



UINTA BASIN FLORA



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UINTA BASIN FLORA

by:

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and

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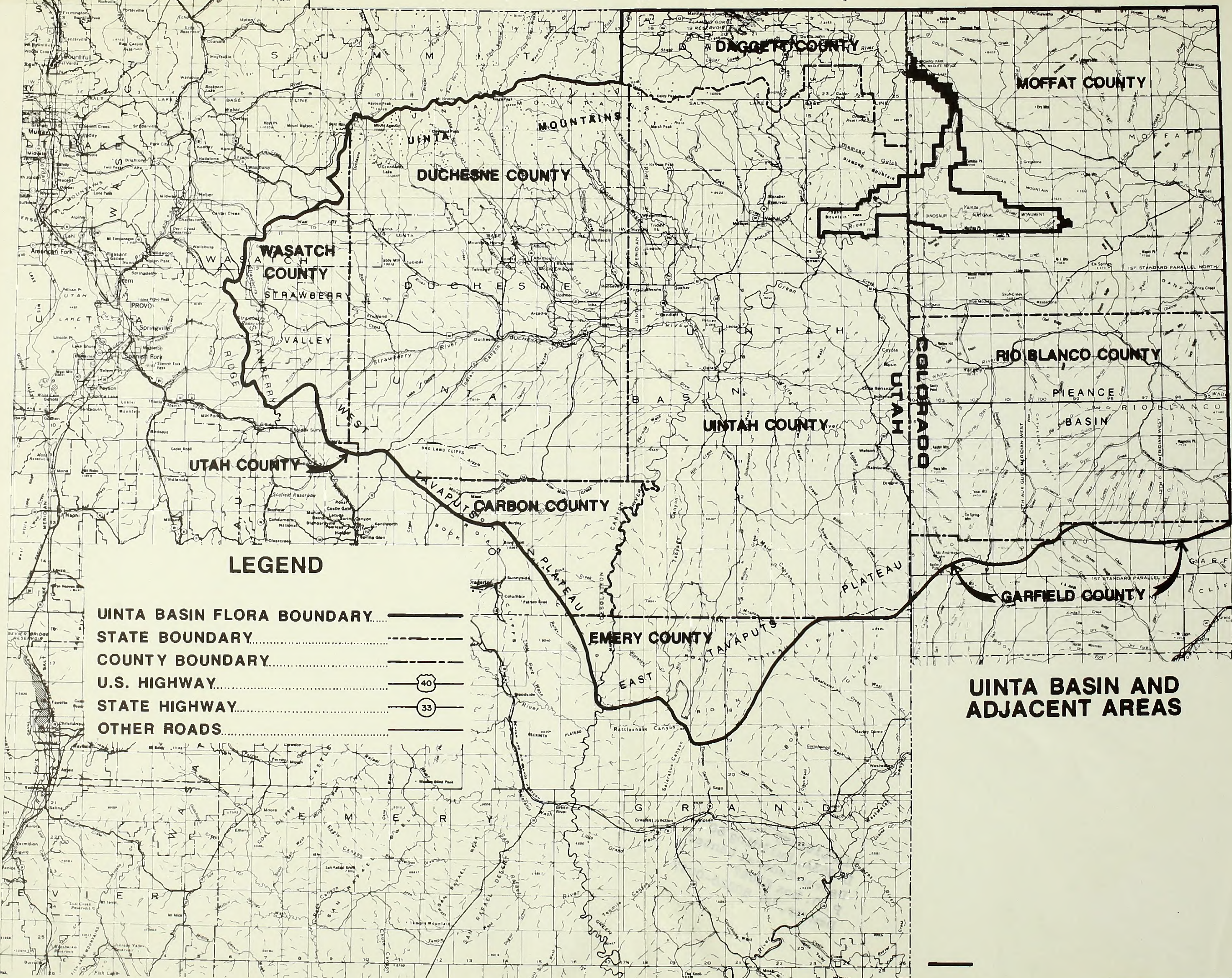
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

by

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UINTA BASIN AND ADJACENT AREAS

CONTENTS

Preface..... i
Introduction..... i
History of Collections..... ii
The Flora..... iii
Plant Communities..... iii
Acknowledgements..... vi
Glossary..... vi
Key to families..... 1
Descriptive Flora..... 18
Excluded Names..... 291
Addenda..... 292
Literature Cited..... 293
Index..... 296

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PREFACE

This flora, containing about 1,660 specific and subspecific taxa of vascular plants, is arranged alphabetical by family, genus, and species. It is intended as a field manual. To reduce the size of the volume, descriptions of species have been omitted except for those that are the only one of a genus, and those descriptions are often brief. Descriptions of families, genera, and species have been paired to apply to plants as found within the boundaries of this flora. Also features listed in the keys are intended for use in this area only. Features listed in the keys are often not repeated in family, generic, or species descriptions. Expanded descriptions can be found in more exhaustive works such as Harrington (1954) and Utah Flora (Welsh 1978, 1980 a, b, 1982, 1983, and 1984 a, b, c; Welsh and Reveal 1977; and Goodrich 1983 and 1985). A Utah Flora as one volume (Welsh and others in preparation) is nearing completion. Descriptions and illustrations can be found in Cronquist and others (1972, 1977, and 1984). When completed, this latter work, Intermountain Flora, will be in six volumes.

We hope to complement the more exhaustive works by providing a manual specific for the Uinta Basin area that is practical to carry into the field. Because descriptions have been omitted, some leads in the keys have been expanded to include several features. The reader should not feel obligated to wade through all of an expanded lead. Rather, the feature that is most applicable to a particular specimen should be sought out. If a specimen has fruit but lacks flowers, then the features of the fruit, leaves, or other part of the plant should be used to key the specimen. However, first-listed features are usually the most readily apparent and the most nearly diagnostic.

Because this book is intended for field use, we have attempted to incorporate as often as possible key features that readily can be seen without a dissecting scope. Size of plants, type of root, and presence or lack of rhizomes, bulbs, or other subterranean parts are features frequently used. All too often the lone specimen brought in from the field for identification is an odd one or incomplete (for example, an albino-flowered specimen of a Penstemon that nearly always has dark blue flowers, or an Allium without the bulb). Advantages to keying specimens in the field are the abundance of material to work with and the opportunity to dig again for subterranean parts first missed.

While this manual is intended for field identification, which with some experience and with the aid of a hand lens is possible, in some cases and especially in some groups (for example, Agrostis, Poa, and Carex) a dissecting scope will be essential. When collecting specimens that are to be identified at the office or herbarium, one should look at a number of plants to determine the range of variation of features of the plants, and dig thoroughly enough to determine the type of root and presence or absence of rhizomes, bulbs, or other underground parts. If the specimens are to be deposited in an herbarium, notes of variation in these features are valuable if included on the herbarium label.

In natural resource studies, one often encounters plants within study plots that do not have flowers or fruit. For this reason, vegetative features (especially when conspicuous) are frequently included in the keys. However, vegetative features can be highly variable, and in many cases we did not find such features that would be of value. By keying a vegetative specimen a few ways through the keys, one can come to a few logical taxa for which the specimen can be checked against herbarium specimens.

INTRODUCTION

The area of this Flora includes the Uinta Basin bounded on the north by the crest of the Uinta Mountains, on the west by the divide of the Strawberry drainage, and on the south by the breaks of the West and East Tavaputs Plateaus. The eastern boundary is not so well marked. The Piceance Basin and Cathedral Bluffs are included, but the White River drainage to the east of these areas is not. The eastern boundary closely corresponds to 108° longitude. Because we anticipate that among the principal users of this work will be personnel of the Ashley National Forest, National Park Service, and the Vernal, Utah, and Craig, Colorado, districts of the Bureau of Land Management, we have included Daggett County, Utah, and parts of Moffat County, Colorado, even though they fall outside the Uinta Basin proper. Thus, all of the Ashley National Forest, Dinosaur National Monument, and Vernal District of the Bureau of Land Management are included. About the western half of the Little Snake and White River Resource Areas of the Craig District of the Bureau of Land Management are also included. Covered in Utah are all of Daggett, Duchesne, and Uintah Counties, a large part of Wasatch County (Strawberry drainage), and small parts of Emery, Grand, and Utah Counties (Tavaputs Plateau). In Colorado about the western half of Moffat and Rio Blanco Counties are included, as is the northwest corner of Garfield County (Baxter Pass-Douglas Pass area and upper Piceance drainage). In this work, the area described above is referred to as "our area". "Our plants" are the vascular plants growing in our area, and "our specimens" or "our records" are the herbarium specimens collected from this area. This usage is concise and commonly used in botanical works (Arnow and others 1980; Cronquist and others 1972, 1977, 1984; Hitchcock and others 1961, 1964, 1969; Harrington 1954; Welsh 1974).

The taxa included in this work and information about distribution, habitat, and elevation are based on herbarium specimens and on label data. This information is not complete. Every field season during this study produced additional taxa and extensions in distribution and elevation. Additional taxa are expected, and distributional information will continue to expand with additional field work. Distributional and

habitat data are given as an aid to identification and understanding of plant taxa of the area. Such data indicate as well where additional collections are needed. Abundance, often a qualitative judgement on our part, is also indicated for many taxa. Following the Latin and common names, synonyms and misapplied names are listed in parentheses and brackets. The term "misapplied" indicates a plant name of a valid taxon mistakenly applied to a plant for which a different name is correct. Misapplied names are usually included if they were used for plants of our area in one or more lists or manuals cited in this work. Many taxa are known to the area by one or two collections only. These collections are usually cited in the text.

Also listed is the acronym of the herbarium where the specimen is deposited, when other than at the Herbarium of Brigham Young University or the Herbarium of Colorado State University. Following is a list of acronyms of herbaria referred to in this work.

ANF¹ Ashley National Forest Herbarium, Vernal, Utah
BRY Herbarium of Brigham Young University, Provo, Utah
CM Herbarium of Carnegie Museum of Natural History, Pittsburgh, Pennsylvania
COLO Herbarium of University of Colorado, Boulder, Colorado
CS Herbarium of Colorado State University, Fort Collins, Colorado
DINO¹ National Park Service Herbarium, Dinosaur National Monument, Utah
NY New York Botanical Garden, Bronx, New York
MO Missouri Botanical Garden
OGDF Forest Service Herbarium, Ogden, Utah
PH Herbarium, Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania
RM Rocky Mountain Herbarium, University of Wyoming, Laramie, Wyoming
SSLP² Herbarium of Shrub Science Laboratory, Intermountain Research Station, Provo, Utah
UI² Uinta Herbarium, Bureau of Land Management, Vernal, Utah
UT Garrett Herbarium, University of Utah, Salt Lake City, Utah
UTC Intermountain Herbarium, Utah State University, Logan, Utah

In addition, the private herbarium of Mont E. Lewis, Ogden, Utah, contains specimens of Carex that are critical to this work.

This flora is mainly concerned with native plants. Cultivated plants that infrequently escape and rarely if ever persist are usually not included. Introduced weedy plants and especially those that have become naturalized are included. Nomenclature, with some exceptions, follows Welsh and others (1981). Other sources for names including those found in synonymy include: Holmgren and Reveal (1966), Harrington (1954), Graham (1937), Arnow and others (1980), Goodrich and others (1981), Welsh and Moore (1973), Hitchcock and Cronquist (1973), Holmgren (1962), Welsh (1957), Bradley (1950), Flowers and others (1960), Beidleman (1957), and Potter and others (1983). We have followed Munz (1968) and Welsh (1974) in the method of listing synonyms. Common names were taken primarily from Plummer and others (1977), Hitchcock and Cronquist (1973), and Arnow and others (1980). The method of abbreviation of common names is adapted from Hitchcock & Cronquist (1973). The abbreviations q.v. (which see), ssp. (subspecies), and var. (variety) are from Stern (1966). The abbreviations of north (n.), east (e.), south (s.), west (w.), northeast (ne.), northwest (nw.), southeast (se.), southwest (sw.), central (c.), County (Co.), Counties (Cos.), mountain (mt.), and mountains (mts.) are those used by Cronquist and others (1977). We have followed Harrington (1954) in using the metric system in keys and descriptions of plants and the English system for listing elevations and distance. Most maps (such as the U.S. Geological Survey 7.5 and 15 minute series) available to our anticipated audience list elevation in feet. Using this unit of measure here will free the user from the need to make frequent conversions.

HISTORY OF COLLECTIONS

The first botanical collections taken from the Uinta Basin were made by the Fremont expeditions in 1844 and 1845 during which type specimens of Gilia stenothyrsa, Penstemon fremontii, and P. pachyphyllus were collected. Graham (1937) conducted the first extensive botanical study in the Uinta Basin. He spent the summers of 1931, 1933, and 1935 in the area and made about 4,200 collections that are deposited at the Carnegie Museum, Pittsburgh, Pennsylvania. Graham's treatment of plant communities, climate, geology, and other features of the area is superb. He listed over 1,100 specific and subspecific plant taxa, and his study has been a valuable source of information to this current work. Critical specimens from his collections were obtained on loan for examination in this study. Much of the nomenclature found in Graham's work is included in the synonymy of this work.

Prior to Graham a number of early botanists collected at the margins of or sparingly within the area. Among these were John Wesley Powell, Lester Frank Ward, Sereno Watson, Marcus E. Jones, Leslie N. Gooding, L. H. Pammel, and George E. Osterhout. Graham (1937) discussed these and other early collectors.

¹ Acronyms not registered in Index Herbariorum (Holmgren and others 1981).

² Acronym approved for inclusion in the next edition of Index Herbariorum.

Bradley (1950) worked on the vascular flora of Moffat County. Collections from this project are deposited at the University of Colorado and Park Service Herbarium at Dinosaur National Monument. She also discussed other collectors of Moffat County. Welsh (1957) provided a checklist of 360 specific and subspecific plant taxa that is based on collections from the Utah part of Dinosaur National Monument. His collections are deposited at the Herbarium of Brigham Young University. Beidleman (1957) assembled a checklist of flora and fauna of Dinosaur National Monument. Woodbury and others (1959) and Flowers (1960) conducted studies on lands that were subsequently covered by waters of Flaming Gorge Reservoir, and Flowers and others (1960) assembled a checklist of plants for that area. Holmgren (1962) studied and collected vascular plants at Dinosaur National Monument and along the Green River from Flaming Gorge to Split Mountain. Lewis (1970) described alpine rangelands of the Uinta Mountains and listed about 335 taxa for that area. Goodrich and others (1981) assembled a checklist of vascular plants of the Uinta Basin that has been the basis for the number of taxa included in this treatment. Vories (1974), Peterson and Baker (1982), and Baker (1983) have studied plants and made collections in the Piceance Basin.

The earliest collections deposited in Uinta Basin herbaria were made by Forest Service collectors, including George Walkup, Clyde Lambert, Charles DeMoisy Jr., K. E. Weight, and Selar Hutchings. Their specimens are deposited at the Forest Service Herbarium at Vernal. Fredrick H. Hermann, Mont E. Lewis, Edward Lindquist, and Duane Atwood have made many collections in the area for the Forest Service. Among those botanists whose collections are deposited at Brigham Young University are Bertrand Harrison, Stanley L. Welsh, Joseph Murdock, Jack Brotherson, Kaye Thorne, Ron Kass, Blain T. Welsh, and James Reveal. Noel H. Holmgren, Rupert C. Barneby, and Arthur Cronquist of the New York Botanical Garden, and Leila Shultz (Curator, UTC) have made critical collections. Frank Smith, Kezia Snyder, and Betsy Neely have collected while working on various rare plant studies sponsored by the Bureau of Land Management. Lois Arnow and Beverly Albee (Curators, UT) have collected in the area, and their excellent work in the central Wasatch Front (Arnow and others 1980) is useful in our area and especially toward the west. Larry England has made many collections and was instrumental in beginning the Uinta Herbarium kept by the Bureau of Land Management at Vernal, which now contains over 5,000 specimens.

William A. Weber (Curator, COLO) has been active in the Colorado part of the area. Other collectors from Colorado include the late Harold D. Harrington (specimens at CS), Dieter H. Wilken (Curator, CS), Karen Wiley-Eberle, William L. Baker, Kimery Vories, Wayne Erickson, Walt A. Kelley, Robert Popp, and Joyce Walker. J. Scott Peterson has made many collections in both Colorado and Utah. The National Park Service has sponsored and cooperated in a number of botanical projects on Dinosaur National Monument, and keeps a herbarium now housed at the Quarry, with principal collections from Ruth Ann Wolf and Kathleen Dever; Noel Holmgren, James Reveal, and Tom Jensen; M. MacLeod; and W. MacLeod.

The authors' field experience mostly has been in the Utah part of the area, where we each have spent several summers and made over 16,500 collections. A nearly complete set of these specimens is deposited at the Herbarium of Brigham Young University, and many duplicates are deposited at the New York Botanical Garden, Intermountain Herbarium, Garrett Herbarium, and at Vernal, Utah, in the Bureau of Land Management and Forest Service herbaria. Between the two Vernal herbaria there is a nearly complete set of specimens for species listed for Utah in this work. The information given for Colorado was mostly based on specimens provided by Colorado collectors, primarily those associated with Colorado State University, Colorado Natural Heritage Inventory, and Craig District of the Bureau of Land Management.

THE FLORA

With extreme elevational differences (4,255 ft in Desolation Canyon to 13,528 ft on Kings Peak) and numerous geological formations, the area supports a diverse flora. The plants of lower and mid elevations are typical of those of the Great Basin. Here desert shrub and sagebrush communities are dominated by Asteraceous and Chenopodiaceous shrubs, and pygmy forests are made up of pinyon (*Pinus edulis*) and juniper (*Juniperus osteosperma*). *Redfieldia flexuosa*, *Spartina pectinata*, *Thermopsis rhombifolia* and a few other species from the Plains reflect a slight influence from that flora. In sharp contrast, Arctic and Rocky Mountain floras are strongly expressed in the Uinta Mountains where the genus *Carex* (the largest of the area) is represented by over 70 species. The flora of the Tavaputs Plateau has some affinity to that of other parts of the Colorado Plateau and Great Basin. The diverse flora of Strawberry Valley shows influences from the Uinta and Wasatch mountains, Colorado Plateaus and Great Basin. Some elements of the Wyoming flora are found in the area, especially in Daggett and Moffat Counties. There are about 30 species endemic to the area. Each endemic is usually confined to one or a few geological formations. These endemic plants have been the basis of a number of studies that have greatly aided in understanding our flora (Bio/West 1984; Neese and Smith 1982; Peterson and Baker 1982; Shultz and Mutz 1979; Shultz 1982; Welsh and Neese 1979a, b; Welsh 1981).

PLANT COMMUNITIES

Moist alkaline lowlands support plant communities dominated by saltgrass (*Distichlis spicata*), greasewood (*Sarcobatus vermiculatus*), seepweed (*Suaeda* spp.), alkali sacaton (*Sporobolus airoides*),

threadleaf rubber rabbitbrush (Chrysothamnus nauseosus ssp. consimilis), and other halophytes. Along washes and other drainages, western goldenrod (Solidago occidentalis) is locally common. With increasing wetness, rushes (Juncus spp.), sedges (Carex spp.), and bullrushes (Scirpus spp.) become abundant. Lowland marshes are often dominated by cattails (Typha spp.), bullrushes, and common reedgrass (Phragmites australis). The flood plains of the Green River and lower elevations of its tributaries support Fremont cottonwood (Populus fremontii) communities.

Dry lowlands support desert shrub communities that are dominated by low shrubs of the CHENOPODIACEAE and ASTERACEAE families. Some of the most common of these shrubs are shadscale (Atriplex confertifolia), Gardner saltbush (A. gardneri), bud sagebrush (Artemisia spinescens), winterfat (Ceratoides lanata), and horsebrush (Tetradymia spp.). Mat saltbush (Atriplex corrugata) is common on geologic formations with high clay and silt content, principally the Mancos Shale, Duchesne River, and Uinta formations. Sanddune rubber rabbitbrush (Chrysothamnus nauseosus ssp. turbinatus) is locally common on aeolian sand. Indian ricegrass (Oryzopsis hymenoides), galleta (Hilaria jamesii), and blue gramma (Bouteloua gracilis) are among the common grasses of these communities. Forbs are numerous, but seldom is any one species of them abundant. Desert shrub communities are found from the lowest elevations of the area up to about 5,800 to 6,000 ft. They indicate an average annual precipitation of about 6 to 8 inches.

Greasewood forms dense thickets at lower elevations of drainages of the Tavaputs Plateau. With increasing elevation and probably decreasing salinity or alkalinity, it is associated with basin big sagebrush (Artemisia tridentata ssp. tridentata), and at about 7,000 ft greasewood is replaced by sagebrush and rubber rabbitbrush (Chrysothamnus nauseosus).

Pinyon and juniper communities form an elevational band across the area starting at about 6,000 ft. The band is wider and more continuous on the Tavaputs Plateau than it is on the Uinta Mountains. It commonly reaches to 8,000 ft on the Tavaputs Plateau, extending upward to about 8,500 ft on warm exposures. On the Uinta Mountains, it commonly reaches to about 7,000 ft extending to about 7,500 (rarely 8,000) ft on warm exposures. On the Tavaputs Plateau the band is made up of juniper at its lower elevations, a mixture of pinyon and juniper at mid elevations, and pinyon with little or no juniper at its upper elevations. On the south slope of the Uinta Mountains, the band is mostly made up of pure stands of juniper with the pinyon being mostly limited to the upper elevations where the communities are restricted to warm exposures. On the north slope of the Uinta Mountains pinyon is rather well represented. The elevational range of pinyon and juniper communities is apparently determined by thermal conditions. They seem to be limited on the lower end by severe cold air inversions that are common to the area in winter. Cold temperatures of long durations at higher elevations seem to be the determining factor at the upper end where these communities show a strong affinity for warm exposures. Low precipitation may be an additional limiting factor of some influence at the lower limit. Pinyon and juniper communities form on all soils and substrates available within the thermal zone to which they are confined. Various kinds of sagebrush (Artemisia spp.) and rabbitbrush (Chrysothamnus spp.) and true mountain mahogany (Cercocarpus montanus) are common associated shrubs. Indian ricegrass, Sandberg bluegrass (Poa secunda), muttongrass (P. fendleriana), and bluebunch wheatgrass (Agropyron spicatum) are common grasses, and on the Tavaputs Plateau, bullgrass (Elymus salina) is common. Stemless hymenoxys (Hymenoxys acaulis), stemless goldenweed (Haplopappus acaulis), and scarlet gilia (Gilia aggregata) are among the common forbs of pinyon and juniper communities.

Sagebrush communities are dominated by Artemisia spp. with or without a codominant component of grasses. Black sagebrush (A. nova) communities are common from about 5,000 to 8,000 ft. They are typically formed on shallow rocky soils, especially those high in carbonates. Black sagebrush is sometimes a component of desert shrub communities. Sandberg's bluegrass is a common grass in these communities.

Wyoming big sagebrush (A. tridentata ssp. wyomingensis) communities are found in and just below the pinyon-juniper zone. Soils of these communities typically have a carbonate hardpan at about 12 to 20 inches below the surface. Associated grasses are often sparse. They include needle-and-thread (Stipa comata var. comata), Indian ricegrass, and Sandberg bluegrass.

Mountain big sagebrush (Artemisia tridentata ssp. vaseyana var. pauciflora) communities cover extensive areas from the upper edge of the pinyon-juniper zone up to about 10,000 ft. At upper elevations they are confined to warm exposures. They are typically formed on soils with dark colored surface horizons and without a carbonate hardpan. The grass component is usually well developed. Among the common grasses are bluebunch wheatgrass, thickspike wheatgrass (Agropyron dasystachyum), needle-and-thread (Stipa comata var. intermedia), muttongrass, sandberg bluegrass, and sheep fescue (Festuca ovina var. rydbergii). Mountain low rabbitbrush (Chrysothamnus viscidiflorus ssp. lanceolatus) is a common associated shrub. Bitterbrush (Purshia tridentata) is also a common shrub especially on the Uinta Mountains. Forbs are well represented in many mountain big sagebrush communities, among the common being arrowleaf balsamroot (Balsamorhiza sagittata) and Hooker balsamroot (B. hooker) and lupine (Lupinus spp.).

Communities of basin big sagebrush are usually limited to alluvial soils of canyon bottoms and valleys from the lowest elevations of the area up to about 8,000 ft. In canyons of the Tavaputs Plateau, basin big sagebrush is often associated with greasewood at lower elevations and with rubber rabbitbrush at upper elevations. In valleys, basin big sagebrush is an indicator of rather deep soils of sandy loam texture, and much of the valley-land once dominated by this sagebrush is now in cultivation.

Silver sagebrush (Artemisia cana) is codominant with grasses, sedges, and forbs in meadows or meadowlike communities where the water table is at or near the soil surface during much of the growing season. Such communities are particularly common in Strawberry Valley, Farm Creek Pass, and on Diamond Mountain. At the head of Cart Creek along Highway 44, silver sagebrush meadow communities are well developed on Browns Park Formation, but they are not known in the Uinta Mountains on quartzite substrate. Apparently such

communities are lacking on the Tavaputs Plateau except at the far west end from Willow Creek of the West Tavaputs Plateau to Strawberry Valley. Occasionally silver sagebrush forms stands with grasses on well-drained soils especially in the Willow Creek vicinity.

Communities of snowfield or spike sagebrush (Artemisia spiciformis) are limited to the western part of the area. They are well developed along Reservation Ridge between Cat Peak and Horse Ridge, near Red Creek Mountain, the east slope in Blind Stream drainage, and at Wolf Creek summit. These communities are best developed on well-drained, leeward slopes where drifting snow accumulates. They are mostly found on soils of clay loam texture with limestone or other basic substrates at 9,000 to 10,000 ft. None are known on quartzite soils of the Uinta Mountains.

Bullgrass communities are best developed on the Tavaputs Plateau on Uinta and Green River formations. Bullgrass forms nearly pure stands on steep raw slopes as well as on lands of gentle relief, or it is associated with bluebunch wheatgrass, sagebrush, big wild buckwheat (Eriogonum corymbosum), pinyon, juniper, and with plants of mountain brush communities such as true mountain mahogany. Away from the Tavaputs Plateau, this grass is mostly scattered and is seldom found above 7,000 feet, but near Sheep Creek Gap and a few other places it forms stands on rather raw formations.

Mountain brush communities are dominated by species of Cercocarpus, Amelanchier, Quercus gambelii, Prunus virginiana, and a few other shrubs. These communities are most common from 7,000 to 8,500 ft. Grasses and forbs are mostly well represented in these communities except for those with a dense canopy of curleaf mountain mahogany (Cercocarpus ledifolius). True mountain mahogany forms rather extensive stands on slopes across the Uinta Mountains, and it is common across the Tavaputs Plateau. Communities of curleaf mountain mahogany are well developed on the north slope of the Uinta Mountains, especially toward the east and on Diamond Mountain. There are sizable stands of this shrub in Lake Fork and Yellowstone Canyons, and it is common on Red Mountain and vicinity north of Vernal, but it is rare elsewhere on the south slope of the Uinta Mountains. It is occasional toward the west on the West Tavaputs Plateau. Littleleaf mountain mahogany (C. intricatus) forms stands on outcrops of Navajo, Weber, and other sandstone formations about the flanks of the Uinta Mountains from about 6,000 to 7,000 ft. Gambel oak communities are well developed west of Blind Stream in the Uinta Mountains (but completely absent from the east part of these mountains) and west of Avintaquin on the West Tavaputs Plateau and again on the East Tavaputs Plateau. Communities dominated by serviceberry (Amelanchier spp.) are rather infrequent, but Saskatoon serviceberry (A. alnifolia) does form stands at a few places in the Uinta Mountains.

Riparian communities are marked by an abundance of willows (Salix spp.), cottonwoods, aspen (Populus spp.), alder (Alnus incana), river birch (Betula occidentalis), and numerous sedges and grasses.

Ponderosa pine (Pinus ponderosa) communities are best developed on the north slope of the Uinta Mountains and between the Lake Fork and Whiterocks drainages of the south slope of these mountains from about 7,000 to 8,000 ft. There are scattered stands elsewhere such as on Red Mountain and Blue Mountain. There is a sizable stand on the Cow Canyon-Timber Canyon area of the West Tavaputs Plateau, but elsewhere on this plateau this pine is either mostly lacking or is associated with other conifers. These communities seem to have a strong affinity for thermal conditions similar to but cooler than those of pinyon-juniper communities, and they are best developed in the warmer elevations of the Uinta Mountains well away from cold air drainage. Ponderosa pine trees occasionally extend down into the Uinta Basin and sometimes survive for many years, but they are killed in winters with long and cold inversions. Bitterbrush is a common understory shrub, and greenleaf manzanita (Arctostaphylos patula) is common in the Lake Fork-Whiterocks area.

Douglas-fir (Pseudotsuga menziesii) communities in the Uinta Mountains are limited to limestone, Red Pine Shale and other nonquartzitic substrates. On the Tavaputs Plateau these communities are well developed below the elevations typically dominated by subalpine fir (Abies lasiocarpa) and are mostly restricted to concave slopes of northerly exposures at 7,500 to 8,500 (9,000) ft.

Aspen communities cover extensive areas on mountain sides and in canyons from about 7,500 to 9,500 ft. Elk sedge (Carex geyeri) is sometimes a common understory plant especially on sandy loam soils in the Uinta Mountains where common juniper (Juniperus communis) is sometimes abundant. On loamy and especially clay loam soils, grasses and forbs form a rather lush understory in places. In other places, mountain snowberry (Symphoricarpos oreophilus) is the dominant understory plant, and in a few places mallow ninebark (Physocarpus malvaceus) is common.

Tall forb communities are often found in association with aspen communities from west of Rock Creek in the Uinta Mountains and west of the Indian Canyon on the West Tavaputs Plateau. They seem to be limited by quartzite in the Uinta Mountains and by insufficient moisture on much of the Tavaputs Plateau. They are marked by an abundance of western coneflower (Rudbeckia occidentalis), butterweed groundsel (Senecio serra), Arizona bluebells (Mertensia arizonica), sweetanise (Osmorhiza occidentalis), and other tall forbs. In seepy places, California false-hellebore (Veratrum californicum) forms dense stands, and cowparsnip (Heracleum lanatum) is occasionally common.

Subalpine fir communities are well developed on concave slopes of cool exposures at the upper elevations of the Tavaputs Plateau and in the vicinity of the Strawberry Valley. On the Uinta Mountains these communities are found on limestone and other basic substrates. On quartzite, subalpine fir is found in association with lodgepole pine (Pinus contorta) and Engelmann spruce (Picea engelmannii), but it is not known to dominate stands on this substrate.

Lodgepole pine communities cover extensive areas on the Uinta Mountains. These communities are closely associated with quartzitic substrate. The tree is lacking or nearly so on soils derived from limestone such as in the Blind Stream drainage. It is not found on the Tavaputs Plateau where quartzite is unknown.

Lodgepole pine often forms pure stands from about 9,000 to 10,000 ft. Subalpine fir is occasionally an associated tree, but it is excluded in vast areas especially where lodgepole pine occurs in pole or "dog-hair" thickets. At places in upper elevations, grouse whortleberry (Vaccinium scoparium) forms a ground cover while elk sedge forms a ground cover at lower elevations. But in many places the forest floor appears to be nearly devoid of understory plants. However, where opened by fire or by logging, several successional species quickly increase. Ross's sedge (Carex rossii) is probably the most common seral species. Several other sedges, spike trisetum (Trisetum spicatum), strawberry (Fragaria spp.), sheep fescue, coast goldenrod (Solidago spathulata), and low goldenrod (S. multiradiata) are among the many other seral plants.

Lodgepole pine and Engelmann spruce grow together from about 9,800 to 10,500 ft in the Uinta Mountains. Communities formed by these two trees often have an understory of grouse whortleberry. But as in lodgepole pine communities, understory plants are sometimes sparse.

Engelmann spruce communities are found from about 10,500 ft to timberline (about 11,000 ft) in the Uinta Mountains. Near timberline these trees are commonly reduced to the krummholz condition. This tree is abundant on quartzite, limestone, and other substrates in the Uinta Mountains, but apparently it is replaced by blue spruce (Picea pungens) on the Tavaputs Plateau. Small stands of blue spruce are found in mesic places at upper elevations of the Tavaputs Plateau, and it is a common tree along drainages at lower to mid elevations in the Uinta Mountains.

Subalpine meadow communities form pleasant openings in the dense conifer forests of the Uinta Mountains. In dry meadows, timber oatgrass (Danthonia intermedia) is abundant. In somewhat more moist places, tufted hairgrass (Deschampsia caespitosa) is abundant. And in very wet places, a number of sedges such as water sedge (Carex aquatilis), Russet sedge (C. saxatilis), and beaked sedge (C. rostrata) are usually dominant. In boggy places, C. limosa, Eleocharis pauciflora, and Scirpus cespitosus are common. Numerous forbs and other grasses are found in these meadow communities. Some of the common forbs include elephant head (Pedicularis groenlandica), explorer gentian (Gentiana calycosa), whitish gentian (G. algida), fernleaf ligusticum (Ligusticum tenuifolium), and American bistort (Polygonum bistortoides). Plain-leaf willow (Salix planifolia) is common especially along drainages.

Alpine tundra communities cover extensive areas on the Uinta Mountains above timberline. These communities are typically dominated by sedges and grasses such as Carex scirpoidea and tufted hairgrass. Alpine avens (Geum rossii) is an abundant primary succession plant in rocky places. Other forbs that are typical of these communities are moss campion (Silene acaulis), alpine sagebrush (Artemisia scopulorum), and Castilleja pulchella.

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GLOSSARY

Abortive. Imperfectly developed or undeveloped.

Acaulescent. Apparently without a stem, that is, with the main basal leaves and slender, leafless flowering stems appearing above ground level.

Accrescent. Increasing in size after flowering; enlarging with age.

Achene. A dry, one-seeded fruit with a firm close-fitting wall that does not open by any regular dehiscence.

Acorn. The leathery fruit of an oak, containing a single large seed and enclosed basally in a cup formed from bracts.

Acuminate. With a long, tapering point set off rather abruptly from the main body (such as of a leaf).

Acute. With a pointed end forming an acute angle, that is, less than a right angle.

Adnate. Fused or attached to another structure from the beginning of development.

Adventive. Said of an introduced plant that is beginning to spread into a new locality or region.

Alpine. Above timberline.

Alternate. With a single structure of each kind occurring at each level of the axis (such as a stem).
These structures (such as leaves and branches) appear to alternate on opposite sides of the axis but actually are in a spiral arrangement.

Ament. A usually early deciduous spike or raceme of small, bracteate, apetalous, unisexual flowers.

Androgynous. With staminate flowers borne above the pistillate ones.

Annual. A plant completing its life cycle in a year or less.

Anther. The portion of the stamen that produces pollen.

Anthesis. The time when the flower expands and opens, or the process of expansion and opening.

Anthocyanin. Any of a common class of pigments having colors ranging from lavender to purple. These pigments are affected by the acidity or alkalinity of the cell sap, and they change color in approximately the same way as litmus paper, tending toward red in an acid medium and blue in a basic (alkaline) medium.

Anthrocyanous. With anthrocyanin pigments.

Antorse. Directed upward or forward.

Apex. The uppermost part.

Apical. Of the apex.

Apiculate. Terminated by an abrupt, short, flexible point.

Apomictic. Reproducing by apomixis.

Apomixis. Reproduction by seed that has developed from an ovule that was not fertilized.

Appressed. Lying tightly against another (usually larger) organ.

Aquatic. Growing in water.

Arachnoid. With slender, tangled hairs resembling the threads of a spiderweb.

Areole. Diminutive of area; a small, clearly marked space. The term is used most frequently in reference to the small, special spine-bearing areas on the stem of a cactus.

Aristate. With a stiff bristle.

Articulate. With conspicuous segments or joints.

Ascending. Arising at an oblique angle (or on a curve).

Attenuate. With a long, tapering point, this usually set off rather abruptly from the main body of the object, for example, a leaf blade.

Auricle. A small projecting lobe or appendage, generally at the base of an organ.

Auriculate. Having an auricle.

Awl-shaped. With a narrow flattened body tapering gradually upward into a point. See subulate.

Awn. A bristlelike part or appendage.

Awned. With an awn.

Axil. The adaxial angle between two organs, particularly the angle between the upper side of a leaf and the stem.

Axillary. In the axil.

Banner. The upper and usually largest petal in the papilionaceous corolla of a plant of the pea family (of the common type having markedly bilaterally symmetrical flowers). Known also as a standard or a vexillum.

Barbate. Bearded. Diminutive, barbellate, with a beard of fine hairs.

Barbed. With a rigid barb like the barb of a fish hook.

Basal leaves. Leaves at the base of an herbaceous plant, arising from several nodes separated by exceedingly short internodes occurring at about ground level.

Basifixed. Attached at the base.

Beaked. Ending in a firm elongated slender structure.

Bearded. With a tuft of hairs.

Berry. A fleshy or pulpy fruit with more than one seed and formed from either a superior or an inferior ovary. The seeds are embedded in pulpy tissue.

Bidentate. With two teeth.

Biennial. Completing the life cycle in 2 years. Biennial plants usually produce only basal leaves above ground the first year and both basal leaves and flowering stems the second.

Bifid. Forked, that is, ending in two parts.

Bilabiate. Two-lipped. A bilabiate corolla has petals or lobes in two sets commonly with two in the upper and three in the lower.

Bilateral. Two-sided.

Bilaterally symmetrical. Capable of division into only two similar sections, which are mirror images of each other.

Bipinnate. Pinnate and the primary leaflets again pinnate.

Bipinnatifid. Pinnatifid with the primary divisions again pinnatifid.

Bisexual. With both sexes represented in the same individual or organ, such as with stamens and pistils in the same flower.

Bladdery. Inflated with thin walls.

Blade. The broad, usually flat, part of a leaf.

Bloom. A usually waxy, whitish or bluish powder covering the surface of a leaf, stem, fruit, or other organ.

Bract. A leaf subtending a reproductive structure, such as a flower or a cluster of flowers or an ovuliferous scale. Usually the leaf is specialized and at least somewhat dissimilar to the foliage leaves. Diminutive, bracteole, a mere scale.

Bracteate. With bracts.

Bracteolate. With bractlets.

Bractlet. A minor bract.

Bristle. A stiff hair.

Bud. A growing structure at the tip of a stem or a branch, with the enclosing scale leaves or immature leaves (vegetative bud); a young flower that has not yet opened (flower bud).

Bulb. An underground bud covered by fleshy scales, the coating formed from the bases of leaves.

Bulbiferous. With bulbs.

Bulblet. A small underground bulb or bulblike structure produced on the stems, usually in the axils of leaves, or sometimes in the places where flowers ordinarily occur.

Bulbous. Bulblike.

Bur. Any rough prickly covering of a seed or seeds.

Caducous. Falling early, as leaves in Opuntia. In the poppy family, the caducous sepals fall away when the flower opens.

Caespitose. Growing in tufts or mats.

Callosity. A thickened hard structure.

Callus. A hard or tough swollen area.

Calyx. A cup; the sepals of a flower; the outermost series of flower parts.

Calyx tube. A tube formed from the lower portions of the sepals.

Campanulate. Bell-shaped, that is, the shape of an inverted church bell, rounded at the attachment and with a broad flaring rim.

Canescent. Grayish-white or hoary, densely covered with white or gray fine hairs, these usually short.

Capillary. Like an elongated delicate hair or thread.

Capitate. In a dense cluster or head; headed.

Capsular. Pertaining to or formed like a capsule.

Capsule. A dry, many-seeded fruit made up of more than one carpel and splitting open (dehiscent) lengthwise at maturity.

Carinate. With a keel.

Carpel. A specialized leaf that forms either all or part of a pistil.

Carpophore. A receptical or part of a receptical that is prolonged between the carpels.

Cartilaginous. With the texture of cartilage, that is, tough and firm but somewhat flexible.

Caruncle. An appendage at the attachment point (hilum) of a seed.

Caryopsis. The fruit of a grass, that is, a one-seeded, indehiscent fruit with the pericarp adnate to the seed.

Catkin. See ament.

Caudate. With a taillike structure.

Caudex, caudices (plural). A largely underground stem base that persists from year to year and each season produces leaves and flowering stems of short duration.

Caulescent. Having a well-developed leafy stem above ground as opposed to having only what appears to be the leafless stalk of the individual flower or cluster of flowers.

Cauline. Of or on the stem.

Chaff. Dry, membranous scales or bracts.

Chaffy. Resembling chaff.

Chamber. A room. Applied to the cavities (locules or "cells") of an anther or an ovary.

Channelled. With lengthwise grooves, the grooves usually deep.

Chartaceous. Like writing paper.

Chlorophyll. The green coloring of most plants. A substance that aids in making the energy of light available to photosynthesis (manufacture of a simple sugar, glucose, formed in effect from carbon dioxide and water).

Cilia. Hairs along the margin of a structure, placed like the eyelashes on a human eyelid.

Ciliate. With cilia along the margin. Diminutive, ciliolate.

Cinereous. The color of ashes.

Circumscissile. Opening by a horizontal circular line, the top coming off like a lid.

Clavate. Gradually enlarged upward after the manner of a baseball bat or the traditional giant's club, that is, either tapering gradually upward or with an enlarged knob at the summit.

Claw. The narrow stalk at the base of a petal, this resembling the petiole of a leaf.

Cleft. Indented about half way or a little more than half way to the base or to the midrib.

Climbing. Supported by clinging.

Clone. An aggregate of stems produced asexually from one sexually produced seedling as is common in aspen.

Coalescence, coalescent. The union of similar parts, as for example, the petals of a flower.

Coetaneous. With the flowers developing the same time as the leaves.

Collar. The outer side of a grass leaf at the juncture of the blade and sheath.

Colonial. In colonies. Used primarily in reference to plants occurring in clumps connected by rhizomes.
 Column. A slender aggregation of coalescent stamen filaments, as in some members of the mallow family.
 Coma. A tuft of hairs on the end of a seed.
 Commissure. The surface along which two or more locules are joined to each other.
 Compound. Composed of two or more similar elements. For example, a panicle is a compound of spikes, racemes, or corymbs--that is, composed of two or more of any one of these elements; a compound leaf is composed of two or more leaflets; a compound pistil is composed of two or more coalescent carpels.
 Compressed. Flattened, particularly from side to side (laterally compressed).
 Concave. Saucerlike; shallowly hollowed.
 Cone. A reproductive structure composed of an axis (branch) bearing sporophylls or other seed-bearing or pollen-bearing structures.
 Cone scale. Scale of a cone subtending a naked ovule.
 Confluent. Running together; blending into one.
 Coniferous. Cone-bearing.
 Connective. The middle part of an anther connecting the two pollen sacs or two pairs of pollen sacs.
 Connivent. Standing together. Stamens with their tips ending against each other are connivent.
 Convex. Rounded outward.
 Cordate. Of a conventional heartshape, the length greater than the width, the petiole attached in the basal sinus, the apex acute; applied also to the basal indentation of a leaf or other structure.
 Coriaceous. Leathery.
 Corm. A bulblike structure formed by enlargement of the stem base. It is sometimes coated with one or more membranous layers.
 Corolla. The petals of a flower, that is, the inner series (or several series) of the perianth.
 Corolla lobe. A lobe is longer than a tooth. Lobe may be applied in a broad sense to cover lobes, parts, or divisions.
 Corolla tube. The hollow cylinder formed by coalescence of petals.
 Corrugation. A ridge or groove of a corrugated (wrinkled or folded) surface.
 Corymb. A flat-topped cluster of flowers; fundamentally like a raceme but with the pedicels of the lower flowers longer and the pedicels of the upper flowers gradually shorter. As a result of this arrangement, at a middle stage of development there may be fruits on the outside, buds in the center, and flowers in between. (The opposite of the arrangement in a cyme.)
 Corymbose. Arranged in corymbs.
 Cotyledon. One of the first leaves developed in the embryo in the seed at the joining point of the hypocotyl and the epicotyl.
 Creeping. The stem growing along the ground and producing adventitious roots.
 Crenate. With rounded teeth or scalloped. Diminutive, crenulate.
 Crisped. Irregularly curled or crooked.
 Culm. The stem of a grass. The term is also applied sometimes to sedges.
 Cultivar. A variety originating and persistent under cultivation, usually derived and maintained by selective breeding or vegetative propagation (a cultivated variety).
 Cuneate, cuneiform. Wedge-shaped; essentially a narrow isosceles triangle with the distal corners (those away from the petioles) rounded off. The petiole of a cuneate leaf is attached at the sharp angle.
 Cupule. A little cup, the term being applied particularly to the cup of an acorn, which is an involucre formed from coalescent bractlets.
 Cyme. A broad, more or less flat-topped cluster of flowers with terminal or central flowers developing before the outer ones.
 Cymose. With cymes or with cymelike clusters of flowers.
 Deciduous. Falling off at the end of each growing season.
 Decompound. More than once compound (or divided).
 Decumbent. Reclining except at the apex.
 Decurrent. Leaf bases that continue along the stem as wings or lines.
 Deflexed. Abruptly bent or turned downward.
 Dehisce. To split open along definite lines.
 Dehiscence. The process of splitting open at maturity.
 Deltoid. Of the shape of the Greek letter delta, that is, an equilateral triangle, the attachment being in the middle of one side.
 Dentate. With angular teeth projecting at right angles to the edge of the structure (such as a leaf).
 Diminutive, denticulate.
 Depauperate. Stunted, that is, small. The term is applied particularly if the plant is undeveloped as compared with others of the species, but also if it is a representative of a small species.
 Depressed. Flattened from above as if pushed downward.
 Diadelphous. In two brotherhoods, the term being applied to stamens coalescent in two sets. The common usage is for members of the pea family in which nine of the 10 stamens are coalescent and the other stands alone.
 Dichotomous. Forking, with two usually equal branches at each point of forking.
 Dicotyledonous. With two cotyledons.
 Didynamous. In two pairs, the pairs not being of the same length. The term is applied to stamens.
 Diffuse. Spreading widely and diffusely in all directions.

Digitate. Resembling the fingers of a human hand, that is, with several similar structures arising at a common point. See palmate.

Dioecious. The flowers unisexual and the staminate on one individual and the pistillate another.

Disc, disk. In the sunflower family or ASTERACEAE, the central portion of the compound receptacle bearing the disc flowers.

Disc flower. In the sunflower family or ASTERACEAE, one of the flowers with tubular corollas.

Discoid. Resembling a disc. In the sunflower family or ASTERACEAE a discoid head is one having only disc flowers and no ray flowers.

Dissected. Divided into narrow segments.

Divaricate. Spreading widely, that is, divergent.

Divergent. Spreading away from each other.

Divided. Indented essentially to the base or midrib.

Dorsal. On the outer surface of an organ, that is, the side away from the axis (such as the back of a leaf); the abaxial surface of a structure such as a petal or a leaf. See ventral.

Dorsiventral. A structure having a clear differentiation of a back and front or upper and lower side.

Double samara. A samara with two locules and two wings.

Double-serrate. Having small teeth set on larger teeth.

Drainage. The watershed or area into which the excess precipitation of a region drains.

Drupe. A fruit with a fleshy exocarp and a hard, stony endocarp about each seed. The classical example is one of the pitted fruits, that is, a plum or cherry.

Ellipsoid. Elliptical in outline with a three-dimensional body. See elliptic.

Elliptic, elliptical. In the form of an ellipse, that is, about one and one half times as long as broad, widest at the middle, and rounded at both ends. A two-dimensional figure.

Embryo. The new plant enclosed in the seed. It consists of an axis and the attached cotyledons and young secondary leaves.

Emersed. Above water.

Endemic. Restricted in occurrence to a particular geographical area.

Endosperm. A cell layer occurring in at least the immature seeds of flowering plants.

Entire. Without divisions or toothings of any kind.

Ephemeral. Lasting for a brief period, for example, 1 day.

Epicotyl. The portion of the embryo of a seed plant just above the cotyledon(s); the young stem.

Equitant. With the leaves folded around a stem after the manner of the legs of a rider around a horse or sometimes with the leaves folded around each other in rows, for example, in Iris.

Erose. With the margin appearing to have been gnawed.

Etiolated. White through failure to develop chlorophyll. Etiolated stems (for example, those developed in darkness or weak light) are elongated and spindly as well.

Even pinnate. Without a terminal leaflet. See odd pinnate.

Exfoliating. Separating into thin layers or strips.

Exserted. Projecting beyond the usual containing structure, as, for example, stamens projecting beyond the rim of a corolla or the midrib of a leaf that is projected beyond the margin of the blade.

Family. A group of related plants forming a category ranking above a genus.

Fasciate. Literally, in a bundle or bundled together. The term is also applied, as fasciated, to branches remaining parallel and grown abnormally together.

Fascicle. A bundle or cluster.

Fascicled. In bundles or clusters.

Fasciculate. In bundles or clusters.

Fastigiate. Erect and close together.

Fertile. Productive. The term is used to mean capable of producing fruit or spores. Sometimes a staminate flower is referred to as infertile or sterile because it produces no seeds.

Fibrous root system. A root system with several major roots about equal and arising from approximately the same point.

Filament. A thread; the stalk of a stamen.

Filiform. Threadlike, that is, long, slender, and cylindroidal.

Fimbriate. Fringed, that is, resembling the fringe on the sleeve of an early American buckskin shirt.

Fistulose. Hollow and cylindroidal.

Flaccid. Limp, floppy, wilted.

Flexuous. Curved in first one direction, then the opposite, or weakened, easily bent or curved.

Floccose. With tufts of woolly hair.

Floral cup. A cup bearing on its rim the sepals, petals, and stamens.

Floral tube. An elongated, slender floral cup.

Floret. A small flower; the flower of a grass and the two immediately enclosing bracts, that is, the lemma and palea.

Floriferous. Bearing flowers.

Flower. A complex strobilus formed at the end of a branch, including the receptacle and bearing sepals, stamens, petals, and pistils, or some of these.

-foliate. -leaved, an example being 3-foliate, or trifoliate, that is, with 3 leaves or 3-leaved.

Follicle. A dry fruit formed from a single carpel, containing more than one seed and splitting open along the suture. The term is sometimes applied to similar fruits splitting only along the midrib.

Fornice. A small scale or appendage in the tube or throat of a corolla such as in Cryptantha.
Free. Separate from other organs.
Free-central placentation. An arrangement of ovules in which they are attached to a central stalk of a 1-chambered ovary.
Fruit. A mature ovary with its enclosed seeds and sometimes with attached external structures (as with an inferior ovary, the floral cup or tube).
Funnelform. In the shape of a funnel.
Fusiform. In the shape of a spindle, that is, widest at the middle and tapering gradually to each pointed end, the body being circular in cross section.
Galea. A hood formed from a portion of the perianth derived, for example, from the two upper petals coalescent indistinguishably into one (in some members of the mint and snap-dragon families) or from the upper sepal (in the monkshood).
Galeate. With a galea.
Gamopetalous. With all the petals coalescent. See sympetalous.
Genus, genera (plural). A group of related species or sometimes a single species.
Gibbous. Swollen or distended on one side.
Glabrate, glabrescent. At first hairy but later becoming glabrous.
Glabrous. Not hairy.
Gland. A secreting organ. Usually glands are recognized by their secretion, which accumulates into droplets or lumps. Often plant glands are on the tips of hairs.
Glandular. Bearing glands, small cellular organs secreting oils, tars, resins, and so forth. Often only the secretion is visible.
Glaucous. Covered with a white or bluish powder or bloom, this often composed of finely divided particles of wax. Example: the bloom on a plum.
Globose, globular. Spheroidal.
Glochid. A sharp hair or bristle tipped with a barb.
Glochidiate. Barbed at the tip.
Glomerate. In compact clusters.
Glume. One of the two chafflike bractlets at the base of a grass spikelet. The glumes do not enclose flowers.
Glutinous. Covered with sticky material.
Gynecandrous. With pistillate flowers borne above the staminate ones.
Gynobase. An enlarged or elongated portion of the receptacle bearing the pistil.
Habit. The general appearance of a plant.
Habitat. The type of locality or the set of ecological conditions under which the plant grows.
Hair. A slender cellular projection. See trichome.
Hastate. More or less sagittate (arrow-head shaped) but with divergent basal lobes.
Head. A cluster of sessile or essentially sessile flowers or fruits at the apex of a peduncle. Essentially a spike with a very short axis. The marginal flowers bloom first, the central last.
Helicoid cyme. A coiled inflorescence. The main stem terminates in a flower and a single bud just below grows out as a stem but terminates also in a flower, the process being repeated many times and always in the same direction.
Hemispheric. With the shape of a sphere but cut in half.
Herb. A nonwoody plant, or not woody above ground level.
Herbaceous. Not woody.
Herbarium. A collection of pressed plant specimens.
Hetro-. A prefix, meaning different (with two or more kinds).
Hip (of a rose). A floral cup that usually becomes enlarged and fleshy at fruiting time. The true fruits are the achenes inside.
Hirsute. With fairly coarse more or less stiff hairs.
Hirtellous. Minutely hirsute.
Hispid. With rigid or stiff bristles or bristly hairs.
Homomorphic. All of one kind. With similar morphology.
Homostylic. With styles of one kind.
Hood. A hoodlike structure, often formed from a petal or a sepal or more than one of either.
Hyaline. Thin and membranous, being transparent or translucent.
Hybrid. Produced by dissimilar parents.
Hypocotyl. The portion of the axis of an embryo of a seed plant just below the cotyledon(s).
Imbricate. Overlapping like the shingles on a roof.
Incised. Cut deeply and sharply into narrow, angular divisions.
Included. Not protruding beyond the normal surrounding structures.
Indigenous. Native in a particular region.
Indusium. An epidermal outgrowth or reflexed and modified leaf margin which covers the sori of many ferns.
Inferior. Below. An inferior ovary is distinguished by being adnate to the floral cup or tube. Therefore, it appears to be embedded in the pedicel below the other flower parts.
Inflorescence. The flowering area or segment of a plant.
Inserted. Attached upon another structure.

Internode. The portion of the stem between two nodes.

Introduced. Brought in from another area.

Involucel. The involucre of a secondary umbel (of a compound umbel).

Involucral. Pertaining to an involucre.

Involucrate. With an involucre.

Involucre. A series of bracts surrounding a flower cluster or sometimes a single flower.

Involute. Rolled inward.

Irregular. Used in botany to indicate a bilaterally symmetrical structure, for example, a bilaterally symmetrical flower.

Keel. A ridge along the outside of a fold, like the keel of a boat.

Key. An outline prepared for use in identifying plants by a process of elimination.

Lanate. With long woolly hair.

Lanceolate. Lance-shaped; four to six times as long as broad, broadest toward the basal (attachment) end, sharply angled at both ends and especially the apical end, the sides being curved at least along the broad part.

Lateral. At the side or sides, or along the margins.

Leaflet. A leaflike segment of a compound leaf.

Legume. A dry, several-seeded fruit of the pea family formed from a single capel and dehiscent on both margins (the suture and the midrib).

Lemma. The lower member of the pair of bracts surrounding a grass flower, this bract enclosing not only the flower but the other bract (palea).

Lenticular. Lens-shaped, that is, biconvex.

Ligule. A flat membranous scale produced at the point of joining of the sheath and the blade of a grass leaf.

Limb. The expanded and spreading parts of a sympetalous corolla or the broad portion of a petal; a branch.

Linear. Long and narrow, the sides being parallel and the length at least eight times the width, tending to be an elongated rectangle.

Lip. A lobe, usually of a flower.

Lobe. A projecting segment of a leaf or other organ that is too large to be called a tooth.

Lobed, lobate. In the broad sense, from moderately to deeply indented toward the base or midrib; in the restricted sense, indented significantly but less than half way to the base or midrib. The broad sense includes lobed (restricted sense), cleft, parted, and divided.

Locule. The cavity of an anther or an ovule, that is, a pollen chamber or a seed chamber.

Loment. A legume divided by constriction into a linear series of segments, each containing one seed.

Longitudinal. Lengthwise.

Malpighian hair. A hair with two branches and almost no stalk, these appearing to be a single straight hair with the attachment point at the middle.

Marcescent. Persisting on the plant after withering.

Megagametophyte. A female gametophyte; the usually larger gametophyte developed from a megaspore, as opposed to the smaller from a microspore.

Megaspore. The larger type of spore developed by a plant with spores of two sizes or kinds.

Membranaceous, membranous. Thin, soft, pliable, and translucent.

Mericarp. A portion of a fruit that appears to be a whole fruit.

-merous. Composed of parts, for example, 3-merous or trimerous, meaning with 3 parts in each series, such as 3 sepals or 3 petals.

Midrib. The middle vein of a leaf or other structure.

Monadelphous. In one brotherhood; referring to stamens with their filaments coalescent into a single tube.

Monocotyledonous. With only one cotyledon.

Monoecious. With unisexual flowers, the staminate and the pistillate occurring on the same individual.

Morphology. The study of form and structure of plants.

Mucro. A short pointed structure terminal upon the organ (such as a leaf) that bears it and of about the same texture as the supporting organ (such as a leaf blade).

Mucronate. With a mucro.

Muricate. Roughened by the presence of short, hard points.

Naturalized. Established thoroughly after introduction from another region.

Node. A "joint" of the stem, that is, the area that bears a leaf or a pair of or several leaves, usually each with a branch or a bud in its axil.

Nut. A hard, relatively large, indehiscent, 1-seeded fruit. Diminutive, nutlet.

Obcordate. A conventional heart-shape but with the attachment at the point instead of at the indentation.

Ob lanceolate. Lanceolate but with the narrowest part toward the attachment.

Oblique. With the sides unequal or slanting.

Oblong. With the length roughly two to three times the breadth, the sides parallel, and with equal and more or less obtuse ends.

Obovate. Ovate but with the narrow part toward the attachment.

Obvoid. Ovoid, but with the attachment at the small end.

Obsolescent. Rudimentary or having nearly disappeared; becoming extinct.

Obsolete. Rudimentary or having practically or wholly disappeared.
 Obtuse. Blunt, that is, forming an obtuse angle, or somewhat rounded instead of strictly angular.
 Ochroleucous. Yellowish-white.
 Odd pinnate. With a terminal leaflet.
 Opposite. Two organs (such as leaves) occurring at the same level and on the opposite sides of the supporting structure (such as a stem).
 Orbicular. Circular or nearly so in outline.
 Orifice. Opening.
 Oval. Broadly elliptic.
 Ovary. The lower part of the pistil, which contains the ovules or later the seeds.
 Ovate. Egg-shaped; a two-dimensional object about one and a half times as long as broad, with rounded ends, and widest toward the base or attachment point.
 Ovoid. Ovate, but a three-dimensional figure.
 Ovulate. Producing ovules.
 Ovule. The structure that after fertilization develops into a seed.
 Palea. The upper bract of the pair that encloses the grass flower, this bract being enclosed by the larger lower bract or lemma.
 Palmate. Descriptive of compound leaves in which leaflets arise at the same point, that is, at the apex of the petiole.
 Palmately. In a palmate manner. A leaf may be palmately lobed, cleft, parted, or divided.
 Palmatifid. Palmately divided and almost but not quite palmate.
 Panicle. A cluster of associated spikes, racemes, or corymbs.
 Paniculate. In a panicle; similar to a panicle.
 Papilionaceous flower. One with a banner petal, 2 wing petals, and 2 partly connate keel petals.
 Papillose, papillate. Bearing minute rounded projections. (Papilla. An individual projection.)
 Pappus. The specialized calyx of members of the sunflower family; composed of bristles or scales.
 Parallel veined. With the principal veins parallel and usually close together.
 Parasitic. Living upon food or water derived from another individual, ordinarily of another species.
 Noun, parasite.
 Parted. Indented more than half way or nearly all the way to the base or midrib.
 Partly inferior (ovary). With only the basal portion of the ovary adnate to the floral cup.
 Pectinate. Divided like the teeth of a comb.
 Pedicel. The internode below a flower.
 Peduncle. The stalk of a cluster of flowers or the next to the last internode below a single flower.
 Peltate. Shieldlike; supported by a stalk attached near the center of the lower surface (thus resembling a coin balanced on the end of a pencil).
 Pendulous. Hanging downward.
 Perennial. Continuing to grow year after year.
 Perfect. Descriptive of a flower having both functional pistils and functional stamens.
 Perfoliate. Descriptive of a sessile leaf encircling the stem.
 Perianth. A collective term for the calyx and the corolla.
 Perianth tube. A tube formed by coalescence and adnation of the lower portions of the sepals and petals.
 Pericarp. The wall of a matured ovary, that is, the wall of the fruit or the inner wall if the ovary is inferior.
 Perigynium, perigynia (plural). The saclike scale enclosing the achene in the genus *Carex*.
 Persistent. Remaining attached longer than might be expected, for example, a calyx that remains on the receptacle or floral cup until fruiting time.
 Petal. One member of the series of flower parts forming the corolla. See corolla.
 Petaloid. Resembling a petal in color and texture.
 Petiolate. Having a petiole.
 Petiole. The stalk of a leaf supporting the expanded portion or blade.
 Petioled. With a petiole.
 Petiolulate. With a petiolule.
 Petiolule. The stalk of a leaflet.
 Phloem. A conducting tissue that usually carries manufactured food downward to places of use or storage.
 Phyllary. An involucre bract, the term often being used for the ASTERACEAE or sunflower family.
 Pilose. Hairy, the hairs being elongated, slender, and soft.
 Pinnate. With two rows of like parts (such as leaflets or veins) arranged on either side of a main axis (rachis or midrib). A pinnately compound leaf more or less has well-developed leaflets with flattened blades that are petiolulate or at least jointed to the rachis.
 Pinnately. In a pinnate manner. A leaf may be pinnately lobed, parted, cleft, or divided.
 Pinnatifid. Deeply pinnately divided, the segments being not quite separate from each other. In general, a pinnatifid leaf as opposed to a pinnately compound leaf has segments that are not petiolulate nor jointed to the rachis but rather are confluent with it.
 Pistil. The organ of a flower that bears ovules and later seeds. It is composed of at least one ovary, stigma, and style, and is formed from one or more carpels.
 Pistillate. Having pistils, that is, a flower that has pistils but no stamens.
 Pith. The central soft tissue of a stem.

Plumose. Like a feather, the term being applied to hairs that have finer hairs attached along each side.

Pod. A dehiscent dry fruit.

Pome. A fleshy fruit with several seed chambers, this formed from an inferior ovary, the fleshy tissue being largely the floral cup, the seeds not embedded in pulp. Apples and pears are classical examples.

Porrect. Directed outward and forward.

Poricidal. Dehiscing by pores.

Precocious. Appearing early in the season, for example, flowers occurring before the leaves.

Prickle. A sharp, pointed outgrowth from the superficial tissues of the stem, that is, from the epidermis or the cortex, as in a rose prickle.

Primary leaflet. A leaflet of the first degree in a bipinnate or more complex compound leaf.

Procumbent. Lying on the ground, but not rooting at the nodes.

Prostrate. Flat upon the ground.

Puberulent. Finely and minutely pubescent, the hairs short.

Pubescent. Hairy or downy, usually with fine soft hairs. Commonly the term is used to indicate hairiness of a generalized instead of a specialized type, and it is used loosely to cover any kind of hair. Noun, pubescence.

Punctate. Dotted with depressed glands or colored spots.

Pustular, pustulate. Blistered.

Pyramidal. Pyramid-shaped.

Raceme. An inflorescence composed of pedicelled flowers arranged along an axis that elongates for an indefinite period. The lower flower blooms first and eventually the terminal bud forms the last flower.

Racemose. In racemes; similar to racemes.

Rachilla. A secondary axis. See rachis.

Rachis (or Rhachis). The axis of a pinnate leaf or of an inflorescence.

Radiate. Spreading from a common center; descriptive of a head that includes ray flowers (sunflower family).

Radially symmetrical. Capable of division into three or more similar sections.

Ray. A pedicel or peduncle within an umbel; a ray flower or its corolla.

Ray flower. In the sunflower family, one of the flowers with a ligulate (strap-shaped or flattened) corolla.

Receptacle. The apical area beyond a pedicel, that is, the portion that bears flower parts. The receptacle consists of several or many nodes and short internodes.

Recurved. Curved downward or backward.

Reduced. Small but probably derived from larger forerunners.

Reflexed. Bent or turned abruptly downward.

Regular. Uniform in shape or structure; radially symmetrical (especially as applied to a corolla).

Reniform. Kidney-shaped or bean-shaped, with the attachment in the indentation, the width greater than the length, the apex rounded.

Resinous. Producing resin, coated with a sticky substance.

Reticulate. In a network or a pattern that appears like a network.

Retrose. Turned back or downward.

Retuse. With a shallow and rather narrow notch in a broad apex.

Revolute. With the margins or the apex rolled backward.

Rhizomatous. With a rhizome; rhizomelike.

Rhizome. A horizontal, underground stem.

Rhombic. More or less diamond-shaped and attached at one of the sharper angles.

Rib. A prominent raised nerve or vein.

Root. The underground portion of the main axis of a plant or the branches of the axis.

Rosette. A circular cluster.

Rostrate. With a beak.

Rotate. Spreading; wheel-shaped or saucer-shaped.

Rounded. Gently curved.

Rudiment. A vestigial organ.

Rugose. Wrinkled. Diminutive, rugulose.

Sagittate. Arrow-head shaped.

Salverform. Descriptive of a sympetalous corolla with the slender basal tube abruptly expanded into a flat or saucer-shaped upper portion.

Samara. A dry, indehiscent fruit with a wing.

Saprophyte. A plant that lives upon dead organic matter such as the leaf mold on forest floors. Adjective, saprophytic.

Scabrous. Rough to the touch, with minute rough projections.

Scale. A thin, membranous structure; a small more or less triangular leaf; a chafflike bract; a flattened hair.

Scape. A flowering stem that bears no leaves, or only a small bract or a pair or whorl of bracts.

Scapose. With a scape or in the form of a scape.

Scarious. Dry, thin, membranous, nongreen, and translucent.

Schizocarp. A fruit that splits into one-seeded sections (mericarps).

Scorpioid. Often used as descriptive of an inflorescence that is coiled in the bud stage, as in the forget-me-not or fiddle-neck. This is a helicoid cyme although it appears to be a spike or a raceme.

Scurfy. With scalelike particles on the surface (the scales resembling human dandruff).

Secondary leaf. One produced above the cotyledon(s) or primary leaf or leaves.

Secund. Turned or directed to one side usually by twisting.

Seed. A matured ovule consisting of an integument (seed coat), an enclosed nucellus (sporangium), the remains of the megagametophyte, the endosperm (in flowering plants), and the embryo.

Sepal. One of the flower parts of the outer series, the sepals forming a calyx. See calyx.

Septate. Divided by partitions.

Sericeous. Silky.

Serotinous. Late; in willows the catkins developing later than the leaves (as in certain species).

Serrate. With teeth like saw-teeth, that is, angular and directed forward. Diminutive, serrulate.

Sessile. Without a stalk, that is, "sitting."

Seta. A bristle, a bristlelike hair.

Setose. Covered with bristles.

Sheath. A tubular cover. An example is the basal portion of a grass leaf, which surrounds the stem.

Sheathing. Covering or enclosing.

Shrub. A woody plant not having a main trunk but several main branches. In general, shrubs are smaller than trees.

Silicle. A short silique, that is, one usually not more than two or three times as long as broad.

Silique. The elongate capsular fruit of the mustard family, which has two seed chambers separated by a false partition from the middle of one placenta to the middle of the other.

Silky. Covered densely with appressed, soft, straight hairs.

Sinuate. With a wavy margin, the margin winding strongly inward and outward.

Sinus. A cleft, recess, or embayment.

Sorus, sori (plural). A cluster of sporangia, as in ferns.

Spathe. A large bract enclosing an inflorescence at least when it is young. Spathes are either white or highly colored but usually not green.

Spatulate. An oblong or somewhat rounded structure with the basal end long and tapered; the shape of a spatula.

Species (singular and plural). A group of related varieties or often a single unit. See taxon. The definition of taxon applies to categories of all ranks.

Spicate. Spikelike.

Spike. An inflorescence in which the sessile flowers are arranged along an axis. The basal flower blooms first; the last one formed is at the apex.

Spikelet. The small densely bracteate spike of a grass or a sedge. Also, diminutive of spike.

Spine. A sharp more or less woody or horny outgrowth from a leaf or a part of a leaf, sometimes representing the entire leaf.

Spinose. With spines; spinelike.

Sporadic. Of irregular occurrence here and there; not forming a continuous population.

Sporangium, sporangia (plural). A spore-case.

Spore. A simple, one-celled reproductive structure.

Sporocarp. A special hard or leathery structure containing sporangia or a sporangium.

Spur. An elongated sac produced from a part of the flower, as in the larkspurs from a sepal or in the columbines from a petal.

Squarrose. With widely spreading or recurved tips.

Stamen. The pollen-producing structure of a flowering plant, consisting of an anther (which includes pollen sacs) and of a filament (stalk).

Staminate. With stamens but not pistils.

Staminode. A sterile stamen, that is, without an anther or at least not producing pollen.

Stellate. Star-shaped; descriptive of hairs branched so that the hair appears like a star.

Sterile. Not producing pollen or seeds.

Stigma. The apical portion of a pistil, that is, the portion receptive to pollen.

Stipe. A stalk. The term is applied to a special stalk under the pistil of a flower.

Stipitate. With a stipe.

Stipular. In reference to stipules.

Stipule. One of a pair of appendages at the base of the petiole or the leaf base at the point of attachment to the stem. These structures may be either thin and scalelike, thickened and hard, green and leaflike, or reduced to mere glands. Occasionally they are specialized as spines.

Stolon. A runner, that is, a branch that grows along the ground and produces adventitious roots.

Stoloniferous. With stolons.

Stramineous. Straw-colored.

Striate. With fine longitudinal lines or streaks.

Strigose. Covered with depressed, sharp, thin, straight hairs.

Strobilus. A cone-like reproductive structure composed of a central axis or branch bearing sporophylls.

Style. The tubular upper or middle part of a pistil connecting the stigma and the ovary.

Stylopodium. A special swelling on the base of the style as in the members of the parsley family.

Submersed. Submerged.

Subspecies. A taxon of a rank between species and variety.

Subulate. Awl-shaped, that is, more or less flat, narrow, tapering gradually from the base to the sharp apex.

Succulent. Fleshy and juicy like a branch of a cactus, the structure (leaf or stem) much thicker than in most plants; applied as an adjective to fruits; applied as a noun to a plant with succulent parts, especially stems or leaves.

Suffrutescent. With the lower part of the stem just above ground level somewhat woody and living over from year to year.

Superior. Above. A superior ovary is not adnate to a floral cup.

Symmetrical. Balanced, the parts similar to each other. The flower, for example, may be radially symmetrical, that is, capable of division into three or more similar parts, or bilaterally symmetrical, capable of division into only two similar parts.

Sympetalous. All the petals coalescent at least basally. See gamopetalous.

Synobasic. With the base united.

Synonym. A name that is not used because one applied earlier designates the same plant or because the same name was used earlier for a different plant.

Synonymous. With the same meaning.

Synonymy. See synonym. This refers to the series of discarded names applied to a single taxon.

Taproot. The primary root, when it is larger than the others.

Taxon, taxa (plural). A category used in classification, for example, a variety, species, genus, or family. A living taxon is a reproducing natural population or system of populations of genetically related individuals. Ranks of plant taxa (divisions, classes, orders, families, genera, species, and varieties) depend upon the degree of their differentiation and isolation from each other.

Tendril. An elongated twining segment of a leaf or a branch, this usually supporting the stem.

Tepal. A term used for sepals and petals that are similar and not easily distinguished from each other; used in the buckwheat family for the sepals of two series, there being no corolla.

Terete. Slender and more or less cylindroidal, approximately circular in any cross section, but of varying diameter.

Ternate. In three's.

Tessellate. Like a cobblestone pavement.

Thallus. A leaflike plant body not differentiated into roots, stems, or leaves.

Thorn. A modified stem with a sharp point.

Throat. The opening of a sympetalous corolla or a synsepalous calyx, that is, the expanding part between the proper tube and the limb (spreading upper portion).

Tomentose. Woolly, that is, densely covered with matted hairs, which usually are not straight.

Toothed. With minor projections and indentations alternating along the margin.

Trailing. Prostrate but not rooting.

Transcorrugated. Corrugated in opposing directions.

Tree. A woody plant with a main trunk. Trees in general are larger than shrubs.

Trichome. Any hairlike outgrowth of the epidermis.

Trifoliate. With three leaflets.

Trigonous. Three-angled.

Truncate. "Chopped off" abruptly; ending abruptly.

Tuber. A thickened short underground branch of the stem serving as a storage organ containing reserve food. An example is a potato.

Tubercle. Diminutive of tuber, but not necessarily an underground structure; usually used in reference to processes or bumps on a surface.

Tuberculate. With tubercles, that is, processes or bumps.

Tuberiferous. With tubers.

Tubular. Forming an elongate hollow cylinder.

Turbinate. Top-shaped, that is, more or less in an inverted cone.

Turions. A small, bulblike offset borne near or below the soil surface, as in some species of Epilobium.

Umbel. An inflorescence with the pedicels of the flowers arising from approximately the same point. A compound umbel is an umbel of umbels.

Umbellate. Like an umbel, or in the form of an umbel.

Undulate. With the margin irregular and forming a wavy line, that is one that winds gently in and out.

Unisexual. Of only one sex. Descriptive of a flower having only stamens or only pistils, not both, or of a gymnosperm producing only pollen or only ovules.

Urceolate. Urn-shaped.

Utricle. A small, 1-seeded, more or less indehiscent fruit that appears to be inflated, that is, with a relatively thin pericarp more or less remote from the single seed.

Variety. The smallest taxon usually recognized. See taxon. A natural population or population system.

Vascular. Containing xylem and phloem (conducting tissues).

Vascular plant. One with the vascular tissues xylem and phloem.

Venation. The type of veining.

Ventral. The side toward the axis, for example, the upper side of a leaf. See dorsal.

Verticil. A whorl or a cycle.

Verticillate. Arranged in a whorl, cycle, or verticil.

Villous. With long, soft, more or less interlaced hairs.

Viscid. Sticky.

Wavy. See undulate.

Weed. An introduced or less commonly a native plant that grows where it is not wanted.

Wing. A thin, membranous or leathery expansion on the surface of an organ, for example, of a fruit; one of the two lateral petals of a papilionaceous corolla.

Woolly. Covered with long, matted hairs that are not straight. See tomentose.

Xylem. The principal cells forming the wood conducting elements, which usually carry water and dissolved salts and sometimes previously stored food upward from the roots to the leaves.

