRISTLECONE PINE. Trees to 15 m tall, the crown often quite irregular; bark gray to red-brown, with shallow fissures; branches contorted; needles 5 per fascicle, upcurved, 3-4 cm long, bearing white resin drops, a narrow groove on the abaxial surface; seed cones ovoid, 6-11 cm long, sessile, falling soon after maturity, each scale bearing a brittle prickle 4-10 mm long; seeds 5-6 mm long, with a wing 10-13 mm long. ●Exposed sites and thin, rocky soils at high elevations in the northern forests. ◆Distinguishing features are 5 short, closely packed needles in a bottlebrush arrangement, with tiny white resin droplets. Closely related to *Pinus longaeva* D.K. Bailey, known to live more than 5,000 years. §



Pinus arizonica Engelmann [of Arizona] ARIZONA PINE [*Pinus ponderosa* Lawson var. *arizonica* (Engelmann) Shaw]. Tree to 35 m tall, the trunk to 1.2 m dbh; bark dark brown, rough and scaly, becoming deeply furrowed with cinnamon-brown scales; twigs stout, 1-2 cm thick; needles 10-22 cm long, mostly 4-5 per fascicle, rarely 3; seed cones ovoid, short-stalked, 5-8 cm long, the scales with slender recurved spines; seeds 4-6 mm long, the wing 12-15 mm long. ●An uncommon tree of the southwestern forests, with thick twigs (1-2 cm) and 4-5 long needles. ◆The disposition of var. *stormiae* Martinez (with longer and thicker needles) is contentious and currently under investigation; it may occur in Eddy County, Guadalupe Mountains (Willyard et al. 2017).



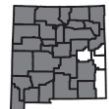
Pinus cembroides Zuccarini [resembling *Pinus cembra*] MEXICAN PIÑON PINE. Shrubs or small trees to 15 m tall, the trunk to 30 cm dbh, much branched, with a rounded crown; bark reddish brown, shallowly furrowed with scaly ridges; needles mostly 3 per fascicle, 2-6 cm long, stiff, curved, the sheath 5-7 mm long, recurving and early-deciduous; seed cones flattened ovoid, 1-3.5 cm long, resinous; seeds 12-15 mm long, wingless. ●Piñon-juniper-oak woodlands in the bootheel region. ◆This is the main edible nut pine of Mexico. In New Mexico, no other pine has such short needles in threes. Of our two varieties, it may be equally accurate to treat var. *bicolor* at the specific level (as *Pinus discolor*) (Montes et al. 2016). §



- a Needles bicolored, one surface with white lines, the other surface green...var. *bicolor* Little [*Pinus discolor* Bailey & Hawksworth, *Pinus johannis* M.-F. Robert]. ◆Some authors prefer to recognize this at the specific rank, as *Pinus discolor*.

- a Needles of one color on both surfaces, or very nearly so...var. *cembroides*

Pinus edulis Engelmann [edible] PIÑON PINE. Shrubs or small trees to 21 m tall, the trunk to 60 cm dbh, the crown rounded; bark reddish brown, shallowly furrowed between scaly ridges; needles mostly 1-2 per fascicle, 2-4 cm long, curved, blue-green; seed cones ovoid to globose, 3.5-5 cm long, pale, resinous, sessile to short-stalked, the sheath 5-7 mm long, recurving and early-deciduous; seeds 10-15 mm long, wingless. ●Common on plains, hills, and mesas surrounding our mountain ranges. ◆This is the main two-needle (sometimes one) piñon of the four-corner states, and very common below the ponderosa zone with various junipers. We have two varieties:

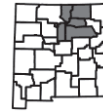


- a Leaves mostly 2 per cluster...var. *edulis* [*Pinus cembroides* Zuccarini var. *edulis* (Engelmann) Voss]. ●Widespread almost throughout the state, on shallow rocky soils of foothills, mesas, canyon walls, and mountain slopes. §
- a Leaves mostly 1 per cluster...var. *fallax* Little [deceptive] [*Pinus californiarum* D.K. Bailey subsp. *fallax* (Little) D.K. Bailey, *Pinus ×fallax* Businsky (nom. illeg.), *Pinus monophylla* Torrey & Frémont subsp. *fallax* (Little) D.K. Bailey]. ●A few populations are known from the southwestern region of the state. ◆Montes et al. (2019) suggest that species status is appropriate for this taxon; the name *Pinus ×fallax* Businsky applies to this taxon but is a later homonym (not *Pinus fallax* Saporta), and no other names at specific rank are yet available. We maintain it at varietal rank, in alignment with similar variation in *Pinus cembroides*.

Pinus engelmannii Carrier [for Georg Engelmann (1809-1884), distinguished German-born physician and botanist of St. Louis] APACHE PINE [*Pinus apachea* Lemmon, *Pinus latifolia* Sargent, *Pinus macrophylla* Engelmann]. Trees to 35 m tall, the trunk to 60 cm dbh; bark dark brown, deeply furrowed into narrow scaly plates; twigs about 2 cm thick; needles 3 per fascicle, 25-45 cm long, the sheath persistent and 2-3 cm long; seed cones ovoid, 11-14 cm long, solitary, very short-stalked, the scales with an out-curved claw; seeds 8-9 mm long, the wings 20 mm long. ●Barely entering New Mexico in the bootheel region. ◆This is one of three pines that are essentially Mexican in distribution, the others being Chihuahua pine and Mexican piñon. The twigs are thick and stout (about as wide as your thumb), and easily seen against the sky, bearing very long needles. §



Pinus flexilis James [curved, pliant] LIMBER PINE [*Apinus flexilis* (James) Rydberg]. Tree 12-26 m tall, the trunk 60-150 cm or more dbh, straight or contorted; bark light gray, nearly smooth to furrowed; needles 5 per fascicle, 3-7 cm long, the margins entire, with whitish stomatal lines visible on both inner and outer surfaces of the needles, the sheath 1-2 cm long, early deciduous; seed cones 7-15 cm long, 5-7 cm wide (when open), falling soon after maturity; seeds 7-10 mm long, wingless or nearly so. ●Summits, ridge tops, rocky foothills, often at edges of forest or at timberline, typically scattered with other conifers, in the Sangre de Cristo Mountains. ♦For relationships to *P. reflexa* and *P. strobiformis*, see comments under *P. reflexa*. §



Pinus leiophylla Schide & Deppe ex Schlechtendal & Chamisso [with smooth leaves]. Tree to 26 m tall, the trunk to 1 m dbh, often forked above; bark reddish brown, narrowly furrowed with narrow rectangular scaly ridges; needles 2-3 per fascicle, 6-12 cm long, the sheath to 1.5 cm long and early deciduous; seed cones broadly ovoid, 3.5-5 cm long, on a stalk to 1.5 cm long, remaining on the tree for several years; seeds 2 mm long, the wing to 10 mm long. ●Mid-elevation forests in the far southwestern region. ♦Our plants belong to var. ***chihuahuana*** (Engelmann) Shaw [of Chihuahua] CHIHUAHUA PINE [*Pinus chihuahuana* Engelmann]. The numerous cones are relatively long-stalked and remain on the tree for several years, and the bark is very thick; the typical variety occurs in Mexico. §



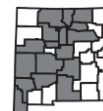
Pinus ponderosa Douglas ex P. Lawson & C. Lawson [heavy, ponderous]. Trees to 30 m tall; trunk to 2 m dbh; bark yellow to reddish brown, deeply furrowed and cross-checked into rectangular scaly plates; twigs stout, to 2 cm thick; needles mostly 2-3 per fascicle, 9-22 cm long, 1-2 mm thick; seed cones mostly symmetric, 5-10 cm long, 5-8 cm wide; scale umbo narrowing to a thick-based out-curving prickle or spur; seed body 3-4 mm, the wing 10-21 mm long. ●Mid-elevations in all the mountains, often with *Pseudotsuga menziesii* and *Quercus gambelii*, sometimes in large, expansive parklands (see Ponderosa Pine Forests in discussion of New Mexico Vegetation Types). ♦*Pinus ponderosa* is extremely variable across its wide range in the western United States from South Dakota to the Pacific, the variation giving rise to up to 5 subspecies or species (Callahan 2013; Willyard et al. 2017). Plants of the continental interior have most commonly been recognized as the *scopulorum* entity, at specific, subspecific, or varietal rank, and range from northern Mexico to Canada along the Rocky Mountain cordillera. Plants of its southern distribution in Arizona and New Mexico were initially named *Pinus brachyptera* by Engelmann in 1880 (based on a specimen collected by Wislizenus in 1846 near Las Vegas, New Mexico), and this taxon has been resurrected recently by Callahan (2013), who amassed a ponderous quantity of ecological, morphological, and statistical data in support of its recognition; his circumscription is supported and elevated to species rank by Willyard et al. (2017). Most of New Mexico populations correspond to this southwestern form (*brachyptera*), with a zone of intergradation into the northern form (*scopulorum*) in the northern mountains. Given the wide and overlapping variability in all features, we regard subspecies rank to be the least disruptive disposition (though Willyard et al. 2017 make a reasonable case for specific rank):



a Needles mostly 2 per fascicle, 9-14 cm long...subsp. ***scopulorum*** (Engelmann) E. Murray [of the rocks or rocky places] ROCKY MOUNTAINS PONDEROSA PINE [*Pinus ponderosa* Lawson var. *scopulorum* Engelmann, *Pinus ponderosa* Douglas ex Lawson & C. Lawson subsp. *scopulorum* (Engelmann) W.A. Weber, *Pinus scopulorum* (Engelmann) Lemmon]. ●Scattered plants and perhaps populations in the northern mountains. ♦Even though one may find individual plants with characteristics aligning somewhat with subsp. *scopulorum*, Callahan (2013) and Conkle & Critchfield (1988) both assert that northern New Mexico is a transition zone between more typical *brachyptera* to the south and *scopulorum* to the north. §

a Needles mostly 3 per fascicle, 11-22 cm long...subsp. ***brachyptera*** (Engelmann) Silba [short winged] SOUTHWESTERN PONDEROSA PINE [*Pinus brachyptera* Engelmann, *Pinus ponderosa* Douglas ex Lawson & C. Lawson subsp. *brachyptera* (Engelmann) Callahan, *Pinus ponderosa* var. *brachyptera* (Engelmann) Lemmon]. ●In all the mountains of the state. ♦Populations in the far northern mountains will show transitional features into var. *scopulorum*, which is more typical in Colorado and northward.

Pinus reflexa (Engelmann) Engelmann [reflexed] SOUTHWESTERN WHITE PINE [*Pinus ayacahuite* var. *reflexa* (Engelmann) Voss, *Pinus flexilis* James var. *reflexa* Engelmann, *Pinus strobiformis* of NM reports]. Tree to 34 m tall, usually with a single straight trunk to 1.5 m dbh; bark gray, becoming darker and broken into furrowed plates; needles 4-10 cm long, with whitish stomatal lines visible only on the inner (adaxial) surfaces, the margins serrulate in the distal half, the sheath 1-2 cm long, early deciduous; seed cones 15-25 cm long, 6-9 cm wide (open), falling soon after maturity; seeds 8-12 mm long, wingless or nearly so. ●Canyon sides, rocky ridges, typically mixed with other conifers, in all New Mexico mountains. ♦Southwestern white pine is the central component of an expansive band of *Pinus* variation, extending from southern Canada, southward along the Rocky Mountain cordillera through New Mexico, along the Sierra Madre Occidentale of Mexico, and south to Guatemala (Bisbee 2014; Frankis 2008). Relatively unambiguous species are *P. flexilis* in the north, from southern Canada to southern Colorado, and *P. strobiformis* in the south, from southern Durango to northern Chihuahua. Just about all of New Mexico constitutes a nearly contiguous zone of intergradation and introgression between these two species, with morphological features merging into *P. flexilis* toward the north, and into *P. strobiformis* toward the south. We concur with Bisbee (2014), Farjon & Styles (1997), and Frankis (2008) in recognizing these intermediate populations as *P. reflexa*. Plants belonging to *P. flexilis* and *P. reflexa* (though not unequivocally so) may be found in the Sangre de Cristo Mountains; nearly all other populations in New Mexico will be referred to *P. reflexa*; no plants of *P. strobiformis* Engelmann (as constituted herein, in the strict sense) are to be found in New Mexico.

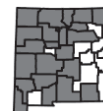


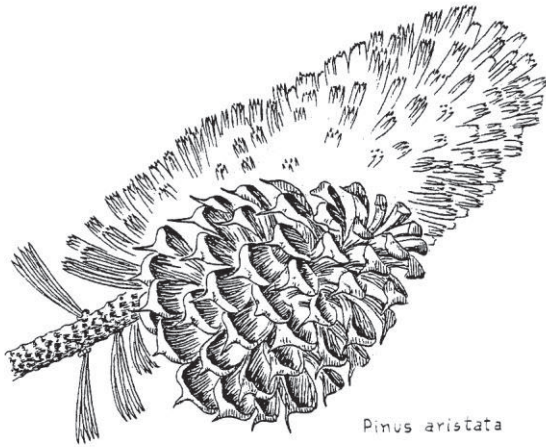
Pseudotsuga [false *Tsuga*] [1].

Tall evergreen trees; bark thick and furrowed; needles flattened, short-stalked, with 2 whitish stomatal bands on the abaxial surface; seed cones borne at the tips of year-old twigs, the scales interleaved with exserted 3-pronged bracts, the seeds falling when mature and the cones falling soon after. ♦A genus of about 7 species in Asia and North America, extremely important for lumber and wood products.

■Adams, R.P., J.J. Vargas-Hernandez, M.S. Gonzalez Elizondo, G. Hunter, T.A. Fairhall, D. Thornberg, & F. Callahan. 2013. Taxonomy of Douglas fir (*Pseudotsuga menziesii*) infraspecific taxa: vars. *menziesii*, *glauca* and *oaxacana*: nrDNA, cpDNA sequences and leaf essential oils. *Phytologia* 95(1): 94-102. ■Bleakly, D. 1997. Plant life on the lava – the vegetation and flora of El Malpais, p. 113-130. IN: Maybery, K. (compiler). Natural History of El Malpais National Monument. Bull. 156. New Mexico Bureau of Mines and Mineral Resources. 185 pp. ■Lipscomb, B. 1993. *Pseudotsuga*, pp. 365-366. IN: Flora of North America, vol. 2. Oxford Univ. Press.

Pseudotsuga menziesii (Mirbel) Franco [for Archibald Menzies (1754-1842), Scottish botanist] DOUGLAS-FIR. Tree to 35 m tall, the trunk single and to 1 m dbh; bark reddish brown to blackish, becoming deeply furrowed; needles 15-30 mm long, 1-1.5 mm wide, flattened, spirally arranged along the twigs, with a short narrowed stalk; seed cones long-ovoid, 4-10 cm long, with 3-pronged and usually reflexed bracts exserted between the scales, falling entire from the tree; seeds 5-6 mm long, the wing 6-8 mm long. ●Very common at intermediate elevations in our forests, invading openings in the canopy. ♦Our plants belong to var. ***glauca*** (Beissner) Franco [blue-green] [*Pseudotsuga mucronata* (Rafinesque) Sudworth, *Pinus taxifolia* (Lamarck) Britton var. *glauca* (Beissner) Sudworth, *Pseudotsuga taxifolia* (Lambert) Britton, *Tsuga douglasii* Carrière var. *glauca* Beissner]; var. *menziesii* is a taller coastal tree of greater mass, with appressed bracts on the cones. The oldest known living var. *glauca* (about 740 years old) occurs in New Mexico, on the El Malpais National Monument (Bleakly 1997). §



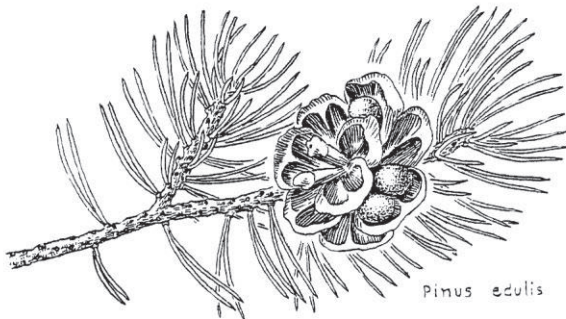


Pinus aristata

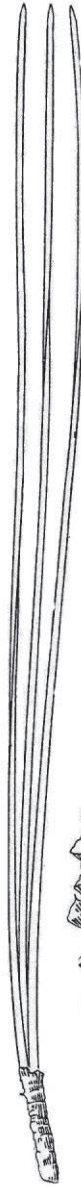


encinal (oak)
woodland 7500
Animas Mts
May 20

Pinus cembroides



Pinus edulis

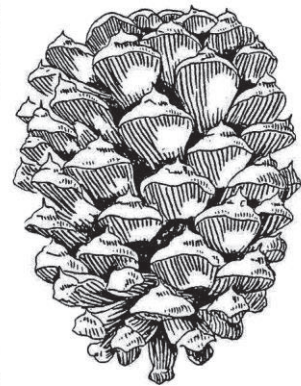


leaves bigger
and grayer
than ponderosa

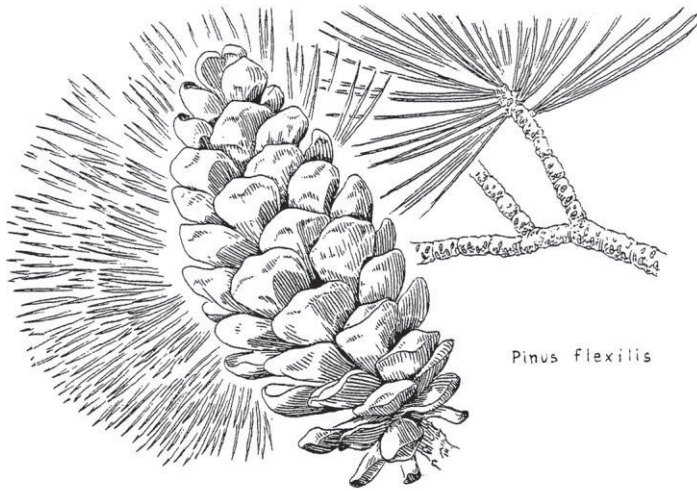
Pine-fir forest

Gray Ranch
Animas Mts.
8300'

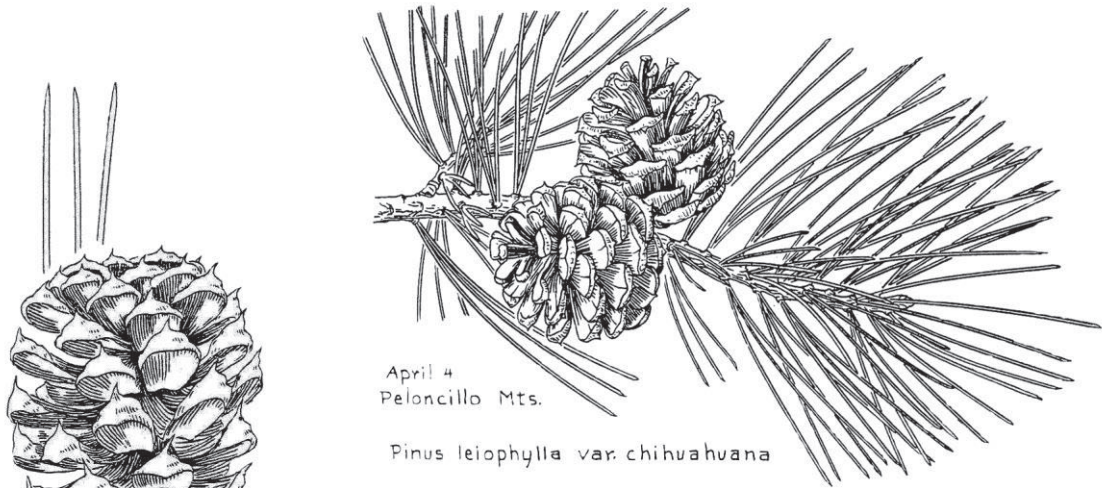
May 19



Pinus engelmannii

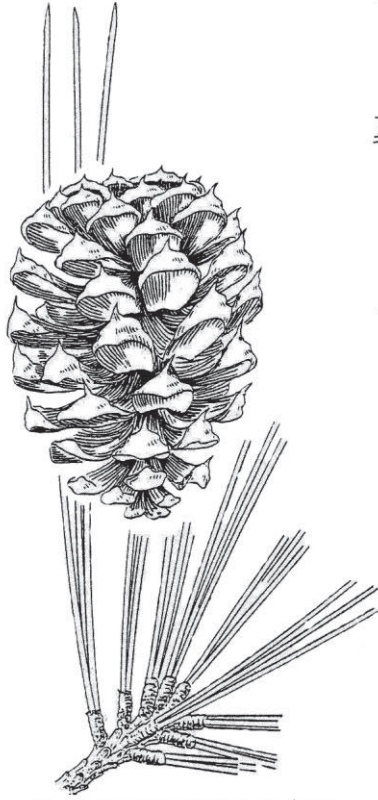


Pinus flexilis

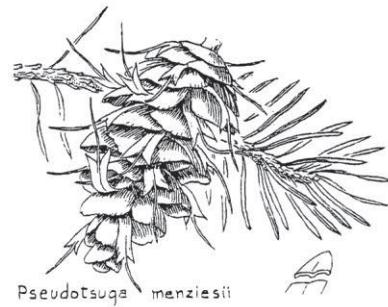


April 4
Peloncillo Mts.

Pinus leiophylla var. *chihuahuana*



Pinus ponderosa subsp. *scopulorum*



Pseudotsuga menziesii

ANGIOSPERMS: MONOCOTYLEDONOUS PLANTS

Key to Families

- 1 Plants parasitic or epiphytic on stems, branches, or roots of other plants, generally without chlorophyll and not green, or if green then clearly growing on and attached to a host plant
 - 2 Plants stem parasites or epiphytes, growing on the aerial portions of a host plant, not growing in the soil BROMELIACEAE
 - 2 Plants root parasites, growing in the soil and attached to the roots or decaying matter of a host plant..... ORCHIDACEAE
- 1 Plants not obviously parasitic on other plants, but producing chlorophyll and greenish in color
 - 3 Plants shrubby, sometimes with well-developed perennial stems 15 cm or more wide; leaves usually longer than 30 cm, leathery, often spiny, borne in rosettes at the tips of branches or all basal
 - 4 Leaves with spiny margins
 - 5 Leaves narrow and ribbon-like, 0.6-1 m long or more and 2-4 cm wide, with numerous stout hooked prickles all along the margins; ovary superior (*Dasyilirion*) RUSCACEAE
 - 5 Leaves shorter and wider, often thick and semi-succulent, with more widely spaced spines or hooks; ovary inferior (*Agave*)... AGAVACEAE
 - 4 Leaves without spiny margins (but may be filiferous with long threads)
 - 6 Leaves entire to filiferous, with a terminal spine; flowers bisexual, more than 1.4 cm long; seeds several to many in each chamber of the ovary AGAVACEAE
 - 6 Leaves serrate to serrulate, lacking a terminal spine; flowers usually unisexual, less than 1 cm long; seeds 2 or 3 in each chamber of the ovary (*Nolina*) RUSCACEAE
 - 3 Plants herbaceous, if perennial stems developed (some giant reed grasses) then the stems much less than 15 cm wide; leaves other than above
 - 7 Plants aquatic, at least most of the plant submerged or floating on the water
 - 8 Plants floating on the water, not rooted in the soil, the plant body less than 2 cm long, disc-shaped, not differentiated into stems and leaves ARACEAE
 - 8 Plants floating or rooted in the soil, the entire plant body generally much longer than 6 cm, differentiated into stems and leaves
 - 9 Leaves sagittate..... ALISMATACEAE
 - 9 Leaves not sagittate
 - 10 Leaves in whorls, very thin and nearly translucent, forming a sheath around the stem HYDROCHARITACEAE
 - 10 Leaves not whorled and not as above
 - 11 Leaves floating or emergent out of the water
 - 12 Emergent leaves linear, cattail-like, lacking a petiole, passing from the sheathing portion directly into the blade portion, both about the same shape, the blade portion 50 cm or more long TYPHACEAE
 - 12 Emergent leaves either not linear and cattail-like, or if so, then the blade portion much less than 50 cm long, usually petiolate, with a distinct difference in shape between the sheathing portion and the blade portion
 - 13 Mid-vein not at all evident..... PONTEDERIACEAE
 - 13 Mid-vein distinct and prominent..... POTAMOGETONACEAE
 - 11 Leaves all or mostly submersed under water
 - 14 Leaves alternate or basal (occasionally opposite toward the tips of the stems)
 - 15 Leaves all basal, the stems not elongate..... ALISMATACEAE
 - 15 Leaves borne on elongate stems
 - 16 Leaves extremely filiform, about 0.5 mm wide; mature fruits in umbels on long coiling peduncles RUPPIACEAE
 - 16 Leaves mostly wider than 2 mm; mature fruits in spikes, the peduncles stout and stiff POTAMOGETONACEAE
 - 14 Leaves opposite
 - 17 Flowers on long thread-like stalks extending to the water's surface (*Elodea*)..... HYDROCHARITACEAE
 - 17 Flowers remaining in the leaf axils, at most very shortly stalked
 - 18 Leaves prominently toothed to shallowly incised, with prickles on the abaxial midveins (*Najas marina*).. HYDROCHARITACEAE
 - 18 Leaves entire or minutely serrulate (use magnification), lacking prickles on the abaxial midveins
 - 19 Leaves 1-3 cm long (*Najas guadalupensis*) HYDROCHARITACEAE
 - 19 Leaves 3-4 cm lng (*Zannichellia*)..... POTAMOGETONACEAE
 - 7 Plants not truly aquatic, growing on dry land, or if growing in mud or shallow water then most of the plant extending up out of the water
 - 20 Perianth chaffy, scale-like, or of bristles, never petal-like in color or texture, or perianth absent
 - 21 Flower parts concealed in the axils of chaffy bracts (spikes and spikelets); perianth absent or represented by bristles or minute scales; grasses and sedges
 - 22 Leaves 2-ranked; sheath margins usually overlapping (fused in some); stems round or compressed in cross-section, but never 3-angled; flower and fruit subtended by two bracts (lemma and palea); anthers attached to their filaments at the middle of the anther POACEAE
 - 22 Leaves 3-ranked; sheath margins fused together; stems 3-angled; flower and fruit subtended by a single bract (in *Carex* the flower completely enclosed in a sack-like perigynium and this subtended by a single bract); anthers attached to their filaments at the end of the anther CYPERACEAE
 - 21 Flower parts not concealed in the axils of chaffy bracts; perianth various, present or absent

- 23 Inflorescence an elongate spike
 - 24 Plants a meter or more tall; spike differentiated into a large, lower portion of pistillate flowers, and a smaller, upper portion of staminate flowers.....TYPHACEAE
 - 24 Plants less than a meter tall; spike uniform of perfect flowers JUNCAGINACEAE
- 23 Inflorescence of racemes, loose clusters, or globose heads
 - 25 Flowers in globose heads, the lower heads pistillate, the upper heads staminate (*Sparganium*)TYPHACEAE
 - 25 Flowers in various clusters, but not in unisexual heads.....JUNCACEAE
- 21 Perianth with some or all the parts petal-like in color or texture
 - 26 Ovary subterranean, the flower arising from ground level; plants acaulescent (*Leucocrinum*)AGAVACEAE
 - 26 Ovary above ground; plants caulescent, at least with a flowering scape
 - 27 Ovary wholly inferior
 - 28 Flowers zygomorphic; stamens 1 or 2, the pollen grains clumped together in a pollen mass..... ORCHIDACEAE
 - 28 Flowers actinomorphic; stamens 3 or 6, the pollen grains readily dispersed individually
 - 29 Leaves cauline, 2-ranked and often equitant; stamens 3 IRIDACEAE
 - 29 Leaves mostly basal, not 2-ranked nor equitant; stamens 6
 - 30 Perianth segments pilose on the abaxial surface; foliage grass-like, herbaceous, usually pubescent HYPOXIDACEAE
 - 30 Perianth segments glabrous; foliage not grass-like, fleshy-thickened, glabrous or nearly so..... AMARYLLIDACEAE
 - 27 Ovary superior or mostly so
 - 31 Carpels numerous (more than 6), separate and distinct in separate pistils; stamens 6-numerous (in pairs opposite each petal when 6)..... ALISMATACEAE
 - 31 Carpels 3 or 6, united into a single pistil; stamens 3-6, never in pairs
 - 32 Petals and sepals clearly differentiated from each other
 - 33 Petals less than 2 cm long, all purplish or two bluish and one white.....COMMELINACEAE
 - 33 Petals more than 2 cm long, white or rose colored (*Calochortus*)..... LILIACEAE
 - 32 Petals and sepals similar in size, texture, and color, not clearly differentiated
 - 34 Flowers mostly solitary or 2-3(4) together, borne at the stem tips or in the leaf axils
 - 35 Plants diffusely branched in flower (but not when very young); leaves scale-like, subtending filiform branches (cladophylls) that resemble leaves (*Asparagus*)ASPARAGACEAE
 - 35 Plants and leaves not as above
 - 36 Leaves all basal or absent, none borne on the flowering stems
 - 37 Leaves 1-2, elliptic, mottled with purple; flowers bright yellow, nodding (*Erythronium*) . LILIACEAE
 - 37 Leaves 1 to several, linear, not mottled; flowers whitish to bluish, erect..... THEMIDACEAE
 - 36 Leaves borne on the flowering stems
 - 38 Flowers borne in the axils of the leaves
 - 39 Perianth segments united to near the tips (*Polygonatum*).....RUSCACEAE
 - 39 Perianth segments separate to near the base (*Streptopus*)..... LILIACEAE
 - 38 Flowers borne at the stem tips
 - 40 Leaves linear-filiform; flowers white or purple-brown LILIACEAE
 - 40 Leaves broader; flowers whitish or orange-red
 - 41 Leaves whorled at the upper nodes, alternate below, lanceolate; flowers orange-red (*Lilium*)..... LILIACEAE
 - 41 Leaves alternate throughout, lanceolate to ovate; flowers whitish or yellowish
 - 42 Stems simple, unbranched; tepals neither swollen nor slightly inflated above the base; flowers erect to spreading (*Maianthemum*)RUSCACEAE
 - 42 Stems branched below; tepals weakly gibbous above the base; flowers nodding (*Prosartes*)..... LILIACEAE
 - 34 Flowers usually several to numerous in umbels, well-developed racemes, or panicles
 - 43 Flowers in umbels or umbel-like clusters
 - 44 Perianth segments separate nearly to the base..... ALLIACEAE
 - 44 Perianth segments united to about the middle THEMIDACEAE
 - 43 Flowers in racemes or panicles
 - 45 Leaves 3-30 cm wide, tending toward broadly elliptic, obviously disposed along the stem, with 5-9 or more leaves on the flowering shoot well above the base
 - 46 Plants 1-2 m tall; leaves 15-30 cm long, the larger 10-20 cm wide; flowers borne in large panicles often more than 20 cm long (*Veratrum*)..... MELANTHIACEAE
 - 46 Plants up to 1 m tall; leaves 5-20 cm long, 3-10 cm wide; flowers borne in panicles or racemes 3-10 cm long (*Maianthemum*)RUSCACEAE
 - 45 Leaves 1-2 cm wide, tending toward linear or narrowly lanceolate, mostly basal or nearly so, with only 1-3 leaves on the flowering shoot slightly above the base
 - 47 Flowers sessile or nearly so and borne in rather dense clusters, pedicels and branches absent or scarcely evident

- 48 Flowers blue-purple; perianth segments united into an urn-shaped tube (*Muscari*) HYACINTHACEAE
- 48 Flowers greenish to yellowish; perianth segments separate (*Schoenocaulon*)..... MELANTHIACEAE
- 47 Flowers borne on well-developed and evident pedicels or branches
 - 49 Tepals yellow to orange with dark veins, 7-8 cm long; leaves 70-100 cm long in mature plants; escaped ornamentals.....HEMEROCALLIDACEAE
 - 49 Tepals yellowish to whitish, less than 2 cm long; leaves less than 50 cm long; native or exotic plants
 - 50 Pedicels jointed with a circular band about mid-length; exotic noxious weed rare in the southern desert region..... ASPHODELACEAE
 - 50 Pedicels not jointed, lacking a circular band; native plants, generally not of the Chihuahuan Desert region
 - 51 Flowers whitish; perianth segments each with a gland at the base; styles distinct.....MELANTHIACEAE
 - 51 Flowers yellowish; perianth segments lacking a gland at the base; styles united (*Echeandia*)..... AGAVACEAE

AGAVACEAE AGAVE FAMILY [4/18/21]
[Anthericaceae]

Robust herbs or shrubs, with at least short rhizomes; leaves alternate or basal, usually in dense rosettes, simple, usually stiff and semi-succulent, persistent, entire to spinose-serrate, the shrubby members usually with a spine at the tip; stipules lacking; inflorescences paniculate, some poorly developed and racemose; flowers actinomorphic to slightly zygomorphic, perfect; perianth of 6 petaloid tepals, distinct or connate at the base; stamens 6; pistil single, superior or inferior, of 3 united carpels; fruit a capsule, sometimes berry-like, the seeds flat, blackish. ♦Widely distributed in warm-temperate regions of the Western Hemisphere, with about 25 genera. The classification of the family is contentious; we follow Judd et al. (2016) in expanding the Agavaceae to include the herbaceous Anthericaceae (not entirely satisfactory), removing the ‘woody’ *Nolina* and *Dasyliirion* to the Ruscaceae (*q.v.*), and maintaining the group as distinct from the Asparagaceae. Some current workers (see Angiosperm Phylogeny Website online) prefer an expanded (and unwieldy and almost meaningless, in our opinion) Asparagaceae to include several taxa treated as families herein.

■Bogler, D.J. & B.B. Simpson. 1995. A chloroplast DNA study of the Agavaceae. *Syst. Bot.* 20(2):191-205. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

- 1 Plants shrubby, leaves usually longer than 30 cm, leathery, often spiny, borne in rosettes at the tips of branches or all basal
 - 2 Leaves mostly serrate to serrulate, some entire, lacking a terminal spine; flowers usually unisexual, less than 1 cm long; seeds 2 or 3 in each chamber of the ovary (*Dasyliirion*, *Nolina*)..... see RUSCACEAE
 - 2 Leaves entire to filiferous, with a terminal spine; flowers bisexual, more than 1.4 cm long; seeds several to many in each chamber of the ovary
 - 3 Leaves with spiny margins; ovary inferior..... *Agave*
 - 3 Leaves without spiny margins (but may be filiferous with long threads); ovary inferior or superior
 - 4 Ovary inferior; leaves 1-2 cm wide and 25-50 cm long; trunk absent, the leaves all basal (*A. schottii*)..... *Agave*
 - 4 Ovary superior; leaves and trunk various
 - 5 Flowers reddish or yellowish, present during much of the growing season, in raceme-like inflorescences; leaves generally 0.5-1 cm wide, deeply furrowed or channeled; known only in cultivation..... *Hesperaloe*
 - 5 Flowers white or cream-colored, usually present only during the flowering season, in panicles or raceme-like inflorescences; leaves mostly 1-5 cm wide, flat to channeled; common in the wild and in cultivation..... *Yucca*
 - 1 Plants herbaceous; leaves other than above
 - 6 Perianth white; ovary subterranean, the flower arising from ground level; plants acaulescent *Leucocrinum*
 - 6 Perianth yellow to yellow-orange; ovary above ground; plants caulescent, at least with a flowering scape..... *Echeandia*

Agave [noble] AGAVE [5].

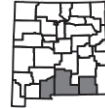
Perennial shrubs and trees, acaulescent or caulescent, often rhizomatous; leaves succulent, in evergreen rosettes, often thick and fleshy, the margins entire to spinose-toothed; inflorescences terminal at the end of elongated scapes arising from rosettes, much exceeding the leaves, spicate, racemose, to paniculate, blooming after 8-20 or more years of vegetative growth and the rosette then dying; flowers showy, erect or recurved, mostly yellowish, funnellform to tubular, the tepals connate basally, the stamens exerted; ovary inferior, succulent and thick-walled, mostly fleshy in fruit. ♦*Agave* provides both sisal hemp and tequila, and is commonly seen as an ornamental (*A. americana* Linnaeus, century plant) in the southwest.

■Freeman, C.E. 1973. A new record of lechuguilla (*Agave lechuguilla*: Agavaceae) in New Mexico. *Southwest. Nat.* 17(4):423. ■Gentry, H.S. 1982. Agaves of Continental North America. University of Arizona Press, Tucson. 670 pp. ■Reveal, J.L. & W.C. Hodgson. 2002. *Agave*, pp. 442-461. IN: *Flora of North America*, vol. 26. Oxford University Press, New York.

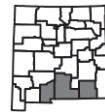
[Key adapted from Reveal & Hodgson 2002]

- 1 Inflorescence spicate or sub-spicate
 - 2 Leaf margins entire or filiferous, sometimes with inconspicuous teeth near the base; Hidalgo County *A. schottii*
 - 2 Leaf margins conspicuously armed with spinose teeth; Doña Ana County and eastward *A. lechuguilla*
- 1 Inflorescence paniculate
 - 3 Plants freely suckering, forming colonies of several rosettes; leaves narrowly lanceolate to broadly ovate..... *A. parryi*
 - 3 Plants rarely suckering, the rosettes single; leaves linear-lanceolate to lanceolate
 - 4 Leaves 18-30 cm long; flowers 6-45 per cluster; flowering summer to early fall; Doña Ana County and eastward..... *A. gracilipes*
 - 4 Leaves 35-92 cm long; flowers 8-16 per cluster; flowering late spring to summer; Luna County and westward *A. palmeri*

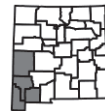
Agave gracilipes Trelease [slender-stalked]. Rosettes usually solitary, 70-80 cm diam; leaves ascending, 18-30 cm long, 4-7 cm wide, lanceolate to broadly lanceolate, the margins not filiferous, armed, the apical spine 2-5 cm long; scapes 3-5 m tall; inflorescences paniculate; flowers 6-45 per cluster, 4-6 cm long, yellow to yellowish green; capsules 2.5-4.5 cm long. ●Barely entering the state in the grasslands and desert scrub north of the Texas border; less abundant than the map implies.



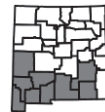
Agave lechuguilla Torrey [little lettuce, from the Spanish] LECHUGUILLA. Rosettes clustered, 50-60 cm diam; leaves ascending to erect, 30-50 cm long, 2-5 cm wide, the margins not filiferous, strongly armed with spinose teeth, the apical spine 1-5 cm long; scape 2-3.5 m tall; inflorescences spicate; flowers 2-3 per cluster, 2-5 cm long, yellow; capsules oblong, 2-3 cm long. ●Rocky hills and slopes in the south-central and southeastern regions, barely entering the state. ♦Plants are toxic to livestock. The apical spines can be pernicious to unwary passers-by, earning the name SHINDAGGERS. §



Agave palmeri Engelm [for Edward Palmer (1829-1911), British botanist, who made vast collections of plants in the Americas]. Rosettes mostly solitary, 70-130 cm diam; leaves ascending to spreading, 35-90 cm long, 4-20 cm wide, lanceolate, the margins not filiferous, armed, the apical spine 3-6 cm long; scapes 3-6 m tall; inflorescences broadly paniculate; flowers 8-16 per cluster, 4-7 cm long, cream-colored to pale yellow or light green; capsules oblong, 3-6 cm long. ●Oak woodlands on limestone in the bootheel region. §



Agave parryi Engelm [for Charles Christopher Parry (1823-1890), English-American botanist]. Rosettes solitary or clustered, 40-80 cm diam; leaves ascending to erect, 10-65 cm long, 4-20 cm wide, broadly ovate, the margins not filiferous, usually strongly armed, the apical spine 1-4 cm long; scapes 2-6 m tall; inflorescences broadly paniculate; flowers 25-50 per cluster, 4-8 cm long, yellow to yellowish green; capsules ovoid to obovoid, 2-5 cm long. ♦There are two varieties, both in New Mexico:



- a Rosettes flat-topped; scape 2-4.5 m tall; perianth tube 12-18 mm long; capsules 2.5-3.5 cm long...var. *neomexicana* (Wooton & Standley) B. Ullrich [for New Mexico] NEW MEXICO AGAVE [*Agave neomexicana* Wooton & Standley]. ●Grasslands and desert scrub in the south-central to southeastern regions.
- a Rosettes globose; scape 4-6 m tall; perianth tube 6-12 mm long; capsules 3.5-5 cm long...var. *parryi* [for Charles Christopher Parry (1823-1890), botanist-surgeon who accompanied the surveys of the mid-1800s] [*Agave americana* Linnaeus var. *latifolia* Torrey]. ●Desert scrub and oak woodlands in the bootheel region. §

Agave schottii Engelm [for Arthur Carl Victor Schott (1814-1875), German naturalist on the U.S.-Mexico Boundary Survey of 1851] [*Agave geminiflora* (Tagl.) Ker-Gawler var. *sonorae* Torrey]. Rosettes solitary or densely clustered, 60-120 cm diam; leaves mostly erect, widest near the base, 20-40 cm long, 1-3 cm wide, the margins filiferous, entire, the apical spine 1-2 cm long; scapes 1.5-4 m tall; inflorescences spicate to racemose; flowers 1-3 per cluster, 3-5 cm long, yellow; capsules obovoid, 1-2 cm long. ●Rocky hills and ledges in the bootheel region. ♦Our plants belong to var. *schottii*, with leaves to 1.2 cm wide, apical spine to 1.2 cm long, spicate inflorescences, and flowers to 4.2 cm long. §



Hesperaloe [western aloe] [0].

Perennial, agave- or yucca-like plants, short- to long-rhizomatous; leaves in expansive basal rosettes, linear, thick, the margins filiferous, not toothed, with a frayed or stout apical spine; inflorescences weakly paniculate to racemose; flowers bisexual, showy, the perianth 6-merous, narrowly tubular (ours) to broadly campanulate, the tepals alike and petaloid; ovary superior; fruit an ovoid capsule. ♦With 5 species, southern U.S., Mexico. We have a single species:

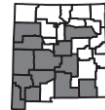
****Hesperaloe parviflora*** (Torrey) Coulter [small-flowered] RED/YELLOW YUCCA [*Yucca parviflora* Torrey]. Leaves dark green, 50-100 cm or more long, 0.5-1(2) cm wide, the margins with slender threads; panicles 1-2.5 m long; flowers reddish to salmon-colored, or yellow in one cultivar, 2.5-3.5 cm long; capsules 2.5-3 cm long. ●Not known in the wild in the state, but commonly used as a landscape ornamental.

Echeandia [for Pedro Gregorio Echeandía (1746-1817), Spanish botanist] CRAG-LILY [1].

Perennial herbs, from corms with enlarged storage roots; leaves grass-like, basal and cauline, sheathing, the bases surrounded by fibrous leaf bases from previous years; inflorescences racemose or paniculate; tepals distinct, strongly reflexed to spreading, 3-veined; anthers connate into a cone or distinct (ours); ovary superior, with a single style; fruits capsule-like, with black seeds. ♦About 80 species of the New World. Formerly placed in the Anthericaceae, which is merged within the Agavaceae herein.

- Cruden, R.W. 2002. *Echeandia*, pp. 215-216. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Echeandia flavescens (J.A. & J.H. Schultes) Cruden [yellowish] [*Anthericum torreyi* Baker, *Anthericum torreyi* Baker var. *neomexicanum* Poellnitz]. Basal leaves 3-15 in number, linear 8-40 cm long, to 1 cm wide, the margins minutely toothed, ciliate; cauline leaves 0-3 in number, 1-10 cm long, about 5 mm wide; flowering scape bracteate; inflorescences 20-70 cm long; tepals 8-15 mm long, the inner (lower) about twice the width of the outer (upper); capsules 7-16 mm long, 3-6 mm wide. ●Desert plains, woodlands, openings in pine forests; widely distributed but nowhere abundant, often hiding among grasses on the forest floor. §

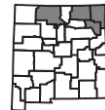


Leucocrinum [white lily] STAR-LILY [1].

Perennial, acaulescent, glabrous herbs, from deeply buried fleshy roots; leaves few, basal, sheathed together basally, the blades linear; inflorescences umbel-like, sessile, at ground level; flowers showy; tepals 6, connate below the middle and forming a perianth tube; stamens inserted near apex of perianth tube; ovary below ground, inferior, 3-locular; fruit capsular, 3-angled, the seeds black. ♦This is a monotypic species of the western United States. Formerly placed in the Anthericaceae, which is merged within the Agavaceae herein.

- Reveal, J.L. & F.H. Utech. 2002. *Leucocrinum*, pp. 217-218. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Leucocrinum montanum Nuttall ex Gray [of mountains]. Plants 5-10 cm tall; leaves spreading outward, lax, 10-20 cm long, 2-8 mm wide, the sheaths 3-8 cm long; perianth tubes 5-8 cm long; tepals 2-3 cm long; anthers 4-6 mm long; capsules 5-8 mm long, the seeds 3-4 mm long. ●Prairies, foothills, bluffs, and sagebrush plains in the far northern counties. ♦After flowering in the spring or early summer, the entire above-ground portions of the plants wither and blow away, leaving scarcely a trace of their presence; how the plants are dispersed is unknown, but some suggest ants



transport the seeds from the below-ground capsule.

Yucca [Carib name for another plant] YUCCA [11].

Perennial shrubs or trees, often branching extensively; leaves in basal or terminal rosettes, evergreen, leathery and often thick and succulent, rigid, the blades linear to lanceolate, the bases expanded, the margins entire or denticulate, usually filiferous, the apices mostly spinose or at least sharp pointed; inflorescences racemose to paniculate; flowers showy, the tepals petaloid and similar, whitish to cream-colored, distinct or connate basally, the stamens included but evident; ovary superior; fruits a capsule, fleshy and indehiscent or semi-woody and dehiscent, the seeds black and flattened. ♦ *Yucca*, without specific designation, is the state flower of New Mexico. There is considerable hybridization and intergradation among several species, and some individual plants may be very difficult to identify; this is also true of most immature (pre-flowering) plants and especially herbarium specimens. Sivinski's overview (2008) is especially helpful in understanding some of the difficult species. The distributions are conservative, and populations might be found outside the mapped ranges. Three genera of the moth family Prodoxidae participate in a mutualistic pollination system with *Yucca*.

■ Benson, L. & R.A. Darrow. 1981. *Trees and Shrubs of the Southwestern Deserts*. 3rd ed. Univ. Arizona Press. 416 pp. ■ Hess, W.J. & R.L. Robbins. 2002. *Yucca*, pp. 423-439. IN: *Flora of North America*, vol. 26. Oxford University Press, New York. ■ Johnson, M.B. 2000. Observations on some Chihuahuan Desert Yuccas. *Desert Plants* 16(1):14-19. ■ Lenz, L.W. & M.A. Hanson. 2000. Typification and change in status of *Yucca schottii* (Agavaceae). *Aliso* 19(1):93-98. ■ Lenz, L.W. & M.A. Hanson. 2001. *Yuccas* (Agavaceae) of the international four corners: southwestern USA and northwestern Mexico. *Aliso* 19(2):165-179. ■ McKelvey, S.D. 1934, 1947. *Yuccas of the southwestern United States*. [part 1, 1934; part 2, 1947]. Arnold Arboretum, Jamaica Plain, Massachusetts. ■ Sivinski, R.C. 2008. Some observations on the dry, dehiscent-fruited Yuccas in New Mexico. *The New Mexico Botanist* 43:1-4. ■ Webber, J.M. 1953. *Yuccas of the Southwest*. USDA Agric. Monogr. No. 17.

The following table may help sort through the more meaningful features:

| taxon | stemmed | stemless | lvs broad
2-5 cm | lvs narrow
1-2 cm | infl
exceeding
lvs | infl within
lvs | panicle | raceme | style
greenish | capsule
constricted |
|---------------------|---------|----------|---------------------|----------------------|--------------------------|--------------------|---------|--------|-------------------|------------------------|
| <i>angustissima</i> | | X | | X | X | | | X | | X |
| <i>baccata</i> | X | (x) | X | | | X | X | | | |
| <i>baileyi</i> | | X | | X | (x) | X | | X | (x) | X |
| <i>campestris</i> | | X | | X | | X | X | | X | X |
| <i>elata</i> | X | | | X | X | | X | | | |
| <i>faxoniana</i> | X | | X | | X | (x) | X | | | |
| <i>glauca</i> | | X | | X | | X | | X | X | |
| <i>harrimaniae</i> | (x) | X | X | | | X | | X | X | X |
| <i>madrensis</i> | X | | X | | | X | X | | | |
| <i>neomexicana</i> | | X | | X | (x) | X | | X | (x) | X |
| <i>schottii</i> | X | | X | | (x) | (x) | X | | | |
| <i>treculiana</i> | X | | X | | | X | X | | | |

[Key partially adapted from Sivinski, 2008]

1 Mature plants tree-like with well-developed stems 1-5 m long

2 Leaves not or only rarely filiferous, 3-6 cm wide

3 Plants mostly solitary; leaves somewhat flexible..... *Y. madrensis*

3 Plants mostly forming colonies; leaves stiff and rigid..... × *Y. schottii*

2 Leaves strongly filiferous, 0.5-8 cm wide

4 Leaves thin and flexible, 0.5-2 cm wide; fruits dehiscent, semi-woody, erect..... *Y. elata*

4 Leaves thick, stout, rigid, 2-8 cm wide; fruits indehiscent, fleshy, pendulous

5 Mature plants shorter than 2 m (not including panicles); distribution in the bootheel (var. *brevifolia*)..... *Y. baccata*

5 Mature plants taller than 2.5 m (not including panicles); distribution rarely in the bootheel

6 Tepals connate basally; ovary 3-8 cm long; most of the panicle exceeding the leaves; leaf arrangement very orderly and symmetric, the leaves tending to be wider..... *Y. faxoniana*

6 Tepals distinct; ovary 1-3 cm long; most of the panicle within the leaves; leaf arrangement unkempt and asymmetric, the leaves tending to be narrower *Y. treculiana*

1 Mature plants acaulescent, aerial stems absent or short to 0.5 m long (not including the peduncle and inflorescence)

7 Inflorescences mostly paniculate with well-developed branches

8 Leaves 2-6 cm wide; fruits fleshy, indehiscent, pendent..... *Y. baccata*

8 Leaves 0.2-1.5 cm wide; fruits semi-woody, dehiscent, erect

9 Peduncles long, lifting the lower panicle branches well-above the leaves; mostly west of Pecos River *Y. elata*

9 Peduncles short, holding the lower panicle branches below or just above the leaf tips; eastern plains *Y. campestris*

7 Inflorescences primarily racemose, occasionally paniculate proximally

10 Leaves concave-convex, 1-4 cm wide; capsules constricted near the middle

11 Leaves 1-2 cm wide; lowermost flowers of raceme arising at least 10 cm or more above the leaves; styles yellowish or pale green; distribution east of Rocky Mountains in the northeastern counties *Y. neomexicana*

11 Leaves 2-4 cm wide; lowermost flowers of raceme arising within or at the leaf tips; styles green; distribution west of Rocky Mountains in the Four Corners region..... *Y. harrimaniae*

10 Leaves plano-convex, 0.3-1.2 cm wide; capsules constricted or not

12 Lowest flowers of the racemes arising well beyond the leaves; capsules deeply constricted near the middle..... *Y. angustissima*

12 Lowest flowers of the racemes arising within or just beyond the leaves; capsules usually not constricted

13 Peduncles 10-20 cm long; styles slender-terete (var. *baileyi*) *Y. baileyi*

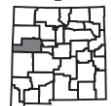
13 Peduncles 20-50 cm long; style slender or swollen

14 Leaves 5-8 mm wide; styles slender, white or pale yellow-green; capsule 2-2.5 cm wide (var. *intermedia*).....

..... *Y. baileyi*

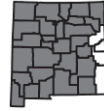
14 Leaves 8-12 mm wide; styles swollen, dark green; capsules 3-5 cm wide..... *Y. glauca*

Yucca angustissima Engelmann ex Trelease [very narrow]. Plants solitary or in colonies, mostly acaulescent, 1-2 m tall; leaves greenish, not glaucous, 25-45 cm long, 0.5-0.8 cm wide, flexible, plano-convex, the margins filiferous; inflorescences racemose, arising well beyond the leaves, 80-100 cm long, the peduncles 30-50 cm long; flowers 4.5-5.5 cm long, the tepals distinct, pale green with rose tinges, the styles mostly white to pale greenish; fruits semi-woody,



erect, 3.5-6 cm long, 2-3 cm wide, deeply constricted near the middle. •Questionably present on arid foothills south of Mt. Taylor. ♦We confine the name *Y. angustissima* to plants that are acaulescent and narrow-leaved, with the racemes elevated well above the leaves and the capsules strongly constricted; relatively few plants near Grants (Cibola Co.) approach this circumscription, and the case can be made that these plants are not *Y. angustissima* at all, but rather hybrids between *Y. baileyi intermedia* x *Y. elata*. It has been reported in the far western Four Corners region of New Mexico, but the narrow-leaved, racemose plants of the western counties align more accurately with *Y. baileyi*.

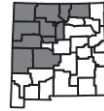
Yucca baccata Torrey [berry-like] BANANA YUCCA. Plants forming colonies, acaulescent or short-caulescent, shorter than 2.5 m; leaves bluish green, concave-convex, 30-100 cm long, 2-6 cm wide, rigid, the margins moderately to strongly filiferous; inflorescences paniculate, within or exceeding the leaves, 60-80 cm long, the peduncles to 80 cm long; flowers 5-13 cm long, the tepals connate basally for 7-12 mm, cream-colored, sometimes with purple tinges, the styles white; fruits fleshy, indehiscent, 8-23 cm long, 4-8 cm wide. •We have two varieties:



a Plants acaulescent or caulescent; stems 1-6, aerial or subterranean, shorter than 30 cm tall; leaf margins coarsely filiferous...var. *baccata* •Widespread nearly throughout the state. §

a Plants caulescent; stems 1-24 in number, aerial, often branched, some reaching 200 cm tall; leaf margins finely filiferous...var. *brevifolia* L.D. Benson & R.A. Darrow [short-leaved] [*Yucca arizonica* McKelvey, *Yucca brevifolia* Schott ex Torrey, nom. ill., not *Yucca brevifolia* Engelman (Joshua tree)]. •Barely entering New Mexico in the bootheel. ♦Easily confused with *Y. faxoniana* or *Y. treculiana* because of the caulescent nature, but those species are essentially absent from the bootheel (perhaps one collection of *Y. treculiana*) and taller than 2.5 m.

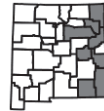
Yucca baileyi Wootton & Standley [for Vernon Orlando Bailey (1864-1942), naturalist for the USDA Bureau of Biological Survey] MOUNTAIN YUCCA. Plants acaulescent, solitary or forming colonies, to 1.5 m tall; leaves yellowish-green, 30-50 cm long, the panicles arising within or somewhat above the leaves; flowers 5-7 cm long, cream-colored or greenish, the tepals distinct, the styles slender-terete, white to pale yellowish green; fruits semi-woody, dehiscent, 5-6 cm long, about 2.5 cm wide, only occasionally constricted. ♦We have two weak varieties:



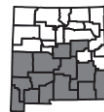
a Inflorescences 25-80 cm long; peduncle shorter than 20 cm long...var. *baileyi* [*Yucca baileyi* Wootton & Standley var. *navajoa* (Webber) Webber, *Yucca navajoa* Webber, *Yucca standleyi* McKelvey]. •Woodlands, grasslands, and foothills of the northwest mountains and plains. ♦Plants of the Four Corners region growing in compact colonies with many erect stems have been called *Y. navajoa* (see synonyms).

a Inflorescences 70-130 cm long (sometimes shorter); peduncle 10-50 cm long...var. *intermedia* (McKelvey) Reveal [*Yucca intermedia* McKelvey]. •Woodlands and grasslands of the western mountains and north-central plains and foothills; endemic to New Mexico.

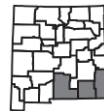
Yucca campestris McKelvey [of fields] [*Yucca intermedia* McKelvey var. *ramosa* McKelvey]. Plants acaulescent, forming open colonies, to 2 m tall; leaves pale to yellowish-green, flat to plano-convex, somewhat flexible to rigid, 25-65 cm long, 0.5-1.5 cm wide, the margins becoming filiferous; inflorescences paniculate, sometimes racemose distally, arising slightly below to above the leaves, 45-100 cm or more long, the peduncles 1-2 m long; flowers 3-5 cm long, pale greenish-white, the tepals distinct, the styles bright green; fruits semi-woody, dehiscent 4-6 cm long, 2-4 cm wide, constricted near the middle. •On the eastern plains. ♦We include here definitely paniculate plants that have been dubiously referred in *Y. intermedia* or *Y. glauca*, extending the distribution of *Y. campestris* from scarcely known in the state to common throughout the eastern plains.



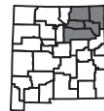
Yucca elata (Engelmann) Engelmann [elevated] SOAPTREE YUCCA [*Yucca angustifolia* Pursh var. *elata* Engelmann]. Plants solitary or forming small colonies, caulescent or rarely acaulescent, commonly with a few branches, 2-5 m tall; leaves pale green, 25-100 cm long, 5-15 mm wide, flexible, the margins strongly filiferous; inflorescences paniculate, sometimes racemose distally or in weakly developed plants, arising well beyond the leaves, 70-150 cm long; flowers 3-6 cm long, creamy white, the tepals distinct, the styles white to pale green; fruits semi-woody, dehiscent, 5-8 cm long, 2-4 cm wide. •Widespread throughout the deserts, grasslands, and foothills in the southern half of the state. ♦Our plants belong to var. *elata*. This species is generally quite distinctive, but young plants without inflorescences can be easily confused with other narrow-leaved yuccas. §



Yucca faxoniana Sargent [for Charles Edward Faxon (1846-1918), assistant director of the Arnold Arboretum] FAXON YUCCA. Plants solitary, tree-like, to about 5 m tall (not including inflorescence); stems single, sometimes branched above; leaves yellow-green, 40-100 cm or more long, 3-8 cm wide, rigid, the margins strongly filiferous; inflorescences paniculate, partially within or mostly exceeding the leaves, 0.5-2 m long, the peduncles 30-60 cm long; flowers 4-12 cm long, the tepals connate basally for 1-32 mm, whitish, the styles white; fruits fleshy, indehiscent, 4-14 cm long, 2-4 cm wide. •Barely entering the state along the southern border with Texas, and known from very few specimens. ♦Similar to *Yucca treculiana*, which is much more common and differs most conspicuously in the key features. Commonly used as an ornamental.



Yucca glauca Nuttall [*Yucca angustifolia* Pursh, *Yucca glauca* Nuttall var. *gurneyi* McKelvey]. Plants acaulescent, commonly forming colonies, to 1.5 m tall; leaves pale green, concave-convex, 40-60 cm long, 0.8-1.2 cm wide, somewhat rigid, the margins filiferous; inflorescences racemose, arising within or just beyond the leaves, 50-100 cm long, the peduncles 20-30 cm long; flowers greenish-white to white, about 5 cm long, the tepals distinct, the styles swollen, dark green; fruits semi-woody, dehiscent, 5-9 cm long, 3-5 cm wide, not constricted. •Grasslands and plains in the northeastern quarter of the state. ♦We apply the name *Y. glauca* herein in a more restrictive sense than other workers, to refer to acaulescent, narrow-leaved plants with racemose inflorescences arising within or nearly at the leaf tips, and with swollen green styles; plants similar to this but with mostly paniculate inflorescences, formerly placed here or within *Y. intermedia*, are referred to *Y. campestris*. §



Yucca harrimaniae Trelease [for Mary Williamson Averell Harriman (1851-1932), patron of natural history endeavors]. Plants acaulescent to short-caulescent, forming colonies, to 1.5 m tall; leaves pale green, 30-50 cm long, 2-4 cm wide, concave-convex, rigid, the margins filiferous; inflorescences racemose, sometimes short-paniculate proximally, 35-70 cm long, the peduncles 10-20 cm long, the lower flowers within or just above the leaves; flowers 4-5 cm long, yellow or greenish-yellow, the tepals distinct with purple tinges, the styles pale to bright green; fruits semi-woody, dehiscent, 3-5 cm long, 2-3 cm wide, deeply constricted near the middle. •Sometimes reported for the state, but authentic specimens are unknown; to be looked for on desert slopes and foothills in the Four Corners region. ♦*Yucca harrimaniae* is characterized by being acaulescent, the leaves concave-convex, thick, and rigid, the racemes arising within or at the leaf tips, the styles green, and the capsules deeply constricted. Plants reported as *Y. harrimaniae* for northwestern New Mexico belong mostly to *Y. baileyi*, and individual hybrids of *Y. baileyi* x *Y. baccata*.

Yucca madrensis Gentry [from the Sierra Madre, Mexico] SIERRA MADRE YUCCA [*Yucca schottii* of many New Mexico reports]. Plants solitary, caulescent, 2-3 m tall; stems single; leaves blue-green to yellow-green, 40-100 cm long, 3-6 cm wide, plano-convex, flexible, the margins mostly not filiferous; inflorescences paniculate, arising within the leaves, 30-75 cm long; flowers about 3.5 cm long, the tepals distinct, white, the styles whitish; fruits fleshy, indehiscent, 6-12 cm long, 2-4 cm wide, not constricted. •Infrequent in pine-oak woodlands in the bootheel region. ♦Many of the plants corresponding to this name were formerly called *Y. schottii*; we follow Lenz & Hanson (2000, 2001) in using the name x *Yucca schottii*

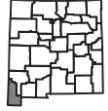


for supposedly hybrid derivatives involving *Yucca baccata* × *Y. elata* × *Y. madrensis*, all of which can be found in the bootheel. We restrict the name *Y. madrensis* Gentry for non-colonizing caulescent plants 2-3 m tall, with somewhat flexible leaves and non-filiferous margins and the panicle arising within the leaves. §

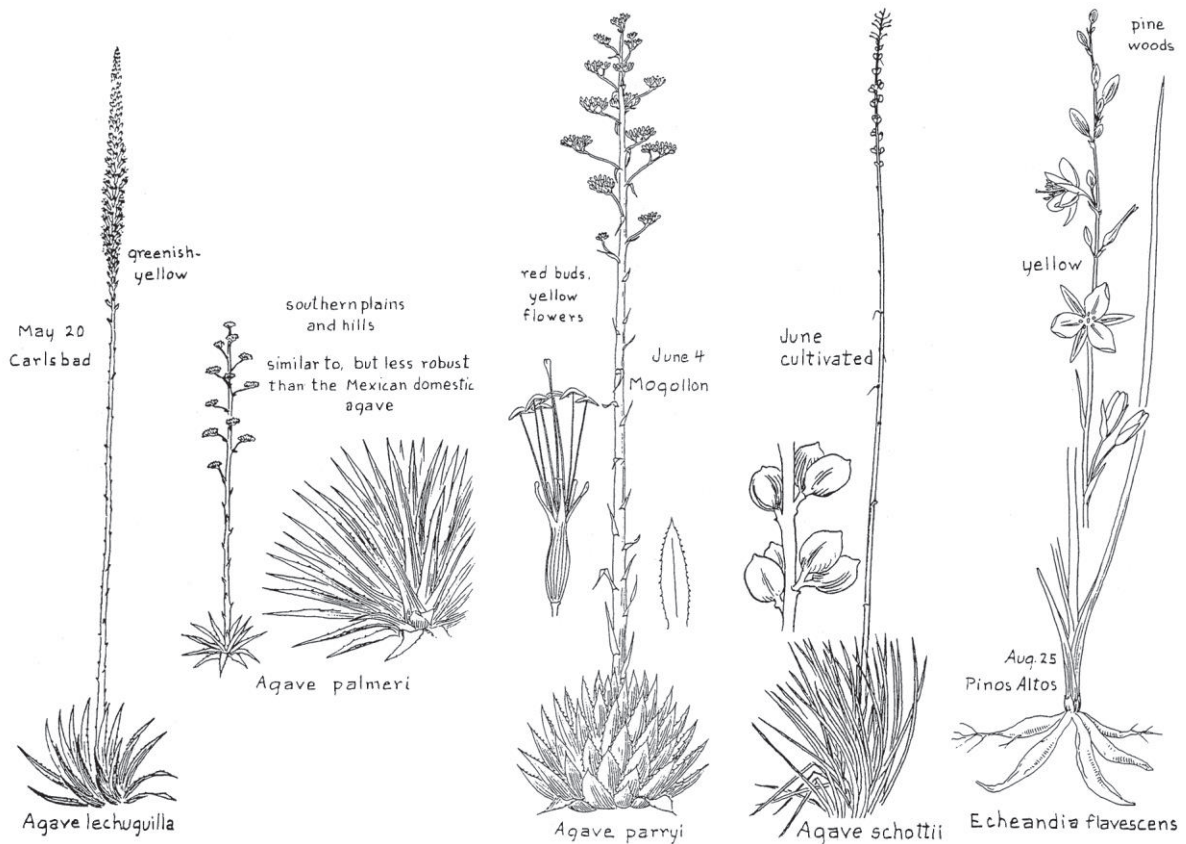
Yucca neomexicana Wooton & Standley [from New Mexico] NEW MEXICO YUCCA [*Yucca harrimaniae* Trelease var. *neomexicana* (Wooton & Standley) Reveal]. Plants acaulescent, single or forming open colonies, to 1.5 m tall; leaves green-glaucous, 15-45 cm long, (0.7)1-2 cm wide, concave-convex, somewhat flexible, the margins filiferous; inflorescences racemose, rarely short-paniculate proximally, arising at or up to 20 cm beyond the leaves, 40-70 cm long; flowers white to greenish-white with purplish tinges, 3-5 cm long, the tepals distinct, the styles pale green to white; fruits semi-woody, dehiscent, 3-4 cm long, 2-3 cm wide, deeply constricted near the middle. ●Rocky slopes and ledges in grasslands and woodlands of the northeastern region. ◆Once thought to be endemic to New Mexico, but now reported from Colorado and Oklahoma as well.

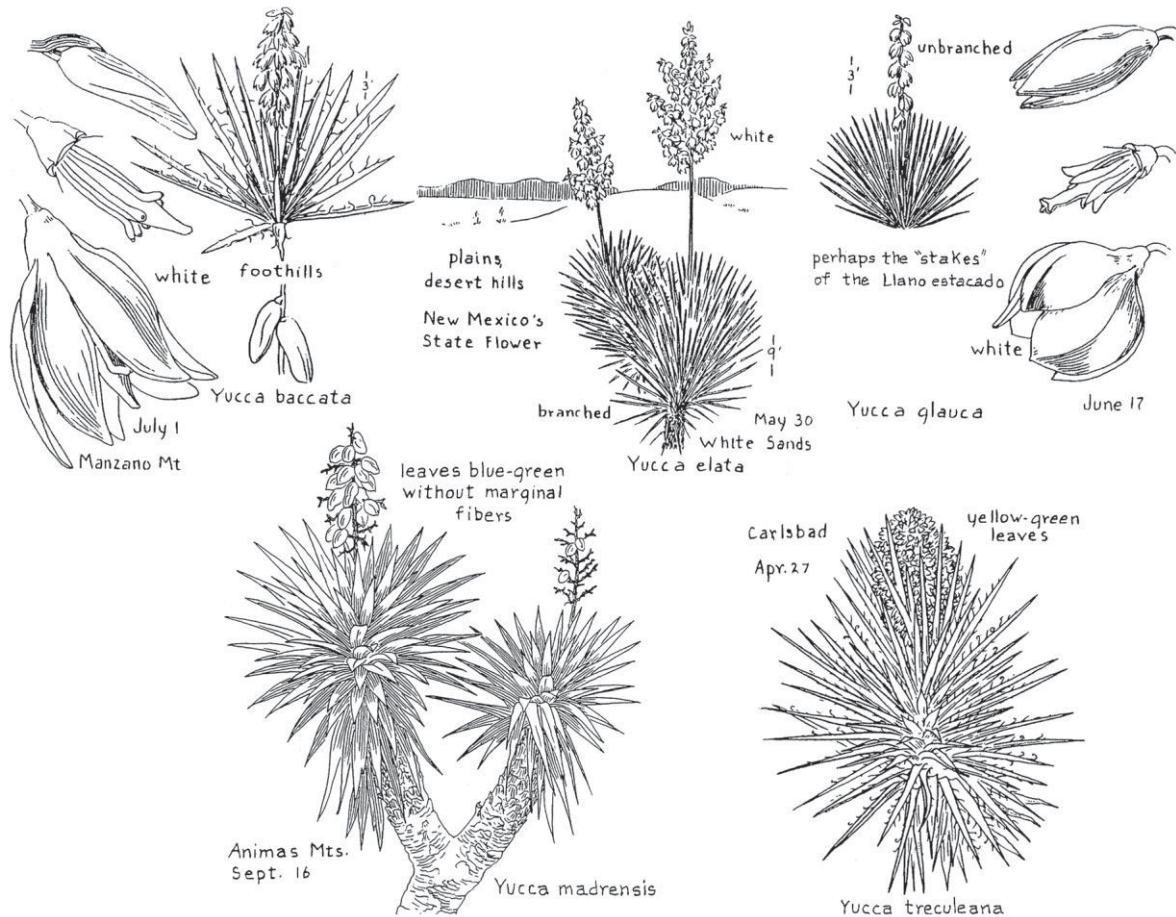


×*Yucca schottii* Engelmann pro sp. [for Arthur Carl Victor Schott (1814-1875), German naturalist]. Plants mostly forming colonies, short-caulescent, 1-2 m tall; leaf blades stiff and rigid, green to glaucous, 40-80 cm long, 3-6 cm wide, the margins mostly entire and not filiferous ◆We follow Lenz & Hanson (2000, 2001) in applying this name to supposedly hybrid derivatives involving *Yucca baccata* × *Y. elata* × *Y. madrensis*, all of which can be found in the bootheel.



Yucca treculiana Carrière [for Auguste Adophe Lucien Trécul (1818-1896), French botanist-anatomist] TORREY'S YUCCA [*Yucca baccata* Torrey var. *macrocarpa* Torrey, *Yucca macrocarpa* (Torrey) Engelmann, *Yucca torreyi* Shafer, *Yucca torreyi* Shafer forma *parviflora* McKelvey]. Plants single or forming colonies, mostly 3-7 m tall, the stems single or occasionally branched; leaves yellowish to bluish green concave-convex, rigid, 35-130 cm long, 2-7 cm wide, the margins filiferous with coarse fibers; inflorescences paniculate, partially exceeding to mostly within the leaves, 50-150 cm long, the peduncles (in ours) 10-20 cm long; flowers 3-8 cm long, the tepals distinct, cream-colored, the styles white; fruits fleshy, indehiscent, 5-18 cm long, 2-5 cm wide. ●Dry hillsides, bajadas, and brush land across the southern desert region. ◆Our plants belong to the *torreyi* form, scarcely differing from the *treculiana* form of southwest Texas to the Gulf. The specific epithet was originally spelled *treculeana*, but that is an orthographic error capable of correction to *treculiana*, in accordance with the rules of epithet formation (see International Code of Nomenclature for algae, fungi, and plants, Articles 60.12 and Recommendation 60C). §





ALISMATACEAE WATER PLANTAIN FAMILY [3/9/9]

Glabrous, aquatic herbs from rhizomes; leaves alternate and basal, simple, linear to sagittate, the petiole distinct with a flattened, sheathing base, the venation reticulate; stipules absent; inflorescence an erect scapose raceme or panicle; flowers actinomorphic, perfect or unisexual (monoecious); sepals 3, green and commonly persistent; petals 3; short-lived; stamens 3, 6, or many; pistils 3-many, superior, of individual carpels, the style single; fruit an achene.

■Haynes, R.R. & C.B. Hellquist. 2000. Alismataceae, pp. 7-25. IN: Flora North America, vol. 22. Oxford University Press.

- 1 Ovaries and fruits arranged in a single whorl on the receptacle; stamens 6..... *Alisma*
- 1 Ovaries and fruits densely crowded over the surface of the receptacle, stamens more than 6
 - 2 Leaf blades with translucent markings evident as distinct lines; flowers bisexual; fruits plump *Echinodorus*
 - 2 Leaf blades lacking translucent markings; at least the proximal flowers unisexual; fruits compressed *Sagittaria*

Alisma [ancient Greek name] WATER-PLANTAIN [3].

Perennial herbs, submersed to emergent, glabrous, rhizomes often present; roots not septate; leaves sessile to petiolate, the blade lacking transverse markings, linear to ovate, the margins entire; inflorescence a panicle of whorls of flowers, erect and emergent, rarely submersed; flowers bisexual, on a flattened receptacle; petals pink to white; stamens 6; pistils 15-20. ♦A small genus of perhaps 9 species, nearly world-wide.

■Allred, K.W. 1999. New plant distribution records [*Alisma subcordatum*]. The New Mexico Botanist 13:7. ■Fernald, M.L. 1946. The North American representatives of *Alisma plantago-aquatica*. Rhodora 48:86-88. ■Hendricks, A.J. 1957. A revision of the genus *Alisma* (Dill.) L. Amer. Midl. Naturalist 58:470-493. ■Pogan, E. 1963. Taxonomical value of *Alisma triviale* Pursh and *Alisma subcordatum* Rafin. Canad. J. bot. 41:1011-1013.

- 1 Leaves linear, less than 2.5 cm wide; achenes about as wide as long, distinctly bisulcate on the back; pedicels stout; petioles 4-6 mm wide *A. gramineum*
- 1 Leaves (emergent) more than 2.5 cm wide; achenes longer than wide, with a solitary groove to almost flat on the back; pedicels slender; petioles less than 4 mm wide
 - 2 Achenes 2 mm long or less, the dorsal groove shallow or with a somewhat depressed slight thickening in the trough; fruiting heads 3.5 mm or less in diameter..... *A. subcordatum*
 - 2 Achenes more than 2 mm long, the dorsal groove deep; fruiting heads more than 3.5 mm in diameter *A. triviale*

Alisma gramineum K.C. Gmelin [grass-like] [*Alisma geyeri* Torrey, *Alisma gramineum* K.C. Gmelin var. *geyeri* (Torrey) Samuelsson]. Perennial herbs, 1-30 cm tall/long; leaves submersed or floating or emergent, the submersed leaves sessile and ribbon-like, the floating leaves linear and to 1 m long, the emergent leaves petiolate and lanceolate to 25 cm long; panicles to 50 cm long, less than 1 cm wide; flowers cleistogamous; sepals 1-3 mm long; petals 2-4 mm long; fruiting heads 3-6 mm diam; achenes 2-3 mm long. ●Shallow water of lakes, ponds, and ditches; known from only a few collections.



Alisma subcordatum Rafinesque [nearly heart-shaped]. Perennial herbs to 60 cm tall/long; leaves emergent, rarely floating, petiolate; blades ovate to elliptic, to 15 cm long and 10 cm wide; panicles to 100 cm long; flowers chasmogamous; sepals 1-3 mm long; petals 1-3 mm long; fruiting heads 2-4 mm diam; achenes 1-2 mm long. ●Shallow water of ponds and ditches.



Alisma triviale Pursh [commonplace] [*Alisma brevipes* Greene, *Alisma plantago-aquatica* sensu W&S, *Alisma plantago-aquatica* Linnaeus var. *americanum* Schultes & Schultes f.]. Perennial herbs to 1 m tall/long; leaves emergent, petiolate, the blades lanceolate to broadly elliptic or ovate, to 35 cm long, 3-12 cm wide; panicles to 1 m long; flowers chasmogamous; sepals 3-6 mm long; petals 3-6 mm long; fruiting heads 4-7 mm diam; achenes 2-3 mm long. ●Shallow water of ponds and ditches. ♦This is the most common of the three species, as its name suggests. §



Echinodorus [spiny like a hedge-hog] BURR-HEAD [1].

Annual or perennial aquatic herbs, the plants emergent or with floating leaves (rarely submersed), glabrous to stellate-hairy, with or without rhizomes, but lacking stolons, corms, and tubers, the roots not septate; leaves sessile to petiolate, the blades with or without transverse markings; inflorescence a raceme or panicle, of 1-several whorls, emergent; flowers bisexual, 3-merous, the petals white, the stamens several-hundreds, the pistils several-hundreds, forming a dense head; fruit an achene. ♦A small New World aquatic genus of about 25 species.

■Great Plains Flora Association. 1977. Atlas of the Flora of the Great Plains. Iowa State Univ. Press. 600 pp. [*Echinodorus berteroi*]

Echinodorus berteroi (Sprengel) Fassett [for Carlo Giuseppe Bertero (1789-1831), Italian botanist] [*Alisma berteroi* Sprengel, *Echinodorus rostratus* (Nuttall) Engelm.] Annual to perennial herbs, to about 70 cm tall (the erect leaves), with rhizomes; leaves mostly emergent, the petioles to 36 cm long, the blades broadly lanceolate to ovate, 3-16 cm long, as wide or wider, the bases truncate to cordate; racemes panicate, 2-40 cm long, as wide or wider, of several whorls; flowers 6-11 mm wide; sepals spreading to recurved, 9-13-veined; stamens 9-15; pistils 45-200; achenes 1-3 mm long, 3-5-ribbed, beaked. ●Wet ditches, streams, and shallow ponds, reported from Roosevelt County. ♦The elongated beaks of the fruits give mature flower heads a bristly appearance.



Sagittaria [arrow-shaped] ARROWHEAD [5].

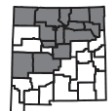
Perennial aquatic herbs, emergent, floating-leaved, or submersed, mostly glabrous, often with rhizomes, stolons, and tubers, corms absent, the roots septate; leaves sessile to petiolate, the blades with transverse markings; inflorescence a raceme or panicle of 1-several whorls, bracteate at the nodes, emergent or floating; flowers unisexual, 3-merous, the staminate distal, the pistillate proximal, the petals white to pinkish, the stamens 7-30, the pistils to a thousand or more, spirally arranged; fruit an achene, often winged. ♦A small, mostly New World aquatic genus of about 30 species. With the exception of *Sagittaria cuneata*, our species are poorly collected or very infrequent in the state. *Sagittaria graminea* Michaux has been reported from Colfax County, but the specimen in question belongs to *S. demersa*.

■Bogin, C. 1955. A revision of the genus *Sagittaria*. Mem. New York Bot. Gard. 9:179-233. ■Haynes, R.R. & C.B. Hellquist. 2000. Alismataceae, p. 7-25. IN: Flora of North America, vol. 22. Oxford University Press.

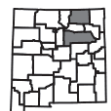
- 1 All leaves linear to oblong, not cordate, hastate, nor sagittate ***S. demersa***
- 1 At least some leaf blades cordate, hastate, or sagittate
 - 2 Sepals of pistillate/fruiting heads erect and enclosing the head ***S. montevidensis***
 - 2 Sepals of pistillate/fruiting heads spreading to recurved, not enclosing the head
 - 3 Bracts distinct or connate much less than ¼ their total length ***S. brevirostra***
 - 3 Bracts connate at least ¼ their total length
 - 4 Beak of the achene projecting horizontally, 1-2 mm long ***S. latifolia***
 - 4 Beak of the achene erect or incurved, to 0.6 mm long
 - 5 Emergent plants with recurved petioles and linear to sagittate blades; basal lobes equal to or shorter than the remainder of the blade; submersed leaves lanceolate, phyllodial; floating blades cordate to sagittate ***S. cuneata***
 - 5 Emergent plants with ascending to erect petioles and sagittate blades; basal lobes longer than the remainder of the blade; submersed and floating leaves absent ***S. longiloba***

Sagittaria brevirostra Mackenzie & Bush [short-beaked] [*Sagittaria engelmanniana* J.G. Smith subsp. *brevirostra* (Mackenzie & Bush) Bogin]. Perennial herbs to 70 cm tall, lacking rhizomes, stolons and corms present; leaves emergent, the petiole to 35 cm long; blades sagittate, 5-20 cm long, 2-8 cm wide, the basal lobes equal to or less than the remainder of the blade; inflorescence of 5-12 whorls, the bracts distinct or connate less than ¼ their total length and 1-4 cm long; flowers to 3.5 cm diam; sepals reflexed to spreading, not enclosing the flower; fruiting heads 1-3 cm diam; achenes with a lateral beak 0.5-1.7 mm long. ●Shallow water of ponds, lakes, and marshy ground; not known from New Mexico, but to be looked for in the northeast region.

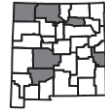
Sagittaria cuneata Sheldon [wedge-shaped] [*Sagittaria arifolia* Nuttall]. Perennial herbs to 100 cm tall, lacking rhizomes and stolons, corms present; leaves submersed, floating, and emergent; submersed leaves phyllodial, 5-40 cm long; floating leaves petiolate, the blades mostly cordate to sagittate, 7-9 cm long, 3-4 cm wide; emergent leaves with petioles recurved, 3-45 cm long, the blades linear to sagittate, 3-15 cm long, 2-10 cm wide, the basal lobes shorter than the remainder of the blade; inflorescences of 2-10 whorls, the bracts connate more than ¼ their total length, 7-40 mm long, the fruiting pedicels ascending; flowers to 2.5 cm diam; sepals recurved, not enclosing the flower; fruiting heads 1-1.5 cm diam; achenes with erect lateral beaks less than 0.5 mm long. ●Muddy shores and river banks, ditches, pastures. ♦This is the most common *Sagittaria* in the state, and can be highly variable. §



Sagittaria demersa J.G. Small [submerged] [*Sagittaria graminea* of NM reports]. Annual herbs to 60 cm tall, lacking rhizomes, stolons and corms present; leaves submersed, phyllodial (lacking a blade), 12-50 cm long, to 1 cm wide; inflorescences of 2-7 whorls, floating or emergent, the bracts connate more than ¼ their total length, 1-2 mm long; fruiting pedicels spreading to reflexed; flowers 2-5 cm diam; sepals spreading in the staminate flowers, erect to spreading in pistillate flowers and often enclosing the flower head; fruiting heads less than 1 cm diam; achenes with a lateral erect beak about 1 mm long. ●Margins of lakes and ponds in the northern plains and foothills; known from few collections, otherwise known only from central Mexico.

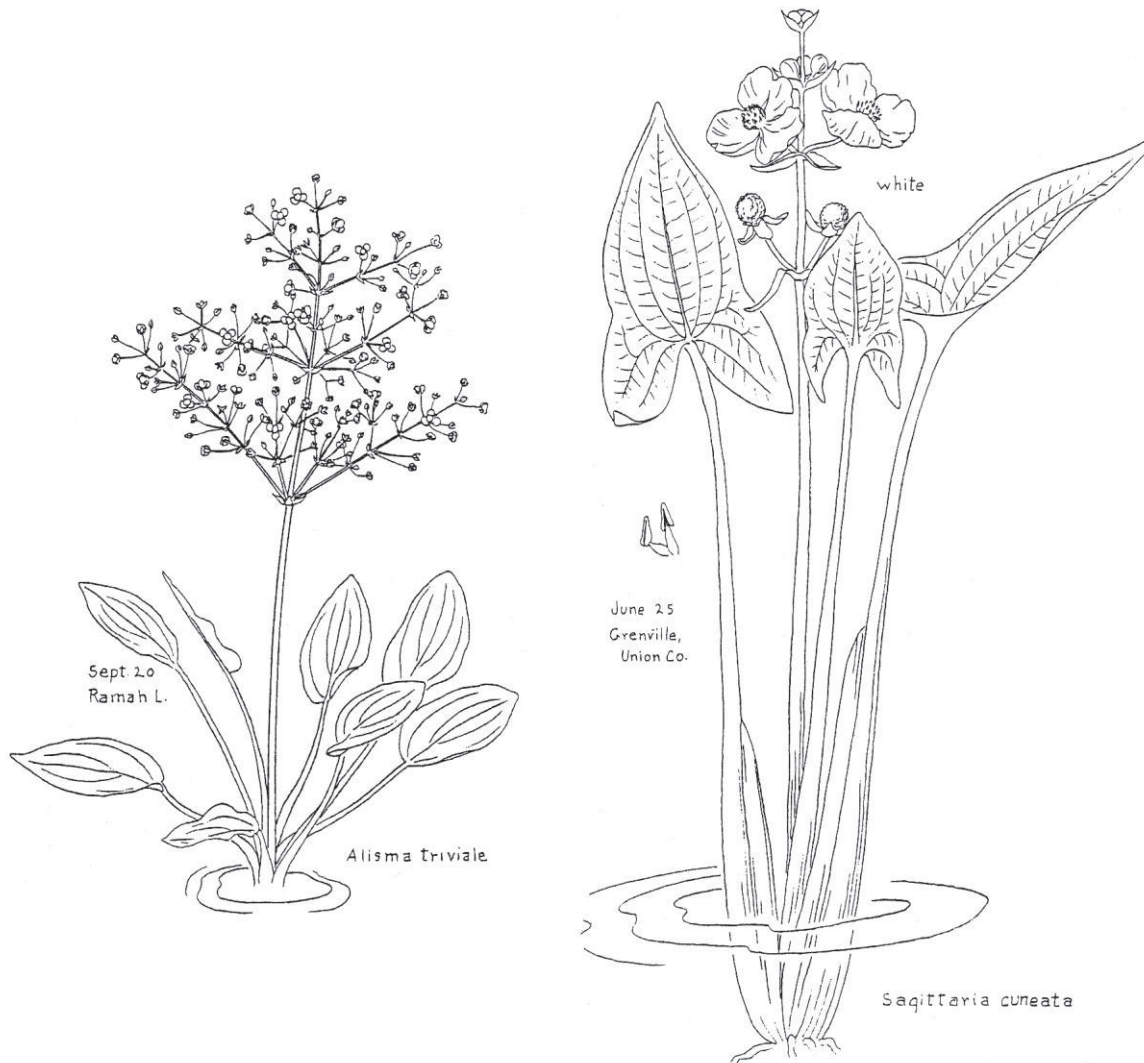
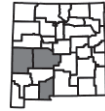


Sagittaria latifolia Willdenow [broad-leaved]. Perennial herbs to 45 cm tall, lacking rhizomes, with stolons and corms; leaves emergent, the petioles 6-50 cm long, the blades sagittate, 2-30 cm long, to 17 cm wide, the basal lobes equal to or less than the remainder of the blade; inflorescences mostly racemose, of 3-9 whorls, the bracts connate more than ¼ their total length, 3-8 mm long; flowers to 4 cm diam; sepals recurved to spreading, not enclosing the flower; fruiting heads 1-2 cm diam; achenes with a lateral horizontal beak 1-2 mm long. ●Margins of lakes and ponds.



Sagittaria longiloba Engelm ex J.G. Smith [with long lobes] [*Sagittaria greggii* J.G. Smith]. Perennial herbs to 100 cm tall, lacking rhizomes, stolons and corms present; leaves emergent, the petioles 25-60 cm long, the blades sagittate, 11-26 cm long, 1-15 cm wide, the basal lobes longer than the remainder of the blade; inflorescences mostly racemose, of 5-17 whorls, the bracts connate more than ¼ their total length, 7-15 mm long, the fruiting pedicels spreading; flowers to 3 cm diam; sepals recurved to spreading, not enclosing the flower; fruiting heads 1-1.5 cm diam; achenes with an erect lateral beak to 0.6 mm long. ●Margins of lakes and ponds, presumably on the eastern plains. ♦Reported by various workers, and present in Texas just east of the state line, but specimens from New Mexico are unknown.

Sagittaria montevidensis Chamisso & Schlechtendal [of Montevideo, Uruguay]. Annual to perennial herbs, to 1 m tall, with rhizomes and corms, stolons absent; leaves submersed and emergent; submersed leaves sessile, the blades linear; emergent leaves petiolate, the petioles 20-50 cm long, the blades hastate to sagittate, 3-18 cm long, 1-20 cm wide; inflorescence of 1-15 whorls, floating or emergent, the bracts distinct, 4-30 mm long; flowers 2-5 cm diam; sepals spreading in the staminate flowers, erect and enclosing the flower in pistillate flowers; fruiting heads 1-2 cm diam; achenes with a lateral horizontal beak 0.4-1 mm long. ●Mud flats of lakes and streams. ♦Our plants belong to subsp. *calycina* (Engelmann) Bogin [calyx-like] [*Sagittaria calycina* Engelm., *Lophotocarpus calycinus* (Engelmann) J.G. Smith]; the typical subspecies is native to South America.



ALLIACEAE ONION FAMILY [2/13/14]

Perennial herbs from bulbs, with or without an onion-like odor; leaves simple, alternate, basal, mostly closed-sheathing, parallel-veined; flowers bisexual, actinomorphic, terminal on a scape in an umbellate inflorescence (actually a contracted eliocid cyme), subtended by a few membranous spathe-like bracts; individual flowers not associated with bracts; perianth of 6 petaloid tepals, sometimes with a corona; stamens mostly 6, distinct to connate; pistil single, superior, of 3 carpels, the style single; fruit a capsule. ♦A family of about 13 genera, widely distributed in temperate to tropical regions of the world, and includes important seasoning plants, such as onion, garlic, leek, and chives (all in the genus *Allium*). *Allium* and relatives were traditionally placed in a large and polyphyletic Liliaceae, and are currently sometimes combined with the Amaryllidaceae, but the smaller families of the Asparagales (such as Alliaceae), as applied herein, remain monophyletic (Judd et al. 2016).

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

- 1 Plants smelling of onion; tepals white, pink, reddish, to pale lavender *Allium*
- 1 Plants not smelling of onion; tepals white, cream-colored, to pale yellow *Nothoscordum*

Allium [the classical Latin name for garlic] ONION [12].

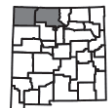
Contributed by Robert C. Sivinski

Perennial, with an onion or garlic-like odor from crushed leaves; scapose from bulbs that annually clone by lateral division, or terminate short/thick or long/slender rhizomes; leaves linear, flat or concave-convex (channeled); inflorescence a terminal, involucre umbel; involucre bracts dry and membranous, one to several nerved; tepals 6, distinct, all petaloid; stamens 6, ovary 3-lobed, sometimes crested on each carpel. ♦All species are edible without worry of misidentifying the genus. If the crushed leaves smell like onion or garlic and the plant has an umbellate inflorescence, it is an *Allium* and the bulbs can be eaten. The species of *Allium* are often misidentified. Digging up a bulb is necessary to view the bulb coat and look for rhizomes. *Allium brevistylum* S. Watson has been reported in the state from misidentified Sierra Blanca specimens of *Allium gooddingii* M. Ownbey.

■McNeal, D.W. Jr. & T.D. Jacobsen. 2002. *Allium*, pp. 224-276. IN: *Flora of North America*, vol. 26. Oxford University Press, New York. ■Sivinski, R.C. 1998. Annotated checklist of the genus *Allium* (Liliaceae) in New Mexico. *New Mexico Naturalist's Notes* 1(1):43-56. ■Spellenberg, R., R. Worthington, P. Knight, & R. Fletcher. 1986. Additions to the flora of New Mexico [*Allium acuminatum*]. *Sida* 11(4):455-470. ■Wheeler, E.J., S. Mashayekhi, D.W. McNeal, J.T. Columbus and J.C. Pires. 2013. Molecular Systematics of *Allium* subgenus *Amerallium* (Amaryllidaceae) in North America. *American Journal of Botany* 100(4):701-711.

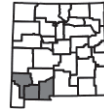
- 1 Outer bulb coat persisting as a conspicuous reticulum of coarse, anastomosing fibers; rhizomes lacking
 - 2 Bracts of the involucre 2- to 5-nerved (occasionally coalescent into what appears to be a single wide nerve in *A. macropetalum*); spring blooming
 - 3 Ovary and capsule conspicuously crested with 3 pairs of short, flat projections; leaves usually 2 per scape; western and central New Mexico *A. macropetalum*
 - 3 Ovary and capsule crested; leaves usually 3 per scape; eastern New Mexico *A. perdulce*
 - 2 Bracts of the involucre mostly 1-nerved; spring or summer blooming
 - 4 Perianth spreading; epidermal cells of inner bulb coats (under outer reticulum) intricately contorted; portions of outer bulb coat fused into irregular, solid pieces except along the ragged top and bottom edges of the bulb; spring blooming *A. drummondii*.
 - 4 Perianth urceolate; epidermal cells of the innermost bulb coats rectangular and vertically elongate; entire outer bulb coat a reticulate fabric of coarse fibers with open interstices; spring or summer blooming
 - 5 Leaves usually 2 per scape; spring blooming *A. textile*
 - 5 Leaves usually 3 or more per scape; summer blooming *A. geyeri*
- 1 Outer bulb coat without fibers (or with a few thin, parallel fibers in *A. gooddingii*), never densely fibrous reticulate; with or without rhizomes
 - 6 Bulbs attached to stout, dark, *Iris*-like rhizomes; leaves flat, strap-shaped, 5-10 mm wide *A. gooddingii*
 - 6 Bulbs with or without rhizomes, if rhizomes present, then slender and pale; leaves linear-channeled or broadly u-shaped in cross section, usually less than 5 mm wide (occasionally flat and more than 5 mm wide in *A. cernuum*)
 - 7 Umbel nodding from a decurved bend in the scape below the involucre bracts; tepals obtuse; stamens exerted from corolla *A. cernuum*
 - 7 Umbel erect; perianth segments acute or acuminate; stamens shorter than the perianth segments
 - 8 Inner whorl of perianth segments long-acuminate with recurved tips, the margins minutely serrulate-dentate; outer segments similar, but conspicuously broader and usually entire; outer bulb coat cells relatively square with thick walls (waffle-like) *A. acuminatum*
 - 8 Inner and outer whorls of perianth segments entire and not conspicuously wider or narrower; other characters never combined as above
 - 9 Ovary and capsule crested
 - 10 Scape usually less than 10 cm tall; perianth 8-14 mm long; rhizomes absent; outer bulb coats dark brown, the cells elongating vertically *A. bigelovii*
 - 10 Scape taller (10-30 cm); perianth segments 6-10 mm long; slender rhizomes often present at base of bulb; outer bulb coats grayish, the cells elongating horizontally *A. biceptrum*
 - 9 Ovary and capsule not crested
 - 11 Bulb subperical, often (not always) proliferating from the base by slender, scaled rhizomes; corolla campanulate-spreading; tepals white (often drying pinkish) with a dark red-purple midrib on the outer surface; anthers pink-purple (drying brown) *A. rhizomatum*
 - 11 Bulb ovoid, without rhizomes; corolla spreading-rotate; tepals white to pale pink (drying pink), outer midrib absent or vague; anthers yellow *A. kunthii*

Allium acuminatum Hooker [a long tapering point]. Bulb nearly spherical, 0.8-1.5 × 0.9-1.5 cm, without rhizomes; outer bulb coat membranous, without fibers, brownish or grayish, cells relatively square with thick walls; leaves 2-3 per bulb, subterete or channeled, 1-3 mm wide, mostly withered by anthesis, scape to 8-25 cm tall; involucre bracts 3-7 nerved; umbel 10-30 flowered; perianth narrowly campanulate; tepals reddish purple with a slightly darker midrib, lanceolate with acuminate recurving tips, inner tepals smaller than outer, margins finely denticulate; ovary crested with

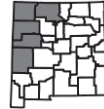


3 processes. ●Rocky, north-facing slopes in arid southwestern hills and woodlands in northwestern canyons near the Colorado border; flowering spring or early summer. ♦The purple flowers with recurved tepal tips cannot be confused with any other early flowering onion.

Allium bigelovii S. Watson [for John Milton Bigelow (1804-1878), physician-botanist on early western surveys]. Bulb globose, 1-1.5 × 1.2-1.5 cm, without rhizomes; outer bulb coat membranous, without fibers, dark brown, cells vertically elongate-rectangular; leaves 2 per bulb, channeled, 2-4 mm wide, usually coiling – especially at the tips; scape 5-12 cm tall; involucre bracts 2-several nerved; umbel hemispheric, loose to ± compact, 10-25-flowered; perianth campanulate; tepals lanceolate, 10-14 mm long, red to bright pink on the midribs and tips of the inner tepals, otherwise white; ovary crested with 6 prominent, flat processes. ●Desert scrub up to juniper savanna in the hills of the southwestern region; flowering in the spring. ♦Arguably our most beautiful wild onion with rather large umbels of pink and white flowers on short scapes.



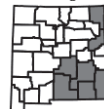
Allium bisceptrum S. Watson [two scepters – the carpel crests] [*Allium bisceptrum* S. Watson var. *palmeri* (S. Watson) Cronquist, *Allium palmeri* S. Watson]. Bulb ovoid, 1-1.8 × 0.7-1.5 cm with filiform rhizomes from the base; outer bulb coat membranous, without fibers, brown or gray, cells contorted and horizontally elongating; leaves 2-4 per bulb, channeled, 2-8 mm wide, channeled or flattened; scape 10-30 cm tall; involucre bracts 3-4 nerved; umbel globose, 10-30-flowered; pedicels loosely spreading, becoming deflexed with age and in fruit; perianth campanulate-spreading; tepals lanceolate, 7-10 mm long, pink or lavender; ovary crested with 6 prominent, flat processes. ●Open forests, meadows and aspen groves in the mountains of the western region; flowering in early summer. ♦Uncommon and rarely observed in the state.



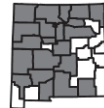
Allium cernuum Roth [nodding] NODDING ONION [*Allium cernuum* Roth var. *neomexicanum* (Rydberg) MacBride, *Allium cernuum* Roth var. *obtusum* Cockerell ex MacBride, *Allium neomexicanum* Rydberg, *Allium recurvatum* Rydberg]. Bulbs clustered, elliptic-elongate, 2-5 × 0.8-1.5 cm; outer bulb coat membranous, without fibers, brownish or grayish; inner bulb coats and upper bulb sheaths sometimes reddish; leaves persistent, green in early fruit, 3-4 per bulb, channeled or flattened, 3-8 mm wide; scape to 30 cm tall, abruptly recurved at the apex just below the umbel; involucre bracts 2-3 nerved; umbel cernuous, loose, 8-30-flowered, hemispheric; pedicels usually recurving in flower and becoming more erect in fruit; perianth campanulate; tepals 4-6 mm long, ± obtuse and incurved at the apex, pink or rarely white, midribs indistinct; stamens and style exerted; ovary crested with 6 prominent, flat processes. ●Mountain meadows and rocky benches in woodlands and forests on all mountain ranges throughout the state; flowering in the summer. ♦Our most common montane onion and an excellent garden addition for homes at higher elevations. Its pink nodding flowers with exerted yellow stamens cannot be mistaken for any other species. §



Allium drummondii Regel [for Thomas Drummond (1790-1831) Scottish botanical explorer] [*Allium helleri* Small, *Allium nuttallii* S. Watson]. Bulb ovoid, 1-2 × 0.6-1.8 cm, without rhizomes; outer bulb coat coarsely fibrous, light reddish-brown, some areas fused into solid pieces that often have no openings between fibers except at the ragged edges around the top and bottom of the bulb; inner bulb coat cells intricately contorted; leaves 2-3 per bulb, channeled, 1-3 mm wide; scape 10-25 cm tall; involucre bracts 1-nerved; umbel hemispheric, 10-20-flowered; perianth campanulate-spreading to rotate; tepals lanceolate, 6-9 mm long, white or rarely pink, with a darker purplish outer midrib; ovary without crests. ●Woodlands on limestone hills down to desert scrub and shortgrass prairie in the eastern one-third of the state; flowering in the spring. ♦The unique outer bulb coat is similar to coconut husk, while the fibrous bulb coats of other species are more like coarse fabric. §



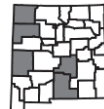
Allium geyeri S. Watson [for Charles A. Geyer (1809-1853) German botanist and plant hunter]. Bulb ovoid or more elongate, 1-2.5 × 0.8-2 cm, without rhizomes; outer bulb coat coarsely fibrous, gray or brown, reticulate, cells rather coarse-meshed; leaves usually 3 or more per bulb, channeled, rarely flat, 1-3 mm wide; scape 10-35 cm tall; involucre bracts usually 1-nerved; umbel 10-25-flowered, tightly packed with short pedicels to subcapitate; perianth urceolate; tepals lanceolate, 4-8 mm long, white or pink without prominent midribs; ovary without crests. ♦Easily distinguished from our other species with fibrous bulb coats by its summer blooming and montane habitats. There are two variants isolated by habitat and reproduction.



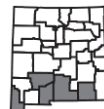
a Umbel wholly floriferous; flowers fertile...var. *geyeri* [*Allium funiculosum* A. Nelson]. ●Widespread on rocky slopes from woodlands up to subalpine meadows in all mountain ranges. §

a Most umbel flowers replaced by bulblets; any remaining flowers are sterile...var. *tenerum* M.E. Jones [tender] [*Allium rubrum* Osterhout, *Allium sabulicola* Osterhout]. ●Occasional in wet mountain meadows and stream sides. ♦Usually taller and more robust than the fertile variety.

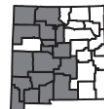
Allium goodingii M. Ownbey [for Leslie Newton Gooding (1873-1946), western botanist and collector]. Bulbs clustered on thick, iris-like rhizome; outer bulb coat brown, membranous or thinly striate fibrous, not coarsely fibrous-reticulate, leaves persistent in flower and early fruit, 3-6 per bulb, flat, 5-10 mm wide; scape 25-45 cm tall; involucre bracts 2-5-nerved; umbel erect, loose, 8-23-flowered; perianth campanulate; tepals lanceolate-elliptic, 8-10 mm long, magenta; without a distinct midrib; ovary without crests. ●Stream sides, damp forest understory and rarely in subalpine meadows in the Mogollon, Sierra Blanca and Chuska mountains; flowering in the summer. ♦This rare onion is listed as endangered by the State of New Mexico. Distinguished by its high elevation habitats, broad leaves and magenta flowers.



Allium kunthii G. Don [for Carl Sigismund Kunth (1788-1850), German botanist with an interest in New World plants] [*Allium scaposum* Benth]. Bulb ovoid or elliptic, 1.5-4 × 1.2-1.5 cm, without rhizomes, often nearly horizontal in the soil; outer bulb coat thickly membranous, without fibers, brownish or grayish; leaves persistent, green at anthesis, 2-5 per bulb, flat or channeled, 2-3 mm wide; scape 15-30 cm tall; involucre bracts 2-several nerved; umbel erect, conic to subcapitate, 5-20-flowered; pedicels 8-16 mm; perianth stellate-spreading to rotate; tepals elliptic-lanceolate, acute, 5-8 mm long, white or pale pink, midribs absent or vague; anthers yellow; ovary without crests. ●Desert scrub up to pine-oak woodland on limestone soils in the ridges and mountains of the southern region; flowering in the late summer. ♦Rare in the southwestern region where it is often confused with *Allium rhizomatum*.



Allium macropetalum Rydberg [large-petaled] LARGE-FLOWER ONION [*Allium deserticola* (M.E. Jones) Wootton & Standley]. Bulb ovoid, 1.5-2.5 × 1-2 cm; outer bulb coats brown, reticulate, coarse-meshed, fibrous; leaves 2-3 per bulb, channeled, 2-3 mm wide; scape 5-20 cm tall; involucre bracts 2-several nerved; umbel erect, loose to ± compact, 8-20-flowered; perianth campanulate to nearly urceolate with outward spreading tepal tips; tepals lanceolate, 8-12 mm long, white to pink with purplish midribs; ovary crested with 6 prominent, flat processes. ●Desert scrub up to juniper savanna and sagebrush in the central and western regions; flowering in the spring. ♦Our most common and abundant spring-blooming onion on arid hills and grasslands in the western two-thirds of the state. Its range does not overlap with *Allium drummondii* or *Allium perdulce*, which are often misidentified as this species. §



Allium perdulce Fraser [thoroughly sweet]. Bulb ovoid, 1-2.5 × 1.2-2.8 cm; outer bulb coats thick, dark brown, reticulate, coarse-meshed, fibrous; leaves 2 per bulb, channeled, 2-3 mm wide; scape 5-18 cm tall; involucre bracts 2-several nerved; umbel erect, loose to ± compact, 5-20-flowered; perianth urceolate with outward spreading tepal tips; tepals lanceolate, 6-10 mm long, white to pink with dark purple midribs; ovary without crests. ●Desert scrub and shortgrass prairie up to juniper savanna in the eastern region; flowering in the spring. ♦We have only var. *perdulce*.



Allium rhizomatum Wootton & Standley [with rhizomes] [*Allium glandulosum* of NM reports]. Bulb globose, 1-2 × 1.2-2 cm, often with a slender, scaly rhizome up to 4 cm long; outer bulb coat membranous, without fibers, brownish or grayish; leaves persistent, green at anthesis, 2-4 per bulb, flat, 2-4 mm wide; scape 15-40 cm tall; involucre bracts 2-3 nerved; umbel globose to hemispheric, loose, 5-15-flowered; pedicels 10-40 mm; perianth spreading to campanulate; tepals lanceolate, acute to acuminate, 6-9 mm long, white with purple outer midribs; anthers pink or purple; ovary without crests. ●Oak woodland, pinyon-juniper woodland or open pine forest in the southwestern region, usually on igneous soils; flowering in late summer. ♦Some populations (e.g. Animas and Peloncillo mountains) lack rhizomes when flowering. In these cases it is distinguished from *Allium kunthii* by its (usually) longer, thicker pedicels, more campanulate corolla with dark purplish outer midribs on the tepals, and purplish anthers.



Allium textile A. Nelson & Macbride [woven] [*Allium reticulatum* Fraser]. Bulb ovoid, 1.2-2.5 × 1-2 cm; outer bulb coats gray or brown, reticulate, fine-meshed, fibrous; leaves 2-3 per bulb, channeled, 2-3 mm wide; scape 5-20 cm tall; involucre bracts 1-nerved; umbel erect, loose to ± compact, 15-30-flowered; perianth urceolate with outward spreading tepal tips; tepals lanceolate, 5-7 mm long, white or rarely pink, with reddish midribs; ovary ± conspicuously crested 6 small, flat processes. ●Woodland, juniper savanna and sagebrush in the northern region; flowering in the spring. ♦Uncommon and similar to *Allium macropetalum* from which it differs by its less prominent ovary crests and involucre bracts with a single nerve.

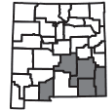


Nothoscordum [false-garlic] CROW-POISON [1].

Perennial, scapose herbs, from bulbs, not smelling like onion or garlic; leaves basal, present at anthesis, sheathing, filiform to linear; inflorescences umbel-like, subtended by a 2 bracts; flowers stiffly funnel-form, creamy white to pale yellow; tepals 6, similar, petaloid, slightly connate to nearly distinct, the midveins darkened; fruit a capsule. ♦A small genus of about 19 species, native to the Western Hemisphere. Plants have been reported as mildly toxic when eaten in large amounts, or not toxic at all; the wise will abstain. They are similar in appearance to our native species of onion (*Allium*), but lack a garlic or onion smell and sometimes have pale yellowish flowers.

■Jacobsen, T.D. & D.W. McNeal, Jr. 2002. *Nothoscordum*, pp. 276-278. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Nothoscordum bivalve (Linnaeus) Britton [2-valved] [*Nothoscordum texanum* M.E. Jones, *Ornithogalum bivalve* Linnaeus]. Plants 15-60 cm tall; bulbs globose, about 1 cm diam; scapes mostly solitary; leaves few, linear, the sheaths surrounding the neck of the bulb, to 30 cm long, 1-4 mm wide; umbels 3-8-flowered, 1-3 cm diam, the subtending bracts persistent and 1-2 cm long; flowers not fragrant; tepals whitish to cream to pale yellow, 8-14 mm long, the midveins reddish or purplish, the apices acute to acuminate; anthers yellow; capsules subglobose, 6-8 mm diam.



●Moist ditch banks, fields, roadsides, plains in the southern region; not common. §

AMARYLLIDACEAE AMARYLLIS FAMILY [1/2/2]

Perennial herbs from bulbs, without an onion-like odor; leaves simple, alternate, basal (ours) or cauline, mostly closed-sheathing, parallel-veined, entire; stipules lacking; flowers bisexual, actinomorphic, terminal on a scape in an umbel-like inflorescence (actually a contracted helicoid cyme), subtended by a few membranous spathe-like bracts; individual flowers each associated with a filiform bract; perianth of 6 petaloid tepals, sometimes with a corona; stamens mostly 6, sometimes united; pistil single, inferior, of 3 carpels, the style single; fruit a capsule (ours) or rarely a berry, the seeds sometimes winged. ♦Worldwide in distribution, this family of about 60 genera includes several notable ornamentals (*Amaryllis*, *Crinum*, and *Narcissus*). The family is sometimes expanded to include Alliaceae, but the segregate families of the Asparagales (such as Alliaceae), as applied herein, remain monophyletic.

■Chase, M.W., J.L. Reveal, & M.F. Fay. 2009. A subfamilial classification for the expanded asparagalean families Amaryllidaceae, Asparagaceae and Xanthorrhoeaceae. Bot. J. Linn. Soc. 161(2): 132-136. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Meerow, A.W., M.F. Fay, C.L. Guyk, Q.-B. Li, F.Q. Zaman, & M.W. Chase. 1999. Systematics of Amaryllidaceae based on cladistic analysis of plastid rbcL and trnL-F sequence data. Amer. J. Bot. 86(9):1325-1345.

Zephyranthes [west-wind flower] ZEPHYR-LILY [2].

Scapose perennial herbs from bulbs; leaves with overlapping sheath bases, the blades linear; scape hollow; inflorescence mostly 1-flowered, with a spathe; perianth funnellform to salverform; tepals connate basally into a tube, subequal; fruit a capsule, subglobose.

♦A New World genus of about 70 species.

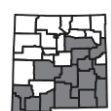
■Flagg, R.O., G.L. Smith, & W.S. Flory. 2002. *Zephyranthes*, pp. 296-303. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Spellenberg, R., M. Mahrt & R. Brozka. 1991. Noteworthy collections, New Mexico [*Zephyranthes longifolia* (as *Z. chlorosolen*)]. Madroño 38:298-301.

- 1 Flowers white; leaves glossy, to 3 mm wide.....*Z. candida*
- 1 Flowers yellow; leaves dull, to 1 mm wide.....*Z. longifolia*

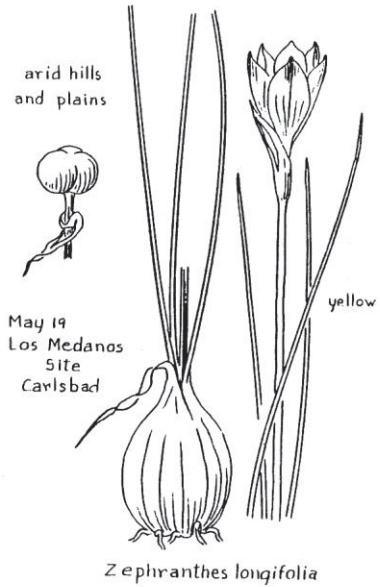
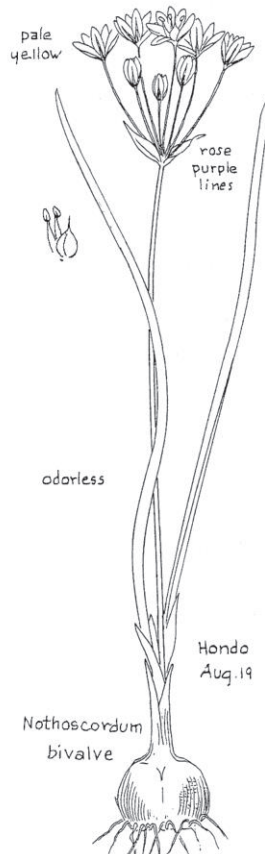
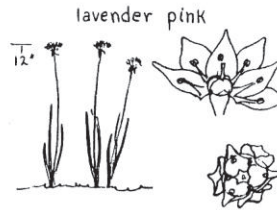
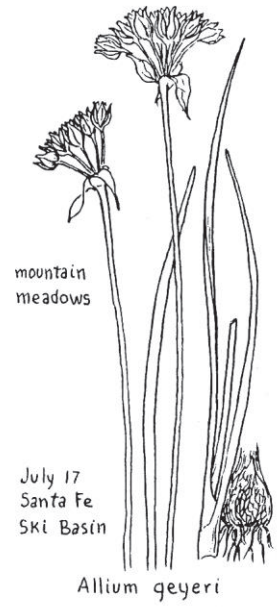
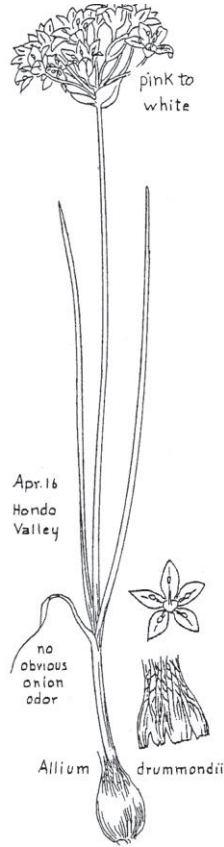
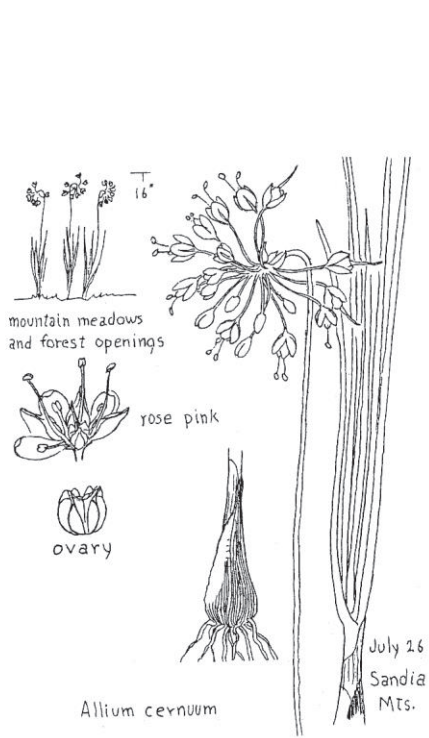
***Zephyranthes candida** (Lindley) Herbert [white] PERUVIAN SWAMP LILY [*Amaryllis candida* Lindley]. Leaf blades glossy deep green, to 3 mm wide; spathes 2-4 cm long; flowered erect, subrotate, 3-4.5 cm long, white; perianth tube green, 1-4 mm long, less than ¼ the perianth length; stigma capitate. ●Wet ground of ditches and canals; recently found in Doña Ana County; native to South America.



Zephyranthes longifolia Hemsley [long-leaved] [*Atamosco longifolia* (Hemsley) Cockerell, *Habranthus longifolius* (Hemsley) Flagg, Smith & Meerow]. Leaf blades dull green, about 1 mm wide; spathes 2-3 cm long; flowers erect to slightly inclined, funnellform, 2-3 cm long, yellow; perianth tube green, 2-6 mm long, no more than ¼ the perianth length; stigma 3-fid.



●Sandy or gravelly soils of plains and flats in the southeastern half of the state. ♦A report of *Zephyranthes chlorosolen* (Herbert) D. Dietrich belongs here; that species is not yet known from New Mexico. §



ARACEAE ARUM and DUCKWEED FAMILY [2/10/10]

[Lemnaceae]

[Description applies to subfamily Lemnoideae; we have no other Araceae in New Mexico] Floating or submerged aquatic perennial herbs, the stems flattened and thallus- or leaf-like and termed a frond, with or without roots; leaves absent; flowers mostly bisexual, 1 per frond, borne in a pouch, lacking a perianth; stamens 1-2; pistil single, superior, of a single carpel; fruit a utricle ♦With 119 genera, 6450 species. Based on numerous phylogenetic and molecular studies (see Judd et al. 2016), the former Lemnaceae is recognized as subfamily Lemnoideae of the Araceae; the spathe typical of Araceae is highly reduced and modified or absent in this subfamily. Our plants are among the smallest and most reduced of the flowering plants, and interpretation of the morphology can be difficult and controversial.

■Daubs, E.H. 1965. A monograph of Lemnaceae. Illinois Biol. Monogr. 34:1-118. ■French, J.C., M.G. Chung, & Y.K. Hur. 1995. Chloroplast DNA phylogeny of the Ariflorae, pp. 255-275. IN: Randall, P.J., P.J. Cribb, D.F. Cutler, & C.J. Humphries (eds.). Monocotyledons: Systematics and Evolution. Royal Botanic Gardens, Kew. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Landolt, E. 2000. Lemnaceae, p. 143-153. IN: Flora North America, vol. 22. Oxford University Press. ■Mayo, S.J., J. Bogner, & P. Boyce. 1995. The Arales, pp. 277-286. IN: Randall, P.J., P.J. Cribb, D.F. Cutler, & C.J. Humphries (eds.). Monocotyledons: Systematics and Evolution. Royal Botanic Gardens, Kew.

- 1 Each body segment (thallus) with several roots hanging down into the water *Spirodela*
- 1 Each body segment (thallus) with 0-1 roots hanging down into the water *Lemna*

Lemna [marsh or pond] DUCKWEED [9].
 Roots 1 per frond; fronds floating or submersed, solitary or in groups or chains, flat or gibbous, entire or minutely toothed, with 2 reproductive pouches, with 1-7 palmately radiating veins; turions generally absent, sometimes present in *L. turionifera*. ♦A small genus of 13 species, found throughout the world. Several species are used as model organisms in community ecology, toxicology, and biology, and as a source of biofuels. Large growths can sometimes invade and congest waterways. We have in New Mexico all of the species that occur in North America, in quiet waters of ponds and lakes, and slow-moving streams, ditchbanks, and the like. The specific epithets *minor*, *minuta*, *obscura*, and *perpusilla*, are ample testimony to the diminutive size of these plants.

■Correll, D.S. & H.B. Correll. 1972. Aquatic and Wetland Plants of Southwestern United States [*Lemna obscura*]. Stanford Univ. Press. ■DeLange, L. & A.H. Pieterse. 1973. A comparative study of the morphology of *Lemna gibba* L. and *Lemna minor* L. Acta Bot. Neerl. 22:510-517. ■Landolt, E. 2000. Lemnaceae, p. 143-153. IN: Flora of North America, vol. 22. Oxford University Press. ■McGrath, J. 2000. New plant distribution records [*Lemna turionifera*]. The New Mexico Botanist 15:7. ■Reveal, J.L. 1990. The neotypification of *Lemna minuta* Humboldt, Bonpland & Kunth, an earlier name for *Lemna minuscula* Herter (Lemnaceae). Taxon 39:328-330.

[Key adapted from Landolt 2000]

- 1 Thallus submersed (except when flowering or fruiting), the margins denticulate at the ends *L. trisulca*
- 1 Thallus floating, the margins entire
 - 2 Thallus with a single vein
 - 3 Vein prominent, longer than the extension of air spaces, or running through at least ¾ the distance between node and apex *L. valdiviana*
 - 3 Vein sometimes indistinct, shorter than the extension of air spaces, not longer than 2/3 the distance between node and apex *L. minuta*
 - 2 Thallus with 3-5 veins
 - 4 Root sheath winged at the base; root tip mostly sharp pointed; roots to 3 cm long; thallus lacking red color or spots, mostly with a single papilla near the apex on the upper surface
 - 5 Root sheath wing 2-3 times longer than wide; seeds remaining within the fruit wall after ripening, with 35-70 indistinct ribs .. *L. perpusilla*
 - 5 Root sheath wing 1-2.5 times longer than wide; seeds falling from the fruit wall after ripening, with 8-26 distinct ribs *L. aequinoctialis*
 - 4 Root sheath not winged; root tip mostly rounded; roots often longer than 3 cm; thallus often with reddish tinge or spots, with or without papilla
 - 6 Largest air spaces more than 0.3 mm long; if red-colored on lower surface, then coloration beginning from the margin; ovary with 2-7 ovules *L. gibba*
 - 6 Largest air spaces 0.3 mm or less long; if red-colored, then coloration beginning from the attachment point of root; ovary with a single ovule
 - 7 Thallus not reddish below (or at least much less than above); greatest distance between the lateral veins near or above the middle *L. minor*
 - 7 Thallus often reddish below, and more so than above; greatest distance between the lateral veins near or below the middle
 - 8 Thallus flat, with mostly distinct papillae on the midline of the upper surface..... *L. turionifera*
 - 8 Thallus often gibbous, with very distinct papillae above node and near the apex on the upper surface, but not between the node and the apex *L. obscura*

Lemna aequinoctialis Welwitsch [from the equator] [*Lemna perpusilla* Torrey var. *trinervis* Austin]. Roots to 3 cm long; fronds floating, few, coherent in groups, ovate-lanceolate, flat, 1-6 mm long, entire, with 3 veins, green above and below, not reddish; turions absent. ♦Meso- to eutrophic quiet water, wet meadows and marshes, rivers, creeks; northern and western mountains. ♦This has been either subsumed within or recognized as a variety of *Lemna perpusilla*; the differences are slight and difficult to observe.

Lemna gibba Linnaeus [swollen]. Roots to 15 cm long; fronds floating, 1-5, coherent in groups, obovate, often gibbous, 1-8 mm long, entire, with mostly 4-5 veins, sometimes red below or with red spots above; turions generally absent. ♦Preferring eutrophic quiet water, streams, stock tanks; western mountains, foothills, and plains.

Lemna minor Linnaeus [smaller]. Roots to 15 cm long; fronds floating, 1-5 or more, coherent in groups, ovate, scarcely gibbous, flat, 1-8 mm long, entire, with 3 veins, rarely reddish below, sometimes reddish above; turions absent. ♦Meso- to eutrophic quiet water, ponds, slow streams, stock tanks, river banks, marshes; widespread and relatively common in the northern and western regions.

Lemna minuta Kunth [minute] [*Lemna minima* Philippi]. Roots to 15 cm long; fronds floating, 1-5, coherent in groups, obovate, flat to gibbous, 1-4 mm long, entire, with 3 veins, often reddish below, sometimes with red spots above; turions absent. ♦Meso- to eutrophic quiet water, lakes, wetlands, ponds, creeks, ditches, marshy ground, scattered sites in the mountains.



Lemna obscura (Austin) Daubs [dusky, obscure] [*Lemna minor* Linnaeus var. *obscura* Austin]. Roots to 15 cm long; fronds floating, 1-5, coherent in groups, obovate, flat or gibbous, 1-4 mm long, entire, with 3 veins, reddish above and below; turions absent. ●Meso- to eutrophic quiet water, small ponds. ♦The reports for Cibola and Grant counties are from Correll & Correll (1972).

Lemna perpusilla Torrey [tiny]. Roots to 3.5 cm long; fronds floating, 1-4, coherent in groups, ovate-obovate, flat, 1-4 mm long, entire, with 3 veins, green above and below, not reddish; turions absent. ●Meso- to eutrophic quiet water, known only from San Juan County.

Lemna trisulca Linnaeus [3-grooved]. Roots to 3 cm long; fronds submersed except when flowering or fruiting, 3-50, coherent in groups or chains, narrowly ovate, flat, 3-15 mm long, the bases suddenly narrowed to a green stalk 2-20 mm long, the margins denticulate distally, mostly with 3 veins; flowers rare. ●Mesotrophic quiet waters rich in calcium. ♦This is the only species with commonly submersed fronds (except when flowering or fruiting).

Lemna turionifera Landolt [bearing turions]. Roots shorter than 15 cm long; fronds floating, 1-3, coherent in groups, obovate, flat, 1-4 mm long, entire, with 3 veins, often red above and below; turions sometimes present, brownish, 1-1.6 mm long. ●Meso- to eutrophic quiet water, ponds and lakeshores, in the northern mountains.

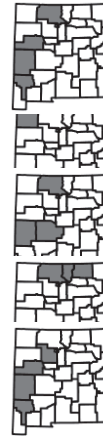
Lemna valdiviana Philippi [from Valdivia, Chile]. Roots to 1.5 cm long; fronds floating or rarely submersed, 1-few, coherent in groups, ovate to lanceolate, flat, 1-5 mm long, entire, with 1 vein, green above and below; turions absent. ●Mesotrophic quiet waters, creeks, ponds, ditches, mostly western mountains, but expected elsewhere.

Spirodela [evident threads] DUCKMEAT [1].

Roots 2-20 per frond; fronds floating, entire, 2-10 clustered together, green above, red-blue below, producing turions that sink to the bottom, with 5-16 palmately radiating veins. ♦A small genus of 3 species, worldwide. ♦Turions lack air pockets, so they sink to the bottom, where they overwinter; in the spring they germinate, produce air pockets, and rise to the surface. Floating mats may be intermingled with *Lemna*.

■Landolt, E. 2000. Lemnaceae, p. 143-153. IN: Flora of North America, vol. 22. Oxford University Press.

Spirodela polyrhiza (Linnaeus) Schleiden [many roots] [*Lemna polyrhiza* Linnaeus]. Roots 7-21, to 3 cm long; fronds obovate to circular, flat, 2-10 mm long, sometimes with a red spot in the center above, with 7-16 or more veins; rootless turions sometimes present, brownish, 1-2 mm diam; flowers rare. ●Quiet waters of ponds and lakes; known only from a few collections.



ASPARAGACEAE ASPARAGUS FAMILY [1/1/1]

Perennial shrubs and herbs from fleshy tuberous rhizomes; leaves alternate, spiral, reduced to scale-like and papery, generally with a spiny spur at the base; stipules lacking; flowers bisexual, actinomorphic, small, borne in racemes or umbels or singly; perianth of 6 petaloid tepals in 2 whorls; stamens 6, borne on the tepals; pistil single, superior, of 3 carpels, the style single; fruit a spherical, fleshy berry, with 1-6 seeds. ♦Members of this family were traditionally placed in a large and polyphyletic Liliaceae.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Asparagus [classical Greek name] ASPARAGUS [1].

Perennial herbs (ours), shrubs, or vines, usually with fusiform tubers, often fern-like, the stems photosynthetic; leaves small, scale-like, subtending flattened photosynthetic cladophylls (modified stems); inflorescences racemose or umbel-like; perianth greenish, white, or yellowish; tepals distinct or basally connate; fruits berry-like, globose, the tepals often persisting. ♦This is a very large genus of up to 300 species (depending upon the circumscription), and the source of our widely cultivated and eaten asparagus; other species are grown for ornament.

■Straley, G.B. & F.H. Utech. 2002. *Asparagus*, pp. 213-214. IN: Flora of North America, vol. 26. Oxford University Press, New York.

****Asparagus officinalis*** Linnaeus [official]. Erect herbs, 1-2 m or more tall, the aerial stems annual, highly branched distally; cladophylls in clusters of 4-20 at the nodes, filiform, 1-3 cm long; leaves scale-like, 3-4 mm long; flowers borne in axillary racemes, campanulate, yellow to yellowish-green, the tepals connate basally for 1-2 mm, 3-8 mm long; berries red, 6-10 mm diam. ●Widely escaped to disturbed areas, fields, roadsides, especially sandy ground; expected in all counties. ♦This is the asparagus of commerce and cuisine. §



ASPHODELACEAE ASPHODEL FAMILY [1/1/1]

Perennial herbs (ours) or rarely pachycaulous trees, with succulent roots; leaves simple, alternate, often in rosettes, parallel-veined, often succulent; flowers bisexual, actinomorphic, in racemes or panicles; perianth of 6 tepals in 2 whorls; stamens 6; pistil single, superior, of 3 carpels, the style single; fruit a capsule or (rarely) a berry; seeds with a fleshy covering. ♦The members of this family were traditionally placed in a large and polyphyletic Liliaceae; Asphodelaceae is sometimes broadened to include the Hemerocallidaceae.

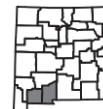
■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Asphodelus [the flower of *Hades* and the dead] ONIONWEED [1].

Annual to perennial herbs, from swollen rhizomes; leaves basal, the blades linear, entire, flat or terete, sheathing; inflorescences scapose, the scape hollow, paniculate to racemose, many-flowered, with persistent bracts; flowers small but showy, borne on an articulated pedicel; tepals 6, each with a single prominent midvein, distinct to scarcely connate basally; filaments expanded at the base; capsules globose, hard, with 3 or 6 black seeds.

■Spellenberg, R., R. Worthington, P. Knight, & R. Fletcher. 1986. Additions to the flora of New Mexico [*Asphodelus fistulosus*]. Sida 11(4):455-470. ■Straley, G.B. & F.H. Utech. 2002. *Asphodelus*, pp. 218-219. IN: Flora of North America, vol. 26. Oxford University Press, New York.

****Asphodelus fistulosus*** Linnaeus [hollow]. Annual to short-lived perennial herbs, 20-70 cm tall; leaves 5-35 cm long, 2-4 mm wide, the blades cylindrical or slightly flattened, hollow; scapes racemose to paniculate, many-flowered; flowers funnelliform, diurnal but lasting more than a day; tepals white to pale pink, with dark midveins, 5-12 mm long; capsules globose, 5-7 mm diam. ●Roadsides and similar waste places in Doña Ana and Luna counties; infrequent and not particularly aggressive in southern New Mexico. ♦There have been reports that onionweed has been eradicated from the state, but it continues to pop up here and there; its last sighting was in the year 2016 in Las Cruces.



BROMELIACEAE PINEAPPLE FAMILY [1/1/1]

Mostly epiphytic herbs, with short stems, with hairs modified as water-absorbing scales; leaves alternate, commonly in dense, stiff rosettes, entire or serrate, with sheathing bases, sometimes grass-like (ours); flowers actinomorphic or zygomorphic, perfect, often with brightly colored bracts; sepals 3, green; petals 3, often brightly colored; stamens 6; pistil single, superior or inferior, of 3 united carpels, the style single; fruit a berry, capsule, or multiple. ♦About 60 genera and over 1000 species, mostly tropical to warm-temperate regions. Pineapple (*Ananas comosus*) is a member of this family; many genera provide hothouse ornamentals.

Tillandsia [for Elias Tillands (1640-1693), Swedish botanist] SPANISH-MOSS.

Epiphytic, perennial herbs, acaulescent or with long stems; leaves evergreen, 2- to many-ranked, the bases sheathing, the blades linear to triangular or ligulate, the margins entire; inflorescences 1-many-flowered, the floral bracts conspicuous; petals distinct; fruit a capsule, the seeds with a plumed appendage. ♦Despite being called SPANISH MOSS, the species of this genus are neither Spanish in origin nor a true moss.

■Luther, H.E. & G.K. Brown. 2000. *Tillandsia*, p. 288-296. IN: Flora North America, vol. 22. Oxford University Press. ■Wagner, W.L. 1979. New records to the Animas Mountain flora, New Mexico [*Tillandsia recurvata*]. Southw. Naturalist 24(2):291-296.

Tillandsia recurvata Linnaeus [curled backwards] BALL-MOSS [*Renalmia recurvata* Linnaeus]. Plants in ball-shaped clumps on branches, to 15 cm diam, the stems short; leaves 4-10 in number, 2-ranked, recurving, 6-12 cm long, 2-3 mm wide, densely scaly, the blades terete distally; inflorescence scapes 2-5 cm long, about 1 mm diam; spikes 8-15 mm long, usually with 2 conspicuous flowers; petals violet, 7-10 mm long. ●On oaks in the bootheel region; known from a single collection in New Mexico, but rather common in other southern states south to South America.



COMMELINACEAE DAYFLOWER FAMILY [2/5/6]

Mostly perennial herbs, commonly semi-succulent with swollen nodes; leaves alternate or basal, simple, entire, closed-sheathing at the base, lacking a ligule, with parallel venation; flowers actinomorphic or zygomorphic, bisexual, often borne in a spathe, lacking nectar; sepals 3, green or sometime petaloid; petals 3, distinct, usually blue, violet, or white; stamens 6, some may be staminodes; pistil single, superior, of 3 united carpels, the style single; fruit a capsule. ♦About 40 genera and 600-700 species worldwide. Flowers are ephemeral, lasting a day at most, often much less.

■Faden, R.B. 2000. Commelinaceae, p. 170-197. IN: Flora North America, vol. 22. Oxford University Press. ■Tucker, G.C. 1989. The genera of Commelinaceae in the southeastern United States. J. Arnold Arbor. 70:97-130.

- 1 Inflorescence enclosed in a spathe; flowers zygomorphic; fertile stamens 3, the filaments glabrous *Commelina*
- 1 Inflorescence not enclosed in a spathe, but subtended by 2 foliose bracts; flowers actinomorphic; fertile stamens 6, the filaments pubescent *Tradescantia*

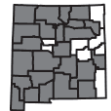
Commelina [for Johan (1629-1692) and his cousin Caspar (1667-1731) Commelijn, Dutch botanists] DAYFLOWER [2].

Annual to perennial herbs; leaves spirally arranged or 2-ranked, the bases sheathing; inflorescences terminal, of 1-2 cymes, enclosed in subtending spathes, the spathes often filled with a mucilaginous liquid; flowers zygomorphic; sepals 3, distinct or the lower 2 connate, unequal; petals 3, distinct, the lower one often a different color than the other 2 and smaller, usually bluish or white or various other colors; stamens 6, 3 fertile and 3 staminodes, the filaments glabrous. ♦About 170 species, nearly worldwide, mainly tropical.

■Brashier, C.K. 1966. A revision of *Commelina* (Plum.) L. in the U.S.A. Bull. Torrey Bot. Club 93:1-19.

- 1 Petals all alike and blue; spathe margins free to the base *C. dianthifolia*
- 1 Petals unlike, the upper 2 large and blue, the lower 1 smaller and white; spathe margins fused at the base *C. erecta*

Commelina dianthifolia Delile [with leaves like *Dianthus*] [*Commelina dianthifolia* Delile var. *filiformis* M.E. Jones, *Commelina dianthifolia* Delile var. *longispatha* (Torrey) Brashier, *Commelina linearis* Bentham var. *longispatha* Torrey]. Perennial herbs, unbranched or only sparsely so, with tuberous roots, the stems erect to ascending; blades linear to linear-lanceolate, 4-15 cm long, to 1 cm wide; distal cyme usually 1-flowered; spathes falcate or not, 2-8 cm long, the margins distinct and not ciliate, the apices gradually to abruptly acuminate; petals dark blue, the lower petal somewhat smaller.



●Widespread on rocky ground, nearly throughout the state, except for the eastern rank of counties. ♦Plants with spathes abruptly narrowed into a long attenuate tip have been referred to var. *longispatha* (Torrey) Brashier, but there is considerable intergradation with the typical forms (Faden 2000). §

Commelina erecta Linnaeus [upright] [*Commelina angustifolia* Michaux, *Commelina crispa* Wooton, *Commelina erecta* Linnaeus var. *angustifolia* (Michaux) Fernald, *Commelina erecta* Linnaeus var. *crispa* (Wooton) Palmer & Steyermark, *Commelina erecta* Linnaeus var. *deamiana* Fernald]. Perennial herbs, with fleshy tufted roots, the stems erect to ascending (rarely decumbent and rooting at the nodes); leaf sheath auriculate at the summit; blades linear to lanceolate, 5-15 cm long, to 4 cm wide; distal cyme absent; spathes falcate or not, 1-4 cm long, the margins connate basally, glabrous except for the ciliate connate portion, the apices acute to acuminate; lower petal minute and white, the upper 2 petals bluish and much larger. ●Numerous habitats, such as sand hills, plains, rocky slopes, ledges and outcrops, roadsides, in much of the state. ♦Plants with blades 3-15 mm wide and spathes 1-2 cm long have been called var. *angustifolia* (Michaux) Fernald; many of our plants seem to fit this, but many do not. §



Tradescantia [for John Tradescant (1567-1638) and son, John Tradescant (1608-1662), gardeners to King Charles I] SPIDERWORT [3].

Perennial herbs; leaves spirally arranged or 2-ranked, the bases sheathing; inflorescence of umbel-like cymes subtended by leaf-like bracts, not enclosed in the bracts; flowers actinomorphic; sepals distinct; petals distinct, equal, white, pink, blue, violet; stamens 6, all fertile, the filaments glabrous or bearded (ours). ♦About 75 species native to the New World. Grown in many parts of the world as ornamentals, hot-house plants, and indoor flowers. The common name, SPIDERWORT, comes from the cobwebby hairs attached to the filaments of many species.

■Anderson, E. & R.E. Woodson. 1935. The species of *Tradescantia* indigenous to the United States. Contr. Arnold Arbor. 9:1-132. ■Faden, R.B. 1993. *Tradescantia crassifolia* (Comelinaceae), an overlooked species in the southwestern United States. Ann. Missouri Bot. Gard. 80:219-222. ■Hershey, A.L. & P.J. Leyendecker, Jr. 1944. Notes on plants of New Mexico - III [*Tradescantia wrightii*]. Leaf. West. Bot. 4(2):21-25. ■Pellegrini, M.O.O. 2017. Morphological phylogeny of *Tradescantia* L. (Comelinaceae) sheds light on a new infrageneric classification for the genus and novelties on the systematics of subtribe Tradescantiinae. PhytoKeys 89: 11-72. ■Spellenberg, R. 1979. Chromosome numbers from some federally proposed threatened or endangered southwestern angiosperms and other miscellaneous taxa [*Tradescantia wrightii*]. Southw. Naturalist 24:187-189.

- 1 Sepals glabrous
 - 2 Petals rose to magenta or purple; leaf blades 4-10 cm long, 2-5 mm wide *T. wrightii*
 - 2 Petals bright blue; leaf blades 5-62 cm long, 4-9 mm wide (var. *scopulorum*) *T. occidentalis*
- 1 Sepals pubescent, the hairs glandular or not

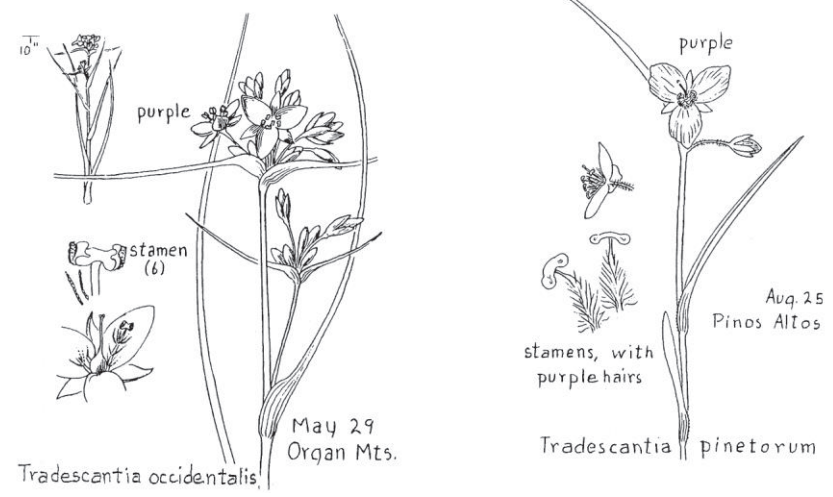
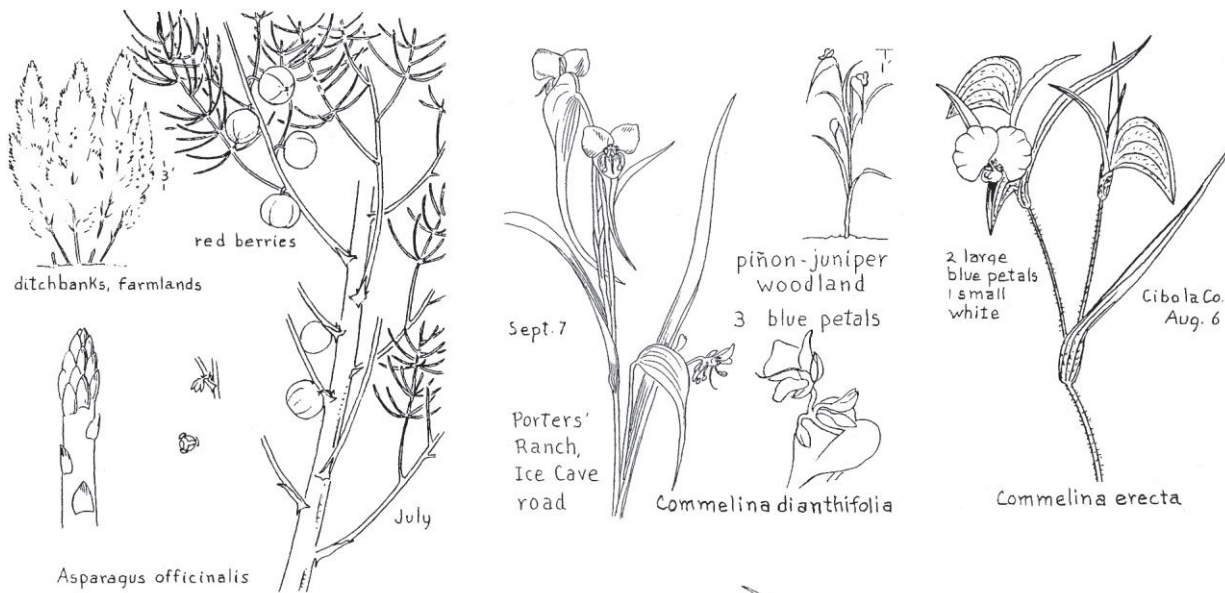
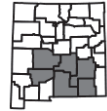
- 3 Pedicels 0.8-1 cm long; sepals 4-6 mm long; petals 9-12 mm long *T. pinetorum*
- 3 Pedicels 0.8-3 cm long; sepals 4-11 mm long; petals 11-16 mm long (var. *occidentalis*) *T. occidentalis*

Tradescantia occidentalis (Britton) Smyth [western] [*Tradescantia virginica* Linnaeus var. *occidentalis* Britton]. Erect or ascending herbs, the stems to 90 cm long/tall; blades linear-lanceolate, 5-50 cm long, to 3 cm wide, glaucous, glabrous; sepals 4-11 mm long; petals blue, rose, magenta, broadly ovate, 6-16 mm long, not clawed; filaments bearded. ♦We have two varieties:

- a Sepals glabrous...var. *scopulorum* (Rose) Anderson & Woodson [of the Rocky Mountains] [*Tradescantia scopulorum* Rose]. •Moist canyons and stream banks in the southern regions.
- a Sepals pubescent, the hairs glandular or not...var. *occidentalis*. •Throughout New Mexico in plains, prairies, foothills, woods, forests openings, and disturbed ground. §

Tradescantia pinetorum Greene [in pine woods] [*Tradescantia tuberosa* Greene]. Erect to ascending herbs, the stems sparsely branched 8-39 cm long/tall; blades linear-lanceolate, 1-10 cm long, to 1 cm wide, glaucous, glabrous; sepals frequently reddish, 4-6 mm long; petals bright blue to rose and purple, about 10 mm long, not clawed; filaments bearded. •Moist canyons and stream banks. §

Tradescantia wrightii Rose & Bush [for Charles Wright (1811-1885), outstanding American botanical collector]. Erect to ascending herbs, the stems unbranched, 5-18 cm long/tall; blades linear-lanceolate, 4-10 cm long, to 0.5 cm wide, glaucous, glabrous; sepals 5-6 mm long, mostly glabrous; petals rose to magenta or purple, broadly ovate, not clawed, about 10 mm long; filaments bearded. •Moist canyons in the western and southern mountains and foothills.



CYPERACEAE SEDGE FAMILY [13/154/156]

Contributed by Max H. Licher and Glenn R. Rink

Grass-like herbs, caespitose or rhizomatous, with fibrous roots; culms usually triangular, occasionally round, polygonal, or rarely compressed in cross section, usually solid, occasionally hollow or septate, not jointed; leaves simple, basal, or cauline and alternate, usually 3-ranked; blades linear, parallel-veined, entire, or leaves reduced to bladeless sheaths; sheaths fused. Inflorescence composed of 1-many spikelets, these arranged in spikes, panicles, umbels, or racemes, in varying orders of complexity, sometimes compressed into a compact head; usually subtended by a leaf-like or scale-like bract; spikelets composed of 1-many florets, usually spirally arranged, occasionally 2-ranked along the axis of the spikelet (reduced to a single floret in *Carex* and some *Kobresia*); flowers small and inconspicuous, bisexual (unisexual in *Carex* & *Kobresia*), each usually subtended by a single scale, with perianth lacking or reduced to bristles and/or scales; ovary superior (in two genera, the pistillate flower/achene is partially (*Kobresia*) or completely (*Carex*) enclosed in a sac-like bract called a perigynium); stamens usually 3, exerted at anthesis; anthers basifixed; stigma 1, either 2 or 3-branched; fruit an achene, either biconvex or trigonous, corresponding to the number of style branches. ♦About 100 genera and 5000 species worldwide. Usually associated with wetlands, but some species adapted to alpine or dryland habitats.

- Brühl, J.J. 1995. Sedge genera of the world: relationships and a new classification of the Cyperaceae. Australian Systematic Botany 8(2):125-305. ■Cronquist, A. 1977. Cyperaceae, p. 67-174. IN: Intermountain Flora, Vol. 6 (Monocotyledons). New York Botanical Garden. 584 pp.
 ■Huygh, W., I. Larridon, M. Reynders, A.M. Muasya, R. Govaerts, D.A. Simpson, & P. Goetghebeur. 2010. Nomenclature and typification of names of genera and subdivisions of genera in Cyperaceae (Cyperaceae): 1. Names of genera in the *Cyperus* clade. Taxon 59(6):1883-1890. ■Tucker, G.C. 1987. The genera of Cyperaceae in the southeastern United States. J. Arnold Arbor. 68:361-445.

- 1 Achene completely or partially enclosed in a sac-like bract (perigynium); perianth absent; flowers all unisexual, with staminate and pistillate flowers in separate spikes or at opposite ends of the same spike, or rarely randomly mixed in a spike
- 2 Perigynium open with margin unsealed on one side, merely wrapping around the achene..... **Kobresia**
- 2 Perigynium closed with sealed margins, completely enclosing the achene except for an apical opening for the style.... **Carex**
- 1 Achene not enclosed in a sac-like bract (perigynium); perianth absent or present, when present consisting of bristles or scale-like structures; flowers usually bisexual, spikes and/or spikelets usually with flowers similarly arranged
- 3 Fruiting spikelets or heads resembling a dense tuft of cotton due to the numerous elongated hair-like perianth bristles that obscure the flowers and scales; montane wetland plants of high elevations **Eriophorum**
- 3 Fruiting spikes or heads not cottony as above; plants of various habitats and elevations
- 4 Spikelets with floral scales arranged in two opposite ranks on either side of the rachis, compressed to terete in cross-section
- 5 Proximal scales of the spikelet fertile or first one empty; perianth absent; spikelets compressed, subterete, or quadrangular; leaf sheaths not blackish; widespread..... **Cyperus**
- 5 Proximal 2 or more scales of the spikelet sterile (empty); perianth of bristles usually present; spikelets compressed; leaf sheaths blackish; Otero County..... **Schoenus**
- 4 Spikelets with floral scales arranged spirally around the rachis, terete in cross section
- 6 Inflorescence consisting of a single terminal spikelet, without an involucre bract **Eleocharis**
- 6 Inflorescence consisting of multiple spikelets, or if a single spikelet, appearing lateral with a bract-like extension of the culm surpassing the spikelets, or with a noticeable involucre bract subtending the spikelets
- 7 Perianth present, of bristles and/or spatulate scales (do not confuse with remnants of filaments after anthers have fallen)
- 8 Perianth dimorphic, of 3 stipitate based, spatulate scales, alternating with 3 much shorter bristles..... **Fuirena**
- 8 Perianth monomorphic, of bristles only
- 9 Inflorescence bract apparently single, appearing as a continuation of the culm so that the inflorescence appears lateral (smaller bracts occasionally present but scale-like and not green); leaves either all basal or confined to the bottom third of the culm; leaves with obvious blades or significantly reduced to little more than basal sheaths..... **Schoenoplectus**
- 9 Inflorescence bracts 2 or more, leafy and spreading and not resembling the culm; at least some leaf blades occurring above the middle of the culm; all leaves with obvious blades
- 10 Spikelets large (4-10 mm in width), commonly 3-40; achenes 2.3 mm or more long; culms with corm-like bases; leaf ligules lacking **Bolboschoenus**
- 10 Spikelets relatively small (less than 4 mm wide), commonly more than 40; culms without corm-like bases; achenes 1.8 mm or less long; leaf ligules present..... **Scirpus**
- 7 Perianth absent
- 11 Large perennial plants usually 1.5-2 m tall; leaves basal and cauline (above the lower ¼ of the culm), blades scabrid with fine sawtooth margins; inflorescences terminal and often lateral (from upper leaf axils), conspicuously branched and rebranched; spikelets 100-1000..... **Cladium**
- 11 Small annuals to larger perennial plants (up to 1 m tall in *Fimbristylis*); leaves all basal (from the lower ¼ of the culm), blades without sawtooth margins, at most moderately scabrid; inflorescences terminal only, simple to branched; spikelets 50 or fewer
- 12 Style base not enlarged in fruit; inner transparent scale behind the thicker primary floral scale present or lacking **Cyperus**
- 12 Style base enlarged; inner transparent scale always lacking
- 13 Style base persistent as a tubercle in fruit; stigmas 3; plants of dry habitats **Bulbostylis**
- 13 Style base deciduous in fruit; stigmas 2 in our species; plants of wet habitats **Fimbristylis**

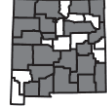
Bolboschoenus [a bulbous *Schoenus*] TUBEROUS BULRUSH [1].

Plants grass-like, perennial, caespitose or rhizomatous; culms 1-several, cormose at base, sharply trigonous, distally scabrous or papillose; leaves both basal and cauline; blades flat or V-shaped in cross section, prominently keeled, distally trigonous; ligules absent; inflorescences terminal, composed of 1-80 spikelets in capitate to subumbelate clusters or subcorymbose panicles; inflorescence bracts

1-5, surpassing the inflorescence, spreading or erect, leaflike; spikelets ovoid to lanceoloid, composed of 25 or more florets spirally arranged along the rachilla; flowers bisexual, subtended by a scale; perianth of 3-6 bristles, stamens 3; ovary superior, style with 2-3 stigma branches, base persistent; fruit an achene, biconvex to trigonous. ♦About 15 species worldwide, 5 listed in the Flora of North America. *Bolboschoenus fluviatilis* (Torrey) Sojak was reported for the state by M&H, but no specimens are known; it is unlikely that this taxon occurs in New Mexico.

■Beetle, A.A. 1942. Studies in the genus *Scirpus* L. IV. The section *Bolboschoenus* Pallas Amer. J. Bot. 42:82-88. ■Browning, J., K.D. Gordon-Gray, & S.G. Smith. 1995. Achene structure and taxonomy of North American *Bolboschoenus* (Cyperaceae). Brittonia 47(4):433-445. ■Rothrock, P.E. 2009. *Bolboschoenus*, pp. 60-63. IN: Sedges of Indiana and the adjacent states, the non-*Carex* species. Indiana Academy of Science. ■Smith, S.G. 1995. New combinations in North American *Schoenoplectus*, *Bolboschoenus*, *Isolepis*, and *Trichophorum* (Cyperaceae). Novon 5:97-102. ■Smith, S.G. 2002. *Bolboschoenus*, pp. 37-44. IN: Flora of North America, vol. 23. Oxford University Press.

Bolboschoenus maritimus (Linnaeus) Palla [of the sea or sea's edge] ALKALI BULRUSH [*Scirpus maritimus* Linnaeus].



Plants perennial, single to few-stemmed and colonial from stout rhizomes; culms 50-150 cm long, (1)3-8 mm wide, with prominent corm-like tuberous bases; leaves basal and cauline, with blades 2-12 mm wide; inflorescences composed of (1)2-40 sessile spikelets in a terminal cluster, or with up to half of the spikelets on 1-4 rays; inflorescence bracts 1-4, surpassing the inflorescences, leaflike; spikelets ovoid to lanceoloid, 7-40 mm long, (4)7-10 mm wide; floral scales brown to stramineous, 5-8 mm long, membranous, with acute apex, bifid 0.5-1 mm deep with slender awn, the awn 1-3 mm long; stigmas 2 or rarely 3; anthers 2-4 mm long; achenes glossy brown, obovoid, usually biconvex, 2.3-4.1 mm long, the beak 0.1-0.4 mm long. ●Watercourses and marshes, ponds and lakeshores, often brackish or alkaline; 3000-8700 ft; widely distributed throughout NM. ♦Our plants belong to subsp. *paludosus* (A. Nelson) T. Koyama [of marshy places] [*Scirpus brittonianus* Piper, *Scirpus campestris* Britton, *Scirpus maritimus* Linnaeus var. *paludosus* (A. Nelson) Koyama, *Scirpus paludosus* A. Nelson]. Similar species: *Bolboschoenus fluviatilis* differs in having the majority of flowers with 3 stigmas, the achenes obviously trigonous, stouter and more persistent perianth bristles, and with more of the spikelets on rays than in the main terminal cluster. Occasionally one can find an inflorescence of *Bolboschoenus maritimus* with the latter character, but the styles will still be predominantly 2-parted. *Bolboschoenus fluviatilis* was previously reported from New Mexico, but is not presently vouchered from the state. §

Bulbostylis [a bulbous style] HAIRSEEDGE [3].

Plants grass-like, annual or less frequently perennial; cespitose with fine fibrous roots only; culms wiry, terete to angulate, ribbed; leaves basal; blades linear to filiform, involute, with scabrous-ciliate margins; sheaths glabrous and usually fimbriate-ciliate apically, ligules absent; inflorescence terminal on slender culms, composed of a single to many spikelets arranged in simple to compound anthelae (cymose corymbs); inflorescence bracts (1)2-8, spreading to erect, leaflike to scale-like; spikelets ovoid to lanceoloid, with 6-50 florets spirally (or rarely sub-distichously) arranged along the rachilla; flowers bisexual, in the axil of a scale; perianth absent; stamens 1-3; ovary superior, style with 3 stigma branches in our species, the style base persistent as a small articulated tubercle on the top of the achene; fruit an achene, trigonous or 3-lobed, 3-ribbed. ♦About 100 species worldwide, 8 listed in the Flora of North America.

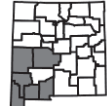
■Kral, R. 1971. A Treatment of *Abildgaardia*, *Bulbostylis* and *Fimbristylis* (Cyperaceae) for North America. Sida 4 (2):57-227. ■Kral, R. 2002. *Bulbostylis*, pp. 131-136. IN: Flora of North America, vol. 23. Oxford University Press.

1 Spikelets usually more than 1 per culm (often 1 in depauperate individuals); culms 10-30 cm tall; leaves ¼ to ½ of total culm length; basal spikelets only occasionally present..... ***B. capillaris***

1 Spikelets 1 per culm; culms up to 10(15) cm tall; leaves ½ to slightly exceeding culms; basal spikelets usually present
2 Anthers 2; culms to 15 cm tall; leaves ½ to exceeding culms; involucre bracts 1 or 0; achenes of the basal spikelets larger (1.5 mm long) than those on scapes (1 mm long); basal spikelets dissimilar to those on culms..... ***B. funckii***

2 Anthers 3; culms to 7 cm tall; leaves exceeding culms; involucre bracts 2; achenes of the basal spikelets the same size as those on culms (1 mm long); basal spikelets similar to those on culms..... ***B. schaffneri***

Bulbostylis capillaris (Linnaeus) Kunth ex C.B. Clarke [hair-like] [*Scirpus capillaris* Linnaeus, *Stenophyllus capillaris*



(Linnaeus) Britton]. Plants annual, cespitose; culms to 30 cm tall, ridged; leaves with blades ¼ - 1/3 the length of the culm, ca. 0.5 mm wide, involute; inflorescence terminal (occasionally basal also), composed of 1-3(7) spikelets in a subcapitate cluster to an open cyme; inflorescence bracts 1-2, filiform, the proximal shorter to longer than the inflorescence; spikelets 3-5 mm long, ovoid to lanceoloid; floral scales 1.5-2 mm long, red-brown with a green or tan midrib, the apex acute; stigmas 3, stamens (1)2, anthers 0.5-0.7 mm long; achenes trigonous-obovoid, 1 mm long. ●Sandy or gravelly clearings, rocky slopes, roadsides, semi-riparian desert scrub, and shallow depressions in pinyon-juniper woodland; 5000-7600 ft; occasional in the southwestern counties. ♦Similar species: When depauperate plants of *Bulbostylis capillaris* have most or all inflorescences with a single spikelet only, or when plants have basal spikelets, they have been confused with *B. funckii* and *B. schaffneri*. However, both of these diminutive annuals have leaf blades at least half as long as the culms, while those of *B. capillaris* are generally much shorter. In addition, the basal spikelets of *B. funckii* look more like individual exposed achenes when mature, and the spikelets of *B. schaffneri* lack the reddish-brown coloration and are distally more acuminate in profile than the ovate ones of *B. capillaris*. *Bulbostylis juncooides*, found in southeastern Arizona and Mexico, looks similar in spikelet coloration, but most inflorescences form definite anthelae with more than 3 spikelets, and it has harder, perennial, sometimes slightly bulbous bases. *Bulbostylis juncooides* was previously reported for New Mexico, but no specimens are known.

Bulbostylis funckii (Steudel) C. B. Clarke [for Nicholas Funck (1816-1896), plant collector] [*Isolepis funckii* Steudel, *Stenophyllus*



funckii (Steudel) Britton]. Plants annual, densely cespitose; culms 5-10(15) cm tall, ridged; leaves with blades 1/2 the length of to slightly exceeding the culm, 0.5 mm wide, flat or involute; inflorescence terminal and basal; terminal inflorescence mostly sterile and composed of a single spikelet with 0-1 bract, the bract when present appearing as an extension of the culm; basal inflorescence composed of individual fertile florets developing in the sheath axils at the culm base; terminal spikelet 5-7 mm long, lanceoloid, with acuminate apex; floral scales 2-2.5 mm long, reddish brown with a green or tan midrib, prominently excurrent as a mucro; stigmas 3, stamens 2, anthers ca. 0.5 mm long; achenes broadly trigonous-obovoid, 1 mm long in terminal spikelets, 1.5 mm long in basal spikelets. ●Sandy clearings, road banks, fields, disturbed areas; 7500 ft; known from one collection in Catron County. ♦Similar species: see discussion under *Bulbostylis capillaris*.

Bulbostylis schaffneri (Boeckeler) C. B. Clarke [for Johann Wilhelm Schaffner (1830-1882), German pharmacist-botanist [*Scirpus schaffneri* Boeckeler]. Plants annual, caespitose, diminutive; culms 5-7 cm tall, ridged; leaves with blades exceeding the culms, 0.5 mm wide, filiform, flat to involute; inflorescence terminal and/or sub-basal on very short culms, composed of a single spikelet; inflorescence bracts 2, the proximal leaflike and exceeding the spikelet; basal spikelets similar to the terminal ones; spikelets 5 mm long, ovoid; floral scales 2-2.5 mm long, pale brown with a greenish or yellowish midrib, excurrent as a spreading or recurved mucro; stigmas 3, stamens 3, anthers less than 0.5 mm long; achenes trigonous-obovoid, 1 mm long. ●Sandy or gravelly clearings, in pine or oak woodlands; 5100-8400 ft; infrequent in the southwestern counties. ♦Similar species: see discussion under *Bulbostylis capillaris*. The spikelets of *Bulbostylis schaffneri* are always pale colored, while those of *B. capillaris* and *B. funckii* are often darker, reddish brown.



Carex [to cut] SEDGE [94].

Contributed by Max H. Licher, James McGrath, William R. Norris, and Glenn R. Rink.

Plants grass-like, perennial, mostly monoecious, but some species dioecious, densely caespitose from short rhizomes to colonial from long-creeping rhizomes; culms mostly trigonous, occasionally subterete, phyllopodic (bearing leaves to the base), or aphyllpodic (lower leaves bladeless and reduced to sheaths only); leaves three-ranked, blades simple, linear, flat to V- or M-shaped in cross section, less commonly filiform or revolute, ligule present and attached to blade, sheaths usually closed, the fronts often hyaline and ripping or shredding in age; inflorescences simple or compound, composed of one or more sessile or pedunculate spikes; spikes entirely staminate, entirely pistillate, androgynous (with both staminate and pistillate flowers with the staminate flowers above the pistillate ones), gynecandrous (with both staminate and pistillate flowers with the pistillate flowers above the staminate ones), or more rarely with staminate and pistillate flowers intermixed in no obvious pattern; each spike subtended by a bract or not, the bracts leaf-like or reduced to a scale (awned or not); flowers with perianth absent; staminate flowers consisting of 3 stamens, each subtended by a scale (“staminate scale”), pistillate flowers consisting of a pistil with 2 or 3 stigmas, each surrounded by a perigynium (a sac-like bract open only at the top with the style and/or stigmas exposed), the characters of the mature perigynia essential for species differentiation, each perigynium subtended by a scale (“pistillate scale”), fruit an achene, 1 per flower, enclosed in the perigynium, biconvex (lenticular) or planoconvex in flowers with 2 stigmas, trigonous in flowers with 3 stigmas. ♦About 2000 species worldwide, about 480 listed in the Flora of North America.

■Allred, K.W. 2000. New plant distribution records [*Carex planostachys*]. The New Mexico Botanist 14:4. ■Alexander, P. 2017. iNaturalist observation of *Carex leucodonta* T. Holm, <https://www.inaturalist.org/observations/9256402>, accessed 24 Feb 2020. ■Ball, P.W. & A.A. Reznicek. 2002. *Carex*, pp. 254-572. IN: Flora of North America, vol. 23. Oxford University Press. ■Cochrane, T.S. 1981. Noteworthy collections (New Mexico) [*Carex leptopoda*]. Madroño 28:186-187. ■Coop, J. 2002. Plant distribution reports [*Carex phaeocephala*]. The New Mexico Botanist 24:7. ■Coop, J. 2003. Plant distribution reports [*Carex brunnescens, conoidea*]. The New Mexico Botanist 25:7. ■Gillespie, E.L. 2005. Phylogeography of *Carex eburnea* (Cyperaceae) and the systematics of the *Carex eburnea* complex. Thesis Appalachian State University. ■Hartman, R.L. 1973. New plant records for New Mexico [*Carex elynoides, oreocharis, praticola*]. Southwestern Naturalist 18(2):241-242. ■Hartman, R.L., B. Reif, B.E. Nelson, & B. Jacobs. 2006. New vascular plant records for New Mexico [*Carex deweyana, rosea*]. Sida 22(2):1225-1233. ■Heil, K. & S. O’Kane. 2007. Plant distribution reports [*Carex nigricans, praeceptorium*]. The New Mexico Botanist 41:7. ■Hermann, F.J. 1970. Manual of the Carices of the Rocky Mountains and Colorado Basin. USDA Agric. Handb. No. 374. ■Hermann, F.J. 1974. Manual of the Genus *Carex* in Mexico and Central America. USDA Agric. Handb. No. 467. ■Hipp, A. 2003. Plant distribution reports [*Carex egglestonii*]. The New Mexico Botanist 28:8. ■Jones, S.D., C.T. Bryson, and J.E. Ubelaker. 1993. *Carex blanda* and *Kyllinga odorata* (Cyperaceae) new to New Mexico and a significant range extension of *Cyperus retrorsus*. Sida 15(3):552-553. ■Keller, C.F. 2005. Plant distribution reports [*Carex pyrenaica*]. The New Mexico Botanist 32:7. ■Keller, C.F. 2010. Plant distribution reports [*Carex luzulina ablata*]. The New Mexico Botanist 52:4. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Carex microglochis, nelsonii*]. J. Bot. Res. Inst. Texas 4(2):777-784. ■Mackenzie, K.K. 1915. Two new sedges from the southwestern United States [*Carex wootonii, rusbyi*]. Smithsonian Misc. Collect. 65(7):1-3. ■Mackenzie, K.K. 1931-1935. North American Flora. 18. Cyperaceae, Tribe 2, Cariceae. New York Botanical Garden. ■McGrath, J. 1999. New plant distribution records [*Carex diandra*]. The New Mexico Botanist 12:8. ■McGrath, J. 2000. New plant distribution records [*Carex geyeri, jonesii*]. The New Mexico Botanist 15:7. ■McGrath, J. 2002. Plant distribution reports [*Carex illota*]. The New Mexico Botanist 24:7. ■McGrath, J. 2003. Plant distribution reports [*Carex macloviana*]. The New Mexico Botanist 25:7. ■McGrath, J. 2005. Plant distribution reports [*Carex deweyana*]. The New Mexico Botanist 33:7. ■McGrath, J., M. Licher, W.R. Norris & G. Rink. 2015. A review of *Carex* in New Mexico: Initial findings. The New Mexico Botanist 63: 1-8. ■Murray, D.F. 1969. Taxonomy of *Carex* sect. *Atratae* (Cyperaceae) in the southern Rocky Mountains. Brittonia 21:55-76. ■Mygatt, J. 2009. Plant distribution reports [*Carex tahoensis*]. The New Mexico Botanist 46:7. ■Norris, W.R. 2012. Plant distribution reports [*Carex gynocates, limosa, tetrastachys, vesicaria*]. The New Mexico Botanist 56:2. ■Norris, W.R. 2012. Plant distribution reports [*Carex scopulorum, senta*]. The New Mexico Botanist 57:3. ■Peterson, R.S. 2000. New plant distribution records [*Carex angustior, sprengelii*]. The New Mexico Botanist 15:7. ■Peterson, R.S. 2010. Plant distribution reports [*Carex lachenalii*]. The New Mexico Botanist 50:3. ■Reznicek, A.A. 1993. Revision of *Carex* section *Ovales* (Cyperaceae) in Mexico. Contr. Univ. Michigan Herb. 19:97-137. ■Rink, G. & Licher, M. 2015. Cyperaceae. Sedge Family. Part 1: Family Description, Key to Genera, and *Carex* L. Canotia 11: 1-97. ■Roalson, E.H., S.D. Jones, & K.W. Allred. 1995. *Carex amplifolia* and *Carex rossii* (Cyperaceae), new to New Mexico and a key to section *Montanae* in New Mexico. Sida 16(3):592-594. ■Sivinski, R.C. 2001. New plant distribution records [*Carex albonigra*]. The New Mexico Botanist 20:8. ■Standley, L.A. 1985. Systematics of the *Acutae* group of *Carex* (Cyperaceae) in the Pacific Northwest. Syst. Bot. Monogr. 7:1-106. ■Weber, W.A., B.C. Johnston, & D. Wilken. 1979. Additions to the flora of Colorado. VI [*Carex rostrata* vs. *Carex utriculata*]. Phytologia 41(7):486-500. ■Worthington, R.D. 1999. New plant distribution records [*Carex muriculata*]. The New Mexico Botanist 10:7. ■Worthington, R.D. 2002. New plant distribution records [*Carex lativena*]. The New Mexico Botanist 22:7. ■Worthington, R.D. 2003. Plant distribution records [*Carex chihuahuensis*]. The New Mexico Botanist 26:7. ■Worthington, R.D. 2004. Plant distribution reports [*Carex microdonta*]. The New Mexico Botanist 29:7. ■Worthington, R. 2005. Plant distribution reports [*Arnica latifolia, bebbii, capitata, garberii*]. The New Mexico Botanist 32:7. ■Worthington, R. 2011. Plant distribution reports [*Carex frankii*]. The New Mexico Botanist 53:4.

- 1 Spikes solitary per culm KEY A
- 1 Spikes multiple per culm
 - 2 Perigynia hairy (at least some hairs present on the upper half) KEY B
 - 2 Perigynia glabrous
 - 3 Spikes generally of two types, the terminal spike(s) staminate (rarely androgynous) or gynecandrous; the lower spikes predominantly pistillate or androgynous, often pedunculate
 - 4 Stigmas 3, achenes trigonous
 - 5 Terminal spike staminate (rarely androgynous)..... KEY C
 - 5 Terminal spike gynecandrous..... KEY D
 - 4 Stigmas 2, achenes biconvex..... KEY E
 - 3 Spikes similar to each other in shape and/or gender arrangement, sessile, subsessile, or short pudunculate
 - 6 Terminal spike androgynous or staminate or pistillate; lateral spikes androgynous or staminate or pistillate; stigmas 2 (3 in *C. muriculata*)..... KEY F
 - 6 Terminal spike gynecandrous (sometimes appearing wholly pistillate after anthers have fallen); lateral spikes gynecandrous or pistillate; stigmas 2 or 3
 - 7 Stigmas 3; spikes sessile to pedunculate..... KEY D
 - 7 Stigmas 2; spikes sessile
 - 8 Perigynia not winged KEY G
 - 8 Perigynia winged KEY H

KEY A: Single spike per culm

- 1 Plants caespitose, growing in dense to loose clumps
 - 2 Perigynia apices rounded to slightly retuse, without beaks; plants soft, lax, of wet/moist habitats within high elevation (8500-10,500 ft) conifer forests, loosely caespitose from short rhizomes *C. leptalea*
 - 2 Perigynia apices contracted, beaked; plants more stiffly upright, habitat and elevation various, densely tufted, rhizomes lacking or inconspicuous
 - 3 Perigynia with stipitate base, glabrous, ellipsoid to narrowly ovoid or lanceoloid; spike with staminate portion shorter than pistillate portion; pistillate scales ovate to lanceolate, dark brown with narrow hyaline margins; plants of dry to moist alpine habitats *C. micropoda*
 - 3 Perigynia lacking stipitate base, glabrous to finely pubescent, ovoid to obovoid; spike with staminate portion longer than pistillate portion (rarely equal); pistillate scales mostly broadly ovate, or broadly obovate to sub-orbulate, light tan to greenish, yellowish or reddish brown, with broad hyaline margins; plants of dry habitats in pinyon-juniper woodland, mountain meadows, grasslands, or alpine
 - 4 Leaf blades folded or channeled, wider blades 0.8-1.5(2.8) mm wide near base, culms sometimes scabrous below the inflorescence; plants of mountain meadows, dry slopes and grasslands, not alpine habitats *C. oreocharis*
 - 4 Leaf blades involute-cylindric, filiform, wider blades 0.2-0.8 mm wide near base, culms mostly smooth below the inflorescence; plants of pinyon-juniper woodland or alpine habitats
 - 5 Perigynia glabrous or sparsely short hirsute/ciliate only on the upper portion near the base of the beak; plants of alpine rock fields and meadows above timberline, 10,500-12,800 ft *C. elynoides*
 - 5 Perigynia usually short pubescent all over, at least on the distal portion; plants of desert scrub and open areas within pinyon-juniper woodland, 5900-8200 ft *C. filifolia*
- 1 Plants rhizomatous, with single stems to small clusters of stems arising from obvious rhizomes
 - 6 Spikes with pistillate and staminate sections separated by a section of bare rachis, pistillate portion of 1-2(3) separated perigynia; perigynia (4.4)4.9-6.4(8.4) mm long, obovoid, rounded at top with a minute beak or beakless; culms to 50 cm tall, plants of dry woodlands and forests, open slopes and meadows *C. geyeri*
 - 6 Spikes with pistillate and staminate sections contiguous, pistillate portion usually with more than 3 adjacent perigynia; perigynia to 4.7 mm long (appearing longer in *C. microglochin* due to exerted rachilla), widest usually at the middle or below, beaked; culms up to 25 cm tall, plants of wet or dry habitats
 - 7 Plants of wet habitats, leaf blades 0.2-1 mm wide
 - 8 Perigynia lance-subulate, 3.4-4.7 mm long, more than 4 times as long as wide, strongly deflexed at maturity, the rachilla present, exerted from orifice up to 2.2 mm (appearing like an extension of the beak); stigmas 3 *C. microglochin*
 - 8 Perigynia ovoid, oblong, or plumply elliptic, 2.6-3.4 mm long, less than 3 times as long as wide, spreading to slightly deflexed at maturity, rachilla absent; stigmas 2 *C. gynocrates*
 - 7 Plants of drier habitats; leaf blades 0.5-3(3.8) mm wide
 - 9 Perigynia uniformly deep red-brown to dark brown, shiny; sheath fronts with red-purple dots; leaf blades 0.5-1.6(2) mm wide, tips generally straight or curved, not curling; rhizomes often reddish-purple; plants of montane grasslands, open forests, ponderosa pine savannas and rocky ridges up to 10,500 ft *C. obtusata*
 - 9 Perigynia cream or pale green with darker tip, dull; sheath fronts without red-purple dots; leaf blades 1.4-3(3.8) mm wide, tips often curling; rhizomes brown; plants of alpine summits, dry meadows and rocky ridges at or above 11,500 ft *C. rupestris*

KEY B: Multiple spikes per culm, perigynia pubescent or muricate-warty

- 1 Inflorescence a dense head of indistinguishable similar androgynous spikes; plants single-stemmed to occurring in small clumps connected by long rhizomes; dry habitats *C. duriuscula* (in part)
- 1 Inflorescence elongate with spikes of different types, terminal spike staminate and lateral spikes mostly pistillate, or if all spikes similar and androgynous, then separated along the rachis and easily distinguishable; plants caespitose or colonial rhizomatous; varying habitats (note that some of these species have both cauline and basal inflorescences, the latter having a simpler, compact structure)
 - 2 Pistillate spikes 1-7 cm long, with 40 or more perigynia; plants colonial from long rhizomes; wetland habitats, usually pond, lake margins, along streams, wet meadows or seasonally flooded wetlands
 - 3 Perigynia occasionally with a few bristles along the nerves, otherwise glabrous; base of leaf blades and summit of leaf sheaths usually pubescent; perigynia 6-8.2(9) mm long, beak bidentate with spreading teeth 1.6-2.2(3.6) mm long *C. atherodes* (in part)
 - 3 Perigynia densely pubescent over entire surface; base of leaf blades and summit of leaf sheaths glabrous; perigynia 2.5-3.8(5.2) mm long, beak bidentate with straight teeth 0.4-0.6 mm *C. pellita*
 - 2 Pistillate (androgynous in *C. muriculata*) spikes 1.2 cm or less long (to 2.2 cm long in *C. muriculata*), with less than 20 perigynia; plants loosely to densely caespitose; dry to mesic woodland, forest, or prairie habitats
 - 4 Surface of perigynia muricate warty; lateral spikes 2-5, androgynous or sometimes appearing pistillate due to cryptic male flowers *C. muriculata* (in part)
 - 4 Surface of the perigynia more or less pubescent (proximally glabrous in *C. planostachys*); lateral spikes 1-3(4), pistillate
 - 5 Plants with cauline inflorescences only, usually with both staminate and pistillate spikes
 - 6 Culms to 50 cm tall, longer to much longer than the leaves; perigynia prominently 10-25 nerved at least to mid-body; proximal inflorescence bract as long or longer than the inflorescence, less frequently shorter; staminate scales pale green throughout, sometimes with a darker green midstripe; southwestern mountains only *C. leucodonta*
 - 6 Culms to 35 cm tall, shorter to longer than the leaves; perigynia nerveless except for two strong marginal nerves; proximal inflorescence bract usually shorter than the inflorescence, rarely a bit longer; staminate scales with brown body and pale or green midstripe; found primarily in the northern half of the state (hybrids w/ basal inflorescences are occasional) *C. heliophila*

- 5 Plants with both basal and cauline inflorescences, occasionally basal only, the cauline inflorescences with staminate and pistillate spikes, the basal spikes on short peduncles, usually all pistillate
 - 7 Perigynia with many prominent nerves, hispidulous distally, glabrous proximally, or nearly glabrous throughout; beak sometimes abruptly bent; southern mountains only *C. planostachys*
 - 7 Perigynia nerveless or with few fine nerves between the two prominent marginal nerves, uniformly pubescent; beak slightly bent or straight; of various distributions
 - 8 Old leaf bases persisting as coarse fibers, tan to brown, usually without any red or orange color; cauline pistillate spike bract usually shorter than the inflorescence; pistillate scales shorter than to as long as the perigynia; staminate spikes often thick with many strongly overlapping scales.....*C. geophila*
 - 8 Old leaf bases only slightly fibrous, with some red or orange coloring; cauline pistillate spike bract shorter to longer than the inflorescence; pistillate scales usually shorter than perigynia; staminate spikes usually slender, with fewer, less overlapping scales, with more of the scale length exposed
 - 9 Perigynia 2.3-3.4(4.2) mm long; beaks 0.5-1(1.5) mm long; plants loosely cespitose, often lax; alpine rock fields and tundra at or above above timberline..... *C. brevipes*
 - 9 Perigynia 3-4.9 mm long; beaks 0.7-2 mm long; plants densely cespitose, strict or lax; pinyon-juniper woodland to ponderosa pine or mixed conifer forests at or below timberline (rarely above in *C. rossii*)
 - 10 Cauline pistillate spikes 3-6(15) flowered; proximal inflorescence bract wide, flat, longer to much longer than the inflorescence; culms 7-25(40) cm tall; staminate spikes (6)13-16.5 mm long, the scales pale to slightly tinged with brown or red (not deep purple) *C. rossii*
 - 10 Cauline pistillate spikes 1-4 flowered; proximal inflorescence bract narrow, folded or involute, shorter to slightly longer than the inflorescence; culms 3-15 cm tall; staminate spikes 4.8-13 mm long, the scales usually darker, with purple-black tinge
 - 11 Cauline inflorescence with 2-4 pistillate spikes, each with (1)2-3 perigynia, the perigynia thus appearing in clusters along the axis of the inflorescence; staminate spike 7.5-13 mm long, on a peduncle of variable length, often with a pistillate flower close to its base; leaves flat, lax.....*C. "aff. rossii"*
 - 11 Cauline inflorescence with 1-2(3) pistillate spikes, each with 1(2) perigynium, the perigynia thus often appearing separated along the axis of the inflorescence; staminate spike 4.8-8.3(11.5) mm long, usually on a long peduncle equal to or much longer than spike, rarely with a pistillate flower at its base; leaves often folded or involute, stiffer than the above *C. pityophila*

KEY C: Multiple spikes per culm, stigmas 3, perigynia glabrous, terminal spike staminate (rarely androgynous), mostly wetland plants (Note: Only *C. capillaris*, *C. geyeri*, *C. hystericina*, & *C. utriculata*) are known from more than a few locations in the state)

- 1 Mature pistillate spikes uniformly dark; perigynia and scales at least partially suffused with dark purple or blackish coloration; plants rare in NM, known from Rio Arriba and Taos counties
 - 2 Stigmas 2 (some flowers occasionally with 3); perigynia 2 times as long as wide, often shiny, ovate to ovate-lanceolate or broadly elliptic in profile, inflated (often flattened in pressing), the beaks smooth; plants colonial rhizomatous *C. saxatilis*
 - 2 Stigmas 3; perigynia 2.5-3 times long as wide, not shiny, narrowly elliptic to lanceolate, not inflated, the beaks ciliate-setose (at least at the base of the beak); plants cespitose to short-rhizomatous *C. luzulina*
- 1 Mature pistillate spikes green to brown or straw colored but not uniformly dark; either perigynia and scales both pale OR dark scales contrasting with pale colored perigynia OR pale scales contrasting with darker perigynia; plants of varying frequency and distribution in NM
 - 3 Plants with robust pistillate spikes; longer pistillate spikes 2-13 cm long, each with more than 50 perigynia, the perigynia densely packed on the spike; perigynia moderately to strongly inflated (though often flattened/collapsed in pressing or flat to slightly inflated in *C. ultra*), the achenes not filling the perigynia; plants often robust; wetland habitats
 - 4 Perigynia beaks 0.2-0.6 mm long, bodies with red-brown spotting or blotching, flattened to only slightly inflated; leaf blades usually glaucous, thick, coriaceous, with harsh scabrous margins; plants densely cespitose; Hidalgo County *C. ultra*
 - 4 Perigynia beaks 0.7-4.2 mm long, bodies without red-brown spotting or blotching (though with dark brownish coloration in some species), usually inflated; leaf blades pale to dark green but not glaucous, thin to thick but not coriaceous and without harsh scabrous margins; plants cespitose to rhizomatous; various locations in NM
 - 5 Pistillate scales with a long scabrous awn, the awn longer than 1 mm, often equaling or longer than the body, distinct from the body of the scale
 - 6 Base of leaf blades and summit of leaf sheaths usually pubescent; perigynium beak bidentate with teeth 1.6-2.2(3.6) mm long; plants rhizomatous, producing large colonies.....*C. atherodes* (in part)
 - 6 Base of leaf blades and summit of leaf sheaths glabrous; perigynium beak bidentate with teeth (0.2)0.3-1 mm long; plants rhizomatous or cespitose
 - 7 Perigynium body obconic, widest near the top, abruptly contracted to the beak; proximal pistillate spike ascending to spreading; sheath fronts papery-membranous, easily torn, not ladder-fibrillose; plants rhizomatous; extreme southern NM..... *C. aureolensis*
 - 7 Perigynium body lanceoloid to ovoid to ellipsoid, widest at or near the middle, gradually tapering into the beak; proximal pistillate spike often pendent; sheath fronts not papery membranous, becoming ladder-fibrillose; plants densely cespitose; widespread in NM *C. hystericina*
 - 5 Pistillate scales without an awn, or with midrib extended as short, smooth awn less than 1 mm long, shorter than the length of the body
 - 8 Perigynia bodies broadly obovoid to subspherical, 3-7 nerved, beaks 0.7-1.1 mm long; widest leaf blades 8-20 mm wide; Grant and Sierra counties..... *C. amplifolia*
 - 8 Perigynia bodies lanceoloid, ovoid, or ellipsoid, 6-12 nerved, beaks 0.8-2 mm long; widest leaf blades 4.5-10 mm wide; widespread (*C. utriculata*) or rare in NM (*C. vesicaria*)

- 9 Ligule of lowest leaf blade no more than 1.5 times as long as wide, with rounded or emarginate apex; culms often thick, clothed in old leaf bases; sheaths thick and spongy based, often with crosswalls between the veins, appearing like brickwork, the sheaths surrounding the thickest culms rarely reddish, the sheaths surrounding narrower culms occasionally reddish; widest leaf blades up to 10 mm wide; plants colonial from long rhizomes; perigynia strongly spreading at maturity; common and widespread..... *C. utriculata*
- 9 Ligule of lowest leaf blade at least twice as long as wide, with acute apex; culms often thin, not clothed in old leaf bases; sheaths thin, not spongy based, with few or no crosswalls between the veins, not appearing like brickwork, the sheaths often reddish; widest leaf blades up to 6(8) mm wide; plants loosely caespitose from short rhizomes; perigynia ascending to spreading at maturity; rare in NM, Cibola and Rio Arriba counties..... *C. vesicaria*
- 3 Plants with delicate pistillate spikes; longer pistillate spikes less than 3 cm long (rarely longer in *C. luzulina*, *C. microdonta*, and *C. sprengelii*), each with fewer than 50 perigynia, the perigynia loosely packed on the spike (or if densely packed, then the spike less than 2 cm long); perigynia not or barely inflated, the achenes more nearly filling the perigynia; plants robust or not; varying habitats
 - 10 Proximal pistillate spikes pendent on long flexuous peduncles
 - 11 Perigynium body abruptly contracted to a long conspicuous beak, the beak 1.9-2.8 mm long, subequal to or slightly longer than the body; sheath bases disintegrating into a persistent tuft of vertical "horsehair" fibers; plants up to 90 cm tall; leaf blades up to 40 cm long..... *C. sprengelii*
 - 11 Perigynium body gradually or abruptly tapered into a shorter beak, the beak 0.1-1.1 mm long, less than half the length of the body, or absent; sheath bases not disintegrating into a persistent tuft of fibers; plants 5-40(70) cm tall; leaf blades usually less than 10 cm long
 - 12 Perigynium surface smooth, beak 0.3-1.1 mm long; inflorescence bract with sheath 4 mm long or longer; roots without a covering of fine hairs; plants caespitose *C. capillaris*
 - 12 Perigynium surface papillate, beak 0.1(0.5) mm long or absent; inflorescence bract with a sheath 3 mm long or less; roots with a covering of fine hairs; plants rhizomatous (but stems sometimes in small clumps)
 - 13 Pistillate scales (0.6)0.9-1.9(2) mm wide, much narrower than and thus not concealing the perigynia, conspicuously longer than the mature perigynia and giving the pistillate spike a 'shaggy' appearance, deciduous; plants rhizomatous but sometimes growing in clumps; phyllopodic, culms usually with dead leaf remains at base *C. magellanica*
 - 13 Pistillate scales (1.7)1.8-2.5(3.4) mm wide, as wide as the perigynia and concealing them, shorter to longer than the mature perigynia, not giving the pistillate spike a 'shaggy' appearance, persistent; plants rhizomatous, colonial; aphyllopodic, culms without dead leaf remains at base..... *C. limosa*
 - 10 Proximal pistillate spikes erect or spreading on stiff peduncles, or sessile
 - 14 Inflorescence with only 1-2 individual sessile perigynia; perigynia obovoid, (4.4)4.9-6.4(8.4) mm long, beakless, with a narrow, spongy base; plants rhizomatous, of dry montane forest, woodland, and meadow habitats *C. geyeri*
 - 14 Inflorescence with more than 3 perigynia, on multiple spikes (sometimes a single basal spike in several species); perigynia of various shapes, without narrow spongy base, 4.5 mm long or less, with beak (except in *C. conoidea*), plant growth form and habitat various, but not both as above
 - 15 Perigynia 1.5-2.2 mm long; inflorescence with the terminal staminate spike surpassed by one or more pedunculate pistillate spikes; inflorescence bract reduced to a sheath only, without blade; leaf blades very fine, 0.2-0.5(1) mm wide; known from a single location in the Sacramento Mtns. (Otero Co.)..... *C. eburnea*
 - 15 Perigynia 2.4 mm long or longer (1.8-3 mm in *C. viridula*); inflorescence with terminal staminate spike(s) surpassing all lateral pistillate spikes; inflorescence bract with blade; leaf blades 1 mm or more wide; distribution various
 - 16 Perigynia with impressed (sunken) nerves, beakless..... *C. conoidea*
 - 16 Perigynia with raised nerves, beaked
 - 17 Proximal pistillate spike arising from the lower third of the culm; plants rhizomatous *C. microdonta*
 - 17 Proximal pistillate spike arising in the upper half (usually upper third) of the culm (separate basal inflorescences can be present in *Carex planostachys*); plants caespitose
 - 18 Proximal inflorescence bract greatly exceeding the inflorescence, erect to widely divergent; pistillate spikes oblong to ovoid to globose, the perigynia very densely packed; the terminal group of spikes tightly clustered and sessile to subsessile to short pedunculate..... *C. viridula*
 - 18 Proximal inflorescence bract shorter than to slightly exceeding the inflorescence, usually erect to ascending; pistillate spikes cylindrical to cylindrical-oblancoeloid, the perigynia more loosely packed than in *C. viridula*; the terminal spikes not tightly clustered, or if clustered, then usually more loosely so and short pedunculate
 - 19 Plants of dry habitats in southern NM, basal inflorescences often present; culms up to 15 cm tall..... *C. planostachys*
 - 19 Plants of wet to mesic habitats, in northern NM, culms usually 15 cm or more tall
 - 20 Perigynium beak evident, straight, 0.5-1.5 mm long, ciliate-serrulate (at least at the base of the beak); culms with leaf blades crowded near the base, fewer above on the culm *C. luzulina*
 - 20 Perigynium beak short, abruptly bent, 0.6 mm long or less, glabrous; culms with leaf blades more evenly distributed along the culm..... *C. blanda*

KEY D: Multiple spikes per culm, stigmas 3(2), perigynia glabrous, terminal spike gynecandrous

- 1 All spikes sessile in a compact head and closely overlapping one another (occasionally the basal spike slightly remote and subsessile)
 - 2 Perigynia ovate to suborbicular, 1.3-2.5(2.8) times longer than wide, contracted abruptly to beak 0.2 -0.5(0.6) mm long; spikes often not readily distinguishable..... *C. nova*
 - 2 Perigynia narrowly elliptic to narrowly ovate, 2.8-3.9 times longer than wide, tapering to a beak (0.3)0.5-0.8(0.9) mm long; spikes easily distinguishable *C. nelsonii*

- 1 Lower spikes pedunculate, some shortly so; inflorescence usually moderately elongate, always with one to several lower spikes remote from the terminal cluster
 - 3 Pistillate scale apices typically with awns 0.5-2(3.5) mm long; lateral spikes sessile to short pedunculate; plants rhizomatous; lower leaf sheath fronts-light-colored becoming ladder-fibrillose with age; rare in NM *C. buxbaumii*
 - 3 Pistillate scale apices acute to acuminate, without awns; lateral spikes short to long-pedunculate; plants loosely to densely caespitose; lower leaf sheaths not becoming ladder-fibrillose with age; rare to common in NM
 - 4 Lowest lateral spike gynecandrous (though often with only a few staminate flowers at the base), on a peduncle longer than the upper spikes); spikes generally long and cylindric or narrowly ellipsoid, often more than 3 times as long as wide.....*C. bella*
 - 4 Lowest lateral spike wholly pistillate (rarely gynecandrous in *Carex chalciolepis*), short pedunculate; spikes oblong, ovoid or ellipsoid in shape, generally less than 2.5 times as long as wide
 - 5 Perigynia 1.9-2.7 mm long, usually bright green or tan, contrasting with the dark scales; pistillate scales shorter than the perigynia; plants of seeps, moist meadows, streambanks or forests *C. stevenii*
 - 5 Perigynia 2.8-4.8 mm long, usually partially suffused with darker color, not contrasting strongly with the dark scales; pistillate scales usually as long as or longer than the perigynia; plants of rocky alpine or subalpine habitats
 - 6 Pistillate scales lanceolate to ovate-lanceolate, exceeding the perigynia in the upper half of the spike, giving the inflorescence a 'shaggy' appearance; achene filling approximately half of the perigynium; inflorescence often nodding in maturity *C. chalciolepis*
 - 6 Pistillate scales broadly ovate, about equaling the perigynia in length, not giving the inflorescence a 'shaggy' appearance; achene filling most of the perigynium; inflorescence usually remaining erect..... *C. albonigra*

KEY E: Multiple spikes per culm, stigmas 2(3), perigynia glabrous, terminal spike staminate (androgynous) or gynocandrous

- 1 Plants relatively slight; culms thin and flexuous, generally less than 40 cm tall; perigynia nearly beakless; lateral pistillate spikes up to 2.8 cm long; leaf blades less than 3.5 mm wide; rhizomes 0.7-1(1.8) mm thick; stigmas usually 2, but sometimes with a few flowers (up to 20%) with 3 stigmas; perigynia sometimes golden yellow to orange *C. aurea*
- 1 Plants more robust or coarse; culms thick and upright, ranging from 7-120 cm tall; perigynia beaks 0.1-1.1 mm long; lateral pistillate spikes 0.5-8 cm long; leaf blades 1-10(12) mm wide; rhizomes 1-6 mm thick; stigmas 2 (occasionally 3 in *C. saxatilis*); perigynia never golden yellow to orange
 - 2 Plants caespitose or culms densely clustered in clumps
 - 3 Basal sheaths red brown, often shiny, ladder-fibrillose; uncommon in southwestern NM; 4500-8500 ft.....*C. senta* (in part)
 - 3 Basal sheaths not red brown, not shiny, not becoming ladder fibrillose; northern and western NM (*C. kelloggii*) or nearly statewide except southwestern NM (*C. emoryi*); 3400-12,500 ft.
 - 4 Plants caespitose; terminal staminate spike usually one; perigynia abruptly and narrowly stipitate; ligule never shorter than wide; free portion of ligules 0.5-2 mm long; spikes dark; 7000-12,500 ft.....*C. kelloggii*
 - 4 Plants rhizomatous; terminal staminate spikes 2 or more; base of perigynia attenuate to broadly stipitate; ligule usually shorter than wide, free portion of ligules up to 0.5 mm long; spikes pale; 3400-8800 ft*C. emoryi*
 - 2 Plants with culms occurring singly or a few together connected by rhizomes
 - 5 Perigynia beaks (0.2)0.3-1.1 mm long; perigynia inflated, suborbicular in cross-section (often flattened in pressed specimens); pistillate scales dark brown to reddish black, often with a white hyaline apex; mostly 2-styled with biconvex achenes, occasionally 3-styled with trigonous achenes; rare in NM; over 10,000 ft *C. saxatilis*
 - 5 Perigynia beaks 0.1-0.6 mm long; perigynia flattened (not inflated), not suborbicular in cross section; pistillate scales light to dark-colored, dark scales lacking a white hyaline apex; 2-styled with biconvex achenes; uncommon to common in NM; 3400-13,000 ft
 - 6 Pistillate scales usually with broad pale midportion with light brown marginal stripes, spikes light colored; ligule usually broadly U-shaped to horizontal, usually shorter than wide; sheaths pale, fronts usually red spotted*C. emoryi*
 - 6 Pistillate scales usually dark with narrow, light-colored midvein (sometimes broad in *Carex aquatilis*); spikes dark-colored; ligule V or U-shaped, as long or longer than wide; sheaths often red-brown, fronts not red spotted
 - 7 Some lower pistillate scale midveins excurrent as a short awn; leaf blades 3-10(12) mm wide; perigynia beaks often bidentate and ciliate at the apex *C. nebrascensis*
 - 7 Pistillate scales lacking awns; leaf blades 1-6(8) mm wide; perigynia beaks entire or minutely bidentate, not ciliate at the apex (sometimes ciliate in *C. scopulorum*)
 - 8 Basal sheaths ladder-fibrillose; southwestern NM; 4500-8500 ft.....*C. senta* (in part)
 - 8 Basal sheaths not ladder-fibrillose; northern NM; 7000-13,000 ft
 - 9 Inflorescence elongate, (4)6-18(21) cm long; proximal bract longer to slightly shorter than the inflorescence; proximal spike 1-5(7) cm long.....*C. aquatilis*
 - 9 Inflorescence congested, 2-8 cm long; proximal bract shorter than the inflorescence; proximal spike 0.5-3.1 cm long.....*C. scopulorum*

KEY F: Multiple spikes per culm, stigmas 2 (3 in *C. muriculata*), perigynia glabrous, spikes sessile, terminal spike androgynous or staminate or pistillate

- 1 Delicate plants, culms arching, flexible; mostly less than 5 perigynia per spike (6, or rarely up to 8 in *C. radiata*)
 - 2 Rhizomes conspicuous; mature perigynia unequally biconvex to round in cross section, plump, the faces conspicuously veined, the margins not serrulate, 1-4 per spike; spikes 2-4(7) *C. disperma*
 - 2 Rhizomes inconspicuous; mature perigynia planoconvex to biconvex in cross-section, not plump, the faces not or inconspicuously veined, the margins serrulate, 1-6(8) per spike; spikes 3-5(8)..... *C. radiata*
- 1 Coarse plants, culms upright and stiff; mostly more than 5 perigynia per spike (sometimes fewer in *C. jonesii* and *C. occidentalis*)
 - 3 Plants rhizomatous, with clear separation between small groups of 1-several culms; distance between the culms along the rhizome mostly greater than 1 cm long
 - 4 Rhizomes flexible, 0.6-1.6 mm thick; plants of dry habitats
 - 5 Plants mostly monoecious; inflorescence 2-9 mm wide, not appearing shaggy

- 6 Culms to 30 cm tall; inflorescence compact, 0.7-2 cm long; all spikes tightly overlapping and indistinguishable; perigynia 2.8-3.8 mm long; beak 0.3-0.8 long; culms smooth just below the inflorescence..... *C. duriuscula* (in part)
 - 6 Culms to 90 cm tall; inflorescence elongate, 1-3.5 cm long; lowest spikes loosely overlapping and distinguishable; perigynia 3.6-6 mm long; beak 1.2-2.5 mm long; culms usually scabrous just below the inflorescence..... *C. siccata*
 - 5 Plants mostly dioecious; staminate inflorescence 7-20 mm wide, pistillate inflorescence 8-20 mm wide, appearing shaggy.....
..... *C. douglasii*
 - 4 Rhizomes stout, 1.2-3.6 mm thick; plants of wet to mesic habitats
 - 7 Perigynia beaks 0.3-0.5 mm long; perigynia 1.7-2.4 mm long, dark reddish brown; culm bases typically pale; of wetter habitats frequently flooded throughout the growing season *C. simulata*
 - 7 Perigynia beaks greater than 0.5 mm long; perigynia 2-4.2 mm long, brown to black at maturity; of moist to wet habitats but usually not those that are flooded throughout the growing season or of springs
 - 8 Culm bases typically dark brown; rhizomes typically not straight; inflorescences branched or spicate; plants usually of wetlands with saturated soils or moist areas that dry out seasonally, sometimes weedy *C. praegracilis*
 - 8 Culm bases typically light brown; rhizomes typically straight; inflorescences always branched; plants typically of springs or creek banks, never weedy *C. agrostoides* (in part)
 - 3 Plants mostly caespitose, forming clumps; distance between the culms along the rhizome mostly less than 1 cm, rarely up to 2 cm long in *Carex agrostoides*
 - 9 Inflorescence 0.8-1.5(2) cm long, spikes and branches nearly indistinguishable *C. jonesii*
 - 9 Inflorescence usually greater than 1.5 cm long, spikes and branches more readily distinguishable
 - 10 Beaks of perigynia light colored and contrasting with the dark and shiny bodies; perigynia with two prominent raised ridges on either side of a dorsal central groove, otherwise without nerves, with a distinct hyaline flap at the top of the dorsal suture; known from a single high elevation wetland in Rio Arriba County *C. diandra*
 - 10 Beaks of the perigynia the same color as the bodies; perigynia lacking two ridges, with or without nerves on at least one face, lacking a distinct hyaline flap at the top of the dorsal suture; NM distributions various
 - 11 Perigynia 3-5.5 mm long, 2-3 mm wide; proximal leaf sheaths loose, longitudinally green and white striped and with prominent green cross veins; northeastern NM..... *C. grivada*
 - 11 Perigynia 2.2-4.8 mm long, 0.9-2 mm wide; proximal leaf sheaths tight, not or indistinctly striped, without prominent cross veins; NM distributions various
 - 12 Inflorescence branched, at least some spikes attached to the lower branches of the inflorescence; generally wet habitats
 - 13 Inflorescence bracts hair-like; perigynia 2.2-2.8 mm long, sharp-margined basally *C. vulpinoidea*
 - 13 Inflorescence bracts broader, not hair-like; perigynia 2.6-4.6 mm long, round-margined basally
 - 14 Culms 4-6 mm wide with the angles winged; sheath fronts cross-rugulose; leaf blades 2-8(11) mm wide; inflorescence robust, spiky with long acute-tipped perigynia pointing in all directions; perigynia 3.6-4.6 mm long *C. stipata*
 - 14 Culms 1.5-3.5 mm wide, sharp angled but not winged; sheath fronts not cross-rugulose; leaf blades 0.7-4(4.4) mm wide; inflorescence softer, if spiky then not so robust; perigynia 2.6-4.2 mm long
..... *C. agrostoides* (in part)
 - 12 Inflorescence unbranched, all spikes attached to the main axis of the inflorescence; generally dry habitats
 - 15 Stigmas 3; achenes trigonous; perigynia muricate-warty; limestone substrates; southeast NM
..... *C. muriculata* (in part)
 - 15 Stigmas 2; achenes lenticular to biconvex; perigynia smooth; various habitats, wide-ranging in NM
 - 16 Pistillate scales as long and wide as the perigynia, mostly concealing them; mature perigynia planoconvex but not plump, with marginal nerves usually on the margins of the body, rarely one nerve pushed over onto the ventral face, mostly unnerved on the faces; beak prominently (and doubly) serrulate on the margins, obviously bidentate; perigynia uniformly oriented in the spikes, giving the inflorescence a smooth appearance..... *C. occidentalis*
 - 16 Pistillate scales usually shorter and narrower than the perigynia, the perigynia readily visible; mature perigynia plumply planoconvex, with at least one of the marginal nerves pushed over onto the ventral face, many-nerved dorsally and often ventrally; beak smooth or finely (and singly) serrulate on the margins, obliquely cleft or only slightly bidentate; some of the perigynia with random orientations in the spikes, giving the inflorescence a rough appearance *C. vallicola*
- KEY G: Multiple spikes per culm, stigmas 2, perigynia glabrous & unwinged, spikes sessile, terminal spike gynecandrous**
- 1 Inflorescence compact and capitate, spikes often indistinguishable..... *C. illota*
 - 1 Inflorescence elongate, spikes easily distinguishable
 - 2 Perigynia radiating in all directions (star-shaped) at maturity; perigynia widest near the base, with spongy thickened tissue at the base apparent
 - 3 Perigynia 2.1-3(3.2) mm long; beaks 0.3-1 mm long *C. interior*
 - 3 Perigynia (2.6)2.8-3.5 mm long; beaks 0.9-1.5 mm long *C. echinata*
 - 2 Perigynia spreading, ascending, and/or appressed, not radiating in all directions at maturity; perigynia widest well above the base, spongy thickened tissue at base not apparent
 - 4 Perigynia planoconvex, 2.5-3.8(4) times longer than wide, margins with a definite edge, surfaces smooth; beaks 0.9-1.8(2.5) mm long
 - 5 Ligule of distal leaf on culm about as long as wide, 0.7-2(2.7) mm long; achenes 1.7-2.1 mm long; inflorescence with 2-4(5) spikes *C. deweyana*
 - 5 Ligule of distal leaf on culm much longer than wide, (2)3.4-7.1 mm long; achenes 1.2-1.6(2.1) mm long; inflorescence with 4-6(9) spikes *C. bolanderi*

- 4 Perigynia biconvex, (1.4)1.6-2.7 time longer than wide, margins rounded, surfaces smooth to papillose; beaks up to 1 mm long
- 6 Spikes light-colored, the lower spikes well separated; pistillate scales hyaline throughout, sometimes tinged brown or brown in the middle with green midveins; perigynia dorsal sutures lacking dark coloration or dark coloration present, but not extending for the entire length of the beaks
- 7 Spikes (2)3-8 mm long, with 1-11 perigynia; perigynia with the dorsal suture well developed, often extending the length of the beak or more, sometimes with a white hyaline flap *C. brunnescens*
- 7 Spikes 3-14 mm long with (2)5-23(30) perigynia; perigynia with the dorsal suture poorly developed, not extending the length of the beak, lacking a white hyaline flap *C. canescens*
- 6 Spikes darker colored, mostly strongly overlapping; pistillate scales reddish-brown or light chestnut brown with hyaline margins; perigynia dorsal sutures dark colored for the entire length of beaks
- 8 Perigynia 1.5-2.3 mm long, papillose; beaks 0.2-0.4(0.5) mm long; inflorescence with (3)4-5(6) spikes..... *C. praeceptorum*
- 8 Perigynia (2)2.4-3.8 long, smooth; beaks 0.5-1 mm long; inflorescence with (1)3(4) spikes *C. lachenalii*

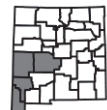
KEY H: Multiple spikes per culm, spikes similar, stigmas 2, all spikes sessile and gynecandrous, perigynia winged (Section *Ovales*, excluding *C. illota*)

Sedges in *Carex* Section *Ovales* are among the most difficult to identify. Many *Ovales* species are characterized by high variation. Some hints will help you: A) When collecting, include at least 6 (preferably more) inflorescences to ensure good representation of the variation on a plant. B) When determining perigynia characters, select mature perigynia from the middle third of the lower spikes and use measurements from the larger ones that are normal in shape. C) Examine many perigynia from your specimen before deciding which way to go in the key regarding perigynia characters, but especially shape and beak characters. Many treatments discuss beaks as either terete and entire, or winged and serrulate to the tip. Tip characters have more variation than this implies, often on one spike. Some beaks that are terete are also serrulate to the tip (*Carex ebenea*). D) Discern whether the upper spikes are distinguishable by seeing if you can easily see the boundaries of the upper spikes without magnification or dissection, at arm's length. E) Once you have arrived at a tentative determination, make sure that your specimen matches the species description.