KEY TO FAMILIES

- 1 Plants aquatic; leaves submerged, or some or all of them floating; inflorescence submerged or floating or sometimes aerial, but then usually not extending much above the water-surface.....KEY 1 P. 2
- 1 Plants not aquatic, sometimes growing in water but then some or all of the leaves emergent and not floating; leaves sometimes much reduced but then the inflorescence well elevated above the surface of the water
 - 2 Plants parasitic or saprophytic, growing on trees, or if not on trees then devoid of chlorophyll and not at all green; leaves obsolete or scalelike.....KEY 2 P. 3
 - 2 Plants not parasitic or saprophytic, with chlorophyll and almost always more or less green, or with well developed leaves
 - 3 Plants not producing flowers or seeds, reproducing by spores; aerial stems and scapes often lacking or else terete, hollow, and sheathing-jointed, or plants mosslike and evergreen (ferns, horsetails, and spikemosses).....KEY 3 P. 4
 - 3 Plants producing flowers and seeds (the flowers sometimes small and inconspicuous or converted into bulblets), with aerial stems or scapes, or flowers sometimes sessile in a basal rosette of leaves, the stems sometimes hollow but not sheathing-jointed, rarely both mosslike and evergreen
 - 4 Stems spiny and succulent; leaves lacking, or essentially so; flowers showy with several to numerous petals; stamens numerous (prickly pears and other cacti).....CACTACEAE
 - 4 Plants not as above in all features
 - 5 Plants vines or vinelike.....KEY 4 P. 4
 - 5 Plants not vines
 - 6 Plants woody above ground level, trees and shrubs.....KEY 5 P. 4
 - 6 Plants herbaceous above ground level
 - 7 Leaves strongly sheathing at the base and not opposite or flowers 3- or 6-merous or both; leaf blades mostly parallel-veined, simple, entire, or rarely basally lobed, sometimes lacking and leaves reduced to bladeless sheaths [class Liliopsida (Monocotyledons), rushes, sedges, grasses, lilies, irises, orchids, and similar plants].....KEY 6 P. 7
 - 7 Leaves not sheathing, or if so then mostly opposite or compound, the blades often but not always pinnately, palmately or reticulately veined, simple or compound, entire, toothed or variously lobed or dissected, rarely lacking; flowers mostly 2-, 4-, or 5-merous or multiples there of [class Magoliopsida (Dicotyledons)]
 - 8 Flowers sessile, in heads subtended by and partly enveloped in an involucre of separate bracts (or if the involucre united then prickly and forming a bur); ovary inferior
 - 9 Leaves simple, opposite
 - 10 Plants with prickles (these often recurved) on the angles of stems, lower midrib of leaves and involucral bracts; leaves sessile, connate; heads brushlike, with each of the numerous flowers subtended by an awned chaffy receptacular bract that surpasses the flower; stamens 4; corollas 4-lobed, white to pale purple.....DIPSACEAE
 - 10 Plants not prickly; leaves various; heads not as above; stamens mostly 5; corollas various
 - 11 Corollas all salverform, white or pink, showy; pappus lacking; leaves entire, petioled; heads solitary on long peduncles.....NYCTAGINACEAE
 - 11 Plants not as above in all features.....ASTERACEAE
 - 9 Leaves compound or alternate or all basal.....ASTERACEAE
 - 8 Flowers not both sessile and in heads subtended by free bracts (involucres if present not forming a bur), (note: a few taxa of Eriogonum might be keyed above, except with close observation they have pediceled flowers and the ovary is superior)
 - 12 Flowers sweetpea-type (the corolla papilionaceous), the uppermost petal (banner) the largest and more or less turned 90 degrees to the lower ones, the lateral petals (wings) equal and more or less enfolding the lower most petals (keel), which are united and strongly folded and more or less keel-shaped; stamens 10, 9 with united filaments forming a tube and the other 1 free, or all free; fruit a legume or a loment; leaves trifoliate, once pinnate, once palmate or rarely simple (pea family).....FABACEAE
 - 12 Plants not as above in all features (flowers similar in FUMARIACEAE but then the leaves 2-3 times pinnate)
 - 13 Petals 4, free, sometimes lacking but then the sepals 4 and free; sepals 4 or sometimes 2 and deciduous; stamens (4) 6 or 8, or if more numerous than plants keyed both ways (mustards, evening primroses, and others).....KEY 7 P. 8

- 13 Petals or sepals other than 4, or if 4 then corolla united; corolla sometimes lacking but then stamens mostly other than 4, 6, or 8; fruit various
- 14 Leaves all basal; flowers scapose or sometimes sessile among a basal rosette of leaves; the scapes sometimes with 1 or 2 (rarely more) entire or toothed bracts or bractlike leaves that are much smaller and usually of different shape than the basal leaves.....KEY 8 P. 9
- 14 Leaves not all basal; the flowering stems mostly with 3 or more leaves, sometimes with only one pair of compound or deeply dissected leaves
- 15 Leaves compound.....KEY 9 P. 11
- 15 Leaves not compound, sometimes deeply parted, or appearing divided and compound and then plants mostly keyed both ways
- 16 Stems prostrate, usually radiating over the ground in several or all directions from a taproot, or sprawling or climbing; plants annual; corolla inconspicuous, 1-5 mm long, not over 3 mm wide, or lacking; leaves entire, sessile or nearly so or gradually tapered to an indistinct petiole, or distinctly petioled in Tiquilia.....KEY 10 P. 12
- 16 Plants ascending to erect, not prostrate, or if so then leaves not entire, or flowers larger, or plants perennial
- 17 Stems leafless, with a pair of opposite, persistent cotyledons 1-3 mm long near the base and a whorl of basally connate bracteate leaves forming an involucre just beneath the flower cluster; plants 1-4 cm tall, annuals (Gymnosteris).....POLEMONIACEAE
- 17 Plants not as above
- 18 Leaves opposite or whorled, the upper ones sometimes alternate but then plants mostly keyed both ways.....KEY 11 P. 13
- 18 Leaves alternate, the lower 1 or 2 nodes of the stems sometimes with a pair of opposite leaves in Plagiobothrys and possibly other genera.....KEY 12 P. 16

KEY 1: PLANTS AQUATIC

- 1 Plants 2-12 mm long, without stems, free floating, often forming a mass over the water surface; roots, if present, dangling from the lower surface of the leaflike thalus.....LEMNACEAE
- 1 Plants not as above in all respects
- 2 Plants without evident stems or scapes; leaves appearing all basal; reproduction by spores; flowers and seeds lacking
- 3 Leaves linear, terete, similar to those of onions, the blades not petioled.....ISOETACEAE
- 3 Leaves like those of a 4-leaved clover, the 4-foliolate blade borne on a slender petiole.....MARSILEACEAE
- 2 Stems or scapes usually evident; leaves not as in the above two families in all features; plants producing flowers and seeds
- 4 At least the submerged leaves dissected into linear or filiform segments
- 5 Flowers borne on naked pedicels or peduncles; corollas conspicuous; leaves twice or more dissected, either with stipular bases or with small, buoyant bladders
- 6 Corollas yellow, united, strongly 2-lipped; stamens 2; the peduncles usually conspicuously emergent, often with more than 1 flower; leaves 2-3 or more times pinnately dissected, bearing small, buoyant bladders, without stipular bases.....LENTIBULARIACEAE
- 6 Corollas whitish, not 2-lipped, the 5 petals free; stamens 10 or more; pedicels usually submersed or nearly so with the solitary flowers near the water surface; leaves 2-3 or more times dichotomously, trichotomously or palmately dissected, with stipular bases, without bladders (Ranunculus).....RANUNCULACEAE
- 5 Flowers borne in the axils of leaves or sessile in a terminal spike, usually inconspicuous, corolla lacking or quickly deciduous; leaves variously dissected, not bearing bladders, not stipular at the base
- 7 Submerged leaves once pinnately dissected, the segments entire; emerged leaves or bracts subentire or pectinately dissected.....HALORAGIDACEAE
- 7 Leaves 1-2 (3) times palmately or dichotomously dissected, the segments finely toothed.....CERATOPHYLLACEAE
- 4 Leaves not dissected into linear or filiform segments, entire, toothed or lobed or trifoliolate to pinnately compound
- 8 Leaves all basal, simple
- 9 Leaf blades 10-45 cm long, cordate, floating, on long submerged petioles; sepals several to many, the inner ones petallike, bright yellow; flowers solitary.....NYMPHAEACEAE
- 9 Leaf blades smaller or flowers not solitary; sepals not as above
- 10 Scapes not over 4 cm long, shorter than the leaves, 1-several per plant; flowers solitary (Limosella).....SCROPHULARIACEAE
- 10 Scapes over 4 cm long, shorter than or exceeding the leaves, 1-3 per plant but often solitary; flowers not solitary.....ALISMATACEAE
- 8 Leaves not all basal, or if apparently all basal then trifoliolate

- 11 Leaves opposite or whorled
 - 12 Leaves 5-30 mm wide; flowers in axillary racemes; corollas blue, conspicuous (Veronica).....SCROPHULARIACEAE
 - 12 Leaves 0.5-4 mm wide; flowers sessile in axils of leaves, or short-pedicel, or solitary on a long threadlike perianth tube; corolla lacking or inconspicuous
 - 13 Leaves whorled; flowers sessile in the axils of leaves, petals lacking; stamen 1
 - 14 Leaves (4) 6-12 per node, 1-2 mm wide, linear, entire; flowers mostly bisexual.....HIPURIDACEAE
 - 14 Leaves rarely more than 4 per node, 0.5-1 mm wide, filiform, minutely serrulate; flowers unisexual.....NAJADACEAE
 - 13 Leaves opposite, sometimes appearing whorled; flowers various; stamens various
 - 15 Leaves 2-10 cm long, the stipules free of the blade and sheathing the stem; stamen 1.....ZANNICHELLIACEAE
 - 15 Leaves 0.2-3 cm long, stipules lacking or fused to the blade; stamens various
 - 16 Flowers and fruit axillary and sessile or on pedicels to 6 mm long, often bisexual; leaves entire, linear or not (see also leads 4 and 5 in KEY 10)
 - 17 Leaves with short but definite connate-sheathing bases; flowers and fruit sessile or on pedicels to 6 mm long; stamens 4; petals 4, about 1.5 mm long (Tillaea).....CRASSULACEAE
 - 17 Leaves not connate-sheathing; flowers and fruit sessile; corolla lacking; stamens 1 or rarely more.....CALLITRICHACEAE
 - 16 Flowers borne on threadlike perianth tubes 4-30 cm long, mostly unisexual; leaves finely serrulate, submersed, all linear.....HYDROCHARITACEAE
- 11 Leaves alternate or appearing basal
 - 18 Leaves simple, entire
 - 19 Flowers and fruit (achenes) sessile in a spike or in 1-several globose heads
 - 20 Leaves parallel-veined, at least some with sheathing bases; perianth greenish
 - 21 Lower leaves loosely sheathing, commonly over 30 cm long, longer than the upper sheathless leaves; stipules lacking; inflorescence of 1-several globose heads, the heads mostly over 1 cm in diameter.....SPARGANIACEAE
 - 21 Lower leaves equal to or mostly smaller than the upper leaves, of various lengths; stipules sheathing; inflorescence a spike, sometimes headlike but then less than 1 cm thick
 - 22 Ligules free or sheathing the stem, not adnate to the leaf blade, conspicuous but often soon shredding into fibrous threads; inflorescence borne on straight peduncles.....POTAMOGETONACEAE
 - 22 Ligules lacking, the scarious margins of the sheaths prolonged on to the leaf blade as adnate small auricles; inflorescence sometimes enveloped in a leaf sheath at first but usually soon elevated to the water surface on a threadlike, elongated, often coiled peduncle.....RUPPIACEAE
 - 20 Leaves pinnate-veined, not with sheathing bases, but with sheathing stipules; perianth pink to rose (Polygonum).....POLYGONACEAE
 - 19 Inflorescence a panicle; fruit not an achene (Catabrosa and possibly other genera).....POACEAE
 - 18 Leaves either compound or not entire
 - 23 Leaves trifoliate, appearing all basal; leaflets entire or undulate-dentate, 5-10 cm long.....MENYANTHACEAE
 - 23 Leaves not as above
 - 24 Leaves pinnately compound with 5-9 or seldom more, suborbicular to elliptic leaflets (Nasturtium).....BRASSICACEAE
 - 24 Leaves palmately lobed (Ranunculus).....RANUNCULACEAE

KEY 2: PLANTS PARASITIC OR SAPROPHYTIC

- 1 Plants parasitic on aerial branches of coniferous trees, more or less green or yellow green; leaves opposite, scalelike.....VISCACEAE
- 1 Plants not on aerial branches of coniferous trees, not green; leaves various
 - 2 Stems twining on host plants, vinelike, often orange or yellow, seldom over 3 mm in diameter.....CUSCUTACEAE
 - 2 Stems erect, not at all vinelike; pale, yellowish, or purple-brown, sometimes over 3 mm in diameter
 - 3 Plants scapose or with 1-3 bladeless sheaths enveloping the lower part of the stem, glabrous; flowers short pedicel or nearly sessile; perianth of 6 similar free segments; ovary inferior (Corallorhiza).....ORCHIDACEAE
 - 3 Stems with few to numerous bractlike or scalelike leaves, these not sheathing, glandular-hairy; corolla united, with 4 or 5 lobes; ovary superior

- 4 Plants 30-60 (100) cm tall; flowers and fruit nodding, the pedices 5-15 mm long (Pterospora)...ERICACEAE
- 4 Plants 3-20 (30) cm tall; flowers and fruit not especially nodding or the pedicels longer than above....
.....OROBANCHACEAE

KEY 3: PLANTS REPRODUCING BY SPORES

- 1 Leaves compound, 2-100 cm long; spores borne on the leaves
2 Leaves palmate with 4 leaflets.....MARSILEACEAE
- 2 Leaves pinnate
 - 3 Plants with a solitary evident aerial stem, the stem supporting one sterile leaf (lower) and one fertile leaf (terminal), of moist or wet, more or less open places that are rich in humus; leaves 2-10 cm long, once compound, the young leaves not coiled at the apex.....OPHIOGLOSSACEAE
 - 3 Plants without evident aerial stems; leaves more than 2, all basal, either longer than above or plants of dry rocky places, the young leaves coiled at the apex.....POLYPODIACEAE
- 1 Leaves lacking or simple and only 0.1-0.3 cm long; spores various
 - 4 Stems densely covered with spirally arranged overlapping scalelike leaves, creeping with ascending erect branches, the branches similarly covered with leaves; plants more or less forming mats, not extending over 10 cm above ground level; spores borne on sporophylls that are slightly different from the leaves.....SELAGINELLACEAE
 - 4 Stems leafless (or leaves inconspicuous), erect, simple or sometimes with whorls of elongate branches, terete, hollow, sheathing-jointed, 10-150 cm tall; spores borne in a conelike cap at the apex of stems.....EQUISETACEAE

KEY 4: PLANTS VINES OR VINELIKE

- 1 Leaves compound, if trifoliolate then opposite
 - 2 Leaves alternate, stems not at all woody (Vicia).....FABACEAE
 - 2 Leaves opposite; stems often slightly woody (Clematis).....RANUNCULACEAE
- 1 Leaves simple, or if trifoliolate then alternate
 - 3 Leaves opposite, trilobate, the lobes uniformly serrate.....MORACEAE
 - 3 Leaves alternate or opposite, not trilobate or if so the lobes not serrate
 - 4 Leaves entire, toothed or hastately lobed or trilobate with the lobes entire
 - 5 Leaves 2-9 cm long, over 2 cm wide or 1.5 mm long or longer, simple, entire, or trilobate to trifoliolate; plants mostly known from below 7,500 ft
 - 6 Corollas 1.5 cm long or longer; fruit a capsule.....CONVOLVULACEAE
 - 6 Corollas about 1 cm long; fruit a berry (Solanum dulcamara).....SOLANACEAE
 - 5 Leaves 0.7-2 cm long, about 5-20 mm wide, simple, entire or obscurely toothed; plants of various distribution
 - 7 Leaves opposite; flowers borne in pairs on naked peduncles, 3-12 cm long; corollas 8-15 mm long (Linnaea).....CAPRIFOLIACEAE
 - 7 Leaves alternate; flowers not as above; corollas 3-5 mm long.....ERICACEAE
 - 4 Leaves palmately lobed, mostly with 5 primary lobes, the lobes various
 - 8 Lobes of leaves entire or with small teeth; plants annual, not woody but vinelike; fruit spinescent.....CUCURBITACEAE
 - 8 Primary lobes of leaves lobed again and often toothed; plants woody vines, cultivated (grapes); fruit succulent, not spinescent (family not included in the text).....VITACEAE

KEY 5: PLANTS WOODY ABOVE GROUND LEVEL, SHRUBS AND TREES

- 1 Leaves needlelike or scalelike, evergreen, aromatic with pinelike odor
 - 2 Leaves needlelike; plants trees or shrublike at timberline; seeds borne in cones; cones 2-15 (25) cm long, with several to many scales, brownish or purplish or blackish.....PINACEAE
 - 2 Leaves scalelike or if needlelike then plants spreading shrubs; seeds borne in globose, drupelike cones; cones not over 1 cm long, without obvious scales, usually blue glaucous.....CUPRESSACEAE
- 1 Leaves not needlelike or scalelike or if so then not evergreen, not aromatic with pinelike odor
 - 3 Leaves compound, not scalelike
 - 4 Leaves palmately divided, the linear segments sometimes appearing as whorls of needlelike leaves, not over 2 cm long; plants low, often subshrubs.....POLEMONIACEAE
 - 4 Leaves not as above
 - 5 Leaves and twigs opposite; leaflets all petiolulate

- 6 Leaves pinnately compound with 5-9 leaflets; leaflets finely serrate with more than 20 teeth (Sambucus).....CAPRIFOLIACEAE
- 6 Leaves with 3-5 leaflets; leaflets entire or coarsely serrate or dentate with fewer than 20 teethACERACEAE
- 5 Leaves and twigs alternate; leaflets sometimes opposite, mostly sessile or nearly so except for the terminal one
 - 7 Leaves hollylike, evergreen, the leaflets with spiny-toothed margins; shrubs not over 30 cm tall, often of woods; flowers yellowish; fruit bluish, berrylike.....BERBERIDACEAE
 - 7 Leaves not hollylike, the leaflets not with spiny-toothed margins; shrubs, flowers, and fruit various
 - 8 Leaflets 3, some usually over 2 cm long, not linear, stems not armed with bristles.....ANACARDIACEAE
 - 8 Leaflets either more than 3 or less than 2 cm long and linear or nearly so, or stems armed with bristles
 - 9 Leaves dissected into linear, or nearly linear, segments, seldom over 2 cm long, emitting a sagebrush odor when crushed; flowers inconspicuous; plants 5-40 cm tall (Artemisia).....ASTERACEAE
 - 9 Leaves mostly pinnately compound with well marked leaflets, mostly over 2 cm long, or dissected as above in Potentilla fruticosa, not emitting a sagebrush odor when crushed; plants mostly over 40 cm tall
 - 10 Flowers sweetpea-type (papilionaceous), yellow; fruit a legume; leaves 4-10 cm long, with 8-12 leaflets (Caragana).....FABACEAE
 - 10 Flowers regular, yellow only in Potentilla and then leaves 1-5 cm long with 3-7 leaflets; fruit not a legume.....ROSACEAE
- 3 Leaves simple, sometimes scalelike or lacking
 - 11 Some or all leaves and twigs opposite or whorled, not all basal
 - 12 Leaves inconspicuous or lacking; twigs mostly whorled, yellow-green, blue-green, or bright greenEPHEDRACEAE
 - 12 Leaves conspicuous; twigs not whorled, variously colored
 - 13 Leaves palmately lobed or divided to the base
 - 14 Trees or tall shrubs over 80 cm tall; leaves over 2 cm long, lobed.....ACERACEAE
 - 14 Shrubs or subshrubs not over 80 cm tall; leaves not over 2 cm long, divided to the midrib, the linear segments sometimes appearing as whorls of needlelike leaves.....POLEMONIACEAE
 - 13 Leaves entire, toothed, or pinnately lobed
 - 15 Leaves whorled at least at the lower nodes; plants low subshrubs, mostly of woods (Chimaphila).....PYROLACEAE
 - 15 Leaves opposite, not whorled; plants low or tall
 - 16 Corollas 2.5-4 cm long, united, lavender-pink, to blue-lavender; leaves serrate; plants rare, subshrubs to 30 cm tall, mostly of rocky places in Uinta Mts. (Penstemon).....SCROPHULARIACEAE
 - 16 Corollas less than 2.5 cm long; leaves entire, minutely toothed, or lobed, or if crenate then plants over 30 cm tall
 - 17 Leaves rarely over 2.5 cm long or 2 cm wide, except on vigorous, young shoots; plants less than 1.5 m tall
 - 18 Leaves scurfy and whitish or gray on both sides; plants not over 80 cm tall, of desert places below 6,300 ft (Atriplex).....CHENOPODIACEAE
 - 18 Leaves not as above; plants montane, or over 80 cm tall
 - 19 Leaves evergreen; shrubs not over 20 cm tall, or if so then the leaves minutely toothed
 - 20 Plants not over 20 cm tall; leaves entire, dark green above and pale beneath (Kalmia).....ERICACEAE
 - 20 Plants 20-60 cm tall; leaves minutely toothed, dark green on both sides (Paxistima).....CELASTRACEAE
 - 19 Leaves not evergreen; plants over 20 cm tall; leaves not minutely serrate
 - 21 Petals separate; fruit a woody capsule, not white (Philadelphus)...SAXIFRAGACEAE
 - 21 Corolla united; fruit berrylike, white (Symphoricarpos).....CAPRIFOLIACEAE
 - 17 Some leaves regularly over 3 cm long and/or over 2 cm wide, or plants over 1.5 m tall
 - 22 Bark of twigs bright red; leaves 5-9 cm long; flowers many in a flat-topped inflorescence.....CORNACEAE
 - 22 Bark not red, or if so, leaves less than 5 cm long or else flowers few and borne in pairs

- 23 Leaves (at least beneath) and young twigs covered with silvery-gray, brownish, or copper colored scurfy stellate hairs (Shepherdia).....ELAEAGNACEAE
- 23 Leaves and twigs not as above
 - 24 Plants shrubs or small trees, 2-8 m tall, of rocky places near or along the Green River; fruit 1-seeded, winged; corolla lacking.....OLEACEAE
 - 24 Plants shrubs, not over 2 m tall, not restricted as above; fruit with 1-several seeds, not winged
- 11 Leaves and twigs alternate or essentially basal
 - 25 Flowers sessile, borne in heads (the heads of flowers subtended by and partly enveloped in an involucre of few to several bracts), yellow and with a pappus, or if not yellow and without a pappus then leaves with a sagebrushlike odor.....ASTERACEAE
 - 25 Flowers not as above in all features; leaves not with a sagebrushlike odor
 - 26 Flowers and fruit borne in aments; leaves not pinnately lobed; plants often along water courses and other places where the soil is kept wet for much of the growing season, but also in dry places especially at high elevations (alder, aspen, birch, cottonwoods, poplars, and willows)
 - 27 Staminate and pistillate aments not borne on the same plant; leaves mostly more than 2.5 times longer than wide, or if wider than plants trees with whitish bark on young branches and sometimes on older branches and trunk.....SALICACEAE
 - 27 Staminate and pistillate aments borne on the same plant; leaves mostly less than 2.5 times longer than wide; plants shrubs or small trees; bark of twigs, branches, and sometimes older branches reddish or reddish-brown.....BETULACEAE
 - 26 Flowers and fruit not borne in aments; or if so (Quercus) then leaves pinnately lobed; habitat various
 - 28 Some of the leaves lobed, parted, or divided
 - 29 Leaves palmately divided, the divisions linear or needlelike; low subshrubs.....POLEMONIACEAE
 - 29 Leaves pinnately or palmately lobed or 3-foliolate, the lobes not linear or needlelike; low to tall shrubs or small trees
 - 30 Leaves pinnately lobed
 - 31 Plants half shrubs, less than 1 m tall; petals 4; fruit flattened, less than 2 mm thick (Lepidium montanum).....BRASSICACEAE
 - 31 Plants shrubs, commonly over 1 m tall; petals lacking or 5; fruit not as above
 - 32 Lobes of leaves entire or nearly so, broad and rounded; plants not armed with spines.....FAGACEAE
 - 32 Lobes of leaves toothed; plants armed with spines (Crataegus).....ROSACEAE
 - 30 Leaves palmately lobed or trifoliolate
 - 33 Corolla tubular and/or plants bearing spines or bristles; fruit a succulent berry (Ribes).....SAXIFRAGACEAE
 - 33 Corolla of separate petals; plants without spines or bristles; fruit not succulent
 - 34 Petals 2-3 mm long; flowers appearing before the leaves; leaves divided to near the base and at least some usually trifoliolate; twigs emitting a pungent rather offensive odor when broken (Rhus).....ANACARDIACEAE
 - 34 Petals over 3 mm long; flowers appearing with leaves; leaves lobed, not trifoliolate.....ROSACEAE
 - 28 Leaves entire or toothed, not lobed
 - 35 Leaves toothed; the teeth sometimes small but then numerous and closely spaced all along the margins of the leaves
 - 36 Leaves minutely toothed (the teeth not over 1 mm long), with 1 prominent midrib; plants 5-30 (60) cm tall, of and adjacent to the Uinta Mts.; corolla united (Vaccinium).....ERICACEAE
 - 36 Leaves more coarsely toothed, or with 3 prominent veins that run the full length of the leaves, and/or plants over 60 cm tall; corolla lacking or of separate petals
 - 37 Leaves entire on the lower 1/4 to 1/2, serrate or dentate above with rather coarse teeth, wedge-shape or rounded on the entire basal portion, 0.5-4 (5) cm long; plants shrubs.....ROSACEAE
 - 37 Leaves about equally serrate from near the base to the apex (the teeth sometimes minute), 2-10 cm long; plants shrubs or trees
 - 38 Leaves cordate or oblique at the base, or plants introduced trees with flattened, orbicular, winged fruits; petals lacking; sepals about 3 mm long; stamens 4-9.....ULMACEAE
 - 38 Leaves not cordate or oblique at the base; plants native, shrubs or trees; fruits not winged; petals present but sometimes small; stamens various

- 39 Stamens 4-5; plants not armed with spines; fruit hard and dry, with 2-4 seeds (nutlets); leaves minutely toothed, either with 3 prominent veins running the entire length and the flowers numerous, or if without 3 prominent veins then the flowers 1-3 in the axils of leaves and unisexual.....RHAMNACEAE
- 39 Stamens 10-20 or more, or if fewer than 10 then branches armed with spines and leaves coarsely serrate; fruit succulent or dry; leaves not prominently 3-veined; flowers few to numerous; bisexual.....ROSACEAE
- 35 Leaves entire, or with a few irregularly spaced small teeth
 - 40 Plants tall shrubs or trees, over 2 m tall when mature
 - 41 Leaves scalelike, 0.2-0.4 cm long, more or less appressed to and appearing more like a part of the twigs than as definite leaves.....TAMARICACEAE
 - 41 Leaves not scalelike, 2-10 cm long
 - 42 Leaf blades oblique or cordate at the base, only about twice as long as wide, scabrous, conspicuously reticulate veined (Celtis).....ULMACEAE
 - 42 Leaf blades tapered or rounded at the base; often over twice as long as wide
 - 43 Leaves, young twigs, fruit and parts of the inflorescence covered with silvery-gray stellate scurfy pubescence; (Elaeagnus).....ELAEAGNACEAE
 - 43 Plants not as above (Rhamnus).....RHAMNACEAE
 - 40 Plants shrubs, rarely over 2 m tall
 - 44 Leaves rigid, swordlike, all basal, 10-30 (50) cm long, evergreen, the margins often with exfoliating curled stringlike fibers; flowers showy, 3-6 cm long.....AGAVACEAE
 - 44 Leaves not as above in all respects; flowers smaller
 - 45 Leaves nearly all basal, 3-17 mm long; flowering stems scapose; plants matted, 2-12 cm tall, mostly growing in cracks of rock outcrops or in rocky places (Petrophytum)...ROSACEAE
 - 45 Plants not as above in all features
 - 46 Inflorescence umbellike or dichotomously or trichotomously branched; leaves floccose or tomentose; stems and flowering stalks sometimes with pubescence similar to that of the leaves; flowers borne in small involucre; perianth of a single whorl, the segments more or less petallike, but small; stamens 9; fruit an achene (Eriogonum)..POLYGONACEAE
 - 46 Inflorescence not as above; leaves glabrous or pubescent but tomentose in a few taxa; flowers not as above in all features
 - 47 Leaves with 3 prominent veins that run the entire length of the blades, 1-2.5 cm long, not linear; plants montane (Ceanothus).....RHAMNACEAE
 - 47 Leaves without 3 prominent veins
 - 48 Leaves 7-17 mm long, 3-4 mm wide, oblanceolate, not scurfy; current year's twigs greenish; twigs turning into spines; petals 4-6 mm long, whitish; shrubs to 60 cm tall (Forsellesia).....CELASTRACEAE
 - 48 Leaves either larger than above or scurfy, or plants taller and petals lacking
 - 49 Flowers inconspicuous, often unisexual, petals lacking; sepals minute or lacking; fruit dry, 1-seeded, often winged or pubescent, not a berry nor a capsule; leaves glabrous, linear, succulent, not over 3 mm wide, or more often gray-white or gray-green with dense hairs, or scurfy with the hairs inflated and soon collapsing and appearing as a mealy or dandrufflike covering.....CHENOPODIACEAE
 - 49 Flowers conspicuous, the corolla present; fruit not 1-seeded, not winged, not pubescent, a capsule or berry or berrylike; leaves not succulent, sometimes pubescent, but not scurfy
 - 50 Plants introduced, known from below 7,000 ft in our area; leaves dull green or grayish; corolla united, funnellform 7-10 (14) mm long, densely pubescent within near the throat at the tube; stamens 4-5; fruit a fleshy red berry with 10-20 seeds (Lycium).....SOLANACEAE
 - 50 Plants native, above 7,000 ft on the Uinta Mts.; leaves usually vivid green at least on one side; corolla united or of separate petals; stamens (5) 8-12; fruit a capsule or a berry, when a berry not both red and fleshy or else with fewer seeds.....ERICACEAE

KEY 6: CLASS LILIOPSIDA (MONOCOTYLEDONS)
 (See KEY 1 for aquatic plants of this group.)

- 1 Flowers without well developed petaloid tepals; perianth parts if present reduced and scalelike, chartaceous, or chaffy (cattails, burreeeds, grasses, and grasslike plants)
- 2 Inflorescence a terminal, cylindric, dense, spike 15-40 cm long, the lower portion pistillate, brown at maturity, 1.5-3 cm thick, the upper portion staminate, pale or light brown; plants 1-3 (4) m tall, growing in water or mud (cattails).....TYPHACEAE

- 2 Inflorescence not as above; plants mostly less than 1 m tall or inflorescence not a thick cattailike spike
 - 3 Flowers borne in globose clusters, each subtended by 3-5 chaffy bracts, the staminate clusters borne above the pistillate clusters; fruit hardened and strongly beaked; plants not particularly grasslike.....SPARGANIACEAE
 - 3 Flowers in spikes, racemes, panicles, or sometimes globose clusters, but then flowers bisexual or the clusters solitary and with both staminate and pistillate flowers; plants more or less grasslike
 - 4 Leaves terete, basal or nearly basal; inflorescence a terminal, elongate, slender spike or spikelike raceme; flowers bisexual, with 6 perianth segments.....JUNCAGINACEAE
 - 4 Plants rarely with both terete leaves and a spiked inflorescence, but if so then the flowers unisexual and perianth segments fewer than 6 or else reduced to bristles
 - 5 Stems jointed with conspicuous often swollen solid nodes and mostly hollow internodes; flowers borne in spikelets consisting of 1 or 2 glumes and 1 to several florets; perianth lacking; stamens and pistil subtended by 2 scales (lemma and palea).....POACEAE
 - 5 Stems not jointed, nodes lacking or inconspicuous and not swollen; internodes mostly not hollow; flowers various; perianth various
 - 6 Flowers unisexual, without a perianth or the perianth reduced to bristles, the staminate ones consisting of 3 stamens, the pistillate ones consisting of 1 pistil, each flower subtended by a single scale; fruit an achene; stems terete or triangular in cross section; leaves often 3-ranked.....CYPERACEAE
 - 6 Flowers bisexual, perianth of 6, more or less similar chartaceous tepals; fruit a capsule with 3-several seeds; stems flattened or terete in cross section; leaves mostly 2-rankedJUNCACEAE
- 1 Flowers with well-developed tepals, these more or less petallike, sometimes small but not chartaceous
 - 7 Stamens 6; ovary mostly superior
 - 8 Inflorescence with whorled branches; leaves all basal, the blades not linear, the petioles nearly as long or longer than the blade; pistils 6; plants growing in water or mud; tepals greenish or white.....ALISMACEAE
 - 8 Inflorescence without whorled branches, sometimes a terminal umbel; leaves not all basal, or if so then linear or sessile or with the petiole much shorter than the blade; pistil 1; habitat various; tepals various
 - 9 Leaves not rigid, not swordlike, the edges smooth; plants caulescent or scapose.....LILIACEAE
 - 9 Leaves rigid, swordlike, the edges usually with threads of exfoliating epidermis; plants scapose.....AGAVACEAE
 - 7 Stamens 1 or 3; ovary inferior
 - 10 Stamens 3, not united to the style; leaves strongly folded and flattened; stems flattened.....IRIDACEAE
 - 10 Stamens 1 or 3, united to the style; leaves not strongly folded, stems not flattened.....ORCHIDACEAE

KEY 7: PETALS 4, SEPALS MOSTLY 4, MOSTLY FREE

- 1 Leaves all basal, lobed or divided; stamens numerous (more than 16); sepals 2, deciduous; petals yellow, 1-3 cm long; plants alpine on the Uinta Mts.....PAPAVERACEAE
- 1 Leaves not all basal or sepals 4 and petals mostly less than 1 cm long or not yellow; stamens 16 or fewer; distribution various, including alpine on the Uinta Mts.
 - 2 Leaves opposite, 3-6 mm long, linear or linear-oblongate, entire, with short but definite connate-sheathing bases; stems 1-6 cm long, prostrate to erect; plants of ephemeral pools and drying mud, rare (*Tillaea*).....CRASSULACEAE
 - 2 Plants not as above in all respects
 - 3 Corolla irregular, petals in 2 series, the outer 2 larger and enfolding the inner 2, the upper petal of the outer set spurred and simulating the banner of a pea flower or upper sepal of a larkspur, the inner 2 petals united at the tip; stamens united into 2 sets of 3 each; sepals 2, deciduous; plants glabrous and glaucous; leaves 2-3 times pinnately dissected.....FUMARIACEAE
 - 3 Corolla regular or petals about equal, none spurred; stamens free; sepals 4; plants various; leaves various
 - 4 Leaves trifoliate or palmate, with 3-7 leaflets; stamens strongly exerted, 6-16; capsules mostly stipitate.....CAPPARIDACEAE
 - 4 Leaves not as above; stamens included or less often exerted, 4, 6, or 8; capsules sessile or less often stipitate
 - 5 Stamens 4 or 8; ovary inferior; sepals and petals borne above the apex of the ovary and fruit; styles slender and elongate, usually equalling or exceeding the petals; flowers usually with a floral tube through which the style extends.....ONAGRACEAE

- 5 Stamens 6; ovary superior; sepals and petals borne at the base of the ovaries and fruit, often deciduous; styles short or obsolete, hardly distinct from the ovary or fruit; flowers without a floral tube.....BRASSICACEAE

KEY 8: LEAVES BASAL

- 1 Leaves compound or parted to divided
- 2 Leaves trifoliate, once pinnate, or once palmate; leaflets well defined, elliptic or obovate, entire, serrate, or dentate, but not lobed
- 3 Leaflets mostly sharply toothed; petals free, not fringed; plants seldom growing in water or bogsROSACEAE
- 3 Leaflets entire or with rounded, poorly marked teeth; corolla united, the lobes densely fringed on the upper side; plants of bogs and lakes.....MENYANTHACEAE
- 2 Leaves either more than once compound or the primary divisions or leaflets again deeply lobed or dissected
- 4 Flowers solitary and terminal; petals yellow; leaves mostly palmately parted, the primary divisions usually deeply lobed; sepals deciduous during or shortly after anthesis
- 5 Sepals 2, densely blackish hirsute; petals 10-30 mm long; fruit a capsule; scapes and leaves blackish hirsute.....PAPAVERACEAE
- 5 Sepals mostly 5, not blackish hirsute; petals 3-18 mm long; fruit an achene, the achenes numerous on an open receptacle; plants glabrous (Ranunculus).....RANUNCULACEAE
- 4 Flowers not solitary or else petals not yellow; leaves mostly pinnately compound or parted
- 6 Petals pink; fruit with a beak, the beak 1-5 cm long, separating into 5 segments upon drying; plants winter annuals, often on disturbed ground (Erodium).....GERANIACEAE
- 6 Petals not pink; fruit not beaked as above; plants perennial
- 7 Inflorescence an umbel; plants not above timberline, or if so then strongly aromatic, not glandular; flowers white, yellowish, or purplish.....APIACEAE
- 7 Inflorescence not an umbel; plants sometimes of high elevation, not aromatic, usually glandular
- 8 Inflorescence a headlike or open cyme; flowers yellow, the petals separate; leaves pinnately compound with numerous, sessile leaflets 3-8 mm long, the leaflets divided into 3-5 entire segments (Ivesia).....ROSACEAE
- 8 Inflorescence a raceme or spikelike raceme; corolla blue, united, or lacking; leaves not as above in all respects
- 9 Corolla lacking; stamens 8-15; leaves ternately or biternately compound; some of the primary leaflets petiolulate; fruit of achenes (Thalictrum alpinum).....RANUNCULACEAE
- 9 Corolla united, blue or bluish, sometimes with a yellowish tube; stamens 2 or 5; leaves pinnatifid; fruit a capsule
- 10 Stamens 2; corolla 4-7 mm long; plants known from above 9,000 ft on the Uinta Mts. (Synthyris).....SCROPHULARIACEAE
- 10 Stamens 5; corolla various; plants of lower elevations (Gilia).....POLEMONIACEAE
- 1 Leaves simple, entire to lobed but not parted or divided
- 11 Flowers hidden in the crowded leaves, inconspicuous; leaves 3-6 mm long, densely crowded with scarious stipules that are 1/2 to as long as the leaves; plants glabrous or slightly puberulent....CARYOPHYLLACEAE
- 11 Flowers not hidden in crowded leaves, or if so (Eriogonum) then leaves without stipules and plants densely tomentose or floccose
- 12 Scapes lacking; flowers sessile in a basal rosette of leaves, the corolla bluish; functional stamens 4; plants puberulent (Penstemon).....SCROPHULARIACEAE
- 12 Scapes present, or corolla not bluish and plants tomentose or floccose
- 13 Flowers solitary and terminal, on simple scapes, often more or less showy
- 14 The upper 1 or 2 petals arched backwards; flowers irregular, usually nodding; leaf blades more or less toothed, sometimes cordate at the base.....VIOLACEAE
- 14 Petals not arched as above; flowers regular except in SCROPHULARIACEAE; leaf blades various
- 15 Plants stoloniferous or at least freely rooting at the nodes of prostrate stems, of moist or wet places; petals yellow, free (Ranunculus).....RANUNCULACEAE
- 15 Plants not stoloniferous; petals not yellow except in Mimulus and then united, mostly white, pinkish, or lavender
- 16 Leaves white tomentose beneath, glabrous and dark green above, regularly crenate, usually revolute, 1-3 cm long, 3-12 mm wide; styles numerous, elongate and plumose in fruit; plants alpine on the Uinta Mts. (Dryas).....ROSACEAE
- 16 Leaves glabrous to villous-hirsute but not tomentose, not crenate or mostly larger than above, not revolute; styles not plumose

- 17 Leaf blades 3-10 cm long, 1.5-5 cm wide, usually crenate or dentate at least in part, more or less cordate at the base; fruit a follicle, the follicles several (Caltha).....RANUNCULACEAE
- 17 Leaf blades mostly smaller than above, mostly entire or lobed, not cordate at the base except in Parnassia; fruit not a follicle
 - 18 Leaves linear or nearly so, about 1-3 mm wide, sessile or gradually tapered to an indistinct petiole
 - 19 Petals lacking or 5, to 1.5 mm long; plants annual; leaves not succulent; scapes without bracts (Myosurus).....RANUNCULACEAE
 - 19 Petals (5) 7-18, 6-35 mm long; plants perennial; leaves more or less succulent; scapes with a pair or whorl of bracts (Lewisia).....PORTULACACEAE
 - 18 Leaves not linear, sometimes rather narrow but then mostly conspicuously narrowed to a petiole
 - 20 Scapes mostly shorter than the leaves, 1-several in the basal rosette
 - 21 Leaf blades shorter than the petioles, 5-18 mm long, 1-7 mm wide, tapered to the petioles, these 1-8 cm long; flowers not over 3 mm long (Limosella)...SCROPHULARIACEAE
 - 21 Leaf blades equal or longer than the petioles, 15-50 mm long, to 20 mm wide; flowers 5-15 mm long (Hesperochiron).....HYDROPHYLLACEAE
 - 20 Scapes exceeding the leaves, mostly solitary
 - 22 Corolla yellow, united; calyx united; leaves glabrous or glandular-villous, the blades elliptic or obovate, sessile or gradually tapered to a rather indistinct, short petiole (Mimulus primuloides).....SCROPHULARIACEAE
 - 22 Corolla white; leaves glabrous, the blades mostly ovate or broader, distinctly petioled, the petiole about 1/3 as long to longer than the blade
 - 23 Styles lacking or nearly so; fertile stamens 5; flowers mostly erect; scapes 7-30 cm tall or taller; leaves not evergreen.....SAXIFRAGACEAE
 - 23 Styles prominent, persistent on the fruit; fertile stamens 10; flowers often nodding; scapes 3-15 cm tall; leaves more or less evergreen (Moneses)....PYROLACEAE
- 13 Flowers not solitary or rarely so in depauperate plants
 - 24 Plants stoloniferous, usually growing in mud; leaves crenulate-toothed; petals yellow, separate, 3-9 mm long; stamens more than 10; fruit of numerous achenes on an open receptacle (Ranunculus)...RANUNCULACEAE
 - 24 Plants not stoloniferous; leaves mostly entire except in SAXIFRAGACEAE; petals not yellow, perianth sometimes yellow in Eriogonum but then united; stamens 10 or fewer; fruit various
 - 25 Leaves shallowly to conspicuously trilobate or palmately lobed and usually also toothed, or if not lobed then uniformly and conspicuously toothed.....SAXIFRAGACEAE
 - 25 Leaves entire or toothed, but not lobed
 - 26 Inflorescence a spike or spikelike; flowers small, the petals lacking or to 3 mm long; leaf blades glabrous, sericeous to villose but not tomentose or floccose; scapes not glandular
 - 27 Leaves 5-15 mm long, 1-5 mm wide; plants of rock faces or at least of rocky places (Petrophytum).....ROSACEAE
 - 27 Leaves longer and sometimes wider than above
 - 28 Flowers solitary and terminal but the petals and sepals lacking or soon deciduous; receptacle elongating in fruit, with many achenes and simulating a spicate inflorescence; leaves linear (Myosurus).....RANUNCULACEAE
 - 28 Flowers numerous, in spikes; fruit a circumscissile capsule with 1-several seeds; leaves linear to broadly ovate.....PLANTAGINACEAE
 - 26 Inflorescence open to capitate, neither a spike nor spikelike; flowers as small as or larger than above; leaves and scapes various
 - 29 Inflorescence a solitary simple raceme; petals 3-7 mm long; styles conspicuous, thickish and persistent in fruit; stamens 10; leaves more or less evergreen; plants glabrous, 5-20 (40) cm tall (Pyrola).....PYROLACEAE
 - 29 Inflorescence not a solitary simple raceme; petals mostly either shorter or longer than above; styles various; stamens various; leaves not evergreen; plants glabrous or pubescent
 - 30 Plants with only 2 or 3 leaves, 2-5 cm tall; leaves only 1-3 mm wide (Lewisia triphylla).....PORTULACACEAE
 - 30 Plants not with the above combination of features
 - 31 Flowers solitary at the ends of rays of simple umbels, 15-28 mm long, and pink-lavender, and plants perennial, or only 3-5 mm long, and white and plants annual; stamens 5; corolla distinctly united or petals reflexed and anthers strongly exserted; fruit a capsule.....PRIMULACEAE
 - 31 Flowers not as above, if in umbels, then the umbels compound and flowers not solitary, 2-10 mm long; plants annual or perennial; stamens 3, 9, or 10; fruit various

- 32 Scapes glandular pubescent; plants perennial, from the Uinta Mts., 4-20 cm tall; flowers in a headlike cluster, or the inflorescence somewhat interrupted after anthesis, not subtended by an involucre; leaf blades deltoid to rhombic-deltoid, mostly toothed (crenate), rarely entire, ciliate.....SAXIFRAGACEAE
- 32 Plants not as above in all features; flowers few to several together in small involucre...POLYGONACEAE

KEY 9: LEAVES COMPOUND

- 1 Leaves opposite or whorled
- 2 Stems prostrate, radiating in all directions from the taproot; leaves once pinnate with 4-8 pairs of opposite leaflets, the basal ones lacking or no longer than the stem leaves; flowers yellow; fruit with hard, sharp-pointed spines; plants annual, weedy.....ZYGOPHYLLACEAE
- 2 Plants not as above in all features
- 3 Leaves divided into filiform, sometimes needlelike segments; the segments sometimes radiating out from the stem and appearing as whorls of filiform leaves, not over 2 mm wide.....POLEMONIACEAE
- 3 Leaves not divided into filiform segments, the divisions well over 2 mm wide
- 4 Leaves once pinnatifid, the segments entire, some of the basal ones and sometimes the lowest pair of stem leaves simple and entire; stems with 2-6 pairs of leaves; flowers numerous; stamens 3.....VALERIANACEAE
- 4 Leaves more than once compound and/or leaflets toothed to lobed, the basal ones not simple and entire, sometimes lacking; stems with 1 or 2 (more in Clematis) pairs of leaves; flowers solitary or up to about 10 per inflorescence; stamens more than 3
- 5 Plants glabrous, rare; leaves ternate; leaflets with petiolules about as long as the blades, ternately or palmately lobed or cleft, or the terminal one ternate again; flowers 3-8 in a headlike terminal cluster; corollas 2-3 mm long, yellowish green.....ADOXACEAE
- 5 Plants pubescent at least in part; leaves not ternate or if so the leaflets sessile or nearly so; flowers not in headlike clusters; petals usually over 3 mm long, white, pink, or yellowish
- 6 Fruit with a styler beak, the beak 1-5 (7) cm long, breaking into 5 twisted or coiled styles upon drying, the styles not plumose; stamens not more than 10.....GERANIACEAE
- 6 Fruit of numerous achenes on a headlike receptacle; if the styles elongate then plumose; stamens more than 10
- 7 Leaves once or occasionally twice pinnate; the basal leaves with blades mostly longer than the petioles, larger than the 1-2 pairs of stem leaves (Geum triflorum)..ROSACEAE
- 7 Leaves either palmatifid with the basal blades mostly shorter than the petioles (Anemone), or 2-4 times pinnate with the middle stem leaves larger than the lower bractlike entire leaves (Clematis).....RANUNCULACEAE
- 1 Leaves alternate
- 8 Leaves trifoliate (rarely palmate), the leaflets entire or obscurely toothed
- 9 Leaves alternate but essentially basal; plants of ponds and bogs in the Uinta Mts., also keyed in KEYS 1 and 8.....MENYANTHACEAE
- 9 Leaves well distributed up the stem; plants of dry places, also keyed in KEY 7 with sepals and petals 4 each and free.....CAPPARIDACEAE
- 8 Leaves not trifoliate nor palmate, or if so then the leaflets lobed or sharply toothed or decompound
- 10 Plants glabrous fragile annuals, 2-10 cm tall, of shady places; flowers solitary on slender, axillary pedicels; petals 3, free, 1-3 mm long, about equal to or shorter than the 3 sepals; leaves once pinnatifid, the segments entire.....LIMNANTHACEAE
- 10 Plants perennial or annual but not as above in all features
- 11 Inflorescence a compound umbel; petals 1-3 mm long or if to 10 mm long then deeply bilobed, free; fruit often splitting into 2 equal segments, the segments each usually borne on a wirelike carpophore; leaves often decompound; plants often aromatic.....APIACEAE
- 11 Inflorescence not umbellate; petals often over 3 mm long, not bilobed, free or united; fruit not as above; leaves various; plants aromatic or not
- 12 Petals deeply trilobate or palmately lobed, separate, not yellow, not spurred; stamens (7-9) 10 (Lithophragma).....SAXIFRAGACEAE
- 12 Corolla united or petals not lobed, often yellow; stamens mostly more than 10 except in FUMARIACEAE
- 13 Corolla united, not yellow, or only partly so; flowers not spurred; stamens 2, 4, or 5; fruit a capsule, the capsule hardly linear
- 14 Corolla irregular; stamens 2 or 4; style and stigma entire; capsules 2-chambered, the 2 sutures usually evident externally.....SCROPHULARIACEAE
- 14 Corolla regular, 5-lobed; stamens 5; styles or stigmas lobed or cleft; capsules various

- 15 Style 2-lobed or 2-parted; stigmas entire; inflorescence exceeded by the leaves, either a helicoid cyme, congested and more or less ball shaped (Hydrophyllum), or flowers solitary in axils of leaves (Nemophila).....HYDROPHYLLACEAE
- 15 Style entire but the stigma 3-lobed; inflorescence exceeding the leaves, not a helicoid cyme; flowers not solitary in axils of leaves.....POLEMONIACEAE
- 13 Corolla of separate petals, often yellow, or lacking; calyx of separate sepals or if corolla or calyx partly united then flowers spurred; stamens 6 to numerous; fruit of achenes on an open receptacle or of follicles or linear capsules
 - 16 Leaves trifoliate or once palmate or once pinnate, the leaflets serrate or dentate (lobed in Geum and rarely in Potentilla), mostly with stipules; flowers with a saucerlike or campanulate floral cup, the sepals, petals, and stamens borne on the floral cup; sepals 5, alternating with 5 sepallike bracteoles and thus sometimes appearing to be 10, persistent; petals yellow, not spurred; stamens numerous.....ROSACEAE
 - 16 Leaves more than once compound or the leaflets deeply lobed to dissected and the primary lobes mostly lobed again; stipules lacking; floral cup lacking; sepals 5, usually deciduous; bracteoles lacking; petals variously colored, sometimes yellow
 - 17 Stamens 6, united in 3 sets of 2 each; petals 4 (plants also keyed in KEY 7), yellow, the upper one spurred, the spur not over 1 cm long; fruit a linear capsule.....FUMARIACEAE
 - 17 Stamens mostly 8-numerous, not united as above; petals 5, not yellow and spurred, or if so then all 5 petals spurred with the spurs over 1 cm long; fruit of achenes on an open receptacle or of 2 or more follicles (See also leads 15, 16, and 17 of KEY 12 for plants with palmately deeply cleft, parted, or divided leaves).....RANUNCULACEAE

KEY 10: STEMS PROSTRATE OR TWINING OR CLIMBING

- 1 Leaves opposite or whorled; plants not dichotomously branched
 - 2 Leaves whorled, with curved or hooked hairs, ovaries and fruit with hooked hairs.....RUBIACEAE
 - 2 Leaves opposite; plants without hooked hairs, mostly glabrous
 - 3 Plants with milky juice, of dry places; leaves ovate or nearly so.....EUPHORBIACEAE
 - 3 Plants without milky juice, growing at margins of ponds and lakes, or aquatic but sometimes stranded and prostrate on mud; at least the lower leaves linear or spatulate
 - 4 Leaves with short but definite connate-sheathing bases, 3-6 mm long; flowers and fruit nearly sessile or on pedicels to 6 mm long (Tillaea).....CRASSULACEAE
 - 4 Leaves not connate-sheathing, sometimes over 6 mm long; flowers and fruit sessile
 - 5 Flowers with a perianth.....ELATINACEAE
 - 5 Perianth lacking; flowers consisting of a naked stamen and a pistil.....CALLITRICHACEAE
- 1 Leaves alternate, sometimes congested at the nodes and appearing opposite or whorled, but then plants usually dichotomously branched
 - 6 Perianth pink or lavender, conspicuous; leaves 1-3 cm long, (2) 5-10 mm wide; stems 10-70 cm long, mainly 2-4 mm thick; plants of low elevations often of alkaline or saline ground; capsules with 3-5 chambers.....AIZOACEAE
 - 6 Perianth not pink or lavender, inconspicuous or lacking; leaves linear or mostly shorter than above; stems not over 10 cm long or else not over 2 mm thick; plants mostly montane
 - 7 Leaves with conspicuous, scarious stipules, the stipules more or less sheathing the stem.....POLYGONACEAE
 - 7 Stipules lacking or inconspicuous
 - 8 Plants glabrous and succulent (sap easily pressed from the leaves and stems by gentle pressure between the thumb and fingers), weeds of gardens and other disturbed ground; petals free, yellow, or lacking (Portulaca).....PORTULACEAE
 - 8 Plants pubescent, not especially succulent, sometimes weedy; corolla united or lacking, not yellow, sometimes concealed by the calyx
 - 9 Corolla 1-5 mm long, united; plants usually densely hispid, or stems retrorsely hispid-prickly
 - 10 Styles 2, united toward the base; leaves gradually tapered to the base, without a distinct petiole; corolla 2.5-5 mm long.....HYDROPHYLLACEAE
 - 10 Style 1, or if 2 then leaves abruptly constricted to a distinct (but short) petiole with the blades broadly elliptic, ovate, or subrotund; corolla 1-3 mm long..BORAGINACEAE
 - 9 Corolla lacking; plants not densely hispid; stems not retrorsely hispid-prickly
 - 11 Styles 1, short; flowers not in numerous chaffy bracts.....URTICACEAE
 - 11 Styles 2; flowers hidden in numerous chaffy bracts.....AMARANTHACEAE

- 16 Corolla united or with a united corollalike floral tube, united only at the base in ERICACEAE; leaves not as above; fruit not as above
- 17 Leaves cleft, often with 1 or 2 pairs of pinnately disposed lower segments well differentiated from the larger terminal segment, the primary segments again lobed and toothed; flowers nearly sessile in the axils of lance-linear bracts, the bracts abruptly differentiated from the leaves; corolla small, mostly hidden in the bracts; plants annual, weedy along roads and on other disturbed places.....VERBENACEAE
- 17 Leaves toothed or lobed, rarely cleft but then plants not as above in all features
- 18 Flowers scarlet red, 2.5-3.5 cm long including a corollalike floral tube; stamens 8; fruit a linear capsule; leaves toothed, not lobed; seeds tipped with numerous white hairs (*Epilobium*).....ONAGRACEAE
- 18 Flowers not scarlet red; stamens not 8; fruit not or hardly linear; leaves toothed or lobed; seeds not tipped with numerous white hairs (with a few plumose hairs in VALERIANACEAE)
- 19 Flowers 1-2 mm long, whitish, borne in racemes; sepals 2, spreading to reflexed, of the same color and texture as the petals; petals 2, notched; stamens 2; fruit covered with hooked hairs (*Circaea*).....ONAGRACEAE
- 19 Flowers and fruit not as above in all respects
- 20 Petals united only at the base; flowers regular; styles 3, persistent in fruit; stamens 10; leaves more or less evergreen, glabrous, finely toothed.....ERICACEAE
- 20 Petals united into a tubular corolla, the corolla regular or irregular; styles 1; leaves not evergreen, coarsely to finely toothed or lobed
- 21 Inflorescence an umbellike cyme; corollas 2-7 mm long, whitish; plants rather ill-scented; seeds tipped with plumose hairlike calyx bristles; stamens 3.....VALERIANACEAE
- 21 Inflorescence not as above; corollas various; plants scented or not; seeds not tipped with plumose calyx bristles; stamens 2 or 4
- 22 Flowers sessile or nearly so and solitary to verticillate in the axils of leaves or in a headlike or spikelike terminal inflorescence, when axillary much shorter than the subtending leaves, white, pink, or blue; styles cleft with 2-4 lobes; fruit of 4, 1-seeded nutlets, these enveloped by a persistent calyx; stems often square in cross section; plants often aromatic.....LAMIACEAE
- 22 Flowers pedicel, axillary or terminal, exceeding the subtending leaves or occasionally exceeded by the leaves in *Veronica*, yellow, blue, or blue-lavender; styles entire or 2-cleft; fruit a 2-chambered capsule; not enveloped by the calyx; stems not square in cross section; plants not aromatic.....SCROPHULARIACEAE
- 12 Leaves entire or less than 15 mm long or glandular denticulate, petioled or sessile
- 23 Stem leaves abruptly constricted to a distinct petiole, the petiole sometimes short; or if leaves sessile then plants with milky juice (and flowers born in umbels, and seeds with dense apical tufts of hair, and fruit a follicle 3-20 cm long except in *Euphorbia*)
- 24 Leaves 3-15 mm long, sometimes inconspicuously toothed; stems prostrate; flowers paired in axils of leaves, inconspicuous; fruit a 3-lobed capsule, usually pendulous; plants with milky juice.....EUPHORBIACEAE
- 24 Leaves over 15 mm long; stems not prostrate; flowers not paired in axils of leaves, conspicuous or not; fruit various; plants with or without milky juice
- 25 Flowers borne in the axils of leaves, inconspicuous; leaves glandular denticulate.....ELATINACEAE
- 25 Flowers not in the axils of leaves, conspicuous; leaves not glandular denticulate
- 26 Plants with milky juice; flowers borne in umbels or in cymes; fruit a follicle, 3-20 cm long, not winged; seeds with an apical tuft of white hairs
- 27 Follicles linear or essentially so, not over 5 mm wide; corolla united to the middle or above, the lobes erect to spreading or somewhat reflexed and to 5 mm long; flowers borne in dichotomously or more often trichotomously branched cymes; stamens and styles not surrounded by hooded appendages.....APOCYNACEAE
- 27 Follicles not linear, often over 5 mm wide; corolla united below the middle only, the lobes mostly deflexed and often over 5 mm long; flowers borne in simple or compound umbels, the umbels mostly more than 3-rayed; stamens and styles surrounded by hooded appendages.....ASCLEPIADACEAE
- 26 Plants without milky juice; flowers in heads or clusters, the heads subtended by involucre or each flower subtended by a leaflike bract; fruit of achenes, not over 1 cm long, or if to 3 cm long then with broad scarious wings; seeds without tufts of hair.....NYCTAGINACEAE
- 23 Stem leaves sessile or the blades gradually tapered to an indistinct petiole; plants without milky juice; flowers not in umbels; seeds not tufted with hairs; fruit not a follicle

- 28 Flowers exceeded by the subtending leaves or bracts, axillary (terminal in Paronychia but then inconspicuous and hidden in crowded leaves)
- 29 Plants pulvinate caespitose perennials; leaves 3-6 mm long, densely crowded, with scarious stipules 1/2 to as long as the leaves; flowers inconspicuous; petals lacking or minute (Paronychia).....CARYOPHYLLACEAE
- 29 Plants not as above; leaves mostly over 6 mm long
- 30 Lower leaves opposite, but some or all of the flowers alternate and subtended by alternate leaves or bracts; plants puberulent or glandular pubescent on the stems or in the inflorescence
- 31 Flowers subtended by bracts or bractlike leaves that are much smaller than the lower leaves, solitary; corolla 2-4 mm long, 4 lobed; stamens 2, usually exserted; calyx of 4 essentially free sepals; fruit a somewhat flattened capsule, notched or obcordate at the apex (Veronica).....SCROPHULARIACEAE
- 31 Flowers subtended by leaves that are only gradually reduced in size from the lower leaves, often in pairs; corolla 5-15 mm long, 5 lobed; stamens 5, included; calyx united to about the middle, 5-lobed; capsules not flattened, not notched or obcordate at the apex (Microsteris).....POLEMONIACEAE
- 30 Leaves subtending the flowers all opposite, a few upper leaves alternate in Glaux but these seldom subtending flowers and then plants glabrous; flowers opposite or verticillate
- 32 Stems prostrate; leaves 3-15 mm long
- 33 Plants with milky juice, of dry places, with short-petioled leaves (also keyed above in lead 23).....EUPHORBIACEAE
- 33 Plants not with milky juice, of wet places (see also lead 4 in KEY 10)....ELATINACEAE
- 32 Stems not prostrate or some leaves over 15 mm long
- 34 Plants of dry places, puberulent throughout, perennials from branched caudices, strongly aromatic; corolla united, 6-12 mm long; calyx tubular with curved teeth (Hedeoma).....LAMIACEAE
- 34 Plants of moist to wet, often alkaline places, glabrous, annual, or if perennial then from rhizomes, not aromatic; perianth of a single set or if both calyx and corolla present then not over 4 mm long
- 35 Plants perennials from rhizomes; leaves 4-25 mm long, crowded, the upper few alternate (Glaux).....PRIMULACEAE
- 35 Plants annual (sometimes with numerous fibrous roots and appearing perennial)
- 36 Leaves 3-12 mm long of if longer then glandular-denticulate, usually with membranous stipules; plants glabrous of glandular-puberulent.....ELATINACEAE
- 36 Leaves (10) 20-40 mm long, entire; stipules lacking; plants glabrous
- 37 Leaves oblanceolate, spatulate or obovate, gradually tapering to a petiole-like base; flowers pink-lavender, 6-10 mm long.....AIZOACEAE
- 37 Leaves linear or nearly so, with auriculate-clasping bases; flowers inconspicuous, not over 4 mm long.....LYTHRACEAE
- 28 Flowers exceeding the leaves, axillary or terminal
- 38 Perianth of similar tepals, the segments free, pubescent, yellowish, about 2 mm long; flowers borne in small involucre, the involucre sessile or at the ends of filiform peduncles; some nodes of the stem usually with more than 2 leaves (Eriogonum salsuginosum).....POLYGONACEAE
- 38 Perianth of sepals and petals or not yellow, mostly over 2 mm long; plants otherwise not as above in all features
- 39 Petals yellow, free; leaves usually with purple-black dots especially along the margins; stamens 15-100.....HYPERICACEAE
- 39 Petals not yellow or if so then united; leaves not black-dotted; stamens 2-10
- 40 Sepals apparently 2, free; petals 5, free; stamens usually 5; style solitary with 3 stigmas.....PORTULACEAE
- 40 Sepals 5 or calyx united; petals, stamens, and styles various
- 41 Petals free, white, pinkish, rarely lavender or red, sometimes small or lacking; sepals free or united into a tubular calyx (if petals lacking then sepals mostly free); stamens mostly 10; styles 2-5; fruit a capsule with free central placentation.....CARYOPHYLLACEAE
- 41 Corolla or corollalike calyx united at least at the base, yellow, blue, pale lavender to deep purple or red; sepals free or united; stamens 2, 4, or 5; styles 1, entire (or lobed in Monardella); fruit various, sometimes a capsule, but not with free central placentation
- 42 Flowers numerous in headlike clusters, the clusters solitary and terminal, closely subtended by an involucre of bracts; stamens exserted; plants strongly aromatic, entering the area at the w. extremes (Monardella).....LAMIACEAE
- 42 Flowers not in a solitary, terminal, headlike cluster; stamens included or exserted; plants seldom aromatic, of various distribution
- 43 Flowers in umbellike cymes, 2-7 mm long, whitish; stamens 3; seeds tipped with plumose, bristlelike pappus-hairs; leaves rarely all entire; plants rather malodorous.....VALERIANACEAE

- 43 Plants not as above in all features
 - 44 Inflorescence open, often trichotomously branched, strongly glandular; stamens and style exerted from the corollalike calyx, this subtended by a calyxlike involucre (Oxybaphus).....NYCTAGINACEAE
 - 44 Inflorescence not trichotomously branched, or if so then glabrous; stamens and style mostly included; true corolla and calyx present, not subtended by an involucre
 - 45 Flowers usually several to numerous, mostly axillary or in axillary racemes; corolla mostly irregular, without fringed appendages within, variously colored (sometimes all yellow); fertile stamens 2-4.....SCROPHULARIACEAE
 - 45 Flowers solitary or 2-3 and terminal, or if more numerous and axillary then the corolla mostly with fringed appendages within; corolla regular, variously colored, not all yellow; stamens 4 or 5
 - 46 Stigmas 3-lobed; corolla 5-lobed, not pleated, without fringed appendages within, the tube 5-20 mm long, not over 4 mm wide; stamens included, fruit a 3-chambered capsule; leaves linear, and seldom over 2.5 (4) mm wide or with narrow teeth or segments, not connate-sheathing; plants mostly perennial.....POLEMONIACEAE
 - 46 Stigmas entire, but styles sometimes 2 cleft; corollas with 4 or 5 lobes, if 5-lobed then pleated or stamens exerted, the tube various but mostly either over 20 mm long or over 4 mm wide, or both longer and wider in perennial plants; leaves various, sometimes connate-sheathing.....GENTIANACEAE

KEY 12: LEAVES SIMPLE, ALTERNATE

- 1 Perianth of a single whorl or the segments not strongly differentiated into sepals and petals (arbitrarily called tepals, the tepals sometimes petallike), not over 4 mm long, inconspicuous or somewhat showy (especially when flowers are clustered together); fruit 1-seeded except in Besseya and Glaux
 - 2 Leaf blades uniformly serrate on most of the margin; stamens 2, strongly exerted from the calyx; plants villous, of high elevations on the Uinta Mts. (Besseya).....SCROPHULARIACEAE
 - 2 Leaf blades entire or occasionally toothed but then stamens not exerted and plants not villous nor of high elevations on the Uinta Mts.
 - 3 Leaves with evident, usually membranous sheathing stipules, or if stipules lacking then inflorescence umbellike or cymelike and borne on long naked peduncles and flowers few to several in tiny involucre.....POLYGONACEAE
 - 3 Leaves without stipules as above; inflorescence not as above
 - 4 Flowers more or less conspicuous; sepals more or less petallike; plants perennials 3-30 (40) cm tall, glabrous, and usually glaucous; leaves 5-40 mm long, 1-10 (16) mm wide
 - 5 Flowers in axils of lower and middle stem leaves; lower leaves often opposite; plants of moist saline or alkaline lowlands (Glaux).....PRIMULACEAE
 - 5 Flowers terminal and in axils of upper leaves; leaves all alternate; plants of dry places.....SANTALACEAE
 - 4 Flowers mostly inconspicuous; sepals scalelike; plants annual, usually weedy, glabrous, scurfy, or hairy; leaves various
 - 6 Style 1, short; flowers in axillary clusters, subtended by several linear involucral bracts; leaves usually elongate-elliptic, with a slender petiole (Parietaria).....URTICACEAE
 - 6 Styles usually 2 or 3; flowers variously disposed, but not subtended by involucral bracts; leaves various
 - 7 Flowers obscured among many, dry, scarios, persistent bracts; sepals scarios; leaves not scurfy, petioled, entire, not linear.....AMARANTHACEAE
 - 7 Flowers not obscured among many bracts, sometimes folded between 2 bracts; leaves often scurfy, sessile or petioled, entire or toothed, sometimes linear.....CHENOPODIACEAE
 - 1 Perianth of 2 whorls, the corolla usually showy, often over 4 mm long; fruit various, but often more than 1-seeded
 - 8 Corolla united for 1/4 or more of its length; stamens 2, 4, or 5
 - 9 Stems creeping, twining or climbing; from deep-seated, whitish rhizomes; corolla 1.5-2.5 cm long, white or pink; leaf blades often triangular or hastate, occasionally oblong-ovate...CONVOLVULACEAE
 - 9 Stems not as above, or corolla smaller
 - 10 Corolla bilaterally symmetrical (irregular); stamens 2 or 4; style entire; fruit a 2-chambered capsule, the two opposite sutures usually evident externally.....SCROPHULARIACEAE
 - 10 Corolla radially symmetrical (regular); stamens 5; style entire or lobed; fruit a capsule or berry with 1-3 chambers
 - 11 Stem leaves entire, sessile or gradually tapered to an indistinct petiole; style 1; stigma 1, entire; fruit a capsule or of 4 nutlets
 - 12 Plants 40-100 (200) cm tall, tomentose with stellate or dendritic hairs; stems solitary; basal leaves 10-40 cm long, 3-12 cm wide; stem leaves becoming sessile and decurrent upward; flowers yellow (Verbascum).....SCROPHULARIACEAE

- 12 Plants not as above in all features
 - 13 Flowers solitary and terminal, or few and the corolla 15-30 mm long, blue, bell shaped from the base, not strongly divided into a tube and a limb; plants glabrous or nearly so except for a few scattered hairs in the inflorescence; style terminal on an inferior ovary; fruit a capsule.....CAMPANULACEAE
 - 13 Flowers not solitary; corolla seldom both blue and over 15 mm long, if at all bell shaped then distinctly divided into a narrow tube and somewhat flaring limb; plants glabrous to more often harshly pubescent; style usually arising from below the base of 1-4 superior nutlets.....BORAGINACEAE
- 11 Stem leaves toothed or lobed to dissected, entire in a few taxa and then with well marked petioles, or if leaves entire and without distinct petioles then styles either 2 or 2-lobed or with 3-lobed stigmas
 - 14 Style 1, stigmas entire; fruit a berry or a capsule; stamens sometimes exerted and united by the anthers into a column around the style.....SOLANACEAE
 - 14 Styles 2, or 2-lobed, or with 3-lobed stigmas; fruit a capsule; stamens not united
 - 15 Styles 2, or 2-lobed, stigmas entire; inflorescence usually a one-sided helicoid cyme that uncoils as the flowers mature; capsules with 1 (2) chamber(s).....HYDROPHYLLACEAE
 - 15 Style 1, entire, but with a 3-lobed stigma; inflorescence not as above; capsules 3-chambered.....POLEMONIACEAE
- 8 Corolla of separate petals or petals united for less than 1/4 of the length (or stamens more than 5, and stems mostly woody toward the base, and plants also keyed in KEY 5)
 - 16 Leaves lobed to divided
 - 17 Leaves pinnately lobed, harshly pubescent with minute, many-barbed hairs, rough to the touch; petals 5 or apparently 10, yellowish; stamens 10-numerous.....LOASACEAE
 - 17 Leaves palmately lobed, cleft or divided, or trilobate, not pubescent as above
 - 18 Stamens 5-10; plants 5-30 (40) cm tall; flowers 4-15 mm long with floral cups on which stamens, petals, and sepals are borne; stem leaves few (only 1-3), the blades mostly less than 3 cm long.....SAXIFRAGACEAE
 - 18 Stamens more than 10; plants sometimes over 30 cm tall; flowers various; leaves various, but mostly not as above
 - 19 Filaments of stamens united into a column around the styles; fruit globose or depressed-globose, partially separating into 5-20 segments; plants usually stellate-pubescent; flowers not spurred, variously colored.....MALVACEAE
 - 19 Filaments free; fruit of achenes on an open receptacle or of follicles; plants not stellate pubescent; flowers yellow or white, or if blue or purplish then spurred.....RANUNCULACEAE
 - 16 Leaves entire or toothed but not lobed
 - 20 Leaves sessile or the blades gradually tapered to a short or indistinct petiole, entire; basal leaves lacking or poorly developed or not much larger than the stem leaves
 - 21 Flowers borne in umbels; bracts of the umbels opposite; plants with milky juice.....EUPHORBIACEAE
 - 21 Flowers not in umbels; plants without milky juice
 - 22 Flowers mostly solitary and terminal (Saxifraga).....SAXIFRAGACEAE
 - 22 Flowers not solitary and terminal
 - 23 Leaves pubescent with minute, many-barbed hairs, rough to the touch, brittle, and clinging to any porous or slightly porous object; stamens 10-numerous; style 1.....LOASACEAE
 - 23 Leaves glabrous, often glaucous; stamens 5-10; styles 2-5
 - 24 Leaves succulent; fruit of basally fused follicles; stamens 8-10; flowers crowded, nearly sessile; yellow or pink to rose-purple.....CRASSULACEAE
 - 24 Leaves not especially succulent; fruit a capsule; stamens 5; flowers crowded or not, on conspicuous pedicels, yellow or blue.....LINACEAE
 - 20 At least some of the leaf blades narrowed to a distinct petiole (often abruptly so), usually also toothed; basal leaves often well developed and larger than the stem leaves
 - 25 Flowers in umbels; petals 1-3 mm long; blades of basal leaves cordate at the base, uniformly serrate; at least some of the stem leaves usually compound (Zizia).....APIACEAE
 - 25 Flowers not in umbels; petals mostly longer; leaves various but all simple
 - 26 Flowers bilaterally symmetrical (irregular), usually nodding, the upper 1 or 2 petals arched backwards at the tip, the lowest one spurred or saccate at the base; leaf blades sometimes cordate at the base.....VIOLACEAE
 - 26 Flowers radially symmetrical (regular); petals not arched, not spurred, leaves not cordate at the base
 - 27 Leaves pubescent with minute, many-barbed hairs, rough to the touch, brittle, clinging to any porous or slightly porous object, mostly well distributed on the stems; stamens 10-numerous.....LOASACEAE
 - 27 Leaves glabrous or nearly so, at least not with hairs as above, sometimes congested toward the base of the stem; stamens various

ACERACEAE

- 28 Flowers yellow; petals separate; stamens more than 10; leaves not evergreen; fruit of achenes on an open receptacle (Ranunculus).....RANUNCULACEAE
- 28 Flowers pink or rose-lavender to white; corolla more or less united; stamens 8-10; leaves usually more or less evergreen; fruit a capsule
- 29 Leaves well distributed along the stems, not crowded toward the base; flowers solitary in axils of leaves.....ERICACEAE
- 29 Leaves crowded toward the base of the stems, sometimes in rosettes; flowers in racemes (Pyrola)...PYROLACEAE

DESCRIPTIVE FLORA

ACERACEAE Maple Family

Acer L. Maple

Shrubs or trees, polygamous or dioecious; leaves opposite, simple or compound, palmately lobed to pinnately compound, often turning bright red in autumn; flowers in terminal or axillary racemes, corymbs or panicles; sepals (4) 5, free or united at the base; petals lacking or shorter than the calyx and inconspicuous; stamens 4-12, arising at the inner or outer edge of a lobed disc or the disc obsolete; pistil 1; ovary superior, usually 2-lobed and 2-chambered; styles 2; fruit a double samara, splitting into halves at maturity, each half with a wing.

- 1 Leaves compound
- 2 Terminal leaflets on an extended rachis; leaflets mostly over 5 cm long; trees; each half of the fruit 2-5 cm long..... A. negundo
- 2 Terminal leaflet sessile or nearly so; leaflets seldom to 5 cm long; shrubs or small trees; each half of the fruit 1-2.5 cm long..... A. glabrum
- 1 Leaves simple
- 3 Leaves sharply serrate; sinuses between the lobes and teeth mostly acute; shrubs or small trees..... A. glabrum
- 3 Leaf margins not serrate, if toothed then the teeth broad and rounded; sinuses between the lobes and teeth typically rounded; trees..... A. grandidentatum

Acer glabrum Torr. Rocky Mt. m. [A. glabrum var. glabrum; A. glabrum var. tripartitum (Nutt.) Pax.] Widespread and scattered; mountain slopes and canyons, often in wooded areas; mostly 7,000-9,000 ft; April-June. Plants with parted, divided, or palmately compound leaves have been referred to var. tripartitum. Those with simple leaves have been referred to var. glabrum. Arnow and others (1980) reported the two forms to be sympatric and to intergrade completely. We treat them in synonymy.

Acer grandidentatum Nutt. Bigtooth m. Rather infrequent at lower and mid elevations of the s. slope of the Uinta Mts., most common towards the w., records and sightings from Rhoades, N. Fork Duchesne, and Rock Creek drainages; one population with rather small leaves has been found as far e. as Whiterocks Canyon; reported by Graham (1937) for the bottom of Florence Canyon, Tavaputs Plateau; May-June.

Acer negundo L. Boxelder. (A. interior Britt.; A. interis Britt.) Occasional or common, widespread; along water courses or in depressions where run off accumulates; mostly below 7,500 ft, sometimes cultivated as a shade tree; May-June.

ADOXACEAE Moschatel Family

Adoxa L. Muskroot; Moschatel

Adoxa moschatellina L. Perennial glabrous herbs from scaly or tuberiferous rootstocks, 5-15 cm tall; leaves basal and one pair opposite above midlength of the stem, long petioled, ternately compound, the leaflets 3-lobed or 3-cleft or the terminal one again ternate; flowers bisexual, in terminal headlike clusters, the clusters 6-8 mm wide, with 3-8 flowers; calyx 2-3 lobed; corolla united, 2-3 mm long, greenish, 4-5 lobed in terminal flowers, 5-6 lobed in lateral flowers; ovary inferior; styles 3-5-parted; fruit a greenish dry drupe with 3-5 nutlets. Listed by Tidestrom (1925) for the Uinta Mts., apparently not collected since.

AGAVACEAE Agave Family

Yucca L. Yucca

Yucca harrimaniae Trelease Harriman y. (Y. gilbertiana Rydb.) Stout rhizomatous subcaulescent shrub from a semiwoody caudex; leaves saberlike, basal, thick and firm, lanceolate to nearly linear, fibrous margined, stiffly awl-pointed, the bases dilated; scape stout; inflorescence racemose, papery-bracted; flowers numerous, large, pendulous, the tepals thick and waxy when fresh, white, cream or

yellowish green; stamens 6, filaments fleshy; ovary superior, 3-loculed, with a 3-lobed stigma, ovoid-oblong in outline, \pm woody in age. Seldom collected, but probably at least occasional at low elevations in the Basin from e. Duchesne Co. eastward; dry slopes and foothills in desert shrub and pinyon-juniper communities; our records 4,800-6,000 ft; May-July. We have two phases in the Basin; they can be recognized at varietal level as follows:

- 1 Plants consisting of 1-few clumped stems, these connected by short caudexlike rhizomes or some of aerial origin; leaves relatively wide, thick, and stiff, the marginal fibers freely exfoliating, coarse and curly; flowers usually greenish-yellow; plants not particularly of sandy places..... var. harrimaniae
- 1 Plants consisting of clones (sometimes numbering many hundreds), individual stems (rosettes) solitary, rather widely spaced, connected by deep-seated horizontal rhizomes; leaves relatively narrow, thin, and flexible, the marginal fibers little exfoliating, mostly slender and nearly straight; flowers white; plants of sandy places..... var. neomexicana * (Woot. & Stand.) Reveal

* Var. neomexicana is a taxon from se. Colorado and adjacent New Mexico (Cronq. and others 1977). Our material (which fails to fruit) described above is tentatively assigned here. Further study is needed.

AIZOACEAE Carpet-weed Family

Sesuvium L. Seapurslane

Sesuvium verrucosum Raf. Glabrous, more or less succulent, annual herbs; stems 10-70 cm long, prostrate or ascending, much branched; leaves opposite, spatulate to linear, the base narrow but clasping; flowers axillary, solitary, bisexual; sessile or on short pedicels; calyx tube turbinate, 5-lobed, the lobes 5-7 mm long, scarious margined, short-horned near the apex; corolla lacking; stamens many; ovary half-inferior; fruit a circumscissile capsule with 3-5 chambers. The 4 records seen are from the shore of Pelican Lake and the flood plain of the Green River near Ouray.

ALISMATACEAE Water-plantain Family

Herbs aquatic, semiaquatic, or growing in wet mud of drying ponds, scapose; leaves erect and/or floating, with elongate, sheathing petioles, the blades with prominent parallel veins and transverse veinlets; inflorescence a series of (1) 2-8 (rarely more) verticels of simple or more often compound umbels or panicles; sepals 3; petals 3 or lacking; stamens (3) 6-many, included; pistils several to numerous, free, the ovary superior, the style often persistent as a beak on the fruit; fruit an achene (ours), the achenes rather numerous, borne on a receptacle, the achenes and clusters of achenes similar to those in some of RANUNCULACEAE.

- 1 Blades of emergent leaves mostly with conspicuous sagittate or hastate lobes; lower flowers pistillate, upper flowers staminate; stamens numerous..... Sagittaria
- 1 Leaf blades not sagittate nor hastate; flowers bisexual; stamens (3) 6-12
 - 2 Stamens 12; achenes firm, with terminal beak, densely packed on the receptacle, not in a single row; leaves not sheathing, the blades of emergent leaves oval or cordate, strongly 5-9 nerved and reticulate veined, abruptly constricted to a distinct petiole; the verticillate peduncles or branches of the inflorescence each with a single umbel, or the upper ones ending in a single flower..... Echinodorus
 - 2 Stamens (3) 6-9; achenes, rather papery, beakless or the rather fragile beak lateral, in a single row on the receptacle;; leaves various, but if the blades oval and abruptly constricted to a petiole then the primary verticillate branches of the inflorescence often with a subterminal verticil of flowers in addition to the terminal umbel..... Alisma

Alisma L. Water-plantain

Perennial herbs, aquatic, submerged or emergent or in mud of drying ponds, from rootstocks and fibrous roots; leaves all basal; inflorescence usually with 2-4 whorls of branches, the branches ending in umbels and often with a lateral whorl of verticillate flowers; flowers mostly bisexual, regular; sepals 3, persistent; petals 3, white to pinkish or purplish, deciduous.

- 1 Inflorescence much exceeding the leaves; emergent leaf blades broadly elliptic to oval, rather abruptly constricted to a distinct petiole, 2-20 cm wide; petals 3.5-6 mm long, white..... A. plantago-aquatica
- 1 Inflorescence shorter than or slightly exceeding the leaves; leaves sometimes all submerged and reduced to linear petioles; blades of emergent leaves narrowly elliptic or rarely oblong, gradually narrowed to the petiole, mostly less than 3 cm wide; petals 2-4 mm long, pinkish or whitish..... A. gramineum

Alisma gramineum Lej. Narrowleaf w. (A. geyeri Torr.) Occasional or locally common; aquatic or in mud; 4,700-7,400 ft; July-Aug.

ALISMATACEAE

Alisma plantago-aquatica L. Common w. The one record seen (Goodrich and Jepson 15960) is from the Uinta Mts., Daggett Co.; from an ephemeral pond, to be expected elsewhere; 7,600 ft; June-Sept.

Echinodorus Rich. Bur-head

Echinodorus rostratus (Nutt.) Engelm. Plants annual, 10-40 (60) cm tall; leaves usually exceeded by the inflorescence, erect, the blades 2-8 (10) cm long, often about as wide, the floating or submerged leaves narrower and lanceolate to elliptic; scapes 1-few, erect, ribbed, or angled; inflorescence of 1-several bracteate verticils, the lower ones often of a few peduncles each terminated by a bracteate umbel or umbellike cluster of pedicellate flowers; the upper verticils simple and of few to several pedicellate flowers; internodes of the inflorescence reduced upward; sepals 3, persistent, reflexed, 2-4 (5) mm long; petals 3, 5-10 mm long, white to cream or greenish-white, the margin entire; stamens 12; achenes 1-4 mm long, with 2-winged ribs alternating with 3 nonwinged ribs, the style persistent as a stout beak; fruiting head burlike at maturity. The 2 records seen are from disturbed ground of wet bottomlands near Ouray; July-Aug.

Sagittaria L. Arrowhead

Sagittaria cuneata Sheldon Wapato. Plants perennial, aquatic or in mud of drying ponds, 20-100 (200) cm tall, arising from stout, tuber-bearing, spreading rhizomes; leaves shorter than or about equalling the inflorescence, blades of aerial leaves sagittate, the terminal lobe 1-10 cm long and 1-6 cm wide, lateral lobes widely divergent, 1-8 cm long and 1-3 cm wide; submerged leaves with lobes reduced and hastate or blades obsolete and leaves petiolelike the entire length; scapes few, erect; inflorescence of 2-7 mostly simple verticils of flowers on pedicels 0.5-6 cm long; lower flowers pistillate, upper flowers staminate, with some bisexual flowers in between, rarely all bisexual or all staminate; sepals 3, reflexed, 5-10 mm long, persistent; petals 3, 1-2 cm long, white; stamens 21 or more; achenes numerous, 2.5-4 mm long, in a globose head 1.5-3 cm in diameter; the style persistent as a beak on the achene. The 4 records seen are from wet bottomlands (flood plain of the Green River) near Ouray, Stewart Lake, Echo Park, and a pond at Green Lakes, Daggett Co.; 4,700-7,380 ft; July-Aug.

AMARANTHACEAE Amaranth Family

Amaranthus L. Amaranth; Pigweed; Redroot

Annual herbs; leaves simple, alternate, entire or shallowly dentate to sinuate; flowers inconspicuous, regular, mostly crowded in dense racemes or spikes, subtended by 1 or more membranous or scarious, pointed, persistent bracts, bisexual or unisexual, the same plant often with a mixture of bisexual and unisexual flowers; bisexual and staminate flowers with 5 scarious or membranous sepals and 5 stamens, corolla lacking; pistillate flowers without a perianth; styles 3 (in ours); fruit a 1-seeded, usually circumscissile, membranous or scarious capsule; seeds smooth, shiny, brown or blackish.

- 1 Flowers in small axillary clusters; leaf blades mostly 1-3 cm long; plants much branched; stamens 2-4
- 2 Stems prostrate to somewhat ascending; seeds 1.3-1.7 mm long; sepals 4-5; stamens 3-4; bracts as long or only slightly longer than the sepals..... A. blitoides
- 2 Stems erect; seeds 0.6-1 mm long; sepals 3; stamens 2-3; bracts about twice as long as the sepals...
..... A. albus
- 1 Flowers in terminal and axillary, simple to compound spikes; leaf blades usually over 3 cm long; plants much branched or not; stamens 3-5
- 3 Plants unisexual, scurfy-villous for some distance below the inflorescence, with flattened, crisped, multicellular hairs; leaves usually hairy on the lower surface at least along the veins; sepals of the pistillate flowers 2.5-4 mm long, mostly 1.5-2 times as long as the ovary and generally longer than the mature fruit, broadly rounded to retuse, with or without a short terminal bristle, membranous and whitish except for the prominently greenish midnerves; stamens 5 (4)... A. retroflexus
- 3 Plants bisexual, glabrous to puberulent or sparsely or obscurely pubescent (but not villous) below the inflorescence; leaves nearly or quite glabrous; sepals of the pistillate flowers 2-3 (3.5) mm long, from shorter than the ovary to about equal the mature fruit, acute or obtuse to sometimes broadly rounded and with a short terminal bristle, the midnerve usually not conspicuously greenish; stamens 3 (4)..... A. powellii

Amaranthus albus L. Tumble p. Roadsides and cultivated areas, increasing after fire and other disturbance, in various plant communities; up to 7,600 (8,000?) ft; July-Oct.

Amaranthus blitoides Wats. Prostrate p., tumble p. (A. graecizans L. misapplied) Roadsides, cultivated areas, and other disturbed areas; up to 8,200 (9,000) ft; July-Oct.

Amaranthus powellii Wats. Reported (Graham 1937) for w. of Vernal, along a ditch; Sept.

Amaranthus retroflexus L. Redroot p., redroot a. (A. hybridus L.) Roadsides, gardens, and other cultivated areas, and waste places; up to about 7,000 ft; July-Oct.

ANACARDIACEAE Sumac Family

Shrubs (ours), trees or climbing plants, the sap usually acrid, resinous or milky; leaves alternate, pinnately or palmately 3-foliolate; flowers regular, bisexual or polygamous, small, in axillary or terminal panicles; sepals usually 5 (4-6) with a glandular disc at the base; petals separate, usually 5 (4-6); stamens as many as and alternate to the petals; ovary superior, 1-chambered, with 1 ovule; styles usually 3; fruit drupelike, but dry, 1-seeded.

- 1 Leaflets mostly less than 3 cm long, the terminal one sessile or on a short stalk much less than 1 cm long; fruit reddish, pubescent..... Rhus
- 1 Leaflets over 3 cm long, the terminal one on a stalk usually over 1 cm long; fruit yellowish white, usually glabrous..... Toxicodendron

Rhus L. Sumac

Rhus trilobata Nutt. Skunkbush, squawbush. Shrub 1-2 m tall; stems usually many from a large root crown; leaves alternate, mostly compound with 3 sessile leaflets, rarely simple and crenate to shallowly lobed or 1-3 cleft; flowers appearing before the leaves, small but densely clustered at the ends of branches; petals yellow-green, 2-3 mm long; fruit 6-8 mm long, subglobose, red or orange, densely puberulent with red, viscid hairs and some long simple hairs, becoming glabrous in age. Widespread and common below 7,500 ft, abundant locally on the flood plains of the Green and White Rivers; April- June. The plant is aromatic with a pungent, rather disagreeable odor that is particularly noticeable when the twigs are crushed or broken. Our plants are referable to var. trilobata.

Toxicodendron Mill Poison Ivy

Toxicodendron rydbergii (Small) Greene [Rhus radicans L. var. rydbergii (Small) Rehder; Toxicodendron radicans L. var. rydbergii (Small) Erskine] Shrub or subshrub to 1.5 m tall, dioecious; leaves alternate, congested toward the summit of the stem, compound with 3 (5) leaflets, the leaflets 3-20 cm long, 2-11 (17) cm wide, coarsely dentate to nearly entire, turning yellow, orange or red in autumn; flowers appearing with the leaves, in compact or loose axillary panicles to about 5 cm long; sepals 5, about 1 mm long; petals 5, yellow-white, to 3 mm long; stamens 5; styles 3, fused at the base; fruit a subglobose drupe, 2.5-7 mm wide, white or cream to yellow, glabrous and smooth. Occasional or rather rare; woods and canyons, the records seen are from Split Mt., Dinosaur National Monument, and canyons of the Uinta Mts.; 4,800-7,400 ft; May-June.

APIACEAE (UMBELLIFERAE) Parsley Family; Carrot Family

Annual or perennial herbs, often aromatic, commonly hollow-stemmed; leaves alternate, basal or rarely opposite, once to many times compound, rarely simple, the petioles often sheathing; flowers in compound (ours) umbels, the rays elongate or sometimes reduced or nearly obsolete and then the umbel headlike; the umbel sometimes subtended by an involucre of separate or united bracts; the pedicels sometimes subtended by an involucre of separate or united bractlets; calyx of 5 minute teeth or lacking; petals 5, separate, mostly small; stamens 5, alternate with the petals; ovary inferior, 2-chambered, each chamber with a single ovule; styles 2, sometimes swollen at the base forming a stylopodium; fruit a schizocarp, splitting at maturity into 1 seeded mericarps and disclosing a wirelike or threadlike carpophore to which the mericarps are apically attached; carpophore sometimes lacking; mericarps typically 5-nerved or 5-ribbed, the ribs sometimes winged.