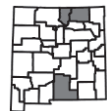
- 1 Longest perigynia up to 4 mm long; wet areas
 - 2 Most inflorescences having 1-3 lower inflorescence bracts longer than the head (often broken off on dried specimens); broad (usually hyaline) margins of the basal portion of the lowest inflorescence bract longer than 1/2 the length of the lowest spike; perigynia beak tips terete and entire in the distal 0.3-0.8 mm *C. athrostachya*
 - 2 Few inflorescences having 1-3 lower inflorescence bracts longer than the head, if so, the broad (usually) hyaline margins of the basal portion of the lowest inflorescence bract less than 1/2 the length of the lowest spike; perigynia winged and serrulate to the tips, or less commonly entire in distal up to 0.5 mm in *C. subfusca*
 - 3 Upper spikes usually indistinguishable, usually tightly clustered; most perigynia apices acuminate to acute, more nearly terete, serrulate to the tip or sometimes as much as 0.5 mm of distal portion entire; widespread in northern and southwestern NM..... *C. subfusca* (in part)
 - 3 Upper spikes usually distinguishable, clustered to moniliform; most perigynia apices acute and winged to tip, rarely terete in the distal 0.2 mm, often serrulate to the tips; rare plants of northern NM
 - 4 Lowest inflorescence internode 2-4.5 mm long; upper spikes usually clustered; spikes (2)5-9; presently known only from Sandoval County *C. bebbii*
 - 4 Lowest inflorescence internode (2)4-9 mm long; spikes moniliform; spikes 3-5(8); presently known only from Rio Arriba County *C. tenera*
- 1 Longest perigynia longer than 4 mm; wet or dry areas
 - 5 Longest perigynia up to 5 mm long (rarely up to 5.2 in *C. phaeocephala*)
 - 6 Upper spikes distinguishable
 - 7 Perigynia less than 2 times as long as wide, body suborbicular; spikes often clavate due to the large number of male flowers at the base, often rough textured (due to prominent beaks on more widely spreading perigynia) *C. brevior*
 - 7 Perigynia more than 2 times as long as wide, body various, but not orbicular; spikes not clavate (except in *C. tahoensis*), smooth textured (perigynia more appressed than in the former)
 - 8 Plants found at or above tree line, of dry places; culms to (5)15-45 cm tall; perigynia tips hyaline *C. phaeocephala*
 - 8 Plants found below tree line (rarely up to tree line in *C. tahoensis*), of wet to dry places; culms up to 120 cm tall; perigynia tips hyaline or not
 - 9 Spikes 3-4(6); achenes nearly filling the middle third of the perigynia; culms loosely clustered, arising from short linear rhizomes; dry places *C. tahoensis* (in part)
 - 9 Spikes (1)3-10(14); achenes mostly filling the lower half of the perigynia; culms densely cespitose; wet places (*C. praticola* might be found in dry places)
 - 10 Most perigynia winged to tip; pistillate scale apices acute to acuminate; moist areas below 8500 ft..... *C. scoparia* (in part)
 - 10 Most perigynia terete at the tip, terete portion 0.4-1 mm long; pistillate scale apices acute to obtuse; mostly wet areas over 8500 ft
 - 11 Perigynia 3.6-4.5 mm long; spikes 5-9(11) mm long; inflorescence 0.6-2.2 cm long *C. pachystachya* (in part)
 - 11 Perigynia (3.7)4.5-6 mm long; spikes 8.5-20 mm long; inflorescence (1.7)2.5-5 cm long *C. praticola*
 - 6 Upper spikes congested and indistinguishable
 - 12 Culms to 25(40) cm tall, often arching; distance from the beak tips to the tops of the achenes (2.3)2.6-3.8 mm; alpine tundra, above 11,800 ft *C. haydeniana*
 - 12 Culms to 120 cm tall, rarely arching; distance from the beak tips to the tops of the achenes (1.2)1.5-3 mm; plants growing in forested areas or meadows below 11,800 ft, rarely higher
 - 13 Perigynium dorsal suture long white-hyaline, tips hyaline; scales dark brown, sometimes with a metallic sheen, hyaline margins of middle scales 0.2-0.5 mm wide *C. macloviana*

- 13 Perigynium dorsal suture not long white-hyaline, tips brown; scales tan to brown, without a metallic sheen, hyaline margins of middle scales 0.1-0.3(0.5) mm wide
- 14 Perigynia planoconvex, narrowly wing-margined, 0.45-0.6 mm thick
 - 15 Perigynia 3.6-4.5 mm long, 1.1-2 mm wide, slightly spreading when mature, veined or not, sometimes with coppery sheen, most perigynia beaks entire in distal 0.3-0.6 mm, sometimes a few serrulate to tips..... *C. pachystachya* (in part)
 - 15 Perigynia 2.4-4(4.3) mm long, 0.9-1.2(1.5) mm wide, ascending when mature, conspicuously veined, never with coppery sheen, most perigynia beaks serrulate to tips, sometimes up to 0.5 mm of distal portion entire *C. subfusca* (in part)
- 14 Perigynia flat except where distended over the achene to thinly planoconvex, broadly wing-margined, 0.3-0.5 mm thick
 - 16 Lowest inflorescence internode up to 3 mm, inflorescence (0.7)1.1-2.4 cm long, the base truncate; perigynia usually widest below the top of the achene *C. microptera*
 - 16 Lowest inflorescence internode usually greater than 4 mm, inflorescence (1.5)2-3.6 cm long, the base tapered; perigynia usually widest at the top of the achene..... *C. "apachense"* (in part)
- 5 Longest perigynia more than 5 mm long
 - 17 Upper spikes distinguishable; most perigynia winged to tip
 - 18 Perigynia not thick, flat except over the achene
 - 19 Perigynia 3.3-5.4(6.8) mm long, (1)1.2-2.2 mm wide; pistillate scale apices acuminate to acute; spikes (1)3-9(13), (5)6-12(16) mm long; moist areas, 5000-8100 ft..... *C. scoparia* (in part)
 - 19 Perigynia (4.8)5.2-7(7.2) mm long, (1.6)1.8-3.5(3.8) mm wide; pistillate scale apices acute; spikes 2-7(8), 8-21 mm long; dry areas, 6700-11,000 ft
 - 20 Perigynia up to 2.3 times as long as wide, (2.2)3-3.5(3.8) mm wide; spikes 8-15 mm long; proximal inflorescence internode (2)4-5 mm long *C. egglestonii*
 - 20 Perigynia more than 2.1 times as long as wide, (1.6)1.8-2.9(3) mm wide; spikes 9-21 mm long; proximal inflorescence internode (2)4-10 mm long..... *C. wootonii* (in part)
 - 18 Perigynia thick, planoconvex, with achenes more nearly filling the perigynia
 - 21 Perigynia usually nerveless ventrally, usually winged to tips; spikes obovoid, with few staminate flowers at the base of each spike; hyaline margins on pistillate scales 0-0.5 mm wide..... *C. wootonii* (in part)
 - 21 Perigynia usually nerved ventrally, winged to the tips or not; spikes narrowly fusiform, lanceoloid, to oblanceoloid, often with many staminate flowers at the base of each spike; hyaline margins on pistillate scales 0.2-0.8 mm wide
 - 22 Perigynia 6-8.4 mm long; distance from perigynium beak tip to top of the achene (1.8)3.2-4.6 mm; pistillate scales shorter and narrower than the perigynia, or equal to the perigynia, pale green to light brown with a pale or green midvein..... *C. petasata*
 - 22 Perigynia 4-4.8(6.2) mm long; distance from perigynium beak tip to top of the achene 1.7-2.2 (2.6) mm; pistillate scales usually covering the perigynia, bronze with a straw to tan midvein..... *C. tahoensis* (in part)
 - 17 Upper spikes indistinguishable; perigynia not winged to tip (usually winged to tip in *C. wootonii*)
 - 23 Perigynia (1.6)1.8-2.9(3) mm wide; spikes 3-7(8), 9-21 mm long..... *C. wootonii* (in part)
 - 23 Perigynia 1.1-1.8 mm wide; spikes 5-12(13), 6-15 mm long
 - 24 Spikes 9-15 mm long; proximal inflorescence internode usually 1-3 mm, rarely up to 5 mm; perigynia (3.5)5.3-7.1 mm long; dry places, over 9000 ft..... *C. ebenea*
 - 24 Spikes 6-10 mm long; proximal inflorescence internode usually at least (3)4 mm long; perigynia (3.5)4-5.6 mm long; wet places, 5700-9700 ft..... *C. "apachense"* (in part)

Carex agrostoides Mackenzie [resembling *Agrostis*] [*Carex alma* of NM reports, *Carex chihuahuensis* Mackenzie]. Plants densely cespitose or rhizomatous with thick, straight, smooth, short, brown rhizomes; culms 20-110 cm tall, 1.5-3.5 mm thick, longer than the leaves; leaf blades 0.7-4(4.4) mm wide; inflorescence (2.5)3.2-9(13) cm long, dense to elongate, composed of several upper spikes sessile on the rachis and (1)2-9 lower multiple-spiked branches, lower internodes (5)10-30 mm long; spikes similar, androgynous, erect to spreading, 5-40 mm long, 3-10 mm wide, the proximal bract with a broad expanded hyaline basal portion, (0.4)1-7.5(9.5) cm long, shorter or longer than the inflorescence; pistillate scales similar in size to the perigynia, bronze with a green midvein and broad hyaline margins; perigynia 2.6-4.2 mm long, 1-1.8 mm wide, ascending, green or pale, turning tan or black at maturity, shiny to dull, weakly to strongly nerved, ovate to lanceolate, planoconvex, the margins rounded, the base spongy, truncate to cordate, the beak 0.6-0.8 mm long; stigmas 2; achenes 1.5-1.8 mm long; section *Multiflorae*, Key F. ●Mountain springs, mountain streambanks and ciénegas in the plains; 4600-6200 ft; common in southwest NM. ♦Similar species: We have diverged from typical treatments here. Standley (2002), synonymized *Carex agrostoides* to *C. alma* (which occurs in AZ and CA, but not NM) inappropriately. We determined that early specimens identified as *C. agrostoides* are the same taxon as *C. chihuahuensis*, but since *C. agrostoides* has priority, we call these plants *C. agrostoides*. *Carex agrostoides* and *C. praegracilis* may intergrade in desert ciénegas. Rhizomes of *C. agrostoides* tend to be thick, straight and rich brown, while those of *C. praegracilis* tend to be thinner, not straight, and dark. The branches at the lower nodes of *C. praegracilis* inflorescences are often (but not always) re-branched, just as in *C. agrostoides*. *Carex praegracilis* perigynia sometimes have bases distended with spongy tissue and thus can appear similar to the perigynia of *C. agrostoides*. In the field, *C. praegracilis* is obviously rhizomatous, often forming large stands, while *C. agrostoides* tends to form clumps of many stems and appears cespitose, even though it is also rhizomatous.



Carex albonigra Mackenzie [white and black]. Plants loosely cespitose from short rhizomes; culms 10-31 cm tall, longer than the leaves; leaf blades 1.5-4.5(5) mm wide, flat, the sheaths pale green to purplish red; inflorescence (1.2)1.7-2.8(3.4) cm long, composed of 2-3(4) similar looking closely aggregated erect spikes, the terminal spike 9-16 mm long, gynecandrous, the lateral spikes 6-13(15) mm long, pistillate, ovoid to ellipsoid to obovoid, short pedunculate, the proximal bract shorter than or equal to the inflorescence; pistillate scales slightly shorter than to longer than and as wide as the perigynia, broadly ovate, dark brown to black with whitish hyaline margins, with or without a narrow paler



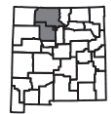
midstripe, the apices obtuse; perigynia 2.8-3.3 mm long, 1.1-1.9 mm wide, ascending, dark brown to black, sometimes light-colored proximally, nerveless, papillose, ovate to elliptic to obovate to orbicular, abruptly contracted to an entire to slightly bidentate beak 0.1-0.4 mm long; stigmas 3; achenes 1.6-1.7(1.9) mm long, 0.8-1(1.3) mm wide, trigonous, nearly filling the body of the perigynia; section *Racemosae*, Key D. ●Alpine rock fields and meadows above timberline, 11,400-12,600 ft; known only from the Sangre de Cristo Mtns and on Sierra Blanca Peak (Otero Co.). ♦Similar species: Immature specimens of *Carex albonigra*, *C. bella*, and *C. chalciolepis* can easily be confused because without mature perigynia, the spikes of *C. chalciolepis* often appear slimmer like the other two, and the scales of *C. albonigra* and *C. bella* both appear more “shaggy”, like *C. chalciolepis*. The nodding aspect of *C. bella* and *C. chalciolepis* inflorescences also may not appear until full maturity, especially in dwarfed alpine plants. In these cases, the few staminate scales at the base of the lowest lateral spike will be diagnostic for *C. bella*, but it may not be possible to separate the other two.

Carex amplifolia Boott [broad-leaved]. Plants forming large clumps or stands from stout rhizomes; culms 50-90(100) cm tall, shorter to longer than the leaves; leaf blades (5)7-15(20) mm wide, the sheaths pale green to reddish, sometimes red-spotted; inflorescence 15.5-26 cm long, composed of 1-2(3) erect terminal staminate spikes and 3-5(7) ascending to spreading lateral pistillate spikes, the staminate spikes (3)5-8 cm long, the pistillate spikes 3-12 cm long, cylindric, subsessile to pedunculate, the proximal bract longer than the inflorescence; pistillate scales shorter and narrower than the perigynia, mucronate to awn-tipped; perigynia 2.4-3.1(3.6) mm long, 1.3-1.7 mm wide, spreading, brownish-green, obovoid to subspherical, sub-inflated, with 3-7 strong nerves, abruptly contracted to a minutely bidentate beak 0.7-1.1 mm long, sometimes bent; stigmas 3; achenes 0.9-1.9 mm long, 0.6-1.3 mm wide; section *Anomalae*, Key C. ●Bogs, wet meadows, streamsides in conifer forests, often in shaded areas; 6100-8800 ft; known only from several locations in the Black Range and along the Mimbres River in west central NM. ♦Similar species: *Carex amplifolia* can be confused with *C. ultra*; both are robust and have long pistillate spikes. However, the perigynia of *C. amplifolia* have subspherical bodies abruptly constricted to long, narrow, sometimes bent beaks, while those of *C. ultra* are narrowly obovoid with short stubby beaks. *Carex amplifolia* forms rhizomatous stands, and has soft, green, lax leaves, while *C. ultra* is clump-forming with stiff, harshly scabrous-edged, and often glaucous leaf blades.

Carex “apachense” ined. [of the Apache people and their lands]. Plants densely cespitose, forming small clumps from short rhizomes; culms 25-75 cm tall, longer or shorter than the leaves; leaf blades 1.4-4 mm wide; inflorescence (1.5)2-3.6 cm long, elongate, the base V-shaped, composed of 5-10(13) erect, gynecandrous spikes, the spikes 6-10 mm long, (3)5-7 mm wide, ovoid, similar, sessile, the upper spikes strongly overlapping and often indistinguishable, the proximal internode usually at least (3)4 mm long, the proximal bract scale-like, shorter than the inflorescence; pistillate scales shorter and narrower than, to rarely as wide as the perigynia, deep brown with a pale or green midvein and hyaline margins; perigynia (3.5)4-5.6 mm long, 1.1-1.8 mm wide, ascending, green to golden brown, usually many-nerved on both sides, broadly wing-margined to the round base, narrowly to broadly ovate, flat except over the achene, long tapering to the dark, terete beak, entire in the distal 0-0.2(0.4) mm, distance from perigynium beak tip to top of the achene (2)2.5-3, perigynia usually widest at the top of the achene; anthers 1.8-2.2 mm long; stigmas 2; achenes (1)1.2-1.4(1.6) mm long; section *Ovales*, Key H. ●Moist to wet meadows, along streams; 5400-9700 ft; mostly known from southwestern NM. ♦Similar species: We have used the provisional name *Carex “apachense”* ined. for plants that morphological and molecular evidence suggest belong to an undescribed taxon (pers. comm. A. Hipp, Morton Arboretum). These plants resemble *C. microptera*, but differ by having more elongate inflorescences, perigynia that are broadest at or above the top of the achene, and longer anthers. They range from southeast AZ into southwestern NM, with a few locations further north. *Carex microptera* is more widespread, but is less common than *Carex “apachense”* in southwestern NM, though the two overlap in the White Mountains in AZ. *Carex “apachense”* has also been confused with *C. wootonii*, which has larger perigynia with beaks that are usually winged to their green or pale tips, while those of *Carex “apachense”* are not as winged to their dark, terete tips. This provisional name also applies to herbarium specimens we earlier annotated as *Carex* cf. *microptera* “Pinalaño”. ♦Note: No official nomenclatural novelty is proposed herein.

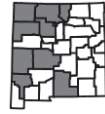
Carex aquatilis Wahlenberg [aquatic] WATER SEDGE [*Carex variabilis* Bailey]. Plants rhizomatous, rhizomes stout, scaly, 1.4-3.5 mm thick; culms arising singly or a few together, 20-120 cm tall, usually shorter than the leaves; leaf blades 2.5-6 mm wide, basal sheaths brown or reddish, not ladder-fibrillose, ligules rounded at the apex; inflorescence (4)6-18(21) cm long, composed of 1-2(4) terminal staminate spikes and 2-4(7) lateral pistillate spikes 0.9-5(7) cm long, with peduncle up to 1 cm long, rarely longer, proximal bract leaf-like, longer to slightly shorter than the inflorescence; pistillate scales shorter to longer and often narrower than the perigynia, ovate to lanceolate, dark with pale green or white midvein or none, apex awnless; perigynia 2-3.6 mm long, 1.3-2.3 mm wide, ascending, dull, papillose, unveined, elliptic or obovate, the beak 0.1-0.4 mm long; stigmas 2; achenes 1-1.8 mm long; section *Phacocystis*, Key E. ●Streambanks, fens and wet meadows; 7000-12,100 ft; common in the mountains of northern NM. ♦Our plants belong to var. *aquatilis*. Similar species: *Carex aquatilis* can be confused with other wetland sedges with dark-colored spikes in northern NM. *Carex kelloggii* is cespitose, usually has a single male spike at the top of the inflorescence, and the perigynia are veined and abruptly stipitate while *C. aquatilis* has long rhizomes, usually has 1-2 staminate spikes at the top of the inflorescence, and the perigynia are veinless and not abruptly stipitate. *Carex nebrascensis* has veined perigynia with bidentate beaks and pistillate scales that are often awn-tipped while *C. aquatilis* has veinless perigynia with entire beaks and pistillate scales that are not awn-tipped. *Carex aquatilis* has longer inflorescences (6-18 cm) than *C. scopulorum* (2-8 cm), which has a more compact and darker inflorescence. Also, the proximal inflorescence bract in *C. scopulorum* is always shorter than the inflorescence while the proximal inflorescence bract in *C. aquatilis* is slightly shorter to longer than the inflorescence. See also discussion under *C. emoryi*. §

Carex atherodes Sprengel [awn-like]. Plants colonial from long rhizomes, forming large stands; culms 30-110(125) cm tall, often shorter than the leaves; leaf blades 3-9 mm wide, lower surface papillose, sparsely to densely pubescent throughout or near the ligule, the sheaths brown to reddish-purple to black, the sheath fronts becoming ladder-fibrillose; inflorescence 12-35 cm long, composed of (1)2-8 erect terminal staminate spikes (1-4 of these rarely androgynous) and 1-4 erect, remote, lateral pistillate spikes, the staminate spikes 2-6 cm long, the pistillate spikes (2)4-7 cm long, cylindric, pedunculate, the proximal bract longer than the inflorescence; pistillate scales shorter or longer than the perigynia, lanceolate to ovate with a conspicuous scabrous awn 1.2-6 mm long; perigynia 6-8.2(9) mm long, (1)1.3-1.8 mm wide, ascending to spreading, green to straw-colored with many strong nerves, the body lanceoloid to ovoid-lanceoloid, smoothly tapered above to a deeply bidentate beak (2.1)2.5-4.2 mm long, with long slender, spreading teeth 1.6-2.2(3.6) mm long; stigmas 3; achenes 2.8-3.1 mm long, 1.4-1.7 mm

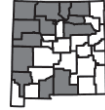


wide; section *Carex*, Key C. ●Floodplains and seasonally flooded wetlands; 5300-9300 ft; known from three locations in northern NM. ♦Similar species: The combination of pubescent sheaths that become ladder-fibrillose and long perigynia teeth set this species apart from all other *Carex* that grow in NM.

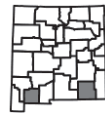
Carex athrostachya Olney [with crowded spikes] [*Carex tenuirostris* Olney]. Plants densely caespitose; culms (5)20-60(80) cm tall, longer than the leaves; leaf blades 1.5-4(5) mm wide; inflorescence 0.9-2.2 cm long, compact, base truncate or tapered, composed of (4)7-10(15) sessile, gynecandrous spikes, the spikes 6-10 mm long, spreading to erect, similar, ovoid, the proximal bract usually much longer than the inflorescence, lowest with base up to 3.5 mm wide, the wide basal (usually hyaline) margin of the proximal inflorescence bract greater than ½ the length of the lowest spike; pistillate scales narrower and shorter than the perigynia, golden to reddish brown with pale center and hyaline margins; perigynia 2.8-4 mm long, (0.8)1-1.5(1.8) mm wide, ascending, green to light brown, nerved dorsally and sometimes ventrally, planoconvex, elliptic to ovate, tapering to a broad stipitate base, the beak terete and entire in distal 0.3-0.8 mm, the distance from perigynium beak tip to top of the achene 1.9-2.5 mm; stigmas 2; achenes 1.2-1.6 mm long; section *Ovales*, Key H. ●Wetlands, seasonally flooded ponds, depressions and streams; 6000-9900 ft; widespread in NM. ♦Similar species: Other *Ovales* with long inflorescence bracts (*C. subfusca*, *C. wootonii*) don't have inflorescence bracts that are broad past the midpoint of the first spike nor perigynia with broad stipitate bases.



Carex aurea Nuttall [golden] GOLDEN SEDGE. Plants rhizomatous to loosely caespitose from long slender rhizomes 0.7-1(1.8) mm thick; culms 5-41 cm tall, usually shorter than the leaves; leaf blades 1.3-3.5 mm wide, the sheaths cream to brown; inflorescence 2-8(13) cm long, composed of 1 terminal staminate (rarely gynecandrous) spike, 3-14(26) mm long and 1-4(7) lateral pistillate spikes, 4-21(28) mm long, lowermost sometimes with peduncles 12+ cm long, sometimes basal; proximal bract leaf-like, longer than the inflorescence, the sheath (2)3-15(20) mm long; pistillate scales about as wide and up to as long as the perigynia, brownish with pale green midvein and hyaline margins, the apices obtuse to cuspidate; perigynia (1.4)2-2.8(3.1) mm long, 0.9-1.9 mm wide, spreading, pale green maturing to yellow-orange, veined or veinless, globose to obovoid, nearly beakless; stigmas 2(3); achenes 1.3-1.8(2) mm long, 1-1.4 mm wide; section *Bicolores*, Key E. ●Wet meadows, seepage slopes, springs, and marginal to sluggish streams; 5500-11,600 ft; scattered in the western ⅓ of NM. ♦Similar species: The globose perigynia of *Carex aurea* might lead one to Key C species, with three stigmas, which *C. aurea* rarely has. Superficially, the inflorescences look similar to those of *C. blanda*, *C. conoidea*, and *C. microdonta* (all rare species in NM), but those plants always have three stigmas and perigynia that never turn golden yellow at maturity. *Carex blanda* has perigynia with short, bent beaks; *C. conoidea* has perigynia with impressed nerves, neither character being found in *C. aurea*. *Carex microdonta* has perigynia 2.6-4.2 mm long, generally longer than those of *C. aurea*. See also, note with *C. microdonta*.



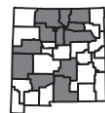
Carex aureolensis Steudel [from Aureola, Iowa]. Plants colonial from long rhizomes, forming large stands to loose clumps; culms (20)30-65(85) cm tall, shorter than the leaves or appearing so because of the long inflorescence bracts; leaf blades (2)4-9 mm wide, scabrous, the sheaths purplish red, not fibrous, septate-nodulose, the sheath fronts papery-membranous; inflorescence 6-13 cm long, composed of 1(2) erect terminal staminate spike and 3-5 erect gynecandrous (rarely pistillate) lateral spikes, the lateral spikes (11)18-38(45) mm long, (5.5)7-11 mm wide, broadly cylindrical, the proximal bract much longer than the inflorescence; pistillate scales (0.4)0.6-1.2 mm wide, shorter than the perigynia, hyaline with green midrib extending into a scabrous awn (1.4)2.1-5.3(9) mm long, the awn exceeding the perigynia; perigynia (3.2)4.3-5.4(5.6) mm long, 1.3-2(2.5) mm wide, ascending initially, widely spreading when mature, brown to dark brown proximally, green to straw-colored distally, many-nerved, obconic, inflated, the beak (1.2)1.5-2.8 mm long, bidentate with teeth 0.3-1 mm long; stigmas 3; achene (1.2)1.9-2.9 mm long, (0.9)1-1.5 mm wide; section *Squarrosae*, Key C. ●Mountain springs and along associated streams; 4300-5600 ft; known only from three locations: in the Guadalupe (Eddy Co.) and Florida (Luna Co.) mountains. ♦Similar species: *Carex aureolensis* might be confused with *C. utriculata*, but *C. aureolensis* typically has shorter pistillate spikes with awned scales that are translucent hyaline with a green midrib, unlike the merely acuminate-tipped, non-hyaline, brownish scales of *C. utriculata*. While they share a rhizomatous, wetland habitat, *Carex utriculata* is a montane species of the north, and *C. aureolensis* is a lower-elevation woodland to scrublands species of the extreme southern part of the state.



Carex bebbii (L. H. Bailey) Olney ex Fernald [for Michael Schuck Bebb (1833-1895), distinguished American botanist] [*Carex tribuloides* W. Herbert var. *bebbii* L.H.Bailey]. Plants densely caespitose; culms (14)20-67(90) cm tall, longer than the leaves; leaf blades 1-4 mm wide; inflorescence 1-2.6 cm long, dense, ovoid to linear-oblong, composed of (2)5-9 gynecandrous spikes, the proximal internode length 2-4.5 mm, the spikes 4-9 mm long, erect to spreading, sessile, similar, ovoid to globose, the proximal bract scale-like or setaceous-prolonged; pistillate scales narrower than and shorter than or equal to the perigynia, lanceolate to oblong-lanceolate, pale to reddish brown with pale or green midvein, sometimes with narrow hyaline margins; perigynia (1.9)2.7-3.2 mm long, 0.9-1.3(1.6) mm wide, ascending, light to dark reddish brown, nerveless or finely nerved dorsally, nerveless ventrally or with several nerves at the base only, winged to the base, flat to planoconvex, ovate or elliptic, the beak winged and serrulate to the tip, the distance from perigynium beak tip to top of the achene (0.9)1.3-2 mm; stigmas 2; achenes 1-1.4 mm long; 0.7-0.8 mm wide; section *Ovales*, Key H. ●Wet meadows and streambanks; 7900-8800 ft; rare in NM. ♦Similar species: *Carex bebbii* could be confused with *C. subfusca* due to the small perigynia of both, but *C. bebbii* spikes are evenly distinct and rounded, giving them a 'beaded' look, while those of *C. subfusca* are usually less distinguishable at least distally.



Carex bella L.H. Bailey [handsome] SOUTHWESTERN SHOWY SEDGE. Plants caespitose from short rhizomes; culms 15-64(75) cm tall, longer than the leaves, often drooping with age; leaf blades (0.8)1.2-4.1(6) mm wide, flat, the sheaths green to dark reddish-brown; inflorescence (2.8)4-9(11) cm long, elongate, compact in dwarf specimens from high elevations, composed of (1)2-5 gynecandrous spikes, cylindrical or narrowly ellipsoid, the lateral spikes (6)11-28(35) mm long, often more than 3 times as long as wide, with progressively fewer staminate flowers and longer peduncles on the lower spikes, the mature lower spikes often drooping; pistillate scales shorter than the perigynia so that at least the tips of the perigynia are visible, occasionally as long as the perigynia, ovate, dark reddish brown with a lighter tan or green midvein, the apices acute, rarely obtuse, or with the midvein extending as an awn up to 0.6 mm long; perigynia 2.4-3.2(3.6) mm long, 1.2-2(2.4) mm wide, ascending, light green or beige, sometimes with reddish to black mottling, smooth, nerveless or obscurely several nerved, elliptic or obovate, rounded at the apex, with beak 0.1-0.5(0.6) mm long; stigmas 3; achenes trigonous, 1.8-2.6 mm long, 0.8-1.6 mm wide,



nearly filling the body of the perigynia; section *Racemosae*, Key D. ●Montane conifer forests to alpine rock fields and meadows, but most common in subalpine forests; 7600-12,200 ft; widespread in the mountains in the northern part of the state, found also in the Sacramento Mtns. ♦Similar species: *Carex chalciolepis* also has pendent inflorescences, but the spikes tend to be shorter and broader, and the pistillate scales longer, exceeding the perigynia. Short alpine specimens of *C. bella* with upright spikes might be confused with *C. albonigra*; however, both the pistillate scales and perigynia of *C. albonigra* are dark, while the pale green perigynia sharply contrast with the dark pistillate scales in *C. bella*. The apices of the pistillate scales are more obtuse in *C. bella* than in *C. albonigra*. There are usually one or more staminate scales at the base of the lowest spike in *C. bella*, while this never occurs in *C. albonigra* or in *C. chalciolepis*.

Carex blanda Dewey [charming, mild]. Plants densely cespitose; culms 14-53 cm tall, ascending, lax, or occasionally decumbent, rarely erect; leaf blades 1-10 mm wide; inflorescence composed of one terminal staminate spike and 3(4) lateral pistillate spikes, the staminate spike 9-20 mm long, sessile to pedunculate, the pistillate spikes 15-18 mm long, pedunculate, the proximal bract leaflike, the sheath more than 4 mm long; pistillate scales shorter than perigynia, hyaline except for green midvein that extends as a conspicuous awn; perigynia 2.5-3.8(4.1) mm long, 1.3-2.2 mm wide, 4-18 per spike, closely overlapping, more than 20 veined, obovoid to ellipsoid-obovoid, beak 0.1-0.6 mm long, abruptly bent; stigmas 3; achenes obovoid, 2.1-3.2 mm long, 0.8-1.8 mm wide; section *Laxiflorae*, Key C. ●Wide range of habitats, often weedy; 6400 ft; known from one location at Ghost Ranch (Rio Arriba Co.) in a moist habitat near stream. ♦Similar species: The short, conspicuously bent perigynium beak distinguishes *C. blanda* from all other NM *Carex* taxa (i.e., *C. aurea*, *C. conoidea*, *C. microdonta*) with similar inflorescence arrangement.



Carex bolanderi Olney [for Henry Nicholson Bolander (1831-1897), California State Botanist] [*Carex deweyana* Schwein. var. *bolanderi* (Olney) W. Boott]. Plants cespitose; culms 20-75(115) cm tall; leaf blades 0.6-3.5(5.9) mm wide, ligule of distal leaf (2)3.4-7.1 mm long, much longer than wide; inflorescence 1.5-4.5(10) cm long, usually with a tight cluster of spikes at the top and several more distant below, composed of 4-6(9) sessile, easily distinguished, gynecandrous or pistillate spikes, the proximal internode 5-15(20) mm long the spikes 8-12(25) mm long; pistillate scales about as long as the body of the perigynia but exposing the beaks, light colored to hyaline with a greenish midvein, with wide hyaline margins, the apices acuminate to short-awned; perigynia 2.8-3.8(5.2) mm long, 1.1-1.4 mm wide, 2.5-3.5(4) times longer than wide, ascending, thin and translucent, lanceolate, tapering to the beak, the beak 1.1-1.7(2.5) mm long, the apex bidentate, with teeth 0.1-0.6(1) mm long, stigmas 2; achenes 1.2-1.6(2.1) mm long, (0.9)1-1.2(1.3) mm wide; section *Deweyanae*, Key G. ●Wetlands and riparian areas, streamside and at springs in montane coniferous forest habitats; 6700-8,800 ft; known from north-central and southwest NM. ♦Similar species: Perigynia beaks greater than 1 mm long distinguish *Carex bolanderi* from *C. brunnescens*, *C. canescens*, and *C. praeceptorum*. *Carex lachenalii* occurs in alpine habitats and has dark spikes, while *C. bolanderi* occurs in conifer forests and has light-colored spikes.



Carex brevior (Dewey) Mackenzie ex Lunell [shorter] [*Carex festucacea* Schkuhr var. *brevior* (Dewey) Fernald, *Carex straminea* Willdenow var. *brevior* Dewey]. Plants densely cespitose; culms 20-70 cm tall, longer than the leaves; leaf blades 1-2.8 mm wide; inflorescence (1.3)2-3.5(6.5) cm long, elongate, composed of 3-6(10) gynecandrous spikes, the spikes 4-13 mm long, 3-7 mm wide, sessile, overlapping, erect, similar, distinguishable, clavate due to the high number of male flowers at the bases, proximal bract scale-like or setaceous-prolonged, shorter than the inflorescence; pistillate scales narrower and shorter than the perigynia, pale yellow brown with green midvein (that fades in time) and narrow hyaline margins; perigynia (2.6)3.4-4.6 mm long, (2)2.2-3 mm wide, less than 2 times as long as wide, green to tan, nerveless ventrally and sometimes nerved dorsally, broadly winged to the base, body of the perigynia nearly orbicular, planoconvex, the distance from perigynium beak tip to top of the achene 1.4-2.4 mm; stigmas 2; achenes 1.5-2.2 mm long; section *Ovales*, Key H. ●Wet meadows and swales, springs and seeps, streambanks and lakeshores; 5400-8200 ft; known from northern NM. ♦Similar species: Mature *Carex brevior* inflorescences are coarse textured, somewhat spiky, with clavate to nearly globose spikes and broad, nearly orbicular perigynia. Immature spikes can resemble those of *C. scoparia*, but even immature perigynia of *C. brevior* have broadly winged bodies, while those of *C. scoparia* are more than twice as long as wide. Also, mature *C. scoparia* spikes are fusiform (equally tapered at both ends), while those of *C. brevior* are often clavate due to the many male florets at the base of each spike, a character only shared with the much larger fruited *C. petasata*, which grows in dry areas.



Carex brevipes W. Boott ex B.D. Jackson [short-stalked] [*Carex deflexa* Hornemann var. *bootii* L.H. Bailey, *Carex globosa* F. Boott var. *brevipes* W. Boott ex Mackenzie, *Carex rossii* W. Boott var. *brevipes* (W. Boott ex B.D. Jacks.) Kükenthal]. Plants loosely cespitose; culms 5-17(31) cm tall, usually shorter to occasionally longer than the leaves; leaf blades 0.9-2.4(3.2) mm wide, the sheaths reddish brown, old sheaths forming a weakly fibrous base; inflorescence of two types, basal and cauline, the basal inflorescences composed of 1-2 pistillate spikes on a slender peduncle, the cauline inflorescences 1-4.3 cm long, composed of 1 terminal staminate spike, subtended by 1-4 lateral pistillate spikes, the staminate spike 5.1-7(12) mm long, the pistillate spikes 3-8 mm long, each with 1-5 perigynia, the proximal pistillate bract of the cauline inflorescence leaf-like, shorter to longer than the inflorescence; pistillate scales shorter than the perigynia; perigynia 2.3-3.4(4.2) mm long, 0.8-1.4 mm wide, ascending, yellow to gray green, with two marginal nerves, pubescent, obovoid to ellipsoid, suborbicular in cross-section, contracted to a narrow stipe-like base, abruptly contracted to the beak, the beak 0.5-1(1.5) mm long, often bent, acuminate, the margins ciliate-serrulate, bidentate, the teeth 0.1-0.5 mm long, stigmas 3; achenes (1.3)1.6-1.8 mm long, 0.9-1.2(1.4) mm wide, obovoid in outline, obtusely trigonous in cross-section; section *Acrocystis*, Key B. ●Alpine rock fields and tundra at or above timberline. 11,800-12,400 ft; known from a few locations in the Sangre de Cristo Mtns. ♦Similar species: *Carex brevipes* resembles a diminutive version of *C. rossii*, with a looser growth form. Its high elevation habitat overlaps with the habitat of *C. rossii*, but should prevent it from being confused with any of the other *Acrocystis* taxa, which are generally found at lower elevations.

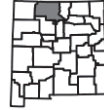


Carex brunnescens (Persoon) Poiret [brownish] [*Carex curta* Goodenough var. *brunnescens* Persoon]. Plants cespitose; culms 10-60 cm tall; leaf blades 0.7-2.5 mm wide; inflorescence 10-50 mm long, composed of 3-10 sessile, easily distinguished gynecandrous spikes, usually with a tight cluster of spikes at the top and several more distant below, proximal internodes 5-14 mm, the spikes (2)3-8 mm long, sub-globose to short-oblong, of 1-11 perigynia; pistillate scales shorter than the perigynia, white hyaline, often brown in the middle with a green midvein; perigynia 1.9-2.7 mm

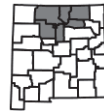


long, (0.7)0.9-1.2(1.5) mm wide, 1.6-2.5 times longer than wide, appressed-ascending to loosely spreading or reflexed when mature, green or brown, often dark brown in age, the dorsal suture usually extending the length of the beak and sometimes with a white hyaline flap, nerved on both sides with two prominent marginal nerves, smooth to papillose, biconvex, ovate to elliptic, widest at or near the middle, the apex tapering to a conspicuously serrulate beak 0.2-0.7 mm long; stigmas 2; achenes 1.3-1.5 mm long, 0.7-1.1 mm wide; section *Glareosae*, Key G. ●Boggy wetlands; 8400-8700 ft; known from Valles Caldera National Preserve in north-central NM. ♦Our plants belong to subsp. *brunnescens*. Similar species: Short, poorly defined perigynia beaks (up to 0.7 mm) of *Carex brunnescens* distinguish it from *C. bolanderi* and *C. deweyana*, which both have beaks 0.9 mm or longer. The light-colored, widely separated (though sometimes overlapping) proximal spikes of *C. brunnescens* separate it from *C. lachenalii* and *C. praeceptorum*, which both usually have dark-colored, crowded, strongly overlapping proximal spikes.

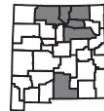
Carex buxbaumii Wahlenberg [for Johann Christian Buxbaum (1683-1730), German botanist]. Plants colonial from long, slender rhizomes; culms 25-45(75) cm tall, stiffly upright, shorter to longer than the leaves; leaf blades 1.5-3(4) mm wide, the sheaths reddish brown to dark brown, the sheath fronts light-colored, becoming ladder-fibrillose; inflorescence 1.5-4(5.5) cm long, elongate, composed of 1 terminal gynecandrous spike and 1-3(4) lateral pistillate spikes, the upper spikes overlapping, the lowest remote, the spikes all oblong-ovoid, the terminal spike (10)18-22(40) mm long, the lateral spikes 5-21 mm long, sessile to short pedunculate, the proximal bract shorter to longer than the inflorescence; pistillate scales usually much longer than the perigynia, lanceolate to ovate-lanceolate, brown to reddish-black with a pale center and raised midvein, tapering to awned apices 0.5-2(3.5) mm long; perigynia 2.5-3(4) mm long, 1.2-1.6(2) mm wide, ascending, pale green, elliptic to obovate, smooth to strongly nerved on the faces, strongly and densely papillose throughout, rounded to tapered at the top to a short beak, up to 0.2 mm long; stigmas 3; achenes trigonous, 1.5-2.2 mm long, 1.1-1.5 mm wide, nearly filling the body of the perigynia; section *Racemosae*, Key D. ●Wet meadows, fens and bogs; 10,300 ft; known from one location in the San Pedro Parks Wildemess (Rio Arriba Co.) ♦Similar species: *Carex buxbaumii* is distinctive; the combination of lanceolate to ovate-lanceolate pistillate scales with prominent awns, stiffly upright culms, ladder-fibrillose sheath fronts, rhizomatous habit, and wetland habitat distinguish it from the other species in Section *Racemosae*.



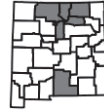
Carex canescens Linnaeus [whitish] SILVER SEDGE. Plants caespitose; culms 15-40(60) cm tall; leaf blades 1-3(4) mm wide; inflorescence 1.5-4.2(5) cm long, composed of 3-7(8) sessile, easily distinguished gynecandrous spikes, the proximal ones more separated than the distal spikes, proximal internode (2)3-14(16) mm long; spikes 3-14 mm long, mostly oblong, but occasionally subglobose, consisting of (2)5-23(30) perigynia; pistillate scales a little shorter and about the width of the perigynia, ovate, hyaline, sometimes tinged brown or green with a green or light-colored midvein; perigynia (1.6)1.8-2.4(2.7) mm long, (0.7)0.9-1.2(1.3) mm wide, (1.4)1.6-2.7 times longer than wide, appressed to spreading-ascending, usually pale green to yellowish-green, sometimes yellowish-brown when mature, the dorsal suture inconspicuous and not extending the length of the beak, nerved on both faces, papillose, elliptic-ovate, biconvex, widest at or near the middle, the apex tapered to an ill-defined, blunt beak, 0.1-0.5(0.6) mm long; stigmas 2; achenes 1-1.5 mm long, 0.8-1(1.2) mm wide; section *Glareosae*, Key G. ●Bogs, fens, lakeshores, streamsides, and other wetlands; 8000-12,000 ft; common in northern NM. ♦Our plants belong to subsp. *canescens*. Similar species: The short, poorly defined beak of *Carex canescens* distinguishes it from *C. bolanderi* and *C. deweyana* (with beaks at least 0.9 mm long). The light-colored and widely separated (though sometimes overlapping) proximal spikes of *C. canescens* separate it from *C. lachenalii* and *C. praeceptorum*, which both have dark-colored, crowded, strongly overlapping proximal spikes.



Carex capillaris Linnaeus [hair-like] [*Carex capillaris* Linnaeus var. *elongata* Olney, *Carex capillaris* Linnaeus var. *major* Drejer]. Plants caespitose, culms 5-35(60) cm tall; leaf blades 0.7-3 mm wide; inflorescence 3-19 cm long, composed of one terminal staminate spike and 2-4 lateral pistillate spikes, the staminate spike (2)4-10 mm long, erect or flexuous, longer than, even with, or occasionally shorter than the upper lateral spikes, the pistillate spikes (4)5-15(20) mm long, the proximal ones pendent on long flexuous peduncles, the proximal bract usually shorter than the inflorescence, the sheath 4+ mm long; pistillate scales shorter and narrower to wider than the perigynia, pale to medium brown with hyaline margins; perigynia (2.3)2.5-3(3.5) mm long, (0.6)0.7-1(1.2) mm wide, pale green to light or dark brown and sometimes shiny, with 2 prominent nerves, glabrous, ellipsoid to lanceoloid-ellipsoid, stipitate, apex acute, beak 0.3-1.1 mm long, prominent, smooth or serrulate; stigmas 3; achenes (1.2)1.3-1.7 mm long, 0.6-0.9(1) mm wide; section *Chlorostachyae*, Key C. ●Springs, streamsides, fens, bogs and wet meadows; 8500-12,500 ft; found in conifer forest and alpine sites in the Sangre de Cristo and Sacramento mts. ♦Similar species: *Carex capillaris* is easily distinguished from other *Carex* taxa with pendent lateral spikes (ie. *C. hystericina*, *C. luzulina*, *C. magellanica*, *C. sprengelii*), per characters in the key. It is more widespread than any of these similar taxa.



Carex chalciolepis Holm [with copper-colored scales] HOLM'S SEDGE [*Carex atrata* of NM reports, *Carex atrata* Linnaeus var. *chalciolepis* (Holm) Kukenthal, *Carex heteroneura* W. Boott var. *chalciolepis* (Holm) F.J. Hermann]. Plants caespitose, from short rhizomes; culms 10-60(75) cm tall, shorter than to often much longer than the leaves, often drooping with age; leaf blades (0.8)1.2-6 mm wide, the sheaths tan to purplish-red; inflorescence 1.5-5.1 cm long, compact, often nodding when mature, composed of (1)2-4(5) overlapping but distinct, similar-looking spikes, the proximal spike usually slightly remote, the terminal spike 1.2-2.4 mm long, ovoid, gynecandrous; lateral spikes (7)10-26 mm long, oblong, pistillate, the lowest rarely gynecandrous, short pedunculate; proximal bract shorter than or equal to the inflorescence; pistillate scales up to 1 mm or more longer than the perigynia, lanceolate to ovate-lanceolate, dark reddish brown to purplish black throughout or with a slightly lighter midvein, sometimes with hyaline margins or nearly entirely hyaline, the apices acute; perigynia 2.9-4.8 mm long, 1.5-2.4 mm wide, ascending, dark red-brown to purplish black, sometimes tan, or with marginal portions bright green or tan, or entirely tan, nerveless, distally papillose, broadly ovate, flattened but distended by achene, abruptly contracted to the beak, the beak 0.2-0.4(0.5) mm long; stigmas 3; achenes trigonous, (1.5)1.8-2.1(2.5) mm long, 0.8-1(1.4) mm wide, filling proximal half or less of the perigynia; section *Racemosae*, Key D. ●Subalpine and alpine meadows, rock fields; 10,300-13,000 ft; found only in the northern Sangre de Cristo mountain range and on Sierra Blanca Peak (Lincoln Co.). ♦Similar species: See discussion under *Carex albonigra* and *C. bella*.



Carex conoidea Willdenow [cone-like]. Plants caespitose from short rhizomes; culms (2)8-35(75) cm tall; leaf blades 1.8-3.2(5.6) mm wide; inflorescence 3-8(10) cm long, composed of one terminal staminate spike and 1-3 lateral pistillate spikes, occasionally also having spikes on long filiform peduncles from basal or lower leaf axils, the staminate spike (5)8-26(30) mm long, the pistillate spikes 5-25(29) mm long, with 5-36(86) perigynia, sessile to pedunculate, the lateral peduncles scaberulous, the proximal bract leaf-like, shorter than to exceeding the terminal spike, the sheath 4+



mm long; pistillate scales shorter to slightly longer than the perigynia, silvery to reddish brown with a green midrib, the apices frequently awned, the awn (0.1)0.7-2.2(2.7) mm long on the lower scales and often scabrous; perigynia 2.4-3.6(4.3) mm long, 1.2-1.8 mm wide, ascending to spreading, spirally imbricate, yellowish or brownish green, with 16-20(25) impressed nerves, oblong-ovoid to oblong-obovoid, the beak up to 0.2 mm long; stigmas 3; achenes 1.8-2.6 mm long, (1)1.2-1.4 mm wide; section *Griseae*, Key C. ●Moist meadows, lakeshores and streambanks; 8600-8800 ft; known from two northern locations: Sangre de Cristo mountains and Valles Caldera. ♦Similar species: Perigynia with impressed veins and scaberulous peduncles distinguish *C. conoidea* from other *Carex* taxa (i.e., *C. aurea*, *C. blanda*, *C. microdonta*) with similar inflorescence architecture and perigynium shape.

Carex deweyana Schweinitz [for Chester Dewey (1784-1867), eminent American caricologist]. Plants caespitose; culms (9)14-52(89) cm tall; leaf blades 1.1-3.1(4.2) mm wide, the ligule of distal leaf 0.7-2(2.7) mm long, about as long as wide; inflorescence (12)20-43(56) mm long, composed of a tight cluster of spikes at the top and several more distant below, easily distinguished, proximal internode 7-26(34) mm long, the spikes 2-4(5), sessile, mostly gynecandrous or pistillate, terminal spike 7-14 mm long, lateral spikes 5-11 mm long; pistillate scales ovate to oblong-ovate, hyaline with green midrib, the apices acuminate to short awned; perigynia (3)3.6-4.6 mm long, 1.1-1.5(1.7) mm wide, 2.5-3.8 times longer than wide, ascending to erect, pale, thin, translucent, narrowly ovate to narrowly elliptic, tapering to the prominent beak, the beak serrulate, 0.9-1.8 mm long, apex bidentate with teeth 0.1-0.5(0.7) mm long; stigmas 2; achenes 1.7-2.1 mm long, 1-1.2 mm wide; section *Deweyanae*, Key G. ●Moist conifer forest or along shaded streambanks in montane conifer forest: 6500-9100 ft; known from northern, south central, and southwest NM. ♦Our plants belong to var. *deweyana*. Similar species: The long perigynium beak (at least 0.9 mm long) of *Carex deweyana* distinguishes it from *C. brunnescens*, *C. canescens*, and *C. praeceptorum*, which all have shorter beaks. *Carex lachenalii* occurs in alpine habitats and has dark spikes, while *C. deweyana* occurs in conifer forests and has light-colored spikes.



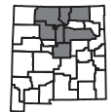
Carex diandra Schrank [with 2 stamens (a misnomer)]. Plants densely caespitose from fibrillose rhizomes; culms 20-100 cm tall, usually longer than the leaves; widest leaf blades 1-3.1 mm wide, the sheath fronts hyaline, red-spotted; inflorescence 1.5-5.5 cm long, dense to elongate, typically composed of several upper spikes sessile on the rachis and (0)1-7 lower multiple-spiked branches, the branches with 2-10 spikes, internode between lowest branches 1.5-12 mm long, the spikes 3-9 mm long, 1.5-4 mm wide, erect to spreading, androgynous, few-flowered, the proximal bract setaceous, shorter than the inflorescence; pistillate scales similar in size to the perigynia, straw-colored to brownish with a pale midvein, the margins hyaline; perigynia (2)2.3-2.8(2.9) mm long, 1-1.4 mm wide, spreading to ascending, green to dark chestnut brown to black at maturity, with two prominent raised ridges on either side of a dorsal central groove, otherwise nerveless, shiny, with a distinct hyaline flap at the top of the dorsal suture, deltoid-ovoid, unequally biconvex to round in cross-section, beak 1-1.3 mm long, usually light-colored contrasting with the dark bodies; anthers 1.2-1.6 mm long; stigmas 2; achenes 1-1.4 mm long, 0.8-1.4 mm wide; section *Heleoglochis*, Key F. ●Wetlands, lake margins, floating logs, sometimes forming floating mats in deeper water; 8000-10,400 ft; in NM, known only from Lagunitas Lakes (Rio Arriba Co.). ♦Similar species: *Carex diandra* can be confused with *C. simulata*, since they share high elevation, inundated habitats, inflorescence architecture and perigynia shape. *Carex diandra* perigynia have longer beaks that contrast in color with the body, whereas *C. simulata* perigynia beaks are shorter and of the same color as the body. *Carex diandra* is caespitose, while *C. simulata* forms large rhizomatous stands. *Carex diandra* occurs in high elevation wetlands in northern NM, while *C. agrostoides* occurs at low elevation springs in southwest NM.



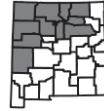
Carex disperma Dewey [2-seeded] [*Carex tenella* Schkuhr]. Plants fine, loosely caespitose or long rhizomatous, the rhizomes brown, scaly, to 1.5 mm thick; culms 6-60 cm tall, 0.2-0.6 mm thick, usually longer than the leaves, weak, arched or nodding; leaf blades 0.7-1.8(2.5) mm wide, the sheaths pale brown; inflorescence 1.3-3.1 cm long, elongate, composed of 2-4(7) sessile, globose, androgynous spikes, the lowermost spikes well-separated, the uppermost more or less contiguous, the spikes 3-5 mm long, 2-4 mm wide, often seemingly pistillate as the staminate flowers are hard to see, each with 1-4 perigynia, the staminate flowers 1-3, forming an inconspicuous cone at the top of the spike, the proximal bract 0.4-1.1 cm long, shorter than the inflorescence, sheathless; pistillate scales shorter than to as long as the perigynia, hyaline with a prominent pale midvein; perigynia 2.4-3.6 mm long, 1-1.7 mm wide, spreading to ascending, pale green maturing to olive-green, becoming shiny dark brown, both faces many nerved, broadly stipitate, ellipsoid to obovoid, unequally biconvex in cross-section, the beak 0.2-0.5 mm long; stigmas 2; achenes (1)1.5-1.75(2) mm long; section *Dispermae*, Key F. ●Wetlands, shady seeps and streambanks, wet meadows, mossy and shady coniferous woods; 7400-11,600 ft; northern NM and the Mogollon Mountains in southwest NM. ♦Similar species: *Carex disperma* rhizomes are more conspicuous than the rhizomes of *C. radiata*, which in contrast to *C. disperma*, has smaller, less plump, more widely spreading perigynia that lack veins and which have serrulate beaks.



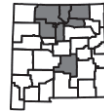
Carex douglasii Boott [for David Douglas (1798-1834), prominent botanical collector] DOUGLAS'S SEDGE. Plants forming dioecious (occasionally monoecious) colonies, culms arising singly or several from slender rhizomes, the rhizomes 0.8-1.4 thick, brown; culms 4-25 cm tall, longer than the leaves, smooth below the inflorescence; leaf blades up to 3 mm wide, the sheaths pale to dark brown; inflorescence dense and head-like, often unisexual, but often having some opposite gender flowers (or spikes) mixed in, the lower branch(es) usually with multiple sessile spikes, the staminate inflorescences lanceoloid, 1.4-4 cm long, 0.7-2 cm wide, the staminate spikes 5-12 mm long, 1.8-3.2 mm wide, the staminate basal inflorescence bracts 8-10 mm long, broad, basally hyaline margined, the pistillate inflorescence 15-33 mm long, 8-20 mm wide, subglobose to ovoid to fusiform, the pistillate spikes 6-15 mm long, 1-5 mm wide, the pistillate basal inflorescence bracts scarious-setaceous, 6-17(39) mm long, shorter or longer than the inflorescence; pistillate scales longer and wider than the perigynia, 4-8 mm long; perigynia (3)3.5-4.2(4.8) mm long, 1.2-2.1 mm wide, ascending, straw-colored to brown, nerveless, round tapering to a stipitate base, narrowly elliptic, elliptic-ovate, obovate, or ovate-lanceolate, planoconvex in cross-section, the beak 1.6-1.9 mm long; anthers 2.4-4 mm long; stigmas 2; achenes (1.4)1.6-2 mm long; section *Divisae*, Key F. ●Seasonally flooded depressions, grasslands to forests; 6600-10,000 ft; northern NM. ♦Similar species: *Carex douglasii* is often confused with *C. praegracilis* and *C. duriuscula*, two other rhizomatous species that tolerate dry, alkaline sites. The pistillate inflorescences of *C. douglasii* are larger and more robust than either of these, with stigmas that are long and form a tangled mat that persists through maturity. *Carex praegracilis* is often dioecious (like *C. douglasii*), but it has a narrower, more elongate inflorescence, darker culm bases and stouter, darker rhizomes. *Carex duriuscula* is usually androgynous, and both the inflorescence and perigynia are smaller than in *C. douglasii*. *Carex siccata* is monoecious, with narrower inflorescences, culms which are scabrous below the inflorescences and is most often found in forests, while *C. douglasii* has culms that are smooth below the inflorescence and is most often found in open sites.



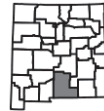
Carex duriuscula C.A. Meyer [somewhat hard] needleleaf sedge [*Carex eleocharis* Bailey, *Carex stenophylla* auctores, *Carex stenophylla* Wahlenberg var. *eleocharis* (Bailey) Breitung]. Plants rhizomatous, the shoots arising 2 to several per cluster, the rhizomes 0.6-1.4 mm thick, brown, covered with sheaths that disarticulate into fibers with age; culms 6-30 cm tall, usually longer than the leaves, bluntly to sharply trigonous (though smooth) below the inflorescence; leaf blades 0.3-1.5(2.3) mm wide, tapering to a long, slender tip, the sheaths light to dark brown, disarticulating into fibers; inflorescence 0.7-2 cm long, 2-8 mm wide, dense, composed of 3-8 sessile, androgynous spikes or the plants rarely unisexual in a clone, often infected with smut, then producing perigynia that are globose, smooth, and gray, the spikes 4-9 mm long, 3-5 mm wide, ovoid, indistinguishable, the; proximal bracts 4-14 mm long, shorter than the inflorescence; pistillate scales as long or longer than the perigynia, 2.4-4.1 mm long, straw-colored to dark reddish brown with hyaline margins and pale midvein, the apices acuminate or with a short protruding midvein; perigynia 2.8-3.8 mm long, 1.2-1.6 mm wide, greenish to dark reddish brown, black at maturity, shiny, often with stiff short hairs on the upper portion of the dorsal face, elliptic-ovate to nearly orbicular, thickly planoconvex in cross-section, beak 0.3-0.8 mm long; stigmas 2; anthers 2.3-2.9 mm long; achenes 1.5-2.1 mm long; section *Divisae*, Key F. ●Dry prairies, grasslands, and openings in woodlands and forests; 6300-11,500 ft; northern and western NM. ◆Similar species: see discussion under *C. douglasii*. *Carex duriuscula* only occurs in dry locations in contrast to *C. praegracilis* which occurs in moist to wet habitats. It has finer rhizomes than *C. praegracilis* and has smooth culms below the always unbranched inflorescence with spikes sessile on the main axis versus roughened culms below the main axis of the often-branched inflorescence of *C. praegracilis*. *Carex duriuscula* could be confused with *C. siccata*. However, *C. siccata* usually has a roughened culm below the inflorescence, a longer and narrower inflorescence, with longer perigynia that are mostly in the upper and lower spikes and male flowers that occur predominantly in the middle spikes.



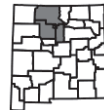
Carex ebenea Rydberg [ebony-colored] EBONY SEDGE. Plants densely caespitose; culms 10-50 cm tall, longer than the leaves; leaf blades 2-3.5 mm wide; inflorescence 1-2.5 cm long, dense, tapered at base, composed of 5-12 erect to spreading, sessile, gynecandrous, similar spikes, the spikes 9-15 mm long, 4.5-6.5 mm wide, ovoid, some strongly overlapping and indistinguishable, the proximal internode usually 1-3 mm, rarely up to 5 mm, the proximal bract lacking, scale-like, or bristle-like; pistillate scales narrower and shorter than the perigynia, dark brown, sometimes with a green or gold midvein (that fades in time) and narrow hyaline margins; perigynia (3.5)5.3-7.1 mm long, 1.1-1.5(1.7) mm wide, green to coppery or golden brown, usually nerved on both sides, broadly winged to the base, lanceolate to ovate, planoconvex, long-tapering to the terete beak, often serrulate to the tips, distance from perigynium beak tip to top of the achene 2.9-4 mm; stigmas 2; achenes 1.5-1.9 mm long; section *Ovales*, Key H. ●Subalpine and alpine meadows, openings in conifer forests, edges of wetlands and lakes, talus; 9000-13,300 ft; known from northern NM and the slopes of Sierra Blanca Peak (Otero Co.). ◆Similar species: Sometimes *Carex microptera* has narrow perigynia, but they are not as long as those of *C. ebenea*. Also, both *C. microptera* and *C. macloviana* grow in wetter places than *C. ebenea*. *Carex haydeniana* can also grow in dry alpine places, but it has shorter perigynia than *C. ebenea*.



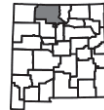
Carex eburnea Boott [ivory-colored]. Plants caespitose; culms (12)15-25(30) cm tall; leaf blades 0.2-0.5(1) mm wide, wiry, involute; inflorescence (1.5)2-2.5(5.5) cm long, composed of one terminal staminate spike and 2-4 lateral pistillate spikes, one or more of the long-pedunculate pistillate spikes overtopping the short-peduncled central staminate spike, the staminate spike 3-10 mm long, the pistillate spikes 3-7 mm long, the proximal bract scale-like, without blade; pistillate scales shorter than or equal to the perigynia, white hyaline with green or brown midrib; perigynia 1.5-2.2 mm long, 0.7-1.1 mm wide, light green becoming dark brown, beak 0.2-0.4(0.5) mm long; stigmas 3; achenes 1.5 mm long, 0.6-0.7 mm wide; section *Albae*, Key C. ●Wet, spring-fed meadow in conifer forest; 8800-8900 ft; known only from one location in Brown Canyon in the Sacramento Mtns (Otero Co.). ◆Similar species: The very thin, wiry leaves and the lateral pistillate spikes overtopping the shorter central staminate spike and the very short perigynia distinguish *C. eburnea* from all other *Carex* in Key C. Populations of *Carex mckittrickensis*, a slightly more robust close relative known from just over the Texas border in the Guadalupe Mtns. are far closer geographically than any other records of *C. eburnea* in the western states, but our single specimen fits better in *C. eburnea*. E.L. Gillespie (2005) makes a convincing case that *C. mckittrickensis* does not merit distinction as a species and is no more morphologically divergent from *C. eburnea* than other regional populations.



Carex echinata Murray [prickly] [*Carex angustior* Mackenzie]. Plants densely caespitose; culms 9-35(60) cm tall, equal to or taller, sometimes shorter than the leaves, slender, wiry; leaf blades (0.4)1.2-2(2.5) mm wide; inflorescence 1-3 cm long, composed of 2-6 sessile, gynecandrous, easily distinguished spikes, the proximal internode 2-7(8) mm long, the terminal spike (5)7-12 mm long, clavate with a prominent narrow staminate basal portion less than to more than half the length of the spike, the lateral spikes (3)4-8 mm long, sometimes wholly pistillate; pistillate scales shorter than the perigynia, ovate, inconspicuous, mostly hyaline, brown in the middle; perigynia (2.6)2.8-3.5 mm long, 0.9-1.5 mm wide, (1.9)2.1-2.9 times as long as wide, becoming spreading to reflexed, giving the short lateral spikes a star-like appearance, green to dark brown when mature, planoconvex, broadest slightly above the base, the base plump, somewhat swollen with spongy tissue, serrulate throughout the prominent beak, beak 0.9-1.5 mm long, tip nearly entire to bidentate up to 0.3 mm; stigmas 2; achenes 1.3-1.7 mm long, 0.9-1.1 mm wide; section *Stellulatae*, Key G. ●Along subalpine streams, in fens and wet meadows; 9000-10,800 ft; known from north-central NM. ◆Our plants belong to subsp. *echinata*. Similar species: The gynecandrous, clavate terminal spikes with narrow prominent staminate portions of *Carex echinata* distinguish it from *C. disperma* and *C. radiata*, both of which have androgynous terminal spikes and widely separated, ovoid to round, short sessile spikes that lack the starburst appearance of *C. echinata*.



Carex egglestonii Mackenzie [for Willard Webster Eggleston, 1863-1935, Vermont botanist]. Plants densely caespitose; culms 30-80 cm tall, longer than the leaves; leaf blades (1.5)2.7-4(6) mm wide; inflorescence 1.5-3.1 cm long, compact, of 2-5(6) gynecandrous spikes, the spikes 8-15 mm long, broadly ovoid, similar, sessile, the proximal internode (2)4-5 mm long, the proximal bract bristle-like to leaf-like, usually shorter than the inflorescence; pistillate scales narrower and shorter than the perigynia, ovate or ovate-lanceolate, gold to brown, sometimes with a green or gold midvein, the hyaline margins 0.2-0.5 mm wide, the apices acute to acuminate; perigynia 5.2-5.9(7.2) mm long, (2.2)3-3.5(3.8) mm wide, 1.8-2.3 times as long as wide, green to gold, not nerved or sometimes up to 6 nerved dorsally, broadly ovate, usually flat except over the achene, the margin flat, 0.5-1.1 mm wide, the beak winged to tip, distance from perigynium beak tip to top of the achene (2.2)3.2-3.6(4.3) mm; stigmas 2; achenes 1.5-2.4 mm long, 1.2-1.7 mm wide; section *Ovales*, Key H. ●Subalpine and alpine meadows, steep grassy slopes, talus; 9700-9800 ft; known from San Pedro Parks Wilderness, Rio Arriba Co. in northern NM. ◆Similar species: *Carex egglestonii* will most often be confused with *C. wootonii* and *C. ebenea*, which are both contrasted in couplets 18 and 24 in Key H.



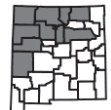
Carex elynoides Holm [resembling *Elyna*] [*Carex filifolia* Nuttall var. *miser* Bailey]. Plants densely caespitose, forming irregular mats; culms 4-12(20) cm tall, mostly shorter to about as long or longer than the leaves, mostly smooth, bases crowded with old straw to brown sheaths; leaf blades 0.2-0.6(0.8) mm wide near base, wiry, involute-cylindric; inflorescence a single terminal androgynous spike 7-17(19) mm long, the staminate portion mostly longer than or equal to the pistillate portion, with (1)3-12 pistillate flowers, inflorescence bract lacking; pistillate scales wider and longer than the perigynia, broadly ovate or obovate, light to dark brown with broad hyaline margins, with a pale midvein, the apices obtuse; perigynia 2-3.5 mm long, 1-2 mm wide, ascending, straw to yellowish-green or cream-colored with base of beak and uppermost part of perigynia brown to dark brown, nerveless, body glabrous to sparsely hirsute and/or ciliate on the upper portion near the base of the beak, ovoid to obovoid, abruptly or gradually contracted to a cylindrical hyaline beak (0.2)0.4 -1 mm long; stigmas 3; achenes trigonous, 1.8-2.6(3) mm long, 1.1-1.3(1.5) mm wide; section *Filifoliae*, Key A. ●Alpine rock fields and meadows above timberline, 11,100-13,200 ft; known from the Sangre de Cristo Mtns. and on Sierra Blanca Peak. ♦Similar species: *Carex elynoides* can be confused with both *C. filifolia* and *C. oreocharis*, its two relatives in Section *Filifoliae*. For the most part, these three species are separated by both habitat and elevation per the key, with only minimal overlap. In general, *Carex elynoides* is a smaller plant than the other two, though depauperate specimens of both can be found in areas of habitat stress. *Carex elynoides* is also easily confused with *Kobresia myosuroides*, which shares the identical habit and habitat. However, *Kobresia myosuroides* spikes appear to have a mixture of staminate and pistillate flowers for most of the length (see description for more precise morphology) while *Carex elynoides* spikes have a basal pistillate portion and a distinctive staminate upper portion, evident even when immature. Also, the perigynia of *Kobresia* are open on the side, contrasting with the fully enclosed perigynia of *Carex*.



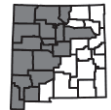
Carex emoryi Dewey [for William Hemsley Emory, 1811-1887, supervisor of early Mexican boundary survey] Emory's sedge [*Carex stricta* Lamarck var. *emoryi* Bailey]. Plants loosely to densely caespitose in tufts of several culms, with extensive rhizomes 1.5-3.5 mm thick; culms 12-120 cm tall, shorter or longer than the leaves; leaf blades 2-4(6) mm wide, usually with a U-shaped to nearly horizontal ligule much wider than long (rarely up to 4 times longer than wide), free portion of the ligule up to 0.5 mm long, the sheaths straw to brown, not ladder-fibrillose; inflorescence (7)10-21 cm long, composed of 2-3 terminal staminate spikes and 3-5 remote lateral pistillate spikes, these (1)2-6 cm long, with peduncle up to 1 cm long, the proximal bract leaf-like, shorter to longer than the inflorescence; pistillate scales shorter than to longer and narrower than the perigynia, oblong, margins light brown surrounding a broad pale mid-portion, apex lacking awns, usually spring flowering with perigynia and pistillate scale deciduous by mid-summer; perigynia 1.7-3.2 mm long, 1-2.1 mm wide, ascending to spreading, green to straw, papillose, veinless or up to 5 veined on each face, ovate to elliptic, beak 0.1-0.4 mm long, entire; stigmas 2; achenes 1.5 mm long; section *Phacocystis*, Key E. ●Banks of slow-moving streams, and floodplain meadows; northern NM and south along the Rio Grande; *Carex emoryi* is the dominant sedge lining the Rio Grande and similar large streams and associated drains and ditches at lower elevations; 3400-8800 ft. ♦Similar species: *Carex emoryi* can be confused with other rhizomatous wetland sedges, but *C. emoryi* can be identified by the pistillate scales with wide pale mid-portion and light-colored spikes, its rhizomatous and spring flowering habit, and its propensity to occur on the edges of streams at relatively low elevations. Rhizomatous wetland sedges with pistillate spikes stripped of scales and perigynia in stream environments below 7000 ft are typically *C. emoryi*, except in the Gila region, where such plants are likely to be *C. senta*. *Carex senta* has dark pistillate scales and shiny reddish-brown sheaths that become ladder fibrillose, both of which are lacking in *C. emoryi*. *Carex aquatilis* has dark pistillate scales with narrow (sometimes wide) mid-veins and lacks red spots on the lower sheath fronts, while *C. emoryi* has lighter scales with pale wide mid-portions and usually has red spots on the lower sheath fronts. *Carex kelloggii* is caespitose, usually has one staminate spike at the top of the inflorescence and perigynia which are abruptly and narrowly stipitate, while *C. emoryi* is rhizomatous, always has more than one staminate spike in the inflorescence and the perigynia are attenuate to broadly stipitate. *Carex nebrascensis* has awn-tipped pistillate scales and bidentate beaks, both of which are lacking in *C. emoryi*. *Carex scopulorum* does not occur in the low-riverine habitats where we find *C. emoryi*.



Carex filifolia Nuttall [with thread-like leaves] THREADLEAF SEDGE. Plants densely caespitose, forming tufts; culms 6-30 cm tall, mostly shorter than the leaves, mostly smooth, bases crowded with old sheaths; leaf blades (0.2)0.3-0.8 mm wide near base, wiry, involute-cylindric, the sheaths straw to yellow brown, sharply contrasting with the green leaves, ladder-fibrillose; inflorescence composed of a single terminal androgynous spike 15-26 mm long, the staminate portion mostly longer than the pistillate portion, with 2-5(7) pistillate flowers, inflorescence bract lacking; pistillate scales wider and mostly longer than the perigynia, broadly ovate to broadly obovate, reddish to yellowish brown with broad hyaline margins and a pale midvein, apex broadly rounded or acute; perigynia 3.1-5 mm long, 1.3-2.1(2.4) mm wide, appressed to ascending, white to light brown at base, nerveless to 2(3) nerved, pubescent at least on the upper half, obovoid to obpyramidal, abruptly or gradually contracted to a cylindrical hyaline beak (0.4)0.7-1 mm long; stigmas 3; achenes trigonous, 2.6-4.2 mm long, 1.5-1.9 mm wide; section *Filifoliae*, Key A. ●Desert scrub and open areas in pinyon-juniper woodland, on sandy soils and limestone, 5800-8300 ft; found in the northern third of the state. ♦Our plants belong to var. *filifolia*. Similar species: The single spike, filiform leaves, pubescence on the perigynia, caespitose habit, conspicuous yellowish-brown basal sheaths and its propensity to grow in pinyon-juniper woodland or other dry habitats in that elevation range (5900-8200 ft.) distinguish *Carex filifolia* from all other NM *Carex*.

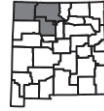


Carex geophila Mackenzie [earth-loving, low growing] WHITE MOUNTAIN SEDGE. Plants densely caespitose; culms 3-18(22) cm tall, shorter than the leaves; leaf blades 0.8-2.9 mm wide, the sheaths tan to brown, with old sheaths persistent, forming a dense fibrous base; inflorescence of two types, basal and cauline, the basal inflorescences composed of 1-2 pistillate spikes on short, stout peduncles, without bracts, the cauline inflorescences 1-2.5(6) cm long, composed of 1 terminal staminate spike, subtended by 1-3 lateral pistillate spikes, the staminate spike 5-12(16) mm long on a peduncle 0.9-6(8.8) mm long, the pistillate spikes 4-10 mm long, each with 1-6 perigynia, the proximal pistillate bract of the cauline inflorescences leaf-like, shorter, or rarely, longer than the inflorescence; pistillate scales shorter than to as long as the perigynia; perigynia 2.5-4.2 mm long, 1.5-2 mm wide, ascending, green to yellowish brown, with two thick marginal nerves and 0-15 lighter nerves on the faces, pubescent, obovoid, ellipsoid, or suborbicular in outline, suborbicular in cross-section, contracted to a narrow rounded base, abruptly contracted to beak, the beak (0.4)0.6-1 mm long, straight, rarely bent, acuminate, entire or shallowly bidentate, the teeth to 0.2 mm long; stigmas 3; achenes 1.6-2.8 mm long, 1.5-1.9 mm wide, globose to obovoid in outline, round to trigonous in cross section with convex sides; section *Acrocystis*, Key B. ●Mostly dry soil in ponderosa pine forests (and occasionally

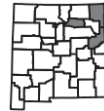


pinon-juniper woodlands) in the northern and western mountains. (5450)6000-8900 ft. ♦Similar species: Without mature perigynia, *Carex geophila* could easily be confused with *C. planostachys*, as they share both habitat and coarse tan to brown fibrous leaf bases. When mature perigynia are present, the lack of multiple conspicuous nerves in *C. geophila* distinguishes it from *C. planostachys*, in which many nerves are obvious on each face of the perigynia. *Carex geophila* has staminate spikes that appear wider, with a greater number of more imbricate scales than any of the other *Acrocystis* taxa with basal spikes.

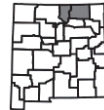
Carex geyeri Boott [Karl/Charles Andreas Geyer (1809-1853), German botanist] ELK SEDGE. Plants rhizomatous, colonial or loosely clumping, rhizomes short to elongate, thick, shallow, brown; culms 12-41(50) cm tall, slightly shorter to slightly longer than the leaves, stiffly erect; leaf blades (1.2)1.5-3.1(3.5) mm wide, flat, leathery; inflorescence a single terminal androgynous spike (10)17-30(35) mm long, the staminate portion much longer than the pistillate portion and separated from it by a segment of bare rachis, with 1-2(3) pistillate flowers, inflorescence bract lacking; pistillate scales longer than the perigynia, narrowly oblong, ovate or lanceolate, the apices acuminate, often awned, green to brown with a pale midvein and hyaline margin; perigynia (4.4)4.9-6.4(8.4) mm long, (1.8)2.2-2.8 mm wide, appressed-erect to ascending, greenish yellow to brown, glabrous, glossy, obovoid, tapering to a spongy narrow base, the apex rounded to a minute beak or beakless; stigmas 3; achenes trigonous, 3.5-5(6.2) mm long, (1.2)2.2-2.5(2.8) mm wide; section *Firmiculmes*, Key A. ●Dry montane forests and woodlands, open slopes and meadows, often in shade, 6300-10,200 ft; known from mountainous areas in northern NM. ♦Similar species: *Carex geyeri* and *C. pitophila* share the character of a single staminate spike above 1-3 somewhat remote perigynia. However, *C. pitophila* often has basal spikes, and each perigynium is a highly reduced spike. In addition, *C. pitophila* is a smaller, caespitose plant, with hairs and a beak on the perigynia, while *C. geyeri* forms large, loose, colonial stands, and has larger, shiny, glabrous, often beakless perigynia.



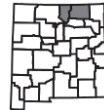
Carex gravida L.H. Bailey [pregnant or heavy] [*Carex gravida* Bailey var. *lunelliana* (Mackenzie) F.J. Hermann, *Carex lunelliana* Mackenzie]. Plants caespitose; culms 20-120 cm tall, widest leaf blades 3-6.5(8) mm wide, the sheaths conspicuously loose at the base, proximally often green-and-white striped with cross veins on the dorsal (back) surface, the ventral (front) surface hyaline, occasionally cross-rugulose with fragile, often torn summit, the ligules (1)2-5(7) mm long; inflorescence (1)2-5.5 cm long, 5-15(18) mm wide, composed of (5)8-19 androgynous spikes, proximal internodes up to 1.5 times as long as proximal spikes, the spikes usually sessile (but sometimes on inflorescence branches), spikes 4-13 mm long, composed of 5-15 perigynia; pistillate scale bodies shorter or slightly longer than length of perigynium, hyaline or brown with green center, the apices acuminate to short-awned; perigynia 3-5.5 mm long, 2-3 mm wide, spreading to ascending, cream to brown with green margins, the margins serrulate distally, lanceolate to ovate, the beak (0.6)0.8-1.3(1.6) mm long, the beak teeth 0.2-1 mm long; stigmas 2; achenes 1.8-2.2(2.5) mm long, (1.6)1.8-2.2 mm wide; section *Phaestoglochin*, Key F. ●Rocky sandy soil; 4900-6700 ft; uncommon in northeast NM near Clayton Lake State Park (Union Co.), perhaps other areas. ♦Similar species: The loose and thicker basal leaf sheath with green-and-white stripes on the back distinguish *Carex gravida* from both *C. occidentalis* and *C. vallicola*, in which the basal leaf sheaths are tight, narrower, and lack green and white stripes on the back. The inflorescences of *C. gravida* are much wider (usually greater than 1 cm) than those (usually less than 1 cm) of *C. occidentalis* and *C. vallicola*. *Carex vulpinoidea* more consistently has cross-rugulose leaf sheaths than *C. gravida*. *Carex vulpinoidea* also has prominent setaceous bracts that extend substantially beyond the spikes and perigynia just 1.3 mm wide which contrast with the 2-3 mm wide perigynia of *C. gravida*.



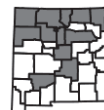
Carex gynocrates Wormskjold ex Drejer [ruled by the female, for the pistillate spikes] [*Carex dioica* Linnaeus subsp. *gynocrates* (Wormskjold ex Drejer) Hulten, *Carex dioica* Linnaeus var. *gynocrates* (Wormskjold ex Drejer) Ostenfeld]. Plants rhizomatous, with culms arising singly or several together, the rhizomes threadlike; culms 2-20 cm tall, longer than the leaves, slender, erect; leaf blades 0.2-0.9 mm wide, involute; inflorescence 4-16(19) mm long, composed of a single androgynous or unisexual spike, the staminate portion often shorter than or equal to the pistillate portion on androgynous inflorescences, with 3-13(15) pistillate flowers on inflorescences that are androgynous or pistillate, inflorescence bract lacking; pistillate scales shorter and wider than the perigynia, broadly ovate, light brown with lighter hyaline, translucent margins, apex acute to mucronate, lowest scale sometimes awned; perigynia 2.6-3.4 mm long, 1.1-1.7 mm wide, ascending when young, to spreading or occasionally somewhat deflexed at maturity, yellowish or green when young to dark brown and shiny when mature, finely to strongly nerved, ovoid, oblong, or plumply elliptic, biconvex, beak 0.2-0.9 mm long; stigmas 2; achenes 1.2-1.7 mm long, 1-1.2 mm wide, biconvex; section *Physoglochin*, Key A. ●Mossy, peaty bogs in coniferous forests, or on gravelly streambanks, 10,300-11,100 ft; found in the northern Sangre de Cristo Mtns in NM. ♦Similar species: *Carex gynocrates* is one of 4 single-spike sedges that occur in high elevation wetlands in NM. The other 3, *C. leptalea*, *C. microglochin*, and *C. micropoda*, have 3 stigmas, compared to 2 for *C. gynocrates*. The perigynia of all four are sufficiently distinct that they should not be easily confused.



Carex haydeniana Olney [for Ferdinand Vandever Hayden (1829-1887), prominent American geologist] [*Carex macloviana* d'Urville subsp. *haydeniana* (Olney) Roy L. Taylor & MacBryde]. Plants densely caespitose; culms 4-25(40) cm tall, equal to or longer than the leaves, often flexuous; leaf blades 1-2.5 mm wide; inflorescence 1-2 cm long, compact, tapered, the base truncate or retuse, composed of 5-7(9) erect to spreading, gynecandrous, mostly indistinguishable spikes, the spikes 6.5-10 mm long, 4.5-8 mm wide, broadly ovoid, sessile, similar; the proximal bract scale-like, sometimes broad at the base, usually shorter than the inflorescence; pistillate scales narrower and shorter than the perigynia, reddish, coppery to dark brown, sometimes with a whitish or pale gold midvein; perigynia 4-5 mm long, (1.2)1.4-2.2 mm wide, straw to brown, often with green wings, often nerved on the dorsal side, sometimes nerved ventrally, lance-ovate to broadly ovate, flat except over the achene, broadly wing-margined to the broad round base, abruptly acuminate to the terete beak, distance from perigynium beak tip to top of the achene (2.3)2.6-3.8 mm; stigmas 2; achenes (1.2)1.4-1.8 mm long; section *Ovales*, Key H. ●Rocky or gravelly alpine slopes and clearings; 11,800-12,300 ft; known from near the CO border in the Sangre de Cristo Mtns. ♦Similar species: *Carex microptera* is usually much taller and usually grows in wetter areas, and has perigynia that are not as wide, tapering more gradually to the beaks. The culms of *C. haydeniana* are also frequently more flexuous than those of *C. microptera*. *Carex macloviana* has perigynia dorsal sutures and beak tips white hyaline, while those of *C. haydeniana* are not white hyaline.



Carex heliophila Mackenzie [sun-loving] SUN SEDGE [*Carex inops* L.H. Bailey subsp. *heliophila* (Mackenzie) Crins, *Carex pensylvanica* Lamark var. *digyna* Boeckeler, *Carex pensylvanica* Lamark subsp. *heliophila* (Mackenzie) W.A. Weber]. Plants in tufts on long rhizomes; culms 13-35 cm tall, shorter to longer than the leaves, scabrous distally; leaf blades (0.7)1.1-2.8 mm wide, the sheaths purplish-red and fibrous; inflorescence cauline only, 1.5-3.5 cm long, composed of a terminal staminate or occasionally androgynous spike and 1-2(3) lateral pistillate spikes, the staminate spike (8)11-19 mm long,

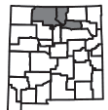


on a peduncle 1-9(14) mm long, the pistillate spikes 5-11 mm long, each with 1-10(15) perigynia, globose to ovoid, the proximal bract 8-21(33) mm long, shorter than the inflorescence; pistillate scales shorter to longer than the perigynia, ovate, reddish brown to pale brown with a lighter or greenish midstripe and hyaline margins, the apices acute to acuminate to short-awned; perigynia 2.8-4(4.9) mm long, 1.2-2.2 mm wide, erect to ascending to spreading, pale green to brown with two prominent marginal nerves, short-pubescent, obovoid to ovoid, nearly orbicular in cross section when fully mature, contracted below to a stipitate base, abruptly contracted to the beak, the beak (0.4)0.5-1.3(2.8) mm long, straight to bent, the margin ciliate-serrulate or not, deeply bidentate, with teeth 0.1-0.8(2.1) mm long; stigmas 3; achenes 1.6-2.5 mm long, 1.1-1.8 mm wide, obtusely trigonous to nearly orbicular in cross-section; section *Acrocystis*, Key B. ●Mixed conifer and ponderosa pine forests, juniper woodlands and montane grasslands in north-central and northeastern NM. 6000-10,500 feet. ♦Similar species: *Carex heliophila* lacks a basal inflorescence, which distinguishes it from six other *Carex* taxa with pubescent perigynia which also have basal spikes (*C. brevipes*, *C. geophila*, *C. pityophila*, *C. planostachys*, *C. rossii*, *C. aff. rossii* sp. nov.). However, hybrid specimens are known, which can have basal spikes on long thin peduncles. These hybrid plants otherwise resemble *Carex heliophila*, with its stiff upright inflorescence, large staminate spikes, and robust habit, though they tend to be sterile. *C. heliophila* has only two prominent marginal nerves on the perigynia, has darker staminate and pistillate scales, and is found mostly in the central to northern part of the state, while *C. leucodonta* has numerous fine nerves between the two prominent nerves, very pale scales, and is known from only one record in the southwestern mountains.

Carex hystericina Muhlenberg ex Willdenow [porcupine-like, a misspelling of *hystericina*] BOTTLEBRUSH SEDGE. Plants densely clumping from short rhizomes; culms (15)20-85(100) cm tall, shorter to longer than the leaves; leaf blades (1.4)2.5-8.5 mm wide, septate nodulose, the sheaths pale to reddish, ladder-fibrillose, old leaves and sheaths often present, brown; inflorescence 5-25(30) cm long, composed of 1 terminal staminate spike (rarely gynecandrous or mixed) and 2-4(6), lateral pistillate spikes, the staminate spike (1.5)2-3.5(4) mm long, the pistillate spikes 1-3.5(6) cm long, 2.4 mm wide, erect to spreading on flexuous, filiform peduncles, the proximal bract (4)13-37 cm long, longer than the inflorescence; pistillate scales much narrower and shorter than the perigynia, inconspicuous, abruptly narrowed to scabrous awns 1.2-6 mm long, the awns often longer than the scale bodies; perigynia 4-7.3 mm long, (0.8)1.2-2.3 mm wide, strongly nerved, ovoid to lanceoloid to ellipsoid, inflated, tapering to a prominent slender beak 1.5-2.7(3.5) mm long, beak bidentate with erect to slightly spreading teeth, the teeth (0.2)0.3-0.7(0.9) mm long; stigmas 3; achenes 1.3-2.5 mm long, 1-1.2 mm wide; section *Vesicariae*, Key C. ●Pond margins, springs and seeps, streams and stream banks; 3900-7300 ft; widely scattered in NM. ♦Similar species: *Carex sprengelii* also has spikes on filiform, flexuous peduncles and perigynia with very long beaks, but *C. sprengelii* perigynia have only two prominent nerves while those of *C. hystericina* have numerous prominent nerves. *Carex hystericina* lacks the dense mass of fibrous "horse hair" found at the base of *C. sprengelii* culms.



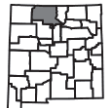
Carex illota L.H. Bailey [dirty, unwashed]. Plants caespitose; culms (10)16-32(38) cm tall; leaf blades (1)1.4-2.5(3) mm wide; inflorescence 6-12 mm long, compact, ovoid to suborbicular, composed of 2-4(6) gynecandrous spikes, the spikes 3-6(8) mm long, sessile, indistinct, orbicular to ovoid, prickly in appearance due to spreading, protruding perigynia; pistillate scales usually shorter than perigynia, dark brown, usually with pale or green midstripe; perigynia 2.1-2.9(3.2) mm long, 0.8-1.3 mm wide, ascending-spreading to spreading to slightly reflexed, gold to dark brown, ovate-lanceolate, planoconvex, margin unwinged and smooth through the poorly defined medium to dark brown beaks with prominent dark dorsal sutures; stigmas 2; achenes 1.2-1.5 mm long, 0.8-1 mm wide; section *Ovales*, Key G. ●Seeps, springs, and wet meadows, often in mixed coniferous forests; 10,400-12,000 ft; uncommon in northern NM. ♦Similar species: The compact capitate head with wingless, smooth-margined perigynia distinguish it from all other taxa in Keys G and H (section *Ovales*). *Carex illota* is easily confused with *C. jonesii*, but *C. illota* is gynecandrous and *C. jonesii* is androgynous. However, this difference is not always clear. The perigynia of *C. jonesii* are more stream-lined, widest at the base and tapering to the tip, while those of *C. illota* are widest significantly above the base and the beaks are more pronounced. In addition, *C. jonesii* contains notable spongy material at the base of the perigynium, while *C. illota* contains very little spongy material at the perigynium base.



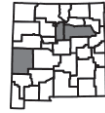
Carex interior L.H. Bailey [inland]. Plants densely caespitose; culms (10)14-53 cm tall, mostly taller than the leaves, slender, wiry; leaf blades 0.4-2.9 mm wide; inflorescence 1-2.3(3.4) cm long, composed of 2-5 sessile, easily distinguished gynecandrous or pistillate spikes, lower spikes remote with proximal internode 2-9 mm long, the terminal spike 5-11 mm long, gynecandrous with a narrow staminate basal portion less than to more than half the length of the spike, the lateral spikes 3-7 mm long, pistillate or gynecandrous with just a few staminate flowers at the base; pistillate scales shorter than the perigynia, inconspicuous, ovate, mostly hyaline, brown in the middle; perigynia 2.1-3(3.2) mm long, 0.9-1.7 mm wide, 1.5-2.5 times as long as wide, becoming spreading to reflexed at maturity, green to dark brown when mature, broadest slightly above the base, serrulate from the shoulders up through the short, stubby beak, the beak 0.3-1 mm long, nearly entire to bidentate to 0.3(0.5) mm; stigmas 2; achenes 1.2-1.6 mm long, 0.9-1.2 mm wide; section *Stellulatae*, Key G. ●Bogs, seeps, wet meadows and springs; 6000-11,000 ft; in mountains of northern NM and the Sacramento Mtns. of south-central NM. ♦Similar species: The clavate gynecandrous terminal spike with prominent narrow basal portion of *Carex interior* distinguish it from *C. disperma* and *C. radiata*, both of which have androgynous terminal spikes and widely separated, short sessile spikes that lack the starburst appearance of *C. interior*.



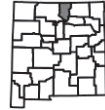
Carex jonesii L.H. Bailey [for Marcus Eugene Jones, 1852-1934, prominent American botanist]. Plants loosely caespitose or arising singly from compactly branched rhizomes; culms 20-40(60) cm tall, longer than the leaves; leaf blades 1-3.5 mm wide; inflorescence 0.8-1.5(2) cm long, ovoid to short cylindrical, composed of 4-10 indistinguishable androgynous spikes, mostly sessile on the inflorescence axis, but sometimes sessile on lower inflorescence branches, lower internodes not more than 3 mm long, usually not visible, the spikes 4-7 mm long, 1-8 mm wide, erect to spreading, similar, the proximal bract scale-like, sheathless, often scarcely longer than a pistillate scale; pistillate scales shorter than to as long as the perigynia, coppery to hyaline to dark brown, shiny; perigynia 2.5-2.9(4.8) mm long, 0.9-1.5 mm wide, 3-12 per spike, green maturing to brown, strongly 7-11 nerved dorsally, 5-9 nerved ventrally when mature, narrowly lanceolate to ovate-lanceolate, widest near the slightly spongy base, base mostly rounded; anthers 1.6-1.8 mm long; stigmas 2; achenes (1.1)1.5(2) mm long; section *Vulpinae*, Key F. ●Wet subalpine meadows, seeps, and stream banks; 9400-10,600 ft; uncommon in northern NM. ♦Similar species: See note with *C. illota*.



Carex kelloggii W. Boott [for Albert Kellogg (1813-1887), prominent California botanist] [*Carex lenticularis* Michaux var. *lipocarpa* (Holm) L. Standley, *Carex lenticularis* Michaux var. *pallida* (W. Boott) Dorn, *Carex vulgaris* Fries var. *lipocarpa* Holm]. Plants caespitose, forming clumps or tussocks, rhizomes sometimes present, then 1-2.5 mm thick, the internodes short; culms 15-80 cm tall, shorter or longer than the leaves; leaf blades 1-4 mm wide, the sheaths straw to light brown, not ladder-fibrillose, free portion of the ligules 0.5-2 mm long; inflorescence 5-12(17) cm long, composed of 1(2) terminal staminate spike(s) and 3-4(7) lateral pistillate spikes, 0.7-4.5 cm long, lower spikes sessile or with peduncle up to 11 cm long, the proximal bract leaf-like, often longer than the inflorescence; pistillate scales narrower and shorter than to equaling the perigynia, oblong-ovate, dark with a narrow to broad green midvein not extending to the apex, the apices obtuse to acute, awnless; perigynia 1.8-3.2(3.5) mm long, 1-1.8 mm wide, ascending to spreading, dull white or green, nerveless or sometimes with 5-7 nerves on each face, elliptic to ovate, the stipe abrupt, narrow, conspicuous, the beak 0.1-0.5 mm long, entire; stigmas 2; achenes ca 1 mm long; section *Phacocystis*, Key E. ●Wet meadows, seasonally wet pond or lake margins, and marginal to sluggish streams; 6900 -12,500 ft; uncommon in the western 2/3 of NM. ♦Similar species: *Carex kelloggii* is unique in Section Phacocystis in its densely caespitose habit, lighter colored bases, and pistillate spikes that are smooth due to small, tightly packed perigynia. It often has only one staminate spike, and no staminate portion on the distal ends of the upper lateral pistillate spikes, as many of the other species in section Phacocystis do. See also similar species discussion under *Carex emoryi*.



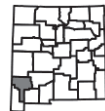
Carex lachenalii Schkuhr [for Werner de la Chenal/de Lachenal (1736-1800), Swiss professor of botany] [*Carex bipartita* Allioni var. *austroromontana* F.J. Hermann]. Plants caespitose; culms 9-30 cm tall; leaf blades 0.8-2 mm wide; inflorescence 10-25 mm long, composed of (1)3(4) sessile, distinct but conspicuously overlapping gynecandrous spikes, the spikes 4-8 mm long, oblong, of 10-20 perigynia; pistillate scales subequal to perigynia, oblong-ovate, the apices obtuse, red-brown with yellowish brown center and hyaline margins; perigynia (2)2.4-3.8 mm long, 0.9-1.5 mm wide, 2.3-2.7 times longer than wide, ascending, pale yellow-green turning to yellowish brown with age, smooth, with well-developed dorsal suture that extends the length of the beak and sometimes onto the perigynium body and is darker than adjacent body, obovate to ovate, biconvex, substipitate, tapering to a beak 0.5-1 mm long, the beak with a hyaline tip, either smooth or with a few serrulate teeth; stigmas 2; achenes 1.2-1.5 mm long, 0.9-1 mm wide; section *Glareosae*, Key G. ●Alpine wet meadows, shallow pond shores; 12,500-12,600 ft; known from the Sangre de Cristo Mtns. in northern NM. ♦Similar species: The dark spikes and alpine habitat preference distinguishes *Carex lachenalii* from *C. deweyana* and *C. bolanderi* which have light-colored spikes and occur in conifer forests. The crowded, dark, strongly overlapping spikes of *C. lachenalii* distinguish it from *C. brunnescens* and *C. canescens*, which both have light-colored, well separated (though sometimes overlapping) spikes.



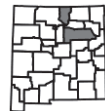
Carex leptalea Wahlenberg [slender, delicate]. Plants caespitose, forming loose clumps from short, pale rhizomes; culms 9-60 cm tall, usually longer than the leaves, hair-like, lax; leaf blades 0.2-1.3 mm wide, flat, soft; inflorescence a single terminal androgynous spike 3-15 mm long, the staminate portion usually shorter than the pistillate portion and often inconspicuous, with 2-9(13) pistillate flowers, the inflorescence bract lacking; pistillate scales shorter than the perigynia, obovate to ovate to lanceolate, green to brown with a pale midvein, the apices acute to acuminate, sometimes awned, the proximal scale awns sometimes prolonged as bristles, early deciduous; perigynia 2.4-4.9(5.4) mm long, 0.8-1.3 mm wide, ascending, pale green to straw, with many fine nerves, oval-elliptic with a constricted pithy stipe-like base, the apex rounded to retuse, beak lacking; stigmas 3; achenes trigonous, 1.3-1.9 mm long, 0.7-1.2 mm wide; section *Leptocephalae*, Key A. ●Mossy bogs, wet meadows, streamsides in conifer forests, 10,600-11,200 ft, known from one location near Wheeler Peak in the Sangre de Cristo Mtns. ♦Similar species: *Carex leptalea* might be confused with *C. disperma* due to the similar egg-shaped perigynia, loosely caespitose habit and habitat preference for mossy wet substrates, but *C. leptalea* is single-spiked, and *C. disperma* has several, often remote spikes. In addition, *C. disperma* perigynia each have an inconspicuous beak, while *C. leptalea* perigynia are beakless.



Carex leucodonta Holm [white-toothed]. Plants loosely caespitose; culms 15-50 cm tall, longer to much longer than the leaves; leaf blades 2-3.5(4) mm wide, the sheaths brown, persistent, forming brown fibrous bases; inflorescence cauline only, 3-5 cm long, composed of 1 staminate terminal spike subtended by 2-3 lateral pistillate spikes, the staminate spike (10)12-24(30) mm long, sometimes with a few female flowers mixed in, the pistillate spikes 5-10 mm long, each with 1-8(10) perigynia, the lowest sometimes branched, the proximal pistillate bract leaf-like, longer or shorter than the inflorescence; pistillate scales about as long as or slightly longer than the perigynia, pale green with hyaline margins and sometimes a darker green midstripe; perigynia 3.4-4(4.2) mm long, (1.5)1.7-2.2(2.4) mm wide, ascending, dull green to straw-colored, 10-25 nerved, the nerves prominent, short-pubescent, obovoid to almost globose in outline, suborbicular in cross section, contracted to a stipitate base, abruptly contracted to beak, the beak 0.5-1 mm long, terete, shallowly bidentate, the teeth up to 0.3 mm long; stigmas 3; achenes (1.6)1.8-2.6 mm long, 1.4-2.2(2.4) mm wide, globose; section *Acrocystis*, Key B. ●Open ponderosa pine forest (7500 ft) in the Pinos Altos Mtns. of the Gila National Forest (Grant Co); currently known from a single observation (Alexander 2017). ♦Similar species: see discussion under *Carex heliophila*. Crins & Rettig (2002) subsumed *C. leucodonta* into a broadly circumscribed *C. turbinata* Liebm. However, we are following Reznicek and Gonzalez (pers. comm. 2013-2014) who believe that the two should remain separate, with *C. turbinata* occurring only in Mexico.



Carex limosa Linnaeus [of marshy or muddy habitats]. Plants colonial, rhizomatous, roots covered with dense white felty pubescence; culms 15-40(60) cm tall, arising singly or in small groups from both horizontal and/or vertical rhizomes, bases often purplish red; leaf blades (0.8)1-2.5(3) mm wide, the sheath fronts red-dotted; inflorescence (3.5)4-6(8.5) cm long, composed of one terminal staminate spike and (0)1-2(3) lateral pistillate spikes, the staminate spike 14-19(21) mm long, the pistillate spikes 5-20 mm long, with (4)7-25(30) perigynia, pendent to ascending on flexuous peduncles, occasionally androgynous, the proximal inflorescence bract 2-6(6.7) cm long, usually shorter than the inflorescence, the sheath up to 3 mm long; pistillate scales longer than, as long as and wider to as wide as the perigynia, 3-4.8(5.5) mm long, (1.7)1.8-2.5(3.4) mm wide, ovate, yellowish-brown to dark reddish brown, sometimes with a green midstripe, cuspidate to awn-tipped; perigynia 2.5-3.5(4) mm long, 1.2-2.3(2.6) mm wide, green to yellow green with conspicuous nerves, ovoid, compressed trigonous, strongly papillose, the beak to 0.1(0.5) mm long, the orifice entire; stigmas 3; achenes (1.5)1.8-2.2(2.7) mm long, 1-1.3(2) mm wide; section *Limosae*, Key C. ●Bogs and fens, sometimes a component of floating mats; 10,200-11,700 ft; known from two locations in the Sangre de Cristo Mtns. ♦Similar species: The ovate persistent pistillate scales that conceal the perigynia in *Carex limosa* distinguish it from the similar *C. magellanica*, which has early deciduous lanceolate scales that are much narrower than the perigynia.



Carex luzulina Olney [Resembling *Luzula*]. Plants caespitose to short rhizomatous; culms 15-60(90) cm tall, much longer than the leaves; leaf blades 1.8-3.7(9) mm wide, clustered near the base, yellowish-green; inflorescence 6-14 cm long, composed of one terminal staminate spike and (2)3-5(6) lateral androgynous to pistillate spikes, the terminal spike (11)13-18(66) mm long, erect, the lateral spikes 7-19(32) mm long, erect, lower spikes remote and sometimes pendent, the peduncle of the lowest spike (5)16-45 mm, the proximal inflorescence bract shorter than inflorescence, the sheath (12)17-29(58) mm long, inflated; pistillate scales dark reddish-brown to dark purple with hyaline margins, midvein scabrous, elevated, green or pale, to 0.2 mm wide; perigynia (3)3.5-5.5 mm long, 0.9-1.6(1.8) mm wide, 2.5-3 times long as wide, cream to green or purple, distal margins often ciliate-setose, narrowly elliptic to lanceolate, tapered at both ends, not inflated, the beak 0.5-1.5 mm long, the tip dark reddish brown to purple; stigmas 3; achenes 1.3-2 mm long, 0.7-1.1 mm wide; section *Aulocystis*, Key C. ●Wet meadows, bogs; 9800 ft; known from one location in the San Juan Mtns. ♦Our plants belong to var. *ablata* (L.H. Bailey) F.J. Hermann [removed from] [*Carex ablata* L.H. Bailey]. Similar species: *Carex luzulina* var. *ablata* can be distinguished from all other similar sedges by the narrowly elliptic to lanceolate perigynia that are tapered at both ends, the prominent dark perigynia beak tips, the dark reddish brown to purple pistillate scales with contrasting light-colored midrib that does not extend to the tip, the long (15-30 mm) inflated inflorescence bract sheaths and the yellowish-green leaf blades concentrated toward the base of the plant.



Carex macloviana D'Urville [from the Falkland Islands] [*Carex festiva* Dewey]. Plants densely caespitose; culms 9-52(60) cm tall, equal to or longer than the leaves; leaf blades 4-18 cm long, (1.7)2-3.6 mm wide; inflorescence 0.9-2.6 cm long, compact, the base tapered, truncate, or retuse, composed of 3-5(9) erect to spreading, gynecandrous spikes, the spikes 5-10.5 mm long, 4-7 mm wide, ovoid to broadly ovoid, strongly overlapping and mostly indistinguishable, similar, sessile; proximal bract scale-like; pistillate scales narrower and shorter than the perigynia, gold to brown, sometimes with a paler midvein, hyaline margins 0.2-0.5 mm wide, lower scale apices usually obtuse; perigynia 3.5-4.5 mm long, (1.1)1.3-2 mm wide, 0.4-0.5 mm thick, straw, gold, red-brown or coppery, sometimes with metallic sheen, margins often brown, darker than perigynium body, nerved or not, wings 0.3-0.4 mm wide, usually with white-hyaline dorsal suture margins and white hyaline tip, narrowly to broadly ovate, planoconvex, entire in distal 0-0.3 mm, distance from perigynium beak tip to top of the achene (1.2)1.6-2.4 mm; stigmas 2; achenes (1.2)1.4-1.9 mm long; section *Ovales*, Key H. ●Wet areas and dry meadows in subalpine or alpine habitats; 8900-12,000 ft; rare in northern NM. ♦Similar species: *Carex macloviana* differs from *C. microptera* by the characters given in couplet 14 in Key H. See note under *C. haydeniana*.



Carex magellanica Lamarck [from the Strait of Magellan region]. Plants rhizomatous, with stems arising singly, in small clusters, or sometimes forming larger loose clumps, the roots covered with yellowish felty pubescence; culms (10)30-50(70) cm tall; leaf blades (1)1.5-3(4) mm wide, the sheaths brown to reddish purple; inflorescence 3-10 cm long, composed of one terminal staminate spike and 1-3 lateral pistillate spikes, the staminate spike 7-10(20) mm long, erect or slightly drooping, the pistillate spikes 5-13(22) mm long, each with 5-20 perigynia, pendent on flexuous peduncles, the proximal bract 3-15 cm long, as long as or longer than the inflorescence, the sheath up to 3 mm long; pistillate scales mostly narrower and conspicuously longer than the perigynia, narrowly lanceolate to ovate-lanceolate, tapering to an acute apex, (2.8)3.8-5.3(7) mm long, (0.6)0.9-1.9(2) mm wide, reddish-brown proximally to yellowish-brown distally, early deciduous; perigynia 2-3.2(3.8) mm long, (1.1)1.7-2.2(2.5) mm wide, green turning deep brown to cream, conspicuously nerved, coriaceous, papillose, broadly ellipsoid to obovoid, compressed trigonous, the apex rounded, the beak 0.1(0.2) mm long or absent, the orifice entire; stigmas 3; achenes 1.9-2 mm long, 1.1-1.2 mm wide; section *Limosae*, Key C. ●Wet meadows, bogs, and fens; 10,300-10,500 ft; known only from the San Pedro Parks Wilderness. ♦Our plants belong to subsp. *irrigua* (Wahlenburg) Hiitonen [supplied with water] [*Carex limosa* Linnaeus var. *irrigua* Wahlenburg, *Carex paupercula* Michaux]. Similar species: The minute beak less than 0.1 mm long of *Carex magellanica* distinguishes it from four other NM *Carex* taxa with spreading or pendent lateral spikes (*C. capillaris*, *C. hystericina*, *C. luzulina*, *C. sprengelii*), which have distinct beaks at least 0.3 mm long. The early deciduous lanceolate pistillate scales, which are narrower than and exposing the perigynia in *C. magellanica* distinguish it from the similar *C. limosa*, whose scales are not deciduous and conceal the perigynia.



Carex microdonta Torrey & Hooker [small-toothed]. Plants colonial, rhizomatous, the culms usually single, or rarely 2-3 culms together from long rhizomes, rhizome internodes often exceeding 5 cm; culms 7-48(56) cm tall; leaf blades 2-6(8) mm wide, the basal sheaths brown; inflorescence 8-20(22) cm long, composed of one erect terminal staminate spike and 2-4(5) erect, lateral, pistillate (rarely androgynous or staminate) spikes, the lowest spike pedunculate, arising in the lower third of the culm, sometimes almost basal, the staminate spike 1.1-4.1(5) cm long, the pistillate spikes 0.7-2.8(3.7) cm long, the pistillate spike bracts leaf-like, shorter to longer than the inflorescence; pistillate scales shorter to longer and narrower than the perigynia, leaving the perigynia exposed, green with hyaline margins, apices often awl-like and sometimes scabrous; perigynia 2.6-4.1(4.2) mm long, 1-2 mm wide, ascending, green to olive-green to light reddish brown, often rust-spotted on the body, with many obscure to prominent nerves, narrowly ovoid to oblong-ovoid, beak 0.3-0.9(1) mm long, nearly entire; stigmas 3; achenes 1.7-2.7 mm long, 1-1.6 mm wide. Section *Granulares*, Key C. ●Limestone seeps in arid to mesic woodland sites; 6800-7100 ft; known only from one location in the Guadalupe Mtns. ♦Similar species: The position of the lowest pistillate spike at or below the culm midpoint distinguish *Carex microdonta* from other *Carex* taxa with similar inflorescence structure (*C. blanda* and *C. conoidea*), but not *C. aurea*, which can also have basal, or near basal spikes.



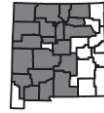
Carex microglochyn Wahlenberg [small-barbed]. Plants rhizomatous, with culms arising singly or several together; culms (2)4-25 cm tall, longer than the leaves, stiffly erect; leaf blades 0.3-1 mm wide, involute; inflorescence a single terminal androgynous spike 6-14 mm long, the staminate portion shorter than to equal to the pistillate portion, with 3-10 pistillate flowers, the inflorescence bract lacking; pistillate scales shorter and wider than the perigynia, brown, ovate-triangular, apex obtuse to subacute; perigynia 3.4-4.7 mm long, 0.6-1 mm wide, erect when young, becoming deflexed at maturity, pale green to straw, conspicuously nerved, with vestigial rachilla exerted 0.6-2.2 mm beyond the orifice making the perigynium look even longer, often curving at the tips, lance-subulate to an ill-defined beak; stigmas 3; achenes trigonous, 1.9-2.4 mm long, 0.5-0.9 mm wide; section *Leucoglochyn*, Key A. ●Moist areas in alpine tundra, seeps, gravelly streambanks, fens, peaty ground and bogs, 10,800-11,700 ft; known from one location in the northern Sangre de Cristo Mtns. ♦Our plants belong to subsp. *microglochyn*. Similar species: *Carex microglochyn* is distinctive when mature with its strongly reflexed lance-subulate perigynia and rhizomatous habit. When immature, the upright spikes might be confused with those of *C. gynocrates*, which shares a similar growth habit and habitat, but perigynia in *C. gynocrates* are plumply elliptic with a distinct beak, whereas *C. microglochyn* perigynia are lance-subulate, tapering to an ill-defined beak.



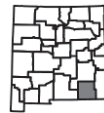
Carex micropoda C.A. Meyer [small-footed] [*Carex crandalli* Gandoger, *Carex pyrenaica* Wahlenberg subsp. *micropoda* (C.A. Meyer) Hulten]. Plants densely cespitose, forming tufts; culms 5-30 cm tall, shorter to longer than the leaves; leaf blades 0.25-1.5 mm wide, wiry, involute, the sheaths not fibrous, the sheath fronts membranous, numerous light-brown to straw dead leaves and sheaths present in clump; inflorescence a single terminal androgynous spike, 6-20 mm long, the staminate portion shorter than the pistillate portion, with (3)7-21 pistillate flowers, the inflorescence bract lacking; pistillate scales mostly shorter than the perigynia, mostly ovate to occasionally lanceolate, deciduous, dark brown, sometimes glossy, with a pale midvein and narrow hyaline margins, apex obtuse to acute; perigynia 2.7-4.5 mm long, 0.7-1.5 mm wide, ascending initially, spreading at maturity, glabrous, light green to straw colored, becoming dark brown at maturity, marginal nerves 2, elliptic to narrowly ovate or lanceolate in profile with a narrow, cylindrical green stipe to about 0.4 mm long, gradually tapered to a conspicuous hyaline beak 0.1-0.5 mm long; stigmas 3(2); achenes trigonous (biconvex), 1.2-1.8 mm long, 0.7-1 mm wide; section *Dornera*, Key A. ●Alpine meadows, scree slopes, and snowmelt basins; 11,500-12,600 ft; Sangre de Cristo Mtns. ♦Similar species: See discussion under *Carex gynocrates*. *Carex micropoda* and *C. elynoides* can occur in similar alpine habitats. In addition to the characters in the key, *C. micropoda* usually has much taller culms than *C. elynoides*.



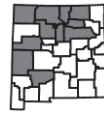
Carex microptera Mackenzie [small-winged] SMALLWING SEDGE [*Carex festivella* Mackenzie, *Carex limnophila* F.J. Hermann, *Carex macloviana* D'Urville subsp. *microptera* (Mackenzie) B. Bovin, *Carex macloviana* D'Urville var. *limnophila* (F.J. Hermann) Dorn, *Carex macloviana* D'Urville subsp. *festivella* (Mackenzie) A. Love & D. Love]. Plants densely cespitose; culms 15-80(110) cm tall, usually longer than the leaves; leaf blades 10-50 cm long, 1-4 mm wide; inflorescence (0.7)1.1-2.4 cm long, compact, the base tapered, truncate, or retuse, composed of 4-10(14) erect to spreading, gynecandrous, strongly overlapping and mostly indistinguishable spikes, the spikes (4)5-9(14) mm long, ovoid to broadly ovoid, sessile, similar, the proximal internode 0.5-3(4) mm long, proximal bract scale-like, usually shorter than the inflorescence, but sometimes leaf-like and longer; pistillate scales shorter and narrower to as wide as the perigynia, brown, usually with a pale midvein, hyaline margin 0-0.2 mm wide, the apices acute; perigynia (2.5)3.1-4.4(4.8) mm long, 1.1-2 mm wide, 0.3-0.5 mm thick, green to tan or brown, dorsally nerved, ventrally nerved or not, broadly wing-margined to the round-tapering base, flat except where distended over the achene to thinly planoconvex, narrowly to broadly ovate, tapering to the long, dark beak, most perigynia serrulate to the terete tip, a few sometimes entire in the distal 0-0.2(0.4) mm, distance from perigynia beak tips to top of the achenes 1.5-2(2.4) mm, perigynia usually widest below the top of the achene; achenes 1.2-1.8 mm long, 0.7-1 mm wide, anthers 1.3-1.9 mm long; stigmas 2; section *Ovales*, Key H. ●Moist to wet meadows and along streams; 5800-11,800 ft; widespread in mountain areas of NM. ♦Similar species: *Carex microptera* perigynia lack the metallic sheen and the hyaline tips and dorsal suture margins of *C. macloviana*. The inflorescences of *C. microptera* are typically truncate or retuse at the base, while those of *C. subfusca* are typically tapered. Also, the perigynia of *C. microptera* are thinner with wider wing-margins than those of *C. subfusca*. Perigynia in *C. microptera* are not wing-margined to the tip as in *C. wootonii*, and *C. microptera* grows in wetter areas than *C. wootonii*. *Carex microptera* growing at high elevations with narrow perigynia appear similar to *C. ebenea*, but the perigynia are shorter than those of *C. ebenea* and they grow in at least seasonally moist areas, while *C. ebenea* usually grows in dry sites. See note under *Carex "apachense"* for discussion of an unnamed segregate taxon. §



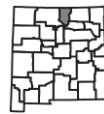
Carex muriculata F.J. Hermann [with sharp points]. Plants cespitose; culms (10)20-60(80) cm tall; leaf blades 1-2.7 mm wide, the sheaths brown to dark brown, fibrillose; inflorescence (1.6)2.5-7 cm long, oblong to linear-oblong, composed of 3-6 androgynous spikes (lateral spikes sometimes appearing pistillate, but with cryptic male flowers), the spikes 5-19(22) mm long, sessile or subsessile on very short peduncles, the proximal inflorescence bract leaflike, 6-27 cm long, sometimes tapering to a narrow bristle and much longer than the inflorescence; pistillate scales exceeding and usually concealing perigynia, oblong-lanceolate, with green to brown center and whitish to pale brown translucent sides, strongly 3-veined, the midvein occasionally scabrous, the apices acuminate, occasionally tapering to an awn, the awn occasionally scabrous; perigynia 3.4-4.9 mm long, 1-1.4 mm wide, ascending to spreading, green to dark brown, prominently 8-16 veined, leathery, muricate-warty with tiny teeth or hairs projecting from the murications, ellipsoid, trigonous in cross-section due to prominent achene, stipitate, the beak 0.6-1.3 mm long, bidentate, the teeth 0.2-0.6 mm long; stigmas 3; achenes 1.9-2.9 mm long, 0.9-1.3 mm wide, trigonous; section *Schiedeanae*, Key B. ●*Carex muriculata* is known only from dry limestone habitats in southeast NM; 5000-5900 ft. ♦Similar species: *Carex muriculata* is unique among NM *Carex* in having perigynia with muricate-warty surfaces.



Carex nebrascensis Dewey [from Nebraska] NEBRASKA SEDGE. Plants rhizomatous, the rhizomes 1.5-3.2 mm thick, scaly, often forming large colonies; culms arising singly or in small clusters, 15-80 cm tall, shorter or longer than the leaves; leaf blades 3-10(12) mm wide, green to glaucous, the sheaths dirty white to dark brown, not ladder-fibrillose, the summit U-shaped to truncate; inflorescence 5-19 cm long, composed of 1-3 erect terminal staminate spikes and 2-4 erect, lateral pistillate spikes, proximal pistillate spike 1.5-5 cm long, lower spikes sessile or with peduncle up to 2(4) cm long, the proximal bract leaf-like, shorter or longer than the inflorescence; pistillate scales equal to or longer than the perigynia, lanceolate, dark with a light-colored midvein, the midvein of at least the lower scales often excurrent and awned, the awn to 1(3) mm long; perigynia (2.2)2.5-4 mm long, (1.3)1.6-2.5 mm wide, erect to divergent, dull, leathery, 3-7 nerved on each face, elliptic to obovate, the beak 0.3-0.6 mm long, brown, bidentate with teeth to 0.2 mm, the orifice often ciliate; stigmas 2; achenes 0.3-2.5 mm long; section *Phacocystis*, Key E. ●Wet meadows, seeps, springs, fens, ditches, and margins of seasonally flooded wetlands and sluggish streams, often in areas used by cattle; 5400-12,100 ft; common in northern NM with fewer populations in the western part of the state. ♦Similar species: The combination of awned scales, strongly nerved perigynia with bidentate ciliate beaks, and wide leaf blades separates *Carex nebrascensis* from other species in Section *Phacocystis*.



Carex nelsonii Mackenzie [for Aven Nelson (1859-1952), teacher and eminent Wyoming botanist]. Plants densely cespitose from short rhizomes; culms 9-19(30) cm tall, longer than the leaves; leaf blades flat, (1.5)2-3 mm wide, the sheaths light brown to dark reddish brown; inflorescence 0.9-1.8(2.5) cm long, compact, composed of 3-4 similar, strongly overlapping spikes, the terminal spike gynecandrous, (6)8-13 mm long, the lateral spikes (5)7-9 mm long, pistillate, sessile to rarely short pedunculate; proximal bract shorter than or rarely equal to the inflorescence; pistillate scales shorter than or equal to and slightly narrower than the perigynia, ovate, dark brown to purplish-black to the margins, the apices acute; perigynia 3.3-4 mm long, 1-1.5 mm wide, 2.8-3.9 times longer than wide, ascending to spreading, light-colored proximally, purplish black distally with light-colored margins, distally papillose, flattened, marginal nerves only, narrowly elliptic to narrowly ovate,



tapering to a dark bidentate beak (0.3)0.5-0.8(0.9) mm long; stigmas 3; achenes trigonous, 1.3-1.7 mm long, 0.9 mm wide, filling proximal half or less of the perigynia; section *Racemosae*, Key D. ●Moist alpine meadows, edges of spring outflows; 12,200-12,400 ft; known only from one location in the Sangre de Cristo Mtns near the CO border. ♦Similar species: *Carex nova* has much wider perigynia that contract abruptly to the beak, usually taller culms, is more widespread, and ranges to lower elevations. *Carex albonigra* has the lower spikes separated, short pedunculate, and more upright, while those of *C. nelsonii* tend to be more tightly clustered, sessile, and spreading.

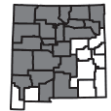
Carex nova L.H. Bailey [new] BLACK SEDGE. Plants loosely cespitose from short rhizomes; culms 14-48(60) cm tall, longer than the leaves; leaf blades flat, (0.9)1.8-4 mm wide, the sheaths light brown to dark reddish brown; inflorescence 0.9-2 cm long, compact, composed of 3-4 similar looking closely proximate spikes, the terminal spike 7-12 mm long, gynecandrous, the lateral spikes 4-13 mm long, pistillate, remote, sessile to rarely short pedunculate, the proximal bract shorter to longer than the inflorescence; pistillate scales mostly shorter and narrower to sometimes longer than the perigynia, ovate to lanceolate, dark brown to purplish black, the apices acute; perigynia 2.5-4 mm long, 1.1-2(3) mm wide, 1.3-2.5(2.8) times longer than wide, ascending to spreading, pale yellow to dark brown or purplish-black distally, lighter-colored proximally, papillose, with marginal nerves only, obovate to suborbicular, flattened, abruptly contracted to a bidentate beak 0.2-0.5(0.6) mm long; stigmas 3; achenes trigonous, 1.6-1.9 mm long, 0.7-1 mm wide, filling proximal half or less of the perigynia; section *Racemosae*, Key D. ●Moist subalpine and alpine meadows, seeps, springs and lake margins; 9400-12,500 ft; known only from the Sangre de Cristo Mtns. ♦Similar species: see discussion under *Carex nelsonii*. §



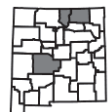
Carex obtusata Liljeblad [blunt]. Plants rhizomatous, with culms widely spaced, arising singly or several together, the rhizomes slender but tough, dark brown to reddish-purple; culms 4-25 cm tall, mostly equal to or longer than the leaves, erect; the sheaths reddish-purple with red dots on sheath fronts; leaf blades 0.5-1.6(2) mm wide, flat or channeled; inflorescence a single terminal androgynous spike, 5-16(20) mm long, the staminate portion about as long as the pistillate portion, with 2-6(14) pistillate flowers, the inflorescence bract lacking; pistillate scales mostly shorter and as wide as the perigynia, ovate to lanceolate, pale brown to reddish-brown with hyaline margins and a pale midvein, apex obtuse to acute to mucronate or awned; perigynia 2.4-4.1 mm long, 1-1.6(1.8) mm wide, ascending to spreading, dark brown to deep red-brown, shiny when mature, finely to strongly nerved, ellipsoid to obovoid, beak prominently bidentate, 0.5-1.3 mm, tip hyaline; stigmas 3; achenes trigonous, 1.7-1.9 mm long, 1-1.2 mm wide; section *Obtusatae*, Key A. ●Montane grasslands, open forests, ponderosa pine savannas and rocky ridges, 6500-10,500 ft; found in widely scattered locations in the northern half of the state. ♦Similar species: *Carex obtusata* might be confused with *C. duriuscula*, since both are of similar stature and habit, and share similar habitats. However, *C. duriuscula* inflorescences are composed of multiple spikes in a compact head, while *C. obtusata* inflorescences each contain a single spike. *Carex duriuscula* has brownish bases, while those of *C. obtusata* are red-purple. *Carex rupestris* grows at higher elevations than *C. obtusata*, and also lacks the spotted sheath fronts of the latter species.



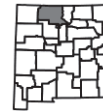
Carex occidentalis L.H. Bailey [western] WESTERN SEDGE [*Carex neomexicana* Mackenzie]. Plants densely cespitose or short rhizomatous with culms crowded; culms 15-90 cm tall, as long as or longer than the leaves; leaf blades 1.4-2.8 mm wide, the sheaths brownish or green; inflorescence 1.5-5.5 cm long, 4-11 mm wide, usually elongate, unbranched, composed of 4-12 similar androgynous spikes, the staminate flowers often inconspicuous; spikes 4-10 mm long, 3-6 mm wide, erect to spreading, with 1-8 perigynia per spike, proximal inflorescence bract absent or setaceous and up to 2 cm long, shorter than the inflorescence; pistillate scales similar in size to the perigynia, brown with green center and hyaline margins; perigynia 3-4.8 mm long, 1.4-1.9 mm wide, ascending to spreading, green maturing to straw, brown or black, smooth, shiny, nerveless, sharp margined, often doubly serrulate above the middle, elliptic to oblong-elliptic, planoconvex in cross-section, beak 0.6-1.3 mm long; stigmas 2; achenes (1.3)1.9-2(2.4) mm long; section *Phaetoglochin*, Key F. ●Dry grasslands, woodlands, forest, more mesic habitats at lower elevations; 5400-11,500 ft; common throughout NM, except the lower eastern plains. ♦Similar species: *Carex occidentalis* is NM's most abundant upland sedge. *Carex occidentalis* is often confused with the less common *C. vallicola*. *Carex occidentalis* pistillate scales are about as long as the perigynia, whereas *C. vallicola* scales are usually shorter. *Carex occidentalis* perigynia are thinner and more serrulate along the upper margins (usually doubly so) than *C. vallicola* perigynia, which can be entire to very finely and singly serrulate along the upper margins. *Carex occidentalis* perigynia are more uniformly oriented in the spikes in an ascending pattern, while those of *C. vallicola* are more randomly oriented, giving the inflorescence a more "irregular" texture. Both *C. occidentalis* and *C. vallicola* are cespitose, unlike the similar *C. siccata*, a rhizomatous sedge which has a narrow and elongate inflorescence, but in which the middle spikes are often wholly staminate. All three of these species prefer dry meadows and forests, though they can occasionally be found on the periphery of riparian zones. *Carex praegracilis* often shares the same inflorescence shape as *C. occidentalis*, but *C. praegracilis* prefers wet habitats, is often dioecious, and the lower inflorescence is usually branched. (The inflorescence of *C. occidentalis* can appear all pistillate late in the season when the anthers have fallen, so look carefully for remaining filaments in the upper scales of each spike.) When seen in the field, the rhizomatous habit of *C. praegracilis* is distinct from the cespitose growth form of *C. occidentalis*.



Carex oreocharis Holm [mountain-beauty]. Plants densely cespitose, forming mats or tufts; culms 6-30(50) cm tall, longer or sometimes shorter than the leaves, sometimes scabrous below the inflorescence; leaf blades (0.3)0.8-1.5(2.8) mm wide near base, folded or channeled, frequently curled at the tips, the sheaths red-brown to dark brown, contrasting sharply with the green leaves; inflorescence a single terminal androgynous spike 11-35 mm long, the staminate portion longer than the pistillate portion, with 3-15 pistillate flowers, the inflorescence bract usually lacking, proximal scale sometimes resembling a bract with an awn 0.1-4 mm long; pistillate scales wider and mostly longer than the perigynia, ovate or lanceolate to broadly orbicular, yellowish green to brown with broad hyaline margins and a pale or green midvein, the apices obtuse to awn tipped; perigynia (2.7)3-4.2 mm long, 1.2-2.1 mm wide, straw to pale yellowish green, appressed to erect, sometimes short pubescent, nerves 0-5(8), margins ciliate near the beak, broadly ovoid to obovoid, usually abruptly contracted to a cylindrical hyaline beak 0.2-1 mm long; stigmas 3; achenes trigonous, 2.2-3 mm long, 1.1-1.9 mm wide; section *Filifoliae*, Key A. ●Mountain meadows, dry slopes, and grasslands, 7500-10,900 ft; found in the northern Sangre de Cristo Mtns. and the Magdalena Mtns. ♦Similar species: *Carex oreocharis* is distinguished by its cespitose habit, culms with single spikes, folded or channeled leaf blades that curl at the tips and its propensity to occur in montane grasslands. See discussion under *Carex elynoides*.



Carex pachystachya Chamisso ex Steudel [thick-spiked] Chamisso sedge [*Carex macloviana* D'Urville subsp. *pachystachya* (Chamisso ex Steudal) Hulten]. Plants densely cespitose; culms 15-60(120) cm tall, longer than the leaves, conspicuously striate; leaf blades 2.2-2.7 mm wide; inflorescence 0.6-2.2 cm long, compact to elongate, composed of 4-10(14) gynecandrous spikes, the upper spikes sometimes indistinguishable, proximal internode 1-2(4.5) mm long, the spikes 5-9(11) mm long, broadly ovoid, sessile, the proximal bract scale-like or leaflike, usually shorter than the inflorescence, occasionally up to 2.5 times longer than the inflorescence; pistillate scales shorter and narrower than the perigynia, ovate to ovate-lanceolate, brown and shiny, with a pale or green midvein, apex acute to obtuse; perigynia 3.6-4.5 mm long, 1.1-2 mm wide, 0.45-0.6 mm thick, slightly spreading when mature, green or tan to brown, darker at margins, typically (5)7-9(11) veined on both sides, sometimes nerveless ventrally, planoconvex, narrowly wing-margined to the round-tapering base with wings to 0.2-0.4 mm wide, widest below the top of the achene, most perigynia entire in the distal 0.3-0.6 mm, a few sometimes serrulate to the tip, tapering to the terete beak; beak tip brown, 1.9-2.7 mm from tip to top of achene; stigmas 2; achenes 1.2-1.4 mm long, 0.8-1.2 mm wide; section *Ovales*, Key H. ●Montane canyons along streams; 9800 ft; known from one location east of Tierra Amarilla, Rio Arriba Co. ♦Similar species: *Carex pachystachya* is most easily confused with *C. microptera*. They occur in the similar habitats and both can have compact inflorescences, but the thicker perigynia of *Carex pachystachya*, cause them to spread more widely at maturity than those of *C. microptera*. *Carex pachystachya* perigynia sometimes have a more shiny texture than most other *Ovales*, and sometimes have a coppery tinge.



Carex pellita Willdenow [covered with a hide] WOOLLY SEDGE [*Carex lamuginosa* auctores]. Plants colonial from long rhizomes; culms 15-100 cm tall, shorter to longer than the leaves; leaf blades 2-4.5(7) mm wide, the sheaths reddish-purple, becoming ladder-fibrillose; inflorescence 5-30 cm long, elongate, composed of 1-3 terminal staminate spike(s), the lower ones when present shorter, sessile or pedunculate and 2-3(4) well-separated, erect to ascending lateral pistillate spikes, the terminal staminate spike 1.8-5 cm long, the pistillate spikes 1-4.2(5) cm long, the lowest pistillate spike on a slender peduncle 8+ cm long, the upper pistillate spikes sessile or on short peduncles, sometimes with a few staminate flowers at the summit, the proximal inflorescence bract erect to spreading, shorter to longer than the inflorescence; pistillate scales shorter or longer than the perigynia, lanceolate to ovate, reddish brown with a pale or greenish midstripe and hyaline margins, apices acute to acuminate awned; perigynia 2.5-3.8(5.2) mm long, 1.4-2.1(2.8) mm wide, ascending, brown, green or reddish brown, nerved on both sides, nerves hidden by uniform dense pubescence throughout, inflated, ovoid, rounded and spongy-thickened below, abruptly contracted to beak, the beak (0.5)0.9-1.2(1.5) mm long, deeply bidentate, the teeth 0.4-0.6 mm long, stigmas 3, achenes 1.5-2.1 mm long, 0.8-1.3 mm wide, trigonous; section *Paludosae*, Key B. ●*Carex pellita* is a common wetland sedge that occurs in a wide variety of habitats including pond and stream edges, grassy and boggy meadows, seepage, and seasonally wet sites. 4700-10,900 ft. Widespread in NM except not present in the eastern central and southeastern regions of the state. ♦Similar species: the obviously densely pubescent perigynia distinguish *Carex pellita* from all other rhizomatous wetland *Carex*. The wetland habitat preference of *C. pellita* easily distinguishes it from all other Key B species except *C. atherodes*. *Carex atherodes* perigynia are nearly glabrous with only a few bristles along nerves of the perigynia compared to the densely pubescent perigynia of *C. pellita*. §



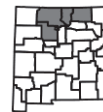
Carex petasata Dewey [brimmed (the perigynium)] [*Carex liddonii* Boott]. Plants densely cespitose, forming small clumps from short rhizomes; culms 28-85 cm tall, longer than the leaves; leaf blades 0.8-3 mm wide; inflorescence 1.7-4.3 cm long, elongate, composed of (2)3-6(7) gynecandrous spikes, the spikes 8-20 mm long, 3-6 mm wide, narrowly fusiform to oblanceoloid, this latter shape due to more basal staminate flowers than in most other *Ovales* species, distinct, erect, sessile, similar, the proximal bract lacking, scale-like, or bristle-like, shorter than the inflorescence; pistillate scales shorter and narrower than the perigynia, or equal to the perigynia, pale green to light brown with a pale or green midvein, with hyaline margins 0.2-0.8 mm wide; perigynia 6-8.4 mm long, 1.7-2.4 mm wide, appressed, light olive green to brown, usually many-nerved on both sides, narrowly wing-margined to the cuneate base, lanceolate to ovate, planoconvex, long tapering and winged to the tip, distance from perigynium beak tip to top of the achene (1.8)3.2-4.6 mm; anthers 3 mm long; stigmas 2; achenes 2.2-3.3 mm long; section *Ovales*, Key H. ●Dry to wet meadows, grasslands, and open clearings in forests; 5100-11,900 ft; uncommon in mountain areas of NM. ♦Similar species: The inflorescence of *Carex petasata* is lighter-colored than those of most *C. wootonii*, with more male flowers at the base of each spike, and with the perigynia more consistently veined on the ventral face. *Carex petasata* has longer perigynia than those of *C. tahoensis*, *C. phaeocephala* and *C. praticola*. What we are calling *C. tahoensis* is a plants of smaller stature, with an inflorescence that is more likely to be a golden light brown than the drab olive of the larger statured *C. petasata*.



Carex phaeocephala Piper [dark-headed]. Plants densely cespitose, forming small clumps from short rhizomes; culms (5)15-45 cm tall, longer than the leaves; leaf blades (0.4)0.8-2.5 mm wide, flat or folded; inflorescence (0.9)1.1-2.7(3.5) cm long, elongate, the proximal internode (2)4-6(10) mm long, the base tapered, composed of (2)3-7 gynecandrous spikes, the spikes 6-16 mm long, ovoid to broadly ovoid, distinct, erect, sessile, similar, the proximal bract scale-like, or bristle-like, shorter than the inflorescence; pistillate scales equaling or slightly shorter than the perigynia with beaks exposed, often covering, or sometimes exposing the side of the perigynia, lanceolate to ovate, gold, red-brown or dark brown with a pale midvein, hyaline margins 0.1-0.3(0.5) mm wide; perigynia (3.4)3.6-4.4(5.2) mm long, (1)1.1-1.5(2.3) mm wide, ascending, pale green to pale yellow to brown or red-brown, sometimes with green margins, veinless to few-nerved ventrally, several nerved dorsally, ovate or elliptic-oblong, flat to planoconvex, beak brown to dark brown with hyaline tip, more or less smooth for (0.2)0.3-0.7 mm from the beak tip, beak 0.7-1.3 mm long, distance from perigynium beak tip to top of the achene (1.3)1.7-2.3(2.8) mm; stigmas 2; achenes (1.3)1.5-2 mm long, (0.8)0.9-1(1.2) mm wide; section *Ovales*, Key H. ●Alpine or windswept high montane rocky areas; 10,100-12,700 ft; uncommon in mountain areas of north-central NM. ♦Similar species: *Carex petasata* has longer perigynia and occurs below treeline, while *C. phaeocephala* occurs primarily above treeline.



Carex pityophila Mackenzie [pine-loving]. Plants cespitose; culms 3-12 cm tall; leaf blades 0.8-1.5(2.6) mm wide, folded or involute, wiry, the bases reddish to purplish brown, the old sheaths becoming slightly fibrous or ladder-fibrillose; inflorescence of two types, basal and cauline, the basal inflorescences composed of 1-2(3) perigynia on a filiform peduncle, the cauline inflorescences 12-26 mm long, composed of 1 terminal staminate spike subtended by 1-2(3) lateral pistillate spikes, the staminate spike 4.8-8.3(11.5) mm long, 0.7-1.5 mm wide, on a peduncle as long or longer than the spike, the lateral pistillate spikes each with a single perigynium or very rarely two, usually somewhat separate along the rachis, the proximal pistillate bract of the cauline inflorescences narrow to involute, subequal to slightly longer than the inflorescences; staminate scales with dark purplish-black coloring, the pistillate scales shorter than or equal to the perigynia; perigynia 3-4.6 mm long,



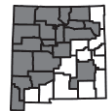
1-1.7 mm wide, erect to ascending, green to yellowish brown, with two marginal nerves, veinless, finely pubescent, ellipsoid to ovoid, abruptly contracted to beak; the beak 0.7-1.7 mm long, straight, smooth or weakly ciliate-serrulate, bidentate, the teeth 0.1-0.7 mm long, stigmas 3; achenes obovoid, 1.9-2.1 mm long, 1.4-1.6 mm wide, obtusely trigonous in cross-section; section *Acrocystis*, Key B. ●Pinyon-juniper woodland, ponderosa pine, and mixed coniferous forests in the mountains of northern NM. 7300-9900 ft. ♦Similar species: *Carex pityophila* is most likely to be confused with depauperate specimens of the other section *Acrocystis* taxa in northern NM. It is a small, wiry plant with very few perigynia in its inflorescence and the terminal staminate spike is usually separated from the pistillate flowers by a long peduncle. *Carex* aff. *rossii* sp. nov. has several perigynia per pistillate spike and generally flatter, more lax leaves. Both have darker colored pistillate spikes than *C. rossii* and all three species have fewer flowered staminate spikes with less overlapping scales than *C. geophila*.

Carex planostachys Kunze [with wandering spikes] [*Carex lativena* S.D. & G.D. Jones]. Plants densely caespitose; culms 4-15 cm tall, shorter than the leaves; leaf blades 0.9-2 mm wide, green, the sheaths tan to dark brown, often becoming ladder fibrillose, forming a dark brown scabrous fibrous base; inflorescences of two types, basal and cauline, the basal inflorescences composed of (1)2-3(4) pistillate spikes (3)7-31 mm long on a slender peduncle, the cauline inflorescences 8-27 mm long, composed of 1 staminate terminal spike, closely subtended by (0)1-2(3) lateral, pistillate spikes, the staminate spike 6-12(15) mm long, the pistillate spikes (4)5-9 mm long, the proximal pistillate bract of the cauline inflorescences leaf-like, shorter or equal to the inflorescence; pistillate scales shorter or longer than the perigynia in the basal spikes, and slightly shorter, as long as, or slightly longer than the perigynia in the terminal spikes, ovate to lanceolate, greenish-white to tan or reddish with hyaline margins, the apices acute, acuminate or cuspidate; perigynia 3-4.9 mm long, (0.7)1-2.1 mm wide, ascending, pale green to straw colored, with 14-18(27) prominent nerves to 0.1 mm wide, glabrous proximally and hispidulous distally (or nearly glabrous throughout), obovoid, triangular to suborbicular in cross-section, contracted below to a white to brown stipitate base, contracted above to beak, the beak straight to strongly bent, 0.1-1 mm long, bidentate; stigmas 3; achenes (1.5)1.9-2.5(2.6) mm long, 0.9-1.6 mm wide, ovoid to obovoid, trigonous with 2 faces convex, 1 face concave, the apices truncate to retuse or obtuse; section *Hallerianae*, Key B. ●Dry, rocky oak-juniper woodland in southern NM. 4200-6800 ft. ♦Similar species: The multiple conspicuous nerves on *C. planostachys* perigynia distinguish it from all other section *Acrocystis* taxa in NM with basal spikes and perigynia that have no nerves other than the two marginal ones. We are including *Carex lativena* S.D. Jones and G.D. Jones in *C. planostachys*. The characters that separate the two (width of nerves and retuse achenes on *C. lativena*) seem ill-defined and perhaps a factor of maturity rather than genetics (pers. correspondence with D. Poindexter, 2018).

Carex praeceptorum Mackenzie [for the teachers, Morton Eaton Peck and James Carlton Nelson]. Plants caespitose; culms 10-31 cm tall; leaf blades 1.5-2.5 mm wide; inflorescence 10-21 mm long, composed of (3)4-5(6) sessile, distinct but overlapping gynecandrous spikes, the spikes 3-11 mm long, oblong, of 8-20 perigynia; pistillate scales subequal to or as long as the perigynia, light chestnut brown with green or lighter center and hyaline margins; perigynia 1.5-2.3 mm long, 1-1.2 mm wide, 1.9-2.1 times longer than wide, appressed-ascending, pale brown, often darker with age, papillose, with prominent nerves on both faces that are often both darker than and raised above the bodies, the dorsal sutures about as long as the beaks and darker than and sometimes extending onto the perigynia bodies, biconvex, short stipitate, widest near the middle, with short, smooth, or serrulate beaks 0.2-0.4(0.5) mm long; stigmas 2; achenes 1.2-1.6 mm long, 0.8-1 mm wide; section *Glareosae*, Key G. ●Bogs and streamsides; known from one location in north-central NM (Carson National Forest, Rio Arriba Co.) at 8400 ft. ♦Similar species: The short beak (no more than 0.5 mm long) of *Carex praeceptorum* distinguishes it from *C. bolanderi* and *C. deweyana*, which have beaks at least 0.9 mm long.

Carex praegracilis W. Boott [very graceful] BLACKCREEPER SEDGE [*Carex camporum* Mackenzie, *Carex latebrosa* Mackenzie]. Plants rhizomatous, often in dense colonies, the rhizomes 1.4-3.6(4) mm thick, coarse, knotty, dark brown or black, culms arising singly, or a few together with internodes between culms up to 2(4) cm long; culms 5-65 cm tall, usually longer than the leaves, usually sharply triangular and scabrous below the heads; leaf blades 1-3.5 mm wide, the sheaths brown to nearly black; inflorescence 1-3(5) cm long, dense to elongate, composed of 4-12 upper spikes sessile on the main rachis and 0-5 multiple-spiked lower branches, the lower branches sometimes separate; spikes similar, erect to spreading, 4-8 mm long, 3-6 mm wide, androgynous or unisexual, with 4-20 perigynia, the staminate flowers inconspicuous, the proximal bract 5-15(30) mm long, with a broad hyaline margin at base, mostly shorter than the inflorescence; pistillate scales similar in size to the perigynia, bronze with a green midvein and broad hyaline margins, becoming pale in age; perigynia 2-3.8 mm long, 1-1.8 mm wide, ascending, green or pale, maturing to brown or black, serrulate to smooth, dull to shiny, nerveless on the ventral face, 0-7 nerved dorsally, elliptic to oblong-elliptic, planoconvex in cross-section, base rounded to truncate, beak 0.7-1.3 mm long; anthers 1.4-3.2 mm long, the apiculus bristly; stigmas 2; achenes 1.5-1.8 mm long; section *Divisae*, Key F. ●Though inconspicuous, *C. praegracilis* is a common wetland sedge that occurs at springs, in seeps, cienegas, floodplains, often in agricultural areas subject to livestock grazing, and in seasonally wet areas; 3500-11,800 ft; northern and western NM. ♦Similar species: *Carex praegracilis* is extremely variable in habit and growth pattern, ranging from seemingly depauperate, widely spaced shoots in alkaline hardpan, to dense lush turf in wet riparian areas. In the northern part of the state, it could be confused with *C. simulata*, another rhizomatous, mostly dioecious species. *Carex simulata* likes wetter zones while *C. praegracilis* favors drier wetland edges, or areas that dry out seasonally. In contrast to *C. praegracilis*, *C. simulata* has light-colored rhizomes and culm bases, and shorter perigynia with beaks 0.5 mm long or less. *Carex praegracilis* can be confused with *C. occidentalis*, which, though usually caespitose, can have short dark brown rhizomes. *Carex occidentalis* grows in dry forests (though it can also grow on the edge of riparian areas), and is always monoecious, while *C. praegracilis* needs some moisture for a period during the year and is often dioecious. Spikes of *C. occidentalis* are virtually always attached to the main axis, while spikes of *C. praegracilis* are often attached to branches in the lower part of the inflorescence. *Carex praegracilis* perigynia beaks are often only obscurely bidentate and serrulate, while *C. occidentalis* perigynia beaks are obviously bidentate and usually doubly serrulate. Also, see discussion under *C. agrostoides*.

Carex praticola Rydberg [a meadow-dweller]. Plants densely caespitose; culms (1)30-70(95) cm tall; leaf blades (1.5)2-3 mm wide; inflorescence (1.7)2.5-5 cm long, elongate, often nodding, sometimes moniliform, composed of 4-10 gynecandrous spikes, the spikes 8.5-20 mm long, 3-9 mm wide, oblanceoloid to broadly ovoid, similar, distinct, sessile, the proximal bract scale-like to bristle-like, shorter than the inflorescence; pistillate scales equaling to longer and narrower than to equaling the perigynia, white, gold, coppery, or brown with a white or green to brown midvein,



hyaline margins 0.1-0.3 mm wide, apex obtuse to acute; perigynia (3.7)4.5-6 mm long, 1.2-2 mm wide, length 2.8-3.1 times the width, appressed to ascending-spreading, often white, hyaline, green or gold, brown or coppery over the achene, usually many-nerved on both sides, ovate to lanceolate, planoconvex to flat, white hyaline or not at tip, the beak tip terete, unwinged, entire for 0.4-1 mm from tip, distance from beak tip to top of the achene (1.6)1.9-3 mm; stigmas 2; achenes 1.4-2.1(2.7) mm long; section *Ovales*, Key H. ●Moist to wet meadows, open dry woods, rocky areas; 9100-9300 ft; known from one location in Rio Arriba County. ♦Similar species: The inflorescence of *Carex petasata* is lighter-colored and has longer perigynia than *C. praticola*. The perigynia of *C. praticola* have terete tips compared to the winged perigynia tips of *C. tahoensis*.

Carex radiata (Wahlenberg) Small [radiating]. Plants without conspicuous rhizomes; culms 13-40(80) cm tall; leaf blades 1.1-1.5(1.9) mm wide; inflorescence 19-42(70) mm long, composed of 3-5(8) spikes each with 1-6(8) erect, spreading, or reflexed perigynia, the proximal internodes 2-4+ times longer than the proximal spikes, spikes androgynous (though male flowers often hard to notice), 2-4.5 mm long, 2-5 mm wide, spreading to erect, the proximal bract 6-26 mm long, shorter (rarely longer) than the inflorescence, threadlike; pistillate scales shorter than the perigynia, ovate, hyaline with green or brown midvein; perigynia 2.2-2.8(3.8) mm long, 0.8-1.2 mm wide, green to pale yellow or pale green with two green marginal nerves, the faces not to weakly nerved, the margins serrulate distally, elliptic to ovate, planoconvex to biconvex in cross-section, base spongy, cuneate to slightly stipitate, beak (0.1)0.3-0.7 mm long; stigmas 2; achenes (1.2)1.3-1.6 mm long, 0.9-1.2(1.4) mm wide; section *Phaestoglochin*, Key F. ●Riparian zones, canyon bottoms, and shady, moist depressions. 7100-8500 ft; rare in northern NM. Our specimens have smaller perigynia than as described in Ball and Reznicek (2002). ♦Similar species: *Carex disperma* can be discerned based on characters as given in the key.



Carex rossii Boott [for John Ross (1777-1856), Arctic explorer]. Plants caespitose; culms 7-25(40) cm tall, usually shorter than the leaves; leaf blades 0.8-3.2(4) mm wide, lax, the sheaths usually reddish brown, the old sheaths slightly fibrous; inflorescences of two types, basal and cauline, the basal inflorescences composed of 1-2 pistillate spikes on a slender, elongate peduncle, the cauline inflorescences 1-3.5 cm long, composed of one terminal staminate spike (rarely lacking), subtended by 2-4 lateral pistillate spikes, the staminate spike 6-13(16.5) mm long, the pistillate spikes 4-11 mm long with 3-6(15) perigynia, the proximal pistillate bracts of the cauline inflorescence leaf-like, usually much longer than the inflorescences; staminate scales pale to slightly tinged with brown or red, the pistillate scales shorter than the perigynia; perigynia 3.2-4.9 mm long, 1.1-1.7(1.9) mm wide, ascending, green to pale brown, with two marginal nerves, sometimes with a few faint nerves on the faces, finely pubescent, obovoid to ellipsoid in outline, suborbicular in cross section, contracted to a narrow stipe-like base, abruptly contracted to beak, the beak 0.8-2 mm long, straight (rarely slightly bent), acuminate, with ciliate-serrulate margins, bidentate, the teeth 0.1-0.8 mm long; stigmas 3; achenes (1.9)2-2.5 mm long, 1-1.3(1.7) mm wide, globose to obovoid to ellipsoid in outline, obtusely trigonous in cross-section; section *Acrocystis*, Key B. ●Ponderosa pine and mixed coniferous forests in the northern and western mountains, rarely above timberline. 6000-11,000 (12,300) ft. ♦Similar species: *Carex rossii* can be confused with *C. brevipes*, *C. pityophila*, and *C. "aff. rossii"*, all of which share reddish bases and lax, lush leaves. See discussion under *C. brevipes*. Both *C. pityophila* and *C. "aff. rossii"* differ from *C. rossii* in generally having fewer perigynia per pistillate spike, shorter culms, and thinner, more involute inflorescence bracts that barely exceed the inflorescence. *Carex rossii* also usually has pale staminate spikes, while both *C. "aff. rossii"* and *C. pityophila* have staminate spikes with darker, purple-red colored scales.



Carex "aff. rossii" ined. [a provisional name, similar to *Carex rossii*]. Plants caespitose; culms 7-15 cm tall, usually shorter than the leaves; leaf blades 0.8-3.4(3.7) mm wide, flat, lax, the sheaths usually reddish to orangish brown, the old sheaths slightly fibrous; inflorescence of two types, basal and cauline, the basal inflorescences composed of 1-2 pistillate spikes on slender, elongate peduncles, the cauline inflorescence 0.8-3.5 cm long, composed of 1 staminate terminal spike (rarely lacking), subtended by 2-4 lateral pistillate spikes, the staminate spike 7.5-13 mm long, on a short peduncle or often with a pistillate flower close to its base, the pistillate spikes 4-11 mm long with 1-4 perigynia, the proximal pistillate bracts of the cauline inflorescences narrow, sometimes involute, subequal to slightly longer than the inflorescence; staminate scales with dark purplish-black coloring, the pistillate scales shorter than the perigynia; perigynia 3.2-4.5 mm long, 1.2-1.8 mm wide, ascending, green to pale brown, with two marginal nerves, sometimes with a few faint nerves on the faces, finely pubescent, obovoid to ellipsoid in outline, suborbicular in cross section, contracted to a narrow stipe-like base, abruptly contracted to the beak, the beak 0.7-1.4 mm long, straight (rarely slightly bent), acuminate, with ciliate-serrulate margins, bidentate, the teeth 0.1-0.9 mm long; stigmas 3; achenes (1.9)2-2.5 mm long, 1-1.3(1.7) mm wide, globose to obovoid to ellipsoid in outline, obtusely trigonous in cross-section; section *Acrocystis*, Key B. ●Pinyon-juniper woodland, ponderosa pine, and mixed conifer forests in the northern and western mountains. ♦This putative new species is based on work within section *Acrocystis* by D.B. Poindexter for his dissertation at University of North Carolina at Chapel Hill. *Carex "aff. rossii"* appears to be far more common in NM than *C. rossii*, which differs as per the discussion under *C. rossii*. The range of *Carex "aff. rossii"* includes AZ, CO, NM, NV, and UT. ♦Note: No official nomenclatural novelty is proposed herein.



Carex rupestris Allioni [growing among rocks] [*Carex rupestris* Bellardi ex Allioni var. *drummondiana* (Dewey) Bailey, *Carex drummondiana* Dewey]. Plants rhizomatous, with culms in loosely caespitose tufts or forming large patches of sparse turf, the rhizomes scaly, brown; culms 4-12(15) cm tall, erect, shorter to slightly longer than the leaves; leaf blades 1.4-3(3.8) mm wide, flat or channeled, the tips often curling, the sheaths reddish-purple to brownish; inflorescence a single terminal androgynous spike, 8-21 mm long, the staminate portion shorter than or as long as the pistillate portion, with 3-10 pistillate flowers, inflorescence bract lacking; pistillate scales longer and wider than the perigynia, ovate to circular-ovate, brown to mostly dark brown with hyaline margins and a pale midvein, the upper scale apices obtuse, the lower scale apices acute to awn tipped; perigynia (2.5)2.9-3.7(4) mm long, 0.9-1.6(2) mm wide, erect to ascending, cream to pale green, dark brown distally, several-nerved, ellipsoid to obovoid, the beak 0.1-0.2 mm long, dark brown, entire, sometimes with a fringe of tiny, tooth-like hairs; stigmas 3; achenes trigonous, 2.1-2.8 mm long, 0.9-1.4 mm wide; section *Rupestris*, Key A. ●Alpine summits, meadows and rocky ridges, 11,800-13,000 ft; found in the northern Sangre de Cristo Mtns. ♦Similar species: *Carex rupestris* grows in the same habitat as *C. elynoides*, but is rhizomatous and has much wider leaves that often curl at the tip. See discussion under *Carex obtusata*.



Carex saxatilis Linnaeus [of rocky places]. Plants colonial from rhizomes 1.2-2.6 mm thick; culms (8)16-45(80) cm tall, shorter to longer than the leaves, triangular, scabrous angled above; leaf blades (1)1.5-3(5) mm wide, long-tapered to a narrow tip, the sheaths brown to reddish brown; inflorescence (3)4-8(14) cm long, composed of 1-2(3) terminal staminate spikes and (1)2-3 lateral pistillate spikes, the staminate spikes 15-30(40) mm long, the pistillate spikes 9-21(40) mm long, the lowest sometimes pendent, the proximal bract (0.6)4-17(29) cm long, shorter to longer than the inflorescence; pistillate scales mostly shorter than to as long as the perigynia, ovate to ovate-lanceolate, dark brown to reddish black, often with white hyaline apices, the apices acute or obtuse; perigynia 2.2-4.2(5) mm long, 1.1-2(2.9) mm wide, 2 times as long as wide, ascending to spreading, dark brown becoming reddish black distally with dark yellowish proximal portion, nerveless ventrally, 4-6 nerved dorsally, elliptic, ovate, or ovate-lanceolate in profile, moderately inflated at maturity, loosely enclosing the achene; beak (0.2)0.3-1.1 mm long, smooth, very shallowly bidentate with teeth up to 0.2 mm long; stigmas 2(3); achenes (1.6)1.8-2.6 mm long, 1.3-1.8 mm wide; section *Vesicariae*, Key C. ●Fens, bogs, lakeshores, ponds and slow moving streams; 10,300-11,600 ft; known only from the San Pedro Parks Wilderness (Rio Arriba Co.) and Glacier Lakes (Colfax Co.) ♦Similar species: *Carex saxatilis* could be confused with *C. scopulorum*, as both are high elevation wetland sedges with dark, short pistillate spikes. *Carex saxatilis* has narrower leaf blades and culms more widely spaced along the rhizomes, and has moderately inflated perigynia that loosely enclose the achene, while *C. scopulorum* forms denser colonies, has wider leaf blades and flattened perigynia more tightly enclosing the achene. Beaks of *C. saxatilis* perigynia are longer and more prominent than the short beaks of *C. scopulorum*.



Carex scoparia Schkuhr ex Willdenow [broom-like]. Plants densely cespitose, rarely short rhizomatous; culms (17)20-76(100) cm tall, mostly longer than the leaves; leaf blades 1.2-4(4.2) mm wide; inflorescence (1)1.2-4 cm long, usually elongate, composed of (1)3-9(13) spreading to erect, gynecandrous spikes, the spikes (5)6-12(16) mm long, ellipsoid, pale green to light brown, sessile, similar, distinct, the proximal bract scale-like with a bristle tip (often broken off in herbarium specimens); pistillate scales shorter and narrower than the perigynia, ovate, the apices acuminate to acute, light brown, sometimes with a pale green or pale midvein, hyaline margins 0-0.2 mm wide; perigynia 3.3-5.4(6.8) mm long, (1)1.2-2.2 mm wide, more than twice as long as wide, erect to ascending, cream to green to light brown, nerved or not, ovate to narrowly ovate, flat except over the achene, beak winged, ciliate-serrulate to the tips, distance from beak tips to top of the achenes 2-3 mm; stigmas 2; achenes (1)1.2-1.7 mm long, 0.7-0.9(1) mm wide; section *Ovales*, Key H. ●Wetlands, wet meadows, streamside, edges of ponds, seasonal ponds, in wet or saturated soils; 5000-8100 ft; uncommon in NM. ♦Our plants belong to var. *scoparia*. Similar species: *Carex hebbii* has smaller perigynia. *Carex subfusca* usually has spikes that are not as easily distinguished as those of *C. scoparia* and the pistillate scale apices are usually not as obviously acuminate as in *C. scoparia*. See comments under *C. brevior*.



Carex scopulorum T. Holm [of the Rocky Mountains]. Plants rhizomatous, the rhizomes 1.4-6 mm thick; culms 7-40(65) cm tall, shorter or longer than the leaves; leaf blades 1.6-3.5(6) mm wide, the sheaths red brown to dark brown, not ladder-fibrillose; inflorescence dark, 2-8 cm long, composed of 1 terminal spike (0.8)1-2(2.5) cm long, staminate or androgynous, occasionally gynecandrous or with perigynia between staminate flowers on the spike, sometimes a second staminate spike below the terminal spike and 1-5 lateral pistillate or androgynous spikes 1-5, erect, 0.5-3.1 cm long, proximal bract shorter than the inflorescence; pistillate scales narrower and shorter or longer than the perigynia, black, with pale midvein (often inconspicuous), awnless; perigynia 2-3.1(4) mm long, 1.2-2.3 mm wide, ascending, dull, pale brown, nerveless, elliptic or obovate, beak 0.1-0.5(0.6) mm long, entire, sometimes ciliate at the apex; stigmas 2; achenes ca 1.4 mm long; section *Phacocystis*, Key E. ●Seeps, springs and edges of lakes and ponds in alpine and subalpine habitats. 9600-13,000 ft; uncommon in northern NM. New Mexico specimens are somewhat intermediate between var. *scopulorum* and var. *bracteosa* (Standley et al. 2002), but more consistently exhibit the features of var. *scopulorum*. ♦Similar species: In its high elevation habitats, *Carex scopulorum* is only likely to be confused with *C. aquatilis*. See discussion under that species.



Carex senta Boott [neglected]. Plants loosely to densely cespitose, the rhizomes 1.6-4 mm thick; culms arising in large clumps, 40-80(100) cm tall, longer than the leaves; leaf blades 1-6(8) mm wide, the sheaths red-brown, often shiny, ladder-fibrillose, ligule U-shaped, longer than wide; inflorescence (5)7-15(19) cm long, composed of 2-3 terminal staminate spikes and 2-4 lateral pistillate spikes, each with a peduncle up to 2(4) cm long, proximal pistillate spike 2-8 cm long, proximal bract shorter or longer than the inflorescence; pistillate scales narrower and shorter than to equaling the perigynia, oblong to lanceolate, dark with a greenish midvein, awnless; perigynia 3-3.5 mm long, 1.5-2(2.3) mm wide, ascending, dull, leathery, weakly to strongly 5-7 nerved on each face, ovate to obovate, beak brown, 0.2-0.3 mm long, entire; stigmas 2; achenes 1.5 mm long; section *Phacocystis*, Key E. ●Along rivers, streams and lakes, often forming tussocks on midstream rocks; 4500-8500 ft; uncommon in southwest NM. ♦Similar species: This is the only sedge in NM in section *Phacocystis* that has shiny red-brown basal leaf sheaths that become ladder-fibrillose. Standley's (2002) statement that, "Collections from New Mexico identified as *C. senta* are *C. stricta*" is incorrect.

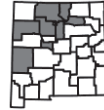


Carex siccata Dewey [dried] DRYSPIKE SEDGE [*Carex aenea* of authors, not Fernald nor Willdenow, *Carex foenea* Fernald var. *tuberculata* F.J. Hermann]. Plants rhizomatous with culms arising singly from long, brown rhizomes, the rhizomes 0.6-1.6 mm thick, scaly with pithy cortex that can be peeled off; culms 15-90 cm tall, as long as or longer than the leaves, scabrous angled to more rarely smooth below the inflorescence; leaf blades 1-3.5 mm wide, the sheaths pale to brown; inflorescence 1-3.5 cm long, 3-9 mm wide, usually elongate, cylindrical to slightly clavate, unbranched, composed of 4-9, ascending spikes, upper spikes often indistinguishable, terminal spike androgynous or appearing pistillate, often subtended by one or more short staminate spikes and thus appearing falsely gynecandrous, the middle spikes staminate or androgynous, the lower spikes staminate, pistillate, or androgynous; spikes 5-10 mm long, 1-8 mm wide, sessile, the proximal bract inconspicuous, setaceous, shorter than the inflorescence; pistillate scales shorter than to as long as the perigynia, brown with pale or green center and hyaline margins; perigynia 3.6-6 mm long, 1.2-2 mm wide, ascending, green to brown or black, about 10-nerved dorsally, nerveless ventrally, sharp margined, elliptic to ovate, planoconvex in cross-section, beak 1.2-2.5 mm long; anthers 2.3-3.4; stigmas 2; achenes 2 mm long; section *Ammoglochin*, Key F. ●Forests and grasslands, alpine meadows; 6600-12,300 ft; mountains of the western 2/3 of NM. ♦Similar species: *Carex siccata* is one of the most common woodland sedges in montane NM, but has often been mistaken for other taxa. The arrangement of staminate and pistillate flowers/spikes in the inflorescence of this taxon described above is unique in NM *Carex*, most notably the often staminate condition of the middle spikes, with only the upper, or sometimes both upper and lowest spikes androgynous with each containing few perigynia. This often gives the inflorescence a "narrow-waisted" look, which has led some

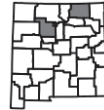


authors to say that the plant appears “falsely gynecandrous”, since the middle spikes look like they are part of the upper spike, and the few staminate flowers on the top of the top spike are early deciduous. This inflorescence architecture is readily discernable at early stages before mature perigynia are formed by noting where anthers and stigmas are showing. Infrequently in NM, *C. siccata* will demonstrate all androgynous spikes, but it can still usually be determined by rhizome characters coupled with habitat, along with perigynia shape. At early stages, the entire inflorescence can appear linear and compact, and may even be mistaken for single-spiked species. *C. duriuscula* can resemble *C. siccata* but usually has finer rhizomes, shorter culms that are smooth below the inflorescence, and more oval heads composed of more consistently androgynous spikes each containing smaller perigynia. The rhizomes of *C. siccata* are uniformly light brown to tan, unlike the dark rhizomes of *C. praegracilis*. *Carex simulata*, which shares the light-colored rhizomes, is almost always found in standing water, while *C. siccata* never is. See discussion under *C. douglasii*.

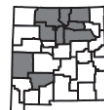
Carex simulata Mackenzie [resembling *Carex gayana*]. Plants rhizomatous, often forming large, dense, unisexual, clonal stands, the rhizomes 1.2-3 mm thick, light to medium brown, the culms arising singly, internodes between culms up to 7 cm long; culms 12-60 cm tall, usually longer than the leaves, sharply triangular, usually minutely scabrous below the inflorescence; leaf blades 1-3 mm wide, the sheaths brown, often with red-spotted hyaline fronts; inflorescence compact into a narrow, fusiform head, mostly unisexual, lowest branches often with 2-several spikes, the staminate heads 2-3 cm long, with 5-8 lanceoid spikes, the staminate spikes 4-9 mm long, 1-3 mm wide, the pistillate heads 1.3-2.8 cm long, with 7-12 ovoid spikes, the pistillate spikes 4-8 mm long, 3-4 mm wide, the proximal pistillate bract broad-based, 0.2-4 cm long, usually shorter than the inflorescence; pistillate scales wider and longer than the perigynia, coppery to reddish brown to dark brown, rarely black, with broad hyaline margins; perigynia 1.7-2.4 mm long, 1.3-1.5 mm wide, chestnut to dark reddish brown, smooth, glossy, 2-6 nerved dorsally, nerveless ventrally, ovate to rhombic-orbicular, planoconvex to biconvex in cross-section, base rounded, spongy, beak 0.3-0.5 mm long; anthers 2.2-2.8 mm long, apiculus papillate; stigmas 2; achenes 1.2-1.5 mm long; section *Divisae*, Key F. ●Wetlands with saturated soils, often in standing water; 6100-11,700 ft; northern and western NM. ◆Similar species: see discussions after *Carex praegracilis* and *C. diandra*.



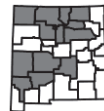
Carex sprengelii Dewey ex Sprengel [for Kurt Polykarp Joachim Sprengel (1776-1833), Prussian physician-botanist]. Plants loosely caespitose; culms 30-65(90) cm tall, the bases covered with dense fibrous remains (“horse hair”) of the previous year’s leaves; leaf blades (1.8)2-4 mm wide, up to 40 cm long; inflorescence 10-20 cm long, composed of one terminal staminate spike and (1)3-5 lateral pistillate spikes, the staminate spike 10-20(22) mm long, erect or slightly drooping, the pistillate spikes (10)13-26(35) mm long, pendent on mostly long, flexuous peduncles, the peduncles (6)18-80 mm long, the proximal bract shorter than to equaling the inflorescence; pistillate scales mostly shorter than but sometimes as long as the perigynia, ovate to ovate-oblong, the apices acuminate, hyaline tinged with chestnut and with green midrib, proximal scales sometimes awned; perigynia (4.5)4.8-5.5(6.5) mm long, (1)1.2-1.8(2) mm wide, tan to golden-green, glabrous with two marginal nerves, oblong, orbicular in cross-section, the top of the body rounded, abruptly contracted to a thin, tubular beak 1.9-2.8 mm long with bidentate teeth (0.3)0.6-1 mm long; stigmas 3; achenes (2)2.2-2.5 mm long, 1-1.4(1.8) mm wide; section *Hymenochlaenae*, Key C. ●Riparian areas in canyon bottoms, mesic habitats in conifer forests or woodlands; 7400-8800 ft; known from the Jemez Mountains and Sugarite State Park near the Colorado border. ◆Similar species: The dense fibrous culm base, as well as the rounded apex of the perigynium body terminated by a long tubular beak, distinguish *C. sprengelii* from all other similar *Carex* taxa with spreading or pendent lateral spikes (*C. capillaris*, *C. hystericina*, *C. limosa*, *C. magellanica*).



Carex stevenii (Holm) Kalela [from Steven’s Mine, Clear Creek County, Colorado] [*Carex alpina* Liljebland var. *stevenii* T. Holm, *Carex media* of NM authors, *Carex media* R. Brown var. *stevenii* (Holm) Fernald, *Carex norvegica* Retzius subsp. *stevenii* (Holm) D.F. Murray]. Plants caespitose, from short, slender rhizomes; culms 10-60 cm tall, longer than the leaves; leaf blades 1.1-3.2(4) mm wide, the sheaths tan to purplish red, the fronts hyaline; inflorescence (9)16-30 mm long, compact, composed of 1 terminal gynecandrous spike and 1-3 (typically 2) lateral pistillate spikes, the spikes short-ovoid to oblong, the terminal spike often longer than the lateral spikes, the lateral spikes (3)4-10 mm long, the lowermost spike sometimes slightly remote, the proximal bract shorter or longer than the inflorescence; pistillate scales shorter than the perigynia and as wide, broadly ovate, dark brown to black with hyaline margins, midvein absent or inconspicuous, the apices obtuse to acute; perigynia 1.9-2.7 mm long, (0.8)1-1.4 mm wide, ascending, pale green or pale yellow to brown, smooth to distally papillose, marginal nerves only, serrulate distally, elliptic, fully filled by the achene, abruptly contracted to a beak (0.1)0.2-0.4 mm long; stigmas 3; achenes trigonous, 1.2-2 mm long, 0.8-1.1 mm wide; SECTION *Racemosae*. Key D. ●Moist meadows, springs, and streambanks, often in partially shaded areas in forests; (6200)7700-12,300 ft; found in the Sangre de Cristo and Jemez mtns, with one occurrence from the Mogollon Mtns. ◆Similar species: *Carex stevenii* is distinctive with its small distinct spikes in a compact head, small light-colored perigynia, which surpass and contrast sharply with the dark scales, and are completely filled by the achenes. *Carex bella* has more elongate spikes and larger perigynia that are somewhat flattened, and lateral spikes that are generally pendent at maturity, with a few staminate flowers at the base.



Carex stipata Muhlenberg ex Willdenow [crowded] AWL-FRUIT SEDGE. Plants densely caespitose forming large tussocks, from short, stout, dark rhizomes; culms 20-75(120) cm tall, 4-6 mm wide, mostly shorter than, but sometimes longer than the leaves, sharply and broadly winged below the head; the leaf blades 2-8(11) mm wide, the sheaths brown, the sheath fronts cross-rugulose near summit; inflorescence 2-6 cm long, dense to elongate, spikey in appearance due to long perigynia beaks, composed of 10-15 multiple-spiked branches, upper not distinguishable, lower distinguishable, the proximal bract setaceous, sheathless; spikes numerous, similar, androgynous, 3-7 mm long, 2-8 mm wide, spreading, 4-10 flowers per spike; pistillate scales shorter than to as long as the perigynia, hyaline to yellow-brown, with a green midvein; perigynia 3.6-4.6 mm long, 1-1.6(2) mm wide, green becoming brown at maturity, nerves 5-15, prominent on both sides, broadest near the base, the base spongy, truncate to cordate, often basally bulbous, lance-triangular, planoconvex or biconvex in cross-section, tapering gradually to the tip, or sometimes abruptly narrowing above the middle forming a violin shape, the beak 2-3.5 mm long; anthers 1.4-1.5 mm long; stigmas 2; achenes 1.3-2.3 mm long; section *Vulpinae*, Key F. ●Wetland, often inundated with flowing water, near springs, along lakes and streams; 6000-9800 ft; mountainous areas of NM. ◆Our plants belong to var. *stipata*. Similar species: *Carex vulpinoidea* shares the dense, branched inflorescence character, and the cross-rugulose sheaths of *C. stipata*, but the inflorescence of the former is finer textured, with multiple setaceous inflorescence bracts, and it has smaller perigynia that are broadest above the base, without swollen pithy tissue at the base. The inflorescence of *C. agrostoides* is also branched, though with a softer feel



than that of *C. stipata*. The perigynia of *C. agrostoides* can be similar in shape, with the swollen bases, the violin-like “waist”, and prominent nerves. However, the culms of *C. stipata* are stouter, with winged margins, while the culms of *C. agrostoides* lack wings. Also, *C. agrostoides* lacks the cross-rugulose sheath fronts of *C. stipata*.

Carex subfusca W. Boott [nearly or slightly brown, the scales] BROWN SEDGE [*Carex macloviana* D’Urville subsp. *subfusca* (W. Boott) T. Koyama]. Plants densely caespitose; culms 10-80(105) cm tall, longer than the leaves; leaf blades 0.8-2 mm wide; inflorescence 1.1-3 cm long, compact to elongate, rarely somewhat moniliform, the base tapered, composed of 4-12(14) erect to spreading, gynecandrous, similar, mostly indistinguishable spikes, the spikes 4-12 mm long, 1.7-7 mm wide, broadly ovoid to narrowly ellipsoid, sessile, similar, the proximal bract usually shorter than the inflorescence, but sometimes leaf-like and longer, wide (usually hyaline) basal portion of the proximal bract less than half as long as the lowest spike; pistillate scales, shorter and narrower to sometimes covering the perigynia, light green to brown, usually with a pale, straw, or green midvein and hyaline margins; perigynia 2.4-4(4.3) mm long, 0.9-1.2(1.5) mm wide, ascending, green to tan or brown, dorsally nerved, dorsal suture not hyaline margined, ventrally nerved or not, narrowly to broadly ovate, narrowly wing-margined to the round-tapering base, planoconvex to biconvex, beak winged and serrulate to tip or less often tip terete and distally entire for up to 0.5 mm, distance from beak tip to top of the achene 1.2-1.8(2) mm; anthers 1.7-2.8 mm long; stigmas 2; achenes 1-1.6 mm long; section *Ovales*, Key H. ●Moist to wet meadows, streambanks, forest margins; 5500-10,700 ft; widespread in northern and southwestern NM. ♦Similar species: see notes under *Carex athrostachya*, *C. microptera*, and *C. scoparia*.



Carex tahoensis Smiley [for the Lake Tahoe region]. Plants densely caespitose; culms (15)40-70 cm tall, longer than the leaves; leaf blades 1.5-2.2(2.5) mm wide, folded or revolute; inflorescence (1.5)2-3.2 cm long, compact to elongate, composed of 3-4(6) gynecandrous spikes; the spikes 5-15 mm long, lanceoloid, often slightly clavate due to a larger number of male flowers at the base, distinct, erect, similar, sessile, the proximal bract scale-like or bristle-like, shorter than the inflorescence; pistillate scales usually covering the perigynia, red-brown with a straw to tan midvein, with hyaline margins 0.2-0.8 mm wide, the apices generally acute to short-awned, hyaline; perigynia 4-4.8(6.2) mm long, 1.4-2(2.6) mm wide, appressed, green to brown with age, many-nerved on both sides, lanceolate to ovate to oblanceolate, the base long-tapering, planoconvex, distended by achene, beak 0.8-1.7 mm long, serrulate and winged to the tip or nearly so, the distance from beak tip to top of the achene 1.7-2.2(2.6) mm; stigmas 2; achenes (1.7)2.1-2.2(2.5) mm long, 1.2-1.4(1.6) mm wide; section *Ovales*, Key H. ●Grasslands, sagebrush slopes, open rocky and sandy slopes, subalpine and alpine meadows; 9400-9900 ft; known from two locations in northern NM (Rio Arriba and Taos counties). ♦Similar species: see notes under *Carex petasata*, *C. phaeocephala* and *C. praticola*. Our NM collections are similar to others from the Rocky Mtns. and mountain ranges of the Colorado Plateau, which have been identified as this taxon. However, we think that they may be different from the *C. tahoensis* described from California. More taxonomic work is needed to determine the relationships here.



Carex tenera Dewey [soft, delicate, tender]. Plants densely caespitose; culms 20-75(90) cm tall, usually longer than the leaves, flexible; leaf blades 1.3-2.5 mm wide; inflorescence 1.5-3 cm long, elongate, proximal internode (2)4-9 mm long, moniliform, sometimes nodding, composed of 3-5(8) erect to spreading, gynecandrous, spikes, the spikes obovoid to globose, tapering to base, 5-11 mm long, similar, distinct, sessile, the proximal bract with thread-like awn to 2 cm long; pistillate scales shorter and narrower than the perigynia, ovate, brown hyaline to pale brown, with a green to pale midvein; perigynia (2.1)2.8-3.8(4) mm long, 1.4-2 mm wide, erect to loosely spreading, green to straw-colored with a brown to red-brown tip, dorsal nerves (1)4-9, ventral nerves 0-8, ovate to broadly ovate, planoconvex, distance from perigynium tip to top of the achene 1-1.9(2.7) mm, the beak winged and serrulate to the tip or nearly so; stigmas 2; achenes 1.3-1.7 mm long, 0.9-1.2 mm wide; section *Ovales*, Key H. ●Dry to wet open forests and meadows, seeps; 8000-8100 ft; Rio Arriba Co. ♦Our plants belong to var. *tenera*. Similar species: *Carex subfusca* has similar-sized perigynia, but its inflorescence is usually not moniliform nor nodding. *Carex praticola* has a nodding moniliform inflorescence, but the perigynia are much larger than those of *C. tenera*.



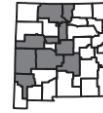
Carex ultra L.H. Bailey [more than, stouter than *Carex laciniata*] [*Carex spissa* var. *ultra* (L.H. Bailey) Kükenthal]. Plants densely caespitose from stout rhizomes; culms 50-160 cm tall, often longer than the leaves; leaf blades 6-15 mm wide, often glaucous, thick, stiff, roughly antrorsely scabrous on margins and keel, basal sheaths brown or reddish, with sheath fronts densely red-spotted or blotched, ladder-fibrillose; inflorescence 18-50 cm long, composed of 1-3 terminal staminate spikes and 3-6 erect lateral pistillate spikes, the staminate spikes 2-12 cm long, the pistillate spikes 2-13 cm long, 0.5-0.8 mm wide, cylindrical, the lowest stiffly long-pedunculate, the proximal bract leaf-like, shorter or longer than the inflorescence; pistillate scales shorter to as long as the perigynia, the apices acute to acuminate, the tip often ciliate-serrulate; perigynia 2-5 mm long, (1)1.4-2.2 mm wide, lance-oblong or obovoid, appressed, pale green to reddish-brown, with red-brown spots, nerved or not, compressed trigonous and slightly inflated above, abruptly short-beaked, beak 0.2-0.6 mm long; stigmas 3; achenes 1.9-2.2 mm long, 0.8-1.1 mm wide; section *Hispidae*, Key C. ●Springs and stream banks; 4800-5200 ft; known only from two locations in the Peloncillo Mtns near the AZ border. ♦Similar species: *Carex ultra* is the most robust *Carex* taxon in NM. The elongate, oblong or obovoid, pale green to reddish-brown perigynia with red-brown spots, and the thick, usually glaucous, leaf blades with harshly scabrous margins distinguish it from others. Also see discussion under *C. amplifolia*.



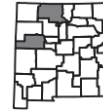
Carex utriculata Boott [bladdery] NORTHWEST TERRITORY SEDGE. Plants colonial, in dense stands from rhizomes; culms 22-100 cm tall, shorter than the leaves; leaf blades (1)3-10 mm wide, the sheaths spongy-thickened, often cross-walled with a brick-like pattern, brown, rarely reddish in smaller plants, the ligules of the lowest leaf blade shorter than wide, apex rounded, sometimes acute; inflorescence (8)10-30(35) cm long, composed of (1)2-5(6) terminal staminate spikes and (1)2-3(4) ascending lateral pistillate spikes, the staminate spikes 0.9-9 cm long, the pistillate spikes 0.9-6(9) cm long, the upper usually sessile, the lower usually on short peduncles, the proximal bract leaf-like, 10-55 cm long, usually longer than the inflorescence; pistillate scales narrower and mostly shorter than the perigynia, lanceolate-ovate to narrowly lanceolate, the apices acute to awn-tipped; perigynium 3-5(5.8) mm long, 1-2(3) mm wide, ascending to widely spreading, green to straw-colored to reddish-brown, 6-10 veined, ovoid to ellipsoid, densely packed, inflated, the beak prominent, 0.8-1.8 mm long, bidentate with straight to curved teeth 0.2-0.5 mm long; stigmas 3; achenes 1.1-2 mm long, 0.9-1.1 mm wide; section *Vesicariae*, Key C. ●Wet meadows, marshes, pond and lake margins, and stream banks; 5600-12,000 ft; common and widely scattered in the western 2/3 of NM, especially in the north. ♦Similar species: *Carex utriculata* is often confused with the much less frequently encountered *C. vesicaria*. They grow in similar habitats, but *C. utriculata* grows in deeper water, while *C. vesicaria* prefers shorelines and damp meadows. *C. vesicaria* has larger perigynia that often appear to be more ascending, while those of *C. utriculata* are smaller and more spreading when mature.



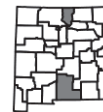
Carex vallicola Dewey [a valley-dweller] [*Carex rusbyi* Mackenzie, *Carex vallicola* Dewey var. *rusbyi* (Mackenzie) F.J. Hermann]. Plants caespitose or rarely short rhizomatous; culms 12-45 cm tall, longer than the leaves, crowded; leaf blades (0.5)1-3 mm wide, the sheaths green; inflorescence 1-3.2 cm long, 4-9 mm wide, usually elongate, unbranched, composed of 5-8 sessile androgynous spikes, the spikes similar, 5-8 mm long, 2-6 mm wide, erect to spreading, androgynous, staminate flowers often inconspicuous, with 2-12 perigynia per spike, the proximal bract short, inconspicuous, sheathless, usually shorter than the inflorescence; pistillate scales shorter than the perigynia, 2-5.8 mm long, hyaline with a green, 1-3-veined center; perigynia (2.5)3.1-4.3 mm long, 1.6-2 mm wide, ascending to spreading, green, glossy, 7-17 nerved proximally dorsally, nerveless ventrally, the marginal nerves pushed to the ventral face at maturity, marginal serrations none to scant, ovate, biconvex in cross-section, beak 0.5-1 mm long; anthers 1.2-2.4 mm long; stigmas 2; achenes 1.6-2.7 mm long; section *Phaestoglochin*, Key F. ●Dry grasslands, woodlands, forests, more mesic habitats at lower elevations; 6900-9400 ft; northern and western NM. ♦Similar species: see discussion following *Carex occidentalis*.



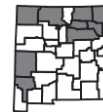
Carex vesicaria Linnaeus [bladder-like]. Plants densely clumping or colonial from short, stout rhizomes; culms 30-95 cm tall, shorter than the leaves; leaf blades 1.5-6(8) mm wide, the sheaths rarely spongy-thickened or cross-walled, the sheaths red to purplish brown, sometimes ladder-fibrillose, the fronts often red-spotted, ligules of lowest leaf usually twice as long as wide, the apices acute; inflorescence 10-22 cm long, composed of 1-3(5) terminal staminate spikes and (1)2-3 ascending widely separated lateral pistillate spikes, the staminate spikes 1.2-6.5 cm long, the pistillate spikes 1.4-5(7.5) cm long, the upper sessile, the lower usually on short peduncles, the proximal bract leaf-like, 10-35 cm long, longer than the inflorescence; pistillate scales narrower and shorter than the perigynia, awnless or sometimes tapering to a smooth awn; perigynia 3.8-7.5 long, (1.5)2.2-3.4 mm wide, mostly strongly 7-12 nerved, lanceoloid to ovoid-lanceoloid, inflated, the beak 1.1-2 mm long, bidentate with straight or curved teeth 0.3-1.2 mm long; stigmas 3; achenes 1.7-3 mm long; section *Vesicariae*, Key C. ●Wet meadows, pond margins, and stream banks; 7700-8400 ft; known only from a few widely scattered locations (Cibola and Rio Arriba counties). ♦Similar species: see discussion under *Carex utriculata*.



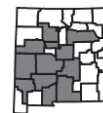
Carex viridula Michaux [greenish] [*Carex oederi* auctores, *Carex oederi* Retzius subsp. *viridula* (Michaux) Hultén]. Plants caespitose; culms 10-35 cm tall, straight or arching; leaf blades 1.5-3(4.5) mm wide; inflorescence composed of 1 staminate (occasionally androgynous) spike, and 1-4(7) lateral pistillate (rarely androgynous) spikes, the terminal spike 3-12 mm long, cylindrical, the lateral spikes 4-12 mm long, ovoid or oblong to globose, sessile or pedunculate, proximal spike sometimes remote, the inflorescence bracts leaf-like, the lowest far exceeding the inflorescence, 3-15(18) cm long, erect to sometimes widely diverging; pistillate scales much shorter than the perigynia, pale brown to golden brown with green, the midrib keeled, the apex obtuse; perigynia 1.8-3 mm long, 0.8-1.4 mm wide, yellow green to green, with several prominent nerves, abruptly narrowed to the beak, beak 0.3-1.1 mm long, straight or slightly bent, smooth or minutely serrulate; stigmas 3; achenes 1-1.6 mm long, 0.6-1 mm wide; section *Ceratocystis*, Key C. ●Wet meadows, alkaline seeps, springs; 7800-10,000 ft; known only from canyons in the Sacramento Mtns. (Otero Co.) and one location in Taos Co. ♦Our plants belong to var. *viridula*. Similar species: The leafy inflorescence bracts that far exceed the inflorescence distinguish *Carex viridula* from other small *Carex* taxa with similar inflorescence structure (i.e. *C. blanda*, *C. conoidea*, *C. microdonta*).



Carex vulpinoidea Michaux [resembling *Carex vulpina*] FOX SEDGE. Plants caespitose from short to long, stout rhizomes; culms (20)30-100 cm tall, shorter than to as long as the leaves; leaf blades up to 3.5 mm wide, leaf sheaths ventrally cross-rugulose near summit, the ligules up to 2 mm long; inflorescence (1.6)3-5 cm long, dense to elongate, composed of 10-15 densely aggregated branches of multiple spikes each, lower internodes 20(25) mm long, the proximal bract up to 14 cm long, sheathless, upper inflorescence bracts shorter, but usually obvious, appearing hair-like throughout the inflorescence; spikes numerous, similar, sessile, androgynous, spreading, 3-9 mm long, 2-6 mm wide; pistillate scales shorter than to equaling the perigynia, hyaline to greenish brown; perigynia 2.2-2.8 mm long, 1.3 mm wide, green to straw-colored, or pale brown, dull, veinless or few nerved dorsally, veinless ventrally, the margins sharp, the base spongy, truncate to cordate, ovate, planoconvex in cross-section, the beak 0.8-1.2 mm long; anthers 1.4-1.5 mm long; stigmas 2; achenes 1.2-1.4(1.6) mm long; section *Multiflorae*, Key F. ●Wetlands along streams and lakes; 5300-8200 ft; northern and southwest NM. ♦Similar species: The hair-like inflorescence bracts of *Carex vulpinoidea* set it apart from all other species it might be confused with in NM. See also discussion following *C. stipata*.



Carex wootonii Mackenzie [for Elmer Otis Wooton (1865-1945), premier New Mexico botanist] WOOTON'S SEDGE. Plants densely caespitose, forming small clumps from short rhizomes; culms (15)21-70(75) cm tall, longer than the leaves; leaf blades 1-4 mm wide, inflorescence 1.7-4 cm long, elongate or compact, composed of 3-7(8) gynecandrous, similar spikes, the spikes 9-21 mm long, obovoid, erect, sessile, often distinct, the proximal internode (2)4-10 mm long, the proximal bract leaf-like or bristle-like, shorter or longer than the inflorescence; pistillate scales shorter and narrower than the perigynia, reddish or golden brown with a pale or green midvein, hyaline margins 0-0.5 wide; perigynia (4.8)5.2-7(7.2) mm long, (1.6)1.8-2.9(3) mm wide, 2.1-3.1(3.5) times longer than wide, appressed, forest green when fresh, usually lacking nerves on either side, broadly wing-margined to the rounded base, narrowly ovate to ovate, planoconvex to flat, long tapering to the usually winged beak, serrulate or nearly so to the beak tip, winged to tip or not, distance from beak tip to top of the achene 2-3.6 mm; stigmas 2; achenes 1.6-3 mm long, 1.3-1.7 mm wide; section *Ovales*, Key H. ●Dry places in open meadows and slopes, clearings in forests, and rocky areas; 6700-11,000 ft; widespread in central to western NM. ♦Similar species: the inflorescence of *Carex petasata* is lighter-colored than in most *C. wootonii*. *Carex wootonii* has longer perigynia than *C. tahoensis*, *C. phaeocephala* and *C. praticola*. See notes under *Carex* "*apachense*" and *C. petasata*.

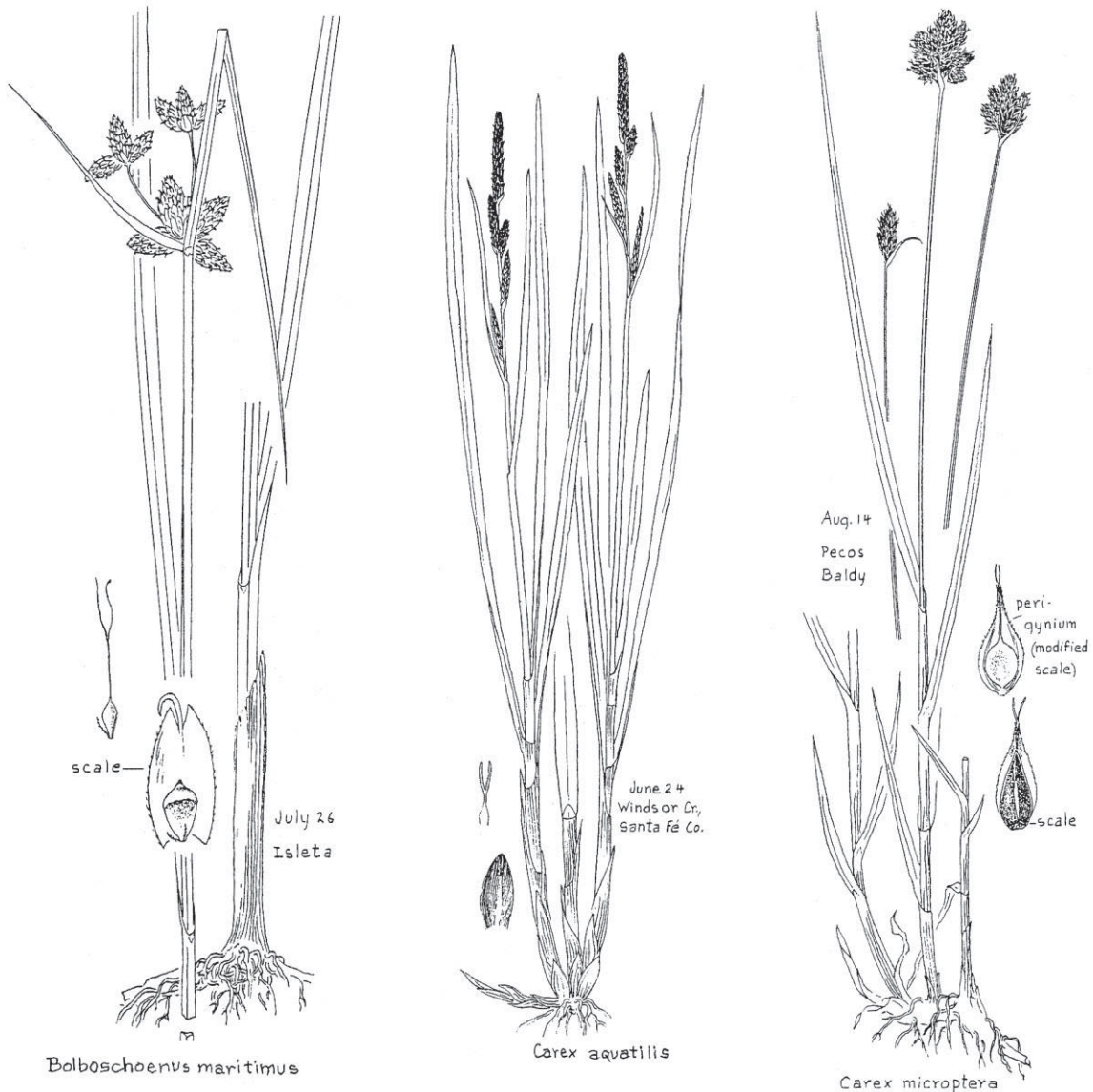


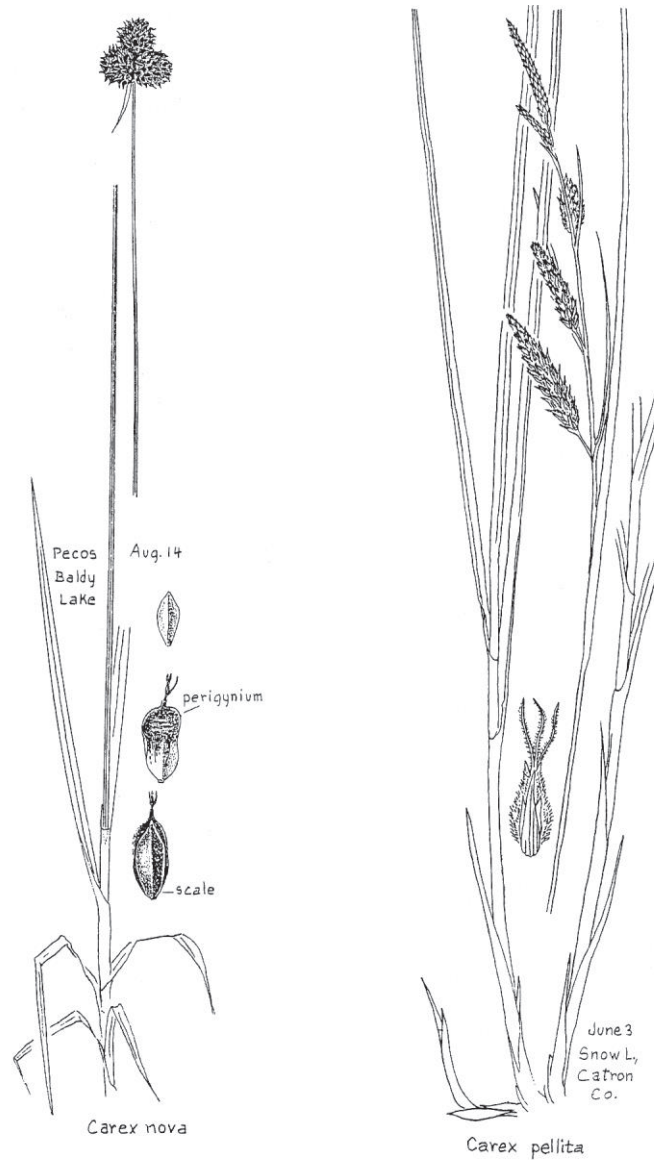
Cladium [a small branch] SAW-GRASS [1].

Plants grass-like, perennial, caespitose from short, stout rhizomes, very robust in our species; culms terete to rounded trigonous; leaves cauline, blades flat to involute, ligules absent; inflorescence terminal and lateral, composed of 100-1000 spikelets in corymbose panicles (ours), with 3rd-4th order branching in our species; inflorescence bracts spreading, leaflike; spikelets with 5-6 florets each spirally arranged along the rachilla; flowers bisexual or staminate, perianth absent; stamens 2-3; pistil style with 3 stigma branches, base thickened, persistent; fruit an achene, terete. - 4 species worldwide, 3 listed in the Flora of North America, 1 documented in NM.

■Allred, K.W. 2003. Plant distribution reports [*Cladium californicum*]. The New Mexico Botanist 26:7. ■Tucker, G.C. 2002. *Cladium*, pp. 240-242. IN: Flora of North America, vol. 23. Oxford University Press.

Cladium californicum (S. Watson) O'Neil [of California] CALIFORNIA SAW-GRASS [*Cladium mariscus* (Linnaeus) Pohl var. *californicum* S. Watson]. Plants perennial, very robust, with culms in large clumps from stout (10 mm thick) short rhizomes; 1-2 m tall, 5-10 mm wide; leaves with flat to v-shaped blades, as long as the culms, 7-10 mm wide, margins harshly scabrid; inflorescence terminal and lateral, pedunculate, composed of many spikelets in a compound panicle with 3rd-4th order flexuous branches; inflorescence bracts 3-4+, leaf-like, the proximal longer than the lateral inflorescence cluster that it subtends; spikelets in clusters of (3)4-6, 3 mm long, ellipsoid to lanceoloid; floral scales 5-6, 2.5-3 mm, glabrous, brown with prominent midrib; stigmas 3, stamens 2, anthers 2 mm long; achenes ovoid, 1.5-2 mm long. ●Alkaline marshes and springs, streambanks; 3200-5600 ft; known from several locations in the southeastern counties, and the wet ciénega below Blue Hole Spring in Santa Rosa (Guadalupe Co.).





Cyperus [the ancient Greek name for various sedges] FLAT-SEDGE [24].

Plants grass-like, perennial or less frequently annual, cespitose from short rhizomes to colonial from long-creeping rhizomes, or fibrous rooted only in the annual species; culms trigonous to rounded in cross section, solid, without nodes, glabrous to less frequently scabrous; leaves three-ranked, mostly clustered at or near the base, blades usually well-developed and linear, flat with face towards the culm to V- or M-shaped, or involute in a few species, rarely reduced to sheaths only, ligules absent; inflorescence terminal, occasionally appearing pseudo-lateral when forced to the side by a strong upright bract, umbellate to capitate, composed of one to many spikes, the spikes in a sessile cluster at the top of the culm, or elevated on bare rays (most frequently unequal in length), or more usually a combination of both, second and third order umbellate branching present in some species; inflorescence bracts spirally arranged at the base of the first order branching, leaflike, spreading to ascending, sometimes reflexed; spikes composed of few to numerous (rarely one) spikelets, either digitately, subdigitately, or spicately arranged along an axis (the rachis); spikelets with few to many florets, usually distichously arranged along a rachilla, very rarely spirally arranged, flattened (compressed) to quadrangular or terete in cross section; flowers bisexual, in the axil of a scale, the scale base often decurrent onto the rachilla forming hyaline “wings”; perianth absent; stamens (1,2) 3; pistil with 1 style and 2 or 3 stigma branches; fruit an achene, either lenticular or trigonous corresponding with the number of stigma branches, stipitate or not. ♦About 600 species worldwide, about 96 listed in the Flora of North America. Recent molecular work (Bauters et al. 2014, Larridon et al. 2014) has shown that both *Lipocarpa* and *Kyllinga* (and other genera) are nested within a paraphyletic *Cyperus* sensu stricto, and new combinations have been made for the former species of these genera now as members of a monophyletic *Cyperus* sensu lato.

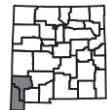
- Adams, T. 1998. New plant distribution records [*Cyperus bipartitus*]. The New Mexico Botanist 7:6. ■Alexander, P. 2018. iNaturalist observation for *Cyperus andinus* (as *C. seslerioides*). <https://www.inaturalist.org/observations/16154558>, accessed 24 Feb 2020. ■Allred, K.W. 1999. New plant distribution records [*Cyperus rotundus*]. The New Mexico Botanist 13:7. ■Bauters, K., I. Larridon, M. Reynders, P. Asselman, A. Vrijdagas, A. Muasya, D. Simpson, & P. Goetghebeur. 2014. A new classification for *Lipocarpa* and *Folkiella* as infrageneric taxa of *Cyperus* s.l. (Cyperaceae, Cyperoidae, Cyperaceae): insights from species tree reconstruction supplemented with morphological and floral developmental data. Phytotaxa 166(1): 33-48. ■Carter, R. & S.D. Jones. 1997. Notes on the *Cyperus retroflexus* complex (Cyperaceae) with three nomenclatural proposals. Rhodora 99:319-334. ■Dai, L., G.C. Tucker, & D.A. Simpson. 2010. *Cyperus*, pp. 219-241. IN: Flora of China, vol. 23. Missouri Botanical Garden Press. ■Friedland, S. 1941. The American species of *Hemicarpha* [*Cyperus*

subsquarrosus. Amer. J. Bot. 28:855-861. ■Goetghebeus, P. & A. Van den Borre. 1999. *Lipocarpha*, pp. 405-407. IN: Flora of Missouri, vol. 1. The Missouri Botanical Garden Press.
 ■Horvat, M.L. 1941. A revision of the subgenus *Mariscus* found in the U.S.A. [*Cyperus niger*]. Catholic Univ. Amer., Biol. Ser. 33:1-147. ■Jones, S.D., C.T. Bryson, and J.E. Ubelaker. 1993. *Carex blanda* and *Kyllinga odorata* (Cyperaceae) new to New Mexico and a significant range extension of *Cyperus retrorsus*. Sida 15(3):552-553. ■Jones, S.D., A.A. Reznicek, & G.D. Jones. 1993. *Cyperus setigerus* (Cyperaceae) new for New Mexico. Sida 15(4):655-656. ■Jones, S.D., J.K. Wipff, & R. Carter. 1996. Nomenclatural combinations in *Cyperus* (Cyperaceae). Phytologia 80(4):288-290. ■Kessler, J.W. 1984. *Cyperus ovalaris* (Michaux) Torrey var. *cylindricus* (Ell.) Torrey new to New Mexico [*Cyperus retrorsus*]. Sida 10:258. ■Larridon, I., K. Bauters, M. Reynders, W. Huygh, & P. Goetghebeur. 2014. Taxonomic changes in *Cyperus* (Cyperaceae, Cyperoidae, Cyperaceae): combining the sedge genera *Ascolepis*, *Kyllinga* and *Pycneus* into *Cyperus* s.l. Phytotaxa 166(1): 1-32. ■Schippers, P., S.J. Ter Borg, & J.J. Bos. 1995. A revision of the infraspecific taxonomy of *Cyperus esculentus* (yellow nutsedge) with an experimentally evaluated character set. Syst. Bot. 20(4):461-481. ■Tucker, G.C. 1984. A revision of the genus *Kyllinga* Rottboell (Cyperaceae) in Mexico and Central America. Rhodora 86:507-538. ■Tucker, G.C. 1985. *Cyperus flavicomus*, the correct name for *Cyperus albomarginatus*. Rhodora 87:539-541. ■Tucker, G.C. 1994. Revision of the Mexican species of *Cyperus* (Cyperaceae). Syst. Bot. Monogr. 43:1-213. ■Tucker, G.C. 1996. New plant distribution records [*Cyperus strigosus*]. The New Mexico Botanist 4:8. ■Tucker, G.C. 2002. *Kyllinga*, pp. 193-194. IN: Flora of North America, vol. 23. Oxford University Press. ■Tucker, G.C. 2002. *Lipocarpha*, pp. 195-197 [*Cyperus subsquarrosus*]. IN: Flora of North America, vol. 23. Oxford University Press. ■Tucker, G.C., B.G. Marks, & J.R. Carter. 2002. *Cyperus*, pp. 141-191. IN: Flora of North America, vol. 23. Oxford University Press. ■Worthington, R.D. 2009. Plant distribution reports [*Cyperus pseudothyrsiflorus*]. The New Mexico Botanist 48:7.

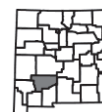
- 1 Stigmas 2; achenes lenticular; spikelets highly compressed or terete in cross section (if terete, the florets spirally arranged)
 - 2 Spikelets with one fertile floret subtended by 1-3 scales; spikes 1-3(4), compact, ovoid to subspherical, sessile
 - 3 Annual, diminutive; spikes 1-2(3), subequal, seemingly lateral; primary inflorescence bract ascending to vertical and often appearing to be an extension of the culm; floral scales 1-2 per spikelet, with outer scale opaque and inner scale membranous or sometimes absent; anthers 0.1-0.2 mm; achenes terete (*Lipocarpha micrantha*)..... **C. subsquarrosus**
 - 3 Perennial, caespitose; spikes 1-3(4), unequal, terminal, the primary spike vertical and larger than the others; inflorescence bracts spreading to reflexed; floral scales 2(3) per spikelet, similar in texture; anthers (0.4)0.6-0.8(1) mm; achenes biconvex (*Kyllinga odorata*)..... **C. sesquiflorus**
 - 2 Spikelets with more than one fertile floret, typically more than 3; spikes 1-many, compact to open, of varying shapes, sessile to pedunculate
 - 4 Florets spirally arranged on the spikelet rachilla (atypical for the genus); spikelets 100+ in number, densely packed into a single ovoid to subglobose capitate head; stigmas 2 or 3 **C. michelianus**
 - 4 Florets distichously arranged on the spikelet rachilla (typical for the genus); spikelets 2-60 in number, loosely distributed along the spike rachis, or digitately arranged in a radiating cluster; stigmas always 2
 - 5 Spikes loosely cylindrical with an obvious rachis; floral scales widely spreading so that the spikelets have a sawtooth edge; plants annual..... **C. flavicomus**
 - 5 Spikes subcapitate, lacking an obvious rachis; floral scales appressed so that the spikelets have a smooth edge; plants perennial or annual
 - 6 Perennial with slender rhizomes, often producing dense clumps; spikes with (3)5-25(60) spikelets; floral scales 1.9-2.7 mm long; anthers 0.6-0.8 mm long **C. niger**
 - 6 Annual with fibrous roots; spikes with 3-5(8) spikelets; floral scales 1.5-2.1 mm long; anthers 0.4-0.5 mm long..... **C. bipartitus**
- 1 Stigmas 3; achenes trigonous; spikelets compressed, quadrangular, or terete in cross-section (not spirally arranged, except *C. michelianus*)
 - 7 Spikelets borne in digitate clusters or in umbellate heads; spikelets compressed in cross-section (except in *Cyperusmichelianus*)
 - 8 Plants annual (occasionally biennial in *C. acuminatus*), lacking rhizomes or tuberous rootstocks
 - 9 Florets spirally arranged on the spikelet rachilla (atypical for the genus); numerous spikelets (100+), densely packed into a single ovoid to subglobose capitate head (spike); stigmas 2 or 3 **C. michelianus**
 - 9 Florets distichously arranged on the spikelet rachilla (typical for the genus); spikelets 2-75, digitate in a subspherical head, or subdigitate in a hemispheric cluster; stigmas 3
 - 10 Floral scales 2 keeled at the base, with 3-5 ribs visible on each side, ribbed almost to the margins, awned tip 0.5-1.0+ mm long, strongly excurved **C. squarrosus**
 - 10 Floral scales single keeled, with 0-2 ribs visible on each side, with a wide area smooth to the margins, cusp up to 0.5 mm long, slightly excurved **C. acuminatus**
 - 8 Plants perennial with rhizomes or tuberous rootstocks
 - 11 Inflorescence a single dense spike (head), spikelets 20-60(-100), tightly radiating; inflorescence bracts horizontal to deflexed parallel to culm; floral scales often milky white; culms 4-30 cm tall..... **C. andinus**
 - 11 Inflorescence usually of more than one spike; spikelets usually less than 20 per spike, ascending in a loose cluster; inflorescence bracts strongly ascending; floral scales not milky-white; culms 15-50(60) cm tall
 - 12 Floral scales (2.3)2.8-3.2 mm, distal scales with apical cusp 0.3-1 mm; achenes broadly ellipsoid; anthers 0.8-1.4 mm; upper culms usually scabrous on the angles; plants of sandy substrates **C. schweinitzii**
 - 12 Floral scales (1.6)1.8-2.4 mm, distal scales with apical cusp 0.1-0.3 mm; achenes ovoid to obovoid; anthers 0.4-0.6 mm; upper culms usually smooth on the angles; plants primarily of rocky slopes **C. sphaerolepis**
 - 7 Spikelets borne in linear spikes (sometimes the rachis so shortened that the spikes appear almost head-like, or with a few ascending spikes from a common terminus), compressed, quadrangular, or terete in cross-section
 - 13 Apex of floral scales with a definite cusp or awn-like tip greater than 0.2 mm long
 - 14 Plants annuals, small, slender, tufted, with fibrous roots; larger culms generally less than 0.8 mm wide; floral scales with strongly excurved awned tips..... **C. squarrosus**
 - 14 Plants perennial, robust, rhizomatous; larger culms generally more than 1 mm wide; floral scales with a straight to slightly spreading cusp
 - 15 Floral scales deciduous (the empty rachilla generally remaining persistent on the spike); spikelets strongly compressed, more than 2x as wide as thick, mostly strongly ascending throughout the spike
 - 16 Most inflorescence bracts slightly ascending (at less than 45 degrees above horizontal) to reflexed; spikes sessile (the central one longest), forming an elongate head, very rarely with 1 short ray **C. fendlerianus**
 - 16 Most inflorescence bracts ascending at greater than 45 degrees above horizontal; most spikes usually on elongate rays, spikes of varying lengths
 - 17 Floral scales (2.3)2.8-3.2 mm, distal scales with apical cusp 0.3-1 mm; achenes broadly ellipsoid; anthers 0.8-1.4 mm; upper culms usually scabrous on the angles; plants of sandy substrates **C. schweinitzii**

- 17 Floral scales (1.6)1.8-2.4 mm, distal scales with apical cusp 0.1-0.3 mm; achenes ovoid to obovoid; anthers 0.4-0.6 mm; upper culms usually smooth on the angles; plants primarily of rocky slopes *C. sphaerolepis*
- 15 Floral scales persistent with spikelets deciduous as a unit (including the rachilla), spikelets quadrangular to slightly compressed, less than 2x as wide as thick, mostly spreading at right angles to the rachis at mid spike
- 18 Longest spikelets (2.2)4-10(18) mm, floral scales 1-5; distal scale with glabrous midrib, the mucro 0.1-0.3(0.5) mm; anthers (0.3)0.4-0.6 mm *C. retroflexus*
- 18 Longest spikelets 9-21 mm, floral scales 3-8(13); distal scale with scabrid midrib, the mucro 0.6-1.9 mm; anthers 0.5-1.3 mm *C. floribundus*
- 13 Apex of floral scales obtuse to acute, lacking any extension, or with a tiny cusp (0.1-0.2 mm long)
 - 19 Spikelets quadrangular to terete, sometimes slightly compressed in cross-section, less than 1.5 times as wide as thick
 - 20 Plants perennial with short rhizomes; spikes less than 1 cm wide, the rays usually with solitary spikes; spikelets with 1-5 floral scales
 - 21 Inflorescence a cluster of 3-6 sessile spikes, sometimes with 1-5 additional spikes on rays; floral scales laterally pale green to whitish; achenes (1.6)1.8-2(2.2) mm long; plants of the sky island ranges in the Bootheel *C. pallidicolor*
 - 21 Inflorescence of one sessile spike, with 4-11 additional spikes elevated on rays; floral scales laterally tan to brown; achenes 1.2-1.7 mm long; plants known from two locations (Dona Ana & Rio Arriba cos.) *C. retrorsus*
 - 20 Plants annual to short-lived perennial, with primarily fibrous roots (rarely producing rhizomes in *Cyperus strigosus*); spikes often significantly wider than 1 cm (except in depauperate specimens), the rays often with clusters of spikes at the apex; spikelets with 3-12(30) floral scales
 - 22 Floral scales 3.2-4.5(6) mm; spikelets generally appearing straight and stiff, falling whole from the rachis of the spike; plants short-lived perennials with thickened corm-like bases (rarely producing rhizomes) *C. strigosus*
 - 22 Floral scales less than 3.2 mm long; spikelets often appearing somewhat flexuous, with the floral scales deciduous from the rachilla or the rachilla disarticulating at each joint and falling with the scale; plants small to robust annuals without corm-like bases or rhizomes
 - 23 Floral scales 1.3-1.5 mm long, spreading at maturity, imbricate, deciduous from the persistent rachilla of the spikelet *C. erythrorhizos*
 - 23 Floral scales 2-2.8(3.2) mm long, generally remaining appressed at maturity and not imbricate; spikelets disarticulating at each joint of the rachilla, each scale remaining attached to its rachilla joint *C. odoratus*
 - 19 Spikelets compressed in cross section, more than 1.5 times as wide as thick
 - 24 Floral scales 1-2 mm long; spikelets densely packed on the spike rachis, the rachis either hidden completely or poorly visible between the spikelets; plants annual
 - 25 Floral scales 1-1.5 mm long; achenes (0.4)0.7-1 mm long; inflorescence bracts (3)5-7(11); plants native, from widely scattered locations in NM *C. erythrorhizos*
 - 25 Floral scales 1.5-2 mm long; achenes 1.3-1.4 mm long; inflorescence bracts 3-4; plants introduced, known from the Rio Grande corridor in central NM *C. glomeratus*
 - 24 Floral scales (1.8)2-4.5(6) mm long; spikelets loosely to moderately packed on the spike rachis, the rachis usually easily visible between the spikelets; plants annual or perennial
 - 26 Floral scales and spikelet rachilla persistent; plants perennial, colonial, with fine rhizomes bearing tubers in mature plants (often not collected)
 - 27 Spikelets golden orange-brown, 10-20(25) per spike *C. esculentus*
 - 27 Spikelets purplish to reddish-brown, (2)3-7(12) per spike *C. rotundus*
 - 26 Floral scales or spikelets as a whole deciduous; plants annual or perennial, the rhizomes if present not bearing tubers
 - 28 Floral scales 2.3-3.1 mm long, often with some pink to reddish tinge; plants annual; culms 5-25 cm tall, 1-1.5 mm wide; widely scattered in the southwestern mountains and river corridors *C. parishii*
 - 28 Floral scales 3-4.5(6) mm long, tan to yellowish or reddish brown; plants perennial (sometimes flowering first year like an annual); culms 20-100 cm tall (shorter in depauperate *C. strigosus*), 1-6 mm wide; rare in NM, known only from a few location
 - 29 Floral scales reddish brown at maturity, deciduous; plants robust perennials with long rhizomes; anthers 1.5-2 mm long; known from one roadside collection north of Santa Rosa (Guadalupe Co.) *C. setigerus*
 - 29 Floral scales yellowish-green to yellowish-brown at maturity, persistent (the spikelet falling whole); plants short-lived perennials to annuals with hardened corm-like bases, rarely producing rhizomes; anthers 0.3-0.5 mm long; known only from a few collections in the Bootheel (Hidalgo Co.) *C. strigosus*

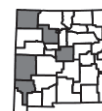
Cyperus acuminatus Torrey & Hooker [sharpened, with a long tapering point] [*Cyperus cyrtolepis* Torrey & Hooker]. Plants annual, tufted with fibrous roots; culms (10-)20-30 cm tall, longer than the leaves; leaf blades 1-2(4) mm wide; inflorescence composed of 1 terminal and 1-4 additional hemispheric to spheric heads (spikes) elevated on rays, 7-12(15) mm wide, the (15)25-50(75) spikelets arranged digitately within each head; inflorescence bracts 3-6, the longest strongly ascending to vertical and longer than the inflorescence; spikelets compressed, with 8-20(35) imbricate flowers; floral scales 1-2 mm long, 2 keeled, laterally faintly 1 ribbed, yellowish, yellowish green to light reddish brown, the apex acuminate and slightly incurved; anthers 0.5 mm long; stigmas 3; achenes trigonous, ellipsoid, brown, 0.8-1.1 mm long, 0.3-0.4 mm wide. ●Wet shorelines and riverbanks, disturbed soils, 5100-6300 ft; infrequent and known from a few widely scattered locations in southwestern NM. ♦Similar species: *Cyperus squarrosus* is another annual with subspherical heads, but is far more common, generally smaller in stature, and has floral scales with widely spreading to recurved awn-like tips, and with strong lateral ribbing.



Cyperus andinus Palla ex Kükenthal [from the Andes Mountains]. Plants perennial, cespitose from short stout rhizomes; culms 4-30 cm tall, longer than the leaves, clothed at the base with old sheaths; leaf blades 1-2.5(3) mm wide; inflorescence composed of one terminal hemispherical to subspherical cluster of (5)20-60(100) sessile spikelets, the spikelets distinguishable to the naked eye; inflorescence bracts 2-5, horizontal to greatly reflexed and almost parallel to culm; spikelets compressed, with 8-12(24) closely imbricate flowers; floral scales 1.7-3.2 mm long, keeled, laterally ribless, base greenish to tan, upper sides and apex whitish, the apex acuminate to mucronate; anthers (0.4)0.6-0.8(1.1) mm long; stigmas 3; achenes trigonous, obovoid, brown to blackish, 0.8-0.9 mm long, 0.5-0.8 mm wide. ●Clearings in woodlands and forests, 7600 ft; rare and known from one location in Sierra County, northern Black Range. ♦Similar species: *Cyperus andinus* is unlikely to be confused with any other NM species; while the very common *C. fendlerianus* shares its drier woodland habitat and also has a capitate inflorescence with reflexed bracts, its inflorescence is composed of several obvious sessile spikes, with the upright central one being longer than the lateral ones. *Cyperus andinus* has sometimes been included in *C. seslerioides* of Mexico, but the two plants seem to remain distinct even in mixed populations. *Cyperus seslerioides* has shorter scales and achenes, and its tightly clustered spikelets are not easily distinguished by the naked eye.



Cyperus bipartitus Torrey [two-parted, the styles] [*Cyperus rivularis* Kunth]. Plants annual, tufted with fibrous roots; culms 3-25 cm tall, shorter to longer than the leaves; leaf blades 1-2 mm wide; inflorescence composed of 1 terminal and 1-4 additional hemispheric heads elevated on rays, 7-12(15) mm in width, the 3-5(8) spikelets arranged digitately within each head; inflorescence bracts 2-3, horizontal to ascending and longer than the inflorescence; spikelets compressed, with (6)10-26(32) closely imbricate flowers; floral scales 1.9-2.7 mm long, 2 keeled, laterally ribless, light to dark brown, the apex obtuse; anthers 0.4-0.5 mm long; stigmas 2; achenes lenticular, obovoid, black, 1-1.3 mm long, 0.6-0.8 mm wide. ●Emergent shorelines, stream banks, ditches, and disturbed areas, 4000-6700 ft; infrequent and known from few widely scattered locations. ♦Similar species: *Cyperus niger* has very similar spikelets digitately arranged, but is a perennial with fine rhizomes (but often densely tufted). It is generally more robust, has larger scales, with more spikelets clustered in each head, but depauperate specimens could be mistaken for *Cyperus bipartitus*. In these cases, the floral scales of *Cyperus niger* tend to be darker brown to almost blackish, and the achenes are more elliptical in shape compared to the obovate ones of *Cyperus bipartitus*.



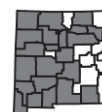
Cyperus erythrorhizos Muhlenberg [red-rooted] REDROOT FLAT-SEDGE. Plants annual, small to very robust, tufted with fibrous roots; culms 5-25(100) cm tall, equal to slightly longer than the leaves; leaf blades 2-5(11) mm wide; inflorescence composed of 1 terminal cluster of 1-3(6) sessile spikes and 2-6(12) additional spikes or clusters of sessile spikes on rays, spikes 10-30(55) mm long, (6)10-16(23) mm wide, with 20-40(80) spikelets arranged cylindrically along the rachis; inflorescence bracts (3)5-7(11), horizontal to slightly ascending; spikelets quadrangular to slightly compressed, with 6-16(30) closely imbricate flowers; floral scales deciduous, 1.3-1.5 mm long, laterally yellowish to reddish brown and ribless, medially green and 3-ribbed, the apex obtuse with small mucro; anthers 0.2-0.3 mm long; stigmas 3; achenes trigonous, ovoid, grey to brown, (0.4)0.7-1 mm long, 0.4-0.6 mm wide. ●Emergent shorelines, 3900-5600 ft; known from widely scattered locations. ♦Similar species: *Cyperus erythrorhizos* is often confused with both *C. esculentus* and *C. odoratus*, which can all be quite variable in size. It can be distinguished from both by its significantly shorter, more imbricate, and deciduous floral scales. The floral scales of *C. esculentus* are persistent, and those of *C. odoratus* disarticulate completely with the joints of the rachis, while in *C. erythrorhizos*, the rachis remains persistent after the scales fall.



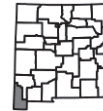
Cyperus esculentus Linnaeus [good for eating] YELLOW NUTSEDGE, CHUFA [*Cyperus esculentus* var. *leptostachyus* Boeckeler, *Cyperus esculentus* Linnaeus var. *macrostachyus* Boeckeler]. Plants perennial, with rhizomes bearing edible tubers, the stems rising singly or in small clumps; culms (20)30-40(65) cm tall, longer than the leaves; leaf blades 2-6.5 mm wide; inflorescence composed of 5-10 spikes, one to several sub-sessile and the rest elevated on rays, spikes 18-30 mm long, 18-35 mm wide, with 10-20(25) spikelets arranged cylindrically along the rachis; inflorescence bracts (3)4-5(7), horizontal to ascending; spikelets compressed, with 9-42 imbricate flowers; floral scales persistent, (1.8)2.0-3.1 mm long, laterally yellowish to orangeish brown and 2-3 ribbed, medially brown to green and 3-ribbed, the apex obtuse to subacute; anthers (1)1.2-1.5(2.1) mm long; stigmas 3; achenes trigonous, ellipsoid, brown, (1.1)1.3-1.6 mm long, 0.3-0.6(0.8) mm wide. ●Widespread in many habitats, both natural and disturbed, riparian areas, washes, ditches, croplands, roadside margins, 3600-8900 ft; throughout the state except in the arid deserts and high mountains. ♦Similar species: *Cyperus esculentus* is most similar to the introduced *C. rotundus*, both of which have tubers on the rhizomes. *Cyperus esculentus* is usually a little more robust, with more spikelets per spike, and golden orange inflorescences compared to the darker, reddish purple ones of *C. rotundus*. See discussion under *C. erythrorhizos* and *C. odoratus* for confusion with those taxa. Two varieties have been recognized in New Mexico (see synonymy): the far more common var. *leptostachyus*, with spikelets 2 mm wide or less and scales 1.8-2.7 mm long, and the infrequent var. *macrostachyus*, with spikelets 2-3 mm wide and scales 2.7-3.4 mm long. These varieties are of questionable distinction, as the actual specimens seem to represent a continuous range, and the two characters are not consistently aligned within a given variety. §



Cyperus fendlerianus Linnaeus [for Augustus Fendler (1813-1883), German-born botanical collector who visited Santa Fe in 1847] FENDLER'S FLAT-SEDGE. Plants perennial, with stems rising singly or in small clumps from short stout rhizomes; culms (7)20-70(85) cm tall, longer than the leaves; leaf blades (2)3-5(7) mm wide; inflorescence composed of (1)3-4(6) sessile spikes in a compact head with the longest erect and the others clustered at its base, very rarely one additional head elevated on a ray, central spike (12)18-30 mm long, (6-)12-20 mm wide, with (8)15-30 spikelets arranged cylindrically along the rachis; inflorescence bracts (2)3-6(10), horizontal to fully reflexed; spikelets slightly compressed, with 5-8(10) flowers; floral scales deciduous, 2.4-2.8(3.4) mm long, ovate to orbiculate laterally yellowish to greenish brown and 2-5 ribbed, medially brown to green and 3 ribbed, the apex obtuse, mucronate; anthers 0.4-0.8 mm long; stigmas 3; achenes trigonous, obovoid, brown, 1.6-1.9 mm long, 1.1-1.4(1.6) mm wide. ●Clearings in woodlands and forests, 4900-9500(10,500) ft; widespread in all mountainous parts of the state. ♦Similar species: *Cyperus fendlerianus* is closely allied to *Cyperus sphaerolepis*, based on the similar shape of the floral scales and achenes. However, in *Cyperus sphaerolepis* the majority of the spikes are elevated on rays, and the inflorescence bracts are typically strongly ascending, while in *Cyperus fendlerianus*, the spikes are all sessile, forming a compact head, forcing the bracts more horizontally or downward. Occasional hybridization can be found between these two species.



Cyperus flavicomus Michaux [with yellow hairs] [*Cyperus albomarginatus* Martius & Schrader ex Nees]. Plants annual, tufted with fibrous roots; culms 30-75 cm tall, longer than the leaves; leaf blades 2-8 mm wide, often withered by anthesis; inflorescence composed of 1-several terminal spikes and (3)5-11 additional spikes or clusters of spikes elevated on rays; each spike with 6-60 spikelets arranged cylindrically along a rachis shorter than or equal to the width of the spike; inflorescence bracts 3-7, horizontal to ascending; spikelets highly compressed, with 6-24 spreading flowers, so that the mature spikelet edge looks sawtoothed; floral scales (1.4)1.7-2.3 mm long, laterally ribbed, light to reddish brown with conspicuous clear margins, the apex acute to obtuse; anthers 0.4 mm long; stigmas 2; achenes lenticular, obovoid, black to dark reddish brown, 1.2-1.6 mm long, 0.6-1.1 wide mm. ●Moist draws and grasslands in oak woodland, 4000-5700 ft; of pantropical distribution, in NM known only from the Animas and Peloncillo Mountains in Hidalgo County. ♦Similar species: *Cyperus flavicomus* is unique among New Mexico flat-sedges in its annual habit combined with 2-stigmatic pistils, and the serrate-edged spikelets with translucent-margined floral scales. §



Cyperus floribundus (Kukenthal) J. Rich, Carter, & S. D. Jones [with abundant flowers] [*Cyperus uniflorus* Torrey & Hooker var. *floribundus* Kukenthal]. Plants perennial, caespitose from short rhizomes; culms 15-40 cm tall, slightly longer than the leaves; leaf blades 1-2 mm wide; inflorescence composed of one terminal spike and 4-14 additional single spikes elevated on rays, each spike with (5)20-35(60) spikelets arranged cylindrically along a rachis shorter than the width of the spike; inflorescence bracts 3-6, ascending to strongly ascending; spikelets deciduous, quadrangular, with 3-8(13) flowers; floral scales appressed, persistent, 2.6-4.8 mm long, laterally whitish to reddish brown and several ribbed, medially green, the apex acute with mucro 0.3-0.5 mm long, distal sterile scale involute with longer cusp, often hooked; anthers 0.5-1.3 mm long; stigmas 3; achenes trigonous, narrowly ellipsoid, light to reddish brown, 1.8-2.4 mm long, 0.6-0.8 mm wide. ●Sandy, open areas, 4360 ft; known from a single collection in Curry Co. ♦Similar species: *Cyperus floribundus* is similar to its close relative *Cyperus retroflexus*, both previously treated as varieties of *Cyperus uniflorus*. It shares similar habitat, and differs primarily in the characters given in the key.



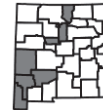
****Cyperus glomeratus*** Linnaeus [clustered]. Plants annual, possibly biennial, single-stemmed to tufted with fibrous roots; culms 30-60(90) cm tall, shorter to slightly longer than the leaves; leaf blades 4-8 mm wide; inflorescence composed of a cluster of 1-5 sessile terminal spikes and 3-8 additional spikes or clusters of spikes elevated on rays; each spike with 50+ spikelets arranged cylindrically and densely along the rachis; inflorescence bracts 3-4, horizontal to ascending; spikelets slightly compressed, with 8-16 imbricate slightly spreading flowers; floral scales 1.4-2 mm long, ribbing obscure, reddish brown, the apex obtuse; stigmas 3; achenes trigonous, narrowly oblong, light gray, 1.3-1.4 mm long, 0.5 mm wide. ●Riverbanks and lakeshores, 4700-5000 ft; known only from the Rio Grande floodplain near Albuquerque; native to Eurasia. ♦Similar species: *Cyperus glomeratus* would most likely be confused with robust specimens of *Cyperus odoratus* or *Cyperus erythrorhizos*.



****Cyperus michelianus*** (Linnaeus) Delile [for Pier Antonio Micheli (1679-1737), Italian botanist]. Plants annual, densely tufted with fibrous roots; culms 2-25 cm tall, slightly shorter to longer than the leaves; leaf blades 1-2.5 mm wide; inflorescence a single dense terminal head, composed of numerous sessile spikelets digitately aggregated on short, hidden rays; inflorescence bracts 3-6, horizontal to slightly reflexed; spikelets slightly compressed, with 10-20 imbricate slightly spreading flowers, spirally arranged on the rachis; floral scales 2 mm long, laterally ribbed, green to yellowish white, the apex with a slightly recurved mucro; stigmas 2(3); achenes plano-convex or trigonous, narrowly oblong, light gray, ca. 1 mm long. ●Wet areas along riverbanks, floodplains, pond margins, 3900-4400 ft; native to Asia, first collected in 2008, known only from along the Gila River in southwest NM (Grant Co.). ♦Similar species: *Cyperus michelianus* is unlikely to be confused with any other species of *Cyperus* in New Mexico. It superficially resembles the former species of *Kyllinga*, from which it differs in that the subspherical heads are composed of multi-flowered spikelets with the scales spirally arranged, while in *Kyllinga* the heads are composed of highly reduced flattened spikelets with one fertile floret only.



Cyperus niger Ruiz & Pavon [black] [*Cyperus niger* Ruiz & Pavón var. *capitatus* (Britton) O'Neill, *Cyperus niger* Ruiz & Pavon var. *castaneus* (S. Watson) Kukenthal]. Plants perennial, densely tufted from fine rhizomes; culms 5-40(95) cm tall, longer than the leaves; leaf blades 1.5-3 mm wide; inflorescence composed of 1 terminal and rarely 1-2 additional hemispheric heads elevated on rays, 7-20 mm wide, the (3)5-25(60) spikelets arranged digitately within each head; inflorescence bracts 2-3, horizontal to reflexed; spikelets highly compressed, with 4-18 closely imbricate flowers; floral scales 1.5-2.1 mm long, 2 keeled basally, laterally ribless, chestnut brown to blackish, the apex obtuse; anthers 0.6-0.8 mm long; stigmas 2; achenes lenticular, ellipsoid, brown, 1.1-1.4 mm long, 0.6-0.8 mm wide. ●Ciénegas, wet meadows, ditches, riverbanks, seeps and springs, 3900-7400 ft; found occasionally in the southwestern mountains, and in the north-central part of the state. ♦Similar species: See discussion under *Cyperus bipartitus*.



Cyperus odoratus Linnaeus [fragrant] FLAT-SEDGE [*Cyperus ferax* L.C.M. Richard, *Cyperus ferruginescens* Boeckeler, *Cyperus odoratus* Linnaeus var. *squarrosus* (Britton) Jones, Wipff, & Carter, *Cyperus speciosus* Vahl, *Cyperus speciosus* Vahl var. *squarrosus* Britton]. Plants annual to less frequently short-lived perennial, single-stemmed to tufted with fibrous roots; culms (5)10-50(130) cm tall, longer than the leaves; leaf blades 4-12 mm wide; inflorescence composed of a cluster of 1-5(12) sessile terminal spikes and (0)6-9(12) additional spikes or clusters of spikes elevated on rays; each spike with 50+ spikelets arranged cylindrically and densely along the rachis; inflorescence bracts 4-8(10), horizontal to ascending; spikelets terete to slightly flattened, with (4)8-12(30) appressed to slightly spreading flowers; floral scales 2-2.8(3.2) mm long, laterally and medially ribbed, reddish brown to stramineous on the sides, green medially, the apex entire or emarginated with small mucro, each flower disarticulating with its rachis joint; anthers (0.2)0.3-0.4(0.7) mm long; stigmas 3; achenes trigonous, narrowly ellipsoid to oblong, brown to black, 1.2-1.5(1.9) mm long, 0.5-0.6(0.75) wide mm. ●Riverbanks and lakeshores, emergent shorelines, disturbed wet areas, 2900-5800 ft; occasional and widespread in the lower elevations. ♦Similar species: *Cyperus odoratus* is unique among NM flat-sedges in that its spikelets disarticulate at each joint of the rachis. However, this character is not always readily evident before full maturity, and consequently, plants are often confused with *Cyperus esculentus* and *Cyperus erythrorhizos*, and might be with the newly introduced *Cyperus glomeratus*. All four share similar lower to mid-elevation wet habitats, can be weedy in habit, and highly variable in size. Very short, imbricate scales (1.5 mm or less) will separate out both *Cyperus erythrorhizos* and *Cyperus glomeratus*. *Cyperus esculentus* is perennial and has tubers on the rhizomes (not usually collected), but also tends to have fewer spikelets more sparsely distributed on the rachis of the spike, and golden orange in color, compared to the reddish brown coloration of *Cyperus odoratus*. *Cyperus odoratus* also has shorter anthers (0.3-0.7 mm long), compared to those of *C. esculentus* which are 1-2 mm long.



Cyperus pallidicolor (Kukenthal) G.C. Tucker [for the pale green color of the floral scales] [*Cyperus subambiguus* Kukenthal var. *pallidicolor* Kukenthal]. Plants perennial, with stems tufted from short rhizomes; culms (10)30-50(80) cm tall, longer than the leaves; leaf blades 2-5 mm wide; inflorescence composed of 3-6 sessile spikes in a compact head, occasionally in robust late season plants 1-5 additional spikes elevated on rays, each spike with (10)25-60(100) spikelets arranged cylindrically along the rachis; inflorescence bracts (3)4-6(8), horizontal to reflexed; spikelets terete, with 1-4 flowers, deciduous as a unit; floral scales appressed, 2.6-3.3 mm long, broadly ellipsoid, laterally whitish to green and 3-4 ribbed, medially green and 3 ribbed, the apex rounded; anthers 0.6-0.8 mm long; stigmas 3; achenes trigonous, ellipsoid, reddish to dark brown, (1.6)1.8-2(2.2) mm long, 0.6-0.9 mm wide. ●Moist draws in ak/juniper woodland, 5200-5300 ft; found only in the Sky Island mountain ranges in Hidalgo County. ♦Similar species: *Cyperus pallidicolor* has been confused with *Cyperus aggregatus* in the past, which is a southeastern species with more golden colored spikelets. A specimen from the Peloncillos appears to have some influence from *Cyperus hermaphroditus*, which typically has longer spikes and spikelets with more flowers, and more of a brownish coloration, and is found in adjacent southern AZ.



Cyperus parishii Britton ex Parish [for Samuel Bonsall Parish (1838-1928), southern California naturalist]. Plants annual, tufted with fibrous roots; culms 5-25 cm tall, longer than the leaves; leaf blades 2-4 mm wide; inflorescence composed of 1 terminal spike and 1-6 additional spikes elevated on rays, spikes 15-25 mm wide, with 5-30 spikelets arranged cylindrically along a rachis shorter than the width of the spike; inflorescence bracts 2-5, ascending; spikelets compressed, with (4)8-12 imbricate flowers; floral scales deciduous, 2.3-3.1 mm long, laterally 2-4 ribbed, red, reddish purple to light reddish brown, medially green, the apex acute to obtuse; anthers 0.3-0.4 mm long; stigmas 3; achenes trigonous, brown to dark purplish brown, 1.1-1.3 mm long, 0.6-0.9 mm wide. ●Streambanks, springs, desert washes, 3900-7600 ft; found in the SW portion of the state. ♦Similar species: *Cyperus parishii* has been mistaken for both *Cyperus esculentus* and *Cyperus odoratus*, with which it shares scales of similar length. *Cyperus odoratus* has terete spikelets with florets that disarticulate at each joint of the rachilla, while *Cyperus parishii* has flattened spikelets with a rachilla that disarticulates only at its base. *Cyperus esculentus* has spikelets with persistent scales and rachilla, and its scales have a golden/orangish appearance, compared to those of *Cyperus parishii* which have a pink to reddish coloration.



Cyperus retroflexus Buckley [bent backwards] [*Cyperus retroflexus* Buckley var. *pumilus* (Britton) R. Carter & S.D. Jones, *Cyperus uniflorus* Torrey & Hooker, non Thunberg, *Cyperus uniflorus* Torrey & Hooker var. *pumilus* Britton, *Cyperus uniflorus* Torrey & Hooker var. *retroflexus* (Buckley) Kukenthal]. Plants perennial, with stems tufted from short rhizomes; culms (5)15-40(80) cm tall, longer than the leaves; leaf blades (0.5)1-3(4) mm wide; inflorescence composed of one sessile spike and 3-6(9) additional spikes elevated on rays, each spike with (5)20-35(65) spikelets arranged cylindrically along the rachis; inflorescence bracts 3-6, horizontal to strongly ascending, attenuate and often curling at maturity; spikelets quadrangular in cross-section, with 1-5 flowers, deciduous as a unit; floral scales appressed, 2.6-3.9 mm long, narrowly ovate, laterally whitish green with red spots or a deep red central area and 3-6 ribbed, medially green to tan, the apex rounded to acute and mucronate, the terminal sterile scale involute and sometimes hooked; anthers (0.3)-0.4-0.6 mm long; stigmas 3; achenes trigonous, ellipsoid, reddish to light brown, (1.8)2-2.4 mm long, 0.6-0.9 mm wide. ●Damp to dry, sandy soils in desert scrub to pinyon-juniper woodlands, 3400-5500 ft; found primarily at lower elevations in the southeastern corner of the state ♦Similar species: *Cyperus retroflexus* is closely related to *Cyperus floribundus*, and differs primarily in the characters given in the key. The reddish color of the spikelets and attenuate, curling bract tips will distinguish it from *Cyperus pallidicolor*.



Cyperus retrorsus Chapman [bent backwards] [*Cyperus cylindricus* (Elliott) Britton]. Plants perennial, with stems tufted from short rhizomes; culms 20-50(-85) cm tall, longer than the leaves; leaf blades 1.5-4(5) mm wide; inflorescence composed of one sessile spike and 4-8(11) additional spikes elevated on rays, each spike with 40-120 spikelets arranged densely and cylindrically along the rachis; inflorescence bracts 3-6(10), ascending; spikelets subterete, with 2-5 flowers, deciduous as a unit; floral scales appressed, 1.8-2.5 mm long, oblong, laterally tan to brown and 3-4 ribbed, medially green, the apex rounded to acute; anthers 0.3-0.5 mm long; stigmas 3; achenes trigonous, oblong-ellipsoid, brown, 1.2-1.7 mm long, 0.5-0.6 mm wide ●Damp to dry, sandy soils in open woods and thickets, 3900-6400 ft; introduced, native to the SE US & NE Mexico, known from only two collections, both presumed waifs, at Ghost Ranch (Rio Arriba Co.) and in a nursery in Las Cruces (Doña Ana Co.). ♦Similar species: *Cyperus retroflexus* is similar in overall habit, but the floral scales and achenes are both longer than those of *Cyperus retrorsus*, and the spikelets are not as densely packed along the rachis of the spike. *Cyperus pallidicolor* has a group of sessile spikes tightly clustered, with only several additional spikes elevated on rays in mature specimens, while *Cyperus retrorsus* usually has just one terminal sessile spike, with the majority elevated on rays.



****Cyperus rotundus*** Linnaeus [round, probably for the root nodules] PURPLE NUTGRASS. Plants perennial, with rhizomes bearing edible tubers, the stems rising singly or in small clumps; culms 10-35(40) cm tall, longer than the leaves; leaf blades 2-6 mm wide; inflorescence composed of 4-10 spikes, one to several sub-sessile and the rest elevated on rays, spikes 12-30 mm long, 12-50 mm wide, with (2)3-7(12) spikelets arranged cylindrically along the rachis; inflorescence bracts (2)3-5, horizontal to ascending; spikelets compressed, with 6-36(42) imbricate flowers; floral scales persistent, (1.8)2.6-3.3 mm long, ovate, laterally purple to reddish brown and 2-3 ribbed, medially green, the apex obtuse; anthers 1-2.5 mm long; stigmas 3; achenes trigonous, ellipsoid, black, 1.4-1.7(1.9) mm long, 0.8-1 mm wide. ●Croplands, lawns, ditches, and roadside margins, 3600-4300 ft; native to Africa and Eurasia, infrequent and known from few locations in southern NM. ♦Similar species: See discussion under *Cyperus esculentus*, a far more widespread species in New Mexico.

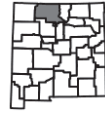


Cyperus schweinitzii Torrey [for Lewis David de Schweinitz 1780-1834, German-American botanist & mycologist]. Plants perennial, with stems rising singly or in small clumps from short stout rhizomes; culms (10)20-50 cm tall, longer than the leaves, upper portion usually scabrous on the angles; leaf blades 2-6 mm wide; inflorescence composed of one loose cluster of sessile ascending to upright spikelets, with 3-5 additional spikelet clusters elevated on rays, the spikelets arranged digitately to sub-digitately on a short rachis, most strongly ascending; inflorescence bracts 3-7, mostly ascending to erect; spikelets slightly compressed, with (1)5-10(14) flowers; floral scales deciduous, spreading, (2.3)2.8-3.4 mm long, broadly to oblong-ovate, laterally tan and 2-3 ribbed, medially green and 3 ribbed, the apex rounded, with prominent cusp, cusp longer on distal scales; anthers 0.8-1.4 mm long; stigmas 3; achenes trigonous, broadly ellipsoid to obovoid, brown to black, 2-2.4 mm long, 0.9-1.4 mm wide. ●Sandy soils, dunes, from pinyon-juniper woodland to prairies, 4300-7500 ft; occasional mostly in the northern half



of the state. ♦Similar species: *Cyperus schweinitzii* appears similar in habit and inflorescence morphology to *Cyperus sphaerolepis*, and the two have often been confused in herbarium records. *Cyperus schweinitzii* has larger scales and achenes, and the upper culm is usually more scabrous on the angles than those of *Cyperus sphaerolepis*. *Cyperus schweinitzii* also prefers sandy soils in a variety of habitats, while *Cyperus sphaerolepis* is more of a forest floor and southern woodland species.

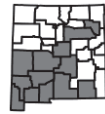
Cyperus sesquiflorus (Torrey) Mattfeld & Kuenthal [one and one-half, referring to the larger middle spike] [*Kyllinga odorata* Vahl]. Plants perennial, densely caespitose, with rhizomes; culms 10-25(45) cm tall; leaf blades 2-3(-4) mm wide; inflorescence composed of 1-3(4) tightly clustered, sessile spikes, with the central one upright and much longer than the lateral ones; central spike 6-12(-18) mm long, 4-8 mm wide, with (50)75-100 spikelets highly compacted, arranged cylindrically along the rachis; spikelets compressed, 2-3 mm long, with 2(3) scales, only the lower one bisexual and fertile; scales 2-2.5 mm long, whitish, with 2-3 lateral ribs; anthers (0.4)0.6-0.8(1) mm long; stigmas 2; achenes biconvex, broadly ovate, reddish to dark brown, 2-2.5 mm long, 0.7-0.9 mm wide. ●Damp grasslands (in its natural habitat), 6400 ft; known from one collection at Ghost Ranch (Rio Arriba Co.), a probable waif. ♦Similar species: See comments under *Cyperus michelianus*.



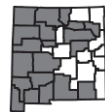
Cyperus setigerus Torrey & Hooker [bristly]. Plants perennial, with rhizomes; culms 50-100 cm tall; leaf blades 4-7 mm wide; inflorescence composed of 1-4 terminal spikes and 5-13 additional spikes or clusters of spikes on rays, 2nd. order rays sometimes present, spikes 5-25 mm long, 15-70 mm wide, with 5-30 spikelets arranged cylindrically along the rachis; inflorescence bracts 3-8, ascending; spikelets compressed, with 6-24 flowers; floral scales imbricate, appressed to somewhat spreading, deciduous, 3-4 mm long, laterally reddish to yellowish brown and 3-4 ribbed, medially green and 1-3 ribbed, the apex obtuse; anthers 1.5-2 mm long; stigmas 3; achenes trigonous, oblong, dark brown, 1.5 mm long, 0.4-0.5 mm wide. ●Ditches, roadsides, croplands, 5350 ft; known from one roadside collection north of Santa Rosa (Guadalupe Co.). ♦Similar species: *Cyperus setigerus* has long floral scales like *C. strigosus*, and both can be quite robust. However, the scales in *C. setigerus* are more imbricate, while those in *C. strigosus* overlap the next scale by only ¼ to ½, and stay quite appressed to the rachilla, giving the spikelets a very thin, smooth, and pointed look compared to the more "ragged" look of those in *C. setigerus*. To date, the few collections of both have been found in widely separated parts of the state, though in theory, based on habitat records from other states, *Cyperus strigosus* might be found in similar locations to *C. setigerus*.



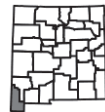
Cyperus sphaerolepis Boeckeler [for the suborbicular shaped floral scales] [*Cyperus rusbyi* Britton, *Cyperus fendlerianus* Boeckeler var. *debilis* (Britton) Kuenthal]. Plants perennial, with stems rising singly or in small clumps from short stout rhizomes; culms (8)15-40(60) cm tall, longer than the leaves, upper culms usually smooth on the angles; leaf blades 1-3(5) mm wide; inflorescence composed of 1-3 sessile ascending to upright spikelets, with (1)2-6(11) additional spikelets elevated on rays, the spikelets arranged subdigitately to cylindrically on a short rachis, most strongly ascending; inflorescence bracts 2-3(7), mostly ascending to erect; spikelets slightly compressed, with (1)4-8(14) flowers; floral scales deciduous, spreading, (1.4)1.8-2.4 mm long, broadly ovate to suborbiculate, laterally tan and 3-4 ribbed, medially green and 1-3 ribbed, the apex obtuse, with short cusp; anthers 0.4-0.6 mm long; stigmas 3; achenes trigonous, ovoid to obovoid, brown to reddish-brown, 1.4-1.6(1.9) mm long, 1-1.4 mm wide. ●Clearings in montane forests and pine/oak or pinyon/juniper woodlands, rocky slopes and grasslands, 4800-8000 ft; primarily found in the southern half of the state. ♦Similar species: See discussion under *Cyperus schweinitzii*. Hybrids between *C. fendlerianus* and *C. sphaerolepis* are occasionally found, and are intermediate in morphological character, with the more robust scales of *C. fendlerianus*, and the spikes elevated on rays like in *C. sphaerolepis*.



Cyperus squarrosus Linnaeus [rough, from projecting parts] AWNEED FLAT-SEDGE [*Cyperus aristatus* Rottboell, nomen illeg., *Cyperus inflexus* Muhlenberg]. Plants annual, tufted with fibrous roots; culms 2-16 cm tall, longer than the leaves; leaf blades 0.5-2.5 mm wide; inflorescence composed of 1 terminal spike and infrequently (1)3-6 additional spikes elevated on rays, the spikes 9-20 mm long, the (2-)6-20(-40) spikelets arranged sub-digitately within each hemispherical spike; inflorescence bracts (1)2-4, the longest strongly ascending to vertical and longer than the inflorescence; spikelets compressed, with (4-)10-20(-34) spreading flowers; floral scales 1.2-1.8(2.2) mm long, deciduous, laterally strongly 7-9 ribbed, green to tan to reddish brown, the apex cuspidate and strongly excurved; anthers 0.2-0.3 mm long; stigmas 3; achenes trigonous, obovoid, brown to black, 0.7-0.8(1.1) mm long, 0.3-0.4(0.5) mm wide. ●Receding shorelines and flood plains, gravelly road margins, soil pockets in exposed bedrock, disturbed moist soils, 3900-9100 ft; throughout the state except in the southeastern plains. ♦Similar species: *Cyperus squarrosus* is one of the smallest flat-sedges in New Mexico, and is distinctive in its strongly ribbed floral scales with long excurved awns. It differs from the other two diminutive annuals in its strongly flattened spikelets with a distichous floral arrangement, whereas both *C. michelianus* and *C. subsquarrosus* have spikelets with spirally arranged florets. See discussion under *C. acuminatus*. §



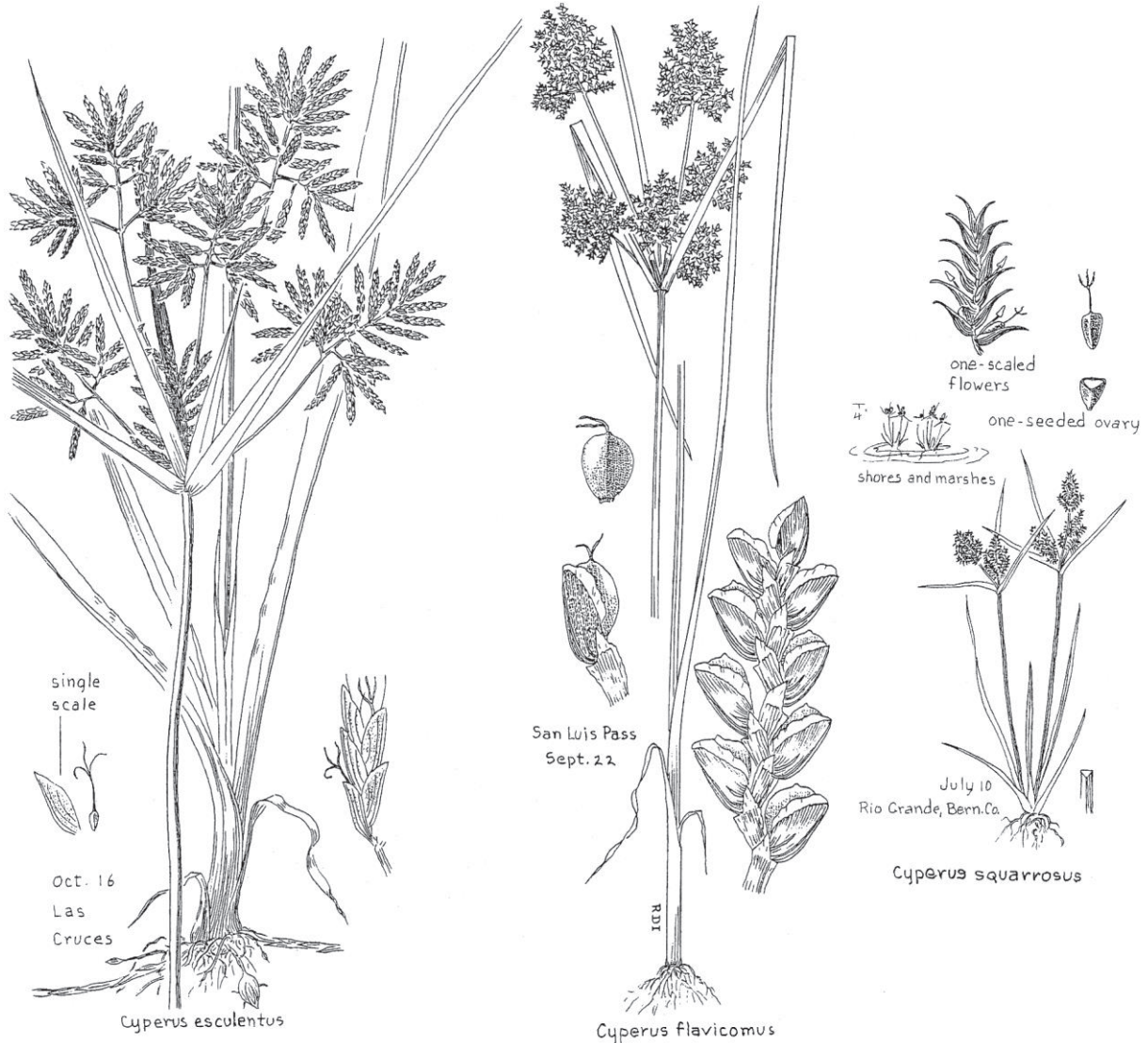
Cyperus strigosus Linnaeus [scraggly]. Plants perennial, tufted from short rhizomes; culms (1)20-40(90) cm tall, with corm-like bases; leaf blades 1-4(8) mm wide; inflorescence composed of 1-4 terminal spikes and (1)3-6(8) additional spikes or clusters of sessile spikes on rays, 2nd. order rays sometimes present, spikes (6)10-28(50) mm long, 10-40 mm wide, with (5)12-50 spikelets arranged cylindrically along the rachis; inflorescence bracts (3)5-7(10), ascending; spikelets stiff and straight, slightly compressed, with 3-11 flowers, deciduous as a unit; floral scales appressed, 3.2-4.5(6) mm long, laterally yellowish-green to yellowish-brown and 3-4 ribbed, medially green and 1-3 ribbed, the apex acute; anthers 0.3-0.5 mm long; stigmas 3; achenes trigonous, narrowly oblong, purplish brown, (1.5)1.8-2.4 mm long, 0.5-0.6 mm wide. ●Pond shores, ciénegas, damp wash-beds, 5000-5200 ft; known only from Hidalgo County in the Bootheel region. ♦Similar species: *Cyperus strigosus* could be confused with both *C. esculentus* and *C. odoratus*, which can also be quite variable in size. It can be distinguished from both by its significantly longer floral scales and stiffly straight spikelets. The floral scales of *C. esculentus* are persistent and more orange tinged, and those of *C. odoratus* are terete and disarticulate completely with the joints of the rachis, and the spikelets in *C. odoratus* are often somewhat curving and flexible compared to the stiffly straight ones of *C. strigosus*. See also discussion under *C. setigerus*.



Cyperus subsquarrosus (Muhlenberg) Bauters [somewhat squarrose] [*Hemicarpha micrantha* (Vahl) Britton, *Lipocarpa micrantha* (Vahl) G. C. Tucker, *Scirpus micranthus* Vahl]. Plants annual, caespitose, diminutive; culms 2-20 cm tall, 0.2-0.5 mm wide; leaves with blades ½-¾ the total length of the culm, ca. 0.5 mm wide or less, flat to involute; inflorescence terminal, composed of 1-2(3) sessile clustered spikes; inflorescence bracts, 1-2, leaflike, the longest erect; spikes 1-3(5) mm long, ovoid (to globose); floral scales 0.9-1.6 mm long, yellowish to reddish-brown with a greenish midvein,



oblanceolate to obovate, the apex tapering to an acute point, shorter than the body of the scale, spreading to slightly recurved; anthers 0.1-0.2 mm long; stigmas 2, stamens 1, anthers 0.1-0.2 mm long; achenes obovoid to terete, 0.4-0.6(0.7) mm long. ●Sandy soils, emergent shorelines, streambanks, pond margins; 5000-5200 ft; rare in NM, known only from a few collections in Hidalgo County. ♦Similar species: The three species of *Cyperus* section *Neohemicarpha* (formerly in *Lipocarpha*) native to the southwest are almost identical in stature and vegetative features, and differ only in characters of the floral scales. *Cyperus aristulatus* has scales with recurved awns as long as the scale body, and *C. hemidrummondii* has shorter, obtuse-tipped, appressed scales. Very few collections of these taxa exist in the Southwest, and of the three, *C. subsquarrosus* is by far the most common. We have been unable to track down valid collections of *C. aristulatus* or *C. hemidrummondii* for New Mexico.



Eleocharis [a beautiful marsh plant] SPIKE-RUSH [16].

Plants grass-like, perennial or less frequently annual, cespitose from short rhizomes to colonial from long-creeping rhizomes, the rhizomes in some species terminating in tubers or bulbs, some species stoloniferous, or fibrous rooted only in the annual species; culm terete to highly compressed in cross section, spongy or hollow, without nodes, glabrous; leaves 2 per culm, basal, blades absent, reduced to sheaths only, sheaths sometimes with a "tooth" or mucro projecting beyond the apex, ligules absent; inflorescence terminal, composed of a single spikelet; inflorescence bract lacking; spikelet terete, ovoid to cylindrical, with 4-500+ florets spirally arranged along the rachilla; flowers bisexual, in the axil of a scale, the proximal 1-2(3) scales empty in some species, perianth of (0)3-6(10) bristles, the bristles retrorsely (or antrorsely) barbed or smooth, shorter to longer than the achene; stamens 1-3; pistil with 1 style and 2 or 3 stigma branches, the style base usually persistent as a tubercle on the top of the achene, often markedly distinct in shape, color, and texture, but sometimes similar and appearing as a beaklike continuation of the achene; achene biconvex, plano-convex, or trigonous to subterete. ♦About 200 species worldwide, about 67 listed in the Flora of North America. *Eleocharis albida* Torrey, *E. montana* (Kunth) Roemer & Schultes, and *E. uniglumis* (Link) Schultes have been reported for the state by various authors, but no specimens are known; it is unlikely that these occur in New Mexico.

■Allred, K.W. 1999. New plant distribution records [*Eleocharis geniculata*]. The New Mexico Botanist 13:7. ■Harms, L.J. 1972. Cytotaxonomy of the *Eleocharis tenuis* complex. Amer. J. Bot. 59:483-487. ■Hartman, R.L. 1973. New plant records for New Mexico [*Eleocharis compressa*]. Southwestern Naturalist 18(2):241-242. ■Larson, B.M.H. & P.M. Catling. 1996. The separation of *Eleocharis obtusa* and *Eleocharis ovata* (Cyperaceae) in eastern Canada. Can. J. Bot. 74:238-242. ■Rothrock, P.E. 2009. *Eleocharis*, pp. 101-142. IN: Sedges of Indiana and the adjacent states, the non-*Carex* species. Indiana Academy of Science. ■Sivinski, R.C., T. Lowrey, & C. Keller. 1995 [1996]. Additions to the floras of Colorado and New Mexico [*Eleocharis bella*]. Phytologia 79(5):319-324. ■Smith, S.G. 2001. Taxonomic innovations in North American *Eleocharis* (Cyperaceae) [*Eleocharis acicularis porcata*]. Novon 11(2):241-

257. ■Smith, S.G., J.J. Bruhl, M.S. Gonzalez-Elizondo, & F.J. Menapace. 2002. *Eleocharis*, pp. 60-120. IN: Flora of North America, vol. 23. Oxford University Press.

- 1 Stigmas 2 (or a mix of 2 & 3, with up to 1/3 flowers with 3 stigmas in several annual species); achenes biconvex (or up to 1/3 compressed trigonous)
 - 2 Plants perennial, colonial with rhizomes; stigmas almost always 2
 - 3 Proximal scale nearly orbicular, clasping 100% of the culm circumference; 2nd proximal scale always with flower; culms 0.3-0.8(1.4) mm wide, averaging 0.6 mm wide, terete; spikelet 3-18 mm long; floral scales 15-50.....*E. erythropoda*
 - 3 Proximal scale usually longer than wide, clasping 2/3-3/4 of the culm circumference; 2nd proximal scale with or without flower; culms 0.5-5.0 mm wide, averaging 1.3 mm wide, terete or compressed; spikelet 5-40 mm long; floral scales 30-100
 - 4 Stem often strongly compressed; distal sheath summit subtruncate, sometimes with apical tooth present; spikelets 5-40 mm long, the apex often sharply pointed; 2nd proximal scale with or without flower.....*E. macrostachya*
 - 4 Stem terete to slightly compressed; distal sheath summit oblique, often splitting, without apical tooth; spikelets 5-25 mm long, the apex rounded to pointed; 2nd proximal scale always without flower..... *E. palustris*
 - 2 Plants tufted annuals, with fine fibrous roots only (late season plants may rarely develop rhizomes), or tiny matted perennials with fine rhizomes that appear like roots; up to 1/3 flowers with 3 stigmas in some species
 - 5 Tubercles not strongly dorsoventrally compressed, cross sectional shape similar to shape of achene, differentiated from the achene with a distinct change in color and texture or constriction; mature achenes dark brown to black; distal leaf sheath apex oblique or with an acute to acuminate tip, without apical tooth
 - 6 Distal leaf sheath apex thin, inflated and membranous, often wrinkled and disintegrating; mature achenes dark brown, the tubercle as high or higher than wide, triangular in appearance from the side; plants often matted, not distinctively tufted, with very fine rhizomes that are difficult to see in the root mass.....*E. flavescens*
 - 6 Distal leaf sheath apex thickened, persistent, with an acute tip on one side; mature achenes black, the tubercle significantly shorter than wide, cap-like when seen from the side; plants definitely tufted, without fine rhizomes
 - 7 Achenes 0.3-0.5 mm long, 0.3-0.4 mm wide; perianth bristles white or clear; culms 2-15 cm tall*E. atropurpurea*
 - 7 Achenes 0.5-1.1 mm long, 0.3-0.7 mm wide; perianth bristles red-brown; culms 3-45 cm tall..... *E. geniculata*
 - 5 Tubercles strongly dorsoventrally compressed, cross sectional shape proportionally much thinner than the cross-sectional shape of achene, distinct but more or less confluent with the achene; mature achenes stramineous to dark brown; distal leaf sheath apex oblique to acute, often toothed
 - 8 Larger spikelets lanceoloid to subcylindric; tubercles not more than 1/4 as high as achene; perianth bristles shorter than achene to equaling tubercle, or often absent..... *E. engelmannii*
 - 8 Larger spikelets broadly ovoid to lanceoloid; tubercles 1/4 -1/3 as high as the achene; perianth bristles equaling to exceeding the tubercle.....*E. obtusa*
 - 1 Stigmas all or mostly 3; achenes trigonous
 - 9 Floral scales cleft at the apex (at least on the lower scales); culms subterete to strongly compressed *E. compressa*
 - 9 Floral scales all entire; culms terete to slightly compressed
 - 10 Achenes with a network of strong vertical ridges interconnected by fine horizontal ridges; tubercle separated from the achene by a distinct constriction
 - 11 Plants annual, tufted, usually with many stems radiating from a central clump of fibrous roots, rarely producing rhizomes; culms 0.1-0.2 mm thick, often some curving upward, usually less than 3 cm tall in our specimens; floral scales 1-1.5 mm long, apex narrowly acute to acuminate; anthers 0.3-0.5 mm long..... *E. bella*
 - 11 Plants perennial, with fine rhizomes (hard to see) forming large, fine irregular colonies; culms wider, 0.2-1.0 mm thick, usually straight, 3-25 cm tall; floral scales 1.5-2.5(3.5) mm long, apex rounded to acute; anthers 0.6-1.5 mm long..... *E. acicularis*
 - 10 Achenes without a regular pattern of ridges; tubercle either confluent with achene or with a distinct constriction
 - 12 Tubercle distinct from achene, with a definite constriction where it joins the rounded top of the achene; distal sheath apex usually with tooth on some culms; plants colonial from rhizomes, the rhizomes 0.5-2 mm thick
 - 13 Spikelets narrowly lanceoloid to cylindrical, 3-20 mm long; floral scales 15-40, 3-4 per mm of rachilla length *E. parishii*
 - 13 Spikelets ovoid or ellipsoid to subcylindric, 4-12 mm long; floral scales 30-100, 6-10 per mm of rachilla length..... *E. montevidensis*
 - 12 Tubercle confluent with the achene, the achene tapering into an acute to acuminate tip; distal sheath apex without a tooth; large plants either tufted from very short rhizomes, or small colonial plants from fine rhizomes, the rhizomes 0.1-1 mm thick
 - 14 Robust plants, tufted from short stout ascending or horizontal caudex-like rhizomes, often forming large dense colonies; culms to over 1 m tall, compressed, with some culms arching to decumbent and rooting at the tip; bulbs not present at the rhizome tips; floral scales 20-40..... *E. rostellata*
 - 14 Small plants, colonial from fine rhizomes; culms less than 35 cm tall, subterete to slightly compressed, erect, never rooting at the tips; bulbs or tubers often present at the rhizome tips; floral scales 3-25
 - 15 Achenes 1.5-2.7 mm long; perianth bristles rudimentary to equaling the achene; floral scales 3-10, 2.5-6 mm long; rhizomes 0.2-1 mm thick; culms 5-35 cm tall..... *E. quinqueflora*
 - 15 Achenes 0.7-1.1 mm long; perianth bristles absent or rudimentary, less than 1/2 of the achene length when present; floral scales 6-25, 1.7-2.5 mm long; rhizomes 0.1-0.2 mm thick; culms 2-9 cm tall *E. coloradoensis*

Eleocharis acicularis (Linnaeus) Roemer & Schultes [needle-like] NEEDLE SPIKE-RUSH [*Eleocharis acicularis* (Linnaeus)

Roemer & Schultes var. *porcata* S.G. Smith, *Scirpus acicularis* Linnaeus]. Plants perennial, colonial from fine rhizomes; culms 1-60 cm tall, 0.2-0.5(0.7) mm wide, terete to occasionally compressed; distal sheath tight to inflated, the apex rounded; spikelet 2-8 mm long, 1-2 mm wide, ovoid, lanceoloid, to subcylindric; floral scales 4-25, 1.5-2.5 mm long, red or purplish brown to tan with a green midrib, the apex blunt to acute; bristles usually absent, occasionally 2-4 present; anthers 0.7-1.5 mm long; stigmas 3; achenes trigonous to subterete, 0.7-1.1 mm long, 0.3-0.6 mm wide, with longitudinal and fine

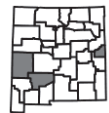


horizontal ridges, tubercle pyramidal to depressed, with basal constriction. ●Wet shorelines and riverbanks, meadows, springs, and disturbed soils, 6300-10,000 ft; frequent in mountainous areas. ♦Similar species: *Eleocharis bella* is a distinctly tufted annual with similar achenes, but shorter anthers (0.3-0.5 mm long), far less common, and generally smaller yet in stature than *E. acicularis*. *Eleocharis quinqueflora* is another small rhizomatous perennial of mountainous habitats, but has slightly bulbous bases, achenes without the horizontal striations, and a confluent tubercle. *Eleocharis coloradoensis* is an additional small, mat-forming rhizomatous perennial that is easily separated from *E. acicularis* per the key if fruit are present. If not, tubers should be looked for on the rhizomes of the former, which are never present on *E. acicularis*. In addition, the proximal scale of *E. acicularis* always subtends a flower, while that of *E. coloradoensis* is empty. The spikes of *E. coloradoensis* are typically pale colored, compared to the darker ones of *E. acicularis*, and it grows at slightly lower elevations, and is less common.

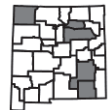
Eleocharis atropurpurea (Retzius) J. Presl & C. Presl [dark purple] [*Scirpus atropurpureus* Retzius]. Plants annual, densely tufted; culms 2-12(19) cm tall, 0.2-0.4 mm wide; distal sheath tight to the culm, the apex acute; spikelet 2-6(8) mm long, 1-2.5 mm wide, ovoid to ellipsoid; floral scales up to 100, 0.6-1.3 mm long, dark reddish brown to tan, the apex rounded to acute; bristles (0)4-6, typically 4, vestigial to exceeding the tubercle; anthers 0.3-0.5 mm long; stigmas 2; achenes black, biconvex, obovoid, 0.3-0.5 mm long, 0.3-0.4 mm wide, smooth, tubercle whitish, flattened to subconic, with basal constriction. ●Floodplains, shorelines and riverbanks, stock ponds, 4000-4400 ft; rare, known only from one collection in the White Sands area. ♦Similar species: *Eleocharis atropurpurea*, *E. engelmannii*, *E. geniculata*, and *E. obtusa* are all annuals that can look similar in habit, and vary in size enough to be confused with one another. If mature fruit is present, the dark shiny black achenes with contrasting whitish tubercles will separate *E. atropurpurea* and *E. geniculata* from the others, and then size will separate these two per the key. If the plants are immature, toothless sheaths will separate the same pair, but there will be no way to definitively tell these two apart without fruit, except that plants taller than 20 cm would indicate *E. geniculata*.



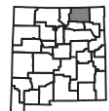
Eleocharis bella (Piper) Svenson [handsome, beautiful] [*Eleocharis acicularis* (Linnaeus) Roemer & Schultes var. *bella* Piper]. Plants annual, densely tufted; culms 1-3(7) cm long, 0.2-0.3 mm wide, terete to 4-angled; distal sheath slightly inflated, apex oblique and acute; spikelet 1.5-2.5(4) mm long, 0.8-2 mm wide, ovoid; floral scales 4-6(15), 1-1.5 mm long, with a green midrib and reddish brown margins, the apex acute to rounded and sometimes slightly recurved; bristles absent; anthers 0.3-0.5 mm long; stigmas 3; achenes trigonous to subterete, 0.6-1.1 mm long, 0.3-0.4 mm wide with fine longitudinal and horizontal ridges, tubercle pyramidal to depressed, appressed to achene with/without much constriction. ●Bare, drying out soil on shorelines, riverbanks, and seasonally wet depressions (4200) 7500-8000 ft; uncommon in the southwestern mountains, with one anomalous location in an eastern prairie pothole. ♦Similar species: See discussion under *Eleocharis acicularis*. Anther measurement is key for accurate determination.



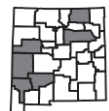
Eleocharis coloradoensis (Britton) Gilly [from Colorado] [*Eleocharis parvula* sensu M&H, *Eleocharis parvula* (Roemer & Schultes) Link var. *anachaeta* (Torrey) Svenson, *Scirpus coloradoensis* Britton]. Plants perennial, colonial from fine inconspicuous rhizomes, the rhizomes often ending in 2.5-4 mm long broadly oblong tubers with a terminal bud; culms 1.5-7(9) cm tall, 0.2-0.5 mm wide, soft and spongy; distal sheath membranous, often disintegrating, the apex rounded; spikelet 2-5(6) mm long, 1-2.5 mm wide, ovoid to ellipsoid; floral scales 5-10(25), 1.7 mm long, 2.5 mm wide, with light green midrib and scarious to sometimes pale red-brown margins, the apex rounded to acute; bristles 0(5), rudimentary if present to ½ the length of the achene; stigmas 3; anthers 0.6-1.2 mm long; achenes light brown, thickly trigonous, obovoid, 0.75-1.1 mm long, 0.5-0.7 mm wide, reticulate, tubercle confluent with the achene. ●Floodplains, drying shorelines and riverbanks, ponds, ditches, 2900-6700 ft; uncommon in widely scattered locations. ♦Similar species: The confluent tubercle and smooth surface separates this species from *Eleocharis acicularis*, which often shares its diminutive colonial habit. The small tubers on the rhizomes are also diagnostic. *Eleocharis quinqueflora* is similar to *E. coloradoensis* in having tubercles confluent with the achenes, but this taxon has darker spikelets and grows at higher elevations in wet mountain meadows than *E. coloradoensis*. Also, *E. quinqueflora* has bulbous culm bases, and sometimes vegetative buds on short rhizomes, but without the tuberous portions that are often present in *E. coloradoensis*.



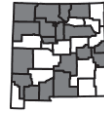
Eleocharis compressa Sullivant [compressed, for the culms]. Plants perennial, colonial from short to long rhizomes, the rhizomes 2-3 mm thick; culms 8-45 cm tall, (0.2)0.5-1 mm wide, 1-2 times wide as thick; distal sheath membranous, the apex obtuse to sub-truncate, without tooth; spikelet 4-8 mm long, 2-4 mm wide, ovoid; floral scales 20-60, spreading in fruit, 2-3(4) mm long, tan to dark brown with a lighter midregion, the apex acute to acuminate, hyaline, usually bifid to shallowly cut in the proximal scales, entire in the upper scales; bristles 0-5, shorter than to as long as the achene; stigmas 3 (occasionally some 2); anthers 0.7-2 mm long; achenes yellow to dark brown, trigonous but usually with some biconvex, obovoid to obpyriform, 0.8-1.1 mm long, 0.6-0.8 mm wide, finely rugulose, tubercle with basal constriction, depressed or rudimentary. ●Seasonal seeps and depressions, meadows, woods, 7600 ft; rare, known from one location in Colfax Co. ♦Our plants belong to var. *acutisquamata* (Buckley) S.G. Smith [with pointed scales] [*Eleocharis acutisquamata* Buckley]. Similar species: The bifid apices of lower scales should distinguish this species from all other *Eleocharis* taxa in NM.



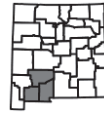
Eleocharis engelmannii Steudel [for Georg/George Engelmann (1809-1884), distinguished physician-botanist of St. Louis] [*Eleocharis engelmannii* Steudel var. *monticola* (Fernald) Svenson, *Eleocharis monticola* Fernald, *Eleocharis obtusa* (Willdenow) Schultes var. *engelmannii* (Steudel) Gilly]. Plants annual, densely tufted; culms to 2-40 cm tall, 0.5-1.5(2) mm wide, straight; distal sheath tight to culm, sometimes slightly flaring near apex, the apex acute to rounded, sometimes with tooth to 0.3 mm long; spikelet 5-10(20) mm long, 2-3(4) mm wide, lanceoloid to subcylindric to ovoid; floral scales 25-100(200), 2-2.5 mm long, brown to tan, the apex rounded to acute, sometimes with tooth to 0.3 mm long; bristles (0)5-8, vestigial to equaling the achene; anthers 0.3-0.7(1) mm long; stigmas 2-3; achenes brown, biconvex, obovoid, 0.9-1.1(1.5) mm long, 0.7-1.1 mm wide smooth, tubercle depressed, subdeltoid, confluent with and almost as wide as the achene, 2/5 or less as high as wide. ●Receding shorelines and riverbanks, seasonal wetlands, ponds, 7200-8400 ft; occasional in widely scattered locations in the mountains. ♦Similar species: *Eleocharis atropurpurea*, *E. engelmannii*, *E. geniculata*, and *E. obtusa* are all annuals that can look similar in habit, and vary in size enough to be confused with one another. They all have spikelets with rounded apices, but those of *E. engelmannii* are often (but not always) more elongate than those of the other three). *Eleocharis engelmannii* and *E. obtusa* are a pair that can be separated from the others by the achene and tubercle differences used in the key, and also by culms that tend to be straighter than those of *E. atropurpurea* and *E. geniculata*, and with sheath apices often toothed.



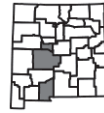
Eleocharis erythropoda Steudel [red-footed]. Plants perennial, colonial from rhizomes; culms 8-55(80) cm tall, 0.3-1.6 mm wide, terete; distal sheath thickened and sometimes red-spotted at tip, the tip obtuse to subacute, with tooth rarely present; spikelet 3-18 mm tall, 2-3(5) mm wide, ovoid, or lanceoloid, to subcylindric; floral scales 15-50, 2-3.5 mm long, medium to deep red-brown with a tan to green midrib, the apex rounded in proximate scales, acute in distal ones; bristles (0)4, tan to medium brown; anthers 1-1.8 mm long; stigmas 2; achenes light yellow, biconvex, obovoid, 0.9-1.6 mm long, 0.7-1.2 mm wide, smooth or lightly rugulose, tubercle pyramidal, higher to lower than wide, with basal constriction at achene. ●Wet shorelines and riverbanks, meadows, springs, fens, and ponds, (5000)5600-8900ft; widely scattered throughout the state at mid elevations. ◆Similar species: *Eleocharis erythropoda* is part of the *E. palustris* complex, and is subsumed into that taxon by some authors. Of the three colonial species with two stigmas in this group in NM, *E. erythropoda* is the easiest to separate from the others based on the consistently narrower culms and proximal scale that completely wraps the culm. *Eleocharis uniglumis* is a fourth species in this complex that has been reported previously for NM, but no documented records are known. It would be separated from *E. erythropoda* by having floral scales that are 1.8-2.5 mm wide compared to those of *E. erythropoda*, which are 1.8 mm or less wide. See discussion under *E. macrostachya* for more on this whole complex. In scale and habit, *E. erythropoda* might also be confused with *E. parishii*, a species with three stigmas whose spikelets are similar in color and shape and whose basal sheaths often have a reddish color. In looking at dried specimens, it is important to examine a number of flowers when counting stigmas, as the stigmas are brittle and often broken off, sometimes making for the appearance of 2 where there were originally 3. In addition to the stigmas, the sheaths of *Eleocharis parishii* have a longer apical tooth, and have teeth more consistently than does *E. erythropoda*.



Eleocharis flavescens (Poiret) Urban [yellowish]. Plants perennial, colonial from fine inconspicuous rhizomes, forming mats; culms 1.5-15(42) cm long, 0.2-0.5 mm wide, soft and spongy; distal sheath membranous and somewhat inflated, the apex long subulate; spikelet 2-5(9) mm long, 1-3 mm wide, ovoid to ellipsoid, the apex acute to acuminate; floral scales 4-40(65), 1.2-1.5(3) mm long, with a green midrib and tan to brown margins, the apex rounded to acute; bristles (0)7-9, retrorsely scabrous, shorter than to as long as the achene; anthers 0.6-1.2 mm long; stigmas 2 (rarely 3); achenes biconvex to thickly trigonous, obovoid, 0.75-1.1 mm long, 0.5-0.7 mm wide, dark brown to blackish, slightly longitudinally striate, tubercle pyramidal with acute to rounded apex, distinctly separate from achene with minor constriction at base. ●Wet shorelines and floodplains, ditches, springs, and mudflats, 4200-5600 ft; infrequent in widely scattered locations. ◆Our plants belong to var. *flavescens*. Similar species: *Eleocharis coloradoensis* shares the diminutive and rhizomatous habit of *E. flavescens*, but has achenes with confluent tubercles and bulbs on the rhizomes. The achenes of *E. flavescens* are most similar to those of *E. geniculata*, but the achenes of *E. flavescens* are dark brown rather than black, and *E. geniculata* is a strongly tufted annual. New Mexico (and some AZ) plants do not fit the species concept of *E. flavescens* perfectly; the sheath summit looks more like those of *E. geniculata* and *E. atropurpurea*, but the tubercle shape is not correct for either species, and the achenes are too large for the latter (as the specimens were originally determined). These may represent a cryptic taxon. More work is needed.



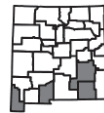
Eleocharis geniculata (Linnaeus) Roemer & Schultes [having small knee-like joints] [*Eleocharis caribaea* auctores not (Rothboell) S.F. Blake, *Scirpus geniculatus* Linnaeus]. Plants annual, densely tufted; culms to 45 cm tall, 0.2-1 mm wide, often curving upwards; distal sheath loose, the apex acute to acuminate; spikelet 1-9 mm long, 1-4 mm wide, ovoid to orbicular, the apex obtuse; floral scales up to 125, 0.8-3 mm long, straw to green to brown, the apex rounded to acute; bristles (0)4-8, typically 7, vestigial to ½ as long as achene; stigmas 2, anthers 0.6-0.8 mm long; achenes black, biconvex, obovoid, 0.5-1.1 mm long, 0.3-0.7 mm wide, smooth, tubercle whitish, flattened to subconic, with basal constriction. ●Floodplains, shorelines, riverbanks, stock ponds, 4500-6500 ft; uncommon in widely scattered locations. ◆Similar species: See discussion under *E. atropurpurea*, a very similar plant that differs mainly in its smaller achenes and culms. See also *E. flavescens*.



Eleocharis macrostachya Britton [large-spiked]. Plants perennial, colonial from substantial rhizomes; culms 10-100 cm tall, 0.5-2.5(3.5) mm wide, terete to compressed; distal sheath with the apex obtuse to truncate, with tooth present occasionally; spikelet 5-40 mm long, 2-5 mm wide, ovoid to narrowly lanceoloid, the tip usually acute; floral scales 30-80, 2.5-5.5 mm long, medium to red or chestnut-brown with a tan to green midrib, the apex rounded in proximate scales, acute in distal ones; bristles 4(5), usually present, tan to brown; stigmas 2; anthers 1.3-2.7 mm long; achenes yellow to dark yellowish brown, biconvex, obovoid, 1.1-1.9 mm long, 0.8-1.5 mm wide, smooth or with fine horizontal ridges, tubercle pyramidal, as high to much higher than wide, with basal constriction. ●Wet shorelines and riverbanks, meadows, springs, ditches, pastures, and ponds, 3100-11,600 ft; widely scattered throughout the state. ◆Similar species: *Eleocharis macrostachya* is part of the *E. palustris* complex, which also includes *E. erythropoda* and *E. uniglumis*. While treated as separate species by the Flora of North America authors, others subsume all of these taxa into one highly variable complex under the name of *E. palustris*, due to overlapping diagnostic characters that are not correlated with range or habitat across the continent. The key will allow some specimens to be placed in one taxon or another, but many will be found to be intermediate, and several of the important characters are almost impossible to determine from pressed specimens where one cannot see all sides of the culm to determine the degree of basal scale clasping, or whether a flattened stem is truly that or an artifact of pressing. Specimens with few culms may not be sufficient to show tooth on the sheath apex, which is uncommon in this complex. In the field, it may be best to identify populations of robust plants with highly flattened culms, and possessing long spikelets with an acute apex as *Eleocharis macrostachya*. Due to the large number of collections not complete enough for an accurate determination, elevation, habitat and range for *E. macrostachya* and *E. palustris* have been combined in this treatment.



Eleocharis montevidensis Kunth [from Montevideo, Uruguay] [*Eleocharis arenicola* Torrey]. Plants perennial, colonial from fine rhizomes; culms 25-50 cm tall, 0.5-1.2 mm wide, terete to elliptic; distal sheath tight to culm, the apex truncate to rounded, with apical tooth present on sheath apices of some to all of the culms; spikelet 4-12 mm long, (1.5)2-3 mm wide, ovoid to ellipsoid, rarely lanceoloid; floral scales 30-100, 1.5-2.5 mm long, orange brown with a green midrib, the apex rounded to obtuse in proximate scales, sometimes acute in distal ones, sometimes horizontally wrinkled and recurved; bristles 5-6(7), usually present, tan to brownish; anthers 0.8-1.5 mm long; stigmas 3; achenes dark brown, compressed trigonous, 0.7-1 mm long, 0.6-0.8 mm wide, smooth, tubercle pyramidal, as high as wide or occasionally depressed, with basal constriction. ●Wet shorelines and riverbanks, meadows, springs, and ponds, 3500-5800 ft; occasional in the extreme southern part of the state at lower elevations ◆Similar species: *Eleocharis montevidensis* forms a species pair with *E. parishii*. They are similar in habit and habitat, and differ primarily in the characters given in the key. The overall trend is for the spikelets of *E. montevidensis* to be more



ovate and rounded at the tip, but there is enough variation even within a population that some more lanceoloid spikelets approaching those of *E. parishii* can be found. However, in these cases the floral scales of *E. montevidensis* will be packed more densely on the rachilla. The range of *E. montevidensis* is restricted to the southern part of the state, while *E. parishii* is more widespread, throughout the state.

Eleocharis obtusa (Willdenow) Schultes [blunt, for the spikelets and floral scales] [*Eleocharis ovata* (Roth) Roemer & Schultes var. *obtusa* (Willdenow) Kükenthal, *Scirpus obtusus* Willdenow]. Plants annual, densely tufted; culms to 3-50(90) cm tall, 0.2-2 mm wide, straight; distal sheath tight to slightly flaring at the apex, the apex acute to obtuse, sometimes with tooth to 0.3 mm long; spikelet (2)5-13 mm long, (2)3-4 mm wide, broadly ovoid to less frequently lanceoloid or ellipsoid; floral scales 15-150, 1.5-2.5 mm long, brown with a bright green midstripe, the apex broadly rounded; bristles (5)6-7, exceeding the achene; anthers 0.3-0.6 mm long; stigmas 2-3; achenes brown, biconvex, obovoid, 0.9-1.2(1.3) mm long, 0.7-0.9 mm wide smooth, deltoid, sub-confluent with and almost as wide as the achene, 1/3-2/3 as high as wide. ●Receding shorelines and riverbanks, seasonal wetlands, ponds, 6450 ft; rare in NM, known only from one early collection in Las Vegas (San Miguel Co.). ♦Similar species: See discussion under *E. engelmannii*, the more common species of this pair in NM.



Eleocharis palustris (Linnaeus) Roemer & Schultes [of marshy or swampy ground] COMMON SPIKE-RUSH [*Eleocharis glaucescens* (Willdenow) Schultes, *Scirpus palustris* Linnaeus]. Plants perennial, colonial from substantial rhizomes; culms 30-115 cm tall, 0.5-5 mm wide, terete to slightly compressed; distal sheath apex obtuse to truncate, with tooth absent; spikelet 5-25 mm long, 3-7 mm wide, ovoid to lanceoloid, the apex obtuse to acute; floral scales 30-100, 3.5 mm long, brown with a tan to green midrib, the apex rounded in proximate scales, acute in distal ones; bristles 4(5), usually present, tan medium brown; anthers 1.5-2.2 mm long; stigmas 2; achenes tan to dark brown, biconvex, obovoid, 1.1-2 mm long, 1-1.5 mm wide, smooth or with fine horizontal ridges, tubercle pyramidal, as high to much higher than wide, with basal constriction. ●Wet shorelines and riverbanks, meadows, springs, ditches, pastures, and ponds, 3100-11,600 ft; widely scattered throughout the state. ♦Similar species: See discussions under *E. macrostachya*, and *E. rostellata*. *Eleocharis palustris* is quite variable in size and habit, and occasionally one will find plants that are of smaller stature and appear more clumped, but key to this species based upon number of stigmas and achene/tubercle morphology, along with some rhizomes being present. §



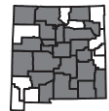
Eleocharis parishii Britton [for Samuel Bonsall Parish (1838-1928), southern California naturalist] PARISH'S SPIKE-RUSH. Plants perennial, colonial from fine rhizomes; culms 10-50 cm tall, 0.2-0.7(1) mm wide, terete to elliptic; distal sheath tight to culm, the apex truncate to rounded, with apical tooth present on some to all of the sheath apices; spikelet 3-20 mm long, 1.5-2.5 mm wide, narrowly lanceoloid, to subcylindric; floral scales 4-25, 1.5-2.5 mm long, orange brown with a green midrib, the apex rounded to obtuse in proximate scales, acute in distal ones; bristles 3-7, usually present, tan to whitish; anthers 1.1-2 mm long; stigmas 3; achenes yellowish to dark brown, compressed trigonous, 0.8-1.4 mm long, 0.5-0.7 mm wide, smooth, tubercle pyramidal, often higher than wide, with basal constriction. ●Wet shorelines and riverbanks, meadows, springs, and ponds, 3900-8000 ft; most frequent in the southwestern quarter of the state, but also following the central mountain ranges north. ♦Similar species: See discussions under *E. erythropoda* and *E. montevidensis*. §



Eleocharis quinqueflora (F.X. Hartman) O. Schwartz [five-flowered, for the few-flowered spikelets] [*Eleocharis pauciflora* (Lightfoot) Link, *Eleocharis pauciflora* (Lightfoot) Link var. *suksdorfiana* (Beauvois) Svenson, *Scirpus pauciflorus* Lightfoot, *Scirpus quinqueflorus* F.X. Hartman]. Plants perennial, colonial from rhizomes, the rhizomes 0.2-1 mm thick, often ending in resting buds, or these found among culm bases; culms 5-35 cm tall, 0.2-0.5(1.2) mm wide, subterete to compressed; distal sheath membranous to papery, the apex subtruncate to acute; spikelets 3-8 mm long, 1.5-4 mm wide, ellipsoid to lanceoloid; floral scales 3-10, 2.5-6 mm long, blackish brown in center, marginally membranous, the apex acute; bristles (0)3-6, rudimentary to equaling the tubercle, often unequal; anthers 2-2.5 mm long; stigmas 3; achenes tan to brown, equilaterally to compressed trigonous, obovoid, 1.6-2.3 mm long, 0.7-1.3 mm wide, smooth to finely longitudinally ridged, tubercle similar in color to the achene, confluent, without a basal constriction. ●Wet meadows, seeps & springs, and fens in the mountains, 8500-11,800 ft; moderately common at higher elevations in the Sangre de Cristo and Jemez mountains in the northern part of the state. ♦Similar species: If achenes are present, the confluent tubercle and smooth surface would separate this species from *E. acicularis*, which often shares its diminutive colonial habit and dark-colored spikelets. The resting buds on the rhizomes or among the culm bases are also diagnostic. The achenes of *E. coloradoensis* also have a confluent tubercle, but it typically is a shorter plant with lighter colored spikelets and grows at lower elevations in muddy areas. It has tuberous buds terminating some of the rhizomes (which are distinctly different in their tuberous nature than the simple resting buds of *E. quinqueflora*).



Eleocharis rostellata (Torrey) Torrey [small-beaked] BEAKED SPIKE-RUSH [*Scirpus rostellatus* Torrey]. Plants perennial, tufted from short horizontal to ascending rhizomes, but forming dense stands by rooting at the long, bent-over culm tips; culms 20-100 cm tall, 0.35-2 mm wide, strongly compressed, 1.5 times or more as wide as thick; distal sheath tight to culm, apex rounded; spikelets 5-17 mm long, 2.5-5 mm wide, ovoid; floral scales 20-40, 3.5-6 mm long, tan to medium brown, the apex rounded to subacute; bristles 5-6, more or less equaling the tubercle; anthers 2-2.4 mm long; stigmas 3 (rarely a mix of 3 and 2); achenes tan to brown, variable in shape within an inflorescence, ovoid to obovoid, 1.5-2.5 mm long, 1-1.2 mm wide, smooth to finely rugulose or reticulate, tubercle similar in color to the achene, without a basal constriction, or absent. ●Wet alkaline meadows, seeps, springs, and fens, often dominant or co-dominant in its habitat, 3000-8800 ft; widespread at lower to mid elevations throughout the state. ♦Similar species: The long, arching culms rooting at the tips are unique and diagnostic, but not always present. Both *E. coloradoensis* and *E. quinqueflora* also have achenes with confluent tubercles and are rhizomatous, but both are much smaller plants than *E. rostellata*. Sometimes *E. rostellata* has been confused with *E. palustris* and its relatives when achenes are not present and stigmas are not readily countable, due to its robust nature and tendency to form large monocultures. However, *E. rostellata* is a clumping species with short rhizomes and tight internodes, that spreads into large swaths by rooting at the stem tips, which may not be evident on collections, while *E. palustris* complex plants have long rhizomes (even though sometimes as many as 20 or more culms may cluster at a node). The bases of *E. rostellata* are stramineous with an orangish tint at best, never with red coloring as in the *E. palustris* complex. The spikelets are also tan in color, while those of the *E. palustris* complex are usually much darker.



Eriophorum [woolly] COTTONSEEDGE, COTTONGRASS [2].

Plants grass-like, perennial; cespitose to colonial from long-creeping rhizomes; culms terete to trigonous; leaves basal and cauline, sometimes reduced to bladeless sheaths; blades flat to filiform, ligules present; inflorescence terminal, composed of a single upright to many spikelets arranged in a subcapitate to subumbellate panicle; inflorescence bracts 1-several, leaflike to scale-like; spikelets with (10-)20-200 florets spirally arranged along the rachilla; flowers bisexual, each in the axil of a scale; perianth persistent, composed of (8-)10-25 hair-like smooth straight elongate bristles, obscuring the scales in the spikelet; stamens 1-3; style with 3 stigma branches, deciduous; fruit an achene, trigonous. ♦About 25 species worldwide, 11 listed in the Flora of North America.

■Ball, P.W. & D.E. Wujek. 2002. *Eriophorum*, pp. 21-27. IN: Flora of North America, vol. 23. Oxford University Press. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Eriophorum scheuchzeri*], J. Bot. Res. Inst. Texas 4(2):777-784. ■Keller, C.F. 2012. Plant distribution reports [*Eriophorum gracile*]. The New Mexico Botanist 56:1. ■Peterson, R.S. 2010. Plant distribution reports [*Eriophorum altaicum*]. The New Mexico Botanist 50:3.

- 1 Spikelets solitary, erect..... *E. scheuchzeri*
- 1 Spikelets 2-10, spreading or nodding..... *E. angustifolium*

Eriophorum angustifolium Honckeney [narrow-leaved] [*Eriophorum polystachion* Linnaeus]. Plants perennial, colonial from long-creeping rhizomes; culms to 1 m tall, 1-1.2 mm wide distally; leaves with flat to channeled blades, with trigonous tip, 1.5-6(8) mm wide, distal blade longer than its sheath; inflorescence terminal, composed of (1)2-10 pendent spikelets in subumbels; inflorescence bracts 1, leaflike, similar to distal leaf; spikelets 10-20 mm long in flower, 20-50 mm long in fruit, ovoid; floral scales 5-10 mm long, brown to grey, paler distally with prominent midrib fading to tip; perianth bristles 10 or more, white to pale yellow, 15-30 mm long; stigmas 3, stamens 1-3, anthers 2-5 mm long; achenes oblanceoloid, 2-5 mm long. ●Marshes, bogs, fens, wet meadows; 10,400-11,900 ft; known from the northern mountains, primarily Sangre de Cristos and San Pedro Parks Wilderness. ♦Our plants belong to subsp. *angustifolium*. Similar species: *Eriophorum gracile*, found in Colorado, was mistakenly reported from NM. It is similar to *E. angustifolium*, but slighter in stature, with shorter anthers and scales, the proximal scales being ribbed, unlike the smooth scales of *E. angustifolium*.



Eriophorum scheuchzeri Hoppe [for Johann Jakob Scheuchzer (1672-1733), Swiss naturalist and physician] [*Eriophorum altaicum* Meinhshausen]. Plants perennial, colonial from long-creeping rhizomes; culms 5-35(70) cm tall, 1 mm wide distally; leaves with channeled to involute blades, 0.5-1.5 mm wide, distal blade reduced to a black-tipped sheath; inflorescence terminal, composed of 1 upright spikelet; inflorescence bract absent; spikelets 8-12(40) mm long in fruit, broadly obovoid to subglobose; floral scales 4-10 mm long, grey to blackish green with midrib not reaching tip; perianth bristles 10 or more, bright white, 15-30 mm long; stigmas 3, stamens 1-3, anthers 0.5-1.5 mm long; achenes narrowly oblong with a subulate beak, 0.4-2.5 mm long. ●Tundra, marshes, peaty soils, riverbanks, pond shores; 12,500-12,600 ft; known only from the highest elevations in the Sangre de Cristos near the Colorado border in Taos County.

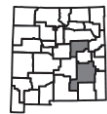


Fimbristylis [a fringed style] FIMBRY [1].

Plants grass-like, annual or perennial (in our single species); cespitose with fine fibrous roots or rhizomatous with culms single to clustered in small tufts; culms wiry, terete, compressed, or angulate, ribbed; leaves basal; blades linear to filiform, flat to folded or terete; sheaths glabrous and scarios margins, ligules absent or if present of erect short hairs; inflorescence terminal on slender culms, composed of few to many spikelets arranged in simple to compound anthelae, or capitate in a few species; inflorescence bracts 2-5, spreading to erect, leaflike to scale-like; spikelets ovoid to lanceoloid or cylindric, 8-100+ florets spirally arranged along the rachilla; flowers bisexual, in the axil of a scale; perianth absent; stamens 1-3; style with 2-3 stigma branches (2 in our species), the style base enlarged and deciduous; fruit an achene, biconvex or trigonous. ♦About 200 species worldwide, 16 listed in the Flora of North America.

■Kral, R. 1971. A Treatment of *Abildgaardia*, *Bulbostylis* and *Fimbristylis* (Cyperaceae) for North America. Sida 4 (2):57-227. ■Kral, R. 2002. *Fimbristylis*, pp. 121-131. IN: Flora of North America, vol. 23. Oxford University Press.

Fimbristylis puberula (Michaux) Vahl [somewhat downy or hairy]. Plants perennial, with culms in small tufts from orangish, slender rhizomes; culms wandlike, up to 100 cm tall, 1 mm wide; leaves with blades 1/3 to as long as the length of the culm, 1-2 mm wide, involute, scabrid-ciliate; inflorescence terminal, composed of 2-20 spikelets in simple to compound anthelae; inflorescence bracts, one per ray, leaflike, the proximal either shorter than or longer than the inflorescence; spikelet 5-10 mm long, ovoid, cylindric, or ellipsoid; floral scales 2.5-3.5 mm long, glabrous, reddish brown with midrib excurrent as a micro, the apex obtuse; stigmas 2, fimbriate, stamens 3, anthers 2-2.5 mm long; achenes lenticular-obovoid, ca. 1 mm long. ●Moist sandy or silty soils in prairie swales or along streambanks; 3400-4600 ft; known from two locations, the wet ciénega below Blue Hole Spring in Santa Rosa (Guadalupe Co.), and along the Pecos River in the Bitter Lake Refuge near Roswell (Chaves Co.). ♦Our plants belong to var. *interior* (Britton) Kral [inland] [*Fimbristylis interior* Britton, *Fimbristylis spadicea* sensu M&H].

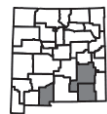


Fuirena [for George Fuiren, 1581-1628, Danish physician-botanist] UMBRELLA-SEDGE [1].

Plants grass-like, annual or perennial; cespitose with fine fibrous roots or rhizomatous with culms single to clustered in small tufts; culms 3-5 angled; leaves cauline only, hairy; blades flat in our species; sheaths closed, ligules tubular, scarios; inflorescence terminal and axillary, composed of sessile or pedunculate clusters of one to several spikelets; inflorescence bract(s) spreading to sub-erect, leaflike; spikelets ovoid, with 20-50 florets spirally arranged along the rachilla; flowers bisexual, each in the axil of a scale; perianth of two types, the outer set of 3 sharp, short bristles, the inner set of 3 stipitate, spatulate longer scales; stamens 1-3(6); style with 3 stigma branches, the style base narrow and persistent; achene trigonous-rhomboid. ♦About 30 species worldwide, 7 listed in the Flora of North America.

■Kral, R. 1978. A synopsis of *Fuirena* (Cyperaceae) for the Americas north of South America. Sida 7:309-354. ■Kral, R. 2002. *Fuirena*, pp. 32-37. IN: Flora of North America, vol. 23. Oxford University Press.

Fuirena simplex Vahl [simple, undivided]. Plants annual or perennial, mostly cespitose; culms tufted or individual, 10-100 cm tall, 0.5-1.5 mm wide, 14-18 ribbed; leaves cauline, blades flat, linear to lance-linear, 2-20 mm wide, margins pilose to hispid-ciliate, faces glabrous to hirsute or scabrous on the veins; inflorescence composed of 1-3(5) clusters of spikelets; proximal inflorescence bract (when more than one cluster of spikelets is present) leaflike, long-sheathing, shorter than to longer than the inflorescence; each cluster subtended by 1-4 leaflike bracts each associated with a spikelet; spikelets 3-15(20) mm long, ovoid, lance-ovoid, or cylindric; floral scales 1.5-2.5 mm long, scabrid, midrib excurrent as a spreading to excurved awn 2/3 or more as long as the scale body, antrorsely scabrous, the scale apex rounded; perianth bristles retrorsely barbed, perianth blades long-clawed, with apical retrorsely barbed bristle; stigmas 3, fimbriate, stamens 3, anthers 1-3, 0.4-



1.4 mm long; achene with stipe and beak, 1.2 mm long. ●Moist soils at seeps and springs, along streambanks; 4300-5900 ft; known primarily from the Guadalupe and San Andreas mountains in southern NM. ◆We have two varieties:

- a Anthers 0.9-1.4 mm long; spikelets 1-5(7), 6-20 mm long; scales with 3-9 ribs, light colored...var. *simplex*
- a Anthers 0.4-0.7 mm long; spikelets 1-12, 3-7 mm long; scales with 3 principal ribs, occasionally with 1-2 less strong ribs, dark colored...var. *aristulata* (Torrey) Kral [short-awned] [*Fuirena squarrosa* Michaux var. *aristulata* Torrey].

Kobresia [for Joseph Paul von Kobres (Cobres)(1747-1823), Austrian botanist-scientist-banker] BOG-SEDGE [2].

Plants grass-like, perennial, densely cespitose with short ascending rhizomes usually not apparent; culms rounded trigonous; leaves basal and cauline, basal sheaths persistent, blades involute to filiform, glabrous, ligules present; inflorescence terminal, spikeate to tightly paniculate with 10-30 spikelets; proximal inflorescence bracts (when present) leaflike to scale-like; spikelets each with 1-4 sessile florets spirally arranged along the rachilla, the distal spikelets usually 1-flowered and staminate, the proximal spikelets 1-flowered and pistillate or 2-4 flowered with 1 pistillate flower proximally and 1-3 staminate flowers distally, sometimes with sterile scales, each spikelet enclosed within a scale-like bract (perigynium) that is open on one side; flowers unisexual, perianth absent; stamens 3; style with 3 stigma branches, the style base persistent; achene trigonous, included within the perigynium. ◆About 30 species worldwide, 3 listed in the Flora of North America.

■Ball, P.W. 2002. *Kobresia*, pp. 252-253. IN: Flora of North America, vol. 23. Oxford University Press. ■Ball, P.W. & A.A. Reznicek. 2002. *Carex*, pp. 254-572. IN: Flora of North America, vol. 23. Oxford University Press. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Kobresia simpliciuscula*]. J. Bot. Res. Inst. Texas 4(2):777-784. ■Wilson, B. L. et al. 2014, pp. 406-409. IN: Field guide to the sedges of the Pacific Northwest, second edition. Oregon State University Press

1 Inflorescence a spike, unbranched; inflorescence bract 0; basal sheaths somewhat glossy, with blades deciduous; plants of drier tundra habitats *K. myosuroides*

1 Inflorescence paniculate, with short branches; inflorescence bract present; basal sheaths dull, usually with the withered remains of the blades attached; plants of more mesic habitats..... *K. simpliciuscula*

Kobresia myosuroides (Villars) Fiori [resembling *Myosurus*] [*Carex myosuroides* Villars, *Kobresia bellardii* (Allioni) Degland].



Plants perennial, densely cespitose; culms 5-20(35) cm tall; leaves with filiform blades 0.2-0.5 mm wide, basal sheaths somewhat glossy, persisting and making an obvious tuft below the current year's blades; inflorescence terminal, 10-30 mm long, 2-3 mm wide, composed of many spikelets in a simple unbranched spike, the proximal spikelets androgynous with 2 flowers (the lowest rarely one-flowered and pistillate), the distal single-flowered and staminate; inflorescence bract absent; scales subtending the perigynia 2-3.5 mm long, glabrous, brown with midvein distinct almost to tip, the apex obtuse or cuspidate; stamens 3, anthers 1-1.5 mm long; stigmas 3, perigynia brown, 2-3.5 mm long, open on one side to base; achenes trigonous, 2-2.8 mm long. ●Alpine tundra and scree slopes; 10,200-12,800 ft; known only from the Sangre de Cristo Mountains in northern NM. ◆Similar species: *Kobresia myosuroides* is more likely to be confused with *Carex elynoides*, which shares the same habitat, than with *K. simpliciuscula*, which differs in both habitat and inflorescence architecture. *Kobresia myosuroides* and *Carex elynoides* are almost identical in habit and vegetative characters, and both have similar sized and shaped inflorescences. However, in addition to the characters given in the genus key, which require a lens to see, in *Carex elynoides* there are typically far more staminate flowers forming a smooth cylindrical portion of the spike above the few perigynia clustered at the base, while in *Kobresia myosuroides*, the pistillate flowers are more evenly distributed for most of the length of the spike.

Kobresia simpliciuscula (Wahlenberg) Mackenzie [nearly simple or undivided] [*Carex simpliciuscula* Wahlenberg].



Plants perennial, densely cespitose; culms 5-35 cm tall; leaves with channeled blades 0.2-1.5(2) mm wide, basal sheaths dull, persisting with the previous year's blades; inflorescence terminal, (8)10-35 mm long, (2)3-8 mm wide, composed of many spikelets in a compact panicle, the proximal spikelets androgynous with 2 flowers or pistillate and 1-flowered, the distal single-flowered and staminate; inflorescence bract brown with a hyaline margin, shorter than the inflorescence; scales subtending the perigynia 2-3 mm long, glabrous, brown with midvein distinct almost to tip, the apex obtuse to subacute; stamens 3, anthers 1-2 mm long; stigmas 3, perigynia brown, 2.5-3.2 mm long, open on one side to base; achenes trigonous, 2-3 mm long. ●Wet montane to alpine meadows, bogs; 10,800-10,900 ft; known only from a few locations in Colfax Co., in the northern Sangre de Cristo Mountains.

Schoenoplectus [a twisted reed] BULRUSH [4].

Plants grass-like, perennial (ours), colonial from long, tough rhizomes (ours); culms terete to trigonous, smooth, glabrous; leaves all basal, rarely 1(2) cauline, confined to the bottom 1/3 or less of the culm, blades rudimentary to well developed, flat to channeled, ligules present, membranous; inflorescences terminal, appearing lateral, composed of 1-100+ spikelets in capitate clusters to open panicles; inflorescence bracts 1-5, leaflike to stem-like, the proximal erect (ours); spikelets terete, ovoid to lanceoid or subcylindric, each with 8+ florets spirally arranged along the rachilla, scales deciduous, each subtending a flower or the proximal empty; flowers bisexual, perianth of 0-6(8) bristles; stamens 3; style with 2-3 stigma branches, base not or scarcely enlarged, deciduous leaving an apiculus; achene biconvex to trigonous. ◆About 77 species worldwide, 17 listed in the Flora of North America. *Schoenoplectus californicus* (C.A. Meyer) Sojak has been reported for the state by M&H, but no specimens are known; it is unlikely that this taxon occurs in New Mexico.

■Raynal, J. 1976. Notes cyperologiques: 26. Le genre *Schoenoplectus*. II. L'amphicarpie et la sect. *Supini*. Adansonia, series 2, 16:119-155. ■Rothrock, P.E. 2009. *Schoenoplectus*, pp. 181-199. IN: Sedges of Indiana and the adjacent states, the non-Carex species. Indiana Academy of Science. ■Schuyler, A.E. 1974. Typification and application of the names *Scirpus americanus* Persoon, *S. olneyi* Gray, and *S. pungens* Vahl. Rhodora 76(805):51-52. ■Smith, S.G. 1995. New combinations in North American *Schoenoplectus*. *Bolboschoenus*, *Isolepis*, and *Trichophorum* (Cyperaceae). Novon 5:97-102. ■Smith, S.G. 2002. *Schoenoplectus*, pp. 44-60. IN: Flora of North America, vol. 23. Oxford University Press.

1 Inflorescence branches absent or scarcely developed, the spikelets borne in a tight cluster on the culm; culms trigonous

2 Plants typically robust; spikelets light brown in color; scales often pale with brown dots, the apex notch 0.1-0.4(0.8) mm deep, with awn 0.2-0.6 mm long; distal leaf blade much shorter than to equaling (rarely 1.5 times longer than) the sheath; proximal inflorescence bract 1-3(6) cm long, other bracts without blades; sides of the mid-culm deeply concave, rarely nearly flat.....

..... *S. americanus*

2 Plants usually less robust; spikelets dark brown in color; scales often rich brown, the apex notch (0.3)0.5-1 mm deep, with awn 0.5-1.5(2.5) mm long; distal leaf blade much longer than to nearly equaling the sheath; proximal inflorescence bract (1)3-20 cm long, other bracts with narrow blades sometimes exceeding the spikelets; sides of the mid-culm shallowly concave to flat or slightly convex.....

..... *S. pungens*

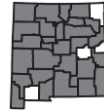
1 Inflorescence branches well-developed and evident, the spikelets borne on branches; culms cylindrical

3 Spikelet scales uniformly orange-brown (sometimes with straw-colored streaks), the dorsal side of scales smooth to sparsely rarely densely) scabrous; awns of the scales straight to bent, 0.2-0.8 mm long; many spikelets solitary at the tips of the pedicels.....

..... *S. tabernaemontani*

3 Spikelet scales wholly or partially pale grey to tan colored with prominent streaks, the dorsal side of the scales sparsely to often densely scabrous; awns of the scales usually contorted, 0.5-2 mm long, most spikelets in sessile clusters of 2 or more*S. acutus*

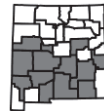
Schoenoplectus acutus (Muhlenberg ex Bigelow) A.&D. Love [sharp-pointed] hardstem bulrush [*Scirpus acutus* Muhlenberg ex Bigelow]. Plants perennial, colonial from stout, long-creeping rhizomes, 5-15 mm thick; culms cylindric, 1-4 m tall, 2-10 mm wide; leaves 3-4, all basal, blades 1-2, the distal 3-7 mm wide and much shorter than the sheath; inflorescence terminal, appearing lateral, composed of 3-40(190) spikelets in a relatively compact panicle, 2(3) times branched, most spikelets in clusters of 2-8; proximal inflorescence bract erect, appearing as a continuation of the stem; spikelets ovoid, 6-18(24) mm long, with numerous florets spirally arranged along the rachilla; floral scales pale grey to light tan with prominent streaks, lightly to densely scabrid, 3-4 mm long, apex notched 0.3-0.5 mm deep, with contorted awn 0.5-2 mm long (often broken off); perianth bristles (4)6(8), retrorsely barbed, shorter to equaling the achene; stigmas 2(3); anthers 2 mm long; achenes dark grey-brown to almost white, obovoid, plano-convex to weakly trigonous, (1.5)2-3 mm long. ●Marshes, lakeshores, streambanks, often emergent in water to 1.5 m; 3000-8800 ft; found throughout the state. ♦Similar species: *Schoenoplectus acutus* is most often confused with *S. tabernaemontani*. Although many of the characters that separate these two overlap, in general, *Schoenoplectus acutus* has fewer and more robust spikelets, very rarely any that are not clustered, floral scales that are almost always more scabrid on the backs, and rarely scales that are orange-brown colored throughout like those of *S. tabernaemontani*. ♦We have two weak varieties in New Mexico:



a All styles with 2 stigmas; culms very firm, with air cavities in distal ¼ mostly 0.5 mm wide...var. *acutus*. ●Generally northern half of the state; common in the eastern half of the U.S. §

b Some styles with 3 stigmas; culms soft to firm, with larger air cavities in distal ¼ mostly 1-2.5 mm wide...var. *occidentalis* (S. Watson) S.G. Smith [western] [*Scirpus acutus* Muhlenberg ex Bigelow var. *occidentalis* (S. Watson) Beetle, *Scirpus lacustris* Linnaeus var. *occidentalis* S. Watson, *Scirpus occidentalis* (S. Watson) Chase]. ●Widespread throughout the state; common in the western half of the U.S.

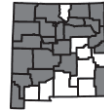
Schoenoplectus americanus (Persoon) Volkart ex Schinz & R. Keller [of the Americas] OLNEY'S BULRUSH [*Scirpus americanus* Persoon, *Scirpus olneyi* Gray]. Plants perennial, colonial from stout, long-creeping rhizomes, 2-5 mm diam.; culms sharply trigonous-winged, sides deeply concave to rarely nearly flat, 0.4-2.5 m tall, 3-10 mm wide; leaves ca. 3, all basal, blades 1-3, the distal blade 0.2-1.5 times as long as the sheath, 2-8 mm wide; inflorescence terminal, appearing lateral, composed of 2-20 spikelets sessile in a single capitate cluster; proximal inflorescence bract erect, 1-3(6) cm long, appearing as a continuation of the stem; spikelets ovoid, 5-15 mm long, with numerous florets spirally arranged along the rachilla; floral scales orangish red to light tan with linear spots, smooth with margins ciliolate, 3-4 mm long, apex notched 0.1-0.4 mm deep, with straight awn 0.2-0.6 mm long; perianth bristles (2)5-6(7), retrorsely barbed, shorter than the achene; stigmas 2(3); anthers 1.5-3 mm long; achenes brown, obovoid, plano-convex to compressed trigonous, 1.8-2.8 mm long, with beak 0.1-0.3 mm long. ●Marshes, ditches, streambanks, pond-shores; 3400-7600 ft; found primarily in the southern half of the state. ♦Similar species: See discussion under *Schoenoplectus pungens*.



Schoenoplectus pungens (Vahl) Palla [sharp-pointed] THREE-SQUARE BULRUSH [*Scirpus americanus* of many NM reports, *Scirpus americanus* (Persoon) Volkart ex Schinz & R. Keller var. *longispicatus* Britton, *Scirpus pungens* Vahl, *Schoenoplectus pungens* (Vahl) Palla var. *longispicatus* (Britton) S.G. Smith]. Plants perennial, colonial from stout, long-creeping, often also vertical rhizomes, 1-6 mm thick; culms bluntly trigonous, sides convex to slightly concave, 0.1-2 m tall, 1-6 mm wide; leaves all basal, blades 2-6, the distal blade (1)2-5 times as long as the sheath, 2-9 mm wide; inflorescence terminal, appearing lateral, composed of 1-5(10) spikelets sessile in a single capitate cluster; proximal inflorescence bract erect, (1)3-20 cm long, appearing as a continuation of the stem; spikelets ovoid, 5-23 mm long, with numerous florets spirally arranged along the rachilla; floral scales dark orangish red to brown or tan with linear spots, smooth with margins ciliolate, 3-4 mm long, apex notched (0.3)0.5-1 mm deep, with irregularly bent awn 0.5-1.5(2.5) mm long; perianth bristles 4-8, retrorsely barbed, rudimentary to equaling the achene; stigmas 3; anthers 2-3 mm long; achenes brown, obovoid, lenticular to compressed-trigonous, (2)2.5-3.5 mm long, with beak 0.1-0.5 mm long. ●Marshes, ditches, streambanks, lakeshores, often emergent in water to 0.7 m deep; 3000-8700 ft; found throughout the state. ♦Similar species: This taxon was known mistakenly for many years as *Scirpus americanus* Persoon, and there is still some confusion between *Schoenoplectus americanus* and *S. pungens* due to the nomenclature used on older specimens. Some of the confusion is also due to the fact that some of the characters that separate the two are not consistent, such as the cross-sectional shape of the stems. However, the depth of the notching on the apex of the floral scales, and the relative length of the distal leaf blade as described in the key, are consistently useful in making a determination. In general, if not always, *Schoenoplectus pungens* are smaller, more wiry plants, with darker scales and fewer spikelets than *S. americanus*. Three varieties of *Schoenoplectus pungens* have been described by various authors, but are not formally recognized in the Flora of North America due to weak morphological delimitation and uncertain ranges. Most of our specimens would belong to var. *longispicatus*. §



Schoenoplectus tabernaemontani (C.C. Gmelin) Palla [for Jacob Theodor von Bergzabern (?-1590), physician & herbalist] SOFTSTEM BULRUSH [*Scirpus tabernaemontani* C.C. Gmelin, *Scirpus validus* Vahl]. Plants perennial, colonial from stout, long-creeping rhizomes, 3-10 mm thick; culms cylindric, 0.5-3 m tall, 2-10 mm wide; leaves 3-4, all basal, blades 1-2, the distal 1-4 mm wide and much shorter than the sheath; inflorescence terminal, appearing lateral, composed of 15-200 spikelets, in a panicle, often with drooping branches, 2-4 times branched, many spikelets single, and others in clusters of 2-4; proximal inflorescence bract erect, appearing as a continuation of the stem; spikelets ovoid, 3-17 mm long, with numerous florets spirally arranged along the rachilla; floral scales uniformly dark to pale orange-brown, sometimes with linear spots, smooth to lightly scabrid, 2-3.5 mm, apex notched 0.2-0.3 mm deep, with straight or bent awn 0.2-0.8 mm long (often broken off); perianth bristles 6, spinulose, equaling the achene; stigmas 2(3); anthers 2 mm long; achenes dark grey-brown, obovoid, plano-convex, 1.5-2.8 mm long. ●Marshes, lakeshores, streambanks, often emergent in water to 1.0 m deep; 3600-8700 ft; found throughout the state. ♦Similar species: See discussion under *Schoenoplectus acutus*. §



Schoenus [a rush] BOG-RUSH [1].

Plants grass-like, perennial, caespitose from short rhizomes; culms terete; leaves basal, rarely cauline, blades involute to channeled, subterete, ligules absent; inflorescences terminal, usually head-like, composed of 10-25 clustered spikelets; inflorescence bracts spreading to erect, leaflike; spikelets compressed, distichous, dark colored at maturity, with 3-11 florets, the proximal 2-3 sterile; flowers, bisexual, each in the axil of a distal scale; perianth of (0)3-6 bristles; stamens 3; style with 3 stigma branches, deciduous; achene rounded-trigonous to subterete in cross section. ♦About 100 species worldwide, 1 listed in the Flora of North America.

■McGrath, J. 2011. Plant distribution reports [*Schoenus nigricans*]. The New Mexico Botanist 54:10. ■Tucker, Gordon C. 2002. *Schoenus*, pp. 239-240. IN: Flora of North America, vol. 23. Oxford University Press.

**Schoenus nigricans* Linnaeus [blackish]. Plants perennial, caespitose, with caudex-like rhizome; culms wiry, erect, terete with spongy center, 20-70 cm tall, 1 mm wide; leaves basal, with blackish sheaths much wider than the blades, blades half as long as the culms, 0.8-2 mm wide, involute; inflorescence terminal, composed of (1)10-25 digitately clustered spikelets in a loose ovoid head; inflorescence bracts 1-2, spreading to erect, leaflike; spikelets compressed, distichous, green to dark brown or black, with proximal 2-3 floral scales empty and the distal 3-8 each containing a flower; flowers with perianth of 0-6 bristles, smooth or slightly scabrous; stamens 3, anthers 1-1.5 mm long; style with 3 stigma branches, deciduous; fruit an achene, whitish, glossy, ovoid to ellipsoid, 1-1.5 mm long. ●Alkaline marshes and springs, damp meadows; 6900 ft; known from one location in Karr Canyon (Otero County); native to Eurasia, southern North America. ◆Similar species: *Schoenus nigricans* might superficially be confused with *Cyperus niger*, both clumping plants with dark capitate inflorescences, however, besides the technical differences noted in the genus key, the floral scales in *Schoenus nigricans* are few and narrowly lanceolate with an acute tip, while those of *Cyperus niger* are more numerous and ovate to orbicular, with an obtuse tip.



Scirpus [classical name for a rush-like plant] BULRUSH [3].

Plants grass-like, perennial, caespitose from short or colonial from long rhizomes; culms trigonous to roundly trigonous, smooth, glabrous; leaves basal and cauline or all cauline, blades well developed, flat to V-shaped, prominently keeled, ligules present; inflorescences terminal (sometimes lateral in the distal 1-3 leaf axils), composed of 50-500 spikelets in subumbellate or corymbose panicles, less than 3.5(5) mm in diameter; inflorescence bracts usually 3, leaflike, ascending to spreading; spikelets terete, ovoid to lanceoid or subcylindric, with 10-50 florets spirally arranged along the rachilla, scales deciduous, each subtending a flower; flowers bisexual, perianth of (0)3-6 bristles; stamens 1-3; style with 2-3 stigma branches, base not or scarcely enlarged, persistent; achene biconvex, plano-convex, or trigonous. ◆About 35 species worldwide, 18 listed in the Flora of North America. Many species formerly treated in *Scirpus* are now treated in *Bolboschoenus* and *Schenoplectus*, which are also keyed here.

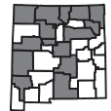
■Allred, K.W. 1999. New plant distribution records [*Scirpus pendulus*]. The New Mexico Botanist 13:7. ■Koyama, T. 1962. The genus *Scirpus* Linn. Some North American aphyllous species. Can. J. Bot. 40:913-937. ■Koyama, T. 1963. The genus *Scirpus* Linn. Critical species in the section *Pterolepis*. Can. J. Bot. 41:1107-1131. ■Rothrock, P.E. 2009. *Schoenoplectus*, pp. 200-219. IN: Sedges of Indiana and the adjacent states, the non-*Carex* species. Indiana Academy of Science. ■Schuyler, A.E. 1966. The taxonomic delineation of *Scirpus lineatus* and *Scirpus pendulus*. Notulae Naturae, Acad. Nat. Sci. Philadelphia 3:1-3. ■Schuyler, A.E. 1974. Typification and application of the names *Scirpus americanus* Persoon, *S. olneyi* Gray, and *S. pungens* Vahl. Rhodora 76(805):51-52. ■Smith, S.G. 1995. New combinations in North American *Schoenoplectus*, *Bolboschoenus*, *Isolepis*, and *Trichophorum* (Cyperaceae). Novon 5:97-102. ■Smith, S.G. & G. Yatskevych. 1996. Notes on the genus *Scirpus* sensu lato in Missouri. Rhodora 98:168-179. ■Whittemore, A.T. & A.E. Schuyler. *Scirpus*, pp. 8-21. IN: Flora of North America, vol. 23. Oxford University Press.

- 1 Terminal bract of the flowering stem single, generally resembling a prolongation of the culm so the inflorescence appears to be lateral rather than terminal (smaller bracts occasionally present but scale-like and not green) go to *Schoenoplectus*
- 1 Terminal bracts of the flowering stem 2 or more, leafy and spreading and not resembling the culm
 - 2 Spikelets large, mostly 12-25 mm long, fewer in number (commonly 3-40)..... go to *Bolboschoenus*
 - 2 Spikelets small, mostly 3-6 mm long, numerous (more than 100) (*Scirpus* s.s.)
 - 3 Spikelets in open clusters, with all but the central spikelet long pedicillate; perianth bristles smooth, strongly contorted, much longer than achenes (sometimes not projecting beyond them because of their contortion)..... *S. pendulus*
 - 3 Spikelets borne closely together in tight clusters with all spikelets sessile within each cluster; perianth bristles barbed, straight, or curved, shorter to longer than achenes
 - 4 Stigmas predominantly 2; spikelets in many smaller clusters of 3-18; scales not (or only very shortly) awned; perianth bristles mostly 4 (sometimes up to 6), the teeth thick-walled, sharp-tipped, densely crowded over most of the bristle length... ..*S. microcarpus*
 - 4 Stigmas predominantly 3; spikelets in fewer, larger clusters of 12-130; scales awned, awns often strongly spreading; perianth bristles 6, the teeth thin-walled, round-tipped, mostly restricted to distal 0.5 mm or less of bristle length *S. pallidus*

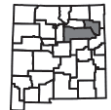
Scirpus microcarpus J. Presl & C. Presl [small-fruited] PANICLED BULRUSH. Plants perennial, colonial from long, stout reddish rhizomes, with conspicuous nodes and internodes; culms upright, 50-100(150) cm tall; leaves cauline, 4-11 per culm, basal sheaths reddish, blades 5-15(20) mm wide; inflorescence terminal, composed of very many dense clusters of 3-18 (largest cluster with 6+) spikelets in an open, compound umbel; inflorescence bracts 2-5, leaflike, shorter to longer than the inflorescence; spikelets ovoid to narrowly ovoid, 2-6(8) mm long, 3.5 mm wide, with numerous florets spirally arranged along the rachilla; floral scales green to blackish, 1.1-3.4 mm long, apex rounded to acute or apiculate, apiculus to 0.2 mm long; perianth bristles (3)4(6), stout, shorter than to longer than the achene, retrorsely barbed; stigmas 2 (rarely 3 in some flowers); achenes almost white, ovate to obovate in profile, biconvex to plano-convex in cross section, 0.7-1.6 mm long. ●Marshes, moist meadows, streambanks, lakeshores; 5400-10,400 ft; found in mountainous areas in the northern and southwestern part of the state. ◆Similar species: *Scirpus microcarpus* is more common than *S. pallidus* in NM, and usually has far more diffuse panicles with more, smaller spikelets. In specimens that exhibit an intermediate architecture in the inflorescence, one should count stigmas and look for the longer, more spreading awns on the scales of *Scirpus pallidus*, which gives the spikelets a rougher, more spiky texture under magnification. §



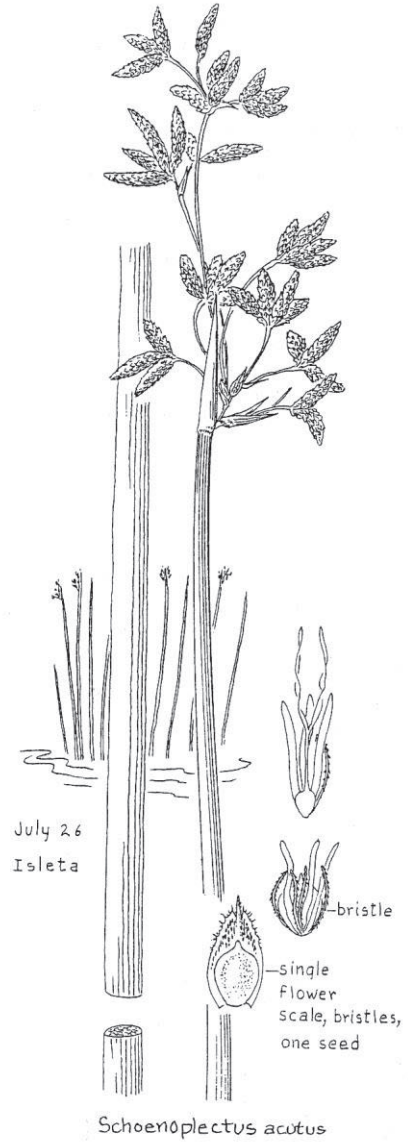
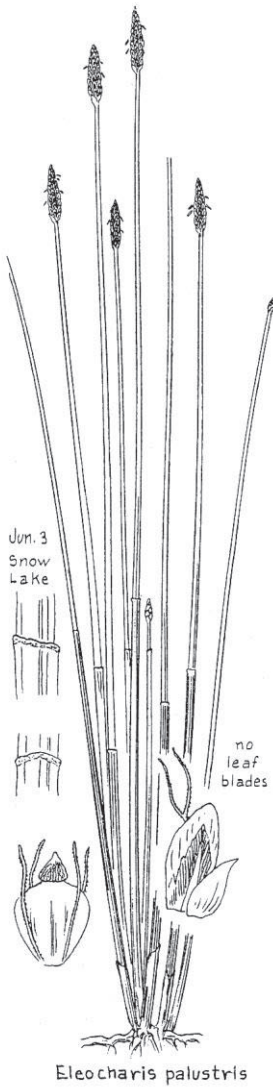
Scirpus pallidus (Britton) Fernald [pale-colored] [*Scirpus atrovirens* sensu W&S, *Scirpus atrovirens* Muhlenberg var. *pallidus* Britton]. Plants perennial, caespitose with short, tough, fibrous rhizomes; culms upright, 60-110(150) cm tall; leaves cauline, 5-10 per culm, basal sheaths green or whitish, blades 8-16 mm wide; inflorescence terminal, composed of a few dense clusters of 12-130 (largest cluster with 40+) spikelets in a relatively compact, compound umbel, the rays unequal; inflorescence bracts 2-5, leaflike, shorter to longer than the inflorescence; spikelets narrowly ovoid, 4-5 mm long, 1.8-2.3 mm wide, with numerous florets spirally arranged along the rachilla; floral scales black to brownish with pale midribs, 1.6-2.8 mm long, apex with a terete to flattened awn to 0.4-0.6(1.2) mm long; perianth bristles 6, stout, shorter to equaling the achene, distally retrorsely toothed; stigmas 3 (rarely 2 in some flowers); achenes pale brown to almost white, elliptic to obovate in profile, plumply trigonous (rarely plano-convex) in cross section, 0.8-1.2 mm long. ●Marshes, moist meadows, streambanks; 5200-8300 ft; found in mountainous areas throughout the state. ◆Similar species: See discussion under *Scirpus microcarpus*.

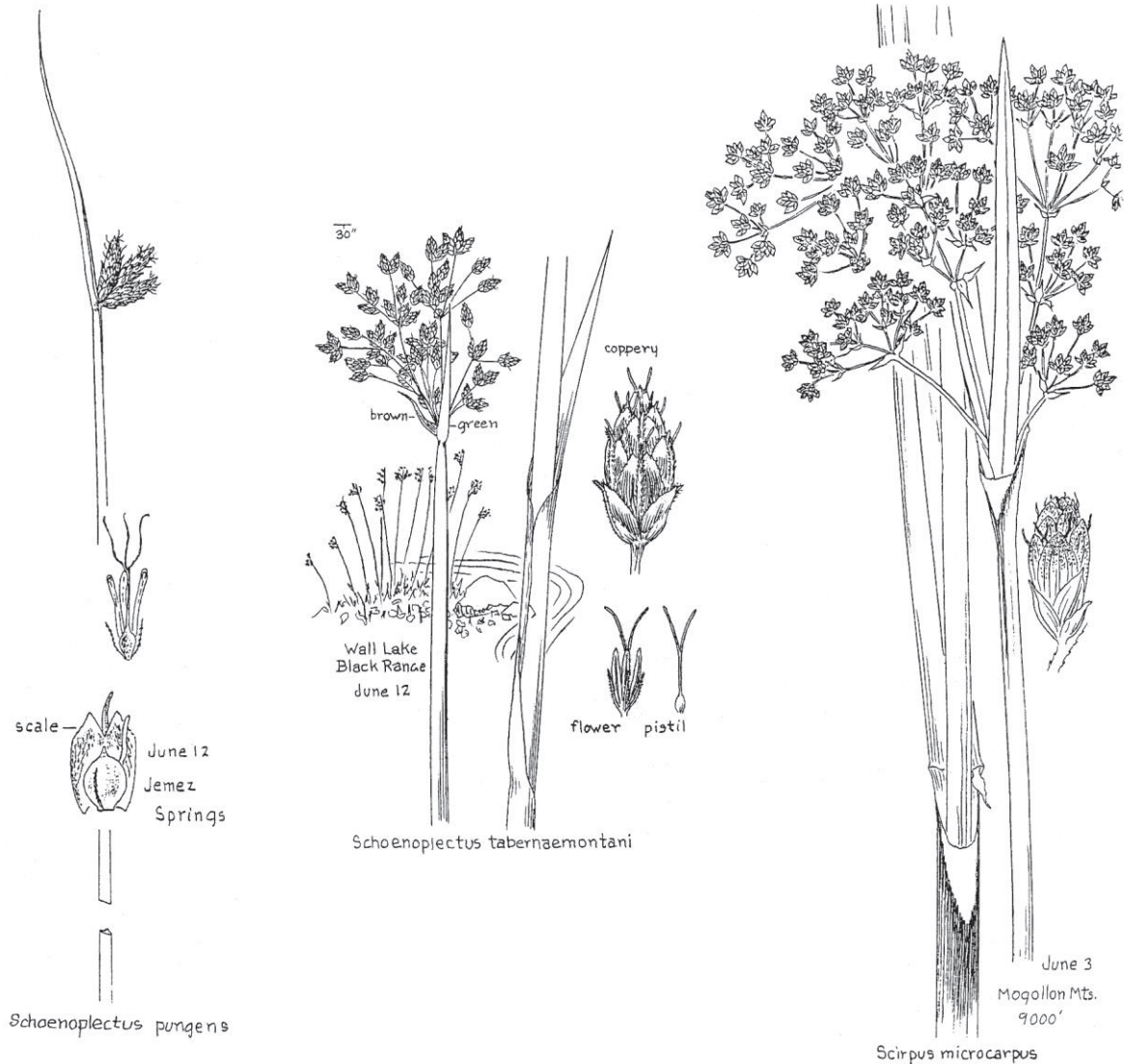


Scirpus pendulus Muhlenberg [drooping]. Plants perennial, caespitose with short stout rhizomes; culms upright, 50-150 cm tall; leaves basal and cauline, 5-7 per culm, basal sheaths whitish, blades 4-8(12) mm wide; inflorescence terminal (occasionally 1-2 lateral also), composed of many individual spikelets in an open, compound cyme, the rays ascending to divergent and often pendent; inflorescence bracts 1 per every primary branch, leaflike, shorter than the inflorescence; spikelets ovoid to lance-ovoid to subcylindric, 5-10(12) mm long, 2-3 mm wide, with numerous florets



spirally arranged along the rachilla; floral scales brown to red-brown with green midrib, 2 mm long, apex mucronate, mucro 0.1-0.3 mm long; perianth bristles 6, slender, much longer than the achene, smooth; stigmas 3; achenes pale to medium brown, elliptic in profile, plumply trigonous (rarely plano-convex) in cross section, 1-1.2 mm long. ●Marshes, moist meadows, streambanks, often on calcareous substrates; 5100-7500 ft; known only from a few collections near Las Vegas (San Miguel Co.). ♦Similar species: *Scirpus pendulus* typically has fewer primary rays than *S. microcarpus*, all of which tend to droop to the same side of the inflorescence, while those of *S. microcarpus* often radiate in all directions, in a more complex looking inflorescence.





HEMEROCALLIDACEAE DAYLILY FAMILY [1/1/1]

Perennial glabrous herbs, sometimes rhizomatous; leaves simple, alternate, distichous, in basal rosettes, parallel-veined; flowers bisexual, actinomorphic, in cymes; flowers somewhat to strongly zygomorphic, 3-merous; perianth of 6 petaloid tepals in 2 whorls, red, yellow, to orange; stamens 6; pistil single, superior, of 3 carpels, the style single; fruit a capsule; seeds with a fleshy covering. ♦The members of this family were traditionally placed in a large and polyphyletic Liliaceae, and are currently sometimes included within the Asphodelaceae.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Hemerocallis [day-beauty] DAYLILY [1].

Perennial herbs, clump-forming but spreading from rhizomes; leaves basal, sessile, the blades long-linear and keeled, the bases sheathing; inflorescences scapose, cymose-racemose; flowers showy, ephemeral and lasting but a single day; tepals 6, connate basally into a short tube, the inner tepals wider than the outer ones; filaments unequal; styles curved upward; capsules leathery. ♦Extremely popular ornamental plants, with thousands of cultivars in the trade.

■Straley, G.B. & F.H. Utech. 2002. *Hemerocallis*, pp. 219-220. IN: Flora of North America, vol. 26. Oxford University Press, New York.

**Hemerocallis fulva* (Linnaeus) Linnaeus [reddish yellow] [*Hemerocallis lilioasphodelus* Linnaeus var. *fulva* Linnaeus].

Perennial, 70-150 cm tall; leaves 70-100 cm long, 1-3 cm wide; scapes 10-20-flowered, exceeding the foliage; flowers funnelform not fragrant, on pedicels 3-6 mm long; tepals yellow to orange, 7-8 cm long, with smooth margins; anthers 5-7 mm long; capsules and seeds rarely developed. ♦Escaped along roadsides near Rociada, San Miguel County, and expected elsewhere in similar, cool habitats; also known as an escape in Pueblo County, Colorado; native to Asia.

♦Very common as an invasive plant east of the Missouri River.



HYACINTHACEAE HYACINTH FAMILY [0/0/0]

Perennial herbs from bulbs or rhizomes; leaves all basal, alternate, simple, sessile and sheathing, parallel-veined; stipules lacking; flowers bisexual, actinomorphic, often showy; inflorescences usually racemose, scapose; tepals of 6 similar parts, petaloid, united (ours) or distinct; stamens usually 6; pistil single, superior, of 3 carpels; fruit a capsule, the seeds wingless.

◆About 65 genera. Important ornamental plants include *Hyacinthus*, *Hyacinthoides*, and *Muscari*. Plants contain poisonous steroidal saponins. Members of the family were traditionally placed in a large and polyphyletic Liliaceae.

Muscari [musk] GRAPE-HYACINTH.

Plants from brown, ovoid bulbs; leaves few, basal, linear, channeled, somewhat fleshy; racemes densely flowered, the distal flowers often smaller, sterile, and different-colored, forming a tuft; flowers fragrant, urn-shaped; tepals connate most of length, the free distal portions reflexed; anthers dark blue. ◆About 30 species, several of which are popular ornamentals, including black, white, and pink cultivars.

■Straley, G.B. & F.H. Utech. 2002. *Muscari*, pp. 316-318. IN: Flora of North America, vol. 26. Oxford University Press, New York.

**Muscari neglectum* Gussone ex Tenore [neglected, over-looked] [*Hyacinthus racemosus* Linnaeus]. Plants to about 25 cm tall; bulbs ovoid, 2-3 cm long, often with offsets; leaves 15-30 cm long, channeled to nearly terete; scape subequal to the leaves; flowers dark blue, the teeth white, 4-6 mm long, drooping in age, the sterile flowers nearly the same color and size; capsules 5-7 mm long. ●Commonly cultivated in flower gardens; to be looked for as an escape along roadsides, moist fields, and yards; native to Eurasia, northern Africa; flowering spring. ◆Erroneously reported for NM by various workers, but the specimen in question [*Blossingame 3897* HPC] belongs to *Allium cernuum* Roth; no other specimens are known.

HYDROCHARITACEAE FROGBIT FAMILY [4/7/7]

[Najadaceae]

Perennial, aquatic herbs, rooted (ours) or unattached and floating; leaves alternate, opposite, whorled, or basal, simple; stipules absent; flowers actinomorphic to slightly zygomorphic, perfect or unisexual; sepals 3 or absent, greenish; petals 3 or absent, whitish; stamens 2-many; pistil single, inferior, of usually 3-6 carpels, the styles 1-several; fruit a capsule, berry, or achene-like. ◆We include herein the Najadaceae, with its single genus *Najas*, shown by recent morphologic and molecular studies to be better placed within the Hydrocharitaceae than in its own family. *Vallisneria americana* Michaux was reported for NM by M&H, but no specimens or other reports are known from the state; we include it in the key for comparison.

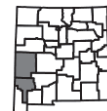
■Haynes, R.R. 2000. Hydrocharitaceae, pp. 26-38. IN: Flora of North America, vol. 22. Oxford University Press, New York. ■Les, D.H., S.W.L. Jacobs, N.P. Tippery, L. Chen, M.L. Moody, & M. Wilstermann-Hildebrand. 2008. Systematics of *Vallisneria*, (Hydrocharitaceae). Syst. Bot. 33(1): 49-65. ■Shaffer-Fehre, M. 1991. The position of *Najas* within the subclass Alismatidae (Monocotyledones) in the light of new evidence from seed coat structures in the Hydrocharitales (Hydrocharitales). Bot. J. Linn. Soc. 107:189-209.

- 1 Leaves all basal (not yet known in the state)..... *Vallisneria*
- 1 Leaves borne on an elongated stem
 - 2 Leaf blades abruptly broadened at the base to sheath the stems..... *Najas*
 - 2 Leaf blades not broadened as above
 - 3 Plants with rhizomes, often terminated by smooth light-brown turions (tuber-like); erect stems often with scaly green turions (bud-like) in leaf axils *Hydrilla*
 - 3 Plants lacking rhizomes and turions
 - 4 Whorls with 5 or more leaves per node..... *Egeria*
 - 4 Whorls with mostly 2-3 leaves per node, or leaves opposite (2 per node) at the lowermost nodes..... *Elodea*

Egeria [a nymph] WATERWEED [1].

Perennial dioecious herbs of fresh waters, lacking rhizomes and stolons, the stems rooted in the soil and mostly submersed; leaves cauline, in whorls of 5 or more (rarely opposite), sessile, submersed, 2 cells thick, the blades linear and entire, lacking prickles on the abaxial midvein; flowers unisexual, the staminate and pistillate on different plants, borne in an axillary spathe, raised to the water surface by highly elongating epigynous floral tubes, the 3 petals white; fruits sessile below the floral tube; seeds fusiform, sticky. ◆Similar to *Elodea*, and often confused with it (being called BRAZILIAN WATERWEED or BRAZILIAN ELODEA), but easily told by the difference in leaves per node (5+ in *Egeria*, 2-3 in our *Elodea*).

**Egeria densa* Planchon [compact, dense] [*Anacharis densa* (Planchon) Victorin, *Elodea densa* (Planchon) Caspary, *Philotria densa* (Planchon) Small]. Perennial herbs, the stems 1-3 mm diam; leaves whorled, recurved, 10-40 mm long, 1-5 mm wide; stalk of staminate flowers to 8 cm long. ●Shallow water of lakes and streams; known only from a few collections; native to Brazil. ◆Waterweed has spread from its native Brazil through the aquarium trade, and is a potential noxious plant in New Mexico. Only staminate plants are known in the United States (Haynes 2000).



Elodea [marshy] ELODEA, WATERWEED [3].

Perennial dioecious herbs of fresh waters, lacking rhizomes and stolons, the stems rooted in the soil and mostly submersed; leaves cauline, in whorls of 2-7 (ours 2-3), sessile, submersed, the blades linear to ovate, entire, lacking prickles on the abaxial midvein; flowers unisexual, the staminate and pistillate on different plants, borne in axillary spathes, raised to the water surface by highly elongating epigynous floral tubes, the 3 petals white; fruits sessile below the floral tube; seeds fusiform to cylindric, glabrous to hirsute, not sticky. ◆Similar to *Egeria*, and often confused with it, but easily told by the difference in leaves per node (2-3 in our *Elodea*, 5+ in *Egeria*).

- 1 Staminate spathes 4 mm or less long; styles usually 2 mm or less long; leaves usually less than 1.7 mm wide..... *E. nuttallii*
- 1 Staminate spathes 6 mm or more long; styles usually more than 2 mm long; leaves usually more than 1.8 mm wide
 - 2 Anthers 2-3 mm long; leaves mostly in 3s; seeds 4.5-6 mm long..... *E. canadensis*
 - 2 Anthers 3-5 mm long; leaves in 2s and 3s; seeds about 3 mm long..... *E. bifoliata*

Elodea bifoliata St. John [2-leaved] [*Elodea longivaginata* St. John]. Leaves in 2s and 3s, spreading, 5-24 mm long, 2-4 mm wide, the margins flat; staminate spathes 10-42 mm long; pistillate spathes 10-60 mm long; anthers 3-5 mm long; seeds about 3 mm long, densely covered with long hairs. ●Streams, lakes, wet meadows, borders of ponds; northern and western mountains.



Elodea canadensis Michaux [of Canada] [*Anacharis canadensis* (Michaux) Planchon, *Elodea planchonni* Caspary, *Philotria canadensis* (Michaux) Britton]. Leaves mostly in 3s, spreading to recurved, 5-13 mm long, 2-5 mm wide, the margins flat; staminate spathes 8-14 mm long; pistillate spathes 8-18 mm long; anthers 2-3 mm long; styles 2.5-4 mm long; seeds 4.5-6 mm long, glabrous. ●Rivers, streams, lakes; northern mountains, also Grant County.



Elodea nuttallii (Planchon) St. John [for Thomas Nuttall (1786-1859), English botanist and explorer] [*Anacharis nuttallii* Planchon, *Anacharis occidentalis* (Pursh) Victorin]. Leaves mostly in 3s, often recurved, 4-15 mm long, 1-2 mm wide, the margins folded; staminate spathes 2-4 mm long; pistillate spathes 8-15 mm long; anthers 1-1.5 mm long; styles 1-2 mm long; seeds 4-4.6 mm long, with long hairs at the base. ●Lakes and rivers; known from subalpine zone in Rio Arriba County.



Hydrilla [of water] HYDRILLA [1].

Monoecious or dioecious, perennial herbs of fresh or brackish water, with rhizomes, stolons absent, the stems rooted in the soil and mostly submersed; rhizomatal turions smooth, cream-brown, tuber-like; stem turions axillary, greenish, covered by scales, bud-like; leaves cauline, in whorls of 3-8 per node, sessile, submersed, the blades linear, toothed, with prickles on the abaxial midvein; flowers unisexual, the staminate and pistillate on different or the same plants, borne in axillary spathes, the pistillate on elongating epigynous floral tubes that reach the water surface, the 3 petals white to reddish; fruits sessile below the floral tube; seeds cylindrical, glabrous, not sticky. ♦Both *Hydrilla* and *Najas marina* have toothed blades and prickles on the lower midveins; in *Najas* the leaves are expanded proximally into a sheath.

■Ashigh, J., J. Wanstall, & F. Sholedice. 2010. Troublesome weeds of New Mexico. College of Agricultural, Consumer and Environmental Sciences, New Mexico State University. Available online at <http://aces.nmsu.edu/pubs/weeds/welcome.html>; accessed 20 June 2016.

****Hydrilla verticillata*** (Linnaeus f.) Royle [whorled] [*Serpicula verticillata* Linnaeus f.]. Leaves 8-15 mm long, 1-4 mm wide, the margins serrulate; spathes of 2 connate bracts; flowers single within the spathe, the staminate nearly sessile, the pistillate with an epigynous floral tube 10-50 mm long. ●Slow-moving waters of lakes, ponds, reservoirs, and irrigation ditches; native to Eurasia, Africa, Australia. ♦This is a federally listed noxious weed, known from Sandoval County, but actually could be more common if observations are confused with *Egeria* or *Elodea*. Plants have the capacity to spread by stem fragments, tuber-like turions on the rhizomes, and bud-like turions in the leaf axils.



Najas [water-nymph] WATER-NYMPH [2].

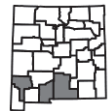
Monoecious or dioecious, annual herbs, lacking rhizomes, stolons, and turions, the stems submersed; leaves opposite or appearing whorled, submersed, expanded to a sheath proximally, the blades linear, 1-veined, and usually finely toothed to incised; flowers unisexual, the staminate and pistillate on the same or different plants, a perianth absent, the staminate flowers short-peduncled and borne in an involucre, the pistillate flowers sessile; fruits achene-like; seeds fusiform to obovoid. ♦Species about 40, nearly world-wide.

■Clausen, R.T. 1936. Studies in the genus *Najas* in the northern United States. *Rhodora* 38:333-345. ■Stuckey, R.L. 1985. Distributional history of *Najas marina* (spiny naiad) in North America. *Bartonia* 52: 2-16.

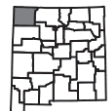
1 Plants dioecious; leaves coarsely toothed to incised; internodes and the abaxial midvein with prickles*N. marina*

1 Plants monoecious; leaves minutely toothed; internodes and the abaxial midvein smooth *N. guadalupensis*

Najas guadalupensis (Sprengel) Magnus [from the French Territory of Guadeloupe, Caribbean Sea] [*Caulinia guadalupensis* Sprengel]. Stems much-branched distally, 11-75 cm long, 0.2-2 mm wide, the internodes lacking prickles; leaves spreading in age, the blades 3-30 mm long, 0.2-2 mm wide, the margins minutely serrulate (use magnification), the abaxial midvein lacking prickles; staminate flowers in distal axils; pistillate flowers in proximal axils; seeds yellowish white, 1-2.5 mm long. ●Lakes, rivers, and ponds in the southern mountains and foothills.



Najas marina Linnaeus [of or near the sea] [*Najas gracilis* (Morong) Small]. Stems branched distally, 6-45 cm long, 1-4 mm wide, the internodes usually with prickles; leaves spreading to ascending, the blades 5-40 mm long, 1-5 mm wide, the margins coarsely serrate to shallowly incised, the abaxial midvein with prickles; staminate and pistillate flowers scattered along the stems; seeds reddish brown, 2-5 mm long. ●Ponds and lakes; San Juan County. ♦Reports of *Najas marina* from Chaves and Otero counties are without specimen verification.



HYPOXIDACEAE STAR-GRASS FAMILY [1/1/1]

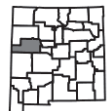
Perennial herbs from corms or rhizomes; leaves simple, alternate, basal, entire, grass-like, parallel-veined, the bases sheathing; stipules lacking; flowers bisexual, actinomorphic, usually showy, solitary or few on a leafless scape, the flowering portion lower than the leaves; perianth of 4 or 6 (ours) petaloid tepals, free or connate, yellow to orange; stamens 6 (ours) or 3 with 3 staminodes; pistil single, inferior, of 3 united carpels, with 1 or 3 styles; fruit a capsule. ♦Members of this small family (about 7 genera) have been variously placed in a large and polyphyletic Liliaceae, or sometimes in the Amaryllidaceae.

Hypoxis [sharp-base] STAR-GRASS [1].

Perennial scapose herbs, glabrous to densely hairy, from rhizomes or corms, the stems below ground, vertical, fleshy; leaves grass-like, linear, entire; scape shorter than the leaves, bearing few-flowered clusters (or single-flowered); tepals 6, spreading, distinct, yellow adaxially, greenish-yellow and pilose abaxially; inferior ovary hairy; capsules with a persistent crown of flower parts. ♦About 100 species, especially southern Africa.

■Herndon, A. 1992. Nomenclatural notes on North American *Hypoxis* (Hypoxidaceae). *Rhodora* 94:43-47. ■Herndon, A. 2002. *Hypoxis*, pp. 201-204. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Sivinski, R.C., T. Lowrey, & C. Keller. 1995 [1996]. Additions to the floras of Colorado and New Mexico. *Phytologia* 79(5):319-324.

Hypoxis hirsuta (Linnaeus) Coville [bristly hairy] YELLOW STAR-GRASS [*Ornithogalum hirsutum* Linnaeus]. Leaves mostly 2-5 mm wide (up to 15 mm), glabrous to densely spreading-hairy; inflorescences umbel-like, 1-6-flowered, the proximal 2 flowers paired; tepals 5-15 mm long. ●Moist to dry woodlands and prairies; known only from the Zuni Mountains of Cibola County.



IRIDACEAE IRIS FAMILY [2/8/8]

Perennial herbs, commonly from bulbs, corms, or rhizomes; leaves, simple, alternate or basal, 2-ranked, often equitant, the bases sheathing, the margins entire; stipules lacking; flowers large to small, actinomorphic or zygomorphic, perfect, subtended by 1-2 bracts; tepals petaloid, similar or dissimilar, distinct or connate; stamens mostly 3; pistil single, inferior, of 3 united carpels; fruit a capsule. ♦A large, worldwide, and well-known family, including numerous ornamental plants (*Gladiolus*, *Iris*). Stigmas of *Crocus sativus* are the source of the spice saffron.

- 1 Flowers more than 5 cm wide, outer perianth parts spreading or reflexed, inner perianth parts erect *Iris*
- 1 Flowers less than 2 cm wide, all perianth parts spreading *Sisyrinchium*

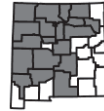
Iris [rainbow] IRIS.

Perennial herbs, with cord-like rhizomes covered with scale-like leaves, the flowering stems erect, terete or slightly flattened; leaves basal, flattened, sword-shaped; flowers large and showy, subtended by 2 spathes, lasting 1-4 days, actinomorphic; tepals petaloid, the sepals (the 'falls') spreading to reflexed and generally larger than the petals, the petals (the 'standards') erect to spreading; stamens opposite the sepals; styles divided distally into petaloid branches; fruit a capsule. ♦Nearly 300 species of the Northern Hemisphere; extensively cultivated as ornamental plants, with hundreds of cultivars.

■Foster, R.C. 1937. A cyto-taxonomic survey of the North American species of *Iris*. Contr. Gray herb. 119:3-82. ■Henderson, N.C.. 2002. *Iris*, pp. 371-395. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Mygatt, J. 2007. Plant distribution reports [*Iris pseudoacorus*]. The New Mexico Botanist 39:7.

- 1 Flowers bluish; moist native habitats usually in the mountains *I. missouriensis*
- 1 Flowers bright yellow; moist weedy spots, escaped from cultivation *I. pseudoacorus*

Iris missouriensis Nuttall [from Missouri] ROCKY MOUNTAIN IRIS [*Iris arizonica* Dykes]. Plants 25-90 cm tall, the stems simple to 2-branched; leaves 45-60 cm long, to about 1 cm wide, glaucous; inflorescence 1-3-flowered; flowers blue, lavender, to white, with yellowish or white portions, with darker veins; sepals and petals 3-7 cm long, the sepals 1-3 cm wide, the petals to about 1 cm wide; capsules 4-5 cm long. ●Widespread in the state on wet slopes, seeps, marshy ground, and clearings in the mountains and upper foothills. §



****Iris pseudoacorus*** Linnaeus [resembling the genus *Acorus*] FALSE SWEET-FLAG, YELLOW IRIS. Plants 60-130 cm tall, the stems usually 1-branched; leaves 40-100 cm long, 2-3 cm wide, only glaucous proximally; inflorescence 4-12-flowered; flowers bright yellow, to 10 cm wide; sepals 4-7 cm long, 2-4 cm wide; petals 2-5 cm long, 1-2 cm wide; capsules 4-5 cm long. ●A common ornamental widely escaped in temperate North America, and becoming noxious in some places; presently known only from the Rio Grande floodplain in Bernalillo County.



Sisyrinchium [pig snout] BLUE-EYED-GRASS [6].

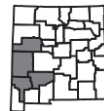
Annual to perennial herbs, with or without rhizomes, the roots sometimes thickened and fleshy; stems compressed, winged; leaves few, basal or cauline, alternate, simple, entire; inflorescence a one-sided cyme, 1-15-flowered, subtended by 2 spathes; flowers not fragrant, of various colors, the distinct tepals widely spreading to reflexed; fruit a globose capsule, with many black seeds. ♦About 80 species, mostly New World. *Sisyrinchium campestre* E.P. Bicknell has been reported for New Mexico, but this species occurs in central Kansas and eastward; plants called this mostly belong to *S. montanum*.

■Cholewa, A.F. & D.M. Henderson. 2002. *Sisyrinchium*, pp. 351-371. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Goldblatt, P., P. Rudall, & J.E. Henrich. 1990. The genera of the *Sisyrinchium* alliance (Iridaceae: Iridoideae): Phylogeny and relationships. Syst. Bot. 15(3):497-510. ■Henderson, D.M. 1976. A biosystematic study of Pacific northwestern blue-eyed-grasses (*Sisyrinchium*, Iridaceae). Brittonia 28:149-176. ■Hess, W.J. 1975. Notes on the flora of the Mogollon Mountains, New Mexico [*Sisyrinchium longipes*]. Sida 6:48-51. ■Mosquin, T. 1970. Chromosome numbers and a proposal for classification in *Sisyrinchium* (Iridaceae). Madroño 20:269-275. ■Worthington, R. 2012. Plant distribution reports [*Sisyrinchium chilense*]. The New Mexico Botanist 56:2.

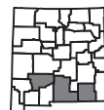
[Key adapted from Cholewa & Henderson 2002]

- 1 Perianth yellow to orange; filaments free or only connate at the base
 - 2 Stems 0.5-2 mm wide; perianth segments 7-11 mm long; capsules 4-9 mm long *S. longipes*
 - 2 Stems 3.5-8 mm wide; perianth segments 11-23 mm long; capsules 8-19 mm long *S. arizonicum*
- 1 Perianth purple to light blue, white, or pinkish; filament completely connate
 - 3 Stems branched, or the population with predominately branched individuals
 - 4 First internode shorter than the longest leaf *S. chilense*
 - 4 First internode longer than the longest leaf *S. demissum*
 - 3 Stems simple, or the population with predominately simple-stemmed individuals
 - 5 Outer spathes usually at least 16 mm longer than the inner; keel of inner spathe gibbous at the base; seed coat rugulose *S. montanum*
 - 5 Outer spathes no more than 16 mm longer than the inner; keel of inner spathe not gibbous; seed coat usually granular *S. idahoense*

Sisyrinchium arizonicum Rothrock [from Arizona] [*Orelirion arizonicum* (Rothrock) Bicknell]. Perennial herb, tufted, to 60 cm tall, the roots fleshy-thickened, the stems branched, 3-8 mm wide; spathes equal or the outer slightly longer; tepals yellow to orange, with brownish veins, the outer 10-23 mm long, the apices aristate; capsules blackish, ovoid to obovoid, 1.5-2.5 mm long. ●Moist meadows and clearings in the forests of the western mountains.

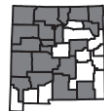


Sisyrinchium chilense Hooker [from Chile] [*Sisyrinchium ensigerum* E.P. Bicknell, *Sisyrinchium scabrum* Chamisso & Schlechtendal]. Perennial herb, tufted, to 30 cm tall, occasionally glaucous, the stems branched, with 1-2 nodes, 2-5 mm wide; spathes subequal, the outer slightly longer or slightly shorter than the inner; tepals bluish violet, the bases yellow, the outer 8-15 mm long, the apices aristate; capsules brown, obovoid to globose, 4-5 mm long. ●Moist, sometimes disturbed, areas in the southern mountains and foothills; known from Eddy, Otero, and Sierra counties.



♦Known previously under the name *Sisyrinchium ensigerum* E.P. Bicknell.

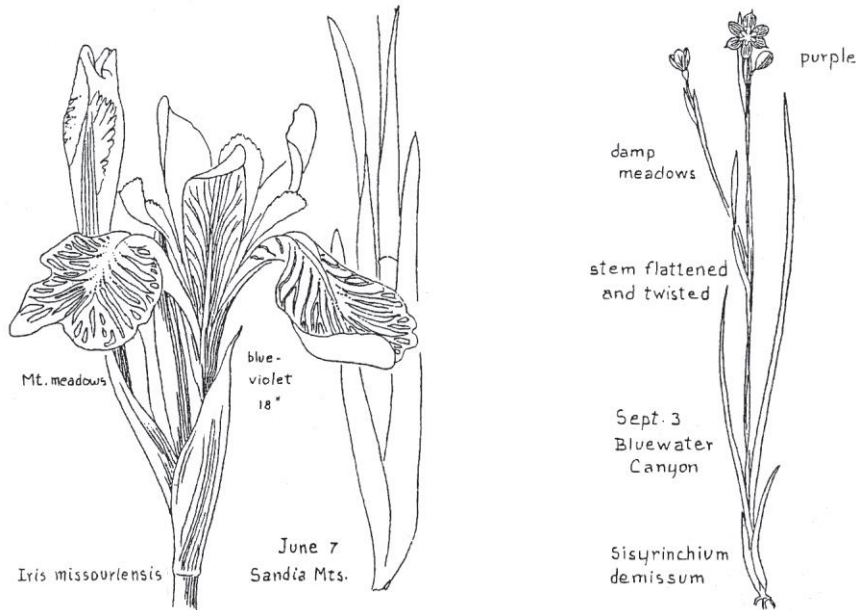
Sisyrinchium demissum Greene [weak, hanging down]. Perennial herb, tufted, to 50 cm tall, the stems branched, 1-2 mm wide, with 1-2 nodes; spathes subequal, the outer slightly short to 5 mm longer than the inner; tepals dark bluish violet, the outer 6-15 mm long, the apices rounded to acute and aristate; capsules tan, globose, 7-8 mm long. ●Mountain meadows and riparian areas, canyon bottoms, moist ground; widespread. §



Sisyrinchium idahoense Bicknell [of Idaho]. Perennial herb, tufted, with slight rhizomes, to 45 cm tall, the stems simple, 1.5-2 mm wide; spathes strongly unequal, the outer 13-15 mm longer than the inner; tepals light to deep bluish violet with yellow bases, the outer 8-13 mm long, the apices truncate, rounded, to emarginate, aristate; capsules light to dark brown, globose, 3-6 mm long. ●Moist meadows, seeps and springs, and forest glades in the northern mountains. ◆Our plants belong to var. *occidentale* (Bicknell) D.M. Henderson [western] [*Sisyrinchium occidentale* Bicknell].

Sisyrinchium longipes (Bicknell) Kearney & Peebles [long-stalked] [*Hydastylus longipes* Bicknell]. Perennial herb, tufted, to 46 cm tall, the stems simple, 0.5-2 mm wide; spathes equal or the outer to 16 mm longer than the inner; tepals yellow to orange, with brownish or purplish veins, the outer 7-11 mm long, the apices acute to rounded; capsules dark brown to black, globose, 4-9 mm long. ●Moist to wet sites in the western mountains, known from only a few collections.

Sisyrinchium montanum Greene [of mountains]. Perennial herb, tufted, to 50 cm tall, the stems simple, 1-4 mm wide; spathes strongly unequal, the outer 1-4 cm longer than the inner; tepals dark bluish violet with yellow bases, the outer 9-15 mm long, the apices emarginate to retuse, aristate; capsules tan to dark brown, globose to obovoid, 4-7 mm long. ●Moist meadows, stream banks, and clearings in the forest, mostly in the northern mountains. ◆Our plants belong to var. *montanum*.



JUNCACEAE RUSH FAMILY [2/28/29]

Contributed by Max H. Licher & Glenn R. Rink

Grass-like herbs, caespitose or rhizomatous, with fibrous roots; culms usually round, or sometimes compressed in cross section, usually solid, occasionally hollow or septate; leaves simple, linear, parallel-veined, flat (sometimes margins inrolled) to channeled (thicker and grooved) or terete in cross section, entire or with ciliate leaf margins, usually spirally arranged, basal and/or cauline, in some species reduced to bladeless sheaths (cataphylls) only; sheath open or closed, usually auriculate, the auricles rarely joined to form a ligule; inflorescence usually terminal, sometimes appearing lateral, cymose, composed of clusters of flowers or single flowers arranged in panicles, racemes, or corymbs, sometimes compressed into a compact head, the inflorescence usually subtended by one or more leaf-like bracts, each branch having 1-2 additional bracts, and the individual flowers subtended by 0-2 reduced translucent smaller bracts (bracteoles); flowers perfect (in our species), the perianth radially symmetric, of 6 herbaceous to scarious tepals in 2 ranks, persistent; ovary superior, stigma 1, style 3-branched; stamens usually 3 or 6, anthers basifixed; fruit a capsule, dehiscent, unilocular with 1 basal placenta or 3-septate to 3-locular with axile or parietal placentas; seeds 3 to many, the outer seed coat hyaline and sometimes forming apical appendages. ◆Genera 7, species about 440, worldwide. Usually associated with wetlands, but some species adapted to alpine habitats.

- 1 Leaves glabrous, or blades absent; capsules with numerous seeds (in ours); bracteoles when present entire; sheaths open *Juncus*
- 1 Leaves ciliate, with hairs at least on the basal margins; capsules with three seeds; bracteoles sub-entire to lacerate or fringed; sheaths closed *Luzula*

Juncus [the classical name for the plants] RUSH [25].

Plants grass-like, glabrous, perennial, or less frequently annual; perennial plants densely caespitose from short rhizomes to colonial from long-creeping rhizomes, annual plants caespitose and fibrous rooted; culms generally round in cross section, sometimes flattened, solid, without nodes, leafy or not; leaves two or three-ranked, clustered at base or alternate up the culm; blades lacking or well-developed and linear, flat with face towards the culm (grass-like), or flat with edge towards the culm (ensiform, *Iris*-like), channeled, or terete, with crosswalls (septa) or without; sheaths open from the base, with hyaline or scarious margins, these often prolonged at the top, forming vertical auricles, sometimes confluent and forming a ligule; cataphylls (bladeless basal sheaths) present and diagnostic in some groups/species; inflorescence terminal, sometimes appearing lateral when forced to the side by a vertical bract that looks like an extension of the culm, cymose, diffuse to strongly congested, sometimes with one to many racemose or paniculate clusters (heads or

glomerules); the branches, clusters, or individual flowers with or without bracts; primary inflorescence bract shorter to much longer than the inflorescence, or sometimes reduced to a scale, flat or terete, sometimes appearing like a continuation of the culm; flowers perfect, with a perianth of six tepals in two ranks, with or without two additional bracteoles (bractlets, or prophylls in some texts), persistent; stamens (1, 2) 3 or 6 (when 3 always under the outer tepals), filaments shorter to longer than the anthers; ovary superior, with 1 style and 3 stigma branches; fruit a capsule, one per flower, septate or not, making them either 3-locular or 1-locular, containing many minute seeds; the seeds ellipsoid to ovoid, sometimes with slender appendages (tails) at one or both ends. ♦About 315 species worldwide, about 95 listed in the Flora of North America.

■Brooks, R.E. & S.E. Clemants. 2000. *Juncus*, p. 211-255. IN: Flora North America, vol. 22. Oxford University Press. ■Hermann, F.J. 1975. Manual of the rushes (*Juncus* spp.) of the Rocky Mountains and Colorado Basin. USDA For. Serv. Gen. Tech. Rep. RM-18. 107 pp. ■Hurd, E.G., S. Goodrich, & N.L. Shaw. 1997. Field guide to Intermountain rushes. USDA For. Ser. Gen. Tech. Rep. INT-306. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Juncus alpinoarticulatus*, *Juncus biglumis*, *Juncus parryi*, *Juncus triglumis*]. J. Bot. Res. Inst. Texas 4(2):777-784. ■Kirschner, J. 2002. Species Plantarum, Part 7. Juncaceae 2: *Juncus* subg. *Juncus*. Australian Biological Resources Study, Canberra. ■Kirschner, J. 2002. Species Plantarum, Part 8. Juncaceae 3: *Juncus* subg. *Agathryon*. Australian Biological Resources Study, Canberra. ■McGrath, J. 1999. New plant distribution records [*Juncus hallii*]. The New Mexico Botanist 12:8. ■Snogerup, S., P. Zika, & J. Kirschner. 2002. Taxonomic and nomenclatural notes on *Juncus*. Preslia, Praha 74: 247-266. ■Zika, P. F. 2012. *Juncus*, pp. 1361-1374. IN: The Jepson Manual, Vascular Plants of California, Ed 2, University of California Press, Berkeley.

- 1 Annual; inflorescence usually at least half the height of the plant; roots fine, fibrous; leaf blades less than 1 mm wide, generally inrolled; plants generally less than 30 cm tall, not of alpine habitats *J. bufonius*
- 1 Perennial; inflorescence usually less than half the height of the plant; roots coarse and/or rhizomes present; leaf blades narrow or wide, flat, or cylindrical, or margins inrolled; plants of varying heights and habitats, if less than 30 cm tall, then of alpine habitats
 - 2 Flowers borne singly (sometimes on very short pedicels in a loose cluster), a pair of bracteoles present on opposite sides of the base of each flower; leaf blades without septa (subgenus *Poiophylli*)
 - 3 Seeds tailed; flowers 1-7; plants 5-40 cm tall, of subalpine to alpine habitats KEY A
 - 3 Seeds not tailed; flowers 3-100+; plants 8-100 cm tall, of various habitats
 - 4 Inflorescence arising laterally through what appears to be a slit in the cylindrical or compressed stem; leaf blades absent or present, when present, cylindrical to compressed cylindrical, sometimes corkscrewed KEY A
 - 4 Inflorescence terminal; leaf blades basal, flat with face toward stem, sometimes involute or canaliculate KEY B
 - 2 Flowers usually in heads or clusters, rarely single; bracteoles absent at the base of each flower (though one to several individual bracts may be present in a cluster); leaf blades with or without septa (subgenus *Juncus*)
 - 5 Leaf blades flat
 - 6 Leaf blades ensiform (flat with edge towards stem, *Iris*-like, with the free edges becoming fused upwards from the stem), with partial septa *J. saximontanus*
 - 6 Leaf blades with face towards stem (grass-like), without septa KEY C
 - 5 Leaf blades channeled to terete
 - 7 Leaf blades with or without imperfect septa; seeds tailed; plants, 2-40 cm tall, of alpine tundra, caespitose, or rhizomatous and of subalpine to alpine habitats KEY D
 - 7 Leaf blades with septa; seeds not tailed, merely apiculate; plants 3-100 cm tall, of various habitats, rhizomatous to at least some degree KEY E

KEY A: Perennial herb; bracteoles present; inflorescence bract erect and stem-like (section *Juncotypus*)

- 1 Rhizomes long; stems scattered or in lines, in loose colonies; inflorescence generally with more than 5 flowers (except in some depauperate specimens); seeds not tailed; plants generally below subalpine
 - 2 Blades well developed on some upper sheaths, more than 5 cm long, stem-like; culms and leaves often compressed and twisted *J. mexicanus*
 - 2 Blades 0 or poorly developed on any sheaths, less than 1 cm long, not stem-like; culms and leaves usually not much compressed, less frequently twisted ... *J. balticus*
- 1 Rhizomes short; stems caespitose, in dense tufts like bunchgrass; inflorescence typically with 1-4(7) flowers; seeds tailed; plants of subalpine to alpine habitats
 - 3 Leaf blades absent (reduced to bristles only); capsule apex blunt to slightly retuse *J. drummondii*
 - 3 Leaf blades present on at least some stems; capsule apex either acute or strongly retuse
 - 4 Capsule apex strongly retuse; inflorescence bract reduced and scarious to leaf-like but scarcely exceeding the flowering head *J. hallii*
 - 4 Capsule apex acute; inflorescence bract exceeding the inflorescence by 2-4 cm *J. parryi*

KEY B: Perennial herbs; bracteoles present; inflorescence bracts flat and leaf-like (section *Steirochloa*)

- 1 Inflorescence congested, 2 cm long or less; tepals usually with brown stripes marginal to the central green stripe (with immature specimens, these stripes can be very light, but are often thickened or have a different texture than the central stripe); mature capsule, 2.5-3.5 cm long, with 3 chambers, the locular partitions united almost to tip, apex retuse; anthers 0.3-0.5 mm long; above 7000 ft *J. confusus*
- 1 Inflorescence open (only appearing congested when immature), 1.5-7 cm long; tepals more uniform in color; mature capsules, 3-4.7 mm long, with single chamber, the locular partitions separated except at base, apex obtuse to truncate; anther 0.1-1 mm long; diverse habitats, from low to high elevations
 - 2 Capsules chestnut to dark brown; tepals with obtuse apices, shorter than the capsule *J. compressus*
 - 2 Capsules tan to light brown; tepals with acute to acuminate apices, slightly shorter to slightly longer than the capsule in length
 - 3 Auricles stiff, thick-margined, leathery to cartilaginous, shiny, often yellowish, apex rounded; tepals 4-6 mm long; anthers 0.6-1 mm long *J. dudleyi*
 - 3 Auricles not stiff, thin-margined, dull, white or translucent, apex rounded to acuminate; tepals 3.3-4.4 mm long; anthers 0.1-0.6(1) mm long
 - 4 Auricles 0.2-0.6 mm long, thicker and opaque below, thinner and more translucent above, apex generally rounded; bracteoles acuminate, sometimes bristle-tipped; stem with 2-6 strong ridges per side; anthers 0.4-0.6(1) mm long; plants often with pinkish bases *J. interior*
 - 4 Auricles generally 1-8 mm long until late in season when generally broken or missing, more or less uniformly translucent,

apex generally acute to acuminate; bracteoles generally acute to blunt; stem with or without strong ridges per side; anthers 0.1-0.2 mm long; plants rarely with pinkish bases..... *J. tenuis*

KEY C: Perennial herb; bracteoles absent; leaves flat with face towards stem, crosswalls (septa) absent (section *Graminifolii*)

1 Perianth segments (tepals) 1.8-3.5 mm long; capsules nearly globose, 1.8-2.9 mm long; stamens 3; inflorescence heads 5-200 in number, with 2-10(20) flowers each; plants caespitose; cataphylls absent at base of culm; leaves to 5 mm wide*J. marginatus*

1 Perianth segments (tepals) 4.5-6 mm long; capsules obovoid, 3-5 mm long; stamens 6; inflorescence heads 1-8(12), with 3-12 flowers each; plants from elongate rhizomes, cataphylls present on at least some culm bases; leaves to 3 mm wide*J. longistylis*

KEY D: Perennial herb; bracteoles absent; leaves channeled to terete, without or with only partial crosswalls (section *Stygiopsis*)

1 Plants rhizomatous; leaves inrolled or folded most of the way to the terete, septate tip, 1-2.5 mm wide in the middle; tepals dark brown to purplish, 4.5-7.5 mm long; inflorescence generally of more than one cluster..... *J. castaneus*

1 Plants caespitose; leaves channeled to terete, 0.5 mm diameter in the middle, tepals pale to dark brown, 2.5-5 mm long; inflorescence a single terminal cluster of flowers

2 Inflorescence bract much longer than the inflorescence, on at least some of the culms; capsule with retuse apex *J. biglumis*

2 Inflorescence bract shorter than to almost equaling the inflorescence; capsule apex obtuse to sub-truncate*J. triglumis*

KEY E: Perennial herb; bracteoles absent; leaves terete, with crosswalls (section *Ozophyllum*)

1 Some to most mature heads in an inflorescence spheric to subspheric, with flowers spreading significantly below the horizontal (sometimes barely so in *Juncus acuminatus*); flowers greenish to tan colored, sometimes with reddish tinting

2 Plants caespitose, capsules broadly lanceoloid with a bluntly acute tip..... *J. acuminatus*

2 Plants rhizomatous with tuberous nodes (sometimes not present on herbarium collections); capsules narrowly lanceoloid with a long-tapering apex

3 Plants low, 10-40 cm tall; leaves erect to ascending; auricles less than 1 mm long; perianth 3-4 mm long, tepals often reddish, inner tepals equal to or longer than the outer ones; cataphylls sometimes present; anthers 3 or 6*J. nodosus*

3 Plants taller, 40-100 cm tall; leaves divaricate, auricles 2-5 mm long; perianth 4-5 mm long, tepals rarely reddish, inner tepals shorter than the outer ones; cataphylls never present; anthers 6.....*J. torreyi*

1 Most mature heads in an inflorescence hemispheric to obpyramidal (flowers in the mature heads mostly spreading or ascending to erect, few, if any, definitely reflexed), sometimes subspheric, but then flowers dark brown to blackish; flowers various colored

4 Inflorescence highly diffuse, 5-20 cm long, with 30-70(130) heads; capsule twice as long as tepals; stamens 3*J. diffusissimus*

4 Inflorescence compact to moderately diffuse, 0.5-8 cm long, with 1-30(50) heads; capsule slightly shorter to exerted to 1.5 times the length of the tepals; stamens 6

5 Inflorescence of 5--30(--50) heads; tepals 1.8-3 mm long, apex obtuse to acuminate, green to brown

6 Stems decumbent to erect; inflorescence branches spreading, sometimes widely so; inner tepals acuminate*J. articulatus*

6 Stems erect; inflorescence branches ascending to erect; inner tepals obtuse*J. alpinoarticulatus*

5 Inflorescence of 1—11 heads; tepals 2.5-6 mm long, apex acuminate mucronate, dark brown to almost black

7 Inflorescence a single head (rarely a second one); tepals 2.3-4.9 mm long; anthers 0.25 times to equal the filament length;

auricles 0.3-0.6(1.2) mm long; capsules abruptly narrowed to beak to truncate or even retuse; plants with densely branching rhizomes, tending to form loose identifiable clumps*J. mertensianus*

7 Inflorescence with (1)2-10 heads; tepals 2.4-6.2 mm long; anthers 1-2 times filament length; auricles 1-3.2 mm long;

capsules more gradually to abruptly narrowed to beak; plants with long rhizomes, tending to express as individual stems in mixed turf composed of other graminoids.....*J. nevadensis*

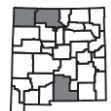
Juncus acuminatus Michaux [acuminate]. Plants perennial, caespitose; culms terete, 15-90 cm tall, 1-3 mm wide; leaf blades terete, septate, 1-40 cm long, 0.6-2.5 mm wide, auricles 0.4-2.5 mm; inflorescence terminal, composed of 3-25(50) hemispheric to spheric heads; heads 5-30(50) flowered, 6-10 mm diam; flowers without bracteoles, tepals 3-4 mm long, lanceolate with acuminate apices, green to straw, often red-tipped; stamens 3(6), the anthers much shorter than filament length; capsules 3-4 mm long, narrowly ovoid, shorter than to nearly equaling the tepals, apices acute to rounded; seeds 0.4 mm long, not tailed; section *Ozophyllum*, Key E. ●Streambanks, lakeshores, wet meadows; 5120-5610 (8200) ft; found primarily in the Bootheel region. ♦Similar species: *Juncus articulatus* has smaller, fewer-flowered obconic heads with exerted capsules; *Juncus torreyi* and *J. nodosus* both have long-acuminate tepal apices, subulate capsule apices, flowers that spread equally in all directions, and are strongly rhizomatous.



Juncus alpinoarticulatus Chaix [alpine-segmented] [*Juncus alpinus* Villars]. Plants perennial, rhizomatous; culms terete, 5-50 cm tall, 1-3 mm wide; leaf blades terete, septate, 1.5-12 cm long, 0.5-1.1 wide mm, auricles 0.5-1.2 mm long; inflorescence terminal, composed of 5-25 obconic heads; heads 2-10-flowered, 2-6 mm diam; flowers without bracteoles, the tepals 1.8-3 mm long, lanceolate to oblong with an obtuse, mucronate apex, green or straw colored; stamens 6, the anthers ½ of filament length; capsules 2.3-3.5 mm long, oblong to ovoid, usually longer than the tepals; seeds 0.5-0.7 mm long, not tailed; section *Ozophyllum*, Key E. ●Wet meadows and marshy lakeshores; 8250 ft; known only from Vermejo Park Ranch in northern Colfax County. ♦Similar species: See discussion under *Juncus articulatus*.

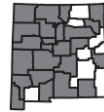


Juncus articulatus Linnaeus [segmented]. Plants perennial, more or less caespitose; culms terete, (5)10-60 cm tall, 0.5-1.8 mm wide; leaf blades terete, septate, 3.5-20 cm long, 0.5-1.8 wide mm, auricles 0.5-1 mm; inflorescence terminal, composed of 3-20(50) obconic to hemispheric heads; heads 3-5(10)-flowered, 6(12) mm diam; flowers without bracteoles, tepals 1.8-3 mm long, ovate to lanceolate with broadly acute apices, green or reddish to dark brown; stamens 6, the anthers equal to filament length; capsules 2.8-4 mm long, narrowly ovoid, longer than the tepals, apices acute; seeds 0.4 mm long, not tailed; section *Ozophyllum*, Key E. ●Wetlands, lake and stream margins, ditches, roadside swales; 5085-9515 ft; found primarily in northwestern counties. ♦Similar species: *Juncus alpinoarticulatus* tends to have fewer stems and a more upright branching pattern; it is restricted to higher elevations in the north, generally above the elevation range of *J. articulatus*. *Juncus acuminatus* has larger, many-flowered hemispheric to spheric heads with included capsules. *Juncus torreyi* and *J. nodosus* both have

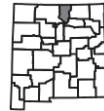


tepals with long-acuminate apices and capsules with subulate apices, flowers that spread equally in all directions, and are strongly rhizomatous.

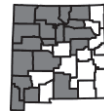
Juncus balticus Willdenow [of the Baltic sea region] BALTIC RUSH. Plants perennial, stems arising singly or a few clumped from long stout rhizomes; culms terete to slightly compressed, rarely twisting, 20-100 cm tall, 0.6-4 mm wide; leaf blades and auricles lacking, bladeless sheaths straw to rich brown, the tips mucronate to awned; inflorescence appearing lateral, compact to open with many branches, with 3-100+ flowers; flowers individual or several close together, with bracteoles, tepals (2.5-)-3.5-5(6) mm long, lanceolate with acuminate apex, straw to brown with green midvein; stamens 6, the anthers much longer than filament length; capsules (3)4-6 mm long, ovoid, longer (rarely shorter) than the tepals; seeds 0.6-0.8 mm long, not tailed; section *Juncotypus*, Key A. ●Wet meadows, stream banks and lakeshores, marshy areas, ditches, often in alkaline areas, tolerating soils that dry out seasonally; 4000-12,530 ft; throughout the state, more common in the north. ♦Our plants belong to subsp. *ater* (Rydberg) Snogerup [matte-black] [*Juncus articus* Willdenow var. *montanus* (Engelmann) Welsh, *Juncus ater* Rydberg, *Juncus balticus* of NM reports, *Juncus balticus* Willdenow var. *montanus* Engelmann]. Similar species: *Juncus mexicanus* develops a blade on the uppermost sheath on one or more culms in a bunch, and has culms more frequently compressed or twisted. §



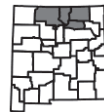
Juncus biglumis Linnaeus [2-glumed]. Plants perennial, loosely caespitose from short rhizomes; culms sub-terete, 2.5-16 cm tall, exceeding leaf lengths; leaves basal, leaf blades nearly terete, imperfectly septate, 2-4(8) cm long, 0.5-1.5 mm wide, auricles absent to 0.5 mm long; inflorescence terminal, composed of 1 upright cluster; 1-2(4) flowered, primary bract upright, and longer to much longer than the inflorescence; flowers without bracteoles, tepals 2.5-4 mm long, oblong with obtuse tip, brown to blackish; stamens 6, the anthers shorter than filament length; capsules 4-5.5 mm long, longer than the tepals, pale with dark margins, narrowly ovoid with retuse and apiculate apex; seeds tailed, body 0.7-0.9 mm long, tails short; section *Stygiopsis*, Key D. ●Wet soil or gravel in alpine tundra, slopes, streambanks, mossy pond margins; 12,530 ft; known from one collection in Vermejo Park Ranch in northern Taos County. ♦Similar species: *Juncus triglumis* shares a similar habit and habitat, and differs primarily in the characters given in the key; the coloration of the tepals and capsules is also darker in *Juncus biglumis*.



Juncus bufonius Linnaeus [toad-like, as to habitat] TOAD RUSH. Plants annual, caespitose with fibrous roots, single to many-stemmed; culms terete, 2-30 cm tall, 0.2-1.2 mm wide; leaf blades flat with face toward culm to involute, 3-13 cm long, 0.3-1.1 mm wide, the auricles truncate to rounded or absent; inflorescence loose and diffuse or less often compact, usually at least ½ total height of plant, with flowers single and usually widely spaced along the axis; flowers 1-20, with 2 scarious bracteoles, tepals 2.4-7(8.5) mm long, the outer slightly longer than the inner or equal, lanceolate with acuminate apex, green to straw; stamens usually 6, sometimes 3, the anthers shorter than to equal to filament length; capsules (2.7)3.2-4.2 mm long, ellipsoid, shorter than the outer tepals; seeds 0.3-0.5 mm long, not tailed; section *Tenageia*. ●Receding pond and lake margins, streambanks, moist soil in washes, ditches, and roadsides, usually in open and sunny sites; 3900-9130 ft; widespread in the northern and western parts of the state. ♦Similar species: Robust specimens might be confused with *Juncus interior*, but the inflorescences of *J. bufonius* start lower on the culm, and generally extend for close to half the height of the plant. §



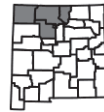
Juncus castaneus Smith [chestnut-colored]. Plants perennial, with solitary culms from long rhizomes; rhizomes 1-1.4 mm thick; culms terete to somewhat flattened, 9-40 cm tall, 1-2 mm wide, slightly exceeding leaf lengths; leaf blades channeled, imperfectly septate, 5-20 cm long, 1-2 mm wide, the auricles absent on distal leaves; inflorescence terminal, composed of 1-3(5) upright clusters; clusters 2-10-flowered, the primary bract basally inflated, upright, and longer than the inflorescence; flowers without bracteoles, tepals 4.5-6.6 mm long, lanceolate with acute to obtuse tip, chestnut brown to occasionally paler; stamens 6, the anthers much shorter than the filament length; capsules 6.5-8.5 mm long, longer than the tepals, chestnut to dark brown, narrowly oblong with acute to long-tapering apex; seeds tailed, body 0.6-0.7 mm long, the tails 0.8-1.1 mm long; section *Stygiopsis*, Key D. ●Wet soil in subalpine to alpine tundra, streambanks, and bogs; 10500-12540 ft; found at high elevations only in the Sangre de Cristo Mountains. ♦Similar species: *Juncus castaneus* is not likely to be confused with other high elevation rushes.



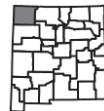
****Juncus compressus*** Jacquin [flattened]. Plants perennial, caespitose; culms slightly compressed, 10-40(80) cm tall, 0.5-1.2 mm wide; leaf blades flat with face towards culm to canaliculate, 5-15(35) cm long, 0.6-2 mm wide, the auricles 0.3-0.5 mm long, scarious to membranous, the basal sheaths green to light brown; inflorescence terminal, composed of 5-60 flowers in a compact and congested cyme with 1-2 primary branches, the proximal bract usually exceeding the inflorescence; flowers with bracteoles, the tepals 1.7-2.7 mm long, ovate to oblong with obtuse apex, with pale brown midvein bordered by darker brown bands and membranous margins; stamens 6, the anthers slightly to much longer than filament length; capsules 2.5-3.5 mm long, broadly ellipsoid to obovoid with obtuse to truncate tip with mucro, longer than the tepals; seeds 0.3-0.6 mm long, not tailed; section *Steriochloa*, Key B. ●Disturbed soils, ditch banks, roadsides; 5930 ft; native to Europe, and widely naturalized in the US; known in NM from one collection in San Juan County. ♦Similar species: The short tepals with an obtuse apex and exserted capsules distinguish this introduced species from others in its section: *Juncus confusus*, *J. dudleyi*, *J. interior*, and *J. tenuis*.



Juncus confusus Coville [perplexed]. Plants perennial, caespitose; culms terete, 30-50 cm tall, 0.5-1.2 mm wide; leaf blades flat with face towards culm to involute, 5-15 cm long, 0.4-1.3 mm wide, auricles 0.2-0.7 mm long, basal sheaths green to light brown; inflorescence terminal, composed of 3-15 flowers in a compact and congested cyme with 1-2 primary branches, the proximal bract usually exceeding the inflorescence, sometimes upright and superficially resembling a continuation of the stem; flowers with bracteoles, the tepals 3-4.5 mm long, lanceolate with acute tip, with deep brown midvein bordered by green to blackish bands and membranous margins; stamens 6, the anthers shorter than filament length; capsule 2.5-3.5 mm long, subglobose to broadly obovoid with strongly retuse tip, shorter than the tepals; seeds 0.4-0.5 mm long, not tailed; section *Steriochloa*, Key B. ●Moist, grassy meadows and streambanks; 8900-10,500 ft; northern mountain ranges. ♦Similar species: See discussion under *J. interior*.



****Juncus diffusissimus*** Buckley [very open]. Plants perennial, caespitose; culms terete, 25-65 cm tall, 1-3 mm wide; leaf blades terete to compressed, septate, 3-20 cm long, 1-2.4 mm wide, auricles 1-2.1 mm long; inflorescence terminal, composed of 30-70(130) hemispheric to obconic heads; heads (1)2-10-flowered, 5-10 mm diam; flowers without bracteoles, the tepals (1.8)2.3-3.2 mm long, the outer longer than the inner, lanceolate with acute apex, green to

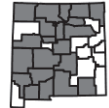


straw; stamens 3, the anthers $\frac{1}{3}$ to $\frac{1}{2}$ the filament length; capsules 4-5.2 mm long, elongate-lanceolate, strongly exserted; seeds 0.3-0.4 mm long, not tailed; section *Ozophyllum*, Key E. ●Marshy shores, sloughs, ditches, in mucky substrates; 5560 ft; known from an irrigation ditch near Farmington, possibly a waif; native eastward in the United States. ♦Similar species: None, no other terete-leaved species has an inflorescence with this many small, diffuse heads.

Juncus drummondii E. Meyer [for Thomas Drummond (1793-1835), Scottish explorer and botanist]. Plants perennial, cespitose; culms terete to slightly flattened, 8-40 cm tall, 0.8-1 mm wide; leaf blades lacking (rarely present on distal sheath), the basal sheaths light brown, the tips mucronate to awned; inflorescence lateral and near the tip, loosely compact with (1)2-3(5) flowers; flowers individual or several close together, with bracteoles, the tepals 4-7(8) mm long, lanceolate with acuminate tip, chestnut brown with dull green midstripe; stamens 6, the anthers longer than filament length; capsules 4.5-7 mm long, narrowly oblong with a blunt to retuse tip, slightly shorter to longer than the tepals; seeds 0.5-0.6 mm long, with tails; section *Juncotypos*, Key A. ●Wet and dry meadows, stream banks, talus slopes, and ridges in subalpine and alpine habitats; 10,000-13,000 ft; primarily in the Sangre de Cristo Mountains. ♦Similar species: *Juncus parryi* differs in usually having leaf blades present on a number of stems in a clump and capsules with acute tips, but shares the clumping habit and lateral inflorescence. *Juncus hallii* differs in having leaf blades present and an inflorescence bract that is often reduced and scarious, or if the bract is longer and more leaf-like, it is less like a rigid extension of the culm. §



Juncus dudleyi Wiegand [for William Russell Dudley (1849-1911), California botanist] DUDLEY'S RUSH [*Juncus tenuis* Willdenow var. *dudleyi* (Wiegand) F.J. Hermann]. Plants perennial, cespitose; culms terete, 20-90 cm tall, 0.5-2.4 mm wide; leaf blades flat with face towards culm to involute, 5-30 cm long, 0.5-1 mm wide, the auricles 0.2-0.4 mm long, yellowish, leathery to cartilaginous throughout with thick rim, the basal sheaths green to tan, rarely pinkish tinged when plant is green; inflorescence terminal, composed of (5)10-80 flowers in a compact to open cyme with up to 5 primary branches, the proximal bract usually exceeding the inflorescence, sometimes upright and superficially resembling a continuation of the stem; flowers with bracteoles (rarely awn-tipped), the tepals 4-6 mm long, lanceolate with acuminate tip, with broad greenish midvein bordered by stramineous-brown bands and membranous margins; stamens 6, the anthers shorter than to subequal to filament length; capsules 2.2-4.2 mm long, ellipsoid with obtuse to truncate tip with mucro, shorter than the tepals; seeds 0.4-0.65 mm long, not tailed; section *Steriochloa*, Key B. ●Moist areas along stream banks, ditches, and around springs, in either exposed or shady sites, 4900-9040 ft; throughout the state with the exception of the eastern plains. ♦Similar species: See discussion under *Juncus interior*.



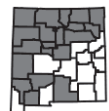
Juncus hallii Engelmann [for Elihu Hall (1822-1882), plant collector]. Plants perennial, densely cespitose; culms terete, 20-40 cm tall, 0.8-1 mm wide; leaf blades terete to channeled below, 4-15 cm long, 0.5-1 mm wide, the basal sheaths brown, auricles 0.2 mm long; inflorescence terminal, compact cymose with 2-7 flowers, inflorescence bract reduced and scarious to leaf-like and longer than the inflorescence; flowers individual or several close together, with bracteoles, the tepals 4-5 mm long, lanceolate with acute tip, light brown with green midstripe; stamens 6, the anthers equal to or slightly longer than filament length; capsules 3.5-5 mm long, oblong-ovoid with a retuse tip, equal to or longer than the tepals; seeds 0.5 mm long, with tails; section *Juncotypos*, Key A. ●Wet and dry meadows, ponds, streambanks, and rocky slopes, in high montane and alpine habitats; 7952-12,500 ft; infrequent in the northern mountains. ♦Similar species: While most closely related to *Juncus drummondii* and *Juncus parryi*, which have longer tepals and capsules, *Juncus hallii* might be more readily mistaken for *Juncus confusus* of Section *Steriochloa*. They are of similar stature, both have bracteoles and retuse capsules, and the narrow flat leaves of *Juncus confusus* could be mistaken for the channeled leaves of *Juncus hallii*; the tepal striping of *Juncus confusus*, however, is darker and its seeds are not tailed.



Juncus interior Wiegand [for its range in the central United States] INTERIOR RUSH [*Juncus arizonicus* Wiegand, *Juncus interior* Wiegand var. *arizonicus* (Wiegand) F. J. Hermann, *Juncus interior* Wiegand var. *neomexicanus* (Wiegand) F. J. Hermann, *Juncus neomexicanus* Wiegand]. Plants perennial, cespitose; culms terete, 20-60 cm tall, 0.5-3.2 mm wide; leaf blades flat with face towards culm to involute, 5-15(30) cm long, 0.3-1.1 mm wide, the auricles 0.2-0.6 mm long, thickened basally but scarious margined, the basal sheaths often pinkish tinged when plant is green; inflorescence terminal, composed of (5)10-30(50) flowers in a compact to open cyme with 1-2 primary branches, the proximal bract usually exceeding the inflorescence, sometimes upright and superficially resembling a continuation of the stem; flowers with bracteoles (often awn-tipped), the tepals 3-3.8(4.4) mm long, lanceolate with acute to acuminate tip, with broad greenish midvein bordered by stramineous-brown bands and membranous margins; stamens 6, the anthers shorter than filament length; capsules 2.4-4(4.7) mm long, ellipsoid to subglobose with obtuse to truncate tip with mucro, shorter than the tepals; seeds 0.4-0.6 mm long, not tailed; section *Steriochloa*, Key B. ●Moist areas along stream banks, ditches, and around springs, and somewhat drier upland areas, in either exposed or shady sites; 4500-10,800 ft; throughout the state with the exception of the eastern plains. ♦Similar species: *Juncus interior* is one of three look-a-like rushes in Section *Steriochloa*. It can be distinguished from both *Juncus dudleyi* and *Juncus tenuis* by its intermediate auricles, which vary from thick at the base to thin and whitish or scarious at the apex. Those of *Juncus tenuis* are long, thin and membranous throughout, and those of *Juncus dudleyi* are thick, especially distally, completely opaque, and often yellowish. The leaf sheaths at the base of the culms are frequently pinkish/reddish in *Juncus interior* and only infrequently so in *Juncus tenuis* and *Juncus dudleyi*. *Juncus interior* might also be confused with *Juncus confusus*, but *J. confusus* has congested and smaller inflorescences, capsules with apices that are strongly retuse with sharp ridges at the summit of the upper valves, and tepals with darker striping on either side of the midvein than those of *Juncus interior*. *Juncus confusus* is only found at high elevations in mixed conifer forest and above, while *Juncus interior* is typically a mid-elevation plant of varied vegetation zones. *Juncus dichotomus* Elliot is a poorly separated relative of *J. interior* that is less robust and primarily found along the coastal plain of the eastern and southeastern United States; it also ranges throughout eastern Mexico and into C. America, where the plants become more robust (personal communication with P. Zika). Similar plants have been identified from southern AZ by Zika. *Juncus dichotomus* is sometimes reported from NM, but all plants appear to belong to *J. interior*.



Juncus longistylis Torrey [long-styled] LONGSTYLE RUSH. Plants perennial, with stems single or few clumped together from long rhizomes, rhizomes 0.4-1.2(1.6) mm diam; culms somewhat compressed, 20-60(70) cm tall, 0.5-2.2 mm wide; leaf blades flat with face toward culm, up to 30 cm long, 1-3 mm wide, the auricles 1-2.5 mm long; inflorescence terminal, composed of 1-8(12) obconic heads on 1-2 short primary branches; heads 3-10(15) flowered, 6-20 mm diam; flowers without bracteoles, the tepals 5-6 mm long, lanceolate with acute to acuminate apex, and pale to deep green midvein with dark brown striping on both sides and scarious margins; stamens 6, the anthers longer than filament length;

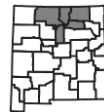


capsules 3-6.5 mm long, obovoid with apex bluntly rounded to slightly retuse, with a mucro up to 1.2 mm long, usually shorter than the tepals; seeds 0.4-0.6 mm long, not tailed; section *Graminifolii*, Key C. ●Wet mountain meadows, springs, and streambanks, at mid to higher elevations, in ponderosa pine to mixed conifer communities; 5000-10,800 ft; widespread in the mountains in the northern and western parts of NM. ♦Similar species: *Juncus longistylis* is distinctive, but has been confused with *J. saximontanus* and *J. nevadensis*, which can also have few-flowered obconic heads. However, both of these have discernable septa in their *Iris*-like or terete leaf blades, while the blades of *J. longistylis* are flat with the face towards the stem, and without septa. §

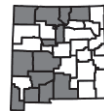
Juncus marginatus Michaux [bordered] [*Juncus biflorus* Elliott, *Juncus marginatus* var. *biflorus* (Elliott) Alph. Wood, *Juncus marginatus* Rostkovius var. *setosus* Coville, *Juncus setosus* (Coville) Small]. Plants perennial, cespitose from short, knotty rhizomes; culms slightly compressed, 30-80(130) cm tall, 1-3 mm wide; leaf blades flat with face toward culm, 10-20(45) cm long, 1.5-5 mm wide, the auricles 0.2-1(3) mm long; inflorescence terminal, usually diffuse and wide spreading, occasionally compact, composed of 10-50(200+) small hemispheric heads; heads (1)3-9(20)-flowered, 3-8 mm wide; flowers without bracteoles, the tepals (1.5)2-3(3.2) mm long, broadly ovate-lanceolate with obtuse to acute apex, tan to brown with green midstripe, the inner tepals longer than the outer; stamens 3, the anthers shorter than or equal to the filament length; capsules (1.8)2-2.5(2.9) mm long, obovoid to nearly globose, shorter than to nearly equaling the tepals; seeds 0.3-0.4(0.6) mm long, not tailed; section *Graminifolii*, Key C. ●Moist areas along stream banks, ponds, and in seasonally dry washes, at lower to mid elevations in desert scrub or chaparral to oak woodland communities; 5000-5600 ft; known from the Peloncillo Mountains in the Bootheel region. ♦Similar species: The inflorescence may look superficially like the open form of *Juncus saximontanus*, but the leaves are definitive.



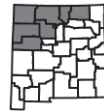
Juncus mertensianus Rostkovius [for Karl Heinrich Mertens (1796-1830), German botanist]. Plants perennial, loosely to densely clumping from rhizomes with short internodes up to 2 cm long; rhizomes 1.2-2 mm thick; culms terete, 5-35 cm tall, 0.6-1.4 mm wide, slightly exceeding leaf lengths; leaf blades terete, septate, 3-15 cm long, 0.3-1.2 mm wide, the auricles 0.2-0.6(1.2) mm long; inflorescence terminal, composed of 1(2) hemispheric to subspheric heads; heads 12-60-flowered, 4.5-15 mm diam; flowers without bracteoles, the tepals 3.2-6 mm long, lanceolate to lance-ovate with acute tip and a subulate mucro, dark purplish-brown to black throughout; stamens 6, the anthers much shorter than or equal to filament length; capsules 2.2-2.6 mm long, much to slightly shorter than the tepals, chestnut to dark brown, obovoid with rounded to retuse apex and mucro 0.2-0.4 mm long; seeds 0.4-0.5 mm long, not tailed; section *Ozophyllum*, Key E. ●Wet soil in alpine meadows, streamsides, spring sites; 8900-12,000 ft; found at high elevations in the mountains in the northern part of the state. ♦Similar species: See discussion under *Juncus nevadensis*. §



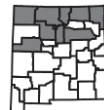
Juncus mexicanus Willdenow ex Roemer & Schultes [of Mexico] MEXICAN RUSH [*Juncus arcticus* Willdenow var. *mexicanus* (Willdenow ex J.A. & J.H. Schultes) Balslev, *Juncus balticus* Willdenow var. *mexicanus* (Willdenow ex J.A. & J.H. Schultes) Kuntze]. Plants perennial, stems arising singly or a few clumped from long stout rhizomes; culms slightly to greatly compressed, often twisted, 8-80 cm tall, 0.6-2 mm wide; leaf blades present on some stems in a population, terete to compressed, not septate, the auricles 0-1.2 mm long, the sheaths straw to rich brown; inflorescence lateral, compact to open with many branches, with 3-60+ flowers; flowers individual or several close together, with bracteoles, the tepals 3.5-5(5.5) mm long, lanceolate with acuminate apex, straw to brown with green midvein; stamens 6, the anthers much longer than filament length; capsules 2.5-4.2(4.5) mm long, ovoid, shorter to longer than the tepals; seeds 0.6-0.8 mm long, not tailed; section *Juncotypus*, Key A. ●Wet meadows, stream banks and lakeshores, marshy areas, ditches, often in alkaline areas, tolerating soils that dry out seasonally; 3700-9950 ft; throughout the state, but less common than *Juncus balticus*. ♦Similar species: *Juncus balticus* is always bladeless, often more robust, and with culms rarely as compressed or twisted.



Juncus nevadensis S. Watson [from the Sierra Nevada] [*Juncus badius* Suksdorf, *Juncus mertensianus* var. *badius* (Suksdorf) F.J. Hermann, *Juncus nevadensis* var. *badius* (Suksdorf) C.L. Hitchcock, *Juncus truncatus* Rydberg]. Plants perennial with culms single to several clumped, often from longer rhizomes with internodes up to 3 cm long; rhizomes 0.7-1.8 mm thick; culms terete, 14-70 cm tall, 0.5-2 mm wide, clearly much exceeding most leaf lengths; leaf blades terete to flattened, septate, 1-20(30) cm long, 0.5-2.3 mm wide, the auricles 1-2.6(3.2) mm long; inflorescence terminal, 1-4(15) cm long, composed of 1-4(12) obconic to nearly globose heads with ascending branches; heads (3)20-60-flowered, 5-12 mm diam; flowers without bracteoles, the tepals 2.4-4 mm long, broadly lanceolate with acute to awned apex, awn to 0.8 mm long, the green midvein with dark brown marginal striping and scarious margins; stamens 6, the anthers 0.6-1.5 times filament length; capsules 2-3.7 mm long, slightly shorter than to slightly longer than the tepals, chestnut brown, broadly ellipsoid with apex abruptly contracted to a minute beak; seeds 0.4-0.5 mm long, not tailed; section *Ozophyllum*, Key E. ●Wet soil along stream banks and lakeshores, montane meadows, springs, marshy areas, sometimes in standing water; 8000-10,200 ft. ♦Similar species: *Juncus nevadensis* is most closely related to *Juncus mertensianus*; some authors have considered them synonymous, though Brooks & Clemants (2000) and Kirschner (2002) retain both. The inflorescence of *Juncus nevadensis* is variable, ranging from single, subspherical, many-flowered heads to open panicles of few-flowered obconic heads, while *Juncus mertensianus* always has single (or rarely two proximate) hemispheric to subspherical heads. *Juncus nevadensis* has long rhizomes with taller more isolated culms, compared to *J. mertensianus* which has short rhizomes with shorter, more bunched culms. *Juncus nevadensis* grows in wet montane meadows, usually in ponderosa pine to mixed conifer zones, while *Juncus mertensianus* grows in subalpine to alpine habitats. In the Southwest, the more prevalent form of *Juncus nevadensis* has 1-2 heads, though a continuous range of inflorescence types can be found.



Juncus nodosus Linnaeus [having many nodes]. Plants perennial, with stems single or few clumped together from long-creeping rhizomes, rhizomes 0.6-1(1.2) mm diam with occasional small tuber-like segments; culms terete, (4)15-35(70) cm tall, 0.7-2.2 mm wide; leaf blades terete to channeled above, septate, 5-16(30) cm long, 0.6-1.6 mm wide, the auricles 0.2-1.7 mm long; inflorescence terminal, composed of 3-9(15) more or less globose heads; heads (3)8-30-flowered, 5-10(12) mm diam; flowers without bracteoles, the tepals 2.4-3.5(4.1) mm long, lanceolate-subulate with acuminate apex, green to light brown, often reddish tinged; stamens 3 or 6, the anthers ½ to equal to the filament length; capsules 3.2-4.2(5) mm long, lance-subulate, longer than the tepals; seeds 0.4-0.5 mm long, not tailed; section *Ozophyllum*, Key E. ●Stream banks and lakeshores, wet meadows, swamps, ditches, and open wetlands; 5640-9100 ft; found primarily in the northern counties. ♦Similar species: *Juncus nodosus* is less common in NM, but can be confused with depauperate specimens of *Juncus torreyi*, its closest relative. *Juncus nodosus* is generally a smaller, less coarse plant, with tepals usually less than 4 mm long, while those of *Juncus torreyi* are more than 4 mm. The most striking difference is that due to the fewer flowered heads (6-30 flowers) of *J. nodosus*, they tend to look more “spikey” than those of *Juncus torreyi* (25-100 flowers), which are more uniformly spherical, even though the flowers and

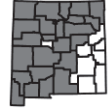


capsules of both are just as pointed. The leaf blades in *Juncus nodosus* are ascending, while those of mature *Juncus torreyi* are sometimes spreading to 45 degrees or more from the culm axis.

Juncus parryi Engelm [for Charles Christopher Parry (1823-1890), botanist-surgeon]. Plants perennial, densely cespitose; culms terete, 5-30 cm tall, 0.5-1 mm wide; leaf blades terete to channeled below, 3-12 cm long, 0.5-1 mm wide, the basal sheaths tan to reddish brown or pinkish, the auricles 0.2-0.3 mm long; inflorescence lateral and in the upper ¼ of the culm, loosely compact with 1-3(4) flowers; flowers individual or several close together, with bracteoles, the tepals 5.5-8 mm long, lanceolate with acuminate tip, light brown with green midstripe; stamens 6, the anthers longer than the filament length; capsules 6-9 mm long, narrowly oblong with an acute tip, usually longer than the tepals; seeds 0.6 mm long, with tails; section *Juncotypus*, Key A. ●Wet and dry meadows, talus slopes, and ridges, in alpine habitats; 10,800-12,600 ft; found only in the Sangre de Cristo Mountains. ♦Similar species: See discussions under *Juncus drummondii* and *J. hallii*. §



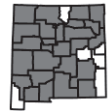
Juncus saximontanus A. Nelson [from the Rocky Mountains] ROCKY MOUNTAIN RUSH [*Juncus brunnescens* Rydberg, *Juncus ensifolius* Wikström var. *brunnescens* (Rydberg) Cronquist, *Juncus parous* Rydberg, *Juncus tracyi* Rydberg, *Juncus xiphioides* E. Meyer var. *montanus* Engelm]. Plants perennial, with stems arising singularly or more frequently a few clumped from long-creeping rhizomes; rhizomes light-colored, 1.2-2 mm thick; culms compressed, 13-70 cm tall, 1.4-2.2 mm wide at the base; leaf blades *Iris*-like, folded lengthwise with the leaf edges toward the stem and fully connate (fused) above the auricles, 3-20 cm long, 1-6 mm wide, imperfectly septate, the septa often visible externally in dried specimens, the auricles 0-0.6 mm long; inflorescence terminal, highly variable, from compact with few branches and few (2-5) many-flowered heads, to elongate with many branches and many (35+) few-flowered heads; heads 2-20-flowered, usually obconic to hemispheric but sometimes subspherical; flowers without bracteoles, the tepals 2.7-3.6 mm long, lanceolate with acuminate apex, green to brown or slightly reddish-brown; stamens 6, the anthers shorter than filament length; capsules 2.4-4.3 mm long, oblong, with tip rounded to acute with mucro, about as long to slightly longer than the tepals; seeds 0.4-0.5(1) mm long; section *Iridifolii*. ●Wet meadows, stream banks and lakeshores, marshy areas, ditches, and open wetlands; 4000-11,800 ft; widespread throughout the western & central portions of NM. ♦Similar species: This is the only rush with *Iris*-like leaves in NM, but since the inflorescence is so variable, these plants have been misidentified as a number of other species. In *Juncus saximontanus*, the membranous sheath margins are also uniquely long tapering to minute or non-existent auricles that are located past the point where the leaf departs the culm. *Juncus xiphioides*, a closely related and more robust species with wider leaves, tepals that are often red-tipped, and more numerous heads in the inflorescence is found in AZ, but does not range east into NM. §



Juncus tenuis Willdenow [slender] [*Juncus macer* S.F. Gray]. Plants perennial, cespitose; culms terete, (10)15-55(80) cm tall, 0.3-1.6 mm wide; leaf blades flat with face toward the culm to involute, 3-30 cm long, 0.5-1.7 mm wide, the auricles 1.5-6 mm long, thin and membranous throughout, delicate and often broken, the basal sheaths green to tan, rarely pinkish tinged when plant is green; inflorescence terminal, composed of (5)15-45 flowers in a compact to open cyme with 2-5 primary branches, the proximal bract usually exceeding the inflorescence, sometimes upright and superficially resembling a continuation of the stem; flowers with bracteoles, the tepals 3.3-4.4 mm long, lanceolate with acuminate tip, with broad greenish midvein bordered by pale green bands and membranous margins; stamens 6, the anthers shorter than filament length; capsules 3-3.5(4.7) mm long, ellipsoid with rounded to obtuse tip with mucro, shorter than the tepals; seeds 0.3-0.5 mm long, not tailed; section *Steriochloa*, Key B. ●Moist areas along stream banks and around springs, in either exposed or shady sites; 7120-8000 ft; known from several collections in north-central NM. ♦Similar species: See discussion under *Juncus interior*. Some floras have included both *Juncus dudleyi* and *Juncus interior* in a broadly defined *Juncus tenuis*, and consequently, there are many specimens throughout the western and central US that have been called *J. tenuis*. However, as currently accepted in a more narrow sense, *Juncus tenuis* is actually quite rare in the Southwest, and is definitively known from only a few widely scattered locations in NM. §



Juncus torreyi Coville [for John Torrey (1796-1873), American physician-botanist] TORREY'S RUSH [*Juncus nodosus* Linnaeus var. *megacephalus* Torrey]. Plants perennial, with stems single or few clumped together from long-creeping rhizomes, the rhizomes 1-2.5(3) mm diam, with occasional tuberous nodes; culms terete, (3)15-90(100) cm tall, 1-4(6) mm wide; leaf blades terete to channeled above, septate, 6-50 cm long, (0.5)1-2.2(4) mm wide, the auricles (1)2-4.2(5) mm long; inflorescence terminal, composed of (1)2-12(20) more or less globose heads; heads 25-100-flowered, (8)10-15 mm diam; flowers without bracteoles, the tepals 4-5 mm long, lanceolate-subulate with acuminate apex, green to light brown, often reddish toward the tip; stamens 6, the anthers ½ of filament length or less; capsules 4-5.1(5.7) mm long, lance-subulate, equal to or longer than the tepals; seeds 0.4-0.5 mm long, not tailed; section *Ozophyllum*, Key E. ●Stream banks and lakeshores, wet meadows, swamps, ditches, and open wetlands, tolerates alkaline conditions well; 3500-8730 ft; widespread throughout the state, except in the southeast counties. ♦Similar species: See discussion under *Juncus nodosus*. In the Bootheel region, *Juncus torreyi* might be confused with *Juncus acuminatus*, which has the same terete, septate leaves, and globose clusters in the inflorescence. However, *Juncus acuminatus* is clump-forming, not rhizomatous as is *Juncus torreyi*, and it has capsules with an acute apex, not subulate as in *Juncus torreyi*. §



Juncus triglumis Linnaeus [3-glumed]. Plants perennial, loosely to densely cespitose from short rhizomes; culms sub-terete, 3-20(30) cm tall, 0.3-0.8 mm wide, exceeding leaf lengths; leaf blades nearly terete, not septate, 3-4 cm long, 0.3-1 mm wide, the auricles to 1 mm long; inflorescence terminal, composed of 1 upright cluster; 2-4(5)-flowered, 4-9 mm diam, the primary bract equal to or slightly shorter than the inflorescence; flowers without bracteoles, the tepals 3-5 mm long, pale brown or darker, oblong-lanceolate; stamens 6, the anthers much shorter than filament length; capsules (4)4.5-6 mm long, equal to or longer than the tepals, dark brown, ellipsoid with subobtuse, mucronate tip; seeds tailed, the body 0.5-1 mm, the tails 0.6-1 mm long; section *Stygiopsis*, Key D. ●Wet gravel soils in alpine tundra, mossy pond margins and bogs; 10,300-12,540 ft; known from the Sangre de Cristo Mountains in northern NM. ♦Similar species: See discussion under *Juncus biglumis*. Two varieties have been identified in the state. While some specimens can be separated using the following key, there does not seem to be any habitat or range distinction that would help confirm their validity.



a Tepals blackish to pale brown; capsule exerted, usually longer than 4.5 mm...var. *triglumis*

a Tepals pale brown to straw; capsule scarcely exerted, usually 4-4.5 mm long...var. *albescens* (Lange) Hulten [whitish] [*Juncus albescens* (Lange) Fernald].

Luzula [shining] WOODRUSH [3].

Plants grass-like, perennial (our species), densely cespitose from short rhizomes or less commonly with short stolons; culms round in cross section, solid, without nodes, leafy or not; leaves spirally arranged, clustered at base or alternating and reduced up the culm, the blades linear to lanceolate, flat with face towards the culm (grass-like), never septate, sparsely to densely ciliate on the margins, the

sheaths closed, without auricles, cataphylls (bladeless basal sheaths) absent; inflorescence terminal, cymose, paniculate, diffuse to strongly congested, sometimes with one to many racemose or paniculate clusters (glomerules), the branches, clusters, and individual flowers with bracts; primary inflorescence bracts shorter to longer than the inflorescence, or sometimes reduced to a scale; flowers perfect, with a perianth of 6 tepals, persistent at fruiting, with 1 bract at the pedicel base and 2 additional sub-entire to fringed bracteoles immediately subtending the tepals; stamens 6 in all of our species; ovary superior, with 1 style and 3 sub-erect stigma branches; fruit a capsule, globose to ovoid-trigonal, with a beak formed by persistent style base, one per flower, uni-locular, containing 3 seeds; seeds globose to ovoid, sometimes with slender appendages (tails) at one or both ends, the base often with a tuft of fibrous hairs. ♦About 115 species worldwide, but rare in the tropics, about 23 species in North America.

■Correll, D.S. & H.B. Correll. 1972. Aquatic and Wetland Plants of Southwestern United States [*Luzula multiflora*]. Stanford Univ. Press. ■Kirschner, J. 2002. *Luzula*, pp. 18-228. IN: Species Plantarum, Part 6. JUNCACEAE 1. Australian Biological Resources Study, Canberra. ■Swab, J.C. 2000. *Luzula*, p. 255-267. IN: Flora North America, vol. 22. Oxford University Press. ■Zika, P. F. 2012. *Luzula*, pp. 1374-1375. IN: The Jepson Manual, Vascular Plants of California, Ed 2, University of California Press, Berkeley.

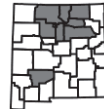
1 Flowers borne singly or several together on long, slender branch tips in an open, drooping panicle; leaves 3-13 mm wide, sparsely hairy on the lower margins *L. parviflora*

1 Flowers borne in congested spikes, each with 5-20 sessile or nearly sessile flowers; leaves 1—6 mm wide, obviously hairy along the lower margins

2 Spikes tightly clustered into a single irregularly continuous inflorescence, usually nodding at maturity; leaves 1-4 mm wide; plants of subalpine forests to alpine tundra *L. spicata*

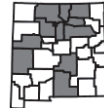
2 Spikes widely separated on ascending, unequal, stiff peduncles, culm strictly upright below inflorescence; leaves 3-6 mm wide; plants of mountain forests and meadows (var. *laxa*) *L. comosa*

Luzula comosa E. Meyer [with an abundance of hairs]. Plants perennial, densely cespitose; culms terete, 10-40(50) cm tall, 1 mm wide; basal leaf blades flat, with dense hairs at the throat and long soft marginal hairs, 7-11 cm long, 3.5-5 mm wide, the apex obtuse, the callous thickened; inflorescence a terminal diffuse panicle, composed of 1(4) subsessile and 2-6 pedunculate cylindrical clusters of flowers, the branches stiffly ascending to spreading, of varying lengths; clusters 5-12-flowered with some basal flowers slightly more remote; floral bracteoles clear, with ciliate margins distally, tepals (3.3)3.5-4 mm long, lanceolate with acute to acuminate apex, tan to pale brown; stamens 6, the anthers longer to much longer than the filament length; capsules up to 2.5-3 mm long, oblong ovoid to globose, subequal to the tepals; seeds 1.1-1.3 mm long.

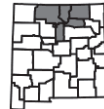


●Meadows, open woods, and coniferous forests; 8000-10,300 ft; infrequent in the Sangre de Cristo and Jemez mountains with one outlying record from the Black Range. ♦Our plants belong to var. *laxa* Buchenau [wide or loose] [*Juncoides intermedium* of NM reports, *Luzula intermedia* of NM reports, *Luzula multiflora* of NM reports], with peduncled flower clusters and slightly longer styles and anthers than the more western var. *comosa*.

Luzula parviflora (Ehrhart) Desvaux [small-flowered] SMALL-FLOWERED WOODRUSH [*Juncoides parviflorum* (Ehrhart) Coville, *Juncus parviflorus* Ehrhart]. Plants perennial, cespitose; culms terete, (8)30-70(100) cm tall, 1-3 mm wide; leaf blades flat, predominantly glabrous with long soft marginal hairs proximally, 8-17 cm long, 4-10(13) mm wide, the apex acute to acuminate, not thickened; inflorescence a terminal diffuse panicle, composed of 30-140+ small floral clusters on 1-4 primary, lax, drooping branches; clusters 1-4-flowered; floral bracteoles with entire to lacerate margins, the tepals 1.8-2.7 mm long, broadly lanceolate with acute apex, clear to dark brown; stamens 6, the anthers shorter to equal the filament length; capsules up to 2.7 mm long, globose, as long to longer than the tepals; seeds 1.1-1.5 mm long. ●Meadows and forest glades, wooded slopes, in moist and shaded locations; 7874-12,040 ft; common in the northern mountains, with a few outlying populations in the Sacramento and Mogollon Mountains.



Luzula spicata (Linnaeus) A.P. de Candolle [spike-like] [*Juncoides spicatum* (Linnaeus) Kuntze, *Juncus spicatus* Linnaeus]. Plants perennial, single or several-stemmed to densely cespitose; culms terete, (3)5-27(33) cm tall, 0.5-1 mm wide; basal leaf blades flat to somewhat channeled, predominantly glabrous with dense hairs at the throat and sparse hairs along the lower margins, 2-15 cm long, 0.4-4 mm wide, the apex blunt to acute, not thickened; inflorescence a terminal condensed spike-like panicle, often nodding at maturity, composed of 3-12 overlapping floral clusters on short branches; clusters 3-20-flowered; floral bracteoles clear with ciliate margins that disintegrate into tangled woolly hairs, the tepals 2-3 mm long, broadly lanceolate, apex acute to acuminate, the inner shorter and narrower than the outer, clear to dark brown the apices awned; stamens 6, the anthers ½ to equal the filament length; capsules up to 1.3-2 mm long, globose, shorter than the tepals; seeds 0.8-1 mm long. ●Alpine tundra and scree slopes to subalpine forests; 9842-13,160 ft; found only at high elevations in the Sangre de Cristo Mountains.



JUNCAGINACEAE ARROW-GRASS FAMILY [1/2/2]

Annual to perennial, semi-aquatic herbs, with rhizomes, evident stems absent; leaves alternate and basal, simple, with a prominent ligule, the sheaths persisting, stipules absent; inflorescence a terminal scapose spike or spike-like raceme, lacking a spathe; flowers small, actinomorphic, perfect or unisexual (monoecious); perianth of 6 distinct tepals; stamens 4, 6; pistils 1, 3, or 6, weakly connate, superior; fruits of nutlets or schizocarps. ♦A cosmopolitan family of about 3 genera, often in saline marshy habitats.

■Haynes, R.r. & C.B. Hellquist. 2000. Juncaginaceae, pp. 43-46. IN: Flora North America, vol. 22. Oxford University Press.

Triglochin [3-pointed] ARROW-GRASS.

Perennial herbs, with stout rhizomes; leaves erect and terete, the ligule apically entire or 2-lobed; racemes spike-like, longer or shorter than the leaves; flowers bisexual, short-pedicellate, the tepals yellow-green; anthers nearly sessile; pistils separating at maturity. ♦With about 12 species, widespread in temperate regions of the world.

■Löve, A. & D. Löve. 1958. Biosystematics of *Triglochin maritima* agg. Naturaliste Canad. 85:156-165.

1 Pistils 6, 3 fertile, 3 sterile; sheaths 3-5 cm long; fruiting receptacles winged *T. palustris*

1 Pistils 6, all fertile; sheaths 1-3 cm long; fruiting receptacles not winged *T. maritima*

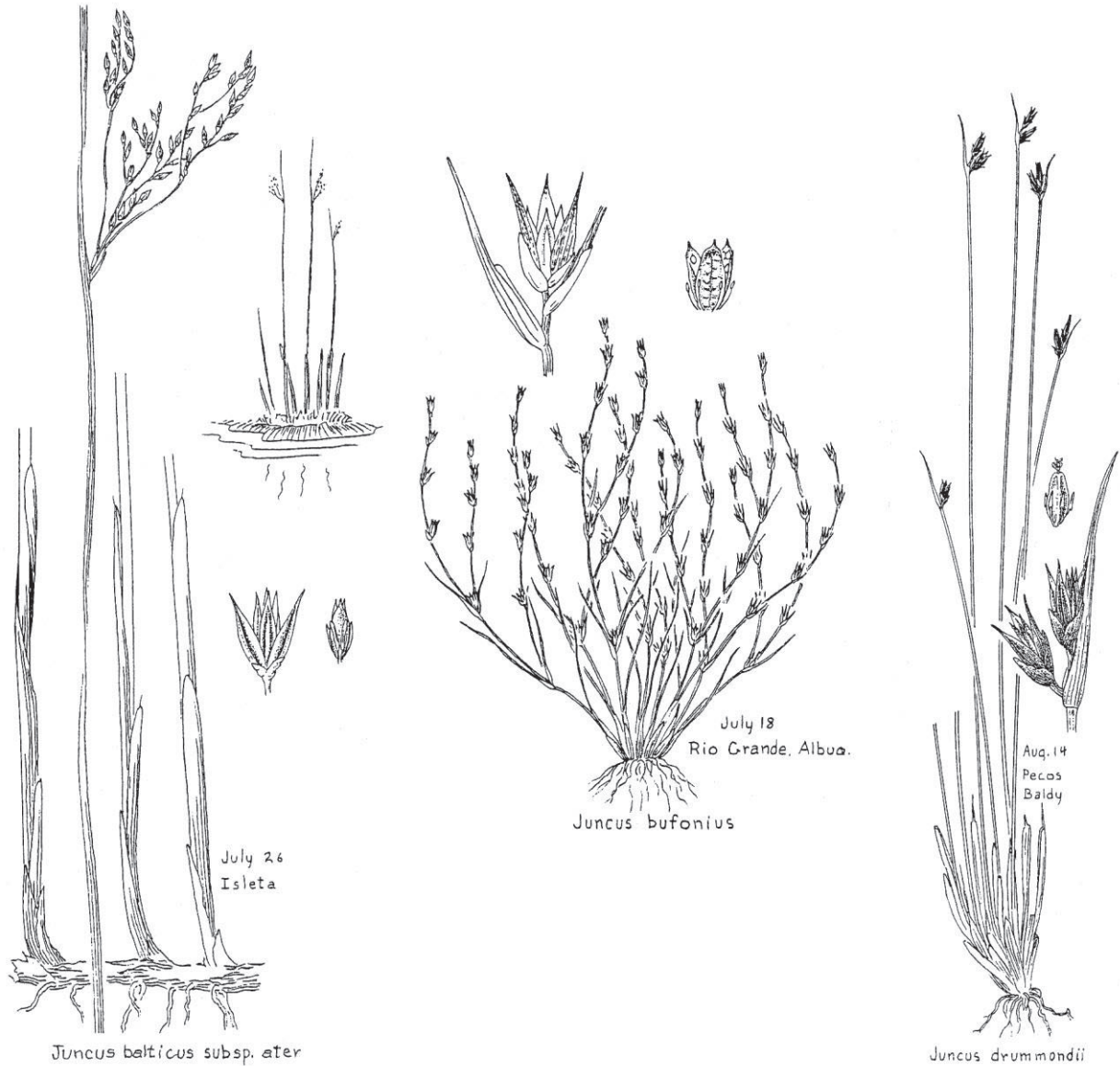
Triglochin maritima Linnaeus [by the sea] [*Triglochin concinna* Davy, *Triglochin concinna* Davy var. *debilis* (Jones) J.T. Howard].