- 1 Plants caulescent, often over 30 cm tall; pseudostem lacking; the few to several peduncles mostly shorter than the leafy stem on which they are borne; styles rarely over 1 mm long; stylopodium present and petals white in native taxa except Zizia and in a few taxa keyed both ways
 - 2 Leaves simple to ternate or pinnate with leaflets mostly sessile..... KEY 1 P. 22
 - 2 At least the larger leaves more than once-compound; primary leaflets usually petiolulate..... KEY 2 P. 22
- 1 Plants acaulescent, the leaves sometimes whorled atop a pseudostem, or if subcaulescent then the usually solitary peduncle longer than the short, leafy stem on which it is borne, and lateral umbels if any mostly borne on the lower 1/3 of the plant, of various stature; styles often over 1 mm long; stylopodium lacking or taxa keyed both ways; petals yellow, white, or purple
 - 3 Leaves ternate or biternate with 3-9 leaflets, or rarely a few simple, usually only 2-3 per plant; leaflets 1.5-7 (11.5) cm long, entire, linear or nearly so; plants 5-10 cm tall, from a globose or fusiform tuber; petals white..... Orogenia
 - 3 Leaves and leaflets not as above, or if so then plants mostly taller and/or petals yellow
 - 4 Petals and anthers white; involucrels lacking or of 1-2 linear bractlets; fruit 3-6 mm long, stylopodium low conic; plants glabrous, not strongly aromatic, of meadows and moist woods above 8,000 ft on the Uinta Mts..... Ligusticum

APIACEAE

- 4 Petals and anthers not white, or if so then the involuclers of broad hyaline bractlets or plants pubescent; fruit often longer if petals white; stylopodium lacking; plants various, but if from above 8,000 ft on the Uinta Mts. then pubescent or strongly aromatic
- 5 Key based on features of the mature fruit..... KEY 3 P. 23
- 5 Key based on vegetative and flowering features..... ALTERNATE KEY 3 P. 23

KEY 1

- 1 Basal leaves simple and cordate at the base, upper leaves sometimes ternate; leaves and leaflets seldom over 7 cm long or 3 cm wide..... Zizia
- 1 Leaves pinnately compound, or if some simple or ternate then the leaves or leaflets over 7 cm long and over 3 cm wide
- 2 Leaflets 10-40 cm long, 10-35 cm wide; plants 1-3 m tall, tomentose; leaves pinnate, ternate, or the upper ones simple; the larger petals cleft, 3-10 mm long..... Heracleum
- 2 Leaflets and plant smaller, not tomentose; leaves pinnate; petals not cleft
- 3 Ultimate segments of leaves mostly entire and filiform, linear, or lanceolate, mostly over 20 times longer than wide, the terminal segment usually much longer than the lateral.... Perideridia
- 3 Ultimate segments of leaves toothed, mostly much broader than above, the terminal segment not as above
- 4 Involucre and involuclers well developed, sometimes spreading or deflexed, the bracts 1-6, the bractlets (2) 4-12; fruit 1.5-3 mm long, the ribs not winged; plants of wet places, usually growing in water, from fibrous roots
- 5 Stems often sprawling, sometimes stoloniferous; leaves with (3) 5-15 opposite pairs of leaflets, these 0.3-4 (6.5) cm long; rays 4-16; fruit 1.5-2 mm long, the ribs obscure..... Berula
- 5 Stems erect, not stoloniferous; leaves with 4-6 opposite pairs of leaflets, these 2-8 (15) cm long; rays 11-24; fruit 2-3 mm long, the ribs prominent, corky..... Sium
- 4 Involucre lacking or infrequently of 1-2 bracts; involuclers often lacking; fruit over 3 mm long or else winged; plants of various habitats, from a taproot or tuberous roots
- 6 Umbels often more than 7 per plant; leaflets hirtellous especially on the lower surface; flowers yellow or red; fruit 5-8 mm long, 3-5 mm wide, strongly flattened, the dorsal ribs filiform..... Pastinaca
- 6 Umbels often less than 7 per plant; leaflets mostly glabrous except in Osmorhiza; flowers white or greenish-yellow; fruit either shorter or narrower than above
- 7 Inflorescence subtended by dilated, sheathing petioles; leaflets glabrous; fruit 3-5 mm long, with small wings..... Angelica
- 7 Inflorescence seldom subtended by dilated, sheathing petioles; leaflets often hirtellous; fruit over 10 mm long, not winged..... Osmorhiza

KEY 2

- 1 At least some ultimate segments of leaflets over 2 cm long or over 1 cm wide, toothed or shallowly lobed
- 2 Involuclers of about 6 bractlets 1-4 mm long; umbels 6-20 or more per stem, the rays 15-26, 1.5-4 cm long; fruit 2-4 mm long, the ribs corky but not winged..... Cicuta
- 2 Involuclers mostly lacking; umbels often fewer than 6 per stem and/or the rays either fewer or longer than above or both fewer and longer; fruit either longer or else winged
- 3 Fruit 3-5 mm long; inflorescence subtended by dilated sheaths; leaflets glabrous..... Angelica
- 3 Fruit 10-25 mm long; inflorescence seldom subtended by dilated sheaths; leaflets often hirtellous..... Osmorhiza
- 1 Ultimate segments less than 2 cm long, less than 1 cm wide, or if longer or wider then deeply lobed to pinnatifid
- 4 Stems usually purple-spotted, (50) 100-300 cm tall, usually much branched, mostly with 10-30 or more umbels, the umbels with 15-26 rays 1.5-4 cm long; involuclers and involuclers usually present... Conium
- 4 Stems not purple-spotted, mostly less than 100 cm tall, mostly not much branched, with 3-9 (14) umbels, the rays usually either fewer or some longer than above; involuclers mostly lacking; involuclers various
- 5 Fruit 3-4 mm long, the ribs filiform; plants biennial, introduced, rarely persisting in indigenous plant communities; involuclers lacking or minute..... Carum
- 5 Fruit 4-8 mm long, the lateral and sometimes the dorsal ribs with small wings; plants perennial, native; involuclers various
- 6 Involuclers usually of 3-6 bractlets; fruit slightly compressed dorsally; root crown mostly simple, without long-persisting petiole-bases; plants rather rare, Daggett Co. and E. Tavaputs Plateau..... Conioselinum
- 6 Involuclers lacking or of 1-3 bractlets; fruit terete or slightly compressed laterally; root crown simple or branched, usually with fibrous long-persisting petiole-bases; plants not of the E. Tavaputs Plateau..... Ligusticum

KEY 3

- 1 Fruit strongly flattened dorsally, the dorsal ribs filiform, not at all winged, the lateral ribs more or less winged, the body 8-15 (20) mm long or if shorter then plants pubescent; involucre lacking..... Lomatium
- 1 Fruit not strongly flattened dorsally or some of the dorsal ribs winged, the body less than 8 mm long or the dorsal ribs winged, the wings to 12 (15) mm long, involucre lacking or present; plants glabrous or hirtellous-scabrous
 - 2 Fruit 2-5 mm long, with rather conspicuous, persisting calyx teeth, the carpophore lacking; rays 1-6 mm long; plants from branched caudices, not strongly aromatic, hirtellous-scabrous throughout, 1-10 cm tall, quite restricted, Uinta Mts., above 9,000 ft..... Oreoxis
 - 2 Fruit 5-16 mm long, the calyx teeth usually not prominent and persisting, or else the carpophore well developed; plants from fibrous taproots and/or of lower elevations, or strongly aromatic and glabrous and rays longer than above..... Cymopterus

ALTERNATE KEY 3

- 1 Plants rather densely hirtellous-scabrous to villous
 - 2 Rays of the umbel 1-6 mm long; primary leaflets sessile or nearly so, 4-14 mm long; plants 2-10 cm tall, known from above 8,400 ft on the Uinta Mts..... Oreoxis
 - 2 Rays of the umbel longer; at least the lower pair of primary leaflets petiolulate, over 14 mm long; plants often taller, of various elevations..... Lomatium
- 1 Plants glabrous or at most obscurely scabrous
 - 3 At least some of the ultimate segments of leaves over 15 mm long and entire..... Lomatium
 - 3 Ultimate segments of leaves less than 15 mm long or else not entire
 - 4 Plants not strongly aromatic, from fibrous taproots, these sometimes enlarged and tuberlike, the crown simple or few-branched, with few if any long-persisting leaf bases; pseudoscape (at least a subterranean one) often present; leaf blades sometimes with confluent portions that are broader than the ultimate teeth or lobes..... Cymopterus
 - 4 Plants strongly aromatic, from simple or more often branched often woody caudices, these often clothed with long-persisting leaf-bases; pseudoscape lacking; leaf blades finely and completely dissected so that the ultimate segments are the widest undivided portion of the blade
 - 5 Calyx teeth lacking or to 0.3 mm long; ultimate segments of leaves 0.2-0.3 mm wide, 500-1000 or more per leaf..... Lomatium grayi
 - 5 Calyx teeth 0.5-0.9 mm long; ultimate segments of leaves 0.5-1 (1.5) mm wide, fewer than 500 per leaf..... Cymopterus

Angelica L. Angelica

Perennial herbs from stout taproots, stems solitary; leaves 1-2 times pinnate or ternate, the ultimate segments broad and distinct, the lateral veins oriented toward the tips of the marginal teeth; petioles strongly sheathing; upper leaves often reduced to dilated sheaths; umbels 1-several, compound; involucre usually lacking; involucre lacking or of a few linear bractlets; calyx teeth mostly lacking; fruit strongly compressed parallel with the commissure, the lateral ribs with broad, thin to corky wings, dorsal ribs threadlike to corky-winged; carpophore divided to the base.

- 1 Stems over 100 cm tall; fruit 7-8 mm long at maturity; umbels globular in shape; plants of the Piceance Basin..... A. ampla
- 1 Stems 30-100 cm tall, rarely taller; fruit 4-7 mm long; umbels rather flat-topped; plants of various distribution
 - 2 Leaves once pinnate or partly bipinnate by some division in lower leaflets; some leaflets usually over 2 times as long as wide..... A. pinnata
 - 2 Leaves twice or more pinnate, the leaflets less than 2 times as long as wide..... A. roseana

Angelica ampla Nels. Giant a. Known in our area (Erickson sn.) from the Piceance Basin.

Angelica pinnata Wats. Small-leaf a. Occasional or locally common; widespread; moist aspen or conifer woods, rarely talus slopes, mostly along streams; 6,000-10,000 ft; June-Sept.

Angelica roseana Henderson Rose a. Occasional or locally common; Uinta Mts., rocky places, often boulder fields in the upper conifer zone and above timberline; (9,300) 10,000-11,700 ft; July-Aug. Graham 8576 (CM!), reported as A. lyallii Wats. (A. arguta Nutt. ex T. & G.) by Graham (1937) belongs here.

Berula Hoffm. Berula

Berula erecta (Huds.) Cov. Stalky b., cutleaf waterparsnip. Plants perennial, often stoloniferous, with numerous fibrous roots; stems 20-80 cm long; submerged leaves much dissected into linear segments, aerial leaves once pinnate, dimorphic, the lower with 4-14 pairs of lanceolate or ovate serrate, crenate or lobed leaflets 1-7 cm long, 3-30 mm wide, the upper with 2-6 pairs of narrower, more deeply lobed, serrate

leaflets; umbels with 6-15 (20) rays; involucre and involucl of narrow, often 3-nerved, more or less reflexed bracts or bractlets; petals white; fruit 1.5-2 mm long. Apparently widespread, seldom collected; semiaquatic or in mud; not expected over 7,000 ft; July-Sept.

Carum L.

Carum carvi L. Caraway. Plants biennial, glabrous, 30-60 (100) cm tall, from a taproot; leaves 2-3 times pinnate and then often pinnatifid, with about 6-11 opposite or offset pairs of lateral primary leaflets, petioles to 15 cm long, the upper ones reduced and the blades sometimes sessile on a dilated sheath, the blades 5-16 cm long, oblong in outline; primary leaflets from less than 1/4 to about 1/2 as long as the leaf blade, sessile, the ultimate segments 2-8 (15) mm long, 0.5-2 mm wide, linear and entire or obovate and toothed to lobed; peduncles 4-12 cm long, usually subtended by a dilated sheath; umbels compound, 6-12 or more; involucre lacking or inconspicuous; rays 6-12 (14), 1.5-8 cm long; involucl lacking or of minute scarios teeth; pedicels (5) 8-20 mm long; petals white; filaments white, the anthers pale green or whitish; styles about 0.5-0.85 mm long; carpophore divided to the base; stylopodium low, conic; fruit 3-4 mm long, the ribs filiform. Introduced from Europe; the three specimens seen are from widely separated locations; pastures, ditchbanks, and occasionally in indigenous plant communities; 6,500-8,000 ft; June-July.

Cicuta L. Water Hemlock

Cicuta maculata L. [C. douglasii (DC.) Coult. & Rose misapplied; C. occidentalis Greene] Perennial herbs, 50-200 cm tall, from tuberous-thickened, chambered roots; leaves 1-3 times ternate-pinnate, the leaflets lanceolate, 3-10 cm long, 0.5-3.5 mm wide, sharply serrate; umbels 1-several; involucre lacking or of a few linear bracts; rays 15-28, 2-6 cm long; involucl of a few linear or elliptic bractlets, these 2-15 mm long, entire, toothed or occasionally lobed; petals white or greenish; fruit elliptic or subglobose, 2-4 mm long, the ribs corky-thickened. Occasional to common; widespread along ditches and natural waterways and other wet places; to about 7,000 ft; June-Aug. A violently poisonous plant. Our plants are referable to var. angustifolia Hook.

Conioselinum Hoffm. Hemlock-parsley

Conioselinum scopulorum (Gray) Coulter & Rose Plants perennial, 30-90 cm tall, from a taproot or cluster of fleshy roots; stems without marcescent material at the base; leaves 1-2 times pinnate or ternate-pinnate; involucral bracts lacking or narrow; rays 10-20; bractlets 2-8 mm long; flowers white; fruit 4-6 mm long, oval, dorsal ribs low, the lateral ribs slightly winged. The few records seen are from the n. slope of the Uinta Mts. and from the E. Tavaputs Plateau, from along streams and aspen woods; (7,800) 8,500- 9,000 ft; June-July. Confused with Ligusticum porteri, but with taproot or cluster of fleshy roots instead of fibrous caudex, without marcescent fibrous leaf bases, and with noticeable bractlets.

Conium L. Poison Hemlock

Conium maculatum L. Plants biennial, from a taproot; stems 50-200 (300) cm tall, hollow, purple spotted; lower petioles purple spotted; leaves 2-4 times pinnately dissected, the ultimate segments seldom over 1 cm long, incised; involucre of linear bracts; umbels numerous, with 15-28 rays; bractlets 2-15 mm long, linear or subovate; petals white or greenish; fruit 2-4 mm long, the ribs corky-thickened and low. Introduced from Europe; to be expected throughout the area, but seldom collected; wet lands, water courses, often ditchbanks; up to 8,000 ft; June-Aug. A violently poisonous plant.

Cymopterus Raf. Springparsley

Scapose to subscapose usually low perennials from fibrous often enlarged taproots or branched caudices; pseudoscape sometimes well developed; leaves mostly pinnately compound, often much dissected; umbels mostly solitary and terminal; involucre and involucl various; fruit strongly compressed parallel with the commissure, the lateral and most of the dorsal ribs winged; carpophore divided to the base or obsolete.

1 Plants strongly aromatic, caespitose, from branched more or less woody caudices, mostly clothed at the base with long-persisting leaf bases and sometimes stem bases, often of rocky places; leaves with (4) 6-10 opposite or offset pairs of lateral primary leaflets, completely and finely dissected so that the ultimate segments (0.3-1.5 mm wide) are not confluent and are the widest undivided parts of the blade; calyx teeth rather prominent, about 0.5-1 mm long, acute, greenish (Pteryxia group)

2 Lowest pair of primary leaflets (1/4) 1/2-3/4 or more the length of the leaf blade, mostly 3-9 cm long, several times longer than the upper pairs, on petiolules 2-4 cm long; stems frequently with 1 or 2 cauline leaves on the lower 1/3; fruiting styles (2.5) 3-4 mm long, mostly curved or coiled; bractlets 2-5 mm long, not exerted beyond the flowers; plants growing at 4,700-7,600 (8,400) ft....

..... C. terebinthinus

- 2 Lowest pair of primary leaflets 1/4 or less the length of the leaf blade, to 2.7 cm long, often not more than twice as long as some of the upper pairs, sessile or on petiolules to 1 cm long; leaves strictly basal; fruiting styles to 2 (2.5) mm long, straight or nearly so; bractlets 2-10 mm long, some often exerted beyond the flowers; plants growing at (rarely 7,500) 9,000-12,000 ft..... C. hendersonii
- 1 Plants not strongly aromatic, from fibrous taproots with simple or sparingly branched crowns, without or with few persisting leaf bases, not specific for rocky places; leaves once ternate to pinnately decomposed with 2-6 opposite or offset pairs of lateral primary leaflets, sometimes not completely dissected, confluent portions of blades sometimes broader than the ultimate teeth or lobes; calyx teeth to about 0.5 mm long, rarely acute
- 3 Involucels scarious, whitish or purplish with purple nerves, the bractlets mostly over 3 mm wide, sometimes united to midlength; involucre like the involucels but larger or sometimes reduced or lacking; broadest wings of the fruit (2) 3-7 mm wide
- 4 Rays 1-3.5 cm long, usually at least some exceeding the well developed to obsolete involucre through all stages of phenology, not obscured by the mature fruits; involucre sometimes lacking or reduced to a ring or shallow cup, the lobes of the involucre and involucel seldom with more than 1 purple nerve; carpophore well developed, tending to persist on the pedicels after the mericarps have fallen; fruit often oblong in outline, the wings 1.7-3 (4) mm wide; peduncles 4-15 cm long; plants flowering in mid-April-May, with mature fruit in late May-June..... C. bulbosus
- 4 Rays 0.3-1 cm long, rarely longer, not exerted beyond the always well developed involucre, obscured by the mature fruits; lobes of the involucre and involucel often with 3 or more purple nerves; carpophore lacking or hairlike and more or less adhering to the faces of the mericarps and not persisting on the pedicels; fruit ovate to orbicular in outline, the wings 3-7 mm wide; peduncles 2-9 cm long; plants flowering in (Feb.) March-early April, with mature fruit by mid-April to early May..... C. purpurascens
- 3 Involucels greenish or the bractlets narrow and divided to the base or nearly so; involucre lacking; broadest wings of the fruit to 2.5 mm wide or to 5.5 mm in C. purpureus
- 5 Involucels green and of the same texture as the leaves, seldom scarious-margined, the bractlets mostly 1.5-4 mm wide; plants mostly obscurely viscid and dotted with numerous adhering grains of sand especially on the scapes and petioles; carpophore lacking; petals and anthers yellow or white C. acaulis
- 5 Involucels rarely wholly green, not of the same texture as the leaves, often scarious-margined and/or the bractlets linear or narrowly elliptic and not over 1.5 mm wide; plants not viscid, rarely with numerous adhering grains of sand; carpophore well developed; petals and anthers various
- 6 An aerial pseudoscape usually rather quickly developing, (3.5) 5-24 cm long; leaf blades with 4-6 opposite or offset pairs of lateral primary leaflets; umbels sometimes nodding on recurved peduncles; petals yellow with only a slight tendency to turn light purple; plants mostly montane, above 7,000 ft..... C. longipes
- 6 Pseudoscapae lacking or mostly subterranean, the aerial portion not over 3 cm long; leaf blades with 2-4 opposite pairs of lateral primary leaflets, or ternate; umbels not nodding; petals purple or yellow, sometimes with a strong tendency to turn dark purple when dried
- 7 Leaves once pinnately compound with 2 opposite pairs of lateral primary leaflets, or a few ternate or rarely biternate, glaucous; confluent portions of the blades (3) 6-25 (40) mm wide; petals and stamens bright yellow when fresh, fading to cream or white in herbarium specimens; plants from 4,690- 5,910 ft..... C. duchesnensis
- 7 Leaves ternate or 2-3 times pinnately compound with up to 4 opposite pairs of lateral primary leaflets, glaucous or not, the confluent portions mostly 1-4 mm wide or if wider than the leaves ternate; petals yellow or purple when fresh, if yellow then turning dark purple in herbarium specimens, the anthers remaining pale; plants of broad distribution.... C. purpureus

Cymopterus acaulis (Pursh) Raf. (C. fendleri Gray) Occasional, widespread; desert shrub, sagebrush, and juniper communities, mostly on sandy soil; 4,700-5,700 (7,200, Red Mt.) ft; April-June. There are two wholly intergrading vars. in our area. Plants with white petals and with peduncles mostly not exerted beyond the leaves are referable to var. acaulis (plains s.). Those with yellow petals and with peduncles mostly exerted beyond the leaves are referable to var. fendleri (Gray) Goodrich (chimaya). Apparently the two vars. come together only in the Uinta Basin with var. acaulis being widespread to the n. of our area and in the Plains, and with var. fendleri being common s. of the Tavaputs Plateau to Arizona and New Mexico. The yellow petals of var. fendleri rather quickly fade to cream or white. Even when fresh, the white flowers of var. acaulis do not seem so bright white as in the plants of Wyoming. In the Uinta Basin, plants with white flowers occasionally grow among those with yellow flowers, and in our area the separation seems trivial except perhaps in Daggett Co. where only white-flowered plants have been found.

Cymopterus bulbosus A. Nels. Onion s. Locally common to abundant; widespread; clay soils of salt desert shrub communities; 4,700-5,700 ft; April-June. Similar to and often confused with C. purpurascens, but in addition to the differences given in the key, plants of C. purpurascens are more scattered than those of C. bulbosus, and are found in sagebrush and pinyon-juniper communities or on slopes in salt desert

shrub communities where soils are usually not clayey, and occur from the bottom of the Basin to 9,000 ft on the Tavaputs Plateau. In many specimens the involucre is reduced or lacking (a condition not well documented for the species). Such a specimen is probably the basis for Graham's (1937) report of C. planosus (Osterh.) Mathias.

Cymopterus duchesnensis Jones Uinta Basin s. Endemic, locally common from Myton to Raven Ridge and disjunct at the confluence of Vermillion Creek and Dry Creek, Moffat Co., but by far most abundant in Uintah Co.; salt desert shrub communities and at the lower fringe of the juniper zone, on raw clay hills and slopes in Duchesne River, Uinta, Morrison, and other formations that weather to badlands; 4,700-5,600 (6,200) ft; April-June.

Cymopterus hendersonii (Coul. & Rose) Cronq. [Pseudocymopterus hendersonii Coul. & Rose; Pteryxia hendersonii (Coul. & Rose) Math. & Const.] Occasional or locally common at (7,500 in canyons) 9,000-12,000 ft in the Uinta Mts.; talus, cliffs, rocky canyons, ridges, slopes, and alpine tundra and known from Cathedral Bluffs, 8,400 ft, Shaley barrens (Neese 11958 and Smith 1801 BRY); June-Aug.

Cymopterus longipes Wats. Longfoot s. Locally common; widespread (no records seen from the E. Tavaputs Plateau); sagebrush, pinyon-juniper and mt. brush communities; 7,000-9,000 ft; April-June.

Cymopterus purpurascens (Gray) Jones Purple s. Scattered or locally common across the area; gravelly terraces, pediments, and hills in desert shrub, sagebrush, and pinyon-juniper communities; 4,700-7,000 ft and up to 9,000 ft on the Tavaputs Plateau; late Feb.-April. See C. bulbosus.

Cymopterus purpureus Wats. There are 2 more or less distinct vars. in our area.

- 1 Wings of fruit 5-8 mm long, to 2 mm wide; fruiting rays 5-8 (15), 0.2-2 (3) cm long; fruiting pedicels 1-5 (7) mm long; leaf blades 1-3.5 (4) cm long, mostly (not always) ternate, the leaflets with rounded lobes; plants glabrous, or more often scabrous; lower to mid-montane, of the Tavaputs Plateau..... var. rosei
- 1 Wings of fruit 8-10 (12) mm long, (2) 2.5-4 mm wide; fruiting rays (8) 12-22, (2) 2.5-7 (9.5) cm long; fruiting pedicels 5-10 mm long; leaf blades commonly 3-9 (13) cm long, pinnately compound, rarely ternate, often with acute ultimate segments; plants mostly glabrous, rarely scabrous, of deserts and lower montane, widespread..... var. purpureus

Var. purpureus Occasional or common; widespread; desert shrub, sagebrush, and pinyon-juniper communities on a variety of geological formations, probably more common on sandy or sandy loam soils than on clayey soils; 4,700-6,000 ft or up to 7,600 ft on the Tavaputs Plateau where it intergrades with var. rosei; May-June.

Var. rosei (Jones) Goodrich Utah s. (C. rosei Jones) Known from the Strawberry drainage from Willow Creek to Indian Canyon, W. Tavaputs Plateau; bullgrass, and pinyon-juniper communities, steep, nearly barren, whitish, marly shale or limestone slopes; 6,200-7,000 ft; May-June.

Cymopterus terebinthinus (Hook.) T. & G. [Pteryxia terebinthina (Hook.) Coul. & Rose] Occasional across much of the area (no records seen from Duchesne Co.); colluvium and crevices of rocks, often with sandstone; 4,700- 7,600 (8,400) ft; April-May. Our plants are referable to var. calcareus (Jones) Cronq.

Heracleum L. Cowparsnip

Heracleum lanatum Michx. [H. sphondylium L. ssp. lanatum (Michx.) A. & D. Love] Plants biennial or perennial from a taproot or fascicled fibrous roots, 1-3 m tall, usually conspicuously hairy at least in the inflorescence; larger leaves mostly ternate, the leaflets 10-75 cm wide, about as long, palmately lobed, coarsely toothed; umbels 10-20 cm wide; rays 15-30; involucre and involucels of 2-10 deciduous, lanceolate or linear bracts or bractlets, these 5-20 mm long; petals white, the outer ones enlarged and 2-lobed, 3-10 mm long; fruit often short-hairy, 6-12 mm long, 5-9 mm wide, flattened, the lateral wings well developed, the dorsal ribs filiform. Occasional to locally common from the Strawberry drainage to Rock Creek (rarely farther e.) in the Uinta Mts. and to the Avintaquin drainage of the W. Tavaputs Plateau, and 1 specimen seen from the E. Tavaputs Plateau; seeps, springs, water courses, and aspen and tall forb communities; 7,200-9,600 ft; June-Aug.

Ligusticum L. Ligustium; Lovage

Scapose to caulescent perennial from a fibrous root crown surmounting a taproot; leaves ternate-pinnately compound; umbels one to several; involucre lacking or of 1 deciduous bract; involucels wanting or of 1-3 narrow bractlets; calyx teeth minute or evident; petals white; stylopodium low-conic; fruit oblong, slightly flattened or nearly round, the ribs narrowly winged, carpophore divided to the base.

- 1 Umbels mostly solitary, occasionally 2, rarely 3, never opposite; rays 0.5-3.6 cm long; petioles 1.2-13.5 cm long; leaf blades 3-19 cm long; plants 10-45 (64) cm tall, of the Uinta Mts.. L. tenuifolium
- 1 Umbels 2-5, the lateral ones frequently opposite or 3 per node; rays 2.5-6.5 (8) cm long; petioles 8-32 cm long; leaf blades (9) 12-30 cm long; plants (40) 60-100 cm tall, of various distribution
- 2 Ultimate segments of leaves mainly linear or narrowly triangular and widest at the base, rarely over 3 mm wide; plants of Wasatch and nw. Duchesne Cos..... L. filicinum

- 2 Ultimate segments of leaves mainly narrowly to broadly elliptic, or at least tending to be wider toward the middle, to 8 mm wide, but as narrow as 1.5 mm; plants mostly from e. and s. of the above..... L. porteri

Ligusticum filicinum Wats. Fernleaf l. Occasional to common; Strawberry Valley to Red Creek Mt. and w. of Rock Creek in the Uinta Mts.; woods or more commonly on open slopes and ridges; 7,700-10,200 ft; June-July.

Ligusticum porteri Coult. & Rose Porter l. Occasional to locally common; s. slope of the Uinta Mts. from Uinta Canyon eastward, and Tavaputs Plateau; aspen woods; 7,400-9,600 ft; June-July.

Ligusticum tenuifolium Wats. Slender-leafed l. [L. filicinum Wats. var. tenuifolium (Wats.) Mathias & Const.] Occasional to common; Uinta Mts.; dry and wet meadows, and along streams in moist woods; 8,000-11,200 ft; June-Aug. Hermann 5070 has passed as Pseudocymopterus montanus (Gray) Coult. & Rose (Graham 1937); but this specimen probably belongs here.

Lomatium Raf. Biscuit-root; Desert-parsley; Lomatium

Plants perennial, acaulescent or caulescent, occasionally with a short pseudostem, but this mostly lacking, glabrous or pubescent, from a slender taproot or from a thickened, woody, branched caudex, sometimes clothed at the base with marcescent material; stems simple or rarely branched and thus peduncles and umbels mostly solitary; leaves once or more pinnate, ternate, ternate-pinnately divided, or decompound, sheaths often dilated especially in lower leaves, the ultimate segments extremely variable; involucre lacking or inconspicuous; involucrel mostly of separate or partly united bractlets, rarely wanting; rays few to many, spreading to ascending, the central ones often shorter and sterile; petals various; fruit flattened dorsally, linear to orbicular or obovate, dorsal ribs filiform or obsolete or occasionally with rudimentary wings at the base, lateral ribs winged. Closely related to the genus Cymopterus, separated in part from that genus by the absence of dorsal wings on the fruit; the strength of this feature is somewhat weakened by the reduced dorsal wings in some of Cymopterus.

- 1 At least some of the ultimate segments of leaves over 15 mm long, these less than 50 per leaf
- 2 Plants from a thickened, woody, branched caudex, glabrous, strongly aromatic, often of rocky places at 7,500-10,500 ft w. of Rock Creek in the Uinta Mts., and w. of Indian Canyon on the W. Tavaputs Plateau; marcescent material often clothing the caudex; leaves basal, the ultimate segments of leaves 0.3-5.5 cm long, 0.5-2 (4) mm wide; lateral wings of fruit to 1 mm wide..... L. nuttallii
- 2 Plants from a taproot or small caudex, puberulent, not strongly aromatic, mostly in loamy soils of sagebrush, mt. brush and aspen communities across the area; marcescent material lacking or weakly persisting; leaves basal or sometimes 1-3 cauline; ultimate segments of leaves 1-12 cm long, 1-10 mm wide; lateral wings of fruit 1-2 mm wide..... L. triternatum
- 1 Ultimate segments of leaves less than 15 mm long, often over 50 per leaf
- 3 Larger mature leaves with blades (10) 15-30 cm long, ternate-pinnately compound, the larger ultimate segments 2-3 mm wide; plants (30) 50-130 cm tall; peduncles fistulose, (3) 4-6 (10) mm thick at the base; wings of the fruit corky thickened..... L. dissectum
- 3 Blades of leaves 2-11 cm long, or if longer then either not ternate or with ultimate segments not over 1 mm wide; plants rarely over 50 cm tall; peduncles fistulose or not, often less than 4 mm thick; wings of the fruit more or less papery
- 4 Plants pubescent; petals white or yellow
- 5 Ovaries and fruit glabrous or occasionally somewhat scabrous; petals white or yellow; plants widespread
- 6 Bractlets of the involucrel about 10, the longer ones 4-10 mm long, pubescent; herbage more or less villous; leaves with about 4 opposite pairs of lateral primary leaflets, the lowest pair sessile or on petiolules to 1 cm long; mature fruit 9-12 (15) mm long; petals white...
..... L. macrocarpum
- 6 Bractlets of the involucrel 1-5, 1-4.5 mm long, glabrous; herbage glabrate to puberulent; leaves with (3) 4-6 opposite pairs of lateral primary leaflets, the lowest pair on petiolules 1-3 cm long; mature fruit 5-8 (11) mm long; petals yellow or white.....
..... L. juniperinum
- 5 Ovaries and young fruit rather densely pubescent, older fruit sometimes glabrous but often retaining some hirtellous hairs; petals yellow; plants rare, known from Daggett Co.....
..... L. foeniculaceum
- 4 Plants glabrous or at most scabrous; petals yellow or plants keyed both ways
- 7 Petals white; fruit 3-6 mm wide; plants not strongly aromatic, from a fibrous taproot, the crown not clothed with long-persisting petiole bases; ultimate segments of leaves 0.7-1.5 mm wide; umbels with 3-12 rays; (a rare glabrous form of a usually pubescent species).....
..... L. juniperinum
- 7 Petals yellow when fresh, quickly fading whitish when dried; fruit 6-8 mm wide; plants strongly aromatic, from branched caudices, these clothed with long-persisting petiole-bases; ultimate segments of leaves 0.2-0.3 mm wide; umbels with 10-26 rays..... L. grayi

Lomatium dissectum (Nutt.) Math. & Const. Indian parsley, fernleaf l. Records seen are all from the s. slope of the Uinta Mts. and Blue Mt.; sagebrush and mt. brush communities; 7,200-8,700 (10,200) ft; April-May.

Lomatium foeniculaceum (Nutt.) Coult. & Rose The 1 specimen seen (Flowers sn 28-30 July 1959 UT) is from Hideout Forest Camp at about 5,900 ft, which is now below the highwater level of Flaming Gorge Reservoir. Plants of our area are referable to var. macdougallii (Coul. & Rose) Cronq.

Lomatium grayi Coult. & Rose Narrowleaf l. (Cogswellia grayi Coult. & Rose) Common on slopes along flanks of the Uinta Mts. in Daggett and Uintah Cos. and e. into Colorado; several plant communities including sagebrush, pinyon-juniper, and mt. brush, often in rocky places; 7,200-9,000 ft; March-June. Our plants are referable to var. grayi. Brown sn (BRY!) from the n. slope of Douglas Mt., reported as L. leptocarpum (T. & G.) Coult. & Rose (Bradley 1950), belongs here.

Lomatium juniperinum (Jones) Coult. & Rose (Cogswellia juniperina Jones) Occasional; Strawberry Valley, Uinta Mts. to Round Top Mt., Moffat Co. and Tavaputs Plateau; sagebrush, pinyon-juniper, and aspen communities; 7,200-9,400 ft; April-July. Petal color varies from white to yellow. There is some correlation between geography and petal color that might support separating our plants into 2 taxa. On the n. slope of the Uinta Mts., petals are yellow. On the Tavaputs Plateau and s. slope of the Uinta Mts., petals are mostly white. However, the weight of this correlation is undermined by 2 yellow-petaled populations on Reservation Ridge, W. Tavaputs Plateau and more seriously by populations of mixed white-petaled and yellow-petaled plants at the e. end of the Uinta Mts. Separation of vars. might have merit, but none are proposed here. The white-petaled plants are the basis for reports of L. nevadense (Wats.) Coult. & Rose [Cogswellia nevadensis (Wats.) Jones] for the area. Perhaps our plants could be included in the L. nevadense complex.

Lomatium macrocarpum (H. & A.) Coult. & Rose Bigseed l. [Cogswellia macrocarpa (H. & A.) Jones] The 9 records seen are from near Minnie's Gap, Daggett Co.; Diamond Mt., Island Park, and Red Wash, Uintah Co.; and near Dinosaur and Rangley in Rio Blanco Co.; desert shrub and sagebrush-grass communities; 5,000-7,200 ft; April-June.

Lomatium nuttallii (Gray) Macbr. Threadleaf l. [Cynomarathrum nuttallii (Gray) Coult. & Rose] Locally common; Strawberry Valley to Rock Creek, Uinta Mts., and to the Avintaquin drainage, W. Tavaputs Plateau; limestone hills in the spruce-fir zone, on sandy, exposed slopes and flats, and on shale barrens and escarpments; 7,500-10,500 ft; June-Aug. This has often been confused with L. triternatum, but is different by the features given in the key. No specimen was found at UT to support the Flowers and others (1960) listing for Hideout Canyon (area now inundated by Flaming Gorge Reservoir, probably confused there with L. triternatum).

Lomatium triternatum (Pursh) Coult. & Rose Nineleaf b. [L. simplex (Nutt.) Macbr.; Cogswellia platycarpa (Torr.) Jones] Slopes and flanks of the Uinta Mts., Split Mt. and into Colorado, seldom collected from the Tavaputs Plateau except in the vicinity of Strawberry Valley; 7,000-8,400 ft; April-June. Our plants are referable to ssp. platycarpum (Torr.) Cronq.

Oreoxis Raf.

Oreoxis alpina (Gray) Coult. & Rose Caespitose, acaulescent plants 2.5-11.5 cm tall, scabrous-hirtellous throughout, from a branched caudex, the caudex clothed with persisting leaf-bases; leaves all basal, mostly bipinnate, with about 4 opposite pairs of sessile or nearly sessile lateral primary leaflets, the upper pairs and those of smaller leaves sometimes once pinnate and then oblong in outline, lowest pair of primary leaflets 4-14 mm long, the ultimate segments about 1-6 mm long, 0.4-1.5 mm wide; peduncles 2-10.5 cm long; umbel solitary; involucre lacking; rays 4-7, 1-6 mm long; involucels of 5-9 bractlets 1-4 mm long, united at the base; pedicels obsolete or to about 0.3 mm long; calyx teeth 0.6-1 mm long, green; petals and stamens yellow when fresh, fading to white or cream or purple tinged within a few years in herbarium specimens; styles 1.7-2 (3) mm long; fruit 4-5 mm long, slightly compressed laterally, the ribs with low corky wings to about 0.7 mm wide. The few specimens seen are from Big Ridge, Uinta Mts. just n. of Tabyonia; alpine and subalpine forb-grass communities and limestone escarpments; 10,000-10,800 ft; July-Aug.

Orogenia Wats. Indian Potato

Orogenia linearifolia Wats. Plant perennial, from a globose or somewhat elongate tuber; scapes 1-several, 2-10 cm tall; leaves few, 1-3 times ternate or occasionally simple, the ultimate segments linear or narrowly lanceolate, 0.5-6 cm long, 1-8 mm wide; inflorescence compact, about 1-4 cm wide or wider in fruit; involucre lacking; rays 1-8, unequal, nearly obsolete or up to 5 cm long; involucels lacking or inconspicuous; pedicels not over 2 mm long; petals white; anthers purple; fruit 3-5 mm long, nearly as wide, the dorsal ribs narrow, the lateral ribs thickened. The 5 specimens seen are from Strawberry Ridge, Diamond Mt., e. end of the Uinta Mts., and Blue Mt., but probably occurring at several points in between, sagebrush-grass and mt. brush communities; March-June, usually blooming during snowmelt.

Osmorhiza Raf. Sweet cicely; Sweetroot

Perennial from elongate thick roots; leaves ternate or pinnate, the ultimate leaflets distinct; rays of umbels 3-14; involucre and involucels lacking or inconspicuous; calyx teeth obsolete; petals various but small; stylopodium conic; fruit narrowly cylindrical or club-shaped, black at maturity, glabrous or bristly, the ribs threadlike; carpophore bifid at the apex.

- 1 Fruit glabrous, the base generally obtuse; flowers yellow or greenish-white; leaflets generally 2-10 cm long, 0.5-5 cm wide, hirtellous to nearly glabrous on both sides; stems usually 2-several per root crown, 40-150 cm tall..... O. occidentalis
- 1 Fruit bristly pubescent, long pointed at the base into bristly tails; flowers white or greenish-white; leaflets hirtellous on veins and margins with translucent hairs; stems mostly 1-3 per root crown, 20-60 (80) cm tall
 - 2 Mature fruit including tails mostly 16-25 mm long, the apex concavely pointed into a beak 1-2 mm long; the most divergent rays spreading 30° to 65° from the peduncle; fruiting pedicels mostly ascending-spreading; blades of leaflets 1.5-6 (9) cm long, 1-4 cm wide; plants most common below 8,000 ft..... O. chilensis
 - 2 Mature fruit including tails mostly 13-18 mm long, the apex convex and obtuse; the most divergent rays spreading 40° to 90° from the peduncle, some fruiting pedicels usually horizontally spreading to deflexed; blades of leaflets 1-4 (5.5) cm long, 1-3 cm wide; plants common above as well as below 8,000 ft..... O. depauperata

Osmorhiza chilensis H. & A. Spreading s. (O. divaricata Nutt.) The two specimens seen are from riparian communities; 7,600-7,800 ft; June-July.

Osmorhiza depauperata Phil. Bluntseed s. [O. obtusa (Coulter & Rose) Fern.] Occasional; widespread; moist woods and streamsides; mostly above 8,000 ft and up to 10,600 ft; May-Aug.

Osmorhiza occidentalis (Nutt.) Torr. Sweetanise, western s. c. Occasional to locally common in the Uinta Mtns. w. of Rock Creek and to Strawberry Valley, apparently rare or lacking from many other parts of the area; on open slopes and in woods, often in aspen-tall forb communities; 7,500-10,200 ft; June-July.

Pastinaca L. Parsnip

Pastinaca sativa L. Plants biennial from a taproot, 30-120 cm tall, the stems often robust and thick; leaves oblong to ovate in outline, the basal ones to 50 cm long, once pinnate; leaflets distinct, lanceolate to ovate, 5-13 cm long, 2.5-10 cm wide, serrate, lobed or divided; umbels compound; rays 15-25, 2-10 cm long; involucre and involucels of a few filiform segments or lacking; petals yellow; stylopodium low-conic; fruit glabrous, 5-6 mm long, 3-5 mm wide, strongly compressed, the dorsal ribs filiform, the lateral ribs narrowly winged. Introduced from Europe; ditchbanks, and other wet places at lower elevations; May-July.

Perideridia Reichb.

Perideridia gairdneri (H. & A.) Mathias Yampa. Perennial herbs 30-80 cm tall, from fascicled, easily detached, tuberous roots; leaves ternate to pinnate, or the upper ones reduced and simple, the ultimate segments linear to narrowly lanceolate, to 15 cm long, 1-6 mm wide; umbels compound, the rays 10-30, 1.5-3.5 cm long; bracts of the involucre (4) 6-10, lanceolate to linear, 3-15 mm long, entire or incised, soon reflexed; involucels similar to the involucre but smaller; petals white; stylopodium low-conic; fruit glabrous, 2-3 mm long, ribbed but not winged. Occasional to locally common in Strawberry Valley; meadow and sagebrush-grass communities; 7,500-7,700 ft; June-Aug. Our plants are referable to ssp. borealis Chuang & Const.

Sium L. Waterparsnip

Sium suave Walt. Hemlock w. Reported for our area, but no records seen. Specimens seen that have been identified as this taxon belong to Angelica pinnata.

Zizia Koch

Zizia aptera (Gray) Fern. Plants perennial, caulescent, glabrous, from fascicles of fleshy roots; leaves simple (at least the basal) or ternate, serrate, the upper ones often lobed; umbels rather compact, usually solitary and terminal, sometimes also lateral, the rays to 3.5 cm long in fruit; flowers yellow; fruit 2-4 mm long, compressed laterally, glabrous, the ribs all filiform. The 3 specimens seen are from Strawberry Valley; willow-streamside communities at 7,500 ft; June-July.

APOCYNACEAE Dogbane Family

Plants perennial, with milky, acrid juice; leaves cauline, simple, opposite or alternate, entire; flowers bisexual, regular, mostly in corymbose cymes; calyx 5-lobed; corolla 5-lobed, united at the base, convolute in bud; stamens 5, attached to the corolla tube; ovaries superior, of 2 separate carpels, the carpels joined by their styles and with a common stigma; fruit of 2 follicles, sometimes only 1 developing.

- 1 Leaves alternate..... Amsonia
- 1 Leaves opposite..... Apocynum

Amsonia Walt.

Amsonia jonesii Woodson (A. latifolia Jones) Herbs from thickened often woody roots, 20-50 cm tall, glabrous; petioles about 4-5 mm long; leaf blades 3-6 cm long, ovate to lanceolate, glaucous; flowers many, densely crowded; calyx lobes 1-2 mm long; corolla white or nearly so, the tube 6-8 mm long, the lobes 3-6 mm long; follicles 5-10 cm long, terete. Occasional from Dinosaur National Monument s. to the Tavaputs Plateau and eastward, only 1 specimen seen from Duchesne Co.; desert shrub, sagebrush and pinyon-juniper communities, often on sandy or white shaly soils; 6,000-7,000 ft; late April-May.

Apocynum L. Dogbane; Indian Hemp

Plants herbaceous or slightly woody at the base; corollas bearing 5 distinct appendages within, these adnate to the corolla tube and opposite the lobes; anthers united to the stigma; follicles terete, elongate; seeds with dense white hairs.

- 1 Corolla about 3 times longer than the calyx, usually 4-12 mm long, white or pinkish, the lobes spreading to recurved; follicles 6-15 cm long; leaves often drooping..... A. androsaemifolium
- 1 Corolla less than 2 times as long as the calyx, 2-5 mm long, white, the lobes erect or only slightly spreading; follicles 12-20 cm long; leaves not drooping..... A. cannabinum

Apocynum androsaemifolium L. Spreading d. (A. scopulorum Greene) Infrequent; widespread; usually in or near open aspen or conifer woods; 7,200-9,000 ft; June-Aug.

Apocynum cannabinum L. Hemp d. Locally common; widespread; forming patches (clones) along ditches, poorly kept agricultural lands, and in riparian and marsh communities; 4,700-6,500 ft; June-Aug. This taxon freely intergrades with A. androsaemifolium, and hybrid segregates of these two have been called A. floribundum Green and A. medium Greene. Apocynum sibiricum Jacq. (A. hypericifolium Ait.) is another taxon of this complex that might be found in the area. Plants of this taxon are distinguished from A. cannabinum by sessile or subsessile cordate and often clasping leaves and by follicles that are only 4-11 cm long, but the plants seldom bear follicles.

ASCLEPIADACEAE Milkweed Family

Perennial herbs with milky juice; leaves simple, usually entire, alternate, opposite or whorled; flowers bisexual, regular, usually in umbels; calyx 5-parted or divided; corolla of united petals, 5 lobed, the lobes often reflexed; stamens 5, inserted on the base of the corolla and closely united around the pistils into a tube that is fused above with the style column, these forming separate or united often hoodlike appendages; pistils 2; ovary superior; fruit of paired follicles, only one usually developing; seeds numerous, each with a tuft of long silky hairs.

Asclepias L. Milkweed

- 1 Plants decumbent, seldom over 20 cm tall; leaves opposite, ovate-orbicular; hoods of flowers purple; follicles 3-5 cm long..... A. cryptoceras
- 1 Plants not as above in all features
 - 2 Leaves whorled (at least some), linear, 2-13 cm long, less than 4 mm wide, glabrous or nearly so.... A. subverticillata
 - 2 Leaves alternate or opposite, mostly over 4 mm wide
 - 3 Umbel solitary and terminal on a long peduncle, conspicuously exceeding the leaves; corolla segments spreading at anthesis; leaves mostly alternate..... A. asperula
 - 3 Terminal umbel often exceeded by the leaves, usually subtended by 1 or more axillary umbels; corolla segments reflexed at anthesis; at least some of the leaves usually opposite
 - 4 Corolla white, greenish or cream; leaves 0.5-2 (2.5) cm wide, 5-15 (or more) times longer than wide..... A. labriformis
 - 4 Corolla pink to greenish-purple; leaves commonly over 2.5 and up to 10 cm wide, often less than 4 times as long as wide
 - 5 Follicles with soft subulate processes; hoods attenuate-acuminate; plants widespread, more or less weedy along ditches and in cultivated places..... A. speciosa

5 Follicles smooth or nearly so; hoods not attenuate-acuminate; plants known from the Piceance Basin, apparently rare..... A. hallii

Asclepias asperula (Decne.) Woodson (A. capricornu Woodson) Apparently widespread but uncommon; the 6 records seen are from Daggett, Rio Blanco, and Uintah Cos.; pinyon-juniper communities and roadcuts; 5,000-7,000 ft; July-Aug. Our material belongs to var. asperula.

Asclepias cryptoceras Wats. Pallid m. Occasional; widespread; desert shrub and pinyon-juniper communities, often on harsh sites of poor substrate; 4,800- 6,500 ft; May-June. Our plants are referable to var. cryptoceras.

Asclepias hallii Gray The 1 specimen seen (Wiley-Eberle & England 0437) is from 2.5 mi sw. from Rio Blanco; talus slopes of Green River shale; 7,200 ft; July.

Asclepias labriformis Jones The 4 specimens seen are all collected from within 8 mi of Ouray; desert shrub communities and a marshy area along a highway; 4,800 ft; June.

Asclepias speciosa Torr. Showy m. Widespread; somewhat weedy, moist ground, especially along roadside-ditch-fence lines and disturbed riparian communities; up to about 7,000 ft; June.

Asclepias subverticillata (Gray) Vail Horsetail m. The 1 specimen seen (Erickson 901) is from Piceance drainage ridge between Dry Fork and Hay Gulch; sandy clay soil; 6,700 ft; Aug.

ASTERACEAE (COMPOSITAE) Sunflower or Thistle Family

Plants annual, biennial or perennial, herbs or shrubs; leaves basal alternate, opposite, or whorled; flowers borne in heads subtended by an involucre of separate or united bracts; calyx modified to a pappus or none, the pappus of awns, scales, or capillary bristles, these simple or plumose; corollas of 2 types, one type (disc flowers) tubular, regular, and mostly 5-lobed, the other type (ray flowers or rays) flattened and strap-shaped and 2-5 toothed at the apex; stamens usually 5, inserted on the corolla, united by their anthers or sometimes by their filaments; ovary inferior, 1-celled, 1-ovuled; styles usually 2 branched; fruit an achene, the achene often bearing a pappus.

- 1 Plants with woody stems extending well above ground level; heads with disc flowers only (except in Gutierrezia)..... KEY 1 P. 31
- 1 Plants not woody, sometimes with a woody caudex, but the woody portion not much above ground-level; heads with or without rays
 - 2 Leaves all or nearly all basal, cauline leaves (if present) bractlike; heads often solitary..... KEY 2 P. 32
 - 2 Leaves not all basal; heads various
 - 3 Some or all leaves opposite or whorled..... KEY 3 P. 32
 - 3 Stem leaves all alternate
 - 4 Leaves compound or 2-3 times pinnatifid or palmatifid, not spiny or prickly..... KEY 4 P. 33
 - 4 Leaves simple, or once ternate to once pinnatifid or palmatifid, or if more divided then spiny or prickly
 - 5 Plants spiny or prickly..... KEY 5 P. 33
 - 5 Plants not spiny or prickly
 - 6 Plants with milky juice; heads with rays only; pappus of capillary bristles except in Cichorium and Microseris..... KEY 6 P. 34
 - 6 Plants without milky juice; heads with some or all disc flowers; pappus various
 - 7 Heads with ray and disc flowers..... KEY 7 P. 35
 - 7 Heads with disc flowers only or the rays inconspicuous..... KEY 8 P. 36

KEY 1

- 1 Leaves aromatic with odor of sagebrush, lobed, to divided, entire only in Artemisia cana; pappus lacking; involucre 2-5 (7) mm high..... Artemisia
- 1 Leaves not with odor of sagebrush, entire and mostly linear or at least narrow except in Brickellia microphylla; pappus present, of capillary bristles or of scales in Gutierrezia; involucre sometimes larger than above
 - 2 Involucral bracts striate; corollas greenish white or cream; plants glandular, strongly aromatic.... Brickellia
 - 2 Involucral bracts not striate; corollas yellow; plants glandular or not
 - 3 Pappus of scales; heads mostly with 1-4 rays; stems and leaves glabrous or at most scabrous, and somewhat viscid..... Gutierrezia
 - 3 Pappus of capillary bristles; rays lacking; stems and leaves glabrous and viscid to densely pubescent
 - 4 Involucral bracts 4-6, equal, in a single series, not imbricate; flowers 4 per head, or if more than plants usually spiny; achenes pubescent with long hairs..... Tetradymia
 - 4 Involucral bracts usually more than 6, slightly to strongly imbricate; flowers usually more than 4 per head; plants not spiny; achenes glabrous or short-hairy

ASTERACEAE

- 5 Involucral bracts 10-13 mm long, all about equal, only slightly imbricate; heads 8-12 mm wide; plants known from Rock Creek and N. Fork Duchesne, Uinta Mts..... Haplopappus macronema
- 5 Involucral bracts mostly shorter, strongly imbricate, the outer shorter than the inner; heads narrower; plants widespread and abundant..... Chrysothamnus

KEY 2

- 1 Leaves exceeding the heads, pinnately divided, the margins translucent-white and irregularly toothed or lobed; plants about 2-4 cm tall..... Glyptopleura
- 1 Heads exceeding the leaves or else leaves entire, or plants over 5 cm tall
 - 2 Heads with rays only; plants with milky juice
 - 3 Heads solitary and terminal
 - 4 Flowering stems (scapes) conspicuously hollow, glabrous; principal bracts of the involucre in a single series, the outer ones much shorter; beak of achenes 2 or more times longer than the body; flowers yellow..... Taraxacum
 - 4 Flowering stems not conspicuously hollow, often pubescent; principal bracts of the involucre in several graduated series; beak of achene much shorter than the body of achene, or if longer than the flowers orange..... Agoseris
 - 3 Heads 2 to several per stem
 - 5 Plants from a taproot and branching caudex, in moist alkaline lowlands, or if montane then mostly in meadows; stems glabrous or pubescent with simple sometimes glandular hairs; involucre with glandular hairs; leaves entire to deeply cut; pappus white..... Crepis runcinata
 - 5 Plants from numerous fibrous roots, mostly in conifer woods; stems with forked or stellate hairs; involucre often with long blackish nonglandular hairs as well as some glandular ones; leaves entire; pappus dirty white or brownish..... Hieracium gracile
 - 2 Heads with some or all disc flowers; plants without milky juice
 - 6 Plants 1-15 cm tall; leaves less than 15 mm wide, entire, the petiole often gradually tapering from the blade; pappus of scales or capillary bristles
 - 7 Heads with disc flowers only (rays, if present, minute), these white or pinkish; pappus of hyaline scales or teeth
 - 8 Scares lacking; heads sessile in the basal rosette of leaves..... Parthenium
 - 8 Scares 2-8 cm tall..... Chamaechaenactis
 - 7 Heads with some conspicuous rays; disc flowers yellowish
 - 9 Rays yellow; pappus of capillary bristles
 - 10 Involucral bracts in a single series; leaves usually not linear; plants sometimes pubescent in part..... Senecio werneriaefolius
 - 10 Involucral bracts in 2 or more series; leaves linear or nearly so; plants glabrous..... Haplopappus
 - 9 Rays not yellow..... Erigeron
 - 6 Plants (10) 15-80 cm tall, if shorter, then leaves mostly over 15 mm wide, the blades entire or divided, usually abruptly contracted to a well developed petiole; pappus not of capillary bristles
 - 11 Leaves dissected into linear segments, often not strictly basal
 - 12 Plants glabrous; leaves opposite or occasionally appearing basal..... Thelesperma
 - 12 Plants white floccose at least in part; leaves alternate or strictly basal... Hymenopappus
 - 11 Leaves entire to parted but the segments hardly linear, all basal; plants pubescent
 - 13 Leaf blades 2-6 cm long, entire..... Enceliopsis
 - 13 Leaf blades 10-40 cm long, entire or pinnately divided..... Balsamorhiza

KEY 3

- 1 At least the lower leaves whorled..... Eupatorium
- 1 Leaves opposite or the upper ones often alternate
 - 2 Leaves compound
 - 3 Leaves clustered mostly on the lower 1/2 of the stem; rays yellow, 10-28 mm long, much exceeding the involucre, or sometimes lacking..... Thelesperma
 - 3 Leaves evenly distributed on the stem; rays lacking or less than 8 mm long, and not exceeding the involucre
 - 4 Leaves with 3-5 leaflets..... Bidens frondosa
 - 4 Leaves more dissected than above
 - 5 Leaves glabrous except for yellow, glandular dots; involucre dotted with yellow glands, not at all spiny; rays yellow, glandular dotted, about equal to the disc flowers; pappus of bristles..... Dyssodia
 - 5 Leaves hispid, puberulent, or tomentose; involucre not glandular dotted, sometimes spiny; rays lacking; pappus lacking..... Ambrosia
 - 2 Leaves simple
 - 6 Rays well developed, yellow
 - 7 Primary involucral bracts in a single series; pappus of numerous capillary bristles..... Arnica

- 7 Involucral bracts usually in more than 1 series; pappus not of capillary bristles
- 8 Leaves serrate to incised, sessile or connate at the base, usually surpassing the heads..... Bidens cernua
- 8 Leaves entire or inconspicuously toothed or heads definitely surpassing the leaves
- 9 Disc flowers dark purple, brown or black
- 10 Plants annual, more or less weedy; rays 15-40 mm long..... Helianthus
- 10 Plants perennial; not weedy; rays 10-13 mm long..... Helianthella microcephala
- 9 Disc flowers yellow
- 11 Stems with 3-5 pairs of leaves; leaves mostly all opposite, with the midnerve and 1-2 pairs of lateral nerves prominent, the lower ones 12-50 cm long; heads solitary or few..... Helianthella
- 11 Stems usually with more leaves, the upper ones sometimes alternate, only the midnerve prominent or leaves less than 12 cm long; heads solitary to many
- 12 Rays 7-17 mm long; leaf blades 3-10 cm long; plants montane, usually on well drained soil, 25-70 (100) cm tall..... Heliomeris
- 12 Rays 20-30 mm long; leaf blades 5-16 cm long; plants mostly in lowland meadows and other wet places, 30-150 cm tall..... Helianthus nuttallii
- 6 Heads with disc flowers only
- 13 Leaves sessile or connate, serrate to incised, usually much surpassing the heads..... Bidens cernua
- 13 Leaves not sessile, or if so then entire
- 14 Pappus of capillary bristles; involucral bracts striate, over 7 mm long..... Brickellia
- 14 Pappus lacking; involucral bracts not striate, not over 5 mm long..... Iva

KEY 4

- 1 Heads with rays
- 2 Rays white, pink or blue
- 3 Heads solitary; plants 3-20 (25) cm tall; rays 1-2 mm wide, 20-60 per head; pappus of capillary bristles..... Erigeron compositus
- 3 Inflorescence with more than 1 head; plants sometimes taller; rays either fewer or wider or both; pappus not of capillary bristles
- 4 Rays 6-10 mm long; disc flowers yellow; involucre 5-10 mm wide; plants annual from a taproot..... Anthemis
- 4 Rays not over 6 mm long; disc flowers white; involucre not over 5 mm wide; plants perennial from rhizomes, aromatic with mintlike odor..... Achillea
- 2 Rays yellow
- 5 Rays (1) 1.5-3.5 cm long, tridentate at the apex; plants about 15-25 cm tall, perennial..... Hymenoxys
- 5 Rays 6-12 mm long, not tridentate; plants 25-100 cm tall, annual..... Bahia
- 1 Rays none
- 6 Pappus of capillary bristles; heads solitary..... Erigeron compositus
- 6 Pappus not of capillary bristles; inflorescence usually with more than 1 head
- 7 Involucres 5-16 mm high; pappus of hyaline scales
- 8 Flowers white or pink; pappus scales 4-10, 2-5 mm long; terminal segment of leaves less than 1 cm long..... Chaenactis
- 8 Flowers yellow; pappus scales 10-20, about 1-2 mm long; terminal segment of leaves sometimes over 1 cm long..... Hymenopappus
- 7 Involucres to 4 (5) mm high; pappus lacking or minute
- 9 Flowers unisexual, the staminate borne in terminal spikes, the pistillate borne singly or in small clusters in the axils of leaves; fruit burlike, with spines at maturity..... Ambrosia
- 9 Flowers not as above; fruit without spines
- 10 Plants annual; receptacle strongly conical..... Chamomilla
- 10 Plants perennial or biennial
- 11 Flowers yellow; inflorescence corymbose; plants introduced..... Tanacetum
- 11 Flowers not especially yellow; inflorescence spicate, racemose or paniculate; plants native..... Artemisia

KEY 5

- 1 Plants with milky juice; rays yellow; disc flowers none; involucral bracts not spiny; leaves sessile, often auriculate clasping
- 2 Rays less than 6 mm long, 6-8 per head, withering and inconspicuous in the heat of the day; leaves prickly on the midrib..... Lactuca serriola
- 2 Rays over 6 mm long; over 10 per head, usually conspicuous in the day; leaves usually not prickly on the midrib..... Sonchus
- 1 Plants without milky juice; rays bluish or lacking; disc flowers present

ASTERACEAE

- 3 Leaves not spiny; spines confined to the fruiting involucre; heads unisexual, the staminate ones in terminal spikes or racemes, the pistillate ones axillary..... Ambrosia
- 3 Leaves spiny or spinulose-margined; heads bisexual
 - 4 Disc flowers yellow; conspicuous rays present in all but 1 species; leaves spinulose toothed but herbage otherwise spineless; plants seldom over 60 cm tall..... Machaeranthera
 - 4 Disc flowers whitish, pinkish or purplish, rays lacking; leaves and sometimes stems and involucral bracts spiny; plants often over 60 cm tall
 - 5 Receptical not bristly or only sparsely and shortly so, fleshy, honeycombed; pappus bristles not plumose; plants sparsely to densely tomentose..... Onopordum
 - 5 Receptical bristly, not fleshy, not honeycombed; pappus bristles plumose or else plants not tomentose
 - 6 Pappus bristles plumose; heads 1-3 (4) cm wide, not nodding; involucral bracts mostly less than 3 mm wide, not reflexed..... Cirsium
 - 6 Pappus bristles not plumose; heads 2-8 cm wide, often nodding; involucral bracts 2-6 (8) mm wide, reflexed in age..... Carduus

KEY 6

- 1 Leaves exceeding the heads, pinnately divided, the margins translucentwhite and irregularly toothed or lobed, plants 2-4 cm tall..... Glyptopleura
- 1 Plants not as above in all respects
 - 2 Flowers yellow, orange, or white
 - 3 Leaves entire or toothed but not lobed or divided
 - 4 Flowering stems hollow, swollen just below the head; leaves widest near base, narrow-linear, long-tapering; involucral bracts 2.5-4 cm long in flower, 4-7 cm long in fruit..... Tragopogon
 - 4 Plants not as above in all respects
 - 5 Involucre not over 1 cm high; rays 3-10 mm long; leaves pubescent in 2 of 3 species..... Hieracium
 - 5 Involucre 8-21 mm high; rays often over 10 mm long; leaves glabrous or hispidulous, but not conspicuously pubescent
 - 6 Pappus of 15-20 narrow scales, 1-3 mm long, each scale terminating in a subplumose awn and thus the pappus appearing to be of capillary bristles; herbage glabrous; leaves not over 2 cm wide, borne on the lower part of the stems but hardly in rosettes... Microseris
 - 6 Pappus of numerous smooth or minutely barbed (but not subplumose) capillary bristles; herbage glabrous or glaucous; leaves 0.5-8 cm wide, in a basal rosette, the stem leaves few and much reduced (see lead 8 below)..... Crepis runcinata
 - 3 Leaves lobed or divided
 - 7 Plants annual, usually in desert shrub communities..... Malacothrix
 - 7 Plants perennial
 - 8 Heads (1) few-several in a mostly branched inflorescence; pappus of simple or minutely barbed, capillary bristles; herbage often pubescent except in Crepis runcinata and then involucre usually glandular; leaves often over 2 cm wide (see lead 6 above)..... Crepis
 - 8 Heads solitary on long peduncles; pappus of 15-20 scales, these 1-3 mm long, with a terminal subplumose or plumose awn that appears as a capillary bristle; herbage glabrous; leaves 0.1-2 cm wide (see lead 6 above)..... Microseris
- 2 Flowers pink, red, or purple
 - 9 Pappus of scales; heads sessile or short pedunculate, 1-3 in the axils of much reduced bractlike leaves, the rays strongly spreading; plants 30-170 cm tall, weeds of fields, roadsides, and waste places..... Cichorium
 - 9 Pappus of capillary bristles; heads usually on elongate peduncles, solitary, the rays erect or spreading; plants of various stature and of various habitats
 - 10 Involucres not over 1 cm high; lower leaves seldom over 5 cm long, upper leaves reduced and bractlike; plants annual or perennial; rays 3-12 mm long
 - 11 Pappus of plumose capillary bristles..... Stephanomeria
 - 11 Pappus of simple capillary bristles..... Prenanthes
 - 10 Involucres 1-2.5 cm high; leaves various; plants perennial; rays usually 12-40 mm long; pappus of simple capillary bristles
 - 12 Leaves to 5 mm wide, all sessile, entire and grasslike; heads borne singly at the ends of branches or stems; rays 5-10 per head, mostly 2.5-4 cm long; stems 10-40 cm tall, simple or much branched; plants of dry places, from taproots..... Lygodesmia
 - 12 Leaves 6-70 mm wide, the lower ones usually with a short petiole; inflorescence more or less racemose or paniculate; rays 18-50 per head, to 1.4 cm long; stems 20-120 (170) cm tall, usually solitary and unbranched except in the inflorescence; plants usually of moist or wet places, from rhizomes..... Lactuca tatarica

KEY 7

- 1 Rays blue, pink, white, or reddish; pappus lacking or of mostly capillary bristles
 - 2 Pappus lacking; leaves pinnately lobed; rays white..... Chrysanthemum
 - 2 Pappus well developed; leaves entire, or toothed with spinulose teeth and then the rays bluish
 - 3 Involucres 2-4 mm high; plants annual, from a taproot, 40-100 cm tall; heads usually numerous, the rays inconspicuous..... Conyza
 - 3 Involucres larger; plants perennial, or if annual then usually shorter than above and with rays well developed
 - 4 Involucre bracts mostly in a single series, usually numerous, mostly of the same color throughout, linear; rays over 20 and often 40-150 per head..... Erigeron
 - 4 Involucral bracts imbricate (overlapping) in 2 or more series, sometimes bicolored, sometimes not linear; rays mostly less than 20 per head, but to 30 in some taxa
 - 5 Plants seldom over 15 cm tall; involucral bracts scarious and ciliate, erose, or fimbriate at the margins; leaves not over 4 cm long, not over 4 mm wide; heads 1-3 per stem
 - 6 Involucres 5-6 mm high; heads exceeding the leaves; stems well developed, about equally and densely leafy throughout; basal tuft of leaves lacking; leaves not over 12 mm long.. Leucelene
 - 6 Involucres mostly larger; heads sessile in a basal rosette of leaves, or if on stems then the leaves mostly larger and sometimes not equally distributed on the stem.... Townsendia
 - 5 Plants mostly over 15 cm tall; involucral bracts not ciliate or fimbriate at the margins; leaves often different from above; heads sometimes over 3 per stem
 - 7 Plants annuals or biennials, from taproots; at least some of the leaves spinulose toothed Machaeranthera
 - 7 Plants mostly perennial, sometimes annual; leaves entire or if toothed the teeth not spinulose
 - 8 Plants from woody, branching caudices, of deserts; rays white or pinkish rarely purple; leaves more or less villose; involucral bracts spinulose-acuminate (note: Erigeron pulcherrimus with involucral bracts rather imbricate may key here but is different by lacking the spinulose-acuminate tips on the involucral bracts.. Xylorhiza
 - 8 Plants from rhizomes and fibrous roots or annual from a taproot but then with rays short or lacking and mostly keyed in KEY 8; habitat various but often montane or else moist; rays bluish or purplish, occasionally white; leaves not villous; involucral bracts not spinulose-acuminate..... Aster
- 1 Rays yellow or orange
 - 9 Pappus of capillary bristles
 - 10 Involucral bracts in single series, equal, or with a few much reduced outer ones, blackish at the tips in a few species; leaves entire, serrate, or pinnatifid; herbage glabrous or with soft hairs (pilose or tomentose)..... Senecio
 - 10 Involucral bracts in 2 or more series and imbricate (overlapping), not black at the tips; leaves entire or slightly toothed in Solidago; herbage glabrous or variously pubescent
 - 11 Leaves pubescent on both sides with rather stiff, short, and appressed hairs (strigose); stems strigose throughout; basal leaves lacking or small..... Heterotheca
 - 11 Leaves glabrous at least on 1 side or merely puberulent; stems glabrous to puberulent; basal leaves sometimes well developed
 - 12 Heads solitary or plants villous or tomentose at least in the inflorescence; involucre mostly over 1 cm wide and/or 1 cm long or villous below; blades of the rays (5) 8-14 mm long..... Haplopappus
 - 12 Heads not solitary; plants glabrous or puberulent; involucre often smaller than above; blades of the rays 2-7 mm long
 - 13 Rays 1-3 per head; leaves entire; stems not over 20 cm tall, usually several from a branched woody caudex..... Petradoria
 - 13 Rays over 5 per head; leaves sometimes toothed; stems 10-100 cm tall, usually 1-few from taproots or rhizomes..... Solidago
 - 9 Pappus not of capillary bristles
 - 14 Rays inconspicuous, 2-3 mm long; leaves linear, entire, not over 7 mm wide
 - 15 Plants annual, tar-scented and malodorous; herbage with stalked, greenish yellow glands.... Madia
 - 15 Plants perennials, subshrubs, not tar-scented..... Gutierrezia
 - 14 Rays longer; leaves various
 - 16 Some or all of the disc flowers reddish, purplish, brown, or black
 - 17 Rays 3 lobed or toothed at the apex, sometimes reddish at base; disc flowers reddish or purplish..... Gaillardia aristata
 - 17 Rays not 3 lobed at apex, yellow throughout; disc flowers brown or black
 - 18 Plants perennial, not weedy; leaves entire; rays 10-13 mm long..... Helianthella microcephala

ASTERACEAE

- 18 Plants annual; more or less weedy; leaves entire or serrate; rays 15-40 mm long..... Helianthus
- 16 Disc flowers yellow
- 19 Plants strongly resinous; some leaves usually serrate; involucre bracts more or less squarrose (strongly spreading or recurved)..... Grindelia
- 19 Plants not strongly resinous; leaves entire or divided into linear segments; involucre bracts not squarrose
- 20 Leaves pinnately divided..... Gaillardia flava
- 20 Leaves not as above, mostly entire
- 21 Plants long-villose or floccose at least in part; leaves not over 10 cm long.. Psilostrophe
- 21 Plants not pubescent as above or if so the larger leaves 10-30 cm long
- 22 Leaf blades mostly less than 10 cm long, the larger ones basal or on the lower part of the stem; involucre 7-10 mm high; rays 7-10 mm long..... Platyschukria
- 22 Leaf blades either over 10 cm long or the larger ones not basal nor confined to the lower part of the stem; involucre and rays sometimes larger
- 23 Disc with chaffy scales among the disc flowers; rays entire or toothed at the apex, not reflexed; leaves without clasping or decurrent bases..... Wyethia
- 23 Disc without chaffy scales; rays lobed or coarsely toothed; leaves with clasping or decurrent bases..... Helenium

KEY 8

- 1 Pappus of capillary bristles
- 2 Leaves spinulose-toothed; strigose or glabrous; plants 5-20 (30) cm tall.... Machaeranthera nuttallii
- 2 Leaves not spinulose toothed
- 3 Plants more or less white or gray tomentose; leaves linear or narrow, entire; inflorescence compact with the heads touching or close together, or solitary on stems not over 3 cm long; involucre 4-9 mm high, occasionally higher
- 4 Plants annual from taproots..... Gnaphalium
- 4 Plants perennial, usually from stolons or rhizomes
- 5 Plants often over 25 cm tall, from rhizomes; tufts of basal leaves lacking; stem leaves 3-10 cm long, less pubescent and greener above than beneath; involucre 6-7 mm high, about as wide (Artemisia ludoviciana might key here but has smaller involucre)..... Anaphalis
- 5 Plants seldom over 25 cm tall, often from leafy stolons; tufts of basal leaves usually well developed; stem leaves mostly less than 3 cm long, usually about equal in pubescence and color on both sides..... Antennaria
- 3 Plants not as above in all features
- 6 Disc flowers yellow, or if not yellow then hidden in the pappus and plants annual; minute rays sometimes present, these yellow, whitish, or purplish; heads including flowers 2-12 mm high, the flowers not much if at all exceeding the involucre; involucre bracts not striate, erose, fimbriate, nor pectinate, mostly entire, herbaceous throughout
- 7 Heads nodding, 8-12 mm high, 7-8 mm wide; involucre bracts in a single series..... Senecio pudicus
- 7 Heads not nodding, mostly smaller or the involucre bracts in 2 or more series
- 8 Plants long lived perennials, from woody branching caudices, glabrous or scabrous; leaves basally disposed, tufted, the stem leaves reduced; involucre 2-3 mm wide.... Petradoria
- 8 Plants annual, or if perennial then either pubescent or heads wider than above
- 9 Plants glabrous or sparingly scabrous above, not glandular, strictly annual, of moist or wet often saline or alkaline lowlands; involucre bracts imbricate in 3 or more series; heads 5-8 (11) mm high, 6-13 (17) mm wide Aster
- 9 Plants pubescent or glandular at least in part, or if glabrous then the heads 2-4 mm high; involucre bracts often in a single series, but sometimes imbricate
- 10 Involucre 2-4 mm high; plants annual, 20-100 cm tall, usually much branched above Conyza
- 10 Involucre 4-10 mm high; plants biennial or perennial, usually not much branched above..... Erigeron
- 6 Disc flowers white, cream, pink or purple, not hidden in the pappus; plants perennial; rays lacking; heads including the flowers often over 12 mm high, the flowers sometimes exceeding the involucre; involucre bracts striate or erose, fimbriate or pectinate, more or less chartaceous
- 11 Plants pubescent, not glandular, not aromatic; involucre bracts erose, fimbriate or pectinate, not striate, in 4-5 more or less equal series; flowers mostly pink or purple, rarely white, often well exceeding the involucre..... Centaurea
- 11 Plants glandular, usually aromatic; involucre bracts striate, entire, in unequal series, the outer much shorter than the inner; flowers white, cream, or sometimes purplish, usually not much exceeding the involucre
- 12 Pappus bristles obviously plumose, the side cilia about 0.5 mm long; plants known from the E. Tavaputs Plateau..... Kuhnia
- 12 Pappus bristles not plumose; plants widespread in the area..... Brickellia

- 1 Pappus not of capillary bristles
- 13 Some leaves over 10 cm wide; involucre covered with hooked bristles..... Arctium
- 13 Leaves smaller; involucre without hooked bristles
 - 14 Some or all of the leaves divided into long, linear segments; plants 1-2 m tall, just entering our area in Desolation Canyon..... Oxytenia
 - 14 Leaves not as above; plants mostly shorter, not restricted as above
 - 15 Plants tar scented and strongly malodorous, annuals; herbage with stalked yellow-green glands; leaves 1-7 mm wide, entire..... Madia
 - 15 Plants sometimes aromatic but not tar scented, perennials or biennials, without glands as above; leaves sometimes wider, entire, toothed, lobed, or divided
 - 16 Plants subshrubs with entire, glabrous or puberulent leaves..... Cutierrezia
 - 16 Plants herbs; leaves often pubescent or toothed, lobed, or divided (entire and glabrous in Artemisia dracuncululus)
 - 17 Corollas lacking; stamens naked in the involucre; heads unisexual, the staminate ones in terminal spikes or racemes, the pistillate ones axillary; involucre of the pistillate heads burlike, with short spines, closely enveloping the flowers..... Ambrosia
 - 17 Corollas present; stamens included in the corolla or rarely lacking; heads mostly bisexual, not axillary, not burlike, not with spines
 - 18 Leaves finely serrate; plants strigose, about 50-100 cm tall, introduced, cultivated, persisting, and perhaps escaping..... Chrysanthemum
 - 18 Leaves entire or lobed to pinnatifid or palmatifid but not serrate; plants more or less tomentose, of various stature, native
 - 19 Inflorescence capitate or corymbiform; leaves tridentate, trilobate, or palmatifid; plants entering our area in Moffat Co. from Wyoming..... Sphaeromeria
 - 19 Inflorescence spicate, racemose or paniculate; leaves entire or pinnatifid; plants widespread..... Artemisia

Achillea L. Yarrow; Milfoil

Achillea millefolium L. (A. lanulosa Nutt.) Perennial, villous, aromatic herbs from slender rootstocks; stems 10-60 cm tall; leaves 3-10 cm long, finely dissected, the ultimate segments linear; inflorescence flat-topped; involucre 4-6 mm high; rays about 5, 2-3.5 mm long, mostly white, rarely pink; disc flowers 10-20. Common, widespread; many plant communities including aspen, conifer, sagebrush, mt. brush, riparian, meadow, and alpine tundra; 6,000- 11,100 ft and probably higher; June-Aug. Our native plants are referable to ssp. lanulosa (Nutt.) Piper. High elevation plants tend to have dark involucral bracts, fewer heads, and lower stature. These plants are referable to var. alpicola (Rydb.) Garrett, but they intergrade completely with plants of var. lanulosa (Welsh 1983).

Agoseris Raf. Mountain Dandelion

Perennial, mostly scapose herbs with milky juice; leaves all basal; heads solitary; involucral bracts in series, the outer shorter and broader than the inner; flowers all ligulate; pappus of numerous, white, simple, capillary bristles; achenes 10-ribbed.

- 1 Achenes narrowed to a long slender beak, the beak equal or longer than the body; flowers yellow to orange, drying to red or purple..... A. aurantiaca
- 1 Beak of achenes obsolete or to about 1/2 as long as the body; flowers yellow..... A. glauca

Agoseris aurantiaca (Hook.) Greene Orange m. d. [A. arizonica Greene; A. gracilens (Gray) Greene] Occasional; widespread; aspen, conifer, and sagebrush communities; 6,000-11,000 ft; June-Aug.

Agoseris glauca (Pursh) Raf. Pale m. d. [A. elata (Nutt.) Greene misapplied (Graham 1937)] With three more or less intergrading vars. in our area.

- 1 Plants glabrous or sparsely ciliate on the petioles and lower part of the leaves, 10-65 cm tall; leaves strongly acute or acuminate, entire or with a few teeth, not laciniate..... var. glauca
- 1 Plants more or less pubescent, if rather sparsely so then leaves laciniate, seldom over 25 cm tall
 - 2 Leaves entire or sometimes weakly laciniate below, mostly oblanceolate or broader, more or less obtuse; plants tending to be rather densely pubescent especially in the involucre... var. dasycephala
 - 2 Leaves mostly laciniate, mostly lanceolate, mostly acute or acuminate; plants less densely hairy, often with the leaf surfaces nearly glabrous and the pubescence largely confined to the top of the peduncle and margins of the involucral bracts..... var. laciniata

Var. dasycephala (T. & G.) Jeps. Four specimens seen, these from the Uinta Mts.; meadows, open conifer woods and openings in woods; 10,600-11,000 ft; July-Aug.

ASTERACEAE

Var. glauca Occasional; widespread; mostly in meadow, willow-streamside, or riparian communities, occasionally with sagebrush but then mostly near meadows; 5,400-10,300 ft; June-July.

Var. laciniata (D.C. Eaton) Smiley [A. taraxifolia (Nutt.) D. Dietr.] Common; widespread; sagebrush, pinyon-juniper, mt. brush, and aspen communities; 5,800-9,000 ft; late May-Aug.

Ambrosia L. Ragweed; Bursage; Burweed

Annual or perennial herbs; leaves opposite or alternate, mostly lobed or dissected; heads unisexual or occasionally bisexual, the staminate heads in terminal spikes or racemes, the involucre saucer-shaped or hemispheric, of 5-12 partly united bracts, the anthers not united; pistillate heads below the staminate ones, axillary, 1-flowered, enclosed by a nutlike or burlike involucre, the involucre with tubercles or spines near the apex; corollas lacking; pappus lacking.

- 1 Leaves bicolor, the lower surface covered with appressed white hairs; plants perennial, from rhizomes A. tomentosa
- 1 Leaves not as above; plants annual..... A. acanthicarpa

Ambrosia acanthicarpa Hook. B. [Franseria acanthicarpa (Hook.) Coville] Locally common; widespread; desert shrub, sagebrush, and pinyon-juniper communities, often on roadsides and other disturbed sites; 4,800-5,800 ft; mid Aug.-early Oct.

Ambrosia tomentosa Nutt. Bur r., skeleton leaf b. (Franseria discolor Nutt.; F. tomentosa Gray) Occasional to locally common along the flood plain of the Green River from Dinosaur National Monument to s. of Ouray, specimens also seen from Blind Stream, Uinta Mts., and Matt Warner Reservoir, Diamond Mt.; roadsides and other disturbed places; 4,700-8,950 ft; June-Aug. Holmgren and others 446 DINO!, reported as Franseria linearis Rydb. [A. linearis (Rydb.) Payne] (Holmgren 1962) belongs here. The listing of A. artemisiifolia L. (Goodrich and others 1981) is based on a specimen belonging here.

Anaphalis D.C. Pearly-everlasting

Anaphalis margaritacea (L.) Benth. & Hook. [A. sublapina (Gray) Rydb.] Perennial, tomentose or floccose herbs from rhizomes; stems erect, leafy, 25-60 cm tall; leaves alternate, 3-10 cm long, linear to narrowly lanceolate, usually green above, white-pubescent beneath; heads in corymbose clusters; involucre 6-7 mm high, of several series of imbricate bracts, the outer shorter, white, scarious, spreading and persistent when dry; flowers all discoid, of two types, one type bisexual and sterile with undivided styles, the other type mostly pistillate with a few bisexual flowers in the center of the head; pappus of capillary bristles; anthers united; achenes glabrous. Occasional to locally common; Uinta Mts.; mostly in lodgepole pine and Engelmann spruce woods, occasionally in aspen and fir woods, or seldom on open rocky ground; 7,600- 10,200 ft; July-Aug.

Antennaria Gaertn. Pussytoes

Perennial herbs, unisexual, tomentose; leaves alternate, and usually in a basal rosette, entire, usually narrow; heads in capitate or corymbose clusters; involucre bracts imbricate in several series, scarious, the tips often whitish or pinkish; staminate heads with bisexual-appearing tubular flowers, and with clavate apical-flattened pappus bristles (except in A. dimorpha); pistillate heads with filiform corollas, and with a pappus of capillary bristles, the bristles united at the base and deciduous together; achenes usually glabrous. We have not seen specimens to support the listing by Goodrich and others (1981) of the more s. A. rosulata Rydb. The report of that taxon for along the Yampa River (Potter and others 1983) is based on a vegetative specimen (Y 69!) of Petrophytum caespitosum.

- 1 Leaves 2-20 cm long, the largest ones mostly over 4 cm long, distinctly 3 (5) nerved; plants 10-40 cm tall, without stolons, rare or rather uncommon in our area
- 2 Stems mostly solitary from short to prolonged rootstocks; plants of wet meadows, bogs, and stream-sides; involucre bracts more or less tomentose toward the base..... A. pulcherrima
- 2 Plants somewhat caespitose, mostly from drier ground than above, the stems usually clustered on a caudex; involucre bracts various
 - 3 Involucre bracts glabrous or nearly so, scarious and whitish to near the base; inflorescence compact to open corymbose; basal leaves 2-5 (8) cm long..... A. luzuloides
 - 3 Involucre bracts tomentose in the lower 1/2, the lower portion not scarious; inflorescence compact cymose; basal leaves 2.5-19 cm long..... A. anaphaloides
- 1 Leaves 0.3-3.5 cm long, with 0-1 distinct nerve (rarely with 3 indistinct nerves); plants 2-20 (30) cm tall, with creeping stolons except in A. dimorpha; plants common
 - 4 Heads solitary, sessile in the basal rosettes, or the stem seldom over 3 cm long; stolons lacking or short; plants of dry hills and lower montane..... A. dimorpha
 - 4 Heads more numerous; stems taller or plants with well-developed stolons; habitat various but mostly montane
 - 5 Involucre bracts white or pink; plants (5) 10-30 cm tall

- 6 Involucres 7-11 mm high; heads less than 10 per stem; plants seldom over 15 cm tall.... A. parvifolia
- 6 Involucres less than 8 mm high; heads sometimes over 10 per stem; plants of various height
- 7 Involucral bracts white with a black spot at the base of the scarious portion; some of the basal leaves over 25 mm long, narrowly oblanceolate..... A. corymbosa
- 7 Involucral bracts white or pinkish, scarcely or not at all darkened below the scarious portion; leaves not over 25 mm long, sometimes wider than above..... A. microphylla
- 5 Involucral bracts dirty brownish green, or blackish green, sometimes whitish at the tip; plants 2-10 (25) cm tall
- 8 At least the inner bracts usually abruptly acute to acuminate, the scarious terminal portion brownish green to blackish green throughout..... A. alpina
- 8 Involucral bracts mostly obtuse at the apex, the scarious terminal portion merely dirty tan or often whitish at the apex..... A. umbrinella

Antennaria alpina (L.) Gaern. Alpine p. (A. media Greene) Uinta Mts.; lodgepole pine and Engelmann spruce woods, rocky slopes, meadows, along streams, and alpine tundra; 10,200-11,500 ft; July-Aug. Passing into A. umbrinella. Our plants are referable to var. media (Greene) Jeps.

Antennaria anaphaloides Rydb. Pearly p. Infrequent in the Brush Creek drainage, and Daggett Co. in the Uinta Mts. and to Goslin and Round Mts.; sagebrush-grass, mt. brush, aspen, Douglas-fir, and spruce-aspen communities; 8,000-8,600 ft; June-mid July.

Antennaria corymbosa E. Nels. Plains p. Uinta Mts.; wet meadows, along streams, bogs, and conifer woods; 8,100-11,000 ft; mid June-Aug.

Antennaria dimorpha (Nutt.) T. & G. Low p. (A. rosulata Rydb. misapplied) Widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 5,000-8,000 ft, one specimen (Harrison 11691) from among rocks at the outlet of Granddaddy Lake at 10,200 ft; April-June (July).

Antennaria luzuloides T. & G. Rush p. Locally common w. of N. Fork Duchesne River in the Uinta Mts. also on Diamond and Hoy Mts. at the e. end of the Uinta uplift; forb-grass, ponderosa pine, and aspen communities, often in openings in woods; 7,700-9,750 ft; June-Aug.

Antennaria microphylla Rydb. Rose p. (A. concinna E. Nels.; A. formosa Greene; A. rosea Rydb.) Common; widespread; sagebrush, pinyon-juniper, mt. brush, aspen, meadow, and conifer communities; 6,000-10,600 ft; June-Aug. Other than the rose color of the involucral bracts, we see no difference in the plants that might be called A. rosea. This feature seems variable within populations.

Antennaria parvifolia Nutt. Littleleaf p. (A. aprica Greene) Occasional across the Uinta Mts., flanks of these mountains to Douglas Mt. and upper elevations of the W. Tavaputs Plateau; conifer woods, edge of meadows, sagebrush, and infrequently riparian communities; 6,500-10,000 ft; late May-July.

Antennaria pulcherrima (Hook.) Greene Showy p. A single specimen seen (S. Goodrich 15069), from a calcareous bog in S. Fork Rock Creek at 9,200 ft; July-Aug.

Antennaria umbrinella Rydb. UMBER p. The 4 specimens seen are from head of W. Fork Duchesne River, and Uinta Mts.; open gravelly slopes, snowbank areas, aspen, and lodgepole pine-streamside meadow communities; 9,000-9,900 ft, to be expected to above 11,000 ft on the Uinta Mts.; June-Aug.

Anthemis L. Camomile; Dog Fennel

Anthemis cotula L. Annual, possible biennial herbs with rank odor; stems branching, leafy, 20-60 cm tall; leaves alternate, 2-3 pinnatifid into linear or filiform segments, about 3-5 cm long; heads solitary at the ends of branches; involucre 4-6 mm high, the bracts in 2 series; pappus none; rays about 6-10 mm long, reflexed in age, white; disc flowers yellow; achenes 10-ribbed. Introduced from Europe. The three specimens seen are from widely scattered locations; more or less weedy, along roads, ditchbanks, and in other disturbed areas; 7,500-8,530 ft; July-Sept.

Arctium L. Burdock

Arctium minus (Hill) Bernh. Biennial herbs 50-200 cm tall, with much branched stems; leaves alternate, long petiolate, the blade up to 50 cm long and 40 cm wide, thinly woolly or glabrous in age; heads in axillary racemelike clusters, the involucral bracts numerous, linear, hooked at the apex, forming a bur; rays lacking, the disc flowers red-violet; pappus of numerous short rigid scalelike bristles. Naturalized from Europe, an occasional weed of ditchbanks and other moist places, up to about 7,200 ft, not particularly aggressive and usually not found in cultivated areas, although usually adjacent to such areas and particularly on abandoned or neglected farmlands; July-Oct.

Arnica L. Arnica

Perennial herbs; herbage more or less pubescent with short or long crinkled hairs, the hairs often glandular; leaves simple, mostly opposite; heads solitary to several in cymose clusters; involucre hemispheric to turbinate, the bracts equal in length, in 1-2 series; receptacles naked; ray and disc flowers yellow, or rays lacking; pappus of capillary bristles.

ASTERACEAE

- 1 Rays lacking, lower heads sometimes nodding..... A. parryi
- 1 Rays well developed, heads not nodding
 - 2 Leaves 3-10 times longer than wide, sessile or gradually tapering to a more or less winged petiole, entire or obscurely toothed, with 3-7 conspicuous ribs or veins running parallel to the margins, hardly if at all netted veined, not cordate, large basal leaves often lacking, or these and the lower cauline ones often withering by anthesis
 - 3 Stems with (4) 5-9 pairs of equally spaced leaves, the lower 1 or 2 pairs connate sheathing (the sheath 1-3 cm long), withering by anthesis, equaling or smaller than middle stem leaves; basal leaves lacking; pappus brownish to straw colored
 - 4 Apex of involucre bracts with a tuft of pilose hairs on the inside; stems arising singly or few together from long-creeping rhizomes, these bearing few if any fibrous roots the first year..... A. chamissonis
 - 4 Apex of involucre bracts not tufted pilose; stems few to several together, arising from short rootstocks, these covered with fibrous roots..... A. longifolia
 - 3 Stems with 2-4 pairs of leaves, the leaves equally spaced or crowded toward the base of the stem, not connate sheathing or the sheath mostly less than 1 cm long except occasionally on the lowest pair, some of the lower leaves occasionally larger than the middle ones
 - 5 Old leaf bases with dense tufts of brown hair in the axils; lower stem leaves sometimes more or less crowded..... A. fulgens
 - 5 Old leaf bases not as above; leaves more or less equally spaced
 - 6 Pappus subplumose, brownish or dirty white; leaves (2) 4-18 cm long, the lower ones more or less petiolate, occasionally connate sheathing; plants 15-65 cm tall..... A. mollis
 - 6 Pappus barbellate, white; leaves 2-5 cm long, the lower ones sometimes reduced to bladeless sheaths; plants 10-25 cm tall..... A. rydbergii
 - 2 Leaves 1-3 times longer than wide, lower stem and basal (if present) leaves abruptly petioled, or sometimes sessile, often conspicuously toothed, more or less netted veined, without prominent parallel veins, sometimes cordate, large basal leaves sometimes present on the rhizomes
 - 7 Pappus brownish to dirty white, subplumose; lower stem leaves obtuse to subcuneate basally..... A. diversifolia
 - 7 Pappus bright white, barbellate; lower cauline leaves cordate, truncate or obtuse basally
 - 8 Peduncles densely white pilose just below the heads; basal and lower stem leaf blades typically (not always) cordate, about equal or shorter than the petioles; involucre 14-20 mm long..... A. cordifolia
 - 8 Peduncles pubescent but seldom densely pilose just below the heads; lower stem leaf blades typically not cordate, much longer than their petioles and sometimes sessile; basal leaves sometimes cordate with long petioles; involucre 9-17 mm high
 - 9 Achenes generally glabrous; leaves more or less toothed; plants common, known from timberline and well below..... A. latifolia
 - 9 Achenes uniformly granular or short-hairy or both; leaves entire or nearly so; plants rare, known from timberline..... A. nevadensis

Arnica chamissonis Less. (A. foliosa Nutt.) Strawberry Valley and Uinta Mts.; along streams, meadows, and rarely in dry places; 7,600-10,000 ft and probably higher; June-Aug.

Arnica cordifolia Hook. Heartleaf a. (A. pumila Rydb.) Common; widespread; aspen and conifer woods, and openings in woods; 7,200-11,000 ft; June-Aug.

Arnica diversifolia Greene The few records seen are from the Uinta Mts.; meadows, rocky ground, talus slopes, and open spruce forests; 10,800-11,000 ft; July-Aug.

Arnica fulgens Pursh Locally common at Greendale area, Daggett Co., Diamond Mt., Uintah Co., Cold Springs and Blue Mts., Moffat Co., and Uinta Canyon, Duchesne Co.; sagebrush communities; 7,400-8,300 ft; June. The closely related A. sororia Greene is reported for the area (Graham 1937) but we have seen no specimens.

Arnica latifolia Bong. Broadleaf a. Rather common in mountains across the area; conifer woods, openings in woods, meadows, and rocky places; (9,000) 9,500-11,100 ft; July-Aug.

Arnica longifolia D.C. Eaton in Wats. Longleaf a. The 2 records seen are from Big Ridge and Brown Duck Mt.; rocky ground near springs and seeps; 10,800-11,000 ft; July-Aug.

Arnica mollis Hook. Hairy a. Common across the Uinta Mts. and to near Strawberry Valley, no specimens seen from the Tavaputs Plateau; conifer woods, moist and wet meadows, open rocky slopes, and talus; 8,600-11,000 (11,600) ft; July-early Sept.

Arnica nevadensis Gray Sierra a. The 1 specimen seen (Maguire 4317 UTC from Krumholz at 11,400 ft on Mt. Agassiz, Duchesne, Co.) has entire blades somewhat gradually tapered into expanded petioles that seem to suggest an alliance with A. rydbergii.

Arnica parryi Gray The few specimens seen are from Carrant Creek to Rock Creek; conifer woods, and openings in woods; 9,800-10,500 ft; mid July-Aug.

Arnica rydbergii Greene Occasional; Uinta Mts.; pine-spruce woods and open slopes; 10,000-11,000 ft; (June) July-Aug.

Artemisia L. Sagebrush; Wormwood; Mugwort

Annual or perennial herbs or shrubs, often aromatic; leaves alternate, entire, lobed or dissected; heads small, mostly in panicles, sometimes in racemes or spicate panicles; involucre bracts imbricate in 2-4 series, the inner ones scarious or scarious-margined; receptacles naked or hairy; marginal flowers pistillate and fertile or wanting, rays obsolete or lacking, the central disc flowers bisexual, fertile or sterile; pappus none. This is a complex group of plants in which boundaries between taxa are sometimes vague and sometimes totally obscured by hybridization. Shrubby plants often have ephemeral and persistent leaves, these often strikingly different in shape and size. This adds to the difficulty in distinguishing the taxa.

- 1 Plants shrubs or subshrubs, woody at least at the base
 - 2 Leaves dissected, with several to many linear or narrow segments; plants mostly 5-50 (60) cm tall
 - 3 Leaves palmately dissected; plants flowering in springtime
 - 4 Old flowering stalks developing into spines; plants flowering May-early June, widespread; corollas hairy, achenes villose..... A. spinescens
 - 4 Old flowering stalks not spiny; plants flowering later than above, known from Moffat Co.; corollas not hairy; achenes glabrous..... A. pedatifida
 - 3 Leaves more or less pinnately dissected; plants flowering Aug.-early Oct.
 - 5 Leaves distinctly once pinnatifid, green and nearly glabrous, 2-8 mm long; plants 5-20 cm tall A. pygmaea
 - 5 Leaves 2-3 times pinnately dissected, silvery-canescens, 6-12 mm long; plants 5-40 cm tall.... A. frigida
 - 2 Leaves entire to palmately lobed or toothed, the lobes or teeth generally 2-5 per leaf; plants of various stature
 - 6 Plants 15-40 cm tall, the flowering stalks often 1/3-2/3 the height of the plant; leaves shallowly tridentate, becoming entire upward, the teeth pointed (obtuse to acute), not rounded, silvery canescens, 1-1.5 cm long; heads ascending, spreading or nodding, with 1-3 central bisexual flowers and with 0-2 marginal, smaller flowers, the marginal flowers lacking stamens and sometimes with minute rays; involucre not over 2 mm wide, the bracts villous throughout..... A. bigelovii
 - 6 Plants not as above in all features
 - 7 Leaves mostly 5-20 mm long, cuneate; plants 10-30 (50) cm tall, rarely growing above 8,000 ft
 - 8 Heads 3-5 mm wide, 6-11 flowered; plants flowering in mid June-July, approaching our area on the n. and e.; leaves deeply 3 lobed..... A. longiloba
 - 8 Heads about 3 mm wide, 2-6 flowered, plants flowering in late Aug.-Sept., common and widespread; leaves 3-toothed or mostly shallowly lobed..... A. nova
 - 7 Some of the leaves commonly over 20 mm long, cuneate or narrower; plants (20) 30-300 cm tall, of a wide elevational range, but mostly growing above 9,000 ft if uniformly less than 30 cm tall
 - 9 Winter-persistent, leaves entire, often few and not infrequently none, many leaves deciduous or dried by frost in autumn; involucre mostly 4-5 mm high; plants sprouting from the base.. A. cana
 - 9 Functional winter-persistent leaves tridentate, relatively numerous, ephemeral leaves commonly 3-5-dentate; leaflike bracts of the flowering stalks often entire; involucre mostly smaller or larger than above; plants sprouting or not
 - 10 Heads 5-7 mm high, nearly as wide, 5-20 (120) per flowering stalk, with (8) 11-18 flowers, often sessile in the axils of bracts; inflorescence spiciform or narrow paniculate; plants sprouting from the base, montane in the w. part of the area, often in snow flush areas on soils with basic substrate..... A. spiciformis
 - 10 Heads 2.5-4 mm high, commonly more numerous, with 2-6 (8) flowers; plants not sprouting from the base, different from above in one or more other features..... A. tridentata
- 1 Plants herbs, annual to perennial, the above ground parts dying back to ground level each year
 - 11 Plants green, glabrous or sparingly pubescent, not aromatic; heads usually numerous, 2-3 mm high, 2-4 mm wide
 - 12 Leaves pinnatifid, the segments serrate for most of their length; heads crowded in axils of leafy bracts; plants annual or biennial with a basal rosette and a taproot..... A. biennis
 - 12 Leaves simple, entire or with 3-5 linear entire segments; heads in open panicles; plants perennial from thickened woody caudices, without basal rosettes..... A. dracunculoides
 - 11 Plants gray or white from dense pubescence, or if sparingly pubescent then heads larger than above and/or plants aromatic, perennial
 - 13 Leaves 2 or 3 times pinnatifid
 - 14 Receptacles beset with numerous long hairs between the flowers, these hairs dense and long enough to be visible without magnification
 - 15 Plants from (10,000) 10,500-13,000 ft on the Uinta Mts., the stems not woody; heads 5-20, in racemes; involucre bracts with black or dark brown scarious margins..... A. scopulorum

ASTERACEAE

- 15 Plants known from 6,600-9,000 ft, the stems often woody toward the base; heads usually more numerous, in panicles; involucre bracts without dark margins..... A. frigida
- 14 Receptacles not pubescent as above
- 16 Plants from taproots or caudices, lacking rhizomes, usually with a basal tuft of persistent leaves larger or more divided than the stem leaves, of the Uinta Mts.; leaves usually 2-3 times pinnatifid, the ultimate segments linear to lanceolate, 1-30 mm long or longer
- 17 Plants known from about 11,000 ft with Engelmann spruce; heads 4-5 mm high; inflorescence somewhat racemose..... A. norvegica
- 17 Plants known from about 8,000 ft; heads 3-4 mm high; inflorescence paniculate..... A. campestris
- 16 Plants with rhizomes or slender-branched caudices, with or often without a basal tuft of leaves, and these often withering by anthesis when present; leaves variously lobed to pinnatifid but often not so divided as above, the ultimate segments seldom over 5 mm long
- 18 Leaves green on the upper side, sparsely to densely tomentose beneath, margins of the segments sometimes slightly clustered toward the base of the stems with upper leaves somewhat reduced, the primary divisions again divided and leaves truly bipinnate..... A. michauxiana
- 18 Leaves more or less equally gray-white tomentose on both sides, the lower ones not much if any larger than the upper ones, usually withered and deciduous by anthesis, the primary segments merely lobed, toothed or entire and leaves not truly bipinnate..... A. ludoviciana
- 13 Leaves simple to once pinnate
- 19 Leaves 1-3 cm long, usually fascicled, pinnately divided into linear or filiform segments about 0.5-1 mm wide..... A. carruthii
- 19 Leaves usually over 3 cm long, usually not fascicled, entire to pinnately divided, the segments 2-4 mm wide..... A. ludoviciana

Artemisia biennis Willd. Biennial w. Most common across the Tavaputs Plateau, occasional elsewhere; flood plains, along drainages and ditches, mostly moist or wet, saline or alkaline soils; 5,400-6,700 ft and to 8,000 ft on the Tavaputs Plateau; mid Aug.-Sept.

Artemisia bigelovii Gray Bigelow s. Across the E. and W. Tavaputs Plateaus and adjacent in the Basin from near Duchesne to the Green River, and at Dinosaur National Monument; pinyon-juniper, sagebrush, and desert shrub communities; 5,000-6,000 ft; mid July-early Oct.

Artemisia campestris L. (A. spithamea Pursh) The 1 specimen seen (Goodrich 21096) is from Lake Fork Canyon, near Moon Lake; July-Aug. Our plants are referable to ssp. borealis (Pall.) H. & C. var. scouleriana (Bess.) Cronq.

Artemisia cana Pursh Silver s. Abundant in Strawberry Valley, occasional or locally common on the Uinta Mts. including Diamond Mt.; dominant with grasses in meadows and semi-meadow lands, and along drainages, usually on soils with poor or slower drainage than typical of A. tridentata sites, not known on soils with quartzite substrate; 7,400-9,000 ft; mid Aug.-Sept. Our plants are referable to ssp. viscidula (Osterh.) Beetle (A. c. var. viscidula Osterh.).

Artemisia carruthii Wood ex Carruth Carruth s. Approaching our area and possibly entering it in Colorado.

Artemisia dracunculoides L. Tarragon. (A. dracunculoides Pursh) Widespread; sagebrush, rabbitbrush, desert shrub, pinyon-juniper, Douglas-fir, aspen, and grass-forb communities, disturbed swampland and open exposed ridges; 4,670-10,000 ft; mid July-Sept.

Artemisia frigida Willd. Fringed s. Widespread; sagebrush, pinyon-juniper, mt. brush, and dry meadow communities, and windswept ridges; 6,600-9,000 ft; mid Aug.-Sept.

Artemisia longiloba (Osterh.) Beetle Early s; Alkali s. (a misnomer - the plant rarely growing in alkaline places) Approaching and possibly entering the limit of our area. Much like and possibly a part of the A. arbuscula complex (Shultz 1986).

Artemisia ludoviciana Nutt. Western m., prairie sage. (A. mexicana Willd.) With two freely intergrading vars. that may arbitrarily be separated in the following key:

- 1 Leaves entire or some of them toothed or lobed; heads mostly with 6-21 flowers; plants of valleys to mid-montane..... var. ludoviciana
- 1 Leaves more or less deeply parted or divided; heads with 15-30 (45) flowers; plants of mountains..... var. incompta

Var. incompta (Nutt.) Cronq. Specimens seen are all from w. of Avintaquin drainage, W. Tavaputs Plateau, and w. of Lake Fork, Uinta Mts., to be expected elsewhere; conifer, cottonwood, and aspen woods, snowbank areas, and grass-forb communities; 7,500-11,000 ft; mid July-mid Sept. Much like and passing to A. michauxiana.

Var. ludoviciana (A. gnaphaloides Nutt.) Widespread; sagebrush, rabbitbrush, juniper, riparian, wet meadow, and ponderosa pine communities, roadsides and flood plains; 4,800-9,400 ft; late June-Sept. See Welsh (1983) for a discussion of this name at the varietal level.

Artemisia michauxiana Bess. Michaux m. Nine specimens seen, these from Blind Stream to the Whiterocks Drainage, Uinta Mts.; rocky and talus slopes, spruce forests and openings in spruce forests; 9,700-11,400 ft; mid July-Aug. Passing into A. ludoviciana var. incompta.

Artemisia norvegica Fries Boreal w. The three specimens seen are from the head of the Uinta Drainage from Engelmann spruce communities at about 11,000 ft; mid July-Aug. Our plants are referable to var. piceetorum Welsh & Goodrich.

Artemisia nova A. Nels. Black s. [A. arbuscula Nutt. var. nova (A. Nels.) Ward] Common to dominate; widespread; hills and mountain slopes and ridges, on shallow or rocky soil, often on calcareous substrate, sometimes a common or dominant understory plant in pinyon-juniper communities; 4,700-8,500 ft and to 9,000 ft on the Tavaputs Plateau; mid Aug.-early Oct. Plants with taller stature (over 50 cm) can be difficult to distinguish from A. tridentata ssp. wyomingensis. The following key may help distinguish the majority of specimens:

- 1 Involucres to 4 mm high, about 3 mm wide, the bracts often curing to golden brown or reddish brown and persistent with these colors through much of the winter, commonly glabrous (but pubescent phases not uncommon in our area); persistent leaves broadly cuneate, 1-3 times longer than wide, sometimes with greenish, glandular dots conspicuous through the pubescence, aromatic with a rather spicy fragrance when crushed, rather sticky when rolled and crushed between the fingers, the lobes 1-6 mm long, 1/5-1/3 as long as the entire leaf; cured flower-stalks reddish-brown and rather thinly pubescent..... A. nova
- 1 Involucres to 3 mm high, about 2 (3) mm wide, the bracts sometimes curing to a golden brown but often fading and not so persistent through the winter, pubescent; persistent leaves cuneate, often about 3 times as long as wide, rarely with glandular dots showing through the dense pubescence, aromatic with a rather pungent, offensive odor when crushed, not particularly sticky when rolled and crushed between the fingers, the lobes about 1 (2) mm long, seldom more than 1/10 as long as the entire leaf; cured flowering stalks mostly remaining white with dense pubescence..... A. tridentata ssp. wyomingensis

Artemisia pedatifida Nutt. The 2 specimens seen are from Irish Canyon and confluence of Shell Creek and Hells Canyon of the Vermillion Creek drainage; sagebrush-grass and Atriplex-grass communities; 6,000-6,800 ft; May-June.

Artemisia pygmaea Gray Pygmy s. Mostly across the flank of the Tavaputs Plateau, rarely to the bottom of the Basin; desert shrub and pinyon-juniper communities, often on raw soils that are high in carbonates, often in association with rare or narrowly endemic species; 5,300-6,000 ft; mid Aug.-early Oct.

Artemisia scopulorum Gray Alpine s., Rocky Mt. s. Common; Uinta Mts.; alpine tundra, pine-spruce woods, occasionally in meadows; (10,000) 10,500-13,000 ft; July-Aug.

Artemisia spiciformis Osterh. Spike s., snowfield s. Locally abundant to dominant, Tavaputs Plateau (Reservation Ridge), Red Creek Mt., and from Wolf Creek to Blind Stream in the Uinta Mts.; moist slopes and snow flush areas, mostly on soils with basic substrate; 9,450-10,000 ft; Aug.-Sept. A hybrid origin (A. cana x A. tridentata) is likely for this plant (Schultz 1983; Goodrich and others 1985). A combination (A. tridentata ssp. spiciformis Goodrich & McArthur) has been made. However, with the habit (several to many small stems), large and many-flowered heads, and sprouting feature of A. cana, this plant seems as closely aligned to A. cana as it is to A. tridentata, with which the common feature is the winter-persistent tridentate leaves. In habitat (well-drained soil), it may be closer to A. tridentata, but the sprouting character by which it persists in snowbank areas is a feature of A. cana. With a unique combination of features found in A. cana and A. tridentata and with fewer heads per inflorescence (on the average), an earlier phenology, and different habitat than in either of the other two taxa, A. spiciformis is probably best left as a species.

Artemisia spinescens D.C. Eaton in Wats. Bud s., budsage. Common to dominant; widespread; desert shrub communities; 4,700-5,700 ft; May-early June.

Artemisia tridentata Nutt. Big s. With 3 intergrading ssp. Varietal names are available at various infraspecific levels for each of the following taxa. We have used the subspecies names because they seem more traditional, not because we necessarily prefer to make the distinctions at that level.

- 1 Vegetative twigs standing about the same height, giving a flat-topped appearance to the shrubs, the flowering stalks well exceeding and usually over 2 times as long as the subtending vegetative twigs; persistent leaves averaging 4 times longer than wide, with slightly pungent or pleasant camphorlike odor when crushed; plants in and above the pinyon-juniper zone..... ssp. vaseyana
- 1 Vegetative twigs short and long; shrubs with an irregularly topped crown, the flowering stalks about equal to or less than 2 times as long as the vegetative twigs or leaves averaging less than 4 times as long as wide; leaves with pungent odor when crushed; plants mostly in and below the pinyon-juniper zone
 - 2 Mature plants with a single, trunklike, main stem, usually 1-2 (3) m tall; persistent leaves nearly linear or narrowly oblanceolate, hardly cuneate or fan shaped, mostly with nearly parallel margins; averaging 5.6 times longer than wide; panicle of each flowering stalk extremely variable but those of vigorous shrubs 5-8 cm wide or wider and 20-40 cm long, profusely flowered..... ssp. tridentata
 - 2 Mature plants with several main branches and mostly without a distinct, trunklike, main stem, mostly less than 1 m tall; persistent leaves cuneate to broadly cuneate or fan shaped, averaging 3.1 times longer than wide; panicle of each flowering stalk various, but seldom over 5 cm wide or 15 cm long even on the most vigorous shrubs, and often small and relatively few flowered..... ssp. wyomingensis

ASTERACEAE

Ssp. tridentata Basin big s. (A. t. var. tridentata) Common to dominant; widespread; sagebrush communities, and with rubber rabbitbrush, Great Basin wildrye, and sometimes greasewood on canyon bottoms, also along gullies, valley bottoms, ditchbanks, and fence rows, usually on gravelly to fine sandy loam, deep alluvial soils, often where periodic deposition of alluvium is more rapid than in-place development of sequential horizons; 4,700-8,000 ft; late Aug.-Sept.

Ssp. vaseyana (Rydb.) Beetle Mt. big s, [A. t. var. vaseyana (Rydb.) B. Boi.] Common to dominant; widespread; sagebrush-grass communities, aspen-sagebrush ecotones, and occasionally pinyon-juniper communities, often with low rabbitbrush, mountain sides, ridges, canyons, and plateaus, usually on Mollisols with dark colored surface horizons and without a carbonate hardpan; about 7,000-10,000 ft; late July-Sept. Our plants are referable to var. pauciflora Winward & Goodrich. Vasey big sagebrush and Vasey sagebrush are common names that have often been applied to our plants but these names are better applied to plants of var. vaseyana that are known from outside our area and mostly to the NW.

Ssp. wyomingensis Beetle & Young Wyoming big s. [A. t. var. wyomingensis (Beetle & Young) Welsh] Common to dominant; widespread; sagebrush and pinyon-juniper communities, hills and flats, mostly on Aridisols with light-colored surface horizons and with a carbonate hardpan at about 12-22 inches; about 5,400-6,500 ft or perhaps to 7,000 ft; late July-Sept. See A. nova.

Aster L. Aster

Annual or perennial herbs from taproots or rhizomes; leaves alternate, simple, mostly entire; inflorescence usually corymbose or paniculate; involucre bracts usually graduated in 3 or more series; receptacles naked, rays white, rose, pink, lavender, or purple, or lacking, disc flowers mostly yellowish; pappus of equal or subequal capillary bristles.

- 1 Plants annual; rays reduced to a short tube or slightly if at all exceeding the pappus; disc flowers hidden in the pappus, rose or purplish, plants mostly of moist saline or alkaline ground
 - 2 Involucre bracts linear, widest at or below the middle, tapering to an acute apex.... A. brachyactis
 - 2 Involucre bracts oblanceolate or spatulate-oblong, mostly widest above the middle; obtuse or abruptly acute or cuspidate..... A. frondosus
- 1 Plants perennial; rays well developed, disc flowers not hidden in the pappus, mostly yellowish; habitat various
 - 3 Upper (inner) involucre bracts not green at the tip, often reddish or purple, with a distinct midvein; rays 5-15 (23) per head; basal leaves lacking (except sometimes in A. glaucodes); lower stem leaves smaller than middle stem leaves, often withering (except in A. glaucodes)
 - 4 Rays dark purple, 7-13 mm long; involucre 5-10 mm high, the bracts strongly graduated; stems (20) 30-50 cm tall; leaves 3-7 cm long, 3-14 mm wide..... A. perelegans
 - 4 Rays white, pink or pale lavender; involucre and stems various; leaves sometimes larger
 - 5 Involucre 8-12 mm high, the bracts acute to acuminate; herbage green; stems (20) 50-150 cm tall; lower leaves smaller than those of midstem; rays (13) 15-25 mm long..... A. engelmannii
 - 5 Involucre 6-9 mm high, the bracts (at least the outer) obtuse or bluntly acute, herbage glaucous; stems 10-70 cm tall; lower leaves larger than those of midstem; rays 7-15 mm long... A. glaucodes
 - 3 Upper (inner) involucre bracts green and herbaceous at the tips or throughout, lacking a distinct midvein; rays (10) 15-50 per head; basal and lower stem leaves sometimes larger than those of midstem
 - 6 Involucre and peduncles glandular
 - 7 Leaves linear to linear-oblanceolate, 2-5 mm wide; 1.5-7 cm long, not especially clasping the stem; involucre 4-7 mm high; plants of saline or alkaline lowlands; rays pale to dark blue... A. pauciflorus
 - 7 Leaves oblanceolate to lanceolate, 8-50 mm wide, 2.5-19 cm long, those of the stem strongly clasping; involucre 8-15 mm high; plants montane, rays dark blue or purple... A. integrifolius
 - 6 Involucre and peduncles not glandular or inconspicuously so
 - 8 Involucre 4-5 mm high, 4.5-6 mm wide, the bracts often squarrose, with minute spinulose tips, ciliate; inflorescence sometimes secund; rays 3-8 mm long, white; herbage villous or villous-hirsute with multicellular hairs..... A. pansus
 - 8 Involucre 4.5-12 mm high, 6-20 mm wide, the bracts mostly not squarrose nor minutely spinulose at the tips; rays 5-15 (20) mm long, white to lavender; herbage various
 - 9 Involucre bracts distinctly and strongly imbricate, most of the outer ones less than 1/2 as long as the inner ones, obtuse or obtusish; pubescence below the heads harsh... A. chilensis
 - 9 Involucre bracts loosely imbricate, most of the outer ones over 1/2 as long as the inner
 - 10 Stems mostly with (10) 15-30 or more heads, plants (40) 60-150 cm tall, rays white, pink, or blue; middle and upper stem leaves mostly less than 1 mm wide
 - 11 Pubescence of stems in decurrent lines below the leaf bases; involucre bracts averaging less than 1 mm wide, distinctly acute or the inner ones long-tapered at the apex; rays mostly blue..... A. hesperius
 - 11 Pubescence of stems more or less uniform; involucre bracts averaging at least 1 mm wide, the outermost often obtuse and apiculate, the innermost abruptly acute; rays white, pinkish, or rarely bluish..... A. eatonii

- 10 Stems usually with fewer than 10 heads; plants 10-50 (80) cm tall; rays blue or purple, or if pale lavender or white then the middle and sometimes upper stem leaves over 1 cm wide
- 12 Middle stem leaves mostly over 1 cm wide, usually less than 7 times longer than wide, the upper ones not much reduced; involucre bracts sometimes over 2 mm wide..... A. foliaceus
- 12 Middle stem leaves mostly not over 1 cm wide, often over 7 times longer than wide; upper leaves often much reduced; involucre bracts less than 2 mm wide..... A. occidentalis

Aster brachyactis Blake [Brachyactis angusta (Lindl.) Britt.] Occasional or very locally common; lowland meadows, riparian communities, edge of ponds and lakes, often on alkaline or saline soil; 4,900-5,400 ft; mid Sept.-early Oct.

Aster chilensis Nees Pacific a., everywhere a. (A. ascendens Lindl.) Common to abundant; widespread; many plant communities including riparian, sagebrush-rabbitbrush, bullgrass, conifer, and aspen, also along roadsides and ditches, weedy in lawns and gardens; up to 10,000 ft and occasionally higher; July-Oct. There is extreme variability between the high and low elevation plants, but all plants from our area are apparently referable to ssp. ascendens (Lindl.) Cronq. (sometimes spelled adscendens). See Welsh (1983) for further discussion.

Aster eatonii (Gray) Howell Eaton a. Two records seen, these from a riparian community along Whiterocks River and a sphagnum bog in Whiterocks Canyon; 5,770-7,360 ft; Aug.-Sept.

Aster engelmannii (D.C. Eaton) Gray Engelmann a. The many specimens seen are from the W. Tavaputs Plateau, Strawberry Valley, and Uinta Mts. to Rock Creek; mostly in conifer woods, occasionally in aspen woods and open rocky slopes; 8,200-10,600 ft; mid July-Aug.

Aster foliaceus Lindl. in DC. Alpine leafy bract a. With two intergrading vars.

- 1 Involucre bracts foliaceous, some 2-6 mm wide..... var. canbyi
- 1 Involucre bracts not foliaceous, mostly less than 2 mm wide..... var. parryi

Var. canbyi Gray Occasional in the Curreant Creek and W. Fork Duchesne drainages; tall forb, willow-streamside, and spruce-fir communities; 9,000-9,600 ft; July-Aug.

Var. parryi (D.C. Eaton) Gray (A. parryi Gray) Specimens seen are from across the Uinta Mts. and Hill Creek, Tavaputs Plateau, to be expected elsewhere; open woods, riparian and meadow communities; 7,200-10,700 ft; July-Aug. Similar to and freely hybridizing with A. occidentalis (Cronquist 1955). However, var. parryi seldom has the long peduncles, dark blue-purple rays, nor the much reduced upper stem leaves of A. occidentalis (Welsh 1983).

Aster frondosus (Nutt.) T. & G. Leafy a. [Brachyactis frondosa (Nutt.) Gray] A single specimen seen (Neese 8462), this from the flood plain of the Strawberry River in a disturbed saline riparian community; 5,900 ft; Sept.

Aster glaucodes Blake Blueleaf a. Occasional to locally common; widespread; pinyon-juniper, mt. brush, Douglas-fir, aspen, ponderosa pine, and lodgepole pine communities, and talus and rocky slopes; 6,720-10,600 ft; Aug.-Sept.

Aster hesperius Gray Siskiyou a., ditchbank a., marsh a. Infrequent, perhaps scattered across the area; the few specimens seen are from lowland meadows and roadside ditches; 5,400-7,500 ft; mid Aug.-Sept.

Aster integrifolius Nutt. Thickstem a. The several specimens seen are all from Wasatch Co.; tall forb, willow-streamside, and spruce-fir communities; 7,600-9,800 ft; late July-early Sept.

Aster occidentalis (Nutt.) T. & G. Western mt. a. (A. fremontii Gray) Occasional; widespread; mostly along streams or in meadows, sometimes in aspen and conifer woods; 7,500-10,400 ft; mid July-Aug. Our plants are referable to var. occidentalis. See A. foliaceus var. parryi.

Aster pansus (Blake) Cronq. Heath-leaved a., tufted white prairie a. [A. ericoides L. var. pansus (Blake) A. G. Jones; A. falcatus Lindl. misapplied] Three specimens seen, from near Manila, Vernal, and Neola; streamside woods, low meadow and roadside ditches; 5,400-5,700 ft; Sept.

Aster pauciflorus A. Nels. & Macbr. Fewhead a., alkali marsh a. (A. junciformis Rydb. misapplied) Occasional to locally common; across the Basin; moist alkaline lowlands, roadside ditches, and riparian communities; 5,100-7,000 ft; Aug.-early Oct.

Aster perelegans A. Nels. & Macbr. Nuttall a. The specimens seen are from Reservation Ridge on the W. Tavaputs Plateau and from Layout Canyon near Strawberry Valley and W. MacLeod 52A (DINO) from Round Top Mt.; mt. brush, Douglas-fir, and aspen communities; 7,400-9,000 ft; late July-Aug.

Bahia Lag. Bahia

Bahia dissecta (Gray) Britt. Ragleaf b. Annual herbs from a taproot, 25-100 cm tall; glandular in the inflorescence; leaves alternate, 2-3 times ternately divided into oblong or linear segments; involucre 5-7 mm high, the bracts in 2-3 series, the outer with 3 or more nerves; receptacles naked; rays 12-20, 7-9 mm long yellow; disc flowers yellow; pappus none. The records seen are from Eagle Creek, Dry Fork, and Whiterocks Canyons of the Uinta Mts. and from the head of Willow Creek, Tavaputs Plateau; 7,500-8,600 ft; Aug.-Sept.

Balsamorhiza Hook. ex Nutt. Balsamroot

Perennial herbs from thickened taproots; leaves large, all basal, or flowering stems with a few much reduced leaves near the base; heads large, mostly solitary; involucre bracts in 2-4 series; receptacles chaffy; ray and disc flowers yellow, pappus none.

- 1 Leaves pinnatifid, greenish, hispidulous..... B. hookeri
- 1 Leaves entire, densely white pubescent..... B. sagittata

Balsamorhiza hookeri Nutt. Hooker b. (B. hirsuta Nutt., misapplied) With 2 vars. in our area.

- 1 Involucres densely villose-tomentose dorsally..... var. neglecta
- 1 Involucres glandular to glabrous..... var. hispidula

Var. hispidula (Sharp) Cronq. (B. hispidula Sharp) The 4 specimens seen are from Clay Basin-Browns Park area and near Roosevelt; desert shrub, sagebrush and pinyon-juniper communities; 5,500-7,200 ft; May-June.

Var. neglecta (Sharp) Cronq. Common on the slopes and flanks of the Uinta Mts. and extending somewhat out into valleys and to Blue Mt.-Douglas Mt.; desert shrub, sagebrush, pinyon-juniper, and ponderosa pine communities; 5,500-8,600 ft; mid April-June. Occasionally hybridizing with B. sagittata.

Balsamorhiza sagittata (Pursh) Nutt. Arrowleaf b. Common in mountains, probably across the area; sagebrush, pinyon-juniper and mt. brush communities; about 7,000-9,000 ft; May-June.

Bidens L. Beggarticks

Plants annual sometimes appearing perennial, herbs; lower leaves opposite; involucre bracts in 2 definite series, the outer series often leaflike and exceeding the head, the inner series smaller; rays (when present) yellow; disc flowers yellow; pappus of 2-4 retrorsely barbed awns.

- 1 Leaves simple, serrate, rarely incised, sessile, sometimes connate; rays lacking or to 15 mm long; heads often nodding..... B. cernua
- 1 Leaves pinnately divided or compound, with 3-5 divisions or leaflets, petioled, the divisions or leaflets more or less petiolulate; rays lacking or to 4 mm long..... B. frondosa

Bidens cernua L. Nodding b. The 4 specimens seen are from the flood plains of the Green River and White River near Bonanza and wet alkaline meadow at Vernal; July-Sept.

Bidens frondosa L. Devils b. One specimen seen from a ditchbank in the town of Duchesne, a few others from the flood plain of the Green River; Aug.-Oct.

Brickellia Ell. Brickellbush

Perennial herbs or shrubs, often aromatic; leaves simple, alternate or some opposite; heads variously disposed; involucre bracts imbricate in series, striate (with longitudinal lines), more or less chartaceous; receptacles naked; rays lacking; disc flowers white, pale greenish, or pinkish white; pappus of capillary bristles, these scabrous to subplumose.

- 1 Petioles 1-7 cm long; leaf blades 2-10 cm long, deltoid-ovate or deltoid-lanceolate, alternate or the lower opposite; plants herbaceous or woody at the base, montane; heads usually nodding... B. grandiflora
- 1 Leaves sessile or petioles not over 3 mm long, alternate; plants sometimes woody above the base, of deserts and lower montane; heads not nodding
 - 2 Leaves linear to elliptic-lanceolate, entire; heads 10-14 mm high, with about 40-50 flowers; plants herbaceous except at the base..... B. oblongifolia
 - 2 Leaves ovate to oblong ovate, sometimes dentate; heads 7-9 mm high, with about 10-12 flowers; plants shrubs or subshrubs..... B. microphylla

Brickellia grandiflora (Hook.) Nutt. Tasselflower b. [Coleosanthus grandiflora (Hook.) Kuntze] Infrequent or very locally common; Uinta Mts. to Echo Park; rocky, conifer woods and talus slopes; 5,500-9,600 ft; July-Aug.

Brickellia microphylla (Nutt.) Gray Littleleaf b. [B. scabra (Gray) A. Nels.; B. watsonii Robins. misapplied] Occasional across much of the area; desert shrub, sagebrush, pinyon-juniper, and dry mt. brush communities, often in rocks or rocky places, sometimes on sandy soil; 5,000-7,100 ft; Aug.-mid Sept. Our plants are referable to var. scabra Gray. Variety watsonii (Robins.) Welsh from the Great Basin has larger involucre and more flowers per head than our var.

Brickellia oblongifolia Nutt. Mohave b. Occasional; widespread (no specimens seen from Daggett Co.); desert shrub, sagebrush, pinyon-juniper, and juniper-mt. brush communities; 4,800-6,700 ft; June-mid July.

Carduus L. Musk thistle; Bristlethistle

Carduus nutans L. Robust, annual or biennial, weedy forbs 80-150 cm tall; leaves alternate, decurrent, pinnately lobed or deeply dentate, the lobes or teeth spinose; heads large, solitary on the branches; involucre bracts strongly imbricate in series, strongly spreading or reflexed in age, with a prominent midrib, this excurrent as a spine; receptacles bristly; rays none; disc flowers deeply 5-cleft, purple or sometimes pale; pappus of scabrous bristles. Introduced from Europe, adventive and weedy across much of the area; roadsides, ditches, fields, rarely in indigenous plant communities; up to about 7,500 (8,000) ft; June-Aug.

Centaurea L. Knapweed

Annual or biennial or perennial herbs; leaves alternate; heads solitary to numerous toward the ends of branches, with disc flowers only; involucre bracts imbricate, with scarious erose to pectinate margins; receptacle bristly, the bristles capillary; flowers purple, blue or whitish (or yellow but not in our taxa); pappus of bristles.

- 1 Leaves pinnatifid into linear segments, these occasionally again toothed or lobed; plants biennials or short lived perennials from a taproot and branched caudex; pappus to 2 mm long, hidden in bristles of receptacle..... C. maculosa
- 1 Leaves simple, entire or serrate; plants perennial from robust, horizontal root stocks; pappus 6-11 mm long..... C. repens

Centaurea maculosa Lam. Spotted k. The specimens seen are from along Hwy. 44 about 11 airline mi n. of Vernal; 6,050 ft; July-Aug. Introduced from Europe, rapidly advancing along roadsides in Utah, to be expected to advance across our area.

Centaurea repens L. Russian k. (C. picris Pall.) Introduced from Eurasia; weedy, becoming noxious in fields and pastures, along ditches, streams and roadsides, moist lowlands, riparian communities, and disturbed ground; 4,700-7,800 ft; late June-Aug.

Chaenactis DC. Chaenactis; Dusty-maiden; False Yarrow

Annual, biennial, or perennial herbs from taproots; leaves alternate or mainly basal, pinnately dissected or entire; heads solitary to several in corymbose cymes, with disc flowers only; involucre bracts in 1-3 series; receptacle naked; flowers whitish or pinkish; pappus of 4-20 hyaline scales.

- 1 Plants annual or winter annual, lacking a basal rosette of leaves, of desert shrub and juniper communities; pappus of 4 scales..... C. stevioides
- 1 Plants biennial or perennial, with a well-developed basal rosette of leaves; distribution various; pappus of 10-16 scales
 - 2 Plants 2-9 cm tall, perennial from a simple or branching caudex, of high elevations on the Uinta Mtns; heads sessile in the leaves or on stems with short internodes..... C. alpina
 - 2 Plants 5-50 (60) cm tall, biennials or short-lived perennials from taproots, of many plant communities; stems with well-developed internodes..... C. douglasii

Chaenactis alpina (Gray) Jones Alpine d. Alpine on the Uinta Mts., the specimens seen are from Lake Fork and Uinta drainages; talus slopes and boulder fields; 11,200-11,600 ft; July-Aug.

Chaenactis douglasii (Hook.) H. & A. Douglas c. Common; widespread; many plant communities including desert shrub, sagebrush, rabbitbrush, pinyon-juniper, mt. brush, bullgrass, ponderosa pine, Douglas-fir, aspen, and occasionally meadow; 4,800-9,500 ft; late May-mid Aug. depending on elevation.

Chaenactis stevioides H. & A. Many specimens seen from e. Uintah Co. and adjacent Colorado, only from Duchesne Co.; desert shrub and sagebrush communities; 4,800-5,000 ft; mid May-mid July.

Chamaechaenactis Rydb.

Chamaechaenactis scaposa (Eastw.) Rydb. Perennial herbs 2-9 cm tall, from a pilose branching caudex, this clothed with old leaf bases, leaves all basal, simple, entire, oblanceolate to orbicular, the blades 4-18 mm long, 3-15 mm wide, pubescent; scapes long villous; heads solitary, with disc flowers only; involucre 7-17 mm high, the bracts about equal or the outer ones shorter, villous; receptacle naked; flowers whitish or pinkish; pappus of hyaline scales. Occasional across the Tavaputs Plateau and flank of the plateau; desert shrub, pygmy sage, juniper-mt. brush-greasebush, pinyon-juniper, and sagebrush-grass communities, often on whitish marl limestone; 5,200-7,900 ft; late April-June.

Chamomilla S. F. Gray Mayweed

Chamomilla suaveolens (Pursh) Rydb. Pineappleweed. [Matricaria matricarioides (Less.) Porter] Annual herbs, 4-40 cm tall, branched from the base or simple, glabrous or pubescent; leaves rather finely

ASTERACEAE

dissected, 1-5 (9) cm long; heads solitary to many, paniculate; involucre saucer shaped, 2-5 mm high; 4-10 mm wide, the bracts with hyaline margins; receptacle conical; rays lacking; disc corollas 4-lobed; pappus a very low crown. Introduced from Europe, the few specimens seen are from scattered stations in the Uinta Mts. and Strawberry Valley, weedy along roadsides and other disturbed places; 7,600-8,200 ft; June-Aug.

Chrysanthemum L.

Perennial herbs; leaves alternate; involucre bracts in 2-4 series with brownish-scarious margins; pappus lacking or a short crown; achene glabrous.

- 1 Leaves finely serrate; heads usually numerous, the involucre 6-8 mm wide; rays usually lacking; plants aromatic with mintlike or balsamlike odor, densely silvery-strigose..... C. balsamita
- 1 At least some of the leaves pinnately lobed; heads solitary, the involucre 15-23 mm wide; rays white, 10-22 mm long; plants not aromatic, glabrous or nearly so..... C. leucanthemum

Chrysanthemum balsamita L. Costmary, mint geranium. A native of sw. Asia, cultivated, persisting, escaping; not expected over 7,500 ft; Aug.-Sept.

Chrysanthemum leucanthemum L. Ox-eye daisy. Introduced from Eurasia, the 1 specimen seen (Neese 15114) is from a roadside near Hacking Lake, Uinta Mts. at 10,300 ft; Aug.

Chrysothamnus Nutt. Rabbitbrush

Shrubs or subshrubs; leaves alternate, sessile or nearly so, linear to filiform, entire, commonly resinous and aromatic; inflorescence usually a panicle or cyme, occasionally racemose; heads small, the involucre cylindrical, the bracts imbricated in more or less distinct vertical rows; receptacle naked; rays none; disc flowers 4-7 to a head, all bisexual, yellow. Nomenclature in the genus is confusing as several of the taxa have been recognized at the species, subspecies, and varietal levels by different authors. This has added considerable difficulty to this morphologically difficult group of plants.

- 1 Stems covered with a feltlike or pannose tomentum, the hairs sometimes matted in resin and not conspicuous
 - 2 Involucre bracts attenuate, rather membranous; inflorescence mostly racemose, leafy..... C. parryi
 - 2 Involucre bracts obtuse to acute, if attenuate then carinate and chartaceous; inflorescence mostly cymose, sparsely if at all leafy..... C. nauseosus
- 1 Stems glabrous or pubescent but not as above
 - 3 Achenes glabrous; involucre 9-12 mm high, the bracts strongly aligned in vertical rows; plants 10-30 cm tall; young twigs scabrous or cinereous..... C. depressus
 - 3 Achenes pubescent; involucre 4-8 mm high, the bracts variously aligned; young twigs glabrous or puberulent, greenish at first, but soon whitish and shining [Note: except for glabrous achenes, C. vaseyi (Gray) Greene will key here. This approaches our area near Soldier Summit, W. Tavaputs Plateau.]
 - 4 Involucre bracts acuminate-cuspidate; leaves 1-2 mm wide, 1 nerved; corollas 4-4.5 mm long; plants mostly 10-35 cm tall..... C. greenei
 - 4 Involucre bracts obtuse or acute; leaves 1-10 mm wide; corollas 4.5-7 mm long
 - 5 Leaves 4-8 mm wide, not twisted, mostly 3 nerved; plants 80-240 cm tall, mostly growing along waterways on bottomland, often in alkaline soil; style appendages long, 40-70 percent of the style branches; outer involucre bracts with a thick greenish or brownish spot near the apex.. C. linifolius
 - 5 Leaves 1-4 (6) mm wide, sometimes twisted; 1-3 (5) nerved; plants mostly 20-120 cm tall, not restricted as above and often of foothills and mountains; style appendages short, 30-45 percent of the style branches; involucre bracts not as above..... C. viscidiflorus

Chrysothamnus depressus Nutt. Infrequent, across the Uinta Basin; mostly within the pinyon-juniper zone; often on poor substrates; 6,500-7,900 ft; June-Sept.

Chrysothamnus greenei (Gray) Greene r. Rather common; Currant Creek to just e. of the Colorado-Utah line and s. along the lower edge of the Tavaputs Plateau; mostly in desert shrub communities; July-Sept.

Chrysothamnus linifolius Greene [C. viscidiflorus ssp. linifolius (Greene) H. & C.] Locally common to abundant across the bottom of the Uinta Basin and following the Green River and Yampa rivers into Daggett and Moffat Cos.; mostly along drainages and in moist bottomlands, often where alkaline; Aug.-Sept.

Chrysothamnus nauseosus (Pallas) Britt. Rubber r. A complex of highly variable plants; the following fairly distinct subspecific taxa have been recognized for the area.

- 1 Ovaries and achenes glabrous..... ssp. leiospermus
- 1 Ovaries and achenes pubescent
 - 2 Involucre glabrous, the outer bracts sometimes ciliate or scurfy; stems greenish; leaves lacking or soon deciduous, linear, greenish yellow..... ssp. psilocarpus

- 2 Involucre pubescent; stems often whitish; leaves persistent, narrowly oblanceolate
- 3 Involucres 9-11 mm long, the bracts strongly aligned in vertical rows, corolla lobes villous; plants about 40-80 cm tall, restricted to aeolian sand..... ssp. turbinatus
- 3 Involucres mostly less than 10 mm long, the bracts variously aligned; corolla lobes not villous; height and habitat various, plants sometimes on but not restricted to aeolian sand
- 4 Plants 10-30 (50) cm tall; leaves 5-20 mm long, rarely longer, usually strongly spreading away from the stem..... ssp. uintahensis
- 4 Plants commonly 60-300 cm tall; leaves often longer, usually not strongly spreading
- 5 Involucres puberulent to tomentose; leaves usually grayish-white
- 6 Leaves 3-10 mm wide, 4-8 cm long; involucral bracts mostly obtuse; plants restricted to the w. end of area..... ssp. salicifolius
- 6 Leaves 0.5-3 mm wide, 2.5-4 cm long; involucral bracts mostly acute; plants widespread
- 7 Corolla lobes 0.5-1 mm long; style appendages shorter than the stigmatic portions..... ssp. hololeucus
- 7 Corolla lobes 1-2 mm long; style appendages longer than the stigmatic portions
- 8 Corollas 6-8.5 mm long; involucres 7-9.5 mm tall; shrubs mostly 0.2-0.6 m tall; plants approaching our area from the n. and e..... ssp. nauseosus
- 8 Corollas (8) 9-11 mm long; involucres mostly 9-11 mm tall; plants mostly 0.4-1.5 m tall, apparently widespread in the area..... ssp. albicaulis
- 5 Involucres glabrous or the outer bracts ciliate or scurfy; leaves usually greenish-yellow
- 9 Leaves 1-3 mm wide, 4-6 cm long, mostly 3-5 nerved, mildly ill-scented..... ssp. graveolens
- 9 Leaves less than 1 mm wide, 2.5-5 cm long, 1 nerved, strongly ill-scented... ssp. consimilis

Ssp. albicaulis (Nutt.) H. & C. White rr. [C. n. var. albicaulis (Nutt.) Rydb; C. n. ssp. speciosus (Nutt.) H. & C.] Occasional to common; widespread; mostly along drainages, roadsides, and on canyon bottoms on deep alluvial soil; 6,000-8,000 ft; Aug.-Oct. Distinct from ssp. hololeucus to the n. of our area, but wholly intergrading into that taxon within our area.

Ssp. consimilis (Greene) H. & C. Threadleaf rr. [C. n. var. consimilis (Greene) Hall; C. n. ssp. pinifolius (Greene) H. & C.] Common to abundant; widespread; mostly along drainages and roadsides and in alkaline low lands; up to about 7,000 (9,000) ft; Aug.-Oct.

Ssp. graveolens (Nutt.) H. & C. Green rr. [C. n. var. bigelovii (Gray) Hall; C. n. var. graveolens (Nutt.) Piper; C. graveolens (Nutt.) Greene] Common to abundant; widespread; mostly along drainages and roadsides and in canyon bottoms on alluvial soil, usually not as tolerant of alkaline conditions as ssp. consimilis; up to about 7,500 (9,000) ft; Aug.-Oct.

Ssp. hololeucus (Gray) H. & C. [C. n. var. gnaphaloides (Greene) Hall] Occasional to common; widespread, mostly along drainages, roadsides, and canyon bottoms on deep alluvial soil; 6,000-8,000 ft; Aug.-Oct. More common than the intergrading ssp. albicaulis q.v.

Ssp. leiospermus (Gray) H. & C. [C. n. var. abbreviatus (Jones) Blake] The 1 specimen seen (Goodrich & Atwood 17983) is from 4 mi ne. of Dinosaur, Moffat Co.; Aug.-Oct.

Ssp. psilocarpus (Blake) L. C. Anderson (C. n. var. psilocarpus Blake) Infrequent; W. Tavaputs Plateau w. of Indian Canyon; sagebrush and bullgrass communities; 6,300-7,500 ft; Aug.-Sept.

Ssp. salicifolius (Rydb.) H. & C. Mountain rr. [C. n. var. salicifolius (Rydb.) Hall] Infrequent or locally common from Strawberry Valley e. to Lake Canyon of the W. Tavaputs Plateau and to Rock Creek of the Uinta Mts.; mostly in canyons above 7,600 ft; Aug.-Oct.

Ssp. turbinatus (Jones) H. & C. Sanddune rr. [C. n. var. turbinatus (Jones) Blake] Locally common to abundant from near Bluebell, Duchesne Co. to near the Utah-Colorado line (and probably further e.); on aeolian sand from Duchesne River, Navajo Sandstone, and probably other formations; mostly below 6,000 ft; Aug.-Oct.

Ssp. uintahensis L. C. Anderson Uinta rr. Endemic, locally common from Lapoint to Red Fleet Reservoir; on Duchesne River, Morrison, Dakota, and other formations of poor substrate; desert shrub communities, often on sandy-clay soil; mostly below 6,000 ft; Aug.-Oct.

Chrysothamnus parryi (Gray) Greene Parry r. A complex of variable plants. Three more or less distinct subspecific taxa have been recognized from the area. Two are keyed below and another is discussed later.

- 1 Upper leaves exceeding the inflorescence, usually gray tomentose; flowers 8-10 mm long, pale yellow; plants uncommon in the area..... ssp. howardii
- 1 Upper leaves shorter than the inflorescence, usually green; flowers 9-12 mm long, yellow; plants common ssp. attenuatus

Ssp. attenuatus (Jones) H. & C. [C. p. var. attenuatus (Jones) Kittell in Tidestr. & Kittell] Infrequent from Vernal to Myton, locally common to abundant from Myton (especially w. of Duchesne on Duchesne River formation) to Currant Creek; occasional at higher elevations (to about 9,000 ft) on the W. Tavaputs Plateau; July-Sept. The plants from the Myton to Currant Creek area are atypical. An unusual phase that is referable to C. p. ssp. affinis (A. Nels.) L. C. Anderson has been collected (E. Neese & L. England 6653) from tuffaceous outcrops in Browns Park area of Daggett Co. A specimen (E. Neese & L.

ASTERACEAE

England 6649) from Antelope Flat, Daggett Co., appears to be of hybrid origin involving C. nauseosus and perhaps C. p. ssp. attenuatus.

Ssp. howardii (Parry) H. & C. [C. p. var. howardii (Parry) Kittell in Tidestr. & Kittell] The single specimen seen (Brotherson 7660) is from Moenkopi formation at Split Mt. Gorge; July-Sept.

Chrysothamnus viscidiflorus (Hook.) Nutt. Low r., little r. A complex of variable plants; 2 fairly distinct subspecific taxa have been found in the area.

- 1 Leaves and upper stems puberulent; leaves often twisted..... ssp. lanceolatus
- 1 Leaves and upper stems glabrous or the leaves merely ciliate-puberulent, leaves not twisted..... ssp. viscidiflorus

Ssp. lanceolatus (Nutt.) Greene Mountain low r. [C. lanceolatus Nutt.; C. v. var. lanceolatus (Nutt.) Greene; C. v. ssp. elegans (Greene) H. & C.; C. v. var. elegans (Greene) Blake] Common to abundant across the area; many plant communities; 7,000-10,500 ft; July-Sept. Livestock use this plant quite heavily especially after flowering.

Ssp. viscidiflorus Stickyleaf low r. [C. stenophyllus (Gray) Gray; C. v. ssp. pumilis (Nutt.) H. & A.; C. v. ssp. stenophyllus (Gray) H. & C.; C. v. var. tortuifolia (Gray) Greene; C. v. var. viscidiflorus] Common to abundant; widespread; many plant communities; 6,000-7,000 ft; July-Sept. Small specimens (mostly less than 30 cm tall) with narrow leaves (1-1.5 mm wide) are referable to var. stenophyllus (Gray) L. C. Anderson. Taller plants (to 1 m tall) with wider leaves are referable to var. viscidiflorus.

Cichorium L. Chicory

Cichorium intybus L. Perennial from a deep taproot, 30-170 cm tall, glabrous or hirsute; lower leaves petiolate, 8-25 cm long, 1-7 cm wide, toothed or more often pinnatifid, upper leaves becoming reduced, sessile, entire, bractlike; heads sessile or short pedunculate, the branches of the inflorescence racemose; rays blue, rarely white, to 2 cm long; involucre 9-15 mm high; pappus of narrow, minute scales; achenes 2-3 mm long. Introduced from the Mediterranean Region, weedy; the 2 records seen are from a neglected field just s. of Roosevelt and a roadside at Neola.

Cirsium Mill Thistle

Biennial or perennial, spiny, coarse herbs; leaves basal and alternate; involucre bracts in several series, subequal to imbricate, usually spine tipped; receptacle densely bristly; rays none; disc flowers pink, purple, reddish, or whitish; pappus of plumose bristles, those of the outer flowers sometimes barbellate; achenes glabrous, flattened or 4-angled, with 4-many nerves. A complex and difficult genus. Harrington (1954) 30 years ago stated that it was badly in need of revision in North America. It remains badly in need of revision, but the recent work by Welsh (1983) for Utah has made it possible to separate most of our plants. The taxonomic concepts presented here are patterned after those of Welsh (1983).

- 1 Plants perennial from creeping robust rhizomes, often forming dense patches or large clones; heads unisexual, comparatively small, the involucre 1-2 (2.5) cm high..... C. arvense
- 1 Plants biennial or perennial, seldom obviously rhizomatus, not forming patches
 - 2 Leaves rough-hispid above; stems spreading-hirsute to cobweb-woolly, conspicuously winged along the internodes by the spiny, decurrent leaf bases; involucre bracts all spine-tipped; introduced biennial weed from Eurasia..... C. vulgare
 - 2 Leaves glabrous to woolly-villous but not rough-hispid above; stems glabrous to variously pubescent, the internodes not winged except in C. ownbeyi and sometimes C. pulchellum; involucre bracts various, but the inner ones often not spine-tipped
 - 3 Inner involucre bracts conspicuously dilated, erose but not lacerate, or tan to silver and contrasting with the outer bracts; heads generally sessile or nearly so in a terminal cluster, the cluster of heads closely subtended by a cluster of leaves; plants of meadows or other moist places, sometimes stemless and the heads sessile in the basal rosette of leaves, or with stems to 1 m tall, and succulent..... C. scariosum
 - 3 Inner involucre bracts not especially dilated nor colored as above; heads not sessile in a terminal cluster except in C. eatonii and C. scopulorum; plants of various habitats; stems well developed, not especially succulent
 - 4 Plants greenish, at least the upper surface of the leaves glabrous or only thinly pubescent, stems often glabrous or thinly pubescent; outer involucre bracts sometimes pinnate-spinose; heads sometimes rather congested, sometimes closely subtended by bractlike leaves of the same texture and vestiture as the lower involucre bracts
 - 5 Plants known from 5,500-6,200 ft in n. Uintah and Daggett Cos.; leaves finely divided and more or less tripinnatifid, the divisions about 1-2 (3) mm wide, green and glabrous on both sides or sparingly tomentose along the midrib beneath; stems winged along the internodes by spiny decurrent leaf bases; involucre bracts sparingly tomentose along the margins; heads not in a terminal cluster..... C. ownbeyi

- 5 Plants known from higher elevations; leaves once or twice pinnatifid, some of the divisions regularly over 2 mm wide, glabrous or pubescent beneath; stems not particularly winged; involucre bracts various; heads various
- 6 Plants rather common above 10,400 ft on the Uinta Mts.; leaves glabrous on both sides, or with villose hairs along the midrib, about 15-25 (35) mm wide, the sinuses 5-10 (15) mm deep; lower involucre bracts either densely long villose-ciliate or else strongly pinnate-spinose..... C. eatonii
- 6 Plants of the E. Tavaputs Plateau, seldom collected; leaves usually at least thinly tomentose beneath, some usually over 30 mm wide, the larger sinuses 15-25 mm deep or deeper; involucre bracts various
 - 7 Involucre bracts ciliate with long yellow or brownish multicellular hairs; spines of bracts 6-15 mm long or more..... C. scopulorum
 - 7 Involucre bracts more or less ciliate with whitish hairs; spines of bracts mainly 3-7 mm long..... C. clavatum
- 4 Plants white or gray; leaves and stems; densely pubescent; involucre bracts not pinnate-spinose; heads usually not much congested, sometimes solitary on the ends of branches, often not closely subtended by bractlike leaves, or if so then the bractlike leaves usually of different texture and vestiture than the involucre bracts
 - 8 Involucres 15-20 mm high, 15-25 mm wide; stems and leaves usually densely white pubescent; plants endemic to white-shale hills at the flank of the E. Tavaputs Plateau..... C. barnebyi
 - 8 Involucres 19-34 mm high, some over 20 mm high in nearly all specimens, 15-45 mm wide, plants gray-white pubescent, but sometimes not so densely as above, widespread
 - 9 Heads often turbinate to subcylindric, the involucre 15-45 mm wide, the bracts seldom with a thickened glutinous, dorsal ridge, at least the inner ones narrowly wedge-shaped, minutely scabrous, often suffused with bright red or light purple toward the tips..... C. calcareum
 - 9 Heads campanulate, sometimes cordate in outline at the base, the involucre 20-60 mm wide, the bracts often with a thickened, glutinous, dorsal ridge, the inner ones various but not particularly narrowly wedge-shaped, not scabrous, usually brownish or grayish, dark brown or dark red upon drying..... C. undulatum

Cirsium arvense (L.) Scop. Canada t. Introduced from Eurasia; weedy, and sometimes a serious weed in agricultural areas, forming patches or clones, ditchbanks, neglected pastures and fields, and disturbed riparian communities; 4,700-7,500 ft, and introduced (in contaminated hay) at recreation, logging, and livestock camps in mountains to 10,000 ft; July-Aug.

Cirsium barnebyi Welsh & Neese in Welsh Barneby t. Endemic, locally common to abundant, lower edge of the E. Tavaputs Plateau; nearly barren, white, shale or marl limestone hills and slopes; 5,000-6,000 ft. The specimens seen are all from near the old mining towns of Rainbow and Watson; mid May-early Aug. Grading into C. calcareum.

Cirsium calcareum (Jones) Woot. & Standl. [C. pulchellum (Greene) Woot. & Standl.] Occasional across the Tavaputs Plateau and Uinta Mts.; rubber rabbitbrush-Great Basin wildrye, bullgrass, sagebrush, mt. brush, ponderosa pine, and Douglas-fir communities; 6,700-9,000 ft; mid July-Aug.

Cirsium clavatum (Jones) Petrak. Fish Lake t. One specimen seen (S. Clark & K. Thorne 3063), from the head of Willow Creek, E. Tavaputs Plateau from an aspen-meadow community; 8,600 ft; Aug.

Cirsium eatonii (Gray) Robins. Eaton t. [C. polyphyllum Rydb. misapplied] With 2 rather sharply marked vars.

- 1 Involucre bracts copiously villous with long (3-4 mm) multicellular hairs, not particularly pinnate-spinose; corollas ochroleucous; heads more or less sessile in a compact terminal cluster, the cluster often closely subtended by leaves..... var. murdockii
- 1 Involucre bracts merely white-tomentose or rarely with short multicellular hairs, at least the outer ones copiously pinnate-spinose; corollas mainly pink or rose; heads sessile and clustered as above or a few distinctly peduncled..... var. eatonii

Var. eatonii Specimens seen are all from w. of Rock Creek in the Uinta Mts.; rocky ground and slopes at and above the upper edge of spruce woodlands; 10,600-11,000 ft; July-Aug.

Var. murdockii Welsh Specimens seen are from e. of Rock Creek in the Uinta Mts.; lodgepole pine and spruce forests, lake margins, krummholz, and rocky ground near and above timberline; 9,800-11,400 (12,000) ft; July-Aug.

Cirsium ownbeyi Welsh Endemic, seldom collected; Daggett and n. Uintah Cos.; juniper, sagebrush, and riparian communities; 5,500-6,200 ft; July.

Cirsium scariosum Nutt. Elk t., Meadow t. [C. coloradoense (Rydb.) Cockerell misapplied or perhaps a synonym; C. drummondii T. & G. misapplied; C. d. var. acaulescens (Gray) Macbr.; C. foliosum T. & G. misapplied] Common; widespread; moist and dry meadows, and occasionally in aspen, conifer, and sagebrush communities but then usually adjacent to meadows. The tall phase is more common from 7,600-8,900 ft; June-Aug. The stemless phase is perhaps more common to 10,000 ft or perhaps higher. Both phases occur together in many populations over the entire range of the species.

ASTERACEAE

Cirsium scopulorum (Greene) Cockerell in Daniels. Two specimens (E. Neese & B. Welsh 8006; England 432) appear to be close to C. scopulorum, but have rather large heads, these from the Tavaputs Plateau from big sagebrush-snowberry communities at 7,000-7,700 ft; July.

Cirsium undulatum (Nutt.) Spreng. Gray t. Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, bullgrass, ponderosa pine, Douglas-fir, and disturbed riparian communities; 4,900-8,800 ft; June-July. Graham 6250, 9087, and 9180 (CM!), referred to C. megacephalum (Gray) Ckll. (Graham 1937), belong here.

Cirsium vulgare (Savi) Ten. Bull t. (C. lanceolatum Hill misapplied) Introduced from Eurasia; weedy, in many plant communities, and on agricultural lands, often on disturbed ground; up to about 8,000 ft; July-Aug.

Conyza Less. Horseweed

Conyza canadensis (L.) Cronq. Canadian h. (Erigeron canadensis L.) Annual herbs from taproots, 40-100 cm tall; stems usually much branched; leaves alternate, simple, 2-10 cm long, 2-8 mm wide, linear to oblanceolate, entire or ciliate-serrate, often deciduous by late anthesis; heads numerous, in panicles, small, the involucre 2-4 mm high, 3-7 mm wide, the bracts more or less imbricate, the receptacle naked; rays numerous, inconspicuous, shorter than the pappus, white or purplish; disc flowers yellowish; pappus of capillary bristles. Scattered across much of the area; canyons and along water courses; 5,400-7,500 ft; July-Aug.

Crepis L. Hawksbeard

Perennial herbs with milky juice; leaves basal or alternate; heads few to numerous in corymbose or paniculate clusters; involucre bracts in 1 or 2 series, the outer ones much reduced; receptacle naked; rays yellow; disc flowers none; pappus of capillary bristles.

- 1 Leaves and stems glabrous or hispid; leaves entire to pinnatifid, mostly basal; plants mostly of meadows C. runcinata
- 1 Leaves and stems more or less tomentose at least in part; leaves pinnatifid, some cauline; plants mostly not of meadows
 - 2 Involucres glabrous or nearly so, the outer bracts sometimes with some pubescence, narrowly cylindric, with only 5-7 (8) inner bracts; heads (5) 20-100 per stem, each with 5-10 flowers..... C. acuminata
 - 2 Involucres tomentose and sometimes hispid, narrowly to broadly campanulate, with 7-15 inner bracts; heads 2-30 (60) per stem, each with 7-60 flowers
 - 3 Leaf segments linear to narrowly lanceolate, entire or nearly so, the terminal lobe more than 5 cm long; achenes usually green..... C. atrabarba
 - 3 Leaf segments narrowly lanceolate to deltoid, some usually toothed, the terminal lobe less than 5 cm long; achenes usually yellowish or brownish
 - 4 Involucres more than twice longer than wide, with 7-8 (12) inner bracts; flowers generally 7-12 (16) in each head; heads usually 10-60 per stem..... C. intermedia
 - 4 Involucres less than twice longer than wide, with 8-14 inner bracts; flowers generally 10-40 in each head, heads usually 2-30 (40) per stem
 - 5 Involucre and/or stems conspicuously setose, the seta not glandular..... C. modocensis
 - 5 Involucre and stems not or sparingly setose, if setose then the seta gland-tipped..... C. occidentalis

Crepis acuminata Nutt. Tapertip h. Occasional to common; widespread; sagebrush, rabbitbrush, bullgrass, mt. brush, aspen, Douglas-fir, and ponderosa pine communities; 7,600-9,400 ft; June-July.

Crepis atrabarba Heller Slender h. The 3 specimens seen are from Daggett Co. and Little Brush Creek Knob, Uintah Co.; forb-grass, sagebrush, and ponderosa pine communities; 7,500-9,300 ft; June.

Crepis intermedia Gray Gray h. One specimen seen (L. Greenwood sn), from a sagebrush community near Twin Pots Reservoir, Duchesne Co.; 7,600 ft; June. This taxon represents a series of intermediate hybrids involving C. acuminata and the last 2 taxa of the above key.

Crepis modocensis Greene Modoc h. (C. scopulorum Cov.) Rather uncommon; widespread (no specimens seen from w. of Uintah Co.); sagebrush-grass and pinyon-juniper communities; 6,000-7,200 ft; late May-June

Crepis occidentalis Nutt. Western h. Occasional across the area; sagebrush, pinyon-juniper, desert shrub, and rabbitbrush communities; 5,100-8,000 ft; late May-mid July.

Crepis runcinata (James) T. & G. Dandelion h. With 2 vars. in our area.

- 1 Involucres hispid with black hairs..... var. hispidulosa
- 1 Involucres glabrous or merely puberulent..... var. glauca

Var. glauca (Nutt.) Welsh (C. glauca Nutt.) Occasional to common; widespread; seeps, meadows, pastures, along ditches, and other waterways, often in alkaline places; 5,300-7,000 ft; June.

Var. hispidulosa Howell ex Rydb. Occasional; widespread in the Uinta Mts. and adjacent to these mts. and Strawberry Valley; nonalkaline, moist, wet, or boggy meadows, and riparian communities; 6,400-8,700 ft; July-Aug. Some specimens from our area have been placed mistakenly in the genus Hieracium.

Dyssodia Cav.

Dyssodia papposa (Vent.) A. S. Hitchc. Plants annual, 15-40 cm tall, glabrous or sparingly puberulent; lower leaves opposite, the upper ones alternate, pinnatifid into 11-15 lobes, these sometimes again lobed; involucre bracts 6-12, 6-10 mm long, oblanceolate, with yellowish oil glands; rays 8 or fewer, yellow-orange; disc flowers dull yellow; pappus of about 20 scales, each dissected into 5-10 bristles; achenes 8-35 mm long. The 1 specimen seen (Goodrich 17816) is from a vegetable garden near Neola.

Enceliopsis (Gray) A. Nels. Enceliopsis

Perennial herbs; leaves all basal, the blades spatulate, lanceolate, oblanceolate, ovate or orbicular; heads solitary; involucre bracts in 2-3 series; receptacle chaffy, the scales clasping the achenes; flowers yellow; pappus of 2 awns, with or without small scales between them, or none.

- 1 Heads with disc flowers only, often nodding; herbage pilose-hirsutulous; plants from tuberous roots.... E. nutans
- 1 Heads with ray and disc flowers; herbage more or less tomentose; plants from caudices..... E. nudicaulis

Enceliopsis nudicaulis (Gray) A. Nels. The several specimens seen are all from e. Uintah Co.; desert shrub and juniper communities; 4,800-6,500 ft; May-mid June. Graham's (1937) listing of E. argophylla (D.C. Eaton) A. Nels. is certainly based on a specimen of E. nudicaulis.

Enceliopsis nutans (Eastw.) A. Nels. Several specimens seen from Uintah Co. and one from Duchesne Co.; desert shrub and juniper communities; 4,700-5,700 ft; late April-mid June.

Erigeron L. Fleabane; Daisy

Annual or perennial herbs; leaves alternate, rarely all basal; heads solitary to several; involucre bracts narrow, often equal, in a single series, but sometimes imbricate, mostly herbaceous throughout; receptacles naked; rays white, pinkish, bluish, or purple, mostly numerous, sometimes lacking; disc flowers yellow; pappus of capillary bristles.

- 1 Lower leaves deeply palmately lobed or divided into linear segments; upper stem leaves much reduced, entire or lacking; heads 1 per stem, with or without rays..... E. compositus
- 1 Leaves entire to toothed or shallowly lobed; heads 1 or more per stem
 - 2 Rays lacking or inconspicuous, not over 5 mm long, mostly erect; plants biennial or short-lived perennials
 - 3 Involucre bracts more or less imbricate, the inner ones usually long attenuate, often glandular; cauline leaves narrowly lanceolate to broader, rarely linear; plants known from Lake Fork and Uinta drainages of the Uinta Mts..... E. acris
 - 3 Involucre bracts mostly in a single series, not glandular; cauline leaves more or less linear; plants widespread..... E. lonchophyllus
 - 2 Rays conspicuous, spreading, usually over 5 mm long
 - 4 Rays 2-4 mm wide; achenes 4-7 nerved; plants keyed both ways
 - 5 Plants silvery pubescent; rays mostly blue or purple; involucre bracts imbricate in 3-5 series, villous with multicellular hairs; leaves linear or narrowly oblanceolate, tufted basally; plants Xylorhiza-like, with well-developed woody caudices, of dry ground at low elevations..... E. pulcherrimus
 - 5 Plants not silvery pubescent; involucre bracts mostly in a single series, glandular, the glands often purple; leaves broader than linear, basal tuft lacking; plants similar to (and also keyed with) those of KEY 1, of moist sites in mountains..... E. peregrinus
 - 4 Rays less than 2 mm wide, or rarely to 2.5 mm wide in some of KEY 1; achenes 2- or rarely 3-nerved
 - 6 Stem leaves well developed, only slightly reduced in size and number upward on the stems, not linear, the basal ones often withering at flowering time; plants asterlike, often over 30 cm tall, from short or long rhizomes and fibrous roots, of dry to moist sites in mountains, heads often more than 1 per stem..... KEY 1
 - 6 Stem leaves often much reduced in size and number upward on the stem or lacking, often linear or narrowly oblong, the basal ones often persisting and functional after flowering time; plants seldom over 30 cm tall except in E. divergens and E. glabellus, of moist or dry sites; heads often only 1 per stem except in E. divergens and E. glabellus..... KEY 2

KEY 1

- 1 Rays 2-4 mm wide; achenes 4-7 nerved..... E. peregrinus
- 1 Rays 1-2 mm wide; achenes 1-4 nerved
 - 2 Hairs of the involucre with black crosswalls near the base; rays white; pappus not double or inconspicuously so; plants known from Uinta Mts. nw. of our area; reported for the area but no records seen..... E. coulteri Porter
 - 2 Hairs of the involucre not as above; rays white, pink, or blue
 - 3 Stem leaves glabrous, mostly shorter than the internodes..... E. superbus
 - 3 Stem leaves ciliate or otherwise pubescent, usually longer than the internodes..... E. speciosus

KEY 2

- 1 Stems arising from a simple or slender-branched caudex with fibrous roots or from rhizomes, taproot lacking or poorly developed; plants perennial, often growing in meadows or in mts.
 - 2 Plants 5-25 cm tall; stems often purple and decumbent at the base; rhizomes usually well developed; involucre glandular and hirsute..... E. ursinus
 - 2 Plants 10-70 cm tall; stems not purple at the base, erect or curved, from a caudex with fibrous roots; rhizomes usually not well developed
 - 3 Involucre not glandular; stems not glandular, usually erect at the base..... E. glabellus
 - 3 Involucre glandular; stems usually glandular, curved at the base; plants reported for the area...
..... E. formosissimus
- 1 Plants from taproots or much branched caudices with few if any fibrous roots, without rhizomes, often of dry places
 - 4 Rays 2-4 mm wide; achenes (2) 3-5 nerved; plants silvery pubescent; Xylorhiza-like with imbricate involucre bracts and well-developed woody caudices, mostly from below 6,500 ft..... E. pulcherrimus
 - 4 Rays less than 2 mm wide; achenes mostly not over 2 nerved; plants otherwise different from above in one or more features
 - 5 Stems slender, rather flexuous, at least some usually trailing along the ground with leaves oriented to one side (upward); flowering stems more upright, usually with fewer leaves than the trailing stems, supporting a single head; plants annual or biennial from slender taproots.....
..... E. flagellaris
 - 5 Stems slender to rigid but not trailing; plants biennial or perennial
 - 6 Pubescence of stems widely spreading
 - 7 Basal leaves with the midnerve and usually 2 lateral nerves prominent; leaves canescent throughout with gray-white, dense, short hairs..... E. caespitosus
 - 7 Basal leaves with only the midnerve prominent; leaves hirsute or villous with widely spreading, harsh or soft hairs
 - 8 Plants widespread from 4,700-7,900 (8,800) ft, from taproots or small caudices; involucre not villous
 - 9 Rays exceeding the involucre and disc flowers by 7-12 mm, white to blue; caudex with few to several branches, often with a noticeable thatch of fibrous old leaf bases....
..... E. pumilus
 - 9 Rays exceeding the involucre and disc flowers by about 5-7 mm; plants from taproots or simple to sparingly short-branched caudices, without much buildup of old, persistent leaf bases
 - 10 Rays blue, rarely white; stems and leaves with widely spreading hairs; plants annual or biennial from simple taproots; a few of the lower leaves sometimes lobed
..... E. divergens
 - 10 Rays mostly white, rarely bluish; pubescence of stems mostly ascending- spreading; pubescence of petioles and lower part of leaves widely spreading, that of the upper part of leaves appressed or spreading-ascending; plants perennial from taproots or short-branched caudices; none of the leaves lobed (see also lead 15)
..... E. engelmannii
 - 8 Plants known from above 8,500 ft in the Uinta Mts., with well-developed caudices or with densely villous involucre
 - 11 Involucre densely villous or woolly-villous with long, often crinkled hairs; leaves villous or villous-ciliate; plants mostly from simple, rather small taproots, these sometimes with fibrous roots..... E. simplex
 - 11 Involucre with short spreading hairs but not densely villous; leaves with spreading or ascending hairs but hardly villous, not villous-ciliate; plants from branched caudices, the caudices seldom bearing fibrous roots
 - 12 Leaves mostly basal, linear or linear-spatulate, those of the stem if present 1-3 and borne on the lower 1/2 of the stem; the spreading hairs of the stem (0.25) 0.5-0.75 mm long; plants known from Phil Pico Mt., Daggett Co..... E. nanus

- 12 Leaves not all basal or rarely so in small specimens, spatulate or oblong, those of the stem merely reduced, not bractlike, often more than 3, and some often borne above midlength of the stem; spreading hairs of the stem to 0.25 mm long; plants known from near or above timberline on the Uinta Mts..... E. goodrichii
- 6 Pubescence of stems mostly appressed or ascending-spreading
- 13 Plants from taproots or simple to sparingly short-branched caudices; stems often leafy; largest leaves often over 3 cm long
 - 14 Base of leaves with widely spreading hairs, the blades with 0-1 conspicuous nerves; plants not purplish, often without a conspicuous tuft of enlarged basal leaves; leaves of the stem often about as long or longer than those of the base; rays white..... E. engelmannii
 - 14 Leaves without widely spreading hairs, the blades with 1-3 conspicuous nerves; plants often purplish at the base, usually with a few enlarged basal leaves; stems decumbent-ascending, sometimes with much reduced leaves above; rays white to blue..... E. eatonii
- 13 Plants from multibranching caudices, somewhat pulvinate caespitose; leaves 0.5-3 cm long, mostly basal or on the lower 1/2 of the stem, or if higher on the stem then mostly bractlike
 - 15 Plants from above 9,000 ft in the Uinta Mts., glabrous or thinly strigose; leaves oblanceolate to spatulate or obovate, the petioles often enlarged and purplish; involucre often dark purple E. leiomerus
 - 15 Plants from below 9,000 ft, strigose to pilosulose; leaves linear to oblanceolate, the petioles various; involucre not dark purple
 - 16 Leaves linear or nearly so; involucral bracts rather uniformly linear, the inner ones about 1 mm wide
 - 17 Involucre about 8-10 mm wide; leaves greenish, sparsely pubescent; persistent leaf bases relatively long, slender, and fibrous; pappus simple or nearly so..... E. nematophyllus
 - 17 Involucre 12-15 mm wide; leaves gray-white, moderately to densely pubescent with spreading multicellular hairs; persistent leaf bases rather short, broad, and chaffy, or inconspicuous; pappus evidently double, the outer set of long slender seta..... E. compactus
 - 16 Leaves narrowly but conspicuously oblanceolate; involucral bracts not so uniformly linear, sometimes with rather broad hyaline margins, sometimes purplish, the inner ones 1-1.5 mm wide..... E. untermannii

Erigeron acris L. Bitter f. The 8 records seen are all from the Uinta and Lake Fork drainages of the Uinta Mts.; spruce-fir-lodgepole pine communities and at timberline, usually on sandy-rocky ground; 8,100-11,400 ft; June-July. Our plants are referable to var. debilis Gray.

Erigeron caespitosus Nutt. Tufted f. Common; Uinta Mts., and perhaps elsewhere in the area; sagebrush, dry aspen, and alpine communities, often on rocky, dry ground; 8,600-13,000 ft; June-July.

Erigeron compactus Blake Three specimens seen, from near Myton, Duchesne Co., and Jesse Ewing Canyon, Daggett Co. and Peterson & Wiley-Eberly 83-79 CS Vermillion Creek and Peterson & Wilken 83-289 from near summit of Lookout Mt. reported for Moffat Co.; desert shrub community and soft, white, tuffaceous, eroding mounds; 5,300-6,700 ft; May-June. Our plants are referable to var. consimilis (Cronq.) Blake.

Erigeron compositus Pursh Fernleaf f. Common; Uinta Mts., Strawberry Valley, and Kleins Hill near the Three Corners area; sagebrush, conifer, and alpine communities, usually on rocky ground; 7,800-13,000 ft; June-July.

Erigeron divergens T. & G. Spreading f. Occasional; widespread; numerous plant communities including desert shrub, sagebrush, aspen, and conifer, also on disturbed ground of riparian communities; 4,950-8,800 ft; June-July (Sept. with sufficient fall moisture).

Erigeron eatonii Gray Eaton f. Common; widespread; numerous plant communities including sagebrush, pinyon-juniper, mt. brush, lodgepole pine, Engelmann spruce, and alpine; (5,500) 7,100-11,000 ft; June-Aug. High elevation plants often have narrow leaves with only 1 instead of the 3 conspicuous nerves that are common in lower elevation plants.

Erigeron engelmannii A. Nels. Engelmann f. Occasional; widespread; desert-shrub, pinyon-juniper, and sagebrush communities; 5,000-7,200 ft; May-June. Erigeron ochroleucus Nutt. which has been reported for our area (Wilken 13058), will key here. This is a plant of the Plains from w. of the Continental Divide (Cronquist 1947). More work is indicated.

Erigeron flagellaris Gray Trailing f. Common; widespread; sagebrush, pinyon-juniper, mt. brush, aspen conifer, meadow and streamside-willow communities; 7,000-9,600 ft; late May-July.

Erigeron formosissimus Greene (E. viscidus Rydb.) Reported for Diamond Mt. and questionably from near Moon Lake (Graham 1937). Possibly confused with E. speciosus.

Erigeron glabellus Nutt. Smooth f. Rather uncommon; Strawberry Valley and canyons and mouths of canyons of the s. slope of the Uinta Mts. and pasture-meadowland at the n. part of the Basin; 5,400-7,900 ft; June.

Erigeron goodrichii Welsh Occasional or locally common mostly at or above timberline on the Uinta Mts.; July-Aug. Perhaps only a narrow-leaved var. of E. caespitosus.

Erigeron leiomerus Gray Yellow f., rockslide f., glaber d. Occasional, Uinta Mts.; conifer woods, rocky slopes, talus, fell fields, and alpine tundra; 9,200-12,000 ft; mid July-Aug.

ASTERACEAE

Erigeron lonchophyllus Hook. Spearleaf f. Widespread but seldom collected; riparian communities, wet ground of seeps, wet meadows, swamps, and bogs; 5,200-7,200 (9,300) ft; mid June-July.

Erigeron nanus Nutt. Dwarf f. The only record seen (Atwood & Goodrich 9078) is from Phil Pico Mt., Daggett Co.; open ridges and forb-grass community at 9,350 ft; July.

Erigeron nematophyllus Rydb. Infrequent; Cross Mt., Three Corners area, Goslin Mt. to Round Top Mt. also Tavaputs Plateau from Atachee Ridge to Nutters Ridge, no specimens seen from the Uinta Mts.; pinyon-juniper and mt. brush communities, mostly on rocky ground or soil of poor substrate; (5,800) 7,200-9,400 ft; May-June. Cottam 14552 BRY!, apparently the basis for the report of E. filifolius for Daggett Co. (Welsh 1983), probably belongs here.

Erigeron peregrinus (Pursh) Greene Peregrine f., subalpine f. [E. salsuginosus (Richards.) Gray] Common; Uinta Mts.; streamside meadows in aspen and conifer woods, moist woods, and occasionally in rocky places near or above timberline; 7,500-11,600 ft; late June-Sept. Our plants are referable to ssp. callianthemus (Greene) Cronq.

Erigeron pulcherrimus Heller Basin f. Common across the Basin; desert shrub, and pinyon-juniper communities, often on rocky ground or formations that weather to badlands; 4,900-6,500 ft; late May-June. Reports of E. argentatus Gray (Graham 1937) and E. utahensis Gray (Holmgren 1962) are based on specimens of E. pulcherrimus.

Erigeron pumilus Nutt. Low f. [E. concinnus (H. & A.) T. & G.] Common; widespread; desert shrub, sagebrush, and pinyon-juniper communities, often on stony hills and ridges and gravel or cobble terraces and benches; 4,700-7,900 ft; late April-June. Generally our plants are referable to ssp. concinoides Cronq. Some plants have been referred to ssp. intermedius Cronq. Macleod 8A DINO, apparently the basis of reports of E. vetensis Rydb., belongs here.

Erigeron simplex Greene Oneflower f. Common; Uinta Mts.; alpine tundra, fell fields, rockstrips, talus, and upper Engelmann spruce communities; 10,600-13,000 ft; July-Aug. The closely related E. melanocephalus Rydb. might be expected on the Uinta Mts., but of the numerous specimens seen, none had consistently dark crosswalls on hairs of the involucre. The crosswalls are white or sometimes a few are light reddish or light purplish or rarely dark, but no specimen showed the consistent dark purple crosswalls as in specimens of E. melanocephalus from the LaSal Mts. of se. Utah or from high mts. of Colorado.

Erigeron speciosus (Lindl.) D.C. Oregon f, showy f. With 4 freely intergrading and often sympatric vars. in our area.

- 1 Leaves ciliate, glabrous on the surface..... var. speciosus
- 1 Leaves glandular or pubescent on one or both sides
 - 2 Involucral bracts merely glandular, rarely also somewhat spreading-hairy; upper leaves often ovate.. var. macranthus
 - 2 Involucral bracts glandular and commonly also spreading-hairy; upper leaves lance-attenuate
 - 3 Leaves and usually the stems with spreading hairs but not glandular or the upper few leaves slightly glandular; involucre spreading hairy and more or less glandular..... var. mollis
 - 3 Leaves and stems glandular or glandular-scabrous, sometimes also sparsely long-hairy..... var. uintahensis

Var. macranthus (Nutt.) Cronq. (E. macranthus Nutt.) Common; Tavaputs Plateau, mostly e. of the Avintaquin drainage; sagebrush, mt. brush, aspen, and Douglas-fir communities; 8,200-10,050 ft; July-Aug.