Perennial, 30-60 cm tall; leaves mostly shorter than the scape, the sheaths 1-3 cm long, the blades 2-12 cm long, the ligules entire to apically 2-lobed; racemes 6-40 cm long; tepals 1-2 mm long; pistils 6, all fertile; fruiting receptacles without wings; schizocarps 2-5 mm long. ●Marshy meadows and edges of ponds, mostly in the mountains. ♦Small plants with 2-lobed ligules have been segregated as *Triglochin concinna*, but these features vary indiscriminately



though the entire range of the species. §

Triglochin palustris Linnaeus [in marshes]. Perennial, 10-42 cm tall; leaves mostly shorter than the scape, the sheaths 3-5 cm long, the blades 6-25 cm long, the ligules unlobed; racemes 5-20 cm long; tepals 1-1.6 mm long; pistils 6, 3 fertile and 3 sterile; fruiting receptacles winged; schizocarps 7-8 mm long. ●Marshy meadows and edges of ponds, mostly in the mountains.



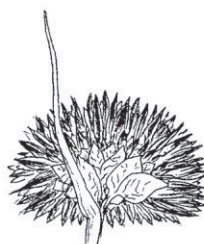


Bluewater Creek
Zuni Mts.
Sept. 8

Juncus longistylis



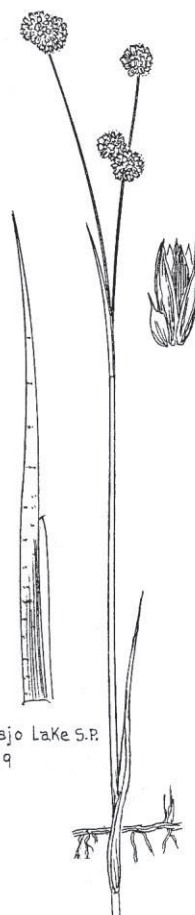
flowers brown to
black, in crowded
heads, one, or
rarely two, to
a stem



each flower grows
from the axile of
a bract; capsule
(ovary) shorter
than tepals

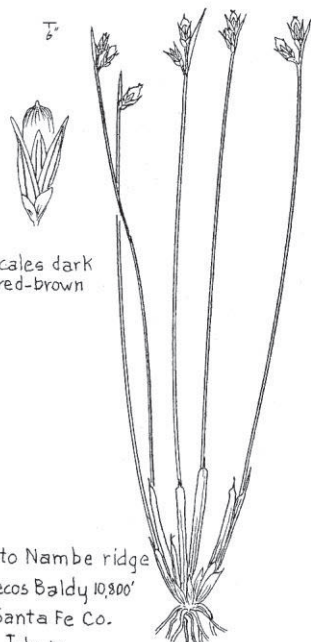
Puerto Nambe ridge
Pecos Baldy 10,800'
Santa Fe Co.
July 17

Juncus mertensianus



Navajo Lake S.P.
Aug. 9

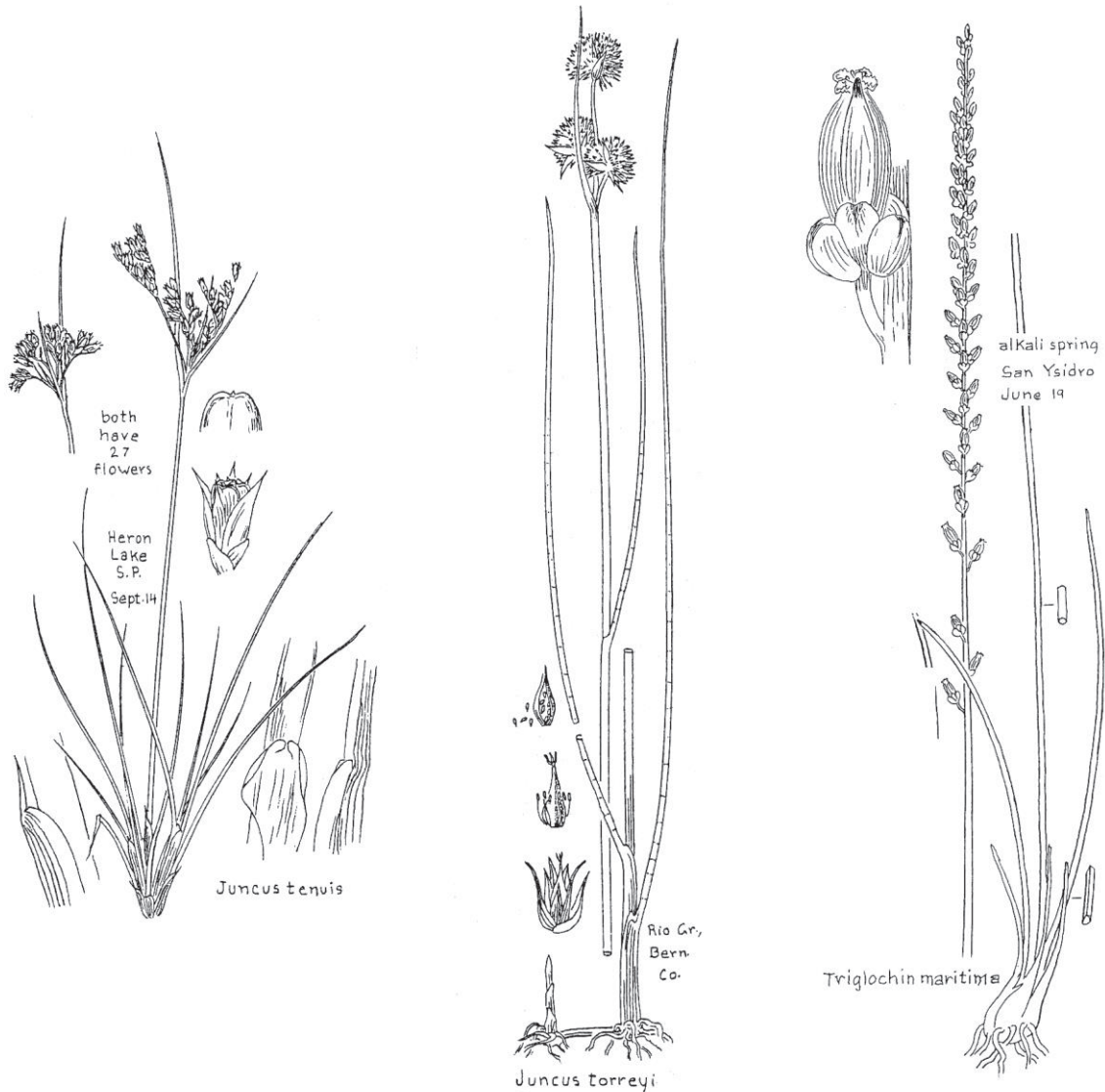
Juncus saximontanus



scales dark
red-brown

Puerto Nambe ridge
Pecos Baldy 10,800'
Santa Fe Co.
July 17

Juncus parrisi



LILIACEAE LILY FAMILY [7/11/12]

[Calochortaceae]

Perennial herbs, commonly from bulbs or rhizomes in some; leaves alternate or whorled, simple, entire, parallel-veined but some reticulate-veined between the main veins, often with a sheathing base; stipules lacking; flowers often showy, actinomorphic (rarely zygomorphic), often solitary, or borne in a terminal raceme or umbel; perianth of 6 petaloid tepals; stamens 6; pistil single, superior, of 3 united carpels, the style single; fruit a capsule. ♦A large worldwide family of 600-700 species, mainly in temperate regions of the Northern Hemisphere. *Lilium* and *Tulipa* are important ornamental plants. This family was traditionally very large, but polyphyletic. A stylized lily, the *fleur-de-lis*, has been used for coats-of-arms, royalty, architecture, military and sports symbols, and Scouting. The family has been restructured to include only monophyletic elements, yielding numerous segregate families.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Utech, F.H. 2002. Liliaceae, pp. 50-347. IN: Flora of North America, vol. 26. Oxford University Press, New York.

- 1 Petals and sepals clearly differentiated from each other *Calochortus*
- 1 Petals and sepals similar in size, texture, and color, not clearly differentiated
 - 2 Leaves all basal or absent, none borne on the flowering stems *Erythronium*
 - 2 Leaves borne on the flowering stems
 - 3 Flowers borne in the axils of the leaves *Streptopus*
 - 3 Flowers borne at the stem tips
 - 4 Leaves linear-filiform; flowers white or purple-brown
 - 5 Flowers purple-brown, pendent *Fritillaria*
 - 5 Flowers white, erect *Gagea*
 - 4 Leaves broader; flowers whitish or orange-red
 - 6 Leaves whorled at the upper nodes, alternate below, lanceolate; flowers orange-red *Lilium*
 - 6 Leaves alternate throughout, lanceolate to ovate; flowers whitish or yellowish *Prosartes*

Calochortus [beautiful herb] MARIPOSA-LILY [5].

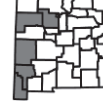
Perennial herbs, sometimes bulbous; stems scapose or leafy, simple or branched, glabrous; leaves basal or cauline; inflorescences 1-many-flowered, bracteate; sepals 3, distinct, somewhat petaloid but clearly different from the petals; petals 3, distinct, longer and broader than the sepals, usually variously hairy adaxially, with an adaxial gland near the base; stigmas 3; fruit a capsule, with many seeds. ♦About 70 species of western North America to Central America. The name, *mariposa*, is the Spanish word for butterfly.

■Allred, K.W. 1999. New plant distribution records [*Calochortus flexuosus*]. The New Mexico Botanist 13:7. ■Bleakly, D. 2000. A key to *Calochortus* in New Mexico. The New Mexico Botanist 16:4. ■Fiedler, P.L. & R.K. Zebell. 2002. *Calochortus*, pp. 119-141. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Ownbey, M. 1940. A monograph of the genus *Calochortus*. Ann. Missouri Bot. Gard. 27:371-553. ■Ownbey, M. 1969. *Calochortus*. Univ. Wash. Publ. Biol. 17(1):765-779.

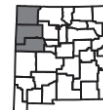
[Key adapted from Bleakly 2000]

- 1 Stems decumbent to weakly erect, usually contorted, often twining among other plants or straggling along ground, branched; petals white with lilac tinge to purplish; petal hairs few, short and thick, or petals glabrous; glands not (or only slightly) depressed *C. flexuosus*
- 1 Stems erect, straight, unbranched; petals white, purplish, or yellow; petal hairs usually elongate, simple or branched; glands depressed
 - 2 Glands elongate transversely, either narrow or broad; petal hairs with the tips enlarged or branched and ± glandular
 - 3 Glands broad, lunate to orbicular; petal hairs with the tips expanded to slightly lobed; petals pinkish to bluish-gray; anther tips usually obtuse (rarely acute)..... *C. ambiguus*
 - 3 Glands narrow, oblong to elongate; petal hairs with the tips branched; petals white to purple or yellow; anther tips acute to apiculate..... *C. gunnisonii*
 - 2 Glands circular; petal hairs simple, the tips not enlarged or branched and not glandular
 - 4 Petal hairs with the tips expanded to slightly lobed; petals pinkish to bluish-gray *C. ambiguus*
 - 4 Petal hairs with the tips simple (rarely slightly dilated); petals & sepals with reddish-brown or purple band or spot above gland
 - 5 Petals lemon yellow *C. aureus*
 - 5 Petals white, tinged with lilac, yellow at base of claw..... *C. nuttallii*

Calochortus ambiguus (M.E. Jones) M. Ownbey [uncertain or doubtful] [*Calochortus watsonii* M.E. Jones var. *ambiguus* M.E.Jones]. Plants often bulbous, 10-60 cm tall; stems straight, usually branching; leaves linear-attenuate, 10-20 cm long; inflorescences 1-4-flowered; flowers pinkish to bluish grey; sepals shorter than to equaling the petals; petals white, pinkish, to purplish, with hairs near the base that are yellowish, distally enlarged, and gland-tipped; glands round to lunate, surrounded by a deeply fringed membrane; capsules 3-5 cm long. ●Rocky open slopes and hills in the western region. §



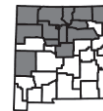
Calochortus aureus S. Watson [golden] [*Calochortus nuttallii* Torrey & Gray var. *aureus* (S. Watson) M. Ownbey]. Plants usually bulbous; stems usually not branching nor twining or straggling, 10-30 cm tall; leaves 10-20 cm long, linear; inflorescences 1-4-flowered; flowers lemon-yellow; sepals 1-4 cm long, broadly lanceolate; petals 3-3.5 cm long, yellow, with a maroon blotch distal to the gland; glands round, surrounded by conspicuously fringed membranes, densely hairy; capsules 2-5 cm long. ●Dry sandy or clayey sites in the northwest region. §



Calochortus flexuosus S. Watson [curved, zig-zag]. Plants rarely bulbous; stems twining or straggling over the ground or adjacent plants, 10-20 cm long; leaves 5-10 cm long, linear; inflorescences 1-4-flowered; flowers whitish to pale lavender; sepals 2-3 cm long, lanceolate-ovate; petals 3-4 cm long, white with a lilac-tinge to pale purplish, with white, yellow, and brownish bands proximally; glands lunate, densely short-hairy; capsules 3-4 cm long. ●Dry stony slopes, rocky mesas and flats, western regions. §



Calochortus gunnisonii S. Watson [for John Williams Gunnison (1812-1853), American military officer and explorer]. Plants usually bulbous; stems straight, not branching, 20-50 cm tall; leaves linear, 20-30 cm long; inflorescences 1-3-flowered; flowers white, purple, or yellow; sepals lanceolate, 2-3 cm long, shorter than the petals; petals obovate, 3-4 cm long, with a band of many long branching yellow hairs, then a squarish band of short thick hairs; glands densely covered with branching hairs; capsules 3-6 cm long. ●Dry to moist slopes in the mountains and foothills. ♦There are two varieties:



a Petals white or purple...var. *gunnisonii*. ●Widespread in the mountains of the state. §

a Petals pale yellow... var. *perpulcher* Cockerell [very beautiful] PECOS MARIPOSA LILY. ●Endemic to New Mexico, in the northern mountains; Colfax, Mora, and San Miguel counties.

Calochortus nuttallii Torrey [for Thomas Nuttall (1786-1859), English botanist and explorer] SEGO LILY. Plants usually bulbous; stems usually simple, straight, 20-45 cm tall; leaves linear-involute, 10-30 cm long; inflorescences 1-4-flowered; flowers white; sepals 2-3 cm long, shorter than the petals, whitish adaxially; petals 3-5 cm long, white, broadly obovate, at the base with a red-purple half-moon band above a circular yellow spot, with scattered unbranched slender hairs; capsules 3-5 cm long. ●Dry slopes and plains in the northern and western regions. ♦This is the state flower of Utah. §



Erythronium [reddish] FAWN-LILY [1].

Perennial, scapose, bulbous, spring-flowering herbs; leaves 2 at anthesis, basal, narrowed to a slight petiole, glabrous, the margins entire; inflorescences terminating a leafless scape, 1-10-flowered; flowers showy, nodding, with 6 distinct similar tepals; stamens 6; ovary superior, with a single style, the stigma unlobed or 3-lobed; fruit a capsule. ♦About 27 species, all but a few native to North America.

■Allen, G.A. & K.R. Robertson. 2002. *Erythronium*, pp. 153-164. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Applegate, E.I. 1935. The genus *Erythronium*: A taxonomic and distributional study of the western North American species. Madroño 3:58-113. ■Todsén, T.K. 1996. New plant distribution records [*Erythronium grandiflorum*]. The New Mexico Botanist 2:6.

Erythronium grandiflorum Pursh [large-flowered] AVALANCHE-LILY. Bulbs 3-5 cm long; leaves 6-20 cm long, the blades green, not mottled, lanceolate, somewhat glaucous; inflorescences usually 1-flowered (up to 5); flowers nodding, bright yellow to creamy white, the tepals 2-3.5 cm long, reflexed, narrowly ovate; stigma unlobed; capsules 2-5 cm long, oblong to narrowly oblong. ●Subalpine meadows and clearings in the far northern mountains. ♦Our material corresponds to subsp. *grandiflorum*, with bright yellow tepals. §



Fritillaria [checked like a dice-box] FRITILLARIA [1].

Perennial, scapose, bulbous herbs, the stems single and erect and only present when flowering; leaves alternate or whorled proximally; inflorescences loosely racemose, 1-many-flowered; flowers usually nodding, malodorous to fragrant, the 6 tepals similar and distinct, the stamens 6, the ovaries superior; fruit a capsule. ♦About 100 species throughout the Northern Hemisphere; some of the European species are grown as ornamentals.

■Beetle, D.E. 1944. A monograph of the North American species of *Fritillaria*. Madroño 7:133-159. ■Ness, B. 2002. *Fritillaria*, pp. 164-171. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Fritillaria atropurpurea Nuttall [dark purple]. Plants 10-60 cm tall; leaves 2-3 per node proximally, 4-12 cm long, linear to lanceolate, shorter than the inflorescence; flowers nodding, brownish purple, mottled yellow and white, 1-2.5 cm long, rounded-keeled abaxially; style branched; capsules 1-2 cm long, angled. ●Known only from an 1892 collection from the Chuska Mountains; it has not been collected since and its continued occurrence in the state is doubtful; to be looked for in shaded mountain meadows and grassy slopes of the far northwestern mountains; the drawing is from an Arizona plant. §

**Gagea** [for Thomas Gage (1781-1820), English botanist and baronet] [1].

Perennial, glabrous herbs from short rhizomes, bulb-like basally by persistent leaf sheaths; leaves alternate, simple, linear, entire; stipules absent; inflorescences racemose, 1-several-flowered; flowers fragrant or not, the tepals similar, petaloid, distinct, yellow or white, with darker veins; fruit a capsule. ♦About 200 or so species of western North America, northern Africa, and Eurasia. ♦Included here are members of the (mostly) white-flowered *Lloydia*, shown to be phylogenetically congruent within the (mostly) yellow-flowered *Gagea*.

■Peterson, A., I.G. Levicev, & J. Peterson. 2008. Systematics of *Gagea* and *Lloydia* (Liliaceae) and infrageneric classification of *Gagea* based on molecular and morphological data. Molecular Phylogenetics & Evolution 46(2):446-465. ■Reveal, J.L. & F.H. Utech. 2002. *Lloydia*, pp. 198. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Zarrei, M., P. Wilkin, M.F. Fayl, M.J. Ingrouille, S. Zarre, & M.W. Chase. 2009. Molecular systematics of *Gagea* and *Lloydia* (Liliaceae; Liliales): implications of analyses of nuclear ribosomal and plastid DNA sequences for infrageneric classification. Ann. Bot. 104:125-142.

Gagea serotina (Linnaeus) Ker-Gawler [late flowering or fruiting] ALP-LILY [*Anthericum serotinum* Linnaeus, *Lloydia serotina* (Linnaeus) Salisbury ex Reichenbach]. Plants slender, 5-20 cm tall; basal leaves longer and broader than the cauline; flowers 1-2, erect to nodding, the tepals creamy white, 1-1.5 cm long; capsules 6-8 mm long. ●Gravelly or rocky slopes and cliffs at high elevations in the central cordillera. §

**Lilium** [ancient Latin name for the lily, from Greek *leirion*] LILY [1].

Perennial, bulbous (actually bulb-like rhizomes in our species) herbs, the stems erect; leaves cauline, alternate to whorled, sessile; inflorescences racemose to umbellate, 1-many-flowered, bracteate; flowers showy, pendent to erect, often fragrant, of various colors, the tepals similar to dissimilar and distinct, the stamens 6, the ovaries superior; fruit a capsule. ♦About 100 species, with many important in the nursery trade; the Easter Lily is *Lilium longiflorum*.

■Skinner, M.W. 2002. *Lilium*, pp. 172-197. IN: Flora of North America, vol. 26. Oxford University Press, New York.

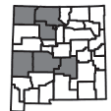
Lilium philadelphicum Linnaeus [from Philadelphia] WOOD LILY [*Lilium andinum* Nuttall, *Lilium montanum* A. Nelson, *Lilium philadelphicum* Linnaeus var. *andinum* (Nuttall) Ker-Gawler, *Lilium umbellatum* Pursh]. Bulbs 1.5-3 x 2-5 cm; stems 30-90 cm tall, erect; leaves alternate below, whorled above, narrowly elliptic to linear, 3-10 cm long; inflorescence umbellate, 1-3-flowered, sometimes more; flowers showy, erect, not fragrant, broadly campanulate, red-orange (rarely yellowish); tepals clawed, 5-8 cm long, outer whorl slightly longer, 2-3 cm wide; capsules 2-8 cm long, 1-2 cm wide. ●Uncommon in aspen clearings and wet open places in the central cordillera, but with a wide distribution in northeastern North America. §

**Prosartes** [to fasten or attach] FAIRYBELLS [1].

Perennial herbs, from knotty rhizomes, generally hairy throughout, the stems branched distally; leaves sessile, alternate, simple, entire, the main veins parallel, the minor veins forming a reticulum; inflorescences terminal, with 1-4 flowers; flowers nodding or pendulous, pedicellate; tepals similar, distinct, whitish; fruits berry-like, straw-colored to red. ♦About 6 species of North America. Formerly included within the Asian genus, *Disporum*.

■Jones, Q. 1951. A cytotoxic study of the genus *Disporum* in North America. Contr. Gray Herb. 173:1-39. ■Shinwari, Z.K., R. Terauchi, F.H. Utech, & S. Kawano. 1994. Recognition of the New World *Disporum* Section *Prosartes* as *Prosartes* (Liliaceae) based on the sequence of the rbcL gene. Taxon 43(3):353-366. ■Utech, F.H. 2002. *Prosartes*, pp. 142-145. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Utech, F.H., Z.K. Shinwari, & S. Kawano. 1995. Biosystematic studies in *Disporum* (Liliaceae-Asparagoideae-Polygonatae). VI. Recognition of the North American section *Prosartes* as an autonomous genus. Mem. Fac. Sci. Kyoto Univ., Ser. Biol. 16:1-41.

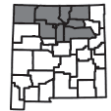
Prosartes trachycarpum S. Watson [rough-fruited] [*Disporum trachycarpum* (S. Wateon) Bentham & Hooker f.]. Plants 30-80 cm tall, grabrate, the stems sparingly branched; leaves ovate to oblong-lanceolate, 4-12 cm long, 2-5 cm wide, 7-9-veined, subcordate to oblique basally; flowers in clusters of 1-3, narrowly campanulate, creamy to greenish white, 8-15 mm long; berries reddish orange to bright red, 12-18 mm diam, strongly papillose. ●Rich, shaded sites in the mountains. §

**Streptopus** [twisted stalk] TWISTED-STALK [1].

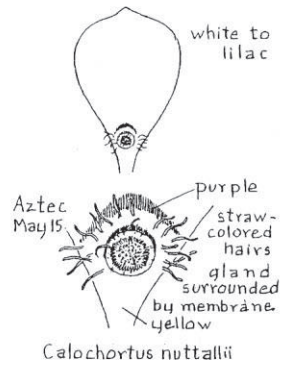
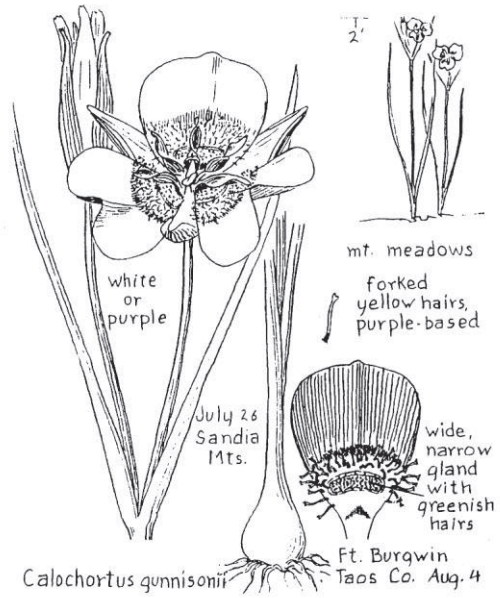
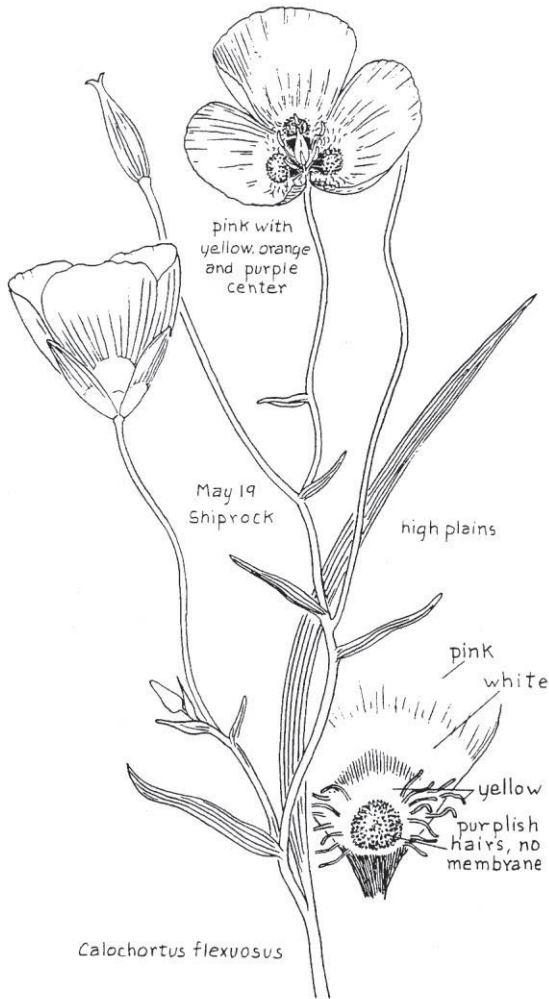
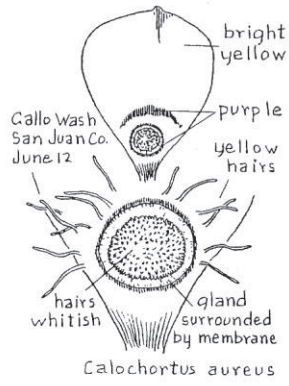
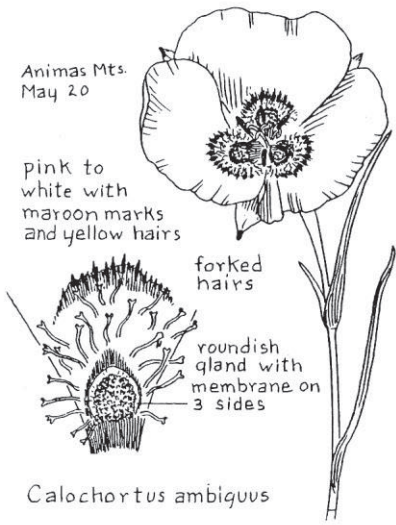
Perennial, rhizomatous herbs, the stems simple to branched; leaves alternate, cauline, sessile, elliptic to ovate, the bases rounded to cordate-clasping, parallel-veined from a common base; inflorescences axillary, 1-2-flowered; flowers hanging beneath the leaves, rotate to campanulate, on a bent or twisted stalk (peduncle); tepals similar, deciduous, distinct or basally connate; stamens 6; fruit berry-like. ♦About 7 species, temperate North America and Eurasia.

■Fassett, N.C. 1935. A study of *Streptopus*. Rhodora 37:88-113. ■Utech, F.H. 2002. *Streptopus*, pp. 145-147. IN: Flora of North America, vol. 26. Oxford University Press, New York.

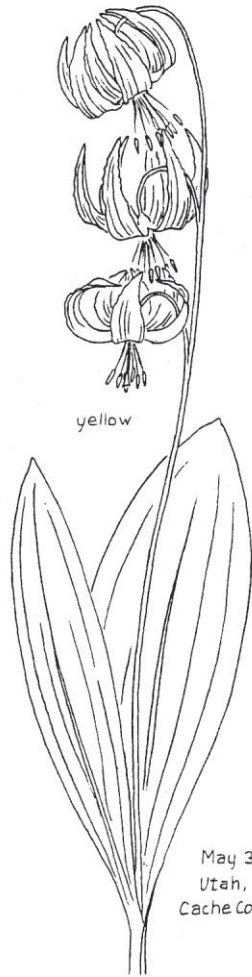
Streptopus amplexifolius (Linnaeus) A.P. de Candolle [with clasping leaves] [*Uvularia amplexifolia* Linnaeus, *Streptopus amplexifolius* (Linnaeus) A.P. de Candolle var. *americanus* J.A. Schultes]. Plants 30-80 cm tall, erect to ascending-spreading, from thick rhizomes, the stems freely branching; leaves ovate to lanceolate, 5-15 cm long, 3-6 cm wide, the bases cordate-clasping, the apices acuminate; peduncles + pedicels 2-5 cm long; flowers 1-2 per axil, white to greenish yellow; tepals recurved apically, 9-15 mm long; stamens short, unequal; berries orangish to reddish when mature, 10-12 mm diam.



●Moist sites in coniferous forests in the northern mountains. ♦Plants are vegetatively very similar to *Maianthemum racemosum* (Ruscaceae), which has often larger leaves and large showy terminal panicles of numerous white flowers. §



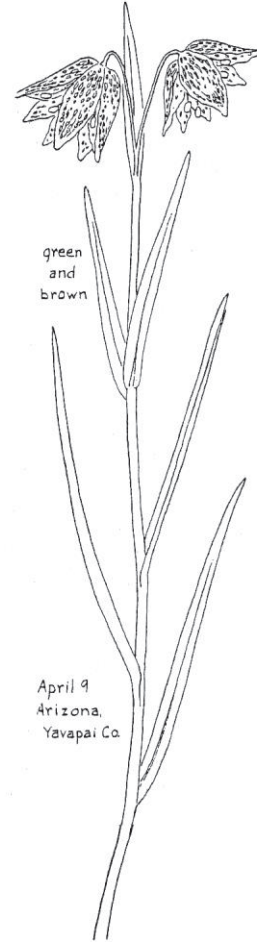
high parks and meadows



yellow

May 3
Utah,
Cache Co.

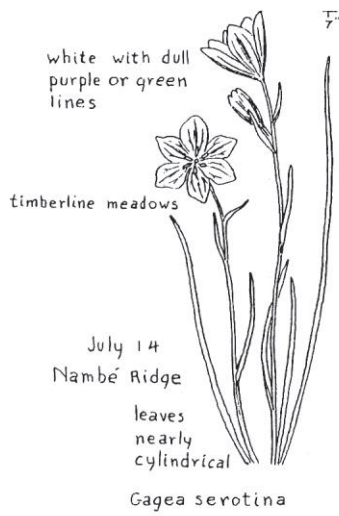
Erythronium grandiflorum



green
and
brown

April 9
Arizona,
Yavapai Co.

Fritillaria atropurpurea



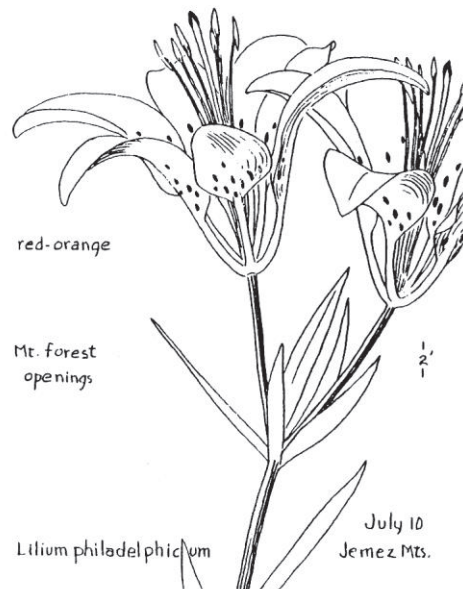
white with dull
purple or green
lines

timberline meadows

July 14
Nambé Ridge

leaves
nearly
cylindrical

Gagea serotina

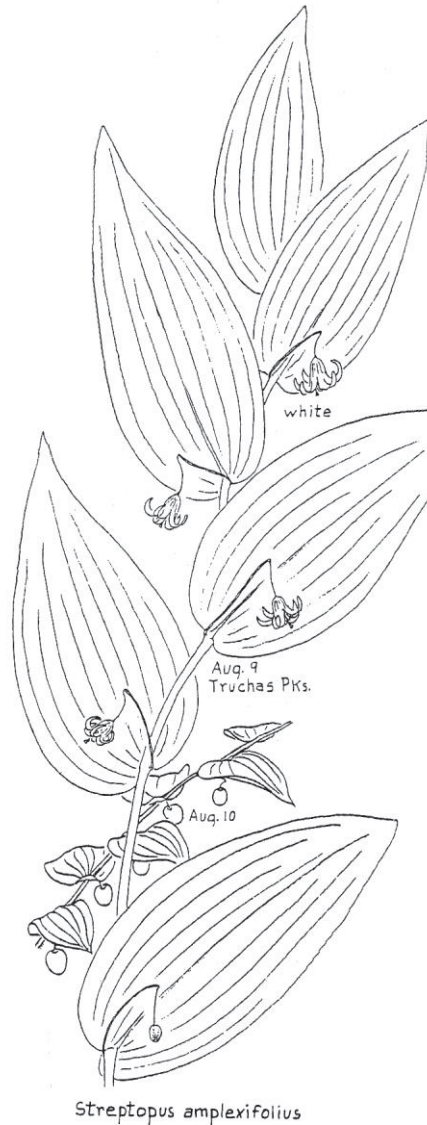
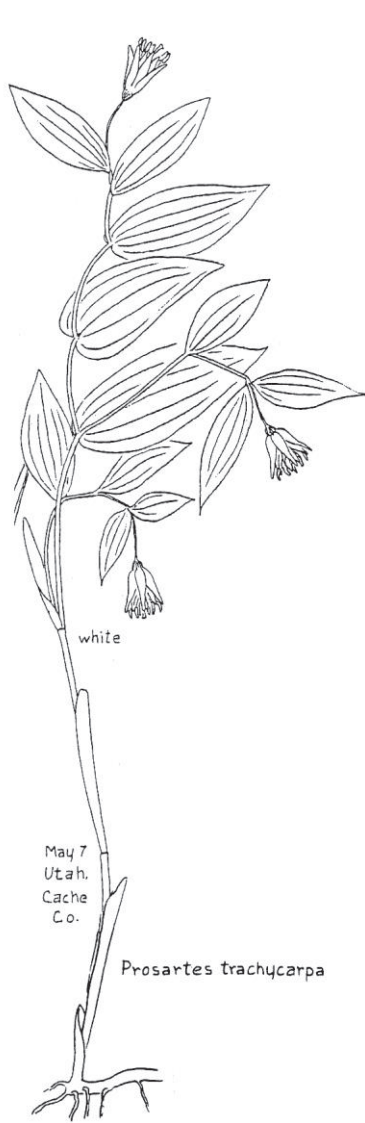


red-orange

Mt. forest
openings

Lilium philadelphicum

July 10
Jemez Mts.



MELANTHIACEAE DEATH-CAMAS FAMILY [4/7/7]

Plants mostly herbaceous perennials from rhizomes or bulbous tubers; leaves basal or sub-cauline, alternate (whorled), simple, sheathing, with parallel (palmate) veins; flowers bisexual, actinomorphic, borne in spikes, racemes, or panicles; perianth of 6 sepaloïd or petaloïd tepals; stamens 6; pistil single, superior or partly inferior; of 3 carpels, the style single; fruit a capsule with winged seeds. ♦*Veratrum* alkaloids are found in all three of our genera, rendering the plants highly toxic. The family members were traditionally placed in a large and polyphyletic Liliaceae.

- 1 Plants 1-2 m tall; leaves obviously disposed along the stem, the larger 10-20 cm wide..... *Veratrum*
- 1 Plants mostly much less than 1 m tall; leaves tending to be basal, never as much as 10 cm wide
 - 2 Flowers greenish to yellowish, sessile or nearly so and borne in rather dense clusters, pedicels and branches absent or scarcely evident *Schoenocaulon*
 - 2 Flowers whitish, cream-colored, to greenish, borne on well-developed and evident pedicels or branches
 - 3 Tepals large, 7-16 mm long *Anticlea*
 - 3 Tepals small, 3-6 mm long
 - 4 Ovary partly inferior; tepal gland bilobed apically (*A. virescens*)..... *Anticlea*
 - 4 Ovary fully superior; tepal gland rounded apically *Toxicoscordion*

Anticlea [the mother of Odysseus] DEATHCAMAS [3].

Perennial, subscapose herbs, with bulbs or rhizomes; leaves mostly basal, alternate, simple, linear, entire, glabrous, the distal ones reduced and grading into floral bracts, the basal ones sheathing, with parallel venation; inflorescences racemose to paniculate; flowers bisexual, sometimes staminate on the panicle branches, actinomorphic; tepals 6, petaloïd, often connate basally, with 1 basal nectary bilobed gland adaxially; stamens 6; ovary partly inferior, the pistil 1 with 3 styles and stigmas; fruit a capsule. ♦Our species were formerly classed in the traditional genus *Zigadenus* (each tepal with 2 glands), which was long known to be polyphyletic. All our species contain one to numerous alkaloids of the *Veratrum*-type and are potentially lethal to humans and livestock; the bulbs particularly are to be avoided.

■Hess, W.J. & R.C. Sivinski. 1995. A new species of *Zigadenus* (Liliaceae) from New Mexico, with additional comments on the section *Anticlea* [*Anticlea mogollonensis*]. Sida

16(3):389-400. ■Schwartz, F.C. 2002. *Zigadenus*, pp. 81-88. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Zomlefer, W.B. 2003. Documented chromosome numbers 2003: 1. Chromosome number of *Toxicoscordion nuttallii* (Liliaceae: Melanthiaceae) and clarification of the genus. *Sida* 20(3):1085-1092. ■Zomlefer, W.B. and W.S. Judd. 2002. Resurrection of segregates of the polyphyletic genus *Zigadenus* s.l. (Liliales: Melanthiaceae) and resulting new combinations. *Novon* 12:299-308.

- 1 Tepals small, 3-6 mm long (rarely longer).....*A. virescens*
- 1 Tepals large, 7-16 mm long (rarely shorter)
 - 2 Tepals 7-11 mm long; flowers whitish to yellowish green, but not purplish along the margins, ascending..... *A. elegans*
 - 2 Tepals 12-16 mm long; flowers reddish purple along the margins and blending to yellowish-green at the middle, nodding

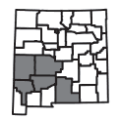
.....*A. mogollonensis*
Anticlea elegans (Pursh) Rydberg [elegant] [*Zigadenus coloradoensis* Rydberg, *Zigadenus dilatatus* Greene, *Zigadenus elegans* Pursh]. Plants 20-80 cm tall, the bulbs 1.5-3 cm long; proximal blades 10-30 cm long, 3-15 mm wide; inflorescences racemose to paniculate, with 1-4 branches at the lower nodes; flowers ascending, 15-20 mm diam; tepals cream-colored to greenish, 7-12 mm long; stamens shorter than the tepals; capsules 1-2 cm long. ●Widespread in the mountains, in clearings, meadows, edges of woods. §



+***Anticlea mogollonensis*** (Hess & Sivinski) Zomlefer & Judd [from the Mogollon Mountains] MOGOLLON DEATH CAMAS [*Zigadenus mogollonensis* Hess & Sivinski]. Plants 45-85 cm tall, the bulbs 2-3 cm long; proximal blades 25-45 cm long, 10-20 mm wide; inflorescences mostly racemose, sometimes with 1-3 branches at the lower nodes; flowers nodding, 8-20 mm diam; tepals greenish, reddish purple on the margins, blending to yellowish-green in the middle, 12-16 mm long; stamens shorter than the tepals; capsules 1-1.5 cm long. ●Endemic to upper elevations in the Mogollon Mountains of western New Mexico.



Anticlea virescens (Kunth) Rydberg [nearly green] [*Anticlea porrifolia* (Greene) Rydberg, *Helonias virescens* Kunth, *Zigadenus porrifolius* Greene *Zigadenus virescens* (Kunth) Macbride]. Plants 35-80 cm tall, the bulbs 3-5 cm long; proximal blades 25-45 cm long, 3-20 mm wide; inflorescences racemose to paniculate, with 1-4 branches at the lower nodes; flowers 4-8 mm diam, nodding; tepals greenish, 4-6 mm long; stamens shorter than the tepals; capsules 1-2 cm long. ●Widespread on mountain slopes in the coniferous forests at mid- to high elevations.

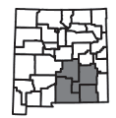


Schoenocaulon [with rush-like stems] SCHOENOCAULON [1].

Perennial, scapose herbs, with bulb-like rhizomes; leaves mostly basal, alternate, simple, grass-like, emerging folded, reduced upwards; inflorescences spike-like to racemose, occasionally with short branches, dense and spike-like; flowers bisexual proximally, staminate distally; tepals 6, leathery to petaloid, distinct, not clawed, the margins entire to faintly toothed; stamens longer than the tepals; fruit a capsule. ♦About 24 species, North America, mostly in Mexico.

■Frame, D. 2002. *Schoenocaulon*, pp. 79-81. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Schoenocaulon texanum Scheele [from Texas]. Plants 40-100 cm or more tall, the bulbs 2-4.5 cm long and nearly as wide; leaves 15-60 cm long, 2-6 mm wide, shorter than or just surpassing the raceme; racemes condensed, spike-like, 5-30 cm long; flowers greenish-yellowish-whitish, loosely spaced proximally in age; tepals leathery, greenish-yellowish, 2.3-4 mm long; stamens about twice the length of the tepals; capsules 1-2 cm long. ●Dry, rocky calcareous sites in the southeastern mountains and foothills. §



Toxicoscordion [poisonous garlic] DEATH CAMAS [2].

Perennial, subscapose herbs, with bulbs or rhizomes; leaves mostly basal, alternate, simple, linear, entire, glabrous, the distal ones reduced and grading into floral bracts, the basal sheathing, with parallel venation; inflorescences racemose to paniculate; flowers bisexual, sometimes staminate on the panicle branches, actinomorphic; tepals 6, petaloid, often connate basally, with 1 basal rounded nectary gland adaxially; stamens 6; ovary fully superior, the pistil 1 with 3 styles and stigmas; fruit a capsule. ♦Our species were formerly classed in the traditional genus *Zigadenus* (each tepal with 2 glands), which was long known to be polyphyletic. All our species contain one to numerous alkaloids of the *Veratrum*-type and are potentially lethal to humans and livestock; the bulbs particularly are to be avoided.

■Schwartz, F.C. 2002. *Zigadenus*, pp. 81-88. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Zomlefer, W.B. 2003. Documented chromosome numbers 2003: 1. Chromosome number of *Toxicoscordion nuttallii* (Liliaceae: Melanthiaceae) and clarification of the genus. *Sida* 20(3):1085-1092. ■Zomlefer, W.B. and W.S. Judd. 2002. Resurrection of segregates of the polyphyletic genus *Zigadenus* s.l. (Liliales: Melanthiaceae) and resulting new combinations. *Novon* 12:299-308.

- 1 Inflorescences paniculate below, the proximal 3-4 nodes with branches, racemose above and lacking branches; upper stem leaves lacking a sheath, the free blade attached to the stem..... *T. paniculatum*
- 1 Inflorescences all racemose, or only the proximal 1-2 nodes bearing branches; upper stem leaves sheathing, the free blade portion diverging from a sheath portion.....*T. venenosum*

Toxicoscordion paniculatum (Nuttall) Rydberg [panicked] [*Helonias paniculata* Nuttall, *Zigadenus paniculatus* (Nuttall) S. Watson]. Plants 20-70 cm tall, the bulbs 2-4 cm long; proximal blades 15-35 cm long, 3-15 mm wide; distal leaves lacking a basal sheathing portion; inflorescences paniculate; flowers 5-10 mm diam; tepals cream-colored, 2-4 mm long, the outer shortly clawed, the inner clawed; gland 1, rounded; stamens 1-2 mm longer than the tepals; capsules 1-2 cm long. ●Open rocky hills and grassy slopes at low to mid-elevations in the northwest region.



Toxicoscordion venosum (S. Watson) Rydberg [very poisonous]. Plants 20-70 cm tall, the bulbs 1-3 cm long; proximal blades 12-50 cm long, 2-10 mm wide; distal leaves with a sheathing basal portion and a free blade portion; inflorescences racemose to paniculate with 1-2 basal branches; flowers 5-10 mm diam; tepals cream-colored, 2-5 mm long, the outer mostly not clawed, the inner clawed; gland 1, rounded; stamens equal to slightly longer than tepals; capsules 1-2 cm long. ●Wooded slopes and open ground in the northwest region. ♦Our plants belong to var. ***gramineum*** (Rydberg)

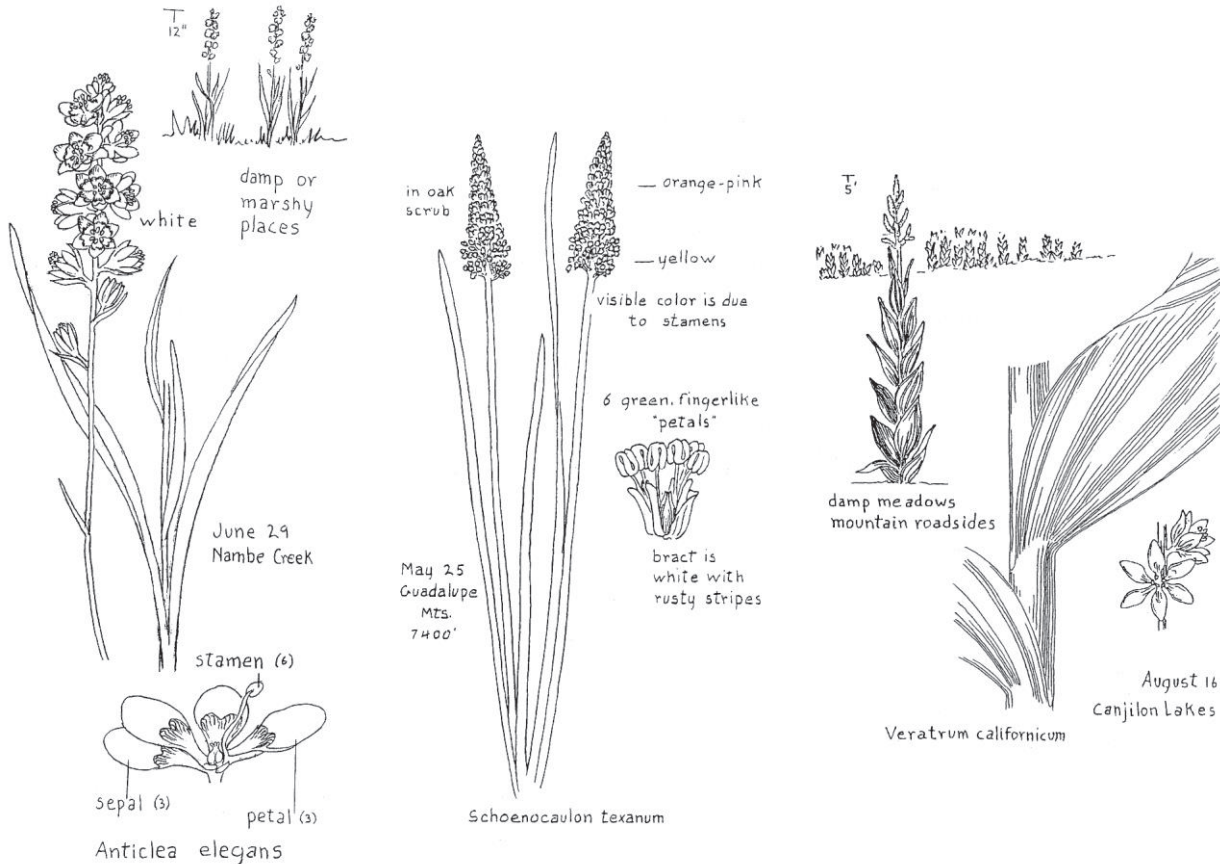
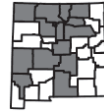


Brasher [grass-like] [*Toxicoscordion gramineum* Rydberg, *Toxicoscordion falcatum* Rydberg, *Zigadenus falcatus* Rydberg, *Zigadenus gramineus* Rydberg, *Zigadenus intermedius* Rydberg, *Zigadenus venenosus* S. Watson var. *gramineus* (Rydberg) Walsh ex M.E. Peck, *Zigadenus venenosus* S. Watson var. *gramineus* (Rydberg) Walsh ex C.L. Hitchcock]; var. *venosum*, not known in New Mexico, has non-sheathing distal leaves, entirely racemose inflorescences, and clawed outer tepals. The specific epithet, *venosum*, means “very poisonous,” and does not refer to venation (which would be *venosus*).

Veratrum [truly black] WESTERN SKUNK-CABBAGE [1].

Perennial herbs from thick vertical rhizomes and swollen bulbs, the stems erect, simple, hollow; leaves alternate, simple, strongly parallel veined, often plicate, reduced distally to sheaths; inflorescences paniculate; flowers mostly bisexual, rotate to campanulate; tepals distinct to weakly connate basally, petaloid, not clawed, with 1-2 glands at the base adaxially; ovary superior to partly inferior, with 3 styles; fruit a capsule. ♦About 30 species of the Northern Hemisphere. Most species have a varied concoction of toxic alkaloids, concentrated in the rhizomes (but all parts poisonous).

Veratrum californicum Durand [from California] [*Veratrum speciosum* Rydberg, *Veratrum tenuipetalum* A. Heller]. Plants 1-2.5 m tall, the stems glabrous proximally, tomentose distally; leaves ovate, to lance-linear distally, 20-40 cm long, 15-25 cm wide, hairy; panicles 30-70 cm long, with stiffly spreading branches; tepals creamy-white, 8-17 mm long, the basal gland V-shaped; capsules 2-3 cm long. ♦Moist to wet marshy or seepy ground in the mountains, generally at higher elevations. ♦Our plants belong to the typical variety, with the panicle bracts seldom exceeding the flowers. New Mexico plants with small flowers have been referred to *V. tenuipetalum* A. Heller. §



ORCHIDACEAE ORCHID FAMILY [14/32/35]

Perennial, terrestrial or epiphytic herbs, sometimes lacking chlorophyll and mycoheterotrophic, the stems often basally thickened to form pseudobulbs, the roots strongly mycorrhizal; leaves alternate or basal, rarely opposite or whorled, simple, entire, frequently somewhat fleshy, sheathing at the base, usually parallel-veined; stipules lacking; flowers strongly zygomorphic, often showy, perfect; sepals 3, green or petal-like; petals 3, the lateral two similar to each other but dissimilar to the central one (labellum or lip); stamens usually 1-2, the pollen sticking together in waxy masses (pollinia); pistil single, inferior, of 3 united carpels, half-twisted; fruit a capsule. ♦With estimates of about 22,000-28,00 species, this is the largest or second largest plant family in the world, but the 25th largest in New Mexico. Flowers are structurally complex and highly modified for pollination. Important economic plants include *Vanilla planifolia* Andrews, the source of vanilla, and numerous ornamental plants of the nursery trade comprising over 100,000 cultivars and hybrids. The family includes the beginning-of-the-line genus, *Aa*. Orchids can be fully mycotrophic, completely dependent upon host fungi for its food and carbon compounds throughout its life cycle (and lacking photosynthesis), or partially mycotrophic, being primarily photosynthetic, but parasitic only during seed germination and development.

■Coleman, R.A. 2002. The Wild Orchids of Arizona and New Mexico. Cornell University Press, Ithaca, NY. 248 p. ■Luer, C.A. 1975. The native orchids of the United States and Canada, excluding Florida. New York Botanical Garden.

[Key adapted from Coleman 2002]

- 1 Plants without chlorophyll; leaves reduced to brownish sheaths, green leaves absent
- 2 Lip without any longitudinal ridges; flowers white (soon discoloring), in dense spicate clusters..... go to lead 13, below
- 2 Lip with 1-several longitudinal ridges; flowers not white, or only partly whitish, rather loosely arranged
- 3 Lip with 5-7 conspicuous longitudinal ridges or crests extending from the base nearly to the tip..... **Hexalectris**

- 3 Lip with 1-2 short longitudinal ridges at the base, not extending even to mid-length of the lip *Corallorhiza*
- 1 Plants with chlorophyll; normal leaves produced (sometimes withering at flowering time)
 - 4 Inflorescence of 1-2 flowers terminating the stem
 - 5 Leaf single per flowering stem, 1-5 cm wide; lip bearded, 1.5-3 cm long *Calypso*
 - 5 Leaves 2-5 per flowering stem, 4-10 cm wide; lip glabrous, 2-6 cm long *Cypripedium*
 - 4 Inflorescence of several flowers arranged in a spike or raceme
 - 6 Lip prolonged backward and downward at base into an evident spur or sac (*Habenaria* s.l.)
 - 7 Leaves mostly basal or on the lower ¼ of the stem, withering by anthesis; flowers subsessile *Piperia*
 - 7 Leaves distinctly cauline on at least the lower ½ of the stem; flowers pedicelled
 - 8 Lip with 3 unequal teeth at the tip; spur saccate, about half the length of the lip *Dactylorhiza*
 - 8 Lip entire at the tip (may be toothed on the margins); spur slender, as long as or longer than the lip *Platanthera*
 - 6 Lip not prolonged backward, spur or sac absent
 - 9 Leaf blades 1-2 per flowering stem
 - 10 Leaves 2, opposite, borne near the middle of the stem *Neottia*
 - 10 Leaves mostly 1, if 2 then alternate (though the sheaths overlapping) and at the base of the stem *Malaxis*
 - 9 Leaf blades 3-several per flowering stem, may be basal only, or withered and nearly gone
 - 11 Leaves mottled, evergreen, mostly in a basal rosette *Goodyera*
 - 11 Leaves not mottled nor evergreen, mostly cauline
 - 12 Flowers pedicelled, brownish purple, the raceme not twisted; leaves lanceolate to ovate *Epipactis*
 - 12 Flowers white or whitish, the spike spirally twisted; leaves linear to linear-lanceolate (*Spiranthes* s.l.)
 - 13 Spike densely flowered with many more than 10 flowers; lip lacking a reddish blotch at the back, but yellowish or whitish *Spiranthes*
 - 13 Spike sparsely flowered with 10 flowers or less; lip with a reddish blotch on the upper surface at the back
 - 14 Leaves present during anthesis; blooming late summer..... *Microthelys*
 - 14 Leaves absent at anthesis; blooming in May *Schiedeella*

Calypso [the sea-nymph in Homer's *Odyssey*] FAIRY-SLIPPER [1].

Perennial, somewhat succulent herbs, with fleshy roots; stems scapose, from a basal bulb-like corm, with 2 sheathing bracts; leaves basal, solitary, produced in the autumn and withering in the spring, plicate, leathery; flowers solitary on the scape, horizontal to slightly nodding, large and showy; sepals and petals ascending to erect; lip slipper-shaped, with a basal opening and 2 apical horns or projections, the margin dilated and bearded; fruit a capsule. ♦A monotypic, circumboreal genus, with a single species and 3-5 varieties.

■Sheviak, C.J. & P.M. Catling. 2002. *Calypso*, pp. 622-623. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Calypso bulbosa (Linnaeus) Oakes [bulb-like]. Plants 10-20 cm tall; blades elliptic to orbicular, 10-60 cm long, nearly as wide, with 3-7 broadly curving veins; floral bracts 5-25 mm long; flowers pink to purplish red, rarely white; sepals and petals narrowly lanceolate to narrowly oblong, 10-24 mm long; lip 13-23 mm long, with sparse to extensive basal bristles; capsules erect, 2-3 cm long. ●Rather common in the northern to central mountains above 8,000 ft. ♦Our plants belong to var. ***americana*** (R. Brown) Luer [of America] [*Calypso americana* R. Brown ex Aiton f., *Cytherea bulbosa* House]. §



Corallorhiza [coral-root] CORAL-ROOT [5].

Perennial herbs, fully or mostly mycotrophic, rootless, leafless, with branching, coral-like rhizomes; stems erect, yellowish, brownish, to purplish, glabrous, with few sheathing bracts; inflorescence a raceme, subtended by closed sheathing bracts; flowers inconspicuous to showy; lip with 2 basal lamellae of the same color as the lip; fruit a capsule. ♦About 11 species, all but 1 in North and Central America.

■Freudenstein, J. 1997. A monograph of *Corallorhiza*, Orchidaceae. Harvard Papers in Botany 10:5-51. ■Magrath, L.K. & J.V. Freudenstein. 2002. *Corallorhiza*, pp. 633-638. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Todsén, T.K. 1970. *Spiranthes parasitica* and *Corallorhiza wisteriana* (Orchidaceae) new to New Mexico. Southw. Natural. 14(4):447-452. ■Todsén, T.K. 1971. Color variation of *Corallorhiza* in New Mexico. Southw. Naturalist 16(1):121-122.

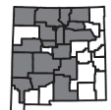
1 Lip 3-lobed or at least with small lateral lobes or teeth

- 2 Sepals 1-veined; lip 3-4 mm long *C. trifida*
- 2 Sepals 3-veined; lip 5-9 mm long *C. maculata*

1 Lip entire, without lateral lobes or teeth

- 3 Lip with involute margin giving a boat-shaped appearance; tepals striped..... *C. striata*
- 3 Lip not involute; tepals not striped
 - 4 Dorsal sepal less than 4.5 mm long, 1-veined; flowering late summer and fall *C. odontorhiza*
 - 4 Dorsal sepal more than 4.5 mm long, 3-veined; flowering spring *C. wisteriana*

Corallorhiza maculata (Rafinesque) Rafinesque [spotted] [*Cladorhiza maculata* Rafinesque]. Plants 10-50 cm tall, the stems brownish, yellowish, pinkish, to purplish; racemes 5-40 cm long, with 6-45 flowers; flowers conspicuous, tan, yellowish, reddish, purplish, chasmogamous, the perianth open; tepals 5-15 mm long, 3-veined; lip whitish, usually purple-spotted, 4-9 mm long, with 2 lateral lobes or teeth; lamellae 2, basal; column whitish yellow, spotted; capsules 10-24 mm long. ●Dry, open forests at mid- to high-elevations, commonly in the leaf litter of conifers, aspens, and oaks; widespread throughout the state, probably the most common orchid in New Mexico. ♦We have three rather weak varieties. §



a Lip little expanded; bracts less than 1 mm long...var. ***maculata***

a Lip distinctly expanded; bracts more than 1 mm long

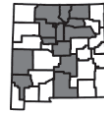
b Lip with spots throughout, covering all portions of the lip...var. ***occidentalis*** (Lindley) Ames [western] [*Corallorhiza multiflora* Nuttall var. *occidentalis* Lindley].

b Lip with spots only near the lamellae and at the edges of the central and lateral lobes...var. ***mexicana*** (Lindley) Freudenstein [of Mexico] [*Corallorhiza mexicana* Lindley].

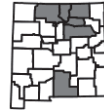
Corallorhiza odontorhiza (Willdenow) Poirlet [with tooth-like rhizomes] [*Cymbidium odontorhizon* Willdenow]. Plants 10-25 cm tall, the stems brownish or purplish; racemes lax, 11-46 cm long; flowers inconspicuous, reddish purple to brownish, the perianth tending to be closed; tepals 3-5 mm long, the dorsal sepal 1-veined; lip whitish, spotted, 3-5 mm long, unlobed; lamellae 2, basal, free; column white proximally, purple distally; capsules 6-8 mm long; flowering late summer. ●Deciduous and conifer woodlands. ♦Included herein based on a report in Magrath & Freudenstein (2002), but specimens are unknown to us; perhaps to be found in the southeastern mountains of Eddy County.

Corallorhiza striata Lindley [striped]. Plants 10-40 cm tall; racemes 10-65 cm long, with 10-30 flowers; flowers chasmogamous, the perianth connivent to spreading; tepals salmon reddish purple with darker veins (striate), sometimes more yellowish; lip unlobed, 2-16 mm long, the margins upturned giving a boat-shaped appearance; lamellae less than 1/2 the lip length, partially connate; column yellowish; capsules 10-30 mm long. •Rather dry, open forests throughout the state, in dry decaying plant matter, also along streams; flowering spring – early summer. ♦The dark veins of the tepals are immediately conspicuous. We have two varieties:

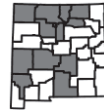
- a Lip 7-16 mm long; sepals and petals open, spreading... var. *striata*. •Known from just a few collections.
- a Lip 2-7 mm long; sepals and petals connivent around the column... var. *vreelandii* (Rydberg) L.O. Williams [for Frederick King Vreeland (1874-1964), wireless radio inventor] [*Corallorhiza striata* Lindley var. *flavida* Todsén, *Corallorhiza vreelandii* Rydberg]. •Known from numerous collections, widespread. §



Corallorhiza trifida Chatelain [3-cleft]. Plants 10-40 cm tall, the stems reddish purple, yellowish brown, to yellow; racemes 8-35 cm long, with 3-18 flowers; flowers inconspicuous, chasmogamous, yellow-green, the perianth open; sepals and petals 1-veined, 3-8 mm long; lip whitish, often purple-spotted, 3-4 mm long, with 2 small lateral lobes or teeth; lamellae 2, basal, free; column yellowish green, 2-3 mm long; capsules 5-15 mm long. •Dry to wet sites in the central cordillera, generally at 9,000-10,500 ft.; few collections. §



Corallorhiza wisteriana Conrad [for Charles Jones Wister (1781-1865), amateur Pennsylvania botanist]. Plants 8-60 cm tall, the stems purplish, light brownish, to yellowish; racemes 10-55 cm long, with 2-32 flowers; flowers chasmogamous, the perianth open, purplish brown or yellowish, with greenish hues; tepals 4-10 mm long; sepals and lateral petals upswept, forming a hood over the column; lip whitish, often spotted, unlobed, 4-7 mm long; lamellae 2, basal, free; column yellow to white, often purplish apically; capsules 7-14 mm long. •Wide-ranging in the mountains of the state in a variety of habitats, from juniper and oak woodlands at low elevations to pine and fir forests at higher elevations; often in deep forest duff or among rocks.

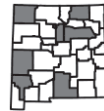


Cypripedium [Venus's slipper] LADY'S SLIPPER [1].

Perennial rhizomatous herbs, the stems leafy or scapose; leaves alternate to subopposite, plicate, the bases sheathing; inflorescences racemose; flowers solitary to 2-3 together, bracteate, resupinate (twisted upside-down), showy; sepals distinct or the 2 lateral ones connate to form the synsepal behind the pouch, the dorsal sepal larger and erect; petals entire, the lateral ones narrower, the lip inflated or sac-shaped; fruit a capsule, elliptical. ♦About 50 species, primarily temperate North America and Eurasia.

- Sheviak, C.J. 1995. *Cypripedium parviflorum* Salisbury, Part 2: The large-flowered plants and patterns of variation. Amer. Orchid Soc. Bull. 64(June): 606-612. ■Sheviak, D.J. 2002. *Cypripedium*, pp. 499-507. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Cypripedium parviflorum Salisbury [small-flowered]. Plants erect, 30-70 cm tall; leaves 3-5 on stem, the blades broadly elliptic to oblanceolate, 8-21 cm long; distal-most bract densely silvery-hairy at least when young; flowers mostly solitary; sepals greenish to yellowish, with dark markings and lines, ovate to lanceolate, the dorsal sepal erect, ovate to lanceolate, 2-8 cm long, the synsepal 1-8 cm long; lateral petals often twisted, linear to narrowly oblong, 2-10 cm long; lip (pouch) pale to deep yellow, 2-5 cm long, with interior reddish markings, the orifice 1-3 cm. •Mesic openings in the forests, moderate to full shade, fairly widespread but not common. ♦Our plants belong to var. *pubescens* (Willdenow) Knight [hairy] [*Cypripedium calceolus* Linnaeus var. *pubescens* (Willdenow) Correll, *Cypripedium pubescens* Willdenow, *Cypripedium veganum* Cockerell], sometimes treated as a separate species. Populations can be exceedingly variable. §

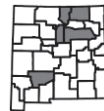


Dactylorhiza [with finger-like roots] FROG ORCHID, ORCHIS [1].

Perennial glabrous herbs, the roots fascicled and tuber-like, palmately divided into 2-5 fleshy lobes; leaves cauline, alternate, the bases sheathing, the distal leaves becoming bract-like; inflorescence spicate or racemose, the floral bracts foliaceous; flowers resupinate; lip 3-notched to 3-lobed, the base elongated into a short spur or sac; fruit a capsule. ♦About 75 or so species, circumpolar, Eurasian. Our single species was formerly placed in the monotypic genus, *Coeloglossum*; recent phylogenetic studies place it squarely within *Dactylorhiza*.

- Bateman, R.M., A.M. Pridgeon, & M.W. Chase. 1997. Phylogenetics of subtribe Orchidinae based on nuclear ITS sequences. 2. Infrageneric relationships and reclassification to achieve monophyly of *Orchis* sensu stricto. Lindleyana 12(3):113-141. ■Bateman, R.M., P.M. Hollingsworth, J. Preston, L. Yi-Bo, A.M. Pridgeon, & M.W. Chase. 2003. Molecular phylogenetics and evolution of Orchidinae and selected Habenariinae (Orchidaceae). Bot. J. Linnean Soc. 142: 1-40. ■Cribb, P.J., M.W. Chase. 2001. Conservation of *Dactylorhiza* (1481). Proposal to conserve the name *Dactylorhiza* Necker ex Nevski over *Coeloglossum* Hartm. (Orchidaceae). Taxon 50: 581-582. ■Pridgeon, A.M., R.M. Bateman, A.V. Cox, J.R. Hapeman, & M.W. Chase. 1997. Phylogenetics of subtribe Orchidinae (Orchidoideae, Orchidaceae) based on nuclear ITS sequences: 1. Intergeneric relationships and polyphyly of *Orchis* sensu lato. Lindleyana 12(2):89-109. ■Sheviak, C.J. & P.M. Catling. 2002. *Coeloglossum*, pp. 580. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Dactylorhiza viride (Linnaeus) Bateman, Pridgeon, & Chase [green] [*Coeloglossum bracteatum* (Muhlenberg) Parlatore, *Coeloglossum viride* (Linnaeus) Hartman, *Coeloglossum viride* (Linnaeus) Hartman var. *virescens* (Muhlenberg ex Willdenow) Luer, *Habenaria bracteata* (Muhlenberg) R. Brown, *Habenaria viridis* (Linnaeus) R. Brown var. *bracteata* (Muhlenberg ex Willdenow) Gray, *Orchis virescens* Muhlenberg ex Willdenow, *Satyrium viride* Linnaeus]. Plants 10-50 cm tall (ours, taller elsewhere), the roots usually 2, tuber-like, with smaller roots at the extremities; leaves 3-6 in number along the stem; leaves elliptic proximally, 3-12 cm long, narrowing upwards to bracts; floral bracts to 6 cm long, much exceeding the flowers; flowers greenish with yellow tinges; sepals dark green, 3-8 mm long, forming a hood; petals pale to light green, 3-5 mm long; lip pale green to yellowish, 3-10 mm long, with 2 longer lateral lobes and a shorter central cusp, the spur about 2 mm long. •Aspen and fir forests at 9,000-10,000 ft. elevations in the northern and western mountains. §

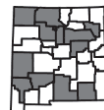


Epipactis [ancient Greek name] HELLEBORINE [2].

Perennial herbs, glabrous to puberulent, the roots fibrous from a short rhizome, the stems leafy; leaves cauline, alternate, plicate, sheathing at the base, gradually reduced upwards into floral bracts; inflorescences racemose, the floral bracts foliaceous and often exceeding the flowers; flowers resupinate; tepals distinct; sepals concave; petals often shorter than the sepals; lip divided into 2 parts by a medial constriction, the proximal part concave to saccate, the distal part flattish to grooved and often dilated; fruit a capsule. ♦About 70 species in the Americas, Asia, and Europe.

- 1 Lip deeply 3-lobed; lateral sepals 16-24 mm long..... *E. gigantea*
- 1 Lip not 3-lobed; lateral sepals 10-13 mm long *E. helleborine*

Epipactis gigantea Douglas ex Hooker [giant]. Plants 30-90 cm or more tall, glabrous or nearly so; leaves 4-14 along the stem, lanceolate, elliptic, to ovate, 5-20 cm long; racemes lax, the floral bracts 1-12 cm long; flowers showy; sepals greenish to rose-colored, with dark veins, the lateral 16-24 mm long; petals pinkish to orangish, with dark veins, 13-17 mm long; lip constricted in the middle, 14-20 mm long. •Wet sites along streams or rocky ground at streamside, at low elevations generally below 7,500 ft. Widespread in scattered locales in the mountains and foothills. §



**Epipactis helleborine* (Linnaeus) Crantz [resembling the genus *Helleborus*] [*Serapias helleborine* Linnaeus]. Plants 30-80 cm or more tall, sparsely to densely pubescent; leaves 3-10 along the stem, lanceolate, elliptic, to orbiculate, 4-18 cm long; racemes commonly 1-sided, the floral bracts 1-5 cm long, reduced distally; sepals greenish, with purplish tinges, the lateral 10-13 mm long; petals pink, purple, or yellowish, 9-11 mm long; lip constricted in the middle, 10-15 mm long, purplish to brownish proximally, pinkish distally. ●River and stream banks, cottonwood bosques, along the Rio Grande, Rio Embudo, Rio en Medio, and Pecos River; native to Eurasia and north Africa. ◆This species is considered invasive in many regions, and should be watched along the northern water courses.



Goodyera [for John Goodyer (1592-1664), English botanist] RATTLESNAKE-PLANTAIN [2].

Perennial rhizomatous herbs; stems erect, scapose; leaves evergreen, in basal rosette, petiolate, the blades commonly marked with white or green reticulate splotches; inflorescence an erect spike, the peduncles viscid-hairy, bracteate; flowers resupinate (twisted upside-down), whitish, sessile, viscid-hairy; sepals distinct, subequal; hood formed by dorsal sepal and petals; lip free from the staminal column, the base concave to sac-like; fruit a capsule. ◆About 40-100 species nearly worldwide.

■Kallunki, J.A. 2002. *Goodyera*, pp. 514-517. IN: Flora of North America, vol. 26. Oxford University Press, New York.

- 1 Whitish reticulations of the leaves mostly extending from the white midribs outward, the marginal regions usually greenish; leaf blades 2.5-10 cm long; lateral sepals 5-8 mm long *G. oblongifolia*
- 1 Whitish reticulations of the leaves mostly extending from the margins inward, the midribs usually not whitish; leaf blades 1-3 cm long; lateral sepals 3-5 mm long..... *G. repens*

Goodyera oblongifolia Rafinesque [with oblong leaves] [*Goodyera decipiens* (Hooker) F. T. Hubbard, *Peramium decipiens* (Hooker) Piper, *Peramium menziesii* (Lindley) Morong]. Plants 20-50 cm tall (in flower); leaves all basal, none borne on the scape above the rosette; blades with white splotches only along the midrib, sometimes with fine white lateral veins, narrowly elliptic to ovate, 2.5-10 cm long, the apices acute; spikes 10-48-flowered, the peduncles 1-4 cm long; flowers greenish to white; lateral sepals 5-8 mm long; petals connivent, the hoods 5-10 mm long, the lips deeply concave, 5-8 mm long, the interior surfaces with 4 rows of glandular papillae. ●Mixed coniferous and spruce-fir forests, generally 7600-10,000 ft. §



Goodyera repens (Linnaeus) R. Brown ex Aiton f. [creeping] [*Goodyera repens* (Linnaeus) R. Brown ex Aiton f. var. *ophioides* Fernald, *Peramium ophioides* (Fernald) Rydberg, *Satyrium repens* Linnaeus]. Plants 9-12 cm tall (in flower); 1-2 leaves borne on the scape above the basal rosette; blades green with white splotches and reticulations mostly extending from the margins inward, the midribs usually not whitish, narrowly to broadly ovate, 1-3 cm long, the apices acute to obtuse; spikes 7-36-flowered, the peduncles 3-18 cm long; flowers white; lateral sepals 3-5 mm long; petals distinct, the hoods 3-6 mm long, the lips narrowly sac-like, 2-5 mm long, the interior surfaces with 2 or 4 rows of glandular papillae. ●Shady and moist sites on the forest floor in the mountains, generally 8,000-10,000 ft. §



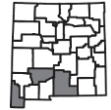
Hexalectris [6-crested] CRESTED-CORAL-ROOT [3].

Perennial herbs, lacking leaves and roots, achlorophyllous, with branching rhizomes; stems erect, brownish to reddish to purplish, with sheathing bracts; inflorescence a raceme, comprising the above-ground portion of the plant; flowers resupinate, brownish, reddish, purplish; sepals falcate to lanceolate, the lateral ones free; lip 3-lobed, with 3, 5, or 7 lamellae; fruit a capsule. ◆About 10 species of fully mycotrophic plants, photosynthesis entirely absent. Sometimes confused with *Corallorhiza*, but distinguished by the (near) absence of raised crests on the lip in the latter.

■Burgess, T.L. & D.K. Northington. 1981. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks [*Hexalectris nitida*]. Chihuahuan Desert Research Institute Contr. No. 107:1-174. ■Catling, P.M. & V.S. Engel. 1993. Systematics and distribution of *Hexalectris spicata* var. *arizonica* (Orchidaceae). Lindleyana 8(3):119-125. ■Goldman, D.H., R.A. Coleman, L.K. Magrath, & P.M. Catling. 2002. *Hexalectris*, pp. 603-607. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Howell, D.J. 1986. Status report: *Hexalectris nitida* L.O. Wms. in Johnston. Office of Endangered Species, Fish and Wildlife Service, Albuquerque, New Mexico. ■Kennedy, A.H. & L.E. Watson. 2010. Species delimitations and phylogenetic relationships within the fully myco-heterotrophic *Hexalectris* (Orchidaceae). Syst. Bot. 35(1):64-76. ■Lowrey, T. 2013. Plant distribution reports [*Hexalectris colemanii*]. The New Mexico Botanist 59:1. ■Todsén, T.K. 2000. New plant distribution records [*Hexalectris revoluta*]. The New Mexico Botanist 14:4.

- 1 Lip deeply 3-lobed, the sinus between the lobes 3 mm or more long
 - 2 Petals 15-17 mm long; column 9-13 mm long; central lobe of the lip nearly truncate apically *H. revoluta*
 - 2 Petals 19-22 mm long; column 14-15 mm long; central lobe of the lip acute apically..... *H. colemanii*
- 1 Lip 3-lobed, but not as deeply, the lobes 2 mm or less long
 - 3 Lip less than 10 mm long; column 6-8 mm long..... *H. nitida*
 - 3 Lip more than 12 mm long; column 11-18 mm long
 - 4 Flowers opening (chasmogamous), the petals and sepals apically revolute; petals 14-23 mm long, 5-9 mm wide *H. spicata*
 - 4 Flowers often remaining closed (cleistogamous), or when open, the petals and sepals not apically revolute; petals 14-16 mm long, 4-5 mm wide..... *H. arizonica*

Hexalectris arizonica (S. Watson) Kennedy & L. Watson [of Arizona] [*Corallorhiza arizonica* S. Watson, *Hexalectris spicata* (Walter) Barnhart var. *arizonica* (S. Watson) Catling & Engel]. Plants 15-70 cm tall, the stems with 3-5 sheathing bracts; flowers tan to dark brown, with purple ridges and stripes on the lip, cleistogamous to chasmogamous, the sepals and petals usually not apically revolute or recurved; sepals 13-18 mm long; petals 14-16 mm long, 4-5 mm wide; lip 12-15 mm long; column 11-14 mm long; anthers whitish. ●Pine-oak woodlands in the southern mountains and foothills, rare. ◆Previous reports of *Hexalectris spicata* belong here.



Hexalectris colemanii (Catling) Kennedy & Watson [for Ronald A. Coleman, contemporary student of Orchidaceae] [*Hexalectris revoluta* Correll var. *colemanii* Catling]. Plants 40-55 cm tall, the stems pinkish-cream, with 4-6 sheathing bracts; flowers whitish to creamy-pink, with brownish or purplish tinges and dark veins; sepals 17-21 mm long; petals 19-22 mm long, 4-5 mm wide, strongly apically revolute; lip 16-20 mm long, the lateral lobes much shorter than the acute central lobe; column 14-15 mm long. ●Juniper-oak woodlands in the bootheel; as yet known from a single recent collection.



Hexalectris nitida L.O. Williams [shiny]. Plants 10-30 cm long, with 3-5 sheathing bracts; flowers rose-brown to tan, with white and purplish tinges; sepals 7-13 mm long; petals 8-11 mm long, 2-4 mm wide; lip 7-11 mm long, shallowly 3-lobed, the lateral lobes 1/3 the length of the central; column 6-8 mm long. ●Shaded sites in rocky canyons of the Guadalupe Mountains, Eddy County.



Hexalectris revoluta Correll [revolute]. Plants 30-50 cm tall, the stems with 3-5 sheathing bracts; flowers tan to pinkish brown, the sepals and petals apically revolute; sepals 15-17 mm long; petals 15-17 mm long, 6-8 mm wide; lip 14-18 mm long,

deeply 3-lobed, the sinus between the lobes more than 3 mm; column 9-13 mm long. •Questionably reported for New Mexico, but definitely known in the adjacent Guadalupe Mountains National Park in Texas; to be looked for in pine-oak woodlands in Eddy County. ♦Previous reports of *Hexalectris revoluta* in the state are referred to *H. colemanii*.

Hexalectris spicata (Walter) Barnhart [spike-like] [*Arethusa spicata* Walter]. Plants 25-80 cm tall, with 3-5 sheathing bracts; flowers chasmogamous, yellow-tan to purple-brown, with dark veins, the petals weakly to strongly recurved apically; sepals 14-24 mm long; petals 14-23 mm long, 5-9 mm wide; lip 13-20 mm long, the sinus between the lobes less than 2 mm; column 13-18 mm long. •Not yet known definitely from the state; New Mexico reports of this belong to *Hexalectris arizonica*; to be looked for in oak woodlands and mixed conifer forests at low elevations in the dry southeastern mountains.

Malaxis [soft] ADDER'S-MOUTH [3].

Glabrous herbs, with fibrous roots and swollen bulb-like stem bases (pseudobulbs); leaves few, the bases sheathing, the blades lanceolate to ovate; inflorescence spicate to racemose, sometimes sub-umbellate; flowers resupinate or not, sessile to pedicellate; sepals free to basally connate; petals spreading to recurved, usually narrower than the sepals; lip not lobed to 3-lobed, concave to saccate; column free; fruit a capsule. ♦About 200 or more species worldwide.

■Catling, P.M. & L.K. Magrath. 2002. *Malaxis*, pp. 627-632. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Todsén, T.K. 1997. Naming a southwestern *Malaxis* (Orchidaceae). *Sida* 17(3):637-638.

1 Flowers red-purple.....*M. porphyrea*

1 Flowers greenish

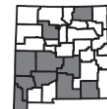
2 Flowers appressed to the rachis, sessile or nearly so; lip 3-lobed*M. soulei*

2 Flowers not appressed to the rachis, definitely pedicellate; lip unlobed.....*M. abieticola*

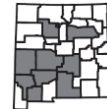
Malaxis abieticola Salazar & Arenas [*Abies*-dwelling] [*Malaxis tenuis* (S. Watson) Ames, not Reichenbach f.]. Plants 10-25 cm tall; leaves single, usually near the middle of the stem; blades bright green and glossy, elliptic to broadly ovate, 3-8 cm long, the bases cordate to truncate, the apices rounded to obtuse; racemes 3-8 cm long; pedicels 7-11 mm long; flowers green to greenish yellow; sepals 4-6 mm long; petals filiform to linear, falcate, 3-5 mm long; lip 3-4 mm long, the apex long-acuminate. •Damp mossy and grassy places under fir at about 8,000-9,500 ft. in the southern and southwestern mountains; rarely collected.



Malaxis porphyrea (Ridley) Kuntze [reddish] [*Achroanthes porphyrea* (Ridley) Wootton & Standley, *Malaxis ehrenbergii* auctores, misapplied, *Microstylis porphyrea* Ridley]. Plants 15-45 cm tall; leaves single, in the lower 1/3 of the stem; blades ovate-lanceolate to orbicular, 3-8 cm long, the apices obtuse to acute; racemes 6-25 cm long; pedicels 3-5 mm long; flowers reddish purple, sometimes with greenish hues; sepals 2-2.5 mm long; petals strongly recurved, linear, about 2 mm long; lip 1.8-2.3 mm long, the apex long-acuminate. •Mixed oak, fir, and pine forests in the mountains throughout the state, often in mossy or grassy wet spots. ♦Our plants have been called, incorrectly, *M. ehrenbergii* (Reichenbach f.) Kuntze, which is a valid species of central Mexico southward (Todsén 1997). §



Malaxis soulei L.O. Williams [for Justus Freeland Soule (1862-1939), professor and Vice President of the University of Wyoming] [*Achroanthes montana* (Rothrock) Greene]. Plants 10-60 cm tall; leaves single, at the middle or lower on the stem, the sheathing leaf bases persistent; blades oblanceolate to ovate-elliptic, 3-15 cm long, the apices acute; racemes spike-like, 6-22 cm long; pedicels 1-2 mm long; flowers green to yellowish green; sepals 1.5-3 mm long; petals strongly reflexed, filiform to linear, 1-3 mm long; lip 1.5-3 mm long, the apex apiculate to 3-lobed/toothed. •Dry to rather moist ground and from low to high elevations in the mountains throughout the state, often at meadow edges or on rocky slopes. ♦The names *Malaxis soulei* and *M. macrostachya* (La Llave & Lexarza) Kuntze have been intermingled, with no clear consensus as to their correct application; we maintain them as separate (Catling & Magrath 2002) pending further clarification. §

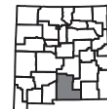


Microthelys [small female] LADIES-TRESSSES [1].

Perennial, acaulescent herbs, from few fleshy roots; leaves basal, 1-3 in number, sometimes present at anthesis, petiolate; blades lanceolate to ovate, the apices acute; inflorescence a spike, with tubular bracts; flowers tubular, curving outward to nodding or reflexed, whitish-greenish, sometimes with orange tinges, subtended by prominent floral bracts; petals erect, recurved near the apex; lip clawed, lobed or unlobed apically, with 2-4 raised calluses; column club-shaped; fruit an ellipsoid capsule. ♦About 10 species of southwestern United States, Mexico, Central America, and Ecuador.

■Coleman, R.A. & M. Baker. 2006. *Microthelys rubrocallosa*, a new addition to the orchid flora of the United States [*Microthelys rubrocallosa*]. *Orchids*, Jan 2006:56-57. ■Jenkins, P. 2005. Plant distribution reports [*Microthelys rubrocallosa*]. *The New Mexico Botanist* 34:7.

Microthelys rubrocallosa (B.L. Robinson & Greenman) Garay [with a red callus] [*Schiedeella rubrocallosa* (B.L. Robinson & Greenman) Balogh, *Spiranthes porphyricola* Schlechter, *Spiranthes rubrocallosa* B. L. Robinson & Greenman]. Perennial, from 1-5 tuberous roots, the scapes greenish; leaves emerging prior to or with the flowers and withering shortly after anthesis; blades narrowly lanceolate, 3-13 cm long, the apices acute; spike 5-16 cm long, 10-30-flowered; flowers whitish-greenish, about 5 mm long above the ovary, partially hidden within subtending floral bracts, curving away from the rachis; tepals subequal, 4-5 mm long; lip unlobed, hairy adaxially, the apex obtuse, the 2 calluses bright salmon-orange and about 2/3 the length of the lip. •Dry hillsides in the Sacramento Mountains, also Mexico; known from a single population; flowering July-Aug.



Neottia [a bird's nest] TWAYBLADE [2].

Perennial herbs, the roots slender and fibrous; leaves (in ours) green, mostly 2, paired at mid-stem, glabrous; or leaves (in *Neottia* s.s.) lacking chlorophyll (mycotrophic) and reduced to scales; inflorescences racemose, the peduncle and rachis glandular-hairy to glabrous, the floral bracts inconspicuous; flowers resupinate, various shades of green, yellow, brown, red, or purple; sepals and petals spreading to strongly reflexed; lip prominently 2-forked or lobed; fruit a capsule. ♦About 65 species, in temperate to arctic regions of the world. Our plants were formerly included in the genus *Listera*, which included the chlorophyll-containing species with two well-developed leaves on the stem, while *Neottia* s.s. comprised the achlorophyllous species. Maintaining this distinction is not without merit, but most recent treatments combine the two genera.

■Magrath, L.K. & R.A. Coleman. 2002. *Listera*, pp. 586-592. IN: Flora of North America, vol. 26. Oxford University Press, New York.

1 Lip cleft 1/2 to 2/3 its length into 2 narrow pointed diverging lobes; sepals and petals (other than the lip) spreading but not reflexed.....*L. cordata*

1 Lip cleft about 1/3 or less its length into broad rounded scarcely diverging lobes; sepals and petals (other than the lip) strongly reflexed*L. borealis*

Neottia borealis (Morong) Szlachetko [northern] [*Listera borealis* Morong]. Plants 5-25 cm tall; leaves broadly lanceolate, elliptic, to narrowly ovate, 2-6 cm long, the apices obtuse to rounded; floral bracts 1-3 cm long; peduncle and rachis glandular-hairy; flowers pale green, yellowish green, or bluish green, with darker veins; sepals and petals strongly reflexed away from the lip and column; dorsal sepal 4-6 mm long; petals about 5 mm long; lip 4-6 mm wide, cleft 1/3 or less its length into 2 rounded lobes. ●Damp ground in spruce-fir forests in the northern mountains; known from very few collections.



Neottia cordata (Linnaeus) Richard [heart-shaped] [*Listera cordata* (Linnaeus) R. Brown, *Listera cordata* (Linnaeus) R. Brown var. *nephrophylla* (Rydberg) Hultén, *Listera nephrophylla* Rydberg, *Neottia nephrophylla* (Rydberg) Szlachetko, *Ophrys cordata* Linnaeus, *Ophrys nephrophylla* (Rydberg) Szlachetko]. Plants 3-30 cm tall; leaves mostly ovate-cordate, 2-4 cm long, the apices acute-mucronate; floral bracts 1-1.5 cm long; peduncle and rachis slightly glandular-hairy to glabrous; flowers green to yellow-green; sepals and petals spreading but not reflexed; dorsal sepal 2-3 mm long; petals 1-3 mm long; lip 1-2 mm wide, cleft 1/2 to 2/3 its length into 2 narrow pointed diverging lobes. ●Damp sites in aspen, fir, and pine forests at high elevations in the northern mountains. ◆The deeply forked lip of *N. cordata* is diagnostic. Our plants consistently have green flowers aligned with the *nephrophylla* epithet, and extra-state populations may have green to red flowers aligned with the *cordata* epithet; this distinction dissolves throughout the range of the species (Coleman 2002). Coleman (2002) calls attention to the fanciful appearance of the lip: the deeply forked and spreading lip resembles legs, and the two horn-like appendages at the base of the lip resemble arms, giving the flower an elf-like appearance. §

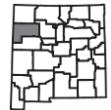


Piperia [for Charles Vancouver Piper (1867-1926), Canadian-American agronomist and botanist] REIN-ORCHID [1].

Perennial, glabrous herbs, the roots fleshy and tuber-like; leaves faded or withering by or during anthesis, basal, the cauline leaves bract-like; inflorescences spicate or racemose; flowers resupinate, white, yellow-green, to green, the lip prolonged backwards into a spur; fruit a capsule. ◆About 10 species of temperate regions of North America, including Mexico.

■Ackerman, J.C. & R. Morgan. 2002. *Piperia*, pp. 571-577. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Sivinski, R.C. & K. Lightfoot, eds. 1994. Inventory of rare and endangered plants of New Mexico [*Piperia unalaschensis*]. New Mexico Forestry and Resources Conservation Division, Misc. Publ. No. 3.

Piperia unalaschensis (Sprengel) Rydberg [from Unalaska, the Aleutian Islands] [*Habenaria unalaschensis* (Sprengel) S. Watson, *Spiranthes unalaschensis* Sprengel]. Plants 15-45 cm tall; leaves 2-6 in number, oblanceolate to elliptic, 8-10 cm long; floral bracts 2-16 mm long; flowers green, with a musty odor; sepals 2-4 mm long; petals 2-5 mm long; lip lance-elliptic to broadly ovate, 2-5 mm long, the spur subequal to the lip. ●Wooded canyons in coniferous forests; known as yet only from McKinley County.



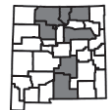
Platanthera [wide anthers] BOG-ORCHID [8].

Perennial herbs, the roots slender or tuberous, the stems erect to decumbent-based, glabrous; leaves basal or cauline and gradually reduced upwards to bracts, the bases sheathing; inflorescence a spike (raceme); flowers usually resupinate; sepals free, the dorsal sepal erect or incurved to form a hood, the lateral sepals spreading to reflexed; petals free, entire to fringed or emarginate, the lip unlobed, spurred at the base; fruit a capsule. ◆About 200 species, mostly north-temperate. Formerly included in *Habenaria*, which is restricted to mostly pantropical members. Determination of key floral features are much easier in fresh, unpressed material.

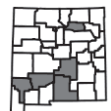
■Correll, D.S. & H.B. Correll. 1972. Aquatic and Wetland Plants of Southwestern United States [*Platanthera sparsiflora laxiflora*]. Stanford Univ. Press. ■Heil, K. 2007. Plant distribution reports [*Platanthera dilatata*]. The New Mexico Botanist 39:7. ■Heil, K.D. 2009. Plant distribution reports [*Platanthera obtusata*]. The New Mexico Botanist 46:7. ■Sears, C.J. 2008. Morphological discrimination of *Platanthera aquilonis*, *P. huronensis*, and *P. dilatata* (Orchidaceae) herbarium specimens. Rhodora 110(944): 389-405. ■Sheviak, C.J. 1999. The identities of *Platanthera hyperborea* and *P. huronensis*, with the description of a new species North America [*Platanthera aquilonis*]. Lindleyana 14(4):193-203. ■Sheviak, C.J. 2002. *Platanthera*, pp. 551-571. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Sheviak, C.J. & W.F. Jennings. 2006. A new *Platanthera* (Orchidaceae) from the Intermountain West. Rhodora 108(933): 19-31.

- 1 Leaves reduced to bracts along the stem..... **P. brevifolia**
- 1 Leaves well developed
 - 2 Leaves typically single at the base of the plant, obovate, broadly rounded at the apex, 4-15 cm long; lateral petals erect or spreading outward, not much curved inward with the sepal hood..... **P. obtusata**
 - 2 Leaves typically numerous, not as above; lateral petals curved inward with the sepal hood
 - 3 Lip pure white, usually with a pronounced dilation at the base; flowers predominantly whitish **P. dilatata**
 - 3 Lip greenish to yellowish, sometimes whitish but with evident and distinct tinges of green, dilated or not at the base; flowers whitish-green, greenish, to yellowish
 - 4 Lip with a small basal protuberance or bump **P. limosa**
 - 4 Lip without a protuberance or bump
 - 5 Column comparatively large, 1/2 or more the length of the dorsal sepal; lip linear to lance-linear..... **P. sparsiflora**
 - 5 Column comparatively small, less than 1/2 the length of the dorsal sepal; lip usually broader than lance-linear
 - 6 Spike densely flowered (sometimes lax); flowers distinctly whitish green (sometimes pale yellowish)..... **P. huronensis**
 - 6 Spike not densely flowered; flowers yellowish green to deep green with purplish tinges
 - 7 Spur 2-3 mm long, sac-like to inflated club-shaped, about 1/2 or less the length of the lip **P. purpurascens**
 - 7 Spur 3-7 mm long, cylindrical to narrowly club-shaped, subequal to the lip
 - 8 Lip 3-6 mm long; spur (2)3-5 mm long; anther low, appearing to lie atop the stigma..... **P. aquilonis**
 - 8 Lip 5-8 mm long; spur 5-7 mm long; anther high, rising above the stigma..... **P. tescamnis**

Platanthera aquilonis Sheviak [pertaining to northern regions] [*Platanthera hyperborea* of NM reports]. Plants 8-60 cm tall; cauline leaves few to several, lanceolate to oblong, 4-20 cm long, gradually reduced to bracts; spikes reduced to bracts; spikes variable, lax to dense; flowers yellowish green to pale whitish green, not showy; lateral sepals spreading to reflexed; petal margins entire; lip lanceolate to angular-lanceolate, 3-6 mm long, the base not dilated, the spur 2-5 mm long. ●Wet ground along streams and hillside seeps, marshy ground, generally above 8,000 ft in the northern mountains. ◆Our plants were long referred to the Icelandic *P. hyperborea* (Linnaeus) Lindley. §



Platanthera brevifolia (Greene) Kraenzlin [short-leaved] [*Habenaria brevifolia* Greene, *Habenaria sparsiflora* S. Watson var. *brevifolia* (Greene) Correll, *Limnorchis brevifolia* (Greene) Rydberg, *Platanthera sparsiflora* (S. Watson) Schlechter var. *brevifolia* (Greene) Luer]. Plants 10-50 cm long; cauline leaves few, quite bract-like, hardly reduced upwards, ovate, 3-6 cm long; spikes variable, lax to dense; flowers green to yellowish green, not showy; lateral sepals mostly reflexed; petal margins entire; lip linear to lanceolate, 6-10 mm long, the spur 9-20 mm long. ●Dry to moist ground in pine-oak woodland and coniferous forests at mid elevations, mostly in the southern and western mountains. §



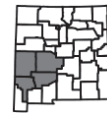
Platanthera dilatata (Pursh) Lindley ex Beck [dilated, expanded] [*Habenaria dilatata* (Pursh) Hooker, *Limnorchis borealis* (Chamisso) Rydberg, *Limnorchis dilatata* (Pursh) Rydberg, *Orchis dilatata* Pursh, *Piperia dilatata* (Pursh) Szlachetko]. Plants 10-60 cm or more tall, with a spicy aroma; cauline leaves few to several, linear to narrowly oblong, 5-30 cm long, gradually reduced to bracts; spikes variable, lax to dense; flowers white, showy; lateral sepals spreading to reflexed; petal margins entire; lip unlobed, narrowly lanceolate, 4-11 mm long, 2-5 mm wide at the dilated base, the spur subequal to the lip (ours). ●Rare in wet meadows in the northern mountains; known from scant collections. ♦This has recently been placed in the genus *Piperia*, but we maintain it here until more evidence is available. §



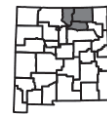
Platanthera huronensis (Nuttall) Lindley [from Lake Huron] [*Orchis huronensis* Nuttall]. Plants 10-60 cm or more tall; cauline leaves few to several, linear-lanceolate to oblong, 5-25 cm long, gradually reduced to bracts; spikes variable, lax to dense; flowers not showy, whitish green, the corollas often whiter than the calyx; lateral sepals spreading to slightly reflexed; petal margins entire; lip unlobed, narrowly lanceolate, 5-12 mm long, 2-4 mm wide, the base slightly to markedly dilated, the apex abruptly narrowed the spur 4-12 mm long. ●Wet meadows, ditches, and clearings in the northern mountains, above 8,000 ft., often associated with aspen. §



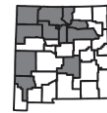
Platanthera limosa Lindley [of muddy ground] [*Habenaria limosa* (Lindley) Hemsley, *Habenaria thurberi* A. Gray, *Limnorchis thurberi* (Gray) Rydberg]. Plants 4-100 cm or more tall; cauline leaves few to several, lanceolate, 9-25 cm long, reduced to bracts upwards; spikes variable, lax to dense; flowers green, not showy; lateral sepals reflexed to spreading; petal margins entire; lip narrowly oblong to ovate, 3-8 mm long, the spur filiform, 8-25 mm long. ●Wet places in mixed forest at mid-elevations, along streams and hillside seeps with constant moisture. §



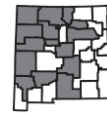
Platanthera obtusata (Banks ex Pursh) Lindley [obtusate] [*Orchis obtusata* Banks ex Pursh]. Plants 6-35 cm tall; leaves mostly single, linear-oblong to broadly elliptic or obovate, 4-15 cm long; spikes loosely flowered; flowers greenish white to yellowish green, not showy; lateral sepals reflexed; petal margins entire; lip unlobed, narrowly lanceolate, 3-8 mm long, 1-2 mm wide, the spur 3-8 mm long. ●Damp forests of the Pecos Wilderness, Sangre de Cristo Mountains. ♦Our plants belong to the typical subspecies; subsp. *oligantha* (Turczaninow) Hulten occurs in Eurasia.



Platanthera purpurascens (Rydberg) Sheviak & Jennings [purplish] [*Habenaria neomexicana* Tidestrom, *Limnorchis purpurascens* Rydberg, *Platanthera hyperborea* (Linnaeus) Lindley var. *purpurascens* (Rydberg) Luer]. Plants 25-70 cm tall, with a strong musty smell; cauline leaves few to several, lanceolate to oblong-ovate, 6-18 cm long; spikes variable, lax to dense; flowers green to yellowish green, often tinged with blue or red, not showy, strongly scented (semen- or musty-like); lateral sepals spreading to reflexed; petal margins entire; lip unlobed, lanceolate to ovate, 4-8 mm long, the base sometimes dilated, the spur strongly clavate, 2-3 mm long. ●Widespread in moist to damp areas in the mountains above 7,000 ft., commonly along streams, seeps, and wet meadows. §



Platanthera sparsiflora (S. Watson) Schlechter [few-flowered] [*Habenaria laxiflora* Rydberg, *Habenaria sparsiflora* S. Watson, *Habenaria sparsiflora* S. Watson var. *laxiflora* (Rydberg) Correll, *Limnorchis ensifolia* Rydberg, *Limnorchis sparsiflora* (S. Watson) Rydberg, *Platanthera hyperborea* (Linnaeus) Lindley var. *gracilis* (Lindley) Luer, *Platanthera sparsiflora* (S. Watson) Schlechter var. *ensifolia* (Rydberg) Luer]. Plants 30-60 cm or more tall; cauline leaves few to several, sometimes clustered near the base, linear, oblong, to ovate, 7-25 cm long; spikes variable, lax to dense; flowers green to yellowish green, showy; lateral sepals reflexed (sometimes spreading); petal margins entire; lip narrowly lanceolate to oblong, not dilated basally, 5-11 mm long, the spur longer than the petals; rostellum lobes of column prominent, often strongly divergent (to obscure). ●Wet places in the central and southern mountains, at low to mid-elevations, commonly along seeps and streams in rocky ground. §



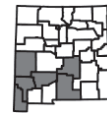
Platanthera tescamnis Sheviak & Jennings [desert-river]. Plants 30-120 cm tall; cauline leaves 3-7, linear-lanceolate to elliptic or ovate, 8-28 cm long; spikes variable, lax to dense; flowers green to yellowish green, showy; lateral sepals spreading to reflexed; petal margins entire; lip oblong to somewhat ovate, sometimes narrower, not dilated basally, 5-8 mm long, the spur subequal to the lip; rostellum lobes of the column small and rounded. ●Not definitely known from the state, but to be looked for in the northwest region, canyons, riparian pine-juniper woodlands; known westward in the Great Basin and Colorado Plateau regions. ♦The species is sometimes credited for New Mexico from photos (see iNaturalist.org), but its occurrence in the state has not been substantiated. It would most likely be confused with *Platanthera sparsiflora*, but differs in the size and structure of the column (Sheviak & Jennings 2006).

Schiedeella [for Christian Julius Wilhelm Schiede (1798-1836), German physician and botanist] INDIAN-BRAIDS [1].

Perennial herbs from thickened tuberous roots; leaves appearing in the summer after dehiscence of the capsule and withering in the fall, not present at anthesis; inflorescence a few-many-flowered spike, spirally arranged; flowers resupinate; sepals similar, connivent, the dorsal sepal adnate to the back of the column, the lateral sepals adnate to the column foot; petals linear, the lips distinctly clawed, the central petal with a reddish disc; fruit a capsule. ♦About 9 species of the Western Hemisphere, only 1 in North America north of Mexico.

■Balogh, P. 1982. Generic redefinition in subtribe Spiranthinae (Orchidaceae). Amer. J. Bot. 69:1119-1132. ■Brown, P.M. 2002. *Schiedeella*, pp. 530. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Brown, P.M. & R.A. Coleman. 2000. *Schiedeella arizonica*: A new species from the southwestern United States. North American Native Orchid Journal 6:3-17. ■Garay, L.A. 1982. Generic revision of the Spiranthinae. Bot. Mus. Leaflet. Harvard Univ. 28:311-313. ■Hess, W.J. 2000. New plant distribution records [*Spiranthes parasitica*]. The New Mexico Botanist 15:7. ■Todsén, T.K. 1970. *Spiranthes parasitica* and *Corallorhiza wisteriana* (Orchidaceae) new to New Mexico [*Schiedeella parasitica*]. Southw. Natural. 14(4):447-452.

Schiedeella arizonica P.M. Brown [of Arizona] [*Schiedeella parasitica* and *Spiranthes parasitica* of NM reports]. Perennial herbs to 20 cm tall, with thickened roots to 3 cm long; leaves absent at anthesis, 3-5 in a basal rosette during the summer and fall, oval, 3-6 cm long; scapes greenish yellow to pinkish, slender, with several bracts; flowers 3-14 in number, whitish, rose, or tan, 6-10 mm long; sepals 5-7 mm long; petals 4-5 mm long, the lip 5-8 mm long, reflexed, with a central reddish spot. ●Mixed coniferous-deciduous forests at a variety of elevations, often in heavy forest duff in the understory; southern and southwestern mountains. ♦This was long-referred to either *Schiedeella parasitica* or *Spiranthes parasitica*; some use the common name FALLEN LADIES-TRESSES to reflect this past relationship with *Spiranthes*. Plants of *Schiedeella arizonica* are not parasitic.



Spiranthes [spiral-flower] LADIES-TRESSES [2].

Perennial herbs, from fleshy (sometimes tuberous) roots; leaves mostly basal or cauline, reduced above to sheathing bracts, present or absent at flowering time; inflorescence a spike, the flowers spirally arranged; flowers resupinate, white, cream, to yellowish; sepals distinct (ours), connivent with the petals and forming a hood, or free and not forming a hood; lip sessile or short-clawed, partly

enclosing the column, spreading or recurved distally; column short, with a single anther; fruit a capsule. ♦About 45 species of the Americas, Eurasia, and Australia.

■Balogh, P. 1982. Generic redefinition in subtribe Spiranthinae (Orchidaceae). Amer. J. Bot. 69:1119-1132. ■Garay, L.A. 1982. Generic revision of the Spiranthinae. Bot. Mus. Leaflet. Harvard Univ. 28:311-313. ■Pace, M.C. & K.M. Cameron. 2017. The systematics of the *Spiranthes cernua* species complex (Orchidaceae): Untangling the Gordian Knot. Syst. Bot. 42(4): 640-669. ■Sheviak, C.J. & P.M. Brown. 2002. *Spiranthes*, pp. 530-545. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Sivinski, R.C. & K. Lightfoot, eds. 1994. Inventory of rare and endangered plants of New Mexico [*Spiranthes magnicamporum*]. New Mexico Forestry and Resources Conservation Division, Misc. Publ. No. 3.

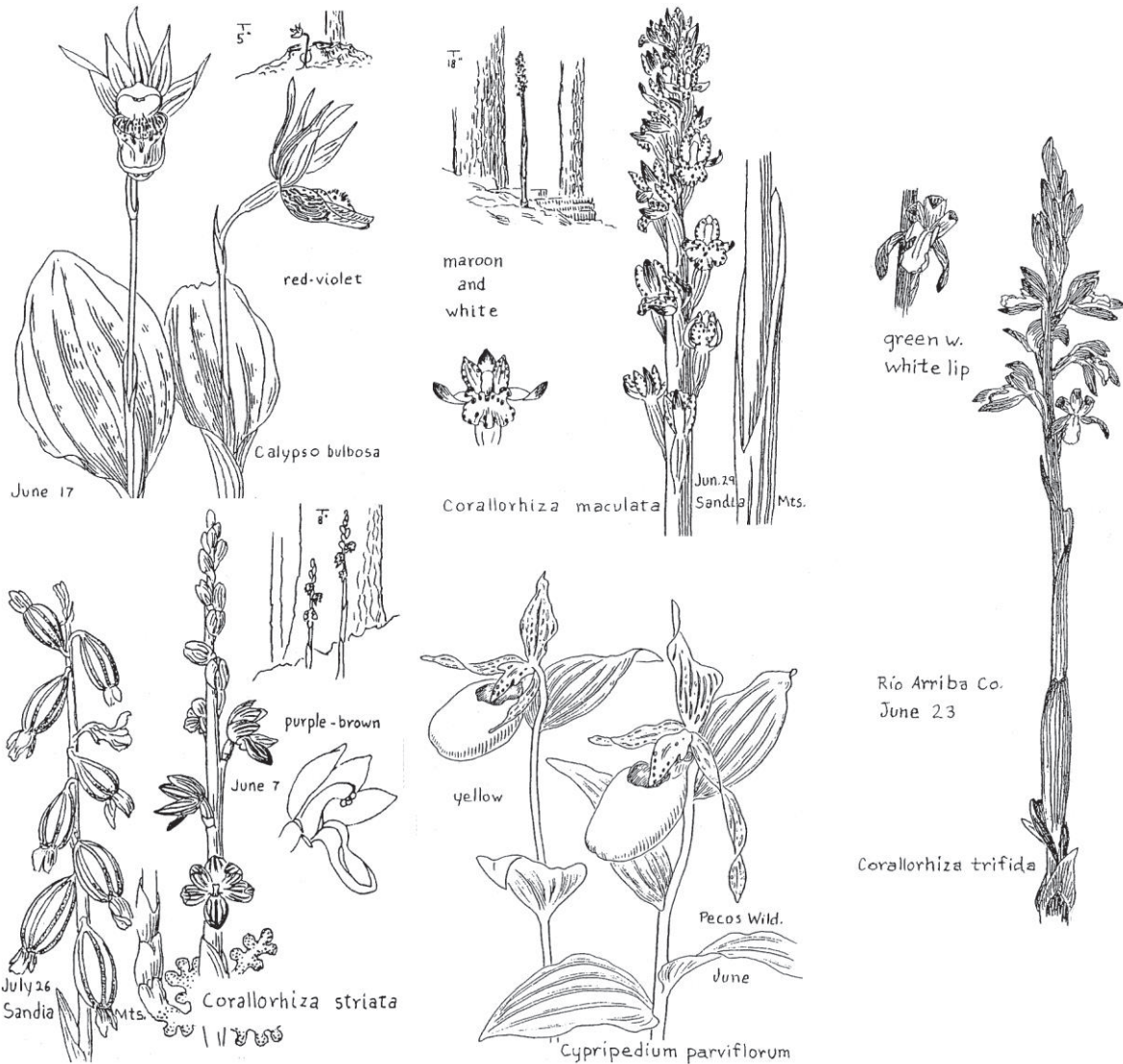
1 Plants often leafless at flowering time; rachis of spike moderately glandular-hairy; sepals and petal free and spreading, not forming a hood.....*S. magnicamporum*

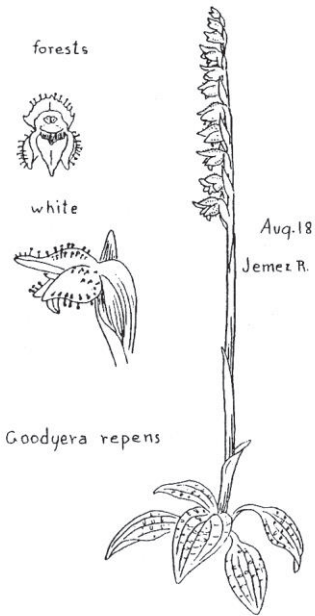
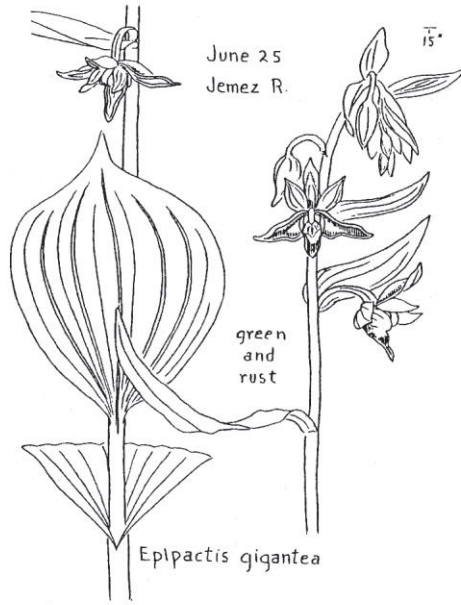
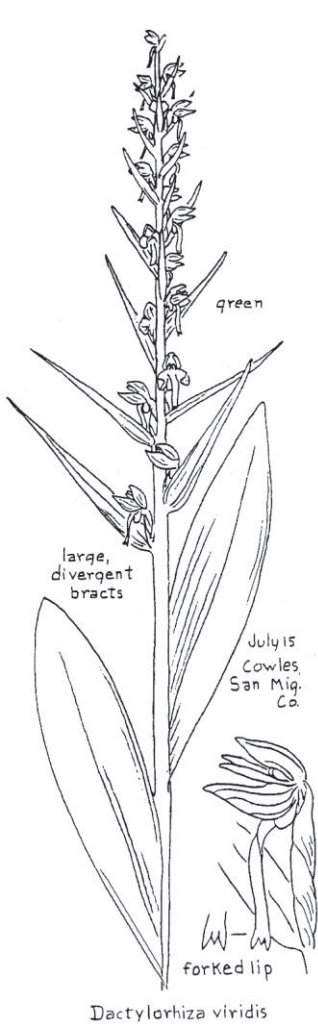
1 Plants with leaves at flowering time; rachis of spike glabrous or nearly so; sepals and petal connate and forming a hood.....*S. romanoffiana*

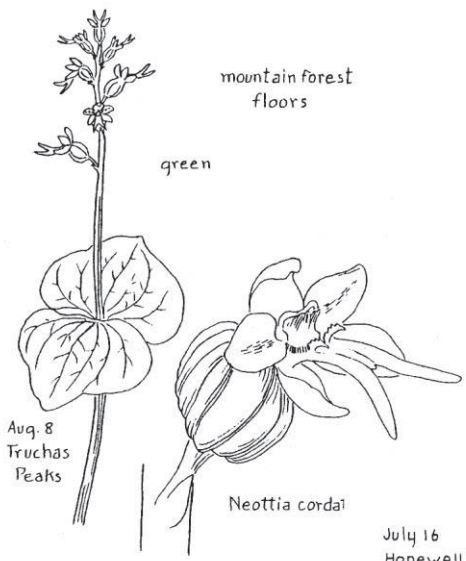
Spiranthes magnicamporum Sheviak [of the Great Plains] [*Spiranthes cernua* of NM reports]. Plants 20-50 cm tall, with 2-3 basal leaves and several sheathing cauline bracts, the roots tuberous to 5 cm long, the stems glandular-hairy; leaves linear-lanceolate, to 16 cm long, present or absent at anthesis; flowers white to ivory, slightly nodding; sepals distinct, 5-14 mm long, the lateral wide-spreading; petals 5-13 mm long, the lip with a yellow center, 5-12 mm long, dilated distally. ●Moist to wet meadows and clearings in the northern mountains and plains; little collected.



Spiranthes romanoffiana Chamisso [for Nikolai Petrovich Romanzoff (1754-1826), Chancellor of the Russian Empire] [*ibidium strictum* House]. Plants 8-40 cm tall (ours, taller elsewhere), with 3-6 basal leaves and several sheathing cauline bracts, the roots tuberous, to 10 cm long, the stems glabrous; leaves linear-lanceolate, to 18 cm long, present (sometimes absent) at anthesis; flowers white to ivory, tilted upward; sepals and petals connivent and forming a hood; sepals connate basally, 5-12 mm long; petals 6-10 mm long, the lip 5-10 mm long, dilated distally. ●Moist to wet meadows, marshy ground, stream banks, and clearings in the northern mountains. §







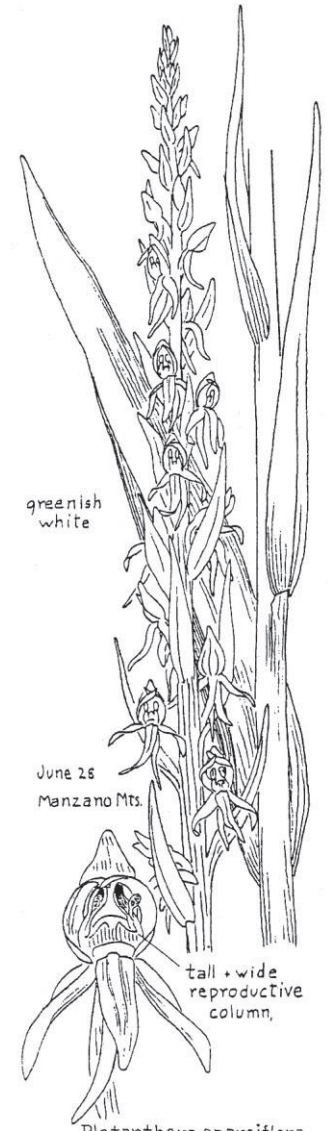
mountain forest floors
green
Aug. 8 Truchas Peaks
Neottia cordata

July 16 Hopewell L. Rio Arriba Co. whitish green
column less than $\frac{1}{2}$ hood height
lip base dilated, but less than dilatata

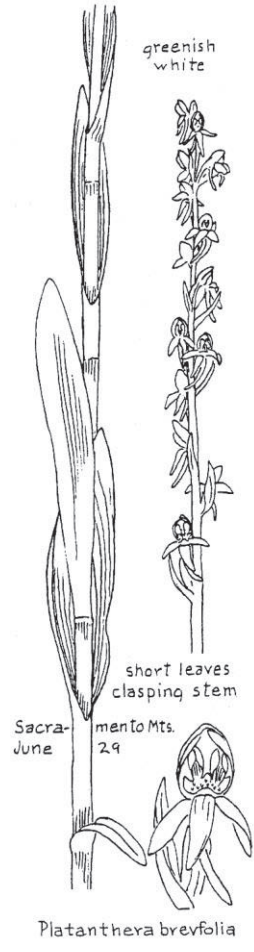
spur about as long as lip, narrowly cylindrical
T 17"
damp meadows



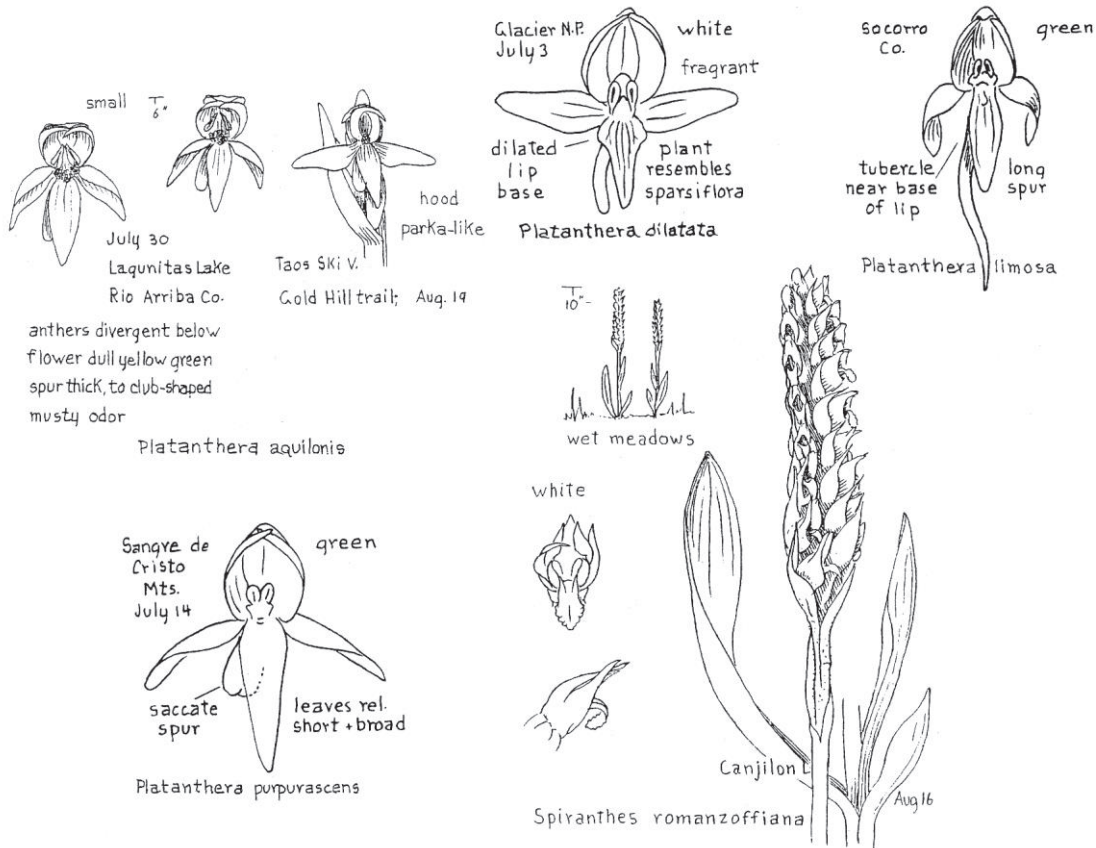
Platanthera huronensis



greenish white
June 28 Manzano Mts.
tall - wide reproductive column,
Platanthera sparsiflora



greenish white
short leaves clasping stem
Sacramento Mts. June 29
Platanthera brevifolia



POACEAE (GRAMINEAE) GRASS FAMILY [125/418/466]

Herbs or less commonly shrubby or even tree-like, the stems usually round and with hollow internodes. Leaves alternate or basal, simple, differentiated into sheath, ligule, and blade, the sheath margins overlapping or fused. Flowers small, inconspicuous, hidden within an inflorescence of spikelets, which is composed of basal glumes, lemmas, paleas, and flowers; perianth, if present, modified as tiny lodicules; stamens 1 or 3 (ours); pistil single, superior, of 3 united carpels, the styles usually 2 and the stigmas feather-like. Fruit a caryopsis, rarely nut-like or an utricle. ♦About 800 genera and 1200 species. This is easily the single most important plant family for humans, providing what (*Triticum*), barley (*Hordeum*), oats (*Avena*), sorghum (*Sorghum*), rice (*Oryza*), sugarcane (*Saccharum*), pearl millet (*Cenchrus*), and corn (*Zea*). Much recent work has been done on the evolutionary and phylogenetic relationship among the grasses; see Soreng et al. (2015, 2017) for current outlines of the classification with references. This treatment includes all grasses known to grow outdoors in New Mexico, whether cultivated, ornamental, crop, exotic, adventive, or native; species found in the wild are in **bold italics**, those known only in cultivation are in *simple italics*.

■Allred, K.W. 1990. New Mexico grass types and a selected bibliography of New Mexico grass taxonomy. *Great Basin Natural*. 50(1):73-82. ■Allred, K.W. 2005. A Field Guide to the Grasses of New Mexico, 3rd ed. Agric. Exp. Sta. New Mexico State University. 388 pp. ■Allred, K.W., S.L. Hatch, & R. Soreng. 1986. Verified checklist of the grasses of New Mexico. *New Mexico Agr. Exp. Sta. Res. Rep.* 579. 45 pp. ■Barkworth, M.E., L.K. Anderton, K.M. Capels, S. Long, & M.B. Piep. 2007. *Manual of Grasses for North America*. Intermountain Herbarium and Utah State University Press. 626 pp. ■Clayton, W.E. & S.A. Renvoize. 1986. *Genera Graminum*. Kew Bull. Additional Series No. 13. ■Hitchcock, A.S. & A. Chase. 1951. *Manual of the Grasses of the United States*. 2nd ed. USDA Misc. Publ. 200. 1051 p. ■Holmgren, A.H. & N.H. Holmgren. 1977. Poaceae, pp. 174-464. IN: *Intermountain Flora*, vol. 6. New York Botanical Garden. ■Peterson, P.M., R.D. Webster, & J. Valdes-Reyna. 1997. *Genera of New World Eragrostidae (Poaceae: Chloridoideae)*. Smithsonian Contr. Bot. 87. ■Saarela, J.M., R.D. Bull, M.J. Paradis, S.N. Ebata, P.M. Peterson, R.J. Soreng, & B. Paszko. 2017. Molecular phylogenetics of cool-season grasses in the subtribes Agrostidinae, Anthoxanthinae, Aveninae, Brizinae, Calothecinae, Koeleriinae and Phalaridinae (Poaceae, Pooideae, Poaceae, Poaceae chloroplast group 1). *PhytoKeys* 87: 1-139. ■Soreng, R.J., P.M. Peterson, K. Romaschenko, G. Davidse, F.O. Zuloaga, E.J. Judziewicz, T.S. Filgueiras, J.I. Davis, & O. Morrone. 2015. A worldwide phylogenetic classification of the Poaceae (Gramineae). *Journal of Systematics and Evolution* 53(2):117-137. ■Soreng, R.J., P.M. Peterson, K. Romaschenko, G. Davidse, J.K. Teisher, L.G. Clark, P. Barbera, L.J. Gillespie, & F.O. Zuloaga. 2017. A worldwide phylogenetic classification of the Poaceae (Gramineae) II: An update and a comparison of two 2015 classifications. *Journal of Systematics and Evolution* 55(4): 259-290. ■Tucker, G.C. 1990. The genera of Arundinoideae (Gramineae) in the southeastern United States. *J. Arnold Arbor.* 71:145-177. ■Watson, L. & M.J. Dallwitz. 1992. *The grass genera of the world*. CAB International, Wallingford, United Kingdom, 1038 pp. ■Wootton, E.O. & P.C. Standley. 1912. *The grasses and grasslike plants of New Mexico*. New Mex. Agr. Exp. Sta. Bull. No. 81. 175 pp.

- 1 Plants not known to flower in New Mexico, spikelets not produced; blades constricted at the base into a narrow stalk-like portion with a tuft of stiff bristles on each side: cultivated ornamentals *Phyllostachys*
- 1 Plants usually flowering each year, the spikelets present; blades not constricted at the base into a narrow stalk-like portion and without stiff bristles on each side; cultivated or wild grasses
 - 2 All or some of the spikelets concealed and hidden from view within modified structures, such as spiny burs, involucre, bony rachis joints, dense fleshy cobs (ears), or detachable clusters of hard bracts KEY A
 - 2 Spikelets not concealed and not hidden within modified structures, but evident and easily seen, sometimes closely subtended by foliage leaves or covered by hairs
 - 3 One or more bristles (sterile branchlets) borne immediately below the spikelets, the bristles sometimes clustered into a bur or involucre
 - 4 Spikelets disarticulating singly, leaving the bristles on the plant *Setaria*
 - 4 Spikelets disarticulating with the involucre of bristles, the two falling together *Pennisetum*

- 3 Bristles not borne immediately below the spikelets, a bur or involucre absent
 - 5 Glumes with numerous hooked prickles 1-2 mm long *Tragus*
 - 5 Glumes lacking hooked prickles
 - 6 Lemma with 7-13 awns (rarely 5) KEY B
 - 6 Lemma with 1-3 awns or awnless
 - 7 Flowering shoots 2 meters or more tall KEY C
 - 7 Flowering shoots less than 2 meters tall
 - 8 All or many of the spikelets sessile and borne on the main axis; inflorescence branches absent, the inflorescence a spike, spicate raceme, or dense head-like cluster of spikelets KEY D
 - 8 All or most of the spikelets borne on branches, the inflorescence a panicle, or if branches absent then all the spikelets with evident pedicels and few (if any) sessile
 - 9 Andropogoneae Tribe: Glumes mostly hardened (membranous in *Zea* and *Imperata*), completely enclosing the florets, dorsally compressed; disarticulation below the glumes and nearly always in units consisting of a sessile spikelet with attached rachis joint and pedicel (the pedicelled spikelet present or absent); spikelets borne in pairs, one spikelet sessile or subsessile and one spikelet pedicelled (sometimes the pedicelled spikelet absent, but the pedicel always present); lemmas very thin and translucent, delicate, awned or awnless.....KEY E
 - 9 Combination of features other than above
 - 10 Spikelets with a single floret only KEY F
 - 10 Spikelets with at least 2 florets, some may be small and poorly developed (look carefully)
 - 11 Paniceae Tribe: Spikelets with 2 florets, the upper bisexual and usually with a hardened lemma at maturity, the lower male or neuter; lemma of the lower floret similar to the second glume in size and texture; disarticulation below the glumes; spikelets dorsally compressed KEY G
 - 11 Combination of features other than above
 - 12 Lemmas with 3 nerves, the nerves usually prominent KEY H
 - 12 Lemmas with 5-many nerves, at least at the base, or the nerves not discernible KEY I

KEY A: Spikelets variously concealed

- 1 Spikelets enclosed in a bur (involucre) of bristles or stiff spines, the bur falling entire
 - 2 Bur of sharp, stiff spines *Cenchrus*
 - 2 Bur of bristles, without spines *Pennisetum*
- 1 Spikelets not enclosed in a bur (involucre) of bristles or spines
 - 3 Plants mat- or sod-forming, with stolons or rhizomes
 - 4 Sheaths strongly compressed-keeled; spikelets all alike and sunken into one side of a corky or succulent, flattened rachis; cultivated lawn grasses *Stenotaphrum*
 - 4 Sheaths rounded; spikelets unisexual and different in appearance, the male on spicate, flag-like primary branches raised above the foliage, the female in bony clusters hidden in the foliage; native range grasses, but sometimes also grown as a lawn grass (*B. dactyloides*)..... *Bouteloua*
 - 3 Plants not mat-forming, without stolons or rhizomes
 - 5 Glumes with numerous hooked prickles 1-2 mm long *Tragus*
 - 5 Glumes lacking hooked prickles
 - 6 Female spikelets borne singly in hard, whitish beads at the ends of long stalks; ornamental or garden grasses only infrequently grown *Coix*
 - 6 Female spikelets borne in cobs, or if bead-like then several borne adjacent to each other; cultivated or wild grasses
 - 7 Spikelets borne in spicate racemes no more than 2 cm long; spikelets paired, the sessile one bisexual, grenade-shaped, and covered with square pits, the pedicelled one male and flattened; rare *Mnesithea*
 - 7 Spikelets borne in panicles or cobs more than 10 cm long; spikelets all unisexual, the sexes in different part of the same inflorescence or in separate inflorescences on the same plant
 - 8 Male spikelets borne in a terminal panicle (tassel); female spikelets borne below in a thick axillary spike (cob) and covered by leaf sheaths, the styles (silk) protruding from the tip; cultivated grasses *Zea*
 - 8 Male and female spikelets borne together in the same panicle, the male ones papery and in pairs at the terminal portion of the spicate branches, the female ones bony and at the base of the same branches; wild grasses, but probably not extirpated from the state *Tripsacum*

KEY B: Lemma with 7-13 awns

- 1 Awns plumose, feathery, ± equal in length *Enneapogon*
- 1 Awns glabrous to scabrous, not plumose and not equal in length
 - 2 Glumes 1-nerved *Pappophorum*
 - 2 Glumes many-nerved *Cottea*

KEY C: Flowering shoots 2 meters or more tall

- 1 Grasses cultivated for ornament, landscaping, or as a harvested crop, occasionally escaping around fields or dwellings
 - 2 Corn: male spikelets borne in a terminal panicle (tassel); female spikelets borne on the stem in a thick axillary spike (cob or ear) covered by leaf sheaths, the styles (silks) protruding from the tip..... *Zea*
- 2 Plants not as above
 - 3 Plants growing in large, thick tussocks with numerous flowering shoots; rhizomes lacking
 - 4 Blades sharply saw-toothed on the margins; spikelets borne singly on rebranching branches of the inflorescence, with several florets extending beyond thin glumes..... *Cortaderia*
 - 4 Blades scabrous to smooth on the margins; spikelets borne in pairs on spicate branches, with no florets extending beyond the stiff glumes
 - 5 Panicle branches breaking apart at the nodes (joints) when mature *Tripsacum*
 - 5 Panicle branches remaining intact, the spikelets falling separately when mature *Miscanthus*

- 3 Plants not in large tussocks, the shoots single, or if clustered then with strong vigorous rhizomes
 - 6 Plants annual, lacking rhizomes (*S. bicolor*) **Sorghum**
 - 6 Plants perennial, with vigorous rhizomes
 - 7 Panicles plume-like, with very dense silky hairs; plants commonly to 6 or 7 meters tall **Arundo**
 - 7 Panicles slightly pubescent but not plume-like; plants rarely taller than 3 meters **Sorghum**
 - 1 Grasses wild or weedy, or seeded for range or pasture improvement, but not crop or ornamental plants
 - 8 Plants tufted, not developing rhizomes
 - 9 Spikelets subtended by numerous bristles; plants annual (*S. magna*) **Setaria**
 - 9 Spikelets not subtended by bristles, but may be pubescent; plants perennial
 - 10 Inflorescence a spike, no branches developed **Elymus**
 - 10 Inflorescence a panicle with branches
 - 11 Disarticulation above the glumes; spikelets awned
 - 12 Basal sheaths compressed-keeled; spikelets purplish; awns less than 1.5 cm long **Muhlenbergia**
 - 12 Basal sheath round; spikelets greenish or tawny; awns 2-3 cm long (*E. robusta*) **Eriocoma**
 - 11 Disarticulation below the glumes; spikelets awned or awnless; sheaths mostly rounded
 - 13 Inflorescence branches 2-5 in number and mostly not rebranched, clustered toward the tip of the shoot (*A. gerardi*) ..
..... **Andropogon**
 - 13 Inflorescence branches numerous and rebranched, not clustered toward the tip of the shoot **Panicum**
 - 8 Plants developing rhizomes
 - 14 Disarticulation below the glumes, the spikelets falling entire
 - 15 Inflorescence a panicle of 2-5 spicate, unbranched primary branches clustered at the tip of the shoot, sometimes a few of the branches rebranching (*A. gerardi*) **Andropogon**
 - 15 Inflorescence a rebranched panicle, the numerous primary branches always rebranching
 - 16 Outer bracts of the spikelet (glumes) membranous, thin and flexible, not hardened; upper floret hardened at maturity; spikelets awnless **Panicum**
 - 16 Outer bracts of the spikelet (glumes) stiff, hardened; inner floret very thin and delicate, not at all hardened; spikelets awned, at least when young
 - 17 Spikelets dull, fuzzy-hairy, the hairs standing out from the spikelet; awn persistent through maturity .. **Sorghastrum**
 - 17 Spikelets somewhat shiny, glabrous or slightly pubescent, the hairs pressed against the spikelet; awn early-deciduous **Sorghum**
 - 14 Disarticulation above the glumes, the glumes remaining on the plant and the florets falling
 - 18 Panicles with unbranched spicate branches **Spartina**
 - 18 Panicles with rebranched branches
 - 19 Spikelets with a single floret (*S. arenicola* & *S. rigidus*) **Sporobolus**
 - 19 Spikelets with several florets
 - 20 Glumes nearly equal in length; rachilla glabrous; lemma long-hairy **Arundo**
 - 20 Glumes unequal, the first about half as long as the second; rachilla beset with long silky hairs; lemma glabrous
..... **Phragmites**
- KEY D: Inflorescence a spike, spicate raceme, or dense head-like cluster, all or many of the spikelets sessile on the main axis, branches absent from the inflorescence.**
- 1 Disarticulation below the glumes, the spikelets falling entire or in clusters, no spikelet parts left on the axis
 - 2 Main axis of the inflorescence breaking apart at maturity
 - 3 Spikelets borne in pairs of one sessile and one pedicelled (sometimes only the pedicel present); glumes mostly enclosing the spikelet, the florets mostly not visible (members of the Andropogoneae tribe)
 - 4 Spikelets awned, the awns at least 5 mm long
 - 5 Awns 1-2 cm long **Schizachyrium**
 - 5 Awns 4-12 cm long
 - 6 Racemes 4-8 cm long; awns 5-12 cm long; main axis (or most of it) breaking apart when mature **Heteropogon**
 - 6 Racemes 10-18 cm long; awns 4-6 cm long; main axis persistent **Trachypogon**
 - 4 Spikelets awnless, or with awns 1-2 mm long
 - 7 Racemes less than 3 cm long, glabrous or only sparsely pubescent; plants annual **Mnesithea**
 - 7 Racemes more than 4 cm long, densely wooly-pubescent; plants perennial **Elionurus**
 - 3 Spikelets borne other than above; glumes may be longer than, but not enclosing the spikelet, the florets usually visible (Triticeae tribe)
 - 8 Spikelets 3 at each node of the main axis, the lateral pair pedicelled, the central spikelet sessile; spikelets with one floret
..... **Hordeum**
 - 8 Spikelets mostly 1 or 2 at each node of the main axis, if 3 then not otherwise as above; spikelets with 2 to many florets
 - 9 Spikelets mostly 1 at each node of the main axis
 - 10 Plants annual
 - 11 Spikes 0.6-2 cm long **Eremopyrum**
 - 11 Spikes 5-10 cm long **Aegilops**
 - 10 Plants perennial
 - 12 Inflorescence very dense, almost head-like, the rachis obscured and viewed only with difficulty; fertile plants of alpine or subalpine habitats (*Elymus scribneri*) **Elymus**
 - 12 Inflorescence less congested and somewhat elongate, not at all head-like, the rachis easily observed; sterile hybrid plants of low-elevation or mid-montane habitats

- 13 Awns of the lemma 4-17 mm long, usually erect; rachis internodes 2.5-6(7) mm long ... these are *Elymus elymoides* × *E. trachycaulus* hybrids [*Elymus saundersii* Vasey, *Agropyron saundersii* (Vasey) A.S. Hitchc.].
- 13 Awns of the lemma (14)18-37 mm long, spreading to recurved downward; rachis internodes mostly 7-10 mm long...these are *Elymus elymoides* × *E. spicata* hybrids [*Elymotrigia saxicola* (Scribn. & Smith) Barkw. & Dewey, *Elymus saxicolus* Scribn. & Smith].
- 9 Spikelets mostly 2 at each node of the main axis
 - 14 Glumes 3-7 mm long; anthers 4-5 mm long ***Psathyrostachys***
 - 14 Glumes 12-100 mm long; anthers, when present, about 2 mm long
 - 15 Glumes 12-24 mm long; sterile hybrid plants ... these are *Elymus trachycaulus* × *Hordeum jubatum* hybrids [*Elyhordeum macounii* (Vasey) Barkw. & Dewey, *Elymus macounii* Vasey].
 - 15 Glumes 25-100 mm long; fertile plants ***Elymus***
- 2 Main axis of the inflorescence remaining intact
 - 16 Plants strongly rhizomatous or stoloniferous perennials
 - 17 Wild range grasses, not cultivated in lawns; spikelets falling in clusters of three..... ***Hilaria***
 - 17 Lawn grasses, occasionally escaping in weedy ground in residential areas; spikelets not falling in clusters of three
 - 18 Plants mostly stoloniferous; blades fleshy and somewhat succulent; spikelets borne on one side of a flattened, succulent main axis ***Stenotaphrum***
 - 18 Plants mostly rhizomatous; blades thin and membranous, not at all succulent; spikelets variously disposed on short pedicels around the thin, non-succulent main axis ***Zoysia***
 - 16 Plants tufted annuals or perennials, not stoloniferous or rhizomatous
 - 19 Plants cultivated lawn grasses or weedy in lawns
 - 20 Spikelets pointed at the tip and arranged on one side of a thickened rachis ***Stenotaphrum***
 - 20 Spikelets blunt at the tip and arranged on both sides of the rachis ***Sclerochloa***
 - 19 Plants of various habitats, but never cultivated or weedy in lawns
 - 21 First glume with 2 or 3 awns; lower stems angled or flattened somewhat ***Muhlenbergia***
 - 21 First glume with a single awn or awnless; lower stems rounded
 - 22 Awns 4-6 cm long ***Trachypogon***
 - 22 Awns, if present, less than 2 cm long
 - 23 Ligules hairy; sheaths prominently inflated; blades widely spreading to reflexed; inflorescence dense and head-like or spike-like, the base often included in the sheath; much-branched annuals (*S. alopecuroides* & *S. schoenoides*) ***Sporobolus***
 - 23 Plants not as above in all respects
 - 24 Spikelets in pedunculate clusters of three, usually hanging downward, and falling together ***Aegopogon***
 - 24 Spikelets not so arranged
 - 25 Glumes awnless; lemma awned (use a lens) ***Alopecurus***
 - 25 Glumes awned
 - 26 Glumes strongly flattened laterally, ciliate on the keeled midnerve ***Phleum***
 - 26 Glumes rounded on the back, not keeled, not ciliate on the midnerve but may be pubescent elsewhere..... ***Polypogon***
 - 1 Disarticulation above the glumes, the glumes often remaining on the inflorescence
 - 27 Spikelets of two different kinds, the male spikelets awnless and the female spikelets with awns 9-10 cm long, the plants mostly dioecious and stoloniferous ***Scleropogon***
 - 27 Spikelets all similar, awnless or with awns mostly less than 6 cm long; plants tufted or if stoloniferous then with short awns
 - 28 Spikelets in very dense ovoid, woolly or bristly heads, at most 2 times longer than wide, with longer awns conspicuous and protruding (resembling *Polypogon*); plants annual
 - 29 Seed heads stiff-bristly; plants essentially glabrous ***Cynosurus***
 - 29 Seed heads soft-wooly; plants with markedly pubescent leaves and sheaths ***Lagurus***
 - 28 Plants not as above in every characteristic
 - 30 Lemmas with 3 awns ***Aristida***
 - 30 Lemmas with one awn or awnless
 - 31 Spikelets with one floret only
 - 32 Plants annual; leaves with prominent, claw-like auricles 2-6 mm long; awns 50-160 mm long ***Hordeum***
 - 32 Plants perennial; leaves without auricles, or occasionally with small rounded auricles about 1 mm long; awns 1-4 mm
 - 33 Spikelets strongly compressed; glumes flattened, keeled on the midnerve, completely enclosing the floret ***Phleum***
 - 33 Spikelets not strongly compressed; glumes rounded on the back, only slightly keeled, not completely enclosing the floret..... ***Muhlenbergia***
 - 31 Spikelets with more than one floret, some may be poorly developed, rudimentary, or vestigial
 - 34 Spikelets in dense, sessile, head-like clusters that are mostly surpassed by and nestled within the foliage.. ***Munroa***
 - 34 Spikelets not in dense, head-like clusters, or if so then elevated well above the foliage
 - 35 Lemmas with 3 conspicuous nerves
 - 36 Lemmas conspicuously pubescent; spikelets with several well-developed florets; blades white-margined.. ***Erioneuron***
 - 36 Lemmas glabrous or scabrous; spikelets with one well-developed floret and 1-3 rudiments above it; blades not white-margined ***Bouteloua***
 - 35 Lemmas with 1 or 5-several nerves

- 37 Plants low annuals; inflorescence not a true spike, but the branches very short with 1-3 spikelets borne on short pedicels nearly on the main axis; lemmas about 2 mm long, the glumes mostly shorter *Catapodium*
- 37 Plants, inflorescence, lemmas, and glumes not as above
 - 38 Spikelets 2 or more per node of the rachis
 - 39 Rhizomes present, evident, creeping..... *Leymus*
 - 39 Rhizomes absent, occasionally short rhizomes developed but the plants still forming dense clumps
 - 40 Glumes absent or reduced to 1 or 2 minute bristles; spikelets horizontally spreading or ascending at maturity (*E. hystrix*)..... *Elymus*
 - 40 Glumes present; spikelets rarely horizontally spreading
 - 41 Glumes 2-10 cm long *Elymus*
 - 41 Glumes shorter than 1.5 cm
 - 42 Glumes 2- to 5-nerved; anthers 1.5-3 mm long..... *Elymus*
 - 42 Glumes 1-nerved; anthers 3-5 mm long..... *Psathyrostachys*
 - 38 Spikelets mostly 1 per node of the rachis
 - 43 Spikelets placed edge-wise to the rachis, the first glume absent on all but the terminal spikelets *Lolium*
 - 43 Spikelets placed flat-wise to the rachis; both glumes present on all spikelets
 - 44 Plants annual
 - 45 Spikes very short, 0.6-2 cm long; plants usually less than 30 cm tall
 - 46 Inflorescence exerted from the sheath at maturity; glumes and lemmas awn-tipped; blades with small auricles *Eremopyrum*
 - 46 Inflorescence often partially enclosed in the upper sheath; glumes and lemmas blunt-tipped; blades lacking auricles *Sclerochloa*
 - 45 Spikes longer, mostly 5-15 cm long; plants usually much more than 30 cm tall
 - 47 Glumes narrow, linear, 1-nerved; spikelets with 2 florets *Secale*
 - 47 Glumes broad, oblong to ovate, 3- to several-nerved; spikelets mostly with 3-5 florets
 - 48 Nerves of the lemma converging at the apex; plants commonly glaucous..... \times *Triticosecale*
 - 48 Nerves of the lemma \pm parallel, not converging at the apex; plants commonly green and not glaucous *Triticum*
 - 44 Plants perennial
 - 49 Spikelets borne in pairs of one pedicelled and one nearly sessile; glumes awnless; lemmas awned, the awns 4-6 cm long *Trachypogon*
 - 49 Spikelets not as above
 - 50 Glumes linear, needle-like, 1-nerved (occasionally broader at the base and 3-nerved).. *Leymus*
 - 50 Glumes lanceolate or broader, usually 3- to 7-nerved
 - 51 Spikelets spreading away from the rachis, placed very close together on the main axis; rachis internodes between the spikelets 0.3-3 mm long in the middle of the spike..... *Agropyron*
 - 51 Spikelets mostly pressed against the rachis, or curving outward toward the tip of the spikelet; rachis internodes between the spikelets 4-25 mm long
 - 52 Glumes acuminate, asymmetrical to curved and somewhat sickle-shaped, gradually tapering to an awn-tip; blades somewhat rigid and prominently ridged above; plants rhizomatous, commonly bluish (*P. smithii*) go to *Pascopyrum*
 - 52 Glumes various, blunt to acuminate, symmetrical, not curving, not gradually tapering to an awn-tip; blades often lax, not prominently ridged above; plants tufted to rhizomatous, not commonly bluish..... *Elymus*

KEY E: Andropogoneae Tribe

- 1 Spikelets all unisexual, the male and female spikelets conspicuously different in form and borne either separately in the same inflorescence or in separate inflorescences on the same plant; plants monoecious
- 2 Female spikelets borne singly in hard, whitish beads at the end of long stalks; domesticated grasses..... *Coix*
- 2 Female spikelets in cobs, or if bead-like then not borne singly at the end of long stalks but adjacent to other bony spikelets; wild or domesticated grasses
 - 3 Male spikelets borne in a terminal panicle (tassel); female spikelets in a separate inflorescence and borne below in a thick axillary spike (cob) and covered by leaf sheaths, the styles (silks) protruding from the tip; domesticated grasses *Zea*
 - 3 Male and female spikelets borne together in the same panicle, the male ones papery and in pairs at the terminal portions of the spicate branches, the female spikelets bony and at the base of the same branches; wild grasses..... *Tripsacum*
- 1 Spikelets unisexual or bisexual but usually not conspicuously different in form, borne in pairs and not separated one from the other; plants not monoecious
 - 4 Each inflorescence a panicle with branches (occasionally a few inflorescences with a single branch), with or without inflated sheaths subtending the inflorescence (spathes)
 - 5 Spikelets all similar in appearance and size

- 6 Pedicels without a spikelet borne at the tip
 7 Flowering shoots mostly with one or a few large, terminal panicles 10 cm or more long *Sorghastrum*
 7 Flowering shoots with numerous small panicles clustered together, each less than 3 cm long and each with a subtending spathe *Andropogon*
- 6 Pedicels with a spikelet borne at the tip
 8 Pedicels and rami segments (rachis joints) with a central longitudinal groove or membrane, flattened in cross-section *Bothriochloa*
 8 Pedicels and rami segments without a central groove or membrane, nearly round in cross-section
 9 Panicles narrow and spike-like, with soft silky hairs, 1-3 cm wide and 8-18 cm long, the branches scarcely noticeable at arm's length..... *Imperata*
 9 Panicles not as above, usually wider and/or shorter or the branches obvious at arm's length
 10 Panicles with 2-5 primary branches *Andropogon*
 10 Panicles with more than 10 branches
 11 Hairs at the bases of the spikelets much shorter than the spikelets, less than 1 mm long; plants grown for crops or adventive in weedy ground..... *Sorghum*
 11 Hairs at the bases of the spikelets nearly equaling or longer than the spikelets, 4-12 mm long; plants grown for ornament
 12 Panicle branches breaking apart at the nodes (joints) when mature *Tripsidium*
 12 Panicle branches remaining intact, the spikelets falling separately when mature *Miscanthus*
- 5 Spikelets not all similar, the pedicelled ones often smaller in size or different in appearance when compared to the sessile ones
 13 Pedicels and rami segments (rachis joints) with a central groove or membrane running lengthwise, flattened in cross section *Bothriochloa*
 13 Pedicels and rami segments without a central groove or membrane, nearly round in cross section, at least at the apex
 14 Inflorescence with numerous (more than 5) branches; sessile spikelets ovoid to nearly globose..... *Sorghum*
 14 Inflorescence with 2-5 nearly digitate branches; sessile spikelets lanceolate (*A. gerardi*)..... *Andropogon*
- 4 Each inflorescence a single unbranched spicate raceme without branches, subtended by a somewhat inflated bladeless sheath (spathe), the flowering shoot usually bearing numerous such inflorescences
 15 Spikelets awnless, or with awns 1-2 mm long
 16 Racemes less than 3 cm long, glabrous or only sparsely pubescent *Mnesithea*
 16 Racemes more than 4 cm long, densely wooly-pubescent *Elionurus*
- 15 Spikelets awned, the awns at least 5 mm long
 17 Awns 0.5-2 cm long..... *Schizachyrium*
 17 Awns 4-12 cm long
 18 Racemes 4-8 cm long; awns 5-12 cm long; the main axis breaking apart at maturity, at least most of it..... *Heteropogon*
 18 Racemes 10-18 cm long; awns 4-6 cm long; the main axis persistent..... *Trachypogon*

KEY F: Spikelets with a single floret.

- 1 Glumes absent; leaf blades strongly saw-toothed on the edges *Leersia*
- 1 Glumes present, at least one; leaf blades smooth to slightly saw-toothed on the edges
 2 Glumes and lemmas awnless
 3 Inflorescence a panicle of evident, unbranched, spicate primary branches
 4 Panicle branches all attached at the tip of the main axis *Cynodon*
 4 Panicle branches attached along the length of the main axis, not only at the tip
 5 Glumes equal in length or nearly so; spikelets nearly round in outline *Beckmannia*
 5 Glumes unequal, the first glume shorter than the second; spikelets lanceolate in outline
 6 Spikelets widely spaced, rarely overlapping, appearing embedded in the branches; blades spirally twisted (*M. paniculata*) *Muhlenbergia*
 6 Spikelets very closely spaced, overlapping, not at all appearing embedded in the branches; blades not spirally twisted *Spartina*
- 3 Inflorescence a panicle of rebranched branches, or dense and spike-like
 7 Disarticulation below the glumes
 8 Ligules hairy; sheaths prominently inflated; blades widely spreading to reflexed; inflorescence dense and head-like or spike-like, the base often included in the sheath; much-branched annuals (*S. alopecuroides* & *S. schoenoides*). *Sporobolus*
 8 Plants not as above in all respects
 9 Spikelets nearly round in outline, the glumes somewhat inflated or puffy-looking *Beckmannia*
 9 Spikelets mostly lanceolate in outline, the glumes not at all inflated or puffy-looking
 10 Glumes softly pubescent on the midnerves; inflorescence dense and spike-like, rarely lobed..... *Alopecurus*
 10 Glumes glabrous to scabrous, not softly pubescent; inflorescence usually lobed at least below *Polypogon*
- 7 Disarticulation above the glumes
 11 Lemma hardened at maturity, enclosing the palea and flower
 12 Lemma with 1 or 2 slender bracts, bristles, or scales at the base of the floret, these sometimes pubescent and often difficult to see without dissecting carefully..... *Phalaris*
 12 Lemma without any bracts, bristles, or scales at the base of the floret
 13 Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part *Piptatheropsis*
 13 Florets terete; lemma margins slightly overlapping, the palea hidden..... *Oryzopsis*
- 11 Lemma remaining thin and flexible, not hardened, not enclosing the palea
 14 Lemma with a single nerve; ligule a ring of hairs
 15 Rare turf grasses planted for lawns; first glume absent, the second glume enclosing the floret..... *Zoysia*
 15 Mostly common grasses of numerous habitats, but never lawn grasses *Sporobolus*

- 14 Lemma with 3 or more nerves; ligule a membrane
 - 16 Sheath margins fused together for half their length or more *Catabrosa*
 - 16 Sheath margins overlapping most of their length
 - 17 Palea about as long as the lemma; body of the glumes (not including awn tips) shorter than the lemma; lemma mostly 3-nerved *Muhlenbergia*
 - 17 Palea half or less as long as the lemma; body of the glumes longer than the lemma; lemma obscurely nerved
 - 18 Rachilla prolonged beyond the palea as a short bristle to 0.6 mm long *Podagrostis*
 - 18 Rachilla not prolonged beyond the palea *Agrostis*
- 2 Glumes and/or lemmas awned
 - 19 Inflorescence a panicle of several evident, unbranched, spicate, primary branches
 - 20 Spikelets nearly round in outline, the glumes somewhat inflated *Beckmannia*
 - 20 Spikelets lanceolate in outline, the glumes not at all inflated
 - 21 Panicle branches all less than 2 cm long *Bouteloua*
 - 21 Panicle branches mostly longer than 2 cm long *Spartina*
 - 19 Inflorescence a panicle of rebranched branches, or a raceme, or in some the pedicels and branches poorly developed and the inflorescence spike-like
 - 22 Lemma hard at maturity, usually enclosing or clasping the palea and flower, mostly with a well-developed and pointed callus
 - 23 Ligule a ring of hairs; lemma terminating in three awns, the two lateral awns occasionally shortened and inconspicuous *Aristida*
 - 23 Ligule a membrane; lemma terminating in a single awn, this may be deciduous
 - 24 Palea hardened, longitudinally grooved and slightly longer than the lemma, protruding from between the lemma margins as a small point; lemma margins involute, fitting into the grooves of the palea *Piptochaetium*
 - 24 Palea usually membranous, not grooved, shorter than or equaling the lemma, not protruding as a small point; lemma margins flat
 - 25 Lemma margins strongly overlapping; palea less than 1/3 the length of the lemma, glabrous, lacking veins *Nassella*
 - 25 Lemma margins not or only slightly overlapping; palea 1/3 to equaling the length of the lemma, always pubescent when short, sometimes glabrous when longer, 2-veined
 - 26 Awns 6-20 cm long or more; glumes longer than 1.8 cm
 - 27 Membranous ligules of lower leaves densely ciliate, with hairs 0.3-1 mm long *Pappostipa*
 - 27 Membranous ligules of lower leaves glabrous or at most minutely ciliate *Hesperostipa*
 - 26 Awns 0.5-7.5 cm long, if longer than 6 cm then the glumes 1-1.5 cm long
 - 28 Palea pubescent, the apex flat, the veins terminating below the apex; lemma coriaceous at maturity but not strongly indurate
 - 29 Glumes without evident nerves, the apices rounded to acute; plants alpine, growing on mossy hummocks in wet ground *Ptilagrostis*
 - 29 Glumes with 1-5 evident nerves and/or the apices attenuate; plants growing in various habitats, but rarely as above
 - 30 Plants with neither woody nor bamboo-like culms 3-6 mm thick, with mostly 2-3 nodes *Eriocoma*
 - 30 Plants with ± woody, bamboo-like culms 3-6 mm thick below, with 3-13 nodes *Pseudoeriacoma*
 - 28 Palea glabrous or pubescent, the apex appearing prow-tipped or pinched, the veins extending to the apex; lemma indurate at maturity
 - 31 Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part *Piptatheropsis*
 - 31 Florets terete; lemma margins slightly overlapping, the palea hidden *Oryzopsis*
 - 22 Lemma not hard (somewhat so in *Apera* but then the rachilla prolonged beyond the palea), not enclosing the flower and palea; mostly without a well-developed callus
 - 32 Inflorescence spike-like or head-like, the branches absent or highly shortened
 - 33 First glume 2-nerved with 2 or 3 awns; lower stems angled or flattened somewhat *Muhlenbergia*
 - 33 First glume 1-nerved with a single awn or awnless; lower stems rounded
 - 34 Glumes plumose; spikelets in dense ovoid heads, rarely any more than 2 times longer than wide; plants annual with markedly pubescent sheaths and blades, grown for ornament and dried bouquets, rarely escaping *Lagurus*
 - 34 Plants not as above in all respects
 - 35 Glumes awnless; lemma awned *Alopecurus*
 - 35 Glumes awned
 - 36 Glumes strongly flattened laterally, ciliate on the keeled midnerve *Phleum*
 - 36 Glumes rounded, not keeled, not ciliate on the midnerve, but may be pubescent on the body *Polypogon*
 - 32 Inflorescence a panicle with evident branches
 - 37 Disarticulation below the glumes
 - 38 First glume with 2 or 3 awns; spikelets falling in pairs *Muhlenbergia*
 - 38 First glume with a single awn or awnless

- 39 Spikelets nearly circular in outline; glumes and lemma awnless (glumes with a tiny point, but not awned) ..
..... *Beckmannia*
- 39 Spikelets elongate, not circular in outline; glume and/or lemmas awned
- 40 Glumes awnless; lemma awned
- 41 Panicle loose, the branches at least 5 cm long and drooping at maturity *Cinna*
- 41 Panicle cylindrical, dense, the branches very short *Alopecurus*
- 40 Glumes awned
- 42 Glumes strongly flattened laterally, ciliate on the keeled midnerve *Phleum*
- 42 Glumes rounded, not keeled, not ciliate on the midnerve, but may be pubescent on the body
..... *Polypogon*
- 37 Disarticulation above the glumes
- 43 Glumes strongly flattened laterally, ciliate on the keeled midnerve *Phleum*
- 43 Glumes rounded, not keeled, not ciliate on the midnerve
- 44 Lemma awned from the back, at about the middle or below
- 45 Floret with a tuft of hairs at the base; rachilla prolonged beyond the palea as a slender bristle.....
..... *Calamagrostis*
- 45 Floret without a tuft of hairs at the base; rachilla not prolonged beyond the palea..... *Agrostis*
- 44 Lemma awned from the apex or just below
- 46 Rachilla prolonged beyond the palea as a slender bristle; plants annual *Apera*
- 46 Rachilla not prolonged beyond the palea; plants annual or perennial *Muhlenbergia*

KEY G: Paniceae Tribe.

- 1 Spikelets subtended by one or more bristles or enclosed in an involucre of spines or bristles
- 2 Spikelets subtended by one to several bristles, these remaining on the plant when the spikelets fall *Setaria*
- 2 Spikelets enclosed in a bowl-like cluster (bur or involucre) of bristles or flattened spines, these falling with the spikelets and not remaining on the plant
- 3 Bur of sharp spines, sometimes also with a whorl of bristles *Cenchrus*
- 3 Bur of bristles, without spines *Pennisetum*
- 1 Spikelets not subtended by bristles or spines
- 4 Inflorescence spike-like, the spikelets embedded in the side of a somewhat corky rachis *Stenotaphrum*
- 4 Inflorescence a panicle, the spikelets not at all embedded in the rachis
- 5 Spikelets covered with long, silky, reddish hairs 2-4 mm long *Melinis*
- 5 Spikelets glabrous or pubescent, but any hairs never as above
- 6 First glume usually less than 0.5 mm long, absent or vestigial
- 7 Inflorescence an open rebranched panicle, the spikelets on long pedicels *Leptoloma*
- 7 Inflorescence a panicle of unbranched branches, the spikelets sessile or short-pedicelled
- 8 Spikelets with a small cup-like structure at the base (the first glume); lemma of upper floret awn-tipped..... *Eriochloa*
- 8 Spikelets without a cup-like structure at the base; lemma of upper floret not awn-tipped
- 9 Spikelets rounded on one side and flattened on the other, orbicular to ovate in outline; margins of the lemma of the upper floret firm and hard when mature, the apex rounded *Paspalum*
- 9 Spikelets not rounded and flattened as above, lanceolate in outline; margins of the lemma of the upper floret thin and translucent when mature, the apex acute to acuminate
- 10 Spikelets glabrous or with short, stiff hairs; plants annual *Digitaria*
- 10 Spikelets silky-pubescent with long, whitish hairs; plants perennial
- 11 Panicles with 3 or more nodes, the branches not subdigitate; plants known in the wild, relatively common.....
..... *Trichachne*
- 11 Panicles with only 1-2 nodes, the branches subdigitate; plants not known in the wild (*D. eriantha*) ... *Digitaria*
- 6 First glume usually more than 0.5 mm long, well-developed, evident
- 12 Ligule absent, the ligular region glabrous; plants annual *Echinochloa*
- 12 Ligule present, the ligular region often pubescent; plants annual or perennial
- 13 Lemma of the upper floret with a stiff bristle projecting from the otherwise blunt apex *Urochloa*
- 13 Lemma of the upper floret without a bristle, the apex rounded to acute
- 14 Plants stoloniferous perennials..... *Hopia*
- 14 Plants tufted annuals or perennials
- 15 Inflorescence a panicle of simple or nearly simple spicate branches; spikelets nearly sessile; back of fertile lemma and second glume turned toward the branch axis; plants annual..... *Urochloa*
- 15 Inflorescence an open rebranched panicle; spikelets often pedicelled; back of fertile lemma and second glume turned away from the branch axis; plants annual or perennial
- 16 Palea of the lower floret inflated, enlarged, obovate, forcing the spikelet to gape open; rare or extirpated plants not known in NM since 1895 *Steinchisma*
- 16 Palea of the lower floret not inflated as above, the spikelet closed (except open somewhat during anthesis); including many common grasses
- 17 Sheaths keeled; lemmas of fertile florets finely roughened-rugose, dull; bases of culms mostly thickened into bulb-like corms *Zuloagaea*
- 17 Sheaths rounded; lemmas of fertile florets smooth and shiny; bases of culms never thickened into bulb-like corms

- 18 Plants perennial, with two distinct growth phases: during the cool season producing a basal rosette of short broad blades and terminal panicles; during the warm season producing much-branched lateral shoots with small axillary panicles; palea of lower floret vestigial..... *Dichantheium*
- 18 Plants annual or perennial, with a single growth phase; basal rosettes not produced; flowering during the warm season only; palea of lower floret vestigial to well-developed..... *Panicum*

KEY H: Lemmas 3-nerved; florets more than one.

- 1 Some spikelets (female ones) with long awns 5 cm or more long; plants stoloniferous, monoecious or dioecious, with awnless male spikelets *Scleropogon*
- 1 All spikelets with awns less than 1 cm long or awnless; plants stoloniferous or tufted, unisexual in *Bouteloua dactyloides* or bisexual
 - 2 Spikelets in dense, sessile, head-like clusters closely subtended and mostly surpassed by the leaves
 - 3 Disarticulation below the glumes, the spikelets in bony clusters and falling together; plants strongly stoloniferous perennials (*B. dactyloides*)..... *Bouteloua*
 - 3 Disarticulation above the glumes, the spikelets not falling in bony clusters; plants annual or perennial, stoloniferous or tufted
 - 4 Plants annual; blades mostly flat (*M. squarrosa*) *Munroa*
 - 4 Plants perennial; blades mostly rolled and needle-like
 - 5 Plants tufted, lacking stolons; lemmas with 3 ciliate awns from the nerves..... *Blepharidachne*
 - 5 Plants producing short stolons; lemmas with a single awn, the lateral nerves extending into lobes (*M. pulchella*)... *Munroa*
 - 2 Spikelets not in dense, sessile, head-like clusters, and/or elevated well above the leaves
 - 6 Inflorescence a panicle of definite and obvious spicate or racemose unbranched primary branches
 - 7 Spikelets all male, 2-flowered with orange-red anthers; lemmas awnless (*B. dactyloides*) *Bouteloua*
 - 7 Combination of features otherwise
 - 8 Panicle branches all digitate or in whorls near the apex of the main axis
 - 9 Spikelets with 2-several well-developed, bisexual florets
 - 10 Second glume and some lemmas short-awned or mucronate; rachis projecting as a stiff point beyond the terminal spikelet *Dactyloctenium*
 - 10 Second glume and lemmas awnless; rachis not projecting beyond the terminal spikelet *Eleusine*
 - 9 Spikelets with 1 well-developed, bisexual floret with 1-4 rudimentary and mostly neuter florets above it
 - 11 Spikelets awnless; the upper rudimentary floret single and represented by a minute scale *Cynodon*
 - 11 Spikelets awned (awnless or mucronate in *Chloris submutica*); the upper rudimentary florets 1-4 in number and obvious
 - 12 Lemma of the lower floret with 3 awns 8-12 mm long *Leptochloa*
 - 12 Lemma of the lower floret with a single awn or awnless *Chloris*
 - 8 Panicle branches distributed all along the main axis and most not in whorls, or with a single branch only
 - 13 Spikelets with a single fertile, well-developed floret and with 1-3 smaller, rudimentary florets above..... *Bouteloua*
 - 13 Spikelets with usually 3-many fertile, well-developed florets
 - 14 Axils of primary panicle branches with tufts of long hairs; spikelets mostly few and widely spaced on each branch. *Eragrostis*
 - 14 Axils of primary panicle branches glabrous; spikelets mostly numerous and usually crowded on each branch
 - 15 Plants perennial..... *Disakisperma*
 - 15 Plants annual
 - 16 Ligules 2-8 mm long, attenuate, not lacerate except by tearing *Diplachne*
 - 16 Ligules 1-3 mm long, truncate to rounded, often erose or lacerate..... *Dinebra*
 - 6 Inflorescence a raceme, or a panicle of rebranched primary branches
 - 17 Sheath margins fused together for ½ their length or more
 - 18 Spikelets less than 5 mm long *Catabrosa*
 - 18 Spikelets usually more than 10 mm long *Bromus*
 - 17 Sheath margins overlapping for most of their length
 - 19 Lemmas pubescent on the nerves or at the base (except *Tridens albescens*), the midnerve usually exerted as an awn or short point (except *Poa*)
 - 20 Ligules membranous; lemma midnerves not exerted as a small point..... *Poa*
 - 20 Ligules a ring of hairs, or if membranous (*Triplasiella eragrostoides*) then the lemma midnerve exerted as a small point
 - 21 Plants strongly rhizomatous; lemma nerves glabrous *Redfieldia*
 - 21 Plants lacking rhizomes; lemma nerves pubescent (except *Tridens albescens*)
 - 22 Palea densely long-ciliate on the upper half; plants annual..... *Triplasis*
 - 22 Palea not long-ciliate on the upper half; plants perennial
 - 23 Blades with white margins *Erioneuron*
 - 23 Blades not white-margined
 - 24 Panicles open, loose, the branches spreading to drooping
 - 25 Lemmas 2-3 mm long, only the midnerve projecting as a short point *Triplasiella*
 - 25 Lemmas 3-5 mm long, the midnerve and lateral nerves projecting as short points (*T. flavus*) *Tridens*
 - 24 Panicles narrow, contracted, the branches erect
 - 26 Nerves of the lemma plainly pubescent *Tridentopsis*

- 26 Nerves of the lemma glabrous or pubescent only at the base (*T. albescens*)..... *Tridens*
- 19 Lemmas glabrous on the nerves and at the base, awnless or awned from the back or from a deeply cleft apex
- 27 Ligule a membrane
- 28 Spikelets on long pedicels mostly much longer than the spikelets; plants spreading from stolons or rhizomes *Muhlenbergia*
- 28 Spikelets sessile or nearly so, the pedicels much shorter than the spikelets; plants tufted
- 29 Lemmas conspicuously awned from the back, the awns 3-6 mm long (*K. spicata*, *K. vaseyi*) *Koeleria*
- 29 Lemmas awnless or with an awn to 2 mm long
- 30 Second glume broadened below the middle; lemmas commonly short-awned, the awn 0-2 mm long; palea colored, at least on the nerves *Grappophorum*
- 30 Second glume broadened above the middle; lemmas completely awnless; palea colorless, scarious, white (*K. macrantha*) *Koeleria*
- 27 Ligule a ring of hairs
- 31 Panicles dense, congested, spike-like, usually light greenish or whitish; lemmas notched at the apex with a minute point; plants perennial (*T. albescens*)..... *Tridens*
- 31 Panicles usually open, loose, often olive or dark colored; lemmas lacking a minute notch and point; plants annual or perennial
- 32 Plants with extensive creeping rhizomes; blades very stiff and sharp-pointed *Kalinia*
- 32 Plants lacking rhizomes or with short knotty rhizomes only; blades usually rather lax, not sharp-pointed..... *Eragrostis*

KEY I: Lemmas with 5-many nerves; florets more than one.

- 1 Glumes and lemmas stiff-ciliate on the midnerves and keels; spikelets arranged in dense, one-sided clusters at the branch tips; sheath margins fused together *Dactylis*
- 1 Glumes and lemmas glabrous or variously pubescent but not ciliate on the midnerves and keels; spikelets not so arranged; sheath margins fused or overlapping
- 2 Sheath margins fused together 3/4 or more their length
- 3 Callus of the floret with a prominent tuft of stiff hairs (otherwise glabrous) and lemmas prominently awned..... *Schizachne*
- 3 Callus of the floret lacking a tuft of hairs and/or lemmas awnless
- 4 Nerves of the lemma 7 in number, nearly parallel, not converging at the truncate or rounded apex *Glyceria*
- 4 Nerves of the lemma 3-11 in number, converging at the obtuse to acute apex, if parallel then less than 7 in number
- 5 Spikelets awned, or if awnless then longer than 15 mm; palea and grain strongly adherent to each other when mature *Bromus*
- 5 Spikelets awnless and shorter than 15 mm; palea and grain free from each other when mature
- 6 Spikelets on mostly racemose unbranched primary branches, hanging like flags away from the axis; upper florets empty, inrolled and represented by a club-shaped rudiment *Melica*
- 6 Spikelets variously arranged, but mostly on rebranched primary branches; upper florets usually not empty nor as above *Poa*
- 2 Sheath margins free from each other, overlapping, or fused only at the lower 1/3 or less
- 7 Disarticulation below the glumes
- 8 Florets 2 per spikelet, the upper with a short hooked awn, the lower awnless *Holcus*
- 8 Florets 2-several per spikelet, all either awnless or awned, but the awn never short and hooked..... *Sphenopholis*
- 7 Disarticulation above the glumes
- 9 Spikelets (glumes and/or lemmas) awned
- 10 Inflorescence a panicle of unbranched, spicate primary branches all clustered toward the apex of the stalk; plants annual.. *Chloris*
- 10 Inflorescence a panicle, but the main branches rebranched or the spikelets on obvious pedicels; plants annual or perennial
- 11 Florets 3 per spikelet, the lower two florets sterile, silky with brownish hairs, and awned, the upper floret fertile, glabrous, awnless, hidden within the sterile florets and appearing as the hardened grain..... *Anthoxanthum*
- 11 Florets not as above
- 12 Florets dissimilar, some awned, some awnless
- 13 Glumes large, more than 15 mm long *Avena*
- 13 Glumes small, less than 12 mm long
- 14 Plants perennial, robust, to 1 m or more tall; mountain plants *Arrhenatherum*
- 14 Plants annual, delicate, to 30 cm or so tall; disturbed ground *Aira*
- 12 All florets alike and awned
- 15 Glumes not extending beyond the lowermost floret
- 16 Spikelets 2(4)-flowered; awn arising from the back of the lemma or from a deeply cleft apex *Koeleria*
- 16 Spikelets mostly 3- to many-flowered; awn arising from an entire apex
- 17 Plants annual *Vulpia*
- 17 Plants perennial; flowers with 3 stamens
- 18 Auricles present; blades mostly wider than 3 mm, flat when fresh..... *Schedonorus*
- 18 Auricles absent; blades mostly narrower than 3 mm, rolled and somewhat stiff (but see *F. sororia*)..... *Festuca*
- 15 Glumes, at least the second, equal to or surpassing the lowermost floret
- 19 Lemmas awned from the back or base
- 20 Spikelets not large, the glumes 2-8 mm long

- 21 Awn of the lemma attached above the middle; lemmas 4-9 mm long (sometimes slightly shorter) .
..... *Koeleria*
- 21 Awn of the lemma attached below the middle; lemmas 1.5-4 mm long (sometimes slightly longer) *Deschampsia*
- 20 Spikelets large, the glumes 10-30 mm long
 - 22 Plants annual; glumes 18-30 mm long *Avena*
 - 22 Plants perennial; glumes 10-15 mm long
 - 23 Panicles 2-5 cm long; blades rolled, usually pubescent..... *Helictotrichon*
 - 23 Panicles 5-15 cm long; blades flat or folded, mostly glabrous..... *Avenula*
- 19 Lemmas awned from an entire or cleft apex, if cleft the awn arising from the sinus at the tip of the midnerve, or lemmas awnless
 - 24 Awns of the lemma minute and nearly obsolete, scarcely visible *Schismus*
 - 24 Awns of the lemma well-developed, easily visible
 - 25 Spikelets mostly 2-3-flowered, 3.5-6.5 mm long; rachilla extending beyond the uppermost floret ..
..... *Koeleria*
 - 25 Spikelets 3- to 7-flowered, 6-15 mm long; rachilla not extending beyond the uppermost floret.....
..... *Danthonia*
- 9 Spikelets (glumes and lemmas) awnless or at most with an awn tip no more than 1 mm long
 - 26 Glumes mostly longer than 2 cm and longer than the florets..... *Avena*
 - 26 Glumes shorter than 2 cm and/or shorter than the florets
 - 27 Spikelets appearing 1-flowered, but the large fertile floret subtended by 1 or 2 smaller scales or bristles representing rudimentary florets, these often appressed to the fertile floret and not immediately apparent *Phalaris*
 - 27 Spikelets not as above
 - 28 Glumes and lemmas at maturity stiff, firm, greenish to straw-colored; leaves distichous, the lower ones bladeless as the stems grade into rhizomes; lemmas 7- to 11-nerved, the nerves obscure; plants strongly rhizomatous, dioecious perennials of alkaline areas and flood plains *Distichlis*
 - 28 Glumes and lemmas pliable, thin, often greenish to purplish (stiff in the annual *Catapodium*); leaves not distichous, the lower ones usually with well-developed blades; lemmas generally 5- to 7-nerved (9-nerved in the annual *Schismus*); plants annual or perennial, of various habitats
 - 29 Glumes and lemmas spreading at right angles to the rachilla, inflated and papery; florets and spikelets about as wide as long; spikelets on long capillary pedicels, resembling the rattles of a rattlesnake *Briza*
 - 29 Glumes, lemmas, florets, and spikelets not all as above
 - 30 First glume 5- to 7-nerved; blades thread-like; small tufted annuals of sandy desert areas..... *Schismus*
 - 30 First glume 1- to 3-nerved; blades thread-like to much broader; annuals and perennials of various habitats
 - 31 Glumes, at least the second, equaling or surpassing the lowermost floret
 - 32 Florets 3 in number, the lower (outer) 2 as large as the upper (middle) one but male, their margins prominently ciliate, the upper (middle) floret fertile, somewhat hardened, and pubescent at the tip..... *Hierochloe*
 - 32 Florets not as above
 - 33 Second glume broadened below the middle; lemmas commonly short-awned, tiny but visible; palea colored, at least on the nerves *Grappheporum*
 - 33 Second glume broadened above the middle; lemmas completely awnless; palea colorless, scarious, white *Koeleria*
 - 31 Glumes, at least one but usually both, not extending beyond the lowermost floret
 - 34 Lemmas awned or narrowing at the apex to an awn-tip
 - 35 Auricles present; blades mostly wider than 3 mm, flat when fresh..... *Schedonorus*
 - 35 Auricles absent; blades mostly narrower than 3 mm, rolled and somewhat stiff (but see *F. sororia*)..... *Festuca*
 - 34 Lemmas completely awnless, often blunt
 - 36 Second glume broadened above the middle; palea colorless, scarious, white; pedicels puberulent..... *Koeleria*
 - 36 Second glume, palea, and pedicels not all as above
 - 37 Inflorescence scarcely branched, the spikelets on short stout pedicels ± on the main axis; plants annual *Catapodium*
 - 37 Inflorescence noticeably branched, the spikelets not borne as above; plants annual or perennial
 - 38 Plants rhizomatous and dioecious; glumes hyaline and translucent..... *Leucopoa*
 - 38 Plants not rhizomatous and dioecious and with translucent glumes
 - 39 Sheath margins fused at least at the base; nerves of the lemma converging toward the acute apex; base of lemma with or without a tuft of cobwebby hair...
..... *Poa*
 - 39 Sheath margins overlapping at the base; nerves of the lemma ± parallel, not converging toward the truncate apex; base of lemma never with a tuft of cobwebby hairs

- 40 Nerves of the lemma conspicuous; plants with creeping rhizomes; blades mostly flat, 4-15 mm wide; plants of freshwater habitats.....**Torreyochoa**
- 40 Nerves of the lemma obscure; plants tufted, lacking rhizomes; blades rolled, or if flat then 1-3(4) mm wide; plants of usually alkaline or saline habitats..

Aegilops [a name used by Theophrastus for a kind of wild oat] GOATGRASS [1].

Tufted annuals; sheaths open; auricles present, ciliate; ligules membranous; blades flat; inflorescence a jointed spike with segments that break apart in maturity, with 1 spikelet per node; spikelets with 2-7 florets, the distal ones sterile; glumes ovate, several-nerved, sometimes indurate, awned or awnless; lemmas rounded, mostly awned; anthers 3.

■Gupta, P.K. & B.R. Baum. 1986. Nomenclature and related taxonomic issues in wheats, triticales and some of their wild relatives. *Taxon* 35(1):144-149.

***Aegilops cylindrica** Host [cylindrical] JOINTED GOATGRASS [*Triticum cylindricum* (Host) Cesati]. Annual, 15-50 cm tall, erect to decumbent at the base, usually highly branched basally; sheaths with hyaline margins; spikes 3-12 cm long, about 3 mm wide; spikelets with 3-5 florets, the lower 2-3 fertile; glumes of upper spikelets with awns 3-6 cm long. ●A troublesome weed of crop fields and roadsides, along railroads, disturbed ground; widely distributed throughout the state and expected in every county; native to the Mediterranean region and central Asia. ◆JOINTED GOATGRASS hybridizes with wheat, *Triticum aestivum*, and is sometimes placed in that genus.



Aegopogon [goat-beard, alluding to the cluster of awns] [1].

Tufted annuals and perennials; sheaths open; auricles absent; ligules membranous; inflorescence raceme-like, the spikelets borne on delicate pedicels that join at the base to form a cluster of 3 spikelets, the cluster falling entire; spikelets with 1 floret, the lateral spikelets highly reduced to well-developed, staminate or sterile, the central spikelet well-developed and fertile; glumes shorter than the florets; lemmas 3-nerved, awned; anthers 3. ◆Peterson et al. (2010) recently demonstrated the phylogenetic affinity of *Aegopogon* within *Muhlenbergia*, and recommended its submergence into that genus. We do not dispute the validity of their argument, but choose to maintain *Aegopogon* as a paraphyletic genus because of its distinctive morphology.

■Peterson, P.M., K. Romaschenko, & G. Johnson. 2010. A phylogeny and classification of the Muhlenbergiinae (Poaceae: Chloridoideae: Cynodonteae) based on plastid and nuclear DNA sequences. *Amer. J. Bot.* 97(9):1532-1554.

Aegopogon tenellus (A.P. de Candolle) Trinius [tender, delicate, or soft] FRAGILE-GRASS [*Aegopogon cenchroides* Humboldt & Bonpland ex Willdenow var. *abortivus* Fournier, *Aegopogon tenellus* (A.P. de Candolle) Trinius var. *abortivus* (Fournier) Beetle, *Lamarckia tenella* A.P. de Candolle, *Muhlenbergia geminiflora* (Kunth) P.M. Peterson]. Tufted annual, 2-25 cm tall; blades flat, 1-2 mm wide; racemose panicles 2-6 cm long; pedicels of the lateral spikelets 1-1.3 mm long, those of the central spikelets 0.3-0.6 mm long; glumes 1-2 mm long, fan-shaped, with short awns; lemmas 2.5-3.2 mm long, with a central awn 3-8 mm long. ●Known only from desert plains and foothills of the bootheel region, in shaded canyons and beneath shrubs and trees, sometimes roadsides. ◆A form with rudimentary awns has been referred to var. *abortivus* (Fournier) Beetle, but these are found mixed in the same inflorescence with awned spikelets. When classed in *Muhlenbergia*, our plants take the name *M. geminiflora*, as the epithet *tenella* is previously occupied by *M. tenella* (Kunth) Trinius.



Agropyron [wild wheat] WHEATGRASS [2].

Tufted perennials; sheaths overlapping; auricles present; ligules membranous; inflorescence a spike with very short internodes between the spikelets; spikelets single per node, longer than the internodes, diverging sharply from the main axis, several-flowered; disarticulation above the glumes, between the florets; glumes shorter than the florets, keeled on the midnerve; lemmas 5-7-nerved; anthers 3. ◆Most species previously found in *Agropyron* are treated in the genera *Elymus* or *Eremopyron* herein, but also in the genera *Pascopyrum*, *Pseudoroegneria*, and *Thinopyrum* in other works; the remaining species of *Agropyron* are native to Eurasia, but have been introduced throughout much of the world's rangelands.

■Asay, K.H., K.B. Jensen, C. Hsiao, & D.R. Dewey. 1992. Probable origin of standard crested wheatgrass, *Agropyron desertorum* (Fischer ex Link) Schultes. *Can. J. Plant Sci.* 72:763-772. ■Baum, B.R., J.R. Estes, & P.K. Gupta. 1987. Assessment of the genomic system of classification in the Triticeae. *Amer. J. Bot.* 74:1388-1395. ■Bowden, W.M. 1965. Cytotaxonomy of the species and interspecific hybrids of the genus *Agropyron* in Canada and neighboring areas. *Can. J. Bot.* 43:1421-1448. ■Dewey, D.R. 1983. Historical and current taxonomic perspectives of *Agropyron*, *Elymus*, and related genera. *Crop Sci.* 23:637-642. ■Dewey, D.R. 1986. Taxonomy of the crested wheatgrasses (*Agropyron*). p. 31-44. IN: Johnson, K.L. (ed.). *Crested wheatgrass: its values, problems and myths; a symposium*. Utah State University. ■Estes, J.R. & R.J. Tyrl. 1982. The generic concept and generic circumscription in the Triticeae: an end paper. IN J.R. Estes, R.J. Tyrl, & J.N. Brunken (eds.), *Grasses and Grasslands*. p. 145-164. Univ. Oklahoma Press. Norman, Oklahoma. ■Great Plains Flora Association. 1977. Atlas of the Flora of the Great Plains [*Agropyron cristatum pectiniforme*]. Iowa State Univ. Press. 600 pp. ■Holmgren, A.H. & N.H. Holmgren. 1977. Tribe 3. Triticeae, pp. 292-336. IN: Intermountain Flora, vol. 6. New York Botanical Garden. ■Runemark, H. & W.K. Heneen. 1968. *Elymus* and *Agropyron*, a problem of generic delimitation. *Bot. Notiser* 121:51-79.

1 Lemmas with an awn 1-6 mm long; spikelets diverging from the rachis at angles of 30-95°, often giving the spike a bristly appearance..... **A. cristatum**

1 Lemmas awnless or at most mucronate; spikelets scarcely diverging from the rachis at angles less than 30°, the spike not at all bristly..... **A. fragile**

***Agropyron cristatum** (Linnaeus) Gaertner [crested] CRESTED WHEATGRASS [*Agropyron cristatum* (Linnaeus) Gaertner subsp. *pectinatum* (Bieberstein) Tzvelev, *Agropyron desertorum* (Fischer ex Link) Schultes, *Agropyron pectiniforme* Roemer & Schultes]. Tufted, but occasionally producing short rhizomes, 25-85 cm or more tall; spikes 2-15 cm long, 0.5-2.5 cm wide, sometimes tapering distally; glumes 3-6 mm long with awns 1-3 mm long; lemmas 5-9 mm long with awns 1-6 mm long. ●Widely introduced for rangeland rehabilitation (so-called) and soil stabilization, except in the southern desert; native to Asia. ◆Includes the cultivars Fairway, Parkway, Ruff, and Standard. §



***Agropyron fragile** (Roth) P. Candargy [fragile] SIBERIAN WHEATGRASS [*Agropyron cristatum* (Linnaeus) Gaertner subsp. *fragile* (Roth) Löve, *Agropyron sibiricum* (Willdenow) Beauvois, *Triticum fragile* Roth]. Tufted, never rhizomatous, 30-70 cm or more tall; spikes 8-15 cm long, 0.5-1.3 cm wide; glumes 3-5 mm long with awns 1-3 mm long; lemmas 5-9 mm long, awnless. ●Old fields, roadsides; known as yet only from a few scattered counties; native to Asia.



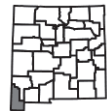
Agrostis [field or pasture] BENTGRASS [8].

Perennial, sometimes with rhizomes or stolons; sheaths open; auricles absent; ligules membranous; inflorescence a rebranching panicle; spikelets 1-flowered; glumes exceeding the floret, awnless or rarely with a short awn; lemmas 3-5-nerved, unawned or awned; paleas minute to as long as the lemma; anthers 1 or 3.

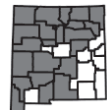
■Bjorkman, S.O. 1960. Studies in *Agrostis* and related genera. *Symb. Bot. Upsal.* 17:1-112. ■Kik, C., J. Van Andel, & W. Joenje. 1990. Life-history variation in ecologically contrasting populations of *Agrostis stolonifera*. *J. Ecology* 78:962-973. ■Reeder, C.G. & J.R. Reeder. 1986. *Agrostis elliottiana* (Gramineae) new to Arizona and New Mexico. *Phytologia* 60:453-458. ■Reeder, C.G. & J.R. Reeder. 1989. A further note on *Agrostis elliottiana*. *Phytologia* 67(2):134-138. ■Swallen, J.R. 1948. *Agrostis variabilis* Rydberg, a valid species. *Leafl. W. Bot.* 5:123-125.

- 1 Palea well-developed, 0.5-2 mm long, ½ to ¾ the length of the lemma
 - 2 Panicle dense, compact, interrupted; spikelets usually disarticulating below the glumes (*P. viridis*)go to *Polygogon*
 - 2 Panicle open or closed but not dense nor compact; spikelets disarticulating above the glumes
 - 3 Plants 3-20 cm tall; anthers 0.5-0.7 mm long; rachilla prolonged beyond the floret; alpine and subalpine meadows and boggy ground (*P. humilis*)..... go to *Podagrostis*
 - 3 Plants taller, mostly 40 or more cm tall; anthers 0.8-1.4 mm long; rachilla not prolonged beyond the floret; occurring in a wide variety of habitats, and common at lower elevations
 - 4 Panicles open during anthesis but contracted thereafter and when mature, mostly 1-1.5 cm broad, the branches erect-appressed; plants often stoloniferous and decumbent at the base, if short rhizomes developed then these bearing no more than 3 scale leaves.....*A. stolonifera*
 - 4 Panicles open both during and after anthesis, more than 1.5 cm broad, the branches ascending to widely spreading; plants with well developed rhizomes bearing more than 3 scale leaves, not stoloniferous, erect at the base *A. gigantea*
- 1 Palea obsolete or a small scale less than 0.4 mm long, never as much as ½ the length of the lemma
 - 5 Panicle narrow, contracted, several times longer than broad, at least some of the branches spikelet-bearing to the base
 - 6 Stems slender, generally not much more than 20 cm tall; blades mostly not more than 1 mm wide.....*A. variabilis*
 - 6 Stems usually stout; mostly much more than 20 cm tall; blades mostly 2-10 mm wide.....*A. exarata*
 - 5 Panicle open to diffuse, often less than 3 times longer than broad, the branches naked at the base
 - 7 Lemmas with a slender, flexuous awn; plants annual; anther 1*A. eliottiana*
 - 7 Lemmas awnless or with a straight awn; plants perennial, though they may appear annual; anthers 3
 - 8 Cauline leaves well-developed, the basal ones often withered by anthesis; blades 2-5 mm wide, flat, 6-20 cm long*A. perennans*
 - 8 Cauline leaves weakly developed, the basal ones usually persistent or at least not withered; blades 1-2 mm wide, rolled to flat, 1-14 cm long
 - 9 Lower panicle branches 1-4 cm long; panicle not detaching at maturity; blades 1-7 cm long.....*A. ×idahoensis*
 - 9 Lower panicle branches 4-12 cm long; panicle often detaching at the base at maturity; blades 4-14 cm long..... *A. scabra*

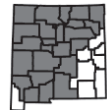
Agrostis eliottiana Schultes [for Stephen Elliott (1771-1830), prominent citizen of the Carolinas] [*Agrostis exigua* Thurber, *Agrostis rosei* sensu Wooton & Standley]. Annual, 5-35 cm tall; basal leaves withered by anthesis; panicles 3-18 cm long, open and diffuse when mature, the branches ultimately widely spreading or drooping and rebranched beyond midlength; spikelets 1.5-2 mm long; lemmas with a flexuous awn 3-10 mm long; paleas absent or minute. ●Along stream banks and in moist woods of the southern desert mountains, uncommon; known only from a few collections in Hidalgo County.



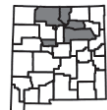
Agrostis exarata Trinius [furrowed, alluding to the grooves between the nerves]. Perennial, 20-80 cm tall, sometimes decumbent-based or short-rhizomatous; blades flat when fresh, 2-7 mm wide; panicles narrow, contracted, 8-28 cm long, 1-4 cm wide; spikelets 1.5-3.5 mm long; lemmas unawned (ours); paleas less than 0.5 mm long. ●Widespread in all the mountains and surrounding foothills and plains, in moist meadows, stream banks, and shady understory. ♦Our plants belong to var. *minor* Hooker [smaller], with unawned lemmas. When abundant, plants provide excellent forage for livestock, elk, and deer. §



****Agrostis gigantea*** Roth [gigantic] REDTOP [*Agrostis alba* of numerous authors]. Plants perennial, 20-100 or more cm tall, with short to rather long (20 cm) rhizomes; leaves mostly cauline; blades 3-8 mm wide; panicles 10-25 cm long, 3-12 cm wide, open both during and after anthesis, some branches spikelet-bearing to the base; spikelets green to purple, 1.7-3.2 mm long; lemmas awnless (rarely with a short awn); paleas about half the length of the lemma. ●Moist pastures, ditches, stream banks, meadows, very widespread and expected in all the counties; native to Europe. ♦Similar to *Agrostis stolonifera*, and both are called redtop, differing most conspicuously in the always open panicle; this species seems to be far more common in New Mexico.



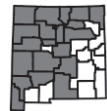
Agrostis ×idahoensis Nash [from Idaho] [*Agrostis bakeri* Rydberg]. Perennial, 8-40 cm tall; leaves mostly basal; panicles 3-13 cm long, 1-6 cm wide, open and diffuse, the branches spreading and rebranching above the middle; spikelets 1.5-2.5 mm long; lemmas awnless; paleas less than 0.2 mm long. ●Wet meadows, seeps, and moist ground at high elevations in the northern mountains; there are few collections from New Mexico. ♦This is a catch-all name for intermediates (presumably due to hybridization) between *A. scabra* and *A. variabilis*, and could be merged with the former.



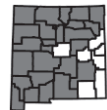
Agrostis perennans (Walter) Tuckerman [perennial] [*Cornucopiae perennans* Walter]. Perennial, 20-80 cm tall; leaves mostly cauline with flat blades 2-5 mm wide; panicles 10-25 cm long, to 11 cm wide, the branches ascending to spreading, rebranching at or below the middle; spikelets 1.8-3.2 mm long; lemmas awnless (rarely awned to 2 mm); paleas absent or to 0.1 mm long. ●Stream banks, moist meadows, shady roadsides; not common; northern and western mountains. ♦Well-developed cauline leaves with broad, flat blades are distinctive. Most plants called this belong to *Agrostis scabra*, but there are a few authentic specimens, both old (1897) and recent (1986).



Agrostis scabra Willdenow [rough] [*Agrostis hiemalis* sensu Wooton & Standley]. Perennial, 10-80 cm tall; leaves mostly basal with rolled blades; panicles 10-40 cm long, to 20 cm wide, the branches widely spreading when mature and rebranching above the middle; spikelets 1.8-3 mm long; lemmas awnless or with an awn to 2 mm; paleas less than 0.2 mm long. ●Meadows, grassy slopes, rocky ground, roadsides, foothills to high mountains throughout the western ¾ of the state. ♦*Agrostis scabra* and the more eastern *A. hiemalis* (Walter) Britton, Stems, & Poggenburg (often spelled *hiemalis*) have been confused in New Mexico, especially in early reports. In *A. hiemalis*, the branches rebranch only in the distal ¼, the pedicels are shorter (to 3.5 mm long), the lemmas are smaller (0.8-1.2 mm), and the anthers are smaller (0.2-0.5 mm). Currently, no verified specimens of *A. hiemalis* are known from the state. §

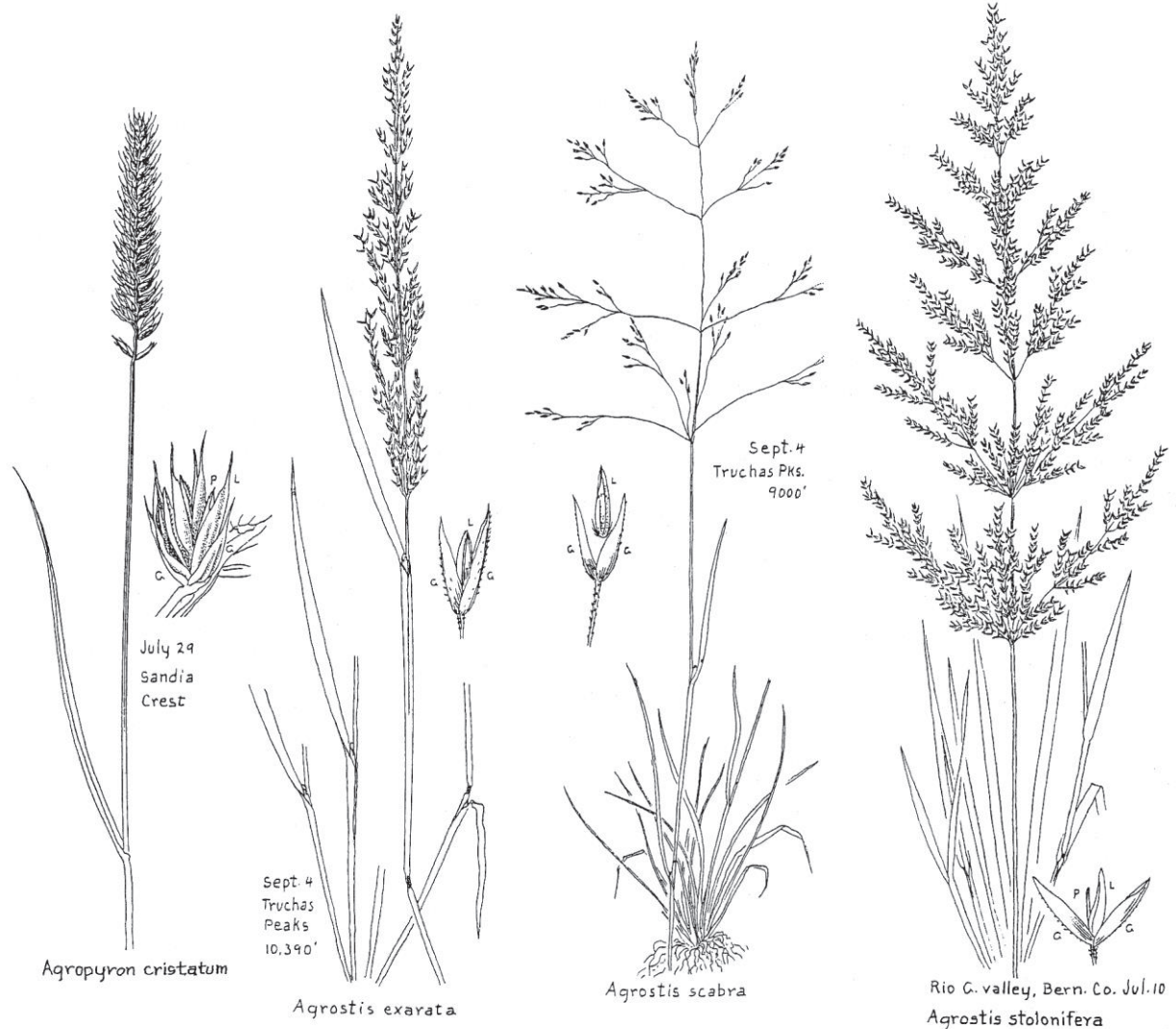


****Agrostis stolonifera*** Linnaeus [bearing stolons] REDTOP [*Agrostis alba* of numerous authors, *Agrostis palustris* Hudson]. Perennial, mostly 30-60 cm tall, with stolons 5-50 cm or more long; blades flat, 2-6 mm wide; panicles narrow and contracted when mature, open during anthesis, mostly 5-16 cm long and 1-4 cm wide, the branches spikelet-bearing to the base; spikelets greenish to purplish, 1.5-3 mm long; lemmas awnless (rarely with a short awn); paleas about half the length of the lemma. ●Moist pastures, ditches, stream banks, meadows, widespread; native to Europe. ♦Similar to



Agrostis gigantea, and both have been called REDTOP, differing most conspicuously in the narrow panicle in maturity; this species seems to be far less common in New Mexico. §

Agrostis variabilis Rydberg [variable, different]. Perennial, 5-20(25) cm tall, mostly tufted or rarely with short rhizomes to 2 cm long; leaves mostly basal in dense tufts; blades 0.5-1.5(2) mm wide; panicles 2-6 cm long, 0.5-1.5 cm wide, narrow and dense, the branches spikelet-bearing to the base; spikelets greenish purple, 1.8-2.5 mm long; lemmas awnless, rarely with a short awn; paleas tiny, about 0.2 mm long. ●Perennial, subalpine and alpine slopes, uncommon in the northern mountains. ◆A small, infrequent species that is similar to *Podagrostis humilis* (not yet known from New Mexico), but differing in its tiny palea and the rachilla not prolonged (the palea large and rachilla prolonged in *P. humilis*).



Aira [an old Greek name for some weedy grass] HAIRGRASS [1].

Tufted annuals; sheaths open; auricles absent; ligules membranous; distal blades highly reduced; inflorescence an open or narrow panicle with capillary branches; spikelets with 2 florets, both usually awned; disarticulation above the glumes and beneath the pair of florets; glumes longer than the florets, awnless; lemmas bifid at the apex, awned from the back below midlength; anthers 3. ◆Several species are grown as ornamental plants for their delicate panicles.

■Adams, T. 1998. New plant distribution records [*Aira elegans*]. *The New Mexico Botanist* 8:10.

**Aira caryophylla* Linnaeus [resembling the genus *Caryophyllus*] SILVER-HAIRGRASS. Tufted annual, 5-45 cm tall; ligules 1-8 mm long; panicle 1-14 cm long, open, nearly as wide; pedicels many-times longer than the spikelets; spikelets 1.7-3.5 mm long; lemma awns 2.1-3.9, protruding past the glumes and visible. ●Found once in New Mexico in 1998; weakly adventive in ornamental plantings in Las Cruces, not likely persisting; native to Europe. ◆Our plants belong to var. *capillaris* (Mertens & W.D.J. Koch) Mutel [hair-like] [*Aira elegans* Willdenow ex Kunth, *Aira elegantissima* Schur].



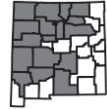
Alopecurus [foxtail] FOXTAIL [5].

Annual or perennial, usually tufted; sheaths overlapping; auricles absent; ligules membranous; inflorescence a spike-like panicle, the branches much reduced; disarticulation below the glumes; spikelets 1-flowered; glumes equaling or longer than the floret, 3-veined, ciliate on the midnerve; lemmas 3-5-nerved, awned from the back just above the base; paleas absent or very small; anthers 3. ◆Other grasses are also commonly called foxtail: *Bromus madritensis*, *Hordeum jubatum*, *Setaria italica*, and *Setaria magna*.

■Dogan, M. 1999. A concise taxonomic revision of the genus *Alopecurus* L. (Gramineae). Turk. J. Bot. 23:245-262. ■Sieber, V.K. & B.G. Murray. 1979. The cytology of the genus *Alopecurus* (Gramineae). Bot. J. Linn. Soc. 79:343-355.

- 1 Spikelets 5-6 mm long
 - 2 Glumes conspicuously ciliate on the keel.....*A. pratensis*
 - 2 Glumes glabrous to scabrous on the keel*A. myosuroides*
- 1 Spikelets 2-4 mm long
 - 3 Awn slightly exerted beyond the glumes, scarcely visible without magnification.....*A. aequalis*
 - 3 Awn well-exserted beyond the lemma, easily visible without magnification
 - 4 Plants annual; anthers 0.3-0.5 mm long*A. carolinianus*
 - 4 Plants perennial; anthers 1.2-2 mm long*A. geniculatus*

Alopecurus aequalis Sobolewsky [equal, referring to the glumes] [*Alopecurus aristulatus* Michaux]. Perennial, 10-70 cm tall, the culms erect to decumbent; upper sheaths not inflated; glumes 1.8-3.5 mm long; lemma awns 0.7-3 mm long, slightly exceeding the glumes and scarcely visible without magnification; anthers golden yellow to orange when mature. ●Ponds, ditches, wet ground; widespread in the state from low to high elevations. §



Alopecurus carolinianus Walter [from the Carolinas]. Annual, 5-50 cm tall, the culms erect to decumbent; upper sheaths not inflated; glumes 2-3 mm long; lemmas awns 3-6 mm long, extending beyond the glumes. ●Moist ground, ditch banks, irrigated ground, fields; uncommon in the southwestern region of the state, with additional records northward, and perhaps elsewhere.



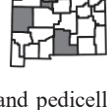
**Alopecurus geniculatus* Linnaeus [bent like a knee]. Perennial, 15-60 cm tall, the lower shoots decumbent and often rooting at the nodes; upper sheaths somewhat inflated; glumes 2-3.5 mm long; lemma awns 3.5-6 mm long, extending beyond the glumes. ●Moist or wet ground, stream and canal banks, irrigated ground; uncommon, mostly in the western region of the state; native to Europe.



**Alopecurus myosuroides* Hudson [resembling *Myosurus*] [*Alopecurus agrestis* Linnaeus]. Annual, 30-80 cm tall; upper sheaths somewhat inflated; glumes 4.5-7.5 mm long; lemma awns 7-12 mm long, extending beyond the glumes; native to Europe. ●Known only from a single collection in the late 1800s from a farm in Las Cruces.



**Alopecurus pratensis* Linnaeus [of meadows]. Perennial with short rhizomes, 30-100 cm tall; upper sheaths not or scarcely inflated; glumes 4-6 mm long; lemma awns 5-10 mm long, extending beyond the glumes. ●Moist woods and ciénegas; uncommon in the mountains, introduced for erosion control and reseeding; native to Europe.



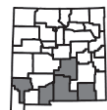
Andropogon [male beard, alluding to the usually hairy staminate spikelets] BLUESTEM [2].

Perennial, tufted or rhizomatous; sheaths overlapping; ligules membranous, sometimes also ciliate; inflorescence a terminal or axillary panicle of 2-several branches; primary branches (the rame) composed of repeating units of sessile and pedicelled spikelets, these units breaking apart at maturity and becoming the dispersal unit; sessile spikelets bisexual and fertile, awned, the 2 glumes enclosing the florets; pedicelled spikelets well-developed and staminate to reduced to a single glume and empty. ♦Formerly a very large and unwieldy genus, *Andropogon* has fittingly been segregated into more meaningful and phylogenetic genera, including *Bothriochloa*, *Capillipedium*, *Dichanthium*, *Heteropogon*, *Ischaemum*, *Schizachyrium*, and *Sorghum*, among others.

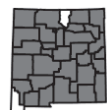
■Barnes, P.W. 1986. Variation in the big bluestem (*Andropogon gerardii*)-sand bluestem (*Andropogon hallii*) complex along a local dune/meadow gradient in the Nebraska sandhills. Amer. J. Bot. 73(2):172-184. ■Campbell, C.S. 1986. Phylogenetic reconstructions and two new varieties in the *Andropogon virginicus* complex (Poaceae: Andropogoneae). Syst. Bot. 11(2):280-292. ■Gould, F.W. 1959. Transfers from *Andropogon* to *Bothriochloa* (Gramineae). Southw. Natural. 3:212. ■Gould, F.W. 1967. The grass genus *Andropogon* in the United States. Brittonia 19:70-76. ■Wipff, J.K. 1996. Nomenclatural combinations in the *Andropogon gerardii* complex (Poaceae: Andropogoneae). Phytologia 80(1):343-347.

- 1 Pedicelled spikelets vestigial or absent; sessile spikelets less than 4 mm long.....*A. eremicus*
- 1 Pedicelled spikelets present, nearly as large as the sessile one; sessile spikelets at least 6 mm long *A. gerardi*

Andropogon eremicus Wipff & Shaw [of the desert] BUSHY BLUESTEM [*Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg var. *scabriglumis* Campbell]. Tufted, 80-150 cm tall; shoots highly branched in the distal half; sheaths scabrous; panicles axillary, partially enclosed in inflated terminal sheaths; sessile spikelets 3-4 mm long; pedicels densely ciliate; pedicelled spikelets absent. ●Seasonally wet places, seeps, and springs in the desert foothills. ♦This species has potential as a landscape ornamental and for dried arrangements. Formerly considered a variety of the eastern *Andropogon glomeratus*.



Andropogon gerardi Vitman [for Louis Gérard (1733-1819), French physician-botanist] BIG BLUESTEM. Perennial, 1-3 m tall; rhizomes, when present, with internodes less than 2 cm long; panicles mostly terminal, with 2-6 rames, often purplish; sessile spikelets 5-12 mm long, with awns 0-20 mm long; pedicelled spikelets 3.5-12 mm long, about the same size and shape as the sessile spikelets; anthers 3. ●Prairies, plains, sand dunes, wooded slopes and forests. ♦An excellent native forage grass; included in many seed mixes, and may have been established in some mountain sites from seeding after fires. We have two subspecies, which intergrade freely when sympatric:



a Awn of sessile spikelet 0-8 mm long; rhizomes well-developed; ligules 2-4.5 mm long; hairs of the rame internodes 3.7-6.6 mm long...subsp. *hallii* (Hackel) Wipff [*Andropogon chrysocomus* Nash, *Andropogon gerardi* Vitman var. *paucipilus* (Nash) Fernald, *Andropogon hallii* Hackel, *Andropogon hallii* Hackel var. *muticus* Hackel]. ●Mostly on the eastern plains, but scattered populations elsewhere. §

a Awn of sessile spikelet 8-20 mm long; rhizomes absent or well-developed; ligules 0.5-2.5 mm long; hairs of the rame internodes 2.2-4.2 mm long...subsp. *gerardi* [*Andropogon furcatus* Muhlenberg]. ●Found essentially throughout the state in a variety of communities, but generally absent from the arid desert areas. §

Anthoxanthum [yellow flower, alluding to the inflorescence] [1].

Tufted annuals and perennials; sheaths open; auricles present to absent; ligules membranous; inflorescence a narrow, sometimes spike-like, poorly developed panicle; spikelets 3-flowered, the 2 lower (lateral) ones awned and sterile, the upper (central) one smaller, awnless, and fertile; disarticulation above the glumes, the florets falling together; glumes strongly unequal, the first about ½ as long as the second; sterile florets shorter than both glumes, awned from the back; fertile floret shorter than the sterile ones and obscured by them, awnless; palea 1-nerved. ♦Some authors now merge the genera *Anthoxanthum* and *Hierochloe* (which see), so that the New Mexico species of *Hierochloe* are brought into *Anthoxanthum* as *A. nitens* (Weber) Schouten & Veldkamp.

■Hartman, R.L. 1973. New plant records for New Mexico. Southwestern Naturalist 18(2):241-242. ■Hedberg, I. 1990. Morphological, cytogenetic and evolutionary studies in *Anthoxanthum odoratum* L. s.l. Sommerfeltia 11:97-107. ■Schouten, Y. & J.F. Veldkamp. 1985. A revision of *Anthoxanthum* including *Hierochloe* (Gramineae) in Malaysia and Thailand. Blumea 30:319-351.

***Anthoxanthum odoratum** Linnaeus [fragrant, sweet-smelling] SWEET VERNALGRASS. Tufted perennial, 25-60 cm or more tall; panicles 4-14 cm long, the branches short; pedicels pubescent; spikelets 8-10 mm long; glumes unequal, the lower 3-4 mm long, the upper 8-10 mm long; awn of first lemma 2-4 mm long; awn of second lemma 4-9 mm long, equaling or only slightly exceeding the upper glume; upper fertile floret 1-2.5 mm long and awnless. ●Disturbed ground, pastures, meadows, sporadic; known from a 1968 collection in Colfax County, and a 1997 collection in Doña Ana County; native to Europe. ♦Plant tissues contain coumarin, which gives the plants a sweet fragrance, but also renders them unpalatable and potentially toxic if consumed in large amounts. When flowering, the stigmas are exerted prior to the anthers (protogynous); this pattern is consistent with other grasses that lack lodicules (as does *Anthoxanthum*).



Apera [not maimed, apparently alluding to the presence of the long awn] [1].

Tufted annuals; sheaths open; auricles absent; ligules membranous; inflorescence a narrow or open panicle; spikelets with 1 floret; glumes subequal; rachilla prolonged as a bristle, rarely with a vestigial floret; disarticulation above the glumes and below the floret; lemmas firm, obscurely 5-nerved, awned from just below the apices; paleas subequal to the lemmas; anthers 3.

■Bjorkman, S.O. 1960. Studies in *Agrostis* and related genera. Symb. Bot. Upsal. 17:1-112.