Var. mollis (Gray) Welsh (E. subtrinervis Rydb.) Occasional to common; Strawberry Valley, e. to Rock Creek in the Uinta Mts., and E. Tavaputs Plateau; open slopes and openings in conifer woods, and dry meadows; 7,200-10,000 ft; July-Aug.

Var. speciosus Occasional; Tavaputs Plateau, w. to Rock Creek in the Uinta Mts., apparently replaced by var. uintahensis to the e. in the Uinta Mts.; sagebrush, mt. brush, aspen, spruce, fir, riparian, and meadow communities; 7,500-10,000 ft; July-Aug.

Var. uintahensis (Cronq.) Welsh (E. uintahensis Cronq.) Occasional; Strawberry Valley and Uinta Mts.; sagebrush, aspen, ponderosa pine, lodgepole pine, and riparian communities; 7,300-9,000 ft; July-Aug.

Erigeron superbus Greene ex. Rydb. Occasional; Uinta Mts.; aspen, conifer, streamside, and meadow communities; 7,400-9,800 ft; July-Aug.

Erigeron ursinus D.C. Eaton. Bear River f. Common; Uinta Mts., W. Fork Duchesne drainage, and on Strawberry Peak of the W. Tavaputs Plateau; dry meadows especially at the edge of conifer woods, streamside meadows, open ridgetops, sometimes aspen and conifer woods, rarely in sagebrush communities and then usually near meadows; (7,500) 8,500-11,000 ft; June-Aug.

Erigeron untermannii Welsh & Goodrich Endemic, rare; head of Indian Canyon, W. Tavaputs Plateau; pinyon-juniper communities, usually on soil of poor substrate; 7,000-7,600 ft; May-June. One disjunct specimen (Goodrich 5652) from a dry ridge near Whiterocks Canyon appears to belong to this taxon.

Eupatorium L. Joe-Pye-weed

Eupatorium maculatum L. Spotted j. Perennial herbs 50-150 cm tall, more or less purple-spotted; leaves opposite or at least the lower ones usually whorled, short-petioled or nearly sessile, simple, serrate or crenate serrate; inflorescence flat-topped; involucre about 7-9 mm high, the bracts in 4 or 5 series,

striate and pinkish; receptacle naked; rays none; disc flowers purple, pink, or rose; pappus of capillary, scabrous bristles. The 3 specimens seen are from ditchbanks and riparian communities near the towns of Tridell and Whiterocks; 5,500-6,000 ft; Aug.-early Oct.

Gaillardia Fouq. Blanket flower; Gaillardia

Perennial herbs; leaves alternate; heads solitary on stem or branches; involucre bracts in 2-3 series, ovate or lanceolate, strongly reflexed in fruit; receptacles with subulate or setiform fimbriae; rays yellow to reddish-purple; pappus of lanceolate paleae, the paleae awned, the awn twice as long as the body.

- 1 Disk flowers dark purple; leaves entire, to toothed or pinnately lobed, rarely parted; rays yellow or reddish-purple at the base..... G. aristata
- 1 Disk flowers yellow; leaves pinnatifid; rays yellow..... G. flava

Gaillardia aristata Pursh Common perennial b. Uncommon to occasional; e. Uinta Mts., from Dry Fork and Carter Creek and e. to Blue Mt.; sagebrush, ponderosa pine, aspen, and lodgepole pine communities; 7,000-9,400 ft; June-Sept. Flowers and others 195 (UT!), reported as G. gracilis A. Nels. (G. pinnatifida Torr.) (Flowers and others 1960) for Hideout Canyon (area now inundated by Flaming Gorge Reservoir) belongs here.

Gaillardia flava Rydb. Entering our area in Desolation Canyon.

Glyptopleura D.C. Eaton

Glyptopleura marginata D.C. Eaton. Depressed winter-annual forbs, seldom over 3 cm tall, with milky juice; leaves in a compact rosette, pinnatifid, the margins toothed, white-crustaceous and scarios, 2-5 cm long; heads sessile in the rosette or short peduncled; involucre about 10-12 mm high, the bracts in 2 series, the inner scarios-margined, the outer crustaceous-margined and pinnatifid above and lacerate-fringed near the base; receptacle naked, rays inconspicuous, hardly if at all exceeding the involucre; disc flowers none; pappus of capillary bristles. A single record seen (Neese 4422) from the mouth of Pariette Draw on gravel benches above the Green River; 4,700 ft; May-June.

Gnaphalium L. Cudweed

Annual or biennial herbs from taproots, more or less woolly throughout; leaves alternate, simple, narrow, entire; heads in glomerals terminating the stems and branches; involucre bracts imbricate in several series, scarios; receptacles naked, usually pitted; rays none; disc flowers inconspicuous; pappus of capillary bristles.

- 1 Stems (10) 20-70 cm tall, rarely much branched; heads inconspicuously bracteate, in dense glomerules, the inflorescence 2-3 cm or more across; involucre 4-7 mm high, white or yellowish in age
- 2 Stems and both surfaces of leaves woolly throughout, not viscid; inflorescence mostly a single cluster of heads, the branches not over 2 cm long; involucre bracts rounded..... G. chilense
- 2 Stems and upper surface of leaves strongly viscid with multicellular glandular hairs, the lower surface (especially of lower leaves) often woolly; inflorescence of a single cluster as above or with few to several clusters, these sometimes on branches up to 12 cm long; involucre bracts acute..... G. viscosum
- 1 Stems 5-20 cm tall, usually much branched; heads in bracteate glomerules; inflorescence narrower than above; involucre bracts various
- 3 Involucre bracts generally brown with a whitish tip; plants loosely tomentose, native; leaves linear to oblanceolate or oblong..... G. palustre
- 3 Involucre bracts generally greenish or brownish to the tip; plants appressed tomentose, introduced; leaves linear or narrowly oblanceolate..... G. uliginosum

Gnaphalium chilense Spreng. Cottonbatting c. The few specimens seen are from along the Green and Yampa Rivers in Daggett and Moffat Cos. and near Neola, Duchesne Co.; riparian and pasture communities; 5,500-5,700 ft; July-Aug.

Gnaphalium palustre Nutt. Lowland c. Widespread, seldom collected; dry meadows, disturbed or open ground of riparian land, and other places; 4,700-9,500 ft; June-Sept.

Gnaphalium uliginosum L. Marsh c. Two specimens seen, from Farm Creek Mt. near Whiterocks, and Diamond Mt.; ephemerally moist ground at a watering place for livestock, to be expected elsewhere on mud flats and other places of moist, disturbed ground; June-Sept.

Gnaphalium viscosum H.B.K. Sticky c. The 1 specimen seen (Neese 14964) is from Diamond Mt., ponderosa pine community, 7,700 ft; Aug.

Grindelia Willd. Gumweed; Resinweed

Grindelia squarrosa (Pursh) Dunal. Curlycup g. Strongly resinous, biennial or short-lived perennial herbs from taproots; stems 1-several, 10-70 (120) cm tall, green to straw-colored; leaves alternate, 2-8 cm long, entire to toothed; heads terminal on stems and branches; involucre 7-9 mm high, the bracts narrow, imbricate in several series, often strongly recurved, the outer ones usually reflexed from the base; receptacles naked; rays yellow, 7-15 mm long; disc flowers yellow; pappus of 2-3 (6) deciduous awns. Widespread; common; more or less weedy along roads, and in neglected pastures and fields; up to about 7,500 ft; July-Oct. Variety serrulata (Rydb.) Steyermark (with upper cauline leaves 2-4 times longer than wide, and var. squarrosa with upper cauline leaves 5-8 times longer than wide) is found in the area. Wolf and Dever 5268 DINO!, reported as G. aphanactis Rydb. (Welsh 1957), belongs here. Other taxa may be present, but we detect none in the specimens seen.

Cutierrezia Lag. Snakeweed

Plants shrubs, and subshrubs woody only at the base, 10-70 cm tall; leaves alternate, entire, linear, or linear-filiform, 1-5 cm long, 1-2 mm wide, glabrous or puberulent; heads small, in terminal corymbs; rays 3-10 per head but inconspicuous, yellow; disc flowers yellow; pappus of scales, present at least on the disc flowers.

- 1 Heads usually solitary; involucre 5-7.5 mm long, 2-5 mm wide, turbinate to cylindrical; disc flowers 5-23 G. pomariensis
- 1 Heads usually clustered; involucre usually less than 5 mm long and 2 mm wide; turbinate; disc flowers 3-8..... G. sarothrae

Cutierrezia pomariensis (Welsh) Welsh [G. sarothrae var. pomariensis Welsh; Xanthocephalum sarothrae var. pomariense (Welsh) Welsh] Endemic, occasional to common in Uintah Co., rather infrequently to Mt. Home in Duchesne Co.; desert shrub, juniper, and sagebrush communities; 4,700-5,700 ft; mid July-early Oct. Quite distinct from but rarely intergrading into G. sarothrae.

Cutierrezia sarothrae (Pursh) Britt. & Rusby Broom s. [Xanthocephalum sarothrae (Pursh) Shinnery] Common; widespread; desert shrub, sagebrush, pinyon-juniper, bullgrass, and Douglas-fir communities; 4,700-9,100 ft; mid Aug.-early Oct. Reports of G. microcephala (D.C.) Gray, a plant of s. and w. of our area, are based on plants of G. sarothrae.

Haplopappus Cass. Goldenweed

Perennial herbs or shrubs; leaves alternate, entire or sometimes toothed; heads variously disposed; involucre bracts usually imbricate in 2 or more series but not in vertical rows; flowers yellow, the disc flowers bisexual; pappus of many capillary bristles. Often spelled Aplopappus in older manuals.

- 1 Plants shrubs; twigs tomentose; heads without rays..... H. macronema
- 1 Plants herbaceous or woody only at the base; stems glabrous or variously pubescent; heads with rays
- 2 Plants glabrous or scabrous, not over 15 cm tall, of dry places, from woody, branching caudices; leaves mostly basal; the stems scapose or scapellike with few, much reduced leaves; heads solitary
- 3 Involucre bracts acute or acuminate at the apex, the inner ones 7-9 mm long, usually of about equal color the whole length; leaves 3 cm long or less..... H. acaulis
- 3 Involucre bracts (especially the outer) rounded at the apex, the inner ones 10-12 mm long, the dark tip often contrasting with the chartaceous pale brown or pale green body; leaves various....
..... H. armerioides
- 2 Plants usually pubescent, at least in part, less than or more than 15 cm tall, from a taproot; caudex if present hardly woody; stems more or less leafy; heads solitary-several
- 4 Heads racemose, on short to long peduncles, 1-8 per stem; plants of valleys or lower montane, usually on slightly to strongly alkaline ground; leaves commonly toothed..... H. lanceolatus
- 4 Heads solitary or 2-3, not racemose; plants of mountains; leaves usually entire..... H. clementis

Haplopappus acaulis (Nutt.) Gray Stemless g. [Aplopappus acaulis (Nutt.) Gray; Stenotus acaulis Nutt.] Common; widespread; desert shrub, sagebrush, and pinyon-juniper communities, often on rocky ground or soils with poor substrates; 5,600-7,600 ft; May-June. Our plants are referable to var. acaulis. There is a narrow-leaved glabrous phase in the s. part of Duchesne Co. Possibly this phase deserves recognition at some taxonomic rank (Welsh 1983).

Haplopappus armerioides (Nutt.) Gray Thrifty g. [Aplopappus amerioides (Nutt.) Gray; Stenotus amerioides Nutt.] With 2 more or less distinct vars.

- 1 Stems mainly 3-8 cm tall; leaves linear to linear-oblongate, mainly 1-3 mm wide; plants on shale barrens of the Tavaputs Plateau..... var. gramineus
- 1 Stems usually over 8 cm tall; leaves oblongate, mainly 3-10 mm wide; plants widespread.....
..... var. armerioides

Var. armerioides Occasional; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 5,000-7,400 ft; May-June.

Var. gramineus Welsh & F. Smith Occasional; endemic, Tavaputs Plateau, mostly Uintah and rarely e. Duchesne Cos.; Uinta and Green River formations; 5,600-6,600 (7,600) ft; May-June. Much like and possibly passing into H. acaulis.

Haplopappus clementis (Rydb.) Blake [H. uniflorus (Hook.) T. & G. misapplied; Pyrocoma clementis Rydb.] Occasional and locally common; Uinta Mts.; dry portions of subalpine meadows, edge of conifer forests, and with krummholz; 9,000-10,700 ft; late July-early Sept.

Haplopappus lanceolatus (Hook.) T. & G. Lanceleaf g. [H. racemosus (Nutt.) Torr. in Sitgreaves misapplied; Pyrocoma laneolata (Hook.) Greene] Four records seen from Duchesne Co.; riparian and stream meadows, and alkaline lowlands; 5,000-7,400 ft; July-Sept.

Haplopappus macronema Gray Whitestem g. Known from S. Fork Rock Creek and N. Fork Duchesne Canyon above Castle Rocks in the Uinta Mts.; open slopes and with scattered conifers, apparently most common on or near limestone; 9,500-10,000 ft; July-Sept.

Helenium L. Sneezeweed

Perennial herbs; leaves alternate, simple, entire or toothed; heads corymbose; involuclral bracts in 2-3 series, spreading or reflexed in age; receptacles naked or sometimes with a few chaffy, scales between the ray and disc flowers; ray and disc flowers well developed; pappus of 5-8 acuminate or awn-tipped scales.

- 1 Stem leaves decurrent; rays 6-10 mm long, strongly reflexed in age, yellow..... H. autumnale
- 1 Stem leaves not decurrent; rays 15-30 mm long, spreading or somewhat reflexed in age, golden-yellow to orange..... H. hoopesii

Helenium autumnale L. Orange s. (H. montanum Nutt.) The 7 records seen are all from the flood plain of the Green River from Little Hole in Daggett Co. to Ouray, Uintah Co.; 4,700-6,600 ft; July-Sept. Our plants are referable to var. montanum (Nutt.) Fern.

Helenium hoopesii Gray Common s. [Dugaldia hoopesii (Gray) Rydb.] The few records seen are all from the w. edge of the area at Mirror Lake, Uinta Mts., Strawberry Valley, Farm Creek Mtn., e. of Tabonia, and e. to near Horse Ridge of the W. Tavaputs Plateau; sagebrush-grass, aspen, and sometimes conifer communities; 8,200-10,200 ft; July-Aug.

Helianthella T. & G. Helianthella

Perennial herbs from stout taproots and woody caudices; leaves simple, entire, often with 3-5 prominent nerves, at least those of the lower stem opposite; heads solitary or few at the ends of branches; involuclral bracts more or less imbricate; receptacles chaffy; ray and disc flowers well developed, the rays yellow; pappus of a pair of awns or teeth, usually with a crown of scales present also; achenes pubescent, sometimes flattened with winged margins.

- 1 Rays 8-10, 10-13 mm long; disc flowers dark purple or blackish; plants 20-60 cm tall, mostly of the pinyon-juniper zone..... H. microcephala
- 1 Rays usually more than 10, 20-30 mm long; disc flowers yellow; plants 40-150 cm tall, mostly not of the pinyon-juniper zone
 - 2 Leaves mostly with 5 prominent nerves, the basal ones large, to 50 cm long; involuclral bracts ciliate; heads nodding..... H. quinquenervis
 - 2 Leaves mostly with 3 prominent nerves, basal leaves small or lacking; involuclral bracts not conspicuously ciliate; heads erect..... H. uniflora

Helianthella microcephala (Gray) Gray Occasional to common; s. flank of the Uinta Mts., Diamond Mt., and probably to Blue Mt.; most common in juniper communities, sometimes with sagebrush and other shrubs, rarely in desert shrub communities well down into the Basin; 5,400-7,600 ft; late July-Sept.

Helianthella quinquenervis (Hook.) Gray Fivenerve h. Occasional; Uinta Mts. and Strawberry Valley; tall forb, aspen, spruce-fir, and sagebrush communities and open grassy slopes; 7,600-10,400 ft; July-Aug.

Helianthella uniflora (Nutt.) T. & G. Oneflower h. Rather common; widespread; sagebrush, forb-grass, tall forb, and aspen communities; 7,200-9,600 ft; mid June-mid Aug.

Helianthus L. Sunflower

Annual or perennial herbs; leaves simple, entire, at least the lower ones usually opposite, the upper ones often alternate; heads large, solitary or few at the ends of branches; involuclral bracts imbricate in several series; receptacles chaffy; rays well developed, yellow; pappus of 2-few readily deciduous scales or awns; achenes more or less 4-angled, not at all winged.

- 1 Disc flowers yellow; plants perennial, usually of wet places; leaves usually 3-5 times longer than wide, not over 3 cm wide, at least the lower ones opposite..... H. nuttallii

ASTERACEAE

- 1 Disc flowers dark purple, reddish brown, or blackish; plants annual, often on disturbed ground or dry places; leaves about 1-3 times longer than wide, mostly alternate
- 2 Involucral bracts ciliate; disc of the head often over 3 cm wide; chaff of receptacles inconspicuously short-hairy at most; leaves 4-20 cm long, about 3-15 cm wide, ovate, rarely ovate-lanceolate, the lower ones often cordate at the base..... H. annuus
- 2 Involucral bracts usually not ciliate; disc seldom over 3 cm wide; chaff at the center of the receptacles evidently white-bearded at the apex at least when young; leaf blades mostly 2-6 cm long, 1-3.5 cm wide, narrowly lanceolate to deltoid-ovate, mostly cuneate at base..... H. petiolaris

Helianthus annuus L. Common s., wild s. (H. aridus Rydb.; H. lenticularis Nutt.) Widespread; weedy in various places, often on disturbed ground, roadsides, ditches, fields, gardens, and waste places, sometimes in indigenous plant communities; up to 7,000 ft, occasionally higher; (June) July-Sept.

Helianthus nuttallii T. & G. Nuttall s. Widespread; along ditches and streams, wet lowlands and riparian communities; 5,200-6,400 ft; mid June-Sept.

Helianthus petiolaris Nutt. Widespread (most of the records seen are from Uintah Co.); desert shrub, sagebrush, and juniper communities, and roadsides; 4,700-6,000 ft; (mid May) July-Sept.

Heliomeris Nutt. Goldeneye

Heliomeris multiflora Nutt. Showy g. [Viguiera multiflora (Nutt.) Blake] Perennial herbs, 25-100 cm tall, branched; leaves lanceolate or linear lanceolate, entire or serrate, short petiolate, the lower ones opposite, the upper ones alternate; heads in loose panicles; involucral bracts in 2-3 series; receptacles chaffy; rays 7-17 mm long, yellow; disc flowers yellow or brownish; pappus lacking. Occasional to common; widespread; aspen, sagebrush, conifer, mt. brush, tall forb, and meadow communities; 6,000-9,800 ft; late July-early Oct.

Heterotheca Cass. Goldaster; Goldenaster

Heterotheca villosa (Pursh) Shinnery Hairy g. [H. fulcrata (Greene) Shinnery; H. horrida (Rydb.) Harms; H. viscida (Gray) Harms; Chrysopsis foliosa Nutt.; C. fulcrata Greene; C. hispida (Hook.) DC.; C. villosa (Pursh) Nutt.; C. viscida (Gray) Greene] Perennial herbs; 10-60 cm tall; herbage strigose to canescent; leaves alternate, entire, 2-7 cm long, linear to obovate; heads solitary to several near ends of branches; involucral bracts imbricate, pubescent to glandular; receptacle naked and pitted; rays 6-15 (20) mm long, yellow; disc flowers yellow; pappus double, the outer series of short scales, the inner series of capillary bristles. Occasional to common; widespread; several plant communities including desert shrub, sagebrush, pinyon-juniper, mt. brush, ponderosa pine, and Douglas-fir; 5,000-9,000 ft; mid June-early Oct. A highly variable taxon with several intergrading vars. none of which are discussed here.

Hieracium L. Hawkweed

Perennial herbs with milky juice; leaves basal or alternate, entire to dentate; heads various; involucral bracts in 1-2 primary series, these sometimes subtended by shorter ones; heads with rays only; pappus of brownish or sordid-white capillary bristles; achenes fusiform, 10-15 ribbed, not beaked.

- 1 Leaves mostly all basal, the cauline ones if present much reduced and bractlike, glabrous or pubescent; stems moderately pubescent, the inflorescence branches and involucre with long greenish-black seta, often villous as well with forked or branched hairs; flowers yellow, quickly withering, not over 1 cm long..... H. gracile
- 1 Stems with at least 1-2 leaves, if the leaves reduced then the stems glabrous or with simple hairs only and flowers white; the long hairs of the inflorescences mostly white but sometimes black
- 2 Flowers yellow; leaves, stems, and branches rather densely pubescent throughout with long spreading hairs; lower leaves often withering by anthesis, about equal to or smaller than the middle stem leaves; involucre 9-15 mm high..... H. cynoglossoides
- 2 Flowers white; leaves glabrous or sparsely pubescent; stems mostly glabrous at least above or with scattered hairs; basal leaves larger than those of the middle stem, sometimes persistent; involucre 7-10 mm high..... H. albiflorum

Hieracium albiflorum Hook. White h. Infrequent; Uinta Mts.; lodgepole pine and spruce woods; 8,200-11,000 ft; mid July-early Sept.

Hieracium cynoglossoides Arv.-Touv. ex Gray Houndstongue h. Occasional from Duchesne Ridge to N. Fork Duchesne drainage; aspen and open conifer woods, and open slopes in forb-grass communities; 7,500-9,800 ft; July-Aug.

Hieracium gracile Hook. Slender h. Common; Uinta Mts.; lodgepole pine and Engelmann spruce woods; 10,000-11,000 ft; July-Aug.

Hymenopappus L'Her. Hymenopappus

Hymenopappus filifolius Hook. Fineleaf h. Perennial herbs, 10-50 cm tall, glabrate to white-floccose; leaves alternate, sometimes mostly basal, usually twice-pinnatifid into filiform segments; involucre 5-10 cm high, the bracts about 6-12 in 1-2 nearly equal series; receptacles naked; rays lacking; disc flowers cream or yellow; pappus of 10-20 minute hyaline scales, sometimes obscured by the long hairs of the achene. With 3 more or less intergrading vars. in our area.

- 1 Basal leaf axils without a dense tomentum, these and stems and leaves glabrous or sparsely tomentose; stems 5-30 (45) cm tall, with 0-1 (2) leaves; corolla 3-5 mm long; achenes 4-6 mm long... var. alpestris
- 1 Basal leaf axils with dense tomentum; stems and leaves sometimes densely tomentose; stem leaves 0-7
- 2 Corollas 2-3 mm long; flowers 10-30 (averaging 20) per head; involucre bracts 3-7 mm long; stem leaves 0-3; pappus 0.1-0.8 mm long; plants 5-20 cm tall..... var. luteus
- 2 Corollas 2.5-7 mm long; flowers (15) 20-70 per head; involucre bracts (5) 6-14 mm long; pappus 1-3 mm long; plants various..... var. cinereus

Var. alpestris (Maguire) Shinnars The few records seen are from the Argyle-Nine Mile drainage to near Fruitland of the W. Tavaputs Plateau; sagebrush, pinyon-juniper, and aspen communities; 6,800-9,000 ft; June-Aug.

Var. cinereus (Rydb.) Johnst. [H. arenosus Heller; H. cinereus Rydb.; H. filifolius var. lugens (Greene) Jepson; H. f. var. megacephalus Turner, as to our material; H. lugens Greene] Occasional to rather common; widespread; desert shrub, sagebrush, pinyon-juniper, and ponderosa pine-bunchgrass communities; 5,100-6,000 (8,000) ft; late May-June. Plants from below 5,500 ft appear to have slightly longer flowers and achenes than those above 6,000 ft of the W. Tavaputs Plateau. Those with larger flowers from lower elevations have been referred to as H. filifolius var. megacephalus. Such plants were referred to H. eriopodus A. Nels. (Graham 1937), but this is a taxon from s. of our area. Those with smaller flowers and of higher elevations are more typical of var. cinereus. The differences are hardly worthy of distinction. See Welsh (1983) for further discussion.

Var. luteus (Nutt.) Turner (H. luteus Nutt.) The 5 specimens seen are from Red Fleet area of e. Uintah Co. and Sheep Creek, Browns Park, and Jesse Ewing Canyon, Daggett Co., and along the Little Snake River, Moffat Co.; desert shrub and juniper communities; 5,000-5,230 ft; late May-June. Over much of its range, this is a distinct and easily recognized var. However, the features intergrade completely with those of var. cinereus in Moffat Co., Colorado, and to a lesser degree with the features of var. megacephalus in the Uinta Basin, Utah (Turner 1956). In addition to the features given in the key, the heads are usually more numerous than in the other vars. of the area.

Hymenoxys Cass. Actinea; Hymenoxys

Caespitose perennial herbs from taproots and simple or branched caudices; herbage glabrate to densely floccose or woolly; often with dense tufts of long hairs in the axils of the basal leaves; leaves basal or alternate; heads solitary on the stem or branches; involucre bracts in 2 or 3 series; receptacles naked; ray and disc flowers well developed, yellow; pappus of 5-8 scales, achenes 5-angled, pubescent.

- 1 Leaves all basal, simple, linear or nearly so, entire; heads solitary on simple scapes
- 2 Plants depressed pulvinate-caespitose; heads sessile in the basal rosettes; involucre bracts recurved, thickened and reddish at the apex; plants of Blue Mt. and vicinity..... H. lapidicola
- 2 Plants caespitose; heads scapose; involucre bracts not recurved; plants widespread
- 3 Involucre bracts with broad scarious margins; backs of rays and involucre bracts glandular with yellow crystalline dots; leaves densely glandular dotted, glabrous or with scattered long, more or less flexuous hairs..... H. torreyana
- 3 Involucre bracts without broad scarious margins; backs of rays and involucre bracts with or without glandular dots; leaves glandular dotted or not, more or less densely pubescent with long hairs..... H. acaulis
- 1 Leaves basal and cauline, mostly divided into linear segments; heads solitary to several
- 4 Rays 26-34 mm long; leaves 2-3 times divided; plants mostly growing above 10,000 ft... H. grandiflora
- 4 Rays 8-23 mm long; leaves once divided into 3-7 segments, occasionally simple; plants mostly growing below 10,000 ft..... H. richardsonii

Hymenoxys acaulis (Pursh) Parker Stemless h. [Actinea acaulis Spreng.; Tetraneuris acaulis (Pursh) Greene] Common; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, and rarely in aspen communities, also dry meadows, rocky slopes and ridges to well above timberline; 5,000- 11,500 ft; late April-July (to Oct. with fall moisture). Plants with all the leaves densely and conspicuously glandular punctate are referable to var. arizonica (Greene) Parker. The distinction seems a little arbitrary in our plants, and no habitat or geographic separation seems evident. However, only a few of our plants have all the leaves consistently and densely glandular punctate, and perhaps all are best referred to var. caespitosa (A. Nels.) Parker.

ASTERACEAE

Hymenoxys grandiflora (T. & G.) Parker Graylocks h. [Actinea grandiflora (T. & G.) Kuntze; Tetraneuris grandiflora (T. & G.) Parker] Occasional and locally common; Uinta Mts.; open slopes and ridges, mostly above timberline; 10,400-12,000 ft; July-Aug.

Hymenoxys lapidicola Welsh & Neese [H. depressa (T. & G.) Welsh & Reveal misapplied] Endemic, Blue Mt. and vicinity, pinyon-manzanita communities, on Weber Sandstone; 6,000-8,100 ft; May-June.

Hymenoxys richardsonii (Hook.) Cockerell Pinque h. [Actinea richardsonii (Hook.) Kuntze] Widespread, particularly common in Daggett Co.; sagebrush, pinyon-juniper, ponderosa pine, and occasionally streamside communities; 5,000-9,500 ft; late May-Aug.

Hymenoxys torreyana (Nutt.) Parker [Actinea torreyana (Nutt.) Macbr.; Tetraneuris torreyana (Nutt.) Greene] The few specimens seen are from 1-4 mi s. of Manila, Jesse Ewing Canyon, and Phil Pico Mt. in Daggett Co., Douglas Mt., Moffat Co., and from the E. Tavaputs Plateau, Uintah Co.; pinyon-juniper communities and open ridges; 6,200-9,000 ft; May.

Iva L. Sumpweed

Herbs with leafy stems; lower leaves opposite, the upper ones often alternate; heads rather inconspicuous, with disc flowers only; pappus lacking.

1 Plants 70-120 cm tall, annual from a taproot; leaf blades 6-15 cm long, ovate to ovate lanceolate, coarsely serrate or incised, the petiole about as long as the blade; heads in axillary and terminal panicles..... I. xanthifolia

1 Plants 10-50 cm tall, perennial, from creeping, horizontal rhizomes; leaf blades 1-3 cm long, oblong or obovate, entire, sessile; heads solitary in axils of leaves..... I. axillaris

Iva axillaris Pursh Stinking Povertyweed, poverty s. Common; widespread; flood plains of rivers and streams, pastures, roadsides, ditchbanks, waste places, often where alkaline or saline; 4,700-6,800 ft; June-Oct.

Iva xanthifolia Nutt. Rag s. Widespread; along ditches, roadsides, neglected pastures, and alkaline and saline riparian communities; about 5,000-6,600 ft; July-Sept.

Kuhnia L. False Boneset

Kuhnia chlorolepis Woot. & Standl. [K. rosmarinifolia Vent. var. chlorolepis (Woot. & Standl.) Blake] Perennial herbs from a taproot, 30-70 cm tall; leaves alternate, entire, or rarely with a basal pair of teeth, sessile or nearly so, linear or narrowly lanceolate; heads solitary on the ends of branches or in loose clusters; involucre 8-12 mm high, the bracts imbricate in a few series, striate and chartaceous; receptacle naked; rays lacking; disc flowers whitish to purplish; pappus of 10-20 plumose bristles, the side cilia about 0.5 mm long; achenes columnar, 10-20 ribbed. The 2 specimens seen are from Sweetwater and Bull Canyons, E. Tavaputs Plateau; gravely alluvium on wash bottoms, rabbitbrush communities; 6,200-6,700 ft; Aug.

Lactuca L. Lettuce

Annual or perennial herbs with milky juice, 30-100 cm tall; leaves alternate; heads paniculate, with rays only; involucre narrowly cylindrical, the bracts in 3 or more series; receptacles naked; pappus of capillary bristles; achenes strongly flattened, beaked.

1 Leaves entire, dentate or some pinnatifid but not spinulose, glabrous or glaucous; flowers blue; plants perennial, from spreading rootstocks; beak of achenes less than 1/2 as long as the body.... L. tatarica

1 Leaves pinnatifid, the lobes spinulose-toothed, the midrib usually spinulose beneath; flowers yellow, opening by night, quickly withering by day and inconspicuous; plants annual or biennial, from a taproot; beak of achenes longer than the body..... L. serriola

Lactuca serriola L. Prickly l. Introduced from Europe, widespread, weedy; roadsides, ditches, around ponds and lakes, lowland meadows, waste places, cultivated ground, and sometimes in indigenous plant communities; 4,700-7,000 ft; late July-early Oct.

Lactuca tatarica (L.) C. A. Mey Chicory l. [L. oblongifolia Nutt.; L. pulchella (Pursh) DC.] Widespread; along ditches, gullies and streams, riparian communities, and wet lowland meadows; 4,900-7,500 ft; July-Aug. Our plants are referable to ssp. pulchella (Pursh) Steb.

Leucelene Greene

Leucelene ericoides (Torr.) Greene Heath aster. (Aster arenosus Blake; A. leucelene Blake) Perennial herbs with branching caudices and rootstocks, 5-12 cm tall, the stems tufted; leaves 2-12 (20) mm long, 0.6-2 mm wide, linear, entire, hispid, ciliate, smaller and fewer upward on the stem; heads solitary on ends of slender branches; involucre 5-7 mm high, the bracts imbricate in about 3-7 series, the midribs green, the margins scarious; rays to 6 mm long, white; disc flowers yellow when fresh, whitish in age;

pappus of capillary bristles. Common; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 5,200-7,200 ft; mid May-July.

Lygodesmia D. Don Skeleton plant; Rush pink

Lygodesmia grandiflora (Nutt.) T. & G. [L. juncea (Pursh) D. Don misapplied] Perennial herbs from deep-seated rootstocks, with milky juice, 10-40 cm tall; leaves alternate, entire, linear and grasslike, often crowded, ascending; heads solitary at the ends of stems and branches, 18-25 mm high; involucre bracts few, the inner series much longer than the outer; receptacles naked; rays 2.5-4 cm long, rose or pink; disc flowers none; pappus of simple capillary bristles. Widespread; desert shrub, sagebrush, pinyon-juniper, bullgrass, and mt. brush communities; 4,800-8,300 ft; late May-July.

Machaeranthera Nees Tansyaster; Aster

Annual or perennial herbs; leaves alternate, simple, spinulose toothed; heads variously disposed; involucre bracts imbricate in a few series; pappus of capillary bristles. A taxonomically troublesome genus in need of considerable clarification.

- 1 Plants perennial from a more or less woody caudex; heads with disc flowers only, these yellow..... M. grindelioides
- 1 Plants annual, biennial, or short-lived perennial; heads with bluish, purplish, or rarely white rays and yellow disc flowers..... M. canescens

Machaeranthera canescens (Pursh) Gray (M. leucanthemifolia (Greene) Greene; Aplopappus leucanthemifolius Greene; Aster leucanthemifolius Greene) With 2 intergrading vars. in our area.

- 1 Stem leaves 2-10 mm wide; linear to oblanceolate, puberulent throughout or glabrous on the upper surface; involucre campanulate, the inner bracts 1-1.5 (2) mm wide; plants from 7,400-9,600 ft, often perennial with short-branched caudices surmounting the taproot..... var. commixta
- 1 Stem leaves 1-4 mm wide, linear, mostly puberulent on both sides; involucre campanulate or turbinate, the inner involucre bracts 0.6-1 mm wide; plants 4,700-7,600 ft, annuals, biennials or at most short-lived perennials from taproots..... var. canescens

Var. canescens (Aster canescens Pursh) Widespread; desert shrub, sagebrush, and pinyon-juniper communities, also roadsides and other areas of disturbance; 4,700-7,600 ft; late June-Oct. One specimen (Neese 6545) with leaves mostly glabrous on both surfaces is referable to M. linearis Greene. This specimen is from the E. Tavaputs Plateau, from a wildrye-rabbitbrush community; 7,400 ft. Aster rubrotinctus Blake (M. rubricaulis Rydb.) is a name that has been applied to plants of this complex.

Var. commixta (Greene) Welsh [M. bigelovii (Gray) Greene (Aster bigelovii Gray) misapplied] Across the E. and W. Tavaputs Plateaus, Strawberry Valley, and Uinta Mts.; sagebrush and mt. brush communities, also open aspen and conifer woods and openings; 7,600-9,600 ft; late July-mid Oct.

Machaeranthera grindelioides (Nutt.) Shinners Discoid t. (Aplopappus nuttallii T. & G.; Haplopappus nuttallii T. & G.) Widespread; desert shrub, black sagebrush, juniper-greasebush, pinyon-juniper, mt. brush, and bullgrass-Douglas-fir communities, often on shallow rocky soils or on poor substrates, sometimes on exposed windswept ridges; 4,800-10,400 ft; June-Aug. Our plants are referable to var. grindelioides.

Madia Molina Tarweed

Madia glomerata Hook. Cluster t. Annual, malodorous herbs, 5-30 (60) cm tall; leaves alternate, entire, linear, 2-6 cm long; heads glomerate near ends of branches; involucre about 6-8 mm long, 3-5 mm wide, the bracts in a single series, the margins involute and enclosing the disc flowers; rays 2-5, inconspicuous, 3-lobed, yellowish; disc flowers about 8-12, yellowish; pappus lacking. Except for 1 specimen from Farm Creek Mt. and 1 from Diamond Mt., all the specimens seen are from w. of N. Fork, Duchesne River, in the Uinta Mts. to Strawberry Valley where the plant is fairly common; openings in aspen and conifer woods, forb-grass communities, mostly roads or other areas of disturbance, increasing with heavy grazing; 7,500-9,000 ft; July-Aug.

Malacothrix DC. Desert dandelion

Annual herbs with milky juice; leaves alternate and basal, mostly pinnatifid; heads solitary to several, principal involucre bracts in 1-2 series, with several shorter outer ones; receptacles naked or bristly; rays yellow; disc flowers none; pappus of capillary bristles that are deciduous together; achenes 5-10 ribbed.

- 1 Leaves with lateral lobes regularly toothed; involucre usually less than 1 cm long; achenes 2-3 mm long at maturity; pappus bristles all quickly deciduous; herbage glabrous or with few glandular hairs..... M. sonchoides

ASTERACEAE

1 Leaves with lateral lobes irregularly toothed or lobed; involucre usually over 1 cm long; achenes 3-4 mm long at maturity; most of pappus quickly deciduous, but 1 or more bristles persistent; herbage often with scattered, stipitate-glandular hairs..... M. torreyi

Malacothrix sonchoides (Nutt.) T. & G. The few specimens seen are from across the Basin; desert shrub, sagebrush, and juniper communities; 4,700-5,600 ft; May-June. Without mature achenes, the plants are difficult to distinguish from those of M. torreyi. In addition to the features given in the key, the involucral bracts are acute in M. sonchoides but often long acuminate in M. torreyi. However, this feature and the difference in pubescence given in the key are not consistent enough to provide definite separation.

Malacothrix torreyi Gray The 7 specimens seen are all from near the Green and White Rivers, mostly near the town of Ouray; desert shrub communities; 4,800-5,100 ft; May-June. See M. sonchoides.

Microseris D. Don Microseris

Microseris nutans (Geyer) Schultz-Bip. Nodding m. Perennial herbs with milky juice, 10-40 (70) cm tall; leaves basally disposed but hardly in a basal rosette, alternate, linear, entire or nearly so, 10-30 cm long, 1-20 mm wide; heads solitary on scapose peduncles, with rays only; involucre 1-2 cm high, the bracts in about 2 series; flowers yellow; pappus of 15-20 narrow scales 1-3 mm long, each with a terminal, subplumose awn, the awns giving the pappus the appearance of capillary bristles; achenes with 8-10 ribs, not beaked. The few records seen are from Diamond Mt. Plateau (where fairly common), Blue Mt. and Daggett Co., and reported (Graham 1937) for E. Tavaputs Plateau; sagebrush, ponderosa pine and meadow communities 7,600-8,200 ft; June.

Onopordum L. Thistle

Onopordum acanthum L. Scotch t.; cotton t. Coarse, branching, strongly spiny, sparsely to densely tomentose, biennial herbs 50-150 (300) cm tall; leaves of basal rosettes 50-60 cm long, 2-20 cm wide or wider, pinnately lobed and serrate-dentate, leaves pinnatifid, strongly decurrent and forming wings the full length of the stem internodes; involucre 25-35 mm high, 30-65 mm wide, the bracts spine-tipped, the spines 3-5 mm long, yellowish, spreading; receptacle fleshy, honeycombed; corollas reddish-purple to pink; pappus bristles barbellate; achenes glabrous, 4- or 5-ribbed. Introduced from Europe, spreading in much of the United States, recently but sparingly found in our area and apparently to date held in check by an aggressive weed control program. Additional introductions can be expected. Similar to Carduus nutans but usually distinguished by the white tomentose herbage, erect or ascending heads, and features listed in the key.

Oxytenia Nutt. Copperweed

Oxytenia acerosa Nutt. Plants perennial, woody at the base, 1-2 m tall; stems slender and leafy or sometimes leafless and rushlike, grayish-strigose; and often canescent especially above; leaves alternate, pinnately parted into 3-5 filiform segments or the upper ones sometimes entire; heads numerous in panicles, each with 10-20, white, staminate disc flowers and 5 marginal pistillate flowers, the pistillate ones lacking corollas; involucre about 4-5 mm wide, with 5 bracts; pappus none or of an obsolete scale; achenes long villose. Known from Desolation Canyon (Graham 9973) and from 5 mi w. of Roosevelt (Stoddart sn UTC); 5000-6000 ft.

Parthenium L. Feverfew

Parthenium ligulatum (Jones) Barneby [P. alpinum (Nutt.) T. & G. var. ligulatum Jones; Bolophyta ligulata (Jones) W. A. Weber] Pulvinate caespitose, perennial herbs, 1-2 (3) cm tall; leaves all in basal rosettes, 0.3-2 cm long, oblanceolate or spatulate, densely strigose; heads sessile in the leaves, inconspicuous, involucre about 5 mm high, the bracts broadly rounded, rather firm; receptacles with firm scales, these partly enveloping the disc flowers; ray and disc flowers white, the rays 1-2 mm long, apparently attached to the apex of the inner involucral bracts; pappus none or obsolete. Endemic, occasional or rather common, but inconspicuous; across the Tavaputs Plateau and flank of the plateau, disjunct in Browns Park area of Daggett Co.; desert shrub, pygmy sagebrush, juniper-greasebush-mt. brush, and pinyon-juniper communities, on barrens, often on whitish marl limestone; 5,600-7,000 ft; May-mid June.

Petradoria Greene Rock goldenrod

Petradoria pumila (Nutt.) Greene (Solidago petradoria Blake) Plants perennial, tufted from woody branching caudices, 10-20 cm tall, the aerial stems herbaceous, glabrous, more or less resinous; leaves simple, alternate, entire, linear-oblanceolate, often 3 nerved, reduced in size and number upward on the stem; inflorescence a flat-topped cyme; involucre about 5-6 mm high, the bracts more or less aligned in rows, greenish or brownish at the apex; flowers few, yellow, the rays 1-3, sometimes lacking, usually inconspicuous; pappus of capillary bristles; achenes glabrous. Occasional to common across much of the

area; desert shrub, sagebrush, and pinyon-juniper communities, often on shallow rocky soil; 4,700-8,500 ft, possibly higher on windswept ridges; late June-Sept.

Platyschkuhria Rydb.

Platyschkuhria integrifolia (Gray) Rydb. [Bahia integrifolia (Gray) Macbr.; B. nudicaulis Gray] Plants perennial from a woody caudex, 10-40 cm tall, puberulent and more or less glandular above; leaves alternate or nearly all basal, entire, simple, the basal ones 2-7 cm long, ovate to lanceolate, 3-nerved, the stem leaves much reduced; heads 1-few, the involucre 7-10 mm high, the bracts about equal, in about 2 rows; ray and disc flowers yellow, the rays 8-20, 7-10 mm long; pappus of 8-14 scales; achenes sparsely hairy. With 2 vars. in our area.

- 1 Involucral bracts obtuse to acute or acuminate; peduncles, involucre, and upper stems with numerous stipitate glandular hairs..... var. desertorum
- 1 Involucral bracts caudate-attenuate; peduncles, involucre, and upper stem with no or few, sessile or short-stipitate glands..... var. ourolepis

Var. desertorum (Jones) Ellison A single specimen seen (Neese 5776), this from the Badlands Cliffs, Duchesne Co., from a pinyon-juniper community; 6,750 ft; June.

Var. ourolepis (Blake) Ellison (Bahia ourolepis Blake) Common in Uintah Co., apparently limited and localized in Rio Blanco Co.; desert shrub, juniper, and sagebrush communities; 4,700-6,000 ft; late May-early July. Our plants have been referred erroneously to var. oblongifolia (Gray) Ellison [P. oblongifolia (Gray) Rydb.; Bahia oblongifolia (Gray) Gray].

Prenanthes Rydb.

Prenanthes exigua (Gray) Rydb. (Lygodesmia exigua Gray) Plants annual, 6-20 cm tall, much branched, with milky juice; leaves alternate, toothed to pinnatifid, the lower ones 1-3 cm long, withered by anthesis, the upper ones reduced and bractlike; heads at the ends of panicle branches; involucre 4-5 mm high, the bracts in 2 series, the outer ones 1-few and much reduced, the inner ones 4-5; rays pink or rose, about 7 mm long; disc flowers none; pappus of simple or barbellate, bright white, capillary bristles. The 2 specimens seen (Neese & Neese 7557, 7588) are from near Randlett and Pelican Lake, both from desert shrub communities; 4,800-4,900 ft; June.

Psilostrophe DC. Paperflower

Psilostrophe bakeri Greene Plants perennial from taproots, these surmounted by woody caudices, 10-20 cm tall, long-villous or floccose; leaves alternate, 5-10 cm long, spatulate or oblanceolate, entire, or rarely more or less lobed; flowers yellow, the rays 3-lobed, about 4-6, 8-15 mm long, becoming papery in age and persistent on the achenes; pappus of 4-6 scales, about 1/3-1/2 as long as the disc corollas. The only specimen seen (Brown s.n. CS, collected in 1938) is from Sunbeam, Moffat Co.

Rudbeckia L. Coneflower

Tall herbaceous perennial herbs; leaves alternate; heads terminal on the stems or branches, long-peduncled; involucral bracts in 2 or more series, herbaceous to foliaceous; receptacles conic or cylindrical in fruit, chaffy; pappus a short crown, a low border, or lacking; achenes 4-angled.

- 1 Leaves entire; disc flowers dark purplish-brown or blackish, rays lacking; heads cylindrical in fruit.. R. occidentalis
- 1 Leaves pinnately divided into 3-7 ovate or lanceolate segments, these cleft and coarsely serrate, disc and rays yellowish; heads ovoid in fruit..... R. laciniata

Rudbeckia laciniata L. Cutleaf c. Known in our area from Black Sulphur Creek near the fork with Canyon Creek, head of the Piceance Basin (Erickson sn). Our plants are referable to var. ampla (A. Nels.) Cronq.

Rudbeckia occidentalis Nutt. Western c. Locally common; Strawberry Valley and e. to N. Fork Duchesne drainage; tall forb, aspen, and streamside communities; 7,500-9,000 ft; July-Aug.

Senecio L. Groundsel

Perennial herbs; leaves alternate, rarely nearly all basal; heads various; involucral bracts equal in a single series, sometimes with a few, much reduced outer ones; receptacles naked; flowers yellowish; pappus of capillary bristles.

- 1 Plants annual, winter annual or biennial, weedy, introduced, mostly about cities and towns; rays lacking; heads not nodding; leaves pinnatifid..... S. vulgaris
- 1 Plants perennial; rays present, or if lacking then heads nodding and leaves entire or shallowly dentate

ASTERACEAE

- 2 Rays lacking; head nodding; plants just entering our area on the Tavaputs Plateau; leaves entire or shallowly dentate..... S. pudicus
- 2 Rays well developed, exceeding the involucre and disc flowers, or rarely lacking; heads not nodding; leaves various
- 3 Leaves only slightly reduced in size or number upward on the stem, glabrous or nearly so, serrate, dentate, lobed, or pinnatifid, occasionally entire, those of the lower stem sometimes withering and deciduous by late anthesis; basal leaves usually lacking
- 4 Plants 5-15 (20) cm tall, sometimes sprawling, of rocky places, mostly near or above timberline on the Uinta Mts.; stems usually several from slender caudices, the caudex branches short or more often elongate and rhizomelike; leaves not over 5 cm long..... S. fremontii
- 4 Plants mostly taller and otherwise different from above in 1 or more ways; leaves over 5 cm long
- 5 Leaves filiform, entire, or parted with filiform segments; plants growing below 7,500 ft
- 6 Plants tomentose; main involucre bracts 13-21..... S. douglasii
- 6 Plants glabrous; main involucre bracts 8-13..... S. spartioides
- 5 Leaves not as above; plants often above 7,500 ft
- 7 At least some (usually most) of the leaves deeply lobed to parted..... S. eremophilus
- 7 Leaves serrate, dentate, or occasionally nearly entire
- 8 Leaves widest beyond the middle, entire to toothed; plants 20-50 cm tall; involucre 8-15 mm wide, the bracts with a small tuft of hairs at the apex..... S. crassulus
- 8 Leaves widest below the middle, toothed; plants often 50-150 cm tall; involucre mostly narrower than above, the bracts not pubescent as above, often black-tipped
- 9 Leaves widest at the base, triangular, the widest ones often over 3 cm wide..... S. triangularis
- 9 Leaves widest between the base and the middle, lanceolate; seldom over 3 cm wide..... S. serra
- 3 Leaves progressively reduced in size and number upward on the stem, if only slightly so then densely pubescent, entire to parted, those of the lower stem usually persistent; basal leaves mostly well developed, persistent
- 10 At least some of the stem leaves pinnatifid or deeply sinuate-toothed, if only shallowly so then often auriculate clasping; basal leaves toothed, lobed or parted
- 11 Basal and stem leaves (except sometimes the uppermost) pinnatifid..... S. multilobatus
- 11 At least some of the basal leaves toothed or lobed, not pinnatifid
- 12 Heads 1-6; plants 2-15 cm tall..... S. werneriaefolius
- 12 Heads usually more, plants mostly taller
- 13 Rays orange, sometimes yellow-orange; plants from Strawberry Valley to Rock Creek, Uinta Mts. (Note: this and the following 3 taxa grade into each other)... S. crocatus
- 13 Rays yellow, distribution various
- 14 Lower and middle cauline leaves as long or sometimes longer than the basal leaves, usually with large auriculate bases; plants known from Rock Creek, Uinta Mts..... S. dimorphophyllus
- 14 Lower and middle cauline leaves prominent or greatly reduced, but not with bases large and auriculate-clasping
- 15 Plants of moist soil of meadows or along streams, arising from a short to weakly spreading or subrhizomatous simple caudex; rare, Daggett and Uintah Cos.; basal leaves thin, ovate or narrower, obtuse but usually pointed at the apex..... S. pauperculus
- 15 Plants mostly on well-drained soil, from horizontal to suberect caudices with fibrous roots, common and widespread; basal leaves thickish, oblanceolate to ovate, rounded across the apex..... S. streptanthifolius
- 10 Leaves all entire, serrate, or cuneate, not lobed or pinnatifid
- 16 Plants glabrous, 70-100 cm tall, growing in swampy or boggy places below 8,500 ft; involucre 3-6 mm wide; leaves entire or minutely denticulate, the larger ones 15-40 cm long..... S. hydrophyllus
- 16 Plants pubescent at least in part when young, if glabrate when mature then differing from above in 1 or more other ways
- 17 Involucre 8-12 mm wide; leaves glabrous, mostly dentate or serrate, often not much reduced in size or number upward on the stem..... S. crassulus
- 17 Involucre mostly narrower and/or leaves pubescent at least when young, the upper ones usually much reduced
- 18 Involucre 3-4 (5) mm wide, with 8 or sometimes 5 principal bracts; leaves permanently tomentose throughout, entire to dentate, the larger ones 10-20 cm long including the petiole; plants (25) 30-60 cm tall, the stems often tomentose..... S. atratus
- 18 Involucre mostly wider or plants otherwise different from above
- 19 Plants mostly 20-80 cm tall, of wet poorly drained sites, from short rhizomes or unbranched caudices; stems mostly solitary; stem leaves 4-30 cm long, the basal ones if present not noticeably larger than those of the lower stem

- 20 Leaves 4-10 (15) cm long including the petioles, entire, occasionally dentate, the surfaces often glabrous at maturity, the axils and lower petioles and stem with some translucent, crinkly, multicellular hairs with flattened segments, the alternating segments often twisted 90°; plants with a short buttonlike caudex, growing in moist or dry places..... S. integerrimus
- 20 Largest leaves 13-30 cm long, including the petioles, with minute callus-tipped, dentate teeth, the surface more or less permanently finely pubescent, the hairs not noticeably flattened and twisted; plants from short stout rhizomes, of moist to wet places..... S. sphaerocephalus
- 19 Plants 2-20 (30) cm tall, of dry places, from prolonged rootstocks and branching caudices; stem leaves seldom over 5 cm long, the basal ones usually noticeably larger than the lower cauline ones
- 21 Plants densely white tomentose even in age, 5-30 cm tall, rarely taller; heads sometimes more than 6; stem leaves usually well developed..... S. canus
- 21 Plants tomentose at first, glabrous or glabrate in age, 2-10 (15) cm tall; heads 1-6; stem leaves small or nearly lacking..... S. werneriaefolius

Senecio atratus Greene Black g. Occasional; Uinta Mts.; rocky open ground, talus, and spruce-pine woods; 9,600-10,600 ft; late June-early Sept.

Senecio canus Hook. Woolly g. (S. harbourii Rydb.; S. purshianus Nutt.) Widespread; sagebrush and pinyon-juniper communities, rocky open conifer woods, krummholz, and alpine; 7,800-11,500 ft; June-Aug. See S. streptanthifolius.

Senecio crassulus Rydb. Thicketleaf g. Specimens seen are from the Blind Stream-Log Hollow-Rock Creek area, Uinta Mts.; Engelmann spruce woods, openings in woods, and open rocky slopes; 9,700-10,600 ft; mid July-Aug.

Senecio crocatus Rydb. Saffron g. (S. pseudoreus Rydb. misapplied) Locally common; Strawberry Valley to Rock Creek and sparingly to Uinta Canyon, Uinta Mts.; willow-streamside, aspen, meadow, and Engelmann spruce communities; 7,600-10,000 ft; mid July-Aug. See S. streptanthifolius.

Senecio dimorphophyllus Greene The few records seen are from Blind Stream and Rock Creek drainages, Uinta Mts.; riparian and spruce-fir communities; 7,500-10,700 ft; late June-Aug. Our plants are referable to var. dimorphophyllus. See S. streptanthifolius.

Senecio douglasii DC. The 1 record seen (Welsh et al. 9434) is from the flood plain of the Duchesne River about 6 mi e. of Myton; salt grass-greasewood alkali flat.

Senecio eremophilus Richards. in Franklin Dryland g. (S. ambrosioides Rydb.) Widespread; aspen, conifer, riparian, forb-grass, and meadow communities, sometimes along roads; 7,200-10,000 ft; late July-Sept. Our plants belong to var. kingii (Rydb.) Greenm.

Senecio fremontii T. & G. Fremont g. Infrequent; Uinta Mts.; conifer woods, rocky slopes, and talus; 9,950-13,000 ft; mid July-Aug.

Senecio hydrophyllus Nutt. Water g. Seldom collected, but probably widespread; swamps and boggy meadows; 4,800-7,800 ft; July-Sept.

Senecio integerrimus Nutt. Lambstongue g. (S. hookeri T. & G.) Locally common; widespread; sagebrush-grass, aspen, streamside, and meadow communities, and rocky ground in pine-spruce woods; 7,200-11,000 ft; late May-early Aug. Our materials are referable to var. exaltatus (Nutt.) Cronq.

Senecio multilobatus T. & G. Lobeleaf g. (S. millelobatus Rydb. misapplied; S. uintahensis Greenman) Common; widespread; sagebrush, pinyon-juniper, mt. brush, bullgrass, aspen, and conifer communities, and rocky slopes; 5,700-11,200 ft; May-Aug. depending on elevation. See S. streptanthifolius.

Senecio pauperculus Michx. Balsam g. Apparently rare; known from a few meadows and streamside communities, Uinta Mts., Daggett and Uintah Cos.; 8,600-9,000 ft; July-Aug. See S. streptanthifolius.

Senecio pudicus Greene The 2 specimens seen are from Mt. Bartles, W. Tavaputs Plateau (Welsh & Clark 15894) and Cart Creek drainage, Uinta Mts. (Goodrich 21778); open ridge top and rocky canyon; 8,000-10,050 ft; July-early Oct.

Senecio serra Hook. Butterweed g., tall g. (S. admirabilis Greene) Occasionally to locally common; Strawberry Valley and adjacent to this valley on the W. Tavaputs Plateau and to Rock Creek and sparingly to Uinta Canyon, Uinta Mts.; aspen, tall forb, and riparian communities, conifer woods and openings; 7,400-10,000 ft; late June-Aug.

Senecio spartioides T. & G. Broom g. Across the s. flank of the Uinta Mts. and adjacent in the Basin; sagebrush, pinyon-juniper, mt. brush, and ponderosa pine communities; 5,800-7,400 ft; Aug.-early Oct. The closely related S. multicapitatus Greenman has been reported for our area; some of our specimens have leaves that are divided into linear segments and an inflorescence with up to 60 heads. These plants could belong to S. multicapitatus, but some or most of the blades are 2 mm wide or wider, a feature referable to S. spartioides. We are unable to distinguish 2 taxa in our material.

Senecio sphaerocephalus Greene Occasional; Strawberry Valley and Uinta Mts.; meadow, willow-streamside, and riparian communities; 7,600-10,500 ft; July-early Sept.

Senecio streptanthifolius Greene (S. rubricaulis Greene; S. cymbalarioides Nels., not Nutt.) The many specimens seen are from the Uinta Mts. and Strawberry Valley, to be expected across the area; riparian, aspen, and conifer woods, meadows, and rocky slopes at and somewhat above timberline; 7,600-11,200 ft; June-Aug. Forming intermediates with S. multilobatus, S. dimorphophyllus, S. pauperculus, and S. canus. Some specimens are not clearly assignable to a definite taxon. S. multilobatus and S. canus as well as S. werneriaefolius also form intermediates. This further complicates separation of plants in the group. Senecio crocatus is also a part of the above complex and is close to and possibly passes into S.

ASTERACEAE

dimorphophyllus and S. pauperculus. References to S. cymbalarioides Nutt. (a plant known from well n. of our area) have been based on plants of S. streptanthifolius and its allies. Welsh 487, referred to as S. fendleri Gray (Welsh 1957; Holmgren 1962), belongs here.

Senecio triangularis Hook. Arrowleaf g. Occasional; Uinta Mts.; along streams, often in coniferous woods, sometimes with aspen and willows; 7,600-11,000 ft; (mid June) July-early Sept.

Senecio vulgaris L. Common g. Introduced from Europe, weedy, mostly about cities and towns.

Senecio werneriaefolius Gray Occasional; Uinta Mts.; rocky slopes and tundra, Engelmann spruce woods, and krummholz; July-Aug. Intergrading into S. canus and the plants of our area referred here may be nothing more than depauperate specimens of that taxon.

Solidago L. Goldenrod

Perennial herbs; leaves alternate, simple, entire or toothed; heads usually small, few to numerous, variously arranged on the branches; involucre bracts imbricate or subequal, chartaceous, often green-tipped (herbaceous in S. parryi); receptacle naked; rays yellow, small, sometimes inconspicuous and not much exceeding the disc flowers; disc flowers yellow; pappus of capillary bristles.

- 1 Involucres 5-12 (15) mm wide, the outer bracts often 1/2 to as long as the inner ones; inflorescence with (1) 3-20 heads, rarely more; heads hardly, if at all, secund, relatively large; plants mostly 2-40 cm tall, basal leaves usually well developed and larger than those of the stem
- 2 Involucre bracts herbaceous, somewhat foliaceous, the larger ones 8-11 mm long, 2-5 mm wide; stems puberulent below the inflorescence and often to near the base; petioles not ciliate with crinkly hairs..... S. parryi
- 2 Involucre bracts chartaceous, smaller than above, seldom over 6 mm long
- 3 Margins of petioles ciliate with crinkled multicellular hairs, these usually much different from other hairs of the leaves; stems sometimes also with crinkled, multicellular hairs, rarely red-purple..... S. multiradiata
- 3 Margins of petioles not ciliate as above; stems glabrous or sparsely scabrous, sometimes glandular, often red-purple..... S. spathulata
- 1 Involucres 3-4 (5) mm wide, the outer bracts mostly less than 1/2 as long as the inner ones; inflorescence mostly with more than 20 heads; heads often numerous, sometimes secund on the branches, relatively small; plants (15) 30-120 (200) cm tall; basal leaves various, sometimes lacking or withering and deciduous by late anthesis
- 4 Stems glabrous below the inflorescence, sometimes glandular or sparingly scabrous; heads not secund except sometimes in S. missouriensis
- 5 Leaves punctate, linear or narrowly elliptic-linear, not at all netted-veined, the midrib flanked by 2 (rarely more) parallel, lateral ribs, these sometimes faint or lacking; heads in small glomerules, not at all secund, the inflorescence leafy-bracteate, large; plants 50-100 cm tall or taller, of low ground in valleys..... S. occidentalis
- 5 Leaves not punctate, mostly oblanceolate, usually more or less netted-veined, with or without parallel veins; heads various, the inflorescence little if at all leafy-bracteate; plants (2) 20-50 (90) cm tall, of various distribution
- 6 Plants from simple or short-branched caudices (mostly keyed above in lead 3); leaves obovate-oblanceolate, often crenate toward the apex; heads not secund, the inflorescence racemose, not at all flat-topped..... S. spathulata
- 6 Plants from rhizomes or caudices with slender elongate branches, or the branches occasionally short as above; leaves oblanceolate to narrowly oblanceolate, mostly entire; heads sometimes secund, in a rounded to flat-topped inflorescence..... S. missouriensis
- 4 Stems puberulent for some distance below the inflorescence and sometimes to near the base; heads more or less secund
- 7 Leaves densely and evenly puberulent (use 10-20X magnification); plants from simple or short-branched caudices; basal leaves usually persisting at late anthesis..... S. nana
- 7 Leaves glabrous or the margins and often the midribs more densely pubescent than the surfaces; plants from rhizomes or caudices with slender elongate branches or the branches occasionally short as above; basal leaves lacking or often deciduous by late anthesis
- 8 Leaves mostly elliptic-lanceolate, often serrate, those of the lower 1/4 of the stem withering by anthesis; rays 10-17; inner involucre bracts tapering from near the base; plants 30-100 (200) cm tall, of moist or wet places; inflorescence 2-20 cm wide..... S. canadensis
- 8 Leaves mostly oblanceolate, usually not serrate, those of the lower stem usually persisting; rays 5-9; inner involucre bracts slightly widened toward the apex; plants 20-60 (100) cm tall, mostly of well-drained soil; inflorescence 2-8 cm wide..... S. sparsiflora

Solidago canadensis L. Canada g. (S. altissima L.; S. elongata Nutt.; S. lepida DC.) Widespread; riparian and wet meadow communities, and along ditches and gullies; 4,800-7,600 ft; late July-Sept. Our plants are referable to var. salebrosa (Piper) Jones.

Solidago missouriensis Nutt. Missouri g. Occasional; widespread; riparian, lodgepole pine, and meadow communities, and sandy alluvium of rivers; 5,500-8,800 ft; July-Aug.

Solidago multiradiata Ait. Low g., mountain g. (S. ciliosa Greene) Common; Uinta Mts.; meadows, pine and spruce woods, rocky slopes, talus, and open rocky ground to timberline; 8,600-11,000 ft; July-Aug. Our plants are referable to var. scopulorum Gray.

Solidago nana Nutt. Baby g. Occasional; widespread; alluvium along rivers, cracks of rocks, seeps, and sagebrush, pinyon-juniper, and ponderosa pine communities; 4,800-8,200 ft; June-Sept.

Solidago occidentalis (Nutt.) T. & G. Western g. (Euthamia occidentalis Nutt.) Across the lowlands of the area; alluvium of rivers, along gullies, ditches, edges of ponds, and in wet bottomlands, often where alkaline or saline; 4,700-5,400 ft; late July-mid Oct. The report of Selloa glutinosa Spreng. for along the Green and Yampa Rivers (Potter and others 1983) is based on specimens (Y 177 et al!) belonging here.

Solidago parryi (Gray) Greene Parry g. [Haplopappus parryi Gray; Oreochrysum parryi (Gray) Rydb.] Common; widespread in mountains; aspen and conifer woods and openings, open slopes in grass-forb communities, talus or rocky slopes, and occasionally above timberline; 8,500-11,600 ft; late July-Aug.

Solidago sparsiflora Gray Slender g. Common; widespread in mountains; sagebrush, pinyon-juniper, mt. brush, aspen, fir, spruce, pine, and meadow communities; sometimes in rocky places; mid July-Aug. Sometimes confused with S. canadensis but usually smaller, more montane and/or of drier and rockier habitats. More like S. nana in stature and general appearance than like S. canadensis, and perhaps grading somewhat toward S. nana in pubescence of leaves, but mostly noticeably different.

Solidago spathulata DC. Coast g. (S. trinervata Greene) Occasional to common; ponderosa pine, lodgepole pine, spruce, fir, and occasionally aspen woods, talus and rocky slopes, and above timberline; July-Aug. Two intergrading vars. can be detected in our plants.

- 1 Inflorescence short and compact, branches or peduncles seldom over 1 cm long; plants 3-15 cm tall, from about 10,000-11,500 ft on the Uinta Mts. (S. decumbens Greene)..... var. nana (Gray) Cronq.
- 1 Inflorescence more or less elongate, some of the lower branches often 1-5 (8) cm long; plants from about 8,800-9,800 ft on the Uinta Mts. and E. Tavaputs Plateau..... var. neomexicana (Gray) Cronq.

Sonchus L. Sowthistle

Annual or perennial herbs with milky juice; leaves alternate, sometimes also basal, usually auriculate clasping, mostly toothed to pinnatifid with prickly margins or the teeth spine-tipped, rarely entire; involucre bell-shaped, the bracts in 3-5 series; receptacles naked; rays yellow; disc flowers none; pappus of capillary bristles.

- 1 Achenes subterete to compressed, with 5 or more rugulose (beaded) ribs; plants perennial, 40-200 cm tall, from stout rootstocks; heads including the rays usually 3-5 cm wide in flower, the involucre mostly 14-22 mm high in fruit; rays 8-15 mm long, bright yellow-orange; pappus 10-14 mm long
 - 2 Involucres and peduncles bearing coarse stipitate glands..... S. arvensis
 - 2 Involucres and peduncles not stipitate glandular..... S. uliginosus
- 1 Achenes strongly compressed, smooth and not ribbed or the ribs only slightly rugulose; plants annual, 10-100 cm tall, from taproots, these often robust and appearing more than annual; heads mostly 1-3 cm wide, the involucre mostly 9-14 mm high in fruit; rays to 7 mm long, yellow; pappus to 9 mm long
 - 3 Achenes with prominent smooth ribs; leaves with rounded auriculate lobes, the margins sharply and narrowly toothed and sometimes lobed..... S. asper
 - 3 Achenes striate to weakly ribbed, scabrous or cross-wrinkled; auriculate lobes of leaves rounded but sharply acute; the margins sharply and broadly toothed, or merely toothed and lyrate pinnatifid..... S. oleraceus

Sonchus arvensis L. Field s. Adventive from Europe, weedy, to be expected across the area; 4 specimens seen, these from Duchesne Co. near Mt. Home, Neola, Talmage, and Red Creek; along drainages; 6,600-7,000 ft; June-Sept.

Sonchus asper (L.) Hill Prickly s. Introduced from Europe, weedy, to be expected across the area, but seldom collected; edge of ponds, along ditches, roadsides, and waste places, usually on moist or wet ground; 4,900-7,000 ft; June-July.

Sonchus oleraceus L. Common s. Introduced from Europe, weedy, to be expected across the area, but seldom collected; disturbed mesic areas as in S. asper; June-Aug.

Sonchus uliginosus Bieb. [S. arvensis ssp. uliginosus (Bieb.) Nyman; S. a. var. glabrescens Guenth] Adventive from Europe, weedy, widespread, the common sowthistle of our area; riparian-wet meadow, saltgrass-scirpus, and common reed communities, along roadside-ditches, edge of ponds, seeps, and flood plains; 4,700-5,600 ft and probably to 7,000 ft; late June-early Oct.

Sphaeromeria Nutt.

Perennial plants with woody bases, 5-20 cm tall in our area, aromatic with sagebrushlike odor; herbage gray-tomentose; leaves appearing clustered at the base, but a few borne on the stems; disc flowers yellow; rays none; pappus essentially lacking.

ASTERACEAE

- 1 Inflorescence a globose head; basal leaves deeply trifid or palmatifid with the larger segments often again trifid..... S. capitatum
- 1 Inflorescence more or less compact-corymbose; basal leaves strongly to weakly tridentate or a few entire S. argentea

Sphaeromeria argentea Nutt. Chicken sage. (Tanacetum nuttallii T. & G.) Approaching our area in Wyoming and Peterson & Wilkin 83-285 CS reported for w. of summit of Lookout Mt., 6,580 ft, Moffat Co.; desert shrub communities; May-June.

Sphaeromeria capitatum Nutt. [Tanacetum capitatum (Nutt.) T. & G.] The 1 specimen seen (Peterson & Wilken 83-301) is from Vermillion Bluffs; sagebrush-atrilex-erigonum community; 7,600 ft; June.

Stephanomeria Nutt. Wirelettuce

Herbs with milky juice, more or less rushlike; leaves alternate, linear to oblong, the upper ones often scalelike; heads with rays only, borne at the ends of branches; involucre cylindrical or oblong, the principal bracts few, about equal, usually with a few outer, much reduced bracts; receptacles naked; rays pinkish, about 3-8 per head, rather small, quickly withering; pappus of 12-20 bristles, these plumose at least above.

- 1 Plants annual; involucre about 7 mm high; pappus bristles plumose on the upper 1/2 or 2/3, simple below; leaves entire or toothed; rays 3-5 mm long..... S. exigua
- 1 Plants perennial; involucre mostly 9-16 mm high; pappus bristles plumose to the base; lower leaves runcinate pinnatifid; rays 4-12 mm long
 - 2 Plants 10-20 cm tall; leaves runcinate-pinnatifid; achenes with ridges pitted and tuberculate; rays mainly 8-12 mm long..... S. runcinata
 - 2 Plants 20-50 cm tall; leaves various; achenes with smooth ridges; rays 4-10 mm long.... S. tenuifolia

Stephanomeria exigua Nutt. [Ptiloria exigua (Nutt.) Greene] Occasional; widespread; desert shrub and juniper communities; 4,700-5,000 ft; July-Sept.

Stephanomeria runcinata Nutt. Occasional; widespread; desert shrub and juniper and mt. brush communities; 4,200-8,600 ft; July-Sept.

Stephanomeria tenuifolia (Torr.) Hall Slender w. [Ptiloria tenuifolia (Torr.) Raf.] Apparently widespread, seldom collected, poorly understood in our area, with 2 vars.

- 1 Involucre 10-16 mm high, the bracts attenuate; basal leaves, at least some, bipinnatifid; stems solitary or 2 from a rhizomelike caudex..... var. uintaensis
- 1 Involucre 8-11.2 mm high, the bracts hardly attenuate; basal leaves not bipinnatifid; stems usually several from a branched caudex..... var. tenuifolia

Var. tenuifolia Apparently widespread, seldom collected; desert shrub, sagebrush, pinyon-juniper, and lodgepole pine-Engelmann spruce communities; 5,000-9,700 ft; July-Sept.

Var. uintaensis Goodrich & Welsh Known only from Brownie Canyon, Uinta Mts.; ponderosa pine-Rocky Mt. juniper communities at about 8,200 ft; Aug.-Sept.

Tanacetum L.

Tanacetum vulgare L. Tansy. Aromatic, glabrous or sparingly tomentose perennial herbs, 30-100 (150) cm tall; leaves 6-15 cm long, sessile or nearly so, the blades 2-3 times pinnate or deeply pinnatifid and essentially pinnate; heads many, with disc flowers only; involucre about 4-5 mm high, flowers yellow, 3-5 lobed; achenes about 1 mm long. Introduced from Europe, cultivated in older plantings, persisting and escaping, the 1 record seen (Goodrich & Atwood 17969) is from an old homestead, Dry Fork Settlement.

Taraxacum Weber Dandelion

Perennial plants from taproots, with milky juice; leaves in a basal rosette, pinnatifid to toothed, rarely entire; heads solitary on a hollow, more or less translucent, succulent scape, with rays only; involucre bracts in a short outer series and a much longer inner series; receptacles naked; rays yellow, 5, toothed at apex; pappus of simple capillary bristles; achenes ribbed and nerved, strongly beaked.

- 1 Introduced weedy plants, widespread from 4,700 to about 10,500 ft; involucre 12-18 mm high, the outer bracts strongly spreading or more often reflexed; leaves toothed to divided, often with a large terminal lobe..... T. officinale
- 1 Native plants, mostly above 10,500 ft; involucre shorter or the outer bracts mostly erect or only slightly spreading; leaves various
 - 2 Involucre 7-10 mm high (in our plants), the inner bracts seldom corniculate; leaves divided to nearly entire, 2-7 mm wide; plants 2-6 cm tall (reported to 15 cm tall); mature achenes blackish, sometimes reddish at the apex..... T. lyratum

- 2 Involucres 11-17 mm high, the inner bracts often corniculate; leaves entire, toothed or shallowly lobed, commonly 8-17 mm wide; plants less than to greater than 6 cm tall; mature achenes greenish or light brown..... T. ceratophorum

Taraxacum ceratophorum (Ledeb.) DC. Horned d. The 3 specimens seen are from Leidy Peak and Kings Peak, Uinta Mts.; open dry slopes and meadows above timberline; July-Aug.

Taraxacum lyratum (Ledeb.) DC. Dwarf alpine d. Five specimens seen from the Uinta Mts.; rocky slopes and talus; 10,600-13,000 ft; July-Aug.

Taraxacum officinale Weber in Wiggers Common d. (Leontodon taraxacum L.) Introduced from Eurasia, weedy and extremely variable; fields, lawns, gardens, roadsides, and in many plant communities; 4,700-10,300 ft and perhaps higher; April-Oct. Over 1,000 species have been described in the genus Taraxacum, but conservative treatments recognize fewer than 60. Taxonomic problems are numerous. Hybridization, polyploidy, and apomixis are all common complicating factors. Some of the specimens seen from our area have reddish or reddish-brown achenes and somewhat corniculate inner involucre bracts, and thus might be referred to T. laevigatum (Willd.) DC (T. erythrospermum Andr. in Besser). However, they also have features of T. officinale, and we are not able to distinguish clearly more than 1 taxon in our specimens of weedy dandelions. Sometimes our 2 indigenous taxa listed above have been included in an expanded T. officinale.

Tetradymia DC. Horsebrush

Shrubs with stems more or less tomentose at least when young; leaves alternate, solitary or fascicled, entire, the primary leaves sometimes modified into spines; heads axillary or clustered at the tips of the branches; involucre bracts 4-6, in a single row, all about equal; rays lacking; disc flowers yellow; pappus of numerous, whitish, capillary bristles; achenes densely pubescent, usually with long hairs.

- 1 Twigs densely, uniformly, and permanently tomentose, the tomentum of older twigs often peppered with minute blackish flakes and appearing blackish beneath, sometimes with recurved spines, these 5-10 (15) mm long; heads solitary or in pairs in axis of the upper leaves; involucre bracts 5-6, tomentose; leaves linear, glabrous or nearly so..... T. spinosa
- 1 At least some of the older twigs tomentose in lines alternating with glabrous lines, or glabrate in age, with or without spines; heads various; involucre bracts 4 (5)
- 2 Twigs armed with spines, these 5-25 mm long; leaves narrowly oblanceolate, 1-3 mm wide, glabrous or sparsely tomentose; involucre bracts tomentose..... T. nuttallii
- 2 Twigs unarmed; leaves either filiform or nearly so or else densely gray- white pubescent
- 3 Leaves densely gray- or white-pubescent, 1-5 mm wide, 6-30 mm long, linear-oblanceolate or linear-elliptic; involucre bracts tomentose..... T. canescens
- 3 Leaves glabrous or scattered-pubescent, mostly greenish, not over 2 mm wide, 3-8 mm long, linear or filiform; involucre bracts glabrous or rather thinly pubescent..... T. glabrata

Tetradymia canescens DC. Gray h. Occasional to common; widespread; sagebrush-grass, pinyon-juniper, mt. brush, bullgrass-Douglas-fir, and aspen-conifer communities; 6,800-9,800 ft; June-Aug.

Tetradymia glabrata Gray Littleleaf h. The one specimen seen (Neese 4970) is from Big Pack Mt.; desert shrub communities; 5,500 ft; May-June.

Tetradymia nuttallii T. & G. Nuttall h. Widespread; desert shrub and juniper communities; 4,800-6,000 ft; June-mid July.

Tetradymia spinosa T. & G. Cottonthorn h. Widespread; desert shrub and juniper communities; 4,800-6,200 ft; late May-early July.

Thelesperma Less. Greenthread

Thelesperma subnudum Gray Navajo-tea g. Plants perennial, glabrous, herbs from rather woody roots, 10-30 cm tall, subscapose; leaves clustered toward the base of the stem, opposite, pinnately or bipinnately divided into linear or broadly linear segments; heads solitary on long peduncles, the involucre bracts in about 2 rows, the outer about 1/4-1/2 as long as the inner, the inner ones 7-10 mm long, united at the base; receptacles chaffy; rays yellow or lacking; disc flowers yellow; pappus a crown with 4-5 teeth or lacking. Common on the W. Tavaputs Plateau and its flank, and some distance (Blue Bench and Windy Ridge) into the Basin, apparently rare on the E. Tavaputs Plateau; desert shrub, pinyon-juniper, and sagebrush communities, barrens, often on white marl limestone; 5,300-8,800 ft; June-Sept.

Townsendia Hook. Townsendia

Plants herbs; leaves basal or alternate, entire, mostly narrow and broadest above the middle; heads variously disposed; involucre bracts imbricate, appressed, mostly with scarious margins; receptacles naked; rays white to violet; disc flowers yellow; pappus of scabrous bristles, or that of the rays sometimes of paleae; achenes of disc flowers with 2-forked or glochidiate hairs.

ASTERACEAE

- 1 Plants annual, biennial, or short-lived perennial, not pulvinate caespitose, the stems often conspicuous, canescent, or strigose
 - 2 Stems reddish, densely to sparsely strigose; involucre bracts glabrate to moderately strigose, 3-7 mm long, 1.2-1.9 mm wide..... T. strigosa
 - 2 Stems grayish-white, densely canescent; involucre bracts strigose, 3-10 mm long, 1-3.5 mm wide..... T. incana
- 1 Plants perennial, more or less pulvinate caespitose, the heads sessile or nearly so in the basal rosettes of leaves; stems rarely over 1 cm long except in vigorous juvenile plants
 - 3 Involucre bracts linear to narrowly lanceolate, acute to acuminate, the inner ones about 10 mm long; leaves linear or narrowly oblanceolate, (10) 15-20 (25) mm long, uniformly and densely strigose on both sides; pubescence persistent on the marcescent leaf bases..... T. hookeri
 - 3 Involucre bracts broadly lanceolate to oblanceolate, rounded to broadly acute, not acuminate, the inner ones 5-8 (9) mm long; leaves linear to oblanceolate, generally shorter than above and/or glabrous to sparingly pubescent
 - 4 Leaves rather densely and uniformly gray-white canescent on both sides, 5-10 (15) mm long, linear or narrowly oblanceolate; rays minutely densely glandular on the upper (inside) surface; plants common from 5,600-9,000 ft on the Tavaputs Plateau..... T. mensana
 - 4 Leaves glabrous or rather sparsely to densely pubescent, more or less greenish, some either longer than above or else distinctly oblanceolate to spatulate; rays generally not glandular or sparsely so; distribution various
 - 5 Plants common, widespread, from 4,700-7,000 ft; leaves uniformly and rather densely gray-white canescent; heads sometimes on short but conspicuous stems; achenes pubescent; see lead 2 above T. incana
 - 5 Plants uncommon, restricted, from 7,000-10,600 ft; leaves green, glabrous or sparingly strigose; heads sessile or nearly so in the basal rosettes; achenes various
 - 6 Leaves narrowly oblanceolate or nearly linear; involucre bracts linear-lanceolate to narrowly elliptic; plants known from the w. end of the Uinta Mts.; achenes pubescent..... T. leptotes
 - 6 Leaves spatulate to narrowly oblanceolate; involucre bracts elliptic to broadly elliptic; plants known from the W. Tavaputs Plateau and e. end of the Uinta Mts.; achenes glabrous or pubescent..... T. montana

Townsendia hookeri Beaman The 8 specimens seen are from widely scattered locations from Pigeon Basin-Clay Basin to Strawberry Valley; big sagebrush, fringed sagebrush, and mt. brush communities; 7,000-10,200 ft; May-June.

Townsendia incana Nutt. Common, widespread; desert shrub, sagebrush, and pinyon-juniper communities; 4,700-7,000 ft; late April-June.

Townsendia leptotes (Gray) Osterh. The 4 records seen are from Lake Fork to Rhoades Canyon in the Uinta Mts., all from limestone gravelly ground; 9,600-10,600 ft; June-July.

Townsendia mensana Jones Endemic, occasional; Tavaputs Plateau and adjacent in the Basin in Duchesne Co., occasional to McCook Ridge, Uintah Co., and perhaps in Colorado; desert shrub, pinyon-juniper, Douglas-fir, and sagebrush-bullgrass communities, often on bare shale or marl limestone slopes and ridges; 5,600-9,000 ft; late April-June.

Townsendia montana Jones With 2 vars. in our area.

- 1 Leaves spatulate, rounded at the tip; plants from calcareous places of the W. Tavaputs Plateau..... var. caelilimensis
- 1 Leaves oblanceolate to narrowly spatulate, some usually pointed at the tip; plants known from the e. end of the Uinta Mts..... var. montana

Var. caelilimensis Welsh (T. minima Eastw. misapplied) The 4 specimens seen are from the W. Tavaputs Plateau, from Argyle Canyon, Indian Canyon, and Willow Creek drainages; pinyon-juniper, Douglas-fir, and bristlecone pine communities, and on nearly barren slopes and ridges of Green River and Uinta Formations; 7,000-8,300 ft; June-July.

Var. montana Known from Dyer Mtn. (N. Holmgren & P. Holmgren 8339 BRY) and Ice Cave Peak (Goodrich 21700), Uinta Mts.; gravelly limestone; 10,000-10,200 ft; July. The specimens seem intermediate to T. leptotes.

Townsendia strigosa Nutt. Occasional; widespread; desert shrub and sagebrush communities; 4,700-6,200 ft; May-June.

Tragopogon L. Goatsbeard; Salsify

Mostly biennial herbs from fleshy taproots, with milky juice; leaves alternate, elongate, linear, entire, strongly nerved; heads with rays only, solitary on long, hollow peduncles, the peduncles sometimes swollen just below the head; involucre bracts in a single row, about equal, united at the base; pappus of plumose bristles; achenes ribbed, long beaked, the achenes and pappus bristles forming a large, feathery,

ball-shaped head, to 10 cm or more in diameter at maturity, the achenes easily broken from the head and carried long distances by wind.

- 1 Flowers purple or rose; leaf axils glabrous..... T. porrifolius
 1 Flowers yellow; leaf axils with tufts of woolly hair..... T. dubius

Tragopogon dubius Scop. Yellow s. Introduced from Europe, widespread; many plant communities, often in areas of disturbance; 4,700-8,000 ft; May-Sept.

Tragopogon porrifolius L. Vegetable-oyster s. Introduced from Europe, no specimens seen from our area, but to be expected.

Wyethia Nutt. Wyethia; Mules-ears

Perennial herbs from stout taproots; leaves alternate, mostly entire; heads large, solitary or few; involucre bracts in 2-4 rows, the outer often leaflike; receptacles chaffy; ray and disc flowers yellow; pappus a crown of unequal, lacinate, persistent scales, these sometimes awned; achenes 6-15 mm long.

- 1 Leaves linear or linear-lanceolate, 3-15 cm long, 3-17 mm wide, the basal ones equal to or smaller than the stem leaves or lacking; plants hispid or scabrous..... W. scabra
 1 Leaves broader, the basal ones well developed, to 40 cm long and up to 5-15 cm wide; plants glabrous or nearly so..... W. amplexicaulis

Wyethia amplexicaulis (Nutt.) Nutt. Mules-ears. Entering our area in Strawberry Valley, Cold Spring Mtn. (Harrington 2127), and 2 mi n. of Rio Blanco (Harrington 4565); forb-grass and aspen communities and open slopes. June-July. References to W. arizonica Gray for our area are based on specimens belonging here.

Wyethia scabra Hook. Badlands w. Rather widespread but uncommon; desert shrub and juniper communities, mostly in sandy places or in sandstone; 5,400-5,600 (7,200) ft; June. England 232 UI, reported as Verbesina encelioides (Cav.) Benth. in Gray (Goodrich and others 1981), belongs here.

Xanthium L. Cocklebur

Xanthium strumarium L. (X. italicum Moretti; X. saccharatum Wallr.) Weedy, annual herbs, 20-80 cm tall or taller; leaves alternate, the petioles slender, about as long as the blades, the blades to 15 cm long, ovate, often cordate, more or less sinuately lobed or dentate, scabrous; heads unisexual; staminate heads borne above the pistillate, with separate involucre bracts, in 1-3 series, the flowers all discoid; pistillate heads burlike, the bracts united, these 2-beaked at the apex and bearing stiff, hooked prickles, the corollas lacking; pappus none. Widespread weed; fields, ditchbanks, gardens, roadsides, drying mud flats of lakes and ponds, and along streams, increasing with disturbance; 4,700-7,500 ft; Aug.-Sept.

Xylorhiza Nutt. Desert Daisy

Perennial herbs (sometimes slightly woody at the base) from branching, woody caudices; leaves alternate, narrowly oblanceolate, villous, entire or undulate, heads solitary on peduncles; involucre bracts in 1-2 series, spinulose, acuminate, short villous on the back; receptacles naked; rays white; pappus of barbellate, capillary bristles; achenes pubescent.