***Apera interrupta** (Linnaeus) Beauvois [interrupted, not continuous] SILKY-BENT [*Agrostis interrupta* Linnaeus]. Tufted annual, 10-70 cm tall; sheaths often purplish; ligules 1.5-5 mm long; panicles narrow, 3-20 cm long, 1-3 cm wide, somewhat interrupted below; spikelets 2-3 mm long; glumes somewhat unequal, the lower 1-nerved, the upper 3-nerved; rachilla extended beyond the floret 0.2-0.6 mm; lemmas 1.5-2.5 mm long, slightly involute, the awn 4-16 mm long. ●Disturbed moist sites; known only from a few collections in the central region of the state; native to Europe.



♦*Apera* differs from *Agrostis* in having firm lemmas, always developed paleas that are nearly the size of the lemmas, a prolonged rachilla, and a well-developed awn.

Aristida [awned] THREEAWN [9].

Annual or perennial, tufted (ours); sheaths overlapping; auricles absent; ligules a ring of hairs or a tiny long-ciliate membrane; inflorescence a panicle, sometimes weakly developed and raceme-like; spikelets 1-flowered; disarticulation above the glumes; glumes equal to strongly unequal, 1-3-nerved, thin; lemmas 3-nerved, convolute around the palea and flower, indurate at maturity, usually with 3 awns extending from the nerves but the lateral awns sometimes reduced or absent; callus with a tuft of short stiff hairs; palea shorter than the lemma; anthers 3(1). ♦About 300 species, worldwide, often in warm arid regions. Indurate florets with three awns are distinctive for this genus, but in some species the lateral awns are shortened or completely absent, leaving the floret with a single awn; this mimics some species of *Eriocoma*, but that genus is easily distinguished by its membranous ligules.

■Allred, K.W. 1984. Morphologic variation and classification of the North American *Aristida purpurea* complex (Gramineae). Brittonia 36:382-395.

■Allred, K.W. 1994. A new name for *Aristida hamulosa* (Gramineae). Phytologia 77(5):411-413.

■Allred, K.W. & J. Valdés-Reyna. 1995. Novelities and notes in North American *Aristida* (Gramineae). Novon 5(3):209-222.

■Allred, K.W. & J. Valdés-Reyna. 1997. The *Aristida pansa* complex and a key to the Divaricatae group of North America (Gramineae: Aristidae). Brittonia 49(1):54-66.

■Henard, J.T. 1926, 1927, 1928, 1933. A critical revision of the genus *Aristida*. Meded. Rijks-Herb. 54:1-701; 55C:703-747.

■Henard, J.T. 1929, 1933. A monograph of the genus *Aristida*. Meded. Rijks-Herb. 58:1-325.

■Trent, J.S. & K.W. Allred. 1990. A taxonomic comparison of *Aristida ternipes* and *Aristida hamulosa* (Gramineae). Sida 14(2):251-261.

1 Plants annual

- 2 Awns mostly 1-2 cm long; glumes mostly 5-12 mm long..... *A. adscensionis*
- 2 Awns 2-7 cm long; glumes mostly 20 mm or more long *A. oligantha*

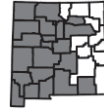
1 Plants perennial

- 3 Lateral awns shortened, rarely longer than 3 mm
 - 4 First glume noticeably shorter than the second; inflorescence narrow, contracted, the branches erect (*wrightii* forma *brownii*)..... *A. purpurea*
 - 4 First glume equal to or longer than the second; inflorescence open, the branches spreading from axillary swellings at maturity
 - 5 First glume longer than the second; awn usually bent at a wide angle, the column twisted; blades flat and curling like wood shavings in age; base of blade glabrous (do not confuse with ligule hairs) *A. schiedeana*
 - 5 First glume subequal to the second; awn mostly straight or only slightly bent, the column straight or slightly twisted; blades rolled or flattened at the base, but not curling like wood shavings; base of blade with scattered long hairs (var. *ternipes*)..... *A. ternipes*
- 3 Lateral awns longer than 3 mm, well-developed, though often shorter than the central awn
 - 6 Panicle closed, contracted, the branches erect-appressed
 - 7 Glumes equal or nearly so; blades usually flat and curling like wood shavings in age *A. arizonica*
 - 7 Glumes noticeably unequal; blades usually rolled and not curling like wood shavings, but sometimes arcuate *A. purpurea*
 - 6 Panicle open, at least the lower branches spreading
 - 8 Primary panicle branches somewhat capillary and curving or drooping under the weight of the spikelets but without axillary swellings; awns mostly (2)3-8 cm long *A. purpurea*
 - 8 Primary panicle branches stiffly divaricate to ascending from axillary swellings; awns mostly 1-2.5 cm long
 - 9 Anthers 0.8-1 mm long
 - 10 Plants more than 25 cm tall; secondary branchlets present and usually well-developed; primary branches 5-13 cm long; apex of lemma strongly twisted 4 or more turns..... *A. divaricata*
 - 10 Plants less than 25 cm tall; secondary branchlets absent or nearly so; primary branches 2-6 cm long; apex of lemma not twisted or twisted only 1 or 2 turns *A. havardii*
 - 9 Anthers 1.2-2 mm long or longer
 - 11 Glumes strongly unequal, the first about 1/2 to 2/3 the length of the second (var. *perplexa*)..... *A. purpurea*
 - 11 Glumes equal or nearly so in length
 - 12 Base of blades with scattered, soft, weak hairs 1.5-3 mm long on the upper surface or margin (var. *gentilis*)..... *A. ternipes*
 - 12 Base of blades glabrous to minutely pubescent on the upper surface, lacking long hairs, any hairs present less than 0.5 mm long (do not confuse with hairs at the collar or summit of the sheath)
 - 13 Blades flat, loosely curling like wood shavings in age; summit of lemma conspicuously twisted... *A. schiedeana*
 - 13 Blades rolled, straight to arcuate but not curling; summit of lemma not or only slightly twisted *A. pansa*

Aristida adscensionis Linnaeus [from Ascension Island in the South Atlantic] SIX-WEEKS THREEAWN [*Aristida bromoides* Humboldt, Bonpland, & Kunth]. Plants annual, mostly 10-50 cm tall, sometimes shorter or taller, usually highly branched and often geniculate; sheaths shorter than the internodes; blades flat to involute; panicles 5-18 cm long, the branches sparsely flowered and lacking axillary pulvini; glumes 1-nerved, unequal, the lower about half the length of the floret; lemmas 6-9 mm long; awns 7-20 mm long, the lateral slightly shorter, not disarticulating. ●Waste ground, disturbed sites, roadsides, sparsely vegetated ground; throughout the state and expected in every county. ◆Plants can be extremely variable in size, depending on moisture. §



Aristida arizonica Vasey [from Arizona] Tufted perennial, 30-80 cm or more tall, unbranched above the base; leaves mostly basal; blades usually flat, 1-3 mm wide, curling like wood shavings in age; panicles 10-25 cm long, 1-3 cm wide, the primary branches appressed and lacking pulvini; glumes subequal, the lower one slightly shorter, 1-2-nerved; lemmas 12-18 mm long; awns mostly equal, 20-35 mm long. ●Somewhat dry mountain slopes and forest clearings at medium elevations, especially associated with ponderosa pine forests; widespread in the mountainous regions of the state. ◆Many specimens of *A. purpurea* var. *nealleyi* have been misidentified as *A. arizonica*; habitat and the curling blades and larger, thicker, more robust spikelet parts of *A. arizonica* serve to distinguish the two.



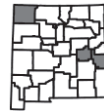
Aristida divaricata Humboldt & Bonpland ex Willdenow [spreading] POVERTY THREEAWN. Plants perennial, 25-70 cm tall, not or sparingly branched; sheaths longer than the internodes, glabrous except at the summit, the collars densely pilose; blades flat to loosely rolled; panicle open, 10-30 cm long and nearly as wide, the branches 5-13 cm long, stiffly spreading to divaricate from axillary pulvini; spikelets infrequently with pulvini; glumes subequal, 1-nerved, 8-12 mm long; floret subequal to the glumes, the terminal 2-3 mm with 4 or more twists at maturity; awns 8-20 mm long, the central erect to curving, the lateral slightly to much shorter. ●Dry plains and foothills nearly throughout the state. ◆Similar to *Aristida havardii*, but that species has shorter primary branches, usually no secondary branches, and more frequently pulvinate spikelets.



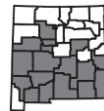
Aristida havardii Vasey [*Aristida barbata* Fournier]. Plants perennial, 15-40 cm tall; unbranched; sheaths longer than the internodes, glabrous except for the summit, the collars densely pilose; blades flat to loosely rolled; panicles widely open, 8-18 cm long and somewhat less wide, the branches 2-6 cm long, stiffly divaricate to reflexed from axillary pulvini; spikelets usually with axillary pulvini; glumes subequal, 1-nerved, 8-12 mm long; floret subequal to the glumes, the terminal 2-3 mm straight or with 1-2 twists at maturity; awns 8-20 mm long, the lateral mostly thinner and shorter than the central. ●Dry plains and foothills, nearly throughout the state except for the northern tier of counties. ◆Plants usually have several stems and tend to grow in short, pale, hemispheric tufts, like a basketball partially sunken into the ground. Similar to *Aristida divaricata*, but that species has longer primary branches, usually with secondary branches, and less frequently pulvinate spikelets.



****Aristida oligantha*** Michaux [few-flowered] OLDFIELD THREEAWN. Plants annual, 20-45 cm tall, geniculate at the base, branching at the nodes; sheaths shorter than the internodes; blades flat or loosely rolled; inflorescence spike- or raceme-like, the spikelets borne on very short pedicels on the main axis, branches rarely developed; pulvini in the axils of the spikelets; glumes large, the lower 3- to 7-nerved, 10-25 mm long, with an awn, the upper 1-nerved and 2-3 mm shorter; floret subequal to the upper glume; awns mostly 2-5 cm long; anther usually 1 and tiny, rarely 3 and 3-4 mm long. ●Disturbed areas and old fields; an uncommon immigrant from the eastward plains known from a few scattered counties, and considered exotic in New Mexico. ◆Easily identified by the annual branching habit, nearly sessile spikelets, large glumes, and long awns.



Aristida pansa Wootton & Standley [expanded, open]. Plants perennial, 20-60 cm tall, unbranched above the base; collars densely pilose with cobwebby hairs that are often arrayed downward; panicles 10-20 mm long, the primary branches stiffly ascending to spreading from axillary pulvini; glumes subequal, 6-12 mm long, 1-nerved; lemmas 7-13 mm long; awns 6-15 mm long, subequal. ●Dry, sandy plains and mesas, mostly southern regions. ◆We have two forms in New Mexico, a third occurs in Mexico, all based on pulvini expression:



a Pulvini completely absent from the panicle, the branches and pedicels all appressed to the adjacent axes...forma *contracta* Allred & Valdes-R. ●Not yet known from New Mexico.

a Pulvini present in the panicle

b Spikelets spreading away from the primary branch, with swellings in the axils of the pedicels...forma *dissita* (I.M. Johnston) Allred & Valdes-R. [spaced apart] [*Aristida dissita* I.M. Johnston, *Aristida pansa* Wootton & Standley var. *dissita* (I.M. Johnston) Beetle].

b Spikelets appressed to the primary branch, without swellings in the axils of the pedicels...forma *pansa*

Aristida purpurea Nuttall [purple]. PURPLE THREEAWN. Densely tufted perennial, 10-100 cm tall, usually unbranched above the base; leaves basal or cauline; collar hairs straight, not cobwebby; ligules less than 0.5 mm long; blades mostly involute, usually glabrous; panicles sparingly branched, sometimes raceme-like, with or without axillary pulvini; glumes mostly unequal, the lower shorter than the upper, 1-nerved, the lower 4-12 mm long, the upper 7-25 mm long; lemmas 6-16 mm long; awns usually subequal, but sometimes the lateral ones reduced. ●Dry plains, slopes, foothills, sandy sites, disturbed ground; throughout the state in all counties. ◆There are 6 varieties in New Mexico, all widespread and none distinguished by habitat or distribution, and all of them intergrading with one or more other varieties:



a Panicle branches with axillary swellings, causing the branches to spread abruptly from the main axis...var. *perplexa* Allred & Valdes-R. [confused, perplexing]. ●Scattered locales throughout the state. ◆Because of the axillary pulvini in the panicle, this taxon was long confused with *Aristida pansa*, which differs in having cobwebby hairs at the collar, equal glumes, and shorter awns.

a Panicle branches without axillary swellings, the branches erect or drooping, but not spreading abruptly from the main axis

b Awns 4-10 cm long

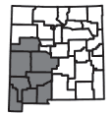
c Summit of lemma 0.1-0.3 mm broad; awns rather delicate, mostly 0.2 mm or less wide at the base, 4-5 cm long; second glume mostly shorter than 16 mm...var. *purpurea* [*Aristida micrantha* Nash, *Aristida purpurea* Nuttall var. *laxiflora* Merrill, *Aristida roemeriana* Scheele]. ●Throughout the state. ◆The delicate and generally drooping pedicels and spikelets, waving in even a slight breeze, give value to this as an ornamental grass. Plants with small spikelets from the eastern plains and eastward were referred to *Aristida roemeriana*, but they intergrade completely with the more typical form.

c Summit of lemma 0.3-0.8 mm broad; awns usually stout, more than 0.2 mm wide at the base, 4-10 cm long; second glume 14-25 mm long...var. *longiseta* (Steudel) Vasey [long-awned] RED THREEAWN [*Aristida longiseta* Steudel, *Aristida longiseta* Steudel var. *rariflora* Hitchcock, *Aristida*

longiseta Steudel var. *robusta* Merrill]. •Throughout the state. ♦The terminal portion of the lemma is only slightly narrowed, and is conspicuously hardened (10x). This was called DOGTOWN GRASS in earlier years, when prairie dogs were prevalent on the western range and this grass rapidly invaded the bare ground around their colonies. §

- b Awns (at least the central) 1-3.5 cm long
- d Summit of lemma mostly less than 0.2 mm broad; awns delicate, mostly less than 0.2 mm wide at the base
- e Panicle branches and pedicels erect, stiff, occasionally spreading...var. *nealleyi* (Vasey) Allred [for Greenleaf Cilley Nealley (1846-1896), plant collector active in Texas] [*Aristida glauca* (Nees) Walpers, *Aristida stricta* Michaux var. *nealleyi* Vasey, *Aristida vaseyi* Wooton & Standley]. •Throughout the state. ♦Tight basal foliage and strictly erect and narrow panicles with very narrow awns distinguish this variety.
- e Panicle branches and pedicels drooping to flexuous...var. *purpurea* [see lead c, above]
- d Summit of lemma mostly broader than 0.2 mm; awns stout, mostly 0.2 mm or more wide at the base
- f Mature panicle branches and pedicels capillary and flexuous or drooping...var. *purpurea* [see lead c, above]
- f Mature panicle branches and pedicels mostly stiff and straight
- g Panicles mostly 3-14 cm long; blades mostly basal and less than 10 cm long...var. *fendleriana* (Steudel) Vasey [for Augustus Fendler (1813-1883), German-born botanical collector who visited Santa Fe in 1847] [*Aristida fendleriana* Steudel]. •Throughout the state. ♦Short, basal blades, with the few-flowered panicle raised above the foliage, make this variety distinctive in the field.
- g Panicles mostly 15-30 cm long; blades mostly cauline and more than 10 cm long...var. *wrightii* (Nash) Allred [for Charles Wright (1811-1885), outstanding American botanical collector] [*Aristida wrightii* Nash]. •Essentially throughout the state, but specimens are unknown from the northwest quarter. ♦Typical forms have rather tall shoots, elongate panicles, and stiff, thick, dark awns. We have two almost identical forma, scarcely worth recognizing:
 - h Both lateral and central awns well-developed...forma *wrightii*
 - h Lateral awns reduced, nearly absent, only the central well-developed... forma *brownii* (Wamock) Allred & Valdes-R. [for Joseph R. Brown, West Texas rancher] [*Aristida brownii* Wamock]. •Rocky limestone slopes of the southern desert mountains; uncommon. ♦This form is almost impossible to recognize in the field without closely examining all the plants of a population, looking for the reduced or absent lateral awns. The plants have the aspect of forma *wrightii*, with which they are always found, and from which they differ only in the shortened lateral awns.

Aristida schiedeana Trinius & Ruprecht [for Christian Julius Wilhelm Schiede (1798-1836), German physician-botanist] SINGLE THREEAWN. Plants perennial, 30-120 cm tall; collar and throat of the sheath usually glabrous; blades mostly flat, coiled or curling at maturity; panicles open, 1-30 cm long and nearly as wide, the primary branches stiffly spreading from axillary pulvini; glumes mostly 1-nerved, subequal or more commonly the upper somewhat shorter; floret 10-15 mm long, the beak twisted; awns strongly unequal, the central 5-12 mm long, the lateral 0-3 mm long. •Mountain slopes and foothills in the piñon and ponderosa zones of the southwestern mountains. ♦Our plants belong to var. *orcuttiana* (Vasey) Allred & Valdes-R. [for Charles Russell Orcutt (1864-1929), botanical collector] [*Aristida orcuttiana* Vasey]; var. *schiedeana*, with pilose collars and throats and equal glumes, occurs southward in Mexico and Central America.



Aristida ternipes Cavanilles [three-footed, referring to the awns] SPIDERGRASS. Tufted perennial, 25-120 cm tall, the stems mostly unbranched above the base; leaves basal and cauline, the sheaths mostly longer than the internodes; ligules usually less than 0.5 mm long; blades flat to folded, the adaxial surfaces with scattered hairs 1.5-3 mm long near the ligule; panicles open, wiry, 15-40 cm long and wide, the primary branches with axillary pulvini; spikelets congested; glumes subequal, 9-15 mm long, 1-nerved; lemmas 9-15 mm long, smooth to tuberculate-scabrous; awns nearly equal to the lateral completely reduced; anthers 3. •Dry plains and mesas, roadsides, in the southwestern and southern regions of the state. ♦There are two varieties in this species, overlapping in distribution:



- a Lateral awns reduced, rarely longer than 2 mm...var. *ternipes* [*Aristida divergens* Vasey, *Aristida ternipes* Cavanilles var. *minor* (Vasey) Hitchcock]
- a Lateral awns well-developed, half or more the length of the central...var. *gentilis* (Henrard) Allred [related] [*Aristida gentilis* Henrard, *Aristida hamulosa* Henrard, *Aristida ternipes* Cavanilles var. *hamulosa* (Henrard) Trent]. §

Arrhenatherum [awned male, referring to the staminate floret] [1].

Tufted to sometimes rhizomatous perennials; sheaths open; auricles absent; ligules membranous, sometime ciliate; inflorescence a sparsely rebranching panicle; spikelets with 2 florets, the lower staminate, the upper fertile; disarticulation above the glumes, the florets falling together; glumes unequal; lower lemma 3-7-nerved, awned from below the middle; upper floret 7-nerved, usually awnless; anthers 3. ♦A small genus of about 7 species, native to Europe.

****Arrhenatherum elatius*** (Linnaeus) Beauvois ex J. & K. Presl [taller] OATGRASS [*Arrhenatherum elatius* (Linnaeus) Beauvois ex J. & K. Presl var. *bulbosum* (Willdenow) Spenner]. Perennial, 0.5-1 m tall or more, often with bulbous bases; ligules 1-3 mm long; panicles 7-30 cm long, spreading before and during anthesis, then contracted; spikelets 7-11 mm long; lower glumes 4-7 mm long, the upper about 3 mm longer; lemmas mostly 6-10 mm long; awn of lower lemma 10-20 mm long; awn of upper lemma absent or to 5 mm long. •Introduced for hay and forage, found escaped in moist, shady places in the mountains; native to Europe. ♦Plants producing bulbous bases have been called var. *bulbosum*.



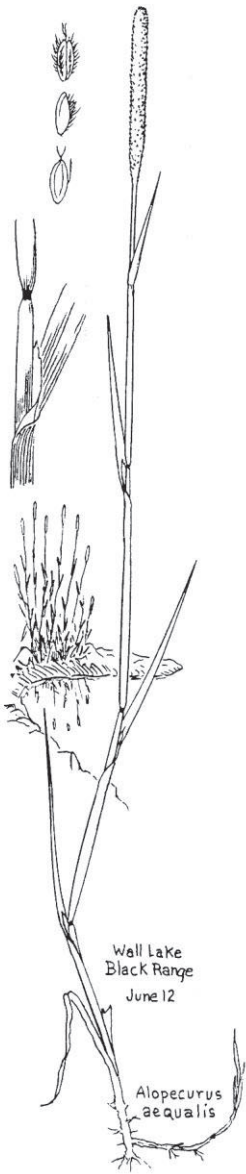
Arundo [the ancient name for various reeds] [1].

Large, bamboo-like giant grasses with short, thick rhizomes; leaves distichous; sheaths open; ligules a ciliate membrane; blades flat or folded; panicles large, plumose, silvery to purplish; spikelets with few to several florets; rachilla glabrous; disarticulation above the glumes and between the florets; glumes large, longer than the florets, 3-5-nerved; lemmas pilose, 3-7-nerved, awnless or shortly awn-tipped; anthers 3. ♦About 5 species, native to Europe and Asia.

- Felger, R.S. & F.S. Molina. 2019. Giant reed in the Yoeme world of Sonora and Arizona. The Plant Press, Arizona Native Plant Society, Winter 2019: 11-15. ■Hardion, L., R. Verlaque, A. Baumel, M. Juin & B. Vila. 2012. Revised systematics of Mediterranean *Arundo* (Poaceae) based on AFLP fingerprints and morphology. Taxon 61(6): 1217-1226. ■Hardion, L. 2013. Evolution et systématique du genre *Arundo* L. (Poaceae), et conservation d'une endémique figure : interactions Homme/Biodiversité en Méditerranée. Thèse: Systematique, phylogénie et taxonomie. Aix-Marseille Université.

****Arundo donax*** Linnaeus GIANT REED. Culms to 10 m tall from vigorous, stout rhizomes more than 1 cm thick; ligules less than 1 mm long; blades 2-9 cm wide, with a wedge-shaped brownish colored area near the base; panicles 30-60 long, to 30 cm wide; spikelets with 2-4 florets, 10-15 mm long; glumes 3-nerved; florets 8-12 mm long, pilose, the hairs 4-9 mm long; paleas shorter than the lemmas. •Found along ditches, culverts, roadsides, and where water accumulates, mostly in the southern half of the state, but with scattered occurrences northward; native to warm regions of the Eastern Hemisphere. ♦Similar to *Phragmites australis*, but that species has unequal glumes and glabrous florets (but with long-hairy rachillas), and generally smaller diameter culms. Giant reed might also be confused with *Tripidium ravennae*, but that species has prominently pubescent blades near the ligules. *Arundo* is an incredibly useful plant throughout the world, and dried stems have been used for thousands of years in the making of reeds for woodwind instruments, as well as for flutes and musical pipes, animal calls, whistles, straws, thatch, mats, baskets, pens and cages, fish traps, furniture, spear shafts and arrows, walking sticks, and fishing poles; also planted as a windbreak or for ornament because of the silvery, plume-like panicles. Plants are sometimes mistaken for sugar cane (*Saccharum officinarum* Linnaeus), but that plant is not known in the state. A form with variegated leaves (cultivar 'VARIEGATA') is an attractive ornamental. §





Wall Lake
Black Range
June 12

*Alopecurus
aequalis*

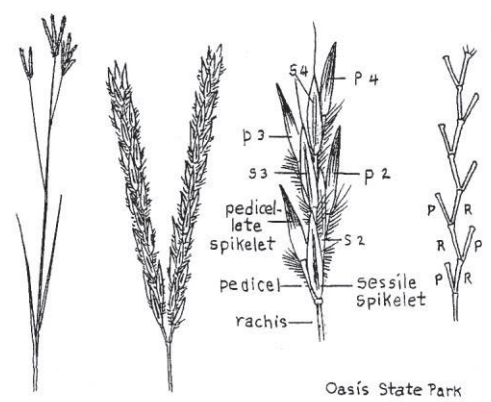


Sandia Mts.
Juan Tabó
Sept. 15

modest
ring of
hairs

Andropogon gerardii
subsp. *gerardii*

± 2-3 branches
divergent awns, med.-length
8-20 mm, twisted + bent
near base
hairs grayish to off-white, 1-2 mm
no hairy brush at tip of spikelets



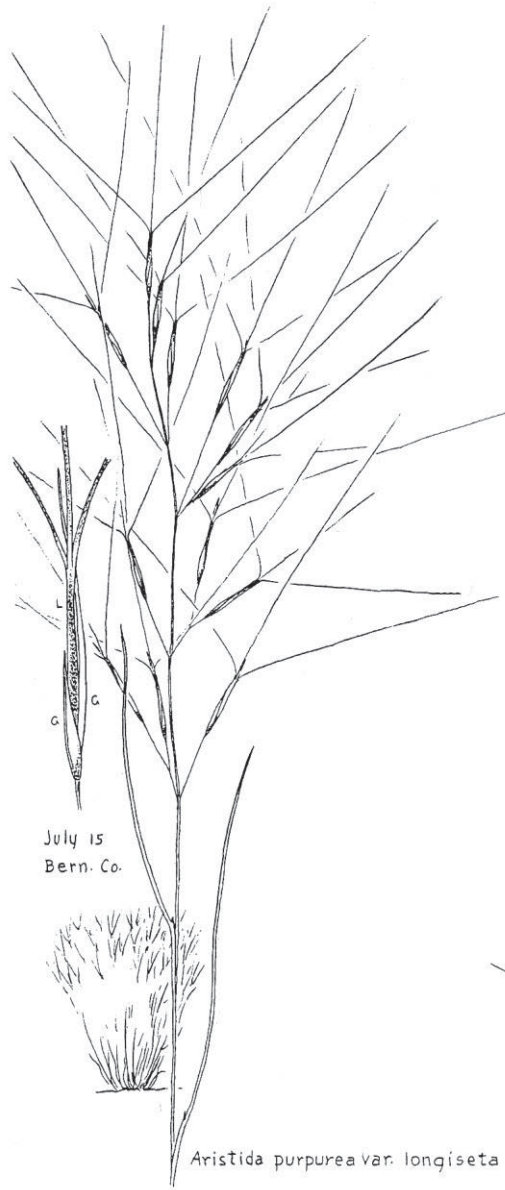
Oasis State Park
Sept. 19

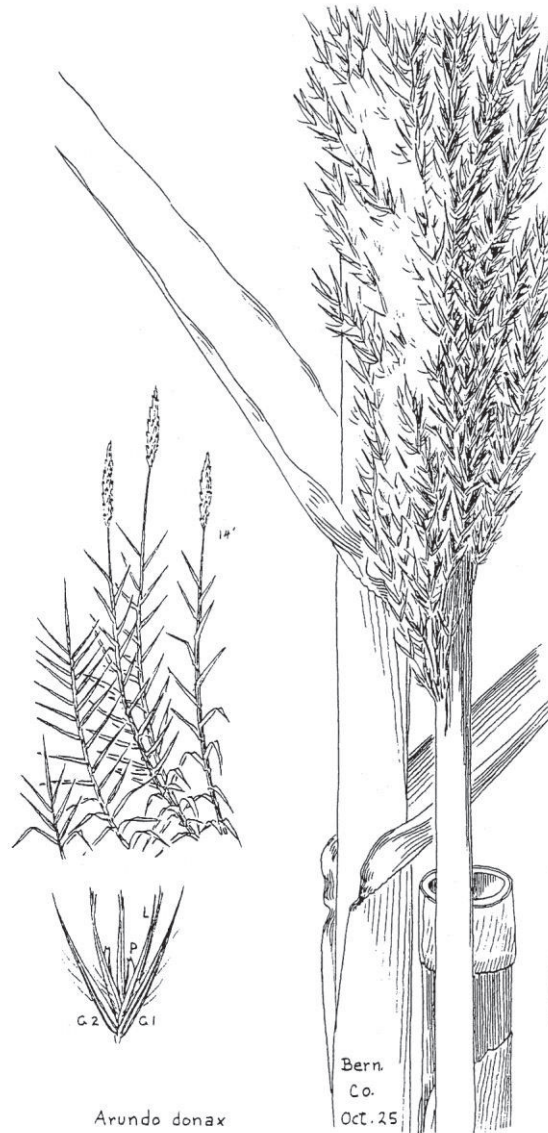
± 2-5 branches
straight, short, inconspicuous
awns, to 5mm, or absent
hairs short, 1-3 mm, tan to brown
hairy brush at tip of spikelet
Andropogon gerardii subsp. *hallii*



Sept. 29
Bern. Co.

Aristida adscensionis





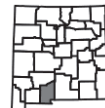
Avena [the classical Latin name for oats] OATS [3].

Plants annual (ours) or perennial; sheaths overlapping, the basal often pilose and the distal glabrous; auricles absent; ligules a membrane; blades usually flat; inflorescence a panicle, sometimes weakly developed; disarticulation above the glumes, above or below the florets; spikelets with few to several florets, ± laterally compressed, the rachilla not prolonged; glumes 3- to 11-nerved, papery, usually surpassing the florets; lemmas usually indurate and enclosing the grain at maturity, 5- to 9-nerved, often strigose, the apex bifid into teeth; awns absent or single off the back of the lemma, twisted below, 1-geniculate; paleas shorter than the lemma; anthers 3; caryopsis longitudinally grooved, terete, hairy. ♦The genus contains about 29 species, native to temperate regions of Europe, north Africa, and central Asia, many now spread throughout the world as an important crop.

■Baum, B.R. 1977. Oats: wild and cultivated. Biosystematics Research Institute, Canada Dept. Agr., Monography No. 14. ■Marshall, D. & S. Jain. 1968. Phenotypic plasticity of *Avena fatua* and *A. barbata*. Amer. Naturalist 102:457-467. ■Scholz, H. 1991. Die Systematik der *Avena sterilis* und *A. fatua* (Gramineae): eine kritische Studie. [The systematics of *Avena sterilis* and *A. fatua* (Gramineae): a critical study.] Willdenowia 20(1-2):103-112.

- 1 Teeth at apex of lemma very thin, elongate, needle-like; pedicels capillary.....*A. barbata*
- 1 Teeth at apex of lemma acute but not elongate and needle-like; pedicels slender but not capillary
 - 2 Awns usually absent or short and straight; florets not disarticulating and remaining on the plant, or falling together, when broken apart mechanically a portion of the rachilla remaining attached to the glabrous callus.....*A. sativa*
 - 2 Awns usually well developed and bent abruptly; florets separating and falling separately, leaving a circular scar or “sucker-mouth” at the bearded callus*A. fatua*

**Avena barbata* Pott ex Link [bearded] SLENDER OATS. Plants annual, 60-100 cm or more tall; blades glabrous to variously hairy; panicles open, 15-40 cm long, 6-12 cm wide; spikelets with 2-3 florets, each floret falling separately; glumes 15-30 mm long, 7-9-nerved; lemmas 15-26 mm long, densely strigose below, the apices with needle-like teeth 2-4 mm long; awns 30-45 mm long, arising about midlength. ●A weed in fields and along roads; a few collections from Doña Ana County; native to Eurasia. ♦The long needle-like teeth at the apex of the lemma are diagnostic.



**Avena fatua* Linnaeus [foolish, of no worth] WILD OATS. Plants annual, 10-120 cm tall or more; blades mostly glabrous; panicles open, 8-35 cm long, 5-18 cm wide, the branches nodding; spikelets with mostly 2 florets, each floret falling separately; glumes 18-30 mm long, 9-11-nerved; lemmas 14-22 mm long, densely strigose below, the apices bifid with teeth to 1.5 mm long; awns 22-40 mm long, arising in the middle of the lemma. ● Weed in grain fields and along roads; widespread in the state; native to Eurasia. ♦ Similar to and forming hybrids with the cultivated *Avena sativa*; some botanists treat these as conspecific. Its easy dispersal and rampancy in the fields no doubt helped to bolster the euphemism 'sowing wild oats' for youthful excess. Awns are sensitive to moisture and humidity, and sometimes will wiggle about in the hand when breathed on. Soft stems of young plants are used by children (of whatever age) to make nooses for catching lizards.



**Avena sativa* Linnaeus [cultivated] CULTIVATED OATS [*Avena fatua* Linnaeus var. *sativa* (Linnaeus) Haussknecht]. Plants annual, 40-150 or more cm tall; blades mostly glabrous; panicles 10-40 cm long, 5-15 cm wide, the branches nodding; spikelets mostly with 2 florets, the florets falling together; glumes 20-32 mm long, 9-11-nerved; lemmas 14-18 mm long, usually glabrous but sometimes strigose, the apices bifid with teeth to 0.5 mm long; awns often absent, 15-30 mm long when developed, arising in the middle of the lemma. ● Commonly cultivated, sometimes escaping along the fields; widespread in the state; native to Eurasia. ♦ Similar to and forming hybrids with the weedy *Avena fatua*; some botanists treat these as conspecific, with cultivated oats being recognized as *A. fatua* var. *sativa*. A conspicuous cultivar frequently grown (in the U.S.) as a crop is 'naked oats,' with up to 7 florets, membranous lemmas, and grains that fall out of the floret. Fields of cultivated oats were much more common in former years, when oats supplied feed for draft horses. Well-known in the little ditty: "Mares eat oats, an' does eat oats, an' little lambs eat ivy; A kid'll eat ivy too, wouldn't you?"



Avenula [little oats] OATGRASS [1].

Tufted or sometimes stoloniferous perennials; sheaths open or closed; auricles absent; ligules membranous; blades not ribbed; inflorescences weakly developed panicles, raceme-like, many branches bearing a single spikelet; spikelets with 2-7 florets; disarticulation above the glumes and between the florets; glumes nearly as large as the spikelet, 1-3-nerved; rachillas glabrous on the side adjacent to the paleas; lemmas 5-7-nerved, awned from about midlength; awns geniculate, twisted below the bend; anthers 3. ♦ Formerly included in *Helictotrichon*, this monotypic genus is distinguished by features of the ligules, blades, rachillas, lodicules, embryos, and root anatomy (Romero-Zarco 2011).

■ Allred, K.W. 2003. Plant distribution reports [*Helictotrichon hookeri*]. The New Mexico Botanist 28:8. ■ Gervais, C. 1973. Contribution à l'étude cytologique et taxonomique des avoines vivaces (e.g. *Helictotrichon* Bess. et *Avenochloa* Holub). Denkschr. Schweiz. Naturf. Ges. 88:3-166. ■ Romero-Zarco, C. 2011. *Helictochloa* Romero-Zarco (Poaceae), a new genus of oat grass. *Candollea* 66(1): 87-103.

Avenula hookeri (Scribner) Holub [for Joseph Dalton Hooker (1817-1911), eminent British botanist and plant collector] [*Avena hookeri* Scribner, *Helictotrichon hookeri* (Scribner) Henrad]. Tufted perennial, 10-75 cm tall; sheaths open; ligules 3-7 mm long; blades flat or folded; panicles 5-15 cm long, 1-2.5 cm wide; spikelets 12-16 mm long; lower glume 9-13 mm long; lemmas 10-12 mm long; awns 10-17 mm long. ● Alpine and subalpine slopes and ledges. Known only from a single 1923 collection in Taos County, but expected to still be in the state and to be looked for in high elevations scraggy habitats.



Beckmannia [for Johann Beckmann (1739-1811), German botanist, naturalist, and industrialist] SLOUGHGRASS [1].

Tufted annuals and rhizomatous perennials; leaves mostly cauline; sheaths open; auricles absent; ligules membranous; blades flat; inflorescence a panicle with spike-like branches, the spikelets borne on one side of the branches; disarticulation below the glumes; spikelets laterally compressed, circular, nearly sessile, with 1-2 florets; rachillas not prolonged; glumes subequal, slightly shorter than the lemmas, inflated, keeled, awnless; lemmas lanceolate, 5-nerved, awnless; anthers 3.

■ Koyama, T. & S. Kawano. 1964. Critical taxa of grasses with North American and eastern Asiatic distribution. *Canad. J. Bot.* 42:859-884. ■ Reeder, J.R. 1953. Affinities of the grass genus *Beckmannia* Host. *Bull. Torrey Bot. Club* 80(3):187-196.

Beckmannia syzigachne (Steudel) Fernald [joined scales, referring to the glumes]. Tufted annual, 30-120 cm tall; sheaths glabrous; ligules 5-11 mm long, acute; blades glabrous; panicles 8-28 cm long, the 1-2 cm long, with few secondary branchlets; spikelets 2-3 mm long, with 1 floret (sometimes 2); lemma 2.5-3.5 mm long; palea about as long as the lemma. ● Along irrigation ditches, marshes, floodplains, riverbanks, and sloughs in the northern plains and mountains. ♦ Our plants belong to subsp. *baicalensis* (N.I. Kusnezov) T. Koyama & Kawano [from Lake Baikal, Russian Federation] [*Beckmannia eruciformis* (Linnaeus) Host]. This is an important grass for waterfowl.



Blepharidachne [eyelash-scale, alluding to the ciliate lemmas] [1].

Tufted perennials, often nearly mat-forming; sheaths open; auricles absent; ligules a ring of hairs or absent; inflorescence a compact panicle; spikelets with 4 florets, the lower 2 sterile or staminate, the 3rd fertile, the terminal one rudimentary and 3-awned; disarticulation above the glumes, all the florets falling as a unit; lemmas 3-nerved, pilose across the base and on the margin, 3-lobed; anthers 2-3. ♦ About 4 species, all of the New World.

■ Hunziker, A. & A.M. Anton. 1979. A synoptical revision of *Blepharidachne* (Poaceae). *Brittonia* 31:446-453.

Blepharidachne bigelovii (S. Watson) Hackel DESERTGRASS [*Eremochloa bigelovii* S. Watson]. Tufted perennials from a knotty base, 6-20 cm tall, the stems branching from the base; basal sheaths shorter than the internodes; ligules to 0.3 mm long; blades rolled, 1-2 cm long, less than 1 mm wide, the lower blades deciduous from the sheath; panicles 1.5-3 cm long, sometimes partially enclosed in the subtending sheaths; spikelets; glumes subequal, shorter than the florets, 5-6 mm long, 1-nerved, awnless or nearly so; fertile 3rd lemma 5-6 mm long, 3-nerved and 3-lobed, awned to 3 mm; palea of fertile 3rd floret slightly longer than the lemma; anthers 2. ● Limestone knolls and ledges in Doña Ana and Eddy counties, uncommon. ♦ Plants of DESERTGRASS have the initial appearance of *Munroa pulchella*, but that species is often shorter, produces short stolons, the blades are white-margined, and the lemmas have a single awn.



Blepharoneuron... go to *Muhlenbergia tricholepis*

Bothriochloa [pitted grass, alluding to the pit in some glumes] BLUESTEM [7].

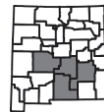
Plants tufted (ours) perennials; sheaths open; auricles absent; ligules membranous, sometimes with a ciliate fringe; blades usually flat when mature; inflorescence a terminal panicle of several branches; primary branches unbranched, composed of repeating units of sessile and pedicelled spikelets, these breaking apart at maturity and becoming the dispersal unit; internode and pedicels with a longitudinal membranous area (native species) or a longitudinal groove (exotic species); sessile spikelets awned, relatively large and fertile, the pedicelled spikelets awnless, staminate or sterile and often much smaller. ♦ Species of *Bothriochloa* were formerly in the genus *Andropogon*. Seedheads contain flavanols and other aromatic oils, and chewing or smelling the seedhead is reputed to give a

strong blueberry taste. Three common native species sort roughly as follows: *B. barbinodis* in the more arid habitats of the southern deserts; *B. torreyana* in more mesic habitats of the plains and prairies; and *B. springfieldii* in the upland foothills and mountain slopes. *Bothriochloa reevesii* (Gould) Gould has been reported for the state, but the specimen in question is referred to *B. springfieldii*.

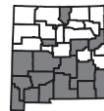
■Allred, K.W. 1983. Systematics of the *Bothriochloa saccharoides* complex (Poaceae: Andropogoneae). Syst. Bot. 8:168-184. ■Gould, F.W. 1959. Transfers from *Andropogon* to *Bothriochloa* (Gramineae). Southw. Natural. 3:212. ■Gould, F.W. 1967. The grass genus *Andropogon* in the United States. Brittonia 19:70-76. ■Scrivanti, L.R. & A.M. Anton. 2011. Nueva combinación en *Bothriochloa* Kuntze (Poaceae). Candollea 66(1): 155-158. ■Scrivanti, L.R., G.A. Norrmann, & A.M. Anton. 2013. Delimiting species boundaries within the *Bothriochloa saccharoides* complex (Poaceae) through morphometric analysis. Phytotaxa 89(1): 24-42. ■Vega, A.S. 2000. Revisión taxonómica de las especies Americanas del género *Bothriochloa* (Poaceae: Panicoideae: Andropogoneae). Darwiniana 38(1-2):127-186.

- 1 Pedicelled spikelets well-developed, about as large and broad as the sessile ones
 - 2 Sessile spikelets more than 5 mm long.....*B. wrightii*
 - 2 Sessile spikelets less than 5 mm long
 - 3 Panicle axis longer than the branches.....*B. bladhii*
 - 3 Panicle axis shorter than the branches.....*B. ischaemum*
- 1 Pedicelled spikelets much shorter and narrower than the sessile ones
 - 4 Sessile spikelets less than 4.5 mm long; awns less than 18 mm long
 - 5 Panicle reddish; hairs subtending the sessile spikelet about ¼ the length of the spikelet, sparse, not at all obscuring the spikelet...*B. bladhii*
 - 5 Panicle silvery; hairs subtending the sessile spikelets at least ½ the length of the spikelet or longer, copious, at least somewhat obscuring the spikelets*B. torreyana*
 - 4 Sessile spikelets more than 4.5 mm long; awns more than 18 mm long
 - 6 Panicle axis mostly less than 5 cm long, with 2-8 branches; rachises and pedicels densely white long-pubescent; nodes densely white long-pubescent with spreading hairs*B. springfieldii*
 - 6 Panicle axis 5-15 cm long, usually with numerous branches; rachises and pedicels long-pubescent but with off-white hairs; nodes bearded with stiff tan or off-white hairs
 - 7 Panicles of the larger shoots 14-25 cm long; stems stout, stiffly erect, little-branched above the base, 1.2-2.5 m tall, bluish-glaucous below the nodes; nodes bearded with spreading hairs 3-6 mm long*B. alta*
 - 7 Panicle mostly 7-13 cm long; stems tending to be bent at the base and much-branched in age, mostly 1.2 m or less tall, not bluish-glaucous below the nodes; nodes bearded with appressed hairs less than 3 mm long*B. barbinodis*

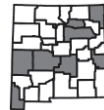
Bothriochloa alta (Hitchcock) Henrard [tall] [*Andropogon altus* Hitchcock]. Plants perennial, 1.2-2.5 m tall or more, little branched, glaucous below the nodes, the nodes hirsute with stiff hairs 2-6 mm long; panicles 14-25 cm long; sessile spikelets 4.5-6 mm long, the first glume short-hairy, pitted or not; awns 18-22 mm long; pedicelled spikelets 3.8-4.4 mm long; 2n=120. ●Plains in the southern region, uncommon, usually along roadways and ditchbanks where extra water accumulates. ♦Plants have the initial aspect of overly large, robust *Bothriochloa barbinodis*, and can also be confused with *Leptochloa crinita* from a passing car.



Bothriochloa barbinodis (Lagasca) Herter [with bearded nodes] CANE BLUESTEM [*Amphilophis barbinodis* (Lagasca) Nash, *Andropogon barbinodis* Lagasca, *Andropogon perforatus* Fournier, *Andropogon saccharoides* Swartz var. *barbinodis* (Lagasca) Hackel]. Plants perennial, 60-120 cm tall, often branched in age, the nodes hirsute with commonly appressed hairs less than 3 mm long; panicles 5-14(20) cm long; sessile spikelets 4.5-7.3 mm long, the first glume short hairy, pitted or not; awns 20-35 mm long; pedicelled spikelets 3-4 mm long; 2n=120, 220. ●Arid plains and grasslands, commonly along roadsides. ♦*Andropogon argenteus* A.P. de Candolle is often incorrectly considered a synonym of *Bothriochloa barbinodis* or *B. torreyana*; the *argenteus* entity has pedicelled spikelets as long as the sessile ones, and not so reduced in length as in the other two. *Andropogon argenteus* is most similar to (and perhaps conspecific with) *Andropogon berteronianus* Steudel of Chile; neither of these names have combinations in *Bothriochloa*, where they belong. Homemade darts can be made from CANE BLUESTEM by inserting cactus spines into a short section of the peduncle, leaving the seedhead for the fletching. §



Bothriochloa bladhii (Retzius) S.T. Blake [for Peter Johan Bladh (1746-1816), Finnish naturalist and industrialist] AUSTRALIAN BLUESTEM [*Andropogon bladhii* Retzius, *Bothriochloa caucasica* (Trinius) C.E. Hubbard, *Bothriochloa intermedia* (R. Brown) A. Camus]. Plants perennial, 50-100 cm or more tall, the nodes glabrous or hairy; foliage greenish; panicles 5-15(20) cm long, reddish when mature, the axis longer than the branches, which spread from the main axis from axillary pulvini, the lower branches rebranched; sessile spikelets 3.5-4 mm long, the first glume mostly glabrous, a pit present or absent; awns 10-17 mm long; pedicelled spikelets about same size and shape as sessile ones to half as large, staminate or sterile; 2n=40, 60, 80. ●Introduced for range restoration, stabilization of roadsides, and erosion control; scattered localities in the state; native to Asia and Africa, notwithstanding its common name. ♦Australian bluestem hybridizes and intergrades with other Asian species of *Bothriochloa*, including *B. ischaemum*, and some plants may be difficult to identify.



Bothriochloa ischaemum (Linnaeus) Keng [resembling *Ischaemum*] YELLOW BLUESTEM [*Amphilophis ischaemum* (Linnaeus) Nash, *Andropogon ischaemum* Linnaeus, *Andropogon ischaemum* Linnaeus var. *songaricus* Ruprecht ex Fischer & C.A. Meyer, *Bothriochloa ischaemum* (Linnaeus) Keng var. *songarica* (Ruprecht ex Fischer & Meyer) Celerier & Harlan]. Plants perennial, 30-85 cm tall, sometimes nearly stoloniferous from geniculate bases, the nodes glabrous or short hairy; leaves mostly basal; panicles 5-10 cm long, fan-shaped, reddish, the branches longer than the main axis and with axillary pulvini; sessile spikelets 3-4.5 mm long, the first glume hairy, not pitted; awns 9-17 mm long; pedicelled spikelets about as long as the sessile, but narrower; 2n=40, 50, 60. ●Introduced for improving dry-land pastures and roadside stabilization, escaping along roadways; native to southern Europe and Asia. ♦Yellow bluestem intergrades with *Bothriochloa bladhii*, and some plants may be difficult to distinguish.



Bothriochloa springfieldii (Gould) Parodi [for Harry Wayne Springfield (1920-2013), range scientist and ecologist] [*Andropogon springfieldii* Gould] Plants perennial, 30-80 cm tall, little branched, the nodes with conspicuous horizontal white hairs 3-7 mm long; panicles 4-9 cm long, the branches longer than the main axis; sessile spikelets 5.5-8.5 mm long, the first glume densely hairy on the lower half, sometimes pitted; awns 18-26 mm long; 2n=120. ●Rocky to sandy slopes and plains, roadsides, in grasslands and woodlands. ♦Easily told in the field by the long white horizontal hairs at the nodes and the short panicles with very white long hairs and long awns; the erect panicle branches disarticulate beginning at the tip, leaving spreading tufts of hairs. This is perhaps our most spectacular bluestem, with its very white hairs of panicles and nodes; a good choice for a native garden. §



Bothriochloa torreyana (Steudel) Scriver & Anton [for John Torrey (1796-1873), distinguished American botanist, mentor to Asa Gray] SILVER BLUESTEM [*Amphilophis saccharoides* auctores non (Swartz) Nash, *Andropogon saccharoides* auctores non Swartz, *Andropogon torreyanus* Steudel, *Bothriochloa saccharoides* of numerous authors, *Bothriochloa laguroides* (A.P. de Candolle) Herter subsp. *torreyana* (Steudel) Allred & Gould, *Bothriochloa saccharoides* (Swartz) Rydberg subsp. *americana* Scriver] . Plants perennial, 35-100 cm or more tall, the nodes glabrous or short-hairy; panicles 4-12 cm long, silvery white, lacking pulvini; sessile spikelets 2.5-4.5 mm long, the first glume glabrous to short hairy, lacking a pit; awns 8-16 mm long; 2n=60. ●Well-drained soils of grasslands, river valleys, roadsides, watered lawns, and cemeteries. ♦SILVER BLUESTEM long went by the name *Bothriochloa saccharoides*, a more southern subtropical species that differs in having pilose leaves, a narrow central groove in the rachis axis, and pulvini in the panicles. The original collection of *B. torreyana* was made during the 1830 Long expedition, from “the Canadian River,” which could have been in New Mexico, Oklahoma, or Texas. Recently Scriver et al. (2013) created the enigmatic *Bothriochloa saccharoides* (Swartz) Rydberg subsp. *americana* Scriver for plants with pilose nodes, a wide rachis groove, sessile spikelets 3-6 mm long, awns 1-23 mm long, and pedicellate spikelets 2-2.4 mm long. The type of subspecies *americana* is very typical *B. torreyana*, including being a hexaploid (2n=60); she cites no other specimens, but the description would include members of *B. barbinodis* as well, which she did not include in her study. §



Bothriochloa wrightii (Hackel) Henrard [for Charles Wright (1811-1885), outstanding American botanical collector] [*Amphilophis wrightii* (Hackel) Nash, *Andropogon wrightii* Hackel]. Plants perennial, 45-70 cm tall; nodes glabrous or hirsute; foliage glaucous; panicles 5-6 cm long, fan-shaped, the axis mostly shorter than the branches; sessile spikelets 5.5-7 mm long; first glume glabrous, usually lacking a pit; awns 10-15 mm long; pedicelled spikelets staminate, nearly as long as the sessile one; 2n=120. ●Perhaps extirpated, but to be looked for in rocky, grassy foothills of the piñon zone in the southwestern mountains. ♦First discovered in 1851 by Charles Wright of the U.S.—Mexico boundary survey. Wright’s notes indicated that it was found in “pine hills from the Mimbres to the Cobre, large patches with scattered culms.” The only other (and latest) collection from New Mexico was in 1904 near Hillsboro. The glaucous leaves, glabrous sessile spikelets, and large pedicelled spikelets are distinctive.



Bouteloua [for Claudio Boutelou Agraz (1774-1842) and Estéban Boutelou Agraz (1776-1813), Spanish agriculturalists and gardeners] GRAMA [16].

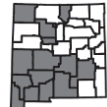
Plants annual to perennial, tufted to rhizomatous or stoloniferous; sheaths open; auricles absent; ligules hairy, membranous, or a combination; inflorescence a panicle of 1-many spicate primary branches; disarticulation below the branch or above the glumes and the florets falling together; spikelets with a single fertile floret and 1-2 smaller staminate or sterile florets above; glumes mostly unequal, 1-nerved; lemmas 3-nerved and usually 3-awned. ♦A New World genus of perhaps 40 species or so. Some have proposed that species with disarticulation above the glumes be segregated into the genus *Chondrosium*, but studies by Columbus (1993, 1999) and others show this to be without strong underpinning. We also follow Columbus (1999) in bringing the monotypic genus *Buchloe* into *Bouteloua*; the staminate inflorescence of the former illustrates its relationship to the latter. *Bouteloua chondrosioides* (Kunth) Bentham ex S. Watson and *B. ramosa* Vasey have been reported for the state, but no validating specimens are yet known.

- Columbus, J.T. 1993. The affinities of *Bouteloua aristoides* and *B. (Chondrosium) eriopoda* and the *Bouteloua-Chondrosium* generic delimitation problem (Gramineae: Cynodonteae). Amer. J. Bot. 80(suppl.):138. ■Columbus, J.T. 1999. An expanded circumscription of *Bouteloua* (Gramineae: Chloridoideae): new combinations and names. Aliso 18(1):61-65.
- Columbus, J.T. 1999. Morphology and leaf blade anatomy suggest a close relationship between *Bouteloua aristoides* and *B. (Chondrosium) eriopoda* (Gramineae: Chloridoideae). Syst. Bot. 23(4):467-478. ■Esparza-Sandoval, S. & Y. Herrera-Arrieta. 1996. Revision de *Bouteloua barbata* Lagasca (Poaceae: Eragrostideae). Phytologia 80(2):73-91. ■Gould, F.W. 1979. The genus *Bouteloua*. Ann. Missouri Bot. Gard. 66:348-416. ■Griffiths, D. 1912. The grama grasses: *Bouteloua* and related genera. Contr. U.S. Natl. Herb. 14(3):343-428. ■Kartesz, J.T. & K.N. Gandhi. 1990. Nomenclatural notes for the North American flora. IV [*Bouteloua gracilis*]. Phytologia 69(4):301-312. ■Reeder, J.R. 1986. Type specimen of *Bouteloua ramosa* Scribner ex Vasey (Gramineae). Taxon 35(1):149-153. ■Reeder, J.R. & C.G. Reeder. 1980. Systematics of *Bouteloua breviseta* and *B. ramosa* (Gramineae). Syst. Bot. 5(3):312-321. ■Reeder, J.R. & C.G. Reeder. 1990. *Bouteloua eludens*: elusive indeed, but not rare. Desert Plants 10(1):19-22,31. ■Strahan, R. 2007. Plant distribution reports [*Bouteloua rigidiseta*]. The New Mexico Botanist 37:7.

- 1 Stem internodes (not the sheaths) woolly-pubescent..... ***B. eriopoda***
- 1 Stem internodes glabrous (distal internodes of *B. breviseta* with a chalky-whitish bloom)
- 2 Plants unisexual, dioecious, stoloniferous, forming low mats often less than 10 cm tall***B. dactyloides***
- 2 Plants bisexual, tufted or shortly rhizomatous, usually taller
- 3 Inflorescence branches deciduous at maturity; spikelets 1-16 per branch
- 4 Branches of the inflorescence 15-80 per stem, or if less than 15 then the branches (including the spikelets) less than 1 cm long
- 5 Leaf blades 1-2(2.5) mm broad; plants not rhizomatous; anthers purple.....***B. warnockii***
- 5 Leaf blades mostly more than 2.5 mm broad; plants with or without rhizomes; anthers red, orange, or yellow***B. curtipendula***
- 4 Branches of the inflorescence 1-13 per stem or if more than 13 then the branches (including the spikelets) 1.5 cm or more long
- 6 Plants annual..... ***B. aristoides***
- 6 Plants perennial
- 7 Glumes and often the lemmas densely pubescent, the hairs not confined to the midnerves
- 8 Inflorescence axis 3-6 cm long; spikelet clusters (including awns) mostly less than 1 cm long***B. rigidiseta***
- 8 Inflorescence axis 7-10 cm long; spikelet clusters mostly more than 1 cm long ***B. eludens***
- 7 Glumes and lemmas glabrous, or scabrous to ciliate on the midnerves only
- 9 Middle inflorescence branches with 12-20 spikelets; lemma of lower floret 4-6 mm long.....***B. repens***
- 9 Middle inflorescence branches with 4-16 spikelets; lemma of lower floret 4.5-8 mm long
- 10 Shoots from hard, stout, rhizomatous bases, the stems thus appearing ± in linear progression and close together; basal sheaths mostly flattened, ribbon-like; middle branches mostly 2-3 cm long (excluding awns)....***B. radicata***
- 10 Shoots solitary or several together in somewhat concentric tufts or from weak rhizomes; basal sheaths little flattened, mostly somewhat keeled and not ribbon-like; middle branches mostly 0.7-2 cm long (excluding awns) ***B. repens***
- 3 Inflorescence branches and glumes persistent on the plant; spikelets usually 20-60 per branch
- 11 Inflorescence reduced to a single branch
- 12 Plants annual..... ***B. simplex***
- 12 Plants perennial
- 13 Primary inflorescence branch extending well beyond the attachment of the terminal spikelet ***B. hirsuta***

- 13 Primary inflorescence branch not extending beyond the attachment of the terminal spikelet *B. gracilis*
- 11 Inflorescence with 2 or more branches (*B. barbata* rarely with a single branch)
 - 14 Second glume of some spikelets with stiff, bulbous-based hairs
 - 15 Primary branch extending well beyond the attachment of the terminal spikelet *B. hirsuta*
 - 15 Primary branch not extending beyond the attachment of the terminal spikelet
 - 16 Lemma 2-3(3.5) mm long; inflorescence branches (2)3-6 in number *B. parryi*
 - 16 Lemma 4-6 mm long; inflorescence branches 2(1-4) in number *B. gracilis*
 - 14 Second glume glabrous or pubescent without bulbous-based hairs
 - 17 Plants annual *B. barbata*
 - 17 Plants perennial
 - 18 Inflorescence branches 2(1-4) in number
 - 19 Stem usually with 2-3 nodes; distal internodes lacking a chalky bloom *B. gracilis*
 - 19 Stem usually with 5 or more nodes, the plants somewhat bushy; distal internodes with a chalky bloom *B. breviseta*
 - 18 Inflorescence branches 3-30 in number
 - 20 Lemma of first floret glabrous *B. trifida*
 - 20 Lemma of first floret pubescent at the base *B. barbata*

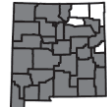
Bouteloua aristidoides (Kunth) Grisebach [resembling the genus *Aristida*] NEEDLE GRAMA. Plants annual, tufted, 4-45 cm tall or more; blade margins usually with bulbous-based hairs at the base; panicles 2-12 cm long, with 4-15 branches densely pubescent basally, the entire branch somewhat resembling an *Aristida* spikelet; disarticulation at the base of the branch; spikelets appressed to the branch; lemmas and paleas of distal spikelets short-awned. ●Alluvial plains and uplands, dry mesas, disturbed rangelands. ♦We have two varieties:



a Panicle branches with 2-4 spikelets, mostly 1.6 cm or less long to the tip of the terminal spikelet; rachis extended 6-10 mm beyond the point of attachment of the terminal spikelet...var. ***aristidoides*** [*Bouteloua gracilis* Vasey, *Dinebra aristidoides* Kunth]. ●Common, with a wide distribution.

a Panicle branches with 6-10 spikelets, 1.5-3.5 cm long; rachis extended 2.5(7) mm beyond the point of attachment of the terminal spikelet...var. ***arizonica*** Jones [of Arizona]. ●In New Mexico known only from Hidalgo County.

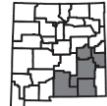
Bouteloua barbata Lagasca [bearded, furnished with long hairs] SIXWEEKS GRAMA [*Chondrosium barbatum* (Lagasca) W.D. Clayton]. Plants tufted annuals or short-lived perennials, sometimes stoloniferous, 1-70 cm tall; panicles 1-22 cm long, with 4-10 branches and numerous spikelets on each branch; disarticulation above the glumes; spikelets crowded and pectinate on the branch, with 1 fertile and 2 reduced florets; first glume lacking bulbous-based hairs; lemmas 3-awned; anthers yellow and red. ●Alluvial flats and slopes, plains, rocky slopes, washes, dry woodlands, roadsides, fields, often disturbed ground; found throughout the state and expected in the few counties not recorded. ♦As with many annual grasses, size varies with available moisture. We have two intergrading varieties. §



a Plants annual; culms usually decumbent and geniculate, occasionally rooting at the lower nodes; panicle branches mostly 10-18 in number...var. ***barbata***
●Throughout the state.

a Plants short-lived perennial; culms erect from the base; panicle branches 15-30 in number...var. ***rothrockii*** (Vasey) Gould [for Joseph Trimble Rothrock (1839-1922), American botanist-western explorer] ROTHROCK'S GRAMA [*Bouteloua rothrockii* Vasey]. ●Known only from Dona Ana and Hidalgo counties; expected in the surrounding counties.

Bouteloua breviseta Vasey [short-awned] GYP GRAMA [*Chondrosium brevisetum* (Vasey) Clayton]. Tufted or rhizomatous perennials to 40 cm tall, somewhat bushy, the culms with 4-5 or more nodes and slightly woody-based, distal portion of the lower internodes with a chalky bloom; panicles 2-4 cm long, with 1-3 branches, each branch ending in a bristle-like spikelet; disarticulation above the glumes; hairs on glumes not bulbous-based; lemmas 3-awned. ●Gypsum plains, hills, and grasslands in the southeastern quarter of the state.



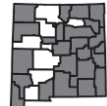
Bouteloua curtipendula (Michaux) Torrey [with short, hanging branches] SIDEOATS GRAMA [*Atheropogon curtipendulus* Fournier]. Tufted to rhizomatous perennials mostly 20-70 cm tall; blades mostly wider than 2.5 mm; panicles 14-30 cm long, with 15-80 short often hanging branches; disarticulation at the base of the branch; spikelets appressed; lemmas awnless to awned; anthers red, orange, yellow, or purple. ●Prairies, grasslands, woodlands, forest openings, usually on well-drained soils; throughout the state. ♦This is an excellent forage grass that withstands grazing well. It is highly variable, largely due to its apomictic mode of reproduction. Regarding the author citation, some maintain that the correct combination is (Michaux) Gray, concluding correctly that Torrey's 1848 combination (in Emory) was provisional and invalid, but they overlook



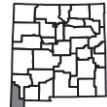
Torrey's valid combination in 1853 (in Marcy), which preceded that of Gray in 1856. [This is the stuff dreams are made of!] §
a Plants tufted, without rhizomes...var. ***caespitosa*** Gould & Kapadia [tufted]. ●Scattered locales, presumably less common than the next.

a Plants with short rhizomes from the bases of the clumps...var. ***curtipendula*** ●Widespread throughout the state.

Bouteloua dactyloides (Nuttall) J.T. Columbus [finger-like] BUFFALOGRASS [*Buchloe dactyloides* (Nuttall) Engelm., *Bulbilis dactyloides* (Nuttall) Rafinesque, *Sesleria dactyloides* Nuttall]. Dioecious (sometimes monoecious), stoloniferous perennials 1-30 cm tall, the pistillate shoots much shorter than the staminate; leaves sparsely pilose in the ligule region; staminate panicle usually exceeding the foliage, with 1-3 branches, disarticulation above the glumes, the spikelets closely crowded and pectinate, with prominent red to orange anthers; pistillate inflorescence partially hidden in leaf sheaths, the branches bur-like with 3-5 enclosed spikelets, disarticulation at the base of the bur. ●Plains, prairies, and grasslands nearly throughout the state except for the central corridor. ♦BUFFALOGRASS provides valuable forage and thrives under heavy grazing. It is also finding favor as an ornamental or lawn plant in xeriscape landscaping. It is similar in vegetative appearance to the stoloniferous *Hilaria belangeri*, but that species has noticeably pilose nodes. Studies by Columbus (1999) have shown the intertwined phylogenetic relationship of *Bouteloua* and *Buchloe*, with *Buchloe* nested solidly within a broader *Bouteloua* variation pattern; one recognizes the relationship when comparing the staminate panicles of *Buchloe* with the inflorescences of *Bouteloua*. §



Bouteloua eludens Griffiths [evading] SANTA RITA GRAMA. Tufted perennials 20-60 cm tall; panicles 6-10 cm long, with 10-16 pubescent branches, the axis extended beyond the last spikelet; disarticulation at the base of the branch; glumes and lemmas densely hairy between the veins; lemmas 3-lobed. ●Dry, rocky slopes and desert grasslands; known from a single collection in Hidalgo County. ♦The similar *Bouteloua chondrosioides* is known from southeastern Arizona, and might reasonably be expected in the bootheel region. The two may be told by the following features:



a Inflorescence 6-10 cm long, mostly with 12-20 branches; branches with 2-6 spikelets...***B. eludens***

a Inflorescence 2.5-6 cm long, mostly with 3-8 branches; branches with 8-12 spikelets...***B. chondrosioides*** (Kunth) Bentham ex S. Watson

Bouteloua eriopoda (Torrey) Torrey [wooly-footed, alluding to hairs at the base of the plant] BLACK GRAMA [*Chondrosium eriopodum* Torrey]. Plants perennial, regularly producing long stolons, sometimes also with short rhizomes; sheaths glabrous and about half as long as the woolly-hairy internodes; panicles 2-16 cm long with 2-8 branches, a tuft of woolly hairs at the base of the branch; disarticulation above the glumes; spikelet hairs not bulbous-based; lemmas mostly with a single awn, the lateral awns absent or very short; anthers yellow to orange. ●Desert grasslands, dry plains, and rocky slopes throughout the state. ♦In New Mexico, only black grama and *Hilaria rigida* (exotic and known only from a single site in Dona Ana County) have woolly internodes. In the early reports of New Mexico vegetation, at least four different grasses were called black grama: *Bouteloua eriopoda*, *B. hirsuta*, *Muhlenbergia porteri*, and *Hilaria mutica*. §



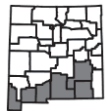
Bouteloua gracilis (Willdenow ex Kunth) Lagasca ex Griffiths [slender, graceful] BLUE GRAMA [*"Bouteloua gracilis"* Lagasca nom. nud., *Bouteloua oligostachya* (Nuttall) Torrey ex A. Gray, *Chondrosium gracile* Willdenow ex Kunth]. Densely tufted perennials, 20-70 cm tall, sometimes with short rhizomes from the base; blades with bulbous-based hairs near the ligule; panicles 2-10 cm long, with 1-5 branches, the rachis bearing spikelets to the end; disarticulation above the glumes; spikelets densely crowded on the rachis, pectinate, with 1 fertile and 1 reduced floret; lower lemmas lobed and mostly awned; anthers yellow or purple. ●Plains, mesas, grasslands, woodlands, forest openings. ♦Similar to *Bouteloua hirsuta*, but that species has a prominent extension of the rachis beyond the terminal spikelet. This is the state grass of New Mexico, and is found in every county in the state, from 4,000 to over 10,000 ft. It is undoubtedly the most valuable forage grass in the state, and BLUE GRAMA plains provide excellent forage for livestock. It was called WHITE GRAMA in the early days of the territory, but it mostly appears neither white nor blue. Some Native Americans used the seeds to make flour for breads and mush. Plants are increasingly being used in xeriscaping. §



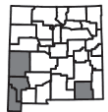
Bouteloua hirsuta Lagasca [hairy or bristly] HAIRY GRAMA [*Chondrosium foenum* Torrey, *Chondrosium hirsutum* (Lagasca) Kunth]. Tufted perennials 15-60 cm tall; blades with bulbous-based hairs near the ligule; panicles 1-18 cm long, with 1-4 branches, the rachis of the branch extending beyond the terminal spikelet as a slender bristle; disarticulation above the glumes; spikelets densely crowded on the rachis, pectinate, with 1 fertile and 1-2 reduced florets; lower lemma lobed and awned; anthers yellow or cream. ●Plains, rocky slopes, woodlands; widespread. ♦Very similar to *Bouteloua gracilis*, but differing most noticeably by the extension of the branch rachis beyond the terminal spikelet in *B. hirsuta*. §



Bouteloua parryi (Fournier) Griffiths [for Charles Christopher Parry (1823-1890), American botanist explorer of the West] PARRY'S GRAMA [*Chondrosium parryi* Fournier]. Tufted annuals, 20-55 cm tall; sheaths with tufts of long hairs at the sides of the collar; blades with bulbous-based hairs on both surfaces; panicles 3-10 cm long, with 4-8 branches, the rachis prolonged into a terminal bristle; disarticulation above the glumes; spikelets densely crowded on the branch, pectinate, with 1 fertile floret and 1-2 reduced florets; glumes with bulbous-based hairs; lower lemmas hairy, awned; anthers yellow. ●Dry sandy plains in the southern regions.



Bouteloua radicata (Fournier) Griffiths [well-rooted] PURPLE GRAMA [*Atheropogon radicosus* Fournier]. Tufted-rhizomatous perennials from hard knotty bases, 40-70 cm tall; basal sheaths flattened and ribbon-like; panicles 10-15 cm long, with 7-12 branches each bearing 8-10 spikelets, the middle branches 2-3 cm long (excluding awns); disarticulation at the base of the branch; spikelets appressed, with 1 fertile and 1 reduced floret; glumes glabrous; lemmas 3-lobed, 3-awned. ●Dry rocky slopes, desert grasslands and woodlands; uncommon. §



Bouteloua repens (Kunth) Scribner & Merrill [creeping] SLENDER GRAMA [*Atheropogon filiformis* Fournier, *Bouteloua filiformis* (Fournier) Griffiths, *Dinebra repens* Kunth]. Tufted perennials, 15-65 cm tall, geniculate-based; panicles 4-14 cm long, with 6-12 branches (sometimes fewer), the rachis prolonged beyond the terminal spikelet; disarticulation at the base of the branch; spikelets appressed, with 1 fertile and 1 reduced floret; lemma mostly glabrous, 3-awned; anthers usually orange or yellow. ●Semi-arid rangelands and woodlands in the southwestern region, not common.



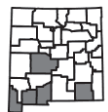
Bouteloua rigidisetia (Steudel) A.S. Hitchcock [with stiff bristles] TEXAS GRAMA [*Aegopogon rigidisetus* Steudel]. Tufted slender perennials, 10-40 cm tall, unbranched; panicles 3-6 cm long, with 6-8 branches, the rachis prolonged beyond the terminal spikelet; disarticulation at the base of the branch; spikelets appressed-spreading, with 1 fertile and 1-2 reduced florets; glumes and lemmas sparsely hairy on the nerves only; lemmas 3-awned. ●Shin-oak mottes on the eastern plains; known from a few recent collections in Roosevelt County.



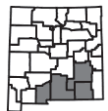
Bouteloua simplex Lagasca [single] MAT GRAMA [*Bouteloua procumbens* (Durand) Griffiths, *Chondrosium simplex* (Lagasca) Kunth]. Tufted annuals, the culms decumbent, 3-18(26) cm long; panicles usually with a single branch 1-3 cm long, rarely with 2-3 branches, the rachis not prolonged beyond the terminal spikelet; disarticulation above the glumes; spikelets densely crowded, pectinate; glumes glabrous; lemmas hairy on the nerves, 3-awned. ●Dry rocky plains, mesas, hills, and disturbed ground in the mountains, nearly throughout the state. ♦MAT GRAMA seems to have a liking for rocky or gravelly sites.



Bouteloua trifida Thurber ex S. Watson [3-cleft] RED GRAMA [*Bouteloua trifida* Thurber ex S. Watson var. *burkii* (Scribner ex S. Watson) Vasey ex L.H. Dewey, *Chondrosium trifidum* (Thurber ex S. Watson) Clayton]. Tufted perennials, older plants sometimes with short rhizomes, 8-35 cm tall; panicles 3-10 cm long, with 2-7 branches, the rachis not prolonged beyond the spikelets; spikelets reddish, with 1 fertile and 1 reduced floret; lemmas glabrous, 3-awned; anthers yellow. ●Calcareous, rocky slopes in the southern desert grasslands, infrequently collected.



Bouteloua warnockii Gould & Kapadia [for Barton Holland Warnock (1911-1998), revered West Texas botanist]. Tufted perennials with rhizomes, 20-40 cm tall; blades narrow, 1 -2(2.5) mm wide, involute when dry; panicles 8-20 cm long, with 9-20 or more branches, the rachis prolonged beyond the terminal spikelet; disarticulation at the base of the branch; spikelets appressed, somewhat greenish; glumes and lemmas mostly glabrous; lemma 3-awned; anthers dark purple. ●Dry plains on limestone in desert grasslands, on ledges and outcrops, often on gypsum; uncommon in the southern regions. ♦Similar to *Bouteloua curtipendula*, but distinguished by the strictly caespitose habit, narrow blades, and purple anthers.



Brachiaria...go to *Urochloa*



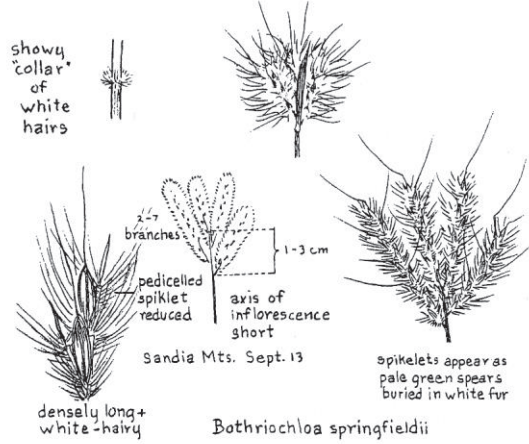
Las Cruces
Oct. 16

25 branches

many branches, fanned at top
pedicelled spikelet reduced



Bothriochloa barbinodis
Sandia Mts Sept. 15



showy
collar
of
white
hairs

2-7
branches

1-3 cm

pedicelled
spikelet
reduced

axis of
inflorescence
short

Sandia Mts. Sept. 13

densely long+
white-hairy

Bothriochloa springfieldii

spikelets appear as
pale green spears
buried in white fur



pairs of red
stigmas are
often seen

pedicelled spikelet
much reduced

Xeri Park, Albuquerque
Sep. 13

± 7 panicle branches
arising from a central
axis ± 4-7 cm long, not
widely fanned at top

silvery with abundant
white hairs, to 9mm
awns less than 18 mm

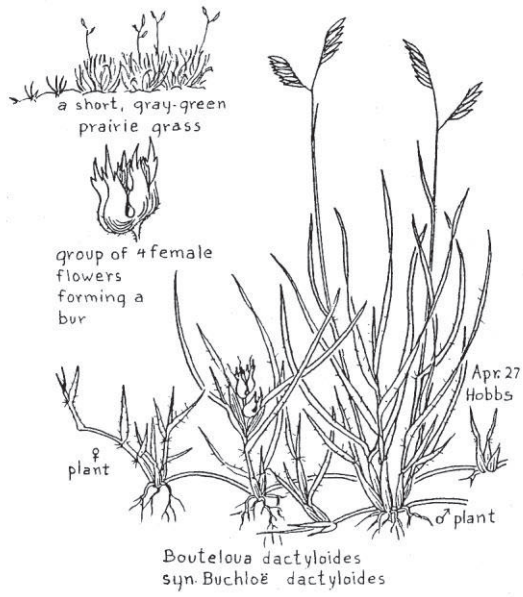
Bothriochloa torreyana

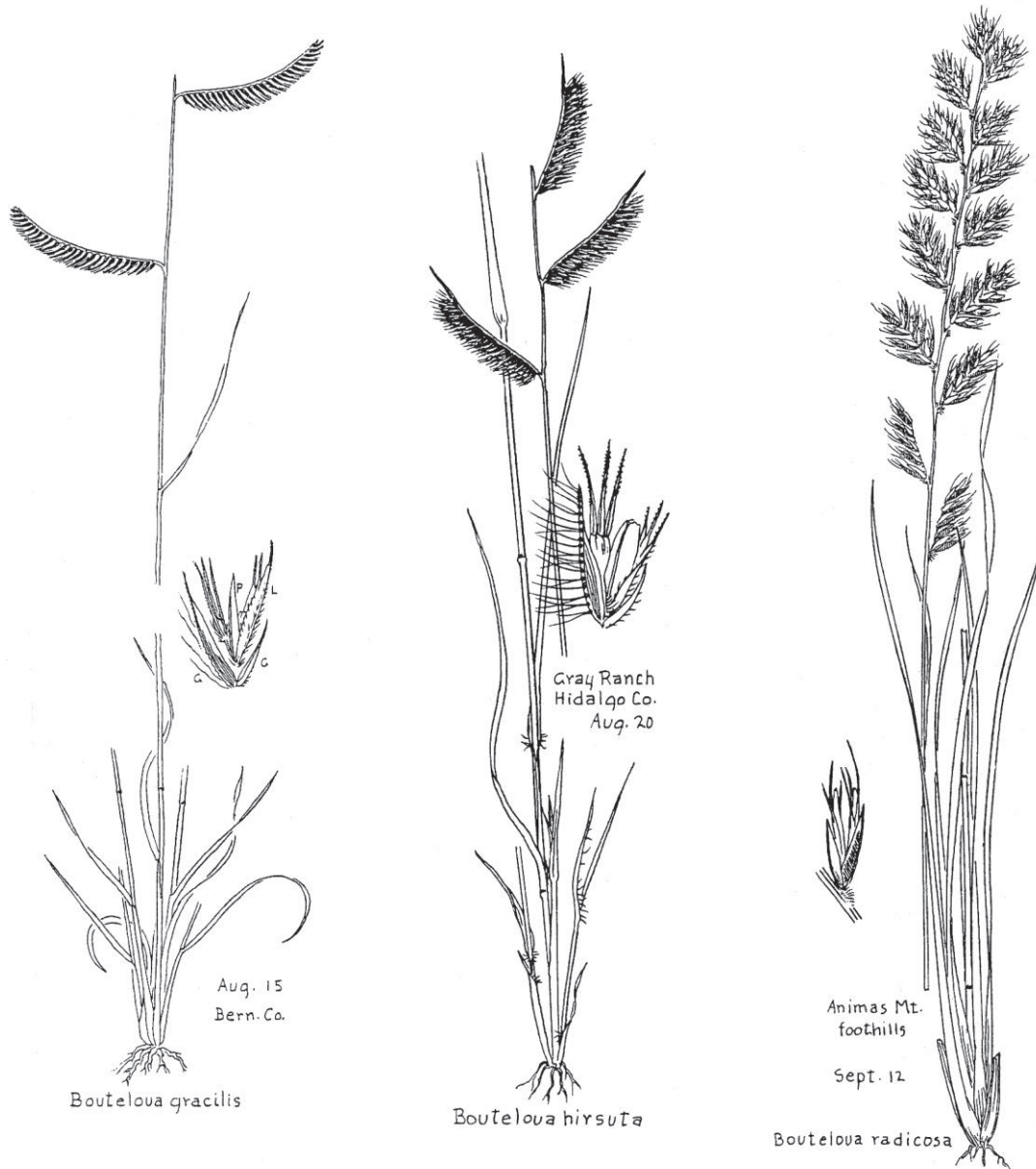


Sept. 23

Bernalillo Co.

*Bouteloua
barbata*





Briza [nodding] QUAKING GRASS [2].

Plants annual (ours) or perennial, tufted; sheaths open; auricles absent; ligules membranous; blades flat; inflorescence an open panicle, the branches capillary; spikelets erect to drooping, with several florets, awnless, the glumes and lemmas spreading from the rachilla; disarticulation above the glumes and between the florets; lemmas inflated, about as wide as long, with rounded backs, with several indistinct nerves; anthers 3. ♦About 5 species of Eurasia and northern Africa. The inflated, awnless spikelets are distinctive. Plants are grown for ornament and bouquets, and are exotic in New Mexico.

■Allred, K.W. 2004. Plant distribution reports [*Briza maxima*]. The New Mexico Botanist 29:7. ■Forbes, A. 1998. New plant distribution records [*Briza minor*]. The New Mexico Botanist 8:10.

1 Spikelets 10-20 mm long; panicles bearing fewer than 10 spikelets *B. maxima*

1 Spikelets 2-5 mm long; panicles bearing numerous (more than 20) spikelets *B. minor*

**Briza maxima* Linnaeus [very large]. Plants 25-75 cm tall; sheaths often less than 1/2 as long as the internodes; panicles 4-10 cm long, 2-6 cm wide; spikelets 10-20 mm long, with several florets; lemmas 7-9 mm long, glabrous proximally, becoming villous distally; anthers 1-1.8 mm long. ●Weakly adventive; found recently in Union County; native to the Mediterranean region. ♦Plants are grown for ornament and bouquets because of the spectacular seedheads.

**Briza minor* Linnaeus [smaller]. Plants 10-70 cm tall; sheaths 1/2 to 3/4 the length of the internodes; panicles 4-15 cm long, 3-11 cm wide; spikelets 2-5 mm long, with several florets; lemmas 1.5-2.5 mm long, mostly glabrous; anthers about 0.5 mm long. ●Weakly adventive; collected from Las Cruces, but not likely persisting; native to the Mediterranean region. ♦The spikelets and its parts are much smaller than the other species (particularly *B. maxima*), hence, it's name. Seedheads are used in dried bouquets.



Bromus [food, also an ancient name for oats] BROME [16].

Plants annual, biennial, or perennial, tufted to rhizomatous; sheaths fused to near the top, often pubescent; auricles present or absent; ligules membranous; inflorescence a panicle, sometimes raceme-like; spikelets with several florets; disarticulation above the glumes and between the florets; lemmas several-nerved, awned or awnless; paleas ciliate on the nerves, adnate to the grain; anthers 3. ♦This is a large and diverse genus, from which segregate genera have been created (*Anisantha*, *Bromopsis*, *Ceratochloa*). We have chosen to retain the genus in its large, inclusive sense, but we record the relevant synonyms and alternative classifications. The works of Pavlick & Anderston (2007) and Saarela et al. (2014) are particularly helpful, but the genus remains a vexing group in New Mexico in need of further study. All the perennials but one are native, and all the annuals but one are exotic. *Bromus purgans* Linnaeus has been reported for the state, but no validating specimens are known.

■Allred, K.W. 1993. *Bromus*, section *Pnigma*, in New Mexico, with a key to the bromegrasses of the state. *Phytologia* 74:319-345. ■Barkworth, M.E., L.K. Anderston, J. McGrew, & D.E. Giblin. 2006. Geography and morphology of the *Bromus carinatus* (Poaceae: Bromoideae) complex. *Madroño* 53(3):233-243. ■Brainerd, R.E., N. Otting, & B.L. Wilson. New combinations in *Bromus sitchensis* (Poaceae). *Phytoneuron* 2016-36: 1-4. ■Elliott, F.C. 1949. *Bromus inermis* and *B. pumpellianus* in North America. *Evolution* 3:142-149. ■Gill, G.S. & S.A. Carstairs. 1988. Morphological, cytological and ecological discrimination of *Bromus rigidus* from *Bromus diandrus*. *Weed Research* 28:399-405. ■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Bromus diandrus*, *Bromus mollis*]. *Great Basin Naturalist* 37(4):530-531. ■Kon, K.R. & W.M. Blacklow. 1989. The biology of Australian weeds 19. *Bromus diandrus* Roth and *B. rigidus* Roth. *Plant Protection Quarterly* 4(2):51-59. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Bromus squarrosus*]. *J. Bot. Res. Inst. Texas* 4(2):777-784. ■Pavlick, L. 1995. *Bromus* L. of North America. Royal British Columbia Museum. ■Pavlick, L. & L.K. Anderson. 2007. *Bromus*, pp. 193-237. IN: *Flora of North America*, vol. 24. Oxford University Press. ■Peterson, P.M., J. Cayouette, Y.S.N. Fernandez, B. Coulman, & R.E. Chapman. 2001. Recognition of *Bromus richardsonii* and *B. ciliatus*: Evidence from morphology, cytology, and DNA fingerprinting (Poaceae: Bromoideae). *Aliso* 20(1):21-36. ■Peterson, R. 1997. New plant distribution records [*Bromus sterilis*]. *The New Mexico Botanist* 6:8. ■Pinto-Escobar, P. 1976. Nota sobre el ejemplar tipo de "*Bromus catharticus*" Vahl. *Caldasia* 11(54):9-16. ■Sales, F. 1993. Taxonomy and nomenclature of *Bromus* sect. *Genea*. *Edinburgh J. Botany* 50(1):1-31. ■Sales, F. 1994. A reassessment of the *Bromus madritensis* complex (Poaceae): a multivariate approach. *Israel J. Pl. Sci.* 42:245-255. ■Saarela, J.M. 2008. Taxonomy of *Bromus* (Poaceae: Bromoideae) sections *Bromopsis*, *Bromus*, and *Genea* in British Columbia, Canada. *J. Bot. Res. Inst. Texas* 2(1): 323-372. ■Saarela, J.M., P.M. Peterson, & J. Valdes-Reyna. 2014. A taxonomic revision of *Bromus* (Poaceae: Bromoideae) in Mexico and Central America. *Phytotaxa* 185(1):1-147. ■Soderstrom, T.R. & J.H. Beaman. 1968. The genus *Bromus* (Gramineae) in Mexico and Central America. *Publ. Mus. Mich. St. Univ., Biol. Ser.* 3(5):465-520. ■Wagnon, H.K. 1952. A revision of the genus *Bromus*, section *Bromopsis*, of North America. *Brittonia* 7:415-480.

1 Plants perennial

2 Rhizomes present

3 Culm nodes usually glabrous; leaves (blades and sheaths) usually glabrous; lemmas mostly glabrous or scabrous; awns 0-3 mm long; seeded or disturbed sites, widespread..... ***B. inermis***

3 Culm nodes often pubescent; leaves often pilose; lemmas pubescent; awns 1-6 mm long; native plant communities, uncommon in the northern mountains ***B. pumpellianus***

2 Rhizomes absent

4 Spikelets strongly flattened, the lemmas v-shaped in cross-section; second (upper) glume 5- to 9-nerved

5 Lemma awns 0-2.5 mm long..... ***B. catharticus***

5 Lemma awns 3-15 mm long (rarely as short as 2 mm)..... ***B. carinatus***

4 Spikelets not strongly flattened, but ± terete, the lemmas rounded on the back in cross-section; second (upper) glume 3-nerved

6 First glume 3-nerved

7 Glumes mostly glabrous; leaf blades often glaucous ***B. frondosus***

7 Glumes mostly pubescent; leaf blades not glaucous

8 Pedicels puberulent; blades of the upper half of the shoot erect, the midrib not narrowed below the collar; auricles absent..... ***B. porteri***

8 Pedicels glabrous; all blades mostly lax or spreading, the midrib mostly narrowed below the collar; auricles frequently present on the lower leaves..... ***B. anomalus***

6 First glume 1(2)-nerved

9 Sheaths densely lanate, the hairs spreading from the sheath but becoming matted at the tips..... ***B. lanatipes***

9 Sheaths glabrous to lightly pilose or hirtellous, if pubescent then not becoming matted

10 Midrib of the culm leaves abruptly narrowed below the collar; anthers 2-4 mm long; lemmas pubescent across the back as well as on the margins..... ***B. anomalus***

10 Midrib of the culm leaves not narrowed below the collar; anthers 1-2.7 mm long; lemmas glabrous to pubescent across the back, pubescent on the margins

11 Anthers 1-1.4 mm long; upper glumes 7-8 mm long; backs of all lemmas glabrous..... ***B. ciliatus***

11 Anthers 1.6-2.7 mm long; upper glumes 9-11 mm long; backs of the upper lemmas in a spikelet with appressed hairs, the backs of the lower lemmas glabrous..... ***B. richardsonii***

1 Plants annual

12 Lemma awns 0-2.5 mm long

13 Lemmas lanceolate, broadest at the base, 9-14 mm long; anthers about 3-4 mm long..... ***B. catharticus***

13 Lemmas inflated, broadest at the middle, 7-9 mm long; anthers 1 mm long or less ***B. briziformis***

12 Lemma awns longer than 3 mm

14 First glumes mostly 3- to 5-nerved or more

15 Spikelets strongly flattened, the lemmas v-shaped in cross-section ***B. carinatus***

15 Spikelets not strongly flattened, but ± terete, the lemmas rounded on the back in cross-section ***B. squarrosus***

14 First glumes mostly 1-nerved (sometimes 3-nerved in *B. diandrus*)

16 Panicle dense, compact, ovoid; panicle branches stout, erect, and mostly much shorter than 2 cm ***B. madritensis***

16 Panicle loose, open, elongate; panicle branches often spreading or drooping, and mostly much longer than 2 cm

17 Awns mostly 3-6 cm long; lemmas 20-35 mm long ***B. diandrus***

17 Awns mostly 1-3 cm long; lemmas 9-20 mm long

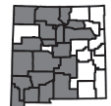
18 Primary panicle branches mostly with 1(3) spikelets; awns 15-30 mm long; lemmas 14-20 mm long..... ***B. sterilis***

18 Primary panicle branches mostly with more than 3 spikelets, at least on mature shoots; awns 10-18 mm long;

lemmas 9-12 mm long..... ***B. tectorum***

Bromus anomalus Ruprecht ex Fournier [abnormal] MEXICAN BROME [*Bromopsis anomala* (Ruprecht ex Fournier) Holub].

Tufted perennials, 40-90 cm tall; nodes glabrous to hairy; sheaths glabrous or pilose, the midrib of the culm leaves abruptly narrowed just below the collar; auricles usually present on the lower leaves; blades 2-4 mm wide; panicles 10-20 cm long, open, the branches spreading, often drooping; glumes usually pubescent, sometimes glabrous, the lower mostly 1-nerved, the upper 3-nerved; lemmas rounded, the back and margin pubescent; awns 1-3(5) mm long; anthers

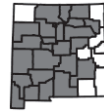


2-4 mm long. ●Mountain scrub, oak & piñon/juniper woodlands, ponderosa parklands, aspen groves, and mountain meadows, often growing with *Bromus ciliatus* and *B. richardsonii*, mid- to high elevations. ♦This intergrades with the two previously-named species and with *B. frondosus*, and identification of some specimens can be vexing; it may be less common than thought. Seeds of this species are used by Tarahumara people in Mexico to begin fermentation in making a corn drink called *tesquino* (Saarela et al. 2014).

**Bromus briziformis* Fischer & Meyer [resembling the genus *Briza*] RATTLESNAKE CHESS. Tufted annuals, 20-60 cm tall; sheaths densely pilose-hispid, the hairs retrorse; auricles absent; blades 2-4 mm wide, pilose; panicles 5-15 cm long, open, the branches spreading to reflexed; spikelets laterally flattened; lemmas 5-8 mm wide, obovate, inflated; awns 0-3 mm long; anthers 0.7-1 mm long. ●Weedy, dry sites; native to Europe. ♦Known only from an old (1913) collection from Santa Fe County, more common northwestward in the Intermountain region.



Bromus carinatus Hooker & Arnott [keeled] [*Bromus arizonicus* (Shear) Stebbins, *Bromus carinatus* Hooker & Arnott var. *arizonicus* Shear, *Bromus carinatus* Hooker & Arnott var. *californicus* Shear, *Bromus carinatus* Hooker & Arnott var. *marginatus* (Nees) Barkworth & Anderton, *Bromus marginatus* Nees ex Steudel, *Bromus marginatus* Nees ex Steudel var. *seminudus* Shear, *Bromus polyanthus* Scribner, *Bromus polyanthus* Scribner var. *paniculatus* Shear, *Bromus sitchensis* Trinius var. *carinatus* (Hooker & Arnott) Brainerd & Otting, *Bromus sitchensis* Trinius var. *polyanthus* (Scribner) Brainerd & Otting, *Ceratochloa carinata* (Hooker & Arnott) Tutin, *Ceratochloa marginata* (Nees ex Steudel) B.D. Jackson, *Ceratochloa polyantha* (Scribner) Tzvelev]. Tufted annuals to short-lived perennials, 50-100 cm tall; nodes glabrous to hairy; sheaths glabrous to rather densely pilose; auricles absent (present?); blades 2-10 mm wide, glabrous to hairy, flat to rolled; panicles 8-40 cm long, the branches stiffly ascending to divergent; glumes glabrous to pubescent, with several nerves; lemmas keeled on the back, glabrous to pubescent; awns 3-15 mm long; anthers 0.4-6 mm long. ●Mountain slopes and forest clearings, widespread. ♦This species has gone by the common name CALIFORNIA BROME, but a better name would be MIXED-UP BROME. In attempts to make sense of the bewildering variation, the following weak phases have been recognized, sometimes treated as varieties or even separate species, but intergradation is common in New Mexico. Recently, the entire complex has been merged with *Bromus sitchensis* (Brainerd et al. 2016); for now, we leave it under the more well-known name, *Bromus carinatus*. §



a Anthers 0.4-0.5 mm long; plants annual; upper glume as long as the lower lemma...the *arizonicus* phase.

a Anthers 1-6 mm long; plants annual to perennial; upper glume shorter than the lower lemma

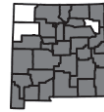
b Awns usually more than 7 mm long...the *carinatus* phase.

b Awns usually less than 7 mm long

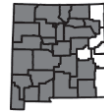
c Plants mostly pubescent throughout...the *marginatus* phase.

c Plants mostly glabrous, at least in the spikelets...the *polyanthus* phase. ♦Recent work (Barkworth et al. 2006) suggests that this could be treated at the specific level, as *Bromus polyanthus* Scribner, but New Mexico populations are unconvincing.

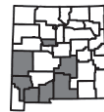
**Bromus catharticus* Vahl [purgative] RESCUEGRASS [*Bromus unioides* Kunth, *Bromus willdenovii* Kunth, *Ceratochloa cathartica* (Vahl) Herter]. Annuals or short-lived perennials, 30-100 or more cm tall; nodes glabrous; sheaths densely pilose; auricles absent; blades 3-10 mm wide, glabrous to pubescent; flat; panicles 10-25 cm long, the branches ascending to spreading; glumes mostly glabrous; lemmas strongly keeled, usually glabrous; awns 0-3 mm long; anthers less than 1 mm long in cleistogamous florets, 2-4 mm in chasmogamous florets. ●Widespread in the state in disturbed ground, lawns, weedy sites, and roadsides; native to South America. ♦This species was widely introduced in the United States for forage; MATUA GRASS is a popular cultivar for irrigated pastures. §



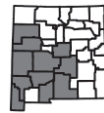
Bromus ciliatus Linnaeus [fringed] FRINGED BROME [*Bromopsis ciliata* (Linnaeus) Holub, *Bromus canadensis* Michaux]. Tufted perennials, 40-120 cm or more tall; upper nodes mostly pubescent; sheaths glabrous or pilose, the midrib of the culm leaves not abruptly narrowed just below the collar; auricles mostly absent; blades 3-9 mm wide, the upper mostly pilose adaxially; panicles 6-18 cm long, the branches spreading to somewhat drooping; glumes glabrous, the lower mostly 1-nerved, the upper 3-nerved, 7-8 mm long; lemmas rounded, the back glabrous, the margins ciliate; awns 3-5 mm long; anthers 1-1.4 mm long. ●Common and widespread in ponderosa, mixed conifer, spruce/fir forests, and mountain meadows, but also extending to lower elevations. ♦This intergrades with *B. anomalous* and *B. richardsonii*, and New Mexico specimens cannot always be told apart, despite the assertions of some recent studies. §



**Bromus diandrus* Roth [having two stamens] RIPGUT BROME [*Anisantha diandra* (Roth) Tutin, *Anisantha rigida* (Roth) Hylander, *Bromus diandrus* Roth var. *rigidus* (Roth) Sales, *Bromus rigidus* Roth]. Tufted annuals, 20-80 cm tall or more, the culms puberulent below the panicle; sheaths pilose; auricles absent; blades 1-9 mm wide, pilose on both surfaces; panicles 12-25 cm long, the branches ascending to spreading and with only 1-2 spikelets; lemmas rounded on the back; awns 30-65 mm long; anthers 0.5-1 mm long. ●Dry, disturbed ground in scattered locales, but most common in the southern counties; native to Europe. ♦Heavy infestations of this grass on pastureland can be harmful to animals if the florets become embedded around the mouth or in the underbelly, as they will work themselves through the coat and skin and damage underlying tissue. *Bromus rigidus* has sometimes been segregated as a variety or subspecies based primarily on whether the spikelets are held erect on short pedicels (*rigidus*) or drooping on long pedicels (*diandrus*), but the distinction is trivial.



Bromus frondosus (Shear) Wootton & Standley [full of leaves, leafy] DROOPING BROME [*Bromopsis frondosa* (Shear) Holub, *Bromus porteri* (Coulter) Nash var. *frondosus* Shear]. Tufted perennials, 45-100 cm tall; nodes usually glabrous; sheaths mostly glabrous, sometimes pilose, the midrib often abruptly narrowed just below the collar; auricles absent; blades 3-6 mm wide, usually glabrous; panicles 10-20 cm long, the branches ascending to drooping; glumes glabrous, 3-nerved; lemmas rounded, the backs glabrous to pubescent, the margins hairy; awns 2-4 mm long; anthers 1.5-3.5 mm long. ●Semi-desert mountain scrub and riparian areas, oak and piñon/juniper woodlands, upwards to ponderosa forests, mostly below 8100 ft in new Mexico. ♦This species has been confused most frequently with *Bromus anomalous* and *B. ciliatus*, which differ in the features in the key, as well as being mostly higher elevation species. The type is from Mangas Springs, Grant County. §



**Bromus inermis* Leysser [unarmed, awnless] SMOOTH BROME [*Bromopsis inermis* (Leysser) Holub]. Rhizomatous perennials, 50-130 cm tall; nodes glabrous; sheaths usually glabrous; auricles sometimes present; blades 5-15 mm wide, glabrous, flat; panicles 10-20 cm long, the branches mostly ascending; glumes glabrous; lemmas rounded on the back, usually glabrous; awns 0-3 mm long; anthers 3.5-6 mm long. ●Pastures, mountain slopes, roadside swales and slopes; throughout the state; native to Eurasia. ♦Commonly planted in forests and fields for so-called improvement, but quite aggressive and spreading easily by the rhizomes. This is the exotic counterpart to our native *Bromus pumpellianus*. §



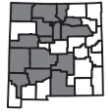
Bromus lanatipes (Shear) Rydberg [wooly-footed] WOOLY BROME [*Bromopsis lanatipes* (Shear) Holub, *Bromus anomalus* Ruprecht ex Fournier var. *lanatipes* (Shear) Hitchcock, *Bromus porteri* (Coulter) Nash var. *lanatipes* Shear]. Tufted perennials, 35-90 cm tall; nodes pubescent to occasionally hairy; lower sheaths densely pilose to wooly, the hairs spreading from the sheath but becoming matted at the tips, becoming pilose to glabrous upwards, the midrib sometimes abruptly narrowed just below the collar; auricles absent; blades 3-7 mm wide, glabrous; panicles 5-15 cm long, the branches erect to ascending or spreading; glumes to sparsely pilose, mostly 1-nerved; lemmas rounded, the backs pubescent or occasionally glabrous, the margins hairy; awns 2-4 mm long; anthers 1.8-4 mm long. ●Semi-desert riparian areas and mountain brush, oak and piñon-juniper woodlands and plains, most plants growing between 6500 and 7600 ft (but extending beyond). ♦The sheath pubescent is distinctive, with the hairs spreading from the sheath and then becoming matted at the tips. §



****Bromus madritensis*** Linnaeus [of Madrid] RED BROME [*Anisantha rubens* (Linnaeus) Nevski, *Bromus madritensis* Linnaeus subsp. *rubens* (Linnaeus) Husnot, *Bromus rubens* Linnaeus]. Tufted annuals, 15-50 cm or more tall; sheaths pilose to glabrous; auricles absent; blades 1-5 mm wide, pubescent to glabrous, flat; panicles 3-12 cm long, dense and compact, reddish, the branches erect and mostly shorter than 2 cm long; spikelets pubescent; awns 12-23 mm long; anthers 0.5-1 mm long. ●Weedy, dry, disturbed ground, roadsides, old fields; native to Europe. ♦*Bromus rubens* is sometimes recognized as a separate species, based on the length and visibility of the panicle branches; we find the distinctions unpersuasive. §



Bromus porteri (Coulter) Nash [for Thomas Conrad Porter (1822-1901), American poet, clergyman, classicist, and naturalist] NODDING BROME [*Bromus kalmii* Gray var. *porteri* Coulter, *Bromopsis porteri* (Coulter) Holub]. Tufted perennials, 30-100 cm tall; sheaths glabrous to pilose, the midrib of the culm leaves not abruptly narrowed just below the collar; auricles absent; blades 2-5 mm wide, noticeably erect rather than spreading or drooping; panicles 7-20 cm long, the branches spreading, often drooping; pedicels puberulent; glumes usually pubescent, rarely glabrous, the lower and upper mostly 3-nerved; lemmas rounded, the back and margin pubescent; awns 1-3 mm long; anthers mostly 2-3 mm long. ●Ponderosa and spruce/fir forests, aspen groves, often at high elevations. ♦The erect blades are quite distinctive in the field. §



Bromus pumpellianus Scribner [for Raphael Pumpelly (1837-1923), American geologist and explorer] [*Bromopsis pumpellianus* (Scribner) Holub, *Bromus inermis* Leysser var. *purpurascens* (Hooker) Wagnon]. Rhizomatous perennials (rarely tufted), 50-130 cm tall; nodes glabrous to pubescent; sheaths mostly pilose to villous, sometimes glabrous; auricles sometimes present on lower leaves; blades 3-9 mm wide, mostly hairy; flat; panicles 10-24 cm long, the branches erect to ascending; glumes glabrous to hairy; lemmas rounded on the back, variously hairy; awns 0-7 mm long; anthers 3.5-7 mm long. ●Uncommon in the forests of the northern mountains. ♦This is the native counterpart to *Bromus inermis*, and differs mainly in having pubescent nodes, sheaths, blades, and lemmas.



Bromus richardsonii Link [for John Richardson (1787-1865), Scottish naturalist, naval surgeon] RICHARDSON'S BROME [*Bromopsis mucroglumis* (Wagnon) Holub, *Bromus mucroglumis* Wagnon]. Tufted perennials, 40-110 cm or more tall; upper nodes usually glabrous; sheaths glabrous to pilose, the midrib not abruptly narrowed just below the collar; auricles absent; blades 3-10 mm wide, glabrous adaxially; panicles 10-20 cm long, the branches spreading to somewhat drooping; glumes mostly glabrous, the lower mostly 1-nerved, the upper 3-nerved, 9-11 mm long; lemmas rounded, the backs of the lower lemmas glabrous, those of the upper lemmas appressed-hairy, the margins ciliate; awns 3-5 mm long; anthers 1.6-2.7 mm long. ●Ponderosa, mixed conifer, spruce/fir forests, and mountain meadows. ♦This intergrades with *B. anomalus* and *B. ciliatus* especially, and New Mexico specimens cannot always be told apart. It is perhaps more widespread than indicated on the map, but more southern specimens are difficult to tell from *B. ciliatus*; further study is needed of New Mexico populations. The placement of *B. mucroglumis* Wagnon is problematic, as the type specimen is incomplete, but it appears to belong either here or with *B. lanatipes*.



****Bromus squarrosus*** Linnaeus [projecting outward and downward] [*Bromus arvensis* Linnaeus var. *japonicus* (Houttuyn) Fiori, *Bromus commutatus* Schrader, *Bromus hordeaceus* Linnaeus, *Bromus hordeaceus* Linnaeus var. *glabrescens* (Cosson & Germain) Shear, *Bromus hordeaceus* Linnaeus subsp. *molliformis* (Lloyd) Maire & Weiller, *Bromus japonicus* Houttuyn, *Bromus japonicus* Houttuyn var. *porrectus* Hackel, *Bromus mollis* Linnaeus, *Bromus molliformis* Lloyd, *Bromus racemosus* Linnaeus, *Bromus secalinus* Linnaeus]. Tufted annuals, 20-100 cm or more tall; nodes glabrous to densely hairy; sheaths glabrous to pilose, sometimes retrorsely so; auricles absent; blades 1-6 mm wide, pilose above, sometimes glabrous, flat; panicles 4-30 cm long, open, the branches ascending, spreading, to drooping, often with a single spikelet; spikelets laterally flattened, but not keeled, the rachilla visible or not; lemmas 1-3 mm wide, obovate, the back ± rounded, glabrous to densely hairy, the nerves obscure to strongly raised; awns 4-13 mm long; anthers (0.3)1-1.5 mm long. ●Weedy sites, disturbed ground, roadsides; widespread throughout the state; native to Europe. ♦Variation in this species is immense and bewildering, and numerous segregate species (included as synonyms herein) have been named, but the segregate taxa are weakly defined by intergrading features, and confident identification of many plants in this group is impossible. Nonetheless, we offer a guide to the following well-known phases:



a Lemmas with strongly protruding or raised nerves when dry; panicles usually dense...the *hordeaceus* phase.

a Lemmas smooth, without protruding or raised nerves when dry; panicles usually open

b Lemmas awns arising less than 1.5 mm below the apex of the lemmas

c Lower sheaths glabrous or with sparse stiff hairs less than 0.6 mm long; rachilla mostly visible at maturity...the *secalinus* phase.

c Lower sheaths densely pilose with long soft hairs to 1.2 mm long; rachilla mostly remaining obscured at maturity...the *racemosus* phase.

b Lemma awns arising 1.5-5 mm below the apex of the lemma

d Lower glumes 7-10 mm long; upper glumes 8-12 mm long; panicle branches conspicuously sinuous; awns erect to weakly spreading...the *arenarius*

phase. ♦Reported for the state by Pavlick & Anderton (2007), but the specimen in question (*Wynhoff X-2* ASU) belongs to the *japonicus* phase; native to Australia.

d Lower glumes 4-7 mm long; upper glumes 5-8 mm long; panicle branches straight to curving to sometimes sinuous; awns erect to strongly spreading

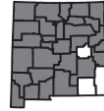
e Panicle branches usually with a single spikelet and the inflorescence appearing racemose; lemmas with hyaline margins 0.5-1 mm wide...the *squarrosus* phase.

e Panicle branches (at least the lower) usually with more than 1 spikelet and the inflorescence appearing paniculate; lemmas with hyaline margins 0.3-0.5 mm wide...the *japonicus* phase.

****Bromus sterilis*** Linnaeus [unfruitful, barren] POVERTY BROME [*Anisantha sterilis* (Linnaeus) Nevski]. Tufted annuals, 30-80 cm or more tall; sheaths densely pilose; auricles absent; blades 1-6 mm wide, pilose on both surfaces; panicles 10-20 cm long, open, the branches mostly drooping and with 1-2(3) spikelets; lemmas 14-20 mm long, rounded on the back; awns 15-30 mm long; anthers 1-1.5 mm long. ●Dry, disturbed ground, a few scattered locales in the state but not common; native to Europe. ♦Similar to *Bromus tectorum*, and perhaps more common than thought; distinguished by the features in the key.



**Bromus tectorum* Linnaeus [of rooftops] CHEATGRASS [*Anisantha tectorum* (Linnaeus) Nevski]. Tufted annuals, 10-90 cm tall, the culm puberulent below the panicle; sheaths densely pilose, the upper sometimes glabrous; auricles absent; blades 1-6 mm wide, pilose on both surfaces; panicles 5-20 cm long, open, the branches drooping and at least some with 4 or more spikelets; lemmas 9-12 mm long, usually pubescent; awns 10-18 mm long; anthers 0.5-1 mm long. ●Dry, disturbed ground, nearly throughout the state, sometimes an indicator of formerly abused rangelands; native to Europe. ♦Plants have a tendency to turn reddish as they mature. This is a noxious plant that is nearly impossible to eradicate once it becomes established. It has recently been found at 9,800 ft in the Sandia Mts (Bernalillo County). §
Buchloë...go to *Bouteloua*



Lincoln Co.
Oct. 25

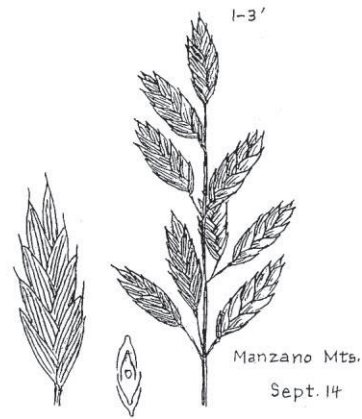
Bromus carinatus

panicle erect,
branches ascending
to spreading $\pm 45^\circ$

spikelets mod. flat.
in cross sect; ± 7
florets; conspic. awns

glume 1: 3 veins glume 2: 5 veins; wide

lemmas: $\pm 5-9$ veins, faintly defined
finely hairy; awns 7-17 mm



Manzano Mts.
Sept. 14

Bromus catharticus

panicle erect, with few
large, flat, showy spikelets

florets 5-9 (± 7); hairless

glume 1: 5 veins
glume 2: 7+ veins

lemmas: ± 9 veins; awns 1-2 mm

scales + veins sharply defined



July 30
Sandia Mts.

Bromus ciliatus



Sacramento Mts.
July 29

Bromus inermis

panicle erect, narrow
with many short, crowded,
ascending branches

spikelet narrow, oval
or roundish in cross sec.

glume 1: 1 vein

glume 2: 3 veins

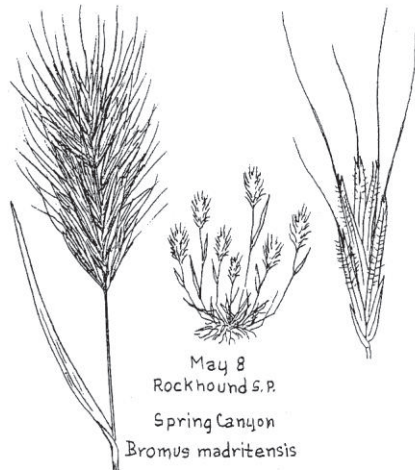
lemmas: 7-9 veins

almost no hairs or awns

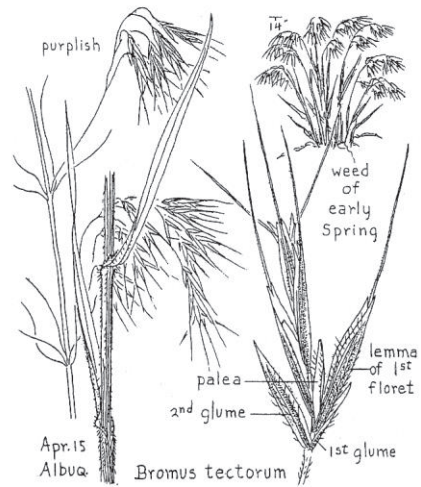


Manzano Mts.
Aug. 19

Bromus lanatipes

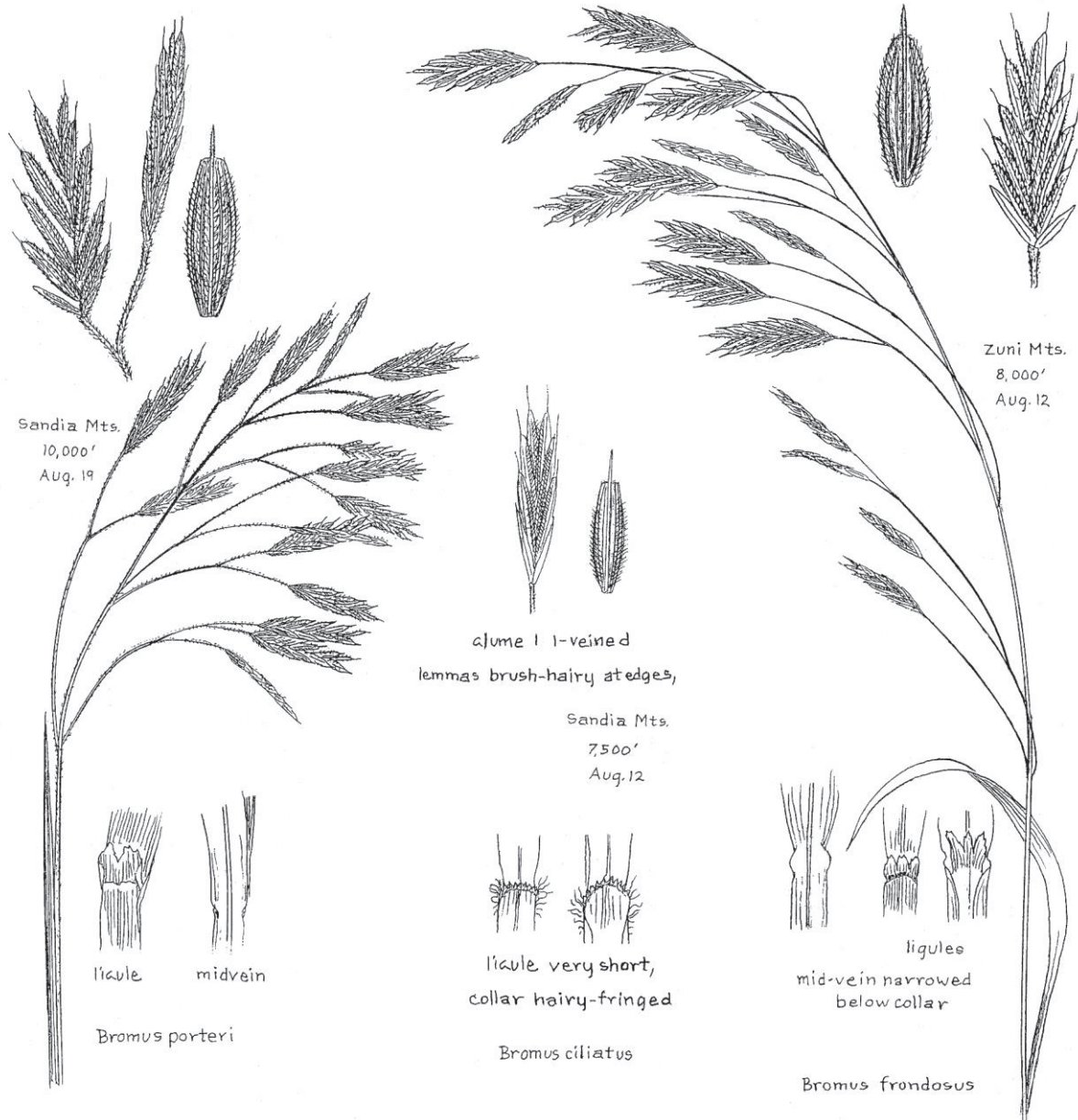


May 8
Rockhound S.P.
Spring Canyon
Bromus madritensis



Apr. 15
Albua

Bromus tectorum



Calamagrostis [reed grass] REEDGRASS [4].

Plants perennial, tufted to commonly rhizomatous; sheaths open; auricles absent; ligules membranous; blades flat to involute; inflorescence a panicle, the primary branches rebranched; spikelets mostly 1-flowered, small, the rachilla prolonged beyond the palea and mostly hairy; disarticulation above the glumes; glumes mostly surpassing the floret, 1- to 3-nerved; lemmas mostly 3-nerved, the apex toothed; awns arising from the back of the lemma, from the base to near the tip, often obscure; paleas well-developed; anthers 3. ♦These are grasses of cool, mostly mountainous habitats in New Mexico. The species boundaries are sometimes blurry and identification can be difficult; this is attributed to hybridization, polyploidy, and asexual reproduction. *Calamagrostis* ×*acutiflora* has become a rather common ornamental in cooler regions of the state. The generic boundaries have been recently redrawn, with the recognition of several segregate genera, none of which occur in New Mexico (Peterson et al. 2019).

■Greene, C.W. 1984. Sexual and apomictic reproduction in *Calamagrostis* (Gramineae) from eastern North America. *Amer. J. Bot.* 71:285-293. ■Kawano, S. 1965. *Calamagrostis purpurascens* R. Brown and its identity. *Acta Phytotax. Geobot.* 21:73-89. ■Nygren, A. 1954. Investigations on North American *Calamagrostis*. I. *Hereditas* 40:377-397. ■Nygren, A. 1958. Investigations on North American *Calamagrostis*. II. *Lantbrukshogskolans Ann.* 24:363-368. ■Peterson, P.M., R.J. Soreng, K. Romaschenko, P. Barbera, A. Quintanar, & C. Aedo. 2019. New combinations and new names in American *Cinnagrostis*, *Peyritchia*, and *Deschampsia*, and three new genera: *Greeneochloa*, *Laegardia*, and *Paramochloa* (Poaceae, Poaceae). *Phytoneuron* 2019-39: 1-23.

- 1 Plants cultivated ornamentals, not known in the wild..... *C. ×acutiflora*
- 1 Plants native wild grasses, not known in cultivation
 - 2 Awns exerted well beyond the glumes, easily visible, 4.5-8 mm long; blades usually densely hairy on the upper surface *C. purpurascens*
 - 2 Awns scarcely if at all exerted beyond the glumes, less than 4.5 mm long; blades glabrous or sparsely hairy

- 3 Pedicels glabrous or nearly so; panicles contracted, 1-2(3) cm wide.....**C. scopulorum**
- 3 Pedicels evidently scabrous; panicles contracted to open
 - 4 Glumes oblong, the apex abruptly acute and not drawn out to an awn tip; blades 1-4 mm wide, usually rolled and stiffly ascending; lemmas not translucent on the upper 1/3; callus hairs 1/2 to 2/3 as long as the lemma**C. stricta**
 - 4 Glumes lance-ovate, the apex of especially the first drawn out to an awn tip; blades 3-10 mm wide, mostly flat and lax; lemmas translucent on the upper 1/3; callus hairs 2/3 to as long as the lemma **C. canadensis**

**Calamagrostis ×acutiflora* (Schrader) A.P. de Candolle cultivar ‘Karl Foerster’ [with pointed flowers or spikelets] FEATHER REEDGRASS. Densely tufted perennials, with short rhizomes at the base, 1-1.8 m tall or more; panicles 15-30 cm long, 1-2 cm wide, greenish purple in anthesis, becoming straw-colored; spikelets 4-5 mm long; floret much shorter than the glumes; awns about 3.5 mm long, attached near the base of the lemma, exserted and distinguished from the long callus hairs. ♦Not known in the wild, this is an attractive ornamental grass that is being planted more and more in the state; native to Europe. The pale panicles show an attractive contrast to the green foliage.

Calamagrostis canadensis (Michaux) Beauvois [of Canada] [*Arundo canadensis* Michaux, *Calamagrostis scribneri* Beal]. Loosely tufted perennials with moderate rhizomes, 50-100 cm or more tall; blades 3-10 mm wide, mostly flat and lax, the upper surface scabrous; panicles 8-20 cm long, 2-6 cm wide, open when mature, purplish to greenish; spikelets 2-5 mm long; glumes lance-ovate, the apex especially of the lower glume drawn out to an awn-tip; rachilla 0.5-1 mm long, with hairs 1.5-3.2 mm long; lemmas translucent on the upper 1/3, the callus hairs 2/3 to longer than the lemma; awns 1-3 mm long, attached in the lower 1/2 of the lemma, difficult to observe. ●Wet meadows, seeps, marshy ground and other wet sites in the northern mountains, above 8000 ft. ♦In the past, *Calamagrostis scribneri* has been recognized based on sheath and collar pubescence and length of callus hairs, but the distinctions are untenable and the name is submerged herein.



Calamagrostis purpurascens R. Brown [becoming purplish]. Tufted perennials with short rhizomes, 30-80 cm tall; blades flat to involute, stiff, the upper surface densely hairy; panicles 4-14 cm long, 1-2.5 cm wide, purplish; spikelets 4.5-7 mm long; rachilla 1-2 mm long, with hairs about 2 mm long; awns 4.5-8 mm long, easily seen, attached in the lower 1/3 of the lemma, bent and stout. ●Open rocky slopes, meadows, and alpine plains at high elevations (above 11,000 ft) in the Sangre de Cristos Mountains; currently known only from Taos County. ♦Plants of other species have been called this in New Mexico, but the hairy blades, narrow purplish panicles, and exserted stiff awns serve to identify this species.



Calamagrostis scopulorum Jones [of rocky places, of the Rocky Mountains]. Loosely cespitose perennials with short rhizomes, 40-90 cm tall; blades flat, pale bluish green, the upper surface glabrous or sparsely hairy; panicles 6-16 cm long, 1-3 cm wide, pale to purplish, straw-colored when mature; spikelets 4-6 mm long; rachilla 1-2 mm long, with hairs 1.5-2.5 mm long; awns 1-2 mm long, attached in the upper half of the lemma and lying against the lemma, not exserted, straight, easily overlooked. ●Known in the state from a single collection in San Juan County, at about 6000 ft, along a seep in a hanging garden of a piñon-juniper community; earlier reports from other counties were in error. ♦Narrow, straw-colored panicles and obscure delicate awns attached in the upper half of the lemma serve to distinguish this species.



Calamagrostis stricta (Timm) Koeler [narrow]. Tufted perennials with short rhizomes, 30-90 cm or more tall; blades mostly 1-4 mm wide, usually roll ed and not lax, the upper surface scabrous; panicles 4-20 cm long, 1-3 cm wide, narrow, purplish to pale green; spikelets 2-4.5 mm long; glumes oblong, the apex abruptly acute and not drawn out to an awn tip; rachilla 0.5-1.5 mm long, with hairs 1.5-3 mm long; lemmas membranous on the upper 1/3, the callus hairs 1/2 to 2/3 as long as the lemma; awns 1.5-2.5 mm long, attached in the lower 1/2 of the lemma. ●Stream banks, wet meadows, seeps, and marshy or wet ground in the mountains, above 7500 ft, often in rather open clearings on mesic mountain slopes. ♦Our plants belong to subsp. *inexpansa* (Gray) C.W. Greene [not spreading or expanded] [*Calamagrostis inexpansa* Gray, *Calamagrostis neglecta* of numerous authors].



Calamovilfa...go to ***Sporobolus arenicola*** and ***S. rigidus***

Catabrosa [devoured] [1].

Tufted perennials, sometimes stoloniferous, usually decumbent-based and rooting at the nodes; sheaths closed to near the summit; auricles absent; ligules membranous; blades flat; inflorescence an open rebranching panicle; spikelets with (1)2(3) florets; rachilla prolonged; disarticulation above the glumes and beneath the florets; glumes much shorter than the florets, awnless; lemmas prominently 3-nerved, the apex erose and truncate, awnless; anthers 3.

Catabrosa aquatica (Linnaeus) Beauvois [found in water] BROOKGRASS [*Aira aquatica* Linnaeus, *Catabrosa aquatica* (Linnaeus) Beauvois var. *uniflora* S.F. Gray]. Tufted to stoloniferous perennials, 10-60 cm tall; sheaths glabrous; ligules 1-8 mm long; panicles 5-28 cm long, 2-10 cm wide; spikelets 1.5-4 mm long; lemmas 2-3 mm long. ●Quiet stream banks in the northern mountains, known only from Colfax County; a report from Mora County (*Atwood 24078*, BRY) was in error. ♦The foliage of BROOKGRASS is succulent and very palatable to livestock, perhaps contributing to its rarity in the state. Both one- and two-flowered plants from the western United States have been referred to var. *uniflora*, and the distinction between this and the typical form is tenuous at best, and disregarded herein.

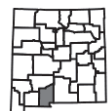


Catapodium [underfoot] [1].

Tufted annuals; sheaths open; auricles absent; ligules membranous; inflorescence a weakly developed panicle, sometimes racemose; spikelets several-flowered, awnless; disarticulation above the glumes and between the florets; rachillas not prolonged, puberulent; glumes shorter than the florets; lemmas 5-nerved, awnless; paleas subequal to the lemmas; anthers 3. ♦A small genus of about 4 species of Eurasia and North Africa.

■Allred, K.W. 1998. New plant distribution records [*Catapodium rigidum*]. The New Mexico Botanist 8:10. ■Soreng, R.J., P.M. Peterson, K.Romaschenko, G. Davise, F.O. Zuloaga, E.J. Judziewicz, T.S. Filgueiras, J.I. Davis, O. Morrone. 2015. A worldwide phylogenetic classification of the Poaceae (Gramineae). J. Syst. Evol. 53(2):117-137.

****Catapodium rigidum*** (Linnaeus) C.E. Hubbard ex Dony [stiff, rigid] RIGID-FESCUE [*Desmazeria rigida* (Linnaeus) Tutin, *Scleropoa rigida* (Linnaeus) Grisebach, *Poa rigida* Linnaeus]. Tufted annuals, the culms up to 60 cm long, but usually much shorter, often procumbent; sheaths glabrous, the margins membranous; ligules 1.5-4 mm long; panicles 2-18 cm long, the branches spreading to divaricate; spikelets 4-10 mm long; glumes glabrous, keeled; lemmas 2-3 mm long, rounded on the back, obtuse to mucronate. ●Weakly adventive from horticultural plantings in the southern region, but likely to appear almost anywhere in the state; native to Europe. ♦Plants have the aspect of six-weeks fescue (*Vulpia octoflora*), but are more coarse and thickened. We follow Soreng et al. (2015) in maintaining *Catapodium* as a genus separate from *Desmazeria*.



Cenchrus [a kind of millet] SANDBUR [3].

Tufted annuals and perennials, the culms often geniculate or decumbent; sheaths open; auricles absent; ligules a ciliate membrane; inflorescence of highly reduced branches clustered into a fascicle or bur, the burs racemose on the main axis; burs of many stiff, spiny, partially fused bristles surrounding and mostly concealing the enclosed spikelets; disarticulation at the base of the bur; spikelets awnless, with 2 florets, the lower usually sterile, the upper fertile; lower glume short, 1-nerved; upper glume and lower lemma subequal, 3- to 9-nerved; upper floret becoming indurate, flattened on one side, enclosing the grain. ♦The sandburs can be pernicious pests because of the spiny burs, and can inflict painful wounds. Chemisquy et al. (2010) argue with some justification for the merger of *Cenchrus* and *Pennisetum* (within *Cenchrus*) in order to uphold monophyly, but we allow a paraphyletic *Pennisetum*, and maintain the obvious and practical morphological distinctions among *Setaria*, *Pennisetum*, and *Cenchrus* as follows: a) bristles subtending the spikelets but not fused and remaining on the plant at disarticulation = *Setaria*; b) bristles fused at least basally to form a disarticulating bur but not spinose = *Pennisetum*; c) bristles fused to form a disarticulating bur and some or all of the bristles spinose = *Cenchrus*.

■DeLisle, D.G. 1963. Taxonomy and distribution of the genus *Cenchrus*. Iowa State Coll. J. Sci. 37:259-351. ■Chemisquy, M.A., L.M. Giussani, M.A. Scataglini, E.A. Kellogg, & O. Morrone. 2010. Phylogenetic studies favour the unification of *Pennisetum*, *Cenchrus* and *Odontelytrum* (Poaceae): a combined nuclear, plastid and morphological analysis, and nomenclatural combinations in *Cenchrus*. Ann. Bot. 106:107-130.

1 Burs with a single whorl of flattened spines subtended by 1-several whorls of bristles*C. echinatus*

1 Burs with more than one whorl of flattened spines, the spines projecting at irregular intervals throughout the body of the bur

2 Burs mostly with 8-40 spines, the bases of the larger spines frequently 1-2 mm wide; upper floret of the spikelets 3.4-5.8 mm

long; only one margin of the blade of uppermost leaf crinkled near the base *C. spinifex*

2 Burs mostly with 45-75 spines, the bases of the larger spines seldom over 1 mm wide; upper floret of the spikelets 5-7.6 mm long;

both margins of the blade of uppermost leaf conspicuously crinkled near the base*C. longispinus*

**Cenchrus echinatus* Linnaeus [prickly like a hedge-hog]. Tufted annuals, 20-100 cm tall; sheaths compressed;

panicles 3-12 cm long; burs 5-10 mm long, with only a single whorl of inner fused spines subtended by 10-20 shorter

unfused outer bristles; spikelets 5-7 mm long. ●Disturbed ground; known only from a single, old collection in Doña

Ana County, and not likely to have persisted; native to more mesic to tropical areas of North and South America. ♦This

is a common weed of the southern United States and coastal plain, but essentially absent in New Mexico.



Cenchrus longispinus (Hackel) Fernald [long-spined] [*Cenchrus carolinianus* Walter, *Cenchrus echinatus* Linnaeus forma

longispinus Hackel, *Cenchrus pauciflorus* Benth. in part]. Tufted annuals or occasionally short-lived perennials from pseudo-

rhizomes, 20-90 cm tall, the bases geniculate; sheaths compressed-keeled; uppermost blade with both margins crinkled

near the base; panicles 2-10 cm long; burs 8-12 mm long, short-hairy, with 45-75 spines, the inner bristles 0.5-1 mm

wide at the base, the outer bristles mostly terete and reflexed; spikelets 4.5-8 mm long; upper florets 4-7.6 mm long.

●Disturbed ground, plains, grasslands; throughout the state. ♦This or *Cenchrus spinifex* was encountered during the 1820 Long

Expedition, which crossed through Union County. Edwin James, the surgeon-naturalist of the expedition, reported that the sandburs

had become very common, the burs “falling into our mockasins, adhering to our blankets and clothing, and annoying us at every

point.”



Cenchrus spinifex Cavanilles [spine-bearing] [*Cenchrus incertus* M.A. Curtis, *Cenchrus pauciflorus* Benth. in part]. Tufted

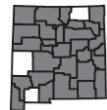
annuals (rarely short-lived perennials), 30-100 cm tall, the bases geniculate; sheaths compressed-keeled; uppermost

blade with only one margin crinkled near the base; panicles 3-8 cm long; burs 5-10 mm long, glabrous or sparsely

pubescent, with 8-40 spines, the inner bristles 1-2 mm wide at base, the outer bristles usually flattened at base; spikelets

3.5-10 mm long; upper florets 3.4-5.8 mm long. ●Disturbed ground, plains, grasslands; throughout the state. ♦See note

under *Cenchrus longispinus*. §



Chasmanthium [hollow flower] : A single specimen of *C. latifolium* (Michaux) Yates was reported from Doña Ana County by Yates

(1966); this is clearly an error in label information or a freak occurrence that need not be perpetuated as natural, as the habitat and

distribution of this species are totally incongruous with its occurrence in New Mexico.

Chloris [Greek goddess of flowers] WINDMILLGRASS [5].

Tufted annuals or perennials; sheaths open, compressed-keeled; auricles absent; ligules a ciliate membrane; inflorescence a panicle

of usually several spicate primary branches, these borne at the tip of the peduncle (digitate) or in a few separate whorls below the apex;

spikelets with a single fertile floret at the base and 1(3) staminate or sterile florets above; disarticulation above the glumes and all the

florets falling together, sometimes below the glumes and the spikelet falling; glumes unequal, shorter than the florets; lemmas 3-

nerved, generally pubescent on the lateral nerves, awned or awnless; paleas present, shorter than the lemma; anthers 3. ♦*Chloris*

divaricata R. Brown was reported for New Mexico by Barkworth (2003), but validating specimens are unknown; it is a perennial with

deeply bilobed sterile florets.

■Allred, K.W. 1996. New plant distribution records [*Chloris submutica*]. The New Mexico Botanist 4:6. ■Anderson, D.E. 1974. Taxonomy of the genus *Chloris* (Gramineae). Brigham

Young Univ. Sci. Bull. Biol. Ser. 19(2):1-133. ■Barkworth, M.E. 2003. *Chloris*, pp. 204-218. IN: Flora of North America, vol. 25. Oxford University Press. ■Hilu, K.W. & L.A.

Alice. 2001. A phylogeny of the Chloridoideae (Poaceae) based on *matK* sequences. Syst. Bot. 26:386-405.

1 Lemma of the lower floret with 3 awns 8-12 mm long (*L. crinita*)..... go to *Leptochloa*

1 Lemma of the lower floret with a single awn or awnless

2 Lowermost lemma awnless or with a short awn less than 2 mm long

3 Upper floret inflated-spheroidal, bowl-shaped, about 1 mm wide *C. cucullata*

3 Upper floret not inflated, less than 0.5 mm wide

4 Florets with a short awn 0.5-2 mm long.....“*C. subdolichostachya*”

4 Florets awnless or with a short mucro to 0.5 mm..... *C. submutica*

2 Lowermost lemma prominently awned, the awn more than 3 mm long

5 Panicle branches typically in several whorls along an axis 2 cm or more long *C. verticillata*

5 Panicle branches in a single terminal whorl, or if in several whorls then the axis less than 2 cm long

6 Tip of lower lemma with a tuft of spreading hairs to 2 mm long; plants annual *C. virgata*

6 Tip of lower lemma with short, appressed hairs; plants perennial“*C. subdolichostachya*”

Chloris cucullata Bischoff [hooded]. Tufted perennials, 15-60 cm tall; blades glabrous; panicle branches 10-20 in mostly 1-3 whorls, 2-5 cm long; disarticulation below the glumes and the spikelets falling entire, or above the glumes and the florets falling together; spikelets with 1 fertile and 1 sterile floret; glumes 1-nerved, hyaline; sterile (upper) floret inflated, spherical, about as wide as long, with awn 0-1.5 mm long. ●Plains and grasslands, roadsides, disturbed ground of the eastern plains, with a disjunct collection from the BUFFALOGRASS plains of Hidalgo County. ♦Plants are known to hybridize with *Chloris verticillata* (Anderson 1974), and one may expect to find plants with intermediate or confusing features.

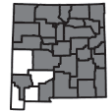


“Chloris subdolichostachya” C. Mueller [with longish spikes] [*Chloris alba* Presl var. *aristulata* Torrey, *Chloris brevispica* Nash]. Plants referred to this name are hybrid derivatives involving *Chloris andropogonoides* Fournier (not in New Mexico), *C. cucullata*, and *C. verticillata*, not accurately assignable to a biologic species, and will have features of all three parents: perennial, panicle branches digitate or in very close whorls, and slightly inflated florets with short awns.

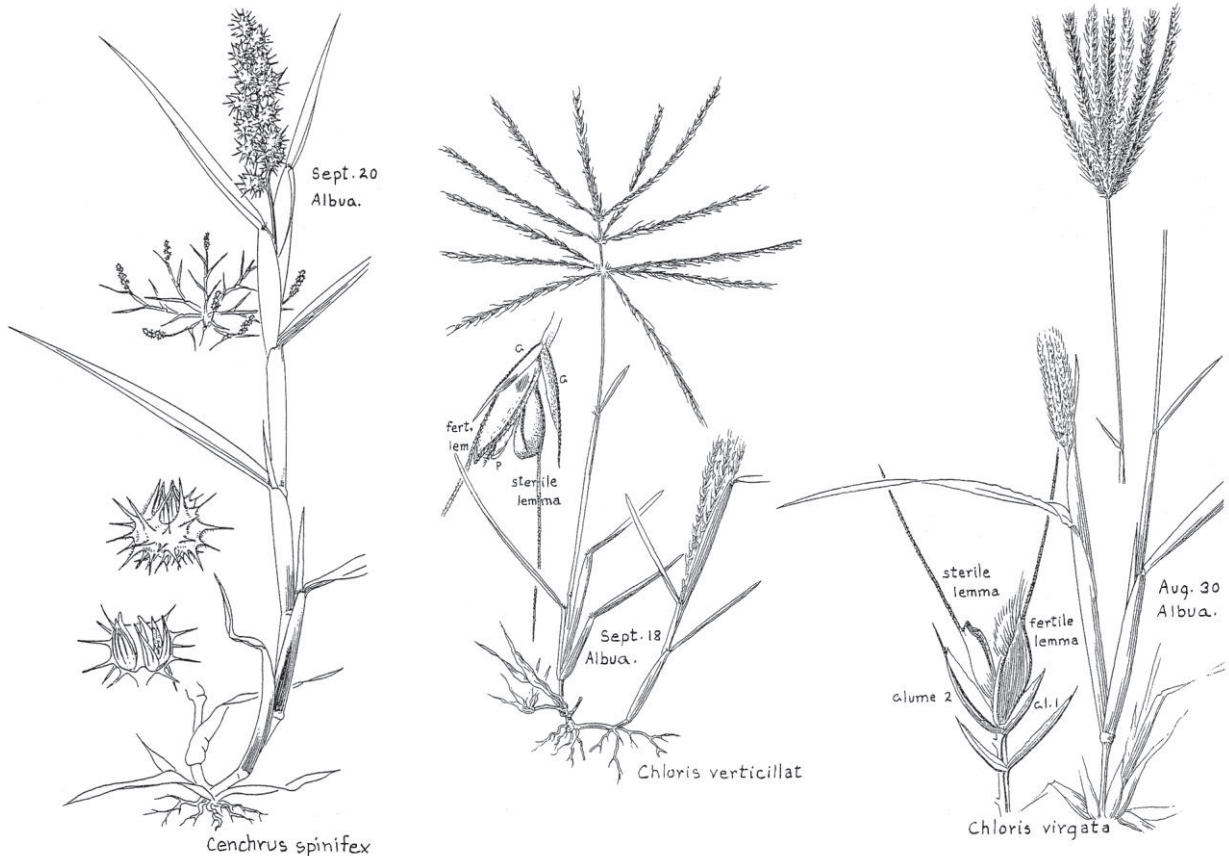
****Chloris submutica*** Kunth [nearly awnless]. Plants perennial, mostly caespitose but occasionally with short stolons, 30-75 cm tall; blades sometimes with long basal hairs; panicle branches 5-17 in 1-3 closely spaced whorls, to 7 cm long, ascending to reflexed when mature; spikelets with 1 fertile and 1 sterile floret; disarticulation above the glumes; florets awnless or with a short mucro. ●Infrequent adventive from Mexico, occasionally found in disturbed ground, lawns, and fields in the southern region. ♦Though native to Mexico and southward, this is considered exotic in New Mexico; known sporadically from Doña Ana and Otero counties.



Chloris verticillata Nuttall [whorled]. Tufted perennials, 15-40 cm tall; blades with basal hairs, otherwise glabrous; panicle branches 10-16 in mostly 2-5 whorls, 5-15 cm long; disarticulation at the base of the panicle and concomitantly above the glumes, releasing the florets and the panicle rolls and bounces across terrain; spikelets with 1 fertile and 1 sterile floret; florets with awns 3-9 mm long. ●Plains and grasslands, roadsides, widespread throughout much of the state, and expected in the other counties. ♦Plants are known to hybridize with *Chloris cucullata* (Anderson 1974), and one may expect to find plants with intermediate or confusing features. §



Chloris virgata Swartz [twiggy, with straight stems or branches] [*Chloris elegans* Kunth]. Tufted annuals, sometimes with stolons, 10-80 cm or more tall; blades with long hairs near the base; panicle branches 4-20 in a single terminal whorl, 5-10 cm long; spikelets with 1 fertile and 1-2 sterile florets; disarticulation above the glumes, the florets falling together; lower (fertile) floret with a conspicuous tuft of long hairs at the apex; first and second florets with awns 3-15 mm long; third floret when present greatly reduced, awnless. ●Disturbed fields, roadsides, and waste areas throughout the state. ♦Sometimes considered exotic in some situations, as plants easily spread from native habitats and ranges. §

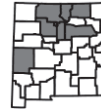


Cinna [an ancient Greek name used by Theophrastus] WOODREED [1].

Tufted, sometimes rhizomatous, perennials; sheaths open; auricles absent; ligules thin-membranous; blades flat; inflorescence a panicle, the branches ascending to spreading; disarticulation below the glumes; spikelets with 1(2) florets; rachillas usually prolonged as a bristle or stub; glumes subequal to the floret, awn-tipped; lemmas 3-5-nerved, short-awned; anthers 1-2. ♦Only 4 species, widespread in the Americas and northern Eurasia.

■Brandenburg, D.B., W.H. Blackwell, & J.W. Thieret. 1991. Revision of the genus *Cinna* (Poaceae). *Sida* 14(4):581-596. ■Brandenburg, D.M. & J.W. Thieret. 2000. *Cinna* and *Limnodea* (Poaceae): Not congeneric. *Sida* 19:195-200. ■Keller, C.F. 2004. Plant distribution reports [*Cinna latifolia*]. *The New Mexico Botanist* 29:7.

Cinna latifolia (Trevisan ex Goepfinger) Grisebach [with broad leaves]. Tufted perennials, 20-100 cm or more tall; ligules 2-8 mm long; panicles 5-40 cm long, the branches spreading; spikelets 2-5 mm long; rachilla prolonged 0-1 mm; glumes lemmas 1.8-3.8 mm long, awnless or with an awn to 2.5 mm long; paleas 1- to 2-nerved; anther 1. ●Moist places in mixed conifer woodlands and forests; not commonly collected.



Coix [an ancient Greek name for a palm-like plant] [0].

Monoecious, tufted annuals and perennials; leaves glabrous; sheaths open; ligules membranous; inflorescences axillary, many per shoot, composed of 1 staminate and 1 pistillate rame; female spikelets borne within hard, whitish, bead-like involucre at the end of long stalks; male spikelets deciduous at maturity, the glumes large and chaffy (somewhat like corn tassels). ♦A small genus of about 3 species, Asia and Australia.

**Coix lacryma-jobi* Linnaeus [Job's tears] JOB'S TEARS. Tufted annual or perennial, 0.8-3 m tall; blades 2-7 cm wide, the base cordate; beads 8-12 mm dia, of varying color; staminate rames 1-3.5 cm long, breaking apart when mature; glumes exceeding the florets, with 15 or more nerves, 5-9 mm long. ●Occasionally cultivated in flower gardens for the bead-like female involucre; not known in the wild; native to tropical Asia.

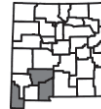
Cortaderia [Latin rendering of the Spanish *cortadera*, cutting, referring to the blade margins] [0].

Tussocky, monoecious or dioecious perennials, 2-7 m tall; sheaths open; auricles absent; ligules a ring of hairs; blades flat or folded, arching, the margins sharply serrate; inflorescence a large plumose panicle; spikelets usually unisexual, with 2-9 florets; disarticulation above the glumes and beneath the florets, which fall together; glumes unequal, nearly as long as the spikelet, 1-nerved; lemmas long-sericeous to glabrous. ♦About 20 species of South and Central America.

**Cortaderia selloana* (J.A. & J.H. Schultes) Ascherner & Graebner [for Friedrich Sellow (Sello) (1789-1831), German naturalist and plant collector in South America] PAMPASGRASS [*Arundo selloana* J.A. & J.H. Schultes]. Giant tussocky perennials, 2-4 m tall, often dioecious, sometimes monoecious; leaves primarily basal; sheaths glabrous, with a dense tuft of hairs at the collar; blades to 2 m long, 3-8 cm wide, the margins sharply serrate; panicles 30-130 cm long, only slightly elevated above the foliage; spikelets 15-17 mm long; lemmas long attenuate to an awn 2-5 mm long; anthers 3 when present. ●Introduced as an ornamental landscape plant, with numerous cultivars; not known in the wild in New Mexico; native to central South America. ♦Though not escaping in New Mexico, populations have become weedy and invasive in California. Sometimes confused with *Tripidium ravennae*, RAVENNA-GRASS, whose blades are nearly as saw-toothed as this, but the panicle branches are scarcely rebranched.

Cottea [for Johann Heinrich Cotta (1763-1844), German botanist-ecologist] [1].

Cottea pappophoroides Kunth [resembling the genus *Pappophorum*] COTTAGRASS. Tufted perennial from knotty bases, 25-70 cm tall; foliage softly pilose; sheaths open; auricles absent; ligules hairy; inflorescence a panicle, purplish, 8-15 cm long, 2-6 cm wide, the branches ascending; spikelets several-flowered, pilose, the distal reduced; disarticulation above the glumes and between the florets; glumes subequal, 4-5 mm long, 7- to 13-nerved; lemmas 3-4 mm long, 9- to 13-nerved and awned; anthers 3. ●Rocky volcanic hills and plains of the southern desert regions, seldom collected.



♦*Cottea* is a monotypic genus, which resembles *Pappophorum*, but that genus has 1-nerved glumes.

Crypsis...go to *Sporobolus alopecuroides* & *S. schoenoides*

Cynodon [dog tooth].

Tufted, rhizomatous, or stoloniferous perennials; sheaths open; auricles absent; ligules a ring of hairs or membranous; inflorescence a panicle of spike-like, digitate branches; spikelets with 1(3) florets, only the lowermost fertile; rachilla usually prolonged, sometimes with a vestigial floret; disarticulation above the glumes; glumes shorter than the floret; lemmas 3-nerved, keeled, awnless to mucronate; paleas subequal to the lemmas; anthers 3. ♦About 10 species native to the warm temperate and tropical regions of the Old World, but spreading worldwide.

■Alderson, J. & W.C. Sharp. 1995. *Grass Varieties in the United States*. CRC Press, Boca Raton, Florida. 296 pp. ■DeWet, J.M.J. & J.R. Harlan. 1970. *Biosystematics of Cynodon L.C. Rich* (Gramineae). *Taxon* 19:565-569. ■Mitich, L.W. 1989. History and taxonomy of bermudagrass. *Proc. Calif. Weed Conference* 41:181-188.

****Cynodon dactylon*** (Linnaeus) Persoon [a finger] BERMUDAGRASS [*Capriola dactylon* (Linnaeus) Kuntze, *Panicum dactylon*

Linnaeus]. Stoloniferous and rhizomatous perennial, 5-40 cm tall, often forming a dense turf or sod; sheaths glabrous, the collars usually with long hairs; ligules about 0.5 mm long; blades flat when mature, 1-10 cm long, 2-5 mm wide; panicles with 2-9 branches 2-6 cm long; spikelets 2-3.2 mm long; glumes subequal, 1.5-2.2 mm long; lemmas a bit longer than the glumes. ●A common grass for lawns (if you don't mind it turning brown in winter) and improved pastures, also escaping into gardens, fields, and along roads; throughout the state and expected in all the counties; native to tropical regions of the Eastern Hemisphere. ♦Shoots of Bermudagrass grow in a pattern of 2-3 short internodes alternating with a long internode, giving the appearance of several leaves clustered together on the culm. There are numerous tenuous varieties and a great many cultivars. §



Cynosurus [dogtail] DOG'S-TAIL GRASS [1].

Tufted annuals or perennials; sheaths open; auricles absent; ligules membranous; inflorescence a dense, spike-like or head-like panicle; spikelets dimorphic and paired, the sterile lower one obscuring the fertile upper one; disarticulation above the glumes, the florets falling together; florets several, reduced to linear lemmas, awnless or awned; fertile spikelets with 1-5 florets, the rachilla extending beyond the terminal floret, the lemmas 5-nerved and awned to awnless; anthers 3. ♦About 8-9 species of Eurasia and North Africa, adventive in many other parts of the world.

■Hartman, R.L., B. Reif, B.E. Nelson, & B. Jacobs. 2006. New vascular plant records for New Mexico [*Cynosurus echinatus*]. *Sida* 22(2):1225-1233.

****Cynosurus echinatus*** Linnaeus [prickly like a hedge-hog]. Tufted annual, 10-100 cm or more tall; ligules 3-10 mm long; panicles 2-8 cm long, ovoid to globose; sterile spikelets persistent, several-flowered, the glumes and lemmas similar and with awns to 8 mm long; fertile spikelets 1-5-flowered; glumes shorter than the florets; lemmas with awns 5-20 mm long. ●Known as yet only from moist weedy ground in Bandelier National Monument, Sandoval County; native to southern Europe. ♦Plants give the initial impression of *Polypogon* or *Hordeum*.



Dactylis [a finger] [1].

Mostly tufted perennials, sometimes with short rhizomes, the internodes hollow, the nodes glabrous; sheaths closed, the margins fused together at least ½ their length, mostly longer than the internodes; auricles absent; ligules membranous; inflorescence a panicle, the spreading branches with dense one-sided clusters of spikelets distally; spikelets several-flowered, ciliate on the keels;

disarticulation above the glumes and between the florets; glumes shorter than the florets; lemmas 5-nerved, short-awned; anthers 3. ♦Commonly treated as a monotypic genus, but recently authors are recognizing 2-5 species from among the numerous infraspecific taxa that have been proposed. If is sufficient for our purposes to treat just a single species.

■Stebbins, G.L. & D. Zohary. 1959. Cytogenetic and evolutionary studies in the genus *Dactylis*. Univ. Calif. Publ. Bot. 31:1-40.

**Dactylis glomerata* Linnaeus [clustered into heads] ORCHARDGRASS. Tufted perennial with abundant foliage, 75-150 cm or more tall; ligules conspicuous, 3-11 mm long; blades 4-10 mm wide; inflorescence a somewhat pyramidal panicle, 4-20 cm long, the distal branches ascending to appressed; spikelets 5-8 mm long, sessile; lemmas 4-8 mm long; paleas slightly shorter than the lemmas. ●Widely introduced for meadow and pasture improvement and found throughout the state; native to Europe. ♦The species includes diploid and tetraploid populations, from which numerous infraspecific, but tenuous, entities have been named. §



Dactyloctenium [a comb-like finger] [1].

Tufted, stoloniferous, to rhizomatous annuals and perennials; sheaths open; auricles absent; ligules membranous to ciliate; inflorescence a panicle of few to several digitate spicate primary branches, the branch axis extending beyond the spikelets to a point, the spikelets 2-rowed on the abaxial sides of the branches; spikelets with several florets, reduced distally; disarticulation above the glumes, the florets falling together; glumes 1-nerved, shorter than the adjacent lemmas, the upper glumes with a curved awn; lemmas 3-nerved, keeled; anthers 3, yellow. ♦About 12 species native to Africa and Australia.

**Dactyloctenium aegyptium* (Linnaeus) Willdenow [of Egypt] CROWFOOTGRASS [*Cynosurus aegyptius* Linnaeus].

Tufted annual, 10-40 cm tall, the culms geniculate-based; sheaths with bulbous-based hairs distally; ligules to 1.5 mm long, ciliate; blades 2-10 mm wide, with bulbous-based hairs, especially proximally; panicle branches mostly 2-6 in number, 2-6 cm long; spikelets 3-5 mm long; glumes with curved awns 1-2.5 mm long; lemmas ovate, with curved awns 0.5-1 mm long, the paleas about as long. ●An infrequent weed of cultivated fields, moist waste places, and lawns in the southern region; native to Africa. ♦The straight hairs on the margins of the blades and collars and the flattened short-awned spikelets are distinctive.



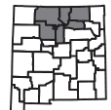
Danthonia [for Étienne Danthoine (1739-1794), French botanist-pharmacist] DANTHONIA, OATGRASS [3].

Tufted perennials; sheaths open, with tufts of hair at the edges of the collars; auricles absent; ligules of hairs; inflorescence a weakly developed panicle, raceme, or a single spikelet; spikelets several-flowered; disarticulation above the glumes and between the florets; glumes subequal, usually exceeding the florets or nearly so, 1- to 7-nerved; lemmas 7- to 11-nerved, the apex with 2 aristate lobes, densely hairy on the callus and margins; awns from between the lemma lobes, geniculate and twisted; anthers 3; cleistogamous spikelets sometimes developed in the lower sheaths, 1- to several-flowered. ♦Called OATGRASS because of the large glumes and awned spikelets that resemble OATS (*Avena*); the two genera are unrelated. *Danthonia californica* Bolander has been reported by various works, but validating specimens have yet to be found. It is distinguished from *D. parryi* by sharply divergent blades of the uppermost leaves, bent backward or reflexed 90° or more, and widely divergent pedicels.

■Baeza-P., C.M. 1996. Los generos *Danthonia* A.P. de Candolle y *Rytidosperma* Steudel (Poaceae) en America: una revision. Sendtnera 3:11-93. ■Clay, K. 1983. Variation in the degree of cleistogamy within and among species of the grass *Danthonia*. Amer. J. Bot. 70:835-843. ■Darbyshire, S.J. 2003. *Danthonia*, pp. 301-306. IN: Flora of North America, vol. 25. Oxford University Press. ■Darbyshire, S.J. & J. Cayouette. 1989. The biology of Canadian weeds. 92. *Danthonia spicata* (Linnaeus) Beauvois in Roem. & Schult. Canad. J. Plant Sci. 69:1217-1233.

- 1 Pedicels and branches puberulent.....*D. parryi*
- 1 Pedicels glabrous
 - 2 Panicle branches widely spreading (chasmogamous form, at anthesis)..... *D. spicata*
 - 2 Panicle branches erect-appressed
 - 3 Older blades prominently straw-colored and markedly curly or coiling; lemmas 2.5-5 mm long; callus of middle florets about as long as wide..... *D. spicata*
 - 3 Older blades green to pale green but not prominently straw-colored, ± straight or only arcuate, not markedly curly or coiling; lemmas 6-8 mm long; callus of middle florets longer than wide..... *D. intermedia*

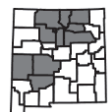
Danthonia intermedia Vasey [intermediate (resembling *Danthonia sericea*)]. Shoots 20-70 cm tall, the culms not breaking at the nodes; sheaths usually glabrous; uppermost blades erect or only slightly diverging from the culm at maturity; panicles with several spikelets, the branches/pedicels erect and appressed; spikelets 11-18 mm long, usually greenish to purplish tinged; lemma teeth 1.5-2.5 mm long; awns 6-8 mm long; cleistogamous spikelets rarely produced. ●Forest meadows and clearings at high elevations in the northern mountains. ♦Greenish plants with ± erect or only curving old blades help to distinguish this species.



Danthonia parryi Scribner [for Charles Christopher Parry (1823-1890), notable collector of western plants]. Shoots in well-developed tussocks, 30-100 cm tall, the culms not breaking at the nodes; sheaths glabrous or sparsely pubescent; lower blades breaking at the collar, leaving clumps of basal sheaths; uppermost blades erect or only slightly diverging from the culm at maturity; panicles with few to many spikelets, sometimes racemose, the branches/pedicels ascending to spreading and puberulent; spikelets 16-24 mm long, commonly straw-colored when mature; lemma teeth 2.5-8 mm long; awns 12-15 mm long; cleistogamous spikelets perhaps produced in the lower sheaths. ●Coniferous forests, mountain meadows and grasslands, mostly in the northern mountains. ♦This species is distinguished by its tussocky growth, bleached basal sheaths without blades, and large spikelets on often spreading pubescent pedicels. Florets are mostly sterile, and we assume reproduction is by cleistogamous spikelets in the lower sheaths. §



Danthonia spicata (Linnaeus) Beauvois ex Roemer & J.A. Schultes [spike-like] [*Avena spicata* Linnaeus]. Shoots 10-65 cm tall, breaking at the nodes when mature; sheaths pilose to glabrous; blades usually straw-colored and curled or coiled when mature (sometimes nearly straight in shade plants); panicles with few to numerous spikelets, the branches/pedicels appressed to ascending, or spreading in anthesis of the chasmogamous form; spikelets 7-15 mm long, greenish to straw-colored; lemma teeth 0.5-2 mm long; awns 5-8 mm long. ●Dry sandy mineral soil in ponderosa pine forests of the northern and western mountains. ♦Pale plants with prominently curly or coiling old blades help to distinguish this species. Narrow panicles with erect branches/pedicels tend to be cleistogamous, self-pollinating in the sheath before elongation, while open panicles with spreading branches/pedicels tend to be chasmogamous, cross-pollinating after elongation from the sheath.



Dasyochloa...go to *Munroa*

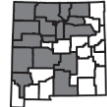
Deschampsia [for Louis August Deschamps (1765-1842), French surgeon-naturalist] HAIRGRASS [2].

Plants annual to perennial; leaves tending to be basal; sheaths open; auricles absent; ligules membranous; inflorescence a panicle; spikelets mostly 2-flowered; disarticulation above the glumes, the florets falling together; glumes exceeding the lower floret; lemmas 5- to 7-nerved, the apex toothed, awned from the lower back; rachilla prolonged beyond the palea; anthers 3.

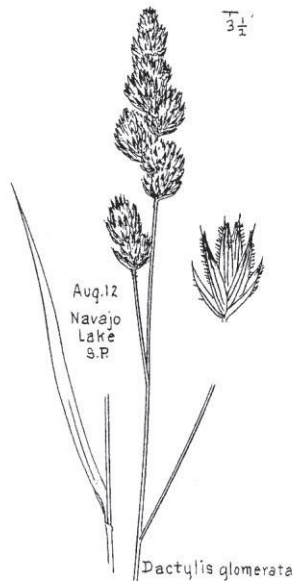
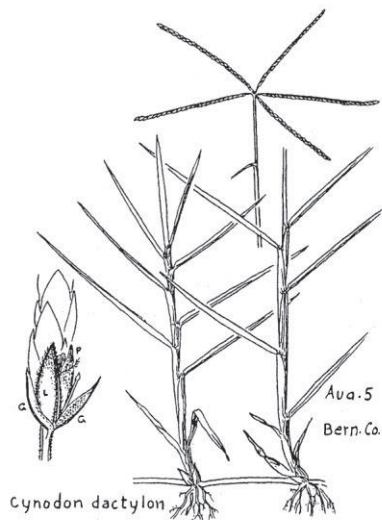
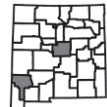
■Kawano, S. 1963. Cytogeography and evolution of the *Deschampsia caespitosa* complex. Can. J. Bot. 41:719-742.

- 1 Plants perennial; blades 1-5 mm wide; panicle loose and open at maturity, the branches spreading *D. caespitosa*
- 1 Plants annual; blades 0.5-1.5 mm wide; panicle narrow at maturity, the branches mostly erect..... *D. danthonioides*

Deschampsia caespitosa (Linnaeus) Beauvois [tufted] [*Aira caespitosa* Linnaeus, *Deschampsia alpicola* Rydberg]. Perennial, 35-100 cm or more tall; panicles 10-30 cm long, 5-25 cm wide, the branches flexuous; spikelets 3-7 mm long, sometimes with 1 or 3 florets; lemmas purplish proximally, pale distally; awns 1-8 mm long, straight to bent, often exceeding the glumes slightly; anthers 1-3 mm long. ●Widespread in moist mountain meadows, bogs, grasslands, and forest openings at medium to high elevations. ◆Our material belongs to variety (or subspecies) *caespitosa*. Linnaeus used the spelling “caespitosa” in his original description. Bicolored lemmas give the panicles a “salt-and-pepper” appearance. §



****Deschampsia danthonioides*** (Trinius) Munro in Bentham [resembling *Danthonia*] [*Aira danthonioides* Trinius]. Annual, 10-50 cm tall; panicles 5-20 cm long, 2-8 cm wide, the branches rather straight; spikelets 4-9 mm long; lemmas pale green to purplish but not bicolored; awns 4-9 mm long, strongly geniculate; anthers 0.3-0.5 mm long. ●An infrequent weed of moist waste places; known from Grant and Torrance counties; native to the western United States and Mexico.



Dichanthelium [two plumes, an allusion to the two flowering periods] ROSETTEGRASS [4].

Tufted (ours) perennials, producing a winter rosette of broad basal leaves often sharply different than the narrow cauline leaves; sheaths open; auricles absent; ligules mostly a ciliate membrane or ring of hairs, often with a second ring of hairs (pseudoligule) adjacent on the blade that is nearly indistinguishable; inflorescence a terminal (spring) or axillary (summer-fall) panicle; spikelets dorsally compressed, with 2 florets, the lower staminate or sterile, the upper fertile and indurate; disarticulation below the glumes; lower glume shorter than the spikelet; upper glume as long as the spikelet, 5- to 11-nerved; lower lemma similar to the upper glume; upper floret forming a hard seed case, the lemma rounded, shiny, and clasping the flat palea; anthers 3. ♦Members of *Dichanthelium* were all formerly included in a large and unwieldy *Panicum*, but their segregation into *Dichanthelium* is supported by a suite of morphological, anatomical, physiological, and molecular features. They are conspicuous by producing simple flowering shoots with terminal panicles in the spring or early summer, and highly branched flowering shoots with numerous axillary panicles in the summer and fall. Many species are highly variable.

■Aliscioni, S.S., L.M. Giussani, F.O. Zuloaga, & E.A. Kellogg. 2003. A molecular phylogeny of *Panicum* (Poaceae: Paniceae): tests of monophyly and phylogenetic placement within the Panicoideae. *Amer. J. Bot.* 90:796-821. ■Brown, W.V. & B.N. Smith. 1975. The genus *Dichanthelium* (Gramineae). *Bull. Torrey Bot. Club* 102:10-13. ■Clark, C.A. & F.W. Gould. 1975. Some epidermal characteristics of paleas of *Dichanthelium*, *Panicum*, and *Echinochloa*. *Amer. J. Bot.* 62:743-748. ■Freckmann, R.W. & M.G. Lelong. 2002. Nomenclatural changes and innovations in *Panicum* and *Dichanthelium* (Poaceae: Paniceae). *Sida* 20(1):161-174. ■Gould, F.W. & C.A. Clark. 1978. *Dichanthelium* (Poaceae) in the United States and Canada. *Ann. Missouri Bot. Gard.* 65:1088-1132. ■Spellenberg, R.W. 1975. Synthetic hybridization and taxonomy of western North American *Dichanthelium*, group *Lanuginosa* (Poaceae). *Madroño* 23:134-153. ■Thomas, J.R. 2015. Revision of *Dichanthelium* section *Lanuginosa* (Poaceae). *Phytoneuron* 2015-50: 1-58. ■Webster, R.D. 1988. Genera of the North American Paniceae (Poaceae: Panicoideae). *Syst. Bot.* 13(4):576-609. ■Zuloaga, F.O., R.P. Ellis, & O. Morrone. 1993. A revision of *Panicum* subg. *Dichanthelium* (Poaceae: Panicoideae: Paniceae) in Mesoamerica, the West Indies, and South America. *Ann. Missouri Bot. Gard.* 80:119-190.

1 Basal leaf blades similar in shape to those of the lower cauline leaves, usually erect to ascending; culms branching from near the base in the fall, with 2-4 leaves, only the upper 2-4 internodes elongated; spikelets 2.4-3.4 mm long

2 Panicles 1-2 cm wide, narrow with appressed spikelets; upper cauline blades 10-20 cm long, distinctly longer than those below.....

.....*D. perlongum*
 2 Panicles 2-4 cm wide, open with spreading spikelets; upper cauline blades 4-8 cm long, similar to those below*D. wilcoxianum*

1 Basal leaf blades usually well-differentiated from those of the lower cauline leaves, spreading, forming a rosette; culms usually branching from the mid-culms in the fall, with many leaves, usually all the internodes elongated; spikelets 1.4-3.8 mm long

3 Spikelets 1.4-2 mm long; upper glume lacking an orange or purplish spot at the base*D. acuminatum*

3 Spikelets 2.7-3.5 mm long; upper glume with an orange or purplish spot at the base*D. oligosanthes*

Dichanthelium acuminatum (Swartz) Gould & Clark [having a tapering point] [*Dichanthelium lindheimeri* (Nash) Gould, *Panicum acuminatum* Swartz, *Panicum huachucae* Ashe var. *fasciculatum* (Torrey) F.T.Hubbard, *Panicum huachucae* Ashe, *Panicum lanuginosum* Elliott, *Panicum lanuginosum* Elliott var. *lindheimeri* (Nash) Fernald, *Panicum lindheimeri* Nash, *Panicum tennesseense* Ashe].



Plants 20-75 cm or more tall; basal rosettes differentiated; sheaths shorter than the internodes, glabrous to densely pubescent; blades usually densely pubescent; spikelets 1.4-2.1 mm long, pubescent; lower glume obtuse to acute; lower floret sterile; upper glume lacking an orange or purplish spot at the base. ●Moist woodlands, stream banks, and shaded canyons in a few scattered locales; reports from San Juan County are undocumented. ♦Basal rosettes, pubescent foliage, and small pubescent spikelets allow recognition of the complex. The complex is highly variable and numerous species, varieties, or subspecies have been named. Thomas (2015) argues for the recognition of several of these segregates at the species level:

a Adaxial row of ligule hairs less than 1.5 mm long...*D. acuminatum*

a Adaxial row of ligule hairs 1.7 mm or more long

b Sheaths of upper spring culms glabrous or glabrate (ignore marginal hairs)...*D. lindheimeri*

b Sheaths of upper spring culms pubescent

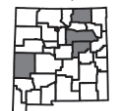
c Marginal cilia on spring blades more than 30 in number, extending from base of blade to halfway up the blade...*D. acuminatum*

c Marginal cilia on spring blades less than 20 in number or absent, present only at the base of the blade...*D. lanuginosum*

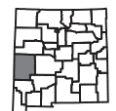
Dichanthelium oligosanthes (Schultes) Gould [with few or small flowers]. Plants 20-75 cm tall; basal rosettes differentiated; sheaths shorter than the internodes, glabrous to pubescent; blades glabrous to pubescent, 6-15 mm wide; spikelets 2.7-3.5 mm long, usually glabrous; lower glume acute; upper glume with a prominent orange to purplish spot at the base. ●Moist shaded places along mountain streams and rivers; widespread in mountain regions. ♦Our plants belong to var. *scribnerianum* (Nash) Gould [for Frank Lamson-Scribner (1851-1938), renowned American agrostologist] [*Panicum helleri* Nash, *Panicum oligosanthes* Schultes, *Panicum oligosanthes* Schultes var. *scribnerianum* (Nash) Fernald, *Panicum scribnerianum* (Nash) Gould]. var. *oligosanthes*, from the eastern half of the United States, has larger pubescent spikelets (3.4-4.2 mm) and narrower blades (4-9 mm).



Dichanthelium perlongum (Nash) Freckmann [very long, referring to the peduncle] [*Dichanthelium linearifolium* of NM authors, *Panicum perlongum* Nash]. Plants 10-50 cm tall; basal rosettes weakly developed; sheaths longer than the internodes, pilose; blades pubescent; spikelets 2.6-3.4 mm long, finely pubescent; lower glume broadly ovate. ●Moist shaded woodlands and canyon bottoms, from a few scattered locales. ♦Some consider *Dichanthelium perlongum* to be conspecific with *D. linearifolium*, with which it occasionally hybridizes; if the taxa are merged, the latter name has priority.



Dichanthelium wilcoxianum (Vasey) Freckmann [for Timothy Erastus Wilcox (1840-1932), U.S. Army surgeon] [*Dichanthelium oligosanthes* (Schultes) Gould var. *wilcoxianum* (Vasey) Gould & Clark, *Panicum wilcoxianum* Vasey]. Plants 15-35 cm tall; basal rosettes poorly developed; sheaths mostly longer than the internodes, hirsute; blades stiffly erect, sparsely pilose; spikelets 2.4-3.2 mm long, finely pubescent; lower glume triangular. ●Moist open grassland clearings in the western mountains; known only from Catron County.



Digitaria [fingers] CRABGRASS [3].

Tufted or stoloniferous annuals to perennials, the culms often rooting at the lower nodes; sheaths open; auricles absent; ligules membranous, sometimes with a ciliate fringe; inflorescence a panicle of spicate, digitate branches, not detaching at maturity, the spikelets appressed in 2 rows along one side of the branches; spikelets, awnless, glabrous to pubescent, 2-flowered, the lower floret staminate to sterile, the upper floret fertile, the rachilla not elongated between the two glumes; disarticulation below the glumes; lower glume absent to no more than ¼ the length of the spikelet; upper glume short to subequal to the spikelet; lower lemma pubescent; upper lemma clasping the palea and forming a seed case, this membranous to somewhat cartilaginous but not indurate, pale- to dark-colored; anthers 3. ♦We treat *Digitaria* in a more narrow sense than previous, with the segregation of *Leptoloma* and *Trichachne*, until further resolution of the classification. The panicles of the annual species resemble those of bermudagrass. The name ‘crabgrass’ derives not from any resemblance to the crustacean, but its allusion to foul or sour (as in crab apple or a crabby person), that is, an undesirable grass in the lawn. ‘Texas crabgrass’ is not a grass at all, but a party dip made from spinach, butter, onion, crabmeat, and parmesan cheese.

■Gould, F.W. 1963. Cytotaxonomy of *Digitaria sanguinalis* and *D. adscendens*. *Brittonia* 15:241-244. ■Henrard, J.T. 1950. Monograph of the genus *Digitaria*. Universitaire Pers, Leiden.
 ■Medico, J.M.L. D.S. Tosto, G.H. Rua, Z.E. Rùgolo de Agrasar, M.A. Scataglini, & A.S. Vega. 2017. Phylogeny of *Digitaria* Sections *Trichachne* and *Trichophorae* (Poaceae, Panicoideae, Paniceae): A morphological and molecular Analysis. *Syst. Bot.* 42(1): 37-53. ■Webster, R.D. 1987. Taxonomy of *Digitaria* section *Digitaria* in North America (Poaceae: Paniceae). *Sida* 12(1):209-222. ■Webster, R.D. & S.L. Hatch. 1981. Taxonomic relationships of Texas specimens of *Digitaria ciliaris* and *D. bicornis* (Poaceae). *Sida* 9:34-42. ■Wipff, J.K. & S.L. Hatch. 1988. Nomenclatural changes in *Taeniatherum* and *Digitaria* (Poaceae). *Sida* 13(1):119-121.

1 Spikelets on long pedicels; inflorescence an open, rebranching paniclego to *Leptoloma*

1 Spikelets sessile or short pedicelled; inflorescence a panicle of unbranched spike or racemose branches

2 Spikelets silky-pubescent with long, whitish hairs; plants perennial

3 Panicles with 3 or more nodes, the branches not subdigitate go to *Trichachne*

3 Panicles with only 1-2 nodes, the branches subdigitate*D. eriantha*

2 Spikelets glabrous or with short, stiff hairs; plants annual

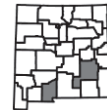
4 Blades usually with prominent, stiff, bulbous-based hairs on both surfaces; lower lemma scabrous on the lateral nerves (use 10x or higher magnification)..... *D. sanguinalis*

4 Blades glabrous, only rarely with scattered hairs; lower lemma smooth on the lateral nerves

5 Spikelets 1.7-2.3 mm long, borne in 3s at the middle portion of the branch; lower glume absent or a nerveless membranous rim less than 0.3 mm long*D. ischaemum*

5 Spikelets 2.8-4.1 mm long, born in 2s at the middle portion of the branch; lower glume 0.2-0.8 mm long..... *D. ciliaris*

**Digitaria ciliaris* (Retzius) Koeler [fringed with hairs] SOUTHERN CRABGRASS [*Panicum ciliaris* Retzius]. Tufted annual, sometimes longer lived, 10-60 cm or more long; sheaths with bulbous-based hairs; blades mostly glabrous except toward the base; panicle branches 2-10 in number, digitate or in 1-2 whorls below the apex, 2-20 cm long; spikelets 2.8-4.1 mm long; lower glume vestigial, less than 0.3 mm long; upper glume 2/3 to nearly as long as the spikelet, short-hairy; upper floret 2.5-4 mm long, glabrous ●Weed of moist waste places in the southern region; native to Asia.



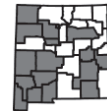
**Digitaria eriantha* Steudel [having woolly flowers] PANGOLA GRASS. Tufted, rhizomatous, or stoloniferous perennial, 35-100 cm tall or more; basal sheaths glabrous to densely pubescent, the hairs 4-6 mm long; blades 3-6 mm wide; panicle branches 3-15 in number, subdigitate, 5-25 cm long; spikelets 2.8-3.5 mm long; lower glume 0.3-0.5 mm long; upper glume and lower lemma woolly hairy.

●Introduced for experimental planting in Quay County at the Tucumcari Research Station, New Mexico State University, but not known to escape; native Africa. ♦This species is widely used as a forage or pasture grass in warm regions of the world; it is native to Africa.

**Digitaria ischaemum* (Schreber) Schreber ex Muhlenberg [resembling *Ischaemum*] SMOOTH CRABGRASS [*Panicum ischaemum* Schreber]. Tufted annual, the culms 20-60 cm long, decumbent and rooting at the nodes; sheaths glabrous or sparsely pubescent; blades mostly glabrous except toward the base; panicle branches 2-7 in number, subdigitate, 6-17 cm long; axillary panicles present in lower sheaths; spikelets 1.7-2.3 mm long; lower glume vestigial, at most a nerveless membranous rim; upper glume 3/4 to as long as the spikelet; upper floret 2-3 mm long. ●Weed of lawns and gardens, scattered locales, but expected elsewhere; native to Eurasia. ♦This species seems to invade the dense turf of lawns more easily than *Digitaria sanguinalis*, the more common crabgrass in the state.



**Digitaria sanguinalis* (Linnaeus) Scopoli [pertaining to blood] HAIRY CRABGRASS [*Panicum sanguinale* Linnaeus, *Syntherisma sanguinale* (Linnaeus) Dulac]. Tufted annual, the culms decumbent and rooting at the nodes, 20-70 cm long; sheaths sparsely pubescent with bulbous-based hairs; blades usually with bulbous-based hairs on both surfaces; panicle branches 4-13 in number, 3-30 cm long, subdigitate, the panicle sometimes with an extended rachis; spikelets 1.7-3.4 mm long; lower glume 0.2-0.4 mm long; upper glume 1/3 to 1/2 as long as the spikelet; upper floret 1.7-3 mm long, purplish to brown. ●Weed of gardens and open, moist, waste ground, widespread; native to Eurasia. ♦This is a common grass of open, moist, disturbed ground, and generally does not invade dense turf as easily as *Digitaria ischaemum*. §



Dinebra [a little tail] SPRANGLETOP [2].

Tufted annuals; sheaths open; auricles absent; ligules a truncate membrane, sometimes erose; blades flat; inflorescence a panicle of spike or racemose branches; spikelets several-flowered, awnless (ours); disarticulation above the glumes and between the florets; glumes 1-nerved; lemmas 3-nerved, hairy on the nerves, awned or awnless; anthers 3. ♦Formerly included in a polyphyletic *Leptochloa* (Peterson et al. 2012).

■Peterson, P.M., K. Romaschenko, N. Snow, and G.P. Johnson. 2012. A molecular phylogeny and classification of *Leptochloa* (Poaceae: Chloridoideae: Chlorideae) sensu lato and related genera. *Ann. Bot-London* 109: 1317-1330. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2015. A molecular phylogeny and classification of the Eleusininae with a new genus, *Micrachne* (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 64:445-467.

1 Sheaths sparsely to densely hairy, the hairs bulbous-based; spikelets 2-4 mm long; lemmas less than 2 mm long, awnless.. *D. panicea*

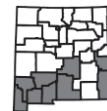
1 Sheaths glabrous (sometimes hairy near the base); spikelets 4.5-8 mm long; lemmas more than 2 mm long, short-awned..... *D. viscida*

Dinebra panicea (Retzius) P.M. Peterson & N. Snow [resembling *Panicum*] RED SPRANGLETOP [*Leptochloa panicea* (Retzius) Ohwi]. Tufted annual, 15-100 cm or more tall; sheaths sparsely to densely hairy, the hairs bulbous-based; blades 3-20 mm wide, glabrous to sparsely pilose on both surfaces; panicles with 3-80 or more branches arranged along the main axis; branches mostly 4-18 cm long; spikelets 2-4 mm long; glumes sometimes as long as the spikelet, acute to aristate; lemmas awnless, acute to obtuse at the apex. ●Moist weedy ground in the southern region. ♦Our plants belong to subsp. *brachiata* (Steudel) P.M. Peterson & N. Snow [having arms] [*Leptochloa brachiata* Steudel, *Leptochloa filiformis* (Persoon) Beauvois, *Leptochloa mucronata* of NM authors, *Leptochloa panicea* (Retzius) Ohwi subsp. *brachiata* (Steudel) N. Snow].



Dinebra viscida (Scribner) P.M. Peterson & N. Snow [sticky] [*Diplachne viscida* Scribner, *Leptochloa viscida* (Scribner) Beal].

Tufted annual, the culms prostrate to erect, 5-50 cm long; sheaths mostly glabrous, sometimes sticky near the base; blades 1-5 mm wide, glabrous; panicles with 5-20 branches arranged along the main axis; branches 1-3 cm long; spikelets 4.5-7.5 mm long; glumes shorter than the spikelet, acute; lemmas sticky on the back, with short awns 0.5-1.5 mm long. ●Plains and swales in the southern region.



Diplachne [double or split scale] SPRANGLETOP [1].

Plants annual or perennial, cespitose, sometimes rhizomatous; sheaths open; auricles absent; ligules membranous or hyaline; blades flat or involute upon drying; inflorescence a panicle of spike or racemose primary branches, typically 1-sided; spikelets several-flowered; disarticulation above the glumes and between the florets; glumes 1-nerved; lemmas 3-nerved, glabrous or hairy on the nerves, awned or awnless; anthers 3. ♦A revised genus of now only 2 species (Peterson et al. 2012; Snow et al. 2018). Formerly included within a polyphyletic *Leptochloa*.

■Peterson, P.M., K. Romaschenko, N. Snow, and G.P. Johnson. 2012. A molecular phylogeny and classification of *Leptochloa* (Poaceae: Chloridoideae: Chlorideae) sensu lato and related genera. *Ann. Bot-London* 109: 1317-1330. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2015. A molecular phylogeny and classification of the Eleusininae with a new genus, *Micrachne* (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 64:445-467. ■Snow, N., P.M. Peterson, K. Romaschenko, & B.K. Simon. 2018. Monograph of *Diplachne*. *PhytoKeys* 93: 1-102.

Diplachne fusca (L. innaeus) Beauvois ex Roemer & J.A. Schultes [dark]. Tufted annuals, sometimes longer lived, 10-100 cm tall or more; sheaths open, glabrous; auricles absent; ligules an attenuate membrane, lacerate at maturity; blades glabrous, 2-7 mm wide; inflorescence a panicle of spicate branches, 10-80 cm or more long; branches numerous, arranged along the main axis, ascending to spreading to 22 cm wide; spikelets several-flowered, to 12 mm long, awned to awnless; disarticulation above the glumes and between the florets; glumes 1-nerved; lemmas 3-nerved, hairy on the nerves, awned or awnless; anthers 3. ●Weedy, moist ground. ◆Formerly included in *Leptochloa*, q.v. (Peterson et al. 2012; Snow et al. 2018). We have two subspecies:



a Uppermost leaf blades exceeding the panicles, which are usually enclosed in the subtending sheaths; mature lemmas whitish with a dark spot in the basal ½, acute to awned to 3.5 mm...subsp. ***fascicularis*** (Lamarck) P.M. Peterson & N. Snow [with little bundles] BEARDED SPRANGLETOP [*Diplachne fascicularis* Lamarck, *Leptochloa fascicularis* (Lamarck) Gray, *Leptochloa fusca* (Linnaeus) Kunth subsp. *fascicularis* (Lamarck) N. Snow]. ●Widespread.

a Uppermost leaf blades exceeded by the panicles, which are usually completely exerted; mature lemmas usually lacking a basal dark spot, truncate to obtuse, awnless...subsp. ***uninervia*** (J. Presl) P.M. Peterson & N. Snow [one-nerved] [*Leptochloa uninervia* (J. Presl) A.S. Hitchcock & Chase, *Megastachya uninervia* J. Presl]. ●Uncommon in Doña Ana County.

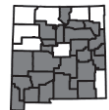
Disakisperma [seeds with 2 teeth] SPRANGLETOP [1].

Tufted perennials, rarely stoloniferous, 30-200 cm tall, typically erect, the nodes glabrous; sheaths open; auricles absent; ligules membranous, ciliate apically; leaf blades lax; inflorescence a panicle of several unilateral spicate branches; cleistogamous spikelets commonly produced in the basal sheaths; spikelets several-flowered, awnless; disarticulation above the glumes and between the florets; glumes 1-nerved; lemmas 3-nerved; anthers 3. ◆With 4 species, Africa, Asia, and the Americas. This is a segregate genus from the traditional *Leptochloa*, which has been dismembered into the additional genera *Dinebra*, *Diplachne*, and *Disakisperma*.

■Peterson, P.M., K. Romaschenko, N. Snow, and G.P. Johnson. 2012. A molecular phylogeny and classification of *Leptochloa* (Poaceae: Chloridoideae: Chloridoideae) sensu lato and related genera. *Ann. Bot.-London* 109: 1317-1330. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2015. A molecular phylogeny and classification of the Eleusininae with a new genus, *Micrachne* (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 64:445-467. ■Snow, N., P. Peterson, K. Romaschenko. 2013. Systematics of *Disakisperma* (Poaceae, Chloridoideae). *PhytoKeys* 26:21-70. doi: 10.3897/phytokeys.26.5649

Disakisperma dubium (Kunth) Peterson & Snow [uncertain] GREEN SPRANGLETOP [*Chloris dubia* Kunth, *Disakisperma mexicana* Steudel, *Leptochloa dubia* (Kunth) Nees].

Perennials, 30-110 cm tall; sheaths sparsely pilose; ligules typically 1-1.5 mm long, truncate; blades to 35 cm long, 2-8 mm wide, flat (drying involute), the midrib prominent; panicle branches 5-15 cm long, alternate along the main axis (infrequently subdigitate); glumes 2-6 mm long; lemmas 3-5 mm long, the green lateral nerves usually prominent against the pale body, pubescent, the apices blunt, notched; paleas subequal to the lemmas; anthers 1-1.6 mm long; caryopses 1.5-2.3 mm long, to 1 mm wide. ●Widespread throughout the state on plains, slopes, bajadas, ravines, roadsides, often shady sites. ◆This is an excellent forage grass relished by livestock, and diminishes under grazing pressure. §

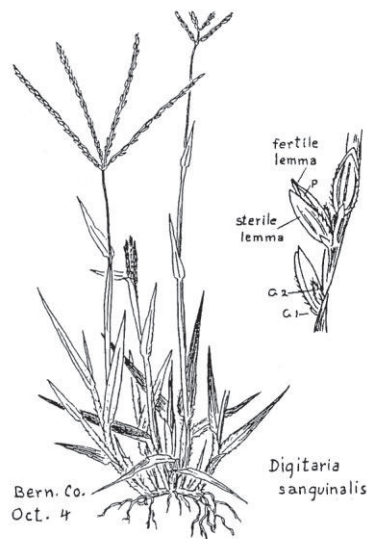
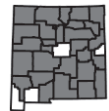


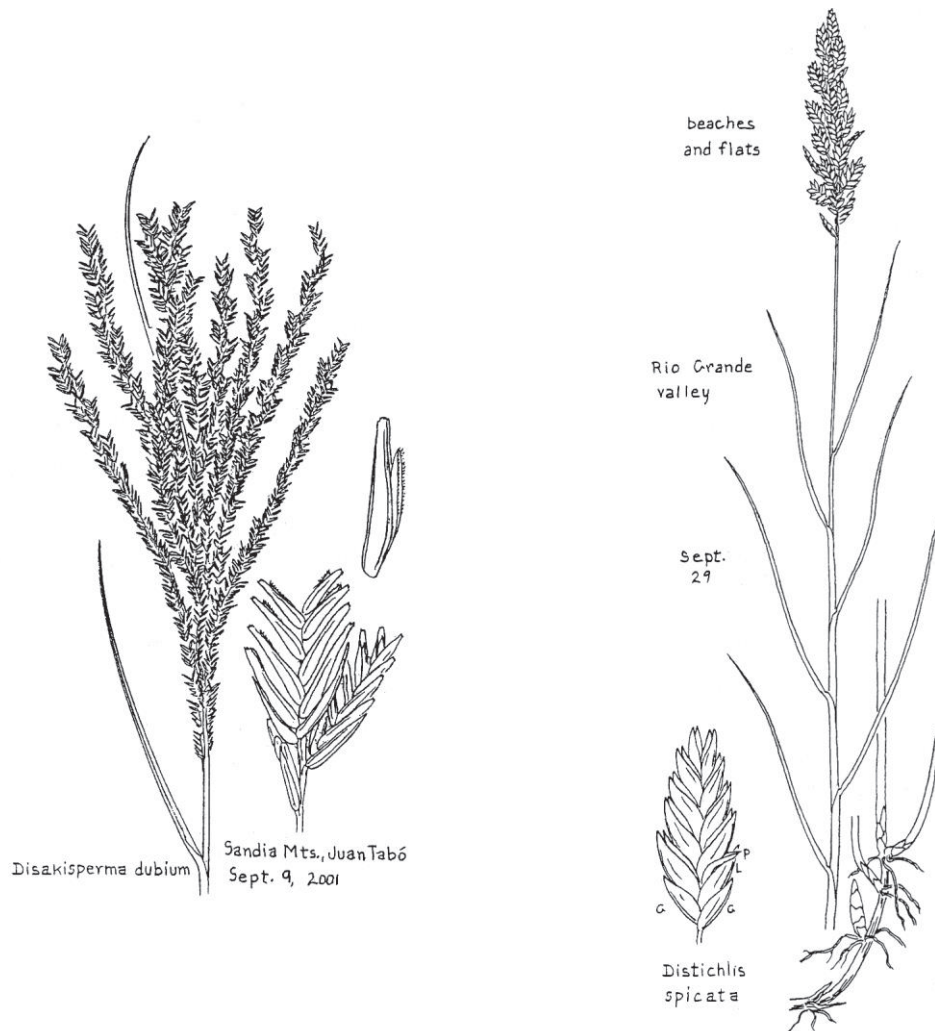
Distichlis [two-ranked] SALTGRASS [1].

Rhizomatous or stoloniferous, usually unisexual, perennials; leaves strongly distichous, glabrous; sheaths open; auricles absent; ligules a short membrane; blades stiff; inflorescence a weakly developed panicle, sometimes racemose; spikelets several-flowered, awnless; disarticulation of pistillate spikelets above the glumes and between the florets, the staminate spikelets usually not disarticulating; glumes 3- to 7-nerved; lemmas thick, 9- to 11-nerved; anthers 3. ◆About 10 species of the Americas and Australia.

■Beetle, A.A. 1943. The North American variations of *Distichlis spicata*. *Bull. Torrey Bot. Club* 70:638-650. ■Bell, H.L. and J.T. Columbus. 2008. Proposal for an expanded *Distichlis* (Poaceae, Chloridoideae): support from molecular, morphological, and anatomical characters. *Systematic Botany* 33(3): 536-55.

Distichlis spicata (Linnaeus) Greene [spike-like] [*Distichlis spicata* (Linnaeus) Greene var. *stricta* (Torrey) Beetle, *Distichlis stricta* (Torrey) Rydberg, *Uniola spicata* Linnaeus, *Uniola stricta* Torrey]. Mostly rhizomatous perennial, 10-60 cm tall; foliage usually exceeding the pistillate panicle but often shorter than the staminate; spikelets 5-20 mm long; glumes unequal; lemmas 3-6 mm long. ●Floodplains, saline soils, swales, salt flats, marshes; throughout the states, and expected in the counties not yet reported. ◆Leaves are often dusted with salt crystals, which are exuded in solution through salt glands. §





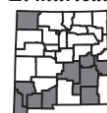
Echinochloa [spiny grass] BARNYARDGRASS [4].

Tufted annuals (ours); sheaths open; auricles absent; ligules absent (ours) or of hairs; blades flat; inflorescence a panicle of spicate branches; disarticulation below the glumes, the spikelets falling entire; spikelets plano-convex, with 2 florets, the lower staminate or sterile, the upper fertile; lower glume much shorter than the spikelet; upper glume similar in size and texture to the lower lemma; upper floret indurate, the lemma clasping the palea; anthers 3. ♦About 35 or so species of warm temperate to tropical regions. Some of the species are grown as cereal grains, and known as millet (see comment under *Panicum miliaceum*).

■Costea, M. & F.J. Tardif. 2002. Taxonomy of the most common weedy European *Echinochloa* species (Poaceae: Panicoideae) with special emphasis on characters of the lemma and caryopsis. *Sida* 20(2):525-548. ■Gould, F.W., M.A. Ali, & D.E. Fairbrothers. 1972. A revision of *Echinochloa* in the United States. *Amer. Midl. Naturalist* 87(1):36-59. ■Michael, P.W. 2009. *Echinochloa colona* versus "*Echinochloa colonum*" (Poaceae). *Taxon* 58(4):1366-1368. ■Wiegand, K.M. 1921. The genus *Echinochloa* in North America. *Rhodora* 23:49-65.

- 1 Palea of lower floret absent or vestigial, much less than half as long as the lemma ***E. cruspavonis***
- 1 Palea of lower floret well-developed, nearly as long as the lemma
 - 2 Hairs of the panicle branches and spikelets not bulbous-based; panicle branches simple, usually 2(3) cm or less long; spikelets awnless, 2-3 mm long, arranged in four rows on the branch ***E. colona***
 - 2 Hairs of the panicle branches and/or spikelets bulbous-based; panicle branches usually rebranched, the lower branches usually more than 2 cm long; spikelets awnless or awned, 2.8-4 mm long (excluding the awns), mostly arranged in two rows on the panicle branch
 - 3 Shiny apical portion of the fertile lemma obtuse or broadly acute, with a line of minute hairs, the tip sharply differentiated and withering; hairs of the panicle branches, at least some, longer than 3 mm..... ***E. crusgalli***
 - 3 Shiny apical portion of the fertile lemma narrowly acute to acuminate, without a line of minute hairs, with a gradual transition to a membranous, stiff tip; hairs of the panicle branches absent to rarely longer than 3 mm..... ***E. muricata***

****Echinochloa colona*** (Linnaeus) Link [cultivated] JUNGLE-RICE [*Echinochloa colona* (Linnaeus) Link subsp. *zonalis* (Gussone) Wootton & Standley, *Panicum colonum* Linnaeus]. Erect to decumbent annual, rooting from the lower nodes, the culms 10-70 cm long; blades often with purplish bars; panicles glabrous to hispid but lacking bulbous-based hairs; branches simple, less than 3 cm long; spikelets 2-3.5 mm long, in 4 rows, awnless; fertile floret 2.5-3 mm long. ●Moist disturbed ground, lawns, gardens, in the southern regions; native to tropical Asia. ♦The specific epithet is sometimes rendered *colonum*, but the adjective should be declined as *colona*. Plants with conspicuous purplish cross-bars on the leaves have been given the epithet *zonalis* Gussone, recognized at various ranks.



***Echinochloa crusgalli** (Linnaeus) Beauvois [cock's-spur] BARNYARDGRASS [*Echinochloa crusgalli* (Linnaeus) Beauvois var. *mitis* (Pursh) Peterman, *Echinochloa crusgalli* (Linnaeus) Beauvois var. *zelayensis* (Kunth) Hitchcock, *Echinochloa zelayensis* (Kunth) Schultes, *Panicum crusgalli* Linnaeus]. Decumbent to stiffly erect annual, 30-100 cm or more tall; panicles with bulbous-based hairs to 5 mm long; branches 2-10 cm long, usually rebranched; spikelets 2.5-4 mm long, awnless or with awns to 5 cm long; fertile floret 2.5-3.5 mm long. ●Wet ground, muddy places, ditch banks, around stock ponds; throughout the state; native to Eurasia. ◆Also known as BARNYARD MILLET, the seeds being used for grain.



Echinochloa cruspavonis (Kunth) Schultes [leg of a peacock]. Annual or short-lived perennial, 30-100 cm or more tall; panicles with bulbous-based hairs; branches 4-12 cm long, usually rebranched with shorter 2nd branches; spikelets 2.5-3.5, awnless or with curved awns to 10 mm; lower palea absent or vestigial. ●Marshy ground and wet disturbed places, uncommon in a few scattered localities. ◆Our plants belong to var. *macera* (Wiegand) Gould [meagre, lean] [*Echinochloa zelayensis* (Kunth) Schultes var. *macra* Wiegand].



Echinochloa muricata (Beauvois) Fernald [with sharp points] AMERICAN BARNYARDGRASS. Annual, 75-160 cm tall; panicles with bulbous-based hairs less than 3 mm long, or absent; branches 2-8 cm long, usually rebranched; spikelets 2.5-5 mm long, usually with bulbous-based hairs, awnless or with awns to 16 mm long. ●Moist to wet swales and seeps, disturbed ground, roadsides. ◆We have two varieties. §



- a Spikelets 3.5 mm or more long to base of awn or awn-tip of lemma of lower floret; lemma of lower floret usually with an awn 6 mm or more long, infrequently all spikelets awnless... var. *muricata* [*Setaria muricata* Beauvois]. ●Rather uncommon, in scattered locales in the state.
- a Spikelets less than 3.5 mm long to base of awn or awn-tip of lemma of lower floret; lemma of lower floret awnless or with an awn to 6(10) mm long... var. *microstachya* Wiegand [small-spiked]. ●Widespread in the state.

Eleusine [from the city of Eleusis in Greece] [1].

Tufted annuals or perennials; sheaths open; auricles absent; ligules membranous, ciliate; inflorescence a panicle of mostly digitate spike-like branches; spikelets several-flowered, laterally compressed; disarticulation above the glumes and between the florets; lemmas 3-nerved; anthers 3. ◆About 10 species of Asia, Africa, and South America.

- Phillips, S.M. 1972. A survey of the genus *Eleusine* Gaertner (Gramineae) in Africa. Kew Bull. 27:251-270.
- Hilu, K.W. & J.L. Johnson. 1997. Systematics of *Eleusine* Gaertner. (Poaceae, Chloridoideae): Chloroplast DNA and total evidence. Ann. Missouri Bot. Gard. 84:841-847.

***Eleusine indica** (Linnaeus) Gaertner [of India] GOOSEGRASS [*Cynosurus indicus* Linnaeus]. Annuals, (10)25-65 cm tall; sheaths strongly keeled, hairy near the throat; blades with prominent white midnerve; panicles with several branches whorled at the apex and often with 1 branch attached below; spikelets 4-7 mm long, awnless. ●Weed of lawns, cultivated fields, and moist waste places, being rather common in Bernalillo and Doña Ana counties; native to Eurasia.

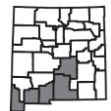


Elionurus [mouse tail] BALSAMSCALE [1].

Tufted to rhizomatous perennials (rarely annual); sheaths open; auricles absent; ligules a ciliate membrane or entirely of hairs; inflorescence spike-like, unbranched, composed of repeating pairs of sessile and pedicelled spikelets; disarticulation below the spikelet pair, the two falling together; spikelets awnless, the sessile fertile, the pedicelled staminate. ◆About 15 species of warm temperate to tropical areas of the world. Sometimes spelled *Elyonurus*.

- Peterson, P.M., R.J. Soreng, & G. Davidse. 1998. (1365) Proposal to conserve the name *Elionurus* (Poaceae, Andropogoneae) with that spelling. Taxon 47(3):737-738.

Elionurus barbiculmis Hackel [bearded stem]. Tufted perennial, 40-80 cm tall, densely hirsute beneath the nodes; blades mostly involute, to 30 cm long, densely pilose on upper surface; inflorescence 5-10 cm long, the axis villous; spikelets densely villous, the sessile 4.5-8 mm long. ●Rocky, grassy slopes and foothills in the bootheel region, uncommon.



Elymus [an ancient Greek name] WHEATGRASS, WILDRYE [17].

Tufted to rhizomatous, sometimes stoloniferous, perennials; sheaths open; auricles often developed; ligules membranous, sometimes ciliate; inflorescence a spike, with 1-5 spikelets per node; spikelets 1- to several-flowered, awned to awnless; disarticulation various, from above the glumes and between the florets to below the spikelet and in the rachis; glumes 2, sometimes highly reduced; lemmas usually 5- to 7-nerved; anthers 3. ◆With perhaps 160 species in the present configuration. The classification and circumscription of this and related genera of the Triticeae Tribe is provocative and frequently changing; genomic analysis is the currently favored criterion, but even that has difficulty aligning with all the variation. We maintain *Elymus* in a more inclusive sense than is currently popular, and include here species that others might place (or have been placed) with reasonable justification in *Agropyron*, *Lophopyrum*, *Pseudoroegneria*, *Sitanion*, or *Thinopyrum*. Other species formerly classed in *Elymus* may be found in *Leymus* herein.

- Aung, T. & P.D. Walton. 1990. Morphology and cytology of the reciprocal hybrids between *Elymus trachycaulus* and *Elymus canadensis*. Genome 33:123-130.
- Barkworth, M.E. 1994. The *Elymus trachycaulus* complex in North America: more questions than answers. Proceedings of the 2nd International Triticeae Symposium 189-198.
- Barkworth, M.E., J.J.N. Campbell, & B. Salomon. 2007. *Elymus*, p. 288-343 [*Elymus villosus*]. IN: Flora of North America, vol. 24. Oxford University Press.
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- Baum, B.R., J.R. Estes, & P.K. Gupta. 1987. Assessment of the genomic system of classification in the Triticeae. Amer. J. Bot. 74:1388-1395.
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- Campbell, J.J.N. 2002. Notes on North American *Elymus* species (Poaceae) with paired spikelets. II. The *interruptus* group [*Elymus interruptus*]. J. Kentucky Acad. Sci. 63(1):19-38.
- Campbell, J.J.N. 2006. Two new species of *Elymus* (Poaceae) in the southern U.S.A. and other notes on North American *Elymus* species [*Elymus hystrix*]. Sida 22(1):485-494.
- Church, G.L. 1967. Taxonomic and genetic relationships of eastern North American species of *Elymus* with setaceous glumes [*Elymus hystrix*]. Rhodora 69:121-162.
- Dewey, D.R. 1964. Natural and synthetic hybrids of *Agropyron spicatum* × *Sitanion hystrix*. Bull. Torrey Bot. Club 91:396-405.
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1 Spikelets mostly solitary at each node of the rachis

2 Spikelets (glumes and/or lemmas) long-awned, the awns prominent and mostly greater than 10 mm long

3 Awns erect-appressed or nearly so, scarcely diverging as much as 15° from vertical; glumes ¾ to equaling the length of the spikelet (subsp. *subsecundus*) ***E. trachycaulus***

3 Awns widely spreading to reflexed, diverging at least 30° or more from the vertical; glumes ½ to 2/3 the length of the spikelet

4 Anthers 4-6 mm long; spikelets widely spaced and hardly overlapping

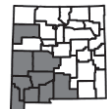
5 Spike 15-30 cm long, often nodding; blades 4-6 mm wide ***E. arizonicus***

5 Spike 8-15 cm long, usually erect; blades 1-2 mm wide ***E. spicatus***

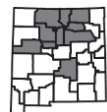
4 Anthers 1-2 mm long; spikelets at least moderately congested and overlapping

- 6 Spikes 3-7 cm long, very dense, the lowermost internodes 3-7 mm long; plants 15-45 cm tall, the bases usually decumbent to prostrate; mid-culm nodes mostly 0.5-1.5 mm wide; glumes 1- to 3(5)-nerved.....*E. scribneri*
- 6 Spikes 7-20 cm long, not especially dense, the lowermost internodes 8-15 mm long; plants 30-70 cm tall, the bases usually erect; mid-culm nodes mostly 1.5-2.5 mm wide; glumes (3)5- to 7-nerved.....*E. ×bakeri*
- 2 Spikelets (glumes and lemmas) awnless or nearly so, any awns usually less than 5 mm long
 - 7 Glumes blunt, nearly truncate, thick and very firm; spikelets awnless; sheaths typically ciliate on at least one margin
 - 8 Plants with evident, long-creeping rhizomes.....*E. hispidus*
 - 8 Plants densely tufted, lacking evident rhizomes.....*E. ponticus*
 - 7 Glumes acute to acuminate, thin and membranous to stiff, but not thick; spikelets awned or awnless; sheaths rarely ciliate
 - 9 Anthers 1-2 mm long
 - 10 Glumes 1- to 2(3)-nerved; rachis tending to break apart at maturity; sterile hybrid plants...these are *E. trachycaulus* × *E. elymoides* hybrids, occurring where the two parents grow together.
 - 10 Glumes (3)5-nerved; rachis remaining intact; fertile to sterile plants
 - 11 Plants mostly with rhizomes.....*E. ×pseudorepens*
 - 11 Plants tufted.....*E. trachycaulus*
 - 9 Anthers 4-16 mm long
 - 12 Plants with evident, long-creeping rhizomes
 - 13 Glumes acuminate, asymmetrical to curved and somewhat sickle-shaped, gradually tapering to an awn-tip; blades somewhat rigid and prominently ridged above (*P. smithii*)..... go to *Pascopyrum*
 - 13 Glumes acute to acuminate, symmetrical, not gradually tapering to an awn-tip; blades often lax, not prominently ridged above
 - 14 Blades flat, mostly 5-15 mm wide, dark green, often with a circular constriction toward the tip; anthers (3)4-7 mm long.....*E. repens*
 - 14 Blades rolled or less than 4 mm wide when flat, usually glaucous, lacking a circular constriction toward the tip; anthers 3-5 mm long.....*E. lanceolatus*
 - 12 Plants lacking evident rhizomes, occasionally rhizomes weakly developed and short
 - 15 Spike 15-30 cm long, often nodding; blades 4-6 mm wide.....*E. arizonicus*
 - 15 Spike 8-15 cm long, usually erect; blades 1-2 mm wide.....*E. spicatus*
- 1 Spikelets 2 or more at each node of the rachis
 - 16 Rachis fragile and breaking apart at maturity
 - 17 Glumes 1 mm or more in width and conspicuously hardened.....*E. virginicus*
 - 17 Glumes less than 1 mm in width, flexible and not hard
 - 18 Lemma awns 4-17 mm long; rachis internodes 2.5-7 mm long...these are *Elymus elymoides* × *E. trachycaulus* hybrids [*Elymus ×saundersii* Vasey, *Agropyron ×saundersii* (Vasey) A.S. Hitchcock].
 - 18 Lemma awns 20-80 mm long; rachis internodes mostly 5-12 mm long.....*E. elymoides*
 - 16 Rachis persistent, not breaking apart at maturity
 - 19 Glumes absent or reduced to one or two minute bristles; spikelets horizontally spreading or ascending at maturity...*E. hystrix*
 - 19 Glumes present and well-developed
 - 20 Glumes nearly subulate, 1- to 2-nerved
 - 21 Sheaths villous; glumes short pilose.....*E. villosus*
 - 21 Sheaths mostly glabrous; glumes glabrous
 - 22 Glumes 1-3 cm long, indurate on the lower portion.....*E. interruptus*
 - 22 Glumes 4-15 cm long, rarely slightly shorter, only slightly hardened if at all.....*E. elymoides*
 - 20 Glumes narrowly lanceolate and broadened above the base, mostly conspicuously 3- to 7-nerved
 - 23 Glumes firm and hardened on at least the lower portion, the bottom bowed out slightly; lemmas 6-9 mm long.....*E. virginicus*
 - 23 Glumes not hardened nor bowed out at the base; lemmas 8-14 mm long
 - 24 At maturity, the spikes erect and the awns erect-appressed; glumes mostly less than 20 mm long, commonly overlapping at the base and obscuring the florets; lemmas glabrous to scaberulous.....*E. glaucus*
 - 24 At maturity, the spikes usually nodding or curved and the awns spreading outward; glumes 20 mm or more long, commonly separate at the base, the florets easily visible; lemmas scabrous to short-hairy (rarely glabrous).....*E. canadensis*

Elymus arizonicus (Scribner & Smith) Gould [of Arizona] [*Agropyron arizonicum* Scribner & Smith, *Agropyron spicatum* (Pursh.) Scribner & Smith var. *arizonicum* (Scribner & Smith) Jones, *Elytrigia arizonica* (Scribner & Smith) Dewey, *Pseudoroegneria arizonica* (Scribner & Smith) Löve]. Tufted perennial, 45-85 cm tall; auricles present; blades 4-6 mm wide; spikes 1-2-30 cm long, usually nodding in age, with 1 spikelet per node; spikelets with 4-6 florets, disarticulating above the glumes and between the florets; glumes 3-nerved; lemmas 8-15 mm long, with awns 10-25 mm long; anthers 3-5 mm long. ●Dry rocky slopes of the southern and western mountains. §



Elymus ×bakeri (E. Nelson) Löve [for Charles Fuller Baker (1872-1927), entomologist and Colorado botanist] [*Agropyron bakeri* E. Nelson, *Elymus trachycaulus* (Link) Gould subsp. *bakeri* (E. Nelson) A. Löve]. Tufted perennials, 25-50 cm tall; auricles usually present; spikes 8-15(20) cm long, not especially dense, straight to somewhat drooping; glume awns to 8 mm long, straight to curving; lemma awns 10-35 mm long, curved to divergent. ♦These are sterile hybrids and perhaps partially fertile hybrid derivatives between *Elymus trachycaulus* and several other species, including *E. scribneri*, *E. elymoides*, and *E. canadensis*, and the features of such plants are diverse and reflect the parentage. High elevation populations (generally above 9,000) have been called *Elymus bakeri*, which serves as a catch-all name for the entire group. Reports of *E. bakeri* from Doña Ana County are misidentifications of *E. arizonicus* (Scribner & Smith) Gould.



Elymus canadensis Linnaeus [of Canada] CANADA WILD RYE [*Elymus brachystachyus* Scribner & Ball, *Elymus canadensis* Linnaeus var. *brachystachyus* (Scribner & Ball) Farwell, *Elymus canadensis* Linnaeus var. *robustus* (Scribner & Smith) Mackenzie & Bush, *Elymus robustus* Scribner & Smith]. Loosely tufted perennial, mostly 50-150 cm or more tall; auricles present; spikes 8-30 cm long, with 2(3) spikelets per node, usually nodding; disarticulation above the glumes and between the florets; glumes narrow, 3- to 5-nerved, with awns 10-25 mm long; lemmas variously hairy to glabrous, with divergent awns 10-45 mm long. ●Stream banks, ditch banks, flood plains, moist sandy soil; throughout the state. ◆Intraspecific taxa have been named (see synonymy) based on widely variable spikelet features; we deem them unworthy of recognition. *Elymus canadensis* hybridizes with *Elymus virginicus*, *E. elymoides*, *E. elymoides*, *E. spicatus*, and *E. trachycaulus*, among others. §



Elymus elymoides (Rafinesque) Swezey [resembling *Elymus*] SQUIRRELTAIL. Tufted perennial, 15-70 cm tall, the stems erect to geniculate-based, the nodes mostly concealed by the sheaths; sheaths glabrous to densely villous; auricles to about 1 mm long; blades 2-6 mm wide, glabrous to villous; spikes 5-20 cm long, erect to bent sharply over, with 2-3 spikelets per node; spikelets mostly with 2-5 florets; disarticulation in the rachis of the spike, then each floret falling; glumes 2-13 cm long, 1-3-nerved, the awns sometimes split; lemmas 6-12 mm long, glabrous to hairy, the awns 2-12 cm long, flattish and grooved. ◆SQUIRELTAIL is often mistaken for *Hordeum jubatum*, which has more slender awns without a central groove and three spikelets per node. This is a poor ecological competitor and only becomes abundant on rocky or sandy soil where other vegetation is scant. The variation of this wide-spread species is extensive and sometimes baffling, no doubt in part due to the extensive hybridization with several other species. We recognize two subspecies in the state: §



a Lowermost floret of one or both spikelets at the node sterile and modified to a subulate or lanceolate awn, giving the appearance of an extra glume segment...subsp. ***elymoides*** [*Sitanion elymoides* Rafinesque, *Sitanion hystrix* (Nuttall) J. S. Smith in part]. ●Plains and grassy slopes; known with certainty only from Colfax County, but expected elsewhere.

a Lowermost floret of each spikelet well developed and fertile, not appearing as an extra glume segment...subsp. ***brevifolius*** [*Elymus brevifolius* (J.G. Smith) M.E. Jones, *Elymus longifolius* (J.G. Smith) Gould, *Sitanion brevifolium* J.G. Smith, *Sitanion caespitosum* J.G. Smith, *Sitanion hystrix* (Nuttall) J.S. Smith in part, *Sitanion longifolium* J.G. Smith, *Sitanion molle* J.G. Smith, *Sitanion pubiflorum* J.G. Smith, *Sitanion rigidum* sensu W&S]. ●Plains, grasslands, woodlands, clearings in forests, roadsides, widespread and ecologically diverse. ◆This is the common SQUIRELTAIL in New Mexico, and forms hybrids with several other species. Particularly common in the southern mountains are putative hybrids with *Elymus canadensis*, characterized by spikes that droop sharply down from the base of the main axis.

Elymus glaucus Buckley [bluish]. Tufted perennial, sometimes weakly rhizomatous, 30-100 cm or more tall; auricles usually present; spikes 5-20 cm long, mostly erect, with usually 2 spikelets per node; disarticulation above the glumes and between the florets; glumes 3- to 5-nerved, slightly united and overlapping at the base, obscuring the florets, thin and flat, not indurate, with awns 0-6 mm long; lemmas 9-15 mm long, with erect to flexuous awns 1-30



mm long; anthers 1.5-3.5 mm long. ●Open woods, aspen groves, edges of mountain meadows, never achieving very thick stands; in all the mountain ranges, but much more common in the north.

****Elymus hispidus*** (Opiz) Melderis [spiny, shaggy, rough]. Rhizomatous perennial, often somewhat glaucous, 50-100 cm or more tall; auricles present; blade margins whitish, thicker than the midnerve; spikes 10-20 cm long, with 1 spikelet per node; spikelets 11-18 mm long, awnless or rarely with short awns from the lemmas; glumes about ½ the spikelet length, blunt, thick and rigid, the midnerve longer than the lateral nerves, offset acute to mucronate; lemmas 7-10 mm long, acute; anthers 5-7 mm long. ●Introduced for range revegetation and erosion control, widespread in the forests and foothills; native to Eurasia. ◆Spikelets are similar to *Elymus ponticus*, which has exactly truncate glumes, and lacks rhizomes. When treated in *Elymus*, the epithet *intermedius* cannot be used for this species (being taken by the earlier *E. intermedius* Bieberstein). We have two weak subspecies, probably better treated as formae: §



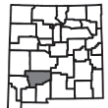
a Spikelets glabrous...subsp. ***hispidus*** INTERMEDIATE WHEATGRASS [*Agropyron hispidum* Opiz, *Agropyron intermedium* (Host) Beauvois, *Elytrigia intermedia* (Host) Nevski, *Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey].

a Spikelets pubescent...subsp. ***barbulatus*** (Schur) Melderis PUBESCENT WHEATGRASS [*Agropyron barbulatum* Schur, *A. trichophorum* (Link) Richter, *Elymus hispidus* (Opiz) Melderis var. *ruthenicus* (Grisebach) Dorn, *Elytrigia trichophora* (Link) Nevski]. ◆This is sometimes treated as a separate species, but it scarcely qualifies to be recognized as a subspecies.

****Elymus hystrix*** Linnaeus [like a porcupine] BOTTLEBRUSH-GRASS [*Hystrix patula* Moench]. Tufted perennial, 50-120 cm or more tall; auricles present; blades glossy green; spikes 8-20 cm long, with 2 spikelets per node; spikelets diverging at nearly right angles from the main axis; disarticulation above the glumes and between the florets, the rachis persistent; glumes vestigial, 0.3-3(5) mm long; lemmas 8-11 mm long, with mostly straight awns 20-40 mm long; anthers 2.5-5 mm long. ●A single collection in 1939 from Colfax County; this was most likely a one-time introduction that has not persisted; it is native and very common roughly west of Kansas City and north of Alabama.



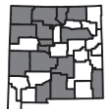
Elymus interruptus Buckley [not continuous, interrupted] [*Elymus canadensis* Linnaeus var. *interruptus* (Buckley) Church]. Tufted perennial, 50-100 cm tall; auricles present or absent; spikes 5-20 cm long, with 2 spikelets per node; spikelets ascending to divergent; disarticulation above the glumes and between the florets; glumes subulate, 1-2 nerved, 10-30 mm long; lemmas 7-10 mm long, with awns 15-22 mm long; anthers 2-4.5 mm long. ●Moist canyons and woodland s in rich soil; known from a single collection at Kingston, Sierra County, in the early 1900s, and an unsubstantiated report from Otero County; likely no longer present in the state.



Elymus lanceolatus (Scribner & Smith) Gould [lance-shaped] [*Agropyron dasystachyum* (Hooker) Scribner (not *Elymus dasystachyus* Trinicus ex Ledebour), *Agropyron dasystachyum* (Hooker) Scribner var. *riparium* (Scribner & Smith) Bowden, *Agropyron lanceolatum* Scribner & Smith, *Agropyron riparium* Scribner & Smith, *Elymus riparius* (Scribner & Smith) Gould, *Elytrigia dasystachya* (Hooker) Nevski]. Rhizomatous perennial, 25-100 cm or more tall; leaves often mostly basal; auricles usually present; blades usually rolled; spikes 5-25 cm long, usually with 1 spikelet per node; spikelets appressed, nearly awnless; glumes shorter than the adjacent lemma; lemmas 7-12 mm long, acute to awned to 2 mm; anthers 3-6 mm long. ●Moist to dry plains and forest clearings. ◆Used in reseeding mixes for land reclamation, but not commonly encountered elsewhere in New Mexico. Intraspecific taxa have been named based on spikelet investiture, and some of these have been propagated as cultivars for reseeding ("thickspike" and "streamside" wheatgrass); none are judged worthy of formal taxonomic recognition.

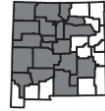


****Elymus ponticus*** (Podpěra) N. Snow [of Pontus, a city on the coast of the Black Sea] TALL WHEATGRASS [*Agropyron elongatum* (Host) Beauvois, *Elymus elongatus* (Host) Runemark, *Elytrigia elongata* (Host) Nevski, *Elytrigia pontica* (Podpěra) Holub, *Elymus elongatus* (Host) Runemark subsp. *ponticus* (Podpěra) Melderis, *Lophopyrum ponticum* (Podpěra) Löve, *Thinopyrum elongatum* (Host) Barkworth & Dewey, *Thinopyrum ponticum* (Podpěra) Barkworth & Dewey, *Triticum elongatum* Host, *Triticum ponticum* Podpěra]. Tufted, sometimes tussocky perennial, 50-200 cm tall; sheaths ciliate on the lower margins; auricles present; spikes 10-40 cm

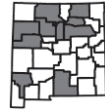


long, with 1 spikelet per node; spikelets glabrous, awnless; glumes about ½ the length of the spikelet, thick and firm, nearly truncate, the midnerve about same length as lateral nerves; lemmas 9-12 mm long. ●Introduced for range revegetation, pasture improvement, and erosion control, widespread in the forests and foothills; native to Eurasia. ♦Spikelets are similar to *Elymus hispidus*, which has glumes with a tiny awn-tip or point projecting from the nerve, but is also rhizomatous. We include here *Elymus elongatus* (Host) Runemark, which differs in blade and pubescence features. Though the names have long been confused, *E. elongatus* s.s. is not known from the United States. §

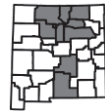
Elymus ×pseudorepens (Scribner & Smith) Barkworth & Dewey [false *repens*] FALSE QUACKGRASS [*Agropyron pseudorepens* Scribner & Smith]. Mostly rhizomatous perennial, sometimes nearly caespitose, 30-90 cm or more tall; auricles present or absent; spikes 6-14 cm long, with 1 spikelet per node; glumes shorter than or equaling the adjacent lemma, 5- to 9-nerved, slightly curved, sometimes short-awned; lemmas 7-15 mm long, mucronate or awned to 3 mm; anthers 1-2 mm long. ●Mountain slopes, grasslands, roadsides, generally below 9000 ft; very common in the southern mountains. ♦This name has been applied to hybrid plants between *Elymus trachycaulus* × *Elymus lanceolatus* or *Elymus repens*. We recognize it herein because it is one of the most common grasses of our mountains.



****Elymus repens*** (Linnaeus) Gould [creeping] QUACKGRASS [*Agropyron repens* (Linnaeus) Beauvois, *Elytrigia repens* (Linnaeus) Nevski, *Triticum repens* Linnaeus]. Strongly rhizomatous perennial, 50-100 cm tall; auricles present; spikes 5-15 cm long, with 1 spikelet per node; spikelets appressed to ascending; disarticulation above the glumes and between the florets; glumes about ½ the length of the spikelet, several-nerved, awnless or awned to 3 mm; lemmas 8-12 mm long, glabrous, awnless or awned to 6 mm; anthers 4-7 mm long. ●Aggressive weed of moist disturbed ground, gardens, and flower beds; found many scattered locales in the state but much less commonly encountered than its derivative, *Elymus ×pseudorepens*; native to Europe.

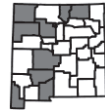


Elymus scribneri (Vasey) M.E. Jones [for Frank Lamson-Scribner (1851-1938), renowned American agrostologist] [*Agropyron scribneri* Vasey]. Tufted perennial, the culms prostrate to erect, 15-40 cm long; auricles usually present; spikes 3-9 cm long, very dense, mostly with 1 spikelet per node; disarticulation below the spikelets in the rachis, the florets also eventually falling; spikelets appressed to ascending; glumes 4-8 mm long, 1- to 3(5)-nerved, with a divergent awn 12-30 mm long; lemmas 7-10 mm long, with divergent awns 15-30 mm long; anthers 1-1.5 mm long. ●Rocky slopes at high elevations, mostly above 9,000 ft in the central chain of mountains. ♦*Elymus scribneri* may be a derivative of hybridization between *E. trachycaulus* and *E. elymoides*.

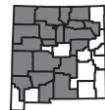


Elymus smithii...go to ***Pascopyrum***

Elymus spicatus (Pursh) Gould [spike-like] BLUEBUNCH WHEATGRASS [*Agropyron inerme* (Scribner & Smith) Rydberg, *Agropyron spicatum* (Pursh) Scribner & Smith, *Agropyron spicatum* (Pursh) Scribner & Smith var. *inerme* (Scribner & Smith) A. Heller, *Elytrigia spicata* (Pursh) Dewey, *Festuca spicata* Pursh, *Pseudoroegneria spicata* (Pursh) Löve]. Tufted perennial, sometimes with short rhizomes, 30-100 cm tall; auricles present; blades involute when dry; spikes 8-15 cm long, with 1 spikelet per node; spikelets scarcely if at all overlapping, appressed to slightly divergent; disarticulation above the glumes and between the florets; glumes about ½ the length of the spikelet; lemmas 5-nerved, awnless (*inerme* phase) to awned, the awns straight to divergent to 25 mm long; anthers 4-8 mm long. ●Sagebrush flats, piñon-juniper foothills, and dry slopes in the western half of the state. ♦This species is often placed in either *Pseudoroegneria* or *Elytrigia*, but is just as much at home in *Elymus* as in those segregate genera. Awnless or nearly awnless forms have been assigned the *inerme* epithet at some rank. §



Elymus trachycaulus (Link) Gould [rough-stemmed] SLENDER WHEATGRASS. Tufted perennial, sometimes producing weak rhizomes, 30-130 cm tall; auricles absent or present; blades mostly flat when fresh, 2-6 mm wide; spikes mostly 8-20 cm long, with mostly 1 spikelet per node; spikelets well-spaced to strongly overlapping; disarticulation above the glumes and between the florets; glumes subequal, nearly as long as the spikelet, green to purplish, the nerves prominent, awned or awnless; lemmas 6-13 mm long, awned to awnless; anthers 1-3 mm long. ●Mountain slopes, meadows, roadsides, from foothills to alpine, nearly throughout the state. ♦This species hybridizes with *Elymus canadensis*, *E. glaucus*, *E. lanceolatus*, *E. elymoides*, *E. scribneri*, and *Hordeum jubatum*, and we find a corresponding array of variation in populations. Numerous subspecies or varieties have been named, but the features upon which they are based seem to segregate independently in our New Mexico populations and their formal recognition is fragile. The following, however, are conspicuous: §



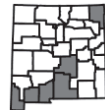
a Lemma awns more than ½ as long as the lemma body, generally 14-40 mm long... subsp. ***subsecundus*** (Link) A. & D. Löve [*Agropyron caninum* sensu M&H and W&S, *Agropyron richardsonii* (Trinius) Schrader, *Agropyron subsecundum* (Link) Hitchcock, *Agropyron unilaterale* Cassidy, *Triticum subsecundum* Link].

a Lemma awns absent to less than ½ as long as the lemma body, generally less than 8 mm long

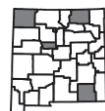
b Glumes mostly 3-nerved; spikelets strongly overlapping, the rachis internodes 4-5 mm long; 9,000-12,000 ft elevation... subsp. ***violaceus*** (Hornemann) A. & D. Löve [*Agropyron latiglume* (Scribner & Smith) Rydberg, *Agropyron violaceum* (Hornemann) Lange, *Elymus alaskanus* (Scribner & Merrill) A. Löve subsp. *latiglumis* (Scribner & J.G. Smith) A. Löve, *Triticum violaceum* Hornemann].

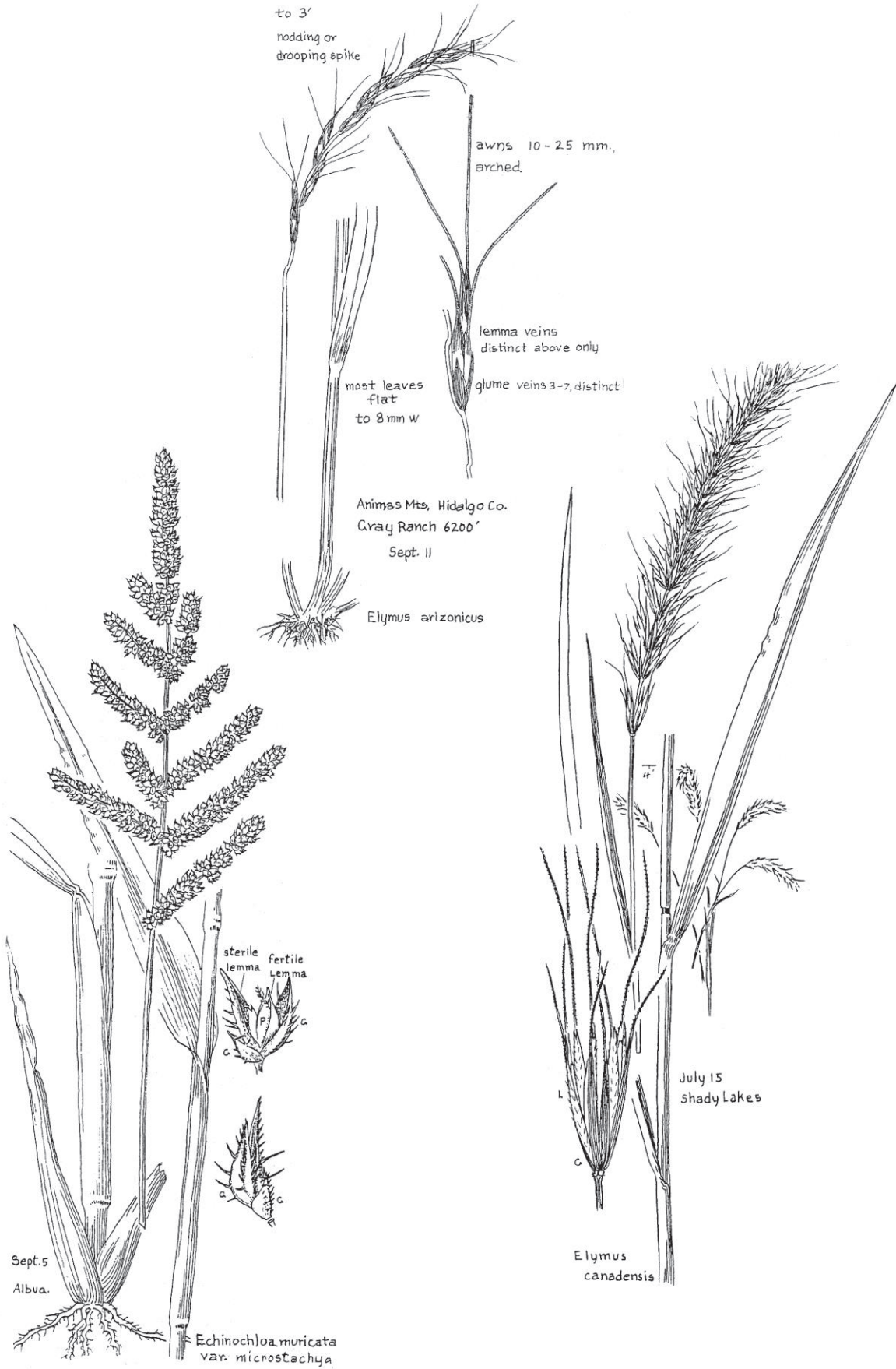
b Glumes mostly 5- to 7-nerved; spikelets scarcely overlapping, the rachis internodes 8-15 mm long; 6,000-10,000 ft elevation or sometimes higher... subsp. ***trachycaulus*** [*Agropyron caninum* sensu M&H & W&S, *Agropyron novae-angliae* Scribner, *Agropyron pauciflorum* (Schweinitz) Hitchcock, *Agropyron tenerum* Vasey, *Agropyron trachycaulum* (Link) Malte, *Elymus trachycaulus* (Link) Gould var. *andinus* (Scribner & Smith) Dorn, *Elymus trachycaulus* (Link) Gould subsp. *novae-angliae* (Scribner) Tsvelev, *Triticum trachycaulum* Link].

****Elymus villosus*** Muhlenberg ex Willdenow [shaggy-haired]. Tufted perennial, 40-100 cm or more tall; sheaths villous to pilose; auricles present; blades short-villous on the upper surface; spikes 4-12 cm long, with usually 2 spikelets per node; spikelets 7-12 mm long, overlapping; disarticulation above the glumes and between the florets; glumes awn-like, hirsute, 12-25 mm long; lemmas 5-9 mm long, usually villous, with awns to 30 mm long; anthers 1.5-3 mm long; native to central United States. ●Known only from a few roadside collections in Union County.



Elymus virginicus Linnaeus [of Virginia] [*Elymus virginicus* Linnaeus var. *glabriflorus* (Vasey) Bush, *Elymus virginicus* Linnaeus var. *submuticus* Hooker]. Tufted perennial, 30- 120 cm tall; foliage mostly glabrous; auricles absent to present; spikes 4-16 cm long, with 2 spikelets per node; disarticulation in the rachis, or below the glumes and the rachis remaining intact; glumes 3- to 5-nerved, the basal portion nearly terete, indurate, and bowed out, gradually narrowing into a straight awn 3-12 mm long; lemmas 6-10 mm long, glabrous to villous, with straight awns 8-20 mm long; anthers 2-4 mm long. ●Moist woods, bottomlands, roadsides, in scattered locales, not common. ♦Plants resemble *Elymus canadensis*, which differs most conspicuously by having divergent awns, disarticulation that leaves the glumes on the rachis, and glume bases that are not terete-indurate nor bowed out.





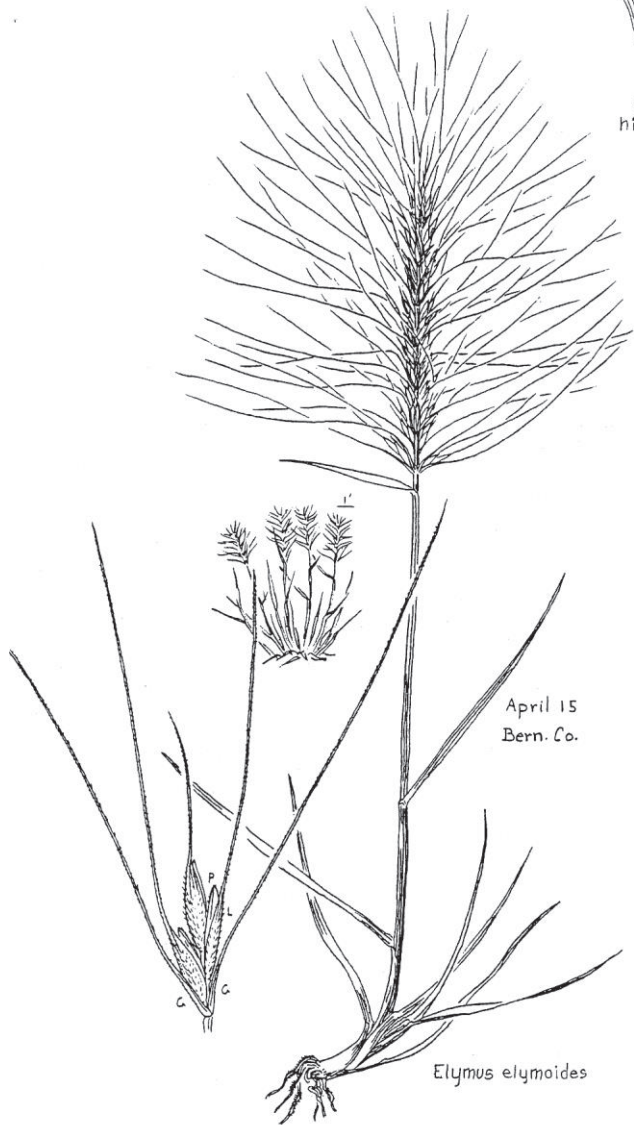
to 3' tall
 spikelets ± 10/stem
 florets 2-6/spikelet
 glumes 4-5 nerves
 lemmas 5-6 nerves,
 white-edged

July 26
 Magdalena
 Mts.



July 30
 McKinley Co.

subsp.
 hispidus subsp.
 barbatus
Elymus hispidus



April 15
 Bern. Co.

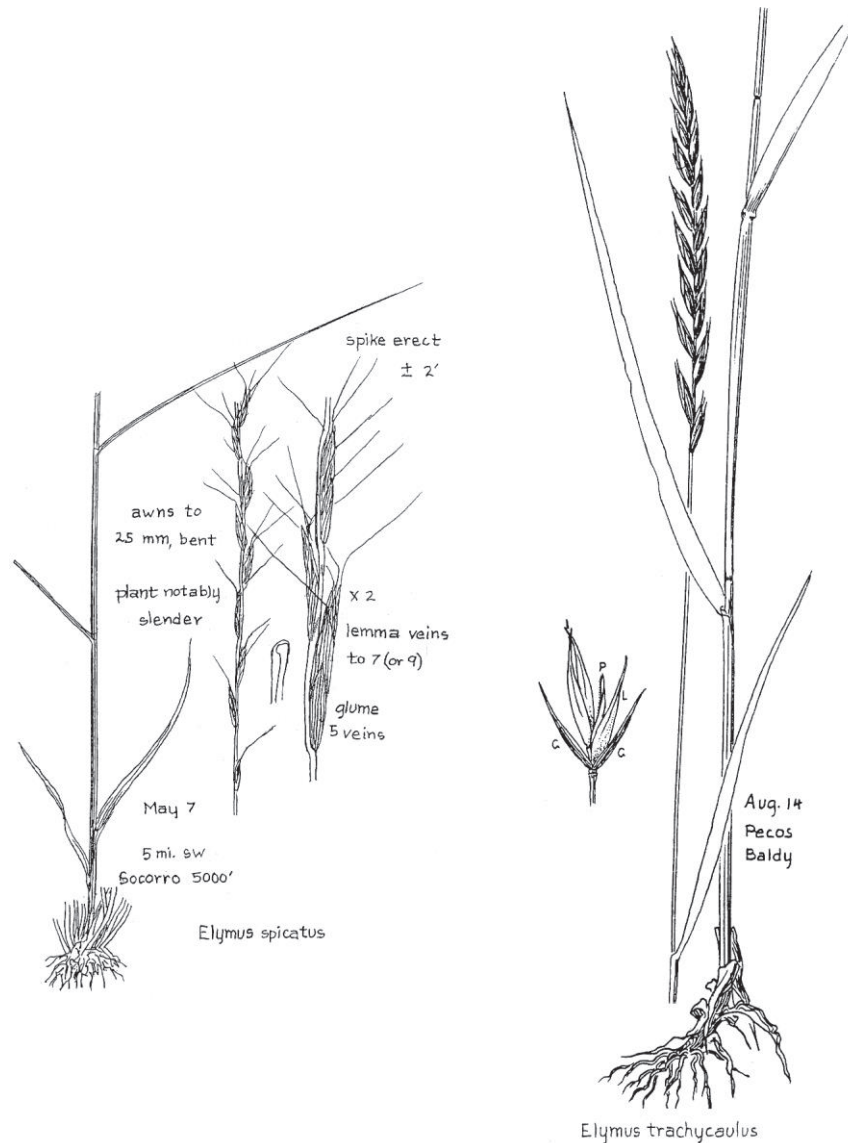
Elymus elymoides



July
 26

Bern.
 Co.
 river
 valley

Elymus ponticus

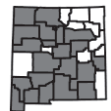


Enneapogon [nine-awned] PAPPUSGRASS [1].

Tufted annuals and perennials; sheaths open; auricles absent; ligules a ring of hairs; inflorescence a weakly developed panicle; spikelets with 3-6 florets, often only the lowermost fertile, the upper progressively reduced; disarticulation above the glumes, the florets falling together; glumes subequal, multi-nerved; lemmas 9-nerved, the nerves extended into 9 plumose awns; anthers 3. ♦About 24 species in warm-temperate to tropical regions worldwide; sometimes called BOTTLE-WASHERS.

■Chase, A. 1946. *Enneapogon desvauxii* and *Pappophorum wrightii*, an agrostological detective story. *Madroño* 8:187-189.

Enneapogon desvauxii Desvaux ex Beauvois [for Nicaise Auguste Desvaux (1784-1856), French botanist] [*Pappophorum wrightii* S. Watson]. Tufted perennial, 20-45 cm tall; nodes hairy; sheaths shorter than the internodes, hairy; panicles 2-10 cm long, mostly less than 2 cm wide, lead-colored; glumes 3-5 mm long; lower lemma 1.5-2 mm long, prominently nerved; awns 3-4 mm long. ●Plains and alluvial hills in desert or arid grasslands. ♦Cleistogamous spikelets with reduced awns are usually found in the lower sheaths.



Eragrostis [obscure origin, perhaps literally love grass, from Latin *eros* and *agrostis*, but other possibilities exist] LOVEGRASS [18].

Plants annual to perennial, tufted, rhizomatous, or stoloniferous; sheaths open; auricles absent; ligules usually a ciliate membrane; inflorescence a panicle; spikelet with several florets; disarticulation generally above the glumes, the grain and lemma falling, the palea remaining on the rachilla; lemmas 3-nerved, awnless; anthers 2-3. ♦A large, worldwide genus of 400 or so species. *Eragrostis ciliaris* (Linnaeus) R. Brown and *E. lugens* Nees have been reported from the state, but no validating specimens have been located.

■Allred, K.W. 2001. New plant distribution records [*Eragrostis frankii*]. *The New Mexico Botanist* 19:3. ■Harvey, L.H. 1975. *Eragrostis*, pp. 177-201. IN: F.W. Gould. *The Grasses of Texas*. College Station, Texas: Texas A&M Press. ■Hershey, A.L. & P.J. Leyendecker, Jr. 1944. Notes on plants of New Mexico - III [*Eragrostis hypnoides*]. *Leaf. West. Bot.* 4(2):21-25. ■Koch, S. 1974. The *Eragrostis pectinacea-pilosa* complex in North and Central America (Gramineae: Eragrostioideae). *Illinois Biol. Monogr.* 48:1-74. ■Koch, S.D. & I.S. Vega. 1985. *Eragrostis mexicana*, *E. neomexicana*, *E. orcuttiana*, and *E. virescens*: the resolution of a taxonomic problem. *Phytologia* 58:377-381. ■Perry, G. & J. McNeill. 1986. The nomenclature of *Eragrostis cilianensis* (Poaceae) and the contribution of Bellardi to Allioni's *Flora Pedemontana*. *Taxon* 35:696-701. ■Peterson, P.M. 2003. "*Eragrostis*," pp. 65-105. IN: *Flora of North America*, vol. 25. Oxford University Press. ■Reeder, J.R. 1986. Another look at *Eragrostis tephrosanthos* (Gramineae). *Phytologia* 60(2):153-154. ■Witherspoon, J.G. 1975. A numerical taxonomic study of the *Eragrostis intermedia* complex (Poaceae). Ph.D. dissertation, University of Montana.

Eragrostis curtipedicellata Buckley [short-stalked] GUMMY LOVEGRASS. Tufted perennial, much of the plant viscid-sticky, sometimes with short knotty rhizomes, 20-65 cm tall; panicles 18-35 cm long, nearly as wide, with 2° branches from the divergent 1° branches; spikelets 1-1.5 mm wide; disarticulation leaving the glumes, but not the rachilla; lemmas glandless; grains not grooved. ●Sandy or clayey plains and grasslands on the eastern plains; reports of a disjunct population from the BUFFALOGRASS prairie of Hidalgo County are unsubstantiated, but not unexpected.

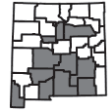


****Eragrostis curvula*** (Schrader) Nees [curved] WEEPING LOVEGRASS [*Eragrostis chloromelas* Steudel, *Eragrostis curvula* (Schrader) Nees var. *conferta* Stapf, *Poa curvula* Schrader]. Tufted perennial, the culms usually erect basally, 50-100 cm or more tall; ligules 0.6-1.3 mm long; blades to 65 cm long and forming fountain-like arrays; panicles 16-40 cm long, about ½ as wide, hairy to glabrous in the axils; spikelets appressed, 4-9 mm long, 1-2 mm wide, lead-colored; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 1.8-3 mm long, the nerves somewhat obscure; grain



grooved or not. ●Widespread throughout the state, from plains and prairies to foothills and mid-elevations in the mountains, often along roadsides. ♦Plants were introduced from Africa for range land restoration and erosion control, but populations spread quickly along roads and disturbed ground. This includes what has been called BOER LOVEGRASS, a distinctive selection with short blades and straw-colored panicles [often segregated as *Eragrostis chloromelas* Steudel or *Eragrostis curvula* (Schrader) Nees var. *conferta* Stapf], but which intergrades quite completely in its native habitats in Africa.

Eragrostis erosa Scribner [with jagged tips]. Tufted perennial, 70-110 cm tall, lacking glands; panicles 25-45 cm long, 10-30 cm wide, hairy to glabrous in the axils; spikelets appressed to divergent, 1-3 mm wide; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 2.4-3 mm long, greenish, the lateral nerves obscure; grains grooved, 0.8-1.6 mm long. ●Rocky limestone hills and mountain slopes, often in piñon-juniper areas, widespread, but more common in the southern regions. ♦Resembles *Eragrostis palmeri* S. Watson, but that species has knotty bases with extravaginal branching, has shorter lemmas (2-2.6 mm), and has shorter grains (0.6-0.8 mm), and is much less common.



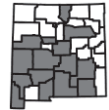
****Eragrostis frankii*** C.A. Meyer ex Steudel [for Joseph C. Frank (1782-1835), German botanical collector]. Tufted annual, 10-50 cm tall, often with glandular pits below the nodes, on the sheaths, and on the panicle branches; panicles less than ½ the length of the plant, 2-12 cm wide, glabrous in the axils; spikelets 1-2 mm wide, with 3-6 florets, lead-colored to reddish; disarticulation leaving the paleas on the rachilla, the glumes falling; lemmas 1-1.5 mm long, the lateral nerves obscure; grains flat or shallowly grooved. ●Disturbed ground, moist weedy sites; native to central and eastern United States; known only from an 1847 collection by Augustus Fendler at Santa Fe; probably no longer present in the state.



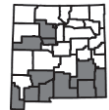
Eragrostis hypnoides (Lamarck) Britton, Sterns, & Poggenburg [moss-like] [*Poa hypnoides* Lamarck]. Stoloniferous annual, forming loose mats, 5-20 cm tall; sheaths short-pilose on the margins and collars; panicles weakly developed, 1-4 cm long, mostly open; spikelets 1-1.5 mm wide, greenish-yellow to purplish, with 12-35 florets; disarticulation leaving the paleas and the rachilla, the glumes falling; lemmas 1.4-2 mm long; grains somewhat translucent, not grooved; anthers 2, 0.2-0.3 mm long. ●Sand and mud bars along slow-moving streams and lakeshores; uncommon, in scattered locales. ♦Formerly confused with *Eragrostis reptans* (Michaux) Nees, which has unisexual spikelets (the plants being monoecious) and 3 large anthers 1.4-2.2 mm long. Oddly, New Mexico plants of *E. hypnoides* are often found with rattlesnakes nearby.



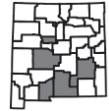
Eragrostis intermedia A.S. Hitchcock [intermediate or similar] PLAINS LOVEGRASS. Tufted perennial, 30-90 cm or more tall; sheaths lightly hairy on the margins and at the apex; panicles 15-40 cm long, 10-30 cm wide, glabrous or hairy in the axils; spikelets 1-1.8 mm wide, with 5-11 florets; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 1.6-2.2 mm long, the lateral nerves obscure; grains strongly grooved. ●Sandy or rocky plains, prairies, mountain slopes, disturbed ground, widespread. ♦Our plants belong to var. *intermedia*. Similar to *E. lugens* Nees, which is sometimes reported for the state, but which has narrower spikelets, shorter lemmas, and caryopses lacking a groove.



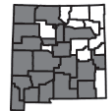
****Eragrostis lehmanniana*** Nees [for Johann Georg Christian Lehmann (1792-1860), German botanist] LEHMANN LOVEGRASS. Tufted perennial, 30-80 cm tall, the bases geniculate, sometimes rooting at the nodes and forming surprisingly long stolons; sheaths mostly glabrous basally; ligules 0.3-0.5 mm long; blades to 12 cm long; panicles 7-18 cm long, about ½ as wide, glabrous in the axils; spikelets generally spreading from the branch (sometimes only slightly), 5-14 mm long, 0.8-1.2 mm wide, lead- to straw-colored; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 1.5-1.7 mm long, the nerves obscure; grains sometimes with a shallow groove. ●Introduced from Africa for range land rehabilitation and roadside erosion control, widespread, especially common in the southern regions. ♦Populations are remarkably uniform and form dense stands along roadsides, noticeable by the geniculate bases, yellow-green foliage, and straw-colored panicles of similar height. In recent years, with milder winters, we have seen this grass spread in the southern counties, venturing from the roadsides into surrounding range land. It is a noxious invader in southeastern Arizona.



Eragrostis lutescens Scribner [yellowish]. Tufted annual, 6-25 cm tall, with glandular pits (but not rings) below the nodes; sheaths and leaf bases with scattered glandular pits; panicles 4-15 cm long, 0.5-2 cm wide, the main axis and branches with glandular pits; spikelets 1.2-2 mm wide, pale yellowish (sometimes purple-mottled), glabrous in the axils; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas straw-colored with greenish nerves, lacking glands; grains without a groove. ●Sandy, moist soil, uncommon with a few scattered localities, mostly southern.



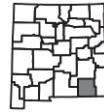
Eragrostis mexicana (Homemann) Link [of Mexico] [*Eragrostis limbata* Fournier, *Eragrostis neomexicana* Vasey, *Poa mexicana* Homemann]. Tufted annual, 10-95(110) cm tall, the culms sometimes with a glandular ring below the nodes; sheaths sometimes with glandular pits; panicles 10-40 cm long, 4-18 cm wide, glabrous in the axils; spikelets 0.7-2.4 mm wide, with 5-12 florets, grey-green to purplish green; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 1.2-2.4 mm long, the lateral nerves evident; grains mostly deeply grooved. ●Roadsides, moist disturbed sites in a variety of habitats, often gravelly or rocky sites, widespread. ♦Our plants belong to var. *mexicana*.



****Eragrostis minor*** Host [smaller] [*Eragrostis poaeoides* P. Beauvois ex Roemer & Schultes]. Tufted annual, 10-45 cm tall, sometimes with a glandular ring below the nodes; sheaths sometimes glandular on the midnerves; blade margins sometimes with crater-like glands; panicles 4-20 cm long, contracted to open, to 8 cm wide, sometimes with glandular pits or glandular rings, glabrous or hairy in the axils; pedicels usually with a glandular ring in the distal half; spikelets 1.1-2.2 mm wide, with 7-20 florets; disarticulation leaving the

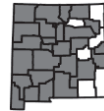
paleas on the rachilla but the glumes falling; lemmas 1.4-1.8 mm long, sometimes with crater-like glands on the keels; grains not grooved. ♦Native to Europe, and not yet known from New Mexico, but occurring in adjacent counties in Colorado; sometimes confused with our annual species; included here for comparison.

Eragrostis palmeri S. Watson [for Edward Palmer (1829-1911), British botanist and ethnologist]. Tufted perennial with knotty bases, the axillary shoots breaking through the base of the sheath (extravaginal), rhizomes lacking, 50-100 cm tall, lacking glands; sheaths short-villous to glabrous; panicles 12-40 cm long, 4-20 cm wide, glabrous to sparsely hairy in the axils; spikelets appressed to divergent, 1-2 mm wide; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 2-2.6 mm long, the lateral nerves obscure to conspicuous; grains grooved, 0.6-0.8 mm long.



●Rocky plains and mountain slopes, uncommon in the southeastern mountains. ♦Resembles *Eragrostis erosa* Scribner, but that species lacks knotty bases with extravaginal branching, has shorter lemmas (2.4-3 mm), and has longer grains (0.8-1.6 mm), and is more commonly encountered.

Eragrostis pectinacea (Michaux) Nees [comb-like] CAROLINA LOVEGRASS. Tufted annual, lacking glands, 10-65 cm tall; panicles 5-25 cm long, 3-12 cm wide, usually open, the axils glabrous or sparsely hairy; spikelets 1.2-2.5 mm wide, with 6-20 florets; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 1-2.2 mm long, the lateral nerves obvious; grains not grooved. ●Roadsides, fields, alkali flats, sandy plains, disturbed ground, widespread. ♦We have two varieties: §

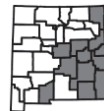


a Pedicels mostly appressed to the panicle branches, rarely diverging...var. ***pectinacea*** [*Eragrostis diffusa* Buckley, *Eragrostis purshii* Schrader]. ●Throughout the state, expected in every county.

a Pedicels mostly spreading to divaricate from the panicle branches at maturity...var. ***miserrima*** (Fournier) J. Reeder [wretched] [*Eragrostis arida* Hitchcock, *Eragrostis purshii* Schrader var. *miserrima* Fournier, *Eragrostis tephrosanthos* Schultes]. ●Mostly in the southwestern half of the state. ♦This can be confused with *Eragrostis barrelieri* Daveau, but that species has conspicuous glandular rings below the nodes

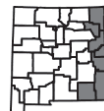
****Eragrostis pilosa*** (Linnaeus) P. Beauvois [hairy] [*Poa pilosa* Linnaeus]. Tufted annual, 8-50 cm tall; sheaths sometimes with glandular pits; blades sometimes with glands along the midnerve; panicles 4-20 cm long, 2-15 cm wide, the branches paired or whorled at the lower 2 nodes, the axils glabrous to hairy; spikelets 0.6-1.4 mm wide, with 5-15 florets; disarticulation leaving the paleas on the rachilla but the glumes falling, and then the paleas eventually falling; lemmas 1.2-2 mm long, the lateral nerves obscure; grains not grooved. ●Roadsides, disturbed ground, gardens, fields; native to Eurasia. ♦Reported by various workers for the state, but authentic specimens are as yet unknown; included here for comparison.

Eragrostis secundiflora Presl [with flowers on one side] RED LOVEGRASS. Tufted perennial, lacking glands, 30-75 cm tall; panicles 5-30 cm long, about ½ as wide, the branches appressed to ascending, the axils nearly glabrous; spikelets 2.5-5 mm wide, strongly flattened, reddish or somewhat straw-colored, with 10-45 florets; disarticulation dropping the florets and rachilla before the glumes; lemmas 2-6 mm long, the lateral nerves conspicuous; grains not grooved.

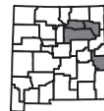


●Sandy grasslands and prairies, roadsides, mostly on the eastern plains. ♦Our plants belong to subsp. ***oxylepis*** (Torrey) S.D. Koch [sharp-scaled] [*Eragrostis beyrichii* J.G. Smith, *Eragrostis oxylepis* (Torrey) Torrey, *Eragrostis secundiflora* Presl var. *capitata* (Fournier) Beetle, *Poa oxylepis* Torrey].

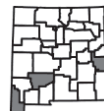
Eragrostis sessilispica Buckley [with sessile spikelets] TUMBLE LOVEGRASS [*Acamptocladus sessilispicus* (Buckley) Nash]. Tufted perennial, lacking glands, 30-90 cm tall; panicles 20-60 cm long, about ½ as wide; branches spicate, unbranched, widely spaced, with hairy axils; spikelets sessile or nearly so on the primary branches, widely spaced and not overlapping, 1.4-3 mm wide, with 3-12 florets; disarticulation leaving the glumes, the florets falling, the panicle also breaking away and tumbling before the wind; lemmas 3-5 mm long, indurate; grains not grooved. ●Sandy hills and prairies on the eastern plains.



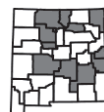
Eragrostis spectabilis (Pursh) Steudel [spectacular, notable] PURPLE LOVEGRASS [*Poa spectabilis* Pursh]. Tufted perennial, 30-75 cm tall, with short knotty rhizomes; sheaths hairy on the margins; blades glabrous to pilose; panicles 20-50 cm long, 15-35 cm wide, hairy in the axils; spikelets 1-2 mm wide, spreading or appressed, reddish purple; disarticulation leaving the glumes, the florets falling; lemmas 1.2-2.5 mm long, the lateral nerves obvious; grains grooved between 2 ridges. ●Sandy soil, in the northeastern grasslands. ♦Plants are quite beautiful, and becoming available in the nursery trade. §



****Eragrostis superba*** Peyritsch [excellent, magnificent] WILMAN'S LOVEGRASS. Tufted perennial, lacking glands, 45-95 cm tall; sheaths hairy on the margins; panicles 10-30 cm long, 1-6 cm wide, glabrous in the axils; spikelets 3-10 mm wide, strongly flattened, straw-colored to greenish or reddish; disarticulation below the glumes, the spikelets falling entire; lemmas 3-5 mm long, papery to leathery, the green lateral nerves conspicuous; grains not grooved. ●Introduced in seeding trials and for erosion control in southern regions, uncommon; native to Africa. ♦The English name commemorates Miss Maria Wilman (1867-1957), a superb South African botanist, geologist, archeologist, and museum curator. Populations seeded on White Sands Missile Range (Sierra County) in 1993 are no longer extant.



Eragrostis trichodes (Nuttall) Wood [hair-like] SAND LOVEGRASS [*Poa trichodes* Nuttall]. Tufted perennial, lacking glands, 30-120 cm tall; sheaths sometimes hairy along the margins; blades sometimes pilose; panicles 30-80 cm long, 10-30 cm wide, glabrous to hairy in the axils; spikelets diverging, 1.5-3.6 mm wide, with 4-18 florets; disarticulation leaving the paleas on the rachilla but the glumes falling; lemmas 2.2-3.5 mm long, the lateral nerves obvious; grains grooved. ●Sandy prairies and open woodlands, mostly in the northeastern quarter of the state.

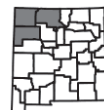


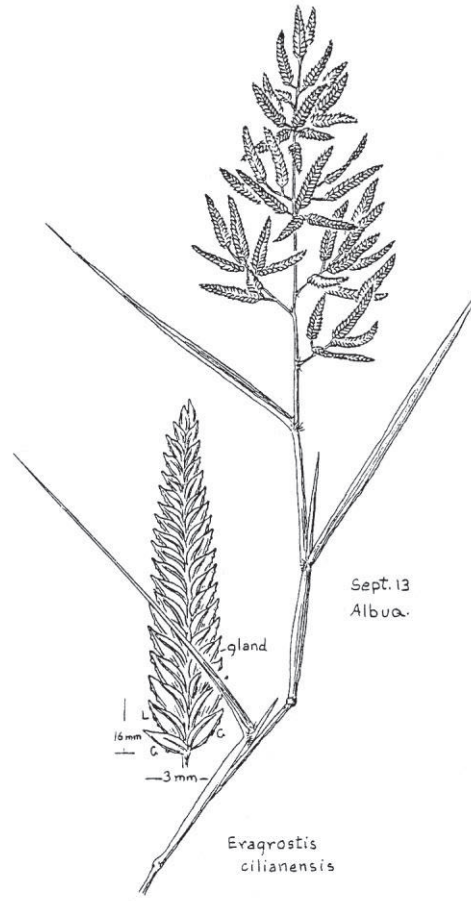
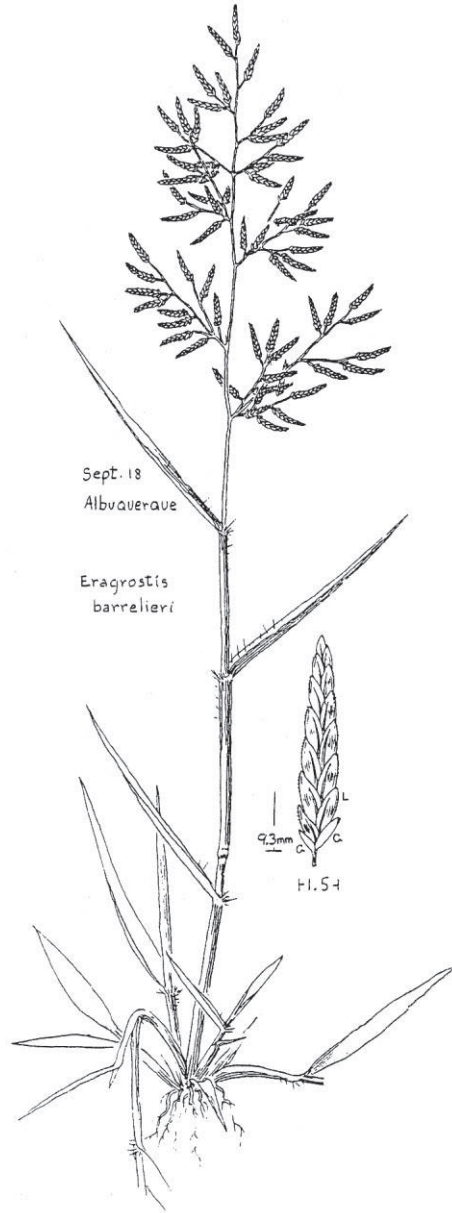
Eremopyrum [desert wheat] [1].

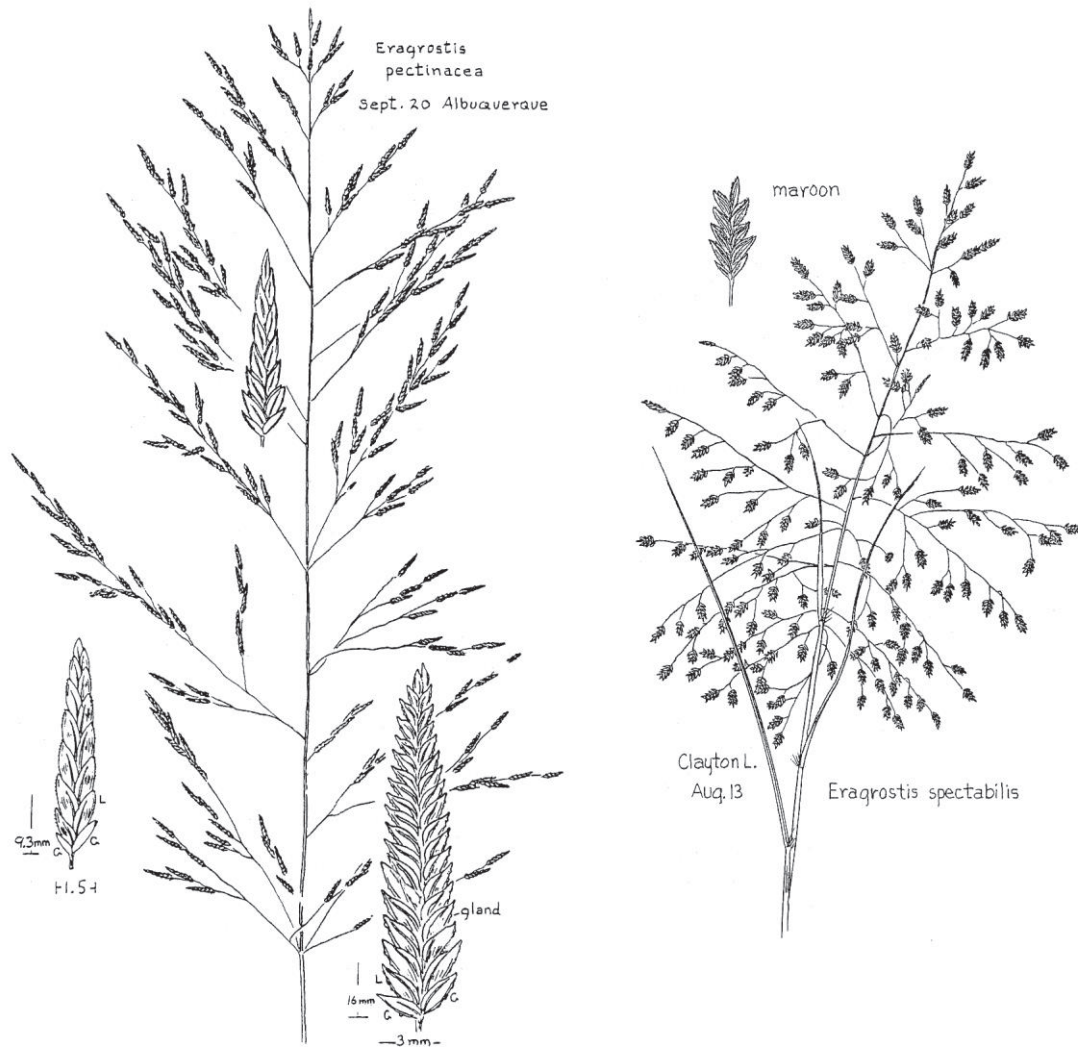
Tufted annual, the culms geniculate-based; sheaths open. auricles present; ligules a truncate membrane; blades flat, short; inflorescence a spike, with 1 spikelet per node, the spikelets crowded and overlapping; disarticulation below the glumes, the rachis shattering, or above the glumes and between the florets; spikelets with 2-5 florets; glumes shorter than the spikelets; lemmas 5-nerved; anthers 3. ♦A Eurasian and North African genus of about 4 species.

■Bowden, W.M. 1962. Cytotaxonomy of the native and adventive species of *Hordeum*, *Eremopyrum*, *Secale*, *Sitanion*, and *Triticum* in Canada. *Can. J. Bot.* 40:1675-1711. ■Frederiksen, S. 1991. Taxonomic studies in *Eremopyrum* (Poaceae). *Nordic J. Bot.* 11:271-285. ■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Eremopyrum triticeum*]. *Great Basin Naturalist* 37(4):530-531.

****Eremopyrum triticeum*** (Gaertner) Nevski [resembling wheat] ANNUAL WHEATGRASS [*Agropyron triticeum* Gaertner]. Tufted annual, 5-30 cm tall; spikes 1-3 cm long; disarticulation above the glumes and between the florets, the rachis remaining; spikelets with 2-3 florets; glumes 1-nerved, awn-tipped; lemmas 5-7.5 mm long, the lowermost hairy. ●Dry plains in the Four Corners region; native to Eurasia, India.







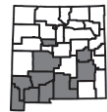
Eriochloa [wooly grass] CUPGRASS [3].

Mostly tufted annuals and perennials; sheaths open; auricles absent; ligules a ciliate membrane; inflorescence a panicle with spike-like branches, lacking bristles; spikelets with 2 florets, the lower sterile, the upper fertile, awned to awnless; disarticulation below the glumes (below the cup); lower glume reduced to a cup-like structure; upper and lower lemma similar in shape and texture; upper floret indurate, the lemma clasping the palea and forming a seed case; anthers 3. ♦About 35 species of Eurasia, Africa, Australia, and the Americas. The cup-like structure formed by the lower glume is distinctive.

■Shaw, R.B. & R.D. Webster. 1987. The genus *Eriochloa* (Poaceae: Paniceae) in North and Central America. Sida 12:165-207.

- 1 Spikelets solitary in the middle of the branches *E. contracta*
- 1 Spikelets in pairs in the middle of the branches
- 2 Adaxial blade surface velvety-hairy; lower paleas 1-4 mm long *E. lemmonii*
- 2 Adaxial blade surface glabrous to sparsely pilose; lower paleas absent *E. acuminata*

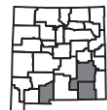
Eriochloa acuminata (Presl) Kunth [with a tapering point]. Tufted annual, 30-100 cm or more long; sheaths sometimes inflated; blades sparsely pilose; panicles 7-16 cm long, the branches 5-20 in number, 1-5 cm long, with spikelets in unequally pedicellate pairs in the middle of the branch, solitary distally; spikelets 3.8-6 mm long; upper glume awnless to awned to 1.2 mm; lower palea absent; upper floret awn-tipped 0.1-0.3 mm. ●Disturbed moist ground, rocky slopes, in the southern half of the state. ♦We have two varieties:



a Spikelets 4-6 mm long, long-acuminate or tapering to a short awn...var. ***acuminata*** [*Eriochloa gracilis* (Fournier) A.S. Hitchcock, *Piptatherum acuminatum* Presl].

a Spikelets less than 4 mm long, obtuse to acute...var. ***minor*** (Vasey) R.B. Shaw [smaller] [*Eriochloa gracilis* (Fournier) A.S. Hitchcock var. *minor* (Vasey) Hitchcock, *Eriochloa polystachya* sensu W&S, *Eriochloa punctata* (Linnaeus) Desvaux ex W. Hamilton var. *minor* Vasey].

Eriochloa contracta A.S. Hitchcock [contracted]. Tufted annual, 20-80 cm or more long; blades sparsely to densely pubescent on both surfaces; panicles 6-20 cm long, the branches 10-28 in number, 1.5-5 cm long, with solitary spikelets in the middle of the branch, sometimes paired proximally; spikelets 3-5 mm long; upper glume acuminate to awned to 1 mm; lower palea absent; upper floret awned 0.4-1.1 mm. ●Loamy soil of prairies and swales in the south-central and south-eastern regions of the state.



Eriochloa lemmonii Vasey & Scribner [for John Gill Lemmon (1832-1908), California botanist]. Tufted annual, 20-80 cm long; blades velutinous on the upper surface; panicles 5-15 cm long, with 2-10 branches 1-4 cm long, with spikelets in unequally pedicellate pairs in the middle of the branch, solitary distally; spikelets 3-5 mm long; upper glume acute, awnless; lower palea 1-4 mm long; upper floret rounded to acute, sometimes mucronate, awnless. ●Rocky, grassy slopes in the foothill region, with a few outliers.



Eriocoma [wooly hair] NEEDLEGRASS [9].

Perennial, ours mostly cespitose; sheaths open; auricles absent; ligules membranous; inflorescence a panicle; spikelets 1-flowered; disarticulation above the glumes; glumes longer than the floret, 1-3-nerved or sometimes more; florets terete, usually fusiform, the lemmas convolute around the palea and flower but the margins only slightly overlapping, awned from the tip with a single awn; anthers 3. ♦Our 27 species of *Eriocoma* were formerly recognized in the genera *Achnatherum*, *Oryzopsis*, and *Stipa*. We accept the reorganizations of Peterson et al. (2019) and Romaschenko et al. (2012), that moves the Western Hemisphere species of a polyphyletic *Achnatherum* to the monophyletic North American genera *Eriocoma* and *Pseudoeriacoma*. *Eriocoma pinetorum* (M.E. Jones) Romaschenko has been reported for the state, but without documentation and no specimens are known.

■Allred, K.W. & K. Heil. 2000. New plant distribution records [*Stipa arida*, *Stipa speciosa*]. The New Mexico Botanist 15:7. ■Barkworth, M.E. 1993. North American Stipeae (Gramineae): Taxonomic changes and other comments. Phytologia 74(1):1-25. ■Hartman, R.L., B. Reif, B.E. Nelson, & B. Jacobs. 2006. New vascular plant records for New Mexico [*Achnatherum nelsonii nelsonii*]. Sida 22(2):1225-1233. ■Hatch, S.L. & D.A. Bearden. 1983. *Stipa curvifolia* (Poaceae) – Studies on a rare taxon. Sida 10(2):184-187. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. Aliso 23:349-361. ■Johnson, B.L. 1945. Natural hybrids between *Oryzopsis hymenoides* and several species of *Stipa*. Amer. J. Bot. 32:599-608. ■Peterson, P.M., K. Romaschenko, R.J. Soreng, & J. Valdes Reyna. 2019. A key to the North American genera of Stipeae (Poaceae, Pooideae) with descriptions and taxonomic names for species of *Eriocoma*, *Neotrinia*, *Oloptum*, and five new genera: *Barworthia*, *Eriosella*, *Pseudoeriacoma*, *Ptilagrosiella*, and *Thorneochoila*. PhytoKeys 126: 89-125. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. Taxon 61(1):18-44.

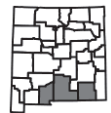
- 1 Lemma densely covered with long hairs; awn short, 3-5 mm long, quickly deciduous; panicle widely spreading at maturity, with dichotomous branches.....***E. hymenoides***
- 1 Lemma glabrous or covered with short appressed hairs; awn longer than 6 mm, persistent or deciduous; panicle narrow with ascending branches
 - 2 Basal segment of the once-geniculate awn plumose with long hairs 3-8 mm longgo to ***Pappostipa***
 - 2 Basal segment of the awn glabrous or with hairs less than 2 mm long
 - 3 Awn ± readily deciduous; blades 1-2 mm wide***E. ×bloomeri***
 - 3 Awn persistent; blades various
 - 4 Lower segment of the awn (not the lemma tip) with hairs 1-2 mm long ***E. curvifolia***
 - 4 Lower segment of the awn (not the lemma tip) scabrous or with hairs less than 1 mm long
 - 5 Awns 3-7.5 cm long, obscurely bent, the terminal segment flexuous or curving
 - 6 Ligule minute, less than 1 mm long, hardly visible; panicle narrow, contracted, the main axis obscured..... ***E. arida***
 - 6 Ligule 1-2 mm long, evident; panicle open when mature, the branches spreading, the main axis visible go to ***Pseudoeriacoma***
 - 5 Awns 1-3 cm long, usually plainly bent, the terminal segment ± straight
 - 7 Palea approximately 2/3 the length of the lemma
 - 8 Hairs at the tip of the palea about the same length as those below; mature stems 60-180 cm tall, 2-6 mm in diameter; blades 4-10 mm wide..... ***E. robusta***
 - 8 Hairs at the tip of the palea longer than those below; mature stems 25-80 cm tall, 1-2 mm in diameter; blades 1-2 mm wide ***E. lettermanii***
 - 7 Palea 1/3 to 1/2 the length of the lemma
 - 9 Hairs at the lemma tip 2.5-3 mm long; callus with a pointed extension ***E. scribneri***
 - 9 Hairs at the lemma tip 1-2.2 mm long; callus blunt, without a pointed extension
 - 10 Apical lemma hairs erect; lemma lobes 0.5-1.2 mm long; florets widest about midlength.....***E. lobata***
 - 10 Apical lemma hairs ascending to divergent; lemma lobes 0.2-0.5 mm long; florets widest below midlength
 - 11 Awns mostly 2-3 cm long; blades 3-7 mm wide ***E. nelsonii***
 - 11 Awns mostly 1-2 cm long; blades 2-3 mm wide ***E. perplexa***

Eriocoma arida (M.E. Jones) Romaschenko [dry, growing in dry places] [*Achnatherum aridum* (M.E. Jones) Barkworth, *Stipa arida* M.E. Jones, *Stipa mormonum* Mez]. Perennial, 30-80 cm tall; blades flat when fresh, 1-3 mm wide; panicles 5-17 cm long, 1-2 cm wide, the bases often enclosed in the subtending sheath at anthesis; glumes subequal to unequal, the lower 8-14 mm long, the upper 1-5 mm shorter; florets 4-6.5 mm long; awns 4-8 cm long, obscurely once-geniculate, the terminal segment flexuous. ●Desert scrub vegetation of the Four Corners region; only recently (2000) found in New Mexico and not well-collected in the state. ♦The long awns, tiny ligule, and a contracted panicle often partially hidden in the subtending sheath are distinctive features.

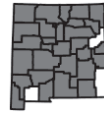


Eriocoma ×bloomeri (Bolander) Romaschenko [for Hiram Green Bloomer (1819-1874), an early San Francisco botanist] [*Achnatherum ×bloomeri* (Bolander) Barkworth, *Oryzopsis bloomeri* (Bolander) Ricker, *Stipa bloomeri* Bolander, *×Stiporyzopsis bloomeri* (Bolander) B.L. Johnson]. ●Not definitely recorded for New Mexico, but to be expected in the Four Corners area. ♦This is a catch-all name for hybrids between *Eriocoma hymenoides* and various other species of *Eriocoma*, generally with the readily deciduous awns of *E. hymenoides* and the longer, narrow florets and wider blades of the other parent.

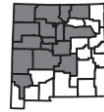
Eriocoma curvifolia (Swallen) Romaschenko [with a curved leaf] [*Achnatherum curvifolium* (Swallen) Barkworth, *Stipa curvifolia* Swallen]. Perennial, 25-60 cm tall; basal sheaths puberulent, sometimes tomentose at the base; blades folded to involute, minutely puberulent, moderately to strongly curled in age; panicles 7-11 cm long; glumes subequal, 3-nerved, 10-14 mm long; florets 6-8 mm long; awns 20-50 mm long, mostly once-geniculate, the first segment with hairs 1-2 mm long. ●Crevices and rocky ledges and cliffs, limestone substrate, sometimes in well-developed soil; uncommon in the southern desertic mountains and foothills; also known from adjacent Texas and Chihuahua; flowering April to mid-June. ♦Though relatively uncommon and scattered, populations of this grass are generally not threatened by development or grazing, and this species is not considered endangered or threatened.



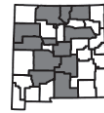
Eriocoma hymenoides (Roemer & J.A. Schultes) Rydberg [membrane-like] INDIAN RICEGRASS [*Achnatherum hymenoides* (Roemer & J.A. Schultes) Barkworth, *Eriocoma cuspidata* Nuttall, *Oryzopsis hymenoides* (Roemer & Schultes) Ricker ex Piper, *Stipa hymenoides* Roemer & Schultes]. Perennial, 20-50 cm tall or more; blades convolute, to 1 mm wide; panicles of dichotomous branching, to 20 cm long and 15 cm wide; spikelets on long divergent pedicels; glumes subequal, 5-7-nerved; florets obovoid, with hairs 2-6 mm long; awns 3-6 mm long, straight, early-deciduous. ●Sandy plains and dunes, in nearly every county of the state. ♦The open, dichotomously branching panicle with long pedicels is unique among our species of *Eriocoma*. INDIAN RICEGRASS hybridizes with several species of *Eriocoma*, *Pappostipa*, and *Nassella*; these are referred to as *E. ×bloomeri* (Bolander) Romaschenko, and are reported to all be sterile. This is an attractive grass with potential as an ornamental, especially in the more arid regions in the state. The seedhead has the same branching pattern as chicken-wire. §



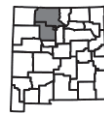
Eriocoma lettermanii (Vasey) Romaschenko [for George Washington Letterman (1841-1913), Missouri school-teacher and reclusive botanist] [*Achnatherum lettermanii* (Vasey) Barkworth, *Stipa lettermanii* Vasey]. Perennial, 25-80(90) cm tall; collars of the flag leaves glabrous; blades rolled to flat when fresh, 1-2 mm wide; panicles 7-20 cm long, to 1 cm wide; glumes subequal, 6-10 mm long; florets fusiform, 4-6 mm long; paleas ¾ to nearly as long as the lemma; awns 12-25 mm long, twice-geniculate. ●Sagebrush flats and hills, dry mountain meadows and clearings, from sagebush to subalpine communities; widespread in the mountains of the state, but not common. ♦Similar to the equally infrequent *Eriocoma nelsonii* and the more common *E. perplexa*, but those species have broader blades and shorter paleas less than ¾ the length of the lemmas.



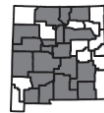
Eriocoma lobata (Swallen) Romaschenko [lobed] [*Achnatherum lobatum* (Swallen) Barkworth, *Stipa lobata* Swallen]. Perennial, to 100 cm tall; blades flat when fresh, 1-4 mm wide; panicles 12-20(25) cm long, to 2 cm wide; glumes unequal, 1-3-nerved, the lower 10-12 mm long, the upper 2-3 mm shorter; florets fusiform, 5-8 mm long, with apical lemma lobes 0.5-1.2 mm long; awns 10-20 mm long, once- to twice-geniculate. ●Rocky hills and woodlands, most common in the semi-arid southern regions, but extending northward to the Colorado state line; flowering summer to fall. ♦This can be difficult to distinguish from *Achnatherum perplexum*, and we must rely on the long lemma lobes and sometimes 3-nerved glumes of *A. lobatum* for accurate determination.



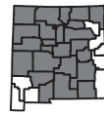
Eriocoma nelsonii (Scribner) Romaschenko [for Aven Nelson (1859-1952), teacher and eminent Wyoming botanist] [*Achnatherum nelsonii* (Scribner) Barkworth, *Stipa nelsonii* Scribner]. Perennial, 40 to 100 cm or more tall; blades flat when fresh, 3-7 mm wide (sometimes less); panicles to 30 cm long and 2 cm wide; glumes subequal, the lower slightly longer, 6-12 mm long; florets fusiform, 4-7 mm long; awns 18-30 mm long, twice-geniculate. ●Infrequent and only recently accurately reported (2006) in mixed conifer forests in the northern mountains; meadows and clearings in the forest; flowering spring to early summer.



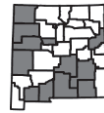
Eriocoma perplexa (Hoge & Barkworth) Romaschenko [confused, obscured, or perplexing] [*Achnatherum perplexum* Hoge & Barkworth, *Stipa columbiana* of NM reports, *Stipa minor* of NM reports, *Stipa nelsonii* of NM reports, *Stipa perplexa* (Hoge & Barkworth) J. Wipff & S.D. Jones]. Perennial, 35-85 cm tall; blades flat when fresh, (1)2-3 mm wide; panicles to 25 cm long and 2 cm wide; glumes unequal, the lower 10-15 mm long and exceeding the upper by 1-3 mm; florets fusiform, 5-10 mm long; awns 10-25 mm long, once- to twice-geniculate. ●Mountain grasslands, clearings, and dry slopes in the piñon to ponderosa pine communities; flowering late summer to fall. ♦The species is aptly named: it has been confused with *Eriocoma nelsonii*, from which it differs in having narrower blades, unequal glumes, and shorter awns; nearly all the reports of *E. nelsonii* in New Mexico refer to this species. The type is from Bernalillo County.



Eriocoma robusta (Vasey) Romaschenko [robust] SLEEPYGRASS [*Achnatherum robustum* (Vasey) Barkworth, *Stipa robusta* Vasey, *S. vaseyi* Scribner, *Stipa viridula* Trinius var. *robusta* Vasey]. Perennial, (60)80-180 cm tall or more; collars hairy, those of the flag leaves densely so; blades flat when fresh, 4-10 mm wide; panicles 15-30 cm long, 1-3.5 cm wide; glumes subequal, 9-12 mm long; florets fusiform, 6-9 mm long, the apical hairs to 1.5 mm long; paleas 2/3-¾ as long as the lemmas; awns 20-35 mm long, twice-geniculate. ●Mountain grasslands, plains, disturbed pastures; widespread in the mountains and foothills of the state, increasing under grazing pressure. ♦Plants contain an alkaloid (lysergic acid amide) that induces torpor in grazing horses, but is not lethal. Recent studies suggest the toxin is produced by endophytic fungi infesting the grasses. §



Eriocoma scribneri (Vasey) Romaschenko [for Frank Lamson-Scribner (1851-1938), renowned agrostologist] [*Achnatherum scribneri* (Vasey) Barkworth, *Stipa scribneri* Vasey]. Cespitose perennials 30-90 cm tall; blades flat or rolled when fresh, 2-4 mm wide when flat; panicles to 24 cm long and 1 cm wide; glumes strongly unequal, the lower 10-17 mm long and often curving outward, the upper 2-4 mm shorter; florets fusiform, 6-10 mm long, the sharp callus extension to 1.5 mm long, with apical hairs 2-3 mm long; awns 14-25 mm long, mostly once-geniculate. ●Dry rocky hills and woodlands, widespread in the state in the piñon to ponderosa pine communities. ♦The usually curving glumes, long sharp callus, and long hairs at the tip of the lemma help to distinguish this sometimes confusing species.



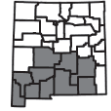
Erioneuron [wooly nerve] TRIDENS, WOOLYGRASS [3].

Tufted or stoloniferous perennials; leaves mostly basal; sheaths open; auricles absent; ligules a ring of hairs; blade margins white, cartilaginous; inflorescence a panicle, sometimes raceme-like; spikelets several-flowered; disarticulation above the glumes and between the florets; lemmas 3-nerved, the nerves strongly hairy; awned or awnless; anthers 1 or 3. ♦A few species of southern North America and southern South America. Species of *Erioneuron* were formerly treated in the genus *Tridens*.

■Valdés-R., J. & S.L. Hatch. 1995. Anatomical study of *Erioneuron* and *Dasyochloa* (Poaceae: Chloridoideae: Eragrostidae) in North America. *Sida* 16(3):413-426. ■Valdés-R. & S.L. Hatch. 1997. A revision of *Erioneuron* and *Dasyochloa* (Poaceae: Eragrostidae). *Sida* 17(4):645-666.

- 1 Spikelets arranged in leafy clusters borne down among the pungent, spine-tipped blades; plants often stoloniferous and shorter than 10 cm (*M. pulchella*)go to **Munroa**
- 1 Spikelets borne on an elongated, leafless stalk elevated above the leaves; plants not or rarely stoloniferous and often taller than 10 cm
 - 2 Tip of lemma acute or with a notch 0.5 mm or less deep; both glumes shorter than the lowermost floret ***E. pilosum***
 - 2 Tip of lemma with a notch 1-2.5 mm deep; upper glume equaling or surpassing the lower floret
 - 3 Spikelets of vigorous plants 10-15 mm long, usually silvery or only slightly purple-tinged; lemmas copiously pubescent at the base; lateral lemma nerves not extended into a mucro ***E. avenaceum***
 - 3 Spikelets seldom longer than 10 mm, usually purplish-tinged or brownish-purple; lemmas with some hairs but not copiously pubescent at the base; lateral lemma nerves extended into a mucro to 1 mm long ***E. nealleyi***

Erioneuron avenaceum (Kunth) Tateoka [oat-like] [*Erioneuron avenaceum* (Kunth) Tateoka var. *grandiflorum* (Vasey) Gould, *Erioneuron grandiflorum* (Vasey) Tateoka, *Tridens avenaceus* (Kunth) Hitchcock, *Tridens grandiflorus* (Vasey) Wooton & Standley, *Triodia avenacea* Kunth, *Triodia grandiflora* Vasey]. Tufted or infrequently stoloniferous perennial, 7-40 cm tall; blades sparsely pilose; panicles 2-10 cm long; spikelets 6-10 mm long, with 4-20 florets; upper glume equaling or surpassing the lower floret; lemmas 4-7 mm long, the lobes 1-2 mm long, with awns 2-4 mm long; anthers 3. ●Limestone hills and rocky outcrops in the southcentral region. ♦Our material belongs to var. *avenaceum*.



Erioneuron nealleyi (Vasey) Tateoka [for Greenleaf Cilley Nealley (1846-1896), USDA plant collector] [*Erioneuron avenaceum* (Kunth) Tateoka var. *nealleyi* (Vasey) Gould, *Tridens nealleyi* (Vasey) Wooton & Standley, *Triodia nealleyi* Vasey]. Tufted perennial, 15-65 cm tall; blades pilose to villous; panicles 5-10 long, compact; upper glumes surpassing the lower floret; lemmas 4-6 mm long, the lobes 1.5-2.5 mm long, with awns 1-3.5 mm long; anther 1. ●Limestone hills and rocky outcrops in the southcentral region.



Erioneuron pilosum (Buckley) Nash [hairy] [*Tridens pilosus* (Buckley) Hitchcock, *Triodia pilosa* (Buckley) Merrill, *Uralepis pilosa* Buckley]. Tufted perennial, 6-40 cm tall; blades sparsely pilose to glabrous; panicles 1-6 cm long; spikelets 6-15 mm long, with 5-20 florets; glumes shorter than the lower floret; lemmas 3-6 mm long, the teeth 0.3-0.5 mm long, with awns 0.5-2.5 mm long; anthers 3. ●Limestone hills and rocky outcrops, widespread and expected in all counties. ♦Our material belongs to var. *pilosum*.



Festuca [pasture or food] FESCUE [12].

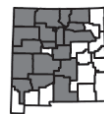
Tufted perennials, with or without rhizomes in addition, rarely stoloniferous; sheaths open to closed to about ¾ their length, sometimes to near the top; auricles absent; ligules membranous, often ciliate; blades flat to variously folded or rolled; inflorescence a panicle, sometimes raceme-like; spikelets with few to several florets; disarticulation above the glumes and between the florets; glumes usually surpassed by the florets, 1-3-nerved; lemmas 5-7-nerved, awned or awnless; anthers 3. ♦A large genus of perhaps more than 500 species, in temperate to arctic regions of the world. Annual fescues, which generally have only a single anther, are treated in *Vulpia*. The classification of *Festuca* and related groups is problematic and controversial, with proposals ranging from having a single large inclusive genus (*Festuca*) that is entirely monophyletic but includes several genera traditionally recognized by many, all the way to having many small tightly circumscribed genera, many of those coming out of what most of us know as *Festuca* (see Catalan et al. 2007 for a good review). To avoid undo confusion, and recognizing the inter-relatedness of all five species groups, we follow here the treatment of the recent *Flora of North America*, vol. 24, which recognizes the genera *Festuca*, *Leucopoa*, *Lolium*, *Schedonorus*, and *Vulpia*.

■Aiken, S.G. & S.J. Darbyshire. 1990. Fescue grasses of Canada. Agriculture Canada Publ. 1844/E. ■Allred, K.W. 1999. New plant distribution records [*Festuca brachyphylla*, *calligera*, *earlei*, *trachyphylla*]. The New Mexico Botanist 13:7. ■Allred, K.W. 2005. Perennial *Festuca* (Gramineae) of New Mexico. Desert Plants 21(2):3-12. ■Argus, G.W. & S.G. Aiken. 1987. Noteworthy collections (New Mexico) [*Festuca minutiflora*]. Madroño 34:268-269. ■Auquier, P. & M. Kerguelen. 1977. Un groupe embrouillé de *Festuca* (Poaceae): les taxons désignés par l'épithète "glauca" en Europe occidentale et dans les régions voisines. Lejeunia (Nouv. sr.) 89:1-82. ■Catalán, P., P. Torrecilla, J.A. López-Rodríguez, J. Müller, & C.A. Stace. 2007. A systematic approach to subtribe Loliinae (Poaceae: Pooideae) based on phylogenetic evidence. Aliso 23(1):380-405. ■Darbyshire, S.J. 1993. Realignment of *Festuca* subgenus *Schedonorus* with the genus *Lolium* (Poaceae). Novon 3:239-243. ■Darbyshire, S.J. & L.E. Pavlick. 1997. Nomenclatural notes on North American grasses. Phytologia 82(2):73-78. ■Darbyshire, S.J. & S.I. Warwick. 1992. Phylogeny of North American *Festuca* (Poaceae) and related genera using chloroplast DNA restriction site variation. Can. J. Bot. 70:2415-2429. ■Frederiksen, S. 1977. The *Festuca brachyphylla* group in Greenland. Bot. Notiser 130:269-277. ■Frederiksen, S. 1979. *Festuca minutiflora* Rydberg, a neglected species. Bot. Notiser 132:315-318. ■Frederiksen, S. 1982. *Festuca brachyphylla*, *F. saximontana* and related species in North America. Nord. J. Bot. 2:525-536. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Festuca hallii*]. J. Bot. Res. Inst. Texas 4(2):777-784. ■Reveal, J.L., E.E. Terrell, J.H. Wiersma, & H. Scholz. 1991. Proposal to reject *Festuca elatior* L. with comments on the typification of *F. pratensis* and *F. arundinacea*. Taxon 40:135-137. ■Soreng, R.J. E.E. Terrell. 1997. Taxonomic notes on *Schedonorus*, a segregate genus from *Festuca* or *Lolium*, with a new nothogenus, *Schedololium*, and new combinations. Phytologia 83(2):85-88. ■Terrell, E.E. 1967. Meadow fescue: *Festuca elatior* L. or *F. pratensis* Hudson? Brittonia 19:129-132. ■Terrell, E.E. 1968. Notes on *Festuca arundinacea* and *F. pratensis* in the United States. Rhodora 70:564-568. ■Wilkinson, M.J. & C.A. Stace. 1991. A new taxonomic treatment of the *Festuca ovina* L. aggregate (Poaceae) in the British Isles. Bot. J. Linn. Soc. 106:347-397.

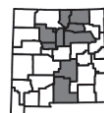
- 1 Blades mostly wider than 3 mm, usually at least somewhat lax and flat when fresh
 - 2 Spikelets 2- to 4-flowered, 8-11 mm long; auricles absent; panicle branches spreading, at least below..... **F. sororia**
 - 2 Spikelets (4)5- to 9-flowered, 10-17 mm long; small auricles usually developed; panicle branches usually ascending go to **Schedonorus**
- 1 Blades mostly less than 3 mm wide, usually rolled and somewhat stiff
 - 3 Glumes (both) equaling or exceeding the upper florets; lemma awns 0-1.3 mm long **F. hallii** (Vasey) Piper. High elevation meadows in the northern mountains; not common.
 - 3 Glumes distinctly shorter than the upper florets; lemma awns various
 - 4 Ligules 2.5-5(9) mm long; lemma awns 0-0.3 mm long; nodes usually visible and conspicuous; plants generally more than 50 cm tall..... **F. thurberii**
 - 4 Ligules less than 2 mm long; lemma awns usually more than 0.5 mm long, occasionally shorter; nodes often not visible nor conspicuous; plant height various
 - 5 Plants usually with short rhizomes, the shoots often loosely tufted; basal sheaths reddish and rapidly separating into thread-like fibers (the whitish veins)
 - 6 Anthers 1.8-4.5 mm long; ovary apices glabrous..... **F. rubra**
 - 6 Anthers 0.6-1.4 mm long; ovary apices densely pubescent..... **F. earlei**
 - 5 Plants lacking rhizomes, the shoots loosely to densely tufted; basal sheaths usually not reddish nor separating into thread-like fibers (sometimes thus separating in *F. calligera*)
 - 7 Anthers 2-4 mm long (sometimes shorter in *F. trachyphylla*)
 - 8 Blades, especially the older ones, strongly laterally compressed, thickened and stiff, 0.5-1 mm wide **F. trachyphylla**
 - 8 Blades, even the older ones, at least somewhat terete, not thickened, but thread-like, 0.2-0.4 mm wide
 - 9 Peduncle and lower panicle branches densely scaberulous; old basal sheaths conspicuous at the base of the clump, generally 4-12 cm long (rarely shorter); body of larger lemmas 5-9 mm long, the awn 0.5-2.5 mm long; ovary apex pubescent **F. arizonica**
 - 9 Peduncle and lower branches glabrous or nearly so; old basal sheaths conspicuous or not at the base of the clump, 1-3 cm long; body of larger lemmas 3-5.5 mm long, the awn 1-7 mm long; ovary and grain apex glabrous or with a few sparse hairs
 - 10 Body of larger lemmas 3.5-5 mm long, the awn 1-2.5 mm long; lower glume 2.5-3.5 mm long; ovary apex with a few sparse hairs at maturity (glabrous when very young); grain 2-3 mm long **F. calligera**

- 10 Body of larger lemmas (4.5)5-5.5 mm long, the awn 2-7 mm long; lower glume 3.5-4.5 mm long; ovary apex glabrous at maturity and when very young; grain 4-5 mm long..... *F. idahoensis*
- 7 Anthers 0.4-1.7 mm long, rarely longer
 - 11 Plants found only as ornamentals and border plants (in New Mexico), never in native habitats; foliage markedly bluish-glaucous in dense hemispheric tufts; ovary and grain apex densely pubescent..... "*F. glauca*"
 - 11 Plants not growing as ornamental landscape plants, planted infrequently as a pasture grass, common in native mountain habitats; growth form various, but usually not in dense hemispheric tufts; foliage somewhat glaucous to green; ovary and grain apex glabrous or pubescent
 - 12 Plants 3-10 cm tall
 - 13 Lemma body 2-3 mm long, with an awn 0.5-1.5 mm long; spikelets with 2, occasionally 3, florets; panicle branches at lowest node usually 2-3; ovary and grain apex pubescent..... *F. minutiflora*
 - 13 Lemma body 3-5.5 mm long, with an awn 2-3.6 mm long; spikelets with 3-4 florets, occasionally only 2; panicle branches at lowest node 1; ovary and grain apex glabrous *F. brachyphylla*
 - 12 Plants over 10 cm tall, usually 15-50 cm tall
 - 14 Basal sheaths reddish and splitting into thread-like fibers (the whitish veins) in age; ovary and grain apex pubescent..... *F. earlei*
 - 14 Basal sheaths mostly straw-colored to brownish, not splitting into thread-like fibers in age (occasionally so in *F. brachyphylla*); ovary and grain apex glabrous
 - 15 Blades soft, striate from the veins showing, somewhat wrinkled in drying, with little or no sclerenchyma tissue; spikelets and foliage greenish; culms usually less than twice the height of the leaves; anthers 0.5-1.3 mm long; rachilla internodes of middle florets 0.6-0.8 mm long *F. brachyphylla*
 - 15 Blades stiff, terete or sulcate, not striate nor wrinkled, the veins generally not visible because of a build-up of sclerenchyma tissue; spikelets and foliage often glaucous; culms usually twice the height or more of the leaves; anthers 1-1.7 mm long (rarely longer); rachilla internodes of middle florets 0.9-1.1 mm long *F. saximontana*

Festuca arizonica Vasey [of Arizona] ARIZONA FESCUE [*Festuca ovina* Linnaeus var. *arizonica* Hackel]. Densely tufted perennial, without rhizomes, 40-100 cm or more tall; sheaths persistent, more than 3 cm long; ligules 0.5-2 mm long; peduncle densely scabrous or pubescent below the panicle; panicles 6-20 cm long; lemmas 5.5-9 mm long; awns 0-3 mm long; anthers 2-4 mm long; ovary apices densely pubescent. ●High mountain grasslands throughout the mountain regions of the state; our most common fescue. ♦Confused with the much less common *Festuca idahoensis*, q.v. This and the other fine-leaved fescues come out of a large and unwieldy *Festuca ovina* Linnaeus, which is now restricted to European plants.



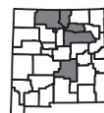
Festuca brachyphylla J.A. Schultes ex J.A. & J.H. Schultes [short-leaved]. Densely or loosely tufted perennial, 5-40 cm tall; sheaths persistent or sometimes splitting into thread-like fibers; ligules 0.1-0.4 mm long; panicle 2-5 cm long, narrow; lemmas 3-4.5 mm long; awns 1-3 mm long; anthers 0.5-1 mm long; ovary apices glabrous. ●Alpine grasslands in the northern mountains. ♦Our plants belong to subsp. *coloradensis* Frederiksen [of Colorado] [*Festuca ovina* var. *brachyphylla* & *Festuca ovina* var. *brevifolia* of NM reports]. §



Festuca calligera Piper [beauty-bearing]. Densely tufted perennial, without rhizomes, 15-50 cm tall; sheaths persistent (rarely splitting in age); ligules 0.3-0.5(1) mm long; panicles 5-15 cm long; lemmas 4-6 mm long; awns 1-2.5 mm long; anthers 2.2-3.5 mm long; ovary apices sparsely pubescent. ●Relatively rare, mostly in the southcentral mountains (but extending north to Colorado), and usually growing with Arizona fescue. ♦This and the other fine-leaved fescues come out of a large and unwieldy *Festuca ovina* Linnaeus, which is now restricted to European plants.

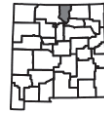


Festuca earlei Rydberg [for Franklin Sumner Earle (1856-1929), American mycologist]. Loosely tufted perennial, often with short rhizomes, 15-45 cm tall; sheaths closed about 1/2 their length, separating into fibers; ligules 0.1-1 mm long; panicles 3-8 cm long; lemmas 3-4.5 mm long; awns mostly 1-1.5 mm long; anthers 0.6-1.4 mm long; ovary apices densely pubescent. ●Subalpine and alpine meadows, grassy slopes at medium to high elevations. ♦Care must be taken to observe the short rhizomatous shoots, often absent in herbarium specimens. Similar to *Festuca rubra*, which is distinguished by it glabrous ovary apices and longer anthers.

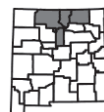


*"*Festuca glauca*" BLUE FESCUE. Perennial; introduced from Europe as an ornamental landscape plant, ideal for borders and accents, with numerous cultivars; not known outside of cultivation. ♦We use this provisional name for several species that have been used in the nursery trade; they are all characterized by dense rounded clumps with markedly bluish foliage and narrow blades. They have gone most commonly by the name *Festuca glauca* Villars, with various additional cultivar names, but also by *F. arvensis* Auquier, Kerguelen, & Markgraf-Dannenberg and *F. ovina* Linnaeus var. *glauca* in various works.

Festuca hallii (Vasey) Piper [for Elihu Hall (1822-1882), American plant collector from Illinois] [*Melica hallii* Vasey]. Densely tufted perennial, with short rhizomes, 20-85 cm tall; sheaths open for 1/3 or more their length, not separating into fibers, persistent; ligules 0.3-0.6 mm long; blades usually folded, to about 1.5 mm across, rarely flat to 3 mm wide; peduncles glabrous to sparsely scabrous; panicles 6-16 cm long, with 1-2 branches per node, the branches erect to stiffly spreading; glumes as long as the spikelet, exceeding the florets, 7-10 mm long; lemmas 5.5-9 mm long; awns absent to 1.3 mm long; anthers 4-6 mm long; ovary apices sparsely pubescent. ●High-elevation meadows and forest glades in the northern mountains; known from a single recent collection, Taos County, at 10,200 ft. ♦Distinctive by the narrow, rolled blades, long glumes, and nearly awnless florets. Its occurrence in the northern mountains is probably more common than indicated by the collections, being overlooked among similar narrow-leaved *Festuca* species.



Festuca idahoensis Elmer [of Idaho] IDAHO FESCUE [*Festuca ovina* Linnaeus var. *ingrata* Hackel ex Beal]. Densely tufted perennial, without rhizomes, 25-85 cm tall; sheaths persistent, less than 4 cm long; ligules 0.2-0.6 mm long; peduncles mostly glabrous, occasionally somewhat scabrous; panicles 5-16 cm long; lemmas 4.5-5.5 mm long; awns 2-7 mm long, occasionally shorter; anthers 2.5-4.5 mm long; ovary apices glabrous. ●Mountain grasslands of the central (mostly northern) cordillera, not common. ♦Not nearly as common as *Festuca arizonica*, with which it is easily

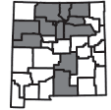


confused, but distinguished in New Mexico by the mostly smooth peduncles, often shorter shoots, shorter sheaths, mostly shorter lemmas, and glabrous ovary apices of *F. idahoensis*. Much of what has been called *F. idahoensis* in recent years belongs to *F. trachyphylla*. This and the other fine-leaved fescues come out of a large and unwieldy *Festuca ovina* Linnaeus, which is now restricted to European plants.

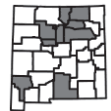
Festuca minutiflora Rydberg [small-flowered] [*Festuca ovina* Linnaeus var. *minutiflora* (Rydberg) J.T. Howell]. Loosely or densely tufted perennial, without rhizomes, mostly 3-10 cm tall in our populations; sheaths persistent; ligules 0.1-0.3 mm long; panicles 1-5 cm long; spikelets with 2-3 florets; lemmas 2-3.5 mm long; awns 0.5-1.5 mm long; anthers 0.5-1.2 mm long; ovary apices sparsely hairy, rarely glabrous. ●Alpine grasslands in the northern mountains. ◆Similar to *Festuca brachyphylla*, but distinguished by the key features.



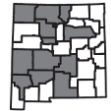
Festuca rubra Linnaeus [red]. Loosely to somewhat tufted perennial, with short rhizomes, 10-50 cm tall; sheaths (especially the vegetative ones) closed about ¾ their length, rapidly separating into thread-like fibers (the whitish veins); ligules 0.1-0.5 mm long; panicles 3-25 cm long; lemmas 4-9 mm long; awns 0.5-4.5 mm long; anthers 2-4.5 mm long; ovary apices glabrous. ●High mountain grasslands and open clearings, sometimes found in lawns. ◆Sheaths splitting into thread-like segments is a feature shared with *Festuca calligera* (rarely), and *F. earlei*. Plants in the wild seem to belong to subsp. *rubra*; lawn and turf mixtures might also include subsp. *commutata* Gaudin (CHEWING'S FESCUE, after George Chewings, who produced seed in New Zealand beginning in the late 1800s).



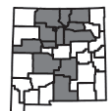
Festuca saximontana Rydberg [rocky mountain] [*Festuca ovina* Linnaeus var. *rydbergii* Saint-Yves]. Densely to loosely tufted perennial, without rhizomes, 10-50 cm tall; foliage often glaucous; sheaths persistent, rarely splitting; blades stiff, the veins usually not visible; ligules 0.1-0.5 mm long; panicles 3-12 cm long; lemmas 3-5 mm long; awns 1-2.5 mm long; anthers 1-2 mm long; ovary apices glabrous. ●Mountain grasslands and forest clearings, mostly in the northern mountains, but also known from Grant County. ◆Included by some as a variety of the similar *Festuca brachyphylla*, which differs in the features in the key.



Festuca sororia Piper [a sister, closely related]. Loosely tufted perennial, without rhizomes, 60-120 cm tall; sheaths splitting into thread-like fibers in age; ligules 0.3-1.5 mm long; blades flat, 3-6 mm or more wide; panicles 10-25 cm long, the branches lax and spreading below; spikelets 2-4(5)-flowered; lemmas 5-8 mm long; awns awnless or with awns to 2 mm long; anthers 1.5-2.5 mm long; ovary apices hairy. ●Moist, shaded slopes and stream banks in the mountains.



Festuca thurberi Vasey [for George Thurber (1821-1890), American botanist and naturalist] THURBER'S FESCUE. Densely tufted perennial, without rhizomes, 50-100 cm or more tall; nodes visible and conspicuous; sheaths persistent; ligules 2-9 mm long; panicles 10-17 cm long, the branches loosely arranged; lemmas 6-10 mm long, awnless; anthers 3-4.5 mm long; ovary apices densely hairy. ●High mountain grasslands in the central cordillera. ◆Plants are conspicuous by their large tufts, exposed nodes, long ligules, and awnless spikelets. §



****Festuca trachyphylla*** (Hackel) Krajina [rough-leaved] HARD FESCUE [*Festuca brevipila* Tracy, *Festuca ovina* Linnaeus var. *duriuscula* of many authors, not Linnaeus, *Festuca ovina* Linnaeus subvar. *trachyphylla* Hackel]. Densely tufted perennial, without rhizomes, 15-75 cm tall; ligules 0.1-0.5 mm long; blades strongly folded, thickened and stiff, 0.5-1 mm wide (folded); panicles 3-15 cm long; lemmas 3.8-6 mm long; awns 0.5-3 mm long; anthers 2-3.4 mm long; ovary apices glabrous. ●Introduced for reseeding, erosion control, and range land restoration; grassy slopes of the northern mountains; native to Europe. ◆Easily confused with the much less common *Festuca idahoensis*, but the thickened, stiff blades of *Festuca trachyphylla* are quite distinctive.



Glyceria [sweet] MANNAGRASS [12].

Rhizomatous perennials, rarely annual; sheaths closed; ligules a scarious membrane, fringed; inflorescence a rebranching panicle; spikelets several-flowered, awnless, the terminal floret sterile; disarticulation above the glumes and between the florets; glumes much smaller than the spikelet, 1-nerved; lemmas several-nerved, the nerves ± parallel and not converging at the apex; anthers 2-3. ◆These are plants of wet places. The common name comes from the use of the grains for food.

■Church, G.L. 1949. A cytotoxic study of *Glyceria* and *Puccinellia*. Amer. J. Bot. 36:155-156. ■Ruiz de Esparza, R. & J. Maze. 1997. A taxonomic study of the grass genus *Glyceria* (Mannagrass) in British Columbia. Can. Field-Natural. 111(2):194-199. ■Whipple, I.G., M.E. Barkworth, & B.S. Bushman. 2007. Molecular insights into the taxonomy of *Glyceria* (Poaceae: Meliceae) in North America. Amer. J. Bot. 94(4): 551-557.

1 Spikelets linear, nearly round in cross-section, 9-18 mm long, 8- to 12-flowered; lemmas 3-5.5 mm long ***G. borealis***

1 Spikelets ovate or oblong, somewhat compressed, 2.5-7 mm long, 3- to 6(7)-flowered; lemmas 1.5-3 mm long

2 Apices of lemmas flat; anthers 3; nerves of 1 or both glumes usually extending to the apex of the glume ***G. grandis***

2 Apices of lemmas prow-shaped; anthers 2; nerves of both glumes ending below the apex of the glume

3 Blades 6-15 mm wide; anthers 0.5-0.8 mm long; culms 2.5-8 mm thick, spongy, 75-150 cm tall or more, often decumbent-based ***G. elata***

3 Blades 2-6 mm wide; anthers 0.2-0.6 mm long; culms 1.5-3.5 mm thick, not or slightly spongy, 20-80 cm tall, generally erect....

..... ***G. striata***

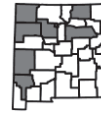
Glyceria borealis (Nash) Batchelder [northern] [*Panicularia borealis* Nash]. Perennial, 60-100 cm tall; culms 1.5-5 mm thick, often decumbent and rooting at the nodes; blades 2-7 mm wide, the adaxial surface of mid-stem leaves densely papillose; panicles 18-45 cm long; spikelets 9-18 mm long, cylindrical, 1-2.5 mm wide; first glume 1.2-2.2 mm long; lemmas 3-5.5 mm long, the apices acute to obtuse and nearly entire; anthers 3, 0.4-1.5 mm long. ●Borders of lakes and ponds in the northern mountains. ◆Floating blades have non-wettable upper surface because of the papillae.



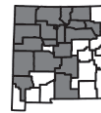
Glyceria elata (Nash ex Rydberg) M.E. Jones [elevated, tall] [*Panicularia elata* Nash ex Rydberg, *Panicularia nervata* (Willdenow) Kuntze var. *elata* (Nash ex Rydberg) Piper]. Perennial, 75-150 cm tall; culms 2.5-8 mm thick, spongy in the internodes, decumbent and rooting at the lower nodes; blades 6-15 mm wide, lacking papillae but scabrous; panicles 15-30 cm long; spikelets 3-6 mm long, flattened, 1.5-3 mm wide; lemmas 1.7-2.2 mm long, the apices prow-shaped; anthers 2, 0.5-0.8 mm long. ●Mountain springs and marshy ground at subalpine elevations; not common. ◆This is closely related to *Glyceria striata*, and some merge the two, but recent analyses (Ruiz de Esparza & Maze 1997; Whipple et al. 2007) argue for distinct species, and the culm, blade, and spikelet features serve to distinguish most populations (individual plants may be more problematic).



Glyceria grandis S. Watson [large, great] [*Panicularia grandis* (S. Watson) Nash]. Perennial, 50-150 cm or more tall; culms 8-12 mm thick, erect to decumbent and rooting at the nodes; blades 5-15 mm wide, lacking papillae; panicles 16-40 cm long; spikelets 3.2-10 mm long, flattened, 2-3 mm wide; lemmas 1.8-3 mm long, the apices flat or nearly so, not prow-shaped; anthers 3, 0.5-1.2 mm long. ●Marshes, swampy ground, irrigation banks, and springs in the foothills and mid-elevations in the mountains.



Glyceria striata (Lamarck) A.S. Hitchcock [striped] [*Glyceria nervata* Trinius, *Glyceria striata* (Lamarck) A.S. Hitchcock var. *stricta* (Scribner) Fernald, *Panicularia nervata* (Willdenow) Kuntze, *Poa striata* Lamarck]. Perennial, 20-80 cm tall, sometimes taller; culms 1.5-3.5 mm thick, not or slightly spongy, only sometimes rooting at the nodes; blades 2-6 mm wide, lacking papillae but scabrous; panicles 6-25 cm long; spikelets 1.8-4 mm long, flattened, 1.2-3 mm wide; lemmas 1.2-2 mm long, the apices prow-shaped; anthers 2, 0.2-0.6 mm long. ●Marshes, springs, wet ground, stream-banks, in the mountains. ♦This is the most common species of *Glyceria* in the state. See comment under *G. elata*. Plants are palatable, and may produce cyanide, but stock poisonings are rare.



Grappheporum [marked with lines] [1].

Tufted to short-rhizomatous perennials; sheaths open, glabrous to pilose; ligules membranous; blades flat, glabrous to pilose; inflorescence an open to contracted panicle, the peduncles glabrous; spikelets 2-3-flowered, awnless to very short-awned; disarticulation above the glumes and between the florets; glumes slightly shorter than the spikelet, the lower glume 1-nerved, the upper 1-3-nerved; lemmas 3-5-nerved, essentially awnless or with a short mucro/awn to 2 mm born immediately below the tip; anthers 3; ovary glabrous or with short apical hairs. ♦With 2 species of North to Central America. Formerly classed within *Trisetum*, which has been reorganized to include only 1-2 species native to Europe and Asia, none of which occur in New Mexico.

■Barberá, P., C. Romero-Zarco, & C. Aedo. 2018. Taxonomic revision of *Trisetum* sect. *Trisetum* (Poaceae: Pooideae: Aveninae) from Eurasia and North Africa. *Ann. Missouri Bot. Gard.* 103: 350-392. ■Barbera, P., R.J. Soreng, P.M. Peterson, K. Romaschenko, A. Quintanar, & C. Aedo. 2019. Molecular phylogenetic analysis resolves *Trisetum* (Poaceae: Pooideae: Koelerinae) polyphyletic: Evidence for a new genus, *Sibirotrisetum* and resurrection of *Acrosopelion*. *J. Syst. Evol. Online early issue 20 Oct 2019*: 1-10. ■Finot, V.L., P.M. Peterson, R.J. Soreng, & F.O. Zuloaga. 2005. A revision of *Trisetum* and *Grappheporum* (Poaceae: Pooideae: Aveninae) in North America north of Mexico. *Sida* 21(3):1419-1453.

Grappheporum wolfii (Vasey) Vasey ex Coulter [for John Wolf (1820-1897), Illinois botanist] [*Trisetum subspicatum* (Linnaeus) Beauvois var. *muticum* Bolander, *Trisetum wolfii* Vasey]. Tufted perennial with short rhizomes, 20-80 cm or more tall; sheaths glabrous to retrose-pilose; ligules 2-6 mm long; blades glabrous to pilose; panicles 10-40 cm long, congested, usually less than 2 cm wide, the branches erect-ascending; spikelets 4-8 mm long, mostly with 2 florets; glumes subequal and usually exceeding the lower floret; rachillas 1.5-2 mm long, with hairs to 1 mm; lowermost lemmas 4-6.5 mm long, obscurely bifid with broad points but not setaceous teeth, awnless or an awn coming from the sinus to 2 mm long. ●Marshy ground around seeps and springs at high elevations in the northern mountains.



Gymnopogon [naked beard] [0].

Gymnopogon ambiguus (Michaux) Britton, Sterns, & Poggenburg was reported in New Mexico by Smith (2003), based on an 1853 collection from Doña Ana County; the species has not been found since and occurs naturally from central Texas eastward.

Hackelochloa...go to ***Mnesithea***

Helictotrichon [twisted hair] OATGRASS [1].

Tufted perennials; sheaths open; auricles absent; ligules membranous, short, about as long as wide; blades rolled, the adaxial surface ribbed; inflorescence a weakly developed panicle, raceme-like; spikelets with 2-8 florets; disarticulation above the glumes and between the florets; glumes nearly as large as the spikelet, 1-3-nerved; rachillas pilose on all sides; lemmas 3-5-nerved, awned from about midlength; awns geniculate, twisted below; anthers 3. ♦Traditionally, the genus *Avenula* has been included in *Helictotrichon*, but the two are distinguished by features of the ligules, blades, rachillas, lodicules, embryos, and root anatomy (see Romero-Zarco 2011).

■Gervais, C. 1973. Contribution à l'étude cytologique et taxonomique des avoines vivaces (e.g. *Helictotrichon* Bess. et *Avenochloa* Holub). *Denkschr. Schweiz. Naturf. Ges.* 88:3-166. ■C. Romero-Zarco. 2011. *Helictochloa* Romero-Zarco (Poaceae), a new genus of oat grass. *Candollea* 66(1): 87-103.

1 Panicles 2-5 cm long; blades rolled, usually pubescent ***H. mortonianum***
 1 Panicles 5-15 cm long; blades flat or folded, mostly glabrous (*A. hookeri*) go to ***Avenula***

Helictotrichon mortonianum (Scribner) Henrard [for Julius Sterling Morton (1832-1902), U.S. Secretary of Agriculture for President Grover Cleveland] [*Avena mortoniana* Scribner]. Tufted perennial, 5-20 cm tall; blades 1-2 mm wide, rolled or folded, strigose at least on the adaxial surface; panicles 2-5(8) cm long; spikelets 8-12 mm long, with (1)2-3 florets, the distal florets awned or awnless; lower lemmas 7-10 mm long, 3-nerved; awns 10-16 mm long. ●Alpine slopes and forest edges in the northern mountains.



Hesperostipa [western *Stipa*] NEEDLE-AND-THREAD [3].

Tufted perennials, lacking rhizomes; sheaths open; auricles absent; ligules membranous, sometimes ciliate; inflorescence a panicle; spikelets with 1 floret; disarticulation above the glumes, the floret falling; glumes large, nearly equaling or exceeding the body of the lemma; lemmas indurate at maturity, the margins overlapping, the distal portion fused into a crown, awned; awns twice-geniculate; paleas equal to the lemmas, indurate at the apex; anthers 3. ♦Species of *Hesperostipa*, strictly North American, were formerly recognized in the genus *Stipa*, now strictly Eurasian.

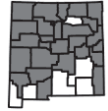
■Barkworth, M.E. 1978. A taxonomic study of the large-glumed species of *Stipa* (Gramineae) occurring in Canada. *Can. J. Bot.* 56(6):606-625. ■Barkworth, M.E. 1993. North American Stipeae (Gramineae): Taxonomic changes and other comments. *Phytologia* 74(1):1-25. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. *Aliso* 23:349-361. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. *Taxon* 61(1):18-44.

1 Terminal segment of awn plumose, with feathery hairs 2-3 mm long ***H. neomexicana***
 1 Terminal segment of awn not plumose, any hairs present shorter than 1 mm

2 Lemmas evenly white-hairy, sometimes glabrous above the callus; lower ligules usually acute, thin, often cut or torn; margins of lower sheaths mostly glabrous ***H. comata***

2 Lemmas unevenly brownish hairy, densely hairy on the margins and in lines on the proximal portion, glabrous distally; lower ligules rounded to truncate, thick, not cut or torn; margins of lower sheaths often ciliate ***H. spartea***

Hesperostipa comata (Trinius & Ruprecht) Barkworth [long-haired]. Tufted perennial, 25-100 cm or more tall; margins of lower sheaths not ciliate; ligules 1-7 mm long, the lower ones usually thin and lacerate; panicles 10-30 cm long; glumes 16-35, the upper glume slightly shorter than the lower; florets 7-13 mm long, the lemmas evenly white hairy; awns 6-22 cm long, any hairs shorter than 1 mm long. ●Plains, prairies, woodland clearings. ◆We have two subspecies, both widespread in the state:



a Terminal segment of the awn curling to flexuous; lower panicle branches usually included in the sheath; lower cauline nodes usually hidden in the sheaths...subsp. ***comata*** [*Stipa comata* Trinius & Ruprecht].

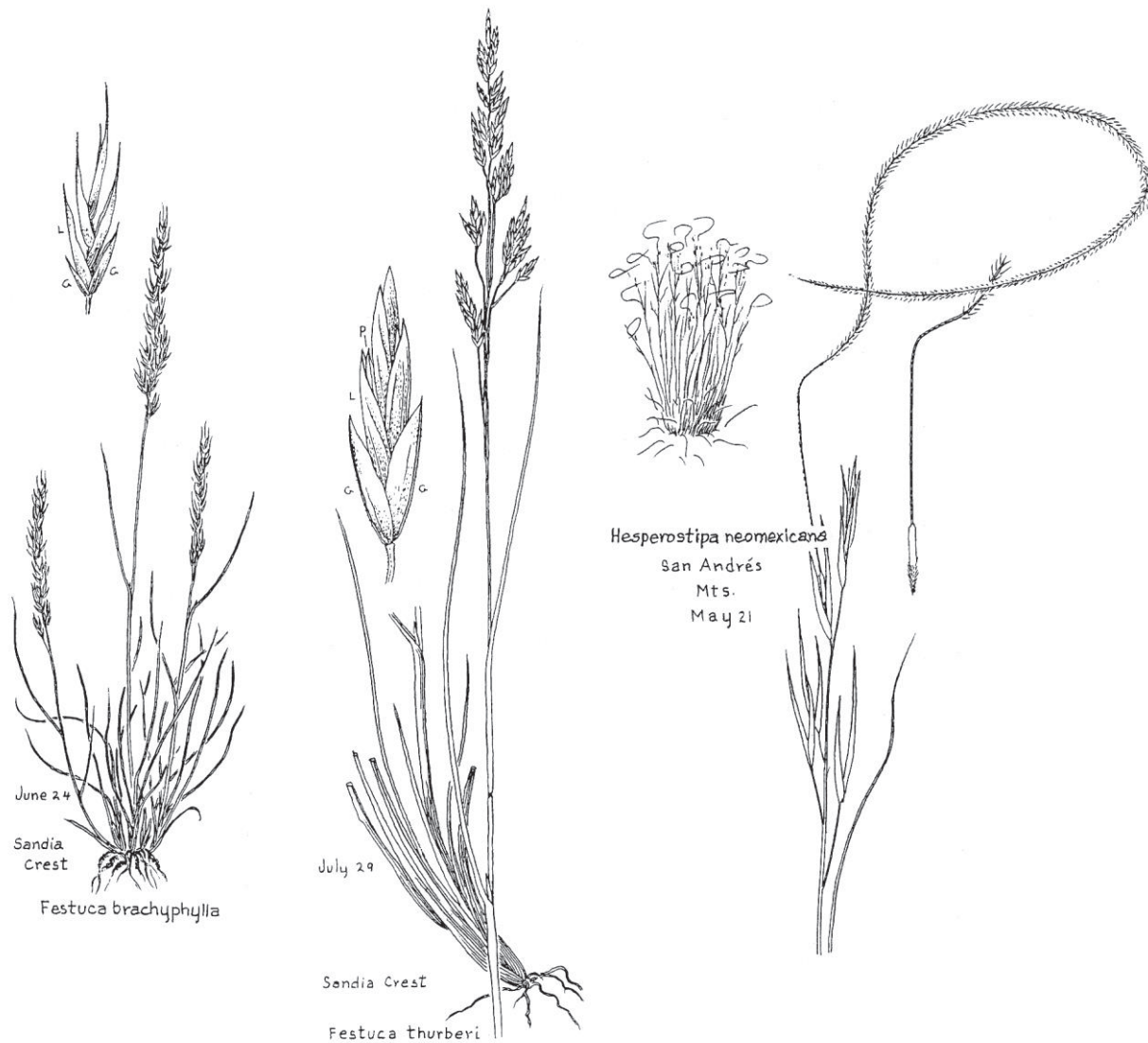
a Terminal segment of the awn straight; lower panicle branches mostly exerted from the sheath; lower cauline nodes usually exposed...subsp. ***intermedia*** (Scribner & Tweedy) Barkworth [between] [*Stipa comata* Trinius & Ruprecht var. *intermedia* Scribner & Tweedy, *Stipa tweedyi* Scribner].

Hesperostipa neomexicana (Thurber) Barkworth [of New Mexico] NEW MEXICO FEATHERGRASS [*Stipa neomexicana* (Thurber ex Coulter) Scribner, *Stipa pennata* Linnaeus var. *neo-mexicana* Thurber ex Coulter]. Tufted perennial, 40-100 cm tall; sheaths not ciliate; ligules 0.5-3 mm long; panicles 10-30 cm long; glumes 30-60 mm long, subequal; florets 15-18 mm long; awns 12-22 cm long, hairs on the terminal segment (1)2-3 mm long. ●Plains, grassy hills, rocky slopes, usually on limestone, throughout the state. §



Hesperostipa spartea (Trinius) Barkworth [a rope or cord] [*Stipa spartea* Trinius]. Tufted perennial, 45-100 cm or more tall; margins of lower sheaths usually ciliate; ligules 0.3-7.5 mm long, the lower ones thick and not lacerate; panicles 10-25 cm long; glumes 22-45 mm long, subequal; florets 15-25 mm long, the lemmas with brownish hairs on the margins and in lines proximally, glabrous distally; awns 9-19 cm long, any hairs less than 1 mm long. ●Plains and prairies, scattered localities in the northern region.



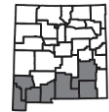


Heteropogon [different awns] TANGLEHEAD [1].

Tufted annual or perennials; sheaths open, keeled; auricles absent; ligules membranous, sometimes ciliate; inflorescence a single raceme (rame), composed of repeating pairs of sessile and pedicelled spikelets; disarticulation in the raceme, the spikelet pairs falling together; sessile spikelets of the upper portion of the raceme fertile, fusiform, long-awned, the hairy glumes concealing the florets; pedicelled spikelets sterile or staminate, flattened, awnless. ♦About 5-6 species, mainly in tropical and subtropical regions.

- 1 Plants perennial; glumes of the upper pedicelled spikelets lacking glandular pits.....*H. contortus*
- 1 Plants annual; first glume of the upper pedicelled spikelets with glandular pits.....*H. melanocarpus*

Heteropogon contortus (Linnaeus) Beauvois ex Roemer & J.A. Schultes [contorted] [*Andropogon contortus* Linnaeus]. Tufted perennial, 20-100 cm or more tall; blades flat or folded, blunt, 2-7 mm wide; racemes 3-7 cm long; awned sessile spikelets 5-10 mm long, with awns 6-10 cm long; pedicelled spikelets 6-10 mm long, lacking glandular pits. ●Desert hills in the southwestern region. ♦This is a native species, its seeds being found in ancient packrat middens in the Southwest.



Heteropogon melanocarpus (Elliott) Bentham [black-fruited] [*Andropogon melanocarpus* Elliott]. Tufted annual, 50-200 cm tall; sheaths with glandular pits along the keel; blades usually folded, 3-12 mm wide; racemes 3-7 cm long; awned sessile spikelets 10-14 mm long, with awns 10-15 cm long; awnless pedicelled spikelets 16-21 mm long, the midnerves glandular-pitted. ●This occurs in adjacent Arizona, and perhaps may be found in the bootheel region; it is a tall rank weedy annual with pits or glandular depressions on the first glumes of the staminate spikelets.

Hierochloe [holy grass] SWEETGRASS [1].

Tufted or rhizomatous perennials; sheaths open; auricles absent; ligules membranous, sometimes ciliate; inflorescence a panicles, the branches sometimes poorly developed; spikelets with 3(4) florets, the lower two staminate and appearing on either side of the upper one, the upper (central) one fertile, sometimes a terminal smaller sterile floret present at the tip; disarticulation above the glumes, the florets falling together; glumes nearly concealing the spikelets, 3-nerved, thin, papery; staminate (lateral) florets large, hairy along the margins, awnless; fertile (central) floret smaller, nearly glabrous, awnless; palea 3-nerved. ♦About 35 species of temperate to subarctic regions. *Hierochloe* is sometimes merged into *Anthoxanthum*, but the two are adequately distinct in North America, and we maintain them in the traditional sense.

■Schouten, Y. & J.F. Veldkamp. 1985. A revision of *Anthoxanthum* including *Hierochloe* (Gramineae) in Malesia and Thailand. *Blumea* 30:319-351. ■Weimarck, G. 1971. Variation and

taxonomy of *Hierochloa* (Gramineae) in the Northern Hemisphere. Bot. Not. 124:129-175.

**Hierochloa odorata* (Linnaeus) Beauvois. Loosely tufted perennial, 10-75 cm tall, with elongate rhizomes; panicles 3-12 cm long, 1.5-7 cm wide; spikelets 3-7 mm long, tawny colored; glumes subequal, exceeding the florets; staminate florets 3.5-5 mm long, sometimes with an awn to 0.5 mm long; fertile florets 2.5-4 mm long. ●Wet high mountain meadows and subalpine to alpine slopes, flowering very early; native to Europe. ♦The native *Hierochloa hirta* (Schrank) Borbas is not yet known from New Mexico, but occurs in Colorado and northward; it has often been circumscribed to include *H. odorata*. It may be told from *H. odorata* as follows:



- a Longest hairs on the distal portion of the bisexual/fertile floret 0.5–1 mm long, evenly distributed around the lemma tip *H. hirta* (Schrank) Borbas
- a Longest hairs on the distal portion of the bisexual/fertile floret mostly less than 0.5 mm long, longer hairs, if present concentrated near the midvein. *H. odorata*

Hilaria [for Auguste François César Prouvañal de Saint-Hilaire (1779-1853), French botanist] [5].

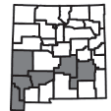
Annuals and perennials, tufted, rhizomatous, or stoloniferous; sheaths open; auricles absent; ligules membranous, often ciliate; inflorescence functionally a spike, with 3 spikelets per node, the cluster sitting on a ledge-like indentation on the zig-zag rachis; disarticulation at the base of the spikelet cluster, which falls entire; lateral spikelets of the cluster with 1-4 staminate or sterile florets, the glumes deeply lobed and short-awned; central spikelet of the cluster with a single fertile floret, the glumes lobed and awnless.

♦Rhizomatous members of this group have been treated in the genus *Pleuraphis*, which is set off by several features, but recent detailed studies (see Columbus & Smith [2010] for a summary) show the advisability and practicality of returning to an all-encompassing *Hilaria*.

■Columbus, J.T. 1993. *Pleuraphis* – distinct from *Hilaria* (Gramineae: Chloridoideae). Amer. J. Bot. 80(suppl.):138-139. ■Columbus, J.T. & M.A. Peot. 1993. Revisionary studies in *Hilaria* (Gramineae: Chloridoideae): the annual species. Amer. J. Bot. 80(suppl.):139. ■Columbus, J.T. & J.P. Smith. 2010. Nomenclatural changes for some grasses in California and the *Muhlenbergia* clade (Poaceae). Aliso 28:65-67. ■Cory, V.L. 1948. Curly mesquite grass in Texas and northern Mexico. Wrightia 1(4):214-217. ■Sohns, E.R. 1956. The genus *Hilaria* (Gramineae). J. Wash. Acad. Sci. 46:311-321. ■Western Regional Technical Committee W-90. 1972. Galleta: taxonomy, ecology, and management of *Hilaria jamesii* on western rangelands. Utah Agr. Exp. Sta. Bull. 487. 38 pp.

- 1 Glumes thickened, indurate, and fused at the base; plants stoloniferous and not rhizomatous and rarely taller than 30 cm
 - 2 Glumes of the lateral spikelets pale to purplish, lacking glandular dots or these only at the base, awned below midlength *H. belangeri*
 - 2 Glumes of the lateral spikelets blackish or purplish, evenly covered with glandular dots, awned from above midlength *H. swallenii*
- 1 Glumes papery or membranous throughout, not fused at the base; plants usually rhizomatous and rarely shorter than 30 cm
 - 3 Lower cauline internodes tomentose; known only from Dona Ana County *H. rigida*
 - 3 Lower cauline internodes glabrous
 - 4 Glumes of the lateral spikelets fan-shaped, the awns not exceeding the apical lobes; cauline nodes short-hairy, sometimes glabrous *H. mutica*
 - 4 Glumes of the lateral spikelets lanceolate or parallel-sided, the awns exceeding the apical lobes; cauline nodes long-hairy or glabrous *H. jamesii*

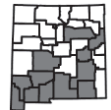
Hilaria belangeri (Steudel) Nash [Charles Paulus Bélanger (1805-1881), French botanist] CURLY MESQUITE [*Anthephora belangeri* Steudel, *Hilaria texana* Nash, *Hilaria cenchroides* Kunth]. Tufted perennial, 5-35 cm tall, usually with stolons; blades sparsely pilose on the adaxial surface with bulbous-based hairs; spikes 2-4 cm long; lateral spikelets with 2-3 staminate florets or 1 sterile floret, the glumes indurate and fused at the base, eglandular or the bases spotted with a few dark glands, the awns from below midlength. ●Desert hills and rocky slopes in the southern mountains. ♦This species was inadvertently named for Bélanger by Steudel, instead of after Jean Louis Berlandier, who collected the plant in Mexico. Plants lacking stolons have been called var. *longifolia* (Vasey) Hitchcock, and are supposedly present in southern New Mexico, but collections are unknown.



Hilaria jamesii (Torrey) Bentham [for Edwin P. James (1797-1861), American botanist and naturalist] GALLETA [*Pleuraphis jamesii* Torrey]. Loosely tufted perennial, with strong rhizomes and sometimes stolons, 25-65 cm tall; spikes 2-6 cm long; spikelet cluster 6-8 mm long; lateral spikelets with 3 staminate florets, the glumes lanceolate or parallel-sided with dorsal awns exceeding the apices. ●Plains and foothills; widespread, but mostly in the northern half of the state. ♦This is the northern equivalent of TOBOSA. The origin of the common name, which means cookie or biscuit in Spanish, is obscure, but perhaps refers to its use as forage by livestock. §



Hilaria mutica (Buckley) Bentham [cut off] TOBOSA [*Pleuraphis mutica* Buckley]. Loosely tufted perennial, with often strong rhizomes, 30-60 cm tall; spikes 4-8 cm long; spikelet cluster 5-8 mm long; lateral spikelets with 1-2 staminate florets, the glumes fan-shaped with dorsal awns not exceeding the apices. ●Flats and swales, gravelly hillsides, mostly in the southern half of the state. ♦TOBOSA is one of our important range grasses of the southern plains, swales, and playas, but it becomes increasingly unpalatable with maturity. This and *Hilaria jamesii* are essentially indistinguishable by vegetative means, and were both confusingly called BLACK GRAMA in the early days in the Southwest. §



****Hilaria rigida*** (Thurber) Bentham ex Scribner [rigid] BIG GALLETA [*Pleuraphis rigida* Thurber]. Tufted perennial, sometimes rhizomatous, 40-200 cm or more tall, much branched and becoming shrubby; lower internodes tomentose; spikes 4-12 cm long; spikelet cluster 6-12 mm long; lateral spikelets with 2-4 florets, the lower ones staminate, the upper sterile, the glumes lanceolate or parallel-sided with dorsal awns exceeding the apices. ●Introduced from California and Arizona for range reseeding trials, without success, but a few plants remain in the test plots of the College Ranch of New Mexico State University. ♦Of all New Mexico grasses, only this and *Bouteloua eriopoda* and *Holcus lanatus* have hairy internodes.



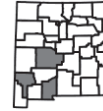
Hilaria swallenii Cory [for Jason Richard Swallen (1903-1991), American agrostologist of distinction]. Loosely tufted perennial, 10-35 cm tall, with stolons; blades mostly glabrous but also sparsely pilose; spikes 1-4 cm long; lateral spikelets with 2 florets, the lower sterile and the upper staminate, the glumes indurate and fused at the base, evenly spotted with dark glands, the awns from above midlength. ●Desert hills and rocky slopes in the southwestern desert mountains; apparently less common than *Hilaria belangeri*.



Holcus [a kind of grain] VELVETGRASS [1].

Tufted or rhizomatous perennials or annuals; sheaths open; auricles absent; ligules membranous, ciliate; inflorescence a panicle; spikelets with 2(3) florets, the lowermost fertile, the upper staminate or sterile; rachilla curved below the lower floret; disarticulation below the glumes; glumes equaling or exceeding the florets, keeled; lemmas 3-5-nerved, the lower awnless, the upper awned; anthers 3.

**Holcus lanatus* Linnaeus [wooly]. Tufted perennial, lacking rhizomes, 35-100 cm tall; lower internodes densely pilose; sheaths densely pubescent; blades 5-10 mm wide, densely soft-hairy; panicles 3-20 cm long, the branches and pedicels hairy; spikelets 3-6 mm long; glumes ciliate on the midnerve, the upper awn tipped; upper lemma with a hooked awn 1-2 mm long. ●Adventive in cool, moist, waste places; native to Europe. ◆The foliage has a distinctive gray-hairy look, giving a field of VELVETGRASS a fog-like appearance.

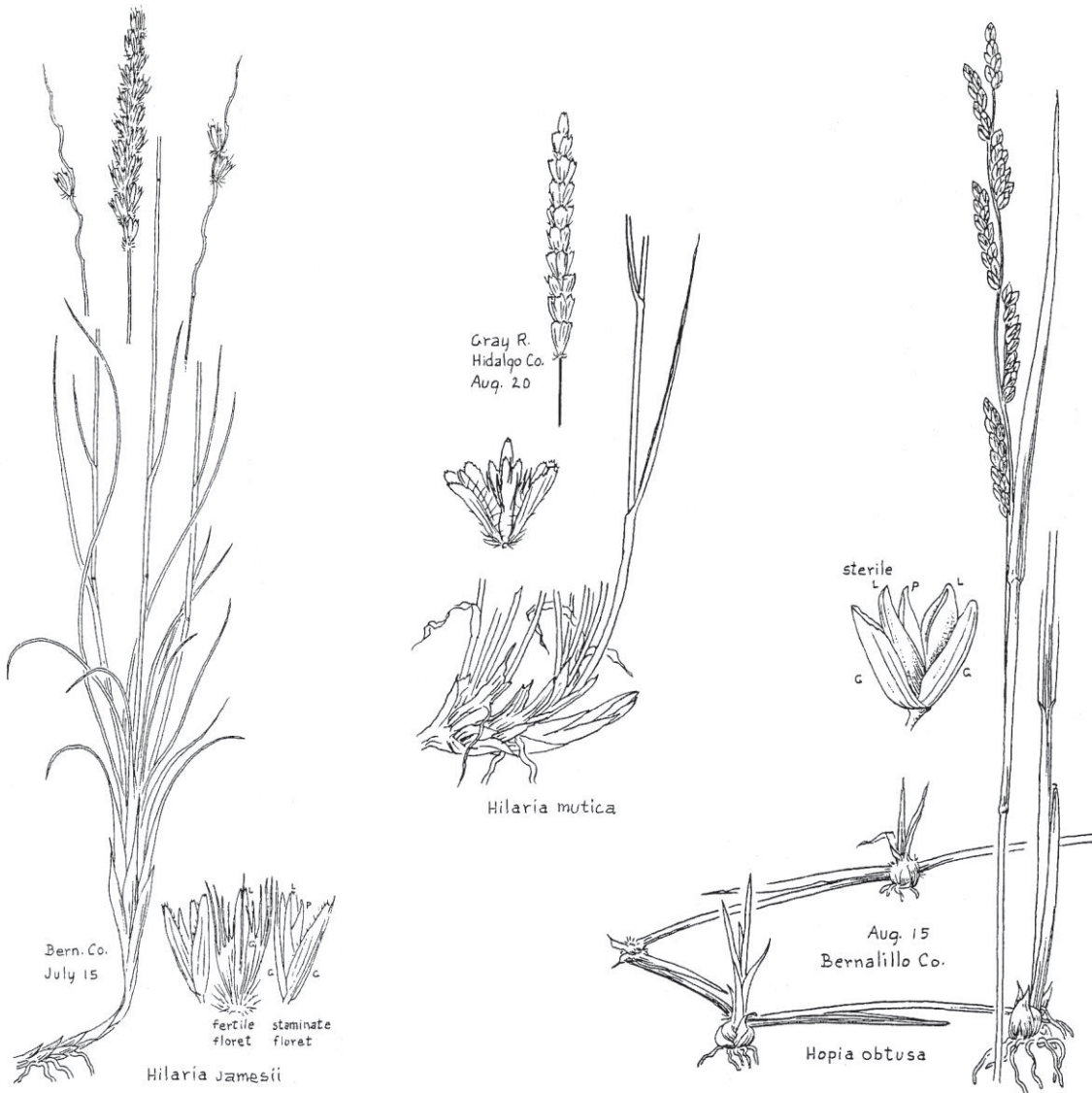
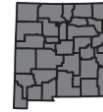


Hopia [for the Hopi Tribe of Native Americans] VINE MESQUITE [1].

Rhizomatous and stoloniferous perennials; sheaths open; auricles absent; ligules membranous; inflorescence a panicle with spike-like branches; spikelets with 2 florets, the lower staminate, the upper fertile; lower glume 3/4 to nearly equaling the spikelet length; upper glume and lower lemma similar in size and appearance; lower palea developed; upper floret becoming indurate, smooth, forming a seedcase. ◆*Hopia* is a monotypic genus segregated from *Panicum*, based on a suite of morphological, anatomical, chromosomal, and molecular evidence.

■Zuloaga, F.O., L.M. Giussani, & O. Morrone. 2007. *Hopia*, a new monotypic genus segregated from *Panicum* (Poaceae). *Taxon* 56(1):145-156.

Hopia obtusa (Kunth) Zuloaga & Morrone [*Panicum obtusum* Kunth]. Stoloniferous perennial sometimes also with short rhizomes, 20-80 cm tall, the long stolons with conspicuously hairy nodes; lower sheaths pilose; ligules 0.2-2 mm long; panicles 5-15 cm long, the branches 2-6 in number; spikelets shaped like a rugby ball, 2.8-4.5 mm long, awnless. ●Usually heavy soils of swales, playas, flats, and low spots; sometimes planted to control soil erosion, throughout the state. §



Hordeum [ancient Latin name for barley] BARLEY [6].

Tufted annuals or perennials; sheaths open; auricles present or absent; ligules membranous; inflorescence a spike (spicate raceme) with 3 spikelets per node, the central sessile and fertile, the lateral pedicelled and usually staminate or sterile (fertile in cultivated forms); disarticulation below the spikelets and in the rachis, the 3 spikelets falling together with the rachis internode (above the glumes in cultivated forms); spikelets with a single floret; glumes awn-like; lemmas awned or awnless; anthers 3. ♦About 40 or so species in the temperate regions of Africa, Eurasia, and the Americas. Species with a disarticulating main axis (all of ours except the annual cultivated species) are placed in the genus *Critesion* by some, but we maintain the genus in the more inclusive sense.

■Baden, C. & R. von Bothmer. 1994. A taxonomic revision of *Hordeum* sect. *Critesion*. *Nordic J. Bot.* 14(2):117-136. ■Baum, B.R. 1980. Multivariate morphometric relationships between *Hordeum jubatum* and *Hordeum brachyantherum* in Canada and Alaska. *Can. J. Bot.* 58(6):604-623. ■Baum, B.R. 1983. Morphometric relationships in *Hordeum vulgare* (Triticeae, Poaceae). II. *Hordeum agriocrithon*, *H. distichum*, *H. lagunculiforme*, *H. spontaneum*, and *H. vulgare*. *Can. J. Bot.* 61(7):2023-2031. ■Baum, B.R. 1988. A taxonomic investigation of *Hordeum arizonicum* (Poaceae: Triticeae) with reference to related species. *Can. J. Bot.* 66:1848-1855. ■Baum, B.R. & L.G. Bailey. 1990. Key and synopsis of North American *Hordeum* species. *Can. J. Bot.* 68:2433-2442. ■Bothmer, von, R., N. Jacobsen, C. Baden, R.B. Jorgensen, and I. Linde-Laursen. 1995. An ecogeographical study of the genus *Hordeum*. 2nd edition. Systematic and Ecogeographic Studies on Crop Gene pools 7. International Plant Genetic Resources Institute, Rome. ■Bothmer, R.N., N. Jacobsen, R.B. Jorgensen, & E. Nicora. 1982. Revision of the *Hordeum pusillum* group. *Nordic J. Bot.* 2:307-321. ■Bowden, W.M. 1962. Cytotaxonomy of the native and adventive species of *Hordeum*, *Eremopyrum*, *Secale*, *Sitanion*, and *Triticum* in Canada. *Can. J. Bot.* 40:1675-1711. ■Boyle, W.S. & A.H. Holmgren. 1955. A cytogenetic study of natural and controlled hybrids between *Agropyron trachycaulum* and *Hordeum jubatum*. *Genetics* 40:539-545. ■Jacobsen, N. & R. von Bothmer. 1995. Taxonomy in the *Hordeum murinum* complex (Poaceae). *Nordic J. Bot.* 15(5):449-458. ■Petersen, G. & O. Seberg. 2003. Phylogenetic analyses of the diploid species of *Hordeum* (Poaceae) and a revised classification of the genus. *Syst. Bot.* 28:293-306.

- 1 Rachis persistent, not breaking apart when mature; plants annual..... *H. vulgare*
- 1 Rachis breaking apart when mature; plants annual or perennial
 - 2 Glumes of the central spikelet with conspicuous ciliate margins; auricles usually well-developed, mostly 1-8 mm long *H. murinum*
 - 2 Glumes of the central spikelet without ciliate margins, at most scabrous; auricles usually lacking or weakly developed and less than 0.5 mm long
 - 3 Plant perennial
 - 4 Glumes of the central spikelet flattened near the base *H. arizonicum*
 - 4 Glumes of the central spikelet terete throughout, not flattened near the base
 - 5 Glumes 7-20 mm long; awns of the lemmas 5-10(20) mm long *H. brachyantherum*
 - 5 Glumes 20-150 mm long; awns of the lemmas 10-70 mm long *H. jubatum*
 - 3 Plants annual
 - 6 Glumes bent outward at the base, strongly divergent when mature
 - 7 Glumes of the central spikelets terete throughout, not flattened near the base, 20-150 mm long *H. jubatum*
 - 7 Glumes of the central spikelets flattened near the base, 11-28 mm long *H. arizonicum*
 - 6 Glumes erect at the base, ascending to only slightly divergent when mature
 - 8 Glumes of lateral spikelets prominently flattened near the base; ligules 0.2-0.8 mm long *H. pusillum*
 - 8 Glumes of lateral spikelets terete to slightly flattened near the base; ligules 0.6-1.8 mm long *H. arizonicum*

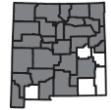
Hordeum arizonicum Covas [of Arizona] [*Critesion arizonicum* (Covas) Löve]. Tufted annual to sometimes a short-lived perennial, 20-70 cm tall; auricles absent; ligules 0.6-1.8 mm long; spikes 5-12 cm long, 6-10 mm wide; glumes 11-28 mm long, flattened near the base; lemmas of the central spikelet 5-9 mm long. ●Weedy ground, uncommon, sporadically occurring in the southwestern counties. ♦This is a hybrid derivative between *Hordeum jubatum* and *H. pusillum*, and so carries features of each, making identification of some plants futile; some consider it not worthy of recognition (and it certainly creates havoc with our key!).



Hordeum brachyantherum Nevski [short anthers] MEADOW BARLEY [*Critesion brachyantherum* (Nevski) Barkworth & Dewey, *Hordeum nodosum* Linnaeus]. Tufted perennial, 25-80 cm tall; auricles absent; spikes 3-8.5 cm long; glumes 7-20 mm long, ascending to spreading, not or rarely flattened near the base; lemmas of central spikelet 5-10 mm long. ●Moist mountain slopes and grassy hills, from mid- to high elevations. ♦Stabilized hybrids with *Hordeum jubatum* go under the name *H. jubatum* subsp. *jubatum*, q.v., below.

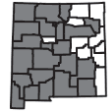


Hordeum jubatum Linnaeus [mane-like] FOXTAIL BARLEY. Tufted perennial, sometimes appearing annual, 20-80 cm tall; auricles absent; spikes 3-15 cm long; glumes 15-85 mm long, divergent, sometimes strongly so; lemmas of the central spikelet 4-8.5 mm long. ●Moist ditches, meadows, roadsides, disturbed ground, throughout the state. ♦Stabilized hybrids between *Hordeum jubatum* and *H. brachyantherum* are recognized as a subspecies of *H. jubatum*, as follows, and occur within the range of *H. brachyantherum*. §



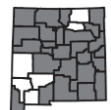
- a Glumes of the central spikelets (including awns) 30 mm or more long; lemma of central spikelet (including awn) 30 mm or more long...subsp. *jubatum* [*Critesion jubatum* (Linnaeus) Nevski].
- a Glumes of the central spikelets (including awns) 20-30 mm long; lemma of central spikelet (including awn) 20-40 mm long...subsp. *intermedium* Bowden [between] [*Hordeum caespitosum* Scribner, *Hordeum jubatum* Linnaeus var. *caespitosum* (Scribner) Hitchcock].

****Hordeum murinum*** Linnaeus [mouse-like] MOUSE BARLEY [*Critesion murinum* (Linnaeus) Löve]. Loosely tufted annual, 3-100 cm or more tall; ligules 1-4 mm long; auricles well developed, 1-8 mm long; spikes 3-8 cm long, 7-16 mm wide; glumes 10-25 mm long, with distinct ciliate margins; lemmas of the central spikelet 8-14 mm long, with awns to 40 mm long. ●Weedy ground; native to Eurasia. ♦The epithet *murinum* (neuter adjective from *murinus*, meaning mouse-like or mouse-colored) derives from *mus*, a mouse, and not *murus*, a wall; the confusion has led to its being called ‘wall barley’ (of walls would be rendered *muralis*). Appropriately, a game of “mousy-mousy” can be played by picking a spike, holding it upside down within a partly closed fist, and wiggling the fingers slightly to make the “mouse” crawl to the top and escape. We have two subspecies: §

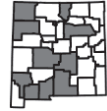


- a Anthers of the central spikelet blackish, 0.2-0.5 mm long; prolongation of the rachilla of the lateral spikelets stout, orange-brown when mature...subsp. *glaucum* (Steudel) Tsvetlev [bluish green] [*Hordeum glaucum* Steudel, *Hordeum stebbinsii* Covas]. ●Relatively common across the state, except for the eastern region.
- a Anthers of the central spikelet yellowish, 0.7-1.4 mm long; prolongation of the rachilla of the lateral spikelets slender, greenish when mature...subsp. *leporinum* (Link) Arcangeli [hare-like] [*Critesion murinum* (Linnaeus) Löve subsp. *leporinum* (Link) Löve, *Hordeum leporinum* Link]. ●Uncommon in New Mexico, known only from Grant, San Juan, and San Miguel counties. Sometimes called HARE BARLEY.

Hordeum pusillum Nuttall [very small, insignificant] LITTLE BARLEY [*Critesion pusillum* (Nuttall) Löve, *Hordeum pusillum* Nuttall var. *pubens* A.S. Hitchcock]. Loosely tufted annual, 10-40 cm tall; auricles absent; ligules 0.2-0.8 mm long; spikes 2-9 cm long, 3-7 mm wide; glumes erect to ascending, not divergent, 8-18 mm long; lemmas of central spikelet 5-8.5 mm long, with awns to 10 mm. ●Waste places, nearly throughout the state. §



***Hordeum vulgare** Linnaeus [common] BARLEY [*Hordeum distichon* Linnaeus, *Hordeum trifurcatum* (Schlechtendal) Wenderoth]. Loosely tufted annual, to 150 cm tall; auricles to 1-6 mm long; spikes 5-10 cm long, 8-20 mm wide, the rachis usually persistent; central and lateral spikelets sessile when both are fertile, the lateral spikelets pedicelled when sterile; glumes 10-30 mm long, flattened near the base; lemmas of central spikelet 6-12 mm long, awned to awnless.



●Introduced barley crop also used for erosion control along roads, adventive along fields and roadsides; expected sporadically in any of the counties; native to Eurasia. ♦Barley is considered to be the first cereal grass to be domesticated, with 9,000 year old artifacts from Syria and Iraq. More than half of the barley grown in the United States is used as feed for livestock, and a quarter of the harvest is used in brewing of beer and whiskey. We have three cultivated races one might encounter:

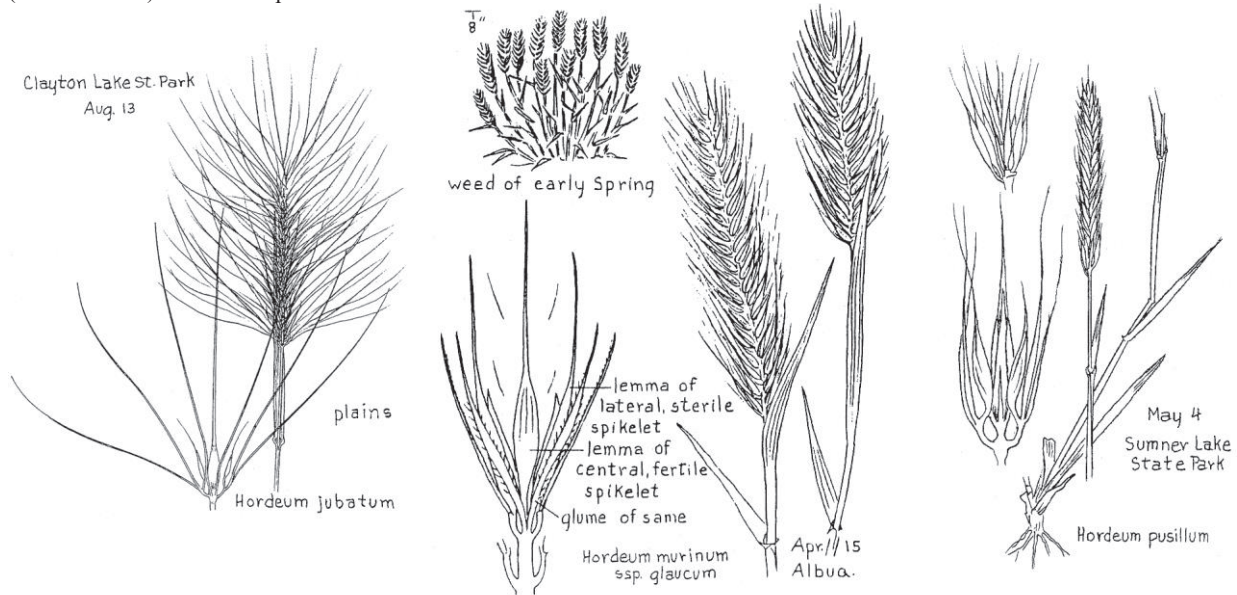
a Awns suppressed or variously deformed, commonly 3-cleft...the **trifurcatum** phase BEARDLESS BARLEY.

a Awns well-developed, not deformed nor 3-cleft

b Lateral spikelets sessile, fertile, well-developed, and prominently awned...the **vulgare** phase SIX-ROW BARLEY.

b Lateral spikelets pedicelled, sterile, much smaller in size, and nearly awnless...the **distichon** phase TWO-ROW BARLEY. ♦This is the wild form of barley.

For the novice, especially without a hand lens, barley (*Hordeum vulgare*), rye (*Secale cereale*), and wheat (*Triticum aestivum*) may be difficult to distinguish. These features may be helpful: a) barley and rye have narrow, needle-like glumes, while wheat has broad glumes. b) barley has three spikelets per node; rye and wheat have a single spikelet per node. Unfortunately, the hybrid between rye and wheat (×*Triticosecale*) muddles the picture!



Imperata [for Ferrante Imperato (1550-1625), apothecary and naturalist of Naples] SATINTAIL [1].

Strongly rhizomatous perennials with erect mostly unbranched culms; sheaths open; auricles absent; ligules membranous; inflorescence a narrow, plumose panicle; panicle branches (rames) composed of repeating pairs of pedicelled spikelets; disarticulation below the glumes, the pairs of spikelets falling together; spikelets all alike, fertile, awnless, in pairs, unequally pedicelled, surrounded by long silky hairs from the rachis; glumes subequal, membranous, with long silky hairs; anthers 1-2. ♦About 10 species of tropical to subtropical regions.

1 Spikelets 3-4 mm long; foliage green; stamen 1; native grass of floodplains.....**I. brevifolia**

1 Spikelets 4-5 mm long; foliage reddish at least in age; stamens 2; exotic grasses in cultivation as an ornamental.....**I. cylindrica**

Imperata brevifolia Vasey [short-leaved] [*Imperata hookeri* (Ruprecht ex Andersson) Ruprecht ex Hackel]. Rhizomatous perennial, 50-120 cm tall; panicles 16-34 cm long; callus hairs 8-12 mm long; spikelets 2.7-4 mm long; anthers 1.3-2.3 mm long. ●In New Mexico, known only from Doña Ana County along the Rio Grande floodplain; last found in 1939.



***Imperata cylindrica** (Linnaeus) Beauvois var. **koenigii** (Retzius) T. Durand & Schinz JAPANESE BLOODGRASS 'RED BARON'. Strongly rhizomatous perennial, 30-150 cm or more tall; panicles 6-25 cm or more long; callus hairs 9-16 mm long; spikelets 2.5-5.5 mm long; anthers 2-4.4 mm long. ●Cultivated as an ornamental landscape plant but not known to escape to the wild in New Mexico; native to Asia, India, Australia, Africa. ♦Plants are aggressive from strong rhizomes, and can completely take over a flower garden.

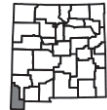
Jarava...go to **Pappostipa**

Kalinia [alkali] ALKALI LOVEGRASS [1].

Rhizomatous and stoloniferous perennial; sheaths open; auricles absent; ligules membranous, ciliate; inflorescence a panicle; spikelets with 5-10 florets; disarticulation above the glumes and between the florets, leaving the glumes; lemmas 3-nerved (sometimes 4 or 5), awnless; anthers 3; grain with a shallow groove. ♦Formerly included as an anomalous member of *Eragrostis*; easily told by the rhizomes and puncturing blades.

■Bell, H.L. & J.T. Columbus. 2012. *Kalinia*, a new North American genus for a species long misplaced in *Eragrostis* (Poaceae, Chloridoideae). *Aliso* 30(2):85-95.

Kalinia obtusiflora (Fournier) H.L. Bell & Columbus [*Brizopyrum obtusiflorum* Fournier, *Eragrostis obtusiflora* (Fournier) Scribner]. Rhizomatous and stoloniferous perennial, 15-40 cm tall; sheaths hairy at the summit; ligules 0.2-0.4 mm long; blades rolled, stiff and sharp pointed; panicles 6-20 cm long, 2-10 cm wide, the upper portion becoming raceme-like, with glabrous to pubescent pulvini; spikelets 8-14 mm long, 1.4-3 mm wide, appressed along the branch; lemmas 3.8-4.5 mm long. ●Along dry shores of Playas Lake in Hidalgo County.



Koeleria [for Georg Ludwig Koeler (1765-1807), German physician & botanist] [3].

Tufted, sometimes rhizomatous or stoloniferous, perennials or annuals; sheaths open, glabrous to pubescent; auricles absent; ligules membranous; blades flat to variously folded or rolled; inflorescence a panicle, often dense and spike-like, the rachis and branches velvety pubescent (ours) to glabrous; spikelets with 2-4 florets, awned to awnless; disarticulation above the glumes and between the florets, the rachilla usually prolonged above the uppermost floret; glumes slightly shorter to exceeding the lemmas, the first 1-nerved, the second 1-3-nerved; lemmas thin, (3)5(7)-nerved, the apices with 2-4 short awns or setae, the body with scarious margins, the awn (when present) dorsal; paleas not tightly enclosed by the lemmas; anthers 3. ♦About 60 or so species throughout the world. ♦We include here two species formerly included within *Trisetum*, which remains a genus of 1-2 species native to Europe and Asia.

■Amow, L.A. 1994. *Koeleria macrantha* and *K. pyramidata* (Poaceae): nomenclatural problems and biological distinctions. *Syst. Bot.* 19(1):6-20. ■Barberá, P., C. Romero-Zarco, & C. Aedo. 2018. Taxonomic revision of *Trisetum* sect. *Trisetum* (Poaceae: Poideae: Aveninae) from Eurasia and North Africa. *Ann. Missouri Bot. Gard.* 103: 350-392. ■Barbera, P., R.J. Soreng, P.M. Peterson, K. Romaschenko, A. Quintanar, & C. Aedo. 2019. Molecular phylogenetic analysis resolves *Trisetum* (Poaceae: Poideae: Koeleriinae) polyphyletic: Evidence for a new genus, *Sibirotrisetum* and resurrection of *Acrospelion*. *J. Syst. Evol. Online early issue* 20 Oct 2019: 1-10. ■Barberá, P., A. Quintanar, P.M. Peterson, R.J. Soreng, K. Romaschenko, & C. Aedo. 2019. New combinations, new names, typifications, and a new section, sect. *Hispanica*, in *Koeleria* (Poaceae). *Phytoneuron* 2019-46: 1-13. ■Finot, V.L., P.M. Peterson, R.J. Soreng, & F.O. Zuloaga. 2005. A revision of *Trisetum* and *Graphophorum* (Poaceae: Poideae: Aveninae) in North America north of Mexico. *Sida* 21(3):1419-1453. ■Greuter, W. 1968. Notulae nomenclaturales et bibliographicae 1-4. *Candollea* 23:81-108. ■Hultén, E. 1959. The *Trisetum spicatum* complex. *Sv. Bot. Tidskr.* 53:203-228. ■Randall, J.L. & K.W. Hill. 1986. Biosystematic studies of North American *Trisetum spicatum* (Poaceae). *Syst. Bot.* 11:567-578. ■Rumely, J.H. 2007. *Trisetum*, p. 744-753. IN: *Flora of North America*, vol. 24. Oxford University Press. ■Shinners, L.H. 1956. Illegitimacy of Persoon's species of *Koeleria* (Gramineae). *Rhodora* 58:93-96.

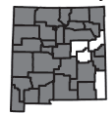
1 Florets awnless..... *K. macrantha*

1 Florets conspicuously and definitely awned

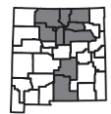
2 Panicles 3-10 cm long, the spikelets densely congested, the branches mostly less than 1 cm long and erect-appressed; leaves tending to be basal..... *K. spicata*

2 Panicles 8-24 cm long, the spikelets somewhat crowded to loosely arranged, the branches (1)2-6 cm long and ascending to somewhat divergent; leaves tending to be cauline..... *K. vaseyi*

Koeleria macrantha (Ledebour) J.A. Schultes [large-flowered] JUNEGRASS [*Aira macrantha* Ledebour, *Koeleria cristata* of many authors, *Koeleria nitida* Nuttall]. Tufted perennial, 20-85 cm or more tall; leaves mostly basal; panicles 5-35 cm long, the primary branches with axillary pulvini, causing them to spread during anthesis; spikelets 2.5-6.5 mm long, obovate; lemmas 2.5-6.5 mm long, shiny, glabrous, rarely with an awn to 1mm long. ●Mountain slopes, foothills, and plains, throughout the state. ♦Shiny glumes and puberulent pedicels and branchlets are distinctive. Plants in flower will often have widely spreading branches from axillary pulvini, so the panicles are broadly pyramid-shaped and up to 8 cm wide; they close again after anthesis. *Koeleria pyramidata* (Lamrck) Beauvois is a closely related European species. §



Koeleria spicata (Linnaeus) Barberá, Quintanar, Soreng, & P.M. Peterson [spike-like] SPIKE TRISETUM [*Aira spicata* Linnaeus, *Trisetum spicatum* (Linnaeus) Richter]. Tufted perennial, sometimes with short rhizomes, 10-60 cm tall; sheaths glabrous; ligules about 1 mm long; blades glabrous to rarely hairy; panicles 3-10 cm long, densely congested and spike-like, the branches mostly less than 1 cm long, the peduncle densely hairy below the panicle, the hairs 0.2-1 mm long; spikelets 4.5-6 mm long; rachilla 0.8-1 mm long, with hairs 0.5-1 mm long; glumes subequal or the first at least ¾ the second; lowermost lemmas 4-5 mm long, the awn 4-6 mm long; ovary glabrous. ●Alpine to subalpine ridges, slopes, and forest clearings, mostly in the northern mountains, generally at higher elevations than *K. montana*. ♦Formerly included within a now dismembered *Trisetum*. §



Koeleria vaseyi Barberá, Quintanar, Soreng, & P.M. Peterson [for George S. Vasey (1822-1893), curator of the U.S. National Herbarium] [*Trisetum canescens* of NM reports, *Trisetum montanum* Vasey, *Trisetum spicatum* (Linnaeus) Richter subsp. *montanum* (Vasey) Weber]. Tufted perennial, 30-70 cm tall; sheaths glabrous to pilose; ligules about 3 mm long; blades glabrous to pilose, generally not very canescent; panicles 10-24 cm long, lax and somewhat open to contracted, the peduncle glabrous below the panicle or with minute hairs; spikelets 4-6 mm long; rachilla about 0.8 mm long, with hairs less than 0.5 mm long; glumes unequal, the first about ⅔ the second; lowermost lemma 4.5-5.5 mm long, the awn 3-6 mm long; ovary glabrous. ●Mountain woodlands and grasslands, clearings, grassy slopes, roadsides; widespread in the mountains, generally at lower elevations than *K. spicata*. ♦Formerly included within a now dismembered *Trisetum*. We include here plants that have been dubiously reported as *Trisetum canescens* Buckley, which is a species mostly of the Pacific Northwest, extending eastward to Arizona and Utah, but not known in New Mexico (nor Colorado).



Lagurus [hare's tail] HARE'S TAIL [1].

Tufted annual, the culms erect to ascending, the foliage pilose to villous; sheaths open, inflated; auricles absent; ligules membranous, densely villous on the back; inflorescence a dense, ovoid, wooly panicle; spikelets with a single floret, the rachilla prolonged; disarticulation above the glumes, the floret falling; glumes exceeding the floret, 1-nerved; lemmas 3-nerved, 3-awned, the lateral nerves prolonged into awns, the central awn arising from the distal ⅓ of the lemma; anthers 3. ♦A monotypic genus of the Old World, native to the Mediterranean Basin and nearby regions. Ten grasses in the world carry the epithet '*laguoides*,' whose wooly or silky seedheads allude to the genus *Lagurus*.

■Allred, K. 2004. Plant distribution reports [*Lagurus ovatus*]. *The New Mexico Botanist* 31:1.

****Lagurus ovatus*** Linnaeus [egg-shaped]. Plants 10-50 cm tall; sheaths 2-8 cm long, inflated; blades 3-10 mm wide; panicles 1.5-3 cm long, 1-2 cm wide, the branches pilose; glumes 6-10 mm long, the awn to 3 mm; lemmas 3-5 mm long; central awn 10-22 mm long, the laterals much shorter. ●A recently found adventive, rarely escaping from cultivation for ornament and dried bouquets; native to the Mediterranean region. ♦The wooly heads resemble somewhat *Polypogon monspeliensis*, which is very common in wet places in the wild, and has nearly glabrous foliage.



Leersia [for Johann Daniel Leers (1727-1774), German botanist-pharmacist] CUTGRASS [1].

Usually tufted or rhizomatous perennials, often rooting at the nodes; sheaths open; auricles absent; ligules membranous; inflorescence a well-developed panicle; disarticulation below the spikelets; spikelets with 1 floret, usually awnless; glumes absent; floret flattened, the lemma and palea subequal and hardened somewhat; lemmas 5-nerved; anthers 1, 2, 3, or 6. ♦A genus of about 17 species of wetlands worldwide.

■Pyrah, G.L. 1969. Taxonomic and distributional studies in *Leersia* (Gramineae). *Iowa St. J. Sci.* 44:215-270.

Leersia oryzoides (Linnaeus) Swartz [rice-like] [*Phalaris oryzoides* Linnaeus]. Rhizomatous perennial, 35-150 cm tall, the culms decumbent-based and rooting at the nodes; sheaths scabrous; ligules to 1 mm long; blades 5-15 mm wide, the margins scabrous; panicles 10-30 cm long, the branches spreading; spikelets elliptic, 4-6 mm long, nearly 2 mm wide; lemmas and paleas ciliate on the keels and margins; anthers chasmogamous (1-3 mm long) or cleistogamous (to 1 mm long). ●River and stream banks in the southern region, often aquatic; expected in more counties than currently known.



Leptochloa [a slender grass] [1].

Tufted perennials; sheaths open; auricles absent; ligules a membrane, truncate to obtuse, somewhat erose or ciliate; inflorescence a panicle of spicate branches, these subdigitate to separated shortly on the main axis; spikelets 2- to 5-flowered, the lowest 1-2 florets fertile, the remaining upper ones sterile; disarticulation above the glumes, the florets falling together; lemmas 3-nerved, awned; anthers 2-3. ♦Traditionally, *Leptochloa* has been defined by annual or perennial plants having panicles with spicate branches scattered along the main axis, and awned or awnless spikelets with several florets of 3-nerved lemmas. Recent phylogenetic studies have shown this circumscription to be polyphyletic, bringing together disparate and unrelated populations, even though they share a morphologic similarity (Peterson et al. 2012; Peterson et al. 2015). We follow Peterson and colleagues in recognizing *Leptochloa* in a more restricted but more phylogenetically accurate sense, which also embraces members of the genus *Trichloris* (which will be an odd alignment for some). Other members of the former *Leptochloa* are dispersed within the genera *Dinebra*, *Diplachne*, and *Disakisperma*, all of which are included in the key below. ♦*Leptochloa nealleyi* Vasey [= *Dinebra nealleyi* (Vasey) P.M. Peterson & N. Snow] was reported for New Mexico by W&S, but this is a species of the coastal prairies of Texas and Louisiana and is not present in the state.

■McNeill, J. 1979. *Diplachne* and *Leptochloa* (Poaceae) in North America. *Brittonia* 31:399-404. ■Peterson, P.M., K. Romaschenko, N. Snow, and G.P. Johnson. 2012. A molecular phylogeny and classification of *Leptochloa* (Poaceae: Chloridoideae: Chlorideae) sensu lato and related genera. *Ann. Bot.-London* 109: 1317-1330. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2015. A molecular phylogeny and classification of the Eleusininae with a new genus, *Micrachne* (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 64:445-467. ■Snow, N. 1998. Nomenclatural changes in *Leptochloa* P. Beauvois sensu lato (Poaceae, Chloridoideae). *Novon* 8:77-80. ■Snow, N. & G. Davidse. 1993. *Leptochloa mucronata* (Michaux) Kunth is the correct name for *Leptochloa filiformis* (Poaceae). *Taxon* 42(2):413-417. ■Snow, N., P. Peterson, K. Romaschenko. 2013. Systematics of *Disakisperma* (Poaceae, Chloridoideae, Chlorideae). *PhytoKeys* 26:21-70. doi: 10.3897/phytokeys.26.5649. ■Soreng, R.J., P.M. Peterson, K. Romaschenko, G. Davidse, F.O. Zuloaga, E.J. Judziewicz, T.S. Filgueiras, J.I. Davis, & O. Morrone. 2015. A worldwide phylogenetic classification of the Poaceae (Gramineae). *Journal of Systematics and Evolution* 53(2):117-137.

1 Plants perennial

2 Panicle branches subdigitate, appearing as a single terminal whorl; spikelets with numerous awns to 12 mm long.....***L. crinita***

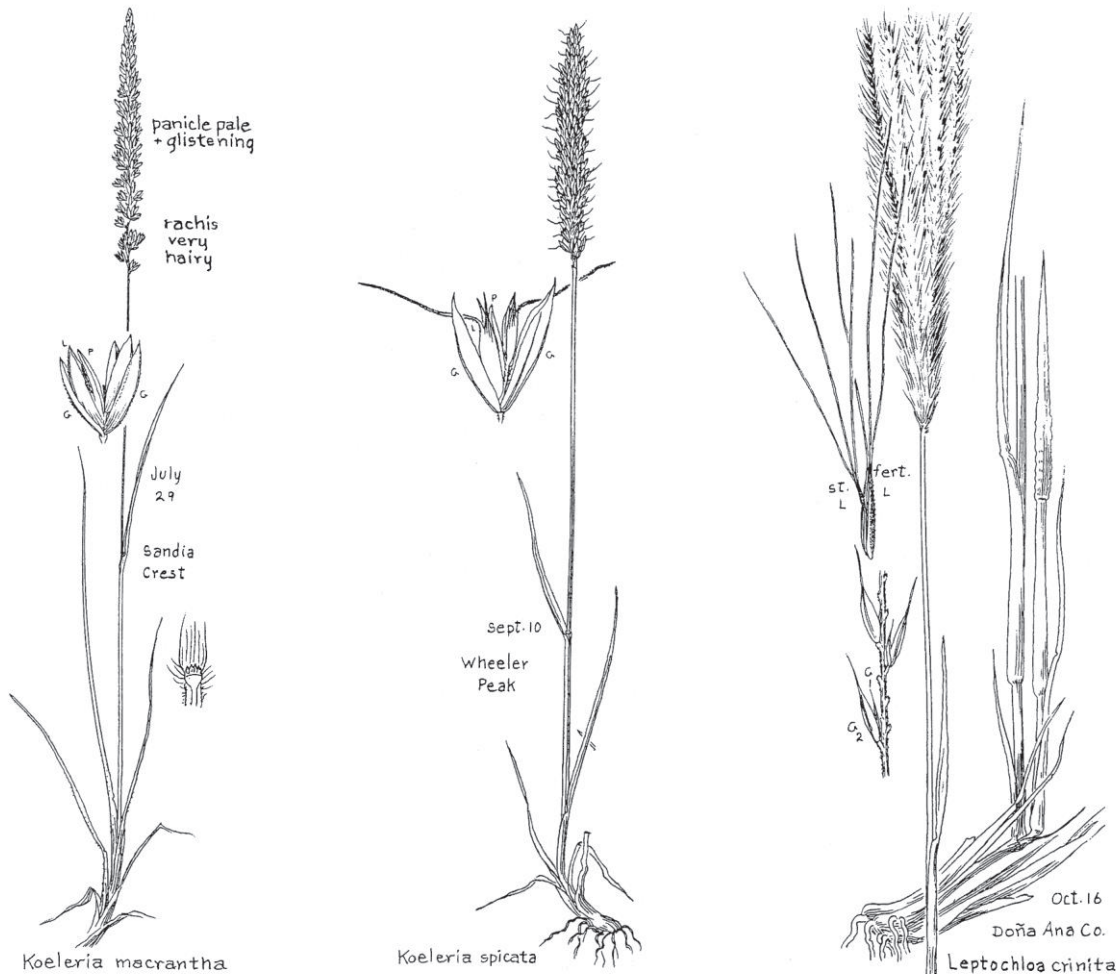
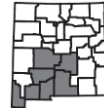
2 Panicle branches not digitate, attached singly along the main axis; spikelets awnless go to ***Disakisperma***

1 Plants annual

3 Ligules 2-8 mm long, attenuate, not lacerate except by tearing go to ***Diplachne***

3 Ligules 1-3 mm long, truncate to rounded, often erose or lacerate go to ***Dinebra***

Leptochloa crinita (Lagasca) P.M. Peterson & N. Snow [furnished with hairs] FALSE RHODESGRASS [*Chloris crinita* Lagasca, *Trichloris crinita* (Lagasca) Parodi]. Tufted perennial, sometimes with short stolons, 45-100 cm or more tall; sheaths glabrous to sparsely hirsute; blades 5-10 mm wide; panicle narrow, 8-15 cm long; panicle branches 6-20 in number, erect, to 15 cm long; spikelets with 1 fertile and 1 sterile floret, the lemmas of both 3-awned; awns 5-12 mm long. ●Disturbed ground, roadsides, fields, and drainages in the desert grasslands. ♦Occasionally used by local florists in dried bouquets. §



Leptoloma [a thin border] LEPTOLOMA [1].

Annuals to perennials, tufted to rhizomatous; sheaths open; auricles absent; ligules membranous, sometimes with a ciliate fringe; inflorescence an open, rebranched panicle, the entire inflorescence breaking at the base (except on one species); spikelets awnless, 2-flowered, the lower floret staminate to sterile, the upper floret fertile, the rachilla elongated between the two glumes; disarticulation below the glumes; lower glume absent to no more than 1/4 the length of the spikelet; upper glume short to subequal to the spikelet; lower lemma pubescent; upper lemma clasping the palea and forming a seed case, this not indurate; anthers 3. ♦With 4-5 species, North America. Most recently included within a broadly defined (and possibly polyphyletic) *Digitaria*; we maintain a more traditional approach until the generic relationships are resolved.

■Henrard, J.T. 1950. Monograph of the genus *Digitaria*. Universitare Pers, Leiden. ■Medico, J.M.L. D.S. Tosto, G.H. Rua, Z.E. Rúgolo de Agrasar, M.A. Scataglini, & A.S. Vega. 2017. Phylogeny of *Digitaria* Sections *Trichachne* and *Trichophorae* (Poaceae, Panicoideae, Paniceae): A morphological and molecular Analysis. *Syst. Bot.* 42(1): 37-53. ■Vega, A.S., G.H. Rua, L.T. Fabbri, Z.E. Rugolo de Agrasar. 2009. A morphology-based cladistic analysis of *Digitaria* (Poaceae, Panicoideae, Paniceae). *Syst. Bot.* 34(2): 312-323. ■Wipff, J.K. 2001. Nomenclatural change in the *Digitaria cognata* complex (Poaceae: Paniceae). *Sida* 19(4):923-924. ■Wipff, J.K. & S.L. Hatch. 1994. A systematic study of *Digitaria* sect. *Pennatae* (Poaceae: Paniceae) in the New World. *Syst. Bot.* 19:613-627. ■Wipff, J.K. & R.B. Shaw. 2018. *Leptoloma syrticola* (Poaceae: Panicoideae): A new species from Texas and new combinations in *Leptoloma* and *Trichachne*.

Leptoloma pubiflorum (Vasey) Wipff & Shaw [with hairy flowers] FALL WITCHGRASS [*Digitaria cognata* (Schultes) Pilger subsp. *pubiflora* (Vasey) Wipff, *Digitaria pubiflora* (Vasey) Wipff, *Leptoloma cognatum* (Schultes) Chase subsp. *pubiflora* (Vasey) Wipff & Hatch, *Panicum autumnale* Bosc ex Sprengel var. *pubiflorum* Vasey]. Densely tufted to loosely rhizomatous perennial, 20-70 cm tall; foliage glabrous to densely pubescent; panicles widely open, 5-25 cm long, 6-30 cm wide, the branches divergent and rebranched; spikelets on long divergent pedicels, 2.3-3.3 mm long; upper glume 2-3 mm long, densely pilose between the 3 nerves; lower lemma 5-nerved; upper floret 2-3.1 mm long, glabrous, dark when mature. ●Southern and eastern plains. ♦We have two generally sympatric varieties separated by growth form and habitat:

a Plants densely tufted, lacking rhizomes...var. **pubiflorum**. ●Generally rocky ground.

a Plants loosely tufted to colonial, with strong rhizomes...var. **syrticola** (Wipff & Shaw) Allred [a sand-dweller] [*Leptoloma syrticola* Wipff & Shaw]. ●Loose to deep sandy ground and dunes.

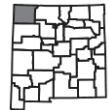


Leucopoa [white *Poa*] [1].

Tufted and rhizomatous perennials, dioecious; sheaths open; auricles absent; ligules membranous; inflorescence a panicle; spikelets unisexual, with 2-6 florets; disarticulation above the glumes and between the florets; glumes mostly hyaline and thinner than lemmas; lemmas 5-nerved, awnless or short-awned, the paleas subequal; anthers 3. ♦About 10 species, mostly Asian. Closely related to *Lolium* and *Schedonorus*, but not so closely to *Festuca*.

■Catalan, P., P. Torrecilla, J.A. Lopez Rodriguez, & R.G. Olmsted. 2004. Phylogeny of the festucoid grasses of subtribe Loliinae and allies (Poaceae, Pooideae) inferred from ITS and trnL-F sequences. *Molec. Phylogenet. Evol.* 31:517-541. ■Darbyshire, S.J. & S.I. Warwick. 1992. Phylogeny of North American *Festuca* (Poaceae) and related genera using chloroplast DNA restriction site variation. *Canad. J. Bot.* 70:2415-2429. ■Hall, H.H. & S. Flowers. 1961. Vascular plants found in the Navajo Reservoir Basin, pp. 47-87. IN: D.M. Pendergast (ed.). Ecological studies of the flora and fauna of Navajo Reservoir Basin, Colorado and New Mexico. Univ. Utah Anthropological Papers, number 55. [*Hesperochloa kingii*].

Leucopoa kingii (S. Watson) W.A. Weber [for Clarence King (1842-1901), American geologist and mountaineer] SPIKE FESCUE [*Hesperochloa kingii* (S. Watson) Rydberg, *Festuca kingii* (S. Watson) Cassidy, *Poa kingii* S. Watson]. Tufted and rhizomatous perennial; 30-100 cm or more tall; panicles 7-22 cm long, with erect to ascending branches; spikelets 6-12 mm long; lemmas 4.5-10 mm long, awnless or with a mucro; anthers 3-6 mm long; ovaries in pistillate plants hairy at the apices. ●Woodlands and brushy hills of the Four Corners region, known from a single collection.



Leymus [an anagram of *Elymus*] WILDRYE [5].

Tufted to rhizomatous perennials; sheaths open; auricles usually present; ligules membranous; inflorescence a spike with 1-8 spikelets per node, sometimes paniculate; spikelets usually sessile, with 2-12 florets; disarticulation above the glumes and between the florets; glumes often reduced and needle-like; lemmas 5-7-nerved, awned or awnless; anthers 3. ♦All the species of *Leymus* have been taken out of *Elymus*, based on a suite of morphologic, chromosomal, anatomical, and molecular features. Many of the species are large, tussocky grasses.

■Allred, K.W. 2001. New plant distribution records [*Leymus racemosus* (as *Leymus cinereus*)]. *The New Mexico Botanist* 18:3. ■Allred, K.W. 2007. Plant distribution reports [*Leymus racemosus*]. *The New Mexico Botanist* 37:7. ■Atkins, R.J., M.E. Barkworth, & D.R. Dewey. 1984. A taxonomic study of *Leymus ambiguus* and *L. salinus* (Poaceae: Triticeae). *Syst. Bot.* 9:279-294. ■Barkworth, M.E. & R.J. Atkins. 1984. *Leymus* Hochst. (Gramineae: Triticeae) in North America: Taxonomy and distribution. *Amer. J. Bot.* 71:609-625. ■Hall, H.H. & S. Flowers. 1961. Vascular plants found in the Navajo Reservoir Basin, pp. 47-87. IN: D.M. Pendergast (ed.). Ecological studies of the flora and fauna of Navajo Reservoir Basin, Colorado and New Mexico. Univ. Utah Anthropological Papers, number 55. ■Hatch, S.L. 1976. A taxonomic evaluation of *Elymus simplex* (Poaceae). *Great Basin Naturalist* 36(2):239-241. ■Ward, J. 2008. Plant distribution reports [*Leymus cinereus*]. *The New Mexico Botanist* 45:7. ■Yen, C., J.-L. Yang, & B.R. Baum. 2009. Synopsis of *Leymus* Hochst. (Triticeae: Poaceae). *J. Systematics & Evol.* 47(1):67-86.

1 Plants strongly rhizomatous, the rhizomes long and slender, not bunch-forming

2 Culms 8-12 mm thick; blades 8-20 mm wide; spikes with 3-8 spikelets per node; glumes 12-25 mm long.....**L. racemosus**

2 Culms 1-3 mm thick; blades 3-10 mm wide; spikes with 2 spikelets per node at mid-spike; glumes 5-16 mm long.....**L. triticoides**

1 Plants tufted, or with short rhizomes but still bunch-forming

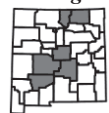
3 Plants in giant clumps to 2 m or more tall, usually much taller than 100 cm; blades flat, 5-15 mm wide; spikelets usually 3-6 per node.....**L. cinereus**

3 Plants much smaller, rarely as much as 1 m tall and usually less than 70 cm tall; blades mostly involute or rarely flat, 2-5 mm wide; spikelets 1-2 per node

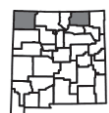
4 Spikelets mostly one per node of the rachis; blades often flat or sometimes involute.....**L. salinus**

4 Spikelets mostly 2 per node of the middle rachis (solitary at the apex and base of the spike); blades almost always involute**L. ambiguus**

Leymus ambiguus (Vasey & Scribner) D.R. Dewey [uncertain] [*Elymus ambiguus* Vasey & Scribner]. Loosely tufted perennial, sometimes with short rhizomes, 60-110 cm tall, the culms 1-1.5 mm thick; auricles to 1.1 mm long; spikes 8-17 cm long, 5-10 mm wide, with 2 spikelets per node; glumes needle-shaped; lemmas 8-14 mm long, with awns 1-7 mm long. ●Dry, rocky foothills and plains, sometimes mountain slopes with oak brush.



***Leymus cinereus** (Scribner & Merrill) Löve [ash-colored] GREAT BASIN WILDRYE [*Elymus cinereus* Scribner & Merrill]. Tussocky perennial, weakly rhizomatous, 70-270 cm tall, the culms 2-5 mm thick, usually green and not glaucous, populations appear ash-colored from a distance; auricles to 1.5 mm long; spikes 10-30 cm long, 8-17 mm wide, with 2-7 spikelets per node; glumes needle-shaped; lemmas 6-12 mm long, acute to awned to 3 mm. ●Known only from Colfax and San Juan counties, where it appears to be adventive or deliberately planted; native to the western United States. ♦An earlier report of this species from San Miguel County is corrected to *Leymus racemosus*. Seedheads are prone to ergot infestation.



**Leymus racemosus* (Lamareck) Tzvelev [raceme-like] [*Elymus racemosus* Lamareck]. Strongly rhizomatous perennial, weakly tufted, often glaucous, 50-100 cm tall or more, the culms 8-12 mm thick; spikes 15-35 cm long, with 3-8 spikelets per node; glumes tapering to needle-shaped, equal to or exceeding the florets; lemmas 15-20 mm long, tapering to an awn 1.5-2.5 mm long. •Known only from a few collections along weedy roadsides in San Miguel and Colfax counties; native to Europe and central Asia.



Leymus salina (M.E. Jones) A. Löve [Salina Pass, Utah] [*Elymus salina* M.E. Jones]. Tufted perennial, sometimes weakly rhizomatous, 35-140 cm tall, the culms 1.5-3 mm thick; spikes 4-14 cm long, with mostly 1(2-3) spikelet per node; glumes needle-like, shorter than the florets; lemmas 7-12 mm long, awnless or awned to 2.5 mm long. •Dry plains in the Four Corners region. ♦The specific epithet refers to a geographical place name (Salina Pass, Utah), and not to a saline habitat; it is used as a noun in apposition and is hence not declined to *salinus*.



Leymus triticoides (Buckley) Pilger [resembling *Triticum*] CREEPING WILDRYE [*Elymus simplex* Scribner & Williams, *Elymus triticoides* Buckley, *Elymus triticoides* Buckley var. *simplex* (Scribner & Williams) Hitchcock]. Strongly rhizomatous perennial, 45-125 cm tall, the culms 1.8-3 mm thick; auricles to 1 mm long; spikes 5-20 cm long, 5-15 mm wide, with 2 spikelets per node (varying proximally and distally); glumes needle-like, shorter than the florets; lemmas 5-12 mm long, with awns to 3 mm long. •Some of our plants are from high mountain forest clearings (introduced there?), but the species is more common on clay flats and swales at much lower elevations; early reports included plantings in Dona Ana County, but plants have not persisted.



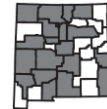
Lolium [ancient Latin name] RYEGRASS [2].

Tufted annuals and perennials, sometimes short-rhizomatous; sheaths open; auricles present or absent; ligules membranous; blades flat; inflorescence a spike, with 1 spikelet per node, the spikelets attached edgewise to the rachis; spikelets with several florets; disarticulation above the glumes and between the florets; glumes 1, 2 in the terminal spikelet, 3-9-nerved, awnless; lemmas 3-7-nerved; awned or awnless; anthers 3. ♦Species of *Lolium* are very closely related to *Schedonorus*, and fertile hybrids are easily produced among them. The two genera could certainly be combined, or the two genera could be submerged within *Festuca*; many such proposals have merit. To avoid undo confusion, we follow here the treatment of the recent *Flora of North America*, vol. 24, which maintains the genera *Festuca*, *Leucopoa*, *Lolium*, *Schedonorus*, and *Vulpia*, while acknowledging the inter-relatedness of all five species groups.

- Aiken, S.G., S.E. Gardiner, H.C.M. Bassett, B.L. Wilson, L.L. Conaul. 1998. Implications from SDS-PAGE analyses of seed proteins in the classification of taxa of *Festuca* and *Lolium* (Poaceae). *Biochemical Systematics and Ecology* 26:511-533.
- Bulinska-Radomska, Z. & R.N. Lester. 1988. Intergeneric relationships of *Lolium*, *Festuca*, and *Vulpia* (Poaceae) and their phylogeny. *Pl. Syst. Evol.* 159:217-227.
- Catalán, P., P. Torrecilla, J.A. López-Rodríguez, J. Müller, & C.A. Stace. 2007. A systematic approach to subtribe Loliinae (Poaceae: Pooideae) based on phylogenetic evidence. *Aliso* 23(1):380-405.
- Darbyshire, S.J. 1993. Realignment of *Festuca* subgenus *Schedonorus* with the genus *Lolium* (Poaceae). *Novon* 3:239-243.
- Soreng, R.J. & E.E. Terrell. 1997. Taxonomic notes on *Schedonorus*, a segregate genus from *Festuca* or *Lolium*, with a new nothogenus, ×*Schedololium*, and new combinations. *Phytologia* 83(2):85-88.

- 1 Glume exceeding the uppermost floret..... **L. temulentum**
- 1 Glume shorter than the spikelet, the florets extending beyond the glume **L. perenne**

**Lolium perenne* Linnaeus [perennial] PERENNIAL RYEGRASS. Tufted perennial, sometimes annual; spikes 5-45 cm long; spikelets with 5-22 florets; lemmas 3.5-9 mm long, awned or awnless; anthers 2-5 mm long. •Introduced from Europe and Asia for lawns, roadsides, and pastures, escaping to moist weedy ground; expected in all the counties. ♦Numerous cultivars, strains, and races have been developed for agricultural uses. Vegetative clumps in lawns are usually easily recognized by their shiny blades and well-developed auricles. Two weak, intergrading, and interfertile varieties are noted: §



- a Lemmas awnless or with awns less than 1 mm long; youngest vegetative leaf blades folded (conduplicate); spikelets with 5-10 florets; plants generally perennial...var. **perenne**
- a Lemmas, at least some, with awns more than 1 mm long; youngest vegetative leaf blades rolled (convolute); spikelets with 10-22 florets; plants annual to short-lived perennials...var. **aristatum** Willdenow [awned] [*Lolium multiflorum* Lamarck, *Lolium multiflorum* Lamarck subsp. *italicum* (A. Braun) Schinz & R. Keller, *Lolium perenne* Linnaeus var. *italicum* (A. Braun) Pamell].

**Lolium temulentum* Linnaeus [drunken] Tufted annual, 10-120 cm tall; spikes 2-40 cm long; spikelets with 3-20 florets; lemmas 3.5-8.5 mm long, awnless or with awns to 23 mm long; anthers 1.4-4 mm long. •Moist weedy ground, known only from Santa Fe Ski Basin; native to Eurasia. ♦Once a serious weed of oats and other crops, but now becoming less common the the United States with more efficient methods of grain cultivation and harvest. This is said to be the tares of the Bible (Matthew 13).



Lycurus...go to **Muhlenbergia alopecuroides** & **M. phleoides**

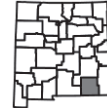
Melica [honey] MELICA [2].

Tufted perennials, occasionally producing rhizomes; sheaths closed; auricles sometimes present; ligules thinly membranous; inflorescence a panicle with rebranched branches; spikelets with several fertile florets, terminating in a sterile rudimentary floret or florets; disarticulation above or below the glumes; lemmas 5-several-nerved, awned or awnless; anthers (2)3. ♦About 90 species, temperate regions of the world.

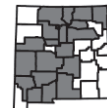
- Boyle, W.S. 1945. A cytotoxic study of the North American species of *Melica*. *Madroño* 8:1-26.
- Mejia-Saules, T. & F.A. Bisby. 2003. Silica bodies and hooked papillae in lemmas of *Melica* species (Gramineae: Pooideae). *Bot. J. Linn. Soc.* 143:447-463.

- 1 Rudiments at end of rachilla blunt and club-like, not resembling the other florets in shape, 1-3 mm long **M. nitens**
- 1 Rudiments at end of rachilla pointed, resembling the other florets in shape, 2-5 mm long..... **M. porteri**

Melica nitens (Scribner) Nuttall ex Piper [shining] [*Melica diffusa* Pursh var. *nitens* Scribner]. Shortly rhizomatous perennial, 55-130 cm tall; panicles 9-26 cm long, the branches 3-6 cm long and often spreading to reflexed; pedicels sharply bent below the spikelets; disarticulation below the glumes; spikelets 8-12 mm long, awnless; lower glumes 5-9 mm long; rudiments 1-3 mm long, club-like, not resembling the other florets in shape. •Calcareous soil and rocky outcrops of the Guadalupe Mts, Eddy County. ♦A Charles Wright collection in 1851-1852 (#2062), without locality other than "New Mexico" has been presumed to be from Grant County, but that is unsubstantiated, and is probably not even from New Mexico.



Melica porteri Scribner [for Thomas Conrad Porter (1822-1901), American poet, clergyman, botanist]. Shortly rhizomatous perennial, 55-100 cm tall; panicles 13-25 cm long, the branches 1-9 cm long and erect-appressed to strongly divergent; pedicels sharply bent below the spikelets; disarticulation below the glumes; spikelets 8-16 mm long, awnless; lower glumes 3.5-6 mm long; rudiments 1.8-5 mm long, resembling the other florets in shape. •Mountain slopes and forest clearings. ♦We have two varieties:



a Panicle branches mostly erect...var. *porteri* ● Widespread throughout the mountains of the state, but nowhere very common.
 a Panicle branches mostly spreading...var. *laxa* Boyle ● In the southern mountains.

Melinis [millet] [1].

Tufted annuals and perennials; sheaths open; auricles absent; ligules of hairs or membranous and ciliate; inflorescence a panicle; disarticulation below the glumes, the spikelets falling, or sometimes also above the glumes and the upper floret falling; spikelets awned or awnless, with 2 florets, the lower staminate or sterile, the upper fertile; upper floret forming a leathery seedcase. ♦ About 20 species native to Africa and Arabia. The genus *Rhynchelytrum* has been submerged within *Melinis*.

■ McIntosh, L. 1985. Noteworthy collections (New Mexico) [*Rhynchelytrum repens*]. Madroño 32:192. ■ Zizka, G. 1987. Revision der Melinideae Hitchcock (Poaceae, Panicoideae). Bibl. Bot. 138:1-149.

**Melinis repens* (Willdenow) Zizka [creeping] NATAL GRASS [*Rhynchelytrum repens* (Willdenow) C.E. Hubbard, *Rhynchelytrum roseum* (Nees) Bews, *Saccharum repens* Willdenow]. Tufted annual or short-lived perennial, 30-100 cm or more tall, the bases decumbent and rooting at the nodes; leaves glabrous to hairy; panicles 5-22 cm long, 2-12 cm wide, pinkish to reddish and quite showy; spikelets 2-6 mm long; glumes as long as the spikelet, villous-hairy, the hairs to 7 mm long, awnless to awned to 4 mm long; upper floret 1.8-2.7 mm long, awnless. ● Known only from only two localities in Luna and Hidalgo counties; native to Africa and western Asia. ♦ Plants are occasionally sold in nurseries for landscaping. It is an invasive weed in some parts of the world, but does not seem to be spreading in New Mexico and is not (yet) considered a threat.



Miscanthus [pedicelled flower] [0].

Densely tufted, tussocky perennials, sometimes with rhizomes; sheaths open; auricles absent; ligules membranous, ciliate; blades flat; inflorescence a panicles with spicate branches, with unequally pedicelled spikelet pairs, the spikelets all alike; disarticulation below the glumes; spikelets awned or awnless, with 2 florets, the lower sterile, the upper fertile; anthers 2-3. ♦ Species are native to Asia and Africa, and grown for ornament.

■ Hodgkinson, T.R., M.W. Chase, M.D. Lledo, N. Salamin, and S.A. Renvoize. 2002. Phylogenetics of *Miscanthus*, *Saccharum*, and related genera (Saccharinae, Andropogoneae, Poaceae) based on DNA sequences sfrom ITS nuclear ribosomal DNA and plastid trnL intron and trnL-F intergenic spaces. Journal of Plant Research 115:381-392.

**Miscanthus sinensis* Andersson [from China] EULALIA. Perennial in large tussocks, with short rhizomes, 60-200 cm or more tall; leaves mostly basal; sheaths glabrous; blades to 20 mm wide, with conspicuous midnerves 1-2 mm wide; panicles 15-25 cm long, the branches 8-20 cm or more long; spikelets with long callus hairs 6-12 mm long; awns 6-12 mm long. ● Widely used as an ornamental landscape plant, with numerous cultivars; not known as an escape in the wild; native to southeastern Asia. ♦ Plants grow in large tussocks with long arching blades. Forms with banded blades are known as PORCUPINE GRASS (blades stiff, upward-pointing) or ZEBRA GRASS (blades lax, drooping).

Mnesithea [for Mnesitheos, 4th century B.C. Greek physician and herbalist] PIT-GRASS [1].

Tufted annuals; sheaths open, shorter than the internodes; auricles absent; ligules membranous, ciliate; inflorescence of single axillary racemes (rame), composed of pairs of sessile and pedicelled spikelets; disarticulation in the raceme, below the spikelet pair; sessile spikelets fertile, awnless; pedicelled spikelets staminate or sterile, awnless. ♦ About 7 species native to Asia and Australia. Our species was formerly placed in the genus *Hackelochloa*, but Veldkamp et al. (1986) demonstrated the validity of merging that genus into *Mnesithea*.

■ Makings, E. 2010. Plant distribution reports [*Hackelochloa granularis*]. The New Mexico Botanist 51:3. ■ Veldkamp, J.F., R. de Koning, & M.S.M. Sosef. 1986. Generic delimitation of *Rotboellia* and related genera (Gramineae). Blumea 31:281-307.

**Mnesithea granularis* (Linnaeus) de Koning & Sosef [like a little seed] [*Cenchrus granularis* Linnaeus, *Hackelochloa granularis* (Linnaeus) Kuntze]. Tufted annual, 20-80 cm tall or more, with bulbous-based hairs; sheaths shorter than the internodes; ligules 2-3 mm long; blades 6-13 mm wide, cordate-based; raceme 5-27 mm long; sessile spikelets spherical, grenade-like, pitted, 1-1.3 mm long, awnless; pedicelled spikelets extending beyond the sessile ones, flattened, ovate, 1.6-2.2 mm long. ● Dry desert plains and foothills in the bootheel region; native to the Eastern Hemisphere. ♦ The grenade-like sessile spikelets are unmistakable.



Muhlenbergia [for Gotthilf Heinrich Ernst Muhlenberg (1753-1815), Pennsylvania pastor & eminent ecologist] MUHLY [46].

Tufted to rhizomatous (rarely stoloniferous) perennials; sheaths open; auricles absent; ligules membranous, sometimes ciliate; inflorescence a panicle, sometimes spike-like; spikelets with 1(2) florets; disarticulation above the glumes; glumes shorter than to longer than the floret; lemmas 3-nerved, awned or awnless; anthers usually 3. ♦ About 150 species or so, primarily of the New World. We have followed Peterson et al. (2010) in expanding *Muhlenbergia* to include the genera *Blepharoneuron*, *Lycurus*, and *Schedonnardus*, whose similarity to *Muhlenbergia* is immediately obvious. We leave *Aegopogon* and *Redfieldia* as separate, paraphyletic genera, however, because their morphologic differences are so conspicuous (even though we do not dispute the phylogenetic argument for their inclusion).

■ Dorr, L.J. and P.M. Peterson. 1993. Typification of two Buckley grass names revisited: *Muhlenbergia texana* and *M. monticola* (Poaceae). Sida 15(4):589-591. ■ Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Muhlenbergia villiflora villosa*]. Great Basin Naturalist 37(4):530-531. ■ Herrera-A., Y. 1998. A revision of the *Muhlenbergia montana* (Nuttall) Hitchcock complex (Poaceae: Chloridoideae). Brittonia 50(1):23-50. ■ Johnson, S. 2002. New plant distribution records [*Muhlenbergia eludens*]. The New Mexico Botanist 21:2. ■ Morden, C.W. 1995. A new combination in *Muhlenbergia* (Poaceae). Phytologia 79(1):28-30. ■ Morden, C.W. & S.L. Hatch. 1996. Morphological variation and synopsis of the *Muhlenbergia repens* complex (Poaceae). Sida 17(2):349-365. ■ Peterson, P.M. & C.R. Annable. 1990. A revision of *Blepharoneuron* (Poaceae: Eragrostidae). Syst. Bot. 15(4):515-525. ■ Peterson, P.M. & O. Morrone. 1997. Allelic variation in the amphitropical disjunct *Lycurus setosus* (Poaceae: Muhlenbergiinae). Madroño 44(4):334-346. ■ Peterson, P.M. & J.T. Columbus. 2008. *Muhlenbergia alopecuroides* (Poaceae: Muhlenbergiinae), a new combination. Madroño 55(2):159-160. ■ Peterson, P.M., K. Romaschenko, & G. Johnson. 2010. A phylogeny and classification of the Muhlenbergiinae (Poaceae: Chloridoideae: Cynodonteae) based on plastid and nuclear DNA sequences. Amer. J. Bot. 97(9):1532-1554. ■ Pohl, R.W. 1969. *Muhlenbergia*, subgenus *Muhlenbergia* (Gramineae) in North America. Amer. Midl. Naturalist 82:512-542. ■ Reeder, C.G. 1985. The genus *Lycurus* (Gramineae) in North America. Phytologia 57:283-291. ■ Reeder, C.G. 1949. *Muhlenbergia minutissima* (Steudel) Swallen and its allies. J. Wash. Acad. Sci. 39:363-367. ■ Reeder, C.G. & J.R. Reeder. 1995. The resurrection of a species; *Muhlenbergia straminea* (Gramineae). Phytologia 78(6):417-427. ■ Sanchez, E. & Z.E. Rugolo de Agrasar. 1986. Estudio taxonomico sobre el genero *Lycurus* (Gramineae). Parodiiana 4(2):267-310. ■ Soderstrom, T.R. 1967. Taxonomic study of subgenus *Podosemum* and section *Epicampes* of *Muhlenbergia* (Gramineae). Contr. U.S. Natl. Herb. 34:75-189. ■ Swallen, J.R. 1947. The awnless annual species of *Muhlenbergia*. Contrib. U.S. Nat. Her. 29:203-208.

Seven species form large clumps or tussocks and are conspicuous components of their plant communities. Because these are so often noticed and collected, they are identified in a separate key (Key I) at the beginning of this treatment, with the key to all species (Key II) following.

Key I. Large, tussock-forming species (see Key II to all species, below)

- 1 Lower sheaths conspicuously compressed-keeled.....*M. emersleyi*
- 1 Lower sheaths rounded on the back
 - 2 Glumes, excluding the awns 3/4 or more the length of the floret; spikelets awnless
 - 3 Ligules 1-3 mm long; panicles tightly contracted, spike-like, the branch tips erect-appressed*M. rigens*

- 3 Ligules 6-20 mm long; panicles loosely contracted, mostly not spike-like, the branch tips often spreading*M. longiligula*
- 2 Glumes, excluding the awn, 2/3 or less the length of the floret; spikelets awned or awnless
 - 4 Panicles open, very diffuse, 8-40 cm wide, strikingly reddish when mature; landscape plants, not known to escape to the wild
.....*M. capillaris*
 - 4 Panicles narrow or somewhat open, not reddish, or if so, then not in cultivation
 - 5 Lemma awns 5-30 mm long*M. rigida*
 - 5 Lemma awns 0-4(5) mm long
 - 6 Awns (3)5-10 mm long; panicles reddish; glumes 1.5-2 mm long*M. rigida*
 - 6 Awns 0-4(5) mm long; panicles greenish; glumes 2-3 mm long *M. dubia*

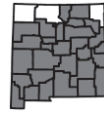
Key II. All species

- 1 Plants annual
 - 2 First glume prominently 2-nerved, usually cleft; panicle branches falling as a unit, bearing 2-3(4) spikelets
 - 3 Glumes about ½ the length of the floret; spikelets 4-6 mm long; lemma awns (5)10-20 mm long*M. brevis*
 - 3 Glumes and floret about equal in length; spikelets 2.5-3.5 mm long; lemma awns 0.5-5(10) mm long..... *M. depauperata*
 - 2 First glume 1-nerved; panicle branches persistent
 - 4 Lemma awns 10-30 mm long
 - 5 Second glume (1)2- to 3-nerved, the apex truncate to acute, 2- or 3-toothed*M. peruviana*
 - 5 Second glume 1-nerved, the apex acute to acuminate*M. tenuifolia*
 - 4 Lemma awns 0-5 mm long
 - 6 Mature panicles narrow, contracted, the branches appressed to the main axis *M. filiformis*
 - 6 Mature panicles open, the branches spreading
 - 7 Glumes glabrous or nearly so
 - 8 Pedicels 0.3-1 mm long, stout, of equal thickness throughout; blades lacking white margins*M. ramulosa*
 - 8 Pedicels 2-8 mm long, capillary but straight, narrowed downward; blades with thickened white margins*M. fragilis*
 - 7 Glumes minutely-pubescent to long-pubescent, at least at the apex (use a lens)
 - 9 Terminal pedicels 2 mm long, the lateral ones appressed to the branchlets*M. eludens*
 - 9 Terminal pedicels mostly longer than 5 mm, the lateral ones spreading to flexuous
 - 10 Pedicels sinuous, often tangled with one another; anthers 0.9-1.4 mm long*M. sinuosa*
 - 10 Pedicels straight or subflexuous, not tangled; anthers 0.3-0.5 mm long
 - 11 Lemma awnless, 0.8-1.5 mm long*M. minutissima*
 - 11 Lemma usually awned, 1.3-2 mm long *M. texana*
 - 1 Plants perennial
 - 12 Second glume evidently 3-nerved, often 3-toothed; lower sheaths flattened, ribbon-like
 - 13 Sheaths usually becoming coiled and appearing like wood shavings; second glume acute, entire or occasionally toothed, nearly as long as the floret..... *M. straminea*
 - 13 Sheaths not conspicuously coiled; second glume toothed to awned, shorter than the floret
 - 14 Ligules 2-5 mm long; stems and blades very slender and narrow; plants usually 15-30 cm tall..... *M. filiculmis*
 - 14 Ligules 10-20 mm long and the tip often shredded; stems and blades more robust; plants 25-80 cm tall..... *M. montana*
 - 12 Second glume 1-nerved, entire or fringed; lower sheaths usually not ribbon-like
 - 15 Stems stiff, wiry, much-branched, the plants bush-like *M. porteri*
 - 15 Stems not as above, the plants not bush-like
 - 16 Plants with evident, slender, creeping rhizomes
 - 17 Callus hairs copious, as long as the body of the lemma *M. andina*
 - 17 Callus hairs long-pubescent to glabrous, but the hairs much shorter than the body of the lemma
 - 18 Awn of the lemma 6-25 mm long
 - 19 Blades mostly 2-6 mm wide, mostly flat*M. mexicana*
 - 19 Blades 0.5-2(2.5) mm wide, mostly rolled
 - 20 Anthers purple, 1.3-3 mm long; lemmas lanceolate, 3.5-5 mm long, the awns 4-12(20) mm long; ligules with lateral lobes to 1.5 mm long.....*M. arsenei*
 - 20 Anthers orange, 1.5-2 mm long; lemmas elliptic, 2-3.5 mm long, the awns 10-25 mm long; ligules lacking lateral lobes *M. polycaulis*
 - 18 Awn of the lemma 0-3(5) mm long
 - 21 Panicles open, loosely flowered with usually spreading to divergent branches at maturity
 - 22 Awns 1-1.5(2) mm long; panicle branches attached in clusters*M. pungens*
 - 22 Awns 0-0.3 mm long; panicle branches not clustered
 - 23 Ligules with pointed lateral extensions 1-2 mm long; blades with thickened white margins and midribs*M. arenacea*
 - 23 Ligules without lateral extensions; blades without thickened white margins or midribs . *M. asperifolia*
 - 21 Panicles contracted, narrow and usually densely flowered, the branches mostly erect to appressed
 - 24 Blades (2.5)3-6 mm wide, mostly flat
 - 25 Glumes 2-3.5 mm long, subequal to the lemma*M. mexicana*
 - 25 Glumes 4.5-6 mm long, the awn-tips much exceeding the lemma
 - 26 Internodes dull and puberulent, usually terete; culms seldom branched above the base; ligules 0.2-0.6 mm long *M. glomerata*
 - 26 Internodes polished and glabrous, keeled; culms much-branched above the base; ligules 0.6-1.7 mm long *M. racemosa*

- 24 Blades 0.5-2(3) mm wide, rolled
 27 Lemma long-pubescent below
 28 Blades 4 cm or more long; glumes acuminate or aristate *M. glauca*
 28 Blades 2-4(5) cm long; glumes acute
 29 Lemma 2-2.5 mm long; glumes about half as long as the floret *M. villiflora*
 29 Lemma 3-4 mm long; glumes shorter than to nearly as long as the floret *M. thurberi*
 27 Lemma glabrous or scabrous only
 30 Inflorescence usually included in the sheath at least below, with 9 nodes or fewer; ligules 0.5-1.5 mm long; glumes ½ to equaling the floret *M. repens*
 30 Inflorescence usually well-exserted from the sheath, with 11-12 nodes; ligules 1-3 mm long; glumes ½ to ½ as long as the floret *M. richardsonis*
- 16 Plants tufted, or sometimes the bases decumbent and spreading, but lacking creeping rhizomes
 31 Panicles of long, strongly divergent, unbranched primary branches bearing widely spaced, sessile, awnless spikelets; blades usually spirally twisted *M. paniculata*
 31 Panicles and blades not as above
 32 Nerves of lemmas and paleas densely pubescent *M. tricholepis*
 32 Nerves of lemmas and/or paleas glabrous, scabrous, or short-pubescent but not densely or noticeably so
 33 Sheaths (at least the lower) compressed-keeled; blades flat or folded
 34 Panicles 20-40 cm long; plants 50-100 cm or more tall in large tussocks *M. emersleyi*
 34 Panicles 5-10 cm long; plants 20-60 cm tall in small tufts
 35 First glume 1-nerved, awnless or with an awn to 1 mm long; lemma awns 0.3-1 mm long
 36 Ligules less than 1 mm long; glumes gradually narrowed to a mucro at most 0.3 mm long *M. cuspidata*
 36 Ligules 1-5 mm long; glumes abruptly narrowed to awns 0.5-1 mm long *M. wrightii*
 35 First glume 2-nerved, with awns 1-3.5 mm long; lemma awns 1.5-3 mm long (*Lycurus*)
 37 Blades terminating in a slender, hair-like bristle 3-12 mm long; ligules acute to acuminate, 3-10 mm long; culms erect *M. alopecuroides*
 37 Blades acute or with a bristle 1-3 mm long; ligules 1.5-3 mm long, with lateral acuminate projections on either side; culms erect to ascending, often geniculate *M. phleoides*
- 33 Sheaths rounded on the back; blades usually becoming rolled
 38 Lemma awns 0-4(5) mm long
 39 Glumes, excluding the awn, 3/4 or more the length of the floret
 40 Ligules 1-3 mm long *M. rigens*
 40 Ligules 6-20 mm long *M. longiligula*
 39 Glumes, excluding the awn, 2/3 or less the length of the floret
 41 Blades 25-60 cm long
 42 Awns (3)5-10 mm long; panicles reddish; glumes 1.5-2 mm long *M. rigida*
 42 Awns 0-4(5) mm long; panicles greenish; glumes 2-3 mm long *M. dubia*
 41 Blades 1-15 cm long
 43 Mature panicles narrow, 0.5-1 cm wide, the primary branches erect to appressed .. *M. filiformis*
 43 Mature panicles open, 4-15 cm wide, at least the primary branches widely spreading
 44 Blades mostly flat, the margins white-cartilaginous *M. arizonica*
 44 Blades mostly rolled or folded, rarely flat, the margins not white-cartilaginous
 45 Blades strongly arcuate, curving, less than 1 mm wide, 1-3(4) cm long; leafy portion ½ or less the length of the plant; lateral pedicels commonly longer than the spikelets *M. torreyi*
 45 Blades rather straight, 1-2 mm wide, 3-15 cm long; leafy portion ½ to ½ the length of the plant; lateral pedicels commonly shorter than the spikelet *M. arenicola*
- 38 Lemma awns 7-40 mm long
 46 Awns 7-10 mm long
 47 Blades 20-60 cm long
 48 Glumes awned; panicles 8-20 cm wide or more; introduced ornamental plants *M. capillaris*
 48 Glumes awnless; panicles 2-4 cm wide; native plants in the wild *M. rigida*
 47 Blades 1-14 cm long; glumes acute to aristate
 49 Blades mostly 1-4(5) cm long; glumes acute; lemmas and paleas sparsely but noticeably short-pilose on the lower half; lateral lobes of ligules less than 1.5 mm long *M. arsenei*
 49 Blades mostly 4-14 cm long; glumes acuminate to aristate; lemmas and paleas glabrous or minutely scaberulous; lateral lobes of ligules 1.5-3 mm long *M. pauciflora*
- 46 Awns 10-40 mm long
 50 Ligules 3-15 mm long
 51 Lemmas purple, scaberulous near the apex; glumes 1-1.3 mm long *M. rigida*
 51 Lemmas straw-colored, smooth and shining; glumes 1.5-2.1 mm long *M. setifolia*
 50 Ligules 0.5-3 mm long
 52 Glumes obtuse, 0.5-1 mm long; lemma awn 20-40 mm long *M. spiciformis*
 52 Glumes acute to subaristate, 1-2 mm long; lemma awn mostly 10-15 mm long
 53 Lemmas essentially glabrous, with only a few closely appressed callus hairs; ligules with lateral lobes 1.5-3 mm long *M. pauciflora*

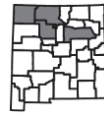
- 53 Lemmas pubescent on the lower half; ligules without lateral lobes
 54 Plant bases usually geniculate and rooting at some of the lowest nodes, sometimes erect, with the lowest sheaths nearly lacking blades; anthers 1.5-2 mm long, orange; lemma hairs to 0.5 mm long.....*M. polycaulis*
 54 Plant bases usually erect, sometime geniculate, rarely rooting at the lowest nodes; anthers 1-1.5 mm long, yellowish; lemma hairs 0.5-1.5 mm long.....*M. tenuifolia*

Muhlenbergia alopecuroides (Grisebach) Peterson & Columbus [resembling *Alopecurus*] WOLFTAIL [*Lycurus phleoides* Kunth var. *glaucofolius* Beal, *Lycurus setosus* (Nuttall) C. Reeder]. Tufted perennial, 30-60 cm tall; sheaths compressed-keeled; ligules 2-12 mm long, long-acuminate, sometimes with a short cleft on either side; blades with prominent whitish midribs extending as fragile bristles 3-12 mm long; panicles 4-10 cm long, 5-8 mm wide, with spikelets borne in unequally pedicelled pairs; disarticulation below the spikelet pair; lower glume 2-nerved, awned to 1-3.5 mm; upper glume 1-nerved, awned to 5 mm; lemmas 3-4 mm long, with an awn 1.5-3 mm long. •Dry slopes, plains, and woodlands, nearly throughout the state. ♦Formerly in the genus *Lycurus*, which has been subsumed in *Muhlenbergia* (see Peterson et al. 2010). WOLFTAIL species may be distinguished as follows: §

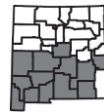


- a Blades terminating in a slender, hair-like bristle 3-12 mm long; ligules acute to acuminate, 3-10 mm long; culms erect...*M. alopecuroides*
 a Blades acute or with a bristle 1-3 mm long; ligules 1.5-3 mm long, with lateral acuminate projections on either side; culms erect to ascending, often geniculate...*M. phleoides*

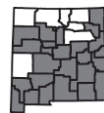
Muhlenbergia andina (Nuttall) A.S. Hitchcock [from the Andes Mts] [*Calamagrostis andina* Nuttall, *Muhlenbergia comata* (Thurber) Bentham]. Rhizomatous perennial, 25-85 cm tall; panicles 2-15 cm long, 0.5-3 cm wide contracted and dense, the branches erect-ascending; spikelets 2-4 mm long; glumes as long as the floret or more; lemmas 2-3.5 mm long, with long hairs 2-3.5 mm long from the callus and base of lemma body; awns 1-10 mm long. •Mountain meadows, forest clearings, gravely river beds, in the northern mountains.



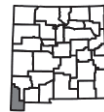
Muhlenbergia arenacea (Buckley) A.S. Hitchcock [of sandy ground] EAR MUHLY [*Sporobolus arenaceus* Buckley, *Sporobolus auriculatus* Vasey]. Rhizomatous perennial, 10-35 cm tall; ligules 0.5-2 mm long, with pointed lateral lobes 1-2 mm long; blades 1-5 cm long, with thickened white margins; panicles 5-15 cm long, nearly as wide; spikelets 1.5-2.6 mm long, sometimes with 2 florets; glumes slightly shorter than the floret, awnless to mucronate; lemmas 1.5-2.5 mm long, awnless or with a mucro to 0.3 mm. •Playas and clay flats in the southern regions, often growing with *Scleropogon brevifolius*. ♦Spikelets may contain 2 florets. The ligular extensions and whitish thickened blade margins are diagnostic. See *Muhlenbergia torreyi* for discussion of similar species.



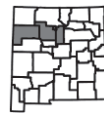
Muhlenbergia arenicola Buckley [sand-dwelling] SAND MUHLY. Tufted perennial, 15-65 cm tall, the bases decumbent; blades 4-15 cm long, the margins not whitish-thickened; panicles 12-30 cm long, 5-20 cm wide, ½ or more the length of the plant; spikelets 2.5-4.2 mm long; glumes shorter than the floret, acute to awn-tipped to 1 mm; lemmas 2.5-4.2 mm long, with awns 0.5-4.2 mm long. •Sandy plains, nearly throughout the state. ♦Slightly curving blades extending partly up the shoots, decumbent-based tufted clumps, and short lateral pedicels help to identify this species. See *Muhlenbergia torreyi* for discussion of similar species.



Muhlenbergia arizonica Scribner [of Arizona]. Tufted perennial, lacking rhizomes, the shoots erect to decumbent, 15-40 cm tall; blades 4-7 cm long, with whitish-thickened margins; panicles 4-20 cm long, 4-15 cm wide; spikelets 2-3 mm long; glumes shorter than the floret, awnless; lemmas 2-3 mm long, with short awns 0.5-1 mm long. •Moist plains and rocky hillsides in the bootheel region, uncommon. ♦A report from Socorro County is unverified. See *Muhlenbergia torreyi* for discussion of similar species.



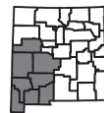
Muhlenbergia arsenei A.S. Hitchcock [for Frère Gerfroy Arsène (1867-1938), French clergyman-botanist at Sacred Heart Training College in Las Vegas, New Mexico]. Rhizomatous to tufted perennial, 10-50 cm tall, decumbent-based; ligules with lateral lobes; blades 1-6 cm long; panicles 4-13 cm long, 1-5 cm wide, loosely contracted; spikelets 3.5-5 mm long; glumes shorter than the floret, awnless or with a short awn to 1.5 mm; lemmas 3.5-5 mm long, pubescent on the lower ½ to ⅓, with awns 4-12 (rarely longer) mm long. •Limestone rock outcrops, gypsum sands, stream-banks; northwestern region. ♦The inflorescence and spikelets are similar to *Muhlenbergia pauciflora*, but that species has glabrous florets with awns 7-25 mm long.



Muhlenbergia asperifolia (Nees & Meyer ex Trinius) Parodi [with rough leaves] SCRATCHGRASS [*Sporobolus asperifolius* (Nees & Meyer ex Trinius) Nees, *Vilfa asperifolia* Nees & Meyer ex Trinius]. Rhizomatous perennial, occasionally stoloniferous, 10-100 cm tall, branching profusely and bushy-like; ligules less than 1 mm long, without lateral extensions; panicles 6-21 cm long, 4-16 cm wide, breaking in the peduncle; spikelets 1-2 mm long, occasionally with 2-3 florets; glumes shorter than the floret, awnless; lemmas 1-2 mm long, glabrous, awnless to mucronate. •Damp or wet ground along streams and rivers, floodplains, alkaline meadows, along seeps and springs; expected in all counties. ♦Plants frequently produce spikelets with 2 florets, and are sometimes infected by a smut fungus (*Tilletia asperifolia*).

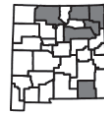


Muhlenbergia brevis C.O. Gooding [short]. Tufted annual, 3-20 cm tall; blade margins whitish-thickened; panicles 3-12 cm long, the branches bearing the spikelets in pedicellate pairs, which fall together or with other pairs on the short branch; spikelets 2.5-6 mm long; glumes shorter than the floret, the lower glume 2-nerved with teeth or awns to 2 mm, the upper glume 1-nerved and awned to 2mm; lemmas 3.5-6 mm long, with awns 10-20 mm long. •Grassy slopes and clearings in volcanic soils in the western half of the state. ♦See comments under *Muhlenbergia depauperata* for comparison to other common annuals.



****Muhlenbergia capillaris*** (Lamarck) Trinius [hair-like] PINK MUHLY. Tufted perennial in expansive clumps, 60-100 cm or more tall; panicles 20-60 cm long, 5-30 cm wide, reddish to pinkish, open and diffuse, the branches and pedicels capillary; spikelets 3-5 mm long; glumes shorter than the spikelets, short-awned; lemmas 3-5 mm long, with awns 2-13(15) mm long. •Introduced as an ornamental landscape plant, not known in the wild; native to eastern Texas and Oklahoma and eastward.

Muhlenbergia cuspidata (Torrey ex Hooker) Rydberg [sharp pointed] [*Vilfa cuspidata* Torrey ex Hooker]. Tufted perennial with knotty bases, not rhizomatous, 20-60 cm tall; sheaths compressed-keeled; ligules 0.2-0.8 mm long; panicles 4-14 cm long, spike-like, less than 1 cm wide; glumes shorter than the floret, 1-nerved, gradually acute, with a mucro to 0.3 mm long; lemmas 2.5-3.6 mm long, with a mucro to 0.6 mm long. •Plains and gravely slopes in the eastern region, uncommon. ♦Similar to *Muhlenbergia wrightii*, but much less common, and distinguished by the ligule and glume features.