- 1 Rays 15-25 mm long; involucre 13-16 mm high; stems leafy only near the base, the peduncles 5-15 cm long X. venusta
 1 Rays 8-12 mm long; involucre 8-12 mm high; stems leafy to near the top, the peduncles about 1-6 cm long X. glabriuscula

Xylorhiza glabriuscula Nutt. [Machaeranthera glabriuscula (Nutt.) Cronq. & Keck.; Aster glabriuscula (Nutt.) T. & G.; Aster xylorhiza T. & G.] Lable data of the one specimen seen (Williams 404 UTC) gives only dry hills, Daggett Co. for location. The species is common to the n. in Wyoming.

Xylorhiza venusta (Jones) Heller [Aster venustus Jones; Machaeranthera venusta (Jones) Cronq. & Keck.] Common; Uintah and Daggett Cos. and e. into Colorado; desert shrub communities or barrens in the desert shrub zone, rarely in sagebrush and pinyon-juniper communities; 4,800-6,200 ft; late April-mid June.

BERBERIDACEAE Barberry Family

Mahonia Nutt. Barberry

Mahonia repens (Lindl.) G. Don Oregon grape. [Berberis repens Lindl.; Odoxylon aquifolium (Pursh) Rydb.] Low shrubs usually not over 30 cm tall; leaves pinnately compound with 3-7 leaflets; leaflets hollylike, 3-7 cm long, thick and evergreen, often turning red in autumn or winter, the margins toothed, each tooth usually ending in a sharp bristle; flowers in dense racemes to 8 cm long; sepals 6 in 2 series

BERBERIDACEAE

of 3 each, petallike, the outer series greenish-yellow and 2-3 mm long, the inner bright yellow and 5-8 mm long; petals 6 in 2 series; stamens 6, opposite the petals; fruit a glaucous, blue-black berry 5-9 mm long. Common throughout our mountains, perhaps most common under aspen and conifer, but also with sagebrush and other shrubby species; 7,000-9,500 ft; May-June. Mahonia fremontii (Torr.) Fedde (Berberis fremontii Torr.) approaches our area on the s. slopes of the E. Tavaputs Plateau. It is distinguished from M. repens by taller stature (1-3 m tall), and by having leaflets less than 3 cm long with fewer than 5 teeth on each side.

BETULACEAE Birch Family

Monoecious shrubs and trees; leaves deciduous, alternate, simple, serrate; staminate flowers numerous in spreading or drooping aments (catkins), the perianth parts inconspicuous; pistillate flowers in conelike aments, without a perianth, each bract (scalelike in Betula, or woody in Alnus) of the catkin subtending and obscuring 2-3 flowers, only the stigmas protruding; ovary inferior or superior; fruit a 1-seeded nut or samara.

- 1 Leaves double-serrate, sinuate or lobed, the lobes or larger teeth with smaller teeth; twigs without glandular dots; scales of the pistillate aments woody and persistent; stamens 4..... Alnus
- 1 Leaves more or less single-serrate with uniform sized teeth; twigs with glandular dots; scales of the pistillate aments thin and deciduous; stamens 2..... Betula

Alnus Mill Alder

Alnus incana (L.) Moench Mountain a. (A. tenuifolia Nutt.) Shrubs or small trees mostly not over 7 m tall; bark thin, gray or reddish; twigs pubescent when young; leaves 2-9 (12) cm long, 1.5-6.5 (8) cm wide; flowers developing before the leaves; staminate catkins in clusters of 2-4, linear, 2-7 (10) cm long; pistillate catkins in clusters of 3-9, sessile or peduncled, 1-1.5 cm long; fruit a thin margined nutlet. Occasional to common; widespread; along water courses, most common in canyons but also in the Basin at lower elevations; (5,400) 6,000-8,000 ft; April-June.

Betula L. Birch

With features of the family.

- 1 Leaf blades usually not over 2 cm long, about as wide as long; shrubs mostly less than 2 m tall, above 8,500 ft..... B. glandulosa
- 1 Leaf blades 2-5 (7) cm long, usually slightly longer than wide; shrubs often over 2 m tall; mostly below 8,500 ft..... B. occidentalis

Betula glandulosa Michx. Bog b., scrub b. Occasional; Uinta Mts.; streamside meadows, boggy meadows, and well-drained soil in snowbank areas; 9,000-11,000 ft; July-Aug.

Betula occidentalis Hook. Red b., river b., water b. (B. fontinalis Sarg.) Widespread; nearly restricted to water courses, most common along banks of rivers of our major mountain drainages, sometimes around springs far removed from other water sources; not expected over 9,000 ft; May-June.

BORAGINACEAE Borage Family

Pubescent often bristly-setose or -hispid herbs (sometimes glabrous in Heliotropium and Mertensia); leaves simple, entire usually alternate; inflorescence a modified cyme, the branches frequently unilateral and coiled, usually elongating as the lower flowers mature; calyx 5-lobed or parted; corolla regular, rotate, salverform, or tubular-campanulate, 5-lobed, usually crested at the narrow throat with 5 rounded pouch-like appendages (fornices); stamens 5, inserted on the corolla tube; ovary 4-lobed, usually deeply so with the style gynobasic and arising from between the lobes, breaking at maturity into 4 bony, 1-seeded nutlets.

- 1 Corolla dull reddish-purple or maroon; fruit 12-15 mm broad, the nutlets subglobose, flattened dorsiventrally, evenly covered with short barbed prickles; coarse biennial weeds of waste places..... Cynoglossum
- 1 Corolla blue, lavender, white, or yellow; fruit less than 8 mm broad
 - 2 Calyx much enlarging in fruit, the segments 2-lobed, at maturity flattened, bractlike, to 2 cm wide; flowers blue-purple, tubular-campanulate, 2-3 mm long, solitary or few in the upper axils; stems 4-angled, bearing retrorse prickles; plants weak sprawling, rough-hispid annuals..... Asperugo
 - 2 Not as above
 - 3 Dwarf, cushionlike, silvery-villous perennial to about 6 cm tall, of tundra habitats above 10,000 ft; corolla bright sky-blue, rotate..... Eritrichium
 - 3 Distribution various but not limited to tundra habitat, if alpine then taller, neither cushion-forming nor silky villous

- 4 Style branched, each branch ending in a capitate stigma; plants taprooted, prostrate, divaricately and dichotomously branched annuals of sandy places; leaves strongly impressed-veiny, ovate, petioled, the blades 3-7 mm long, the margins revolute; flowers small, clustered in the axils, pinkish-lavender..... Tiquilia
- 4 Styles simple, with a single stigma; other characteristics not as above
- 5 Stigma and obsolescent style terminated on the summit of the ovary, the style neither gynobasic nor persistent, the stigma with a broad flangelike disc at the base; plants glaucous, totally glabrous, somewhat fleshy, of wet saline of alkaline places; inflorescence dichotomously branched, the spikelike branches densely flowered, 1-sided, coiled at the tip; flowers white or suffused with blue or lavender in the throat, without appendages..... Heliotropium
- 5 Style gynobasic, arising from between ovary lobes, persistent; otherwise not as above in all respects
- 6 Margins of nutlets with barbed prickles that cling tenaciously to clothing and fur
- 7 Plants usually slender annuals, rarely biennial; pedicels erect in fruit; flowering branches bracteate; nutlet scar elongate, basal; gynobase narrowly pyramidal, elongate..... Lappula
- 7 Plants relatively coarse, biennial to perennial; pedicels reflexed in fruit; flowering branches without bracts subtending the flowers; nutlet scar almost round, median on the nutlet's inner face; gynobase low and broad..... Hackelia
- 6 Nutlets smooth or roughened, but not with barbed "sticktight" prickles
- 8 Corolla orange, yellow, or yellowish green
- 9 Corolla tube 1.5-4.0 cm long..... Lithospermum incisum
- 9 Corolla tube 1.2 cm or less long
- 10 Plants annual; flowers yellow-orange, known in our area only from Strawberry Valley....
..... Amsinckia
- 10 Plants perennial
- 11 Nutlets attached at their base to a flat gynobase, at maturity glossy, hard and pebblelike, greyish-white, not concealed by the calyx lobes..... Lithospermum
- 11 Nutlets attached at their ventral face to a conical gynobase, the attachment scar elongate or narrowly triangular; nutlets concealed by the calyx lobes.... Cryptantha
- 8 Corolla blue or white (throat appendages may be yellow)
- 12 Plants biennial to perennial
- 13 Corolla blue (rarely pink), tubular-funnelform to tubular-campanulate; herbage glabrous, finely pubescent, or strigulose, never setose or hispid; mostly montane and above..... Mertensia
- 13 Corolla white or yellowish, rotate or salverform, the limb usually flat-spreading; herbage usually bristly-hispid and with pustulate-based setose hairs, also often densely strigose; plants usually of lower elevations than montane..... Cryptantha
- 12 Plants slender annuals
- 14 Nutlets attached at their base to a flat gynobase, smooth and glossy on both sides, flattened-ovoid, the margins acute, the inner face not keeled or grooved; corolla blue; rare, currently known from Utah only from near Flaming Gorge Reservoir..... Myosotis
- 14 Nutlets attached laterally to a conical gynobase and with a groove or keel running the length of the ventral face; corolla white; distribution various
- 15 Ventral face of nutlet with a longitudinal elevated keel or ridge; plants of drying mud of ephemeral pools and reservoir, lake, and stream margins..... Plagiobothrys
- 15 Ventral face of nutlet with a longitudinal, impressed groove or slit; plants of mostly dry sites..... Cryptantha

Amsinckia Lehm. Fiddleneck

Amsinckia retrorsa Suksd. Rough f. Erect, bristly, usually weedy annuals; inflorescence of 1-sided scorpoid cymes, the branches elongating with age; corolla yellow-orange, the throat open, fornices obsolete; nutlets coarsely roughened or tessellate, attached near the base of the ventral face to a short-pyramidal gynobase; cotyledons deeply lobed. We have a single record (Higgins 13946) from Bryant's Fork campground, w. side of Strawberry Reservoir, Wasatch Co., from a sagebrush-aspen community.

Asperugo L. Catchweed; Madwort

Asperugo procumbens L. Common c. Nutlets obliquely compressed, ovate, attached above the middle, enveloped in the calyx; other characters as given in the key. A sparingly introduced weed of fairly moist places, our only record (Neese and Peterson 5619) from the Three Corner area in Daggett Co., near a heavily used spring at about 7,300 ft.

Cryptantha Lehm. Cryptantha; Catseye

Plants annual, perennial, or biennial; herbage pubescent, usually harshly hispid or setose; corolla usually white, sometimes yellow, the fornices usually yellow; nutlets smooth to variously sculptured, 1-4

BORAGINACEAE

maturing, attached most of their length to an elongate, narrowly pyramidal gynobase; style slender, included or exerted; stigma capitate.

Our cryptanthas comprise 2 distinct groups: the small-flowered annuals (Section *Krynitzkia*) and the showy-flowered perennials (Section *Oreocarya*). Characters of the nutlets such as surface texture, size, number maturing, and size and shape of attachment scar are generally consistent for each species and serve as useful diagnostic features. They are especially important in the annual species, since the annuals are often vegetatively similar. A dissecting scope is often required for adequate evaluation of nutlet characters; also, these characters are not always evident except in fully mature fruit, a time of phenology when the plants are seldom noticed or collected. The following keys emphasize vegetative characters whenever possible to facilitate identification of immature material.

- 1 Slender annuals from taproots; basal leaf rosette absent; corolla inconspicuous, the limb not more than 2.5 mm wide (Section *Krynitzkia*)..... KEY 1 P. 76
- 1 Biennials or perennials from stout caudices; basal leaves well-developed; corolla showy, the limb 4-14 mm wide (Section *Oreocarya*)..... KEY 2 P. 76

KEY 1

- 1 Nutlets with conspicuous white marginal wings, these irregularly toothed along the margin, at maturity the wings partially exposed between the calyx lobes..... *C. pterocarya*
- 1 Nutlets not winged, concealed by the calyx
 - 2 Calyx circumscissile, at maturity fracturing above the midpoint, the green apical portion falling away as a unit from the paler scarious cupulate base; plants diminutive, branched from the base, forming small cushions 1-5 cm high; inflorescence congested, bracteate throughout, not elongating in age..... *C. circumscissa*
 - 2 Calyx not circumscissile; plants (except in the most depauperate) taller than 5 cm; inflorescence not bracteate throughout (some of the lowermost flowers sometimes subtended by leafy bracts)
 - 3 Calyx becoming stiffly recurved, asymmetrical, bent at base; stems strigose, the hairs all or nearly all closely appressed..... *C. recurvata*
 - 3 Calyx symmetrical, not bent or curved at base; stems hispid with stiffly spreading hairs, sometimes also with appressed hairs
 - 4 Cymes borne in terminal, more or less globose clusters at the end of slender peduncles, congested, scarcely elongating in age; nutlets solitary, only 1 maturing per flower, smooth and shining; calyx densely pubescent with soft, straight, white hairs, with few or no pustulate-based coarse bristle-hairs..... *C. gracilis*
 - 4 Cymes elongating in fruit, at least a few of the mature lower flowers remote from the apex; all 4 nutlets maturing in most of the flowers; calyx bristly with coarse, stiffly spreading hairs
 - 5 Nutlets roughened, the surface sparsely tuberculate
 - 6 Nutlets ovate, all alike..... *C. ambigua*
 - 6 Nutlets lanceolate, heteromorphic, the one nearest the stem slightly larger, often more firmly attached, of different texture, and smoother or more sparsely tuberculate than the others..... *C. kelseyana*
 - 5 Nutlets all smooth or obscurely granular, usually glossy
 - 7 Nutlets asymmetric, the line of attachment and scar nearer one margin, not median on the ventral face; inflorescence becoming elongate, usually of 2 or 4 paired slender erect branches held well above the leaves..... *C. affinis*
 - 7 Nutlets symmetrical, the scar equidistance from the edges; inflorescence usually more freely branched or the branches spreading, or not greatly exceeding the leaves
 - 8 Nutlets with margins definitely angled..... *C. watsonii*
 - 8 Nutlets with margins rounded
 - 9 Nutlets lanceolate; plants of very sandy places..... *C. fendleri*
 - 9 Nutlets broadly ovate; plants seldom of very sandy places..... *C. torreyana*

KEY 2

- 1 Corolla tube mostly longer than the calyx; style exceeding mature nutlets by (2.3) 4-8 mm, usually equalling or exceeding the calyx in all stages of phenology
 - 2 Corolla bright yellow; nutlets at maturity lanceolate, smooth and glossy, 1 (rarely 2 or 3) maturing *C. flava*
 - 2 Corolla white (rarely light yellow in *C. flavoculata* but then nutlets coarsely roughened, ovate, all 4 usually maturing)
 - 3 Corolla limb campanulate, never flat-opening
 - 4 Plants biennial or (rarely) short-lived perennial from a simple taproot or sparingly branched caudex; corolla tube, when withered, filiform, 0.2-0.5 mm in diameter, evidently swollen at base near nutlets and at summit near anthers; pubescence whitish or obscurely yellowish; nutlets 1.6-1.8 mm long, finely roughened dorsally; widespread..... *C. rollinsii*

- 4 Plants perennial from much-branched caudices, forming large mounds in age; corolla tube when withered 1-1.5 mm in diameter, the sides parallel, not swollen at base nor summit; pubescence usually prominently yellowish, harshly bristly; nutlets 2.1-2.3 mm long, smooth dorsally; known only from barren shale knolls of the E. Tavaputs Plateau..... C. barnebyi
- 3 Corolla limb flat-opening
- 5 Plants not over 15 cm tall, uncommon; leaves often folded, not over 4 mm wide; corolla fornicies when fresh low, rounded, as broad as long; nutlet scar closed..... C. paradoxa
- 5 Plants often over 15 cm tall, widespread, common; some leaves usually well over 4 mm wide; corolla fornicies elongate, evidently longer than wide; nutlet scar open..... C. flavoculata
- 1 Corolla tube about equalling the calyx; style exceeding the mature nutlets by 2 mm or less, conspicuously shorter than the calyx in all stages of phenology
- 6 Pustulate hairs absent or inconspicuous on upper side of active leaves; the upper side closely silky-strigose, with a satiny sheen
- 7 Plants long-lived, caespitose with a much-branched caudex, forming mounds; leaves silky strigose on both sides; hairs of lower stem appressed; nutlets muriccate..... C. breviflora
- 7 Plants short-lived, from a simple taproot or sparingly branched caudex, never forming mounds; leaves usually bristly-hairy on lower side with evident pustulate-based hairs; hairs of lower stem widely spreading; nutlets rugose..... C. sericea
- 6 Pustulate hairs usually rather prominent on upper side of active leaves, nonpustulate hairs often rather harsh, the leaves never with a satiny sheen
- 8 Limb of corolla 11-15 mm wide; style exceeding mature nutlet by 1.5-2 mm, conspicuously widened near base, tapering to tip; plants known from exposed white shale barrens of the E. Tavaputs Plateau..... C. grahamii
- 8 Limb of corolla not over 10 mm wide; style exceeding mature nutlet by 1 mm or less; plants not restricted as above
- 9 Plants strict, erect, 10-40 cm tall, biennial or short-lived perennials from simple taproots or sparingly branched caudices; pubescence harshly setose; nutlets glossy, sparingly rugose on dorsal surface, smooth on ventral surface; known from the n. and s. flanks of the Uinta Mts. in Daggett and e. Uintah Cos. and in near-adjacent Colorado..... C. stricta
- 9 Plants caespitose, or not distributed as above; seldom over 15 cm tall; nutlets roughened and dull both dorsally and ventrally
- 10 Plants short-lived perennials, not especially caespitose, entering our area in Argyle Canyon of W. Tavaputs Plateau; leaves sometimes over 4 cm long; calyx 4-5 mm long at anthesis; flowers white when dry; pubescence of calyx whitish, setose-hirsute; nutlets bowed, the margins not in contact, the scar open..... C. mensana
- 10 Plants long-lived perennials, sometimes caespitose mound-forming; leaves not over 4 cm long; calyx 2-4 mm long at anthesis; flowers white or yellowish when dry; pubescence of calyx often yellowish, subtomentose; nutlets not bowed, their margins in contact
- 11 Plants known (in our area) from Daggett Co. on Phil Pico Mt. and in Browns Park, and in adjacent Moffat Co.; mound plants, forming dense low clumps; stems short, the above-ground portion of plants usually shorter than 0.8 dm; calyx short, about 4 mm long at fruiting; corolla white; nutlets rugose, the projections rounded..... C. caespitosa
- 11 Plants widely distributed in the Basin but not from Daggett or Moffat Cos.; plants caespitose but not forming mats or mounds, often taller than 1 dm; calyx at fruiting usually 5-8 mm long; corolla (in our area) light yellow fading yellowish-brown; nutlets muriccate-rugulose, the projections often acute..... C. humilis

Cryptantha affinis (Gray) Greene Uncommon; our few records from near Strawberry Reservoir and from n. of Vernal; disturbed places in sagebrush, bitterbrush, and aspen communities; 6,000-7,700 ft; June-July.

Cryptantha ambigua (Gray) Greene Uncommon; our 2 records from Strawberry Valley and Diamond Mt. and reported for Zenobia Peak (Bradley 1950). The subtle nutlet characters given in the key seem to be the only consistent means of separating this from C. kelseyana. See note under that species.

Cryptantha barnebyi Johnst. Barneby c. Narrowly endemic, locally abundant; restricted to domed or gently sloping white shale barrens of the Green River Formation between Hill Creek and the Colorado border, mostly in the pinyon-juniper zone, usually growing with Chamaechaenactis scaposa, Cirsium barnebyi, Eriogonum ephedroides, Hymenoxys acaulis, and Machaeranthera grindelioides; 5,600-7,200 ft; May-June.

Cryptantha breviflora (Osterh.) Payson Smallflower c. Endemic, locally common; sporadic across the Basin from Fruitland to the Colorado border; mixed desert shrub and juniper communities on sparsely vegetated, dry, often seleniferous or otherwise poor substrates of eroding knolls and badland slopes in numerous geologic formations, especially common on the Duchesne River Formation; 4,800-6,500 (7,400 on Red Mt., Uintah Co.) ft; late April-May.

Cryptantha caespitosa (A. Nels.) Payson Tufted c. Uncommon; known in our area from Brown's Park in Daggett and Moffat Cos., where it grows on barren sandy or tuffaceous ridges and knolls in the pinyon-juniper zone, and the summit of Phil Pico Mt. w. of Manila, on barren ridges with limber pine; June-July.

Cryptantha circumscissa (H. & A.) Johnst. Cushion c. Uncommon; our few records from w. Duchesne Co. and in the vicinity of Vernal; usually in pinyon-juniper or sagebrush communities, in sand or sandstone crevices; 5,400-7,600 ft; May-July.

Cryptantha fendleri (Gray) Greene Common; s. flank of the Uinta Mts., Raven Ridge, and Moffat Co.; sagebrush-grassland, rabbitbrush, pinyon-juniper, and mt. brush communities and along roadsides, usually on sand dunes or in sandy places; 5,600-9,000 ft; June-Sept.

Cryptantha flava (A. Nels.) Payson Yellow c. Widespread; common in many plant communities and on many substrates, especially common in sand and on sandstone outcrops, our records from pinyon-juniper, rabbitbrush-Indian rice grass, sagebrush, galleta-black sage, bitterbrush, and curl leaf mt. mahogany communities; 4,700-7,200 ft; May-July.

Cryptantha flavoculata (A. Nels.) Payson Roughened c. Probably our most common and widespread cryptantha; salt desert shrub, mixed desert shrub, pinyon-juniper, sagebrush, and mt. brush communities in gravelly, shaley, clay or alluvial soils, usually in less sandy places than C. flava; from valley bottoms to about 9,000 ft; May-July. Cryptantha flavoculata is a variable taxon. Future study may justify recognition of infraspecific taxa, but little if any correlation is apparent in the geographic and morphological variation of our specimens.

Cryptantha gracilis Osterh. Common in the e. end of the area in Uintah, Daggett, Moffat, and Rio Blanco Cos.; apparently less common westward; sagebrush, pinyon-juniper, and ponderosa pine communities; 5,000-6,500 (8,200) ft; May-July.

Cryptantha grahamii Johnst. Graham c. Endemic, locally common; Gate Canyon in se. Duchesne Co. eastward to the Willow Creek-Buck Canyon area; salt desert shrub and pinyon-juniper communities, restricted to sparsely vegetated shale terraces, benches, gentle talus slopes, and knolls of Green River Formation; 4,750-6,750 ft; May-June. This distinctive species grows on similar habitats with much the same distribution as C. barnebyi, but the species are quite different, and they do not grow together.

Cryptantha humilis (Gray) Payson Low c. [C. nana (Eastw.) Payson] Common, scattered across the Basin in Duchesne, Uintah, and Rio Blanco Cos.; salt desert and mixed desert shrub, and pinyon-juniper communities, usually on dry, sparsely vegetated ridges and slopes, usually on soils derived from Duchesne River and Green River Formations; 4,800-7,800 ft; late April-June. Our plants are referable to var. nana (Eastw.) Higgins.

Cryptantha kelseyana Greene Common at moderately low elevations in Uintah and Daggett Cos., apparently rare in Duchesne Co., and absent from the w. end of the Basin; usually in desert shrub communities with sagebrush, greasewood, horsebrush, shadscale, and hopsage; 4,800-8,200 ft; May-Aug. Note: Cryptantha pattersonii (Gray) Greene is reported (Higgins 1972) to occur in the Basin at a few widely scattered locations. It is closely related to C. kelseyana, differing in having slightly smaller, relatively broader nutlets, the odd one nearly smooth, and to C. ambigua, differing in having slightly heteromorphic rather than homomorphic nutlets. We have been unable to correlate nutlet variations in C. kelseyana-like material with geographic or other morphological features; further study is indicated. Graham 7872 (CM!), referred to as C. scoparia A. Nels. (Graham 1937), belongs here.

Cryptantha mensana (Jones) Payson Table c. Rare; our single record (Neese & England 5861) is from Argyle Canyon, Duchesne Co., at 7,500 ft in a mt. brush community. Additional specimens from just outside our area are from the top of Soldier Creek drainage in Carbon Co. Note: a similar species, C. bakeri Payson, has been collected just outside the Basin near the Carbon-Duchesne Co. line due n. of Price. It would key here or to C. sericea, and is characterized by nutlets that are more sharply rugose and with a closed, not open scar. It is to be expected on limestone or limey shale of the Green River Formation at about 7,200 ft in sagebrush communities.

Cryptantha paradoxa (A. Nels.) Payson Uncommon; gravelly margins of abandoned old pediments and river terraces above the Green and Duchesne Rivers (1 record from near Steinaker Reservoir); desert shrub and juniper communities; 4,700-5,600 ft; April-May.

Cryptantha pterocarya (Torr.) Greene Winged c. Occasional; Uintah and Rio Blanco Cos.; usually in sandy pockets and crevices of sandstone outcrops in juniper-mountain mahogany communities; 5,300-6,000 ft; May-July. Graham 7894 (CM!) referred to as C. scoparia A. Nels. (Graham 1937), belongs here.

Cryptantha recurvata Cov. Recurved c. The 2 specimens seen are from Moffat Co. 13 mi e. of Dinosaur (Dunn & Gallian 17731 BRY) roadside and adjacent sagebrush-Bromus community and Dinosaur Ledge (Quary), Dinosaur National Monument, Morrison Formation (Weber 5445 DINO). Its distribution is generally much to the s. and w. of our area. Cronquist and others (1984) stated that it may be merely introduced in Moffat Co.

Cryptantha rollinsii Johnst. Rollins c. Endemic, common in the central part of the Basin, uncommon near Raven Ridge; desert shrub and pinyon-juniper communities, usually on semibarren land of shaly or silty-clay slopes; 4,800-6,800 ft; late May-early Aug.

Cryptantha sericea (Gray) Payson Silky c. Common; widespread; apparently rare or absent on the s. slope of the Uinta Mts. w. of Vernal; many plant communities, but mostly in dry places of the pinyon-juniper zone on poor quality soils; 5,400-9,000 ft; May-July.

Cryptantha stricta (Osterh.) Payson Locally common; entering our area from the ne. in Moffat and Daggett Cos. (Phil Pico Mt. and Browns Park), se. to Blue Mt. and Raven Ridge, Uintah Co.; desert shrub, juniper, sagebrush-grass, and mt. brush-limber pine communities, usually on rocky ridges or on barrens; 6,600-9,400 ft; June-July. Note: anomalous specimens (Neese & Fullmer 11715; & Smith and others 1716) from

the sw. rim of the Blue Mt. plateau are tentatively placed here. They have morphological features of C. rugulosa (Payson) Payson, a species well outside our range in Nevada and w. Utah.

Cryptantha torreyana (Gray) Greene Torrey c. Uncommon; entering our area at the w. edge near Strawberry Reservoir, our 2 records at 7,600 ft in a little rabbitbrush-sagebrush community (Neese 8443) and at 8,300 ft in an aspen-tall forb community (Goodrich 19363).

Cryptantha watsonii (Gray) Greene Watson c. Occasional; our records from the e. end of the Uinta Mts. and in Moffat Co.; sagebrush-grassland and ponderosa pine communities; 7,000-8,000 ft; June-Aug. An additional specimen from Duchesne Co. (Nutter's Ridge) is from a chained and seeded area.

Cynoglossum L. Houndstongue

Cynoglossum officinale L. Common h. Taprooted, single-stemmed, villous biennial; leaves elliptic to oblong or lanceolate, the lower ones petioled; inflorescence branches elongating, strongly coiled only when young; flowers racemously arranged, calyx lobes broad, blunt, in fruit enlarging to 8 mm long and loosely spreading or reflexed; corolla short-salverform or salverform-campanulate, quickly deciduous, 6-9 mm wide, the fornicies broadly rounded; nutlets attached to style at tips after splitting from base. Sparingly introduced, locally abundant in disturbed places, our records from Wasatch and Duchesne Cos. in Strawberry Valley, the W. Tavaputs Plateau, and near Boneta, probably occurring elsewhere. In dry or fairly moist places at mid-elevations.

Eritrichium Schrad.

Eritrichium nanum (Vill.) Schrad. Alpine forget-me-not. (E. argenteum W. F. Wight; E. elongatum Rydb.) Plants subcaulescent or with flowering stems to 1 dm tall; leaves in basal tufts and on lower portions of flowering stems, elliptic, to about 15 mm long; flowers borne in cymose clusters; corolla sky-blue, the tube and fornicies usually white or yellowish, the limb 4-8 mm wide; nutlets 1-4, glabrous, the dorsal surface crowned with a lacerate submarginal flange. Occasional above timberline in the Uinta Mts. on open rocky slopes and ridges; July-Aug. Ours is var. elongatum (Rydb.) Cronq.

Hackelia Opiz Stickseed; Wild Forget-me-not; Tickweed

Biennial to perennial taprooted herbs, often somewhat weedy; leaves basal and cauline, reduced upward, becoming bractlike near the base of the inflorescence; inflorescence branches elongating in age, bractless except near base; corolla rotate to short-salverform, blue, or white with blue markings, the fornicies usually white; nutlets with a single marginal ring of barbed or glochidiate prickles, these dilated and flattened toward the base.

- 1 Flowers white with blue markings near the center; fornicies short-hairy; nutlets with numerous small intramargined prickles..... H. patens
 1 Flowers blue (sometimes pinkish when young); fornicies not pubescent; nutlets with 0-few intramarginal prickles
 2 Plants biennial, from a mostly unbranched caudex; lower leaves often withering by or soon after anthesis; intramarginal face of all or almost all nutlets with no prickles..... H. floribunda
 2 Plants long-lived perennials from a branched caudex; lower leaves seldom withered by anthesis; intramarginal face of nutlets with a few minute barbed prickles..... H. micrantha

Hackelia floribunda (Lehm.) Johnst. Western s., western t. Fairly common at the w. end of the Basin, from the Rock Creek drainage w. and s. to Strawberry Valley and on the W. Tavaputs Plateau e. to Indian Canyon; also (less common) nw. of Vernal in the Dry Fork area, on the E. Tavaputs Plateau, and in the Piceance Basin; tall forb communities of the mt. brush and montane zones, usually with aspen and sagebrush, often in disturbed areas; 7,200-9,000 ft; mid May-Aug. England 219 (UI!) [the basis for H. gracilentia (Eastw.) I. M. Johnston and H. leptophylla (Rydb.) I. M. Johnston as listed in Goodrich and others 1981] belongs here.

Hackelia micrantha (Eastw.) Gentry Jessica s., Jessie t. [H. jessicae (McGreg.) Brand] With similar distribution and habitat as the preceding species at the w. end of the area, absent eastward, not so much associated with disturbance; 7,100-10,000 ft; June-Aug. Similar to the preceding species, immature specimens often difficult to place. The flowers tend to be a little larger and more showy.

Hackelia patens (Nutt.) Johnst. Common s., white t. Uncommon; our 3 records from Strawberry Valley (Goodrich 18835) and the upper Duchesne River drainage (Goodrich 18776, 4093) in aspen-oak and aspen-sagebrush-snowberry communities; 7,000-8,000 ft; June-July. More common westward in the Wasatch Mts.

Heliotropium L. Heliotrope

Heliotropium curassavicum L. Salt h., quailplant. (H. spathulatum Rydb.; H. xerophilum Cockerell) Characteristics as given in the key, plus ovary scarcely lobed and nutlets with a marginal corky or bony ridge, the scar asymmetrically placed near the summit of the ventral face. Apparently rare; our few records from the Ouray Wildlife Refuge, clay soil at margin of a disturbed swamp community (B. Welsh & G.

BORAGINACEAE

Moore 189), from Linwood Bridge (Flowers 127 UT), and from Moffat Co. at Irish Lakes (Peterson & Kennedy 83-386). Also cited for the Green River near Quarry (Graham 1937). Our plants are referable to var. obovatum DC.

Lappula Gilib. Stickseed

Taprooted annuals (usually) or biennials; herbage puberulent, hirsute, or partly strigose, not setose; stems mostly erect, simple, or variously branched; inflorescence branches spreading-ascending, racemose; corolla blue or white, small and relatively inconspicuous, short-funnelform, the throat closed by fornicies.

- 1 Nutlets ringed with 2-3 rows of slender distinct prickles; corolla 2.5-4 mm wide..... L. squarrosa
- 1 Nutlets ringed with a single row of prickles, these distinct or (usually) weakly to strongly fused, swollen and cupulate at base; corolla averaging smaller, usually about 2 mm wide..... L. redowskii

Lappula redowskii (Hornem.) Greene Desert s. [L. occidentalis (Wats.) Greene; L. texana (Scheele) Britt.] Common; from valley bottoms to the montane zone, especially abundant in disturbed places; widespread; many plant communities and soils, in dry to moderately mesic places; 4,900-8,300 ft; late April-July. The phase with the prickles seated on and confluent with a swollen cupulate collar may be recognized as var. cupulata (A. Gray) Jones.

Lappula squarrosa (Ritz.) Dumort. European s. (L. echinata Gilib.; L. myosotis Moench.) Uncommon; introduced from Eurasia, widely scattered in our area in disturbed or overgrazed places; our 3 records from 7,400-8,400 ft in Daggett Co. 12 mi s. of Manila, Uintah Co. between Dry Fork and Tridell, and Garfield Co. at Douglas Pass.

Lithospermum L. Stoneseed; Gromwell; Puccoon

Perennial herbs, the pubescence not bristly; roots red or purple-staining; flowers axillary or in short, few-flowered, terminal clusters, the inflorescence not noticeably coiled; fornicies absent or inconspicuous; nutlets ovate, hard and glossy and appearing enameled, sparingly pitted, keeled centrally, 1-4 maturing.

- 1 Corolla (when developing) yellow, conspicuous, the tube mostly 2-4 cm long, the limb about 1.5 cm wide, the lobes erose; flowers of 2 kinds, the early season ones large, showy, long-styled, seldom setting seed, the later ones remaining closed, short-styled, highly fertile; nutlets mostly 3-4 mm long..... L. incisum
- 1 Corolla light yellowish-green, inconspicuous, about 0.5 cm long; flowers homomorphic and homostylis; nutlets mostly 4.5-7 mm long..... L. ruderales

Lithospermum incisum Lehm. Fringed s., trumpet p. Occasional; Rock Creek and eastward on foot slopes of the Uinta Mts., Tavaputs Plateaus, Piceance Basin, and Daggett Co.; rocky, gravelly, or sandy places in desert shrub, sagebrush-grassland, and pinyon-juniper communities; 4,800-8,200 ft; May-June (the late season inconspicuous flowers are produced in late summer and fall).

Lithospermum ruderales Dougl. ex Lehm. S., yellow s. (L. lanceolatum Rydb.) Occasional; our records from the Uinta Mts. of e. Duchesne Co. and of Uintah and Daggett Cos., also from the E. Tavaputs Plateau and Piceance Basin; pinyon-juniper, mt. brush, bitterbrush, Mt. big sagebrush-grassland, and open ponderosa pine communities; 7,000-8,100 ft; May-June.

Mertensia Roth Bluebells

Caulescent leafy herbs, the leaves often unilaterally oriented; flowers borne in the upper axils and at tips of stems in inconspicuously coiled modified cymes, usually somewhat nodding or pendulous; corolla tubular near the base, flaring distally to a lobed campanulate limb; nutlets ovoid, roughened, attached laterally.

- 1 Plants relatively robust and tall (greater than 4 dm in well-developed stems), summer-blooming, of shady moist places; stem leaves relatively broad, generally over 1.5 cm wide, with well-developed evident lateral veins
 - 2 Calyx 1/3 or less as long as the corolla tube in most flowers, the lobes blunt; anthers mostly less than 2 mm long; plants of wide distribution in the Uinta Mts..... M. ciliata
 - 2 Calyx mostly 1/2 or more as long as the corolla tube, the lobes acute; anthers mostly longer than 2 mm; plants of Wasatch and w. Duchesne Cos., and of the Piceance Basin of Colorado..... M. arizonica
- 1 Plants relatively short (almost always less than 4 dm tall), spring-blooming of relatively dry or rocky open places; stem leaves relatively narrow, mostly less than 1.5 cm wide; lateral veins of stem leaves absent or inconspicuous
 - 3 Style included, short, 2.5 mm or less; anthers virtually sessile, included within the tube; flowers mostly erect, not strongly nodding..... M. brevistyla

- 3 Style 4 mm or more long, exceeding or about equalling the corolla tube; stamens shortly but evidently exerted from the tube, the filaments more or less equalling the anthers; flowers often noticeably nodding
- 4 Corolla tube definitely longer than the limb in most flowers, glabrous within..... M. oblongifolia
- 4 Corolla tube more or less equalling the limb, pubescent within at least near the base
- 5 Lower leaf surface glabrous; upper leaf surface evenly and densely strigose, the hairs mostly parallel and directed toward the margins; plants mostly of moderate elevations in the mts.....
..... M. fusiformis
- 5 Leaves glabrous to pubescent on one or both surfaces, the upper and lower surfaces not markedly different, or the hairs pointing toward the leaf tips not strongly oriented toward the margins; plants mostly of alpine or subalpine places..... M. viridis

Mertensia arizonica Greene Arizona b. [M. a. var. grahamii L. O. Williams; M. a. var. leonardii (Rydb.) I. M. Johnston] Our records from Strawberry Valley and the upper Duchesne River drainage, also Piceance Basin in Rio Blanco Co., (Kelley & Riefler 82-124); mostly in aspen, spruce, and sagebrush-meadow communities, usually associated with tall forbs on deep loamy soil; 7,600-9,600 ft; June-Aug.

Mertensia brevistyla Wats. Shortstyle b. Uncommon; our few records from Strawberry Valley to the upper Duchesne River drainage, listed for Carter Creek, Daggett Co. (Flowers and others 1960) but we have not found a specimen from here; dry to moist soil, often on rocky slopes and ridges, in Mt. big sagebrush, aspen-spruce, and fir communities; 7,600-9,500 ft; May-Aug, often one of the first plants in bloom in an area.

Mertensia ciliata (Jones) G. Don. Streamside b. Common across the Uinta Mts. (but apparently absent from our area w. of Duchesne Co., where it is replaced by M. arizonica); spruce-lodgepole, spruce-Ribes, willow, and wet meadow communities, often in shady places along streams, or above treeline in talus below melting snowbanks; 8,000-12,500 ft; June-Sept.

Mertensia fusiformis Greene Spindleroot b. Common in the Uinta Mts., occasional in Daggett Co., E. Tavaputs Plateau, and the Piceance Basin of Colorado, apparently absent from Strawberry Valley and the W. Tavaputs Plateau; characteristically in Vasey sagebrush-grassland, but occurring as well in open spruce, fir, and lodgepole pine woodlands, and pinyon-juniper, mt. brush, and riparian communities; 6,000-10,650 ft; May-Aug. A few specimens seen from the upper limits of the elevational range of M. fusiformis are scarcely separable from M. viridis, and may be of hybrid origin.

Mertensia oblongifolia (Nutt.) G. Don. Oblongleaf b. Locally common; our few records all from the Yampa Plateau of Blue Mt. and from Dinosaur National Monument (but widespread outside our area) on sandy soil derived from the Weber Formation; pinyon-juniper, ponderosa, and Vasey sagebrush communities; 6,000-8,150 ft; May-June.

Mertensia viridis A. Nels. Mt. b. (M. bakeri Greene; M. viridis var. cana L. O. Williams; M. v. var. dilatata L. O. Williams) Common in the high Uinta Mts. of Duchesne and Uintah Cos., alpine ridges, boulder fields, rock stripes, and open slopes, near or above timberline, with Geum, sedges, and grasses; 10,400-12,700 ft; also elevational disjunct in Daggett Co. and adjacent Moffat Co.; ponderosa, sagebrush-mahogany, pinyon-juniper, and grass-forb communities at 6,000-8,400 ft; May-Sept. The high elevational material is freely pubescent on leaf and calyx lobe surfaces, at least when young; low-elevational specimens are essentially glabrous on the leaves (except for ciliate margins and occasionally a few rudimentary pustulate hairs) and backs of the ciliate calyx lobes. Higgins (1979) believes the M. viridis complex to represent ecotypes of the larger, more wide-ranging M. lanceolata (Pursh) A. DC. Our material might best be treated infraspecifically under that name.

Myosotis L. Forget-me-not

Myosotis micrantha Pallas ex Lehm. Small-flowered f. Slender annual or winter annual, usually freely branched from base, beginning to flower while small; racemes erect, elongating with age, eventually to 2.3 dm tall, leafy bracteate near base, naked above; calyx at maturity about 4 mm long, lobed half-way to base, short-pedicelled; flowers minute, blue; nutlets about 1 mm long. A single record (Neese 13809) from Greendale Campground, Flaming Gorge Reservoir, from roadside and disturbed meadow; native of Eurasia, known previously in the Intermountain area only from Washoe Co., Nevada.

Plagiobothrys F. & M. Popcornflower

Plagiobothrys scouleri (H. & A.) Johnst. Scouler p. [P. cognatus (Greene) I. M. Johnston; P. nelsonii (Greene) Johnston; P. scopulorum Greene; Allocarya nitans Greene] Low annual, the stems 1-many, usually spreading to erect or sometimes prostrate, to about 2 dm long; herbage more or less strigose; lower leaves opposite, the bases connate; flowers white, small, about 2 mm wide; nutlets rough-tuberculate, attached laterally near the base. Our records from the Uinta Mts., w. of the Duchesne River drainage and e. of the Ashley Creek drainage; apparently rare or absent from the central part of the Basin; common in drying mud or crevices of sandstone in fresh water habitats along streams, reservoir margins, and potholes, and in montane wet meadows, in Vasey sagebrush, silver sage, sedge-willow, lodgepole, and ponderosa communities; 7,000-9,600 ft; June-Aug. Our plants are referable to var. penicillatus (Greene) Cronq.

Tiquilia Persoon

Tiquilia nuttallii (Hook.) A. Richardson (Coldenia nuttallii Hook.) Taprooted, prostrate annual, the dichotomously divaricate branches forming a flat, open mat; herbage hirsute, prickly-hispid in the inflorescence; flowers sessile, the corolla tubular-funnelform, about 3 mm long; nutlets smooth, lance-ovate, about 1 mm long. Uncommon; our records clustered in the areas of Ouray and the Bonanza-Red Wash area of Uintah Co., also near Pariette Draw, Duchesne Co.; sandy places of salt desert shrub communities; 4,800-5150 ft; May-Sept.

BRASSICACEAE (CRUCIFERAE) Mustard Family

Annual or perennial herbs, glabrous or often pubescent with simple, forked, or stellate hairs; leaves alternate or basal, simple to compound, the stem leaves sometimes sessile and auriculate; inflorescence mostly a raceme, spike, or corymb; flowers bisexual, regular or nearly so; sepals 4; petals 4, rarely lacking; stamens 6, the outer shorter than and inserted lower than the other 4, rarely 4 or 2; ovary superior, usually 2-loculed, with a thin papery (when dry) partition (septum), the valves usually separating from the partition in fruit; fruit (pods) linear or nearly so and several times longer than wide (silique) or mostly not linear and 1-3 times as long as wide (silicle), terete or square or compressed parallel or contrary to the septum, seeds 1-several per locule. A large and complex family in which generic lines are as difficult or more so to determine than are species lines.

- 1 Fruit 2-9 mm long, or if longer then about as wide as long and either bladdery inflated and with a style 3.5-7 mm long or strongly flattened with thin broad wings, mostly not linear; petals lacking or 1-5 (7.5) mm long, or if longer then ovaries with distinct slender styles, and plants densely covered with appressed many-rayed stellate hairs (Physaria and Lesquerella), white or yellow (or sometimes pink to lavender only in Smelowskia and Thlaspi montanum)..... KEY 1 P. 82
- 1 Fruit (8) 10-100 (130) mm long, linear, not inflated, the style not over 3 mm long (fruit sometimes beaked and the beak simulating a style); petals often 5-28 mm long, but shorter in several genera, white, yellow, pink or purplish; ovaries without distinct slender styles; plants mostly not appressed-stellate pubescent..... KEY 2 P. 83

KEY 1

- 1 Lower leaves compound, more or less finely dissected; upper leaves appearing perfoliate clasping, simple, nearly orbicular, about 3.5 mm long..... Lepidium perfoliatum
- 1 Lower leaves simple to compound, but seldom finely dissected; upper leaves not appearing perfoliate clasping
- 2 Petals strongly bilobed, white; styles 2-3 mm long; plants 30-100 cm tall; leaves simple, entire.... Berteroa
- 2 Petals not strongly bilobed, if white then styles mostly shorter; plants and leaves various
- 3 Styles 2-7 mm long; petals 4-12.5 mm long, yellow; plants covered with dense, appressed many-rayed stellate hairs; leaves not strictly basal, not auriculate clasping
- 4 Fruit excluding the style 7-15 mm long, strongly inflated, often cordate at the base and retuse at the apex; leaves 7-50 mm wide, entire or toothed to pinnatifid..... Physaria
- 4 Fruit excluding the style 3-7 mm long, not or somewhat inflated, not cordate at base nor retuse at apex; leaves 1-15 mm wide, entire..... Lesquerella
- 3 Styles lacking or to 2.5 mm long; petals either less than 4 mm long or not yellow or plants scapose or not pubescent as above
- 5 Stem leaves not auriculate clasping, entire or nearly so, 3-30 mm long, rarely longer; plants pubescent at least in part with forked, branched, or stellate hairs, or if nearly glabrous or with simple hairs only, then scapose or nearly scapose with only 1-2 reduced stem leaves
- 6 Fruit orbicular, more or less winged, rounded to retuse at the apex, 3-4 mm long; plants annual, appressed-stellate pubescent, not at all scapose..... Alyssum
- 6 Fruit usually longer than wide, not winged, pointed or rounded at apex but not retuse; plants annual or perennial, usually with stalked and forked to branched hairs, sometimes scapose..... Draba
- 5 Stem leaves auriculate clasping and/or not entire, or plants glabrous or with simple hairs only and not scapose
- 7 Leaves dissected into fine segments, not auriculate; plants stellate-pubescent, annual..... Descurainia
- 7 Leaves entire or toothed to pinnatifid, but not dissected into fine segments, either auriculate clasping or plants glabrous or with simple hairs only
- 8 Leaves all pinnatifid, not auriculate, pubescent with forked hairs; plants high montane to alpine on the Uinta Mts., perennial; petals white to lavender; fruit 5-9 mm long..... Smelowskia
- 8 Stem leaves not pinnatifid, or if so then glabrous or with simple hairs only; leaves auriculate and/or glabrous or with simple hairs only; plants, petals, and fruit various

- 9 Plants pubescent with forked or branched hairs, introduced annual weeds; stem leaves sessile and auriculate; pedicels of fruit 6-18 mm long
- 10 Fruit obcordate, flattened; petals white or pinkish, 2-4 mm long; leaves of the basal rosette deeply lobed to pinnatifid..... Capsella
- 10 Fruit obovoid, slightly inflated, not at all flattened; petals cream to white, 3-5 mm long; leaves of basal rosette lacking or withered by anthesis, entire or obscurely toothed..... Camelina
- 9 Plants glabrous or with simple hairs only, annual or perennial; stem leaves various; pedicels of fruit various but often shorter than above
- 11 Petals yellow; plants 35-100 cm tall, introduced weeds, stem leaves entire or nearly so, the lower ones 3.5-15 cm long; fruit flattened, 10-18 mm long, 4-7 mm wide, 1-seeded, the mature pedicels reflexed..... Isatis
- 11 Petals yellow only in Rorippa and then plants not as above in all features
- 12 Petals yellow, 0.5-3.5 mm long; fruit rounded in cross section, usually distinctly longer than wide, with several to many seeds..... Rorippa
- 12 Petals white or pinkish, 0.7-5 (7.5) mm long, or sometimes lacking; fruit flattened in cross section and/or only 1-2 seeded, or about as broad as long
- 13 Stem leaves auriculate
- 14 Plants glabrous and glaucous, annual, introduced weeds, with fruit 10-17 mm long, or perennial and high montane to alpine on the Uinta Mts..... Thlaspi
- 14 Plants pubescent, introduced weeds with fruit not over 6 mm long, annual or perennial, not high montane or alpine
- 15 Plants annual, from taproots; fruit 5-6 mm long, longer than wide; upper cauline leaves lanceolate; fruiting racemes 5-10 cm long or more..... Lepidium campestre
- 15 Plants perennial, from aggressive rhizomes; fruit less than 5 mm long, wider than long; upper cauline leaves ovate; fruiting racemes 2-5 cm long..... Cardaria
- 13 Stem leaves not auriculate
- 16 Fruit flattened, with only 1 seed per locule; plants glabrous or pubescent, perennial, or if annual then fruit narrowly winged and notched at the apex..... Lepidium
- 16 Fruit not strongly flattened, not winged, not notched at the apex, several seeded; plants annual, glabrous..... Hutchinsia

KEY 2

- 1 Plants pubescent at least in part (note basal leaves) with forked, branched, or stellate hairs, sometimes nearly glabrous or with simple hairs in Draba but then plants scapose or nearly scapose with only 1-2 reduced stem leaves; leaves entire to toothed, not auriculate except in Arabis and Halimolobos
- 2 Leaves pinnatifid or pinnately compound, dissected into rather fine segments..... Descurainia
- 2 Leaves entire to toothed but not dissected
- 3 Fruit 2-4 times longer than wide, or if narrower then plants scapose, 4-20 mm long, 2-5 mm wide; petals yellow or white, 1.7-5 (7) mm long; plants annual or perennial, with dendritic hairs or scapose or nearly scapose with only 1-2 reduced stem leaves, 2-20 (40) cm tall..... Draba
- 3 Fruit mostly over 8 times longer than wide, (8) 12-120 mm long, 1-2 mm wide, or if to 3 mm wide then mostly well over 20 mm long; petals various; plants various but not scapose
- 4 Petals yellow; fruit terete to square in cross section; pubescence of malpighian hairs..... Erysimum
- 4 Petals white, pink or lavender; fruit flattened, terete or square in cross section; pubescence not of malpighian hairs
- 5 Petals 15-25 mm long; leaves petioled or subsessile to auriculate, 2-20 cm long, 6-40 mm wide; fruit terete or square in cross section, 31-100 mm long; plants introduced, cultivated, persisting and sometimes escaping..... Hesperis
- 5 Petals less than 15 mm long or leaves not over 6 mm wide; plants native or introduced
- 6 Pedicels of fruit 1-2 mm long; fruit nearly terete, 33-66 mm long; petals pink or lavender, 6.2-9.5 mm long; plants annual, introduced, weedy..... Malcolmia
- 6 Pedicels of fruit 3-24 mm long; fruit usually flattened, except in Halimolobos, (8) 12-120 mm long; petals various; plants native, not or hardly weedy
- 7 Fruit erect or nearly so, the pedicels ascending and forming a 30°-40° angle with (and holding the pods away from) the axis of the raceme; racemes not dense; plants biennial (see discussion under Halimolobos virgata for further comparison with biennial species of Arabis with erect pods)..... Halimolobos
- 7 Fruit erect to pendulous, if erect then the pedicels also erect or nearly so, not holding the pods away from the axis of the racemes, the racemes usually rather dense..... Arabis
- 1 Plants glabrous or with simple hairs only, not scapose (except in Parrya and then differing from Draba with petals pink or lavender and 16-23 mm long, and with fruits 25-47 mm long); stem leaves often auriculate
- 8 Fruit not over 12 mm long; leaves pinnatifid; petals yellow; plants rhizomatous, of wet places..... Rorippa sinuata

BRASSICACEAE

- 8 At least the longer fruits regularly over 12 mm long; leaves, petals, and plants various
- 9 Some of the stem leaves compound or pinnatifid; petals white; plants aquatic or of moist places
- 10 Fruit erect, 15-30 mm long; pedicels 3-10 mm long; leaves all pinnately compound; plants annual..
..... Cardamine pensylvanica
- 10 Fruit spreading, 10-18 (25) mm long; pedicels 5-13 (20) mm long; leaves simple to pinnately compound; plants perennial from rhizomatous or stolons, submerged or emergent in water.....
..... Nasturtium
- 9 Stem leaves simple, or if not simple then petals not white; plants of dry to wet places but not aquatic
- 11 Petals yellow; stem leaves entire to deeply lobed or pinnatifid to compound..... KEY 3 P. 84
- 11 Petals white or purplish; stem leaves entire or toothed but not pinnatifid not compound except...
..... Thelypodium laxiflorum
- 12 Leaves glabrous, usually glaucous, not both strongly petiolate and cordate-ovate; stems glabrous except sometimes at the very base..... KEY 4 P. 84
- 12 Leaves pubescent, sometimes nearly glabrous except for the ciliate hairs of basal leaves; stems often pubescent, (plants sometimes glabrous in Cardamine but then the leaves strongly petiolate and cordate-ovate)..... KEY 5 P. 85

KEY 3

- 1 Stamens exerted, the filaments about twice as long as the petals; petals 10-19 mm long; fruits 30-80 mm long with a stipe 10-25 mm long; racemes 10-50 cm long or longer, many-flowered; plants perennial, 25-120 (150) cm tall..... Stanleya
- 1 Stamens about equal to or shorter than the petals; fruit pedicellate but not stipitate; racemes various but often shorter than above; plants various
- 2 Leaves compound, pinnatifid, or if only lobed then 5-20 cm long, and 3-10 cm wide; plants annual or biennial, (15) 25-120 cm tall; herbage glabrous or hirsute
- 3 Stem leaves pinnatifid with about (5) 8-20 primary lobes or divisions, not all auriculate; the primary leaf divisions often narrow; lower part of stem and parts of lower leaves strongly hirsute; fruit not beaked, 2-9 cm long; pedicels 7-20 mm long; plants annual, mostly of dry places
..... Sisymbrium
- 3 Stem leaves lobed to compound, but usually with only 3-5 primary lobes or leaflets, often auriculate; most of the primary lobes or leaflets broad and rounded; stems and leaves glabrous or hirsute; pedicels 2-6 mm long (except to 20 mm in Brassica campestris); plants various
- 4 Fruit not at all beaked, (15) 20-50 mm long; pedicels only 2-4 mm long; petals 4-6 mm long; plants biennials, of wet places, meadows and woods, not weedy..... Barbarea
- 4 Fruit constricted to a seedless beak, the beak 5-15 mm long, or if only 1-5 mm long then the fruit only 10-25 mm long; pedicels 2-6 (20) mm long; petals 5-15 mm long; plants annuals, often weedy..... Brassica
- 2 Leaves entire or toothed or sometimes the lower ones pinnatifid in Schoenrambe, but then not over 25 mm wide and plants perennial from deep seated rhizomes; plants of various stature; herbage glabrous and usually glaucous
- 5 Cauline leaves sessile and strongly auriculate, entire, the basal ones also entire; plants annual, 20-50 (70) cm tall; fruit 7-10 (13) cm long..... Conringia
- 5 Cauline leaves not auriculate, the basal ones lacking or entire to pinnatifid; plants perennial; fruit 1-7.5 cm long
- 6 Fruit 1-2 cm long; plants 10-25 cm tall, endemic to vicinity of Big Pack Mt., Uintah Co.; leaves all cauline, 0.7-2.5 cm long, 0.3-1 cm wide, entire or toothed..... Glaucocarpum
- 6 Fruit 2.5-7.5 cm long; plants 15-90 cm tall, widespread; leaves not all cauline although the basal ones usually withered by anthesis, 1.3-9.3 cm long, 0.1-2.5 cm wide, entire to pinnatifid
..... Schoenrambe

KEY 4

- 1 Stem leaves sessile and strongly auriculate
- 2 Leaves dentate at the truncate apex; fruit flattened, 5-8.5 cm long, 3-5.8 mm wide; petals chestnut-brown; sepals sometimes pubescent at the apex; plants perennial..... Streptanthus
- 2 Leaves entire and/or fruit not over 2 mm wide; petals cream, pinkish or purplish but not at all reddish- or purplish-brown; sepals glabrous; plants annual or short-lived perennial
- 3 Fruit 7-10 (13) cm long; petals white or cream, 6.2-12 mm long; leaves entire..... Conringia
- 3 Fruit 1-7.5 cm long, if over 7 cm then petals pink or purple and 11-14.5 mm long; leaves entire or toothed to sinuate dentate
- 4 Petals obovate, 3-6 mm wide, 11-14.5 mm long, constricted to a broad claw; basal leaves 3-15 mm wide; fruit 45-75 mm long; stigmas expanded and deeply bilobed..... Thelypodopsis elegans
- 4 Petals oblanceolate, 1-4 mm wide, 5-15 mm long, tapering to a narrow claw; basal leaves 10-50 mm wide; fruit 10-65 mm long; stigmas narrow, not deeply bilobed..... Thelypodium sagittatum
- 1 Stem leaves sessile or petioled but not auriculate

- 5 Stems fistulose, usually strongly inflated; calyx hirsute; fruit 7-14 cm long; pedicels 1-4 mm long, sometimes hirsute; petals brownish-purple; leaves of the basal rosette often pinnatifid; plants perennial..... Caulanthus
- 5 Stems not inflated; calyx glabrous; fruit 1-6 cm long; pedicels glabrous; petals white, pink or purple; leaves entire or toothed
- 6 Fruit reflexed-descending; plants annual or winter annual; leaves 1.5-8.5 cm long, 1-12 mm wide..... Streptanthella
- 6 Fruit spreading to ascending; plants biennial to perennial; leaves various
- 7 Plants perennial, 13-30 cm tall; leaves 0.9-3 cm long, 8-20 mm wide, entire..... Schoenocrambe argillacea
- 7 Plants biennial, (15) 50-300 cm tall; at least the basal leaves over 3 cm long and up to 30 cm long and 10 cm wide, entire, toothed or pinnatifid..... Thelypodium

KEY 5

- 1 Leaf blades cordate-ovate or broader, mostly glabrous, borne on slender petioles; petioles of lower leaves 2-5 times longer than the blades; petals white; plants of wet places in mts., not stipitate glandular..... Cardamine cordifolia
- 1 Leaves narrower than cordate-ovate, sessile or plants stipitate glandular; petioles much shorter than above; petals sometimes white but more often pink or purple
- 2 Plants stipitate-glandular; stem leaves lacking or petioled, not auriculate; petals 9-23 mm long, pink to purple
- 3 Plants scapose, alpine on the Uinta Mts., perennial; petals 16-23 mm long; fruit 3-3.5 mm wide, flattened, not beaked..... Parrya
- 3 Plants not scapose, not alpine, annual, weedy; petals 9-12.5 mm long; fruit about 2 mm wide, terete, constricted to a seedless beak, the beak 8-22 mm long..... Chorispora
- 2 Plants not stipitate-glandular; stem leaves sessile, often auriculate; petals various
- 4 At least the basal leaves ciliate, or if not then the pedicels and fruit erect; surfaces of leaves sometimes pubescent other than along the veins, the hairs simple or forked; petals mostly 3-9 mm long, the limb only 2-3 mm long; sepals 2-5 mm long; plants mostly montane..... Arabis
- 4 Leaves not ciliate; pedicels spreading to spreading-ascending; fruit spreading to spreading-ascending, or if erect then plants of deserts or of the pinyon-juniper zone; surface of leaves mostly pubescent only along the veins, the hairs simple; petals 5-15 mm long, the limb 4-7 mm long; sepals 4-7 mm long..... (Thelypodium and Thelypodopsis) see lead 4 in KEY 4 P. ___

Alyssum L. Alyssum

Annual stellate pubescent herbs; leaves alternate, simple, entire, not auriculate; petals yellow; fruit a sessile silicle, broadly elliptic to oval in outline, flattened parallel to the septum; seeds 1 or 2 per locule.

- 1 Fruit glabrous or nearly so; styles 0.5-0.8 mm long; sepals deciduous soon after anthesis..... A. desertorum
- 1 Fruit stellate-pubescent; styles various; sepals persistent until the fruit is nearly mature
- 2 Fruit 4-5 mm broad; styles 0.8-1.2 mm long; plants pubescent with rather coarse, spreading, stellate hairs..... A. minus
- 2 Fruit about 3-4 mm wide; styles 0.3-0.6 mm long; plants pubescent with delicate, appressed, stellate hairs..... A. alyssioides

Alyssum alyssioides (L.) L. Pale a., yellow a., madwort. Introduced from Europe, more or less weedy on disturbed ground, only 1 specimen seen (Brotherson 2076 from Strawberry Valley), to be expected in desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; May-June.

Alyssum desertorum Stapf. Desert a. Introduced from Eurasia, more or less weedy on disturbed ground, reported for our area but no records seen, to be expected in similar communities as A. alyssioides; April-June.

Alyssum minus (L.) Rothm. Introduced from Eurasia, the 1 specimen seen (Thorne and others 1698) is from Snake John Ridge, Uintah Co.; juniper-sagebrush community; 5,500 ft; May-June.

Arabis L. Rockcress

Plants biennial or perennial, glabrous or pubescent with simple, branched, or stellate hairs; leaves simple, entire, dentate, serrate, or sinuate, sessile and usually auriculate; flowers in racemes; pedicels erect to pendulous; sepals deciduous; petals white, cream, pink, lavender, or purple; fruit a silique, many times longer than wide. This is a difficult genus. One should not expect complete success in initial efforts to differentiate taxa. Study of the genus and familiarity with several taxa will contribute greatly to confident use of the key.

BRASSICACEAE

- 1 Plants more or less caespitose, sometimes mat-forming, from a much-branched caudex, 5-30 (50) cm tall, of high or moderate elevations; stems usually several, mostly slender; leaves oblanceolate or elliptic-oblanceolate to oblanceolate-obovate, 5-25 (40) mm long, the basal ones usually numerous
 - 2 Pedicels spreading, 2-6 mm long; fruit ascending-spreading or somewhat pendulous; racemes secund, with 3-10 flowers; basal leaves grayish-pannose with dense, tiny, dendritic hairs; petals 4-6 mm long; plants at and above timberline on the Uinta Mts..... A. lemmonii
 - 2 Pedicels and fruit erect or erect-ascending, the pedicels 4-13 (15) mm long; racemes not particularly secund; basal leaves not gray-pannose, or if so plants of lower elevations
 - 3 Plants known from 10,000-11,500 ft on the Uinta Mts.; basal leaves green, mostly glabrous, sometimes finely hairy, all entire; pedicels and sepals glabrous; petals 7-10 mm long; fruit 2-3 mm wide..... A. lyallii
 - 3 Plants known in our area from 6,000-8,600 ft; basal leaves densely gray-pubescent with several-branched hairs, sometimes toothed; pedicels and sepals glabrous or hairy; petals 5-14 mm long; fruit 1-2 mm wide
 - 4 Petals 5-8 mm long, pink or lavender; stems glabrous or pubescent below; pedicels glabrous or pubescent..... A. microphylla
 - 4 Petals 9-14 mm long, white to pink; stems densely pubescent below; pedicels glabrous..... A. fernaldiana
- 1 Plants from a taproot or simple to sparingly branched caudex, not at all caespitose, (8) 15-80 (100) cm tall; leaves various, but at least some usually over 25 mm long except in A. nuttallii
 - 5 Fruit densely pubescent to glabrate; lower leaves smaller than the main stem leaves; plants sometimes slightly woody above ground level, of dry places, mostly below 6,000 ft; petals about 1-2 cm long, white, pink, or lavender..... A. pulchra
 - 5 Fruit glabrous; lower leaves larger than the stem leaves; plants herbaceous above ground level, from (5,600) 6,000-11,000 ft, or higher; petals usually less than 1 cm long
 - 6 Pedicels and fruit erect; stems and leaves glabrous or hirsute with simple, forked, or malpighian hairs; leaves not uniformly ciliate; petals white to cream or sometimes pinkish; plants biennial or perennial
 - 7 Plants perennial, common; basal leaves 2-12 mm wide, usually not forming a flat rosette; seeds winged, the wing at the tip of the seed about 1 mm wide; petals 6.5-10.5 mm long (note: some plants of A. nuttallii might be keyed here, but these have nonauriculate leaves and the seeds are not winged; the stem leaves in A. drummondii are strongly auriculate)..... A. drummondii
 - 7 Plants (annual?) biennial, from taproots, infrequent or rare; basal leaves 3-50 mm wide, often forming a basal rosette that lies flat on the ground; seeds wingless (note: the superficially similar Halimolobos virgata may key here. See note under that taxon)
 - 8 Stigmas expanded, 0.8-1.1 mm broad, wider than the style base; fruit not strongly compressed; outer sepals not gibbous at the base; petals cream to rarely pinkish, 4.7-7 mm long; stem leaves 15-90 (120) mm long, 4-35 mm wide..... A. glabra
 - 8 Stigmas not obviously expanded, 0.3-0.6 mm broad, not much wider than the style base; fruit strongly compressed; outer sepals gibbous at the base; petals white to pink, 3.2-9 mm long; stem leaves 6-50 mm long, 2-20 mm wide..... A. hirsuta
 - 6 Pedicels or fruit or both spreading to descending; stems and leaves often with branched, dendritic (or stellate?) hairs or lower leaves rather uniformly ciliate with simple or forked hairs; petals pink, lavender, or purple, rarely white; plants perennial
 - 9 Lower leaves hirsute-ciliate with simple or once-forked hairs; stems and leaf surfaces glabrous or with simple or forked hairs; pedicels glabrous
 - 10 Pedicels ascending to nearly erect; fruit erect or nearly so; stem leaves not auriculate; plants known from Strawberry Valley..... A. nuttallii
 - 10 Pedicels and/or fruit strongly spreading to descending; stem leaves auriculate except in A. pendulina; plants of various distribution
 - 11 Stems solitary (14) 20-60 cm tall, not arising from between the basal rosette and a tuft of secondary leaves; stem leaves auriculate, (0.5) 1-3.5 (4) cm long, 3-7 mm wide; petals 5-8 mm long..... A. fendleri
 - 11 Stems usually several to many, 10-30 cm tall, arising from between the basal rosette and a tuft of secondary leaves; stem leaves auriculate or not, 5-10 cm long, 1-4 mm wide; petals 4-6.5 mm long..... A. demissa
 - 9 Lower leaves not ciliate exclusively with simple or once-forked hairs; lower part of stems and leaf surfaces of at least lower leaves with forked, branched, or dendritic hairs; pedicels glabrous or pubescent
 - 12 Stems usually 3 or more, arising from between the basal rosette and a secondary tuft of leaves
 - 13 Fruiting pedicels (but not necessarily the fruit) ascending to erect; leaves entire or subentire hardly (and possibly not) distinct from A. perennans..... A. selbyi
 - 13 Fruiting pedicels spreading to descending; leaves usually toothed but sometimes entire..... A. perennans
 - 12 Stems solitary or few; tuft of secondary leaves lacking or poorly developed

- 14 Pedicels and fruit ascending; fruit straight, not curved; stems usually pubescent with 3-forked or malpighian hairs, with 10 or more well-developed, often overlapping leaves; plants seldom collected...
..... A. confinis
- 14 Pedicels and fruit spreading, descending, or reflexed; fruit often curved; hairs of stems sometimes more than 3-branched; stem leaves various
- 15 Leaves and lower part of stem grayish, densely appressed-pubescent with minute dendritic hairs; basal leaves linear-oblongate, always entire; plants rarely collected in our area.....
..... A. lignifera
- 15 Lower leaves and lower part of stem with spreading hairs; basal leaves linear-oblongate to broader, often toothed
- 16 Fruiting pedicels hirsute; fruit strongly curved, widely spreading, 6-12 cm long; petals 8-14 mm long.....
..... A. sparsiflora
- 16 Fruiting pedicels glabrous to pubescent but not hirsute, curved to sharply deflexed; fruit straight or curved, 2-7 cm long; petals 4-9 mm long.....
..... A. holboellii

Arabis confinis Wats. Spreading r. (A. divaricarpa A. Nels.) Infrequent; the few specimens seen are from Daggett and Uintah Cos., open pine forest with sparse sagebrush. This is probably a hybrid taxon derived from crosses of A. drummondii with A. holboellii and other species of the genus. The plants persist in uniform populations by apomictic reproduction (Rollins 1983). See Welsh and Reveal (1977) for discussion of synonymy.

Arabis demissa Greene [A. demissa var. languida Rollins; A. pendulina Greene; A. p. var. russeola (Rollins) Rollins] Occasional; widespread; desert shrub, sagebrush, juniper, and ponderosa pine communities; 5,700-8,600 ft; late April-June.

Arabis drummondii Gray Drummond r. Occasional; widespread; sagebrush, forb-grass, aspen, aspen-alder, conifer, and alpine meadow communities; 7,600-11,000 (12,500) ft; June-Aug. Hybridizing with A. holboellii and other taxa of the genus.

Arabis fendleri (Wats.) Greene Fendler r. The 5 specimens seen are from the W. Tavaputs Plateau, (var. fendleri?) also reported for Daggett and Moffat Cos. [var. spatifolia (Rydb.) Rollins]; pinyon-juniper, Douglas-fir-snowberry, and forb-grass communities; 7,000-10,300 ft; June-July. With the habit of A. holboellii and the pubescence of A. demissa, this seems to be an intermediate taxon of questionable status.

Arabis glabra (L.) Bernh. Tower mustard. Infrequent or rather rare; widespread; pinyon-juniper, aspen and spruce-fir communities, and along streams; 7,000-8,000 ft; June-July. Our plants are referable to var. glabra.

Arabis hirsuta (L.) Scop. Hairy r. (A. rupestris Nutt.) Infrequent or rather rare; apparently widespread; sagebrush, silver sagebrush-grass, mt. brush, aspen and spruce-fir communities; 6,230-10,000 ft; June-Aug. Our plants are referable to var. pyncocarpa (Hopkins) Rollins.

Arabis holboellii Hornem Skyrocket, Holboell r. (A. exilis A. Nels.; A. retrofracta Graham) One of the more common rockcrests of our area; widespread; desert shrub (along washes), sagebrush, pinyon-juniper, mt. brush, aspen, conifer, and margin of riparian communities; (5,400) 6,000-9,350 ft; May-July. Variety pinetorum (Tides) Rollins, with pedicels gently curved downward and fruit pendulous and somewhat curved inward, occurs in the same habitat and often side-by-side with var. secunda (Howell) Jeps. [A. h. var. retrofracta (Grah.) Rydb.] with pedicels abruptly curved at the base and deflexed and fruit strictly reflexed and mostly straight. Variety pendulocarpa (A. Nels.) Rollins with cauline leaves not auriculate has been reported for the Colorado part of our area.

Arabis lemmonii Wats. Lemmon r. The 3 specimens seen are from the Uinta Mts., Duchesne Co.; alpine communities; 11,600-13,000 ft; July-Aug.

Arabis lignifera Nels. Woody r. Probably widespread; the 1 specimen seen (Brotherson 982) is from 10 mi n. of Altona; sagebrush community, and Harrington 2078 reported for Cold Springs Mt. (Bradley 1950); May-June. Perhaps specimens from our area that have been keyed here belong to A. holboellii.

Arabis lyallii Wats. Lyall r. Occasional; Uinta Mts.; alpine tundra, talus, boulder fields, moraines, and krummholz; 10,000-11,500 ft and probably higher; June-Aug. Our plants are referable to var. lyallii.

Arabis microphylla Nutt. in T. & G. Littleleaf r. The 6 specimens seen are from the Uinta Mts. and E. Tavaputs Plateau; sagebrush, pinyon-juniper, and Douglas-fir communities; 6,000-8,600 ft; May-June. Apparently our plants are referable to var. macouni (Wats.) Rollins.

Arabis nuttallii Robins. in Gray Nuttall r. Infrequent or locally common; Strawberry Valley; silver sagebrush-meadow and meadow communities; 7,600 ft; June-July.

Arabis perennans Wats. Occasional, one of the most often collected rockcrests of our area; widespread; desert shrub, sagebrush, pinyon-juniper, bullgrass, mt. brush, and Douglas-fir communities; 5,600-8,900 ft; April-June. Our specimens approach A. lignifera on one extreme and A. selbyi on the other.

Arabis pulchra Jones Beauty r. (A. formosa Greene) Our most commonly collected rockcrest of lower elevations; widespread; desert shrub, sagebrush, and juniper communities; 4,700-6,000 ft; May-mid June. Our plants with white to pale lavender petals are referable to var. pallens Jones (A. p. var. duchesnensis Rollins).

Arabis selbyi Rydb. With distribution and habitat of A. perennans and hardly distinct from that taxon. Welsh and Reveal (1977) has suggested that this might be treated at an infraspecific level as a part of A.

BRASSICACEAE

perennans. The only differences are the slightly more ascending pedicels and usually entire or subentire leaves.

Arabis sparsiflora Nutt. in T. & G. Sicklepod r. No specimens seen, reported for our area along the Green River near the Uintah-Daggett Co. line. Plants of the area are referable to var. subvillosa (Wats.) Rollins.

Arabis vivariensis Welsh (A. fernaldiana Rollins misapplied) The few records seen are from Jones Hole and Dinosaur National Monument, in Uintah Co. and w. Moffat Co.

Barbarea R. Br. Wintercress

Barbarea orthoceras Ledeb. American w., erectpod w. Plants glabrous or sparsely hirsute on basal leaves, biennial or rarely annual from taproots, 15-100 cm tall; basal leaves lyrate-pinnatifid to pinnately compound, 1.5-15 (20) cm long, 1-2.5 (4) cm wide; stem leaves smaller and less divided than the basal ones, sometimes entire, auriculate-clasping; sepals 2.5-3.5 mm long, yellowish; petals 4-5.5 mm long, yellow; fruit a silique, many times longer than wide, linear, (15) 20-50 mm long, to 2.5 mm wide, the pedicels 2-4 mm long, the style beaklike, 0.5-2 mm long. Specimens seen are from Strawberry Valley and the Uinta Mts.; 7,000-10,700 ft; June-July.

Berteroa DC. Berteroa

Berteroa incana (L.) DC. Plants annual, 30-100 cm tall, stellate pubescent; leaves simple, entire, the basal ones 3-5 cm long, slender-petioled, the cauline reduced upward, sessile; racemes many-flowered; petals 4-6 mm long, conspicuously bilobed, white; fruit 5-7 mm long, about 2-3 mm wide; styles 2-3 mm long. Introduced from Europe; the 1 specimen seen (Goodrich 21986) is from Daggett Co., Uinta Mts., Deep Creek; ponderosa pine community; 7,970 ft.

Brassica L. Mustard

Plants annual, glabrous or hirsute; leaves alternate and basal; the basal ones often lyrate-pinnatifid, the cauline ones reduced upward, petiolate or sessile to auriculate; flowers in racemes; sepals deciduous; petals yellow; fruit a silique, terete or nearly so, the beak 1-3 nerved.

- 1 Stem leaves sessile, auriculate-clasping, glaucous, entire or nearly so; pedicels of fruit 7-20 mm long; fruit 30-70 mm long, the beak 8-15 mm long; petals 6-10 mm long..... B. campestris
- 1 Stem leaves petiolate and not auriculate, or if (rarely) seeming so, then falsely petiolate above the clasping base; pedicels and fruit various; petals 5-15 mm long
- 2 Fruit 10-25 mm long, erect and appressed against the branches of the inflorescence, the beak 1-5 mm long and terete or nearly so..... B. nigra
- 2 Fruit 20-50 mm long, spreading to erect but not appressed, the beak 7-15 mm long, terete, flattened, or angular
- 3 Pedicels 2-6 mm long; beak of fruit 3-veined, flattened or angular..... B. kaber
- 3 Pedicels 8-17 mm long; beak of fruit 1-veined, nearly terete..... B. juncea

Brassica campestris L. Field m., common bird rape. Introduced from Europe, more or less weedy; fields, roadsides, and waste places, to be expected across the lower elevations of our area. This is the wild phase of turnip (B. rapa L.) and has been put in synonymy with B. rapa. See Arnov and others (1980).

Brassica juncea (L.) Czern. Indian m. Introduced from Asia; the 2 specimens seen are from Hanna and from between Yellowstone and Uinta Canyons; fields and on disturbed ground at a campsite; 6,900-8,080 ft; June-Aug.

Brassica kaber (DC.) L. C. Wheeler Charlock, wild m. [B. arvensis Rabenh.; Sinapis arvensis L.] Introduced from Europe, more or less weedy; no record seen, but to be expected across the area at lower and mid elevations in fields, roadsides, ditchbanks, and waste places.

Brassica nigra (L.) Koch in Roehl. Black m. Introduced from Europe, more or less weedy; Goodrich 20968 from Hanna, to be expected across the area at moderate and lower elevations in fields, pastures, ditchbanks, and waste places.

Camelina Crantz False Flax

Camelina microcarpa Andrzej. in DC. Hairy f., littlepod f. Plants annual, 8-80 cm tall with simple or forked to stellate hairs; leaves alternate, simple, entire or obscurely toothed, about 1-8 cm long, at least the upper ones auriculate; sepals 2-2.7 mm long, often reddish, more or less villous; petals white or cream; fruit a silicle, moderately inflated, glabrous, 5-7 mm long Introduced from Asia, more or less weedy with disturbance, but also in desert shrub, sagebrush, and pinyon-juniper communities; up to 8,000 ft; May-June.

Capsella Medic. Shepherds-purse

Capsella bursa-pastoris (L.) Medic. Plants annual, 10-50 cm tall, stellate pubescent and hirsute; basal leaves lyrate-pinnatifid to merely toothed; stem leaves much reduced upward, auriculate; sepals 1.2-2.5 mm long, pubescent or glabrous; petals white; fruit a silicle, 4.5-8 mm long, strongly flattened, obcordate. Introduced from Europe, more or less weedy with disturbance; up to about 8,000 ft; May-June.

Cardamine L. Bittercress; Toothwort

Plants glabrous or pubescent with simple hairs; leaves alternate, sometimes also in basal rosettes; flowers mostly racemose; petals white to pinkish; fruit a silicle, several to many times longer than wide.

- 1 Leaves all simple, cordate-ovate to orbicular, the basal ones on long petioles 2-5 times longer than the blades; petals 7-12 mm long; pedicels mostly 10-20 mm long; fruit 20-35 mm long; plants perennial from rhizomes..... C. cordifolia
 1 Leaves pinnately compound, the basal ones with 7-11 pairs of lateral leaflets, the cauline ones with 3-5 pairs of lateral leaflets; petals 2-3 mm long; pedicels 3-10 mm long; fruit 15-30 mm long; plants annual or biennial from a taproot..... C. pensylvanica

Cardamine cordifolia Gray Heartleaf b., large mt. b. (C. infausta Greene) Locally common; widespread; along streams usually in woods; 7,000-10,500 ft; June-Aug.

Cardamine pensylvanica Muhl. in Willd. Pennsylvania b. The few specimens seen are from the Uinta Mts.; riparian or stream communities; 7,000-8,000 ft; May-June.

Cardaria Desv. Whitetop; Hoary cress

Plants perennial from deep-seated rhizomes, pubescent; leaves alternate, sinuate-dentate, auriculate-clasping; flowers in panicle racemes; petals white; fruit a silicle. Perhaps the most aggressive noxious weeds of our area.

- 1 Fruit glabrous; obcordate in outline..... C. draba
 1 Fruit puberulent; orbicular in outline..... C. pubescens

Cardaria draba (L.) Desv. Heart-podded w. or h. Introduced from Eurasia, widespread; weedy in fields, ditchbanks, roadsides, and waste places; up to about 7,500 ft or perhaps higher; May-June. Cardaria chalepensis (L.) Handel-Mazzetti with inflated fruits might also be expected in our area. This is considered to be synonymous with C. draba by some authors. See Arnow and others (1980) for a discussion of these taxa.

Cardaria pubescens (C. A. Mey.) Jarm. Globe-podded w. or h. Introduced from Eurasia, weedy, the 3 specimens seen are from Daggett Co.; riparian and sagebrush-grass communities; 5,500-7,400 ft; May-July.

Caulanthus Wats. Wild Cabbage; Caulanthus

Caulanthus crassicaulis (Torr.) Wats. Thickstemmed w. c. Short-lived perennial (biennial) from a taproot; (20) 30-90 cm tall, with a single unbranched, usually strongly inflated stem; basal rosette of entire or more often pinnatifid leaves 3-12 (17) cm long; stem leaves reduced, entire, narrow; pedicels 1-4 mm long; sepals hirsute, brownish-purple; petals dull-purplish, 10-14 mm long; fruit 7-14 cm long. Occasional; widespread; desert shrub, sagebrush, and pinyon-juniper communities; up to 7,200 ft; May-June. The sepals vary from more or less hirsute (var. crassicaulis) to glabrous or nearly so (var. glaber Jones). Value of this distinction is moot.

Chorispora R. Br. Chorispora; Blue Mustard

Chorispora tenella (Pall.) DC. Annual malodorous herb, 20-45 cm tall, stipitate-glandular throughout and often hirsute at least at the base; leaves 5-85 mm long, 1-28 mm wide, entire, dentate or pinnatifid; petals 9-12.5 mm long, pink to lavender; fruit 30-45 mm long, with a seedless beak 8-22 mm long. Introduced from Asia, widespread, weedy; roadsides and other disturbed ground where sometimes so abundant as to blanket the landscape with color, occasionally in indigenous plant communities; up to 8,500 ft or perhaps higher; April-June.

Conringia Adans. Hare's-ear

Conringia orientalis (L.) Dumort. Annual herb, 20-50 (70) cm tall, glabrous and usually glaucous; leaves 2-12 cm long, 1-6 cm wide, those of the stem strongly auriculate-clasping; petals 6-12 mm long, white to cream; fruit 7-10 (12.3) cm long. Introduced from Europe; the 3 specimens seen are from Rio Blanco Co., also reported for Moffat Co. (Bradley 1950); desert shrub communities, clayey soils; up to about 6,000 ft; May-June.

Descurainia Webb & Berth. Tansymustard

Annual or biennial herbs, stellate-pubescent, stipitate-glandular, or glabrate; leaves 1-3 times pinnately compound or pinnatifid; flowers racemose; petals yellow; fruit 3 to many times longer than wide, terete or nearly so.

- 1 Fruit (15) 20-30 mm long, rarely shorter, narrowly linear, the replum (internal translucent membrane that divides the fruit) often 2-nerved; upper as well as lower leaves 2-3 times pinnate; plants mostly of disturbed sites, mostly below 7,000 ft..... D. sophia
- 1 Fruit less than 20 mm long, seldom over 15 mm long and then the replum usually nerveless; upper leaves once-pinnate; distribution various
- 2 Plants from 4,700-7,000 (8,000) ft, 10-100 cm tall; pedicels 3-15 mm long, shorter to longer than the fruit; fruit linear or somewhat clavate, slightly or not at all torulose (constricted between the seeds), 3-15 (20) mm long, the style obsolete or to 0.3 mm long, the septum usually nerveless; lower leaves often bipinnatifid; petals 1.5-3 mm long..... D. pinnata
- 2 Plants from 7,000-10,500 ft, (15) 30-130 cm tall; pedicels 3-7 (9) mm long, shorter than or equal to the fruit; fruit sometimes ellipsoid or fusiform, usually torulose, the style 0.2-0.7 mm long, the septum 1-nerved
- 3 Fruit 3-7.2 mm long, fusiform, with 1-3 seeds per locule; petals 1.1-1.6 mm long; plants not glandular; leaves mostly all only once-pinnate..... D. californica
- 3 Fruit 7-14 mm long, linear or less commonly ellipsoid; seeds mostly 4-10 per locule; petals 1.3-2.8 mm long; plants sometimes glandular; lower leaves sometimes bipinnatifid.. D. richardsonii

Descurainia californica (Gray) O. E. Schulz California t. Occasional or locally common, widespread; Strawberry Valley, Tavaputs Plateau, Uinta Mts. and Middle Mt. in the Three Corners area; sagebrush-snowberry, aspen, Douglas-fir, and spruce fir communities; 7,000-10,100 ft; late June-Aug.

Descurainia pinnata (Walt.) Britton Blue t. [D. brachycarpa (Richards.) O. E. Schulz; D. halictorum (Cockerell) O. E. Schulz; D. longipedicellata (Fourn.) O. E. Schulz] Occasional to common; widespread; desert shrub, sagebrush, pinyon-juniper, and rarely aspen communities, and on disturbed ground; 4,700-7,000 (8,000) ft; May-Sept. Several highly variable, intergrading vars. have been described; 3 or 4 of the vars. are found in our area, but they are hardly worthy of separation and they are not listed here.

Descurainia richardsonii (Sweet) O. E. Schulz Western t. [D. incisa (Engelm.) Britt.; D. serrata (Greene) O. E. Schulz] Occasional; widespread; sagebrush, sedge-willow, tall forb, aspen, lodgepole pine, and spruce-fir communities; 7,000-10,500 ft; May-Sept. With vars. in our area. Variety brevipes (Nutt. ex T. & G) Welsh & Reveal (var. macrosperma Schulz), with the fruits and pedicels erect and more or less appressed to the axis of the raceme, seems quite distinct; the plants are mostly found above 9,000 ft. Variety viscosa (Rydb.) Peck (stipitate-glandular) and var. sonnei (Robins) C. L. Hitchc. seem less distinct and plants of both are mostly found below 9,000 ft.