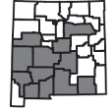


Muhlenbergia depauperata Scribner [impoverished] SIX-WEEKS MUHLY [*Lycurus schaffneri* (Fournier) Mez, *Muhlenbergia schaffneri* Fournier]. Tufted annual, 3-15 cm tall, branching at the nodes; sheaths often longer than the internodes; panicles 2-9 cm long, less than 1 cm wide; spikelets 2.5-5 mm long, in unequally pedicelled pairs, the pair falling as a unit or with other pairs on the short branch; glumes equaling or exceeding the floret, the lower glume 2-nerved and 2-cleft or awned; lemmas 2.5-4.5 mm long, with an awn 6-15 mm long. ●Grassy slopes and clearings in volcanic soils in the southcentral and eastern regions. ◆In addition to this species, most of the annuals could be called “six-weeks muhly,” coming up quickly in bare areas after rains and quickly flowering before the next dry spell; these can be sorted into visual groups as follows:



| | |
|---|--|
| blade margins whitish-thickened | <i>M. brevis</i> , <i>M. fragilis</i> |
| panicles narrow, contracted, somewhat dense | <i>M. brevis</i> , <i>M. depauperata</i> |
| spikelets ± appressed along the branchlets | <i>M. eludens</i> , <i>M. ramulosa</i> |
| spikelets with noticeable awns | <i>M. depauperata</i> , <i>M. eludens</i> , <i>M. texana</i> |

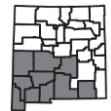
Muhlenbergia dubia Fournier ex Hemsley [uncertain, doubtful] PINE MUHLY [*Muhlenbergia acuminata* Vasey]. Densely tufted perennial, forming large clumps, 30-100 cm tall; ligules 4-10 mm long; blades 10-60 cm long; panicles 10-40 cm long, 0.5-2.5 cm wide; contracted, grayish green; spikelets 3.8-5 mm long; glumes shorter than the florets, blunt, awnless; lemmas 3.8-5 mm long, awnless to awned to 6 mm. ●Woodlands, rocky mountain slopes, canyons.



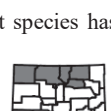
Muhlenbergia eludens C.G. Reeder [evading or baffling]. Scant, tufted annual, 10-40 cm tall; sheaths longer than the internodes; panicles 10-20 cm long, 3-7 cm wide; spikelets 1.7-3 mm long; glumes shorter than the floret, sparsely short-hirsute, 1-nerved, awnless or awned to 1mm; lemmas (1.7)2-2.5 mm long, with awns 1.2-3.5 mm long. ●Rocky woodlands and forest clearings in the western mountains; known from only a few collections. ◆See comments under *Muhlenbergia depauperata* for comparison to other common annuals.



Muhlenbergia emersleyi Vasey [for John Dare Emersley (ca. 1826-ca. 1899), Scottish miner and botanical collector] BULLGRASS. Robust, tussocky perennial, lacking rhizomes, 50-150 cm tall; sheaths compressed-keeled; ligules 10-25 mm long; blades 20-50 cm long, flat or folded, 2-6 mm wide; panicles 20-45 cm long, loosely contracted to open, 3-15 cm wide, the branches not bearing spikelets in the lower parts; spikelets 2.2-3.2 mm long; glumes longer than the floret, 1-nerved; lemmas 2-3 mm long, short-hairy on lower ¾, with awns 1-15 mm long. ●Rocky hills and woodlands, mostly in the southern regions. ◆Another tussocky, long-liguled species in New Mexico is *Muhlenbergia longiligula*, but that species has rounded basal sheaths, panicle branches spikelet-bearing to the base, and awnless, glabrous florets.



Muhlenbergia filiculmis Vasey [thread-like stems]. Tufted perennial, lacking rhizomes, 5-30 cm tall; sheaths becoming flattened and ribbon-like but not coiling like wood-shavings; ligules 2-5(8) mm long; panicles 2-7 cm long, 1-2 cm wide; spikelets 2.2-3.5 mm long; glumes shorter than the floret, the lower 1-nerved and awn-tipped, the upper 3-nerved and 3-toothed; lemmas 2.2-3.5 mm long, appressed short-hairy on lower half, with awns 1-5 mm long. ●Moist, sandy ground in high mountain grasslands and clearings, in the northern mountains.



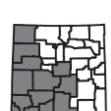
Muhlenbergia filiformis (Thurber ex S. Watson) Rydberg [thread-like] PULL-UP MUHLY [*Vilfa depauperata* Torrey ex Hooker var. *filiformis* Thurber ex S. Watson]. Tufted annual, sometimes appearing perennial, 5-35 cm tall, erect to geniculate-based and rooting at the lower nodes; sheaths shorter than the internodes; panicles 1-6 cm long, less than 1 cm wide, spike-like, the branches well-spaced; spikelets 1.5-3.2 mm long; glumes shorter than the floret, 1-nerved, rounded to acute; lemmas 1.5-3 mm long, appressed hairy with hairs to 0.3 mm long, awnless or with a mucro shorter than 1 mm. ●Ponderosa/Douglas-fir forests, occasionally higher, mostly in the northern mountains, but populations also in the Mogollon Mountains.



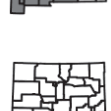
Muhlenbergia fragilis Swallen [fragile] DELICATE MUHLY. Tufted annual, 10-35 cm tall; ligules 1-3 mm long, with long lateral lobes or projections on the sides; blade margins whitish-thickened; panicles 10-24 cm long, 4-11 cm wide, open and diffuse; pedicels capillary, 2-8 mm long, generally straight, narrowed downward from the spikelet; spikelets tiny, 1-1.2 mm long; glumes shorter than or subequal to the floret, glabrous or nearly so, awnless; lemmas 1-1.2 mm long, glabrous to hairy on the nerves, awnless. ●Moist sandy soil and rocky clearings in the western mountain regions and northwestern mesas. ◆See comments under *Muhlenbergia depauperata* for comparison to other common annuals.



Muhlenbergia glauca (Nees) B.D. Jackson [bluish green] [*Muhlenbergia lemmonii* Scribner, *Podosemum glaucum* Nees]. Rhizomatous perennial, 25-60 cm tall, often decumbent; blades 4-12 cm long, 1-2.5 mm wide; panicles 4-17 cm long, 0.5-2.5 cm wide, contracted; spikelets 2.4-3.5 mm long; glumes shorter than to subequal to the floret, 1-nerved, acuminate, with awns to 1 mm; lemmas 2.4-3.4 mm long, hairy on the lower ½, short-awned to 5 mm. ●Desert plains in the bootheel region, with an outlier eastward; little known in New Mexico.



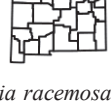
Muhlenbergia glomerata (Willdenow) Trinius [wound up] SPIKE MUHLY [*Polypogon glomeratus* Willdenow]. Rhizomatous perennial, 30-120 cm tall, seldom branched above the base; internodes dull, puberulent, terete; ligules 0.2-0.6 mm long; blades 2-6 mm wide; panicles 2-12 cm long, 0.5-2 cm wide, lobed; spikelets 3-8 mm long; glumes subequal, much exceeding the floret (including the awn-tip; lemmas 2-3 mm long, long-hairy on the lower ½, awnless or awn-tipped to 1mm. ●Moist shaded ground in conifer forest; known from a single collection in Colfax County. ◆This is the southern-most locality for this mostly Canadian species. Similar to the frequently encountered *Muhlenbergia racemosa*, which is distinguished by much-branched shoots, polished and glabrous internodes, and ligules 0.6-1.7 mm long.



Muhlenbergia longiligula A.S. Hitchcock [with long ligules] LONGTONGUE MUHLY [*Epicampes stricta* Presl]. Tufted, tussocky perennial, 60-130 cm tall; sheaths rounded; ligules (6)10-30 mm long; panicles 15-55 cm long, 1-15 cm wide, loosely contracted; spikelets 2-3.5 mm long; glumes mostly longer than the floret, awnless or with a mucro to 0.2 mm; lemmas 2-3 mm long, awnless or awned to 2 mm. ●Canyons and rocky slopes, mostly in the southwestern region. ◆Large *Muhlenbergia* with noticeable ligules include *M. dubia* (4-10 mm), *M. emersleyi* (10-25 mm), *M. longiligula* (10-30 mm), *M. montana* (4-20 mm), and *M. rigida* (1-15 mm).

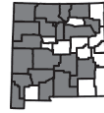


Muhlenbergia mexicana (Linnaeus) Trinius [of Mexico] [*Agrostis filiformis* Torrey, *Agrostis mexicana* Linnaeus, *Muhlenbergia mexicana* (Linnaeus) Trinius forma *ambigua* (Torrey) Fernald, *Muhlenbergia mexicana* (Linnaeus) Trinius var. *filiformis* (Torrey) Scribner]. Rhizomatous perennial, 30-90 cm tall, much-branched above the base; sheaths somewhat keeled; ligules 0.4-1 mm long; blades 2-6 mm wide; panicles 3-20 cm long, 0.5-3 cm wide, dense, interrupted; spikelets 1.5-3.8 mm long; glumes equaling or slightly shorter than floret, acuminate, awnless or awn-tipped to 2 mm; lemmas 1.5-3.8 mm long,

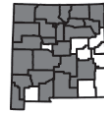


hairy on the lower 1/2, awnless or with awns to 10 mm long. ●Moist thickets, woodlands, and canyon bottoms, scattered locales; not well-known in the state. ♦Some have segregated long-awned forms as var. *filiformis*, but the distinction seems without merit. Despite the name, *Muhlenbergia mexicana* is not known to occur in Mexico.

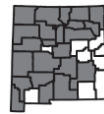
Muhlenbergia minutissima (Steudel) Swallen [very tiny] LEAST MUHLY [*Agrostis minutissima* Steudel, *Sporobolus confusus* auctores]. Tufted, annual, 5-40 cm tall, much-branched from the base; ligules 1-2.5 mm long, sometimes with lateral projections; blade margins not whitish-thickened; panicles 5-20 cm long, 1.5-6 cm wide, open, diffuse; pedicels straight or curving somewhat, but not flexuous; spikelets 0.8-1.5 mm long; glumes shorter than the floret, sparsely hairy, 1-nerved, acute; lemmas 0.8-1.5 mm long, awnless. ●Moist, sandy or rocky slopes, widespread. ♦See comments under *Muhlenbergia depauperata* for comparison to other common annuals. §



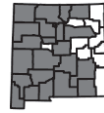
Muhlenbergia montana (Nuttall) A.S. Hitchcock [of mountains] MOUNTAIN MUHLY [*Calycodon montanum* Nuttall, *Calycodon montanum* Nuttall, *Muhlenbergia trifida* Hackel]. Tufted perennial, 20-80 cm tall; sheaths becoming flattened and ribbon-like, usually not coiled like woodshavings but sometimes so; ligules 4-20 mm long; panicles 5-25 cm long, 1-6 cm wide; spikelets 3-7 mm long; glumes shorter than the floret, the lower 1-nerved and awnless or nearly so, the upper 3-nerved and 3-toothed to shortly 3-awned; lemmas 3-7 mm long, appressed-hairy on the lower portion, with awns 6-25 mm long. ●Rocky or grassy slopes, ledges, forest clearings, widespread. ♦Mountain muhly has been confused with *Muhlenbergia straminea*, which has prominently coiled old sheaths and second glumes equaling or exceeding the lemma. This is a common understory grass in ponderosa pine forests, providing abundant forage.



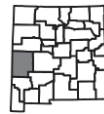
Muhlenbergia paniculata (Nuttall) P.M. Peterson [having a panicle] TUMBLEGRASS [*Lepturus paniculatus* Nuttall, *Schedonnardus paniculatus* (Nuttall) Trelease]. Tufted perennial, 10-55 cm tall; leaves mostly basal; sheaths compressed-keeled; blades usually spirally twisted in age, the margins whitish-thickened; panicles 8-45 cm long, breaking at the base and rolling, the spike-like branches widely spaced, 5-16 cm long; spikelets mostly sessile and widely spaced, 3-5.5 mm long, awnless; glumes a bit shorter than the floret; lemmas 3-5 mm long, awnless or awn-tipped. ●Plains and grasslands nearly throughout the state. ♦We follow Peterson et al. (2010) in subsuming *Schedonnardus* within *Muhlenbergia*. The twisted blades and curved panicle with spike-like branches are distinctive.



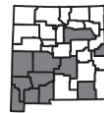
Muhlenbergia pauciflora Buckley [few-flowered] NEW MEXICO MUHLY [*Muhlenbergia neomexicana* Vasey]. Tufted perennial, often bushy, sometimes rhizomatous or geniculate and rooting at the lower nodes, 30-70 cm tall; sheaths shorter than the internodes; ligules 1-5 mm long, with lateral projections 1.5-3 mm longer than the central portion; blades 4-15 cm long; panicles 3-15 cm long, 1-3 cm wide; loosely contracted, the branches spikelet-bearing to the base; spikelets 3.5-5.5 mm long, occasionally with 2 florets; glumes shorter than the floret, acuminate to awn-tipped to 2mm; lemmas 3-5.5 mm long, often purplish, glabrous except for the callus, with awns 2-25 mm long. ●Rocky slopes, ledges, and mountain outcrops, widespread. ♦A bushy habit, purplish panicles, visible awns, and glabrous florets help distinguish this species.



Muhlenbergia peruviana (Beauvois) Steudel [of Peru] [*Clomena peruviana* Beauvois, *Muhlenbergia pulcherrima* Scribner]. Tufted annual, 3-25 cm tall; ligules 1.5-3 mm long; blades 1-5 mm long, somewhat stiff and straight, at least when young; panicles 2-8 cm long, 0.5-3.5 cm wide, contracted to somewhat open; spikelets 1.5-4.2 mm long; glumes shorter than the floret, awnless, awn-tipped, or the upper one 2-3-toothed; lemmas 1.5-4.2 mm long, sparsely short-hairy below, with awns 3-10 mm long. ●Mountain meadows and ciénegas, known only from Catron County.

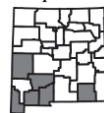


Muhlenbergia phleoides (Kunth) Columbus [resembling *Phleum*] WOLFTAIL [*Lycurus phleoides* Kunth]. Tufted perennial, 20-50 cm tall; sheaths compressed-keeled; ligules 1.5-3 mm long, acute to acuminate, with pointed lateral projections 1.5-4 mm long on either side; blades with prominent whitish midribs extending as a bristle only as much as 3 mm; panicles 4-10 cm long, 5-8 mm wide, with spikelets borne in unequally pedicelled pairs; disarticulation below the spikelet pair; lower glume 2-nerved, awned to 3.5 mm; upper glume 1-nerved, awned to 5 mm; lemmas 3-4 mm long, with an awn 1.5-3 mm long. ●Dry slopes, plains, and woodlands mostly in the southern regions. ♦Formerly in the genus *Lycurus*, which has been subsumed in *Muhlenbergia* (see Peterson et al. 2010). WOLFTAIL species may be distinguished as follows:

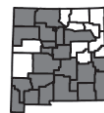


- Blades terminating in a slender, hair-like bristle 3-12 mm long; ligules acute to acuminate, 3-10 mm long; culms erect.....*M. alopecuroides*
- Blades acute or with a bristle 1-3 mm long; ligules 1.5-3 mm long, with lateral acuminate projections on either side; culms erect to ascending, often geniculate.....*M. phleoides*

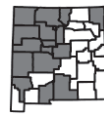
Muhlenbergia polycaulis Scribner [many-stemmed]. Loosely tufted perennial usually with geniculate-decumbent bases and rooting at some of the lower nodes, sometimes shortly rhizomatous, 15-45 cm tall; ligules 0.5-2.5 mm long, without lateral projections; panicles 2-12 cm long, 1-2 cm wide, interrupted; spikelets 2.5-4 mm long; glumes shorter than the florets, acute to acuminate, awnless or awn-tipped to 1.5 mm; lemmas 2-3.5 mm long, appressed hairy on the lower portion, the hairs to 0.5 mm long; awns 10-25 mm long. ●Shaded ledges and grassy slopes in the southern regions. ♦This species is poorly known in the state, with few collections.



Muhlenbergia porteri Scribner ex Beal [for Thomas Conrad Porter (1822-1901), American poet, clergyman, botanist] BUSH MUHLY. Tufted, bushy perennial, lacking rhizomes, 25-100 cm or more tall, the culms wiry, stiff, geniculate, zig-zaggy; sheaths shorter than the internodes; ligules 1-4 mm long, with short lateral lobes; panicles 4-14 cm long, 6-15 cm wide, widely open and diffuse, breaking at the base and blowing in the wind; spikelets 3-4.5 mm long; glumes shorter than the florets, acuminate to mucro-tipped; lemmas 3-4.5 mm long, appressed-pubescent on the lower portion, with awns 2-13 mm long. ●Dry plains, nearly throughout the state. ♦This is an important species in the desert grasslands, nearly always found in the protection of shrubs. Early settlers and soldiers would gather large quantities of bush muhly for feed for their animals, and the grass was called HOE-GRASS for a time; it is called MESQUITE-GRASS in W&S. §



Muhlenbergia pungens Thurber [sharp-pointed] SANDHILL MUHLY. Rhizomatous perennial, 15-70 cm tall; sheaths gray-wooly proximally, glabrous distally; ligules less than 1 mm long, with short lateral lobes; blades 2-8 cm long, stiff and pungent; panicles 8-20 cm long, 3-14 cm wide, the primary branches widely spreading, the pedicels often appressed; spikelets 2.5-4.5 mm long; glumes shorter than the floret, acuminate to awn-tipped to 1 mm; lemmas 2.5-4.5 mm long, with an awn 1-2 mm long; paleas 2-awned to 1 mm long. ●Sand dunes and plains, mostly in the western regions. ♦The blades are stiff and pungent, capable of puncturing the skin. Rattlesnakes seem to enjoy these grasses, as well as agrostologists. §

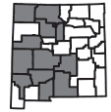


Muhlenbergia racemosa (Michaux) Britton, Sterns, & Poggenburg [raceme-like] GREEN MUHLY [*Agrostis racemosa* Michaux]. Rhizomatous perennial, 30-110 cm tall, much-branched above the middle of the shoot; internodes flattened; sheaths slightly keeled; ligules 0.6-1.7 mm long; blades 2-5 mm wide, flat; panicles 2-16 cm long, 0.5-2 cm wide, dense, lobed; spikelets 3-8 mm long; glumes longer than the lemmas, awned to 5 mm; lemmas 2.2-3.8 mm long, pilose on the lower ½, the hairs to 1 mm long; awnless or awn-tipped to 1 mm. ●Canyon bottoms, riparian strands, irrigation ditches, moist prairies, roadsides. ◆Similar to the rare (in NM) and mostly Canadian *Muhlenbergia glomerata*, which is distinguished by shoots seldom branched above, dull puberulent internodes, and ligules 0.2-0.6 mm long.



distinguished

Muhlenbergia ramulosa (Kunth) Swallen [much-branched] RED MUHLY [*Muhlenbergia wolfii* (Vasey) Rydberg, *Vilfa ramulosa* Kunth]. Tufted annual, 3-25 cm tall, much-branched; ligules 0.2-0.5 mm long, without lateral projections; panicles 1-9 cm long, 1-3 cm wide, the primary branches spreading; pedicels tending to be appressed, 0.3-1.1 mm long, stout, of equal thickness throughout; spikelets tiny, 0.8-1.3 mm long; glumes shorter than the floret, glabrous, awnless; lemmas 0.8-1.3 mm long, oval, awnless. ●Moist soil in forest clearings in the central and western mountains, and northwestern mesas. ◆See comments under *Muhlenbergia depauperata* for comparison to other common annuals.



Muhlenbergia repens (Presl) A.S. Hitchcock [creeping] CREEPING MUHLY [*Sporobolus repens* Presl]. Rhizomatous perennial, 5-40 cm tall, the shoots decumbent-based, forming mats; ligules 0.2-1.8 mm long; blades 1-6 cm long; panicles 1-9 cm long, less than 1 cm wide, with few widely spaced spikelets, usually partially included in the subtending sheath; spikelets 2.6-4.2 mm long, occasionally with 2 florets; glumes ½ to equaling the floret; lemmas 2.6-4 mm long, awnless or with a mucro to 0.3 mm long. ●Flats, roadside swales, moist plains, widespread and expected in all the counties. ◆Sometimes confused with *Muhlenbergia utilis* (Torrey) A.S. Hitchcock of high elevation wet meadows, but that species is as yet unknown from the state.



Muhlenbergia richardsonis (Trinius) Rydberg [for John Richardson (1787-1865), Scottish naturalist and naval surgeon] [*Muhlenbergia squarrosa* Rydberg, *Vilfa richardsonis* Trinius]. Rhizomatous perennial, 5-30 cm tall, shoots decumbent to erect, forming loose mats; ligules 0.8-3 mm long; panicles 1-15 cm long, less than 2 cm wide, exerted, often spike-like; spikelets 1.7-3.1 mm long, ½ to ½ as long as the floret, awnless; lemmas 1.7-3 mm long, awnless to mucronate to 0.5 mm. ●Mountain meadows and ciénegas; not common. ◆The common name MAT MUHLY has been applied widely to both *Muhlenbergia richardsonis* and *M. repens*, and its use is abandoned here. The two species are easily confused, and reports of *M. richardsonis* in New Mexico should be evaluated carefully; it is much less common than *M. repens*.



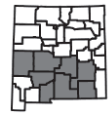
Muhlenbergia rigens (Benth) A.S. Hitchcock [stiff, rigid] DEERGRASS [*Epicampes rigens* Benth, *Muhlenbergia mundula* I.M. Johnston]. Tufted, tussocky perennial, 40-150 cm tall; sheaths terete basally; ligules 0.5-3 mm long; blades 10-50 cm long, stiff; panicles 15-60 cm long, 0.5-1.5 cm wide, spike-like; spikelets 2.4-4 mm long; glumes subequal to the floret, awnless; lemmas 2.4-4 mm long, awnless or with a mucro to 1 mm. ●Dry woodland stream banks, rocky canyons, gullies, common in the southwestern region but in scattered locales elsewhere; also found increasingly as an ornamental landscape plant.



Muhlenbergia rigida (Kunth) Trinius [stiff, rigid] PURPLE MUHLY [*Muhlenbergia affinis* Trinius, *Muhlenbergia metcalfei* M.E. Jones, *Podosemum rigida* Kunth]. Tufted, tussocky perennial, 40-100 cm tall; lower sheaths terete; ligules 1-15 mm long; blades 12-35 cm long; panicles 10-35 cm long, 2-10 cm wide, narrow but loose and sometimes quite open, purplish; spikelets 3.5-5 mm long, purplish; glumes shorter than the floret, awnless; lemmas 3.5-5 mm long, purplish, with awns (5)10-22 mm long. ●Rocky hillsides, canyon slopes, and woodlands in the southern regions. ◆Plants with narrower panicles and shorter awns have been called *Muhlenbergia metcalfei*, which is absorbed here; the diminution of *M. metcalfei* is historically unfortunate, as the epithet honors Orrick Baylor Metcalfe (1879-1936), botanical collector and student of E.O. Wootton.



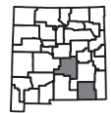
Muhlenbergia setifolia Vasey [with bristle- or hair-like leaves] CURLYLEAF MUHLY. Tufted perennial, 30-80 cm tall; basal sheaths terete; ligules 4-10 mm long; blades 5-20 cm long, tightly rolled, curly; panicles 10-25 cm long, 2-5 cm wide, loosely contracted; spikelets 3.5-5 mm long, straw-colored to purplish; glumes shorter than the floret, awnless or with a short mucro, the lower one nerve-less; lemmas 3.5-5 mm long, smooth and shiny (except for the callus), with flexuous awns 10-30 mm long. ●Dry gravelly plains and hillsides, juniper woodlands, in the southern regions.



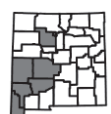
Muhlenbergia sinuosa Swallen [curvy]. Tufted, branched annual 15-40 cm tall; ligules 1.5-3 mm long, with lateral projections longer than the central portion; blades mostly flat, puberulent adaxially; panicles 10-26 cm long, 3-8 cm wide, open and diffuse; pedicels curved or sinuous, often tangled; spikelets 1.4-2 mm long; glumes shorter than the floret, conspicuously hairy, awnless; lemmas 1.4-2 mm long, awnless. ●Moist soil of canyon bottoms, riparian habitats, and rocky hills, mostly in the central and western mountains. ◆See comments under *Muhlenbergia depauperata* for comparison to other common annuals.



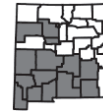
Muhlenbergia spiciformis Trinius [spike-shaped] [*Muhlenbergia parviglumis* Vasey]. Tufted perennial, lacking rhizomes, 25-80 cm tall, erect and wiry; ligules 1-3 mm long; panicles 5-20 cm long, 0.5-3 cm wide, narrow; spikelets 3-4 mm long; glumes much shorter than the floret, awnless; lemmas 2.8-4 mm long, slightly appressed hairy below, with awns 10-40 mm long. ●Canyons and moist woodlands, known only from a few collections in Lincoln and Eddy counties.



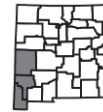
Muhlenbergia straminea A.S. Hitchcock [straw-like] SCREWLEAF MUHLY [*Muhlenbergia virescens* auctores]. Tufted perennial, 25-70 cm tall; sheaths becoming flattened and ribbon-like, coiling like woodshavings in age; ligules 6-20 mm long; panicles 8-25 cm wide, 0.5-3 cm wide, loosely contracted; spikelets 3.5-7 mm long; glumes awnless or shortly awn-tipped, the upper equaling or exceeding the floret, 3-nerved and sometimes 3-toothed; lemmas 3.5-6 mm long, hairy on the lower ½, with awns 12-30 mm long. ●Rocky slopes and clearings, mostly in pine forest, southwestern mountains. ◆SCREWLEAF MUHLY has been confused with *Muhlenbergia montana*, with which it often occurs, which has only occasionally coiled old sheaths and second glumes shorter than the lemma. Reeder & Reeder (1995) cleared up the prior confusion with *M. virescens* (Kunth) Trinius, a species of Mexico.



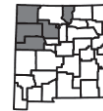
Muhlenbergia tenuifolia (Kunth) Trinius [thin-leaved] MESA MUHLY [*Calamagrostis tenuifolia* Kunth, *Muhlenbergia monticola* Buckley]. Tufted annual to short-lived perennial, 20-70 cm tall; sheaths shorter than the internodes; ligules 1.2-5 mm long; panicles 7-20 cm long, 0.5-3 cm wide, lax, often nodding, interrupted; spikelets 2-4 mm long; glumes shorter than the floret, awnless or awn-tipped; lemmas 2.3-4 mm long, hairy on the lower ½, with an awn 10-30 mm long. ●Rocky ledges and outcrops, canyons, sandy drainages. ◆Plants from San Juan and McKinley counties must be examined closely, as these have been confused with *M. pauciflora*, which has nearly glabrous florets.



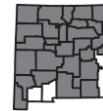
Muhlenbergia texana Buckley [of Texas]. Slender tufted annual, 10-35 cm tall; ligules 1-2.5 mm long; panicles 9-21 cm long, 2-7 cm wide, loosely diffuse; spikelets 1.3-2 mm long; glumes shorter than the floret, sparsely short-hairy, awnless or with a mucro; lemmas 1.3-2 mm long, short-appressed-hairy on the lower ½, awnless or with an awn to 2 mm. ●Rocky outcrops, sandy drainages, disturbed ground, southwestern counties.



Muhlenbergia thurberi (Scribner) Rydberg [for George Thurber (1821-1890), American botanist and naturalist]. Rhizomatous perennial, 12-36 cm tall, the aerial stems densely clustered at the base of the shoot; sheaths shorter than the internodes; ligules 0.9-1.2 mm long; blades 0.5-4 cm long, tightly rolled; panicles 1-6 cm long, less than 1 cm wide; spikelets 2.6-4 mm long; glumes shorter than the floret, awnless; lemmas 2.6-4 mm long, hairy on the lower ¾, awnless or with an awn to 1 mm. ●Dry hills in the northwestern region.



Muhlenbergia torreyi (Kunth) A.S. Hitchcock ex Bush [for John Torrey (1796-1873), distinguished American botanist] RING MUHLY [*Agrostis torreyi* Kunth, *Muhlenbergia gracillima* Torrey]. Tufted perennial lacking rhizomes, the bases decumbent, 10-45 cm tall; leaves concentrated at the base of the plant, the leafy portion in the lower ¼ or less; blades 1-5 cm long, tightly folded or rolled, strongly curving, the margins not whitish-thickened; panicles 7-21 cm long, 3-15 cm wide; spikelets 2-3.5 mm long; glumes shorter than the floret, awnless or with an awn to 1 mm; lemmas 2.3-3.5 mm long, with awns 0.5-4 mm long. ●Sandy plains, throughout the state. ◆An abundance of this grass often indicates an overgrazed range. As the clumps grow, the interior portions die off, producing a ring-like growth form; the short curving blades concentrated at the base of the plant are distinctive. Four species of low stature and similar habitat that are likely to be confused are compared below: §

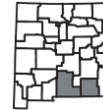


| | <i>arenacea</i> | <i>arenicola</i> | <i>arizonica</i> | <i>torreyi</i> |
|------------------------|-------------------------|--------------------------------|----------------------------------|--------------------------|
| habit | rhizomatous | tufted, bases decumbent | tufted, bases erect to decumbent | tufted, bases decumbent |
| ligules | with lateral extensions | lacking extensions | lacking extensions | lacking extensions |
| blade / plant ratio | ½ or more plant height | ½ or more plant height | ¼ or more plant height | 1/8 or less plant height |
| blade shape | ± straight | ± straight to slightly curving | ± straight | strongly curving |
| blade length | 1-5 cm | 4-15 cm | 4-7 cm | 1-5 cm |
| blade margins | whitish-thickened | not whitish-thickened | whitish-thickened | not whitish-thickened |
| lateral pedicel length | > spikelets | < spikelets | > spikelets | > spikelets |
| lemmas length | 1.5-2.5 mm | 2.5-4.2 mm | 2-3 mm | 2.3-3.5 mm |
| lemma awn | 0-0.3 mm | 0.5-4.2 mm | 0.5-1 mm | 0.5-4 mm |

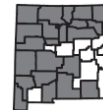
Muhlenbergia tricholepis (Torrey) Columbus [hairy scale] PINE DROPSEED [*Blepharoneuron tricholepis* (Torrey) Nash, *Vilfa tricholepis* Torrey]. Plants perennial, tufted, 15-65 cm tall; panicle 3-22 cm long, the branches spreading; pedicels capillary, sinuous; spikelets with a single floret, grayish, 1.8-3 mm long; disarticulation above the glumes; lemma slightly longer than the glumes, 3-nerved, silky hairy on the nerves and margins, awnless; palea shorter than the lemma, densely silky hairy; anthers 3. ●Widespread on rocky or gravelly slopes in the mountains and foothills. ◆Formerly segregated in *Blepharoneuron*, but we agree with Peterson et al. (2010) in its realignment with *Muhlenbergia*. A related species, *Muhlenbergia shepherdii* Vasey, is known in the mountains of Chihuahua, Mexico, and may be looked for in Hidalgo County; it is a slender annual with smaller florets. §



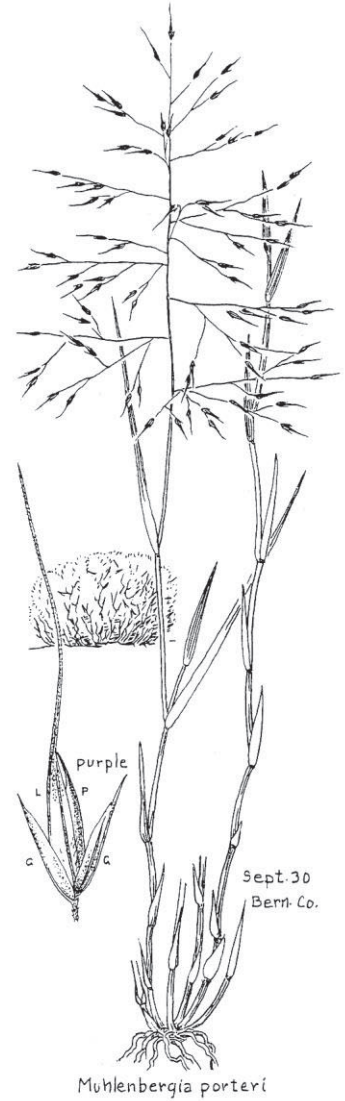
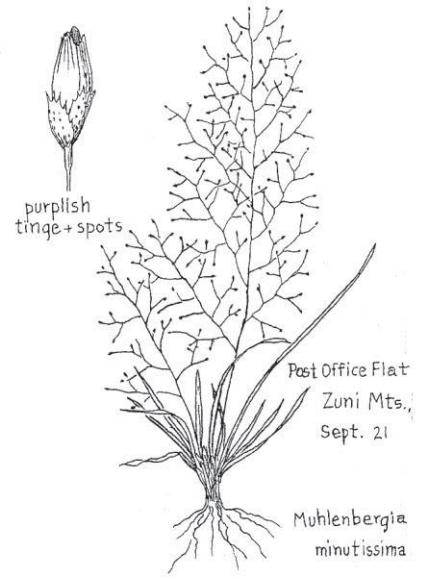
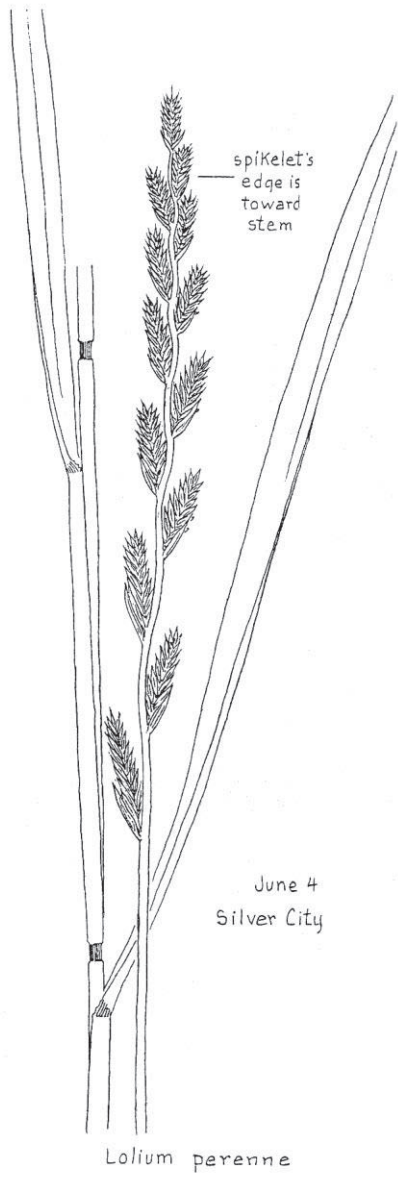
Muhlenbergia villiflora A.S. Hitchcock [shaggy-haired flowers]. Rhizomatous perennial, 5-30 cm tall; sheaths shorter than the internodes; ligules 0.5-1.5 mm long; blades tightly rolled; panicles 1-5 cm long, less than 1 cm wide, not dense, usually exerted from the subtending sheath; spikelets 1.4-2.5 mm long; glumes shorter than the floret, glabrous, awnless; lemmas 1.4-2.5 mm long, villous nearly throughout, awnless or with a short mucro to 0.5 mm. ●Dry plains; known in New Mexico from a few collections in Eddy and Otero counties. ◆Our plants belong to var. *villosa* (Swallen) Morden [shaggy-haired] [*Muhlenbergia villosa* Swallen].

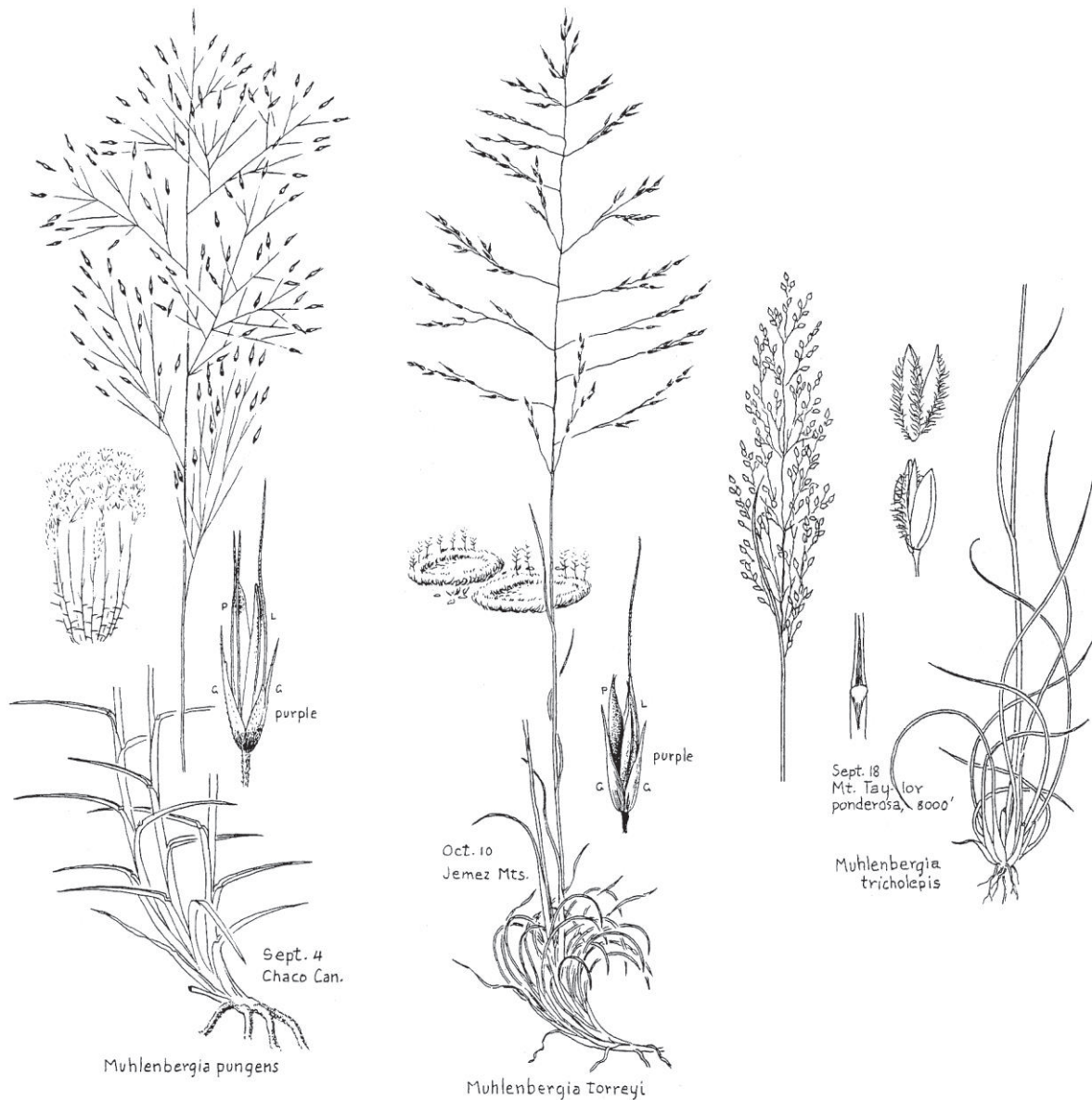


Muhlenbergia wrightii Vasey ex Coulter [for Charles Wright (1811-1885), outstanding American botanical collector] SPIKE MUHLY. Tufted perennial, 15-60 cm tall; sheaths compressed-keeled; ligules 1-5 mm long; panicles 5-16 cm long, 1 cm wide or less, spike-like, interrupted below; spikelets 2-3 mm long; glumes ¾ or less the length of the lemma, abruptly acuminate to an awn-tip to 1 mm; lemmas 2-3 mm long, minutely hairy on the lower ¾, awnless or with an awn-tip to 1 mm. ●Plains and grassy hills and slopes, widespread. ◆We have six *Muhlenbergia* species with compressed-keeled sheaths: *alopecuroides*, *cuspidata*, *emersleyi*, *paniculata*, *phleoides*, and *wrightii*. This is a convenient vegetative identification feature; combined with the following, the species can be eliminated in order:



| | |
|---|--|
| Plants 50-150 cm tall, tussocky | <i>M. emersleyi</i> (hardly possible to be confused with the others) |
| Blades spirally-twisted and with whitish-thickened margins | <i>M. paniculata</i> |
| Blades terminating in a bristle 3-12 mm long | <i>M. alopecuroides</i> |
| Ligules less than 1 mm long | <i>M. cuspidata</i> |
| Ligules with long pointed lateral projections on either side of the central portion | <i>M. phleoides</i> |
| And the last man standing | <i>M. wrightii</i> |





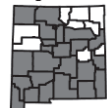
Munroa [for William Munro (1818-1880), British botanist & soldier] [2].

Stoloniferous annuals or perennials, often mat-forming, the stolons ending in fascicles of leaves from which arise new shoots; sheaths open, with a tuft of hair at the throat; auricles absent; ligules a ring of hairs; blades flat or involute; inflorescence a dense, head-like cluster of spike-like branches, the branches hidden in the subtending sheath and bearing a few spikelets; spikelets with few to several florets, the lower fertile, the upper sterile; disarticulation both above the glumes and between the florets or beneath the leaves subtending the panicle; glumes subequal to the adjacent lemmas; lemmas 3-nerved, 2-lobed, pilose along the nerves; paleas subequal to the lemmas; anthers 2-3. ♦All but 2 of the 6 species in this genus are confined to South America. We include the genus *Dasyochloa* here. The name was originally mis-spelled *Monroa*, an obvious orthographic error that is correctable and need not endure. Young plants of both species may produce a white, wooly covering, appearing like floccose hairs. These are hair-like, water soluble crystals that wash off in water, the product of transpiration and evaporation (Parodi 1934). *Munroa squarrosa* var. *floccuosa* was named from such a specimen.

- Anton, A.M & A.T. Hunziker. 1978. El genero *Munroa* (Poaceae): Sinopsis morfologica y taxonomica. Bol. Acad. Nac. Ci. 52:229-252.
- Caro, J.A. 1981. Rehabilitación del género *Dasyochloa* (Gramineae). Dominguezia 2:1-17.
- Parodi, L.R. 1934. Contribución al estudio de las gramíneas del género *Munroa*. Revista Mus. La Plata 34:171-193.
- Sánchez, E. 1984. Estudios anatómicos en el género *Munroa* (Poaceae, Chloridoideae, Eragrostideae). Darwiniana 25:43-57.
- Valdés-R., J. & S.L. Hatch. 1995. Anatomical study of *Erioneuron* and *Dasyochloa* (Poaceae: Chloridoideae: Eragrostideae) in North America. Sida 16(3):413-426.
- Valdés-R. & S.L. Hatch. 1997. A revision of *Erioneuron* and *Dasyochloa* (Poaceae: Eragrostideae). Sida 17(4):645-666.

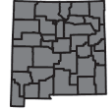
- 1 Plants perennial; blades rolled; glumes longer than the lower lemma..... ***M. pulchella***
- 1 Plants annual; blades flat; glumes shorter than the lower lemma..... ***M. squarrosa***

Munroa pulchella (Kunth) L.D. Amarilla [beautiful and little] FLUFFGRASS [*Dasyochloa pulchella* (Kunth) Willdenow ex Rydberg, *Erioneuron pulchellum* (Willdenow ex Rydberg) Tateoka, *Tridens pulchellus* (Willdenow ex Rydberg) Hitchcock, *Triodia pulchella* Kunth]. Stoloniferous perennial (though sometimes short-lived), 2-15 cm tall, the peduncle/stolon 3-10 cm long; blades 2-6 cm long, involute; panicles 1-2 cm long, densely white-hairy; glumes 6-9 mm long; lemmas 3-6 mm long, the apex 2-lobed to about 3 mm, awned from the midnerve 2-4 mm long. ●Rocky desert flats and hills, common in the southern



regions, but extending northward to San Juan County. ♦This species is a nomenclatural and systematic vagabond, passing through *Triodia*, *Koeleria*, *Uralapis*, *Tricuspis*, *Sieglingia*, *Tridens*, *Erioneuron*, and *Dasyochloa*, before finding a permanent (it is hoped) home in *Munroa*. Florets are gathered by harvester ants, taken below ground to the nest where the grain is excised, and the chaff is brought back up and piled in large mounds around the entrance to the nest. §

Munroa squarrosa (Nuttall) Torrey [projecting downward] FALSE BUFFALOGRASS [*Crypsis squarrosa* Nuttall, *Munroa squarrosa* (Nuttall) Torrey var. *floccuosa* Vasey ex Beal]. Annual, producing short stolons, 3-15(30) cm tall; blades 1-5 cm long, flat, 1-2 mm wide; spikelets with 3-5 florets; glumes of lower spikelets 2.5-4 mm long, acute; lemmas of lower spikelets with tufts of hair on the lateral nerves, the midnerve extended into a mucro or awn-tip 0.5-2 mm long. ●Sandy plains and flats throughout the state. ♦True BUFFALOGRASS, *Bouteloua dactyloides*, is a perennial that produces bony seed burs among the leaves and staminate flags raised above. Even more similar, though is its congener, *Munroa pulchella*, which differs by the key features. §



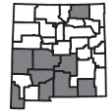
Nassella [narrow-necked] NEEDLEGRASS [2].

Mostly tufted perennials, rarely annual or rhizomatous; sheaths open; auricles absent; ligules membranous, sometimes ciliate; inflorescence generally a rebranching panicle; spikelets with 1 floret, the rachilla not prolonged; disarticulation above the glumes; glumes 3-5-nerved, longer than the floret; lemmas 5-nerved, convolute, wrapped around the palea and grain; awns present; paleas to ½ the length of the lemma; anthers 1 or 3. ♦About 116 species of the New World. Our species were all formerly included in *Stipa*; most species of the genus are South American.

■Barkworth, M.W. 1990. *Nassella* (Gramineae, Stipeae): Revised interpretation and nomenclatural changes. *Taxon* 39(4):597-614. ■Barkworth, M.E. 1993. North American Stipeae (Gramineae): Taxonomic changes and other comments. *Phytologia* 74(1):1-25. ■Barkworth, M.E. & M.A. Torres. 2001. Distribution and diagnostic characters of *Nassella* (Poaceae: Stipeae). *Taxon* 50:439-468. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. *Aliso* 23:349-361. ■Reeder, J.R. 1994. *Stipa tenuissima* (Gramineae) in Arizona – a comedy of errors. *Madroño* 41:328-329. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. *Taxon* 61(1):18-44. ■Thomasson, J.R. 1981. Micromorphology of the lemma in *Stipa robusta* and *Stipa viridula* (Gramineae: Stipeae): taxonomic significance. *Southw. Natural.* 26(2):211-214.

1 Awns 4-10 cm long, capillary; florets 2-3 mm long; summit of sheath glabrous or obscurely pubescent ***N. tenuissima***
 1 Awns 2-3 cm long, stout; florets 4-6 mm long; summit of sheath with a conspicuous tuft of hair ***N. viridula***

Nassella tenuissima (Trinius) Barkworth [very slender] MEXICAN FEATHERGRASS [*Stipa tenuissima* Trinius]. Tightly tufted perennial, 25-100 cm tall; sheaths without conspicuous hairs at the summit; ligules 1-5 mm long; blades to 60 cm long, convolute and very thin, to 1.5 mm wide; panicles 8-50 cm long, loosely contracted; glumes 5-13 mm long, aristate; florets 2-3 mm long; awns 4-10 cm long ●Rocky slopes and woodlands, mostly in the southern regions. ♦Plants are gaining popularity as an ornamental grass, but they easily escape their plantings to adjacent ground; considered noxious in other states. The seedheads become tangled in the wind, forming very dense balls of florets reaching the size of a softball.



Nassella viridula (Trinius) Barkworth [greenish] GREEN NEEDLEGRASS [*Stipa viridula* Trinius]. Tufted perennial, 35-120 cm tall; sheath margins ciliate, with a conspicuous tuft at the summit; ligules 0.2-1.2 mm long; blades 10-30 cm long, 1.5-3 mm wide, flat to rolled; panicles 3-7 cm long, loosely contracted; glumes 7-13 mm long, apiculate; florets 3.5-6 mm long; awns 2-3 cm long. ●Grassy hills, plains, and flats in the northern regions.



Oryzopsis [resembling rice] [1].

Tufted perennial; leaves mostly basal; sheaths open; auricles absent; ligules membranous; inflorescence a contracted panicle; spikelets with 1 floret, the rachilla not prolonged; disarticulation above the glumes; glumes subequal to the floret; lemmas 3-5-nerved, strongly convolute, leathery at maturity; lemma awns deciduous; anthers 3. ♦The reorganization of the Stipeae Tribe renders *Oryzopsis* a monotypic genus in North America; former members of *Oryzopsis* fall into the genera keyed below.

■Barkworth, M.E. 1982. Embryological characters and the taxonomy of the Stipeae (Gramineae). *Taxon* 31(2):233-243. ■Barkworth, M.E. 1993. North American Stipeae (Gramineae): Taxonomic changes and other comments. *Phytologia* 74(1):1-25. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. *Aliso* 23:349-361. ■Johnson, B.L. 1945. Natural hybrids between *Oryzopsis hymenoides* and several species of *Stipa*. *Amer. J. Bot.* 32:599-608. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. *Taxon* 61(1):18-44.

a Glumes 2.5-3.5 mm long; lemmas glabrous or pubescent, the margins not overlapping, hence the palea is exposed... ***Piptatheropsis***
 a Glumes 4-10 mm long; lemmas sparsely to copiously pubescent, the margins overlapping so the palea is hidden

b Blades rolled; lemma body densely long pubescent as is the callus ***Eriocoma***
 b Blades flat or loosely rolled; lemma body sparsely pubescent with short appressed hairs, the callus very densely ringed with short hairs ***O. asperifolia***

Oryzopsis asperifolia Michaux [with rough leaves] MOUNTAIN RICEGRASS. Tufted perennial, 25-65 cm tall; leaves mostly basal; ligules less than 1 mm long; blades of basal leaves 30-90 cm long, 4-9 mm wide, the bases twisted so the adaxial surface is uppermost, remaining green through the winter; panicles 3-13 cm long; glumes 6-10-nerved, 5-7.5 mm long, subequal to the lemma; lemmas 5-7 mm long; awns straight, deciduous, 7-15 mm long; anthers 2-4 mm long. ●Moist wooded sites in the northern mountains, usually in the shade. ♦The species is unmistakable, with a prominent cluster of broad green basal leaves, the blades twisted upside-down, and narrow few-flowered panicles with plump spikelets and short awns (many of which have fallen).



Panicum [bread, millet] PANICUM [12].

Annuals and perennials of various habit; basal leaves not forming a basal rosette; sheaths open; auricles absent; ligules membranous, usually ciliate; inflorescence a panicle of various arrangement, bristles absent; spikelets dorsally compressed, awnless, with 2 florets, the lower staminate or sterile, the upper fertile; disarticulation below the glumes and the spikelet falling, sometimes the upper floret falling out; glumes usually unequal, many-nerved, the lower often short but sometimes as long as the spikelet, the upper similar in size and texture to the lower lemma; upper lemma becoming indurate, clasping the edges of the palea, together forming a neat case; anthers 3. ♦A large genus of perhaps 400 or more species worldwide. The genus *Panicum* has passed from including nearly all members of the Paniceae Tribe, through successive reductions and revisions that have removed obviously foreign elements (and some not so obvious), to a much smaller and more accurate phylogenetic alignment. Fairly recent modifications include the removal of species to *Dichantherium*, *Hopia*, *Setaria*, *Steinchisma*, *Urochloa*, and *Zuloagaea*.

■Aliccioni, S.S., L.M. Giussani, F.O. Zuloaga, & E.A. Kellogg. 2003. A molecular phylogeny of *Panicum* (Poaceae: Paniceae): tests of monophyly and phylogenetic placement within the Panicoideae. *Amer. J. Bot.* 90:796-821. ■Allred, K.W. 2003. Plant distribution reports [*Panicum alatum*]. *The New Mexico Botanist* 28:8. ■Bess, E.C., A.N. Doust, G.Davidse, & E.A.

Kellogg. 2006. *Zuloagaea*, a new genus of neotropical grass within the "bristle clade" (Poaceae: Paniceae) [*Zuloagaea bulbosum*]. Syst. Bot. 31(4):656-670. ■Bough, M., J.C. Colosi, & P.B. Cavers. 1986. The major weedy biotypes of proso millet (*Panicum miliaceum*) in Canada. Can. J. Bot. 64:1188-198. ■Clark, C.A. & F.W. Gould. 1975. Some epidermal characteristics of paleas of *Dichanthelium*, *Panicum*, and *Echinochloa*. Amer. J. Bot. 62:743-748. ■Fairbrothers, D.E. 1953. Relationships in the *Capillaria* group of *Panicum* in Arizona and New Mexico. Amer. J. Bot. 40:708-714. ■McGregor, R.L. 1984. *Panicum capillare* L. var. *occidentale* Rydberg (Poaceae): an illegitimate name. Contr. Univ. Kansas Herb. No. 10. ■McGregor, R.L. 1984. *Panicum capillare* L. var. *barbipulvinatum* (Nash) comb. nov. Phytologia 55:256. ■McGregor, R.L. 1985. *Panicum hillmanii* Chase (Poaceae): validity and distribution. Contr. Univ. Kansas Herb. No. 13. ■Morrone, O. & F.O. Zuloaga. 1993. Sinopsis del genero *Urochloa* (Poaceae: Panicoideae: Paniceae) para Mexico y America Central. Darwiniana 32:59-75. ■Reeder, J.R. 1991. A new species of *Panicum* (Gramineae) from Arizona [*Panicum mojavense*]. Phytologia 71:300-303. ■Spellenberg, R.S., D. Anderson, & R. Brozka. 1993. Noteworthy Collections: New Mexico [*Panicum mojavense*]. Madroño 40:136-138. ■Zuloaga, F.O., R.P. Ellis, & O. Morrone. 1993. A revision of *Panicum* subgen. *Dichanthelium* sect. *Dichanthelium* (Poaceae: Panicoideae: Paniceae) in Mesoamerica, the West Indies, and South America. Ann. Missouri Bot. Gard. 80:119-190. ■Zuloaga, F.O. & O. Morrone. 1996. Revision de las especies Americanas de *Panicum* subgenero *Panicum* seccion *Panicum* (Poaceae: Panicoideae: Paniceae) [*Panicum alatum*]. Ann. Missouri Bot. Gard. 83:200-280. ■Webster, R.D. 1988. Genera of the North American Paniceae (Poaceae: Panicoideae). Syst. Bot. 13(4):576-609.

1 Plants annual

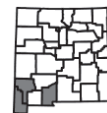
- 2 Lemma of the upper floret wrinkled; spikelets nearly sessile on simple or nearly simple primary branchesgo to *Urochloa*
- 2 Lemma of the upper floret smooth, not wrinkled; spikelets pedicelled in a usually open freely rebranched panicle
 - 3 First glume about 1/4 as long as the spikelet, obtuse or rounded at the tip; stems as much as 1 m long, coarse and often somewhat trailing *P. dichotomiflorum*
 - 3 First glume more than 1/4 as long as the spikelet, acute to acuminate at the tip; stems various
 - 4 Spikelets 4.5-5 mm long; panicle nodding at maturity *P. miliaceum*
 - 4 Spikelets less than 4 mm long; panicle usually not nodding
 - 5 Mature panicles 2-3 cm long and congested among the leaves, never exceeding the foliage; plants 2-8 cm tall *P. mohavense*
 - 5 Mature panicles longer, exceeding the leaves; plants usually taller
 - 6 Mature panicles more than half the length of the entire plant; panicle axils pubescent *P. capillare*
 - 6 Mature panicles not more than 1/3 the length of the entire plant; panicle axils glabrous
 - 7 Palea of lower floret well developed, as long as the upper floret; first glume 1/3-1/2 the length of the spikelet *P. stramineum*
 - 7 Palea of lower floret 1/2 or less the length of the upper floret; first glume 1/2 to nearly the length of the spikelet
 - 8 Upper floret ovoid to ellipsoid, not stipitate, lacking thickenings at the base, but with 2 small scars, the base with a cavity when mature and the palea usually bulging outward at the base *P. hirticaule*
 - 8 Upper floret obovoid at maturity, shortly stipitate, with 2 fleshy thickenings at the base, the base lacking a cavity and the palea not protruding but even with the lemma *P. alatum*

1 Plants perennial

- 9 Terminal spikelet of each branch subtended by one or more bristles (vestigial branchlets) go to *Setaria*
- 9 Terminal spikelets not subtended by a bristle
 - 10 First glume about as long as the second; primary panicle branches mostly unbranched; long stolons developed go to *Hoplia*
 - 10 First glume shorter than the second; primary panicle branches often rebranched; stolons not developed
 - 11 Spikelets 4-8 mm long
 - 12 Spikelets 6-8 mm long *P. havardii*
 - 12 Spikelets 4-5(6) mm long
 - 13 Panicles narrow, contracted *P. amarum*
 - 13 Panicles open, not contracted
 - 14 Plants with stout scaly rhizomes; blades not curling *P. virgatum*
 - 14 Plants tufted, lacking rhizomes; blades often curling *P. hallii*
 - 11 Spikelets less than 4 mm long
 - 15 Palea of the lower floret inflated, enlarged, obovate, forcing the spikelet to gape open go to *Steinchisma*
 - 15 Palea of the lower floret not inflated as above, the spikelet closed (except open somewhat during anthesis)
 - 16 Stems hard and somewhat woody in age, becoming much-branched above; basal buds silky long-pubescent; spikelets 2.5-3 mm long *P. antidotale*
 - 16 Stems not hard and woody, or if so then not much-branched above; basal buds not silky long-pubescent
 - 17 Spikelets appressed and usually closely clustered on simple or nearly simple panicle branches or on short spur branches
 - 18 Lower floret staminate, producing anthers, which are usually visible; plant usually dark green, the blades rarely curling *P. coloratum*
 - 18 Lower floret neuter, anthers not produced; plants usually bluish green, the blades often curling *P. hallii*

Panicum alatum Zuloaga & Morrone [winged]. Glabrous to hispid, tufted annual, 8-65 cm or more tall; ligules of hairs, 0.7-1.8 mm long; blades 3-17 mm wide, sparsely pilose; panicles 4-23 cm long, 2-11 cm wide, the branches stiffly spreading; pedicels and terminal branchlets tending to be appressed; spikelets 2.4-4.5 mm long; lower glume 1/2 to 3/4 the length of the spikelet; upper floret obovoid when mature, very shortly stipitate, with 2 fleshy thickenings at the base, the base lacking a cavity and the palea not protruding but even with the palea. ●Sandy to clayey disturbed ground, roadsides, swales, in the bootheel region. ◆Plants belonging to this species were formerly treated in *Panicum hirticaule*. We have two obscure varieties:

- a Upper floret dull, densely papillose all over (use magnification)...var. *alatum*
- a Upper floret smooth, shiny, not papillose except at the tip of the palea...var. *minus* (Andersson) Zuloaga & Morrone [less] [*Panicum hirticaule* Presl var. *minus* Andersson].



**Panicum amarum* Elliott [bitter]. Rhizomatous perennial, glabrous and glaucous throughout, 30-200 cm or more tall; ligules 1-5 mm long; blades 2-13 mm wide; panicles 10-80 cm long, 2-17 cm wide, loosely contracted; spikelets 4-7.7 mm long, glabrous; lower glume ½ to nearly as long as the spikelet; upper glume and lower lemma exceeding the fertile floret by 1.5-3 mm; lower floret staminate; fertile floret 2.4-4 mm long, smooth, shiny, the lemma clasping the palea only at the base. ●Planted for erosion control near Zuñi, Cibola County; native to the sandy beaches and plains of the Atlantic and Gulf coasts.



**Panicum antidotale* Retzcius [antidote] BLUE PANICUM. Rhizomatous, glaucous perennial, 50-300 cm tall, becoming somewhat woody and much-branched in age; scales of the rhizome densely brownish pilose; basal buds silky long-hairy; nodes swollen, sometimes hairy; ligules 0.3-1.5 mm long; blades 3-20 mm wide; panicles 10-45 cm long, about ½ as wide; spikelets 2.4-3.4 mm long, glabrous; lower glume ½ or less the spikelet length; lower floret staminate; fertile floret 1.8-2.8 mm long, smooth, shiny. ●Introduced for range restoration; native to India. ♦Plants may accumulate toxic levels of nitrates, especially after fertilization and irrigation.



Panicum bulbosum Kunth...go to **Zuloagaea**

Panicum capillare Linnaeus [hair-like] WITCHGRASS. Often densely hirsute or hispid annual, the hairs bulbous-based, 15-130 cm tall; ligules membranous-ciliate, 0.5-1.5 mm long; blades 3-18 mm wide; panicles 13-50 cm long, 7-24 cm wide, very open and diffuse, usually more than ½ the length of the plant, the bases often in the subtending sheath, breaking and rolling in the wind when mature, or remaining intact; spikelets 2-4.5 mm long; lower glume ½ or less the spikelet length; lower floret sterile, the lemma extending beyond the fertile floret by 0.5-1 mm, the palea present or absent; fertile floret sometimes falling out of the spikelet. ●Roadsides and other disturbed sites throughout the state. ♦Some populations may accumulate toxic levels of nitrates. Panicles turn a bright red in the fall and are unmistakable along the road. The origin of the name WITCHGRASS is unknown, perhaps alluding to the broom-like panicles? We have two subspecies: §



a Panicles breaking away at the peduncle and dispersing as a unit; palea of lower floret absent (lodicules may be mistaken for a palea); lemma of the upper floret

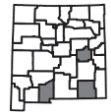
lacking a crescent-shaped scar at the base...subsp. *capillare* [*Panicum barbipulvinatum* Nash, *Panicum capillare* Linnaeus var. *barbipulvinatum* (Nash)

McGregor, *Panicum capillare* Linnaeus var. *brevifolium* Rydberg & Shear, *Panicum capillare* var. *occidentale* Rydberg]. ●Common throughout the state.

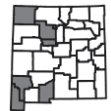
a Panicles remaining intact; palea of the lower floret present; lemma of the upper floret with a crescent-shaped scar at the base...subsp. *hillmanii* (Chase)

Freckman & Lelong [for Frederick Hebard Hillman (1863-1954), Nevada botanist] [*Panicum hillmanii* Chase]. ●Infrequent along roadside, ditches, irrigated pastures on the eastern plains.

**Panicum coloratum* Linnaeus [colored] KLEINGRASS. Tufted perennial, but also with short rhizomes, 50-140 cm tall; shoots with abundant foliage; sheaths shorter than the internodes; ligules 0.5-2 mm long; blades 2-8 mm wide, flat; panicles 5-30 cm long, 3-14 cm wide; spikelets 2.5-3.5 mm long, glabrous; lower glume about ½ the length of the spikelet; lower floret staminate, the palea 2-3 mm long; fertile floret 2-2.5 mm long, smooth, shiny. ●Introduced for irrigated pastures, escaping along roadsides; probably more common in the state than indicated by the collections; native to Africa. ♦Though reasonably good pasture forage, plants have also been associated with photosensitivity in sheep and horses, called "big-head." The origin of the English name is unknown, perhaps alluding to the person involved in its introduction as a forage grass?



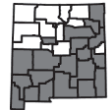
**Panicum dichotomiflorum* Michaux [paired flowers] FALL PANICUM. Tufted annual or short-lived perennial under mild conditions, 10-200 cm tall, geniculate-based and rooting at the lower nodes in wet soil or water; culms often zig-zag and somewhat flattened; sheaths compressed, inflated; ligules 0.5-2 mm long; blades 3-25 mm wide, glabrous to pilose; panicles both terminal and axillary, 5-40 cm long, diffuse when mature; spikelets 1.8-3.8 mm long, glabrous; lower glume very short, about ¼ the spikelet length; lower floret sterile, the palea vestigial to well-developed; fertile floret 1.5-2.5 mm long, smooth, shiny. ●Moist stream banks, meadows, roadsides, not common; native to central and eastern United States and Canada.



Panicum hallii Vasey [for Elihu Hall (1822-1882), American plant collector from Illinois] [*Panicum lepidulum* of NM reports].

Tufted perennial, 10-100 cm tall; leaves clustered at the base of the plant; ligules 0.6-2 mm long; blades 2-10 mm wide, mostly flat, generally curling in age; panicles 7-30 cm long, 3-15 cm wide, the branches ascending, the pedicels appressed (common) to spreading (var. *filipes*); spikelets 2-4.2 mm long, glabrous; lower glume ½-¾ the spikelet length; lower floret sterile, the palea nearly as long as its floret; fertile floret 1.5-2.5 mm long, smooth, darkening.

●Plains and rocky slopes, foothills, often on limestone, also clay swales and flats, up to about 7400 ft. ♦Earlier New Mexico works reported *Panicum lepidulum* A.S. Hitchcock (from Mexico and Central America) that would key here; the specimen in question was determined to be *P. hallii*. We have two varieties:



a Spikelets 3-4.2 mm long, mostly appressed along the primary panicle branches, the panicle usually exceeding the blades; sheaths mostly papillose-hirsute...var. *hallii*. ●Eastern and southern plains and foothills, widespread.

a Spikelets 2-3 mm long, mostly spreading from the panicle branches, the panicle scarcely exceeding the blades; sheaths mostly glabrous...var. *filipes* (Scribner) Waller [thread-like base of stalk] [*Panicum filipes* Scribner]. ●Dry plains in the southeastern corner of the state, uncommon.

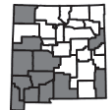
Panicum havardii Vasey [for Valéry Havard (1846-1927), distinguished Army surgeon and botanist] [*Panicum virgatum* Linnaeus var. *macranthum* Vasey].

Robust rhizomatous perennial, 0.6-1.5 m tall, with decumbent bases, shoots arising singly or in small clusters, glabrous throughout, often glaucous; sheaths longer than the internodes; ligules a ciliate membrane, 2-4 mm long; blades 5-10 mm wide; panicles 17-40 cm long, nearly as wide, the branches stiffly ascending to spreading; spikelets 6-8 mm long; lower glume ½-¾ the spikelet length; upper glume and lower lemma exceeding the fertile floret by 1-2 mm; fertile floret 4.5-5 mm long. ●Sandy plains and dunes on the eastern plains. ♦Some include this within *Panicum virgatum*, to which it is certainly related, but it differs strikingly in the solitary, decumbent-based culms and larger spikelets. The seemingly out-of-range report for San Miguel County is a specimen collected by Vasey (the author of the species) near Las Vegas in 1880.



Panicum hians* Elliott...go to **Steinchisma

Panicum hirticaule Presl [hairy stem] Tufted, branched, annual, 15-75 cm or more tall; foliage generally hispid with bulbous-based hairs; sheaths shorter than the internodes; ligules 1-1.5 mm long; blades 0.5-2 mm wide; panicles ½ or less the length of the plant, 9-20 cm long, 5-10 cm wide, glabrous in the axils; pedicels generally appressed along the branchlets; spikelets 1.8-4 mm long, glabrous; lower glume ½-¾ the length of the spikelet; lower floret sterile, with a



palea 1/2 or less the length of the adjacent fertile floret; fertile floret 1.5-2.4 mm long, smooth, shiny to dull, with 2 small scars at the base but lacking fleshy thickenings; palea of fertile floret usually bulging outward at the base. ●Rocky to sandy slopes, plains, and washes, mostly in the southwestern regions, common. ♦We have three obscure varieties:

- a Fertile floret dull, covered with conspicuous papillae on both lemma and palea (use magnification)...var. *verrucosum* Zuloaga & Morrone [warty]. ●Known only from the Animas Valley, Hidalgo County.
- a Fertile floret shiny, smooth, with sparse papillae only at the tip of the palea
- b Lower glumes 1/2-3/4 the spikelet length; spikelets 2-3.6 mm long...var. *hirticaule* ●Widespread, the most common variety.
- b Lower glumes 3/4 to nearly equaling the spikelet; spikelets 3.6-4 mm long...var. *pampinosum* (A.S. Hitchcock) Beetle [with many shoots] [*Panicum capillare* Linnaeus var. *pampinosum* (A.S. Hitchcock & Chase) Gould, *Panicum pampinosum* A.S. Hitchcock & Chase]. ●Dona Ana and Grant counties. ♦Our only verified records of var. *pampinosum* are from the late 1800s or early 1900s; it is likely that this is no longer present in the state; more recent collections are known from Arizona.

**Panicum miliaceum* Linnaeus [millet-like] BROOMCORN MILLET. Tufted annual 20-150 cm or more tall; sheaths densely pilose with bulbous-based hairs; ligules 1-3 mm long; blades 7-25 mm wide; panicles 6-20 cm long, about 1/2 as wide, heavy, often drooping; spikelets 4-6 mm long, glabrous; lower glume 1/2-3/4 the spikelet length; lower floret sterile, the palea no more than 1/2 the length of the adjacent fertile floret; fertile floret 3-3.8 mm long, smooth to faintly lined, shiny, persisting in the spikelet or disarticulating singly. ●Occasionally cultivated, adventive in waste places, sometimes found under bird feeders; native to Asia. ♦The term MILLET is used for many grasses with edible grains, including species of *Echinochloa*, *Eleusine*, *Eragrostis*, *Panicum*, *Paspalum*, *Setaria*, and *Sorghum*. With two subspecies:

- a Mature upper florets blackish, disarticulating at maturity; culms 0.7-2 m tall; panicles mostly erect, with well-developed axillary pulvini...subsp. *ruderale* (M. Kitagawa) Tzvelev [of waste places] [*Panicum miliaceum* Linnaeus var. *ruderale* M. Kitagawa]. ●A weed in corn and crop fields, the wild form.
- a Mature upper florets straw- to orange-colored, not disarticulating; culms 0.2-1.2 m tall; panicles usually nodding, lacking axillary pulvini...subsp. *miliaceum*. ♦This is the subspecies used in bird seed, the domestic form.

Panicum mohavense Reeder [from the Mojave region, Arizona]. Tiny annual, 2-8 cm tall, the foliage generally hispid with bulbous-based hairs; ligules 0.2-0.4 mm long; blades 1-4 cm long, 1-3 mm wide, flat; panicles down among the blades, about as wide as long; spikelets 2-2.2 mm long, glabrous, plump, obtuse-acute; lower glume about 1/3 the spikelet length; lower floret sterile, with a tiny palea; fertile floret 1.4-1.8 mm long. ●Limestone ridges of the Oscura Mts, Socorro County; also Arizona.

Panicum stramineum A.S. Hitchcock & Chase [*Panicum hirticaule* Presl var. *stramineum* (A.S. Hitchcock & Chase) Beetle]. Tufted annual, 10-70 cm or more tall; sheaths glabrous to hirsute with bulbous-based hairs; ligules 1-2.5 mm long; blades 3-20 mm wide; panicles 3-30 cm long, 4-15 cm wide; spikelets 2.3-3.2 mm long; lower glume 1/2-3/4 the length of the spikelet; palea of the lower floret as long as or longer than the adjacent fertile floret; fertile floret 1.5-2.5 mm long. ●Reported by several previous works, but re-examination of the specimens from New Mexico failed to confirm its presence; to be looked for in the bootheel region. ♦It may be that this species is better treated as a variety or subspecies of *Panicum hirticaule*.

Panicum virgatum Linnaeus [twiggy, straight] SWITCHGRASS. Rhizomatous perennial, 40-200 cm or more tall, the culms solitary or more commonly forming dense clumps; sheaths longer than the lower internodes, glabrous or pilose, the margin usually ciliate; ligules 2-6 mm long; blades 2-15 mm wide; panicles 10-50 cm long, about 1/2 as wide; spikelets (3)4-8 mm long, glabrous, acuminate; lower glume 1/2 to nearly as long as the spikelet, acuminate; upper glume and lower lemma extending 1-3 mm beyond the upper floret; lower floret staminate, the palea well-developed; fertile floret 2.3-3 mm long, smooth, shiny. ●Moist plains, prairies, and meadows, roadsides, mostly in the eastern regions; also used in seed mixes for range restoration. ♦The large pointy spikelets are distinctive, with generally three points: one each from the lower glume, the upper glume, and the lower lemma. An excellent forage grass where abundant, though it does have the rare capacity for photosensitization. Many of the occurrences, both on the plains and in the mountains, come from seeding programs. Gaining popularity as an ornamental.

Pappophorum [pappus-bearing] PAPPUSGRASS [1].

Tufted, glabrous perennials; sheaths open; auricles absent; ligules a ring of hairs; inflorescence a narrow, spike-like panicle; spikelets with 3-5 florets, the lower ones fertile, the upper ones sterile; disarticulation above the glumes, all florets falling together; glumes 1-nerved, reaching at least to the awns of the florets; lemmas ± 7-nerved, the nerves extending into minutely hairy awns, the awns forming a pappus-like crown; anthers 3. ♦About 8-10 species of North and South America.

- Chase, A. 1946. *Enneapogon desvauxii* and *Pappophorum wrightii*, an agrostological detective story. *Madroño* 8:187-189.
- Reeder, J.R. & L.J. Toolin. 1989. Notes on *Pappophorum* (Gramineae: Pappophoreae). *Syst. Bot.* 14(3):349-358.

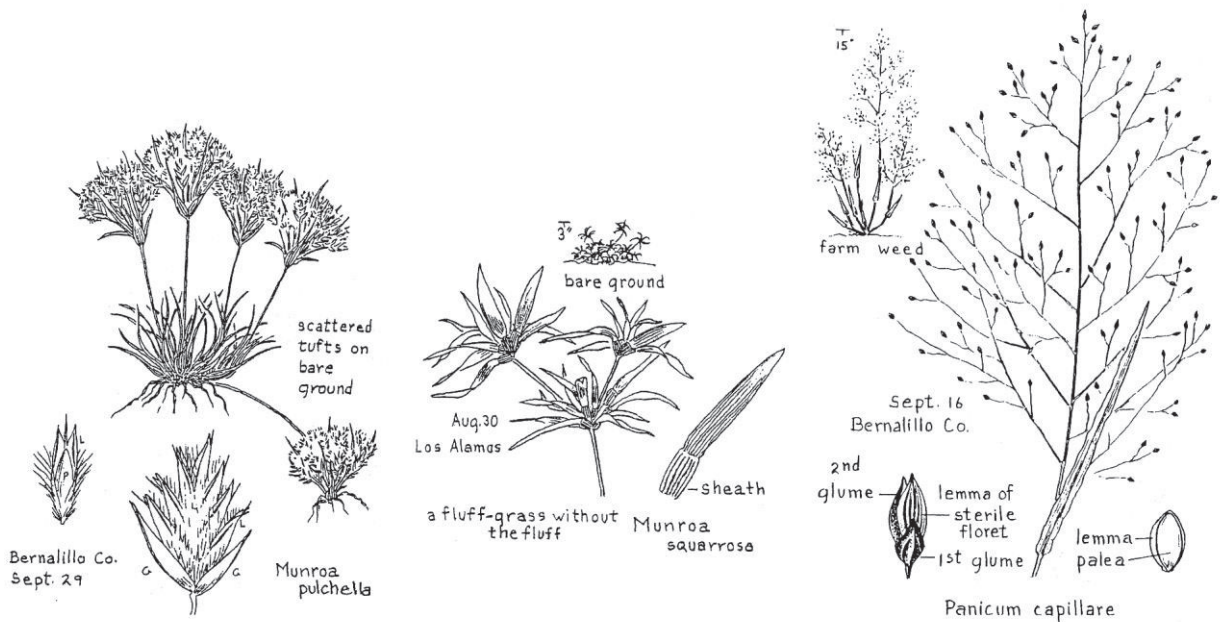
Pappophorum vaginatum Buckley [*Panicum mucronulatum* of numerous North American authors]. Tufted perennial, 40-100 cm tall; sheaths with a tuft of hairs at the throat; panicles 10-25 cm long, whitish or tawny, rarely pinkish; spikelets with 1-2 fertile florets and 2 reduced florets; glumes 3-4.5 mm long, glabrous; fertile lemma bodies about 3 mm long; awns about twice the length as the lemma bodies. ●Infrequent in the southern plains and foothills. ♦Plants resemble *Enneapogon desvauxii*, but that species has compressed-keeled sheaths, hairy glumes with 5-7 nerves, and plumose awns.

Pappostipa [pappus-bearing *Stipa*] NEEDLEGRASS [1].

Tightly tufted perennials; sheaths open; auricles absent; ligules membranous, ciliate; blades flat to convolute, adaxial surface hairy; inflorescence a narrow panicle; spikelets with a single floret; glumes large, subequal, longer than the floret (except the awn); florets fusiform, awned; lemmas rolled around the palea, but the margins only slightly overlapping; awns 2-10 cm or more long, strongly once-geniculate, the basal segment densely pilose with hairs 3-10 mm long; paleas 1/2 to subequal to the lemma. ♦About 14 species, all but one of which occur in South America. Originally classified in *Stipa*, and from thence to *Achnatherum*, *Jarava*, and lastly, *Pappostipa*, all in the search for monophyly.

- Allred, K.W. & K. Heil. 2000. New plant distribution records [*Stipa speciosa*]. *The New Mexico Botanist* 15:7.
- Cialdella, A.M., L.M. Giussani, L. Aagesen, F.O. Zuloaga, & O. Morrone. 2007. A phylogeny of *Piptochaetium* (Poaceae: Poideae: Stipeae) and related genera based on a combined analysis including *trnL-F*, *rpl16*, and morphology. *Syst. Bot.* 32(3):545-559.
- Peñalillo, P. 2002. El genero *Jarava* Ruiz et Pavon (Stipeae-Poaceae): Delimitacion y nuevas combinaciones. *Gayana Botanica* 59:27-34.
- Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. *Aliso* 23:349-361.
- Romaschenko K, Peterson PM, Soreng RJ, Garcia-Jacas N, Futorna O, Susanna A. 2008. Molecular phylogenetic analysis of the American Stipeae (Poaceae) resolves *Jarava* sensu lato polyphyletic: evidence for a new genus, *Pappostipa*. *Journal of the Botanical Research Institute of Texas* 2: 165-192.
- Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Poideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. *Taxon* 61(1):18-44.

Pappostipa speciosa (Trinius & Ruprecht) Romaschenko [showy, handsome] [*Achnatherum speciosum* (Trinius & Ruprecht) Barkworth, *Jarava speciosa* (Trinius & Ruprecht) Peñailillo, *Stipa speciosa* Trinius & Ruprecht]. Tufted perennial, 30-60 cm tall; basal sheaths reddish brown, becoming flat and ribbon-like in age; ligules variable, those of the lower leaves densely ciliate with hairs 0.3-1 mm long; panicles 10-15 cm long, contracted, usually partially included in the subtending sheath; spikelets 16-24 mm long (excluding awns); florets 6-10 mm long; awns 3.5-8 cm long, once-geniculate, with hairs 3-8 mm long on the basal segment, the terminal segment glabrous. ●Desert canyons and rocky hills, known in New Mexico only from San Juan and Sandoval counties. ♦The reddish-brown sheaths and once-geniculate awns with long hairs on the basal segment serve to identify this species. Plants may hybridize with *Eriocoma hymenoides*, the offspring being referred to as *Eriocoma ×bloomeri* (Bolander) Barkworth.



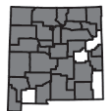
Pascopyrum [pasture wheat] WHEATGRASS [1].

Rhizomatous perennial; leaves tending toward the base; sheaths open; auricles present; ligules membranous; inflorescence a spike mostly with 1 spikelet per node; spikelets with several florets; disarticulation above the glumes and between the florets; glumes narrowly lanceolate, curving to falcate, 1-nerved distally, acuminate; lemmas lanceolate, mucronate to awned; anthers 3. ♦Most recently classified in *Elymus*, *Pascopyrum smithii* is the derivative of hybridization between *Elymus* and *Leymus* species, with a unique genomic complement; because of this, it is placed in the monotypic genus *Pascopyrum*.

■Barkworth, M.E. & D.R. Dewey. 1985. Genomically based genera in the perennial Triticeae of North America: identification and membership. *Amer. J. Bot.* 72:767-776. ■Baum, B.R., J.R. Estes, & P.K. Gupta. 1987. Assessment of the genomic system of classification in the Triticeae. *Amer. J. Bot.* 74:1388-1395. ■Dewey, D.R. 1975. The origin of *Agropyron smithii*. *Amer. J. Bot.* 62:524-530. ■Dewey, D.R. 1983. Historical and current taxonomic perspectives of *Agropyron*, *Elymus*, and related genera. *Crop Sci.* 23:637-642. ■Estes, J.R. & R.J. Tyrl. 1982. The generic concept and generic circumscription in the Triticeae: an end paper. IN J.R. Estes, R.J. Tyrl, & J.N. Brunken (eds.), *Grasses and Grasslands*. p. 145-164. Univ. Oklahoma Press, Norman, Oklahoma. ■Melderis, A. 1978. Taxonomic notes on the tribe Triticeae (Gramineae), with special reference to the genera *Elymus* L. sensu lato, and *Agropyron* Gaertner sensu lato. *Bot. J. Linn. Soc.* 76:369-384. ■Runemark, H. & W.K. Hensen. 1968. *Elymus* and *Agropyron*, a problem of generic delimitation. *Bot. Notiser* 121:51-79.

Pascopyrum smithii (Rydberg) Barkworth & Dewey [for Jared Gage Smith (1866-1925), botanist and agrostologist for U.S.D.A]

WESTERN WHEATGRASS [*Agropyron molle* (Scribner & Smith) Rydberg, *Agropyron occidentale* Scribner, *Agropyron palmeri* (Scribner & Smith) Rydberg, *Agropyron smithii* Rydberg, *Agropyron smithii* Rydberg var. *molle* (Scribner & Smith) M.E. Jones, *Agropyron smithii* Rydberg var. *palmeri* (Scribner & Smith) Heller, *Elymus smithii* (Rydberg) Gould, *Elytrigia smithii* (Rydberg) Nevski]. Rhizomatous perennial, 25-100 cm or more tall; foliage with a bluish cast; ligules tiny, about 0.2 mm long; blades rigid, prominently veined on the upper surface; spikes 5-18 cm long, spikelets 12-26 mm long, ascending, sometimes curving outward; glumes about ½ the length of the spikelet, stiff, curving to one side; lemmas 6-12 mm long, glabrous to hairy, acute to awned to 5 mm; anthers 4-6 mm long.



●Widespread throughout the state on plains, swales, grassy hills and slopes, forming thick stands often with a bluish tint; expected in all the counties. ♦The vagaries of applying correct botanical nomenclature can be illustrated by the following, written by Wootton and Standley (1912) in “The Grasses and Grass-Like Plants of New Mexico,” about the scientific name of WESTERN WHEATGRASS: “Within the past 10 or 15 years the name of this grass has been changed quite frequently. It was first referred to *Agropyron repens*, an Eastern species. Then it was recognized as *A. repens* var. *glaucum*. Then it was considered as a separate species and the usual custom followed and it was called *A. glaucum*. But the name was already in use for another and prior publication so two attempts were made to correct this. One author called it *A. occidentalis* and another *A. smithii*. The former name was taken up for some time though it appears the latter really has the claim of priority; hence it is used here, though its author uses the other in the ‘Flora of Colorado.’” §

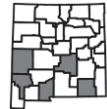
Paspalum [ancient name for a millet] PASPALUM [3].

Tufted, rhizomatous, or stoloniferous annuals and perennials; sheaths open; auricles usually absent (ours), sometimes present; ligules membranous or absent (ours); inflorescence a panicles of spike-like branches, sometimes rebranching shortly; spikelets dorsally compressed, flat on one side and rounded on the other, borne on one side of the branch, awnless, with 2 florets, the lower sterile, the upper fertile; glumes unequal, the lower vestigial to absent, the upper as long as the spikelet and similar to the lower lemma in size and texture; upper floret fertile, indurate at maturity, the lemma edges clasping the palea. ♦Identification can be confusing for the novice, because of the absence of the first glume, leading some to think the spikelets are 1-flowered.

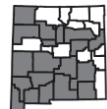
- Allred, K.W. 1982. *Paspalum distichum* L. var. *indutum* Shinners (Poaceae). Great Basin Naturalist 42:101-104. ■Banks, D.J. 1966. Taxonomy of *Paspalum setaceum* (Gramineae). Sida 2:269-284. ■Chase, A. 1929. The North American species of *Paspalum*. Contr. U.S. Nat. Herb. 28:1-310. ■Committee on Nomenclature, IAPT. 1983. Report on Proposal 528, to reject the name *Paspalum distichum* L.; proposal rejected, the traditional usage of the name may be retained. Taxon 32(2):281. ■Fosberg, F.R. 1977. *Paspalum distichum* again. Taxon 26:201-202. ■Guedes, M. 1976. The case for *Paspalum distichum* and against futile name-changes. Taxon 25:512-513.

- 1 Inflorescence branches 2 in number, attached less than 1 cm apart (1 or 2 additional branches occasionally present below)
 - 2 Second glume and lemma of lower floret pubescent (sometimes obscurely so); ditchbanks and sloughs.....***P. distichum***
 - 2 Second glume and lemma of lower floret glabrous; in lawns and turf***P. vaginatum***
- 1 Inflorescences branches 1-numerous, when 2 in number then the branches more than 1 cm apart
 - 3 Spikelets 3-4 mm long, the margins conspicuously ciliate with soft hairs ***P. dilatatum***
 - 3 Spikelets 1.5-2.6 mm long, the margins glabrous or minutely pubescent..... ***P. setaceum***

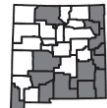
****Paspalum dilatatum*** Poiret [dilated] DALLISGRASS. Tufted perennial with short rhizomes, 40-125 cm or more tall; sheaths glabrous or pubescent; ligules 1.5-3.8; blades to 16 mm wide; panicles with 2-7 branches 2-12 cm long; spikelets 2.3-4 mm long, ovate, pilose; lower glume absent. ●Introduced as a pasture grass and persisting along roadsides and in old moist fields and waste places; expected in weedy sites in many counties. ♦This is the first grass keyed-out by the author, in 1968, solo, without benefit of a dissecting scope or any training in grasses; it took a while!



Paspalum distichum Linnaeus [two-ranked] KNOTGRASS [*Paspalum distichum* var. *indutum* Shinners]. Tufted or rhizomatous perennial, 10-65 cm tall; sheaths glabrous to weakly pilose distally; ligules 1-2 mm long; panicles with 2 branches 2-7 cm long, attached less than 1 cm apart, a 3rd branch sometimes present below; spikelets 2.4-3.2 mm long, elliptic, glabrous; lower glume absent or to 1 mm. ●Weedy along ditchbanks and ponds, slow-moving streams and sloughs; widespread, nearly throughout the state.



Paspalum setaceum Michaux [bristle-like]. Tufted perennial, sometimes with short rhizomes 25-110 cm tall; sheaths glabrous or pubescent; ligules 0.2-0.5 mm long; panicles with 1-6 branches 2-15 cm long; spikelets 1.4-2.6 mm long, ovate to nearly orbicular, glabrous to minutely hairy; lower glume absent. ●Sandy plains and dunes, in scattered locales, but more frequent on the eastern plains. ♦We have two varieties, without geographic distinction:



- a Lower lemmas without evident midveins; blades yellowish-green to dark green...var. ***stramineum*** (Nash) Banks [straw-colored] [*Paspalum bushii* Nash, *Paspalum ciliatifolium* Michaux var. *stramineum* (Nash) Fernald, *Paspalum stramineum* Nash].
- a Lower lemmas with evident midveins; blades dark green to purplish...var. ***ciliatifolium*** (Michaux) Vasey [with ciliate leaves] [*Paspalum ciliatifolium* Michaux].

****Paspalum vaginatum*** Swartz [sheathed] Rhizomatous and stoloniferous perennial, 15-70 cm tall, rooting at the nodes; sheaths glabrous, sparsely pilose distally; ligules 1-2 mm long; panicles with 2 branches 2-8 cm long, attached less than 1 cm apart, sometimes a 3rd branch below; spikelets 3-4.5 mm long, narrowly elliptic, glabrous; lower glume absent. ●Infrequently grown as a turf grass in southern communities; not known in the wild.

Pennisetum [feathery bristle] FOUNTAIN-GRASS [3].

Annuals and perennials; sheaths open; auricles absent; ligules a ciliate membrane or a ring of hairs; inflorescence bristly, spike-like, the spikelets clusters in fascicles or burs of reduced panicle branches; burs sessile to stalked, composed of 3-100 or more bristles free or fused at the base, not spiny; disarticulation below the bur; spikelets glabrous, hidden within the bur, with 2 florets, the lower staminate or sterile, the upper fertile; fertile floret leathery, the lemma clasping the palea by the edges. ♦Chemisquy et al. (2010) argue with some justification for the merger of *Cenchrus* and *Pennisetum* (within *Cenchrus*) in order to uphold monophyly, but we allow a paraphyletic *Pennisetum*, and maintain the obvious and practical morphological distinctions among *Setaria*, *Pennisetum*, and *Cenchrus* as follows: a) bristles subtending the spikelets but not fused and remaining on the plant at disarticulation = *Setaria*; b) bristles fused at least basally to form a disarticulating bur but not spinose = *Pennisetum*; c) bristles fused to form a disarticulating bur and some or all of the bristles spinose = *Cenchrus*. All *Pennisetum* in New Mexico are exotics used in landscaping that have escaped to the wild, or forage grasses introduced in neighboring states (*P. ciliare*) that have found their way here.

- Allred, K.W. 2007. Plant distribution reports [*Pennisetum villosum*]. The New Mexico Botanist 37:7. ■Allred, K.W. 2008. Plant distribution reports [*Pennisetum setaceum*]. The New Mexico Botanist 43:7. ■Chemisquy, M.A., L.M. Giussani, M.A. Scataglini, E.A. Kellogg, & O. Morrone. 2010. Phylogenetic studies favour the unification of *Pennisetum*, *Cenchrus* and *Odontelytrum* (Poaceae): a combined nuclear, plastid and morphological analysis, and nomenclatural combinations in *Cenchrus*. Ann. Bot. 106:107-130. ■Wipff, J.K. & J.F. Veldkamp. 1999. *Pennisetum advena* sp. nov. (Poaceae: Paniceae): A common ornamental grass throughout the southern United States. Sida 18(4):1031-1036.

- 1 Panicles white to tawny, ovoid; longer bristles 3-5 cm long.....***P. villosum***
- 1 Panicles purplish or rosy, generally elongate; longer bristles 1-3 cm long
 - 2 Blades generally reddish or purplish; plants cultivated ornamentals, not known in the wild..... ***P. advena***
 - 2 Blades green; plants escaped to the wild, also known in cultivation
 - 3 Blades convolute or folded, the midribs noticeably thickened; primary bristles 26-34 mm long; panicle rachis hairy proximally ..
..... ***P. setaceum***
 - 3 Blades flat, the midribs not thickened; primary bristles 10-23 mm long; panicle rachis scabrous but not hairy ***P. ciliare***

**Pennisetum advena* Wipff & Veldkamp [a stranger] PURPLE FOUNTAINGRASS [*Cenchrus advena* (Wipff & Veldkamp) Morrone, *Pennisetum setaceum* 'Rubrum', 'Atropurpureum', 'Cupreum', & 'Purpureum']. Tufted, tussock-forming perennial (annual in cooler climates), 1-1.5 m tall; leaves burgundy-colored; sheaths glabrous, the margins ciliate; ligules 0.5-0.8 mm long; to 55 cm long, 6-11 mm wide, the midnerve not noticeably thickened; panicle 20-35 cm long, 3-6 cm wide, exserted, burgundy-colored, the rachis hairy; burs with 1-3 spikelets; outer bristles 1-18 mm long; inner bristles 11-25 mm long; primary bristles 21-24 mm long. ●Introduced as an ornamental landscape plant in the southern regions; native to the Old World; not yet known to escape to the wild. ♦This is one of the fountain-grasses commonly sold as a cultivar of *Pennisetum setaceum*, differing from that species in the key features.

**Pennisetum ciliare* (Linnaeus) Link [fringed with hairs] BUFFELGRASS [*Cenchrus ciliaris* Linnaeus]. Tufted perennial from a hard, knotty base, sometimes with short rhizomes, 20-150 cm tall; sheaths glabrous, but with ciliate margins; ligules 0.5-3 mm long; blades to 50 cm long and 13 mm wide, with ciliate margins; panicles 3-20 cm long, 4-35 mm wide, exserted, green, brownish, to purplish, the rachis scabrous, but not hairy; burs with 1-12 spikelets; outer bristles 1-12 mm long; inner bristles 4-14 mm long; primary bristles 10-23 mm long. ●Adventive in a few places in the southern desert and foothill regions; native to Africa, Asia, India; widely introduced in semi-tropical regions for forage. ♦The name 'buffel' comes from Africaans, for buffalo. It was introduced as a forage grass in Texas, and now covers millions of acres of range land there.



**Pennisetum setaceum* (Forsskål) Chiovenda [bristle-like] [*Cenchrus setaceus* (Forsskål) Morrone, *Pennisetum ruppelii* Steudel?, *Phalaris setacea* Forsskål]. Tufted, tussock-forming perennial, 45-150 cm tall; sheaths glabrous, but with ciliate margins; ligules 0.5-1.1 mm long; blades to 65 cm long, 2-3.5 mm wide, convolute or folded, the midnerve noticeably thickened; panicles 8-32 cm long, 4-5 cm wide, exserted, pink to burgundy, the rachis hairy; burs with 1-4 spikelets; outer bristles 1-19 mm long; inner bristles 8-27 mm long; primary bristles 26-34 mm long. ●Introduced as an ornamental landscape plant in the southern regions; only recently known to escape to the wild in the southern desert regions.



**Pennisetum villosum* R. Brown ex Fresenius [villous, shaggy] [*Cenchrus longisetus* M.C. Johnston]. Tufted perennial, also with short rhizomes, 20-75 cm tall; sheaths glabrous, but with ciliate margins; ligules 1-1.3 mm long; blades to 40 cm long, 2-4.5 mm wide, flat to folded, glabrous to pubescent, with ciliate margins; panicles ovoid, 4-12 cm long, 5-8 cm wide, white to tawny, the rachis hairy proximally; burs with 1-4 spikelets; outer bristles 1-14 mm long; inner and primary bristles 13-50 mm long. ●Cultivated as an ornamental landscape grass, but known as an escape from at least one site in Doña Ana County.



Phalaris [the coot] CANARYGRASS [5].

Tufted or rhizomatous annuals and perennials; leaves glabrous; sheaths open; auricles absent; ligules membranous; blades usually flat; inflorescence a dense, narrow, often spike-like panicle; spikelets with 1-3 florets, awnless, with 1-2 lower reduced sterile florets or rudiments and 1 terminal well-developed fertile floret; disarticulation below the glumes (ours), the florets falling together; glumes exceeding the florets, keeled and sometimes winged; sterile florets reduced, less than ¼ the length of the fertile floret, sometimes obscure and mistaken for tufts of hair; fertile floret leathery to indurate, shiny, 5-nerved; anthers 3. ♦The name 'CANARYGRASS' comes from *Phalaris canariensis*, the epithet meaning from the Canary Islands; the islands were named, not for the birds, but for the aboriginal dogs, the name deriving from the Latin, *Insulae Canariae*, dog islands, incorrectly Anglicized to Canary Islands.

■Anderson, D.E. 1961. Taxonomy and distribution of the genus *Phalaris*. Iowa State J. Sci. 36:1-96. ■Baldini, R.M. 1995. Revision of the genus *Phalaris* L. (Gramineae). Webbia 49(2):265-329.

- 1 Plants perennial, with rhizomes *P. arundinacea*
- 1 Plants annual, without rhizomes
 - 2 Sterile floret (appearing as a scale) solitary, at the base and to one side of the large, fertile floret..... *P. minor*
 - 2 Sterile florets (appearing as chaff or bristles) two, at the base and on both sides of the large, fertile floret
 - 3 Glumes broadly winged, the wings obvious; sterile florets broad and chaffy, usually at least ½ as long as the fertile floret..... *P. canariensis*
 - 3 Glumes wingless or if slightly winged then the wings narrow and obscure; sterile florets needle-like, mostly less than ½ as long as the fertile floret
 - 4 Sterile florets 1.5-2.5 mm long; grain 2-2.3 mm long; panicle ovate-lanceolate *P. caroliniana*
 - 4 Sterile florets 0.7-1.5 mm long; grain 1.4-1.6 mm long; panicle narrowly cylindrical *P. angusta*

**Phalaris angusta* Nees ex Trinius [narrow]. Tufted annual, lacking rhizomes, 10-150 cm or more tall; ligules 4-7 mm long; blades 2-12 mm wide; panicles 2-10 cm long, 6-15 mm wide, cylindrical; spikelets 2-5.5 mm long; glumes with winged keels; sterile florets 2, needle-like, obscure, sparsely hairy; fertile floret 2-3.8 mm wide, hairy. ●Known from a single old collection in Grant County (Mangas Spring), and probably no longer present in New Mexico; native to the Gulf Coast region and California.

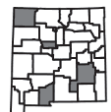


Phalaris arundinacea Linnaeus [reed-like] REED CANARYGRASS [*Phalaroides arundinacea* (Linnaeus) Rauschert]. Rhizomatous perennial, forming dense stands, 40-200 cm or more; ligules 4-10 mm long; blades 5-20 mm wide; panicles 5-40 cm long, 1-2 cm wide, branched at least basally; spikelets 4-8 mm long; glumes not or scarcely winged; sterile florets 2, less than ½ the fertile floret, scale-like, hairy; fertile floret 2.5-4.2 mm long, shiny when mature.

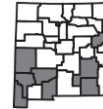


●Marshy ground, sloughs, wet meadows, widespread. ♦REED CANARYGRASS stands are immediately noticeable from a distance by their even height, band of green foliage, and terminal straw-colored panicles. Forma *variegata* (Pamell) Druce has whitish longitudinal stripes on the blades and is grown as an ornamental, called RIBBONGRASS or GARDENER'S GARTERS. Typical forms are being found more frequently in nurseries and garden shops.

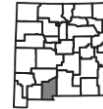
**Phalaris canariensis* Linnaeus [from Canary Islands]. Tufted annual, 30-100 cm tall; ligules 3-6 mm long; blades 2-10 mm wide; panicles 1-5 cm long, 1-2 cm wide, ovoid, not lobed, truncate at the base; spikelets 7-10 mm long; glumes broadly winged on the keels, enlarging distally; sterile florets 2, broad and chaffy, ½ or more the length of the fertile floret; fertile floret 4.5-6.8 mm long, densely hairy, shiny when mature. ●Moist weedy ground near human habitation; widely used in birdseed mixes and found around bird feeders; native to southern Europe. ♦The broad wings are distinctive, especially toward the apex of the spikelet. The distribution is probably more extensive than shown by herbarium collections.



Phalaris caroliniana Walter [from Carolina]. Tufted annual, lacking rhizomes, 30-150 cm tall; ligules 1-7 mm long; blades 2-11 mm wide; panicles 1-9 cm long, 8-20 mm wide, ovoid to cylindrical; spikelets 3.8-8 mm long; glumes narrowly to broadly winged on the keels, the lateral nerves prominent; sterile florets needle-like, ½ or more the length of the fertile floret; fertile floret 3-4.7 mm long, hairy, shiny when mature. ●Moist weedy ground.



****Phalaris minor*** Retzius [smaller]. Tufted annual, 15-100 cm tall; ligules 5-12 mm long; blades 2-10 mm wide; panicles 1-8 cm long, 1-2 cm wide, dense, narrowly ovoid to elliptic, truncate at the base; spikelets 4-6.5 mm long; glumes winged on the keels, the lateral nerves prominent; sterile florets single, scale-like, ½ or less the length of the fertile floret; fertile floret 2.5-4 mm long, hairy, becoming shiny. ●Adventive weed escaping from agricultural fields in Doña Ana County where it has been grown for birdseed production, also Los Alamos County; native to the Mediterranean region and northwestern Asia.



Phleum [ancient name for some marsh grass] TIMOTHY [2].

Tufted annuals and perennials, sometimes with short rhizomes; sheaths open; auricles absent; ligules membranous, not ciliate; blades usually flat; inflorescence a narrow, dense, spike-like panicle, the branches highly reduced; spikelets strongly laterally compressed, with 1 floret, the rachilla not or sometimes prolonged beyond the floret; disarticulation above the glumes and below the floret, or sometimes below the glumes late in the season; glumes longer than the floret, strongly keeled and ciliate, 3-nerved, abruptly awn-tipped to awned; lemma membranous, 5-7-nerved, awnless; palea shorter than or subequal to the lemma; anthers 3. ♦About 18 species, all but one native to Europe, Asia, and North Africa. Named for Timothy Hansen, who promoted its use in Virginia and the Carolinas about 1720.

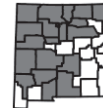
■Humphries, C.J. 1978. Notes on the genus *Phleum*. Bot. J. Linn. Soc. 76:337-340. ■Kula, A., B. Dudziak, E. Sliwinska, A. Grabowska-Joachimiak, A. Stewart, H. Golczyk, & A.J. Joachimiak. 2006. Cytomorphological studies on American and European *Phleum commutatum* Gaud. (Poaceae). Acta Biol. Cracov., Ser. Bot. 48:99-108. ■Joachimiak, A. & A. Kula. 1996. Karyosystematics of the *Phleum alpinum* polyploid complex. Plant Syst. Evol. 203:11-25. ■Piper, C.V. & K.S. Bort. 1915. The early agricultural history of Timothy. J. Amer. Soc. Agron. 7(1):1-14.

1 Panicles several times longer than wide, (3)4-16 cm long and 5-7.5(10) mm wide; awns of glumes 1-1.5 mm long***P. pratense***
 1 Panicles only 2 or 3 times longer than wide, 1-5(6) cm long and (7)8-12 mm wide; awns of glumes (1.2)1.5-2.5 mm long.***P. alpinum***

Phleum alpinum Linnaeus [alpine or high mountains] ALPINE TIMOTHY [*Phleum commutatum* Gaudin, *Phleum alpinum* Linnaeus subsp. *commutatum* (Gaudin) Richter]. Tufted perennial, sometimes with short rhizomes, 15-50 cm tall, often decumbent-based; sheaths subtending the panicles usually inflated; ligules 1-4 mm long; panicles 1-6 cm long, 5-12 mm wide, ½-3 times longer than wide; glumes 2.5-4.5 mm long, their junction forming a notch, the keels strongly ciliate, with dark-awns 1-3 mm long; lemmas about ¾ the length of the glumes. ●Subalpine meadows, moist grasslands, mossy rivulets and seeps, mostly in the northern mountains. ♦North American (*commutatum*) and European (*alpinum*) plants are considered to be conspecific. Short panicles, long dark awns, and inflated subtending sheaths are diagnostic. §



****Phleum pratense*** Linnaeus [of meadows]. Tufted perennial, lacking rhizomes, 30-150 cm tall, the lower internodes sometimes bulbous; sheaths subtending the panicles not inflated; ligules 2-4 mm long; panicles 5-16 cm long, 5-10 mm wide, 5-20 times longer than wide glumes 3-4 mm long, their junction not forming a notch but joined straight across, the keels strongly ciliate, with greenish to somewhat darkened awns 1-2 mm long; lemmas about ½ the length of the glumes. ●Roadsides, fields, mountain meadows, introduced from Europe as a pasture grass. ♦Plants that develop a bract at the base of the panicle have been referred to forma *bracteatum* Ascherson & Graebner. Some plants will produce little plantlet from the spikelets (vivipary). Pollen is highly allergenic, and is often used in the preparation of vaccines. This grass was originally called CAT'S-TAIL in England, but even there it has secondarily acquired the North American name of TIMOTHY. In the early years in the New England colonies, it was also called HERD'S GRASS, after John Herd, who found it growing along the Piscataqua River in New Hampshire in 1711. A 1747 letter from Benjamin Franklin to Jared Eliot states that the seed of HERD'S GRASS that Franklin received turned out to be "merely timothy" (see Piper & Bort 1915). §



Phragmites [fence-like] [1].

Tall rhizomatous and stoloniferous perennials; sheaths open; auricles absent; ligules a ciliate membrane; blades flat or folded; inflorescence a plumose panicle; spikelets with several florets, the proximal ones staminate, the middle ones fertile, the distal ones sterile; rachilla long silky-hairy; disarticulation above the glumes and below the florets; glumes strongly unequal, shorter than the florets, glabrous; lemmas 3-nerved, glabrous, awnless; anthers 1-3; seed rarely produced. ♦About 4-6 species, found throughout the world in temperate and tropical wetlands. Similar to *Arundo*, which has large equal glumes, a glabrous rachilla, and hairy lemmas.

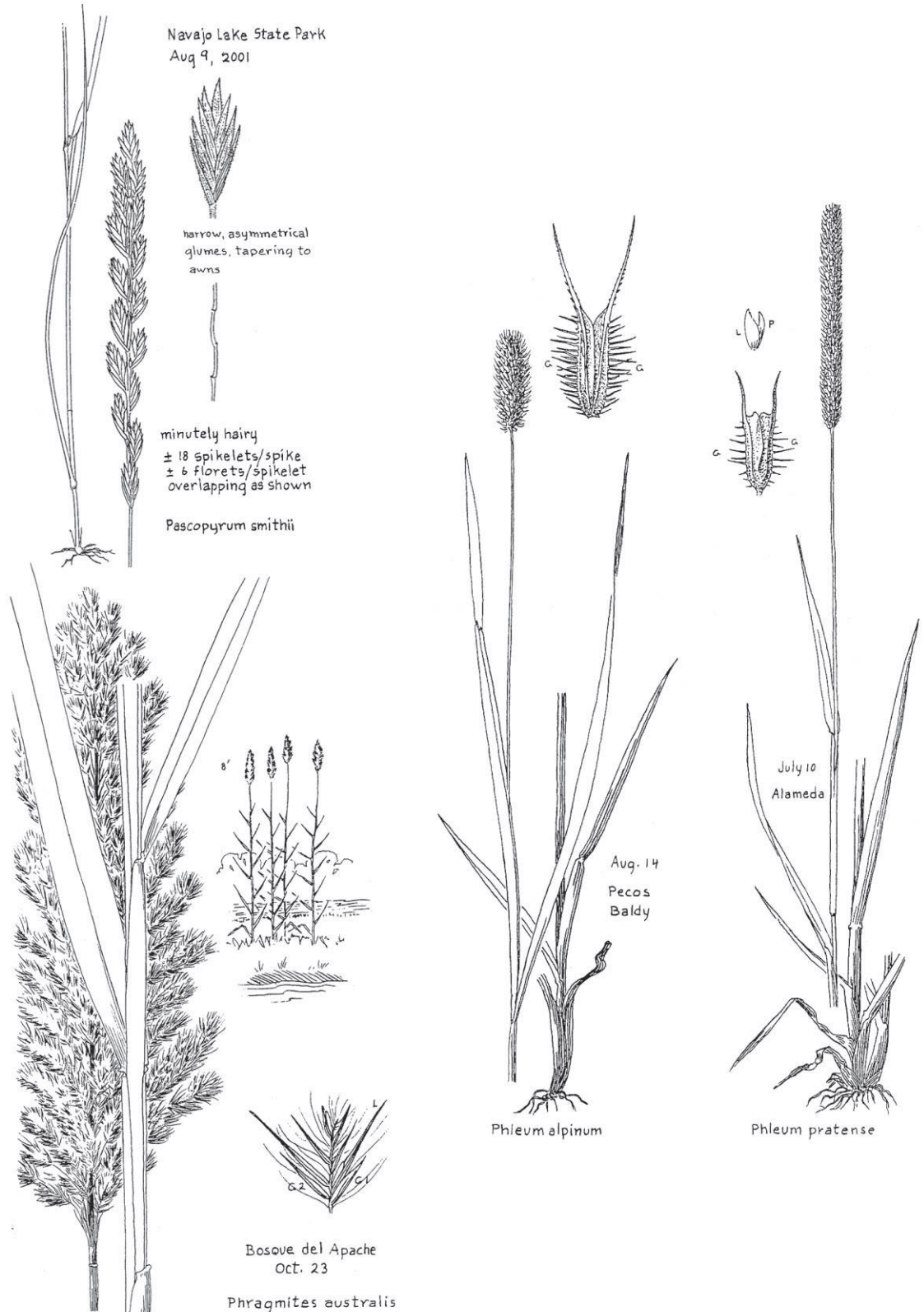
■Clayton, W.D. 1968. The correct name for the common reed. Taxon 17:168-169. ■Fernald, M.L. 1932. *Phragmites communis* Trinius var. *berlandieri* (Fournier) comb. nov. Rhodora 34:211-212. ■Haines, A. 2010. *Phragmites americanus*, comb. et stat. nov. Stantec, Botanical Notes 13(add.):1. ■Lambert, A., K. Saltonstall, R. Long, & T. Dudley. 2016. Biogeography of *Phragmites australis* lineages in the southwestern United States. Biological Invasions 18(9): 2597-2617. ■Saltonstall, K., P.M. Peterson, & R.J. Soreng. 2004. Recognition of *Phragmites australis* subsp. *americanus* (Poaceae: Arundinoideae) in North America: Evidence from morphological and genetic analyses. Sida 21(2):683-692.

Phragmites australis (Cavanilles) Trinius ex Steudel [southern] COMMON REED, CARRIZO [*Phragmites communis* Trinius, *Phragmites karka* (Retzius) Trinius ex Steudel *Phragmites phragmites* (Linnaeus) Karsten]. Rhizomatous and stoloniferous perennial, 1-4 m tall, the culms 0.5-1.5 cm thick; ligules about 1 mm long; blades 2-4 cm wide, breaking from the sheath in age; panicles 15-35 cm long 8-20 cm wide; spikelets with 3-10 florets; rachilla hairs 4-10 mm long; lemmas 8-15 mm long, narrow, glabrous ●Forming dense thickets and fence-rows along streams, rivers, canals, and ditches and in wet ground of springs and seeps; expected in every county. ♦Plant parts have been used for cordage, nets, mats, screens, arrow shafts, prayer sticks, baskets, pipes, and thatching; calligraphers prized the hollow internodes for making quills; large expanses of reed beds are effective filters of toxins and heavy metals as the water slowly passes through the mass of roots and rhizomes; dried stalks can be ground and sifted to produce a flower with very high sugar concentrations; this is formed into a ball and scorched by the fire, yielding the grass equivalent of marshmallows. Recent studies indicate we have three races of common reed in New Mexico: §



a Ligules 1-1.7 mm long; lower glumes 3-6.5 mm long; upper glumes 5.5-11 mm long; lemmas 8-13.5 mm long; leaf sheaths deciduous in age, the culms exposed in the winter, smooth and shiny...subsp. ***americanus*** Saltonstall, Peterson & Soreng [of America] [*Phragmites americanus* (Saltonstall, Peterson & Soreng) A. Haines]. ♦This is our native race, found essentially throughout the state.

a Ligules 0.4-0.9 mm long; lower glumes 2.5-5 mm long; upper glumes 4.5-7.5 mm long; lemmas 7.5-12 mm long; leaf sheaths not deciduous in age, the culms not exposed, smooth and shiny or ridged and not shiny
 b Culm internodes smooth and shiny; apparently infrequent in the southern regions of the state...var. ***berlandieri*** (Fournier) Reed [for Jean Louis Berlandier (1805-1851), French naturalist] [*Phragmites berlandieri* Fournier]. ♦This race is perhaps native in New Mexico.
 b Culm internodes ridged and not shiny; essentially throughout the state...subsp. ****australis***. ♦This is the exotic race.



Phyllostachys [leafy spike] BAMBOO [0].

Shrubby, rhizomatous perennials; nodes swollen; internodes flattened; leaves early deciduous; sheaths open; auricle present or absent; ligules a ciliate membrane; inflorescence and spikelets never produced in New Mexico. ♦Bamboo is seen sparingly in the state as a landscape ornamental, and should be planted in containment boxes or they will rapidly invade adjacent ground by their aggressive rhizomes. Spikelets are never found. It is not found outside of cultivation in the state.

**Phyllostachys aurea* Carr ex A. & C. Rivière GOLDEN BAMBOO, FISHPOLE BAMBOO. Rhizomatous perennial to 3 m tall (ours), the culms 1-4 cm thick; sheaths glabrous except for a basal line of whitish hairs, not glaucous; auricles absent on culm leaves, present on foliage leaves. •Introduced from Asia as an ornamental landscape plant, not common and not known in the wild; not known to flower in New Mexico.

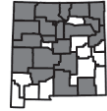
Piptatheropsis [resembling *Piptatherum*] RICEGRASS [2].

Tufted perennials, sheaths open; auricles absent; ligules membranous; inflorescence a panicles, the rebranching sometimes slight; spikelets with 1 floret; glumes subequal, slightly longer than the floret, 1-3-nerved; florets dorsally compressed to terete; disarticulation above the glumes, the floret falling, the scar circular or elliptic; lemmas leathery, 3-5-nerved, the central nerve obscure, the margins not overlapping, the palea exposed, the awn deciduous. ♦Formerly included in *Piptatherum*, which is considered strictly Eurasian, and before that in *Oryzopsis* (see Romaschenko et al. 2011).

- Hartman, R.L., B. Reif, B.E. Nelson, & B. Jacobs. 2006. New vascular plant records for New Mexico [*Piptatherum pungens*]. Sida 22(2):1225-1233. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. Aliso 23:349-361.
- Romaschenko, K., P.M. Peterson, R.J. Soreng, O. Futorna, & A. Susanna. 2011. Phylogenetics of *Piptatherum* s.l. (Poaceae: Stipeae): Evidence for a new genus, *Piptatheropsis*, and resurrection of *Patis*. Taxon 60(6):1703-1716.

- 1 Florets 3-4 mm long, the lemma pubescent, the awn 1-2 mm long (when present).....***P. pungens***
- 1 Florets 1.5-2.5 mm long, the lemma mostly glabrous (rarely pubescent), the awn 4-10 mm long (when present).....***P. micrantha***

Piptatheropsis micrantha (Trinius & Ruprecht) Romaschenko, Peterson, & Soreng [small-flowered] [*Oryzopsis micrantha* (Trinius & Ruprecht) Thurber, *Piptatherum micranthum* (Trinius & Ruprecht) Barkworth, *Urachne micrantha* Trinius & Ruprecht]. Tufted perennial, 20-85 cm tall, the basal branching extravaginal; ligules 0.4-2.5 mm long; blades 0.5-2.5 mm wide, usually rolled; panicles 5-20 cm long, the branchlets and pedicels usually appressed; glumes 2.5-3.5 mm long; florets 1.5-2.5 mm long, the lemma usually glabrous, the awn 4-10 mm long, deciduous. •Moist, shaded, often rocky, ground in the mountains and foothills.



Piptatheropsis pungens (Torrey) Romaschenko, Peterson, & Soreng [sharp pointed] [*Milium pungens* Torrey in Sprengel, *Oryzopsis pungens* (Torrey in Sprengel) A.S. Hitchcock, *Piptatherum pungens* (Torrey in Sprengel) Barkworth]. Tufted perennial, 10-90 cm tall, the basal branching intravaginal; ligules 0.5-2.5 mm long; blades 0.5-1.8 mm wide, flat to rolled; panicles 4-6 cm long, the branchlets and pedicels usually diverging; glumes 3.5-4.5 mm long; florets 3-4 mm long, the lemma evenly pubescent, the awn 1-2 mm long, early deciduous. •Pine forests in the northern mountains, not common; as yet known only from Valles Caldera National Preserve in Sandoval County.



Piptatherum...go to ***Piptatheropsis***

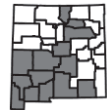
Piptochaetium [falling awns] RICEGRASS [2].

Tufted perennials, lacking rhizomes; sheaths open, the margins glabrous; ligules membranous, sometimes ciliate; blades flat to rolled; inflorescence a panicle, often narrow, the branches usually spikelet-bearing on the distal half; spikelets with 1 floret, the rachilla not prolonged; disarticulation above the glumes, the floret falling; glumes subequal, longer than the floret; florets terete; lemmas indurate, the margins involute, not encircling the palea but fitting into the grooved palea, the apex fused into a crown, awned; paleas long than the lemmas, indurate, grooved; anthers 3. ♦About 27 species of the New World, primarily South America.

- Barkworth, M.E. 1993. North American Stipeae (Gramineae): Taxonomic changes and other comments. Phytologia 74(1):1-25. ■Cialdella, A.M., L.M. Giussani, L. Aagesen, F.O. Zuloaga, & O. Morrone. 2007. A phylogeny of *Piptochaetium* (Poaceae: Poideae: Stipeae) and related genera based on a combined analysis including *trnL-F*, *rpl16*, and morphology. Syst. Bot. 32(3):545-559. ■Jacobs, S.W.L., R. Bayer, J. Everett, M.O. Arriaga, M.E. Barkworth, A. Sabin-Badereau, M.A. Torres, F. Vazquez, & N. Bagnall. 2006. Systematics of the tribe Stipeae using molecular data. Aliso 23:349-361. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Poideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. Taxon 61(1):18-44.

- 1 Glumes 3-4 mm long; awns 0.5-1 cm long (*P. micrantha*)..... go to ***Piptatheropsis***
- 1 Glumes 5-10 mm long; awns 1-3 cm long
 - 2 Glumes about 5 mm long; blades rolled and thread-like, elongate and weeping..... ***P. fimbriatum***
 - 2 Glumes about 10 mm long; blades flat or loosely rolled, firm and somewhat erect ***P. pringlei***

Piptochaetium fimbriatum (Kunth) A.S. Hitchcock [fringed] PIÑON RICEGRASS [*Oryzopsis fimbriata* (Kunth) Hemsley, *Stipa fimbriata* Kunth]. Tufted perennial, 35-100 cm tall; ligules of upper leaves 1-3 mm long; blades usually involute and 0.3-1 mm wide; panicles 7-25 cm long, 4-14 cm wide, few-flowered, the spikelets on long pedicels; glumes 4-6.2 mm long, 5-7-nerved; florets 3-5.5 mm long; lemmas tan to dark brown, hairy when young, becoming glabrous and shiny; awns 10-22 mm long. •Shaded, moist sites in woodlands, widespread, commonly under piñon.



Piptochaetium pringlei (Beal) Parodi [Cyrus Guernsey Pringle (1838-1911), prolific American botanical collector] [*Stipa pringlei* Beal]. Tufted perennial, 50-100 cm or more tall; ligules of upper leaves 1-3.5 mm long; blades flat or sometimes loosely rolled, 1-3.5 mm wide; panicles 6-20 cm long, 3-12 cm wide, the spikelets on long pedicels; glumes 9-12 mm long, 5-7-nerved; florets 6.5-10 mm long; lemmas brown, sometimes dark, usually stiffly pubescent; awns 19-30 mm long. •Pine and oak woodlands at medium elevations in the southern mountains.



Pleuraphis...go to ***Hilaria***

Poa [an ancient Greek name for grass or fodder] BLUEGRASS [20].

Tufted, rhizomatous, and stoloniferous annuals and perennials; sheaths open to closed; auricles absent; ligules membranous; blades with a groove on each side of the midnerve, the apices often prow-shaped; inflorescence a panicle, infrequently poorly developed and raceme-like; spikelets laterally compressed, with several spikelets, awnless; disarticulation above the glumes and between the florets; glumes usually not exceeding the lowermost lemma; callus often with a dense tuft of hairs, sometimes cobwebby; lemmas mostly 5-nerved. ♦Perhaps 500 species worldwide, primarily in temperate and boreal regions. Identification can be difficult because of hybridization, apomixis, and polyploidy. These are often prized forage grasses for grazing animals. *Poa pattersonii* Vasey and *P. stenantha* Trinius have been reported by various workers for the state, but no specimens are known.

- Arnov, L.A. 1981. *Poa secunda* Presl versus *P. sandbergii* Vasey (Poaceae). Syst. Bot. 6(4):412-421. ■Boivin, B. & D. Löve. 1960. *Poa agassizensis*, a new prairie bluegrass. Le Naturaliste Canadien 87:173-180. ■Cingay, B., R.J. Soreng, & E. Cabi. 2016. Stem Anatomy of two bulbous *Poa* species (Poaceae) from the Mediterranean region of Turkey. Abstract, IN: XV OPTIMA Meeting (Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area), June 6-11, 2016, Montpellier, France. ■Gillespie, L.J., A. Archambault, & R.J. Soreng. 2006. Phylogeny of *Poa* (Poaceae) based on *trnT-trnF* sequence data: Major clades and basal relationships. Aliso 23:420-434. ■Kellogg, E. 1985. A biosystematic study of the *Poa secunda* complex. J. Arnold Arboretum 66:201-242. ■Kellogg, E.A. 1985. Variation and names in the *Poa secunda* complex. J. Range Management 38(6):516-521. ■Kellogg, E.A. 1987. Apomixis in the *Poa secunda* complex. Amer. J. Bot. 74(9):1431-1437. ■Marsh, V.L. 1952. A taxonomic revision of the genus *Poa* of United States and southern Canada. Amer. Midl. naturalist 47:202-250. ■Soreng, R.J. 1985. *Poa* L. in New Mexico, with a key to middle and southern Rocky Mountain species (Poaceae). Great Basin Naturalist 45:395-422. ■Soreng, R.J. 1991. Systematics of the "Epiles" group of *Poa* (Poaceae). Syst. Bot. 16(3):507-528. ■Soreng, R.J. 2001. New plant distribution records [*Poa pratensis alpigena*]. The New Mexico

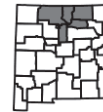
Botanist 19:3. ■Soreng, R.J. 1985. *Poa* L. in New Mexico, with a key to middle and southern Rocky Mountain species (Poaceae). Great Basin Naturalist 45:395-422. ■Soreng, R.J. 2007. *Poa*, pp. 486-601 [*Poa arctica arctica*]. IN: Flora of North America, vol. 24. Oxford University Press. ■Soreng, R.J. & F.R. Barrie. 1999. Proposal to conserve the name *Poa pratensis* (Gramineae) with a conserved type. Taxon 48(1):157-160. ■Soreng, R.J. & S.L. Hatch. 1983. A comparison of *Poa tracyi* and *Poa occidentalis* (Poaceae: Poaeae). Sida 10(2):123-141.

[Robert J. Soreng assisted with earlier versions of this key.]

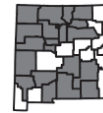
- 1 Florets modified and forming small leafy plantlets; stems slightly to strongly bulb-like at the base..... *P. bulbosa*
 1 Florets not modified into small leafy plantlets; stems rarely somewhat bulb-like
- 2 Anthers 1 mm long or less, nearly all of them well-developed; plants annual or perennial
- 3 Callus without a tuft of long hairs (but the nerves of the lemma pubescent) *P. annua*
 3 Callus with a tuft of long, cobwebby hairs
- 4 Panicles narrow, contracted; paleas pubescent on the keels; plants mostly annual or infrequently short-lived perennial.....
 *P. bigelovii*
- 4 Panicles open when mature; paleas glabrous or pubescent; plants perennial
- 5 Sheath margins fused together $\frac{1}{5}$ or less their length; first glume mostly 3-nerved *P. palustris*
 5 Sheath margins fused together $\frac{1}{4}$ to $\frac{3}{5}$ their length; first glume mostly 1-nerved
- 6 Sheaths densely scabrous with downward pointing hairs, rarely glabrous; panicles (8)13-40 cm long, the internodes of the main axis mostly 4 cm or more long *P. occidentalis*
 6 Sheaths glabrous to sparsely scabrous with downward pointing hairs; panicle mostly less than 12 cm long, the internodes of the main axis shorter than 3.5 cm
- 7 First glume linear-lanceolate, much narrower than the second; paleas glabrous to scabrous on the keels . *P. leptocoma*
 7 First glume about the same shape and width as the second, both broadly lanceolate; paleas short-pubescent on the keels *P. reflexa*
- 2 Anthers mostly longer than 1 mm, or vestigial and poorly developed; plants perennial
- 8 Stems and nodes strongly flattened; plants strongly rhizomatous; sheath margins open to near the base
- 9 Lemmas 5-6 mm long; spikelets unisexual, the plants dioecious with the sexes on separate plants; rare.....*P. arachnifera*
 9 Lemmas 2-3 mm long; spikelets bisexual, with both sexes in the same floret.....*P. compressa*
- 8 Stems and nodes round or nearly so; plants tufted or rhizomatous; sheath margins fused or open
- 10 Callus of the floret with a tuft of cobwebby hairs, these short-kinky to long-sinuuous, borne on the back surface of the lemma and distinct from any hairs on the lemma midnerve
- 11 Plants dioecious, with unisexual spikelets and the sexes on separate plants; long, delicate rhizomes developed; panicles oblong, compact, the terminal branches densely-flowered from near the base; rare.....*P. arachnifera*
 11 Plants bisexual, or if female then the panicle more open and the branches sparsely flowered; rhizomes present or absent
- 12 Sheath margins fused $\frac{1}{2}$ their length or more; panicles mostly 13-29 cm long, the lower internodes of the main axis mostly longer than 3.5 cm; anthers averaging 2.2 mm long*P. tracyi*
 12 Sheath margins fused $\frac{1}{2}$ their length or less; panicles mostly less than 13 cm long (longer in *Poa palustris*), the internodes of the main axis rarely longer than 3.5 cm; anthers mostly less than 1.9 mm long
- 13 Plants with strong rhizomes; sheath margins fused together $\frac{1}{4}$ to $\frac{1}{2}$ their length; panicle branches glabrous to moderately scabrous, round
- 14 Glumes distinctly keeled, scabrous on the nerves, the second glume plainly shorter than the first lemma; panicles often with 4 or more branches at the lowermost node (some occasionally vestigial); ligules mostly 1-2 mm long..... *P. pratensis*
 14 Glumes weakly keeled, nearly glabrous, the second glume subequal to or longer than the first lemma; panicles usually with fewer than 4 branches at the lowermost node; ligules 2-4 mm long*P. arctica*
- 13 Plants tufted, lacking rhizomes (in wet habitats occasionally producing decumbent stems that root at the nodes); sheath margins fused together $\frac{1}{4}$ or less their length (to $\frac{1}{2}$ in *P. trivialis*); panicle branches distinctly scabrous, mostly angled
- 15 Ligules 3-10 mm long; lemmas sparsely pubescent on the keel near the base and mostly glabrous on the marginal nerves and between the nerves; first glume very narrow, sickle-shaped, 1-nerved *P. trivialis*
 15 Ligules mostly less than 4 mm long; lemmas pubescent on the keel and marginal nerves and often between the nerves; first glume narrow to broad, not sickle-shaped, 1- to 3-nerved
- 16 Panicles mostly 10-30 cm long, abundantly rebranched; stems often decumbent and rooting at the nodes, stout and leafy well above the middle, 25-120 cm tall *P. palustris*
 16 Panicles mostly less than 12 cm long, sparingly rebranched if at all; stems never decumbent and rooting at the nodes, leafy or not, mostly less than 50 cm tall
- 17 Lemmas glabrous between the nerves; leaves green*P. interior*
 17 Lemmas mostly pubescent between the nerves; leaves glaucous *P. glauca*
- 10 Callus not with cobwebby hairs as above, glabrous or with hairs similar to and continuous with those of the lemma keel, or in *P. secunda* with short, straight hairs around the top of the callus and not restricted to the back side of the lemma
- 18 Plants unisexual, all the spikelets of a plant either male or female
- 19 Plants rhizomatous; uppermost stem blade well-developed; rare in New Mexico..... *P. wheeleri*
 19 Plants mostly tufted; uppermost stem blade very reduced; common in New Mexico..... *P. fendleriana*
- 18 Plants bisexual, the spikelets with both anthers and pistil in a single floret
- 20 Lemmas glabrous to scabrous; sheath margins not fused together*P. secunda*
 20 Lemmas prominently pubescent or puberulent; sheath margins fused together or not
- 21 Plants rhizomatous
- 22 Sheath margins fused together $\frac{1}{3}$ to $\frac{1}{2}$ their length; glumes weakly keeled; plants subalpine to alpine (subsp. *grayana*) *P. arctica*
 22 Sheath margins overlapping most of their length, fused $\frac{1}{3}$ or less; glumes strongly keeled; plants of plains and valleys *P. arida*

- 21 Plants tufted, not rhizomatous
 - 23 Stem bases enclosed in persistent, thickened, closely overlapping sheaths; panicle branches widely spreading at maturity; spikelets ovate to subcordate; blades 2-4 mm wide *P. alpina*
 - 23 Stem bases not enclosed in persistent sheaths as above; panicle branches not widely spreading; spikelets ovate to more elongate, not at all cordate at the base; blades usually less than 2 mm wide
 - 24 Lemmas keeled on the back, the pubescence on the nerves longer and more dense than between the nerves; ligules 1-3 mm long (subsp. *rupicola*) *P. glauca*
 - 24 Lemmas rounded on the back, minutely pubescent all across the base, the hairs on nerves and between nerves similar; ligules 2-7 mm long *P. secunda*

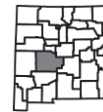
Poa alpina Linnaeus [alpine or high mountains] ALPINE BLUEGRASS. Tufted perennial, 10-40 cm tall; leaves mostly basal, the basal sheaths persistent, closely overlapping; upper ligules 4-5 mm long; blades 2-4 mm wide; panicles 2-8 cm long, open; spikelets ovate to subcordate, with 3-7 florets; lemmas 3-5 mm long, the nerves villous, without tuft of cobwebby hairs; anthers 1.3-2.3 mm long. ●Alpine to subalpine slopes, meadows, talus, and moist ledges. ♦This is one of the easier *Poa* to identify, with its broad, almost rosette-like, basal leaves and cordate-based spikelets, always at high elevations, known only from the northern mountains.



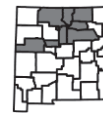
****Poa annua*** Linnaeus [annual] ANNUAL BLUEGRASS. Densely tufted annual, rarely with short stolons from the base, 2-25 cm tall; sheaths closed on lower 1/3; ligules 0.5-5 mm long; blades flat to folded, 1-5 mm wide; panicles 1-8 cm long, about 1/2 as wide; spikelets with 2-6 florets; lemmas 2.5-4 mm long, the nerves villous, without a tuft of cobwebby hairs at the base; anthers 0.6-1 mm long. ●Lawns, flower beds, moist disturbed ground; native to Europe. ♦Annual bluegrass has the potential to flower throughout the year under favorable growing conditions. In lawns, the grass can produce seedheads even when mowed regularly to a height of 6 mm, with the culms extending out nearly horizontal to the ground, resulting in a form called LOW SPEARGRASS. Exceptionally tall forms may produce stolons.



****Poa arachnifera*** Torrey [bearing spider webs]. Dioecious, loosely tufted to rhizomatous perennial, 20-85 cm tall; sheaths closed on lower 1/3; ligules 1-4 mm long; blades 1.5-4.5 mm wide; panicles 5-18 cm long, loosely (staminate) to narrowly (pistillate) contracted, with numerous spikelets; spikelets unisexual, with 2-10 florets; staminate lemmas with a weak tuft of cobwebby hairs, the anthers vestigial (to 0.2 mm long) or well-developed (1.5-2.5 mm long); pistillate florets 4-6.5 mm long, with copious cobwebby hairs from the base and villous hairs running up the nerves. ●Known only from a single collection from the Bosque del Apache wildlife refuge (Socorro County), presumably brought in by wildfowl. ♦The hairs of the callus of pistillate florets are especially long and copious (hence, spider-like).



Poa arctica R. Brown [arctic] ARCTIC BLUEGRASS. Rhizomatous perennial, 10-60 cm tall, usually with solitary aerial culms; sheaths closed only at the base; ligules 2-7 mm long; blades flat to folded, 1-6 mm wide; panicles 2-15 cm long, ovoid and to nearly as wide; spikelets with 3-6 florets; lemmas 3-7 mm long, the nerves long-villous, with or without a basal tuft of cobwebby hairs; anthers 1.5-2.5 mm long. ●Forests and subalpine and alpine meadows in the northern mountains, usually in deep, rich soil. ♦We have three basically sympatric subspecies that are difficult to distinguish:

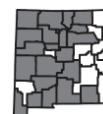


- a Panicles erect with relatively stout and straight branches; culms wiry, usually several together; callus glabrous to short-webbed...subsp. *aperta* (Scribner & Merrill) Soreng [open] [*Poa aperta* Scribner & Merrill, *Poa gracillima* of NM authors].
- a Panicles lax to erect with flexuous to straight branches; culms not wiry, solitary or several together; callus glabrous to long-webbed
 - b Callus mostly glabrous...subsp. *grayana* (Vasey) A. & D. Löve & Kapoor [for Asa Gray (1810-1888), preminent American botanist of the 19th century] [*Poa grayana* Vasey].
 - b Callus mostly copiously cobwebby...subsp. *arctica*

Poa arida Vasey [growing in dry places] PLAINS BLUEGRASS [*Poa glaucifolia* Scribner & Williams]. Rhizomatous perennial, the culms loosely tufted to solitary, 15-80 cm tall; sheaths closed only at the base; ligules 1-5 mm long; blades flat to folded, 2-5 mm wide; panicles 4-12 cm long, narrow and loosely contracted, the branched mostly erect to ascending; spikelets with 2-7 florets; glumes strongly keeled; lemmas 2.5-4.5 mm long, the nerves short-hairy, the callus mostly glabrous and without a tuft of cobwebby hairs; anthers 1.3-2.2 mm long. ●Prairies and floodplains, east of the Rio Grande and eastern slopes of the Rocky Mountains.



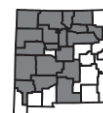
Poa bigelovii Vasey & Scribner [for John Milton Bigelow (1804-1878), American physician-botanist-explorer]. Densely tufted annual, rarely longer lived, 5-60 cm tall; sheaths closed 1/2 or less their length, compressed-keeled; ligules 2-6 mm long; blades flat, 1.5-5 mm wide; panicles 5-15 cm long, contracted-cylindrical, the branches erect; spikelets with 3-7 florets; lemmas 2.5-4.2 mm long, the nerves short-villous, usually glabrous between the nerves, with a tuft of cobwebby hairs at the base; anthers 0.2-1 mm long. ●Rocky hills, arroyo bottoms, wooded slopes, widespread.



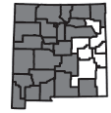
****Poa bulbosa*** Linnaeus [having bulbs]. Densely tufted perennial, 15-60 cm tall, the bases bulbous; sheaths closed about 1/4 their length, the lowest sheaths with inflated bases; ligules 1-3 mm long; blades flat, 1-3 mm wide, soon withering; panicles 3-12 cm long, loosely contracted, the branches erect to ascending; spikelets with 4-7 florets, most of the florets modified into leafy shoots; unmodified lemmas 3-4 mm long, the callus webbed or glabrous. ●Moist hills and slopes in the mountains; native to Eurasia. ♦Our plants belong to subsp. *vivipara* (Koeler) Arcangeli [producing live young, as in bulbs or plantlets] [*Poa bulbosa* Linnaeus var. *vivipara* Koeler]. According to recent studies (Cingay et al. 2016), *Poa* is the only genus of grasses that produces true bulbs; swollen culm bases in other genera (i.e., *Zuloagaea*) are corms.



****Poa compressa*** Linnaeus [flattened] CANADA BLUEGRASS. Strongly rhizomatous perennial, the aerial culms mostly solitary or few together, 20-60 cm tall, the bases geniculate, the nodes and internodes flattened; sheaths closed only at the base; ligules 1-3 mm long; blades flat, 1.5-4 mm wide; panicles 2-10 cm long, loosely contracted, 1/3 or less as wide, the scabrous branches erect-ascending, sometimes spreading; spikelets with 4-7 florets; glumes distinctly keeled; lemmas 2.3-3.5 mm long, the nerves densely short-villous, usually with a tuft of cobwebby hairs at the base; anthers 1.3-1.8 mm long. ●Forest clearings, disturbed meadows, roadsides; native to Europe, and not Canada. ♦This is often confused with sympatric Kentucky bluegrass, but differs in having conspicuously flattened nodes and internodes, and lemmas with indistinct lateral nerves and less cobwebby hairs. Culms remain green long after the foliage has faded.



Poa fendleriana (Steudel) Vasey [for Augustus Fendler (1813-1883), German-born botanical collector who visited Santa Fe in 1847] MUTTONGRASS. Densely tufted perennial, often with weak short rhizomes, 15-70 cm tall, erect to decumbent-based, the plants sometimes staminate or pistillate; sheaths closed about 1/3 their length; ligules 0.2-1.8 mm long; cauline blades shortened distally, usually rolled, 1-4 mm wide; panicles 4-15 cm long, congested, narrow; spikelets with 2-10 florets, ovate, flattened; glumes distinctly keeled; lemmas 3-6 mm long, the nerves glabrous to villous, lacking a tuft of cobwebby hairs at the base; anthers vestigial (0.1-0.2 mm long) or well-developed (2-3 mm long). ●Woodlands, rocky hills, mountain slopes; very widespread. ♦We have three subspecies: §



a Lemmas keels commonly scabrous to glabrous...subsp. *albescens* (A.S. Hitchcock) Soreng [whitish] [*Poa albescens* A.S. Hitchcock]. ●Known only from the bootheel region.

a Lemmas commonly pubescent on the keels

b Ligules of middle to upper stem leaves 1.8-11 mm long...subsp. *longiligula* (Scribner & T.A. Williams) Soreng [with long ligule] [*Poa longiligula* Scribner & T.A. Williams]. ●Widespread in the northwestern third of the state.

b Ligules of middle to upper stem leaves 0.2-1(2) mm long...subsp. *fendleriana*. ●Widespread nearly throughout the state, except for the eastern plains.

Poa glauca Vahl [bluish green]. Densely tufted, usually glaucous perennial, 5-60 cm tall; sheaths only at the base; ligules 1-5 mm long; blades flat or folded, 1-2.5 mm wide; panicles 4-20 cm long, 3-5 times longer than wide, narrowly pyramidal to contracted; spikelets with 2-5 florets; lemmas 2.5-4 mm long, the nerves short-villous, the callus glabrous or with a tuft of cobwebby hairs; anthers 1-2.5 mm long. ●Alpine and subalpine ridges, grassy slopes, meadows, and mossy ledges in the mountains. ♦We have two subspecies, often growing together:



a Calluses of all florets entirely glabrous; dwarf alpine plants with the lemmas hairy between the nerves...subsp. *rupicola* (Nash ex Rydberg) W.A. Weber [a rock dweller] [*Poa rupicola* Nash].

a Calluses usually with cobwebby hairs; if dwarf alpine plants, then calluses of at least the basal florets with at least a vestige of a web or the lemmas glabrous between the nerves...subsp. *glauca*

Poa interior Rydberg [interior, within] [*Poa nemoralis* Linnaeus subsp. *interior* (Rydberg) W.A. Weber]. Densely tufted, green to glaucous perennial, 10-80 cm tall; sheaths closed only at the base; ligules 0.5-3 mm long; blades flat, 1-3 mm wide; panicles 3-16 cm long, about 2-4 times longer than wide, the branches often lax and scabrous; spikelets with 1-5 florets; lemmas 2.5-4 mm long, the nerves short-villous; with a tuft of cobwebby hairs at the base, this sometimes scant to glabrous; anthers well-developed, 1.3-2.5 mm long. ●Alpine and subalpine ledges, meadows, and forest clearings in the northern mountains.



Poa leptocoma Trinius [weakly hairy] BOG BLUEGRASS. Loosely tufted perennial, occasionally with short rhizomes, 15-100 cm tall; sheaths closed in the lower 1/4 to 2/5; ligules 1.5-6 mm long; blades flat, 1-4 mm wide; panicles 5-15 cm long, lax, open, sparsely flowered, the branches spreading to reflexed, scabrous; spikelets with 2-5 florets; lower glume much narrower than the upper, 1-nerved; lemmas 3-4 mm long, the nerves pubescent, with a tuft of cobwebby hairs at the base; paleas glabrous to scabrous on the keels, sometimes ciliate; anthers well-developed, 0.2-1 mm long. ●Alpine or subalpine springs, meadows, and boggy ground, generally above 8,000 ft, and often above 9,800 ft.



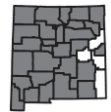
Poa occidentalis Vasey [western] NEW MEXICO BLUEGRASS. Densely tufted perennial, 20-110 cm tall; sheaths closed to 2/3 their length; ligules 3-12 mm long; blades flat, lax, 1.5-10 mm wide; panicles 12-40 cm long, open, lax, the branches spreading to drooping and densely scabrous; spikelets with 3-7 florets; lemmas 2.6-4.2 mm long, the nerves short-villous, with a tuft of long cobwebby hairs at the base; anthers well-developed, 0.3-1 mm long. ●Forest clearings and moist woods, generally above 7,000 ft.



Poa palustris Linnaeus [in marshy ground] FOWL BLUEGRASS. Loosely to densely tufted perennial, sometimes with stolons, lacking rhizomes, 25-120 cm tall, the culms erect to decumbent-based and rooting at the nodes; sheaths closed only at the base; ligules 1-6 mm long; blades flat, 2-8 mm wide, held in an ascending position; panicles 10-40 cm long, lax, open, about 1/2 as wide; spikelets with 2-5 florets; lower glume 1-nerved; lemmas 2-3 mm long, keeled, the margins hyaline, the nerves short-villous, with a tuft of cobwebby hairs at the base; anthers 1.3-1.8 mm long. ●Moist meadows, marshy ground, sloughs, at medium to high elevations; mostly in the northern regions. ♦Culms are often decumbent-stoloniferous, rooting at the nodes. Helpful identification features include the loosely tufted habit with decumbent bases, ascending leaf blades, hyaline lemma margins, and abundant cobwebby hairs. §



Poa pratensis Linnaeus [of meadows] KENTUCKY BLUEGRASS. Strongly rhizomatous perennial, the aerial stems loosely tufted to solitary, 10-100 cm tall; sheaths closed 1/4 to 1/2 their length; ligules 1-3 mm long; blades flat, folded, to rolled, 1-4 mm wide, the apices usually broadly prow-shaped; panicles 3-20 cm long, loosely contracted to broadly open and diffuse, the branches often whorled at the lower nodes; spikelets flattened, green and white, with 2-5 florets; glumes keeled; lemmas 2-4.5(6) mm long, keeled, the nerves villous, the lateral nerves prominent, with a tuft of cobwebby hairs at the base; anthers 1-2 mm long. ●Common throughout the state in a wide variety of habitats, generally in the mountains, also disturbed ground along ditches and streams, lawns, moist open fields and meadows; very widespread and expected in all the counties. ♦We have three subspecies, two of which may represent native populations:



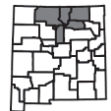
a Panicle branches scabrous...subsp. *pratensis*. ●This is the subspecies introduced from Europe for improved pastures, meadow reseeding, and lawns, escaping to similar moist sites in natural habitats; very widespread. §

a Panicle branches smooth or nearly so

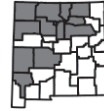
b Panicles 4-18 cm long; blades flat or folded, soft, adaxial surfaces usually glabrous, sometimes sparsely hairy; plants of alpine areas in the northern mountains...subsp. *alpigena* (Lindman) Hiitonen [originating in the mountains] [*Poa alpigena* Lindman]. ●Known in New Mexico from a single collection in Colfax County, from the Philmont Scout Ranch, at 11,200 ft, perhaps the southernmost extension of this arctic subspecies.

b Panicles 4-8 cm long; blades folded or rolled, somewhat firm, adaxial surfaces often sparsely hairy; plants generally from subalpine to lower elevations...subsp. *agassizensis* (Boivin & D. Löve) Taylor & MacBryde [from Pleistocene Lake Agassiz] [*Poa agassizensis* Boivin & D. Löve]. ●A presumably native subspecies, but its distribution in New Mexico is poorly known. Many of our upland meadows and dry mountain grasslands contain this subspecies.

Poa reflexa Vasey & Scribner ex Vasey [reflexed] NODDING BLUEGRASS. Densely tufted perennial, 10-60 cm tall; sheaths closed 1/3-2/3 their length; ligules 1.5-3.5 mm long; blades flat, 1-4 mm wide; panicles 4-15 cm long, the branches usually spreading to reflexed, flexuous, smooth or scabrous; spikelets with 3-5 florets; glumes similar in shape and width; lemmas 2-3.5 mm long, the nerves villous, with a tuft of cobwebby hairs at the base; anthers 0.6-1 mm long. ●Alpine or subalpine meadows, ridges, and rocky ledges, in the northern mountains; infrequently collected.



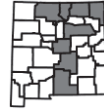
Poa secunda Presl [secund] SANDBERG'S BLUEGRASS. Densely tufted perennial, sometimes glaucous, 15-120 cm tall, the bases erect to slightly decumbent; sheath closed ¼ or less their length; ligules 1-8 mm long; blades flat, folded, to rolled, 0.5-5 mm wide, shortened upwards; panicles 4-25 cm long, loosely contracted, 2-4 cm wide, the branches erect-ascending, glabrous to densely scabrous; spikelets mostly with 3-5 florets, nearly terete to slightly flattened; lemmas 3.5-6 mm long, the nerves glabrous to short-villous, the base glabrous or with a short tuft of soft hairs; anthers 1.5-3 mm long. ●Forest clearings, sagebrush plains, meadows, disturbed ground. ♦*Poa secunda* is a complex of up to 45 facultative apomictic forms, most of which have been described as species. A conservative approach recognizes two subspecies in New Mexico with overlapping morphologies and distributions in the northern and western regions of the state:



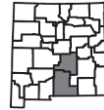
a Lemmas prominently crisp-puberulent on the back toward the base; ligules of axillary shoots usually longer than 2 mm...subsp. *secunda* [*Poa canbyi* (Scribner) Piper, *Poa laevigata* Scribner, *Poa lucida* Vasey, *P. sandbergii* Vasey, *P. scabrella* (Thurber) Vasey].

a Lemmas glabrous to minutely scabrous on the back; ligules of axillary shoots to 2 mm long...subsp. *juncifolia* (Scribner) Soreng [with leaves as in *Juncus*] [*Poa ampla* Merrill, *Poa juncifolia* Scribner, *P. nevadensis* Vasey, *Poa secunda* Presl var. *ampla* (Merrill) Soreng, *Poa secunda* Presl var. *nevadensis* (Vasey ex Scribner) Soreng]. ●Our material mostly corresponds to what some regard as the *ampla* entity, with a single collection of the *nevadensis* entity, both likely introduced by seeding (Soreng & Gillespie 2018).

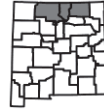
Poa tracyi Vasey [for Samuel Mills Tracy (1847-1920), American botanist and horticulturalist]. Loosely tufted perennial with short rhizomes, 30-100 cm or more tall; sheaths closed from ½ to nearly all their length, keeled, frequently retrorsely pubescent; ligules 2-4.5 mm long; blades lax, flat, 2-5 mm wide; panicles 10-30 cm long, open, to ½ as wide, the branches spreading to drooping, flexuous, scabrous; spikelets with 2-8 florets; lemmas 2.5-5 mm long, the nerves villous, with a tuft of cobwebby hairs at the base; anthers vestigial (0.1-0.2 mm long) or well-developed (1.5-3 mm long). ●Rich humus and moist loam of forests and woodlands in the mountains.



****Poa trivialis*** Linnaeus [commonplace]. Loosely to densely tufted perennial, with weak stolons or trailing stems, 25-100 cm or more tall; sheaths closed ⅓-½ their length, densely scabrous; ligules 3-10 mm long; blades 1-5 mm wide, flat, lax; panicles 8-25 cm long, open, loose, the branches ascending to spreading, densely scabrous; spikelets with 2-4 florets; lower glume very narrow, sickle-shaped, 1-nerved; lemmas 2.3-3.5 mm long, the marginal nerves glabrous, with a tuft of long cobwebby hairs at the base; anthers 1.3-2 mm long. ●Known from shaded, moist sites in the south-central mountains, but expected in other disturbed mountain areas; native to Europe. ♦Sometimes used as a turf grass at golf courses.



Poa wheeleri Vasey [for George Montague Wheeler (1842-1905), director of the western surveys of 1869-1879] [*Poa nervosa* (Hooker) Vasey var. *wheeleri* (Vasey) C.L. Hitchcock]. Tufted perennial with short rhizomes, 35-80 cm tall, often decumbent-based; sheaths closed ⅓-¾ their length, some retrorsely pubescent; ligules 0.5-2 mm long; blades flat or folded, 2-3.5 mm wide, the uppermost blades well-developed; panicles 5-18 cm long, loosely contracted to open, the branches ascending to reflexed, scabrous; spikelets with 2-7 florets; lemmas 3-6 mm long, the nerves generally glabrous but also short-villous, without a tuft of cobwebby hairs at the base; anthers usually vestigial, 0.1-0.2 mm long, but sometimes aborted late in development and up to 2 mm long. ●Subalpine mountain slopes in rich soils in the northern mountains; known from only a few collections.



Podagrostis [stalked *Agrostis*] [0].

Tufted to rhizomatous perennials; sheaths open; auricles absent; ligules membranous; inflorescence a rebranching panicle; spikelets with a single floret, the rachilla prolonged; disarticulation above the glumes and below the floret; glumes equaling or surpassing the floret; lemmas mostly 5-nerved, awnless to awned; anthers 3.

■Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, & P.K. Holmgren. 1977. Vol. 6 (Monocotyledons) [*Agrostis humilis*]. New York Botanical Garden. 584 pp.

Podagrostis humilis (Vasey) Bjorkman [dwarfish, low-growing, humble] [*Agrostis humilis* Vasey]. Low perennial, 3-25 cm tall, sometimes with short rhizomes; panicles 2-6 cm long, less than 2 cm wide; spikelets purplish, 1.5-2 mm long; rachilla prolonged beyond the floret 0.1-0.6 mm, often with a tiny tuft of hairs at the tip; paleas well-developed, 1-1.5 mm long. ●Reported for the state (Cronquist et al. 1977), but specimens are as yet unknown; if present, to be found in high elevation meadows and forest clearings in the northern mountains; known from adjacent counties in Colorado. ♦*Podagrostis humilis* resembles *Agrostis variabilis*, but that species has a short palea and the rachilla is not prolonged.

Pogonarthria : *Pogonarthria falcata* (Hackel ex Shinz) Rendle was grown in experimental plots on the NMSU College Ranch in Doña Ana County in the 1940s, and some herbarium specimens exist; no plants remain in the wild.

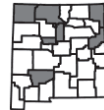
Polyogon [many awns] POLYPOGON [4].

Tufted annuals and perennials; sheaths open; auricles absent; ligules membranous; inflorescence a dense panicle; disarticulation below the glumes, the spikelet falling; spikelets with 1 floret, the rachilla not prolonged; glumes exceeding the floret, awned (usually) or awnless; lemmas 1-3-nerved, often awned; paleas arising from the back to terminal, ½ to as long as the lemma; anthers 3. ♦Similar to *Agrostis*, and some of our species were formerly placed there, but *Agrostis* differs most conspicuously by its disarticulation above the glumes. All our species are exotics.

■Barkworth, M. 2004. Plant distribution reports [*Polyogon maritimus*]. The New Mexico Botanist 31:1. ■Bjorkman, S.O. 1960. Studies in *Agrostis* and related genera. Symb. Bot. Upsal. 17:1-112.

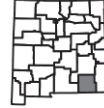
- 1 Glumes awnless..... ***P. viridis***
- 1 Glumes awned
 - 2 Awns 1-3(5) mm long; glumes acute and entire to minutely cleft at the tip..... ***P. interruptus***
 - 2 Awns 4-12 mm long; glumes obtuse to shallowly lobed at the tip
 - 3 Glumes deeply lobed, the lobes 1/6 to 1/3 the length of the glume body and evident..... ***P. maritimus***
 - 3 Glumes not lobed or only very slightly so..... ***P. monspeliensis***

****Polyogon interruptus*** Kunth [not continuous, interrupted] [*Agropogon litoralis* (Small) C.E. Hubbard, *Agropogon lutosus* (Poiret) Fournier, *Polyogon litoralis* Small]. Tufted perennial, 20-80 cm tall, decumbent-based; ligules 2-6 mm long; blades 3-6 mm wide; panicles 3-15 cm long, 1-3 cm wide, lobed; glumes 2-3 mm long, with awns to 3.2 mm long; lemmas 1-1.5 mm long, ovoid, with awns 1-3.2 mm long. ●Wet ground, ditches, seeps, and springs; rarely collected; native to



South America. ♦Some propose this to be a hybrid between *Polyogon monspeliensis* and *Agrostis stolonifera*.

****Polyogon maritimus*** Willdenow [sea-side or water's edge] MEDITERRANEAN BEARDGRASS. Tufted annual, 10-50 cm tall, geniculate-based; uppermost sheaths sometimes inflated; ligules 3-7 mm long; blades 1-5 mm wide; panicles 2-12 cm long, dense, ellipsoid, sometimes lobed; glumes 1.8-3.2 mm long, with awns 4-12 mm long; lemmas tiny, 0.5-1.5 mm long, awnless or with awns to 1 mm long. ●Disturbed wet places; known in New Mexico from a single



collection in Eddy County; native to Europe.

****Polygonum monspeliensis*** (Linnaeus) Desfontaines [of Montpellier, France] RABBITFOOTGRASS [*Alopecurus monspeliensis* Linnaeus]. Tufted annual, 10-100 cm tall, erect to geniculate-based; uppermost sheaths sometimes inflated; ligules 3-16 mm long; blades 1-7 mm wide; panicles 2-17 cm long, 2-4 cm wide, very dense, occasionally lobed; glumes 1-3 mm long, with awns 4-10 mm long; lemmas tiny, 0.5-1.5 mm long, with awns 1-4 mm long. ●Ditch banks, seeps, wet disturbed ground, throughout the state; native to Europe. §



****Polygonum viridis*** (Gouan) Breistroffer [green] [*Agrostis semiverticillata* (Forsskål) Christensen, *Agrostis viridis* Gouan, *Polygonum semiverticillata* (Forsskål) Hylander]. Tufted perennial, 10-90 cm tall, sometimes decumbent and rooting at the lower nodes; sheaths not inflated; ligules 1-5 mm long; blades 1-6 mm wide; panicles 2-10 cm long, 1-3 cm wide, dense but lobed and interrupted; glumes 1.5-2 mm long, awnless; lemmas 0.8-1.2 mm long, awnless. ●Wet ground of springs, seeps, ponds, ditch banks, and the like, widespread, expected in all the counties; native to Europe.



Psathyrostachys [brittle spike] [1].

Tufted perennials, sometimes also with rhizomes or stolons; basal sheaths closed to near the top; auricles sometimes present; ligules membranous; inflorescence a spike with 2-3 spikelets per node; disarticulation below the spikelets in the main axis; spikelets with 1-3 florets; glumes 1-nerved, needle-like, shorter than the florets; lemmas 5.5-14 mm long, 5-7-nerved, awned; paleas equaling or longer than the lemmas; anthers 3. ♦*Psathyrostachys* species are native to Eurasia; one species has been introduced as forage.

■Baden, C. 1990. A taxonomic revision of *Psathyrostachys* (Poaceae). Nord. J. Bot. 11:3-26. ■Dewey, D.R. & C. Hsiao. 1983. A cytogenetic basis for transferring russian wildrye from *Elymus* to *Psathyrostachys*. Crop Sci. 23:123-126.

****Psathyrostachys juncea*** (Fischer) Nevski [rush-like] RUSSIAN WILDRYE [*Elymus junceus* Fischer]. Densely tufted perennial, 25-80 cm or more tall; old sheaths persistent; ligules 0.2-0.3 mm long; blades flat or rolled; spikes 7-12 cm long, 0.5-2 cm wide; spikelets strongly overlapping, the lateral spikelets slightly larger; glumes 3-9 mm long; lemmas 5.5-7.5 mm long, glabrous or with short hairs, awn-tipped or with awns to 4 mm long; anthers 2.5-5 mm long. ●Introduced from northern Asia for range restoration and erosion control, scattered localities. ♦The needle-like glumes are distinctive, but are also found in *Leymus*.

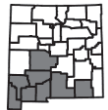


Pseudoeriocoma [false *Eriocoma*] NEEDLEGRASS [1].

Tufted perennials, usually short-rhizomatous from a knotty base, the culms often geniculate, 3-6 mm thick, with numerous nodes; sheaths open, shorter than the internodes, glabrous to hairy; auricles absent; ligules membranous; blades flat to tightly involute or convolute; inflorescence a rebranching panicle; disarticulation above the glumes and below the floret; spikelets with 1 floret, the rachilla not prolonged; glumes longer than the floret, 1-7-nerved; floret usually fusiform, evenly hairy; lemmas coriaceous, the margins enveloping most of the floret, the awns 2-geniculate, flexuous; paleas 1/3 to 3/4 as long as the lemma, 2-nerved, the nerves not prolonged; anthers 3. ♦With 6 species in southwestern United States and Mexico. Formerly treated in a polyphyletic *Achnatherum*, and before that, *Stipa*.

■Peterson, P.M., K. Romaschenko, R.J. Soreng, & J. Valdes Reyna. 2019. A key to the North American genera of Stipeae (Poaceae, Pooideae) with descriptions and taxonomic names for species of *Eriocoma*, *Neotrinia*, *Oloptum*, and five new genera: *Barworthia*, **Eriosella*, *Pseudoeriocoma*, *Ptilagrostiella*, and *Thorneochloa*. PhytoKeys 126: 89-125. ■Romaschenko K, P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, & A. Susanna A. 2010. Phylogenetics of Stipeae (Poaceae: Pooideae) based on plastid and nuclear DNA sequences. p. 513-539. IN: O. Seberg, G. Petersen, A.S. Barfod, & J.I. Davis (eds.) Diversity, phylogeny, and evolution in the monocotyledons. Aarhus University Press, Denmark. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. Taxon 61(1):18-44.

Pseudoeriocoma eminens (Cavanilles) Romaschenko [eminent, standing out] [*Achnatherum eminens* (Cavanilles) Barkworth, *Stipa eminens* Cavanilles]. Perennial, 50-100 cm tall, with knotty bases, sometimes with short rhizomatous shoots; blades flat when fresh, 1-3 mm wide; panicles with drooping branches, 20-40 cm long, 3-8 cm wide; glumes unequal, 3-5-nerved, the lower 5-12 mm long, the upper 1-4 mm shorter; florets 4-7 mm long, the callus sharp and 1-2 mm long; awns 3.5-7 cm long, twice-geniculate, the terminal segment flexuous. ●Rocky foothills, upland plains, and bajadas across the southern region. ♦The open, wavy panicle and long awns with curly end-segments is distinctive.



Ptilagrostis [feathery *Agrostis*] [1].

Tightly tufted perennials; leaves mostly basal; sheaths open; auricles absent; ligules membranous; blades convolute; inflorescence a panicle with flexuous branches; disarticulation above the glumes and below the floret; spikelets with 1 floret, the rachilla not prolonged; florets fusiform; lemmas awned, the margins not overlapping; paleas well-developed; anthers 3. ♦Formerly included in the genus *Stipa*, but differing in morphological, anatomical, and molecular features.

■Barkworth, M.E. 1983. *Ptilagrostis* in North America and its relationship to other Stipeae (Gramineae). Syst. Bot. 8:395-419. ■Johnston, B.C. 2006. *Ptilagrostis porteri* (Rydb.) W.A. Weber (Porter's false needlegrass): A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region. Online at: <http://www.fs.fed.us/r2/projects/scp/assessments/ptilagrostisporteri.pdf> [accessed 20 Feb 2013]. ■Legler, B.S. 2010. Additions to the vascular flora of New Mexico [*Ptilagrostis porteri*]. J. Bot. Res. Inst. Texas 4(2):777-784. ■Romaschenko, K., P.M. Peterson, R.J. Soreng, N. Garcia-Jacas, O. Futorna, & A. Susanna. 2012. Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. Taxon 61(1):18-44.

Ptilagrostis porteri (Rydb.) W.A. Weber [for Thomas Conrad Porter (1822-1901), American poet, clergyman, botanist] [*Stipa porteri* Rydb.]. Tufted perennial, 23-50 cm tall; ligules 0.7-1.5 mm long; blades rolled-filiform; panicles 7-12 cm long, open or contracted, the branches ascending to spreading, with few spikelets; glumes hyaline, without evident nerves, 4.5-6 mm long, broad, acute to obtuse, awnless; florets 2.5-4 mm long; awns 5-25 mm long, the basal segment hairy with hairs 1-2 mm long; anthers 1-3 mm long. ●Mossy hummocks at very high elevations in the northern mountains; very uncommon. ♦Thought to be endemic to Colorado, *Ptilagrostis porteri* was only recently (2010) discovered in northern New Mexico. It is distinctive by the filiform leaf blades, sparsely flowered panicles, broad nerve-less glumes, and awns hairy on the lower segment.



Puccinellia [for Benedetto Luigi Puccinelli (1808-1850), Italian botanist] ALKALIGRASS [3].

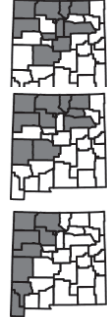
Tufted to stoloniferous annuals to perennials, the culms sometimes decumbent; sheaths open; auricles absent; ligules membranous; inflorescence a rebranching panicle; spikelets with several florets, awnless; disarticulation above the glumes and between the florets; glumes 1-3-nerved, shorter than the lowest lemma; lemmas mostly 5-nerved, the apex rounded to truncate and somewhat erose, the nerves parallel, not reaching the apex and not converging; anthers 3. ♦About 120 species of the Northern Hemisphere. Plants are generally found in wet, alkaline or saline, environments. These grasses are commonly called SALTGRASS in many regions.

■Church, G.L. 1949. A cytotoxic study of *Glyceria* and *Puccinellia*. Amer. J. Bot. 36:155-156. ■Davis, J.I. 1983. Phenotypic plasticity and the selection of taxonomic characters in *Puccinellia* (Poaceae). Syst. Bot. 8:341-353. ■Sivinski, R.C. 1995. Parish's alkali grass (*Puccinellia parishii*). Section 6, Progress Report, U.S. Fish Wildlife Service.

1 Plants annual, 3-10(15) cm tall..... *P. parishii*
1 Plants perennial (sometimes short-lived), 15 cm or more tall

- 2 Lemmas with conspicuous nerves; plants with creeping rhizomes; blades mostly flat, 4-15 mm wide; freshwater habitats (*T. pauciflora*) go to *Torreyochloa*
- 2 Lemmas with obscure or indistinct nerves; plants tufted, lacking rhizomes; blades rolled, or if flat then 1-3(4) mm wide; usually alkaline or saline habitats
- 3 Plants with yellow-green herbage and erect culms; lower panicle branches erect to divergent at maturity; lemmas 2-3.5 mm long; anthers 0.6-2 mm long *P. nuttalliana*
- 3 Plants with blue-green herbage and often geniculate-based culms; lower panicle branches divergent to reflexed at maturity; lemmas 1.5-2.2 mm long; anthers 0.4-0.8 mm long *P. distans*

**Puccinellia distans* (Jacquin) Parlature [separating] [*Poa distans* Jacquin]. Tufted perennial, 10-60 cm tall, not forming mats, erect to decumbent; blades 1-7 mm wide; panicles 3-20 cm long, open, the branches divergent-horizontal to reflexed; spikelets 2.5-7 mm long; lemmas 1.5-2.2 mm long; anthers 0.4-0.8 mm long. ●Alkali flats and floodplains; native to Eurasia.



Puccinellia nuttalliana (Schultes) A.S. Hitchcock [for Thomas Nuttall (1786-1859), English botanist, ornithologist, naturalist, and explorer] [*Poa nuttalliana* Schultes, *Puccinellia airoides* (Nuttall) S. Watson & Coulter]. Tufted perennial, 10-100 cm tall, not forming mats, erect; blades 1-4 mm wide; panicles 5-30 cm long, open, the branches erect to divergent; spikelets 3.5-9 mm long; lemmas 2-3.5 mm long; anthers 0.6-2 mm long; ●Alkali flats and floodplains.

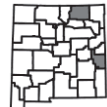
Puccinellia parishii A.S. Hitchcock [for Samuel Bonsall Parish (1838-1928), southern California naturalist]. Tufted annual, 3-15 cm tall; leaves mostly basal; blades 0.2-1.2 mm wide; panicles 1-8 cm long, mostly contracted in our populations, sometimes open; spikelets 3.5-5 mm long; lemmas 1.8-2.2 mm long, the nerves densely hairy on the lower 1/2-3/4; anthers 0.4-0.5 mm long. ●Alkali flats and seeps, in numerous scattered localities in the western half of the state. ◆Now known to be more common than once thought, this is a species of conservation concern in New Mexico. §

Redfieldia [for John Howard Redfield (1815-1895), American amateur botanist] [1].

Strongly rhizomatous perennial, rooting at the nodes; leaves cauline; sheaths open, shorter than the internodes; ligules a ciliate membrane; auricles absent; blades rolled; inflorescence an open, diffuse, rebranching panicle; pedicels longer than the spikelets; spikelets ovate to obovate, olive-green to brownish, awnless, with 2-6 florets, the distal florets sometimes sterile; disarticulation above the glumes and between the florets; glumes 1-3-nerved; fertile lemmas narrowly lanceolate to falcate, with a dense tuft of straight soft hairs at the callus; anthers 2. ◆*Redfieldia* is a monotypic genus endemic to the Great Plains of the United States, with a few scattered outlying reports. Peterson et al. (2010) included *Redfieldia* within an expanded *Muhlenbergia*, based on several phylogenetic studies all showing it to be paraphyletic within that genus; we leave *Redfieldia* as a separate genus, however, because its morphologic differences are so conspicuous (even though we do not dispute the phylogenetic argument for its inclusion in *Muhlenbergia*).

■Hatch, S.L. 2003. *Redfieldia*, p. 41. IN: Flora of North America, vol. 25. Oxford University Press. ■Peterson, P.M., K. Romaschenko, & G. Johnson. 2010. A phylogeny and classification of the Muhlenbergiinae (Poaceae: Chloridoideae: Cynodonteae) based on plastid and nuclear DNA sequences. Amer. J. Bot. 97(9):1532-1554. ■Reeder, J.R. 1976. Systematic position of *Redfieldia* (Gramineae). Madroño 23:434-438.

Redfieldia flexuosa (Thurber) Vasey [much curved, tortuous] BLOWOUT GRASS [*Graphephorum flexuosum* Thurber ex A. Gray, *Muhlenbergia ammophila* P.M. Peterson]. Rhizomatous perennial, 50-130 cm tall, rooting at the nodes as the sand covers them; ligules 0.5-1.5 mm long; blades to 45 cm long, 2-8 mm wide; panicles 20-50 cm long, 8-28 cm wide, the lower branches ascending, the upper spreading; glumes acute-attenuate; fertile lemmas 4.5-6 mm long; anthers 2-3.6 mm long. ●Deep sand hills and dunes, blowout areas. ◆We know of no specimens of blowout grass from New Mexico, but



it was reported for the state by Hitchcock & Chase (1951), a plant from Roosevelt County was identified as such by a botanist of the Natural Resources Conservation Service in 1993, and Hatch (2003) shows it in Colfax County. Also, Heerwagen (in Grasslands of the Great Plains, by J.E. Weaver & F.W. Albertson, 1956) reported that this grass was an uncommon pioneer on blowouts in the sand dunes of eastern New Mexico. It apparently lived here in the past, and determined searches may yet yield a vouchered record.

Saccharum...go to *Tripidium*

Schedonardus...go to *Muhlenbergia paniculata*

Schedonorus [growing in or near the mountains] FESCUE [2].

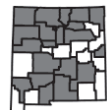
Plants tufted perennials, rarely rhizomatous; sheaths open; auricles present, clasping; ligules membranous; inflorescence a panicle, the branches weakly rebranched; disarticulation above the glumes and between the florets; spikelets several-flowered; lemmas 3- to 7-nerved, the apex short-awned to about 3 mm; anthers 3. ◆The genus is Eurasian, and all species in New Mexico are exotic, introduced for forage and turf. These species are related to *Lolium*, with which they easily hybridize, and its members were formerly placed in *Festuca*, thence combined in *Lolium*. The classification of this and related taxa is controversial and chaotic, with proposed classifications ranging from a single large genus to numerous small segregate genera; all have some degree of justification. To avoid undo confusion, we follow here the treatment of the recent *Flora of North America*, vol. 24, which recognizes the genera *Festuca*, *Leucopoa*, *Lolium*, *Schedonorus*, and *Vulpia*, while acknowledging the inter-relatedness of all five species groups.

■Catalán, P., P. Torrecilla, J.A. López-Rodríguez, J. Müller, & C.A. Stace. 2007. A systematic approach to subtribe Loliinae (Poaceae: Pooideae) based on phylogenetic evidence. Also 23(1):380-405. ■Darbyshire, S.J. 1993. Realignment of *Festuca* subgenus *Schedonorus* with the genus *Lolium* (Poaceae). Novon 3:239-243. ■Soreng, R.J. & E.E. Terrell. 1997. Taxonomic notes on *Schedonorus*, a segregate genus from *Festuca* or *Lolium*, with a new nothogenus, ×*Schedololium*, and new combinations. Phytologia 83(2):85-88.

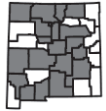
1 Auricles lacking cilia (10x or greater); two panicle branches borne at the lowermost node, together rarely bearing more than 6 spikelets; old sheaths brown, decaying to fibers; blades 3-6(7) mm wide.....*S. pratensis*

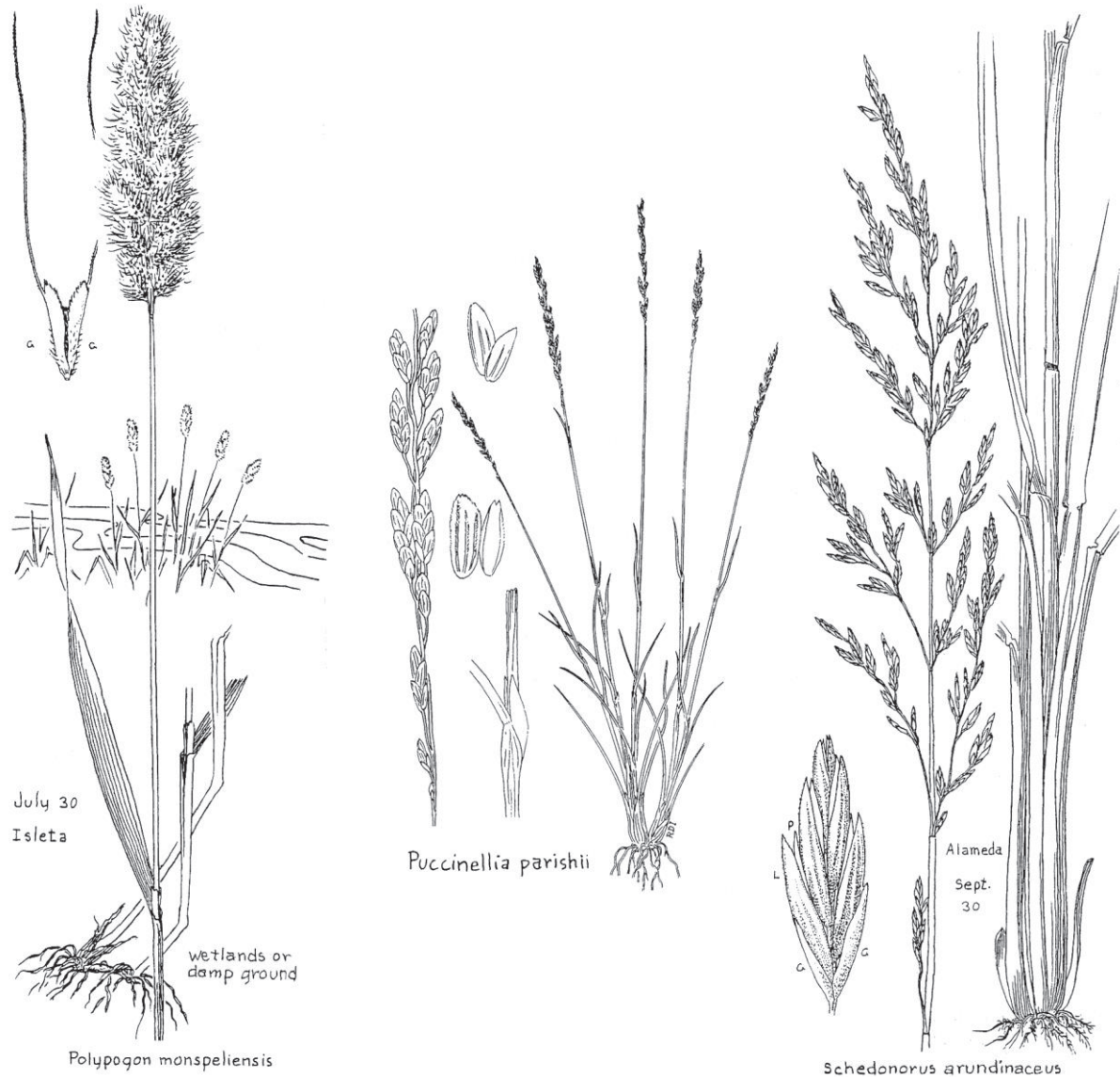
1 Auricles with minute cilia (10x or greater); two or three panicle branches borne at the lowermost node, together usually bearing 5-18(30) spikelets; old sheaths pale straw-colored, often remaining intact; blades 3-12 mm wide.....*S. arundinaceus*

**Schedonorus arundinaceus* (Schreber) Dumortier [resembling a reed] TALL FESCUE [*Festuca arundinacea* Schreber, *Festuca elatior* Linnaeus, *Lolium arundinaceum* (Schreber) S.J. Darbyshire, *Poa phoenix* Scopoli, *Schedonorus phoenix* (Scopoli) Holub]. Plants to 2 m tall, often shorter; auricles ciliate; blades rolled in young shoots; panicle branches with abundant spikelets (up to 30 or more); lemmas 5-10 mm long, awnless to short-awned to about 3 mm. ●Introduced from Europe for lawns, improved pastures, and revegetation, widespread. ◆The name *Schedonorus arundinaceus* (Schreber) Dumortier is conserved over *Schedonorus arundinaceus* Roemer & Schultes (Taxon 55:798. 2006). Also, the priority of *Festuca arundinacea* over *Poa phoenix* may not be accurate and warrants further validation. Potentially toxic to grazing animals, as it sometimes causes summer fescue toxicosis and fescue-foot. §



**Schedonorus pratensis* (Hudson) P. Beauvois [of meadows] MEADOW FESCUE [*Festuca elatior* of many authors, *Festuca pratensis* Hudson, *Lolium pratense* (Hudson) Darbyshire]. Plants to 1.3 m tall; auricles glabrous; blades folded or rolled in young shoots; lower panicle branches with few spikelets (less than 8 spikelets); lemmas 5-8 mm long, awnless or with a very short mucro. ● Introduced from Europe for lawns, improved pastures, and revegetation, widespread in scattered locales, but seemingly less common than tall fescue. ♦ This and *Festuca arundinacea* are closely related to *Lolium perenne*, and form fertile hybrids. The hybrid of *F. pratensis* × *Lolium perenne* has been named ×*Festulolium loliaceum* (Hudson) P. Fournier – it produces a panicle with the upper spikelets sessile and arranged in a spike and the lower spikelets stalked and on branches.





Schismus [a split or cleft] MEDITERRANEANGRASS [1].

Tufted annuals or short-lived perennials; sheaths open, usually shorter than the internodes, with tufts of hair at the corners; auricles absent; ligules a ciliate membrane; inflorescence a small, dense panicle, sometimes racemose, the branches weakly developed with few spikelets; spikelets with several florets; disarticulation above the glumes and between the florets, sometimes below the glumes; glumes subequal, nearly as long as the spikelet, 3-7-nerved; lemmas 7-9-nerved, the margins villous, the apices cleft to broadly notched, sometimes with a mucro from the sinus; anthers 3; grain strikingly pale orange-iridescent. ♦About 4 species native to Africa and Asia. This is a small genus native to Africa and Asia, with a single species introduced to North America.

■Conert, H.J. & A.M. Turpe. 1974. Revision der Gattung *Schismus* (Poaceae: Arundinoideae: Danthoneieae). Abh. Senckenberg. Naturf. Ges. 532:1-81. ■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Schismus arabicus*]. Great Basin Naturalist 37(4):530-531. ■Rissing, S.W. 1986. Indirect effects of granivory by harvester ants: plant species composition and reproductive increase near ant nests. Oecologia (Berl.) 68:231-234.

**Schismus barbatus* (Loefling ex Linnaeus) Thellung [bearded]. Often densely tufted annual, 2-25 cm tall; blades 3-15 cm long, 0.3-2 mm wide, glabrous to hairy adaxially; panicles 1-7 cm long, 1-3 cm wide, glumes 4-6 mm long; lower lemmas 1.5-2.5 mm long, variously hairy between the nerves and on the margins; paleas shorter to longer than the lemmas. ●Adventive in dry waste places, fields, roadsides, mostly in the southern desert region, but in scattered locales elsewhere; native to Africa and Asia. ♦Grains are harvested by desert ants, *Pogonomyrmex rugosus*, which increases their dispersion (Rissing 1986). We have two very similar varieties, sometimes treated as separate species and sometimes completely merged. One can find many plants corresponding to the following patterns, but also many that defy categorization:



[use the lowermost florets for identification]

a Teeth at tip of lemma narrowly triangular, clearly longer than broad; palea reaching at most to the middle of the lemma teeth, usually only as far as the base of the cleft; lower glumes equaling or exceeding the distal florets...var. *arabicus* (Nees) J.P. Smith [of Arabia] [*Schismus arabicus* Nees].

a Teeth at tip of lemma broadly triangular, about as broad as long; palea reaching at least as far as the lemma teeth and often projecting well beyond; lower glumes shorter than the distal florets...var. *barbatus* [*Festuca barbata* Loefling ex Linnaeus].

Schizachne [a split scale] FALSE MELIC [1].

Loosely tufted perennial, often decumbent-based; sheaths closed to almost the summit; ligules membranous; inflorescence a weakly developed panicle, often racemose; spikelets with 3-6 florets; disarticulation above the glumes and between the florets; glumes shorter than the adjacent lemmas; lemmas papery, 7-9-nerved, the nerves parallel; awned from a cleft apex; anthers 3. ♦*Schizachne* is a monotypic genus of boreal and montane regions in the Northern Hemisphere.

■Swallen, J.R. 1928. The grass genus *Schizachne*. J. Wash. Acad. Sci. 18:203-206.

Schizachne purpurascens (Torrey) Swallen [purplish] [*Avena striata* Michaux, *Trisetum purpurascens* Torrey]. Tufted perennial, 30-80 cm or more tall; ligules 0.5-1.5 mm long; blades folded or loosely rolled, 2-5 mm wide; panicles 7-17 cm long, narrow to open; glumes unequal, 3-5-nerved, often flushed with purple; lemmas 8-12 mm long; awns 8-15 mm long, divergent; anthers 1.4-2 mm long. ●Moist woods, pine forests, streamsides, and meadows.



Schizachyrium [a split chaff] BLUESTEM [3].

Tufted to rhizomatous annual and perennials; sheaths open; auricles absent; ligules membranous; blades of uppermost leaves highly reduced; inflorescence a single spicate raceme (rame) composed of repeating pairs of sessile and pedicelled spikelets subtended by a spathe, generally several of these separate rames on a flowering shoot; disarticulation below the glumes, the pair of spikelets falling together with a section of the rame; rame internode somewhat flattened, without a medial groove; sessile spikelets with 2 florets, the lower sterile, the upper fertile, the glumes enclosing the florets and awnless, the upper lemma deeply bifid and awned from the sinus; pedicelled spikelets staminate or sterile, shorter or equaling the sessile spikelet, awned or awnless. ♦About 60 species of the tropical, subtropical, and warm-temperate regions of the world. Formerly included in *Andropogon*.

■Camus, A. 1923. Note sur le genre "*Schizachyrium*" (Gramineae). Ann. Soc. Linn. Lyon 70:87-91. ■Gould, F.W. 1967. The grass genus *Andropogon* in the United States. Brittonia 19:70-76. ■Hatch, S.L. 1978. Nomenclatural changes in *Schizachyrium* (Poaceae). Brittonia 30:496. ■Hatch, S.L. 1984. A new combination in the Poaceae. Sida 10(4):321.

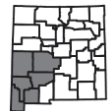
1 First glume of the sessile spikelet pubescent on the back..... ***S. sanguineum***

1 First glume of the sessile spikelet glabrous on the back, but this sometimes obscured by subtending hairs

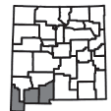
2 Pedicelled spikelets about the same size as the sessile; internodes and pedicels nearly glabrous or short-ciliate with very short hairs to 1 mm that do not at all obscure the spikelets ***S. cirratum***

2 Pedicelled spikelets much shorter and narrower than the sessile; internodes and pedicels densely ciliate with hairs 1.5-6 mm long that often obscure the spikelets..... ***S. scoparium***

Schizachyrium cirratum (Hackel) Wooton & Standley [curly] [*Andropogon cirratus* Hackel]. Tufted perennial, ours lacking short rhizomes, 30-75 cm tall, often decumbent-based but not rooting; ligules 1-2.5 mm long; blades 2-4 mm wide; rames 4-6 cm long, usually exerted from the spathe; internodes straight, with a tuft of short hairs at the base but otherwise nearly glabrous; sessile spikelets 8-9 mm long, the subtending hairs less than ¼ their length; lower glumes glabrous; upper lemmas cleft to ½ their length; awns 8-12 mm long; pedicelled spikelets 6-10 mm long, about the same length as the sessile, staminate to sterile, awnless, the pedicel stiffly ciliate on one side near the tip. ●Woodlands and rocky hills in the southwest quarter of the state.



Schizachyrium sanguineum (Retzius) Alston [blood-red; hairy flowers]. Tufted perennial, 40-110 cm or more tall, glaucous; ligules 1-2 mm long; blades 2-5 mm wide, with long bulbous-based hairs at the base; rames 4-12 cm long, usually exerted from the spathe; internodes straight, glabrous to hirsute; sessile spikelets 5-9 mm long, the subtending hairs to ½ their length; lower glumes hirsute; upper lemmas cleft ⅔ to nearly their length; awns 10-15 mm long; pedicelled spikelets 3-5 mm long, smaller than the sessile, staminate to sterile, with awns 0.3-5 mm long, the pedicels curving outward in age. ●Woodlands and rocky hills in the southwestern mountains and foothills. ♦Our plants belong to var. ***hirtiflorum*** (Nees) Hatch [hairy flowers] [*Andropogon feensis* Fournier, *Andropogon hirtiflorus* (Nees) Kinth, *Andropogon hirtiflorus* (Nees) Kunth var. *feensis* (Fournier) Hackel]. The epithet *feensis* (in the synonym *Andropogon feensis* Fournier) refers to Santa Fe, but not ours; Fournier based the name on specimens from a canyon near the village of Santa Fe in the Valley of Mexico.



Schizachyrium scoparium (Michaux) Nash [broom-like]. Tufted (ours) to rhizomatous perennials, greenish to purplish, 10-100 cm or more tall (taller elsewhere); ligules 0.5-2 mm long; blades 2-9 mm wide; rames 3-8 cm long, usually exerted from the spathe; internodes sparsely to densely ciliate; sessile spikelets 4-11 mm long, the subtending hairs ½ to nearly as long as the spikelet; lower glumes glabrous; upper lemmas cleft to ½ their length; awns 3-17 mm long; pedicelled spikelets 1-10 mm long, narrower than the sessile spikelet, sterile to staminate, awnless or awned to 4 mm. ●Hills, plains, woodlands, rocky slopes, throughout the state. ♦This species extends from the Canadian plains to central Mexico, and exhibits considerable variation. Two varieties are found in New Mexico: §



a Rachis and pedicels flexuous, curved away from one another, thin, less villous, sometimes quite sparsely so...var. ***scoparium*** LITTLE BLUESTEM [*Andropogon scoparius* Michaux, *Andropogon scoparius* Michaux var. *frequens* C.E. Hubbard, *Schizachyrium scoparium* (Michaux) Nash var. *frequens* (C.E. Hubbard) Gould]. ●Throughout the state.

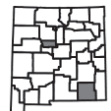
a Rachis and pedicels straight and relatively thick at maturity, copiously and thickly villous...var. ***neomexicanum*** (Nash) Hitchcock [from New Mexico] NEW MEXICO BLUESTEM [*Andropogon neomexicanus* Nash, *Andropogon scoparius* Michaux var. *neomexicanus* (Nash) Hitchcock, *Schizachyrium neomexicanum* (Nash) Nash]. ●Sandy plains and hills, often on gypsum.

Sclerochloa [hard grass] HARDGRASS [1].

Tufted annuals; sheaths open to closed ½ their length; auricle absent; ligules membranous; inflorescence a small raceme clustered among the leaves, sometimes weakly paniculate; spikelets laterally compressed, glabrous, subsessile on short pedicels to 1 mm long, with 2-7 florets, awnless; glumes unequal, shorter than the lowermost lemma, blunt to rounded, 3-5-9-nerved, with hyaline margins; lemmas indurate when mature, 7-9-nerved, with hyaline margins, rounded to emarginate; anthers 3. ♦A Eurasian genus of only 2 species, with one found throughout the world as a weed.

■Brandenburg, D.M., J.R. Estes, & J.W. Thieret. 1991. Hard grass (*Sclerochloa dura*, Poaceae) in the United States. Sida 14(3):369-376.

****Sclerochloa dura*** (Linnaeus) Beauvois [hard, durable] [*Poa dura* Linnaeus]. Tufted annual, 2-15 cm tall, the shoots usually prostrate to sometimes ascending; foliage overlapping and usually surpassing the foliage; blades 1-4 mm wide, the apices prow-shaped; racemes 1-5 cm long, the base usually still in the subtending sheaths; spikelets 4-10 mm long; both glumes much shorter than the lowermost lemma; lemmas 4-7 mm long, the nerves scaberulous, the distal lemmas smaller. ●Adventive in lawns, golf course, athletic fields, and other moist waste places, uncommon in scattered localities, and expected in more counties; native to Eurasia.

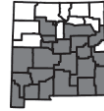


Scleropogon [hard bearded] BURROGRASS [1].

Stoloniferous (sometimes rhizomatous), usually dioecious (sometimes monoecious) perennial, the stolons rooting at the nodes and producing new plants; leaves mostly basal; sheaths open; ligules a ring of hairs; blades flat or folded, stiff; inflorescence a spike-like raceme or weakly panicle, rising above the leaves; staminate spikelets awnless or short-awned, not disarticulating, the glumes and lemmas similar and 1-nerved; pistillate spikelets with several florets, the lower fertile, the upper ones reduced to awns, disarticulating above the glumes and below all the florets, the lemmas long-awned. ♦*Scleropogon* is a monotypic genus of the Americas.

■Allred, K.W. 1989. Observations on seed dispersal and implantation in burrgrass (*Scleropogon brevifolius* – Gramineae). Sida 13(4): 493-496. ■Beetle, A.A. 1981. Noteworthy grasses from Mexico [*Scleropogon longisetus*]. Phytologia 49(1):33-43. ■Peterson, P. M., and J. T. Columbus. 1997. Allelic variation in the amphitropical disjunct *Scleropogon brevifolius* (Poaceae: Eragrostideae). BioLania, Edición Especial 6: 473-490. ■Reeder, J.R. & J. Toolin. 1987. *Scleropogon* (Gramineae), a monotypic genus with disjunct distribution. Phytologia 62:267-275.

Scleropogon brevifolius Philippi [short-leaved] [*Festuca macrostachya* Torrey & Gray, *Scleropogon longisetus* Beetle]. Plants



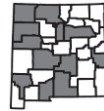
10-20 cm tall, the stolon internodes 5-15 cm long; basal sheaths hairy; ligules about 1 mm long; blades about 1 cm long and 1-2 mm wide; staminate spikelets with 5-10 florets, the glumes and lemmas 1-3-nerved; pistillate spikelets with several florets, the glumes and lemmas 3-nerved, the lemma awns 3-15 cm long, widely divergent. ●Grassy plains and clay flats, widespread. ♦The dispersal unit of BURROGRASS is the cluster of long-awned pistillate florets. At maturity the awns bend outward and downward, forming a spider-like structure that creeps and skitters across the clay flats where the species is common, powered by gentle puffs of air arising from heat convection off the desert floor. The pointed florets catch and are embedded in the cracks and crevices of the drying clay, effectively planting the grains (see Allred 1989). This was called NEEDLEGRASS in the early days, as was *Aristida purpurea*. The grass increases under heavy grazing, and a 1938 Soil Conservation Service Bulletin reported that BURROGRASS was "...a heavenly gift to fools who insist on grazing the last spear of grass from the range." §

Secale [an ancient name for some grass] RYE [1].

Tufted annuals and perennials; sheaths open; auricles present; ligules membranous; inflorescence a spike, with 1 spikelet per node; spikelets with 2 florets; disarticulation above the glumes and between the florets; glumes needle-like, 1-nerved, shorter than the lemmas; lemmas strongly compressed and keeled, the keel ciliate, awned; anthers 3. ♦A genus of 2-3 species (or more, depending on who's doing the counting), native to Eurasia.

■Allred, K.W. 2002. Rye, wheat, triticale, and barley. The New Mexico Botanist 22:5-6. ■Baum, B.R. & P.K. Gupta. 1990. Taxonomic examination of Triticale (*×Triticosecale*). Can. J. Bot. 68:1889-1893. ■Bowden, W.M. 1962. Cytotaxonomy of the native and adventive species of *Hordeum*, *Eremopyrum*, *Secale*, *Sitonia*, and *Triticum* in Canada. Can. J. Bot. 40:1675-1711. ■Frederiksen, S. and G. Petersen. 1998. A taxonomic revision of *Secale* L. (Triticeae, Poaceae). Nordic J. Bot. 18:399-420.

****Secale cereale*** Linnaeus [agricultural]. Tufted annual, mostly 50-120 cm or more tall; blades 4-12 mm wide; spikes



3-15 cm long, erect to nodding; disarticulation below the glumes in the rachis or above the glumes and below the florets; glumes 8-20 mm long, with an awn 1-3 mm long; lemmas 14-18 mm long, with awns 7-50 mm long; anthers about 7 mm long. ●Introduced as a cultivated crop plant, and also widely used for erosion control along roadsides, occasionally escaping around fields, but not persisting long; native to Eurasia; expected in any of the counties. ♦Plants are susceptible to rot infestation by numerous fungi, particularly *Claviceps purpurea*. Unlike wheat, barley, and oats, which are normally self-pollinated, rye is cross-pollinated. Hybrids between rye and wheat are known agronomically as TRITICALE, and are herein treated in the hybrid genus *×Triticosecale*, q.v.

Setaria [bristly] BRISTLEGRASS [11].

Tufted annuals and perennials, rarely with rhizomes; sheaths open; ligules a ring of hairs, or a ciliate membrane; inflorescence a usually dense, spike-like panicle, the branches sometimes nearly absent but usually discernible, also composed of numerous bristles below the spikelets that represent highly reduced branchlets; disarticulation below the glumes and above the bristles; spikelets with two florets, the lower staminate or sterile, the upper fertile, awnless; lower palea usually developed; upper floret indurate when maturity, transversely rugose (rarely smooth); anthers 3. ♦About 140 species of tropical to warm-temperate regions worldwide. *Setaria scheelei* (Steudel) A.S. Hitchcock and *Setaria villosissima* (Scribner & Merrill) K. Schumann have been reported for the state from time to time, but no validating specimens are known.

■Emery, W.H.P. 1957. A cytotoxic study of *Setaria macrostachya* (Gramineae) and its relatives in the southwestern United States and Mexico. Bull. Torrey Bot. Club 84:94-105. ■Fairbrothers, D.E. 1959. Morphological variation of *Setaria faberii* and *S. viridis*. Brittonia 11:44-48. ■Fox, W.E. III & S.L. Hatch. 1999. New combinations in *Setaria* (Poaceae: Paniceae). Sida 18(4):1037-1047. ■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Setaria adhaerens*, *Setaria reverchonii*, *ramiseta*]. Great Basin Naturalist 37(4):530-531. ■Kerguelen, M. 1977. Notes agrostologiques, II [*Setaria parviflora*]. Bull. Soc. Bot. Fr. 124:337-349. ■Rominger, J.M. 1962. Taxonomy of *Setaria* (Gramineae) in North America. Illinois Biol. Monogr. 29:1-132. ■Toolin, L. & J.R. Reeder. 2000. The status of *Setaria macrostachya* and its relationship to *S. vulpisetia* (Gramineae). Syst. Bot. 25(1):26-32. ■Webster, R.D. 1993. Nomenclature of *Setaria* (Poaceae: Paniceae). Sida 15(3):447-490.

1 A single bristle usually present at the base of only the terminal spikelet of each branch..... ***S. reverchonii***

1 Bristles present below all or nearly all the spikelets

2 Bristles with downward-pointing barbs, thus the seedheads readily clinging to clothing and to each other

3 Margins of the upper sheaths thin and translucent, glabrous, often with a slight auricle at the summit; blades stiff-pubescent on both surfaces ***S. adhaerens***

3 Margins of the upper sheaths not thin and translucent, pubescent, lacking an auricle at the summit; blades scabrous or stiff-pubescent on the upper surface only ***S. verticillata***

2 Bristles with upward-pointing barbs, the seedheads not readily clinging

4 Margins of the sheaths glabrous; bristles 4-13 below each spikelet; second glume ½ to ⅔ the length of the adjacent upper lemma

5 Plants perennial from hard, knotty, nearly rhizomatous bases, the stems arising singly or in small tufts; spikelets 2-2.8 mm long..... ***S. parviflora***

5 Plants annual, the stems in large or small tufts; spikelets 2.8-3.4 mm long ***S. pumila***

4 Margins of the sheaths pubescent (rarely glabrous in *S. leucopila*); bristles 1-3 below each spikelet; second glume ¾ to equaling the length of the adjacent upper lemma

6 Plants annual, though often coarse and robust

7 Panicles contracted, but relatively loose and often lobed or interrupted below, the main axis visible..... ***S. grisebachii***

7 Panicles dense, cylindrical and spike-like, lobed and interrupted in *S. italica*, otherwise the main axis obscured

8 Terminal panicles 18 cm or more long, as much as 40 cm long; shoots 1.2-3 m tall ***S. magna***

8 Terminal panicles 3-15 cm long; shoots mostly 0.2-0.7 m tall

9 Panicles lobed; disarticulation above the glumes, the upper floret falling away from the spikelet..... ***S. italica***

9 Panicles not lobed, cylindrical; disarticulation below the glumes ***S. viridis***

6 Plants perennial

- 10 Palea of the lower floret nearly as long as the adjacent upper palea; spikelets mostly 2-2.3 mm long, appearing globose; blades, at least some, 7-15 mm wide.....***S. macrostachya***
- 10 Palea of the lower floret ½ to ¾ as long as the adjacent upper; spikelets 2.2-3 mm long, elliptic; blades typically 2-5(7) mm wide.....***S. leucopila***

****Setaria adhaerens*** (Forsskål) Chiovenda [clinging, adhering] CLINGING BRISTLEGRASS [*Panicum adhaerans* Forsskål]. Tufted annual, 20-60 cm tall; sheath margins thin and translucent distally, glabrous; ligules 1-2 mm long, a ring of hairs; blades 5-10 mm wide, with bulbous-based hairs on both surfaces; panicles 2-6 cm long, the bristles 4-7 mm long, retrorsely scabrous, solitary beneath each spikelet; spikelets 2-2.3 mm long; lower glume about ½ the spikelet length; lower palea less than ½ the spikelet length; upper floret finely transversely rugose. ●Weedy sites, roadsides, lawns, widespread; native to tropical regions throughout the world. ♦Similar to the much less common *Setaria verticillata*, but rather easily told apart by the key features. The seedheads cling tenaciously to socks and pant legs, and mischievous little boys have been known to toss the entangling burs into the long tresses of little girls fleeing before them.



Setaria grisebachii Fournier [for August Heinrich Rudolf Grisebach (1814-1879), German botanist and professor] [*Chaetochloa grisebachii* (Fournier) Scribner, *Chaetochloa grisebachii* (Fournier) Scribner var. *ampla* Scribner & Merrill]. Tufted annual, 30-100 cm tall; sheath margins ciliate; ligules a ring of hairs; blades flat, 4-20 mm wide, pilose-hispid on both surfaces; panicles 3-18 cm long, lobed and interrupted, the main axis visible, often purple, the bristles 1-3 below each spikelet, 5-15 mm long; spikelets 1.5-2.2 mm long; lower glume about ½ the spikelet length; lower palea about ½ the spikelet length; upper floret finely transversely rugose. ●Canyon bottoms, rocky hills, and stream banks. ♦A form of this species with very poorly developed bristles below only some of the spikelets is known from the Diamond Creek drainage in Sierra County.



****Setaria italica*** (Linnaeus) Beauvois [of Italy] FOXTAIL MILLET [*Chaetochloa italica* (Linnaeus) Scribner, *Panicum italicum* Linnaeus]. Tufted annual, 10-100 cm or more tall; sheaths mostly glabrous, the margins sparsely ciliate; ligules 1-2 mm long; blades 1-2 mm wide; panicles 8-30 cm long, dense and congested, often drooping, sometimes lobed below, the bristles 1-3 below each spikelet, 3-12 mm long; spikelets about 3 mm long, the fertile floret falling out; lower glume about ½ the spikelet length; lower palea about ½ the spikelet length; upper floret appearing smooth, but very finely transversely rugose with magnification. ●Introduced as a cultivated crop in many parts of the world, also present in birdseed mixes, escaping but rarely persisting for long; native to Asia. ♦This species varies greatly in size, blade width, panicle length and density, and bristle length. The term millet is used for many grasses with edible grains, including species of *Echinochloa*, *Eleusine*, *Eragrostis*, *Panicum*, *Paspalum*, *Setaria*, and *Sorghum*.



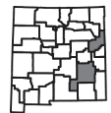
Setaria leucopila (Scribner & Merrill) K. Schumann [white haired] PLAINS BRISTLEGRASS [*Chaetochloa leucopila* Scribner & Merrill, *Setaria macrostachya* sensu many North American authors]. Tufted perennial, 20-100 cm tall; sheath margins villous distally; ligules a ciliate membrane 1-2.5 mm long; blades 2-5 mm wide; panicles 6-15 cm long, congested, the bristles usually solitary, 4-15 mm long; spikelets 2.2-2.8(3) mm long, elliptical; lower glume about ½ the spikelet length; lower palea ½-¾ the length of the adjacent upper palea; upper floret finely transversely rugose. ●Plains, rocky hills and slopes, widespread. ♦This and *Setaria macrostachya* Kunth have been confused for many years, and both scientific names have been used interchangeably; most of the records of *S. macrostachya* in New Mexico pertain to *S. leucopila*, which is very common in New Mexico. The two are accurately distinguished by the features in the key. §



Setaria macrostachya Kunth [large-spiked] [*Chaetochloa composita* (Kunth) Scribner]. Tufted perennial, 60-120 cm tall; sheath margins with only a few hairs at the throat; ligules 2-4 mm long, densely ciliate; blades 7-15 mm wide; panicles 10-30 cm long, congested, the bristles usually solitary, 10-20 mm long; spikelets 2-2.3 mm long, nearly spherical; lower glume ½-½ the spikelet length; lower palea nearly equaling the adjacent upper palea; upper floret finely transversely rugose. ●Rocky hills of the southern mountains in the bootheel region and Guadalupe Mountains of Eddy County; uncommon. ♦See comment under *Setaria leucopila*.



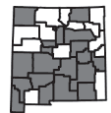
****Setaria magna*** Grisebach [great or large] GIANT FOXTAIL. Tufted annual, 1.5-4 m or more tall; sheath margins villous distally; ligules 1-2 mm long, ciliate; blades 1.5-3.5 cm wide; panicles 20-50 cm long, 2-5 cm wide, congested, the bristles 1-2 below each spikelet, 10-20 mm long; spikelets about 2 mm long, the upper floret falling out; lower glume ½ the spikelet length; lower palea large, equaling the lower lemma and adjacent upper palea; upper floret smooth and shiny brown. ●Marshy ground at the Bitter Lake Refuge in Chaves County, presumably introduced by water fowl, and moist roadsides in Curry and Quay counties; native to eastern and Gulf coasts of the United States. ♦Unmistakable because of its giant size.



Setaria parviflora (Poiret) Kerguelen [small-flowered] KNOTROOT BRISTLEGRASS [*Setaria geniculata* (Lamarck) Beauvois]. Semi-tufted perennial with short knotty rhizomes, 30-120 cm tall; sheath margins glabrous; ligules a short ring of hairs, less than 1 mm long; blades 2-8 mm wide; panicles 3-10 cm long, dense, the bristles 4-12 below each spikelet, 2-12 mm long; spikelets 2-2.8 mm long; lower glumes about ½ the spikelet length; lower palea equaling the lower lemma; upper floret distinctly transversely rugose. ●Open moist habitats in the foothills of the southern and central mountains, not common. ♦Glabrous sheath margins, many bristles, and a hard knotty base are diagnostic for this species.



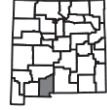
****Setaria pumila*** (Poiret) Roemer & Schultes [small, dwarf] YELLOW BRISTLEGRASS [*Chaetochloa glauca* of authors, *Panicum pumilum* Poiret, *Setaria glauca* of authors, *Setaria lutescens* (Weigel) F.T. Hubbard]. Tufted annual, 30-100 cm or more tall; sheath margins glabrous; ligules ciliate; blades 4-10 mm wide, with bulbous-based hairs proximally on the adaxial surface; panicles 3-15 cm long, dense, yellowish, the bristles 4-12 below each spikelet, 3-8 mm long; spikelets 2-3.4 mm long, turgid; lower glumes about ½ the spikelet length; upper glumes about ½ the spikelet length; lower palea equaling the lower lemma; upper floret exposed (not covered by the upper glume), strongly rugose. ●Weedy ground along roads, fields, in lawns, widespread; native to Europe. ♦This went by the name *Setaria glauca* for many years, presumably based on *Panicum glaucum* Linnaeus, but that basionym is correctly applied to *Pennisetum americanum* (Linnaeus) Leeke (Kerguelen 1977; Webster 1993). The species is quickly told by the visible rugose upper floret, only half hidden by the upper glume.



Setaria reverchonii (Vasey) Pilger [for Julien Reverchon (1837-1905), French-born botanist and colonist in Texas]. Rhizomatous perennial, the bases knotty, 30-90 cm tall; sheath margins ciliate distally; ligules a ring of stiff hairs 1-2 mm long; blades 1-7 mm wide, rolled, stiff; panicles 5-20 cm long, loose, lobed and interrupted, the branches weakly developed, the bristles 2-8 mm long, solitary below usually only the terminal spikelet of the branches, sometimes present below other spikelets as well; spikelets 2-4.5 mm long; lower glumes $\frac{1}{2}$ the spikelet length; lower paleas absent; upper floret finely transversely rugose. ●Dry plains and scrublands in the southeastern region, uncommon. ◆Our plants belong to subsp. *ramiseta* (Scribner) W.E. Fox [bristle-branch] [*Panicum ramisetum* Scribner, *Setaria ramiseta* (Scribner) Pilger]. Stiff blades, weakly developed panicles, and paucity of bristles distinguish this species.



**Setaria verticillata* (Linnaeus) Beauvois [whorled] HOOKED BRISTLEGRASS [*Panicum verticillatum* Linnaeus]. Tufted annual, 30-100 cm tall; sheath margins ciliate distally, not thin and translucent; ligules a densely ciliate membrane 0.3-1 mm long; blades 5-15 mm wide, scabrous on the adaxial surface only; panicles 5-15 cm long, dense, the bristles solitary, 4-7 mm long, retrorsely scabrous; spikelets 2-2.3 mm long; lower glumes about $\frac{1}{3}$ the spikelet length; lower palea about $\frac{1}{2}$ the spikelet length; upper floret finely transversely rugose. ●Weedy ground, known only from a few old collections in Doña Ana County, perhaps no long present in the state; native to Europe.



**Setaria viridis* (Linnaeus) Beauvois [green] GREEN BRISTLEGRASS [*Chaetochloa viridis* (Linnaeus) Scribner, *Panicum viride* Linnaeus]. Tufted annual, 20-100 cm tall; sheath margins ciliate distally; ligules a ciliate membrane 1-2 mm long; blades 4-25 mm wide, glabrous; panicles 3-20 cm long, dense, sometimes the apex nodding, the bristles 1-3 below each spikelet, 5-10 mm long; spikelets 1.8-2.2 mm long; lower glumes about $\frac{1}{3}$ the spikelet length; lower palea about $\frac{1}{3}$ the lower lemma length; upper floret very finely transversely rugose, greenish. ●Common weed in disturbed ground, throughout the state; native to Europe. ◆Very similar to *Setaria italica*, which differs in panicle, disarticulation, and upper floret features, all perhaps tied to the domestication of *S. italica*. Children (and young-at-heart grassy old folks) play woolly-bear caterpillar with the seedheads, by squeezing the inflorescence in the closed hand and watching it wiggle out from between the fingers. §

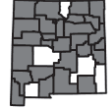


Sorghastrum [resembling *Sorghum*] [1].

Tufted annuals and perennials, sometimes rhizomatous; sheaths open; auricles present or absent; ligules membranous, sometimes ciliate; inflorescence a rebranching panicle, the branches (rames) composed of repeating units of sessile spikelets and pedicels (the pedicelled spikelets absent); disarticulation below the spikelets; all spikelets sessile, with two florets, the lower sterile, the upper fertile; glumes coriaceous, enclosing the florets; upper lemma fertile, bifid, awned from the sinus; pedicels slender, lacking a spikelet at the tip, but sometimes with a vestige of a scale. ♦About 18 species of tropical to warm-temperate regions of the Americas and Africa. Because pedicelled spikelets are absent in *Sorghastrum*, all the spikelets are alike, well-developed, awned, and fertile.

■Davila A., P. 1990. Anatomia foliar de las especies de *Sorghastrum* Nash (Poaceae: Andropogoneae). An. Inst. Biol. Univ. Nac. Auton. Mexico, Bot. 60:59-84. ■Veldkamp, J.F. 1984. The identity of *Andropogon nutans* Linnaeus (Gramineae). Taxon 33:95-97.

Sorghastrum nutans (Linnaeus) Nash [drooping] INDIANGRASS. Rhizomatous perennial, the aerial shoots sometimes forming small clumps, 50-200 cm or more tall; sheaths with thick erect auricles at the collars adjacent to the ligule; ligules 2-6 mm long; blades 1-4 mm wide, usually glabrous; panicles 20-75 cm long, yellowish to brownish or copper-colored, loosely contracted, the branches ascending; pedicels and rachises copiously hairy; spikelets 5-8.7 mm long, sparsely long-hairy; awns 10-30 mm long. ●Grasslands, open woods, prairies, and moist rocky hillsides, often included in reseeding mixes, widespread. ♦This is a handsome plant with golden panicles, and seeing increased use as an ornamental. Several cultivars have been developed for forage and pasture use. A form with pinkish rather than coppery-colored hairs is known from the southwestern mountains. §



Sorghum [Italian *sorgo*, for a tall cereal grass] [2].

Tufted to rhizomatous annuals and perennials; sheaths open; auricles absent; ligules membranous and ciliate, or a ring of hairs; blades usually broad and flat; inflorescence a rebranching panicle, the terminal branches (rames) composed of repeating pairs of sessile and pedicelled spikelets, the sessile ones fertile, the pedicelled ones staminate or sterile; sessile spikelets with 2 florets, the lower staminate or sterile, the upper fertile, both highly reduced and hidden within the large glumes, awned; pedicelled spikelets usually with a single floret or none, well-developed and subequal to the sessile spikelet, awnless. ♦About 25 species, all but one native to the Old World. Preliminary studies (Hodkinson et al. 2002; Spangler et al. 1999) point to the polyphyly of the genus, and further work will likely result in systematic and nomenclatural adjustments.

■DeWet, J.M.J. 1978. Systematics and evolution of *Sorghum* sect. *Sorghum* (Gramineae). Amer. J. Bot. 65:477-484. ■Doggett, H. 1970. *Sorghum*. Longmans, London. 403 pp. ■Hodkinson, T.R., M.R. Chase, M.D. Lledo, N. Salamin, & S.A. Renvoize. 2002. Phylogenetics of *Miscanthus*, *Saccharum* and related genera (Saccharinae, Andropogoneae, Poaceae) based on DNA sequences from ITS nuclear ribosomal DNA and plastid trnL intron and trnL-F intergenic spacers. J. Pl. Res. 115: 381-392. ■Spangler, R., B. Zaitchik, E. Russo, & E. Kellogg. 1999. Andropogoneae Evolution and Generic Limits in Sorghum (Poaceae) Using ndhF Sequence. Syst. Bot. 24(2):267-281. ■, J.H. & J. Dahlberg. 2007. The nomenclature of *Sorghum bicolor* (L.) Moench (Gramineae). Taxon 56(3):941-946.

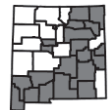
- 1 Plants perennial, with strong rhizomes; rame segments breaking apart easily *S. halepense*
- 1 Plants annual, lacking rhizomes; rame segments persistent or breaking apart tardily and inconsistently *S. bicolor*

****Sorghum bicolor*** (Linnaeus) Moench [of two colors] SORGHUM, MILO. Tufted robust annual, sometimes longer lived, 50-300 cm or more tall, the culms 1-5 cm thick; blades to 1 m long and 10 cm wide; panicles 10-60 cm long, open or contracted; disarticulation not occurring or tardily so; sessile spikelets 3-9 mm long, glabrous to various hairy, awnless or with an awn 5-30 mm long; pedicelled spikelets 3-6 mm long, somewhat shorter than the sessile spikelet, awnless. ●Grown as a cultivated crop, infrequently escaping along fields but not persisting long; its distribution in New Mexico (as a crop) is much more than shown on the map; native to Africa and Asia. ♦There are numerous cultivars and agricultural races, with great variability in features; the following seems to comprise much of the variation we see in New Mexico plants:



- a Panicle axis much thicker than the branches, tough; branches remaining intact...subsp. *bicolor* GRAIN SORGHUM [*Holcus bicolor* Linnaeus, *Sorghum vulgare* Persoon]. ♦Here are placed nearly all the cultivated varieties and races.
- a Panicle axis only slightly thicker than the branches, fragile; branches disarticulating tardily...subsp. × *drummondii* (Nees ex Steudel) deWet [for Thomas Drummond (1790-1831), Scottish explorer & naturalist] SUDAN-GRASS [*Sorghum drummondii* Nees ex Steudel, *Sorghum sudanense* (Piper) Stapf]. ♦This represents hybrids and backcrosses between subsp. *bicolor* and subsp. *arundinaceum* (Desvaux) Harlan & DeWet, sometimes cultivated or popping up in fields of grain sorghum as seed contaminants.

****Sorghum halepense*** (Linnaeus) Persoon [from Aleppo, Syria] JOHNSONGRASS [*Holcus halepensis* Linnaeus]. Rhizomatous perennial, 50-200 cm or more tall, the culms 0.5-2 cm thick; blades to 90 cm long and 4 cm wide; panicles 10-50 cm long, generally open, 5-25 cm wide; disarticulation below the spikelet pair; sessile spikelets 4-6.5 mm long, pubescent, awnless or with awns to 13 mm long; pedicelled spikelets 3.5-5.5 mm long, somewhat shorter than the sessile spikelets, awnless. ●An aggressive weed of fields, ditches, and moist waste places, widespread; expected in more counties than shown; native to the Mediterranean region. ♦Johnsongrass hybridizes with *S. bicolor*, and one of those hybrid derivatives is known as *Sorghum ×almum* Parodi, an annual or short-lived perennial sometimes grown for feed and seed. Johnsongrass produces cyanide when growing under stress or unusual conditions, such as frost, nitrogen fertilization, or just-mowed fields, and can cause serious problems for domestic livestock if eaten before drying. §



Spartina [cord-like] CORDGRASS [2].

Tufted to rhizomatous perennials; sheaths open; auricles absent; ligules ciliate from a short membrane; inflorescence a panicle of spike-like branches, the branches scattered along the rachis, not digitate, erect-appressed to divergent; spikelets sessile, with 1 floret, laterally compressed, crowded on one side of the branch; disarticulation below the glumes, the spikelet falling; glumes keeled, unequal, the lower usually shorter than the florets and the upper usually longer; lemmas 1-3-nerved, keeled; anthers 3. ♦Usually found in wet, marshy, saline habitats. Recent work by Peterson et al. (2014) and others has shown *Spartina* to be closely aligned to *Sporobolus*, and they have proposed, with reason, the submergence of *Spartina* into *Sporobolus*; we maintain *Spartina* in the traditional practical sense, based on its differences in panicle morphology, leaving *Sporobolus* paraphyletic.

■Mobberley, D.G. 1956. Taxonomy and distribution of the genus *Spartina*. Iowa State Coll. J. Sci. 30:471-574. ■Peterson, P.M., K. Romaschenko, Y. Herrera Arrieta, & J.M. Saarela. 2014. A molecular phylogeny and new subgeneric classification of *Sporobolus* (Poaceae: Chloridoideae: Sporobolinae). Taxon 63(6):1212-1243.

- 1 Plants slender, the shoots 2-4 mm thick; most blades less than 5 mm wide; upper (longer) glume only slightly longer than the floret, 6-10 mm long, acute to attenuate but not awned..... *S. gracilis*
- 1 Plants robust, the shoots 3-11 mm thick; most blades more than 5 mm wide; upper (longer) glumes nearly twice as long as the floret, 10-25 mm long, including the awn..... *S. pectinata*

Spartina gracilis Trinius [slender, graceful] [*Sporobolus hookerianus* P.M. Peterson & Saarela]. Strongly rhizomatous perennial, 40-100 cm tall, the culms slender, 2-4 mm thick; ligules 0.5-1 mm long; blades 2-8 mm wide; panicles 8-25 cm long, with 3-12 branches 2-8 cm long, with 10-30 spikelets; spikelets 6-11 mm long; upper glumes 6-10 mm long, subequal to the floret, acute to attenuate, awnless. ●Marshes and wet prairies, known only from San Miguel County and last found in 1945.



Spartina pectinata Bosc ex Link [comb-like] [*Sporobolus michauxianus* A.S. Hitchcock]. Strongly rhizomatous perennial, 50-150 cm or more tall, the culms robust, 3-11 mm thick; ligules 1-3 mm long; blades 5-15 mm wide; panicles 30-90 cm long, with 5-50 branches 2-15 cm long, with 10-80 spikelets; spikelets 10-25 mm long; upper glumes 10-25 mm long (including the awn), much exceeding the floret, with an awn 3-8 mm long. ●Marshes and wet prairies on the eastern plains, uncommon.



Sphenopholis [wedge-scale] WEDGESCALE [3].

Tufted annuals and perennials; sheaths open; auricles absent; ligules membranous; inflorescence an open to contracted panicle; disarticulation below the glumes, the upper florets sometimes falling prior; spikelets with 2-3 florets, laterally compressed, the rachilla prolonged beyond the terminal floret; glumes unequal and dissimilar, with scarious margins, somewhat wedge-shaped; lemmas 3-5-nerved, but the nerves scarcely visible, awned or awnless; anthers 3. ♦About 6-8 species native to North America.

- Barbera, P., R.J. Soreng, P.M. Peterson, K. Romaschenko, A. Quintanar, & C. Aedo. 2019. Molecular phylogenetic analysis resolves *Trisetum* (Poaceae: Pooideae: Koeleriinae) polyphyletic: Evidence for a new genus, *Sibirotrisetum* and resurrection of *Acrospelion*. J. Syst. Evol. Online early issue 20 Oct 2019: 1-10.
- Barberá, P., A. Quintanar, P.M. Peterson, R.J. Soreng, K. Romaschenko, & C. Aedo. 2019. New combinations, new names, typifications, and a new section, sect. *Hispanica*, in *Koeleria* (Poaceae). Phytoneuron 2019-46: 1-13.
- Erdman, K.S. 1965. Taxonomy of the genus *Sphenopholis* (Gramineae). Iowa State J. Sci. 39:289-336.
- Finot, V.L., P.M. Peterson, R.J. Soreng, & F.O. Zuloaga. 2005. A revision of *Trisetum* and *Graphophorum* (Poaceae: Pooideae: Aveninae) in North America north of Mexico. Sida 21(3):1419-1453.

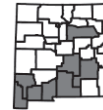
1 Plants annual; spikelets short-awned..... ***S. interrupta***
 1 Plants perennial; spikelets awnless

2 Second glume rounded to broadly obovate, somewhat hood-shaped, 1/3 to 1/2 as wide as long; panicles dense, spike-like. ***S. obtusata***
 2 Second glume blunt to acute, oblanceolate, not hood-shaped 1/3 to 1/2 as wide as long; panicles loose, somewhat open. ***S. intermedia***

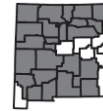
Sphenopholis intermedia (Rydberg) Rydberg [intermediate or similar to] [*Eatonia intermedia* Rydberg, *Sphenopholis obtusata* (Michaux) Scribner var. *major* (Torrey) Erdman, *Sphenopholis pallens* sensu W&S, *Sphenopholis pennsylvanica* sensu W&S]. Tufted perennial, 20-100 cm or more tall; sheaths glabrous to hairy; ligules 1.5-2.5 mm long; blades 2-6 mm wide; panicles 5-20 cm long, usually nodding, the spikelets loosely arranged; spikelets 2-4 mm long; upper glume 2-3 mm long, oblanceolate to obovate, not cucullate, the apex acute to rounded; lower lemma 2-3 mm long. ●Moist ground in the forests, shaded ground along streams; known from a few northern counties. ♦Sometimes confused with *Koeleria macrantha*, but that species has (most conspicuously) minutely fuzzy pedicels and panicle branches.



Sphenopholis interrupta (Buckley) Scribner [not continuous] [*Trisetum interruptum* Buckley]. Tufted annual 5-50 cm tall; leaves tending to be basal; sheaths glabrous to pilose; ligules 1-2.5 mm long; blades glabrous to hairy, the margins ciliate; panicles 2-15 cm long, to 1.5 cm wide, congested, the branches short and usually erect; spikelets 3.5-6 mm long, with 2-3 florets; disarticulation above and below the glumes; rachillas 0.8-1 mm long, with hairs about 0.5 mm long; glumes subequal, elliptical to oblanceolate, the lower about 1/2 as wide as the upper; lowermost lemmas 3-4.5 mm long, the 4-8 mm long; ovary glabrous to sparsely hairy near the apex. ●Dry, rocky, desert hills, mostly in the southern counties. ♦Formerly placed within a now dismembered *Trisetum*.



Sphenopholis obtusata (Michaux) Scribner [blunt] [*Aira obtusata* Michaux, *Sphenopholis robusta* (Vasey) Heller]. Tufted perennial, 15-100 cm or more tall; sheaths glabrous to hairy; ligules 1-2.5 mm long; blades 1-8 mm wide; panicles 5-25 cm long, usually erect, the spikelets densely arranged; spikelets 2-3.5 mm long; upper glume 1.5-2.5 mm long, broadly obovate, somewhat cucullate, the apex rounded to blunt; lower lemma 2-2.8 mm long. ●Moist or wet ground along streams, springs, canals, and ditches, low to medium elevations; widespread.



Sporobolus [thrown seed] DROPSEED [18].

Tufted, rhizomatous, and stoloniferous annuals and perennials; sheaths open, often with tufts of hair at the collar's edge or ciliate on the margins; ligules a ring of hairs; inflorescence a panicle, sometimes reduced and racemose; spikelets with 1 floret (rarely 2 or 3), awnless; disarticulation below the glumes, or above the glumes with the lemmas and paleas separating and the seeds falling from the ovary as well; lemmas 1-nerved; paleas well-developed, often as long as or longer than the lemma; fruit a utricle, the pericarp becoming free from the seed. ♦Nearly 200 species of tropical to warm-temperate regions worldwide. Recent studies by Peterson et al. (2014) and others have shown the close relationship of the genera *Crypsis* and *Calamovilfa* to *Sporobolus*; they share hairy ligules, 1-flowered spikelets, 1-nerved lemmas, and fruits with a free pericarp, as well as always occurring within *Sporobolus* in several molecular-phylogenetic studies; we adopt their conclusion of merging *Crypsis* and *Calamovilfa* into *Sporobolus*. *Spartina* is similarly related, but we maintain it as a separate genus largely on the basis of having panicles of spike-like, unbranched primary branches, leaving *Sporobolus* paraphyletic (but not polyphyletic).

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- Lorch, J. 1962. A revision of *Crypsis* Ait. s.l. (Gramineae). Bull. Res. Council Israel Sect. D, Bot. 11: 91-116.
- McGregor, R.L. 1990. Seed dormancy and germination in the annual cleistogamous species of *Sporobolus* (Poaceae). Trans. Kansas Acad. Sci. 93(1-2):8-11.
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- Reeder, J.R. & M.E. Ellington. 1960. *Calamovilfa*, a misplaced genus of Gramineae. Brittonia 12:71-77.
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- Thieret, J.W. 1966. Synopsis of the genus *Calamovilfa* (Gramineae). Castanea 31:145-152.
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1 Plants annual

2 Sheaths prominently inflated; blades widely spreading to reflexed; inflorescence dense and head-like or spike-like, the base often included in the sheath (*Crypsis*)

3 Inflorescence at maturity 5-6 times longer than broad, spike-like, exerted beyond the sheath; spikelets often black-tinged..... ***S. alopecuroides***

3 Inflorescence at maturity 3-4 times longer than broad, head-like, often remaining partially within the sheath; spikelets pale to purple-tinged..... ***S. schoenoides***

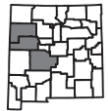
2 Sheaths, blades, and panicles not all as above

- 4 Spikelets all less than 2 mm long; glumes very unequal; panicles narrow when in flower and open at maturity, the lower branches whorled..... *S. pyramidatus*
- 4 Spikelets, at least some, more than 2 mm long; glumes equal or nearly so; panicles narrow, the lower branches often included in the subtending sheath
 - 5 Florets glabrous *S. neglectus*
 - 5 Florets pubescent *S. vaginiflorus*
- 1 Plants perennial
 - 6 Lemma with a prominent tuft of hairs at the base
 - 7 Lemma and palea long-pubescent along the back above the callus hairs..... *S. arenicola*
 - 7 Lemma and palea glabrous above the callus hairs *S. rigidus*
 - 6 Lemmas lacking a tuft of hairs at the base
 - 8 Lateral pedicels 5-25 mm long *S. texanus*
 - 8 Lateral pedicels 4 mm or less long
 - 9 Spikelets 1-2(2.9) mm long
 - 10 Panicles dense and spike-like, the branches appressed
 - 11 Stems robust, 1-2 m tall, 3-8 mm thick at the base; anthers 0.6-1 mm long *S. giganteus*
 - 11 Stems more slender, mostly less than 1 m tall, 1.5-3.5 mm thick at the base; anthers 0.3-0.5 mm long *S. contractus*
 - 10 Panicles open, the branches spreading at least from the middle and at the tip, the lower portion often enclosed in the subtending sheath
 - 12 Base of the plant knotty, nearly rhizomatous; blades stiff, spreading at right angles; stems mostly less than 30 cm tall. *S. nealleyi*
 - 12 Base of plant loosely tufted, not knotty; blades erect or ascending; stems often taller than 30 cm (except *S. pyramidatus*)
 - 13 Primary panicle branches with sticky glandular streaks or patches; lowermost branches in definite whorls; stems 10-60 cm tall *S. pyramidatus*
 - 13 Primary panicle branches lacking any sticky glandular patches; lowermost branches whorled or not, often in the sheath; stems often 40-120 cm or more tall
 - 14 Sheaths with many long hairs at the summit; plants more slender, the shoots easily pulled from the ground, the basal sheaths not shiny, often darkened, the roots thin
 - 15 Mature panicle branches and pedicels divaricate and flexuous, usually tangled with other branches or other panicles; branch pulvini pubescent; spikelets loosely arranged on the branches..... *S. flexuosus*
 - 15 Mature panicle branches erect to spreading but not flexuous nor tangled; branch pulvini glabrous; spikelets crowded on the branches *S. cryptandrus*
 - 14 Sheaths glabrous or with only a few long hairs at the summit; plants robust, the shoots difficult to pull from the ground, the basal sheaths shiny and cream-colored, the roots thick
 - 16 Panicles 10-45 cm long; branchlets naked below, the pedicels 0.5-2 mm long, often spreading. *S. airoides*
 - 16 Panicles 20-60 cm long; branchlets densely flowered to the base, the pedicels less than 0.5 mm long, appressed to the branchlets..... *S. wrightii*
 - 9 Spikelets, at least some, 3 mm or more long
 - 17 Second glume shorter than the lemma, the floret extending beyond the glume *S. compositus*
 - 17 Second glume equal to or longer than the lemma, the floret not extending beyond the glume, but often surpassed by it
 - 18 Panicles usually spike-like; spikelets 2.5-3.5 mm long; grain not globe-shaped; blades as much as 10 mm wide *S. giganteus*
 - 18 Panicles usually loose, the branches spreading; spikelets 4-6 mm long; grain globe-shaped; blades 1-2 mm wide *S. heterolepis*

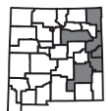
Sporobolus airoides (Torrey) Torrey [resembling the genus *Aira*] ALKALI SACATON [*Agrostis airoides* Torrey]. Densely tufted perennial, forming large tussocks to 1 m or more across, lacking rhizomes, 35-150 cm tall; adventitious roots thick, 2-4 mm diameter; lower sheaths shiny, becoming straw-colored; sheath apices glabrous or only sparsely hairy with long hairs; ligules less than 0.5 mm long; blades to 60 cm long, weeping; panicles 15-45 cm long, very open and diffuse at maturity, the base often included in the sheath; pulvini glabrous; spikelets 1.3-2.8 mm long; glumes unequal, the upper subequal to the floret, the lower ½ or less the spikelet length. ●Sandy, gravelly, clayey plains, flats, mesas, playas, floodplains, throughout the state. ♦Floodplains and playa beds can be covered with an almost solid expanse of these plants, and seem to harbor a disquieting number of rattlesnakes. The plants are firmly rooted in the soil, and even small portions can be very difficult to pull out by hand. Sometimes confused with small plants of *S. wrightii*. §



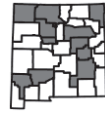
****Sporobolus alopecuroides*** (Piller & Mitterpacher) P.M. Peterson [resembling *Alopecurus*] [*Crypsis alopecuroides* (Piller & Mitterpacher) Schrader, *Phleum alopecuroides* Piller & Mitterpacher]. Tufted annuals, 5-70 cm long, rarely branched above, the shoots prostrate to erect; blades 1-3 mm wide; panicles dense, spike-like, 1.5-6.5 cm long, 4-6 mm wide, often purplish, completely exerted from the subtending sheath when fully mature; spikelets 1.8-2.8 mm long. ●Shore lines of ponds and lakes; presently known from only a few counties; native to Europe, Africa, Asia. ♦Formerly recognized in the genus *Crypsis*, which has been totally immersed in *Sporobolus* (see note in genus description).



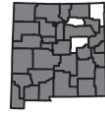
Sporobolus arenicola P.M. Peterson [gigantic] BIG SANDREED [*Calamagrostis gigantea* Nuttall, *Calamovilfa gigantea* (Nuttall) Scribner & Merrill]. Perennial with elongate shiny rhizomes, 1-2.4 m tall; sheaths glabrous or pubescent at the throat; ligules 0.7-2 mm long; blades elongate, to 90 cm long and 12 mm wide; panicles 25-80 cm long, 20-55 cm wide, the branches ascending to divergent; spikelets 7-11 mm long; tuft of hairs at base of floret ¼-¾ the floret length; lemmas 6-10 mm long, pubescent on the back above the callus hairs. ●Sandy hills and dunes in the eastern plains; a not uncommon and valuable sand-binder. ♦Formerly recognized in the genus *Calamovilfa*, which has been totally immersed in *Sporobolus* (see note in genus description). §



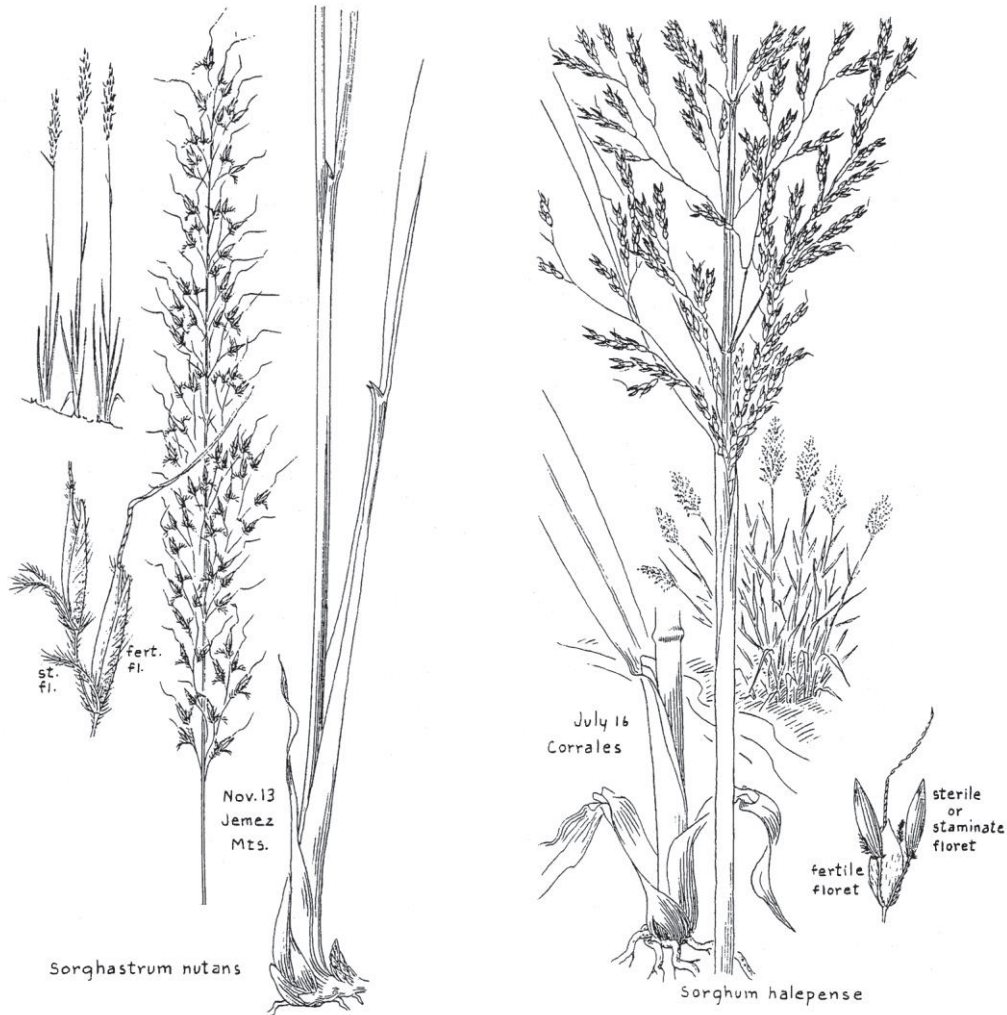
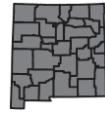
Sporobolus compositus (Poiret) Merrill [*Agrostis composita* Poiret, *Sporobolus asper* (Beauvois) Kunth]. Tufted perennial, without rhizomes (ours), 25-100 cm or more tall; sheath apices sparsely pilose; ligules less than 0.5 mm; panicles 8-30 cm long, contracted and spike-like, with smaller cleistogamous panicles produced in the axils of the sheaths; spikelets 4-8 mm long; glumes $\frac{1}{2}$ - $\frac{2}{3}$ the spikelet length; lemmas (2.3)3-6 mm long, extending beyond the upper glume; paleas subequal to the lemmas. •Plains and grasslands, sometimes roadsides, in scattered localities. ♦Our plants belong to the typical variety.



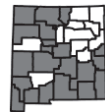
Sporobolus contractus A.S. Hitchcock [drawn together] SPIKE DROPSEED [*Sporobolus strictus* Merrill]. Tufted perennial, lacking rhizomes, 40-100 cm or more tall, the culms 2-5 mm thick; sheaths margins densely ciliate, the apices with conspicuous tufts of pilose hairs; ligules 0.4-1 mm long; panicles 10-50 cm long, 0.3-1 cm wide, spike-like, the base often in the sheath; spikelets 1.7-3.2 mm long; glumes unequal, the lower about $\frac{1}{2}$ or less the length of the upper; lemmas 2-3.2 mm long, surpassing both glumes; paleas subequal to the lemmas. •Sandy hills and plains, widespread and expected in all the counties. ♦This and *Sporobolus giganteus* produce narrow, spike-like panicles; when mature, *S. giganteus* differs in having taller shoots (100-200 cm), thicker stems (4-10 mm), wider panicles (1-4 cm), and longer anthers (0.6-1 mm). §



Sporobolus cryptandrus (Torrey) A. Gray [hidden stamens] SAND DROPSEED [*Agrostis cryptandra* Torrey]. Tufted perennial, lacking rhizomes, 30-120 cm tall, the culms 1-3.5 mm thick; sheath margins sometimes ciliate, the apices with conspicuous tufts of pilose hairs 2-4 mm long; ligules 0.5-1 mm long; panicles erect, 15-40 cm long, 2-14 cm wide, open in age but often spike-like when young, the branches ascending to reflexed, not entangled; secondary branchlets and spikelets generally appressed along the primary branches; pulvini glabrous; spikelets 1.5-2.7 mm long; glumes unequal, the lower $\frac{1}{2}$ or less the length of the upper; upper glume $\frac{2}{3}$ or more the spikelet length; lemmas 1.4-2.7 mm long; paleas subequal to the lemmas. •Sandy or gravelly plains, mesas, roadsides, waste places, throughout the state. ♦Similar to *Sporobolus flexuosus*, but differing in the key features; also, the primary panicle branches are generally persistent, and even if they break, they do not leave a spine-remnant as in MESA DROPSEED. §



Sporobolus flexuosus (Thurber ex Vasey) Rydberg [much curved, tortuous] MESA DROPSEED [*Vilfa cryptandra* (Torrey) Torrey ex Trinibus var. *flexuosa* Thurber ex Vasey]. Tufted perennial, lacking rhizomes, 30-120 cm tall, the culms 1-3 mm thick near the base; sheath margins glabrous to ciliate, the apices with tufts of hair 1-3 mm long; ligules 0.5-1 mm long; panicles often nodding, 10-30 cm long, 4-12 cm wide, open and diffuse, often becoming entangled with other branches and panicles, the branches diverging to strongly reflexed; secondary branchlets and spikelets widely spreading; pulvini



hairy; spikelets 1.8-2.5 mm long; glumes unequal, the lower ½ or less the length of the upper; upper glume subequal to the floret; lemmas 1.4-2.5 mm long; paleas equal to the lemmas. ●Sandy plains and mesas, widespread. ♦Similar to *Sporobolus cryptandrus*, but differing in the key features; also, the panicle branches eventually break off, leaving the recurved, swollen base with a tiny spine-remnant of the branch. §

Sporobolus giganteus Nash [gigantic] GIANT DROPSEED. Large tufted perennial, lacking rhizomes, 100-200 cm tall, the culms 4-10 mm thick; sheath margins ciliate distally, the apices with tufts of pilose hairs to 2 mm long; ligules 0.5-1.5 mm long; panicles 25-75 cm long, 1-4 cm wide, spike-like, the base often in the sheath, the branches mostly appressed but sometime ascending outward; pulvini glabrous; spikelets 2.5-4 mm long; glumes unequal, the lower about ½ the length of the upper; upper glumes subequal to the floret; lemmas 2.5-4 mm long; paleas equal to the lemmas. ●Sandy hills and plains, widespread, expected in every county. ♦This and *Sporobolus contractus* produce narrow, spike-like panicles; when mature, *S. contractus* differs in having shorter shoots (40-120 cm), thinner stems (2-5 mm), narrower panicles (0.1-1 cm), and shorter anthers (0.3-0.5 mm). §



Sporobolus heterolepis (A. Gray) A. Gray [different scales] PRAIRIE DROPSEED [*Vilfa heterolepis* A. Gray]. Tufted perennial, lacking rhizomes, 30-80 cm tall; sheath margins glabrous, the apices with sparse hairs; ligules 0.1-0.3 mm long; blades 1-2.5 mm wide; panicles 5-25 cm long, 1-11 cm wide, contracted to loosely open, the branches erect to ascending-spreading; pulvini glabrous; spikelets 3-6 mm long; glumes unequal, the lower about ½ the upper; upper glume usually surpassing the floret; lemmas 2.7-4.3 mm long; paleas equal to longer than the lemmas; fruit globose, indurate, without a loose pericarp. ●Grasslands and woodlands in the northeastern region; currently known from only a few collections in Colfax County.



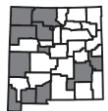
Sporobolus nealleyi Vasey [for Greenleaf Cilley Nealley (1846-1896), USDA plant collector] GYPGRASS. Tufted perennial, the bases hard and knotty, 10-50 cm tall, the culms 0.7-1.2 mm thick; sheath margins villous-ciliate, the apices with a tuft of hairs to 4 mm long; ligules 0.2-0.4 mm long; blades stiff, spreading at right angles; panicles 3-10 cm long, 1-6 cm wide, the branches eventually spreading the divergent, the secondary branchlets spreading to appressed; spikelets 1.4-2.1 mm long; glumes unequal, the lower one about ½ the upper; upper glumes about as long as the spikelet; lemmas 1.4-2.1 mm long; paleas equal to the lemmas. ●Sandy, alkaline, and mostly gypsiferous plains and flats.



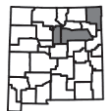
****Sporobolus neglectus*** Nash [overlooked] PUFFSHEATH DROPSEED. Tufted delicate annual, 10-40 cm tall; sheath inflated, the margins glabrous, the apices with small tufts of hairs to 3 mm long; ligules 0.1-0.3 mm long; panicles 2-5 cm long, to 0.5 cm wide, often completely hidden in the sheaths; spikelets 1.6-3 mm long; glumes nearly equal, shorter than the floret; lemmas 1.6-2.9 mm long, glabrous; paleas equaling the lemmas. ●Sandy fields, floodplains, stream banks, disturbed ground, scattered localities but not common; common in central and northeastern United States. ♦Axillary cleistogamous panicles of this and *Sporobolus vaginiflorus* yield seeds of two different sizes and growth patterns. Larger seeds at the upper portion of the panicles germinate in the spring after one overwintering period, and smaller seeds toward the base of the panicles require two overwintering periods separated by a rest period (McGregor 1990).



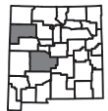
Sporobolus pyramidatus (Lamarck) A.S. Hitchcock [pyramid-shaped] [*Agrostis pyramidata* Lamarck, *Sporobolus pulvinatus* Swallen]. Tufted annual, sometimes longer lived, 7-40(60) cm tall, erect to decumbent; sheath margins ciliate, the apices with a tuft of pilose hairs to 3 mm long; ligules 0.3-1 mm long; blades 2-6 mm wide, the margins pectinate-ciliate; panicles 4-18 cm long, open, pyramidal, 1-6 cm wide, the lower branches whorled, with elongated glandular patches or streaks; pulvini glabrous; spikelets 1.2-1.8 mm long; glumes strongly unequal, the lower less than 1 mm long, the upper 1.2-1.8 mm long, ⅔ or more the spikelet length; lemmas 1.2-1.7 mm long; paleas equal to the lemmas. ●Sandy plains, clay flats, disturbed ground, widespread. ♦See note about seed production under *Sporobolus neglectus*. This is apparently very similar to the Asian and African *S. coromandelianus* (Retzius) Kunth, but whether these are conspecific or not is yet to be determined.



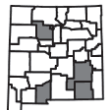
Sporobolus rigidus (Buckley) P.M. Peterson [stiff, rigid] PRAIRIE SANDREED [*Calamagrostis longifolia* Hooker, *Calamovilfa longifolia* (Hooker) Scribner, *Vilfa rigida* Buckley]. Strongly rhizomatous perennial, 0.5-2 m tall; sheaths glabrous to softly pilose, the margins glabrous to ciliate, the apices often with scattered hairs; blades elongate, to 65 cm long and 12 mm wide; panicles 15-70 cm long, 4-25 cm wide, the branches ascending to divergent; spikelets 5-8.5 mm long; lemmas 4.5-7 mm long, glabrous on the back above the callus hairs. ●Sandy hills and dunes in the eastern plains; known from only a few collections, but common in the central plains northward. ♦Buckley's basionym *Vilfa rigida* must be used instead of Hooker's more familiar *longifolia*, which is unavailable in *Sporobolus* because of *S. longifolia* (Torrey) Alph. Wood.



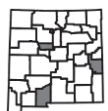
****Sporobolus schoenoides*** (Linnaeus) P.M. Peterson [resembling *Schoenus*] [*Crypsis schoenoides* (Linnaeus) Lamarck, *Phleum schoenoides* Linnaeus]. Tufted annual, the shoots 2-75 cm long, usually not branching, but some plants strongly branched above the base; blades 2-6 mm wide; panicles dense, spike-like or head-like, 0.5-7 cm long, 5-8(12) mm wide, the base usually remaining in the subtending sheath at maturity; spikelets 2.7-3.2 mm long, strongly laterally compressed; glumes subequal, larger than the floret; lemmas 2.4-3 mm long, the palea slightly smaller. ●Wet ground along ponds and marshes; presently known from only a few western counties; native to Europe, Africa, Asia, India. ♦Formerly recognized in the genus *Crypsis*, which has been totally immersed in *Sporobolus* (see note in genus description).



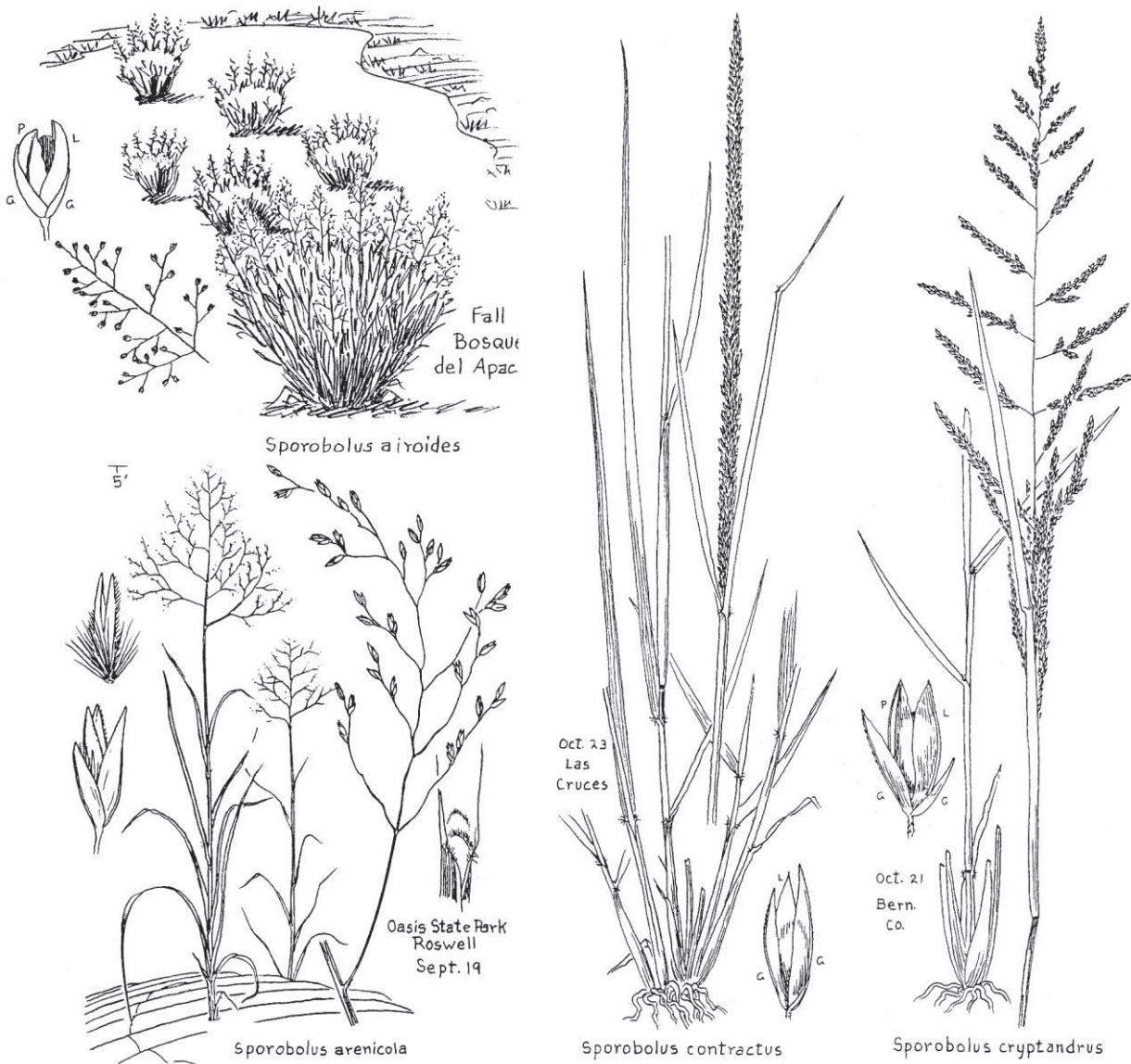
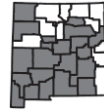
Sporobolus texanus Vasey [of Texas]. Tufted perennial, 20-70 cm tall; sheath margins glabrous, the apices glabrous or with sparse pilose hairs to 4 mm long; ligules 0.2-0.6 mm long; panicles 10-35 cm long, widely diffuse, ½ to nearly as wide, the base usually in the sheath, all branches, branchlets, and pedicels spreading; pedicels 5-25 mm long; spikelets 2.3-3 mm long; glumes strongly unequal, the lower ⅓ or less the upper; upper glumes ⅔ to slightly longer than the floret; lemmas 1.8-3 mm long, glabrous; paleas equal to the lemmas. ●Low wet plains and swales, uncommon.

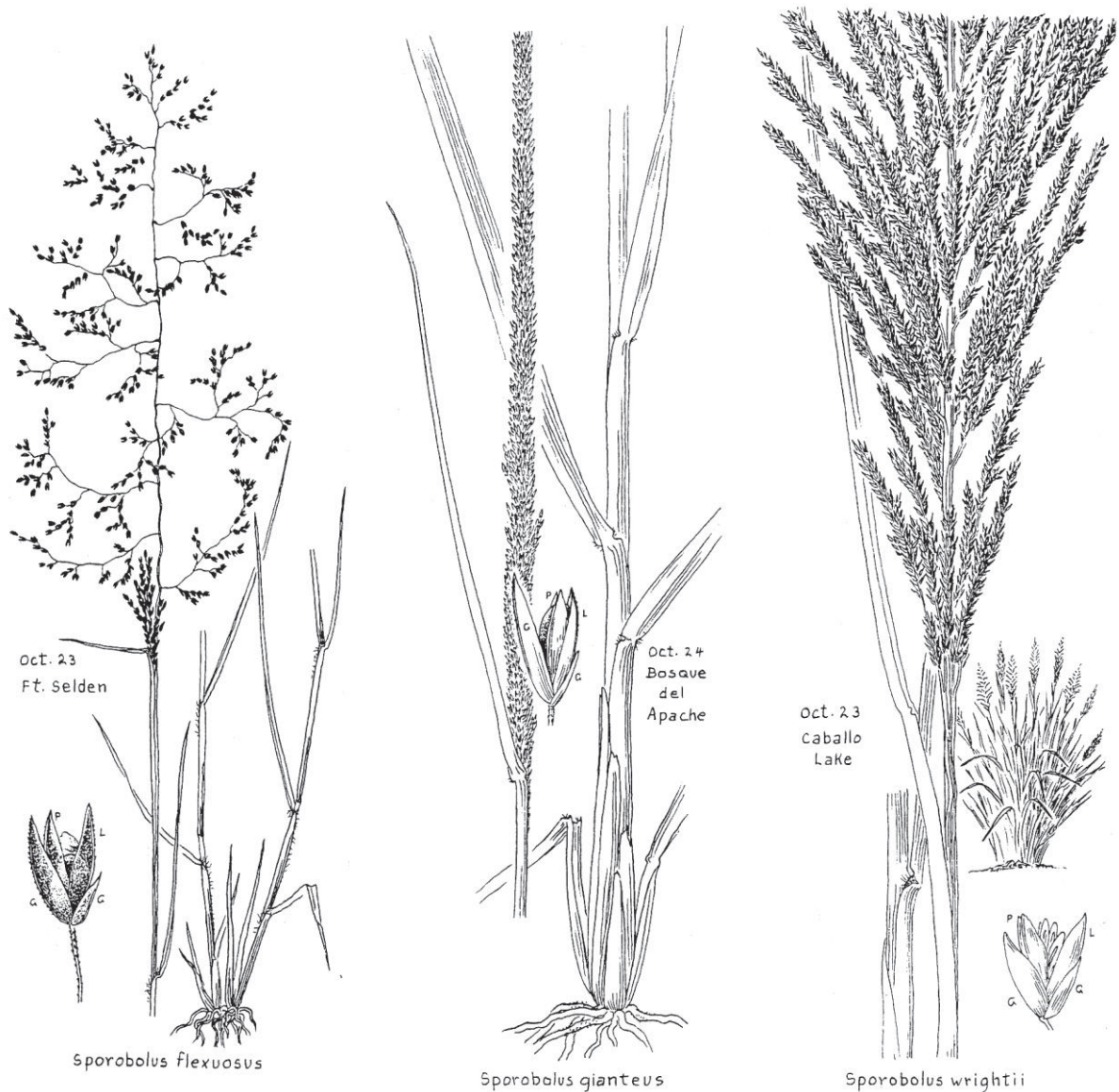


****Sporobolus vaginiflorus*** (Torrey ex Gray) Wood [with sheathed flowers] POVERTY DROPSEED [*Vilfa vaginiflora* Torrey ex Gray]. Tufted delicate annual, 15-60 cm tall; sheaths often inflated, the margins glabrous, the apices sometimes with small tufts of hair to 3 mm long; ligules 0.1-0.3 mm long; panicles 1-5 cm long, 2-5 mm wide, spike-like, enclosed in the sheath; spikelets 3-6 mm long; glumes subequal, narrowly lanceolate, slightly shorter or longer than the floret; lemmas and paleas 3-5.4 mm long. ●Sandy and disturbed ground, uncommon, known from a few old collections in Bernalillo and Doña Ana counties, and one fairly recent (1999) collection from Roosevelt County; native to central and northeastern United States, and considered adventive in New Mexico.



Sporobolus wrightii Munro ex Scribner [for Charles Wright (1811-1885), outstanding American botanical collector] GIANT SACATON [*Sporobolus airoides* (Torrey) Torrey var. *wrightii* (Scribner) Gould]. Large tussocky perennial, 1-2.5 m tall; sheath margins not ciliate, the apices sparsely hairy with hairs to 6 mm long; ligules 1-2 mm long; blades to 70 cm long, flat, 3-10 mm wide; panicles 20-60 cm long, 12-26 cm wide, open, broadly lanceolate, generally fully exerted, the secondary branches, branchlets, and pedicels usually appressed; spikelets 1.5-2.5 mm long; glumes unequal, the lower about ½ the length of the upper; upper glumes ¾ to subequal to the floret; lemmas 1.2-2.5 mm long, glabrous; paleas equal to the lemmas. ●Swales, playas, ditches, often in hard-packed alkaline soil, widespread. ♦According to Wootton & Standley (1912), giant sacaton was preferred by liverymen over alfalfa for hay for buggy horses rented out to hard service. It is finding increased use as an ornamental. §





Steinchisma [a narrow gap or split] [1].

Tufted perennials, sometimes with short tillering rhizomes; sheaths open, usually keeled; auricles absent; ligules a minute ciliate membrane; inflorescence a rebranching panicle; disarticulation below the glumes; spikelets elongate, gaping open in age, with 2 florets, the lower staminate or sterile, the upper fertile; lower paleas longer than the lower lemmas, becoming greatly inflated and indurate at maturity; upper floret forming a seed case, becoming indurate at maturity. ♦Formerly included in *Panicum*, *Steinchisma* includes about 6 species of the Western Hemisphere, with only one in North America.

■Soreng, R.J., P.M. Peterson, K. Romaschenko, G. Davidse, F.O. Zuloaga, E.J. Judziewicz, T.S. Filgueiras, J.I. Davis, & O. Morrone. 2015. A worldwide phylogenetic classification of the Poaceae (Gramineae). *Journal of Systematics and Evolution* 53(2):117-137. ■Zuloaga, F.O., O. Morrone, A.S. Vega, and L.M. Giussani. 1998. Revisión y análisis cladístico de *Steinchisma* (Poaceae: Panicoideae: Paniceae). *Ann. Missouri Bot. Gard.* 85:631-656.

**Steinchisma hians* (Elliott) Nash [gaping] GAPING PANIC-GRASS [*Panicum hians* Elliott]. Tufted perennial, 20-75 cm tall, the shoots and sheaths compressed; sheaths shorter than the internodes, sparsely ciliate at the summit; ligules 0.2-0.5 mm long; blades 2-5 mm wide, sparsely pilose adaxially at the base; panicles 5-20 cm long, about ½ as wide, open, the branches lax, the secondary branchlets appressed; spikelets 1.8-2.4 mm long, often purplish; lower glumes about ½ the spikelet length; lower palea slightly longer than the lower lemma; fertile floret 1.6-2 mm long, dull, minutely papillose, with an acute apex. ●Collected once in Las Cruces in 1895, undoubtedly an accidental introduction and not persisting; native to southeastern United States to Argentina.



Stenotaphrum [narrow trench] [0].

Tufted annuals and perennials, sometimes rhizomatous or stoloniferous; sheaths open, compressed, shorter than the internodes; ligules a ciliate membrane or ring of hairs; inflorescence a spike-like panicle, the branches very short and partially embedded in the rachis; disarticulation below the glumes; spikelets awnless, the lower glume oriented away from the rachis, with 2 florets, the lower staminate or sterile, the upper fertile. ♦About 7 species primarily of the Indian Ocean region, with one species native to coastal areas of the New World.

■Busey, P., T.K. Broschat, and B.J. Center. 1982. Classification of St. Augustinegrass. *Crop Sci.* (Madison) 22:469-473. ■Sauer, J.D. 1972. Revision of *Stenotaphrum* (Gramineae: Paniceae) with attention to its historical geography. *Brittonia* 24:202-222.

**Stenotaphrum secundatum* (Walter) Kuntze [one-sided] ST. AUGUSTINEGRASS [*Ischaemum secundatum* Walter]. Stoloniferous perennial, 10-30 cm tall; sheaths sparsely pilose, constricted at the summit; ligules about 0.5 mm long; blades 3-15 cm long, 4-10 mm wide, thick, flat; spicate panicles 4-10 cm long, less than 1 cm wide, the rachis flattened and winged; spikelets 3.5-5 mm long; lower glume 1/3 or less the spikelet length; upper lemma papery, weakly clasping the palea. ●Cultivated as a coarse-textured lawn grass for shaded areas in the southern counties, not known in the wild; native to southeastern United States and southward. ♦Seed production is practically nil, and sod must be planted by plugs. A form with longitudinally striped leaves (var. *variegatum* A.S. Hitchcock) is sometimes grown as a hanging basket plant.

Stipa [tow fibers] [0].

Many recent studies in the *Stipeae* have resulted in the relegation of North American members of *Stipa* to segregate genera, which are keyed below. The genus *Stipa* remains a Eurasian taxon.

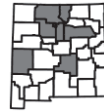
- 1 Palea hardened, longitudinally grooved and slightly longer than the lemma, protruding from between the lemma margins as a small point; lemma margins involute, fitting into the grooves of the palea go to **Piptochaetium**
- 1 Palea usually membranous, not grooved, shorter than or equaling the lemma, not protruding as a small point; lemma margins flat
 - 2 Lemma margins strongly overlapping; palea less than 1/3 the length of the lemma, glabrous, lacking veins go to **Nassella**
 - 2 Lemma margins not or only slightly overlapping; palea 1/3 to equaling the length of the lemma, always pubescent when short, sometimes glabrous when longer, 2-veined
 - 3 Awns 6-20 cm long or more; glumes longer than 1.8 cm
 - d Membranous ligules of lower leaves densely hairy, with hairs 0.3-1 mm long go to **Pappostipa**
 - d Membranous ligules of lower leaves glabrous or at most minutely ciliate go to **Hesperostipa**
 - 3 Awns 0.5-7.5 cm long, if longer than 6 cm then the glumes 1-1.5 cm long
 - 4 Palea pubescent, the apex flat, the veins terminating below the apex; lemma coriaceous at maturity but not strongly indurate
 - 5 Glumes without evident nerves, the apices rounded to acute; plants alpine, growing on mossy hummocks in wet ground go to **Ptilagrostis**
 - 5 Glumes with 1-5 evident nerves and/or the apices attenuate; plants growing in various habitats, but rarely as above
 - 6 Plants with neither woody nor bamboo-like culms 3-6 mm thick, with mostly 2-3 nodes **Eriocoma**
 - 6 Plants with ± woody, bamboo-like culms 3-6 mm thick below, with 3-13 nodes **Pseudoeriacoma**
 - 4 Palea glabrous or pubescent, the apex appearing prow-tipped or pinched, the veins extending to the apex; lemma indurate at maturity
 - 7 Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part go to **Piptatheropsis**
 - 7 Florets terete; lemma margins slightly overlapping, the palea hidden go to **Oryzopsis**

Torreyochloa [Torrey's grass, for John Torrey (1796-1873), distinguished American botanist] MANNAGRASS [1].

Rhizomatous perennials; sheaths open; auricles absent; ligules membranous; blades flat; inflorescence a panicle; spikelets with 2-8 florets; disarticulation above the glumes and between the florets; glumes shorter than the lowermost floret; lemmas rounded, with 7-9 parallel nerves, the lateral nerves shorter; paleas subequal to the lemmas; anthers 3. ♦About 5 species of North America and northeast Asia. Similar in morphology to *Glyceria* and *Puccinellia*, the genus is not closely related to either. From *Glyceria* it differs most obviously by its open leaf sheaths; from *Puccinellia* by the 7-9 prominent nerves.

■Church, G.L. 1952. The genus *Torreyochloa*. *Rhodora* 54:197-200. ■Clausen, R.T. 1952. Suggestion for the assignment of *Torreyochloa* to *Puccinellia*. *Rhodora* 54:42-45. ■Davis, J.I. 1991. A note on North American *Torreyochloa* (Poaceae) including a new combination. *Phytologia* 70:361-365. ■Soreng, R.J., J.I. Davis, and J.J. Doyle. 1990. A phylogenetic analysis of chloroplast DNA restriction site variation in the *Poaceae* subfam. *Pooideae*. *Pl. Syst. Evol.* 172:83-97.

Torreyochloa pallida (Torrey) Church [pale]. Rhizomatous perennial, 20-140 cm tall, erect to decumbent-based; larger ligules 3-9 mm long; blades to 18 mm long; panicles 5-25 cm long, 2-14 cm wide, the branches often lax and flexuous, erect to reflexed; spikelets 3.6-7 mm long; upper glumes 1-1.8 mm long; lemmas 2.2-3.3 mm long, truncate to acute ●Wet ground of high-mountain streams and fresh-water ponds, where it is eagerly grazed by elk. ♦Our plants belong to var. *pauciflora* (J.S. Presl) J.I. Davis [few-flowered] [*Glyceria pauciflora* Presl, *Puccinellia pauciflora* (J. Presl) Munz, *Torreyochloa pauciflora* (Presl) Church]. The report of *Renner 11* in 1923 from San Juan County is in error; the locality (Manzanares Creek) is actually in San Miguel County.



Trachypogon [rough-bearded] [1].

Tufted to shortly rhizomatous annuals and perennials; sheaths open; auricles absent; ligules membranous; inflorescence a solitary raceme (rame) composed of repeating pairs of subsessile and pedicelled spikelets; disarticulation beneath the pedicelled spikelet; subsessile spikelets staminate or sterile, awnless, otherwise similar to the pedicelled spikelets; pedicelled spikelets fertile, with a sharp callus, the glumes firm and enclosing the 2 florets, the lower floret sterile, the upper floret perfect, the awns twisted, plumose. ♦About 4 species of warm-temperate to tropical regions of the Americas and Africa. *Trachypogon* is curious in the Andropogoneae, because it is the pedicelled spikelets that are fertile while the subsessile spikelets are staminate or sterile, reverse to the customary condition in the tribe; also, only the pedicelled spikelet disarticulates from the rachis, leaving the subsessile spikelets on the plant.

■Soreng, R.J., G. Davidse, P.M. Peterson, F.O. Zuloaga, T.S. Filgueiras, E.J. Judziewicz, & O.N. Morrone. 2003 and onwards. Internet Catalogue of New World Grasses: On-line taxonomic novelties and updates, distributional additions and corrections, and editorial changes to the four published volumes of the Catalogue of New World Grasses (Poaceae) published in *Contr. U.S. Natl. Herb.* vols. 39, 41, 46, and 48.

Trachypogon spicatus (Linnaeus f.) Kuntze [spike-like] CRINKLE-AWN [*Heteropogon secundus* Presl, *Stipa spicata* Linnaeus f., *Trachypogon montufari* (Kunth) Nees, *Trachypogon plumosus* (Humboldt & Bonpland ex Willdenow) Nees, *Trachypogon secundus* (Presl) Scribner]. Tufted perennial, 60-120 cm tall, generally unbranched from the base, the nodes appressed-hirsute; sheaths sparsely appressed-pilose; ligules 2-5 mm long; racemes 10-18 cm long; pedicelled spikelets 6-8 mm long, the glumes pilose, the awns 4-6 cm long with pilose hairs to 2 mm proximally, nearly glabrous distally. ●Rocky hills and slopes in the mountains of the bootheel region.



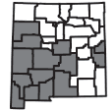
Tragus [for Jerome Bock (*Hieronymus Tragus*) (1498-1554), German physician and herbalist] BURGRASS [1].

Tufted annuals and perennials; sheaths open, shorter than the internodes; ligules a ciliate membrane; blade margins ciliate; inflorescence a spike-like, reduced panicle, the branches very short and bearing 2-5 spikelets, the branch bur-like; disarticulation at the base of the branch; spikelets with 1 floret, the lower spikelets fertile, the distal spikelets sterile and smaller; lower glume minute or absent; upper glume as large as the spikelet, 5-7-nerved (seen by viewing the interior or the glume), with 5-7 rows of straight or hooked spine-like projections; lemmas membranous, 3-nerved. ♦A small genus of 7 species native to the Old World, easily recognized by the bur-like branches and hook-covered glumes.

■Anton, A.M. 1981. The genus *Tragus* (Gramineae). *Kew Bull.* 36(1):55-61. ■Reeder, J.R. & C. Reeder. 1978. *Tragus racemosus* in Arizona. *Madroño* 25:107-108.

1 Second glume 5-nerved, with 5 longitudinal rows of hooked projections; branch (bur) mostly with 2 spikelets..... *T. berteronianus*
 1 Second glume 7-nerved, with 6-7 longitudinal rows of hooked projections; branch (bur) mostly with 3-5 spikelets *T. racemosus*

**Tragus berteronianus* Schultes [for Carlo Giuseppe Bertero (1789-1831), Italian botanist] [*Nazia aliena* of authors]. Tufted annual, the shoots 3-40 cm long, erect to prostrate; blades 1-8 cm long; panicles 1-13 cm long, 4-8 mm wide; branches 0.5-3 mm long, with 2(3) spikelets; lower (inner) glumes 0.1-0.6 mm long; upper (outer) glumes 1.8-4.3 mm long, 5-nerved, with 5 longitudinal rows of hooked projections 0.3-1 mm long. ●Disturbed ground in desert plains, mesas, and bajadas.



**Tragus racemosus* (Linnaeus) Allioni [in a raceme] [*Cenchrus racemosus* Linnaeus]. Tufted annual, the shoots 5-40 cm long; blades 1-6 cm long; panicles 2-11 cm long, 7-13 mm wide; branches 2-4.8 mm long, with (2)3-5 spikelets; lower (inner) glumes 0.7-1.1 mm long; upper (outer) glumes 1.8-4.3 mm long, 7-nerved, with 6-7 longitudinal rows of hooked projections 0.2-1.3 mm long. ●Not yet known from New Mexico, but to be looked for in arid plains and foothills of the southwestern counties; it occurs in adjacent Arizona. ♦*Tragus racemosus* has been reported for the state in various works through the years, but all specimens have turned out to be *T. berteronianus*.

Trichachne [hair-scale] COTTON-TOP [1].

Tufted perennials, with knotty or spreading rhizomes; sheaths open; auricles absent; ligules membranous, sometimes with a ciliate fringe; inflorescence a panicle of branched or branching primary branches alternating along the central axis, not detaching at maturity, the spikelets in pairs of one sessile and one pedicellate, appressed in two rows along the one side of the branch; spikelets awnless, silky-pubescent, the hairs generally longer than the spikelet, 2-flowered, the lower floret staminate to sterile, the upper floret fertile, the rachilla elongated between the glumes and florets, the upper floret ± stipitate; disarticulation below the glumes; lower glume absent to no more than ¼ the length of the spikelet; upper glume short to subequal to the spikelet; lower lemma pubescent; upper lemma clasping the palea and forming a seed case, this membranous to somewhat cartilaginous but not indurate, dark-colored when mature; anthers 3. ♦Most recently merged within the genus *Digitaria*, but that disposition is less than settled (Vega et al. 2009), and we retain *Trichachne* in the more traditional sense until the classification is resolved.

■Henrard, J.T. 1950. Monograph of the genus *Digitaria*. Universitaire Pers, Leiden. ■Medico, J.M.L. D.S. Tosto, G.H. Rua, Z.E. Rúgolo de Agrasar, M.A. Scatagli, & A.S. Vega. 2017. Phylogeny of *Digitaria* Sections *Trichachne* and *Trichophorae* (Poaceae, Panicoideae, Paniceae): A morphological and molecular Analysis. Syst. Bot. 42(1): 37-53. ■Vega, A.S., G.H. Rua, L.T. Fabbri, Z.E. Rugolo de Agrasar. 2009. A morphology-based cladistic analysis of *Digitaria* (Poaceae, Panicoideae, Paniceae). Syst. Bot. 34(2): 312-323. ■Wipff, J.K. & R.B. Shaw. 2018. *Leptoloma syrticola* (Poaceae: Panicoideae): A new species from Texas and new combinations in *Leptoloma* and *Trichachne*.

Trichachne californica (Bentham) Chase [of California] ARIZONA COTTONTOP [*Digitaria californica* (Bentham) Henrard, *Panicum californicum* Bentham, *Valota saccharata* (Buckley) Chase]. Tufted perennial, 40-100 cm tall; basal sheaths villous; panicles 8-15 cm long, densely villous; panicle branches appressed to ascending, not digitate but attached along the main axis; spikelets short-pedicelled; upper glume and lower lemma densely villous with hairs to 5 mm long. ●Rocky plains, foothills, and bajadas, mostly in the southern half of the state. §



Trichloris...go to **Leptochloa**

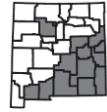
Tridens [three-toothed] TRIDENS [2].

Tufted perennials, sometimes with short rhizomes, lacking stolons; sheaths open, shorter than the internodes; auricles absent; ligules a ciliate membrane or a ring of hairs; inflorescence a panicle, sometimes racemose; spikelets with several florets, sometimes the distal ones sterile; disarticulation above the glumes and between the florets; glumes awnless; lemmas 3-nerved, usually hairy on the nerves, awnless or the midnerve excurrent to a mucro or awn-tip; paleas glabrous, widened or bowed-out below; anthers 3, purplish. ♦About 14 species. The genus has been restructured (Peterson et al. 2014, 2016) to allow the monophyly of *Tridens* and its segregates, *Triplasiella* and *Tridentopsis*.

■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2014. A molecular phylogeny and classification of the Cteniinae, Farragininae, Gouiniinae, Gymnopogoninae, Perotidinae, and Trichoneurinae (Poaceae: Chloridoideae: Cynodonteae). Taxon 63(2):275-286. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2016. A molecular phylogeny and classification of the Cynodonteae (Poaceae: Chloridoideae) with four new genera: *Orthacanthus*, *Triplasiella*, *Tripogonella*, and *Zaqiqah*; three new subtribes: Dactylocteninae, Oriniinae, and Zaqiqahinae; and a subgeneric classification of *Distichlis*. Taxon 65(6): 1263-1287. ■Tateoka, T. 1961. A biosystematic study of *Tridens* (Gramineae). Amer. J. Bot. 48:565-573. ■Valdés-R. & S.L. Hatch. 1997. A revision of *Erioneuron* and *Dasyochloa* (Poaceae: Eragrostideae). Sida 17(4):645-666.

- 1 Panicles open, loose, the branches spreading to drooping
 - 2 Lemmas 2-3 mm long, only the midnerve projecting as a short point (*T. eragrostoides*)..... go to *Triplasiella*
 - 2 Lemmas 3-5 mm long, the midnerve and lateral nerves projecting as short points *T. flavus*
- 1 Panicles narrow, contracted, the branches erect
 - 3 Nerves of the lemma glabrous or pubescent only at the base..... *T. albescens*
 - 3 Nerves of the lemma plainly pubescent (*T. muticus*)..... go to *Tridentopsis*

Tridens albescens (Vasey) Wooton & Standley [whitish] WHITE TRIDENS [*Triodia albescens* Vasey]. Tufted perennial, often with a knotty short-rhizomatous base, 30-100 cm tall; ligules to 0.5 mm long; panicles 8-25 cm long, 0.5-1.5 cm wide; glumes about as long as the adjacent lemma, 1-nerved; lemmas 3-5 mm long, papery, whitish or purplish, glabrous or with a few short hairs at the base of the lateral nerves; paleas long hairy. ●Low swales and ditch banks in the plains, deserts, and prairies.



****Tridens flavus*** (Linnaeus) A.S. Hitchcock [yellow, golden] PURPLE-TOP [*Poa flava* Linnaeus]. Tufted perennial, with short rhizomes from a knotty base, 60-180 cm tall; ligules to 0.5 mm long; panicles 15-40 cm long, 2/3 as wide, open, pyramidal, the branches rebranched and drooping, covered with glandular dots; glumes shorter than the adjacent lemmas, 1-nerved; lemmas 3-5 mm long, the nerves prominently villous-ciliate and extended as 3 tiny mucros; paleas glabrous, widened or bowed-out below. ●Prairies and grassy hills; known from a single collection near Clines Corners in Torrance County and perhaps not persisting; native to central and eastern United States. ♦It is unclear why Linnaeus applied the epithet *flavus*, yellow or golden, to this species.

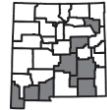


Tridentopsis [resembling *Tridens*] TRIDENS, TRIDENTOPSIS [1].

Tufted perennials, with short knotty rhizomatous bases, lacking stolons, the nodes often bearded; sheaths open, shorter than the internodes; auricles absent; ligules a ciliate membrane or a ring of hairs; inflorescence a panicle, the branches racemose and erect to widely spreading or reflexed; spikelets with several florets, sometimes the distal ones sterile; disarticulation above the glumes and between the florets; glumes glabrous, awnless; lemmas 3-nerved, usually hairy on the nerves, awnless or the midnerve excurrent to a mucro or awn-tip; paleas not widened or bowed-out below; anthers 3, purplish. ♦A genus of 2 species, most recently included in the genus *Tridens*, but its creation renders *Tridens* and its segregates monophyletic.

■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2014. A molecular phylogeny and classification of the Cteniinae, Farragininae, Goumiinae, Gymnopogoninae, Perotidinae, and Trichoneurinae (Poaceae: Chloridoideae: Cynodonteae). Taxon 63(2):275-286. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2016. A molecular phylogeny and classification of the Cynodonteae (Poaceae: Chloridoideae) with four new genera: *Orthacanthus*, *Triplasiella*, *Tripogonella*, and *Zaiqiqah*; three new subtribes: Dactylocteninae, Oriniinae, and Zaiqiqahinae; and a subgeneric classification of *Distichlis*. Taxon 65(6): 1263-1287. ■Tateoka, T. 1961. A biosystematic study of *Tridens* (Gramineae). Amer. J. Bot. 48:565-573.

Tridentopsis mutica (Torrey) P.M. Peterson [cut-off] SLIM TRIDENS. Tufted perennial, with short rhizomes from a knotty base, 20-80 cm tall; ligules 0.5-1 mm long; panicles 7-25 cm long, somewhat racemose, to 1 cm wide, the branches racemose; glumes shorter than adjacent lemmas, 1-7-nerved; lemmas 3.5-7 mm long, purplish, the nerves pilose above midlength, rarely excurrent; paleas shorter than the lemmas. ●Dry flat, hills, outcrops, often on limestone, widespread, more common in the southern regions. ♦We have two intergrading varieties:



a Second glume 1-nerved, typically 5 mm or less long, occasionally longer...var. ***mutica*** [*Tricuspis mutica* Torrey, *Tridens muticus* (Torrey) Nash, *Triodia mutica* (Torrey) Scribner].

a Second glume 3- to 7-nerved, typically 6-8 mm long...var. ***elongata*** (Buckley) P.M. Peterson & Romaschenko [lengthened] [*Tridens elongatus* (Buckley) Nash, *Tridens muticus* (Torrey) Nash var. *elongatus* (Buckley) Shinnars, *Triodia elongata* (Buckley) Scribner, *Uralepis elongata* Buckley]. ●More mesic sites than the above.

Tripidium [perhaps an allusion to three stamens, or to the genus *Ripidium*, or both] [1].

Tufted perennials from a knotty base, sometimes rhizomatous; sheaths open; ligules a ciliate membrane; blades flat, usually glabrous; inflorescence a large, often plumose, fully exerted rebranching panicle; terminal panicle branches composed of pairs of sessile and pedicelled spikelets; disarticulation below the spikelet pairs, which fall as a unit; sessile and pedicelled spikelets similar in size and shape, both fertile, densely long-hairy, each with 2 florets, the lower sterile, the upper fertile; glumes large, exceeding the florets; upper lemmas awnless or awned; anthers 3. ♦About 3 species, Europe, Africa, Asia. ♦Recently segregated from an otherwise polyphyletic *Saccharum* (Welker et al. 2015), and placed in *Erianthus* before that.

■Hodkinson, T.R., M.W. Chase, M.D. Lledo, N. Salamin, & S.A. Renvoize. 2002. Phylogenetics of *Miscanthus*, *Saccharum*, and related genera (Saccharinae, Andropogoneae, Poaceae) based on DNA sequences from ITS nuclear ribosomal DNA and plastid trnL intron and trnL-F intergenic spaces. Journal of Plant Research 115:381-392. ■Peterson, R.S. 2000. New plant distribution records [*Saccharum ravennae*]. The New Mexico Botanist 15:7. ■Webster, R.D. and R.B. Shaw. 1995. Taxonomy of the North American species of *Saccharum* (Poaceae: Andropogoneae). Sida 16:551-580. ■Welker, C.A.D., T.T. Souza-Chies, H.M. Longhi-Wagner, M.C. Peichoto, M.R. Mckain, and E.A. Kellogg. 2015. Phylogenetic analysis of *Saccharum* s.l. (Poaceae: Andropogoneae), with emphasis on the circumscription of the South American species. Amer. J. Bot. 102: 248-263.

****Tripidium ravennae*** (Linnaeus) H. Scholz [from Ravenna, Italy] RAVENNA-GRASS [*Andropogon ravennae* Linnaeus, *Erianthus ravennae* (Linnaeus) Beauvois, *Ripidium ravennae* (Linnaeus) Trinius, *Saccharum ravennae* (Linnaeus) Linnaeus]. Large, tussocky, tufted perennial, 2-4 m tall; culms and leaves glabrous; ligules about 1 mm long; blades to 100 cm long and 1.4 cm wide; panicles elevated usually far above the leaves, 40-80 cm long and about 1/3 as wide; spikelets 4-6 mm long, the silky basal hairs as long as the spikelet; awns 2-5 mm long, obscured by the hairs. ●Increasingly cultivated as an ornamental landscape plant, and found more and more as an escape in scattered locales; native to northern Africa and the Mediterranean region. ♦Ravenna-grass has fled the Albuquerque Zoo (aided by rebellious elephants and giraffes) and has spread along the Rio Grande floodplain nearby and northward; plants are also expanding in range along the Pecos River near the Bitter Lakes Wildlife Refuge in Chaves County, along the highway between Shiprock and Farmington in San Juan County, and near New Mexico State University in Dona Ana County.



Triplasiella [resembling the genus *Triplasis*] TRIPLASIELLA [1].

Tufted perennials, with knotty rhizomatous bases; sheaths open; auricles absent; ligules a ciliate membrane; inflorescence an open, rebranching panicle, cleistogamous spikelets not produced in any of the sheaths; spikelets with several florets, the distal ones sometimes sterile, the rachilla prolonged; disarticulation above the glumes and between the florets; glumes shorter than the lowermost lemma, 1-nerved; callus hairy; lemmas 3-nerved, the nerves puberulent, the midnerve sometimes excurrent as a small mucro, the lateral nerves not excurrent and often not reaching the apex; palea keels smooth or scabrous, not villous, not widened or bowed-out below; anthers 3. ♦A monotypic genus, most recently included in a polyphyletic *Tridens*, but its creation renders *Tridens* and its segregates monophyletic.

■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2014. A molecular phylogeny and classification of the Cteniinae, Farragininae, Gouiniinae, Gymnopogoninae, Perotidinae, and Trichoneurinae (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 63(2):275-286. ■Peterson, P.M., K. Romaschenko, & Y. Herrera Arrieta. 2016. A molecular phylogeny and classification of the Cynodonteae (Poaceae: Chloridoideae) with four new genera: *Orthacanthus*, *Triplasiella*, *Tripogonella*, and *Zaqiqah*; three new subtribes: Dactylocteninae, Orininae, and Zaqiqahinae; and a subgeneric classification of *Distichlis*. *Taxon* 65(6): 1263-1287.

***Triplasiella eragrostoides** (Vasey & Scribner) P.M. Peterson & Romaschenko [resembling *Eragrostis*] [*Tridens eragrostoides* (Vasey & Scribner) Nash, *Tridentopsis eragrostoides* (Vasey & Scribner) P.M. Peterson, *Triodia eragrostoides* Vasey & Scribner]. Tufted perennial, with a knotty short-rhizomatous base, 50-100 cm tall; ligules 1.2-3 mm long; panicles 10-30 cm long, 8-20 cm wide, the branches somewhat racemose, ascending to reflexed in age; glumes 1-nerved, purple, dissimilar, the upper one subequal to the adjacent lemma; lemmas 2-3.5 mm long, the nerves puberulent, the midnerve sometimes excurrent as a mucro, otherwise unawned; paleas glabrous or scabrous proximally. ●Desert plains and bajadas in brushy country; known from a single collection in Luna County; native to Texas south into Mexico and Cuba.



Triplasis [triple] SANDGRASS [1].

Tufted annuals and perennials, sometimes rhizomatous; sheaths open; auricles absent; ligules a ring of hairs or a ciliate membrane; inflorescence a rebranching panicle, axillary cleistogamous panicles also produced; spikelets with several florets, the distal ones sometimes sterile, the rachilla prolonged; disarticulation above the glumes and between the florets, or the florets falling together, also in the nodes of the culm and the axillary panicles dispersing; glumes shorter than the lowermost lemma, 1-nerved; callus hairy; lemmas 3-nerved, the nerves villous, awned from the sinus at the apex or awnless; palea keels villous; anthers 3. ♦An American genus of only 2 species.

■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Triplasis purpurea*]. *Great Basin Naturalist* 37(4):530-531.

Triplasis purpurea (Walter) Chapman [purple] [*Aira purpurea* Walter]. Tufted annual to short-lived perennial with short rhizome-tillers, 15-100 cm tall, nodes hairy; sheaths inflated late in season with development of axillary cleistogamous panicles; ligules a ring of hairs to 1 mm long; blades hairy; panicles 3-7 cm long, the base often in the sheath spikelets 6-9 mm long with 3-4 florets; lemmas 3-4 mm long, the apical lobes shorter than 1 mm; awns straight, shorter than 2 mm; paleas about 2.5 mm long, the keels conspicuously villous. ●Sandy flats and plains, disturbed ground, in the southeastern region; rarely collected. ♦Small vestigial cleistogamous panicles are conspicuous in the swollen sheath axils, which blow about when old culms break into internode segments.



Tripsacum [a rubbed (smooth) grain] GAMAGRASS [0].

Monococious perennials, the staminate and pistillate spikelet separated in the same inflorescence; sheaths open; ligules a ciliate membrane; inflorescence a panicle of 1-several digitate racemose branches (rames), with the pistillate spikelets below the staminate ones; disarticulation in the rame; pistillate spikelet bony at maturity, embedded in the rame axis, the glumes leathery, covering the florets, awnless; staminate spikelets sessile or pedicelled or both, chaffy, like a corn tassel, awnless. ♦With about 12 species, gamagrasses are native to the New World, and are related to likewise native corn and teosinte, with which they are used in breeding experiments.

■DeWet, J.M.J., J.R. Gray, & J.R. Harlan. 1976. Systematics of *Tripsacum* (Gramineae). *Phytologia* 33(3):203-227. ■DeWet, J.M.J., D.E. Brink, & C.E. Cohen. 1983. Systematics of *Tripsacum* section *Fasciculata* (Gramineae). *Amer. J. Bot.* 70:1139-1146. ■Mearns, E.A. 1907. Mammals of the Mexican boundary of the United States. U.S. Natl. Mus. Bull. 56. 530 pp.

Tripsacum lanceolatum Ruprecht ex Fournier [spear-shaped] MEXICAN GAMAGRASS. Rhizomatous perennial, 1-2 m tall; lower sheaths hispid; blades to 1 m long and 3 cm wide; terminal panicle with 3-7 rames; pistillate spikelets 2-3 mm wide, shiny, bead-like; staminate spikelets in pairs of 1 sessile and 1 pedicelled, the glumes 5-10 mm long; pedicels 2-5 mm long. ●Reported by W&S, and thence others, but the specimen in question (*E.C. Merton 2015*, US) was collected in the vicinity of Monument No. 73 on 27 Aug 1893, either in Arizona or Sonora, but certainly not in New Mexico (see Mearns [1907] for itinerary and dates). No other specimens or reports are known.

Trisetum [three-awned] [0].

Recent phylogenetic analyses have resulted in the reorganization of species formerly classed within *Trisetum*, which remains a small genus of 1-2 species native to Europe and Asia (exotic elsewhere), none of which occur in New Mexico. Our *Trisetum* have been apportioned to the genera *Graphephorum*, *Koeleria*, and *Sphenopholis*, as seen below. *Trisetum canescens* Buckley has been reported from Colfax County, but the specimen in question belongs to *Koeleria vaseyi* (*Trisetum montanum*); the classification of the *canescens* taxon is currently unsettled, but it shows affinities to *Graphephorum*, and may end up there (R. Soreng, pers. comm. 2019).

■Barberá, P., C. Romero-Zarco, & C. Aedo. 2018. Taxonomic revision of *Trisetum* sect. *Trisetum* (Poaceae: Pooideae: Aveninae) from Eurasia and North Africa. *Ann. Missouri Bot. Gard.* 103: 350-392. ■Barberá, P., R.J. Soreng, P.M. Peterson, K. Romaschenko, A. Quintanar, & C. Aedo. 2019. Molecular phylogenetic analysis resolves *Trisetum* (Poaceae: Pooideae: Koeleriinae) polyphyletic: Evidence for a new genus, *Sibirotrisetum* and resurrection of *Acrospelon*. *J. Syst. Evol.* Online early issue 20 Oct 2019: 1-10. ■Barberá, P., A. Quintanar, P.M. Peterson, R.J. Soreng, K. Romaschenko, & C. Aedo. 2019. New combinations, new names, typifications, and a new section, sect. *Hispanica*, in *Koeleria* (Poaceae). *Phytoneron* 2019-46: 1-13. ■Finot, V.L., P.M. Peterson, R.J. Soreng, & F.O. Zuloaga. 2005. A revision of *Trisetum* and *Graphephorum* (Poaceae: Pooideae: Aveninae) in North America north of Mexico. *Sida* 21(3):1419-1453. ■Hultén, E. 1959. The *Trisetum spicatum* complex. *Sv. Bot. Tidskr.* 53:203-228. ■Randall, J.L. & K.W. Hilu. 1986. Biosystematic studies of North American *Trisetum spicatum* (Poaceae). *Syst. Bot.* 11:567-578. ■Rumely, J.H. 2007. *Trisetum*, p. 744-753. IN: *Flora of North America*, vol. 24. Oxford University Press.

a Lemmas awnless or with short awns less than 2 mm long, scarcely visible (*G. wolfii*).....go to **Graphephorum**

a Lemmas with awns longer than 3 mm, easily visible

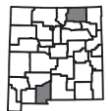
b Plants annual; spikelets eventually disarticulating below the glumes and falling as a unit (*S. interrupta*)go to **Sphenopholis**

b Plants perennial; spikelets disarticulating above the glumes and between the floretsgo to **Koeleria**

×**Triticosecale** [a word combination of *Triticum* and *Secale*] TRITICALE [1].

■Allred, K.W. 2002. Rye, wheat, triticale, and barley. *The New Mexico Botanist* 22:5-6. ■Baum, B.R. & P.K. Gupta. 1990. Taxonomic examination of Triticale (×*Triticosecale*). *Can. J. Bot.* 68:1889-1893. ■Stace, C.A. 1987. Triticale: A case of nomenclatural mistreatment. *Taxon* 36(2): 445-452.

*×**Triticosecale** Wittman ex A. Camus [×*Triticale* Tschermak-Seysenegg ex Müntzing]. Tufted, erect Annual, to 130 cm tall; spikes 8-20 cm long; spikelets 2-3 florets, the terminal floret usually reduced; glumes ovate, 9-12 mm long, asymmetrically keeled and toothed distally, with awns 3-4 mm long; lemmas ovate, 10-15 mm long, the nerves converging at the apex, the awns 3-50 mm long. ●A rather common, though non-persistent, waif of agriculture, more frequent than collections indicate. ♦The name ×*Triticosecale* refers to tetraploids derived by artificial hybridization between wheat (*Triticum*) and rye (*Secale*). There is no valid specific epithet for this agricultural invention (Stace 1987), and the crop generally goes by the common name, TRITICALE. Cultivars are referred to in the normal way, e.g., ×*Triticosecale* 'NEWTON' or ×*Triticosecale* 'BOKOLO.' The hybrid has been known since the late 1800s, but not until the last 50 years or so has the crop been developed commercially. The genetics are extremely complex, involving multiple hybridizations, backcrossing, and artificially induced chromosome doubling. The morphological variation is correspondingly diverse, and plants rarely fall strictly intermediate to the two parents. Triticale is most commonly confused with wheat, since the glumes are broad in both, but triticale is usually glaucous and has lemma nerves converging toward the apex.

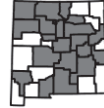


Triticum [classical Latin name for wheat] WHEAT [1].

Tufted annuals; sheaths open; auricles present; ligules membranous; inflorescence a spike, with 1 spikelet per node; disarticulation in the rachis (wild species) or not disarticulating (domesticated species); spikelets with 2-9 florets, the distal often sterile; glumes ovate, thick, leathery, prominently keeled, awned; lemmas keeled, the lower lemmas usually awned; anthers 3. ♦About 25 species of both wild and cultivated entities. Wheat is one of the world's most important crops, and was first cultivated in western Asia at least 9,000 years ago.

■Allred, K.W. 2002. Rye, wheat, triticale, and barley. *The New Mexico Botanist* 22:5-6. ■Baum, B.R. & P.K. Gupta. 1990. Taxonomic examination of Triticale (*×Triticosecale*). *Can. J. Bot.* 68:1889-1893. ■Bowden, W.M. 1962. Cytotaxonomy of the native and adventive species of *Hordeum*, *Eremopyrum*, *Secale*, *Sitanion*, and *Triticum* in Canada. *Can. J. Bot.* 40:1675-1711. ■Briggle, L.W. & L.P. Reitz. 1963. Classification of *Triticum* species and of wheat varieties grown in the United States. USDA Tech. Bull. 1278. 135 pp. ■Gupta, P.K. & B.R. Baum. 1986. Nomenclature and related taxonomic issues in wheats, triticales and some of their wild relatives. *Taxon* 35(1):144-149.

**Triticum aestivum* Linnaeus [of the summer]. Tufted, erect annual, 20-150 cm tall, sometimes branched basally; spikes 4-18 cm long; spikelets 10-15 mm long, with 3-9 florets; glumes ovate, 6-12 mm long, keeled in the distal ½, toothed or awned to 4 mm; lemmas ovate, 10-15 mm long, the nerves prominent and converging at the apex, toothed or awned to 12 mm. ●Cultivated crop in most regions of the state, and found sporadically along roadsides and old fields, not persisting. ♦This is the common bread wheat of agriculture, the "staff of life," a hexaploid derived from wild GOATGRASS (*Aegilops* sp.) and emmer wheats. Both awned (bearded) and awnless (beardless) forms exist in cultivation. Artificial hybrids between wheat and rye (*Secale*) are found in *×Triticosecale*, which are easily confused with wheat, but are generally more glaucous and with the nerves of the lemmas converging at the apex.



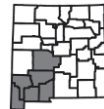
Urochloa [tail-grass] SIGNALGRASS [5].

Tufted annuals and perennials, sometimes stoloniferous; sheaths open; auricles absent; ligules with a scant basal membranous portion terminated by hairs; blades flat; inflorescence a panicles, the branches spike-like, rarely rebranched; disarticulation beneath the spikelets; spikelets borne on one side of the branch, with 2 florets, the lower staminate or sterile, the upper fertile; lower glumes ⅔ or less the spikelet length; upper glumes and lower lemmas similar in size and texture; upper florets perfect, fertile, becoming indurage and forming a seed case. ♦About 100 species of warm-temperate to tropical regions of the world. Our native species were formerly classed in the genera *Brachiaria* and (before that) *Panicum*.

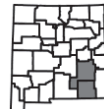
■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Urochloa ciliatissima*, *texana*, *panicoides*]. *Great Basin Naturalist* 37(4):530-531. ■Morrone, O. & F.O. Zuloaga. 1993. Sinopsis del genero *Urochloa* (Poaceae: Panicoideae: Paniceae) para Mexico y America Central. *Darwiniana* 32:59-75. ■Spellenberg, R. 1978. New plant distribution records from the southwestern United States and northern Mexico [*Urochloa panicoides*]. *Madroño* 25:169-170. ■Webster, R.D. 1988. Genera of the North American Paniceae (Poaceae: Panicoideae). *Syst. Bot.* 13(4):576-609. ■Wipff, J.K., R.I. Lonard, S.D. Jones, & S.L. Hatch. 1993. The genus *Urochloa* (Poaceae: Paniceae) in Texas, including one previously unreported species for the state. *Sida* 15:405-413.

- 1 Spikelets with conspicuous and dense villous hairs (easily visible without magnification) on the second glume and lemma of lower floret; plants perennial with short rhizomes *U. ciliatissima*
- 1 Spikelets glabrous or with short, inconspicuous hairs (hardly visible without magnification); plants annual, lacking rhizomes
 - 2 Leaf margins noticeably crinkled; lemma of upper floret with a stiff bristle projecting from an otherwise blunt apex..... *U. panicoides*
 - 2 Leaf margins not crinkled, smooth; lemma of the upper floret without a bristle, the apex rounded to acute
 - 3 Spikelets 5-6 mm long; plants often 50 cm or more tall *U. texana*
 - 3 Spikelets 2-4 mm long; plants rarely taller than 50 cm and usually much shorter (in ours)
 - 4 Spikelets glabrous or nearly so, mostly 2-3 mm long, the base ± truncate; upper lemma with deep transverse furrows..... *U. fusca*
 - 4 Spikelets definitely puberulent, mostly 3-4 mm long, the base drawn out somewhat and attenuate; upper lemma with minute bumps but lacking obvious transverse furrows *U. arizonica*

Urochloa arizonica (Scribner & Merrill) Morrone & Zuloaga [of Arizona] [*Brachiaria arizonica* (Scribner & Merrill) S.T. Blake, *Panicum arizonicum* Scribner & Merrill]. Tufted annual, 15-65 cm tall, erect to geniculate-based; sheaths glabrous or pubescent; panicles 6-20 cm long, hairy with bulbous-based hairs, open, the branches 3-7 cm long; spikelets 3-4 mm long, appressed to the branches, generally puberulent; lower glumes ½ the spikelet length; upper floret 2.8-3 mm long, lacking deep transverse furrows. ●Disturbed ground and rocky slopes in the deserts and woodlands of the southwestern region.



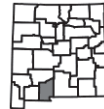
Urochloa ciliatissima (Buckley) R.D. Webster [very or most ciliate] [*Brachiaria ciliatissima* (Buckley) Chase, *Panicum ciliatissimum* Buckley]. Rhizomatous or stoloniferous perennial, 10-40 cm tall; nodes villous; sheaths glabrous or with bulbous-based hairs; panicles 3-6 cm long, narrow, the branches erect-appressed, to 2 cm long, rarely rebranched; spikelets 3-4.5 mm long, with long villous hairs on the upper glume and lower lemma; lower glume ⅓ or more the spikelet length; upper floret 2.4-2.8 mm long. ●Sandy plains and desert grasslands; uncommon in the southeastern region.



Urochloa fusca (Swartz) Hansen & Wunderlin [dark] [*Brachiaria fasciculata* (Swartz) Parodi, *Panicum fasciculatum* Swartz var. *reticulatum* (Torrey) Beal, *Panicum fuscum* Swartz, *Urochloa fasciculata* (Swartz) R.D. Webster]. Tufted annual, 15-120 cm tall; nodes glabrous or pilose; sheaths glabrous to hispid, the margins ciliate; panicles 5-15 cm long, the branches appressed to divergent and 2-10 cm long, scabrous to sparsely pilose; secondary branchlets developed below; spikelets 2-3.4 mm long, glabrous or rarely puberulent, usually dark at maturity; lower glume about ½ the spikelet length; upper glume and lower lemma with evident cross-venation; upper floret 1.8-3 mm long. ●Disturbed ground of the southwestern region.



**Urochloa panicoides* Beauvois [resembling *Panicum*]. LIVERSEED GRASS. Tufted annual, erect to decumbent, 10-55 cm or more long, rooting at lower nodes; sheaths hispid, the margins ciliate; blades with bulbous-based hairs on both surfaces; panicles 3-10 cm long, narrow to open, the branches 1-7 cm long, erect to spreading, ciliate with bulbous-based hairs; pedicels with a few long hairs below the spikelet; spikelets 2.5-5.5 mm long, appressed to the branches, glabrous; lower glume less than ½ the spikelet length; upper florets 2.6-3.5 mm long, short-awned to 1 mm. ●Weedy ground along sidewalks, in flower beds, waste ground; native to Africa. ♦LIVERSEED GRASS is listed as a noxious weed by the U.S. Department of Agriculture, and is found in a few localities in Doña Ana County. The Flora of North America treatment (2003) reported that populations of this species in New Mexico were destroyed, but collections have been made in late 2003 and 2006.



Urochloa texana (Buckley) R.D. Webster [of Texas] [*Brachiaria texana* (Buckley) S.T. Blake, *Panicum texanum* Buckley]. Tufted annual, 20-100 cm tall or more, erect or geniculate-based and forming stolons; sheaths hairy with bulbous-based hairs, the margins ciliate; blades pubescent on both surfaces; panicles 8-24 cm long, narrow, less than 1 cm wide, the branches erect-appressed; spikelets 4.8-6 mm long, sparsely puberulent, appressed to the branches; lower glumes ½ or less the spikelet length; upper floret 3.6-4.1 mm long, acute. ●Disturbed weedy ground; uncommon in the southern region; known only from Doña Ana County. ♦Our few plants probably represent introductions, rather than being natural occurrences.



Vulpia [for Johann Samuel Vulpus (1760-1846), German amateur botanist] SIXWEEKS-FESCUE [4].

Tufted annuals, sometimes longer-lived; sheaths open, usually glabrous; auricles absent; ligules membranous; inflorescence a panicle or raceme, open or spike-like; spikelets with 1-17 florets, the distal florets often reduced; disarticulation above the glumes and between the florets; glumes shorter than the adjacent lemmas, awnless or awn-tipped; lemmas membranous, 3-5-nerved, the margins rolled over the edges of the grain, acute to awned; anthers usually 1, sometimes 3 in chasmogamous spikelets. ♦A segregate genus of about 25 species, formerly (and sometimes currently) treated in *Festuca*, from which they differ in being annual and having only a single anther in each floret.

■Allred, K.W. 2008. *Vulpia octoflora* (Walter) Rydberg var. *tenella* (Willdenow) Fernald: The correct name for what has been called *Vulpia octoflora* (Walter) Rydberg var. *glauca* (Nuttall) Fernald. *Phytologia* 90(3):414-415. ■Cotton, R. & C.A. Stace. 1967. Taxonomy of the genus *Vulpia* (Gramineae): I. Chromosome numbers and geographical distribution of the Old World species. *Genetica* 46:235-255. ■Darbyshire, S.J. & S.I. Warwick. 1992. Phylogeny of North American *Festuca* (Poaceae) and related genera using chloroplast DNA restriction site variation. *Can. J. Bot.* 70:2415-2429. ■Hatch, S.L. 1977. New grass distribution records for New Mexico and the United States [*Vulpia myuros*]. *Great Basin Naturalist* 37(4):530-531. ■Lonard, R.I. & F.W. Gould. 1974. The North American species of *Vulpia* (Gramineae). *Madroño* 22:217-230. ■Spellenberg, R., M. Mahrt & R. Brozka. 1991. Noteworthy collections, New Mexico [*Vulpia microstachya microstachya*]. *Madroño* 38:298-301.

1 First glume less than ½ the length of the second glume, often nearly absent.....***V. myuros***

1 First glume more than ½ the length of the second glume

2 Panicle branches 1-2 per node; spikelets with 4-17 florets; rachilla internodes 0.5-0.7 mm long; awn of the lowermost lemma 0.3-9 mm long; caryopses 1.7-3.7 mm long..... ***V. octoflora***

2 Panicle branches solitary; spikelets with 1-8 florets; rachilla internodes 0.6-1.2 mm long; awn of the lowermost lemma 2-20 mm long; caryopses 3.5-6.5 mm long

3 Panicle branches and pedicels erect at maturity, without swellings in the axils..... ***V. bromoides***

3 Panicle branches or pedicels spreading or reflexed at maturity, at least below, with swellings usually present in the axils ***V. microstachya***

****Vulpia bromoides*** (Linnaeus) S.F. Gray [resembling *Bromus*] [*Festuca bromoides* Linnaeus, *Festuca dertonensis* (Allioni) Ascherson & Graebner]. Annual, 5-50 cm tall; sheaths glabrous or pubescent; panicles 1-15 cm long, 0.5-3 cm wide, mostly narrow; spikelets with 4-8 florets, the rachilla internodes 0.6-1.1 mm long; lower glumes ½ to nearly the length of the upper; upper glumes 4.5-9 mm long; lemmas 4-8 mm long, scabrous distally, the lower awns 2-13 mm long. ●Dry, disturbed ground; native to Europe.



Vulpia microstachya (Nuttall) Munro ex Benth [small-spiked]. Annuals, 15-75 cm tall; panicles 2-24 cm long, 1-8 cm wide, the branches or pedicels spreading to reflexed from axillary pulvini when mature, erect when young; spikelets with 1-6 florets, the rachilla internodes 0.6-1.2 mm long; lower glumes ½-¾ the upper glume; lemmas 3.5-9.5 mm long, scabrous to pubescent, the lower awns 3-20 mm long. ●Dry, disturbed ground in the southern regions. ♦We have two weak varieties, both uncommon:



a Spikelets pubescent...var. ***microstachya*** [*Festuca microstachya* Nuttall].

a Spikelets glabrous...var. ***pauciflora*** (Scribner ex Beal) Lonard & Gould [few-flowered] [*Festuca microstachya* Nuttall var. *pauciflora* Scribner ex Beal, *Festuca pacifica* Piper].

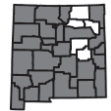
****Vulpia myuros*** (Linnaeus) K.C. Gmelin [mouse tail]. Annual, 10-75 cm tall; sheaths glabrous; panicles 3-25 cm long, 0.5-2 cm wide, rather dense, sometimes racemose, pulvini absent; spikelets with 3-7 florets, the rachilla internodes 0.7-2 mm long; glumes strongly unequal, the lower less than ½ the length of the upper; lemmas 4.5-7 mm long, margins sometimes ciliate, the lower awns 5-22 mm long. ●Dry, disturbed ground, mostly in the southern regions. ♦We have two weak forms, both exotic:



a Lemmas not ciliate on the margins near the tip; awn of the lowermost floret 7.5-17 mm long...forma ***myuros*** [*Festuca myuros* Linnaeus, *Vulpia myuros* (Linnaeus) C.C. Gmelin var. *myuros*].

a Lemmas ciliate on the margins near the tip; awn of the lowermost floret 9.5-22 mm long...forma ***megalura*** (Nuttall) Stace & Cotton [large tail] [*Festuca megalura* Nuttall, *Vulpia myuros* (Linnaeus) C.C. Gmelin var. *hirsuta* Hackel].

Vulpia octoflora (Walter) Rydberg [eight-flowered]. Annual, 5-60 cm tall; panicles 1-20 cm long, 0.5-1.5 cm wide, the branches appressed to spreading; spikelets with 4-17 florets evenly spaced like a comb, the rachilla internodes 0.5-0.7 mm long; lower glumes ½-¾ the length of the upper; lemmas 2.7-6.5 mm long, the lower awns 0.3-9 mm long. ●Dry, disturbed ground, roadsides, rocky slopes and plains, widespread. ♦We have three weak varieties, mingled throughout the state:



a Spikelets, excluding the awns, mostly 4-5.5 mm long; awn of lowermost floret 0.3-3 mm long...var. ***tenella*** (Willdenow) Fernald [quite delicate] [*Vulpia octoflora* (Walter) Rydberg var. *glauca* (Nuttall) Fernald].

a Spikelets, excluding the awns, mostly 5-10 mm long; awn of lowermost floret 2.5-9 mm long

b Lemma glabrous or slightly scabrous on the back, often scabrous on the margin...var. ***octoflora*** [*Festuca octoflora* Walter].

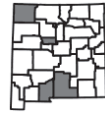
b Lemma prominently long-scabrous to densely pubescent on the back, at least near the tip...var. ***hirtella*** (Piper) Henrard [somewhat hairy] [*Festuca octoflora* Walter subsp. *hirtella* Piper].

Zea [Greek name for some grain] CORN, MAIZE [1].

Monococious annuals and perennials; sheaths open; auricles sometimes present; ligules membranous, ciliate; blades flat; inflorescence unisexual or bisexual, highly modified panicles, sometimes spike-like; pistillate inflorescence terminal on axillary branches, spike-like; staminate inflorescence (tassel) paniculate; staminate spikelets in pairs of 1 sessile and 1 pedicelled, each with 2 staminate florets, the glumes chaffy, large, and enclosing the florets; pistillate spikelets in domesticated taxa in dense cobs or ears in subsessile pairs each with 1 floret, the glumes shorter than the spikelets and hyaline distally (and getting stuck between the teeth); pistillate spikelets in wild taxa in small axillary spikes and enclosed within a hardened seed case formed by the rachis; styles (silks) 2, fused except at the very tip, long. ♦*Zea* is an American genus of about 5 species. The wild taxa, known as teosinte, produce essentially inedible pistillate spikelets, the grain being enclosed in a bony seed case formed by the rachis; they are used extensively in breeding experiments. Our common domesticated corn, with all its variation and cultivars, is *Zea mays*.

■Doebley, J.F. & H.H. Iltis. 1980. Taxonomy of *Zea* (Gramineae). I. A subgeneric classification with key to taxa. Amer. J. Bot. 67:982-993. ■Iltis, H.H. & J.F. Doebley. 1980. Taxonomy of *Zea* (Gramineae). II. Subspecific categories in the *Zea mays* complex and a generic synopsis. Amer. J. Bot. 67:994-1004. ■Iltis, H.H. 2000. Homeotic sexual translocations and the origin of maize (*Zea mays*, Poaceae): A new look at an old problem. Econ. Bot. 54:7-42. ■Westerbergh A. and J. F. Doebley. 2002. Morphological traits defining species differences in wild relatives of maize are controlled by multiple quantitative trait loci. Evolution 56:273-283.

**Zea mays* Linnaeus [Indian-Mexican name for maize]. Tufted annual, often with prop roots, 0.5-6 m tall (as high as an elephant's eye), 2-5 cm thick; blades 2-12 cm wide; ears (cobs) 15-40 cm long, permanently enclosed by subtending sheaths, not disarticulating at maturity; pistillate spikelets in 8-24 or more rows; tassels with a thick rachis and thinner non-disarticulating branches. ●Cultivated throughout the state, rarely found along old fields or roadsides but not persisting; grown in every county; the map indicating adventive plants. ♦Our plants belong to subsp. *mays*. Other subspecies of *Zea mays* are native grasses of the southern Mexican highlands, with hard, bony ears that are inedible. Corn is the only major domesticated cereal from the New World, and is a singularly human artifact, incapable of reproducing itself in the wild. It was a staple in the diet of most Native Americans, and was unknown in the Old World until after Columbus. Allusions to corn in the Bible refer to wheat, rye, or some other grain. Most of the corn grown in the United States is "hybrid corn," being derived from crossing two inbred lines. Varieties of corn include pod, dent, flint, pop, flour, and sweet. Our intricate relationship with corn is celebrated in Mitchell, South Dakota, during the Corn Palace Festival, where a palace made of corn ears is constructed anew each year. Children (and adults) can be entertained by the whimsical rhyme (sung to the tune of "Four and Twenty Blackbirds..."): "Sing a song of popcom when the snowstorms rage; fifty little round men put into a cage; shake them till they laugh and leap crowding to the top; watch them burst their little coats, pop, pop, pop." They probably don't sing this song in Corn, Oklahoma, however, as the name of this Mennonite community comes from the German *korn*, meaning grain, referring to their fields of wheat.



Zoysia [for Karl von Zois (1756-1800), an Austrian botanist and plant collector] ZOYSIAGRASS [0].

Rhizomatous to stoloniferous perennials, turf-forming, densely branched at ground level; sheaths open; auricles absent; ligules short, ciliate; blades conspicuously distichous, stiff, flat to involute; inflorescence a dense spicate raceme, the spikelets appressed to the axis; disarticulation below the glumes, the spikelets falling entire, the pedicels persistent; spikelets laterally compressed, with 1 floret; lower glume usually absent; upper glume as long as the spikelet, enclosing the floret, leathery, glossy, the apices acute to mucronate; lemma membranous, 1-3-nerved; palea reduced to absent. ♦With 9 species, tropical Asian coastlines, introduced worldwide for turf. The spikelets often consist of only 2 bracts, the upper glume and lemma. These are low, turf-forming plants introduced as lawn and fairway grasses in the southern regions. The two species are perhaps conspecific, and are difficult to distinguish. They are not known in New Mexico outside of cultivation.

1 Pedicels 1.6-3.5 mm long; spikelets ovate, 1-1.4 mm wide; culm internodes 2-10 mm long; blades ascending*Z. japonica*

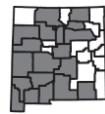
1 Pedicels 0.6-1.6 mm long; spikelets lanceolate, 0.6-1 mm wide; culm internodes 5-40 mm long; blades spreading *Z. matrella*

**Zoysia japonica* Steudel [of Japan]. Producing long stolons, mat-forming, the culms erect, to 20 cm tall if unmowed; sheaths glabrous, pilose at summit, the basal sheaths persistent; blades 2-6 cm long, 2-4 mm wide, thinly pilose adaxially, the apices pungent; racemes 2-4 cm long, rising above the leaves; spikelets 2.5-3.5 mm long, 1-1.5 mm wide, the lemma slightly shorter than the glume, 1-nerved, the palea absent, the anthers about 1.5 mm long. ●Occasionally planted as a lawn grass; not known outside of cultivation.

**Zoysia matrella* (Linnaeus) Merrill [resembling the genus *Matrella*] [*Agrostis matrella* Linnaeus]. Producing stolons, mat-forming, the culms erect, to 20 cm tall if unmowed; sheath glabrous, pilose at summit; blades 3-8 cm long, 1-2.5 mm wide, thinly pilose adaxially, the apices acute; racemes 2-4 cm long, rising above the leaves; spikelets 2-3 mm long, about 1 mm wide, the lemma obscurely 3-nerved, the palea present, ½ as long as the lemma, the anthers 1-1.5 mm long. ●Occasionally planted as a lawn grass; not known outside of cultivation.

Zuloagaea [for Fernando O. Zuloaga (1951-x), Argentinian botanist & authority on *Panicum*] [1].

Zuloagaea bulbosa (Kunth) Bess [bulbous] BULB PANIC-GRASS [*Panicum bulbosum* Kunth, *Panicum bulbosum* Kunth var. *minus* Vasey, *Panicum bulbosum* Kunth var. *sciaphilum* (Ruprecht) Hitchcock & Chase, *Panicum plenum* Hitchcock & Chase]. Tufted perennial, with or without rhizomes (creeping rootstock), 25-150 cm or more tall, lowest internodes often thickened into hard, bulb-like corms; sheaths open, glabrous to pilose, keeled; auricles absent; ligules membranous, ciliate, 0.3-5 mm total; blades flat, to 75 cm long, 0.2-1.5 mm wide; inflorescence an open, pyramidal panicle, 10-75 cm long, the branches ascending to diverging, bristles absent; spikelets dorsally compressed, awnless, 3-5.5 mm long, with 2 florets, the lower staminate or sterile, the upper fertile; disarticulation below the glumes; lower glumes about ⅔ as long as the spikelet; upper glume similar in size and texture to the lower lemma; lower palea present, about as long as its companion lemma in the lower floret; upper lemma 2-5 mm long, finely rugose, clasping the edges of the palea, together forming a hardened seed case; anthers 3. ●Canyon bottoms and moist slopes in the mountains and foothills. ♦*Zuloagaea* is a monotypic genus, taken out of *Panicum* because of molecular and phylogenetic matters, with which it shares a strong outward resemblance. The genus is most closely related, however, to species of *Setaria*, but lacks any bristle development. The characteristic "bulbs" at the base of the plants are sometimes only poorly developed or even absent.



PONTERIERACEAE PICKEREL-WEED FAMILY [1/2/2]

Aquatic, glabrous, rhizomatous herbs, floating to emergent, the stems spongy; leaves alternate, basal, opposite, or whorled, the petiole commonly enlarged with air cells, the base sheathing, the venation parallel to palmate; stipules present, withering but remaining attached; inflorescence racemose or spicate; flowers usually showy, actinomorphic or zygomorphic, perfect; perianth of 6 tepals, connate to form a tube; stamens 3 or 6, the filaments adnate to the perianth tube; pistil single, superior, of 3 united carpels, the style single, the stigma 1- or 3-lobed; fruit an nut or capsule, surrounded by a persistent basal portion of the perianth tube. ♦With 2 genera (Pellegrini et al. 2018), and about 35 species, widespread in wetlands of tropical and subtropical regions. *Pontederia* (*Eichornia*) *crassipes* Martius is an extremely aggressive aquatic weed that has invaded the Gulf Coast states, California, and adjacent Arizona; it is not (yet) known from New Mexico.

■Horn, C. 2002. Pontederiaceae, pp. 37-46. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Pellegrini, M.O.O., C.N. Horn, & R.F. Almeida. 2018. Total evidence phylogeny of Pontederiaceae (Commelinales) sheds light on the necessity of its circumscription and synopsis of *Pontederia* L. PhytoKeys 108: 25-83. ■Rossati, T.J. 1987. The genera of Pontederiaceae in the southeastern United States. J. Arnold Arboretum 68:35-71.

Heteranthera [with varying anthers] MUD-PLANTAIN [2].

Annual to perennial herbs, rooting the mud, submersed to emergent; sessile leaves submersed or emergent, the blades linear to oblanceolate; petiolate leaves floating to emergent, the blades reniform, cordate, to oblong, the apices acute to obtuse; inflorescences 1-30-flowered; flowers showy, open for a single day, the tepals connate 1/2 or more their length into a floral tube; stamens 3, unequal, the 2 lateral ones usually shorter; fruit a capsule. ♦*Heteranthera dubia* (Jacquin) MacMillan, with equal stamens and coiling anthers, is sometimes attributed to New Mexico, but no specimens are known.

■Adams, T. 1998. New plant distribution records [*Heteranthera rotundifolia*]. The New Mexico Botanist 7:6.

- 1 Petiolate leaf blade round to oblong, the base cordate to truncate; vegetative stems commonly elongating unless plant is emergent from early age.....***H. rotundifolia***
- 1 Petiolate leaf blade oblong to ovate, the base truncate to cuneate; vegetative stems short, elongating only on plants in over 5 cm of water..... ***H. limosa***

Heteranthera limosa (Swartz) Willdenow [muddy] [*Pontederia limosa* Swartz]. Annual herbs; sessile leaves submersed, forming a basal rosette, the blades linear to oblanceolate, 3-6 cm long; petiolate leaves emergent, the blades oblong to ovate, 1-5 cm long and mostly longer than wide, the bases truncate to cuneate, the apices acute; inflorescences 1-flowered; flowers opening shortly after dawn and withering by mid-day; perianth blue to white, salverform, the tube 15-44 mm long, the limbs narrowly elliptic, 5-26 mm long. ●Shallow water of ponds and ditches; scattered locales.



Heteranthera rotundifolia (Kunth) Grisebach [with round leaves] [*Heteranthera limosa* (Swartz) Willdenow var. *rotundifolia* Kunth]. Annual herbs; sessile leaves submersed, forming a basal rosette, the blades linear to oblanceolate, 2-5 cm long; petiolate leaves floating or emergent, the blades round to oblong, 1-5 cm long, about as wide; inflorescences 1-flowered; flowers opening shortly after dawn and withering by mid-day; perianth blue to white, salverform, the tube 11-30 mm long, the limbs narrowly elliptic, 5-18 mm long. ●Shallow water and muddy ground of ponds, ditches, and ephemeral pools. §



POTAMOGETONACEAE PONDWEED FAMILY [3/15/17]

[Zannichelliaceae]

Annual to perennial, aquatic herbs, submersed to emergent, with or without rhizomes; leaves alternate, simple, entire, opposite, or whorled, submersed to floating, often dimorphic, the bases stipule-like and often sheathing but not persisting; inflorescences axillary, cymose and sessile and submersed or spike-like and emergent; flowers small, actinomorphic, perfect to unisexual (monoecious or dioecious); perianth absent, the stamens with accessory appendages the form what appears to be a perianth; stamens 1 or 4; pistils 4-5, superior; fruit a cluster of achenes or drupes. ♦A small family of 4-5 genera, found throughout the world in wetland habitats. Many of the species form hybrids, with the resulting intergradation of form. We follow Judd et al. (2016) in placing Zannichelliaceae here, but it is often maintained as a separate family, with ample justification either way.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Lindqvist, C., J. DeLaet, R.R. Haynes, L. Aagesen, B.R. Keener, & V.A. Albert. 2006. Molecular phylogenetics of an aquatic plant lineage, Potamogetonaceae. Cladistics 22: 568-588.

- 1 Leaves mostly opposite; flowers unisexual and borne in sessile cymose submersed clusters***Zannichellia***
- 1 Leaves mostly alternate; flowers bisexual and borne on pedunculate emergent spikes
 - 2 Submersed leaves linear, mostly more than 10 times as long as wide
 - 3 Stipules free from the leaf or united less than 1/2 the length of the stipule (less than 4 mm), the petioles or blades directly attached at the nodes or close to them.....***Potamogeton***
 - 3 Stipules united with the base of the leaf more than 1/2 the length of the stipule (7 mm or more), the petioles or blades not directly attached at the nodes but diverging from the distal portion of the stipules
 - 4 Plants with long-petioled floating leaves and sessile linear submersed leaves; if floating leaves absent then the fruiting spikes of submersed parts capitate and sessile or nearly so (*Potamogeton diversifolius*).....***Potamogeton***
 - 4 Plants with submersed leaves only; fruiting spikes slender.....***Stuckenia***

Potamogeton [river neighbor] PONDWEED [10].

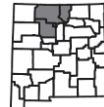
Perennial herbs, rhizomes present or absent, tubers absent, the stems terete or compressed; leaves all submersed or both submersed and floating, alternate to nearly opposite, the stipules connate or not, forming ligule-like structures; submersed leaves sessile or petiolate, the blades translucent, the margins entire to toothed; floating leaves petiolate leathery, the margins entire; inflorescence a spike or panicle of spike-like branches, submersed or emergent, capitate or cylindrical, the peduncles stiff and projecting the inflorescence out of the water when long; pistils 1 or 4. ●All our species are found in aquatic and wetland habitats, lakes, ponds, canals, with fast to slow moving water. ♦Many species provide important food for wildlife and water fowl. Very similar to *Stuckenia*, which was formerly included within *Potamogeton*, differing in features of the stipule adnation, presence of floating leaves, translucence of submersed blades, and projection of the inflorescence above the water. The generic name is properly treated as masculine, and not neuter (Haynes & Hellquist 2000).

■Catling, P.M. & I. Dobson. 1985. The biology of Canadian weeds. 69. *Potamogeton crispus* L. Canad. J. Plant Sci. 65:655-668. ■Correll, D.S. and H.B. Correll. 1972. Aquatic and Wetland Plants of Southwestern United States. Stanford Univ. Press. ■Haynes, R.R. 1974. A revision of North American *Potamogeton* subsection *Pusilli* (Potamogetonaceae). Rhodora 76:564-649. ■Haynes, R.R. & C.B. Hellquist. 2000. Potamogetonaceae, p. 47-74 [Potamogeton pusillus pusillus]. IN: Flora North America, vol. 22. Oxford University Press. ■McGrath, J. 2000. New plant distribution records [*Potamogeton alpinus*]. The New Mexico Botanist 15:7. ■McGrath, J. 2001. New plant distribution records [*Potamogeton richardsonii*]. The New Mexico Botanist 19:3. ■Reznicek, A.A. & R.S.W. Bobbette. 1976. The taxonomy of *Potamogeton* subsection *Hybridi* in North America. Rhodora 78:650-673. ■Stuckey, R.L. 1979. Distributional history of *Potamogeton crispus* (curly pondweed) in North America. Bartonica 46:22-42. ■Wieggle, G. & Z. Kaplan. 1998. An account of the species of *Potamogeton* L. (Potamogetonaceae). Folia Geobotanica 33(3):241-316.

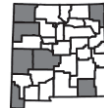
- 1 Submersed leaves linear, mostly more than 10 times as long as wide
 - 2 Stipules united with the base of the leaf for a distance of 7 mm or more, the petioles or blades not directly attached at the nodes but diverging from the distal portion of the stipules***P. diversifolius***
 - 2 Stipules free from the leaf or united for a distance of less than 6 mm, the petioles or blades directly attached at the nodes or close to them

- 3 Floating leaves absent
 - 4 Dorsal keel of fruits prominent, thin, winged, undulate or toothed.....*P. foliosus*
 - 4 Dorsal keel of fruits rounded or acute but never thin and winged.....*P. pusillus*
- 3 Floating leaves usually present, with broad blades and long petioles
 - 5 Submersed leaves linear, usually bladeless and filiform, 10-30 cm long, 0.8-2 mm wide; blade (when present) linear-lanceolate and on a very long petiole; base of floating leaves subcordate *P. natans*
 - 5 Submersed leaves linear to linear-obovate, often very unequal in size, usually tapering to tip and base, 3-12 cm long, 1-15 mm wide; base of floating leaves acute to rounded..... *P. gramineus*
- 1 Submersed leaves lanceolate to ovate or spatulate, mostly less than 10 times as long as wide
 - 6 Leaves both submersed and floating, the floating leaves with broad blades and long petioles *P. nodosus*
 - 6 Leaves all (or nearly all) submersed and essentially alike; petioles short or absent
 - 7 Submersed leaves clasping the stem*P. richardsonii*
 - 7 Submersed leaves petiolate or sessile but not clasping
 - 8 Leaf margins conspicuously serrate; stem flattened*P. crispus*
 - 8 Leaf margins entire or slightly serrate only at the tip; stem terete
 - 9 Floating leaves with 9-13 veins, mostly 10-25 mm wide (sometimes wider)..... *P. alpinus*
 - 9 Floating leaves with 13-29 veins, 20-65 mm wide..... *P. illinoensis*

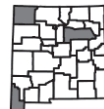
Potamogeton alpinus Balbis [of high mountains]. Rhizomes present; stems terete; turions absent; leaves reddish, submersed and floating, or floating leaves absent; submersed leaves sessile, narrowly oblong to lanceolate, 4-18 cm long, with 7-9 veins; floating leaves petiolate, elliptic, oblong, to obovate, 4-10 cm long, with 9-13 veins; spikes 10-35 mm long. ●Northern mountains. ◆Plants often appear red when taken from the water.



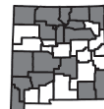
***Potamogeton crispus** Linnaeus [curled]. Rhizomes absent; stems flattened; turions common, both axillary and terminal, 1-3 cm long; leaves submersed, almost spirally arranged; stipules free from the blade; ligules absent; blades linear, 10-90 mm long, 4-10 mm wide, the margins sharply serrate and undulate; spikes 10-15 mm long. ●Widespread in scattered sites, though not commonly collected; native to . This is the only species with serrate leaves in North America.



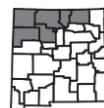
Potamogeton diversifolius Rafinesque [with different kinds of leaves]. Rhizomes present; stems compressed; leaves floating or both submersed and floating; submersed leaves sessile, reddish, linear, 2-4 cm long the stipules adnate to the blade for ½ the stipule length; floating leaves petiolate, light green, elliptic to obovate, 1-4 cm long; spikes dimorphic, the submersed capitate and 2-3 mm long, the emergent cylindrical and 5-10 mm long. ●Known from a few scattered localities in the state.



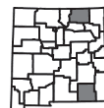
Potamogeton foliosus Rafinesque [with abundant leaves] [*Potamogeton foliosus* Rafinesque var. *genuinus* Fernald, *Potamogeton foliosus* Rafinesque var. *macellus* Fernald]. Rhizomes absent; stems slightly compressed; turions uncommon; leaves submersed, ± spirally arranged, sessile, pale to olive green, 1-8 cm long, with 1-3 veins; spikes capitate to cylindrical, 2-7 mm long; fruits with an abaxially winged keel. ●Widespread. ◆Our plants belong to subsp. *foliosus*. This is the most common *Potamogeton* in the state, with submersed leaves and winged fruits.



Potamogeton gramineus Linnaeus [grass-like] [*Potamogeton gramineus* Linnaeus var. *typicus* Ogden, *Potamogeton gramineus* Linnaeus var. *maximus* Morong]. Rhizomes present; stems terete to compressed; turions absent; leaves both submersed and floating, or just submersed; submersed leaves sessile, lax, green or brownish green, elliptic, 3-9 cm long, with 3-9 veins; floating leaves (when present) with petioles 3-4 cm long, yellow-green to dark green, elliptic to ovate, 3-4 cm long, with 3-9 veins; spikes 15-35 mm long. ●Across the northern tier of counties. ◆Grades into *Potamogeton illinoensis*, but told apart when similar by submersed leaves with acuminate apices (mucronate in *illinoensis*) and fewer veins in the leaves.



Potamogeton illinoensis Morong [of Illinois]. Rhizomes present; stems terete; turions absent; leaves both submersed and floating, or just submersed; submersed leaves sessile or petiolate (1-4 cm long), lax, reddish to green, lanceolate to elliptic, 5-20 cm long, with 7-19 veins; floating leaves (when present) with petioles 2-9 cm long, light green, elliptic to oblong, 4-19 cm long, with 13-29 veins; spikes 25-70 mm long. ●Known from only a few collections from Colfax and Eddy counties. ◆Grades into *Potamogeton gramineus*, but told apart when similar by submersed leaves with mucronate apices (acuminate in *gramineus*) and more veins in the leaves.



Potamogeton natans Linnaeus [floating]. Rhizomes present; stems terete, often rust-spotted; turions absent; leaves both submersed and floating; submersed leaves sessile, rigid, green, 9-20 cm long, linear, with 3 veins; floating leaves petiolate, green, lanceolate to elliptic or ovate, 2-5 cm long, the bases rounded to cordate, with 9-numerous veins; spikes 10-35 mm long. ●Northern and western mountain regions.

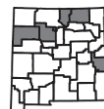


Potamogeton nodosus Poirer [with many nodes] [*Potamogeton americanus* Chamisso & Schlechtendal]. Rhizomes present; stems terete; turions absent; leaves both submersed and floating, or just submersed; submersed leaves with petioles 2-13 cm long, lax, green, linear-lanceolate to narrowly elliptic, 9-20 cm long, with 7-15 veins; floating leaves (when present) petiolate, light green, elliptic, 3-11 cm long; spikes 20-70 mm long. ●Widespread in mountain regions. §

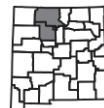


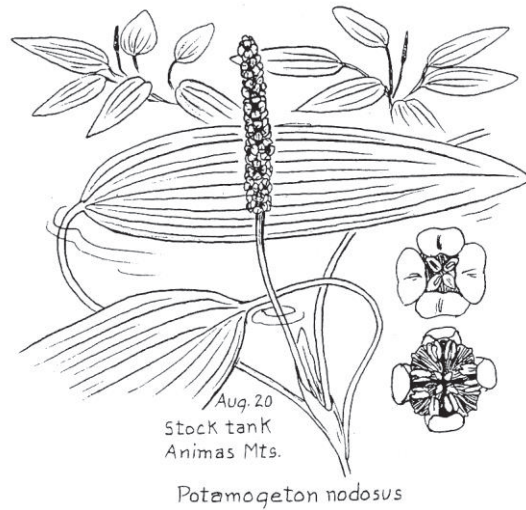
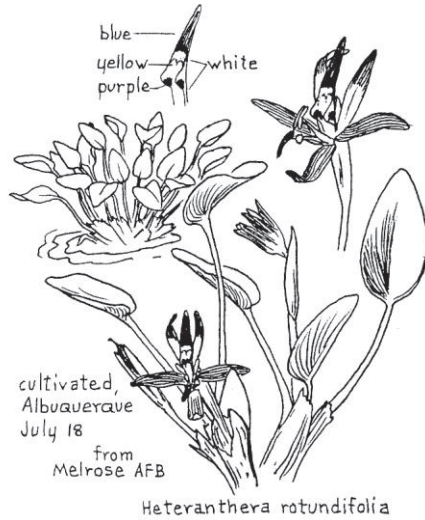
Potamogeton pusillus Linnaeus [small]. Rhizomes absent; stems terete to slightly compressed; turions common; leaves submersed, ± spirally arranged, sessile, pale to olive green, linear, 1-7 cm long, mostly with 1-3 veins; spikes submersed or emergent, 2-10 cm long. ●Mostly northern counties. ◆We have 2 varieties:

- a Mature fruits obovoid, widest toward the tip, the sides concave; peduncles 1-3 per plant...var. *pusillus*
- a Mature fruits oblong or ovoid, widest at the middle or below, the sides rounded; peduncles more than 3 per plant...var. *tenuissimus* Mertens & Koch [very slender] [*Potamogeton berchtoldii* Fieber, *Potamogeton berchtoldii* Fieber var. *tenuissimus* (Mertens & Koch) Fernald].



Potamogeton richardsonii (Bennett) Rydberg [for John Richardson (1787-1865), Scottish naturalist, naval surgeon] [*Potamogeton perfoliatus* Linnaeus var. *richardsonii* Bennett]. Rhizomes present; stems terete; turions absent; leaves submersed, sessile, lax, olive green, lanceolate to ovate-lanceolate, 2-13 cm long, the bases rounded, with 3-35 veins; spikes 13-37 mm long. ●Lakes, streams, and ponds in the northern mountains.





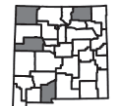
Stuckenia [for Wilhelm Adolf Stucken, 1860-1901, German botanist]. PONDWEED [4].

Perennial herbs, with rhizomes, tubers absent or present, the stems terete; leaves submersed, alternate, sessile, linear, entire, opaque, 1-5-veined, the stipules adnate to the base of the blades for 2/3 or more the length of the stipule, extending upwards as a ligule; inflorescence a capitate or cylindric spike, submersed, the peduncles lax and not raising the spikes above the water; pistils 4; fruit a cluster of achenes. ♦About 6 species, worldwide, in brackish to alkaline waters of lakes, streams, rivers, floodplains, canals, and similar wetlands. Very similar to *Potamogeton*, and formerly included within that genus, differing in features of the stipule adnation, presence of floating leaves, translucence of submersed blades, and projection of the inflorescence above the water.

■Haynes, R.R. & C.B. Hellquist. 2000. Potamogetonaceae, p. 47-74. IN: Flora North America, vol. 22. Oxford University Press. ■Heil, K. 2007. Plant distribution reports [*Stuckenia vaginata*]. The New Mexico Botanist 39:7. ■Hellquist, C.B. 2013. Potamogetonaceae, pp. 870-874. IN: K.D. Heil, S.L. O’Kane, Jr., L.M. Reeves, & A. Clifford. Flora of the Four Corners Region [*Stuckenia striata*]. Missouri Botanical Garden Press, St. Louis. 1098 pp. ■Holub, J. 1997. *Stuckenia* Boerner 1912 – the correct name for *Coleogeton* (Potamogetonaceae). Preslia 69: 361-366.

- 1 Leaf apices acute to apiculate (rarely rounded); proximal stipular sheaths not inflated; stems abundantly branched on the distal portion
 - 2 Leaves 1-3 mm or more wide, the apices apiculate or cuspidate.....*S. striata*
 - 2 Leaves 0.2-1 mm wide, the apices acute to mucronate or apiculate *S. pectinata*
- 1 Leaf apices notched, obtuse, to rounded (rarely apiculate); proximal stipular sheaths often inflated; stems sparsely branched on the distal portion
 - 3 Distal stipules with distinct ligules 2-10 mm long; summit of mid-stem stipules tight around stem and about the same width as the stems.....*S. filiformia*
 - 3 Distal stipules absent or to 2 mm long; summit of mid-stem stipules inflated at least 2 times the width of the stems.....*S. vaginata*

Stuckenia filiformis (Persoon) Boerner [thread-like]. Stems freely branching proximally, sparsely branching distally, subterete; stipular sheaths of inflated on proximal portion of stems; ligules 2-10 mm long; blades filiform to linear, 1-15 cm long, to 2 mm wide, the apices notched, blunt, or short-apiculate, with 1-3 veins; spikes 5-55 mm long. ♦We have two subspecies:

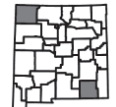


- a Plants 20-100 cm long; stipules on lower portions of the stems inflated, disintegrating in age; fruits often absent...subsp. *occidentalis* (J.W. Robbins) R.R. Haynes, Les, & M. Kral [western] [*Potamogeton marinus* Linnaeus var. *occidentalis* J.W. Robbins]. ♦Known only from an early collection from a stock tank in Doña Ana County.
- a Plants 10-30 cm long; stipules on lower portions of the stems tightly clasping or hardly inflated, persistent; fruits common...subsp. *alpina* (Blytt) R.R. Haynes, Les, & M. Kral [of high mountains] [*Potamogeton filiformis* Persoon var. *alpina* (Blytt) Ascherson & Graebner, *Potamogeton filiformis* Persoon var. *borealis* (Rafinesque) St. John, *Potamogeton filiformis* Persoon var. *macounii* Morong, *Potamogeton marinus* Linnaeus forma *alpinus* Blytt]. ♦A few scattered locales in the northern and western mountains.

Stuckenia pectinata (Linnaeus) Boerner [comb-like] [*Potamogeton pectinatum* Linnaeus]. Stems freely branched, especially distally, terete to slightly compressed; stipular sheaths not inflated; ligules about 1 mm long; blades linear, 5-10 cm long, to 1 mm wide, the apices acute to apiculate, with 1-3 veins; spikes 14-22 mm long. ♦Widespread throughout the state, but nowhere very common (perhaps because of collecting deficiency?). ♦Extremely important for waterfowl, which aid in dispersal.



Stuckenia striata (Ruiz & Pavon) Holub [striped] [*Potamogeton latifolius* (J.W. Robbins) Morong, *Potamogeton striatus* Ruiz & Pavon]. Stems branched distally, terete to 5-ridged; stipular sheaths not inflated; ligules 2-11 mm long; blades linear, 5-21 cm long, to 5 mm wide, the apices apiculate, cuspidate, or rarely rounded, with 3-5 veins; spikes 13-45 mm long. ♦Known from only a few collections in Eddy and San Juan counties. ♦Plants from New Mexico are known only in the vegetative state, without flowers or fruits (Hellquist 2013).



Stuckenia vaginata (Turczaninow) Holub [sheathed] [*Potamogeton vaginatus* Turczaninow]. Stems freely branching proximally and distally, terete; stipular sheaths inflated; ligules absent to 0.2 mm long; blades filiform to linear, 1-15 cm long, to 3 mm wide, the apices rounded to slightly notched, mostly with 1 vein; spikes 10-80 mm long. ♦Known only from high mountain ponds in the Chuska Mountains.

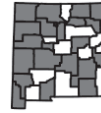


Zannichellia [for Giovanni Girolamo Zannichelli (1662-1729), Italian physician- botanist] HORNED-PONDWEED [1].

Annual herbs, without rhizomes or turions; leaves alternate, opposite or nearly whorled, often all on the same plant, submersed, sessile, sheathed basally, the stipules often producing a ligule, the blades filiform to linear, mostly with 1 vein; flowers unisexual (monoecious) and borne in small sessile, cymose, submersed clusters of 1 staminate and 1 pistillate (with 4-5 pistils); fruits drupe-like, short-stalked, the papillose endocarp visible after decay of the outer wall.

■Haynes, R.R. & C.B. Hellquist. 2000. Zannichelliaceae, p. 84-85. IN: Flora North America, vol. 22. Oxford University Press.

Zannichellia palustris Linnaeus [of marshes]. Submersed annuals, to 50 cm long; leaves nearly terete, entire, filiform, 3-5 cm long. ●Streams, lakes, ponds, and sloughs; widespread, nearly throughout the state, and expected in most unrecorded counties.



RUPPIACEAE DITCH-GRASS FAMILY [1/1/1]

Aquatic herbs, mostly annual, lacking rhizomes, mostly submerged, turions rarely present; leaves alternate or opposite, simple, submersed, narrowly linear, toothed at the apex, the base sheathing; flowers small, actinomorphic, perfect, borne in 2-flowered spikes; perianth none or greatly reduced; stamens 2; pistils 4, superior, the 4 carpels distinct, the style absent; fruit drupe-like. ♦The family has but a single genus, nearly worldwide.

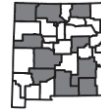
■Haynes, R.R. 2000. Ruppiaceae, p. 75-76. IN: Flora North America, vol. 22. Oxford University Press. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

Ruppia [for Heinrich Bernhard Rupprius (1688-1719), German physician and botanist] DITCH-GRASS.

Annual herbs, rooting at the lower nodes; blades 1-veined; inflorescences with fewer than 20 flowers, initially enclosed in sheathing leaf bases; fruits beaked, also long-stipitate. ♦The relationships and classification of the species is in disarray, with anywhere from 2-10 species recognized by various investigators; we follow Haynes (2000) and Ito et al. (2017) for our New Mexico plants.

■Ito, Y., T. Ohi-Toma, C. Nepi, A. Santangelo, A. Stinca, N. Tanaka, & J. Murata. 2017. Towards a better understanding of the *Ruppia maritima* complex (Ruppiaceae): Notes on the correct application and typification of the names *R. cirrhosa* and *R. spiralis*. Taxon 66(1): 167-171.

Ruppia spiralis Linnaeus ex Dumortier [in a spiral] [*Ruppia cirrhosa* of NM reports, *Ruppia maritima* of NM reports]. Stems to 50 cm long and 0.3 mm wide; leaves 3-45 cm long, the blades less than 0.5 mm wide; peduncles with 5-30 coils in fruit, 3-30 cm long; stalk of fruit 2-4 mm long. ●Lakes, rivers, and ponds with high concentrations of sulphur or calcium; widespread, but apparently less common in mountains. ♦Ito et al. (2017) has corrected the nomenclature in the *Ruppia maritima* complex, resulting in a change in the name of our plants from *Ruppia cirrhosa* to *R. spiralis*.



RUSCACEAE BUTCHER'S BROOM FAMILY [4/8/8]

[Convallariaceae, Dracaenaceae, Nolinaceae]

Plants perennial rhizomatous herbs to trees; stems glabrous or with simple hairs; leaves alternate and spiral along stem or in a basal rosette, with parallel veins, simple, entire or with marginal prickles, sometimes petiolate, stipules absent; inflorescences determinate, terminal or axillary; flowers bisexual, unisexual, or functionally unisexual; tepals (4)6, distinct or connate; stamens (4)6, filaments distinct or connate; carpels (2)3, connate; ovary superior; stigma 1; fruit a berry or capsule. ♦At one time, all of our species were placed in a large and polyphyletic Liliaceae; the woody members were then classed together in the Agavaceae and Nolinaceae, and the herbaceous members in the Convallariaceae. Monophyly of the current alignment is supported by numerous studies, and we follow Judd et al. (2016) in placing the following genera together in the Ruscaceae; other current works broaden the Asparagaceae and place this family therein (as subfamily Nolinoideae). The family takes its name from the genus *Ruscus* (butcher's broom), which has leaves reduced to scales and the flattened, leaf-like stems (phyllodes) performing the necessary photosynthesis.

■Bogler, D. 1998. Nolinaceae, pp. 392-397. IN: K. Kubitzki (ed.). The Families and Genera of Vascular Plants. Vol. III. Flowering Plants - Monocotyledons, Liliaceae (except Orchidaceae). Springer-Verlag, New York. ■Bogler, D.J. & B.B. Simpson. 1995. A chloroplast DNA study of the Agavaceae. Syst. Bot. 20(2):191-205. ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

1 Leaves in a basal rosette; plants shrubby

2 Leaf margins with curved prickles; inflorescence on a long stalk raised high above the leaves; capsules 1-locular, 1-seeded *Dasyliirion*
 2 Leaf margins entire or serrulate; inflorescence on a short or long stalk; capsules 3-locular, 3-seeded..... *Nolina*

1 Leaves alternate on stems; plants herbaceous

3 Flowers borne in the axils of the leaves on long, hanging peduncles..... *Polygonatum*
 3 Flowers borne in terminal clusters, not hanging or drooping..... *Maianthemum*

Dasyliirion [thick lily] SOTOL [2].

Plants short-stemmed to arborescent; leaves in a basal rosette, persistent, linear, elongate, with broad bases; margins with hooked prickles; inflorescences paniculate, borne on long, woody stalks; flowers unisexual or functionally unisexual; tepals 6, distinct; fruit a 1-loculed, 1-seeded, 3-winged capsule. ♦About 17 species of the southwestern United States and Mexico.

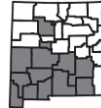
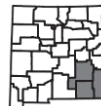
■Bogler, D.J. 1995. Systematics of *Dasyliirion*: Taxonomy and molecular phylogeny. Bol. Soc. Bot. Mexico. 56:69-76. ■Bogler, D.J. 2002. *Dasyliirion*, pp. 422-423. IN: Flora of North America, vol. 26. Oxford University Press, New York.

[Key adapted from Bogler 2002]

1 Leaves bright green, not waxy or glaucous, smooth and shiny; marginal prickles pointed mostly toward the base, some otherwise..... *D. leiophyllum*
 1 Leaves whitish or bluish green, waxy-glaucous, papillose and dull; marginal prickles pointed toward the apex..... *D. wheeleri*

Dasyliirion leiophyllum Engelmans ex Trelease [with smooth leaves]. Leaf blades bright green, smooth, glabrous, shiny, not waxy or glaucous; fascicles of flowers 8-12 cm long from base to tip; distal wing lobes of fruiting capsules 1.5-2 mm. ●Gravelly slopes, bajadas, and canyons in the southeastern plains and foothills.

Dasyliirion wheeleri S. Watson ex Rothrock [for George Montague Wheeler 1842-1905], pioneer surveyor of the western U.S.]. Leaf blades whitish or bluish green, waxy-glaucous, papillose, and dull; fascicles of flowers 10-20 cm long from base to tip; distal wing lobes of fruiting capsules 2-2.5 mm. ●Rocky slopes, bajadas, and canyons from the central to the southern desert plains and foothills. ♦*Dasyliirion* is used in distilling a mezcal-like alcoholic beverage, "sotol". Plants of this species are widely used in landscaping, and are often called DESERT SPOON. §



Maianthemum [May-flower] FALSE SOLOMON'S-SEAL [2].

Plants herbaceous; rhizomes creeping, spreading and filiform or cylindrical and fleshy; stems simple, zig-zag; leaves alternate, lanceolate to ovate, sessile, clasping, or short-petiolate; inflorescences terminal, paniculate or racemose; tepals distinct; tepals and stamens 6 (sometimes 4 in species outside our area); fruit a greenish or reddish berry. ♦About 40 species of temperate regions of North America, Europe, and Asia, including the former genus *Smilacina*.

■Cronquist, a. 1977. *Smilacina*, pp 482-484. IN: Intermountain Flora, Vol.6 (Monocotyledons). New York Botanical Garden. ■Galway, D.H. 1945. The North American species of *Smilacina*. Amer. Midl. Naturalist 33:644-666. ■Kim, C., K.M. Cameron, & J.-H. Kim. 2017. Molecular systematics and historical biogeography of *Maianthemum* s.s. Amer. J. Bot. 104(6): 939-952. ■LaFrankie, J.V., Jr. 1986. Transfer of the species of *Smilacina* to *Maianthemum* (Liliaceae). Taxon 35:584-589. ■LaFrankie, J.V., 2002. *Maianthemum*, pp. 206-210. IN: Flora of North America, vol. 26. Oxford University Press, New York.

- 1 Lowermost pedicels 1-2 mm long; tepals 1-2 mm long; berry 4-5 mm in diameter..... ***M. racemosum***
- 1 Lowermost pedicels 4-5 mm long or more; tepals mostly 5-7 mm long; berry 8-9 mm in diameter..... ***M. stellatum***

Maianthemum racemosum (Linnaeus) Link [with flowers in a raceme]. Rhizomes 8-14 mm in diameter; stems erect; leaves elliptic to ovate, sessile and clasping, 9-17 cm long, 5-8 cm wide; flowers numerous, on pedicels 1-2 mm long; stamens mostly longer than the tepals; berry 8-9 mm in diameter. ●Shaded woodlands and forests; widespread in the mountains. ♦Our plants belong to subsp. ***amplexicaule*** (Nuttall) LaFrankie [clasping the stem] [*Maianthemum racemosum* (Linnaeus) Link var. *amplexicaule* (Nuttall) Dorn, *Smilacina amplexicaulis* Nuttall, *Smilacina racemosa* (Linnaeus) Desfontaines var. *amplexicaulis* (Nuttall) S. Watson, *Vagnera amplexicaulis* (Nuttall) Greene]; subsp. ***racemosum*** occurs in the eastern half of the United States. In spite of the specific epithet, inflorescences are usually paniculate, and only rarely racemose. Plants are vegetatively very similar to *Streptopus amplexifolius* (Liliaceae), which has usually smaller leaves and 1-2 white to greenish axillary flowers hanging below the leaves. §



Maianthemum stellatum (Linnaeus) Link [star-like] [*Convallaria stellata* Linnaeus, *Smilacina stellata* (Linnaeus) Desfontaines, *Vagnera stellata* (Linnaeus) Morong]. Rhizomes 1-4.5 mm in diameter; stems erect; leaves ovate-elliptic to lanceolate, sessile and clasping, 5-6 cm long, 2.5-3.5 cm wide; flowers few on pedicels 5-15 mm long; stamens mostly shorter than the tepals; berry 4-5 mm in diameter. ●Riparian areas, meadows, shaded forest slopes; widespread in mountain areas. §



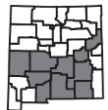
Nolina [for Abbé C.P. Nolin (1717-1795), French arboriculturist] BEARGRASS [3].

Plants perennial, acaulescent to short-caulescent; leaves numerous, forming rosettes; blades elongate, linear, not rigid, usually much broadened at the base, margins entire to serrate; inflorescence a compound racemose panicle; flowers numerous, small, perfect or imperfect; fruit a 3-winged capsule. ♦Despite persistent attempts to distinguish the species based on degree of toothiness of the leaves, this remains an elusive and confusing feature, with inconsistent occurrences in *Nolina microcarpa* and *N. texana*, and this feature is ignored herein. Leaves are commonly gathered for weaving and thatching.

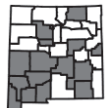
■Hess, W.J. 2002. *Nolina*, pp. 415-421. IN: Flora of North America, vol. 26. Oxford University Press, New York.

- 1 Bracts of the inflorescence deciduous, rarely persistent; inflorescence much exceeding the leaves..... ***N. microcarpa***
- 1 Bracts of the inflorescence persistent; inflorescence not or only partly exceeding the leaves
 - 2 Inflorescence conspicuously tinged purple, diffuse, the main rachis and divisions slender and flexible; fruiting pedicels jointed near the middle, not noticeably dilated..... ***N. micrantha***
 - 2 Inflorescence not purplish, or only rarely so, dense, the main rachis and divisions thick and rigid; fruiting pedicels jointed near the base, noticeably dilated..... ***N. texana***

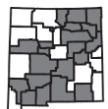
Nolina micrantha I.M. Johnston [small-flowered]. Plants acaulescent; leaves 3-7 mm wide; inflorescence at least partly within the leaves, tinged with purple, main rachis and divisions slender and flexible, bracts persistent; fruiting pedicels 2-4 mm long, jointed near the middle, not noticeably dilated distally; capsules firm-walled, inflated. ●Southern grasslands and plains, limestone or sandy hills.



Nolina microcarpa S. Watson [small-fruited]. Plants acaulescent; leaves 6-12 mm wide; inflorescence much exceeding the leaves, main rachis and divisions straight and stout, bracts deciduous; tepals white; fruiting pedicels 4-6 mm long, jointed well below the middle; capsules thin-walled, inflated. ●Rocky hillsides, desert grasslands and woodlands; mostly southern, but a few populations north and east. §



Nolina texana S. Watson [of Texas] [*Nolina greenei* S.Watson]. Plants acaulescent; leaves 2-6(-10) mm wide; inflorescence not exceeding the leaves, main rachis and divisions thick and rigid, bracts persistent; tepals white to yellow-green; fruiting pedicels 4-7 mm long, jointed near the base, noticeably dilated distally; capsules thin-walled, inflated. ●Rocky hillsides, open woodlands, and plains; scattered, through much of the state. §

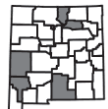


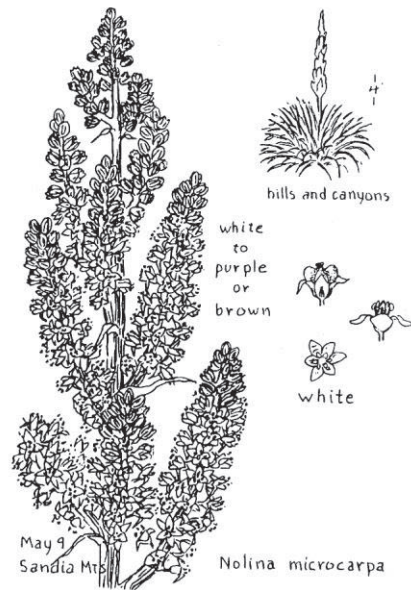
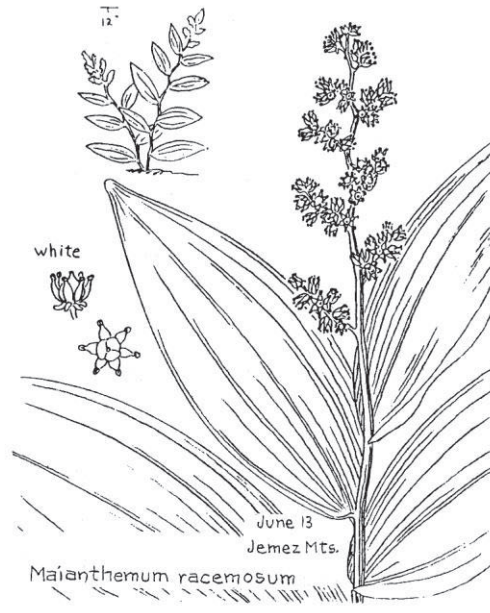
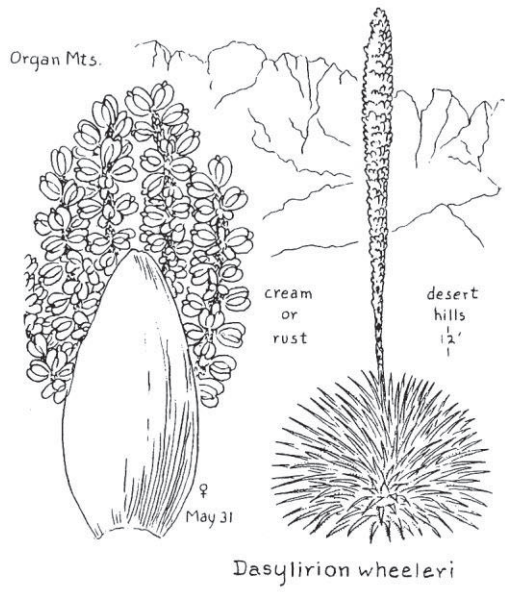
Polygonatum [resembling the genus *Polygonum* (Polygonaceae)] SOLOMON'S-SEAL [1].

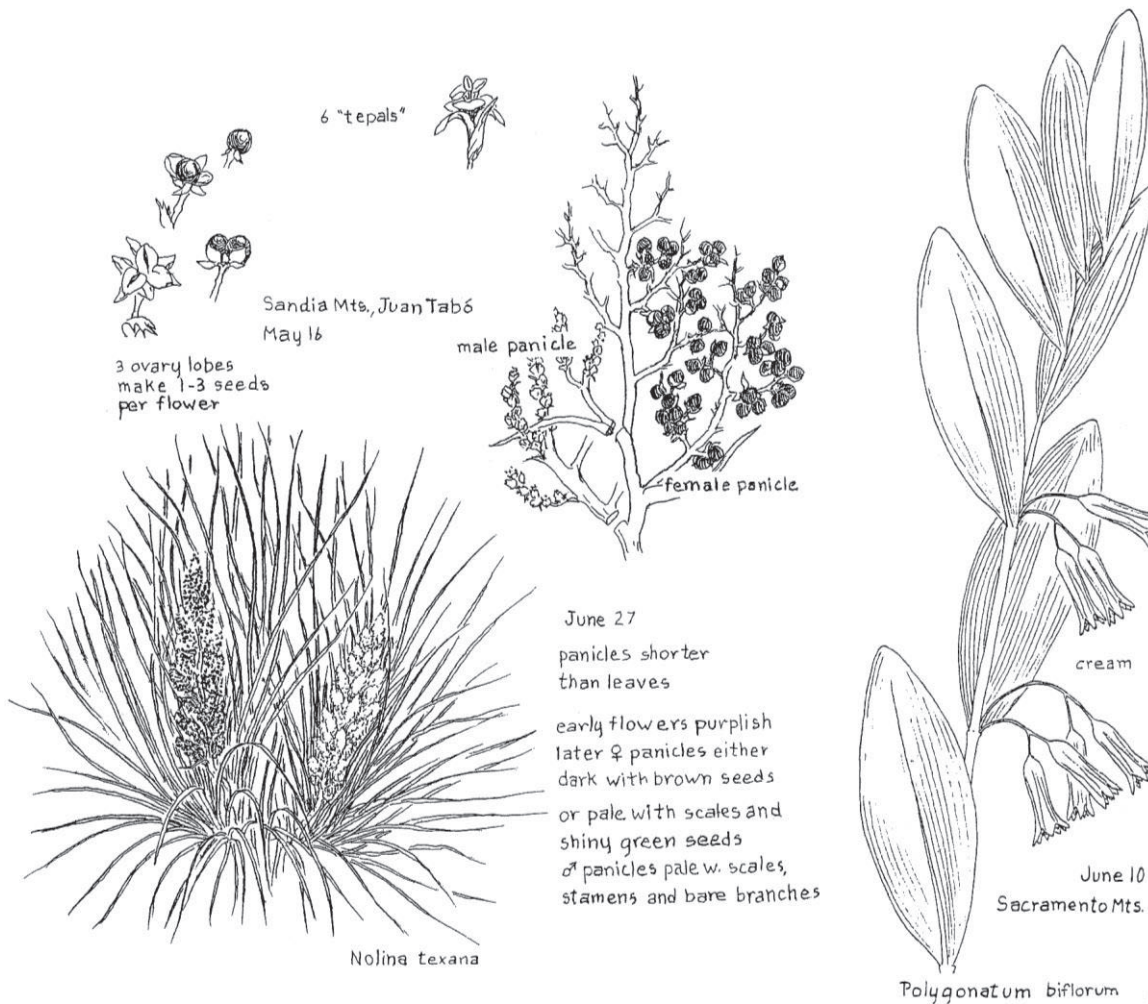
Plants perennial from knotty, creeping rhizomes; stems simple, leafy, erect or arching; leaves simple, alternate, short-petiolate, sessile or clasping, ovate, lanceolate, or elliptic, margins entire; flowers nodding, pendulous, on peduncles from leaf axils; tepals connate into a cylindrical tube with free tips; fruit a blue or black berry. ♦About 60-70 species, mostly Asian. The common name supposedly comes from a fanciful resemblance of cross-sections of the rhizome (seen when broken at the nodes) to King Solomon's royal seal.

■Ownbey, R.P. 1944. The liliaceous genus *Polygonatum* in North America. Ann. Missouri Bot. Gard. 31:373-413. ■Utech, F.H. 2002. *Polygonatum*, pp. 210-212. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Polygonatum biflorum (Walter) Elliott [two-flowered] [*Convallaria biflorum* Walter, *Polygonatum biflorum* (Walter) Elliott var. *commutatum* (J.A. & J.H. Schultes) Morong, *Polygonatum cobrense* (Wootton & Standley) Gates, *Polygonatum commutatum* (Roemer & Schultes) Dietrich, *Salomonias cobrensis* Wootton & Standley]. Leaves lanceolate to broadly elliptic, 10-20 cm long, 4-9 cm wide, sessile to clasping, glabrous; inflorescences in most leaf axils, peduncles deflexed, (1)2-4(-10) flowered; flowers whitish or yellowish-green, on pedicels much shorter than peduncles; berries 8-12 mm in diameter. ●Infrequent in mountain forests and moist canyons. §







THEMIDACEAE BRODIAEA FAMILY [4/4/4]

Scapose perennial herbs from a fibrous corm, lacking an onion-like odor; leaves all basal, simple, linear, with parallel venation and sheathing bases; flowers bisexual, actinomorphic, arranged in a terminal scapose umbel; perianth of 6 similar sepals and petals; stamens 6 or 3 alternating with 3 staminodes, inserted on tepals; pistil single, superior, of 3 carpels, the style single; fruit a capsule. ♦The family was traditionally placed in a large and polyphyletic Liliaceae; current studies recognize it as a subfamily of an enlarged Asparagaceae, or as herein, a separate family (Fay & Chase 1996; Judd 2016).

■Fay, M.F. & M.W. Chase. 1996. Resurrection of Themidaceae for the *Brodiaea* alliance, and recircumscription of Alliaceae, Amaryllidaceae, and Agapanthoideae. *Taxon* 45(3):441-451.
 ■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp.

- 1 Tepals free at the base, not forming a perianth tube..... **Muilla**
- 1 Tepals united at least basally and forming a perianth tube
 - 2 Flowers single on the scape, white, with a very long floral tube **Milla**
 - 2 Flowers borne in clusters of at least 3-4, variously colored, the floral tube not much longer than the lobes
 - 3 Flowers bluish to purplish; plants 30-60 cm tall; capsules 4-6 mm long **Dipterostmon**
 - 3 Flowers whitish to greenish with purple veins; plants 10-30 cm tall; capsules 10-15 mm long **Androstephium**

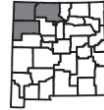
Androstephium [male crown] FUNNEL-LILY [1].

Perennial, scapose herbs from corms; leaves basal, the blades linear and channeled; scapes solitary, terete; inflorescences umbellate, 2-12-flowered, subtended by 3 bracts; perianth connate basally into a funnellform floral tube less than ½ the total length; tepals 6, petaloid; stamens 6, epipetalous, the filaments connate with apical appendages forming a crown; fruit a capsule, subglobose, with

numerous black seeds. ♦Only 3 species of western United States and northern Mexico.

■Pires, J.C. & J.L. Reveal. 2002. *Androstegium*, pp. 333. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Androstegium breviflorum S. Watson [short-flowered]. Leaves 10-30 cm long, 1-2 mm wide; scapes 10-35 cm long, scabrous proximally; perianth white to light purplish-violet, 1.5-2 cm long, the lobes longer than the tube; capsules 1-1.5 cm long. ♦Dry, rocky to sandy, deserty ground in the Four Corners region. §

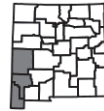


Dipterostemon [stamens 2-winged] BLUEDICKS [1].

Perennial, scapose herbs from corms; leaves basal, the blades usually keeled and channeled; scapes solitary, weak, terete; inflorescences umbellate or racemose, 2-15-flowered, subtended by 2-4 bracts; flowers cylindrical to campanulate; tepals petaloid, connate basally into a tube, this not narrowed above the ovary; stamens 6, with 3 small and 3 large, the outer filaments winged or dilated basally; fruit a capsule, ovoid, with numerous black seeds. ♦A monotypic genus of a single species of western United States and northern Mexico (Preston 2017). Closely related to *Brodiaea* or *Dichelostemma*, and sometimes included there.

■Pires, J.C. 2002. *Dichelostemma*, pp. 328-331. IN: Flora of North America, vol. 26. Oxford University Press, New York. ■Preston, R.E. 2017. New nomenclatural combinations for blue dicks (*Dipterostemon capitatus*); Asparagaceae: Brodiaeoideae. Phytoneuron 2017-15: 1-11. ■Ry, B. 1996. Development of ovule, embryo sac, and endosperm in *Dipterostemon* and *Dichelostemma* (Alliaceae) relative to taxonomy. Amer. J. Bot. 83(6):790-801.

Dipterostemon capitatus (Bentham) Rydberg [head-like]. Leaves 2-3 in number, 10-70 cm long, the blades scarcely keeled; umbels dense, 2-5-flowered; flowers purplish, bluish, pinkish, or white; perianth not constricted above the ovary, the tube 3-12 mm long, the lobes 7-12 mm long; stamens 6, the 3 smaller one on the outer tepals. ♦Arid regions in the southwestern plains and foothills. ♦Our plants belong to subsp. *pauciflorus* (Torrey) R.E. Preston [few-flowered] [*Brodiaea capitata* Bentham var. *pauciflora* Torrey, *Dichelostemma capitatum* (Bentham) Wood, *Dichelostemma pauciflorum* (Torrey) Standley, *Dichelostemma pulchellum* (Salisbury) Heller var. *pauciflorum* (Torrey) Hoover, *Dipterostemon pauciflorus* (Torrey) Rydberg], with pale bracts, few flowers, and long pedicels. This species is occasionally confused with *Dichelostemma congestum* (Smith) Kunth, but that species has only 3 equal stamens and occurs on the West Coast, as does subsp. *capitatum*. §

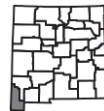


Milla [for Juliani Milla, 18th century Spanish gardener] MEXICAN-STAR [1].

Perennial, scapose herbs from solitary corms; leaves basal; blades linear, channeled to terete; scapes terete; inflorescences an umbel-like cluster, 1-many-flowered, subtended by 4 triangular bracts; flowers appearing unequally pedicellate, salverform; tepals petaloid, connate into a long floral tube that is adnate to a stipe, white with a strong abaxial midvein; ovary long-stipitate; fruit a capsule, beaked, with numerous black seeds. ♦A small genus of 6-10 species, North to Central America.

■McNeal, D.W., Jr. 2002. *Milla*, pp. 346-347. IN: Flora of North America, vol. 26. Oxford University Press, New York.

Milla biflora Cavanilles [2-flowered]. Corms 1-2 cm long, the coat minutely striate and splitting into strips; leaves to 1 mm wide, ½ to equaling the scapes; scapes 5-50 cm long; inflorescences with 1-9 flowers; tepals 1.5-2.5 cm long, white with green abaxial stripe; capsules ovoid, 1-2 cm long, the beak 1-3 mm long. ♦Dry volcanic hillsides and ridges in the bootheel. §

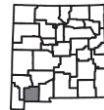


Muilla [an anagram of *Allium* spelled backwards] MUILLA [1].

Perennial herbs, scapose, from fibrous-coated corms; leaves 1-10 per plant, basal, the blades linear and flat; scapes 1-2, the inflorescence terminal, umbellate, bracteate; tepals 6, petaloid, not connate into a tube, whitish to bluish; stamens 6, the filaments filiform to conspicuously dilated; ovary superior, with a single style; fruit a capsule, globose. ♦Species 3, of western North America; not to be confused with *Milla*.

■Shevock, J.R. 1984. Redescription and distribution of *Muilla coronata* (Liliaceae). Aliso 10: 621-627.

Muilla coronata Greene [crowned]. Plants 3-8 cm tall (above ground), the corms 1-2 cm diam; leaves 1 (rarely 2), 7-18 cm long, to 1 mm wide; scapes 3-5 cm long, with 2-10 flowers; tepals whitish or rarely bluish, the midvein greenish, slightly united basally to about 0.5 mm, but not forming a perianth tube, the lobes 3-6 mm long; filaments conspicuously dilated their entire length, the margins overlapping with the adjacent filament to form a crown but not connate, the anthers yellow; capsules globose, 3-angled, 3-7 mm diam; flowering spring. ♦Loose sandy ground of the Chihuahuan Desert, among *Prosopis* coppice dunes; known from a single population in Luna County; otherwise Mojave Desert of southern California and Nevada.



TYPHACEAE CATTAIL FAMILY [2/7/7]

[Sparganiaceae]

Perennial, rhizomatous, aquatic or semi-aquatic herbs, sometimes forming dense colonies in marshy ground; leaves alternate, 2-ranked, simple, linear, entire, sheathing at the base, floating or emergent, with parallel venation, often spongy with air canals and partitions containing stellate cells; stipules lacking; inflorescence of densely clustered flowers in spikes or globose heads, often subtended by linear bract; flowers unisexual (monoecious), actinomorphic the staminate above the pistillate in the spike, or staminate heads above pistillate heads; tepals 1-6, not petaloid; stamens 1-8, the filaments distinct or connate; ovary superior; fruit a drupe or achene. ♦A small family of 2 genera and about 30 species, throughout the world (especially Northern Hemisphere) in aquatic and wetland habitats. Evidence from morphology and molecular phylogenetics strongly supports the merger of Typhaceae and Sparganiaceae, with little justification for their segregation other than tradition. The starchy rhizomes and young staminate inflorescences are edible.

■Judd, W.S., C.S. Campbell, E.A. Kellogg, P.F. Stevens, & M.J. Donoghue. 2016. Plant Systematics: A Phylogenetic Approach, 4th ed. Sinauer Associates, Inc., Sunderland, Massachusetts. 677 pp. ■Kaul, R.B. 2000. Sparganiaceae, p. 270-277. IN: Flora North America, vol. 2. Oxford Univ. Press. ■Smith, S.G. 2000. Typhaceae, p.278-285. IN: Flora North America, vol. 22. Oxford University Press.

1 Flowers in dense globose heads usually separated by naked internode segments.....*Sparganium*
 1 Flowers in dense continuous spikes, the distal staminate portion contiguous or separated from the proximal pistillate portion ... *Typha*

Sparganium [a ribbon] BUR-REED [4].

Erect or floating herbs; leaves basal and cauline, plano-convex to V-shaped in cross-section, spongy, the margins entire; inflorescences terminal, emergent or floating, mostly not exceeding the basal leaves, of unisexual globose heads on an often zig-zag rachis, the smaller staminate heads distal, deciduous, the rachis persistent, the larger pistillate heads proximal, becoming bur-like because of the beaked fruits; tepals 3-6, distinct, translucent to opaque; fruits achene-like drupes, beaked. ♦About 14 species, mostly north-temperate, providing important food and habitat for waterfowl.

■McGrath, J. 2000. Notes on *Sparganium emersum* and *S. angustifolium*. The New Mexico Botanist 15:5.

1 Leaves and inflorescences usually floating

- 2 Staminate heads single; pistillate heads 8-12 mm diam *S. natans*
- 2 Staminate heads usually more than 1; pistillate heads 10-40 mm diam
 - 3 Leaves mostly 5-18 mm wide; staminate heads not contiguous; fruit beaks 2-5 mm long; leaves keeled toward the base..... *S. emersum*
 - 3 Leaves mostly 2-5 mm wide; staminate heads nearly contiguous, often appearing as a single elongate head; fruit beaks 1-2 mm long; leaves keeled..... *S. angustifolium*

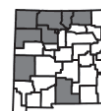
1 Leaves and inflorescences emergent, stiff and out of the water

- 4 Inflorescences unbranched; stigmas 1 in all of the pistillate flowers; fruits fusiform and tapering at the apices, tightly constricted below the equator..... *S. emersum*
- 4 Inflorescences usually branched; stigmas 2 in most or all of the pistillate flowers; fruits obpyramidal and truncate to rounded at the apices, not constricted..... *S. eurycarpum*

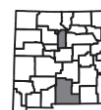
Sparganium angustifolium Michaux [narrow-leaved] [*Sparganium multipedunculatum* (Morong) Rydberg]. Plants slender, 2 m or more long; leaves and inflorescences usually floating; leaves limp, flat to plano-convex, mostly 20-80 cm long, but as long as 200 cm, 2-15(10) cm wide; inflorescences unbranched, the pistillate heads 1-3 cm diam; staminate heads 1-4 in number, contiguous to each other, but not with the pistillate heads; stigmas 1; fruit bodies 3-7 mm long, the beaks 1-2 mm long. •Shallow oligotrophic waters of ponds, streams, and ditches, mostly in the northern mountains.



Sparganium emersum Rehmman [emerging]. Plants robust to slender, to 2 m tall; leaves and inflorescences stiff and emergent, or some of the leaves limp and floating; stiff erect leaves to 80 cm long, 4-10 mm wide; limp floating leaves to 2 m long, 4-10 mm wide; inflorescences unbranched, the pistillate heads 1-4 cm diam; staminate heads 3-10 in number; stigmas 1; fruit bodies 3-4 mm long, about 1/2 as wide, the beaks 2-5 mm long. •Quiet eutrophic waters, mountains and foothills. §



Sparganium eurycarpum Engelmann ex Gray [with broad fruits]. Plants robust, to 2.5 m tall, the leaves and inflorescences emergent; leaves erect, keeled, distally flattened, 6-20 mm wide; inflorescences usually branched, the pistillate heads 1-5 cm diam; staminate heads 10-40 or more in number; stigmas usually 2; fruit bodies 5-10 mm long and nearly as wide, the beaks 2-4 mm long. •Quiet waters of ponds and marshes; known from only a few collection sites from Otero and Santa Fe counties.



Sparganium natans Linnaeus [floating] [*Sparganium minimum* of authors]. Plants slender, to 60 cm long, the leaves and inflorescences floating, or suberect when stranded; leaves limp, not keeled, to 80 cm long, 1-5 mm wide; inflorescences unbranched, the pistillate heads 8-12 mm diam; staminate heads single, terminal; stigmas 1; fruit bodies ellipsoid to obovoid, 2-4 mm long, the beaks 0.5-1.5 mm long. •Quiet waters of ponds, ditches, and wetlands; known in New Mexico from only a few collections in the Chuska Mountains.



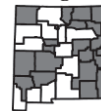
Typha [marsh] CATTAIL [3].

Floating to emergent perennial herbs, with starchy rhizomes; shoots to 4 m tall; leaves persistent, the sheaths open and overlapping, the blades loosely twisted, flattened; inflorescences terminal, equaled or exceeded by the leaves, cylindric, dense and spike-like, the staminate flowers distal and often separated from the proximal pistillate flowers; flowers unisexual (monoecious), densely beset with hairs; fruit an achene or follicle. ♦About 10-12 or more species nearly worldwide. All our species are known to hybridize among themselves, and intergradation among them is to be expected.

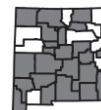
■Hotchkiss, N. 1949. Taxonomy and distribution of North American cat-tails. Amer. Midl. Natur. 41:237-254. ■Spellenberg, R., R. Worthington, P. Knight, & R. Fletcher. 1986. Additions to the flora of New Mexico [*Typha domingensis*]. Sida 11(4):455-470.

- 1 Staminate and pistillate portions of the inflorescence contiguous; leaves flat on the back..... *T. latifolia*
- 1 Staminate and pistillate portions of the inflorescence separated by a naked interval; leaves commonly convex on the back
 - 2 Mucilage glands absent from the upper (adaxial) surface of the blade and generally from the central part of the sheath near the summit; summit of sheath with membranous auricles (disintegrating late in season)..... *T. angustifolia*
 - 2 Mucilage glands present on the upper (adaxial) surface of the sheath and adjacent 1-10 cm of the blade; summit of sheath tapering to the blade and generally without auricles (but sometimes with auricles)..... *T. domingensis*

**Typha angustifolia* Linnaeus [narrow-leaves]. Plants 1.5-3 m tall; sheaths with apical auricles, the transition from sheath to blade marked with brown mucilage glands; widest blades 4-12 mm when fresh, 3-8 mm when dry; staminate and pistillate portions of the spike usually separated by 1-12 cm, the pistillate portion 13-22 mm wide in fruit. •Widespread in wet ground, perhaps more common in the eastern half of the state. §

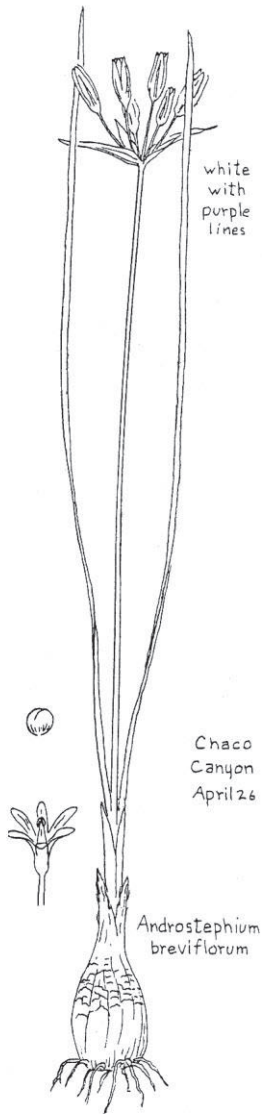


Typha domingensis Persoon [from Santo Domingo]. Plants 1.5-4 m tall; sheaths with or without apical auricles, the transition from sheath to blade marked with orange-brown mucilage glands; widest blades 6-18 mm wide when fresh, 5-15 mm when dry; staminate and pistillate portions of the spike usually separated from each other by 1-8 cm, the pistillate portion 15-25 mm wide in fruit. •Widespread in wet ground.



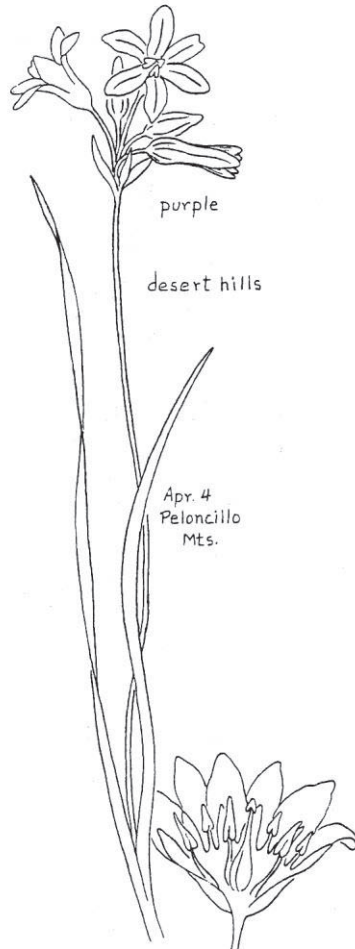
Typha latifolia Linnaeus [broad-leaved]. Plants 1.5-3 m tall; sheaths with apical auricles or not, the transition from sheath to blade colorless and obscure; widest blades 1-3 cm wide when fresh, 5-20 mm when dry; staminate and pistillate portions of the spike usually contiguous to each other, or sometimes separated 1-4 cm, the pistillate portion 2.5-3.5 cm thick in fruit. •Widespread in wet ground. §





Chaco Canyon
April 26

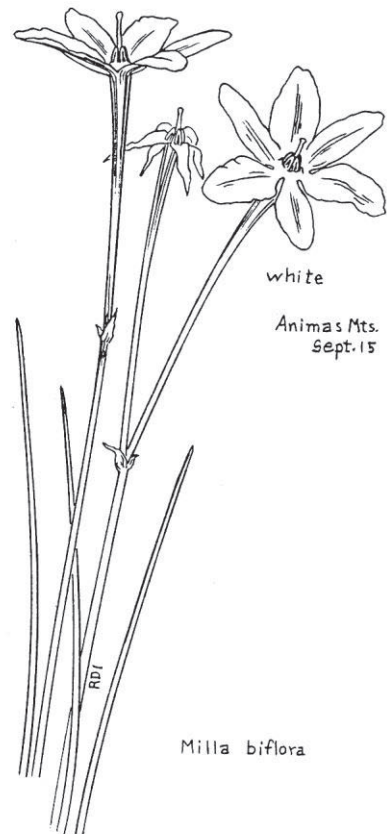
Androstephium breviflorum



purple
desert hills

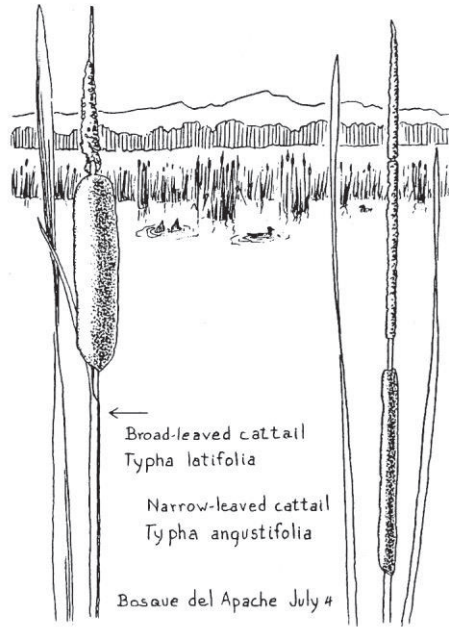
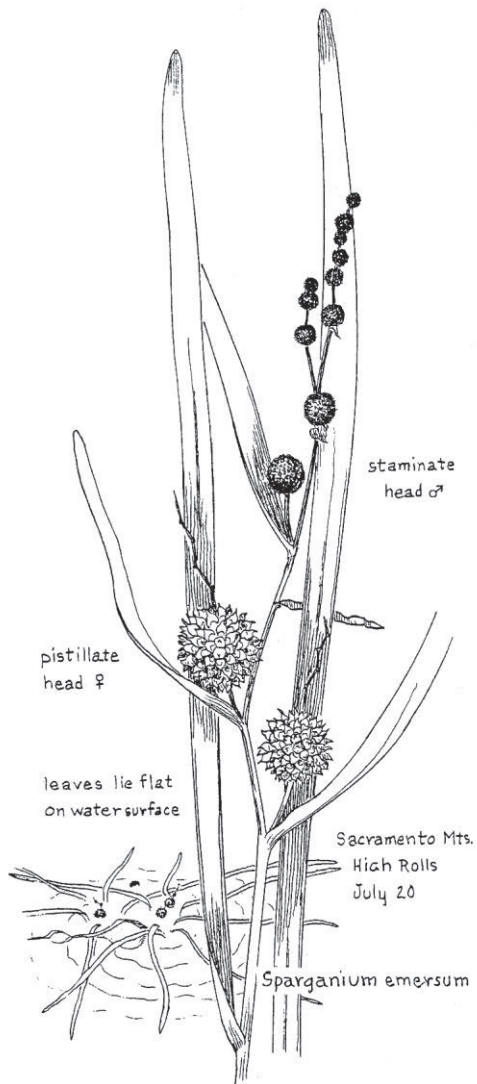
Apr. 4
Peloncillo Mts.

Dipterostemon capitatus



white
Animas Mts.
Sept. 15

Milla biflora



REFERENCE MATERIAL

Glossary

[modified from Wikipedia, "Glossary of botanical terms," http://en.wikipedia.org/wiki/Glossary_of_botanical_terms, accessed 6 April 2012]

A

abaxial: the side away from the axis, for instance the lower surface of a leaf.
accrescent: increasing in size with age, such as a calyx that continues to grow after the corolla has fallen, for example in *Physalis peruviana*.
-aceae: the suffix added to the stem of a generic name to form the name of a family.
achene: a dry 1-seeded indehiscent fruit
acicular: slender or needle-shaped. See Leaf shape.
actinomorphic: radially symmetrical; may be bisected into similar halves in at least two planes. Generally applies to flowers in which the perianth segments within each whorl are alike in size and shape; compare zygomorphic.
aculeate: armed with prickles; e.g. the stem of a rose.
acuminate: tapering gradually to a point.
acute: sharply pointed; converging edges making an angle of less than 90°; compare obtuse.
adaxial: the side next to the axis; e.g. the upper surface of a leaf.
adnate: fused to an organ of a different kind; e.g. a stamen fused to a petal; compare connate.
adventitious: a structure produced in an abnormal position; e.g. an adventitious bud produced from a stem rather than from the axil of a leaf.
adventive: introduced accidentally (usually referring to weeds).
alternate: (as adjective) leaves or flowers borne singly at different levels along a stem; compare opposite and whorled.
amplexicaul: with the base dilated and clasping the stem, usually of leaves.
androecium: male parts of flower; the stamens of a flower collectively; compare gynoecium.
androgynous: with male and female flowers in the same inflorescence.
angiosperms: 'flowering plants'; plants with developing seeds enclosed in an ovary.
annual: a plant that completes its life cycle and dies within one year.
anther: pollen-bearing part of the stamen.
anthesis: time of flowering; the stage at which the pollen is released from the anthers inside the bud, usually corresponding with flower opening.
antrorse: directed towards or upwards, e.g. of hairs on a stem; compare retrorse.
apetalous: without petals.
apex (plural **apices**, adj. **apical**): the tip; the point furthest from the point of attachment.
apiculate: terminating in a short sharp flexible point; less abrupt than mucronate.
apomixis: reproduction, where viable seed or spores are produced without fertilization. A plant produced in this way is an apomict.
appressed: pressed closely, but not fused; e.g. leaves against a stem.
aquatic: plants whose natural habitat is water: living in or on water for all or a substantial part of the organism's life span, generally restricted to fresh or inland waters.
arborescent: tree-like in growth or general appearance.
areole: (from areola) in cacti, the region of a cactus bearing the flowers and/or spines.
aristate: with a stiff, bristle-like awn or tip.
articulate: jointed; separating freely, leaving a clean scar; for example the fronds of certain ferns where they join the rhizome.
ascending: spreading horizontally, then becoming erect.
asexual: of reproduction that does not involve the gametes; i.e. vegetative reproduction.
attenuate: narrowing gradually.
auricle (adjective auriculate): ear-shaped lobe; in grasses, found a junction of sheath and blade.
awn: fine bristle-like appendage; e.g. terminating or on the back of glumes and/or lemmas of some grass spikelets.
axil: the upper angle between one part of a plant and another; e.g. the stem and a leaf.
axillary: borne in or arising from the axil of a leaf.
axis: a line passing through the center of something; it usually refers to the main stem of a whole plant or inflorescence.

B

bark: the protective external layer of tissue on the stems and roots of trees and shrubs; includes all of the living and non-living tissue external to the cambium.
basal: at the base, situated or attached at the base.
basifixed: something attached by its base; e.g. an anther attached to the filament.
beak: a pointed projection.
berry: a fleshy indehiscent fruit, with the seeds immersed in the pulp, for instance tomato.
biennial: plant which completes its life cycle and dies within the second year; usually also forms a basal rosette of leaves the first year and flowers and fruits the second year.
bifid: forked; cut in two for about half its length.
bilabiate: having two lips; e.g. the form of the petals in many irregular flowers.
bilateral: two-sided, arranged on opposite sides; e.g. leaves on a stem.
binomial: making use of names consisting of two words to form the scientific name (or combination) in a Latin form. For example, where the first is the name of the genus to which the species belongs, and the second is the epithet given to that species to distinguish it from others in the same genus.
bipinnate: twice pinnate; for example of a compound leaf with individual leaflets pinnately divided.
bipinnatisect: a pinnatisect leaf with deeply dissected segments.
bisexual: bearing both male and female reproductive organs; usually, flowers with both stamens and carpels; hermaphrodite.
blade: the lamina or flattened part of a leaf, excluding the stalk.
bloom (noun): a fine white or bluish waxy powder occurring on plant parts, usually stems, leaves and fruits. It is easily removed by rubbing.
bract: a modified leaf associated with flower or inflorescence, differing in shape, size or color from other leaves (and without an axillary bud).

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bracteole: small bracts borne singly or in pairs on the pedicel or calyx.

branchlet: a small branch.

bulb: thick storage organ, usually underground, consisting of a stem and leaf bases (the inner ones fleshy).

C

caducous: falling off early; compare persistent.

caespitose: tufted; e.g. the growth form of some grasses; also caespitose.

calyx (plural calyces): the outer whorl of a flower, usually green; the sepals of one flower collectively.

calyx tube: a tube formed by the fusion of the sepals (calyx), at least at the base.

campanulate: bell-shaped.

canaliculate: channeled; with a longitudinal groove.

canopy: the branches and foliage of a tree; crown.

capitate: with a knob-like head; of an inflorescence, with the flowers unstalked and aggregated into a dense cluster; of a stigma, like the head of a pin.

capitulum: a dense cluster of sessile, or almost sessile, flowers or florets; a sunflower head.

capsule: a dry fruit formed from two or more united carpels and dehiscent when ripe (usually by splitting into pieces or opening at summit by teeth or pores).

carinate: keeled.

carpel: a female organ borne at the center of a flower, consisting of an ovary, a style and a stigma. The gynoecium is the collective term for all the carpels of a single flower.

cartilaginous: hard and tough; gristly.

caryopsis: a dry, indehiscent, one-seeded fruit in which the seed coat is closely fused to the fruit wall, as in most grasses.

catkin: a spike, usually pendulous, in which the mostly small flowers are unisexual and without a conspicuous perianth; e.g. willows, poplars, oaks.

The individual flowers often have scaly bracts; they are generally wind-pollinated. The catkins are usually shed as a unit.

caudate: having a narrow tail-like appendage.

cauline: borne on an aerial stem, e.g. leaves, flower or fruits.

centrifixed: of a two-branched organ attached by its center, e.g. a hair, or anther.

caespitose: tufted; e.g. the growth form of some grasses; also caespitose.

chartaceous: with a papery texture.

chasmogamous: of flowers that are pollinated when the perianth is open; compare cleistogamous.

ciliate: generally, having hairs more or less confined to the margins of an organ, like eye-lashes.

circinate (circinnate): spirally coiled with the tip innermost; e.g. the developing fronds of most ferns.

class: the principal category for taxa in a rank between division and order.

clavate: club-shaped.

claw: narrow, stalk-like basal portion of petal.

cleistogamous: of flowers that self-pollinate and never open fully, or self-pollinate before opening; compare chasmogamous.

climber: a plant growing more or less erect by leaning or twining on another structure for support.

coalescent: plant parts fused or grown together to form a single unit.

coherent: (of like parts) sticking together, but not firmly or solidly as in connate.

columnar: shaped like a column.

commissure: the seam or face by which two carpels adhere.

compound: composed of several parts, for instance a leaf with leaflets, a gynoecium with several carpels, or an inflorescence made up of smaller inflorescences.

compressed: flattened lengthwise, either laterally (from side to side) or dorsally (from front to back).

concolorous: the same color throughout.

connate: fused to another organ (or organs) of the same kind; e.g. petals in a floral tube; compare adnate.

connective: the part of an anther that connects the anther cells.

conspecific: belonging to the same species.

contorted: twisted out of the normal shape.

convolute: referring to the arrangement of floral or foliar organs in a bud when each organ or segment has one edge overlapping the adjacent organ or segment.

cordate: heart-shaped, with the notch lowermost; of the base of a leaf, like the notched part of a heart.

coriaceous: leathery; stiff and tough, but somewhat flexible.

corn: fleshy, swollen stem base, usually underground, storing food reserves, with buds naked or covered by very thin scales; a type of rootstock.

corolla: collective term for the petals of a flower.

corona: literally, crown; (1) in flowering plants, ring of tissue arising from the corolla or perianth of a flower and standing between the perianth lobes and the stamens; e.g. the daffodil trumpet.

corymb (adjective corymbose): inflorescence with branches arising at different points but reaching about the same height, giving the flower cluster a flat-topped appearance.

costa (adjective costate): a rib.

cotyledon: primary leaf or leaves of an embryo, becoming the seed leaf or leaves.

crenate: with blunt or rounded teeth, scalloped.

crenulate: minutely scalloped.

crisped: finely curled. A term generally applied to the edges of leaves and petals.

cruciform: cross-shaped.

culm: in grasses, sedges, rushes, and some other monocotyledons, an aerial stem bearing the inflorescence.

cultivar: the term cultivar is derived from cultivated variety and denotes an assemblage of cultivated plants clearly distinguished by one or more characters (morphological, physiological, cytological, chemical or other); when reproduced (sexually or asexually), the assemblage retains its distinguishing characters. A cultivar may arise in cultivation or be introduced from the wild. Cultivar names are written with single quotation marks around them e.g. 'Blue Carpet', 'Alba'.

cuneate: wedge-shaped; with straight sides converging at base.

cyathium: an inflorescence of unisexual flowers surrounded by involucre bracts, e.g. the flowers of Euphorbia.

cyme (adjective cymose): inflorescence in which the main axis and all lateral branches end in a flower (each lateral may be repeatedly branched).

D

deciduous: falling seasonally, for instance bark, leaves, petals.

decumbent: with branches growing horizontally but turned up at the ends.

decurrent: extending downwards beyond the point of attachment, e.g. when the base of a leaf is prolonged downwards along the stem in a raised line or narrow wing.

decussate: opposite, with successive pairs borne at right angles to the last; generally applied to the arrangement of leaves.

deflexed: bent downwards.

dehiscent: breaking open at maturity to release contents. Generally refers to the release of seed from some fruits; also pollen from anthers.

deltoid: with the shape of an equilateral triangle.

dentate: toothed.

denticulate: finely toothed.

determinate: limited, usually in growth.

dichasium: a cymose inflorescence with all branches below the terminal flower in regular opposite pairs.

dichotomous: forking into two equal branches, resulting from an equal division of the growing tip.

digitate: with segments spreading from a common center, like the fingers of a hand.

dimorphic: of 2 different kinds (in respect to shape and/or size), for example of stamens, fronds, leaves.

dioecious: when male and female reproductive structures develop on different individuals; of inflorescence.

disk (disc): a plate or ring of structures derived from the receptacle, and occurring between whorls of floral parts: in daisies, the central part of capitulum, hence disk flowers or florets.

disjunct: occurring in widely separated geographic areas, distinctly separate; applies to a discontinuous range in which one or more populations are separated from other potentially interbreeding populations far enough as to preclude gene flow between them.

dissected: deeply divided; cut into many segments.

distal: remote from the point of origin or attachment; the free end.

distichous: arranged in two opposite rows (and hence in the same plane).

distinct: separate or free, not united.

divaricate: wide-spreading.

divergent: spreading in different directions, generally upward.

division: the term used for the rank below kingdom in the taxonomic hierarchy.

domatia: pits formed at the junction of two veins on the undersurface of leaves; often modified appendages that shelter parasites and other micro-organisms.

dorsal: the back; at the back; abaxial.

dorsifixed: attached at or by the back, e.g. anthers on a filament.

dorsiventral: having structurally different upper and lower surfaces, e.g. some leaves.

drupe: a fleshy fruit formed from one carpel, with a single seed that is enclosed by a stony layer of the fruit wall; e.g. peaches, olives.

E

elliptical (elliptic): shaped like a flattened circle, about twice as long as broad, tapering equally both to the tip and the base.

emarginate: notched at apex (notch usually broad and shallow).

endemic: having a natural distribution restricted to a particular geographic region.

endocarp: the innermost layer of the wall of a fruit; in a drupe, the stony layer surrounding the seed.

endosperm: nutritive tissue in a seed.

ensiform: shaped like the blade of a sword.

entire: having a smooth margin, not lobed, divided or toothed.

ephemeral: short-lived.

epidermis: an organ's outermost layer of cells, usually only one cell thick.

epipetalous: of stamens that are attached to the petals.

epiphyte: one plant growing on another without deriving nourishment from it (in other words, not parasitic).

epithet: the adjectival component in a binomial.

equitant: of a leaf when folded lengthwise with edges adhering except at the base, where it clasps another leaf on the opposite side of the stem.

erect: upright, more or less perpendicular to the ground or point of attachment.

erose: with the margin irregular as though nibbled or worn away.

even-pinnate: having an even number of leaflets in a compound leaf.

evergreen: not deciduous, having leaves all the year round.

ex: in nomenclature, indicating that the preceding author proposed the name but did not legitimately publish it, and that the succeeding author referred to the first author when legitimately publishing the name.

exocarp: the outer layer of the pericarp, often the skin of fleshy fruits.

exotic: not native; introduced from another region or country.

exserted: projected beyond, e.g. the stamens beyond the corolla tube.

exstipulate: without stipules.

F

facultative: optional.

falcate: curved like the blade of a scythe.

family: a formal group of one or more genera with features and/or ancestry in common; the term for the principal rank between order and genus.

fascicle: a cluster, e.g. a tuft of leaves all arising from the same node.

fastigiata: parallel, clustered and erect, e.g. the arrangement of branches in the Lombardy Poplar.

filament: stalk of a stamen.

filamentous: consisting of filaments or fibers.

filiform: thread-like.

fimbriate: fringed.

flabellate: fan-shaped.

flaccid: limp; tending to wilt.

Glossary

flexuous (flexuose): bent alternately in different directions; zig-zag.
floccose: with a soft and woolly covering of hairs.
floral leaves: the upper leaves at the base of the flowering branches.
floral tube: tube bearing the perianth and stamens, consisting of tissue derived from the receptacle and/or perianth and/or stamens; hypanthium.
floret: literally, a small flower; usually refers to the flowers of the daisy and grass families.
flower: the sexual reproductive structure of the angiosperms, typically with a gynoecium, androecium, perianth, and an axis.
follicle: a dry fruit formed from one carpel, splitting along a single suture, to which the seeds are attached.
forma (in common usage, form): a taxonomic category subordinate to species and within the taxonomic hierarchy, below subspecies and variety (varietas), usually differentiated by a very minor character.
free: not united with others organs of the same type; not attached at one end.
frond: a leaf of a fern, cycad or palm.
funnelform: with a form gradually widening from the base to apex; funnel-shaped.
fused: joined together.
fusiform: 3-dimensional, narrowing gradually from the middle towards each end; spindle-shaped.

G

genus (plural **genera**): a group of one or more species with features or ancestry (or both) in common. Genus is the principal category of taxa intermediate in rank between family and species in the nomenclatural hierarchy.
gibbous (gibbose): when part of an organ is swollen; usually with a pouch-like enlargement at base.
glabrescent: becoming glabrous, almost glabrous.
glabrous: without surface ornamentation such as hairs, scales or bristles; this is not the same as smooth.
gland: a secretory structure within or on the surface of a plant; (loosely) a smooth, usually shining, bead-like outgrowth.
glandular hair: hairs tipped with a gland.
glaucous: with a whitish bloom, blue-green in color.
globose (globular): nearly spherical.
globulose: small or nearly spherical.
glochid: a barbed hair or bristle, e.g. the fine hairs in *Opuntia*.
glumes: bracts subtending the floret(s) of a grass.
glutinous: sticky.
granular: of a surface, covered with small rounded protuberances.
grass: a plant belonging to the family Poaceae (Gramineae).
gymnosperm: a seed-bearing plant with ovules borne on the surface of a sporophyll within a cone; conifers.
gynobasic: of a style, arising near the base of the gynoecium, e.g. between the lobes of the ovary.
gynoecium: female parts of flower; the collective term for the carpels of a flower whether united or free; compare pistil; androecium.
gynophore: stalk supporting the gynoecium (above the level of insertion of the other floral parts).

H

habit: the general external appearance of a plant, including size, shape, texture and orientation.
habitat: the place where a plant lives; the environmental conditions of its home.
hair: a single elongated cell or row of cells borne on the surface of an organ.
half-inferior: of ovary, partly below and partly above the level of attachment of the other floral parts.
hastate: like the head of a halbert, i.e. narrow and pointed but abruptly enlarged at the base into two acute diverging lobes; may refer only to the base of a leaf with such lobes.
haustorium: in parasitic plants, a structure developed for penetrating the host's tissues.
head: see capitulum.
helicoid: coiled; of a cymose inflorescence, when the branching is repeatedly on the same side (the apex is often recurved); compare scorpioid.
herb: a vascular plant that does not develop a woody stem; e.g. a violet.
herbaceous: not woody; usually green and soft in texture.
herbarium: a collection of preserved, usually dried, plant material.
heteromorphic: of 2 or more distinct morphologies (e.g. of different size and shape).
hilum: the scar on a seed coat where it separates from its stalk (funiculus).
hirsute: bearing coarse, rough, longish hairs.
hispid: having long erect rigid hairs or bristles, harsh to touch.
hoary: covered with a greyish to whitish layer of hairs, giving a frosted appearance.
hyaline: translucent; usually delicately membranous and colorless.
hypanthium: see floral tube.

I

illegitimate name (nomen illegitimum): a name not abiding by the rules of the botanical Codes, and thereby not usable.
imbricate: overlapping each other; of perianth parts, edges overlapping in the bud.
imparipinnate: a pinnate leaf with an odd number of pinnae (terminated by a single leaflet).
in: in nomenclature, where the preceding author published the name in an article or book, authored or edited by the succeeding author.
incised: cut deeply and (usually) unevenly (a condition intermediate between toothed and lobed).
included: enclosed, not protruding; for example stamens within the corolla.
incurved: bent or curved inwards; of leaf margins, when curved towards the adaxial side.
indehiscent: not opening in any definite manner at maturity; usually referring to fruit.
indeterminate: unlimited, usually in growth.
indigenous: native to the area, not introduced, and not necessarily confined to the region.
indumentum: any surface covering, e.g. hairs, scales; a collective term for such coverings.
indusium: a membrane covering the sporangia of some ferns.
inferior: of an ovary, at least partly below the level of attachment of other floral parts; compare superior.
inflated: swollen, like a bladder.
inflexed: bent sharply upwards or forwards; compare deflexed.

inflorescence: several flowers closely grouped together to form an efficient structured unit; the grouping or arrangement of flowers on a plant.
infraspecific: denotes taxonomic ranks below species level, for example subspecies.
inrolled: rolled inwards.
internode: the portion of a stem between two nodes.
interpetiolar: of stipules, between the petioles of opposite leaves.
introrse: of anther locules, with opening towards the center of flower (at least in bud); compare extrorse, latrorse.
involucre: a group of bracts surrounding the base of a flower-head; e.g. as seen in a daisy.
involute: rolled inwards, for example when the margins of a leaf are rolled towards the adaxial (usually upper) surface; compare revolute.

J

joint: a node or junction of two parts; articulation.
juvenile leaves: formed on a young plant and different in form from the adult leaves.

K

keel: a ridge like the keel of a boat, e.g. the structure formed by the fusion of the two anterior petals of a flower in the Fabaceae.
kingdom: the highest generally employed category of the taxonomic hierarchy, above that of division.

L

labellum: lip; one of three or five petals which is (usually) different from the others, e.g. in Orchidaceae.
labiate: lipped; where the limb of a corolla is divided into two parts, called an upper and lower lip, the two resembling an open mouth with lips.
lacerate: jagged, as if torn.
lacinate: slashed into narrow, pointed lobes.
lamina: the blade of a leaf or the expanded upper part of a petal, sepal or bract.
lanceolate: shaped like a lance or spear head.
lateral: attached to the side of an organ.
latex: a milky substance that exudes from such plants such as milkweeds, figs and dandelions.
lax: loose, not compact.
leaflets: the ultimate segments of a compound leaf.
legume: (1) a fruit characteristic of the Fabaceae family, formed from one carpel and either dehiscent along both sides, or indehiscent; (2) a crop species in the family Fabaceae; (3) a plant belonging to the Fabaceae.
lemma: the lower of 2 bracts enclosing a grass flower.
lenticel: a loosely packed mass of cells in the bark of a woody plant (used for gas exchange), visible on the surface as a raised powdery spot.
lepidote: covered with small scurfy scales.
ligulate: (1) bearing a ligule; (2) strap-shaped.
ligule: (1) small membranous appendage on the top of the sheath of grass leaves; (2) extended, strap-like corolla of some daisy florets.
linear: very narrow in relation to its length, with the sides mostly parallel.
lobe: part of a leaf (or other organ), often rounded, formed by incisions to about halfway to the midrib.
lunate: crescent-shaped.
lyrate: lyre-shaped; deeply lobed, with a large terminal lobe and smaller lateral ones.

M

margin: the edge, as in the edge of a leaf blade.
marginal: occurring at or very close to the margin.
mealy: covered with coarse, flour-like powder, sometimes due to collapsed hairs.
membranous: thin, translucent and flexible, seldom green.
mericarp: one segment of a fruit (a schizocarp) that splits at maturity into units derived from the individual carpels, or a carpel, usually 1-seeded, released by the break-up at maturity of a fruit formed from 2 or more joined carpels.
meristem: a group of actively dividing tissues.
mesocarp: the fleshy portion of the wall of a succulent fruit inside the skin and outside the stony layer (if any), surrounding the seed.
midrib: the central, and usually most prominent, vein of a leaf or leaf-like organ; midvein.
monoecious: of vascular plants, where the male and female reproductive structures are in separate flowers but on the same plant; compare dioecious.
mucro: a sharp, short point.
mucronate: terminating in a mucro.
muricate: covered with short hard protuberances.

N

native: naturally occurring in an area, but not necessarily confined to it.
naturalized: describing a plant introduced from another region, that grows and reproduces readily in competition with the natural flora.
nectary: a specialized gland that secretes nectar.
nerve: a vein.
node: the part of a stem where leaves or branches arise.
nut: a hard, dry, indehiscent fruit, containing only one seed.
nutlet: a small nut; one of the lobes or sections of the mature ovary of some members of the Boraginaceae, Verbenaceae, and Lamiaceae.

O

ob-: inversely; usually same shape as suffix but attached by the narrower end, for example obcordate, oblanceolate, obovate.
oblique: slanting; of a leaf, larger on one side of the midrib than the other, in other words asymmetrical.
oblong: length a few times greater than width, with sides almost parallel and ends rounded.
obtuse: blunt or rounded at the tip or apex; converging edges making an angle of more than 90°.
ocrea (ochrea): a sheath, formed from two stipules, encircling the node in Polygonaceae.
odd-pinnate: (imparipinnate) having an odd number of leaflets in a compound leaf.
opposite: leaves or flowers borne at the same level but on opposite sides of the axis. 2 per node; or when something occurs on the same radius as

Glossary

something else, for example anthers opposite sepals.

orbicular: more or less circular.

oval: generally used to mean the same as ovate.

ovary: the basal portion of a carpel or group of fused carpels, enclosing the ovule(s).

ovate: shaped like a section through the long-axis of an egg and attached by the wider end.

ovoid: egg-shaped, with wider portion at base; 3-dimensional object, ovate in all sections through long-axis.

ovule: the seed before fertilization.

P

palea: the upper of 2 bracts enclosing a grass flower.

palmate: (1) a compound leaf divided into several leaflets arising from the same point at the top of the petiole; (2) of veins in a simple leaf when they arise in a similar fashion.

palmatifid: deeply divided into several lobes arising from more or less the same level.

palmatisect: intermediate between palmate and palmatifid, i.e. the segments are not fully separated at the base.

panicle (adjective paniculate): an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these.

papilionaceous: butterfly-like; with a corolla like that of a sweet pea.

papilla (plural **papillae**, adjective papillose): a small, elongated protuberance on the surface of an organ, usually an extension of one epidermal cell.

pappus: in daisy florets, a tuft or ring of hairs or scales borne above the ovary and outside the corolla (representing the missing calyx); a tuft of hairs on a fruit.

paripinnate: having an even number of leaflets (or pinnae), that is terminated by a pair of pinnae as opposed to a single pinna; compare imparipinnate.

patent: of plants, spreading.

pectinate: pinnately divided with narrow segments closely set like the teeth of a comb.

pedate: with a terminal lobe or leaflet, and on either side of it an axis curving outwards and backwards, bearing lobes or leaflets on the outer side of the curve.

pedicel (adjective pedicellate): the stalk of a flower or of a grass spikelet.

peduncle (adjective pedunculate): the stalk of an inflorescence.

peltate: shield-like; with stalk attached to the lower surface and not to the margin.

pellucid: transmitting light; for example, said of tiny dots in leaves visible when held in front of light.

pendulous: hanging.

pepo: type of berry formed from an inferior ovary and containing many seeds, usually large with a tough outer skin, for instance, pumpkin, cucumber.

perennial: a plant whose life span extends over several growing seasons or years.

perfect: of a flower, when bisexual.

perfoliate: with its base wrapped around the stem (so that the stem appears to pass through it), e.g. of leaves and bracts.

perianth: the collective term for the calyx and corolla of a flower.

pericarp: the wall of a fruit, developed from the ovary wall.

perigynous: borne around the ovary.

persistent: remaining attached to the plant beyond the usual time of falling, for instance sepals not falling after flowering, flower parts remaining through maturity of fruit.

petal: in a flower, one of the segments or divisions of the inner whorl of non-fertile parts surrounding the fertile organs, usually soft and conspicuously colored.

petaloid: like a petal; soft in texture and colored conspicuously.

petiolate: subtended by a petiole.

petiole: the stalk of a leaf.

petiolule: the stalk of a leaflet.

pilose: covered with soft, weak, thin and clearly separated hairs, which are usually defined as long and sometimes ascending.

pinna (plural **pinnae**): a primary segment of a compound leaf.

pinnate: a compound leaf with leaflets arranged on each side of a common petiole or axis; also applied to how the lateral veins are arranged in relation to the main vein.

pinnatifid: pinnately lobed.

pinnatisect: pinnately divided almost to midrib but segments still confluent.

pinnule: ultimate free division (or leaflet) of a compound leaf.

pistil: the female reproductive organ of a flower, composed of a basal ovary, the style, and a terminal stigma.

pith: the central region of a stem, inside the vascular cylinder; the spongy parenchymatous central tissue in some stems and roots.

placenta: the tissue within an ovary to which the ovules are attached.

pllicate: pleated; folded back and forth longitudinally like a fan.

plumose: like a feather; with fine hairs branching from a main axis.

pollen: powdery mass shed from anthers (of angiosperms) or microsporangia (of gymnosperms); the microspores of seed plants; pollen-grains.

polyploid: with more than two of the basic sets of chromosomes in the nucleus.

prickle (adjective: prickly): hard, pointed outgrowth from the surface of a plant (involving several layers of cells but not containing a vein).

propagules: a structure capable of producing a new plant; includes seeds, spores, bulbils, etc.

prostrate: lying flat on the ground.

proximal: near the point of origin or attachment; compare distal.

pruinose: covered with a powdery, waxy material; with a bloom.

puberulous (puberulent): covered with minute soft erect hairs.

pubescent: downy; covered with short, soft, erect hairs; or, in a general sense, hairy.

pulvinus: a cushion-like swelling.

punctate: marked with dots.

pungent: having a sharp hard point.

pyramidal: of a plant's form, pyramid-shaped.

Q

quadrate: more or less square.

R

raceme (adjective racemose): an indeterminate inflorescence in which the main axis produces a series of flowers on lateral stalks, the oldest at the base and the youngest at the top.

rachilla: the axis of a grass spikelet, above the glumes.

rachis (plural **rachises**): the axis of an inflorescence or a pinnate leaf.

radiate: of daisies, of a capitulum, with ray florets surrounding disc florets.

recurved: bent or curved backwards or downwards.

reflexed: bent sharply back or down.

reniform: kidney-shaped.

reticulate: forming a network (or reticulum), e.g. veins that join one another at more than one point.

retorse: directed backwards or downwards; compare antrorse.

retuse: with a blunt (obtuse) and slightly notched apex.

revolute: rolled under (downwards or backwards), for example when the edges of leaves are rolled under towards the midrib; compare involute.

rhizome: a perennial underground stem usually growing horizontally.

rootstock: short, erect, swollen structure at junction of a plant's root and shoot systems.

rotate: circular and flattened; for example a corolla with a very short tube and spreading lobes (for instance some Solanaceae).

rugose: wrinkled.

rugulose: finely wrinkled.

runcinate: sharply pinnatifid or cleft, the segments directed downward.

S

saccate: pouched.

sagittate: shaped like the head of an arrow; narrow and pointed but gradually enlarged at base into two straight lobes directed downwards; may refer only to the base of a leaf with such lobes; compare hastate.

scabrous: rough to the touch with short hard emergences or hairs.

scape (adjective scapose): a stem-like flowering stalk of a plant with basal leaves.

scapose: having the floral axis more or less erect with a few leaves or devoid of leaves; consisting of a scape.

scarious: dry and membranous.

schizocarp: a dry fruit formed from more than one carpel but breaking apart into individual carpels (mericarps) when ripe.

scorpioid: of a cymose inflorescence, when it branches alternately on one side and then the other; compare helicoid.

secund: with all the parts grouped on one side or turned to one side (applied especially to inflorescences).

seed: a ripened ovule.

sensu lato (s.l.): of a plant name, in its broadest sense.

sensu stricto (s.s.): of a plant name, in its narrowest sense.

sepal: in a flower, one of the segments or divisions of the outer whorl of non-fertile parts surrounding the fertile organs, usually green; compare petal.

septum (plural **septa**): a partition, for example the membranous wall separating the two valves of the pod of Brassicaceae.

sericeous: silky with dense appressed hairs.

serrate: toothed with teeth pointing forward; like the cutting edge of a saw.

serrulate: finely serrate.

sessile: without a stalk.

sheath: a tubular or rolled part of an organ, e.g. the lower part of the leaf in most grasses.

shoot: usually the aerial part of a plant; a stem including its dependent parts, leaves flowers etc.

simple: undivided, for instance a leaf not divided into leaflets.

sinuate: with deep, wave-like depressions along the margins, but more or less flat; compare undulate.

sinus: a notch or depression between two lobes or teeth in the margin of an organ.

spathe: a large bract ensheathing an inflorescence.

spathulate (spatulate): spoon-shaped; broad at the tip with a narrowed projection extending to the base.

spike (adjective spicate): an unbranched, indeterminate inflorescence in which the flowers are without stalks; compare raceme.

spine (adjective spinose): a stiff, sharp structure, formed by the modification of a leaf.

spinescent: ending in a spine; modified to form a spine.

spreading: extending horizontally, for example branches; standing out at right angles to axis, for example leaves or hairs.

stamen (adjective staminate): male organ of a flower, consisting (usually) of a stalk (filament) and a pollen-bearing portion (anther).

staminode: a sterile stamen, often rudimentary.

stellate: star-shaped, for example a type of hair.

stipe: in ferns, the stalk of a frond; generally a small stalk.

stipitate: stalked; borne on a stipe; of an ovary, borne on a gynophore

stipulate: bearing stipules.

stipule: small appendage at the bases of leaves in many dicotyledons.

stolon: slender, prostrate or trailing stem, producing roots and sometimes erect shoots at its nodes.

stoloniferous: having stolons.

striate: striped with parallel, longitudinal lines or ridges.

strigose: covered with appressed, rigid, bristle-like, straight hairs; the appressed equivalent of hispid.

style: an elongated part of a carpel, or group of fused carpels, between the ovary and the stigma.

subspecies: a grouping within a species, usually used for geographically isolated and morphologically distinct entities. Its taxonomic rank occurs between species and variety.

subtend: to stand beneath or close to, as in a bract at the base of a flower.

subulate: narrow and tapering gradually to a fine point.

succulent: juicy, fleshy; a plant with a fleshy habit.

sulcate: furrowed; grooved.

Glossary

superior: of an ovary, borne above the level of attachment of the other floral parts.
syn- (sym-): with, together.

T

taproot: the main, descending root of a plant with a single dominant root axis.
taxon (plural **taxa**): a group or category in a system of classification, derived from the Greek prefixes *taxo-*, *taxis-* meaning arrangement.
tendrill: a slender organ (modified e.g. from stem, leaf, leaflet or stipule) used by climbing plants to cling to an object.
tepal: perianth segment, either sepal or petal; usually used when all perianth segments are similar in appearance.
terete: circular in cross-section; more or less cylindrical.
terminal: situated at the tip or apex.
ternate: in groups of three; of leaves, arranged in whorls of three; of a single leaf, with the leaflets arranged in groups of three.
testa: seed coat.
thorn: a sharp, stiff point, usually a modified stem, that cannot be detached without tearing the subtending tissue.
throat: the opening of a corolla or perianth.
thyrs: a branched inflorescence in which the main axis is indeterminate (racemose) and the lateral branches determinate (cymose).
tomentum (adjective *tomentose*): a dense covering of short, tangled and matted hairs.
toothed: with a more or less regularly incised margin.
tree: a woody plant, usually with a single distinct trunk and generally more than 5 m tall.
tribe: a taxonomic grouping, in rank between genus and species.
trifoliolate: a compound leaf of three leaflets, for example a clover leaf.
trigonous: triangular in cross-section and obtusely angled.
trinerved: having three nerves or veins.
triquetrous: more or less triangular in cross-section, but acutely angled (with 3 distinct longitudinal ridges).
truncate: cut off squarely; with an abruptly transverse end.
trunk: the upright large main stem of a tree.
tuber: an underground storage organ formed by the swelling of an underground stem which produces buds and stores food, forming a seasonal perennating organ, for example, potato.
tubercle: a small wart-like or nipple-like outgrowth.
tuberculate: covered in tubercles; warty or nipple-like.
tuberous: resembling a tuber; producing tubers.
tubular: with the form of a tube or cylinder.
turbinate: top-shaped.
turgid: swollen with liquid; firm.
tussock: a dense tuft of vegetation, usually well separated from neighboring tussocks, for example some grasses.
two-ranked: having leaves arranged in two rows in the same plane, on opposite sides of the branch; distichous.

U

umbel (adjective *umbellate*): an inflorescence in which all the individual flower stalks or secondary peduncles arise in a cluster at the top of the peduncle and are of about equal length.
uncinate: with a hook at the apex.
undulate: wavy and not flat.
unilocular: having one locus or chamber.
uniseriate: Arranged in a single row or series.
unisexual: of one sex; bearing only male or only female reproductive organs.
urceolate: urn-shaped.
utricle: a small bladder; a membranous bladder-like sac enclosing an ovary or fruit.

V

valvate: of sepals and petals in bud, which meet edge to edge but do not overlap.
varietas (variety in common usage, abbreviated as *var.*): in the Linnaean hierarchy a rank below that of species, between the ranks of subspecies and form.
variegated: irregularly marked with blotches or patches of another color.
vein: a strand of vascular tissue; nerve.
veinlet: a small vein; the ultimate (visible) division of a vein.
velvety: densely covered with fine, short, soft, erect hairs.
venation: the arrangement of veins in a leaf.
ventral: towards the front; in particular, towards the axis in a lateral organ or towards substratum in prostrate plant; adaxial.
vernation: the arrangement of unexpanded leaves in a bud; the order of unfolding of leaves from a bud.
verrucose: with warts.
versatile: of anthers, swinging freely about the point of attachment to the filament.
verticillate: arranged in one or more whorls.
villous: covered with long, soft, weak hairs, the covering somewhat dense.
viscid: sticky.

W

warty: a surface covered with small round protuberances, especially in fruit, leaves, twigs and bark.
whorl: a ring of 3 or more organs borne at the same level or node on an axis, for example leaves, bracts or floral parts.
woolly: very densely covered with long, more or less matted or intertwined hairs, resembling sheep's wool.

Z

zygomorphic: bilaterally symmetrical; applies to flowers in which the perianth segments within each whorl vary in size and shape; compare actinomorphic.

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