Descurainia sophia (L.) Webb ex Prantl. in E. & P. Flixweed. Introduced from Eurasia, widespread; more or less weedy with disturbance; up to about 7,000 ft and probably higher; May-Aug.

Draba L. Whitlow-grass; Draba

Annual or perennial, mostly small herbs, nearly glabrous to densely pubescent with branched to stellate hairs; leaves simple and entire to toothed; flowers racemose; petals white or yellow; fruit orbicular to linear.

- 1 Plants annuals or short-lived perennials from taproots; from low elevations up to near timberline (above timberline in D. aurea, but then plants keyed both ways); leaves and fruit not with appressed pectinate hairs; styles obsolete or to 0.2 mm long (longer in D. aurea)
- 2 Petals white; fruit crowded toward the ends of scapelike peduncles, the raceme short, the axis only 1/2 to 1/4 as long as the height of the plant, the internodes (at least the upper) 1-3 mm long; pedicels 1-3 mm long; leaves crowded toward the base of the stems, all basal or nearly so; plants found at 5,000-6,700 ft
- 3 Upper part of the peduncle, axis of raceme, pedicels, and fruit pubescent..... D. cuneifolia
- 3 Upper part of the peduncle, axis of raceme, and pedicels glabrous; fruit pubescent.... D. reptans
- 2 Petals yellow, or cream, sometimes fading white when dried; fruit not crowded as above, the stems not scapelike or if so then the inflorescence from 1/2 to nearly as long as the height of the plant, the internodes of the racemes regularly over 3 mm long; pedicels 1-15 (20) mm long; leaves various; plants found at 6,000-10,600 ft
- 4 Stem, axis of raceme, pedicels, sepals, and fruit glabrous; plants (annual?) short-lived perennials tending to be scapose, with well-developed (although small) basal rosettes
- 5 Leaves glabrous or ciliate with simple or rarely forked hairs; stems glabrous; plants of the lodgepole pine-Engelmann spruce zone of the Uinta Mts..... D. crassifolia
- 5 At least some of the leaves pubescent at least on the lower surface with stalked, 2-4-rayed hairs; stems usually pubescent below; plants of broader distribution..... D. stenoloba
- 4 Stems and inflorescence pubescent at least in part

- 6 Pedicels, upper part of stem, or at least the axis of the raceme glabrous
- 7 Fruit glabrous, mostly over 2/3 as long to longer than the pedicels; stem leaves sometimes glabrous on the upper surface; plants sometimes tending to be scapose, short-lived perennials with well-developed (although small) basal rosettes, the leaves 3-40 mm long..... D. stenoloba
- 7 Fruit pubescent, mostly 1/5-2/3 as long as the pedicels; stem leaves pubescent on the upper surface; plants not scapose, clearly annual; basal rosette lacking or of few leaves, the leaves 3-30 mm long..... D. nemorosa
- 6 Pedicels, axis of raceme, fruit, stem, and leaves pubescent
- 8 Fruit 4-10 mm long, 2-2.5 mm wide, plain, not contorted; style obsolete; pedicels 2-10 mm long; plants annual..... D. rectificructa
- 8 Fruit 8-17 mm long, 2-4 mm wide, plain or contorted; style short but usually evident; pedicels 3-20 mm long; plants perennial or biennial with a basal rosette, the leaves of the rosette 1-5 cm long, 2-13 mm wide..... D. aurea
- 1 Plants perennial, mostly from branching caudices, from above timberline on the Uinta Mts., or if of lower elevations then leaves and/or fruit with appressed double-pectinate hairs or plants keyed both ways; styles mainly 0.2-1.2 mm long
- 9 Plants scapose or nearly so, the stem sometimes with 1 or 2 reduced leaves; leaves 3-15 mm long; fruit flat or somewhat inflated but not contorted
- 10 Leaves ciliate with simple or rarely forked hairs, the upper and sometimes the lower surfaces glabrous; scapes often glabrous; fruit and pedicels glabrous..... D. densifolia
- 10 Leaves not ciliate with simple hairs, usually pubescent on both surfaces with branched to stellate hairs; scapes often pubescent
- 11 Fruit linear or narrow-elliptic, 5-14 mm long, 1-2 mm wide, about 3-7 times longer than wide; petals white, 2.5-4 mm long; pedicels glabrous; plants from above timberline.. D. lonchocarpa
- 11 Fruit not linear, 3-8 mm long, 2-5.5 mm wide, not more than twice as long as wide; petals yellow or plants from below timberline; pedicels glabrous or stellate pubescent
- 12 Leaves 1-2 mm wide, the surface pubescent with pectinate hairs that are more or less parallel to the leaf axis; fruit not strongly flattened, either with simple hairs or double-pectinate hairs..... D. oligosperma
- 12 Leaves 2-4 mm wide, densely cinereous with simple, forked or branched hairs; fruit flattened, densely pubescent with forked, branched or stellate hairs; plants usually soboliferous..... D. ventosa
- 9 Plants not scapose, the stems mainly with 3-several leaves 5-40 (80) mm long; fruit flat or undulate to contorted
- 13 Fruit and ovaries glabrous; leaves 20-80 mm long, the surfaces mostly glabrous, the margins mostly ciliate with simple hairs; plants rare; petals 4-8 mm long, yellow..... D. crassa
- 13 Fruit and ovaries pubescent; leaves 5-40 mm long, the surfaces with forked or branched hairs; plants rather common; petals various
- 14 Petals white, 2.2-4 mm long; fruit 5-12 mm long; leaves 1-4 mm wide, the basal ones panose with branched to stellate hairs; plants at or above timberline on the Uinta Mts..... D. cana
- 14 Petals yellow, 3.5-6 mm long; fruit 8-17 mm long; leaves 2-13 mm wide, with a mixture of forked, branched, and stellate hairs; plants from lower montane to above timberline, widespread across the area..... D. aurea

Draba aurea M. Vahl. in Hornem. Golden d. (D. brachystylis Rydb.) Occasional; widespread; sagebrush-snowberry, aspen, various conifer, streamside, meadow, krummholz, and alpine communities; 7,000-12,500 ft; June-Aug. The features ascribed to D. brachystylis seem to be included in the variation of D. aurea.

Draba cana Rydb. (D. lanceolata Royle misapplied) Occasional; Uinta Mts.; mostly alpine and krummholz and occasionally upper Engelmann spruce communities; 10,600-12,000 ft; July-Aug.

Draba crassa Rydb. (D. spectabilis Greene misapplied) The 1 specimen seen (Welsh et al. 19011) is from Anderson Pass near Kings Peak, fell field and rock strip; 12,450 ft; 2 other specimens from outside our area are from high elevations of the Uinta Mts.; July-Aug.

Draba crassifolia R. Grahm. Rocky Mt. d. The few records seen are all from the Uinta Mts.; Engelmann spruce, Engelmann spruce-lodgepole pine, and lower alpine communities; 9,600-11,500 ft; June-Aug. Grading into D. stenoloba in pubescence and habitat.

Draba cuneifolia Nutt. in T. & G. Wedgeleaf d. The 3 records seen are all from se. Uintah Co. from Rainbow-Dragon area to Coyote Basin; desert shrub, juniper, and sagebrush communities; 6,000-6,700 ft; May-June. Our plants are referable to var. cuneifolia, and those from our area are clearly more closely related to D. reptans than to plants (from outside of our area) that have passed under the name of D. cuneifolia var. platycarpa (T. & G.) Wats. by the scapelike peduncles and narrow fruits. From a provincial view it would seem best to reduce D. cuneifolia to synonymy or varietal status. However, D. reptans is an Old World plant, and outside of our area, plants of D. cuneifolia do have elongate racemes. More study is indicated, and no new combinations are proposed here.

Draba densifolia Nutt. in T. & G. Rockcress d. Occasional; Uinta Mts.; alpine communities; July-Aug. Plants glabrous except for ciliate leaves and with styles 0.2-0.5 mm long are referable to var. daviesiae (C. L. Hitchc.) Welsh & Reveal. Plants sometimes hairy on the lower leaf-surfaces and on the scape and with styles 0.5-1 mm long are referable to var. densifolia.

BRASSICACEAE

Draba lonchocarpa Rydb. Lancefruit d. (D. nivalis Lilj.) Occasional; Uinta Mts.; above timberline; July-Aug. Plants with elliptic to linear fruit less than 7 mm long are referable to var. exigua O. E. Schultz. Those with linear to narrow elliptic fruit mostly over 10 mm long are referable to var. lonchocarpa. The report by Graham (1937) of D. uncinialis Rydb. (D. sobolifera Rydb.) is based on a specimen (Hermann 5001 M0!) that belongs here.

Draba nemorosa L. Woods d. Occasional; Strawberry Valley, Uinta Mts., Blue Mt., and Yampa Plateau, no specimens seen from e. of Willow Creek of the W. Tavaputs Plateau but to be expected there; pinyon-juniper, mt. brush, and ponderosa pine communities; 5,800-8,200 ft; May-June.

Draba oligosperma Hook. Few-seeded d. With 2 distinct vars. in our area.

- 1 Fruit pubescent with simple hairs or rarely glabrous; plants mostly above timberline but occasionally down to 8,500 ft..... var. oligosperma
 1 Fruit pubescent with pectinate hairs; plants of lower elevations..... var. juniperina

Var. juniperina (Dorn) Welsh [D. juniperina Dorn; D. pectinipila Rollins misapplied; D. oligosperma var. pectinipila (Rollins) C. L. Hitchc. misapplied] Occasional; Daggett and ne. Uintah Cos.; 6,800-7,600 ft; May-June.

Var. oligosperma Occasional; Uinta Mts. and Diamond Peak in Moffat Co.; in a variety of plant communities, but mostly alpine; 8,240-12,500 ft; June-Aug.

Draba rectifruca C. L. Hitchc. Mt. d. Of the specimens seen, 5 are from Strawberry Valley and Uinta Mts. and 1 is from the E. Tavaputs Plateau; sagebrush, aspen, and spruce-fir communities; 7,000-10,500 ft; June-Aug. Like D. nemorosa in pubescence of stems and leaves, and like D. stenoloba in the tendency to have a small but rather well-developed basal rosette.

Draba reptans (Lam.) Fern. Carolina d., Carolina w. (D. micrantha Nutt.) The 8 specimens seen are from Daggett Co., ne. Uintah Co. and e. into Colorado; sagebrush and juniper communities; 5,000-6,000 ft; May-June.

Draba stenoloba Ledeb. Alaska d., Alaska w., slender d. (D. nitida Greene) The few specimens seen are from Current Creek, Uinta Mts., and W. Tavaputs Plateau; meadows, woods, along streams, and in sagebrush-grass communities; 7,200-10,900 ft; June-Aug. Our plants belong to var. nana (Schultz) C. L. Hitchc. Reports of D. fladnizensis Wulfen for the Uinta Mts. are perhaps based on specimens of this taxon.

Draba ventosa Gray Wind River d. Known from a talus slope at 10,900 ft above Lake Basin, Rock Creek drainage, Uinta Mts. (Goodrich 13565) and from adjacent to our area on Gilbert Peak, Summit Co., Utah (Maguire 14462 UTC). July-Aug.

Erysimum L. Wallflower

Plants pubescent with 2-3 (4)-rayed hairs; leaves entire to toothed, linear, narrow-elliptic, lanceolate or oblanceolate; petals yellow; fruit linear, many times longer than wide, square to subterete in cross section.

- 1 Petals (10) 12-20 mm long; fruit (17) 20-115 mm long, the styles mostly 1.5-3 mm long; pedicels 3-17 mm long; plants biennial or perennial, native..... E. asperum
 1 Petals 3-11 mm long; fruit 12-50 mm long, the styles 0.8-1.5 mm long
 2 Petals 6-11 mm long; fruit (15) 25-50 mm long, strongly ascending to erect; pedicels erect, 3-8 mm long; plants biennial or short-lived perennial, native..... E. inconspicuum
 2 Petals 3-5 mm long; fruit 12-20 (27) mm long, spreading or ascending-spreading; pedicels spreading-ascending, 4-15 mm long; plants annual, weeds of moist sites..... E. cheiranthoides

Erysimum asperum (Nutt.) DC. Rough w., prairie rocket. [E. capitatum (Dougl.) Greene; E. wheeleri Roth.] Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, aspen-fir, Douglas-fir, Engelmann spruce, and meadow communities; 5,000-11,300 ft; May-June.

Erysimum cheiranthoides L. Treacle mustard, wormseed w. The 6 records seen are from Strawberry Valley to Wolf Creek; willow-streamside, meadow, silver sagebrush-grass, and aspen communities; 7,140-8,600 ft; July-Aug.

Erysimum inconspicuum (Wats.) MacMillan Smallflower rocket, small w. (E. parviflorum Nutt.) The 9 specimens seen are from Strawberry Valley, W. Tavaputs Plateau, and Farm Creek Pass, Uinta Mts. and Blue Mt.; sagebrush, snowbank, and meadow communities; 7,500-9,000 ft; June-Aug. Erysimum repandum is a weedy introduced annual that has been found adjacent to and reported for our area (Flowers and others 1960), but we have not found a specimen. It is distinguished from E. inconspicuum by spreading fruits 26-85 mm long and pedicels only 2-5 mm long that are nearly as thick as the fruit.

Glaucocarpum Rollins

Glaucocarpum suffrutescens (Rollins) Rollins (Thelypodium suffrutescens Rollins) Perennial, glabrous, glaucous herbs from woody branching caudices, 10-25 cm tall; leaves entire, 7-25 mm long, 3-10 mm wide, elliptic, lanceolate or oblanceolate, not auriculate; pedicels 3-12 mm long; sepals 4-6 mm long, yellowish or greenish; petals 9-11 mm long, pale yellow; fruit 10-20 mm long, linear. Endemic, known only

from the vicinity of Big Pack Mt. in Hill Creek and Agency Draw drainages; desert shrub and juniper-mahogany communities on Green River Formation; 5,400-6,500 ft; May-early June.

Halimolobos Tausch

Halimolobos virgata (Nutt.) Schulz Biennial plants but occasionally flowering the first year, 10-40 cm tall, pubescent with mixed, simple, forked and branched hairs at least toward the base; basal leaves 3-6 cm long, 0.5-1.8 cm wide denticulate to shallowly lobed, rarely entire; cauline leaves reduced upward, at least the upper ones sessile and auriculate; pedicels 7-11 mm long, ascending at a 30°-40° angle from the axis of the raceme; petals 4-4.5 mm long, white, the veins often purplish; pods erect, parallel or nearly so with the axis of the raceme, 15-40 mm long, 1-1.5 mm wide, rounded to nearly square in cross section. The 2 specimens seen are from Trout Creek Peak, Wasatch Co. and Phil Pico Mt., Daggett Co.; windswept ridges, fringed sagebrush and forb-grass communities; 9,000-9,350 ft; July-Aug. Arabis glabra and A. hirsuta also with erect pods and biennial habit, are sometimes mistaken for this taxon. The following key may help to distinguish these taxa. In addition the mature pods of Halimolobos are terete or nearly square in cross section. Those of Arabis are moderately to strongly compressed.

- 1 Pedicels diverging at a 30°-40° angle from the rachis, the pods erect, their angle abruptly changed from the angle of the pedicels; stems often branched..... Halimolobos
 1 Pedicels and fruit erect or nearly so, the fruit not assuming a strongly different angle from the pedicels; stems mostly simple at least in unbroken or ungrazed specimens..... Arabis

Hesperis L.

Hesperis matronalis L. Perennial herbs with simple and forked hairs, 50-130 cm tall; leaves lanceolate to ovate-lanceolate, serrate-dentate to entire, 5-20 cm long, the lower ones long-petioled, the upper ones often nearly sessile and sometimes auriculate; flowers fragrant; petals purple or white to rose, 18-25 mm long; fruit 40-100 cm long, linear. Introduced from Europe, cultivated as a garden flower, persisting and escaping. The 1 specimen seen (Neese & Peterson 5821) is from a roadside 1 mi n. of Tridell.

Hutchinsia R. Br. Hutchinsia

Hutchinsia procumbens (L.) Desv. Annual glabrous herb, 5-30 cm tall; stems slender, mostly branched, erect or prostrate; leaves ovate to nearly linear, 5-30 mm long, 1-13 mm wide, entire to pinnatifid; sepals about 1 mm long, greenish or purplish; petals about 1 mm long, white; fruit 2.5-4 mm long, elliptic to obovate. The 3 records seen are from Sheep Creek Canyon, Daggett Co. and near Island Park, Uintah Co.; streamside and sagebrush communities; 5,200-6,000 ft; May.

Isatis L. Woad

Isatis tinctoria L. Dyers w. Plants biennials or short-lived perennials from robust taproots, glabrous or with long simple hairs at the base; leaves simple, alternate, the basal ones petiolate, 3.5-18 cm long, 0.8-4 cm wide, entire to inconspicuously crenulate, ciliate to pilose with simple hairs, the cauline leaves sessile, strongly auriculate, gradually reduced upward; pedicels 4.5-9 mm long, reflexed; petals 3-4.2 mm long, yellow; fruit 10-18 mm long, 4-7 mm wide, strongly flattened, winged, oblong to oblanceolate, black at maturity, 1-seeded. Introduced from Europe, recently introduced to our area and known from a few widely scattered locations, a troublesome weed to be expected to invade roadsides and other disturbed sites as well as indigenous plant communities from low elevations up to about 8,500 ft; May-July.

Lepidium L. Peppergrass; Pepperweed

Annual or perennial herbs or low shrubs (ours), glabrous or with simple hairs; leaves simple, entire to tripinnatifid; flowers in racemes; petals white (yellow in L. perfoliatum); fruit a silicle, usually less than twice as long as wide, flattened contrary to the partition.

- 1 Stem leaves clasping the stem
 2 Leaves all entire or toothed, the stem leaves auriculate-clasping; petals white, 2-2.5 mm long.....
 L. campestre
 2 Lower leaves pinnatifid into fine segments; upper leaves entire or dentate and falsely perfoliate clasping; petals yellow, 1-2 mm long..... L. perfoliatum
 1 Stem leaves petioled or sessile but not clasping the stem
 3 Plants strictly annuals, from taproots; fruit more or less with small wings, notched at the apex; styles obsolete or not over 0.2 mm long, arising from between and shorter than the notch of the fruit
 4 Pedicels flattened, about twice as wide as thick, glabrous or puberulent on the lower side; fruit pubescent..... L. lasiocarpum

BRASSICACEAE

- 4 Pedicels either subterete or else puberulent on the upper side; fruit glabrous except sometimes in L. ramosissimum
- 5 Fruits oblong to obovate, broadest above the middle; petals lacking, or mostly shorter than the sepals..... L. densiflorum
- 5 Fruits elliptic-rotund to orbicular, broadest about the middle; petals usually longer than the sepals except in L. ramosissimum
- 6 Petals lacking or shorter than the sepals; fruits often ciliate or uniformly pubescent, elliptic or nearly so; plants commonly much branched, reported for Moffat Co... L. ramosissimum
- 6 Petals usually longer than the sepals; fruits glabrous, elliptic-rotund to nearly orbicular; plants usually sparingly branched, known from the s. slope and flank of the Uinta Mts..... L. virginicum
- 3 Plants biennial or perennial; fruit not or only slightly winged, not notched at the apex or else the style exceeding the notch; styles 0.2-1.2 mm long
- 7 Plants mostly 60-150 (200) cm tall; leaves simple, entire to toothed, often over 4 and up to 80 mm wide
- 8 Plants arising from deep-seated robust rootstocks, introduced, weedy, along water courses, roadsides, and in fields..... L. latifolium
- 8 Plants arising from taproots and simple to branched caudices, native, in pinyon-juniper and sagebrush communities..... L. montanum var. spathulatum
- 7 Plants less than 30 cm tall, or if taller then the leaves mostly pinnatifid
- 9 Leaves pinnatifid; plants from taproots or simple to sparingly branched caudices, biennial or perennial, 3-60 cm tall or taller..... L. montanum
- 9 Leaves entire; plants from thickened, more or less woody, usually much branched caudices, long-lived perennials, mostly 3-25 cm tall
- 10 Leaves linear or oblong-linear; petals 3.5-4.2 mm long; plants known only from the vicinity of Indian Canyon, Duchesne Co..... L. barnebyanum
- 10 Leaves oblanceolate to elliptic; petals 2.7-3.1 mm long; plants not known from Duchesne Co... L. integrifolium

Lepidium barnebyanum Reveal. Endemic, known only from the vicinity of lower Indian Canyon, W. Tavaputs Plateau; pinyon-juniper communities on marl limestone or marl shale of the Uinta Formation; 6,200-6,500 ft; May-June.

Lepidium campestre (L.) R. Br. in Ait. Field p. Introduced from Europe, more or less weedy; a single record (Goodrich 672 ANF!) from a roadside ditch near Tridell.

Lepidium densiflorum Schrad. Prairie p. With 2, more or less distinct vars. in our area.

- 1 Pedicels subterete, pubescent all around; fruit averaging less than 3 mm long; plants commonly of roadsides and other disturbed places, over a wide elevational range..... var. densiflorum
- 1 Pedicels flattened, especially on the upper side, tending to be glabrous on the lower side; fruit averaging at least 3 mm long; plants often in indigenous plant communities at low elevations..... var. ramosum

Var. densiflorum Perhaps introduced, widespread; often weedy along roadsides, in sheep bedgrounds, and other disturbed places; 7,000-10,000 ft, to be expected at lower elevations; June-Aug.

Var. ramosum (A. Nels.) Thell. Apparently native, widespread; desert shrub, greasewood, sagebrush, cottonwood, and ponderosa pine (?) communities; 4,800- 6,200 (7,600) ft; May-June.

Lepidium integrifolium Nutt. in T. & G. Rare; moist meadows at lower elevations; no specimens seen, but listed for Uintah Co. (Welsh and Reveal 1977).

Lepidium lasiocarpum Nutt. in T. & G. The 1 record seen (Brotherson 809) is from Dinosaur National Monument, Mowry Shale. Plants of our area are referable to var. georginum (Rydb.) C. L. Hitchc. Except for the pubescent fruit, hardly different from L. densiflorum and L. virginicum.

Lepidium latifolium L. Broadleaf p., giant whitetop. Introduced from Eurasia; weedy along water courses, roadsides, fields, and other moist places; up to about 7,200 ft; May-Sept. This rather recently introduced weed probably entered our area from the n. along the Green River. It has spread rapidly especially along the flood plain of the Green River, and it is likely to become one of our most noxious weeds.

Lepidium montanum Nutt. in T. & G. Mt. p. With 3, more or less distinct vars. in our area.

- 1 Plants 60-120 cm tall, flowering from about mid Aug.-Sept.; stems sometimes pubescent; stem leaves simple, mostly entire, a few sometimes toothed or lobed, most regularly over 4 mm wide..... var. spathulatum
- 1 Plants (10) 15-40 cm tall, flowering in May and June, occasionally in July, and rarely into Aug.; stem leaves pinnate-compound, pinnatifid, toothed or entire, the entire ones mostly less than 4 mm wide
- 2 Stems glabrous; stem leaves entire to pinnatifid and occasionally pinnate; plants common and widespread..... var. jonesii
- 2 Stems puberulent; some of the stem leaves commonly pinnate; plants uncommon..... var. montanum

Var. jonesii (Rydb.) C. L. Hitchc. [L. m. var. alyssoides (Gray) Jones] Common; widespread; desert shrub, sagebrush, pinyon-juniper, and cottonwood-squawbush communities; 4,700-7,400 ft; May-June (July). Specimens from Red Mt. area, Uintah Co. are woody well above the base and may be worthy of additional taxonomic separation.

Var. montanum The 2 records seen (Welsh & Higgins 6204; Garrett 8302) are from Duchesne Co.; pinyon-juniper communities; May-June.

Var. spathulatum (Robins.) C. L. Hitchc. [L. m. var. eastwoodiae (Woot.) C. L. Hitchc. misapplied] Mostly E. Tavaputs Plateau, 1 specimen seen from Moffat Co. and one from n. of Maeser below the base of Taylor Mt.; desert shrub, sagebrush, and pinyon-juniper communities; 5,400-7,400 ft; mid Aug.-Sept.

Lepidium perfoliatum L. Claspings p. Introduced from Europe, widespread; weedy especially on disturbed ground, not expected above 8,000 ft; May-June.

Lepidium ramosissimum A. Nels. Reported for Moffat Co. (Bradley 1950) and approaching our area in sw. Wyoming (Dorn 1977).

Lepidium virginicum L. Virginia p. (L. medium Greene) The few specimens seen are from the s. slope and flank of the Uinta Mts.; various plant communities, often on disturbed ground; 7,200-8,500 ft; May-July. Our plants are referable to var. pubescens (Greene) Thell.

Lesquerella Wats. Bladderpod

Perennial forbs, whitish or grayish with dense, appressed, stellate hairs; flowers in racemes; petals yellow; fruit less than twice as long as wide; slightly inflated, the style distinct and slender. The common name of bladderpod is somewhat misleading, for the fruit is not nearly so bladdery-inflated as in the similar twinpod (Physaria).

- 1 Leaves linear or if spatulate then gradually tapered to a petiole, the blades seldom over 4 mm wide
- 2 Plants 2-10 (12) cm tall, mostly densely caespitose and sometimes mound forming, from a slightly to much branched caudex; styles 1-4 mm long; fruit pointed at the tip, ovate-lanceolate; basal leaves arising with the stems, 1-4 cm long
 - 3 Styles 1-1.5 mm long; siliques flattened on margins and apex..... L. congesta
 - 3 Styles 1.5-4 mm long; siliques flattened at apex only..... L. alpina
- 2 Plants often over 10 cm tall, not caespitose, from a taproot and simple or slightly branched root-crown; styles 2-7 mm long; fruit rounded, orbicular to ellipsoid; stems erect or more or often decumbent, often with a basal tuft of leaves arising separately from the stems; basal leaves 1-10 cm long
 - 4 Pedicels generally recurved or arched downward in fruit or less commonly almost straight; leaves mostly linear, rarely over 4 mm wide; plants widespread..... L. ludoviciana
 - 4 Pedicels more or less S-shaped; basal leaves often narrowly spatulate, the blades sometimes over 4 mm wide; plants uncommon, known in our area from the E. Tavaputs Plateau..... L. rectipes
- 1 Leaves rather abruptly contracted to a petiole, spatulate or broader, the blades commonly over 4 mm wide except in L. alpina
 - 5 Plants mostly caespitose, sometimes mound-forming, from a branched caudex or this simple in young plants, 1-7 (10) cm tall; from 5,300-7,900 ft; styles 1.5-4 mm long; fruit pointed at the tip; leaf blades 1-5 mm wide..... L. alpina
 - 5 Plants from taproots and somewhat enlarged simple rootcrowns, rarely with slightly branched caudices, the stems sometimes over 7 cm long, from (6,000) 8,000-10,600 ft; styles 2-7 mm long; fruit rounded apically; basal leaf blades often over 5 mm wide
 - 6 Seeds 2 per locule; plants of the Piceance and Cathedral drainages, Rio Blanco Co.; stems 10-30 cm tall; basal leaves distinctly differentiated into a comparatively broad blade and a short petiole L. parviflora
 - 6 Seeds 3-8 per locule; distribution otherwise and stems mostly less than 15 cm long, or else the basal leaves gradually tapered to a petiole
 - 7 Leaves mostly gradually tapered to a petiole; stems ascending, erect, or decumbent at the base, often with 6 or more leaves, 4-40 cm long; fruit not obcordate; plants of the E. and W. Tavaputs Plateaus..... L. rectipes
 - 7 Leaves abruptly tapered to a petiole; at least the outer stems often strongly spreading to prostrate, seldom with more than 6 leaves, 2-10 (15) cm long
 - 8 Fruit obcordate in outline, sometimes subglabrous; plants of Strawberry Valley and W. Tavaputs Plateau..... L. hemiphysaria
 - 8 Fruit orbicular, pubescent, slightly flattened contrary to the septum, not obcordate or retuse at the apex; plants of Uinta Mts..... L. utahensis

Lesquerella alpina (Nutt.) Wats. Alpine b. In addition to the taxa of the following key, ssp. condensata (A. Nels.) Rollins & Shaw [L. condensata A. Nels.; L. alpina var. condensata (A. Nels.) C. L. Hitchc.] approaches our area from Wyoming near Daggett Co. The names alpina and alpine b. are misnomers at least in our area.

BRASSICACEAE

- 1 Leaves (at least some) expanded into spatulate or obovate blades, intergrading somewhat into those of the next taxon..... ssp. alpina
 1 Leaves linear or nearly so..... ssp. parvula

Ssp. alpina (L. alpina var. a.; L. condensata A. Nels. var. laevis Payson misapplied; L. subumbellata Rollins) Common; Taylor, Diamond, Blue Mts., and e. through Moffat Co.; sagebrush, juniper-mahogany, pinyon-juniper, and Douglas-fir communities, on a variety of substrates; 6,000-7,900 ft; late April-June. Plants referable to L. subumbellata are quite distinct in the L. alpina complex, but they are tied to it through a series of intermediates (Rollins and Shaw 1973). If the mound forming plants of marly barrens of the Tavaputs Plateau that have been referred to as L. subumbellata are indeed part of the L. alpina complex, then the status of L. congesta q.v. is moot. More work is indicated.

Ssp. parvula (Greene) Rollins & Shaw [L. alpina var. parvula (Greene) Welsh & Reveal] Occasional; n. slope and flank of the Uinta Mts. in Daggett Co.; 6,400-8,400 ft, and at isolated stations in Duchesne and Wasatch Cos. Tabby and Red Creek Mts. up to 10,400 ft; sagebrush, pinyon-juniper, and mt. brush communities and barren ridges; May-June depending on elevation.

Lesquerella congesta Rollins Endemic; Piceance Basin; shale barrens of Green River Formation. The plants of shale barrens in the Piceance Basin are much like mound-forming, short-styled plants of white marly barrens of the Green River and Uinta Formations on the Tavaputs Plateau in Duchesne and Uintah Cos. that have been referred to as L. subumbellata (type from the Uinta Mts.). These latter plants may belong to or at least be more closely related to L. congesta than to L. alpina q.v.

Lesquerella hemiphysaria Maguire Infrequent; Strawberry Valley and W. Tavaputs Plateau; sagebrush-snowberry, bullgrass-sagebrush, and Douglas-fir-sagebrush communities; 8,000-10,050 ft; (May) June-Aug. Our plants are referable to var. lucens Welsh & Reveal.

Lesquerella ludoviciana (Nutt.) Wats. Silver b. [L. intermedia (Wats.) Heller misapplied] Common across the n. and s. flanks and lower slopes of the Uinta Mts., from the Uinta drainage to Blue Mt. and Moffat Co., apparently rare across the Basin in e. Uintah Co. and across the E. Tavaputs Plateau, not known from the W. Tavaputs Plateau; desert shrub, sagebrush, pinyon-juniper, and ponderosa pine-manzanita communities; May-June.

Lesquerella parviflora Rollins Occasional; Cathedral and Piceance drainages; mt. brush communities and shale barrens; 6,250-8,515 ft; June-July.

Lesquerella rectipes Woot. & Standl. The few specimens seen are from the Tavaputs Plateau, but also reported for the W. Tavaputs Plateau (Rollins and Shaw 1973) in Carbon Co.; pinyon-juniper communities and barren, shaly slopes; 6,000-8,400 ft; June-July. Reports of L. montana (Gray) Wats. from our area might be based on specimens of L. rectipes, to which it is most closely related (Rollins and Shaw 1973).

Lesquerella utahensis Rydb. Utah b. Occasional in the Uinta Mts. in Duchesne and Wasatch Cos., only 1 specimen seen from each of Uintah and Daggett Cos.; sagebrush-grass, forb-grass, spruce-fir, Engelmann spruce, and krummholz communities; 8,400-10,800 ft; June-Aug.

Malcolmia (L.) R. Br. Malcolmia

Malcolmia africana R. Br. in Ait. African mustard. Plants annual, decumbent to erect, 3-40 cm tall, pubescent with forked or 3-rayed hairs; leaves 1.2-9 cm long, 0.3-2.3 cm wide, oblanceolate to elliptic, sinuate-dentate, petioled or sessile, not auriculate; petals 6-10 mm long, pink to lavender; fruit 33-66 mm long, 1-2 mm wide. Introduced from Africa; more or less weedy on disturbed ground and invading some indigenous plant communities; up to 7,400 (8,600) ft; April-June.

Nasturtium R. Br. Watercress

Nasturtium officinale R. Br. in Ait. [Rorippa nasturtium-aquaticum (L.) Schinz & Thell.] Perennial herbs with rhizomelike stolons; stems 3-100 cm long, glabrous; leaves 1-10 cm long, simple to pinnately compound; petals 3-5 mm long, white; fruit 10-18 (25) mm long, about 2 mm wide. Locally common; widespread; submersed or emergent in springs, seeps, and sluggish streams; 4,800-8,000 ft; May-Oct.

Parrya R. Br.

Parrya rydbergii Botsch. (P. platycarpa Rydb.) Perennial, stipitate-glandular herbs, from caudices clothed with persistent leaf-bases, 7-12 cm tall, scapose; leaves 3-10 cm long, 0.6-2 cm wide, oblanceolate to elliptic dentate; flowers 3-10, in racemes, the petals 16-23 mm long, pink to lavender; fruit 25-47 mm long, 3-3.5 mm wide, strongly flattened parallel to the septum. Endemic, seldom collected; alpine on the Uinta Mts. on quartzite rockfields and talus, often on small patches of turf; 11,000-12,400 ft; June (July). Much like P. nudicaulis (L.) Reg. of Alaska, Yukon, and Eurasia.

Physaria (Nutt.) Gray Twinpod; Double-bladderpod

Plants perennial, grayish, whitish, or silvery with dense appressed-stellate hairs; leaves mainly basal, the stem leaves much reduced, simple; petals yellow; fruit bladderly-inflated, often broader than long, strongly indented at apex and usually at the base. In addition to the taxa treated below, P. stylosa

Rollins has recently been described (Rollins 1983) from material of Wasatch Co. in which the fruit is without sinuses at the base. In this feature, the taxon differs from the following and it is aligned with P. chambersii Rollins of the Great Basin. More collections are needed to fully understand this taxon of intermediate distribution and morphology.

- 1 Basal leaves sinuate-dentate to lobed, sometimes some entire; stem leaves often toothed; plants uncommon to rare
- 2 Basal and stem leaves toothed to lobed..... P. grahamii
- 2 Stem leaves entire..... P. floribunda
- 1 Leaves entire, rarely dentate or repand; plants common..... P. acutifolia

Physaria acutifolia Rydb. Common t. [P. australis (Payson) Rollins; P. didymocarpa (Hook.) Gray var. australis Payson; P. repanda Rollins] Common; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, bullgrass-Douglas-fir, and ponderosa pine communities; 4,700-8,900 ft, and rare on talus slopes and alpine communities up to 11,300 ft; April-June (July). Occasional specimens of the W. Tavaputs Plateau with repand leaves (P. repanda) grow in populations of mostly entire-leaves plants. Such specimens show intergradation into the following 2 taxa.

Physaria floribunda Rydb. D. Endemic, occasional in w. Colorado; 4,500-9,000 ft; May-June.

Physaria grahamii Morton in Graham Endemic, rare or perhaps occasional; W. Tavaputs Plateau, from Indian Canyon to Sand Wash and s. to Range Creek; desert shrub, pinyon-juniper, mt. brush, and aspen-Douglas-fir communities; 6,000-9,000 ft; May-June. A poorly understood taxon; more collections are needed to better understand this plant, perhaps not distinct from P. floribunda, which in turn is hardly more than a phase of P. acutifolia.

Rorippa Scop. Cress; Yellowcress

Plants annual, biennial, or perennial, glabrous or pubescent with simple hairs; leaves pinnatifid, toothed or the upper ones subentire, petioled to sessile, sometimes auriculate; flowers in racemes, the petals yellow, fading white or pinkish; fruit orbicular to sublinear, but short (rarely over 1 cm long).

- 1 Plants perennial, from rhizomes, lacking basal rosettes even when young, rarely collected, from low elevations; petals 3.5-5.5 mm long; leaves rather uniformly sinuate..... R. sinuata
- 1 Plants from taproots, with basal rosettes when young, occasional to common, from low to high elevations; petals about 1-2 mm long; leaves various
- 2 Stems erect or somewhat decumbent, mostly 30-60 (100) cm tall, 4-12 mm in diameter; fruit 1-2 times longer than wide, the pedicels equal to or longer than the fruit (including the style); inflorescence becoming 10-15 cm wide; plants from 5,400-7,000 (8,000) ft..... R. islandica
- 2 Stems erect to prostrate, often less than 30 cm long, about 1-4 mm thick; fruit mostly 2-5 times longer than wide, the pedicels shorter than or equalling the fruit; inflorescence less than 10 cm wide; plants of various elevations
- 3 Fruit minutely papillose; stems prostrate to decumbent; plants known from 4,700-5,400 ft, uncommon..... R. tenerima
- 3 Fruit glabrous; stems prostrate to erect; plants known from (7,000) 8,000-11,000 ft, common..... R. curvipes

Rorippa curvipes Greene [R. alpina Wats.; R. obtusa (Nutt.) Britt. var. alpina Wats.; Nasturtium obtusum Nutt. var. alpinum Wats.] Common; Strawberry Valley and Uinta Mts.; wet places, often in mud at the edge of ponds and lakes and along streams; (7,000) 8,000-11,000 ft; June-Aug. Three vars. [var. alpina (Wats.) Stuckey; var. curvipes Greene; and var. integra (Rydb.) Stuckey] have been collected from our area. See Welsh and Reveal (1977) for features used for separation. Variety alpina is the common phase above 9,800 ft on the Uinta Mts.

Rorippa islandica (Oeder) Borbas Marsh y., hispid y. [R. sphaerocarpa (Gray) Britt. misapplied; Nasturtium palustre (L.) DC.] Occasional to locally common, wet places; 6 specimens seen (from Whiterocks-Tridell-Lapoint area, Rock Creek, flood plain of the Green River, and the W. Tavaputs Plateau, 5,400-8,000 ft) are referable to var. hispidula (Desv.) Butlers & Abbe [R. hispidula (Desv.) Britt.] with stems more or less hispid. One specimen from the bottomlands of the Duchesne River near Bridgeland at 5,500 ft with glabrous stems is referable to var. glabra (O. E. Schulz) Welsh & Reveal. See Welsh and Reveal (1977) for a discussion of the use of the name R. islandica in preference to R. palustre (L.) Besser.

Rorippa sinuata (Nutt.) A. S. Hitchc. Spreading y. (Nasturtium sinuatum Nutt.) The few specimens seen are from the flood plain of the Green River; disturbed swamp communities and pond margins; 4,700-6,760 ft; June-Sept. Graham (1937) lists Graham 6113 from between Green River and Quarry.

Rorippa tenerima Greene The 4 records seen are from along the Green River at Leota Bottoms and Browns Park and at the high water line of Steinaker Reservoir; 4,700-5,400 ft.

Schoenrambe Greene Plainsmustard

Plants perennial from semiwoody caudices, glabrous or with simple hairs; leaves linear, lanceolate or oblanceolate, entire or the lower ones somewhat pinnatifid; flowers in racemes; fruit terete, linear, many times longer than wide.

- 1 Flowers yellow; leaves 13-93 mm long, 1-25 mm wide, entire or the lower ones pinnatifid; plants branched above, usually rhizomatous..... S. linifolia
 1 Flowers pale purple, the petals purple-veined; leaves 9-30 mm long, 1-2 (6) mm wide, entire; plants not branched above, not rhizomatous..... S. argillacea

Schoenrambe argillacea (Welsh & Atwood) Rollins (Thelypodiopsis argillacea Welsh & Atwood) Endemic, known only from vicinity of Big Pack Mt. at the flank of the E. Tavaputs Plateau; Uinta and Green River Formations, desert shrub communities; 5,000-5,600 ft; May-June.

Schoenrambe linifolia (Nutt.) Greene Flaxleafed p. [Sisymbrium linifolia (Nutt.) Nutt. in T. & G.] Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 4,700-8,300 ft; late April-July.

Sisymbrium L. Tumblemustard

Plants annual or rarely biennial, glabrous or hirsute, from taproots; lower leaves pinnatifid, the upper ones sometimes entire; flowers in racemes, petals yellow; fruit linear, terete or nearly square in cross section, many times longer than wide.

- 1 Fruit 5-9 cm long; lower leaves strongly pinnatifid, upper leaves linear and entire..... S. altissimum
 1 Fruit 2-3.5 cm long; lower leaves pinnatifid or lobed, upper leaves similar to the lower ones.....
 S. loeselii

Sisymbrium altissimum L. Jim Hill mustard, t. Introduced from Europe, occasional or locally common; widespread; roadsides, wastepieces, pinyon-juniper, sagebrush, and mt. brush communities; up to 7,500 ft; May-June.

Sisymbrium loeselii L. Loesel t. Reported for our area but no records seen.

Smelowskia C. A. Mey. Smelowskia

Smelowskia calycina C. A. Mey. in Ledeb. Alpine s., Siberian s. (S. lineariloba Rydb.) Plants perennial, caespitose, from branched caudices, 4-20 cm tall, pubescent with simple and branched hairs; leaves pinnatifid, 5-50 mm long, 3-16 mm wide, the upper ones sometimes smaller; flowers mostly in racemes; petals 3-8 mm long, white, cream, pink, or lavender; fruit 5-9 mm long, linear or nearly so. Common; Uinta Mts.; open lodgepole pine and Engelmann spruce woods, krummholz, dry and moist meadows, moraine, talus, fell fields, rock stripes, and alpine tundra; 9,700-13,000 ft; June-Aug. Our plants are referable to var. americana (Regel & Herd.) Rollins.

Stanleya Nutt. Princesplume; Stanleya

Plants perennial, from taproots or caudices, glabrous or with simple hairs; flowers in racemes, yellow, the stamens strongly exerted beyond the petals; fruit long-stipitate, linear, many times longer than wide.

- 1 Middle and upper cauline leaves sessile, auriculate; leaves all entire; petal-claw glabrous on both surfaces; plants infrequent..... S. viridiflora
 1 Leaves not auriculate, usually petiolate, entire or not; petal-claw pubescent on one side
 2 Leaves entire or toothed, ovate, lanceolate, or oblanceolate..... S. integrifolia
 2 At least the lower leaves pinnatifid, lanceolate to elliptic..... S. pinnata

Stanleya integrifolia James in Torr. [S. pinnata var. integrifolia (James) Rollins] Occasional; Daggett and Uintah Cos., and e. into Colorado; desert shrub and juniper communities; 5,500-7,000 ft; May-July.

Stanleya pinnata (Pursh) Britt. Bushy s. (S. arcuata Rydb.) Occasional; widespread; desert shrub and pinyon-juniper communities, an indicator of seleniferous soils; 4,600-7,500 ft; June-Aug. Our plants belong to var. pinnata.

Stanleya viridiflora Nutt. Perennial s. The 5 records seen are from Duchesne, Uintah, and w. Moffat Cos.; desert shrub, pinyon-juniper, and sagebrush-mahogany communities; 4,500-7,300 ft; July-Aug.

Streptanthella Rydb. Streptanthella

Streptanthella longirostris (Wats.) Rydb. Beaked s. Annual herbs from taproots, 10-50 cm tall, without basal rosettes; leaves 1.5-8.5 cm long, 0.1-1.2 cm wide, oblanceolate to elliptic or nearly linear, entire

to sinuate-dentate, the lower ones deciduous by flowering time; petals 5-8 mm long, white with purplish veins; fruit 30-60 mm long, 1.5-2 mm wide, reflexed or descending, narrowed to a 3.7 mm long beak. Occasional or locally common; widespread; desert shrub, sagebrush, and pinyon-juniper communities, often (but not always) on sandy soils; 4,700-7,100 ft; May-mid June.

Streptanthus Nutt. Streptanthus

Streptanthus cordatus Nutt. in T. & G. Heartleaved s. Perennial, glabrous, glaucous herbs from taproots, 18-60 (80) cm tall; basal leaves 1.5-8 (15) cm long, 0.5-2 cm wide, obovoid to oblanceolate, dentate at the apex; stem leaves sessile and strongly auriculate; petals 10-15 mm long, purple to chestnut-brown; fruit 50-85 mm long, 3.5-8 mm wide. Occasional; widespread; almost always associated with pinyon or juniper, rarely in desert shrub or ponderosa pine communities; 5,200-7,800 ft; May-June.

Thelypodopsis Rydb.

Thelypodopsis elegans (Jones) Rydb. [T. wyomingensis (A. Nels.) Rydb.; Sisymbrium elegans (Jones) Payson] Biennial or winter annual forbs, from taproots, 12-95 cm tall, glabrous or densely pubescent below with flattened, flexuous hairs; basal leaves 1-6.5 cm long, 0.3-1.5 cm wide, those of the stem sessile and auriculate, up to 12 cm long, and 2 cm wide; flowers in racemes; petals 11-15 mm long, pink to lavender or white with pink veins; fruit 45-75 mm long, 1-2 mm wide. Occasional to locally common; widespread; desert shrub and pinyon-juniper communities; 4,800-7,200 ft; late April-mid June.

Thelypodium Endl. Thelypodium

Annual, biennial or short-lived perennial herbs from taproots, glabrous or pubescent with simple hairs; leaves entire to pinnatifid; flowers in racemes; petals white, pink, or lavender; fruit linear, many times longer than wide, short stipitate.

- 1 Stem leaves auriculate; plants of silver sagebrush and meadow communities, 20-100 cm tall..... T. sagittatum
- 1 Stem leaves not auriculate; plants various
 - 2 Fruit 12-20 mm long; racemes densely crowded even in fruit; leaves entire to dentate; plants 50-300 cm tall, from along water ways, known from below 7,500 ft..... T. integrifolium
 - 2 Fruit 20-75 mm long; racemes crowded in flower but elongating in fruit; leaves entire to pinnatifid; plants 15-150 cm tall or taller; known from woods of the W. Tavaputs Plateau above 7,500 ft..... T. laxiflorum

Thelypodium integrifolium (Nutt.) Endl. [T. rhomboideum Greene var. gracilipes (Robinson) Payson] Infrequent; widespread; along water ways, meadows, and seeps, tolerant of alkali; 5,600-6,900 ft; July-Oct. Our plants are referable to var. gracilipes Robins. Variety integrifolium (T. lilacinum Greene) has been reported for our area, but we have seen no records.

Thelypodium laxiflorum Al-Shebaz The 2 records seen (S. Welsh & K. Taylor 15148; E. Neese & L. England 6149) are from the W. Tavaputs Plateau, Carbon Co.; woods; 8,000-9,000 ft; June-Aug. Thelypodium wrightii Gray [Stanleyella wrightii (Gray) Rydb.] has been listed for the s. edge of our area at Post Canyon (Graham 1937). Plants of this taxon will key here with T. laxiflorum. See Welsh and Reveal (1977) for key and discussion.

Thelypodium sagittatum (Nutt.) Endl. (T. paniculatum A. Nels.) The 5 specimens seen are from Duchesne and Wasatch Cos., from Farm Creek Pass of the Uinta Mts., Strawberry Valley, and W. Tavaputs Plateau; wet meadows, silver sagebrush, and aspen communities; 7,500-8,600 ft; June-Aug. Harrington 3712 reported for Blue Mt., 7,500 ft (Bradley 1950) was apparently annotated else where prior to 1985.

Thlaspi L. Pennycress; Stinkweed

Herbs from taproots or caudices, glabrous and usually glaucous; leaves auriculate, simple, entire to dentate or lobed; flowers in racemes; petals white or sometimes pinkish or lavender; fruit slightly to strongly flattened contrary to the septum, more or less winged.

- 1 Plants annual; fruit orbicular in outline, conspicuously winged, notched at the apex, 10-17 mm long, 7-12 mm wide; style inconspicuous, not exceeding the apical notch of the fruit..... T. arvense
- 1 Plants perennial, from caudices; fruit obovate to obcordate, winged or wingless, not notched at the apex, 3-8 mm long, 1.5-5 mm wide; style 0.5-2.5 mm long..... T. montanum

Thlaspi arvense L. Field p., fanweed. Introduced from Europe, infrequent, more or less weedy; roadsides, disturbed ground, desert shrub, pinyon-juniper, aspen, and Douglas-fir communities; up to 9,000 ft; June-July.

Thlaspi montanum L. Wild candytuft. (T. alpestre L. misapplied; T. fendleri Gray; T. glaucum A. Nels.) Occasional; widespread; sagebrush, mt. brush, aspen, meadow, and Douglas-fir communities, most common in

CACTACEAE

subalpine forests and alpine areas of the Uinta Mts. and Zenobia Peak; 7,300-12,500 ft; May-Aug. depending on the elevation.

CACTACEAE Cactus Family

Perennial, succulent, usually spiny plants with globose, cylindric, or flattened stems; leaves lacking, at least at maturity; areoles axillary (regardless of apparent position), even spaced, bearing spines, branches, flowers, or (in Opuntia) fine short-barbed bristles (glochids); stamens numerous; ovary inferior; fruit a many-seeded, dry or fleshy berry.

- 1 Stems jointed, the joints more or less flattened and padlike; areoles bearing numerous minute glochids as well as spines, subtended at the developing stem apex with quickly caducous small and fleshy, green leaves..... Opuntia
- 1 Stems hemispheric or cylindric, not of jointed pads; areoles with spines but no glochids; leaves absent at all stages of development
 - 2 Stems ribbed, the tubercles longitudinally confluent at the base and thus aligned in rows
 - 3 Flowers bright red; stems cylindric, usually few to numerous in compact clusters; flowers borne laterally, the buds breaking through the epidermis above an areole; spines never hooked..... Echinocereus
 - 3 Flowers pinkish to rose-purple; stems subglobose or ovoid (rarely in old individuals short-cylindric), usually solitary (sometimes few-branched due to injury of terminal bud); flowers subterminal, borne at the stem apex; spines hooked or not..... Sclerocactus
 - 2 Stems not ribbed, the tubercles nipplelike, not confluent at the base
 - 4 Upper side of tubercles with a longitudinal groove; petaloids usually rose-pink; plants rare..... Coryphantha
 - 4 Upper side of tubercles not grooved; petaloids usually whitish, yellow, or peach, occasionally pinkish; plants common..... Pediocactus

Coryphantha (Engelm.) Lem. Pincushion Cactus; Ball Cactus

Coryphantha vivipara (Nutt.) Britt. & Rose [C. neomexicana (Engelm.) Britt. & Rose probably misapplied; Mammillaria vivipara (Nutt.) Haw.] Plants diminutive, 2-5 cm long, and broad, the stems depressed-globose to ovoid, solitary or clustered; tubercles separate and spirally arranged; central spines 4, rather prominent, radial spines 12-20, slender, the spines mostly 1-2 cm long, straight; flowers borne near the summit of the stem on the tubercle at the base of a longitudinal felty groove, pink-purple or rose, about 4 cm wide; fruit green, ellipsoid, 1-2 cm long. Reported for Theodore (Duchesne), benches of the Uinta Mts., 8,000 ft based on a collection by M. E. Jones of 13 May 1908 (Benson 1982) and for a bench w. of Green River, n. of Sand Wash, 4,500 ft based on Graham 7908, collected 28 May 1933 (Graham 1937). Ours is referable to var. vivipara.

Echinocereus Engelm. in Wisliz. Hedgehog Cactus; Strawberry Cactus

Echinocereus triglochidiatus Engelm. Scarlet h. c., clarecup. [E. coccineus Engelm.; E. mojavenis (Engelm. & Bigel.) Britt & Rose misapplied; E. octacanthus (Muhl.) Britt. & Rose misapplied] Stems few to numerous in mounds, mostly 8-15 cm long, 4-7 cm thick; ribs 9 or 10, the tubercles not prominent; central spines 1-3; radial spines 5-9, shorter than the central; flowers narrowly vase-shaped, the petaloides scarlet, greenish toward the base. Uncommon; our records scattered across the Basin from near Duchesne ne. across the footslopes of the Uinta Mts. to the Green River in Browns Park (Swallow Canyon overlook, Neese 5664A - this apparently the most northerly known location for the species), on the E. Tavaputs Plateau, and in the Piceance Basin; dry, often rocky or sandy places; June.

Opuntia Mill. Pricklypear

Stems jointed, the joints flattened (sometimes nearly terete in O. fragilis), never ribbed; leaves small, fleshy, scalelike, caducous; areoles with glochids as well as spines (rarely nearly spineless); flowers borne in areoles of previous year's growth, yellow, peach, pink, rose, or purple, tube of hypanthium short, cup-shaped; ovary spiny or not; fruit (in ours) dry; seeds light colored, flattened. Note: The pricklypears of the Basin form a complexly intergrading group; morphological characters traditionally treated as diagnostic (spine number, shape, color, and distribution, pad shape, nature of the areole, and so forth) seem little-correlated, the populations demonstrating a perplexing array of combinations. The following keys to species and to infraspecific taxa which follow Welsh (1984) and more loosely Benson (1982) are largely artificial and may represent convenience rather than taxonomic relationships. See introductory paragraphs of Utah Flora: Cactaceae (Welsh 1984) for a more exhaustive discussion.

- 1 Largest joints 2-8 cm long, 1.5-3.5 cm wide, relatively thick, sometimes nearly terete, readily detachable; plants mat-forming (transitional to the next)..... O. fragilis

- 1 Largest joints mostly 7-15 cm long, 4-12 cm broad, flattened, not readily detached; plants mat-forming or not
- 2 Spines not especially flattened, terete or nearly so (plants transitional to the next)..... O. polyacantha
- 2 Spines somewhat flattened, at least basally..... O. erinacea

Opuntia erinacea Engelm. Our few records from Deadman Bench and Dinosaur National Monument, Uintah Co.; June. Our material has been designated var. utahensis (Engelm.) L. Benson. The specimens are doubtfully distinct from O. polyacantha (q.v.).

Opuntia fragilis (Nutt.) Haw. Brittle p. Occasional to common, especially in heavily grazed areas; occurring in many habitats but usually in dry, open, often rocky or sandy places in the juniper and mt. brush zones, sometimes under ponderosa pine; June-July. Note: this species is rather more distinct throughout most of its wide range than it is in the Uinta Basin, where most populations show apparent intergradation with either O. polyacantha or O. erinacea.

Opuntia polyacantha Haw. Plains p. Common, sometimes occurring in dense stands in heavily grazed areas; salt desert shrub, and mixed brush communities, usually in dry open rocky or sandy places; 4,700-7,000 ft (and probably higher); June-July. Two vars. from the Basin are treated by Benson (1982); they are sympatric and intergrading. A third var. [var. rufispina (Engelm. & Bigel.) L. Benson (O. rutila Nutt.)] is indicated (Bradley 1950). Benson (1982) indicates this to be adjacent to our area.

- 1 Spines mainly in upper areoles, mostly coarser and longer than in the next; fruits sparingly spiny.... var. juniperina (Britt. & Rose) L. Benson
- 1 Spines in most areoles, slender, mostly to 3 cm long; fruit often spiny..... var. polyacantha

Note: the following names have been variously applied (Graham 1937; Harrington 1954) to collections of the O. erinacea - O. polyacantha complex in the Basin.

- O. hystricina Engelm. & Bigel. (Graham 8169; Vernal-Manila road n. of Vernal): probably misapplied to O. polyacantha var. polyacantha.
- O. juniperina Britt. & Rose = O. polyacantha var. juniperina.
- O. phaeacantha Engelm. (Graham 9143; Red Wash above Island Park): probably misapplied to O. erinacea var. utahensis. O. rhodantha Schum. = O. erinacea var. utahensis.

Pediocactus Britt. & Rose Hedgehog Cactus

Pediocactus simpsonii (Engelm.) Britt. & Rose (Echinocactus simpsonii Engelm.) Plants subglobose, usually solitary, to 15 cm high; tubercles spirally arranged; areoles woolly, at least when young; spines straight; flowers borne at one side of the areoles near the tubercle apex, small, often numerous, in a ring near the summit of the stem; fruit dry. Our records from near Starvation Reservoir and the Uinta River drainage e. to Diamond Mt., also near Manila, Daggett Co., and on the Tavaputs Plateaus; salt desert shrub, mixed desert shrub, sagebrush-grasslands, juniper, and mt. brush communities, usually on gravelly benches or in sandy rocky places; 5,500-7,700 ft; April-June. Graham 9122 (CM!), reported as Coryphantha neomexicana (Engelm.) Britt. & Rose (Graham 1937) belongs here.

Sclerocactus Britt. & Rose Fishhook Cactus

Sclerocactus whipplei (Engelm.) Britt. & Rose Whipples f. c. (Echinocactus whipplei Engelm. & Bigel.) We have 2 intergrading vars.

- 1 Spines all straight or essentially so; principal central spine often arching upward; plants of gravel terraces near the Green River, central Uintah Co..... var. glaucus
- 1 Lowermost central spine strongly hooked, often curving downward; plants from near Duchesne and Starvation Reservoir, Duchesne Co..... var. roseus

Var. glaucus (J. A. Purpus) Welsh Basin hookless f. c. [S. glaucus (K. Schum) L. Benson] Uncommon; along the Green River and associated old terraces, from about 8 mi above Ouray to Minnie Maud Creek, also w. to near the Duchesne Co. line on the slopes above Nine Mile Creek; gravelly terrace and bluff margins, sloping gravelly, pediments, and gravel-littered draws at their bases, usually where clay or silty clay underlies the stony surface, in shadscale and mixed desert shrub communities; 4,700-5,800 ft; May-June. At least a few individuals in most populations possess moderately to strongly hooked spines. A peculiar local phase of S. whipplei occurs in the Pariette Draw-Castle Cliff area in se. Duchesne Co. In these plants the central spine is very short (to 2 mm), stout, black, and mostly hooked, and the juvenile stem stage persists for several years after the initiation of flowering. This and two other populations of different but intergrading morphology have been mapped and discussed (Bureau of Land Management 1985). Graham 8839 (CM!), questionably referred to Utahia sileri (Engelm.) Britt. & Rose by Graham (1937), belongs here. Graham 7941a, reported by Graham (1937) as Neolloydia texensis Britt. & Rose for a bench on the w. side of the Green River n. of the mouth of Sand Wash, probably belongs here.

CALLITRICHACEAE

Var. roseus (Clover) L. Benson (S. parviflorus Clover & Jolter) Uncommon; gravelly benches or rocky or sandy places; salt desert shrub and pinyon-juniper communities; 5,400-5,800 ft; May-June. The plants are transitional to the preceding var.

CALLITRICHACEAE Waterstarwort Family

Callitriche L. Waterstarwort

Aquatic, submerged or emergent, slender-stemmed, inconspicuous, perennial herbs, sometimes stranded on mud of drying pools; leaves opposite or the floating ones tufted at the ends of stems; flowers inconspicuous, solitary or 2-3 in the axils of leaves, mostly unisexual, consisting of a single pistil or 1 (rarely more) stamens; ovary separating at maturity into four 1-seeded achenelike fruits.

- 1 Leaves all linear, 1 nerved, all submerged; floral bracts lacking; fruit not wing-margined, the faces with minute, pitlike, irregularly distributed markings..... C. hermaphroditica
- 1 Upper (floating) leaves usually broader; floral bracts usually present; fruit usually slightly wing-margined at the top, the faces with minute pitlike markings in vertical lines
- 2 Fruit wing-margined at the top, rectangular or at least not wider above the middle except for the wings, 1/5-1/3 longer than broad, the tiny pitlike markings of the faces in rather regular vertical lines..... C. palustris
- 2 Fruit not wing-margined, obcordate or at least widest above the middle, about as wide as long, the tiny pitlike markings of the faces irregularly distributed..... C. heterophylla

Callitriche hermaphroditica L. The 2 specimens seen are from Blue Mt. (Neese & Snider 11907) and Diamond Mt. (Neese 14832); aquatic in ponds and lakes; 7,050-7,800 ft; June-Sept.

Callitriche heterophylla Pursh ex Darby The 4 specimens seen are from the Uinta Mts.; pools, ponds, and lakes; 7,600-10,330 ft; July-Sept.

Callitriche palustris L. (C. verna L.) The specimens seen are all from the Uinta Mts.; pools, ponds, lakes, and perhaps in slow streams; 7,100-10,500 ft; July-Sept.

CAMPANULACEAE Harebell Family

Campanula L. Bellflower; Harebell

Perennial herbs from rootstocks; leaves alternate, simple, entire to toothed; flowers bisexual; corolla united, 5-lobed, mostly bell-shaped; stamens 5, alternate with the corolla lobes; ovary inferior or nearly so; style 1 with 3-5 stigmas; fruit a many-seeded capsule.

- 1 Plants mostly over 50 cm tall; middle and upper stem leaves lanceolate, distinctly toothed; flowers usually many..... C. rapunculoides
- 1 Plants rarely to 50 cm tall; middle and upper stem leaves linear or nearly so, mostly entire
- 2 Corolla 7-10 (12) mm long, narrowly bell-shaped; anthers 1.5-2.5 mm long; flowers solitary; capsules erect, opening by pores near the summit; lower leaves sessile or the petioles not sharply distinct from the blades, gradually expanding into the blade..... C. uniflora
- 2 Corolla 12-20 mm long, about as wide as long; anthers 4-6.5 mm long; flowers 1-several; capsules nodding, opening by pores near the base; lower leaves often early deciduous, the petioles often as long or longer than the blades, often abruptly contracted from the blade..... C. rotundifolia

Campanula rapunculoides L. Creeping b. Cultivated and escaping, native of Eurasia; the 3 records seen are from a roadside at Neola and in Brownie Canyon, Uinta Mts. in an aspen-fir community, and from a flower garden in Roosevelt; May-Oct.

Campanula rotundifolia L. Scotch b., bluebell. (C. petiolata A. DC.) The common bellflower of the Uinta Mts.; many plant communities; 7,500-11,500 ft; June-Aug.

Campanula uniflora L. Arctic b. Occasional; Uinta Mts.; above timberline; July-Aug.

CAPPARIDACEAE (Capparaceae) Caper Family

Annual herbs, often ill-scented; leaves alternate, ternate or palmately compound with 3-7 leaflets, or upper ones sometimes simple, the leaflets usually entire or serrulate; inflorescence a raceme; flowers bisexual; petals usually clawed; stamens 6-16 (ours) exerted; ovary superior; fruit a 2-valved capsule, the 2 valves separating at maturity.

- 1 Capsules not over 6 mm long, usually wider than long; leaflets 0.7-2.5 cm long; stamens 6, the filaments about 5 mm long; plants 5-20 (30) cm tall..... Cleomella
- 1 Capsules 10-55 mm long, longer than wide; leaflets 2-5 (8) cm long; stamens 6-16, the filaments 7-15 mm long; plants 20-80 (100) cm tall

- 2 Capsules sessile or short stipitate, the stipe 1-3 mm long; stamens usually 12-16, the filaments 7-10 mm long; plants viscid-villose, clammy..... Polanisia
- 2 Capsules stipitate, the stipe 10-20 mm long; stamens 6, the filaments 10-15 mm long; plants glabrous or nearly so..... Cleome

Cleome L. Spiderflower; Bee-plant

With features of the family.

- 1 Petals yellow, 5-8 mm long; at least the lower leaves with 5-7, entire leaflets..... C. lutea
- 1 Petals purple, 8-12 mm long; leaves trifoliate, the leaflets entire or minutely serrulate.. C. serrulata

Cleome lutea Hook. Yellow s. Occasional to common; widespread; desert shrub, and sagebrush-juniper communities, roadsides and flood plains, sometimes in sandy soils, often where soil is disturbed; 4,700-6,000 ft; May-Aug.

Cleome serrulata Pursh Bee s. Occasional; widespread; sagebrush, basin wildrye-rubber rabbitbrush, mt. brush, and aspen communities, flood plains and roadsides, often on disturbed soils; 4,650-7,400 ft; mid June-Sept.

Cleomella DC.

Cleomella palmerana Jones Plants 5-20 (30) cm tall; leaves trifoliate; leaflets 7-25 mm long, glabrous or nearly so; sepals about 1 mm long, acuminate, persistent; petals 3-4 mm long, yellow; fruit rhombic, about 5-6 mm long, 7-9 mm wide, the stipe about 5 mm long. The only specimen seen (Goodrich 12312) is from a clay hillside in Morrison Formation at Rainbow Draw, near Island Park, Uintah Co; 5,400 ft. Also reported by Graham (1937) between Green River and Quarry; 4,700 ft.

Polanisia Raf. Clammyweed

Polanisia dodecandra (L.) DC. Roughseed c., western c. (P. trachysperma T. & G.) Plants 20-28 cm tall, viscid, clammy, strongly ill-scented; leaves trifoliate or rarely simple; sepals purple-tinged, deciduous; petals 8-12 mm long, yellowish-white; stamens about twice as long as the petals; capsules 3-5.5 mm long, 5-7 mm wide. Several specimens seen from Bonanza to s. of Ouray in the vicinity of the Green and White Rivers; 3 specimens seen from Jessie Ewing Canyon, Browns Park area, Daggett Co. and reported for Hideout Canyon, Daggatt Co. (Flowers and others 1960) but no specimen found at UT or elsewhere to verify this report; desert shrub, rabbitbrush, and sagebrush communities, gravelly washes, and tuffaceous outcrops; 5,000-5,800 ft; July-early Sept. Our plants are referable to ssp. dodecandra var. trachysperma (T. & G.) J. Iltis.

CAPRIFOLIACEAE Honeysuckle Family

Trees, shrubs, and woody vines; leaves opposite, simple or compound; flowers bisexual; sepals 4-5, mostly reduced to small teeth or obsolete; corolla, rotate to salverform, (4) 5-lobed; stamens (4) 5, arising from the corolla tube, alternate with the lobes; pistil 1; ovary inferior, 1-3 or 5 chambered; style 1 or obsolete; stigmas 1-3 or 5; fruit a berry or drupe.

- 1 Plants woody, prostrate-creeping, vinelike, the aerial stems not over 15 cm tall..... Linnaea
- 1 Plants upright shrubs or small trees
- 2 Leaves pinnate compound with 5-9, large, serrate leaflets..... Sambucus
- 2 Leaves simple
- 3 Fruit a red or black berry; flowers and fruit borne in pairs on slender peduncles over 1 cm long; leaves entire or wavy-margined..... Lonicera
- 3 Fruit a white or greenish drupe; flowers and fruit not in distinct pairs, peduncles not as above; leaves entire or those of vigorous young shoots sometimes toothed or lobed..... Symphoricarpos

Linnaea L. Twinflower

Linnaea borealis L. Longtube t. Creeping vinelike shrub; stems prostrate to 1 m long; aerial (flowering) stems not over 15 cm tall; leaves simple, ovate to orbicular, 8-20 mm long, entire or few-toothed above the middle; flowers in pairs, nodding, borne on naked peduncles 3-12 cm long; corolla 8-15 mm long, white to pink; fruit small, dry, 1-seeded. Apparently uncommon; the few records seen are from coniferous woods of the Uinta Mts.; 8,600-9,700 ft; July-Aug.

Lonicera L. Honeysuckle; Twinberry

Shrubs; leaves simple, opposite, mostly entire; flowers in pairs, borne on slender, elongate peduncles from axils of upper leaves; corolla cylindric to bell-shaped, 4 (5)-lobed or 2-lipped with the upper lip 4-lobed, the tube pouched near the base; fruit a fleshy, several-seeded berry.

- 1 Fruit red; corollas 15-20 mm long, pale yellow, subtended by narrow, green bracts; leaves 2-6 cm long, pale blue-green..... L. utahensis
 1 Fruit black; corollas 12-15 mm long, yellow, subtended by conspicuous broad, reddish-purple or blackish bracts; leaves 5-15 cm long, green..... L. involucrata

Lonicera involucrata (Rich.) Banks ex Spreng. Bearberry h., black t. Occasional; widespread; canyons, mountains, and into valleys, along streams or in moist places; 5,000-10,000 ft; May-Aug. The red-purple bracts are rather easily mistaken for flowers. Our plants are referable to var. involucrata.

Lonicera utahensis Wats. Utah h. Records seen are from the Avintaquin drainage and w. on the W. Tavaputs Plateau and from Rock Creek and w. on the Uinta Mts.; mostly on basic substrates, aspen, fir, and spruce communities; June-July.

Sambucus L. Elderberry

Shrubs or rarely small trees; leaves opposite, pinnately or bipinnately compound, the leaflets serrate, lanceolate; flowers small and numerous, usually in compound umbellike cymes; sepals inconspicuous; corolla white to cream, rotate or nearly so, the tube short, the limb horizontally flaring; stamens (4) 5; style nearly obsolete with 3 or 5 stigmas; fruit a juicy drupe.

- 1 Fruit glaucous blue, blackish beneath the bloom; inflorescence flat-topped, often over 15 cm wide; pith of stems white; plants mostly growing below 8,000 ft, 2-5 m tall..... S. caerulea
 1 Fruit red or yellowish; inflorescence rounded or pyramidal, to about 8 cm wide; pith of older stems brownish; plants mostly growing above 8,000 ft, 0.5-2.5 m tall..... S. racemosa

Sambucus caerulea Raf. (orthographic variants: S. cerulea and S. coerulea) Blueberry e. Occasional; widespread; sagebrush, pinyon-juniper, mt. brush, and ponderosa pine communities; 7,000-8,000 (8,800) ft; June-Aug.

Sambucus racemosa L. Red e. (S. melanocarpa Gray; S. microbothrys Rydb.; S. pubens Michx.) Scattered to locally abundant; Uinta Mts. and Tavaputs Plateau; often in aspen openings and adventive on conifer forest areas that have been opened up by fire or timber harvest; 8,000-10,500 ft; June-Aug. Our plants are referable to ssp. pubens (Michx.) House var. microbothrys (Rydb.) Kearney & Peebles based on the red or yellowish fruits and mostly glabrous leaves. The var. melanocarpa (Gray) McMinn with black fruits apparently does not enter our area.

Symphoricarpos DuRoi Snowberry

Shrubs with exfoliating bark; leaves simple, opposite, entire to lobed, glabrous or pubescent; flowers small, pink or white, in axillary or terminal clusters, or solitary in upper axils; calyx teeth 4 or 5; corolla regular, campanulate, funnelform or salverform, 4-5 lobed; stamens 4-5; ovary 4-celled; style 1; fruit a 2-seeded berrylike drupe.

- 1 Corolla tube glabrous inside, 11-13 mm long, slender (salverform), the lobes 1/5-1/3 as long as the tube S. longiflorus
 1 Corolla tube pubescent inside, 7-13 mm long wider than above, campanulate or funnelform, the lobes at least 1/3 as long as the tube
 2 Corolla short-campanulate, the lobes about as long as the tube or longer; leaves 3-10 cm long; petioles 4-10 mm long; plants mostly below 7,000 ft..... S. occidentalis
 2 Corolla tubular-funnelform, the lobes 1/3-1/2 as long as the tube; leaves commonly 1-3 cm long, those of sterile shoots sometimes larger; petioles mostly less than 5 mm long; plants above 6,500 ft..... S. oreophilus

Symphoricarpos longiflorus Gray Longflower s. The few records seen are from 4-5 mi s. of Manila in the Sheep Creek area at the n. flank of the Uinta Mts. and along the rocky canyons of the Green River to near Split Mt.; rocky places; May-June.

Symphoricarpos occidentalis Hook. Western s. Locally common; apparently widespread; often forming clones along ditches, streams and on flood plains of rivers; 5,000-7,000 ft; May-July. The Flowers and others (1960) reference to S. albus (L.) Blake is based on specimens (UT!) belonging here.

Symphoricarpos oreophilus Gray Mt. s. (S. tetonensis A. Nels.; S. utahensis Rydb.; S. vaccinoides Rydb.; S. rotundifolius Gray misapplied) Common to abundant, widespread; sagebrush, pinyon-juniper, mt. brush, aspen, and fir communities; 7,000-9,500 ft; May-July. Our plants are more or less referable to var. utahensis (Rydb.) A. Nels.

CARYOPHYLLACEAE Pink Family

Annual or perennial herbs, sometimes suffrutescent; stems mostly with swollen nodes; leaves opposite, simple, entire, often linear to lanceolate; flowers mostly cymose, sometimes solitary, terminal, or axillary, complete or apetalous, usually bisexual, usually 5 (4)-merous; petals white or sometimes pinkish or reddish; stamens equal to or twice as many as the petals; fruit a utricle or capsule, the capsule sessile or elevated on a stalk (carpopore).

- 1 Leaves with prominent scarious stipules; fruit various; stamens 5 or 10
 - 2 Plants perennial, pulvinate caespitose, not glandular; flowers sessile, included among the dense leaves; leaves 3-6 mm long, the scarious stipules 1/2 to as long as the leaves; petals lacking or minute; fruit a 1-seeded utricle; stamens 5; style 1..... Paronychia
 - 2 Plants annual or winter annual, often glandular; flowers not sessile, about equalling or exceeding the leaves; leaves 5-25 (40) mm long; stipules mostly less than 1/2 as long as the leaves; petals about equal or a little shorter than the sepals; fruit a capsule; stamens various; styles 3..... Spergularia
- 1 Leaves without scarious stipules; fruit a many-seeded, 1-chambered capsule with free central placentation; stamens 10
 - 3 Calyx united, the tube equal or longer than the lobes, 10-20 mm long at anthesis (only 3-10 mm long in Silene)
 - 4 Flowers in densely crowded clusters, sessile or nearly so (the pedicels to 6 mm); plants perennial, 20-90 cm tall, glabrous, introduced and persisting in gardens and escaping; calyx about 15-20 mm long; styles 2
 - 5 Each flower subtended by a pair of linear, elongate bracts, these equal or exceed the calyx; leaves 1-2 cm wide, the pairs 4-10 per stem and connate for 2-4 mm; calyx about 40-nerved..... Dianthus
 - 5 Flowers not closely subtended by bracts, the bracts much shorter than the calyx; leaves 1.5-4 cm wide, the pairs up to 20 per stem, not connate; calyx about 20-nerved..... Saponaria
 - 4 Flowers solitary or in open cymes; plants annual or perennial, of various stature; calyx 3-15 mm long at anthesis; styles various
 - 6 Plants annual, glabrous, to 80 cm tall; leaves 5-40 mm wide; inflorescence an open cyme; petals 15-20 mm long, usually exceeding the calyx by 3-10 mm, deep pink to red; styles 2 or rarely 3..... Vaccaria
 - 6 Plants not as above except in Silene antirrhina, and then the petals 4-10 mm long, equalling or exceeding the calyx by less than 3 mm, white to pink
 - 7 Calyx 10-15 mm long; plants perennial from taproots, not pulvinate-caespitose; stems erect, glandular-pubescent at least above..... Lychnis
 - 7 Calyx 3-10 mm long; plants annual or perennial and pulvinate-caespitose or spreading from slender rhizomes..... Silene
 - 3 Sepals separate to the base or nearly so, 2-8 mm long
 - 8 Petals entire at the apex (sometimes lacking in Sagina); leaves rigid to pungent, less than 15 mm long and/or less than 2 mm wide (except lax and flat in Arenaria lateriflora); plants not rhizomatous (except in Arenaria lateriflora), often on well-drained soils
 - 9 Sepals about 2.5 mm long; petals lacking or shorter than or about equal to the sepals; styles (4) 5; opened capsules with 4 or 5 teeth; plants glabrous, biennial or perennial; flowers mostly solitary..... Sagina
 - 9 Sepals 3-9 mm long; petals equal to or mostly longer than the sepals; styles 3 (4); opened capsules with 3 or 6 teeth; plants perennial, either glandular pubescent or flowers not solitary (except in Arenaria rubella)..... Arenaria
 - 8 Petals lacking or deeply bilobed; leaves mostly not rigid, not pungent, (5) 10-30 mm long or longer, often over 2 mm wide; styles 3 or 5; plants rhizomatous except in some of Cerastium, often of moist or wet, sometimes shady sites
 - 10 Styles mostly 5; capsules curved near the tip, opening by 10 usually revolute-margined teeth; stems pubescent, often glandular..... Cerastium
 - 10 Styles mostly 3; capsules not curved, opening by 6 (8) teeth; stems glabrous or glandular-hairy in Stellaria jamesiana..... Stellaria

Arenaria L. Sandwort

Perennial herbs with features of the family, and as listed in the key.

- 1 Leaves oblong to oval, (2) 3-12 mm wide, not pungent; plants from slender rhizomes..... A. lateriflora
- 1 Leaves linear, mostly not over 2 mm wide, often rigid or even pungent; plants more or less caespitose, often from branching caudices
 - 2 Open capsules with 3 teeth; plants seldom over 10 cm tall, often (not always) above 10,000 ft on the Uinta Mts.; flowers solitary or few, never in capitate clusters; stems sometimes sprawling; leaves

CARYOPHYLLACEAE

- 3-10 (15) mm long, densely crowded on the stems, the primary ones with fascicles of secondary leaves in the axils (or rather scattered and without secondary fascicles in A. rubella); petals 2-5 (8) mm long
- 3 Plants glabrous, rather rare; sepals 2.5 (3.5) mm long, 1-3 nerved; stems 1-3 (4) cm long; leaves 1-nerved, 4-6 mm long..... A. filiorum
- 3 Plants glandular; sepals 3-5 mm long, 3-nerved; stems 1-10 (15) cm long; leaves sometimes 3-nerved, 3-10 (15) mm long
- 4 Stems brittle, generally shattering at the nodes; leaves mostly pungent, 3-nerved; capsules shorter than the acuminate to pungent sepals; seeds about 1.5 mm long, papillate in concentric rows..... A. nuttallii
- 4 Stems not brittle, not shattering; leaves mostly obtuse or only slightly mucronate, 1-3 nerved; capsules often exceeding the obtuse to acute sepals; seeds mostly less than 1 mm long, lightly reticulate to tuberculate
- 5 Sepals 4-5 mm long, the tip mostly obtuse, more or less erose, slightly incurved and hooded, purplish; stems sprawling, clothed with current and marcescent leaves, with 1 (rarely 2-3) flowers; plant more mat-forming than cushion-forming, from a rather thick taproot..... A. obtusiloba
- 5 Sepals 3-4 mm long, obtuse to acute, not erose, not hooded; stems more upright, usually not clothed with leaves, with (1) 2-5 (7) flowers; plants usually forming small cushions, from a slender taproot..... A. rubella
- 2 Open capsules with 6 teeth; plants often over 10 cm tall or flowers in dense capitate clusters; stems mostly erect from branching woody caudices; leaves 6-30 (80) mm long, not densely crowded; petals 5-12 mm long
- 6 Inflorescence of 1 or more compact clusters, the flowers sessile or on pedicels mostly shorter than the calyx
- 7 Leaves 0.5-8 cm long, some nearly always over 1.5 cm; plants rather loosely caespitose, seldom mound-forming, mostly 10-30 cm tall; sepals 3-6 mm long; petals about 1.5 times longer than the sepals..... A. congesta
- 7 Leaves 0.5-1 cm long; plants densely caespitose, mound-forming, 2-6 (15) cm tall; sepals 5-9 mm long; petals not much longer than the sepals..... A. hookeri
- 6 Inflorescence an open cyme, the flowers on pedicels that equal or exceed the length of the calyx; leaves mostly 1-3 cm long..... A. fendleri

Arenaria congesta Nutt. in T. & G. Ballhead s. (A. burkei Howell) Scattered or locally common; widespread; sagebrush, pinyon-juniper, grass-forb, dry meadow, mt. brush, ponderosa pine, aspen, Douglas-fir, open pine-spruce, and alpine tundra communities; 7,000-11,500 ft; June-Aug. Our plants seem referable to var. congesta.

Arenaria fendleri Gray Fendler s. Occasional to common; widespread; desert shrub, sagebrush, pinyon-juniper, and ponderosa pine communities, often in rocky places; 5,000-7,500 (8,500) ft; May-June. Most of our plants seem referable to var. eastwoodiae (Rydb.) Harrington (A. eastwoodiae Rydb.). They are a part of a large complex that includes A. kingii (Wats.) Jones, A. kingii var. uintahensis (A. Nels.) C. L. Hitchc. [A. k. ssp. uintahensis (A. Nels.) Maguire; A. uintahensis A. Nels.] Taxa in the complex have been separated by tenuous features. They are all probably no more than vars. of A. fendleri.

Arenaria filiorum Maguire [A. rossii R. Br. in Richards (Minuartia rossii (R. Br. in Richards) Graebn. misapplied; Minuartia filiorum (Maguire) McNeill] The few specimens seen are all from the Blindstream-S. Fork Rock Creek area, Uinta Mts.; rocky (limestone) ground, with scattered (often krummholz) spruce, and open alpine tundra; 10,500-11,000 ft; July-Aug.

Arenaria hookeri Nutt. Hooker s. Occasional and locally common; widespread; sagebrush, pinyon-juniper, mt. brush, and windswept grass-forb communities, usually on nearly barren ground of harsh substrates; 5,700-8,400 (9,000) ft; late May-early July.

Arenaria lateriflora L. Bluntleaf s. [Moehringia lateriflora (L.) Fenzl] Widespread in and adjacent to the Uinta Mts., but rarely collected; along streams in woods and in meadows; 7,000-8,600 ft; June-Aug.

Arenaria nuttallii Pax. Nuttall s. Minuartia nuttallii (Pax.) Briq. Two specimens seen (Peterson 83-305 from Lookout Mt., Moffat Co.; 7,800 ft, and Goodrich & Atwood 16165 from Rock Creek-Brown Duck divide, Uinta Mts.; fine limestone talus; 11,300 ft); June-Aug.

Arenaria obtusiloba (Rydb.) Fern. Arctic s. [A. sajanensis B. L. Robins not Willd.; Minuartia obtusiloba (Rydb.) House] Occasional to common; Uinta Mts.; near or above timberline; 10,500-12,000 ft; July-Aug.

Arenaria rubella (Wahl.) Smith Boreal s., reddish s. [A. propinqua Richards.; Minuartia rubella (Wahl.) Hiern.] Occasional to common; Uinta Mts.; mostly on rocky alpine tundra or meadows and talus; 10,000-11,500 ft but occasionally down to 7,600 ft in ledges and rock outcrops; June-Aug.

Cerastium L. Cerastium; Mouse-ear; Chickweed

With features of the family and as listed in the key.

- 1 Plants annual; stems ascending to erect, not matted, not rooting at the nodes; petals equal to or slightly longer than the sepals..... C. nutans

- 1 Plants biennial or perennial; stems often decumbent or trailing, sometimes matted; petals various
- 2 Plants mostly from above 9,000 ft on the Uinta Mts., rather densely pubescent with mostly gland-tipped hairs; primary leaves without fascicles of secondary leaves; petals about 1.5 times longer than the sepals..... C. beeringianum
- 2 Plants from below 8,800 ft, pubescent but the hairs mostly not gland-tipped, or else primary leaves usually with fascicles of secondary leaves in the axils
- 3 Petals about 1.5 times longer than the sepals, 8-12 (14) mm long; primary leaves of the flowering stems often with fascicles of secondary leaves in the axils, linear to narrowly lanceolate, 3-4 (8) mm wide; bracts of inflorescence scarious margined..... C. arvense
- 3 Petals about equal to the sepals, 4-8 mm long; primary leaves of the flowering stems without fascicles of secondary leaves in the axils, oblanceolate or spatulate, up to 15 mm wide; bracts of the inflorescence hardly scarious-margined..... C. fontanum

Cerastium arvense L. Field ch., starry ce. (C. oreophilum Greene) Specimens seen are from Strawberry Valley, Uinta Mts., Blue Mt., and Yampa Plateau; sagebrush, pinyon-juniper, riparian, meadow, and ponderosa pine communities, and rock outcrops; 7,000-8,800 ft; June.

Cerastium beeringianum C. & S. Alpine ce., alpine ch. (C. buffumae A. Nels.) Scattered or locally common; Uinta Mts.; around seeps and springs, along streams, and in moist meadows; 9,200-12,800 ft; June-Aug.

Cerastium fontanum Baumg. Big ce. (C. vulgatum L.) Introduced from Europe; more or less weedy in lawns and pastures but appearing native in wet meadows and along streams; up to 8,100 ft; June-Aug.

Cerastium nutans Raf. Nodding ce. [C. brachypodium (Engelm.) Robins. in Britt.] The 2 specimens seen are from Daggett Co. and Matt Warner Reservoir, Diamond Mt.; damp meadows; 6,900-7,700 ft; June-July.

Dianthus L. Pink; Carnation

Dianthus barbatus L. Sweet William. Perennial herbs, 20-60 cm tall; basal leaves several, oblong-lanceolate, 1-2 cm wide; cauline leaves lanceolate, mostly 4-9 cm long; calyx about 15 mm long; petals white, pink, or red, the narrow claws about equaling the calyx, the expanded blade 6-10 mm long, erose-dentate; capsule on a 3-4 mm long carpophore. Native of the Old World, planted (especially about older homes), persisting and occasionally escaping. No specimens seen.

Lychnis L. Campion

Perennial, more or less glandular herbs, from simple or branched root crowns and taproots; leaves narrow, mostly lanceolate or oblanceolate or linear; calyx 10 (20) nerved, the nerves often purplish; petals with narrow elongate claws usually about equaling the calyx, the short expanded blade usually retuse and with 2 (4) lobes and hardly projected beyond the calyx. Our members of the genus are sometimes included (and reasonably so) in the genus Silene.

- 1 Calyx more or less inflated in fruit, not closely enveloping the capsule; plants alpine, 5-15 (25) cm tall, often glandular below the inflorescence; flowers 1-3, rarely more; styles 5..... L. apetala
- 1 Calyx closely enveloping the capsule; plants not alpine, 20-30 (60) cm tall, glandular only in the inflorescence; flowers (1) 3-several; styles 3..... L. drummondii

Lychnis apetala L. Apetalous c. (L. kingii Wats.) Scattered across the Uinta Mts. above timberline. Our plants are referable to var. montana (Wats.) C. L. Hitchc. They have often been referred to as L. kingii, and the type specimen of that taxon is from the Uinta Mts. The separation of L. kingii from L. apetala var. montana seems to be based solely on flowers erect instead of nodding at anthesis (Maguire 1950) or perhaps only in bud (Hitchcock and Cronquist 1964). After examining many specimens from the Uinta Mts., we feel this feature is a function of phenology, and it has no taxonomic merit. A few specimens from upper Uinta and Yellowstone drainages are distinctly less pubescent on the leaves than most others from the area. These plants are like typical circumboreal plants. Perhaps our more pubescent plants are worthy of taxonomic recognition, but the weight and consistency of the pubescence do not seem to merit more than varietal status.

Lychnis drummondii (Hook.) Wats. Drummond c. (Silene drummondii Hook.) Occasional, widespread; Vasey sagebrush, mt. brush, ponderosa pine, Douglas-fir, aspen, lodgepole pine, Engelmann spruce, and meadow communities; 7,200-11,200 ft; July-Aug. With 3 styles and capsules opening with 6 teeth, this could be included in the genus Silene just as well as in Lychnis.

Paronychia Mill. Nailwort; Whitlow-wort

Perennial, densely caespitose, low herbs from woody caudices; aerial stems short or essentially lacking, often hidden in the crowded leaves, hirtellous; leaves sessile, crowded, 3-6 mm long, puberulent, with scarious stipules about as long as the leaves; flowers terminal and solitary or rarely paired, small and often inconspicuous, with scarious bracts; sepals 5, concave or hooded at the awn-tipped apex; petals

CARYOPHYLLACEAE

lacking or minute; stamens 5; styles partly united; fruit an ovoid or globose utricle included in the persistent calyx.

- 1 Leaves not linear or seldom so, nerveless; plants at or above timberline on the Uinta Mts.; flowers more or less hidden in the leaves, sometimes sessile or nearly so in the basal rosettes..... P. pulvinata
- 1 Leaves linear, often with a prominent midrib; plants from well below timberline; flowers usually borne on definite stems..... P. sessiliflora

Paronychia pulvinata Gray Rocky Mt. n. Occasional; Uinta Mts., at or above timberline; 11,100-13,000 ft; July-Aug.

Paronychia sessiliflora Nutt. Creeping n. Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities, and exposed ridges and slopes, often on rocky ground or semibarrens; 5,800-8,400 ft; July-Aug.

Sagina L. Pearlwort

Sagina saginoides (L.) Britt. Arctic p. Biennial or tufted to matted perennial, sometimes flowering the first season and appearing annual; stems numerous, 0.3-5 cm long, ascending to procumbent; basal leaves 3-20 mm long, 0.2-0.5 mm wide; stem leaves 3-6 (10) mm long, occasionally with secondary leaves in the axils; flowers usually solitary and terminal, a second flower occasionally in the upper leaf axil, on filiform pedicels 0.3-2.5 cm long. Specimens seen are from Strawberry Valley and the Uinta Mts.; along streams, around seeps and springs, in woods, meadows, and alpine tundra; 8,100-13,000 ft; June-Aug.

Saponaria L. Soapwort

Saponaria officinalis L. Bouncing-bet. Rhizomatous perennial herbs, 30-90 cm tall; stems simple; leaves lanceolate to oblanceolate, mostly 4-10 (12) cm long; calyx 15-20 mm long at anthesis, up to 25 mm long in fruit, often deeply cleft in one or more places; petals white to pink, the narrow claw slightly exceeding the calyx, the blade 10-15 mm long, shallowly retuse; capsule on a short carpophore. Introduced from Europe, rather showy, widely planted as an ornamental (especially about older homes), persisting and occasionally escaping. Two specimens seen from abandoned homesteads at Dry Fork Settlement, and Whiterocks, another from disturbed ground in a rabbitbush community in the mouth of Uintah Canyon; not expected much above 7,500 ft; July-Sept.

Silene L. Campion; Wild Pink; Silene

With features of the family and as listed in the key.

- 1 Plants pulvinate caespitose perennials, forming cushions or mats, with branched caudices and woody taproots, 2-5 (10) cm tall; leaves linear, 0.4-1 (2) cm long, 1-2 mm wide; flowers solitary, often unisexual, the petals lavender, pink, to (rarely) white; calyx often purplish..... S. acaulis
- 1 Plants annual, or if perennial then from rhizomes, 5-50 (80) cm tall; leaves (0.3) 2-6 (10) cm long, 2-25 mm wide; flowers seldom solitary, bisexual, the petals white, pink, or purple
 - 2 Plants annual, 5-50 (80) cm tall; stems erect, simple below; calyx tube glabrous; petals white, pink, or purple..... S. antirrhina
 - 2 Plants perennial from rhizomes, 5-20 (40) cm tall; stems decumbent, often branched below; calyx tube glandular; petals white..... S. menziesii

Silene acaulis L. Moss c., moss s. Common; Uinta Mts.; mostly in rocky alpine tundra; 10,800-13,000 ft; July-Aug.

Silene antirrhina L. Sleepy s. Known from Taylors Flat-Sears Canyon, Uintah Co. (Neese 5660A); populus-pinyon-juniper community; 5,700 ft; June.

Silene menziesii Hook. Menzies s. Occasional; widespread; mt. brush, aspen, and Douglas-fir communities and open rocky slopes; 7,000-10,400 ft; June-Aug.

Spergularia (Pers.) J. & C. Presl. Sandspurry

Annual to perennial herbs, glabrous to stipitate-glandular; leaves linear, mucronate (in ours); flowers in open leafy-bracteate terminal cymes.

- 1 Leaves mostly fascicled in the axils; plants mostly above 7,000 ft; stamens 9-10; stems decumbent to erect..... S. rubra
- 1 Leaves not fascicled or occasionally some nodes with 1 or 2 axillary leaves; plants of alkaline areas below 7,000 ft; stamens 2-5; stems prostrate..... S. marina

Spergularia marina (L.) Griseb. Saltmarsh s. Introduced from Europe or possibly native; the 2 specimens seen (B. Welsh & G. Moore 219; England 315 UI) from near Jensen and Leota Bottoms near Ouray, sandbars of the Green River; Aug.

Spergularia rubra (L.) J. & C. Presl. Red s. Introduced from Europe; the few specimens seen are from Strawberry Valley and the Uinta Mts.; roadside and recently burned lodgepole pine communities; 7,800-9,900 ft; July-Sept.

Stellaria L. Starwort; Chickweed

With features of the family and as listed in the key. Arenaria lateriflora is keyed below because it is similar in a general way to the latter 3 taxa of the following key and it often occupies similar, wet, often shady sites as do those taxa.

- 1 Stems strongly glandular, mostly arising singly, not matted, from creeping rhizomes that often have tuberlike enlargements; plants usually growing on well drained soil; petals 6-12 mm long, conspicuously longer than the sepals; leaves 2-10 (15) cm long..... S. jamesiana
- 1 Stems not glandular, often matted, from very slender rhizomes (these easily broken and often lacking in herbarium specimens); plants often of wet places; petals lacking or to 5 mm long, not much if any longer than the sepals
 - 2 Stems and sometimes the midribs of leaves more or less crisply or retrorsely puberulent; petals entire..... Arenaria lateriflora
 - 2 Stems and midribs of leaves glabrous or with multicellular hairs but not retrorsely puberulent; petals lacking or bilobed
 - 3 Inflorescence an umbellate-cyme, with dichotomous or trichotomous branches, the branches spreading as much as 130°-180° from each other; bracts of the inflorescence minute, scarious; sepals 2-3 mm long at anthesis; petals lacking or minute; leaves (5) 10-20 (25) mm long, 2-5 mm wide, the margins smooth..... S. umbellata
 - 3 Flowers solitary or in few-flowered, leafy-bracteate cymes with erect or somewhat spreading branches; sepals 2.7-4.5 mm long at anthesis; petals and leaves various
 - 4 Leaf margins minutely toothed (use a strong lens), sometimes ciliate with multicellular hairs; leaves (5) 10-50 (95) mm long, 3-7 (9) mm wide, lanceolate or narrowly elliptic, but seldom linear, rather lax; petals lacking or nearly as long as the sepals..... S. calycantha
 - 4 Leaf margins smooth or sometimes ciliate at the base; leaves 10-30 (40) mm long, 1-3 (4) mm wide, linear or narrowly lanceolate, acute, rather stiff; petals equal to or slightly longer than the sepals..... S. longipes

Stellaria calycantha (Ledeb.) Bong. Northern s. [S. borealis Bigel.; Alsine borealis (Bigel.) Britt.] Occasional; Uinta Mts.; along streams, around seeps and springs, and in peat bogs, in various plant communities; 7,300-10,300 (11,300) ft; June-Aug. Plants with several-flowered terminal bracteate cymes and reduced upper leaves may be referable to var. sitchana (Steud.) Fern. Plants with 1 terminal flower, the others axillary and solitary or in few-flowered leafy-bracteate cymes may be referable to var. bongardiana Fern. Specimens from our area that have been identified as S. crispa C. & S. [Alsine crispa (C. & S.) Holt.] most likely belong to S. c. var. bongardiana.

Stellaria jamesiana Torr. Sticky c. or s. [Alsine curtisii Rydb.; A. jamesiana (Torr.) Heller; Pseudostellaria jamesii (Torr.) W. A. Weber] Occasional or common; widespread; sagebrush, pinyon-juniper, mt. brush, aspen, fir, lodgepole pine, and Engelmann spruce communities; 6,800-10,600 ft; June-Aug.

Stellaria longipes Goldie Longstalk s. [Alsine laeta (Richards) Rydb.; A. longipes (Goldie) Cov.] Strawberry Valley, Uinta Mts., and Yampa Plateau; streambanks, wet meadows, margins of ponds and lakes, and on well-drained rocky slopes; (6,000) 7,000-11,400 ft; June-Aug. Plants with bracteate flowers commonly more than 1 per stem are referable to var. longipes. Those with ebracteate flowers commonly 1 per stem are referable to var. monantha (Hulten) Welsh [var. altocaulis (Hulten) C. L. Hitchc.].

Stellaria umbellata Turcz. ex Kar. & Kir. Umbellate s. (Alsine baicalensis Cov.) Strawberry Valley and Uinta Mts.; streambanks, around springs, margins of lakes, and rocky ground, in aspen, fir, lodgepole pine, and spruce communities and perhaps above timberline; 9,000-11,400 ft; July-Aug. Graham 6544, 6559, and 8447 (CM!), referred to as Alsine longifolia (Muhl.) Britt. (Stellaria longifolia Muhl.) belongs here.

Vaccaria Medic. Cowcockle; Cowherb

Vaccaria pyramidata Medicus [V. segetalis (Neck.) Garcke ex Asch.; Saponaria vaccaria L.] Annual glabrous herbs 15-80 cm tall; leaves 3-9 cm long, 0.5-4 cm wide, sessile, sometimes cordate-clasping; flowers usually numerous in an open flat-topped panicle composed of leafy-bracteate cymes; calyx tube greenish, inflated, keeled or winged on the nerves at fruiting; petals inconspicuous, clawed, retuse; styles 2 (3); capsules enclosed in the calyx. Introduced from Europe, more or less weedy, reported for our area, no specimens seen.

CELASTRACEAE

CELASTRACEAE Stafftree Family

Shrubs; leaves simple; flowers regular, usually bisexual, small, usually inconspicuous; calyx deeply 4-5 parted; petals 4-5, separate; stamens as many or twice as many as the petals, inserted on or below the margins of a disc; ovary superior, 2-5 celled; style short or lacking; stigma 2-5-lobed.

- 1 Leaves opposite, serrulate above the middle; sepals and petals 4; stamens 4; fruit a capsule..... Pachistima
- 1 Leaves alternate, entire; sepals and petals usually 5; stamens 5-7; fruit a follicle..... Forsellesia

Forsellesia Greene Greasebush; Green-bush

Forsellesia meionandra (Koehne) Heller [F. spinescens (Gray) Greene; Glossopetalon meionandra Koehne] Low shrubs not over 60 cm tall; twigs terminating in spines, young twigs greenish or grayish-yellow; leaves 7-17 mm long, 3-4 mm wide; flowers solitary, axillary; sepals about 3 mm long; petals 4-6 mm long, greenish-white or cream; follicle about 4 mm long, 3 mm wide. Locally common on sandstone from Brush Creek to Split Mt., and on white, marly shale or limestone of the Tavaputs Plateau, occasional elsewhere; 4,900-7,600 ft; April-June.

Pachistima Raf. (orthographic variants: Pachystima and Paxistima)

Pachistima myrsinites (Pursh) Raf. Mountain lover. Low shrubs with stems growing along the ground or arising to 50 cm tall; leaves evergreen, 5-40 mm long, oval to oblanceolate, glossy above, paler beneath; flowers bisexual, sessile or nearly so in the axils of leaves, the sepals less than 1 mm long, the petals about twice as long as the sepals, deep red to brownish-red; capsules 4-5 mm long, 2-chambered, each chamber with 2 dark brown seeds. Occasional or locally common, widespread in mountains; mostly in aspen and conifer woods, sometimes along streams or on open slopes; 7,000-10,400 ft; June-Aug.

CERATOPHYLLACEAE Hornwort Family

Ceratophyllum L. Hornwort

Ceratophyllum demersum L. Submerged, aquatic, rootless perennial herbs; stems slender, 20-100 cm long; leaves verticillate, 5-12 in each whorl, dichotomously forked into linear or filiform segments, these often minutely toothed; flowers solitary in axils of leaves, unisexual, both the staminate and the pistillate with a perianth or involucre of 8-15 greenish segments; stamens 10-16, the filaments short; fruit a hardened achene, the achene with a persistent beaklike style, smooth or with -2 hornlike appendages at the base. No specimens seen, but to be expected.

CHENOPODIACEAE Goosefoot Family

Plants herbaceous or shrubby, annual or perennial; leaves alternate or opposite, sometimes succulent or fleshy; flowers borne in small glomerules in the axils of bracts or leaves, in spikes, panicles, or cymes, bisexual or unisexual, the perianth of a single set, regular or nearly so, lobed or parted with 5 (2-6) lobes or reduced to a single scale or sometimes lacking in pistillate flowers; stamens generally equal to the perianth lobes and opposite them; ovary superior or sometimes adnate to the perianth, 1-chambered, 1-ovuled; fruit an utricle, indehiscent or irregularly rupturing.

- 1 Plants perennial, more or less woody at least at the base
 - 2 Leaves glabrous or glaucous, fleshy-succulent, linear to subterete
 - 3 Shrubs more or less spiny, 0.3-3 m tall, woody throughout except for twigs of the season..... Sarcobatus
 - 3 Plants not spiny, 0.1-0.8 m tall, woody only at the base..... Suaeda
 - 2 Leaves either densely scurfy or otherwise pubescent, whitish or grayish, sometimes wider than above, succulent or not, but hardly fleshy
 - 4 Leaves and twigs glabrate, hirsute or sericeous to densely tomentose, not scurfy; leaves linear to nearly filiform; plants mostly suffrutescent subshrubs
 - 5 Twigs and leaves stellate-tomentose; leaves linear, slightly to strongly revolute, hardly terete, not subulate, the midnerve conspicuous beneath..... Ceratoides
 - 5 Twigs not tomentose or if so not with stellate hairs; leaves glabrate, sericeous or hirsute, terete or nearly so or subulate, the midnerve sometimes not conspicuous
 - 6 Current year's twigs thinly to densely tomentose; perianth 4-merous, wingless in fruit; leaves filiform-subulate, rigid, appearing pungent, fascicled, rather thinly hirsute with widely spreading hairs; inflorescence branched..... Camphorosma
 - 6 Current year's twigs sericeous but not tomentose; perianth 5-merous, winged in fruit; leaves linear but not subulate, glabrate or sericeous, the hairs appressed or ascending but not widely spreading..... Kochia

- 4 Plants scurfy, the hairs inflated and collapsing when dry and leaving a grayish or whitish mealy coating on leaves and twigs; leaves linear or broader; plants suffrutescent subshrubs or shrubs with woody, rigid stems well above ground level
- 7 Plants spiny; leaves oblanceolate to orbicular
- 8 Leaves scurfy pubescent when young with some of the hairs usually forked or stellate, glabrate or glabrous and green when mature, oblanceolate; bark of twigs exfoliating in long, whitish strips; bracts of fruit wholly united into a sac; anthers attached near the base, erect, parallel to each other..... Grayia
- 8 Leaves permanently and densely gray-white scurfy with simple hairs, mostly obovate, ovate, or orbicular; bark not exfoliating in strips; bracts of fruit free toward the apex; anthers attached near the middle, the lower 1/2 widely divergent..... Atriplex confertifolia
- 7 Plants not spiny
- 9 Leaves linear, 3-10 times longer than wide, or if broader then some of the lower leaves and/or branches opposite or subopposite and stems not rigid; bracts of fruit dorsally compressed, sometimes tuberculate on the faces with wartlike appendages, margins of bracts free towards the apex, often toothed..... Atriplex
- 9 Leaves mostly less than 3 times as long as wide, alternate; stems rigid; bracts of fruit compressed or not, united to the apex, smooth on the faces or ribbed but not tuberculate, the margins entire
- 10 Fruiting bracts 5-12 mm long, 6-15 mm wide, glabrous at maturity, thickened and spongy within; leaves 5-30 mm long, 2-12 mm wide, scurfy when young, some or most of the hairs forked or branched, glabrate in age; bark of twigs exfoliating in long, whitish strips....
..... Grayia
- 10 Fruiting bracts 5-6 mm long, about 4-8 mm wide, scurfy at maturity, papery, not thickened; leaves 10-70 mm long, (4) 10-45 mm wide, scurfy even in age, the inflated hairs simple; bark of twigs seldom as above..... Zuckia
- 1 Plants annual, herbaceous
- 11 Leaves opposite, scalelike, not over 2 mm long, fleshy, embedded and barely discernible in the terete fleshy stem; some or most of the branches of the inflorescence opposite; flowers sunken in the axis of spikes; plants known from about Pelican Lake..... Salicornia
- 11 Leaves alternate, some usually over 2 mm long, not embedded in the stem; branches of the inflorescence alternate, or if opposite then the flowers not sunken in the axis of spikes; plants of various distribution
- 12 Plants pilose, sericeous, or stellate at least in part; leaves entire, linear
- 13 Pubescence of branched hairs at least in part; flowers mostly solitary in axils of scarious-margined bracts; fruit 3.5-4.5 mm long, strongly flattened, the margins winged.. Corispermum
- 13 Pubescence of simple hairs, flowers various; fruit not flattened, smaller than above, the margins not winged
- 14 Perianth lobes each with a spreading, hooked, spinelike hair; plants pilose throughout
..... Bassia
- 14 Perianth lobes without hooked spinelike hairs; plants sometimes glabrate in part.....
..... Kochia
- 12 Plants glabrous or scurfy with inflated hairs that collapse upon drying and leave a grayish or whitish mealy coating on the leaves and sometimes the stems, or if otherwise pubescent then leaves not entire and linear
- 15 Leaves terete or linear, entire, not over 2 (3) mm wide, green, glabrous, often more or less fleshy-succulent at least when young
- 16 Leaves 2-6 (13) mm long, not terete; plants dichotomously branched, the outer branches capillary or nearly so; fruiting calyx not winged; plants rare..... Monolepis pusilla
- 16 Leaves mostly over 10 mm long or else terete; branches not as above; fruiting calyx often winged; plants widespread
- 17 Leaves terete, 5-10 mm long, tipped with a single bristlelike mucronate hair, succulent; seed ringed by a 3-4 mm wide horizontal wing; plants not spiny
tumbleweeds..... Halogeton
- 17 Leaves terete or not, not tipped with a bristlelike hair, often over 10 mm long; seed various
- 18 Leaves 3-6 cm long, filiform; plant much branched, succulent when young but becoming spiny tumbleweeds upon drying; seed ringed by a horizontal wing.....
..... Salsola
- 18 Leaves sometimes shorter than above; plants not becoming spiny tumbleweeds; seed not ringed by a horizontal wing
- 19 Fruit strongly flattened, 3.5-4.5 mm long, about as wide, solitary in axils of scarious-margined bracts, the margins winged; plants of sandy ground....
..... Corispermum
- 19 Fruit not flattened, smaller than above, solitary or in clusters, the margins not winged; plants usually of moist alkaline ground Suaeda

CHENOPODIACEAE

- 15 Leaves neither terete nor linear or if linear and less than 3 mm wide then whitish or grayish scurfy and not particularly succulent or at least some hastate and not entire
- 20 Perianth with a horizontal wing in fruit; plants villous-tomentose when young, glabrate in age.... Cycloloma
- 20 Perianth without a horizontal wing; plants not villous-tomentose
 - 21 Plants greenish, 4-15 (30) cm tall; most of the leaves with a pair of hastate lobes, otherwise entire, 1-8 (11) mm wide; calyx with 1 (rarely 2-3) lobes; flowers and fruit not enclosed in bracts..... Monolepis nuttalliana
 - 21 Plants scurfy and whitish or grayish at least in part, or if greenish then often taller than above or leaves not as above; calyx with 5 lobes or else the flowers and fruit enclosed in bracts
 - 22 Flowers bisexual, the perianth regular, with (3-4) 5 lobes; leaves all alternate; seeds mostly brownish or blackish and shiny..... Chenopodium
 - 22 Flowers unisexual, the pistillate naked or with greatly reduced perianth and subtended by and enveloped in 2 bracts, the bracts enlarging as the flowers and fruit mature; perianth of staminate flowers with 3-5 lobes; leaves alternate or opposite at some of the lower nodes; seeds not brownish, blackish, nor shiny..... Atriplex

Atriplex L. Orache; Saltbush

Annual or perennial, monoecious or dioecious herbs and shrubs, often scaly, scurfy, or mealy; leaves alternate or some of the lower ones opposite; flowers bisexual or unisexual, in axillary clusters, terminal spikes, or panicles; staminate flowers without bracts, the perianth, inconspicuous, 3- to 5-parted; stamens 3-5; pistillate flowers lacking a definite perianth, subtended by 2 bracts, these dorsally compressed and united at the base but free toward the apex; stigmas 2; fruit an utricle, the pericarp usually free; seeds erect or rarely horizontal. Vegetative features have been used throughout the keys, but positive identification is not always possible without mature fruit.

- 1 Plants perennial shrubs or subshrubs; leaves entire
 - 2 Fruiting bracts 4, conspicuously winglike, 6-15 mm long, 4-8 (10) mm wide entire, undulate, or toothed; plants 40-200 cm tall, with erect and spreading, rigid stems and twigs; leaf blades mostly linear to narrowly oblong, 1.5-5 cm long, 2-8 mm wide..... A. canescens
 - 2 Fruiting bracts 2, mostly smaller than above, sometimes rather inconspicuous; stems not rigid, or if so (as in A. confertifolia) then the leaves ovate to elliptic
 - 3 Twigs rigid except for those of the current season, these becoming spinelike late in the season or in the second year; leaves 1-2 cm long, broadly ovate, obovate or elliptic, alternate; plants 20-100 cm tall; fruiting bracts 6-12 mm long, nearly as wide, the margins entire, the faces smooth A. confertifolia
 - 3 Twigs not rigid, not turning into spines; leaves often linear or oblong, or if broader than some of the lower ones usually opposite or subopposite; fruiting bracts smaller than above, the margins toothed, the faces smooth or tuberculate with wartlike appendages
 - 4 Leaves 2-10 (15) mm long, 1-4 (5) mm wide, often densely crowded; plants more or less mat-forming, (2) 5-10 cm tall..... A. corrugata
 - 4 Leaves 15-50 mm long, (2) 5-25 mm wide; plants sometimes with low spreading stems but hardly mat-forming, (15) 20-50 cm tall..... A. gardneri
- 1 Plants annual herbs; leaves entire or toothed
 - 5 Fruiting bracts truncate at the apex or the faces heavily appendaged with wartlike tubercles, or the leaves sessile and entire; seeds all alike, either black or brown; plants native, mostly of dry alkaline flats and hills in desert shrub communities, sometimes along roads or other disturbed places, of various stature but often 10-40 cm tall; leaves entire or at most wavy-toothed, hardly if at all hastate, mostly much smaller than in A. hortensis, mostly gray-scurfy, alternate or rarely the lower 2 opposite
 - 6 Leaves (except sometimes the lower ones) linear, nearly filiform, about 1-2 (3) mm wide, seldom over 2 cm long..... A. wolffii
 - 6 Leaves not linear, at least some over 2 mm wide
 - 7 Leaves sessile, lanceolate or elliptic, rarely ovate, acute to acuminate, entire, mostly 1-3 cm long, 3-10 mm wide; plants low and spreading, 10-30 cm tall, rare at the e. edge of the area; small glomerules of staminate flowers borne above the pistillate flowers..... A. dioica
 - 7 Leaves either petioled or of different shape; plants various, either unisexual or with staminate and pistillate flowers mixed
 - 8 Plants unisexual; leaves with 3 prominent veins; fruiting bracts blunt at the apex, the faces with tubercles..... A. powellii
 - 8 Plants bisexual; leaves seldom with 3 prominent veins; fruiting bracts various
 - 9 Fruiting bracts of 2 kinds, those of the lower axils sessile to subsessile, truncate, without crested appendages, those of the upper axils long-stalked, sometimes reflexed, with crested or horny appendages toward the apex; leaves somewhat cordate.... A. saccaria
 - 9 Fruiting bracts all alike; leaves not cordate

- 10 Fruiting bracts sessile, truncate, entire except for 3 minute teeth at the apex, the faces smooth..
..... A. truncata
- 10 Fruiting bracts sometimes stalked, dentate well below the apex, the faces sometimes with crested
appendages..... A. argentea
- 5 Fruiting bracts ovate to orbicular, 3-12 mm wide, entire, and with smooth faces, or more or less
triangular with the tips pointed and the faces smooth or slightly tuberculate; leaves not both sessile
and entire; seeds in the same plants of 2 types, both black and brown; plants introduced (except A.
patula), mostly of roadsides, ditchbanks, fencelines, gardens, fields, and other disturbed areas, mostly
30-200 cm tall; leaves sinuate-dentate or mostly hastate (entire in A. hortensis but then the blades
5-20 cm long and 2-10 cm wide), more or less greenish and only slightly gray-scurfy except in A. rosea;
lower part of stems sometimes with 1-3 or more pairs of opposite leaves or branches
- 11 Fruiting bracts ovate to orbicular, entire, smooth-faced
- 12 Fruiting bracts 6-12 mm wide, 1-veined at the base; leaf blades 5-20 cm long, 2-10 cm wide,
ovate-triangular to broadly lanceolate; plants 50-200 cm tall..... A. hortensis
- 12 Fruiting bracts 3-5 mm wide, 5-veined at the base; leaf blades (1) 2-8 cm long, 0.5-6 cm wide,
triangular-hastate; plants (20) 30-80 cm tall or taller..... A. heterosperma
- 11 Fruiting bracts more or less triangular with the tips pointed, often toothed, the faces smooth or
slightly tuberculate
- 13 Leaves sinuate-dentate the whole length, ovate, elliptic, lanceolate or nearly rhombic, not or
slightly hastate, mostly grayish-scurfy on the lower surface, alternate except for the lowest 2,
the upper ones sessile or on short petioles..... A. rosea
- 13 Leaves hardly if at all sinuate-dentate, narrowly to broadly triangular, often conspicuously
hastate, greenish and glabrous on both sides or slightly scurfy, petioled; stems usually with
1-few pairs of opposite leaves or branches..... A. patula

Atriplex argentea Nutt. Silverscale. Occasional; widespread; desert shrub communities and flood plains
with Sarcobatus; 4,700-5,200 ft perhaps higher; July-Oct.

Atriplex canescens (Pursh) Nutt. Fourwing s. Occasional to common; widespread; desert shrub, and
pinyon-juniper communities; up to about 7,500 (8,00) ft; June-Aug.

Atriplex confertifolia (Torr. & Frem.) Wats. Shadscale. Common to dominant; widespread; desert shrub
communities and extending upward into pinyon-juniper communities on the Tavaputs Plateau; seldom above
7,000 ft; May-June.

Atriplex corrugata Wats. Mat s. Common to dominant; desert shrub communities, mostly on clay of Mancos
Shale, Duchesne River and other formations that weather to badlands; 4,700-5,400 ft; April-early June.
Some larger specimens with larger leaves are intermediate between A. corrugata and A. gardneri var.
cuneata.

Atriplex dioica (Nutt.) Macbr. Rillscale. One specimen reported for the e. edge of the area (W. A.
Weber & J. Wingate 15372 CS) is from a clay butte just n. of Rio Blanco Lake; June-July.

Atriplex gardneri (Moq.) Dietr. (A. nuttallii Wats.) There are 3 more or less distinct vars. in our
area as follows:

- 1 Leaves all alternate, linear or narrowly oblong or oblanceolate; fruiting bracts widest at or below the
middle, the faces smooth; plants mostly restricted to the flood plains of the Green River; (stems
erect?)..... var. tridentata
- 1 Some of the lower leaves and branches usually opposite or subopposite; leaves wider than above or
fruiting bracts widest at or above the middle, plants not restricted as above
- 2 Plants n. of the Uinta Mts.; leaves usually 4-12 mm wide, greenish, sometimes widest above the
middle; fruiting bracts 2-5 mm wide, the faces smooth or with tubercles less than 1 mm long.....
..... var. gardneri
- 2 Plants s. of the Uinta Mts.; leaves 10-25 mm wide, gray-green, usually widest below the middle;
fruiting bracts 5-9 mm wide, the faces heavily tuberculate with wartlike appendages, these sometimes
over 1 mm long..... var. cuneata

Var. cuneata A. Nels. Castle Valley s., Castle Valley clover. [A. cuneata A. Nels.; A. nuttallii Wats.
var. cuneata (A. Nels.) H. & C.; A. oblanceolata Rydb.] Common to dominant; desert shrub communities
across the Basin, typically on valley fill from silty or clayey formations that weather to badlands, but
also on hills; 4,700-5,700 (6,000) ft; May-June. Perhaps intergrading into A. corrugata (q.v.).

Var. gardneri Gardner s. [A. nuttallii Wats. var. gardneri (Moq.) H. & C.] Common to dominant;
desert shrub communities n. of the Uinta Mts.; up to about 6,200 ft; May-June. See Arnow and others (1980)
for a discussion of the spelling of A. gardneri.

Var. tridentata (Kuntze) Macbr. Three-toothed s. [A. tridentata Kuntze; A. nuttallii Wats. var.
tridentata (Kuntze) H. & C.] Known only from along flood plains of the Green River near Dinosaur Quarry
and Ouray; July-Sept.

Atriplex heterosperma Bunge Introduced from Eurasia; along ditches, roadsides, moist alkaline lowlands
and flood plains; 4,600-5,800 and perhaps to 7,000 ft; Aug.-Oct.

Atriplex hortensis L. Garden o. Introduced from Eurasia; along roadsides, ditches, and fencelines; up
to about 6,000 or perhaps 7,000 ft; June-Sept.

CHENOPODIACEAE

Atriplex patula L. Spearscale, spear o. Widespread; somewhat weedy on disturbed ground, mostly on moist alkaline ground, meadows, and flood plains; up to 6,000 ft; July-Oct. Our plants are referable to var. triangularis (Willd.) Thorne & Welsh (A. triangularis Willd.; A. hastata L. misapplied). Var. patula is known from the Wasatch Front and might be expected in our area.

Atriplex powellii Wats. Scattered to abundant; widespread; desert shrub, greasewood, and pinyon-juniper communities, often on Mancos Shale, Duchesne River and other formations that weather to badlands; 4,700-6,000 ft; July-Oct.

Atriplex rosea L. Red o., tumbling o. Introduced from Eurasia, more or less weedy; mudflats of flood plains, roadsides, and other disturbed sites in various plant communities; up to 8,000 ft; July-Oct.

Atriplex saccaria Wats. The 6 specimens seen are from Daggett and Uintah Cos.; flood plain-greasewood and desert shrub communities; 5,000-6,600 ft; June-Aug. Plants with pedicels of fruiting bracts less than 3 mm long and with the bracts of the lower axils tending to be sessile and less tubercled than the upper ones are referable to var. saccaria. Those with pedicels of fruiting bracts 3-8 mm long and with the bracts essentially all alike are referable to var. caput-medusae (Eastwood) Welsh. The varieties intergrade.

Atriplex truncata (Torr.) Gray Wedgescale. A single specimen reported (Graham 1937) for w. side of Green River near Quarry; July-Sept. Much like and hardly distinct from A. argentea.

Atriplex wolfii Wats. (A. tenuissima A. Nels.) Infrequent; widespread; desert shrub, greasewood, and sagebrush(?) communities; up to 7,000 ft; July-Oct.

Bassia All. Bassia

Bassia hyssopifolia (Pall.) Kuntze Fivehook b., smotherweed. [Echinopsilon hyssopifolium (Pall.) Moq.] Annual, pilose plants, 15-50 (200) cm tall; leaves alternate, sessile, entire, linear to oblong-lanceolate, 1-4 cm long; flowers bisexual, solitary or glomerate in axils of leaves or leafy bracts, perianth with 5 lobes, each lobe armed on the back with a slender spine, the spine usually hooked; fruit enclosed by the perianth. Widespread; moist alkaline lowlands, roadsides, desert shrub, and pinyon-juniper communities; up to 7,000 ft; Aug.-Sept. Similar to and possibly hybridizing with the annual Kochia of our area (Arnold and others 1980).

Camphorosma L.

Camphorosma monspeliacum L. Mediterranean camphorflume. Plants perennial, woody at the base, usually several-stemmed and more or less caespitose, aromatic with odor of camphore but perhaps only weakly so, 10-60 cm tall; current years stems tomentose; leaves 3-10 mm long, linear-subulate, rigid and appearing (but not) pungent, spreading to recurved, fascicled; flowers in dense spikes; perianth 3-3.5 mm long, glabrous or pubescent, the 2 longer lateral teeth herbaceous and recurved in fruit, the 2 middle lobes shorter and scarious; seed glandular. Native of Eurasia, recently introduced from Russia, and planted in experimental plots s. of White River near Ouray, possibly escaping.

Ceratoides Gagnebin Winterfat; White Sage; Winter Sage

Ceratoides lanata (Pursh) J. T. Howell [Eurotia lanata (Pursh) Moq.] Suffrutescent subshrubs or occasionally the stems woody well above the base, 15-100 cm tall; twigs of the season densely stellate-tomentose and also with longer straight hairs; leaves simple, alternate, entire, linear to narrowly lanceolate, sessile or short-petioled, the blades 1-4 cm long, stellate-tomentose, the margins revolute, the midnerve conspicuous beneath; flowers unisexual, in axillary clusters or terminal in a spikelike inflorescence; staminate flowers with a 4-parted perianth; stamens 4; pistillate flowers lacking a perianth, but with 2 united pilose bracts; stigmas 2; fruit covered with white pilose hairs. Occasional to abundant; widespread; desert shrub, sagebrush, and pinyon-juniper communities; up to about 8,000 (9,000?) ft; June-Sept.

Chenopodium L. Goosefoot; Pigweed; Lambsquarters

Annual herbs; leaves alternate, glabrous or grayish or whitish scurfy, entire to toothed or hastate, often reddish or purplish in age; flowers bisexual or some pistillate, in terminal or axillary crowded spikes or panicles; perianth herbaceous or slightly fleshy, 2-5 lobed; stamens 1-5; styles usually lacking; stigmas 2-5; seed erect or horizontal in the pericarp.

- 1 Seeds mostly vertical in the pericarp; leaves green on both sides, hastate and/or toothed to lobed, the larger ones commonly 1.5-10 cm long and 1-5 cm wide
- 2 Flowers in globose, terminal and subterminal axillary clusters, the clusters forming bracteate spikes, the larger ones often over 4 mm wide; plants mostly growing above 7,000 ft on well-drained soil..... C. capitatum
- 2 Flowers in elongate axillary clusters, clusters forming erect or steeply ascending compact panicles; plants known from below 7,000 ft, mostly growing on muddy ground..... C. rubrum

- 1 Seeds mostly horizontal in the pericarp or leaves whitish or grayish scurfy at least on the lower side or smaller than the above, entire to variously toothed or lobed
- 3 At least some of the leaves sinuate-dentate, 4-25 mm long, 2-10 mm wide, green above, usually densely white or gray scurfy beneath; stems mostly prostrate or decumbent, 3-15 (30) cm long; seeds horizontal or vertical; plants of wet soil..... C. glaucum
- 3 Leaves entire or with a pair of hastate lobes of if sinuate-dentate then mostly larger than above and stems mostly longer, erect, or ascending; seeds mostly horizontal; plants of dry or wet soil
- 4 Larger cauline leaves more or less cordate to truncate basally, often over 4 cm wide, glabrous, green; sepals not keeled dorsally; panicles large and open..... C. hybridum
- 4 Larger cauline leaves seldom cordate or truncate, less than 4 cm wide, sometimes gray or white scurfy beneath; sepals usually keeled
- 5 Larger cauline leaf blades 3-16 times longer than wide, mostly entire
- 6 Leaves with only the midnerve conspicuous (with a 10 power lens), linear, 1-4 mm wide; pericarp adherent to the seed; plants common from 7,500-9,000 ft, occasionally below 7,500 ft; intergrading into the next taxon..... C. leptophyllum
- 6 Larger leaves usually with 2 or more lateral nerves as well as the midnerve conspicuous (with a 10 power lens), linear or slightly broader, 1-10 mm wide; pericarp not adherent to the seed; plants known from 4,800-7,800 ft; intergrading into the following 2 taxa..... C. dessicatum
- 5 Large cauline leaf blades 1-3 times longer than wide, entire or hastate to sinuate-dentate
- 7 Leaf blades entire or with a pair of hastate lobes, the lobes sometimes again toothed or lobed, but the blades rarely with 1 or 2 teeth on the larger terminal lobe; calyx lobes obscurely or narrowly membranous-margined; plants indigenous
- 8 Leaf blades not hastately lobed, (2) 4-10 mm wide; pericarp usually adherent to the seed; plants montane (7,700-9,500 ft), intergrading into the following taxon..... C. atrovirens
- 8 Leaf blades often hastately lobed, the larger ones 5-40 mm wide; pericarp not adherent to the seed; plants of a wide elevational range..... C. fremontii
- 7 At least some of the leaves sinuate-dentate, or if hastate then with 2 or more teeth on the terminal lobe; calyx lobes with broad scarious margins; plants introduced, found mostly below 7,000 ft..... C. album

Chenopodium album L. Lambsquarters, g. (C. berlandieri Moq.) Frequent; widespread; more or less weedy and with disturbance, occurring in several plant communities; 5,000-6,800 ft; June-Sept. Rare plants with sculptured seeds (alveolate-reticulate or reticulate) are referable to var. berlandiere (Moq.) Mack. & Bush (C. acerfolium Andrz.). Our common phase with smooth or faintly striate seeds is referable to var. album.

Chenopodium atrovirens Rydb. [C. fremontii var. atrovirens (Rydb.) Fosberg; C. hians Standl.] Occasional; Strawberry Valley, Tavaputs Plateau, Uinta Mts., and Douglas Mt.; roadside, sagebrush, aspen, and Douglas-fir communities; 7,700-9,500 ft; July-Sept. See discussion under C. fremontii.

Chenopodium capitatum (L.) Asch. [C. chenopodioides (L.) Aellen misapplied; C. overi Aellen; Blitum capitatum L.] Occasional; widespread; sagebrush, pinyon-juniper, mt. brush, aspen, spruce, and fir communities and along streams and roadsides, often with disturbance; 7,000-9,000 ft; late June-Sept. Our plants with small clusters of fruit are referable to var. parvicapitatum Welsh. They do not have the red, fleshy fruits of var. capitatum.

Chenopodium dessicatum A. Nels. (C. pratericola Rydb.) The 7 specimens seen are from widely scattered locations; desert shrubs, sagebrush, pinyon-juniper, and riparian communities and roadsides; 4,750-7,800 ft; late June-Sept. See discussion under C. fremontii.

Chenopodium fremontii Wats. Fremont g. [C. incanum (Wats.) Heller] Infrequent; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, and Douglas-fir communities, sometimes wet places, often along roadsides or other disturbed places; 5,200-8,700 ft; July-Sept. Plants mostly less than 25 cm tall that branch from the base with the curved ascending branches subequal to the main stem and with leaves more or less white scurfy beneath are referable to var. incanum Wats. Specimens seen of this variety are from below 7,500 ft. Plants 5-80 cm tall with lower branches lacking or shorter than the main stem and with leaves glabrous to scurfy are referable to var. fremontii. Plants of C. fremontii and C. leptophyllum are strikingly different, but through C. atrovirens and C. dessicatum a continuum is formed. Mostly specimens can be assigned to one of the above taxa, but intermediate leaf forms are not uncommon.

Chenopodium glaucum L. Oakleaf g. (C. salinum Standl.) Occasional to locally common; widespread; mostly along moist or ephemerally moist alkaline drainages and seeps, rarely dry ground; up to 7,000 (8,000) ft; July-Oct.

Chenopodium hybridum L. Mapleleaf g. (C. gigantospermum Aellen) Collected from and reported as common at Echo Park (N. Holmgren 458 DINO), and collected from Hideout Forest Camp at 5,800 ft (Flowers 150 UT!) where later inundated by Flaming Gorge Reservoir.

Chenopodium leptophyllum Nutt. in Wats. Occasional to locally abundant with disturbance; widespread; many plant communities; about 5,200-9,000 ft; July-Sept. See discussion under C. fremontii.

Chenopodium rubrum L. Red g. (C. humile Hook.) Infrequent or occasional; widespread; mud flats of flood plains, margins of lakes and ponds, and along streams, often with disturbance; 4,900-6,500 ft; Aug.-Oct.

Corispermum L. Bugseed; Tickseed

Corispermum villosum Rydb. Common b. (C. hyssopifolium L. misapplied) Annual herbs, 15-60 cm tall, much branched; leaves simple, entire, linear, 1-7 cm long, 1-3 mm wide; inflorescence a densely flowered spike; flowers bisexual, in the axils of leaflike, scarious-margined, ovate to lanceolate, usually imbricate bracts; fruit 3.5-4.5 mm long, conspicuously winged. Infrequent; widespread; sandy ground in pinyon-juniper communities and possibly other communities; the few records seen are from below 6,000 ft; Aug.-Oct. See Welsh (1984b) for discussion of C. villosum.

Cycloloma Moq. Ringweed; Winged Pigweed

Cycloloma atriplicifolium (Spreng.) Coult. Tumble r. Plants annual, diffusely branched, 10-40 cm tall, villous-tomentose when young, glabrate in age; stems striate; leaves 1-6 cm long, alternate, petiolate, early deciduous, coarsely and irregularly sinuate-dentate, the teeth or lobes mucronate; inflorescence paniculate, with spicate branches, usually turning a deep red in age; flowers unisexual or bisexual or both in the same plant; perianth 5-lobed, the lobes inflexed, carinate, developing a membranaceous, horizontal wing that surrounds the fruit; stamens 5; stigmas 3; fruit depressed-globose; pericarp free; seed horizontal. The 1 specimen seen (Goodrich 22006) is from a sandy flood plain of the Green River at the Jensen Bridge.

Grayia H. & A. Hopsage

Grayia spinosa (Hook.) Moq. in DC. Spiny h. [Atriplex spinosa (Hook.) Collotzi] Dioecious (monoecious) shrubs 50-150 cm tall; branchlets with whitish bark exfoliating in long strips, pubescent with scurfy and stellate hairs when young, often spiny in age; leaves alternate, 5-30 mm long, 2-12 mm wide, linear-oblongate, spatulate, or obovate, entire, tapering to a short petiole, scurfy pubescent when young but glabrate in age; flowers mostly unisexual, the staminate usually with a 4-lobed perianth enclosing the stamens; pistillate flowers in short spicate inflorescences, enclosed in 2 united, dorsally flattened bracts with lateral margins winged; wings of the fruiting bracts thickened and spongy within, 6-15 mm wide, greenish or straw-colored or turning bright red in age; seeds vertical. Locally common to abundant; widespread; desert shrub communities, often on aeolian sand; up to about 6,500 ft; May-June and with fruiting through July. The genus could logically be expanded to include Zuckia q.v.

Halogeton C. A. Mey. Halogeton

Halogeton glomeratus (Bieb.) C. A. Mey. in Ledeb. Annual, succulent, fleshy herbs, 8-30 cm tall, the stems branched, glabrous except tomentose in leaf axils; leaves 5-10 mm long, about 1-3 mm wide, alternate, linear, or narrowly oblong, terete, entire, sessile, with a single hairlike bristle at the apex; flowers bisexual or some pistillate, in axillary clusters; perianth segments 5; stamens 5 or 3; stigmas 2; fruiting encompassed by a scarious, horizontal, 3-4 mm wide wing. Introduced from Eurasia; widespread; mostly along roads and other areas of disturbance; up to about 7,500 ft; July-Sept.

Kochia Roth Molly; Summer Cypress

Annual herbs or perennial subshrubs, occasionally glabrous but more often sericeous at least in part; leaves mostly alternate, entire; flowers mostly bisexual or some pistillate, solitary or a few in axils of leaves; perianth 6-lobed, persistent; stamens 3-5; stigmas 2 or 3; pericarp free from the seed.

- 1 Plants annual herbs, usually much branched, 30-100 cm tall; leaves 2-7 cm long, linear to lanceolate, short petiolate..... K. scoparia
- 1 Plants perennial subshrubs; stems usually simple at least below the inflorescence; leaves 0.5-3 cm long, narrowly linear, sessile
 - 2 Plants branched in the inflorescence, 10-75 cm tall, introduced; stems often reddish in age; fruit not encompassed by a horizontal wing..... K. prostrata
 - 2 Plants not branched in the inflorescence, 10-30 (40) cm tall, native; stems seldom reddish; fruit encompassed by a horizontal wing..... K. americana

Kochia americana Wats. Gray m., green m., red sage. [K. vestita (Wats.) Rydb.] Scattered to locally common; widespread; desert shrub communities and with scattered juniper; up to about 6,000 ft; June-Sept.

Kochia prostrata (L.) Schrad. Native of Eurasia, recently introduced from Russia, used in reclamation seedings on mine and oil shale spoils, perhaps escaping.

Kochia scoparia (L.) Schrad. Belvedere s. c., kochia weed. [K. iranica Bornm. misapplied] Introduced from Eurasia, weedy, widespread; fields, gardens, fencelines, roadsides, and waste places; up to about 7,000 ft; Aug.-Oct.

Monolepis Schrad. Monolepis; Povertyweed

Annual herbs with branching stems; leaves alternate; flowers unisexual or bisexual; perianth segments (0) 1-3, bractlike; stamens 1; stigmas 2, cleft to the base; fruit laterally compressed.

- 1 Leaves bractlike, 0.2-0.6 (1.3) cm long, entire, oblong to obovate; plants dichotomously branched, rarely collected in our area; flowers 1-5 per axil, borne on slender pedicles; perianth segments 1-3...
..... M. pusilla
- 1 Leaves not at all bractlike, 1-7 cm long, triangular to lanceolate, hastate-lobed; plants not dichotomously branched, common; flowers in dense axillary clusters and in terminal interrupted spikes, sessile or nearly so; perianth segment 1..... M. nuttalliana

Monolepis nuttalliana (Schult.) Greene Nuttall m. or p. Mostly scattered, widespread; many plants communities, often with disturbance; 5,000-10,400 ft; May-Sept.

Monolepis pusilla Torr. Dwarf m. or p. A single record seen (N. Holmgren et al. 1934) is from 10.5 mi s. of Ouray; 4,900 ft on the bottom of a dried up draw, locally abundant; also reported by Graham (1937) near Dinosaur Quarry and mouth of Ashley Creek

Salicornia L. Glasswort; Pickleweed; Samphire

Salicornia europaea L. Marshfire g. or p. [S. e. ssp. rubra (A. Nels.) Breitung; S. rubra A. Nels.] Halophytic, glabrous, annual, herbs 9-30 cm tall, from slender taproots; stems fleshy, erect or ascending, commonly branched, the whole plant often reddish at maturity; leaves opposite, scalelike, triangular, to about 1.5 mm long; flowers bisexual or some unisexual, borne in spikes; spikes usually several to numerous, with internodes 2-4 mm long; perianth scalelike, sunken in depressions of the axis of the spikes, consisting of 4 basally united segments, enclosing the fruit; seed vertical, retrorsely pubescent. The 1 specimen seen (Neese 14654) is from the margin of Pelican Lake; 4,800 ft; Aug.-Sept.

Salsola L. Russian Thistle; Tumbleweed

Salsola iberica Sennen & Pau Saltwort. (S. kali L. misapplied; S. pestifer A. Nels.) Annual herbs, 30-80 cm tall, much branched, succulent when young, becoming rigid, spiny tumbleweeds in age; stems spreading or ascending; leaves 3-6 cm long, alternate, entire, filiform, or linear-filiform, acute; flowers bisexual, solitary or few in axils of leaves, subtended by 2 bracts; perianth 4-5 parted; fruit encompassed by a horizontal, scarious, dorsal wing. Introduced from the Old World, widespread; scattered to locally abundant on disturbed ground; up to 8,000 ft; July-Oct.

Sarcobatus Nees Greasewood

Sarcobatus vermiculatus (Hook.) Torr. Black g. Spiny, much branched shrubs with rigid stems, (0.3) 1-2 (3) m tall, from deep taproots and branched root crowns; bark of older stems dull brown or gray, often pitted; twigs of the season green and succulent at first, turning white and spiny at the end of the season; leaves alternate or occasionally opposite, 1-4 cm long, about 1-3 mm wide, linear, entire, slightly flattened to nearly terete, fleshy-succulent, green, glabrous; the flowers unisexual, the staminate in conelike or catkinlike spikes, these 5-25 mm long, the pistillate ones solitary or 2 in axils of leaves; fruit encompassed by a horizontal, scarious wing 6-12 mm wide. Common to abundant; widespread; saline or alkaline lowlands, forming dense thickets on deep alluvial soils of canyon bottoms of the Tavaputs Plateau; up to about 7,000 ft; May-June. Ours are referable to var. vermiculatus.

Suaeda Forsk. Seepweed

Leaves alternate, succulent, terete or nearly so, entire, glabrous or glaucous; flowers unisexual or bisexual, solitary or clustered in axils of upper leaves or bracts; perianth 5-lobed or 5-parted; stamens 5; styles usually 2; fruit included in but usually free from the pericarp.

- 1 Plants perennial, somewhat woody at the base, 30-80 cm tall; perianth lobes equal, not corniculate-appendaged nor winged; leaves 1-2 cm long..... S. torreyana
- 1 Plants annual, from slender taproots; perianth lobes unequal, corniculate-appendaged
- 2 Main stem simple, without floriferous branches on the lower 1/3-1/2, or sometimes with primary branches at the base, and then these branches erect or strongly ascending, 10-55 cm tall; flowers mostly 3-7 per axil..... S. calceoliformis
- 2 Main stem branched throughout with the primary branches spreading and/or with floriferous branches usually on the lower 1/3 as well as above, 7-20 (35) cm tall; flowers mostly 1-3 per axil..... S. occidentalis

CHENOPODIACEAE

Suaeda calceoliformis (Hook.) Moq. Slender s. [S. depressa (Pursh) Wats. misapplied; S. maritima (L.) Dumort.] Scattered to locally common; widespread; moist to swampy, alkaline lowlands, roadsides, edges of ponds and reservoirs; 4,700-6,000 (7,000) ft; Aug.-Oct.

Suaeda occidentalis Wats. Western s. The 4 specimens seen are from Duchesne Co.; moist alkaline lowlands; 5,400-6,700 ft; Sept.-Oct. Sometimes growing with S. calceoliformis, but much less common, and usually well marked by the branching habit.

Suaeda torreyana Wats. Bush s. [S. diffusa Wats.; S. fruticosa Wats.; S. fruticosa (L.) Forsk. misapplied; S. intermedia Wats.; S. nigra (Raf.) Macbr.; Dondia torreyana (Wats.) Standl.] Occasional to common; widespread; moist lowlands, tolerant of alkali; not expected over 6,000 ft; July-Sept. See Arnow and others (1980) for discussion relating to S. fruticosa Forsk. of the Old World.

Zuckia Standl.

Zuchia brandegei (Gray) Welsh & Stutz Applebush. Monoecious or more often dioecious shrubs 10-80 cm tall, not thorny; herbage pubescent with inflated but readily collapsing hairs (scurfy); leaves alternate, subsessile or with a short petiole, 8-70 mm long, (0.4) 10-45 mm wide, elliptic, ovate, obovate, or oblanceolate, entire or rarely hastately lobed; staminate flowers 2-5 in clusters in axils of bracts, the perianth with 4 or 5 lobes, not enclosed in bracts; pistillate flowers 1-several in the axils of bracts, each enveloped by small, united bracts. Plants of what have been referred to as Grayia brandegei and Zuchia arizonica are vegetatively similar, and plants of Z. arizonica are scattered through much of the range of G. brandegei from n. Arizona to the Uinta Basin, Utah. Although the features of the fruit are strikingly different, staminate flowers seem to be alike. We have followed Welsh and Stutz (Welsh 1984b) in treating the two taxa as vars. of a single species, with the reservation that the two might well be treated at the species level especially if features of the staminate flowers are found to contrast, and also with the reservation that Zuchia could as well be included in Grayia. The differences in the seeds are similar to those found in Chenopodium, with seeds vertical in some taxa and horizontal in others. The 2 taxa are as follows:

- 1 Fruiting bracts forming an oval or rounded (in cross section), apically depressed sac 2-4 (5) mm wide, this 6-ribbed, 2 of the ribs slightly larger, united except for a small orifice at the retuse apex; seeds horizontal..... var. arizonica
- 1 Fruiting bracts thin and flat, 4-8 mm wide, completely united, not ribbed, winged; seeds vertical..... var. brandegei

Var. arizonica (Standl.) Welsh (Z. arizonica Standl.) The 4 specimens seen are from near Bonanza and from 5 mi s. of Ouray; desert shrub communities.

Var. brandegei (Grayia brandegei Gray) Mostly scattered; widespread but no specimens seen from Duchesne Co. and westward; desert shrub communities and up to the lower edge of the juniper zone, often on formations that weather to badlands; 4,800-6,700 ft; May-June, with fruit through Sept.

CONVOLVULACEAE Morning-glory Family

Perennial herbaceous vines from extensive creeping rhizomes; stems creeping or climbing by twining; leaves alternate, petiolate; pedicels or peduncles solitary in axils, with 1-2 flowers, these 5-merous except for the 2-chambered pistil; calyx segments free or united at the base; corolla united, funnellform to campanulate, entire to 5-lobed, pleated, white, creamy, pink or purplish; fruit an ovoid to globose capsule.

- 1 Corollas 4-6 cm long; calyx 10-17 mm long; bracts 15-30 mm long, immediately subtending and enveloping the calyx, broadly cordate-ovate, obtuse to acute; pedicels 3.5-12 cm long, with a solitary flower; stigma lobes oblong, blunt apically, distinct from the style..... Calystegia
- 1 Corollas 1.5-3 cm long; calyx 3-5 mm long; bracts 1.5-3 mm long, often remote from the calyx, narrow, acute; pedicels or peduncles 0.5-3 cm long, with 1-2 flowers; stigma lobes linear or filiform, acute apically, continuous with the style..... Convolvulus

Calystegia R. Br. Morning-glory; Bindweed

Calystegia sepium (L.) R. Br. Hedge b. [Convolvulus sepium L.; C. americanus (Sims) Greene misapplied] Graham 9787 (CM!) is from the mouth of Ashley Creek, 4,750 ft. To be expected in moist disturbed places in valleys. Plants of the Intermountain Region belong to var. angulata (Brummitt) N. Holmgren.

Convolvulus L. Bindweed; Morning-glory

Convolvulus arvensis L. Small or field b., orchard m. Introduced from Europe; fields, gardens, ditchbanks, roadsides, and other disturbed places; a troublesome weed that is nearly impossible to eradicate because of its low growth and extensive deep rhizomes; not expected much over 9,000 ft; June-Sept.

CORNACEAE Dogwood Family

Cornus L. Dogwood

Cornus stolonifera Michx. Red-osier d. (C. instolonea A. Nels.) Shrub to 4 m tall; bark bright red or reddish-purple; leaves opposite, entire, 5-10 (15) cm long, 2-5 (7) cm wide, or larger on young vegetative twigs, ovate to elliptic or oblong; flowers in terminal, flat-topped to slightly rounded clusters 3-6 cm across; sepals 4, minute to obsolete; petals 4, white, 2-4 mm long, arising with the stamens at the base of a disc; stamens 4, alternate with the petals; ovary inferior; style 1; fruit a white or bluish drupe, 7-9 mm in diameter. Occasional or locally common; widespread; usually along streams or other places where the soil is kept wet for most of the growing season; up to about 9,000 ft; May-July. North American plants have been referred to as C. sericea L.; this may be the correct name for our plants.

CRASSULACEAE Stonecrop Family

Annual or perennial, usually succulent herbs; sepals and petals 4 or 5, free or connate at the base; fruit of follicles.

- 1 Plants annual, usually of ephemeral pools or drying mud; leaves opposite, 3-6 mm long, linear or linear-oblongate, with short but definite sheathing bases; stems weak, often prostrate, sometimes rooting at the nodes, 1-6 cm long; flowers inconspicuous, whitish..... Tillaea
- 1 Plants perennial, of dry or wet places; leaves alternate, linear or orbicular to obovate, not connate-sheathing; stems stouter than above, ascending to erect; flowers conspicuous, not whitish..... Sedum

Sedum L. Stonecrop

Plants perennial, succulent; leaves alternate (ours), fleshy, terete or flat, often closely imbricate; flowers bisexual, 4-5-parted; petals as many as the sepals, separate or united at the base; stamens twice as many as the petals, the filaments adnate to the perianth at the base; carpels 3-5, separate or united at the base; fruit of 1-chambered follicles dehiscent along the ventral side.

- 1 Flowers yellow; leaves 6-16 mm long; stems 5-20 cm tall; plants usually of dry places
- 2 Leaves of flowering stems opposite at least in part, orbicular to obovate, rounded at the apex, to 8 mm long, about as wide as long; plants entering our area in Wasatch Co..... S. debile
- 2 Leaves of flowering stems alternate, narrowly lanceolate to occasionally ovate, acute at the apex, 3-20 mm long; plants widespread..... S. lanceolatum
- 1 Flowers pinkish or reddish; leaves usually over 16 mm long; stems 10-35 cm tall; plants of moist or wet places..... S. rhodanthum

Sedum debile Wats. Weakstem s. The 1 specimen seen (Goodrich 19391) is from Water Hollow, Wasatch Co. escarpment of conglomerate rock; 9,480 ft; Aug.

Sedum lanceolatum Torr. Lanceleaf s. (S. stenopetalum Pursh misapplied) Common; widespread; various plant communities; from about 7,000 ft to near timberline, often in dry, rocky places; June-Aug.

Sedum rhodanthum Gray Redpod s. [Clementsia rhodantha (Gray) Rose] Common; Uinta Mts.; streambanks and wet to boggy meadows; 9,700-11,800 ft; July-Aug.

Tillaea L. Pigmy-weed

Tillaea aquatica L. Plants as described in the key and flowers single in axils, usually 4-merous, greenish, shortly pedicellate with the pedicels to 6 mm long in fruit; calyx 0.5-1 mm long, united at the base; petals about 1.5 mm long, whitish; stamens 4, shorter than the petals; fruit of follicles less than 2 mm long, purplish. The 1 record seen (Neese 13963) is from Diamond Mt.; shallow, flowing water of a wet meadow; 6,890 ft; June-Aug.

CUCURBITACEAE Gourd Family

Echinocystis T. & G. Balsam Apple; Wild Mockcucumber

Echinocystis lobata (Michx.) T. & G. Annual climbing vines with branched tendrils; leaves alternate, simple, palmately lobed, with 3-7 triangular lobes, scabrous, the blades about 3-8 cm long, cordate at the base; staminate flowers numerous, racemose or paniculate, pistillate flowers solitary or few from the same axils as the staminate; sepals 5-6; corolla united, deeply 5-6 parted, the lobes 3-6 mm long, rotate, pale yellowish green or whitish; stamens 2-3, the anthers more or less united; fruit an ovoid pepo, 1- or 2-celled, covered with numerous soft spines, 3-5 cm in diameter, spongy and fibrous within, pendulous, becoming papery and rupturing apically at maturity. The few records seen are from Vernal, Whiterocks, and Dry Fork Settlement; ditchbank and fence row communities; 5,600-6,400 ft; Aug.

CUPRESSACEAE Cypress Family

Juniperus L. Juniper

Trees or shrubs, dioecious, occasionally monoecious, evergreen, aromatic; wood resinous; leaves opposite or whorled, scalelike or needlelike, often appressed to and clothing the twigs and smaller branches; staminate cones solitary or clustered, rounded, 3-6 mm in diameter; pistillate cones berrylike, blue, black, or reddish brown, covered with a waxy bloom; seeds 1-4.

- 1 More or less prostrate or spreading-ascending shrubs, seldom over 1.5 m tall; leaves needlelike, not appressed to the branches..... J. communis
- 1 Ascending or erect shrubs or trees, mostly over 1.5 m tall; leaves on mature growth scalelike, appressed to the branches
 - 2 Fruit 4-8 mm in diameter; trunks usually straight and undivided, to 13 m tall; heartwood red or purple-red; leafy twigs relatively slender, the ultimate ones mostly less than 1 mm wide..... J. scopulorum
 - 2 Fruit (6) 8-14 mm in diameter; trunks usually branched near the base and/or twisted, to 6.5 m tall; heartwood white; leafy twigs relatively stout, the ultimate ones mostly more than 1 mm thick..... J. osteosperma

Juniperus communis L. Common j., prostrate j. (J. sibirica Burgsd.) Widespread; most common in aspen and Douglas-fir communities where sometimes forming a rather dense undergrowth, occasionally as solitary or scattered plants in sagebrush and other communities; 7,000-11,000 ft. Our plants are referable to var. depressa Pursh.

Juniperus osteosperma (Torr.) Little Utah j., boneseed j., white cedar. [J. utahensis (Engelm.) Lemmon] This juniper (alone or in association with pinyon) forms the extensive pygmy forests (often referred to locally as "the cedars") that flank the Uinta and other mts. and the Tavaputs Plateau; about (5,600) 6,000-7,500 ft. Due to its abundance, this juniper has been the principal source of "cedar posts" that have been used in great numbers in thousands of miles of fence and in livestock shelters. The wood is quite rot-resistant, considerably more so (according to local ranchers) than that of the following species. See J. scopulorum.

Juniperus scopulorum Sarg. Rocky Mt. j., Rocky Mt. red cedar. [J. virginicum L. var. scopulorum (Sarg.) Lemmon] Most common in canyons and on cool exposures or at higher elevations than the preceding species, often scattered and not forming extensive stands, although sometimes in small stands in Vasey sagebrush, mt. brush, ponderosa pine, Douglas-fir, and other communities; 7,000-9,000 ft. Also distinguished from J. osteosperma by entire and opposite leaves rather than minutely toothed and sometimes whorled leaves (Arnow and others 1980).

CUSCUTACEAE Dodder Family

Cuscuta L. Dodder

Parasitic annual or perennial herbs, lacking chlorophyll and whitish or yellowish, the ephemeral root systems quickly withering and the twining stems not attached to the ground, but rather attached to their host plants by intrusive haustoria; leaves scalelike, obsolete, alternate; flowers small, inconspicuous, regular, bisexual; calyx persistent, 4-5 lobed to divided, shorter or longer than the corolla; corolla 4-5 lobed, narrowly tubular to campanulate or urceolate, mostly white; stamens inserted just below the sinuses of the corolla; fringed or fimbriate-margined scalelike appendages (infrastaminal scales) usually attached near the base of the corolla; pistil 1, superior, with 2 separate styles; fruit a membranous globose or depressed-globose capsule. The following key was adapted from Cronquist and others (1984). The identification of specimens and distribution data was contributed by Gary Baird, student of Cuscuta, Brigham Young University.

- 1 Stigma appearing as a slender, tapering-cylindric continuation of its style, several times longer than thick; introduced plants; mainly on legumes, especially alfalfa..... C. approximata
- 1 Stigma capitate, appearing as a small expanded knob terminating the style, not longer than thick; native species on a wide range of hosts
 - 2 Infrastaminal scales wanting or much reduced, sometimes forming faint winged or toothed ridges; flowers sessile; corolla lobes acuminate; plants probably rare or infrequent, no specimens seen..... C. occidentalis Millspaugh
 - 2 Infrastaminal scales well developed, generally more or less fringed
 - 3 Corolla lobes obtuse or rounded; flowers (3) 4 (5)-merous, sessile or nearly so; plants probably infrequent, no specimens seen..... C. cephalanthi Engelm.
 - 3 Corolla lobes acute; flowers mostly 5-merous, subsessile to pediceled
 - 4 Capsule ovoid, usually 1-seeded; plants often on desert shrubs..... C. denticulata
 - 4 Capsule globose, usually 2-4 seeded; plants seldom on desert shrubs

- 5 Corolla often papillose-nerved; capsules slightly crested (evidently thickened around the styles that appear to be set in a shallow pit surrounded by a collar)..... C. indecora
- 5 Corolla not papillose-nerved; capsules not evidently thickened around the styles
- 6 Capsule papillose-granular on the upper 1/2, more or less enveloped by the withered corolla when mature..... C. glabrior
- 6 Capsule smooth to tuberculate-thickened apically, merely cupped at the base by the withered corolla when mature..... C. pentagona

Cuscuta approximata Bab. [C. planifolia Ten. misapplied (Graham 1937)] To be expected throughout the area, but only a few collections seen.

Cuscuta denticulata Engelm. Rarely collected, apparently widespread; often on desert shrubs, especially Artemisia and Chrysothamnus, but apparently not on Chenopodiaceous shrubs.

Cuscuta indecora Choisy Bigseed alfalfa d. The 1 specimen seen (B. Welsh & Moore 179) from near Ouray was parasitic on Salsola.

Cuscuta glabrior (Engelm.) Yunker The 1 specimen seen (Choong sn UT) from near Ouray was parasitic on Ambrosia and Salsola.

Cuscuta pentagona Engelm. The three records seen are from Uintah Co. and were parasitic on Ambrosia, Convolvulus, Grindelia, and Solanum.

CYPERACEAE Sedge Family

Grasslike, mostly perennial herbs; stems usually solid, not jointed as in grasses, often triangular in cross section or terete; leaves mostly 3 ranked, the sheaths mostly closed, the blades elongate, narrow or reduced or even lacking; inflorescence variable; flowers unisexual in 2 of our genera and bisexual in the others, sessile, subtended by a scale, arranged in spikes or spikelets; perianth lacking or of 1-many bristles; stamens 1-3; ovary superior; style 1 with 2-3 (4) stigmas; fruit an achene, lenticular (flattened or lens shaped in cross section) or trigonous (triangular in cross section), the lenticular fruits with 2 stigmas and the trigonous ones with 3 stigmas. This is a large family. The genus Carex with about 70 species is the largest genus of the area. Differences are small between the taxa, and mature plants are needed to identify specimens. Identification without a dissecting scope or good lens is not practical in many taxa.

- 1 Achene enclosed or folded in a closed or open sac or small bract as well as subtended by scale; perianth bristles lacking; flowers unisexual
- 2 Achene completely enclosed in a sac (perigynium), this closed to the tip; attachment of the style to the achene concealed by the perigynium, with only the stigmas exerted..... Carex
- 2 Upper part of the achene usually exposed, the subtending bract with unsealed margins and exposing the attachment of the style to the achene as well as the stigmas..... Kobresia
- 1 Achene exposed, not enveloped by nor folded in a sac or bract, merely subtended by a scale and usually by perianth bristles; flowers bisexual
- 3 Bristles subtending the achene numerous, much elongate and giving the inflorescence the appearance of a tuft of cotton; plants subalpine and alpine on the Uinta Mts..... Eriophorum
- 3 Bristles not as above
- 4 Inflorescence a solitary spike, not subtended by conspicuous bracts; leaves reduced to bladeless sheaths (note: Scirpus caespitosus is also keyed here)..... Eleocharis
- 4 Inflorescence of few to many spikelets, subtended by 1 or more conspicuous bracts that either appear like a continuation of the culm or like leaves; leaves various but some commonly with conspicuous blades
- 5 Scales spirally arranged; perianth bristles present; plants perennial except in S. supinus, mostly over 15 cm tall except in S. caespitosus and then found above 8,500 ft..... Scirpus
- 5 Scales arranged in 2 vertical ranks; perianth bristles lacking; plants annual, 3-15 cm tall, found below 8,500 ft (note: perennial species might be expected in the area)..... Cyperus

Carex L. Sedge

Monoecious or dioecious perennials; stems tufted to arising singly from creeping rhizomes; inflorescence of congested and short to remote and elongate spikes; spikes staminate, pistillate, androgynous (staminate flowers above the pistillate ones) or gynaeandrous (pistillate flowers above the staminate ones) each spike with few to many unisexual sessile or nearly sessile flowers; perianth lacking; staminate flowers reduced to 2 or 3 stamens in the axil of a scale, the pistillate ones reduced to a pistil, this enclosed in a scalelike perigynium (plural, perigynia) with only the stigmas exerted from the apex, each one borne in the axils of a scale (a small bract). A delightful genus to work with, for many of the taxa have sharp boundaries even though the differences may be small. Hybridization in the genus as well as the rest of the family is rare. However, the taxa of Section Ouales are challenging and do present some taxonomic problems.

- 1 Spikes solitary, the perigynia attached directly to the rachis..... KEY 1 P. 122

CYPERACEAE

- 1 Spikes more than 1 (sometimes densely congested into a head that resembles a solitary spike), the perigynia attached to a rachilla and the rachilla attached to the rachis
- 2 Spikes all sessile, aggregated into a headlike or spikelike inflorescence, the terminal one not staminate and the lower ones commonly not all pistillate except in unisexual specimens
 - 3 Stigmas 3; achenes trigonous; inflorescence with 3-5 spikes, often subtended by a leaflike bract; terminal spike gynaecandrous, the lateral ones mostly all pistillate; pistillate scales black or blackish purple (Section *Atratae*)..... KEY 5 P. 126
 - 3 Stigmas 2; achenes lenticular; inflorescence commonly with more than 5 spikes, or else the pistillate scales paler than above, not subtended by a leaflike bract (except in *C. athrostachya*); spikes mostly all androgynous, all gynaecandrous, or all unisexual
 - 4 Spikes androgynous, or if unisexual then plants with well-developed creeping rhizomes..... KEY 2 P. 123
 - 4 Spikes gynaecandrous; plants caespitose; rhizomes lacking or short
 - 5 Perigynia round-margined, not winged, not conspicuously flattened, mostly less than 3.5 mm long; scales pale green to brown; inflorescence commonly less than 2 cm long and/or less than 1 cm wide; plants mostly of wet places..... KEY 3 P. 124
 - 5 Perigynia wing-margined, often conspicuously flattened, (2.5) 3.5-7.5 (8) mm long; scales commonly brownish to dark brown, often with green midrib; inflorescence often longer or wider than above; plants of dry or wet places (Section *Ovales*)..... KEY 4 P. 125
- 2 At least the lower spike peduncled, or if sessile then well separated from the upper ones and/or the terminal one staminate; lower spikes mostly all pistillate
 - 6 Terminal spike gynaecandrous, the lateral ones all pistillate or gynaecandrous with few staminate flowers; pistillate scales dark brown-purple to black; plants tufted, without rhizomes or these short (except in *C. buxbaumii*)..... KEY 5 P. 126
 - 6 Terminal spike and sometimes 1 or more lateral spikes staminate or androgynous (the terminal one occasionally gynaecandrous in a few taxa but then the scales pale green, or if brown then the culms from slender rhizomes)
 - 7 Stigmas 2; achenes lenticular; scales often black or black-purple or with blackish lines flanking a greenish or pale midstripe, often contrasting with the greenish or stramineous perigynia; plants commonly or wet places..... KEY 6 P. 127
 - 7 Stigmas 3; achenes trigonous; scales greenish or brownish, or of blackish then usually about the same color as the perigynia (except in *C. raynoldsii* of well-drained soil).... KEY 7 P. 127

KEY 1

- 1 Spike unisexual; scales dark brown-purple to black
 - 2 Perigynia glabrous; plants of Strawberry Valley and vicinity, unusual specimens of a species usually with more than one spike..... *C. parryana*
 - 2 Perigynia pubescent; plants of the Uinta Mts..... *C. scirpoidea*
- 1 Spike androgynous; scales green to dark brown
 - 3 Plants densely caespitose, often fasciculate; rhizomes lacking or not evident; leaf blades rarely over 1 mm wide
 - 4 Perigynia blunt at the retuse apex, not conspicuously beaked; leaves and culms lax to flaccid; plants rare, of wet places in Whiterocks and Uinta Canyons at about 7,200 ft..... *C. leptalea*
 - 4 Perigynia beaked; leaf blades and stems rather strict; plants mostly of dry places and/or of higher elevations
 - 5 Rachilla lacking; perigynia slightly stipitate, slightly spreading or occasionally widely so in age; pistillate scales deciduous in age, only about as wide as the perigynia; leaves flat or slightly channeled; plants rare, known from the vicinity of Gilbert Peak..... *C. pyrenaica*
 - 5 Rachilla about equalling or longer than the achene; perigynia sessile, appressed or nearly so; pistillate scales persistent, usually wider than the perigynia; leaves tightly rolled; plants various
 - 6 Perigynia minutely hirtellous at least in the upper 1/2 (use 15-20X magnification); spikes 1.3-2.5 cm long, the staminate portion exceeding the upper most perigynia by about 8-13 mm; plants of pinyon-juniper communities below 8,000 ft..... *C. filifolia*
 - 6 Perigynia glabrous or serrulate-ciliolate or with a few minute hairs near the beak; spikes 0.5-1.8 cm long, the staminate portion exceeding the upper most perigynia by 2-7 mm; plants of high (mostly alpine) communities above 8,000 ft
 - 7 Perigynia with conspicuous flattened margins, the margins commonly serrulate-ciliolate; spikes equalling or included in the leaves, the staminate part inconspicuous and exceeding the upper most perigynia by about 2-3 mm; pistillate scales conspicuously greenish or pale along the midrib, about equalling or a little wider than the perigynia; stigmas 2 or 3 (see also *C. capitata*)..... *C. nardina*
 - 7 Perigynia with rounded or somewhat involute margins, glabrous, rarely serrulate-ciliolate with a few minute hairs near the beak; spikes equalling or exceeding the leaves, the staminate part usually conspicuous and exceeding the upper most perigynia by about 3-7

- mm; pistillate scales mostly not conspicuously green or pale along the midrib, wider than the perigynia; stigmas 3..... C. elynoides
- 3 Plants caespitose or not, but with conspicuous rhizomes, or if rhizomes lacking then the leaves over 1 mm wide
- 8 Stigmas 2; achenes lenticular; leaves to about 1 mm wide
- 9 Perigynia plump, widely spreading at maturity, conspicuously nerved dorsally, the wall thick and spongy; rachilla obsolete; culms arising singly from slender long rhizomes..... C. dioica
- 9 Perigynia flattened, ascending to loosely spreading, finely nerved dorsally, the wall thin; rachilla over 1/2 as long as the achene; culms arising from stout short rhizomes..... C. capitata
- 8 Stigmas 3; achenes trigonous; leaves various
- 10 Spikes with only 1 or 2 perigynia 5-6 mm long, the staminate portion 1-2 (3) cm long... C. geyeri
- 10 Perigynia either more numerous or smaller than above; staminate portion of spike usually less than 1 cm long
- 11 Rachilla exerted beyond the orifice of the perigynium; perigynium soon strongly reflexed, these and the scales deciduous at maturity, greenish or pale brown; plants rare..... C. microglochin
- 11 Rachilla lacking or included in the perigynia; perigynia ascending and persistent, or if strongly spreading and deciduous then these and the scales black or blackish-purple at least in part; plants various
- 12 Leaves (at least some) exceeding the spikes, often strongly curved to completely curled at the tip; rachilla lacking; plants alpine..... C. rupestris
- 12 Leaves mostly exceeded by the spikes, straight or at least not curled; rachilla about as long as the achene (except in C. nigricans)
- 13 Rachilla lacking; perigynia narrowed to a substipitate base, ascending at first, these and the scales widely spreading and deciduous in age..... C. nigricans
- 13 Rachilla about as long as the achene; perigynia sessile or inconspicuously stipitate, these and the scales ascending and persistent 15
- 14 Perigynia firm, mostly 1-6 per spike; achenes filling the perigynia; plants occasional or locally common..... C. obtusata
- 14 Perigynia thin, mostly more than 6 per spike; achenes various; plants rare (Section Inflatae)
- 15 Perigynia 4-7.5 mm long, mostly over 1.8 mm wide; spike 6-12 mm wide, 1.2-2.5 times as long as wide; achenes much smaller than the perigynia; plants of alpine, well-drained sites..... C. breweri
- 15 Perigynia 2.5-3 (4) mm long, to 1.5 mm wide; spike commonly 4-6 mm wide, 2.5-3 times as long as wide; achenes about as large as the perigynia; plants of subalpine wet places C. subnigricans

KEY 2

- 1 Culms arising singly or few together from creeping rhizomes
- 2 Spikes mostly well separated from each other, with 1-3 staminate and pistillate flowers, each about 5 mm long; scales and perigynia green..... C. disperma
- 2 Spikes congested into a headlike or continuous spikelike inflorescence, mostly with more flowers and longer than above; scales and perigynia brownish or blackish
- 3 Spikes closely aggregated into a compact, nearly globose head, none distinguishable without teasing the head apart; plants mostly 5-25 cm tall, rare, known from a subalpine wet meadow, at 9,800 ft at Lost Lake, Wasatch Co. just to the w. of our area (Hayward 9948) (C. vernacula L. H. Bailey)..... C. foetida All.
- 3 Spikes not so closely aggregated, the lower ones and sometimes the upper readily distinguishable without teasing the head apart; plants often taller or of lower elevations, variously distributed
- 4 Perigynia winged, deeply bidentate, serrulate to below the middle; lateral spikes androgynous or staminate, the upper one often wholly pistillate; plants 19-36 cm tall; rhizomes light brown..... C. siccata
- 4 Perigynia not winged or scarcely so, bidentate or not, if serrulate then mostly so only on the upper half; spikes androgynous or unisexual
- 5 Perigynia 1.7-2.6 mm long, yellow-green or yellow-brown, thick walled and firm especially toward the base, the beaks 0.2-0.5 mm long, slightly winged and serrulate at the confluence of the beak and the body only; plants usually of boggy meadows..... C. simulata
- 5 Either the perigynia or their beaks longer than above, the walls rather thin, mostly brownish, wings and serrulations lacking or inconspicuous except in C. praegracilis and then usually extending onto the body; plants of dry or wet places..... 8
- 6 Rhizomes averaging 2-4 mm wide, blackish or dark brown; lower leaves reduced to bladeless sheaths, blackish or dark brown; plants 10-70 cm tall, often (not always) of wet places; perigynia slightly winged, serrulate distally and sometimes medianly..... C. praegracilis

CYPERACEAE

- 6 Rhizomes less than 2 mm wide, brownish or tan; lower leaves with blades, or if reduced to bladeless sheaths these light brown or greenish; plants 8-28 cm tall, mostly of well-drained soil; perigynia wingless, not serrulate or inconspicuously so..... 9
- 7 Plants unisexual; beak of perigynia 1-1.5 mm long; inflorescence 1.5-5.5 cm long, with the most conspicuous coloration coming from the hyaline margins of the scales..... C. douglasii
- 7 Plants bisexual, the spikes androgynous, the staminate portion usually conspicuous; inflorescence 0.8-2.0 cm long, with the most conspicuous coloration coming from the brown or dark brown body of the scales..... C. stenophylla
- 1 Culms caespitose; rhizomes lacking or short
- 8 Inflorescence simple, ovoid or ovoid-oblong, or if linear then plants of well-drained soil; stature various
- 9 Perigynia tapered to a beak, not or inconspicuously serrulate; plants mostly of wet places..... C. neurophora
- 9 Perigynia abruptly contracted to a beak or conspicuously serrulate; plants of well-drained soil (section Bracteosae)
- 10 Perigynia entire or serrulate on the beak only, somewhat rounded on the margins, with the marginal nerves displaced onto the ventral surface, pale green or straw-colored, about 3-7 per spike, the beak not (or only slightly) bidentate..... C. vallicola
- 10 Perigynia serrulate on the beak and usually onto the upper 1/2 of the slightly winged-margins of the body, with the marginal nerves on the wing-edges or slightly displaced onto the ventral surface, green to dark brown, about 4-12 per spike, the beak bidentate
- 11 Spikes closely congested into an ovoid or ovoid-oblong head, rarely the lower ones noticeably separated, the internodes obscure..... C. hoodii
- 11 Spikes loosely congested into an oblong to linear head or spikelike inflorescence, the lower ones generally noticeably separated, the lowest internode conspicuous, generally 2-7 mm long..... C. occidentalis
- 8 Inflorescence compound (at least some of the lower spikes borne on branched rachillas), usually oblong to linear; plants mostly of wet places, (20) 30-120 cm tall, rare
- 12 Leaf sheath copper-colored at the mouth, often red-dotted; inflorescence 3-8 cm long; perigynia 2.75-4 mm long, nearly concealed by the scales; leaves 3-5 mm wide; plants reported for the Uinta Mts..... C. cusickii Mack.
- 12 Leaf sheath not copper-colored at the mouth, not red-dotted; inflorescence 2-3.5 (5) cm long, not interrupted or but slightly so; perigynia 2-3 mm long, not concealed by the scales; leaves 1-2.5 (3) mm wide..... C. diandra

KEY 3

- 1 Perigynia widely spreading at maturity, the lower ones sometimes reflexed (section Stellulatae)
- 2 Perigynium beak 1/4-1/3 (1/2) the length of the body, up to ca 1 mm long, inconspicuously bidentate with broad short teeth; perigynia mostly 2.2-3.2 mm long..... C. interior
- 2 Perigynium beak 1/2 or more the length of the body, conspicuously bidentate, the teeth narrow; perigynia mostly 2.8-3.5 (4) mm long..... C. muricata
- 1 Perigynia appressed
- 3 Perigynia and scales black or dark brown at maturity; inflorescence an ovoid head, 0.8-1.4 cm long, the spikes closely congested and not or but slightly distinguishable without teasing the head apart..... C. illota
- 3 Perigynia greenish or light brown and/or the inflorescence more open with the spikes distinguishable (section Heleonastes, in part)
- 4 Pistillate scales dark brown, equal to the body of the perigynium but often surpassed by the beak; perigynia 2.4-3.4 mm long; spikes 2-4, all approximate; plants rare, alpine on the Uinta Mts..... C. bipartita
- 4 Pistillate scales greenish to dark brown, shorter than the body of the perigynium; perigynia 1.7-2.5 mm long; spikes 4-8, the lower ones sometimes well separated; plants various
- 5 Lower spikes 4-8 mm long, equal or shorter than the internode of the rachis (to 8 times shorter), with 5-10 (15) perigynia; perigynia somewhat spreading, smooth or nearly so except for the serrulate beak, thin and easily ruptured distally, the ventral surface nerveless or nearly so, the dorsal suture conspicuous the length of the beak and encroaching onto the body; scales tending to be pale and hyaline except for the greenish midstripe..... C. brunnescens
- 5 Lower spikes sometimes larger, usually equal to or longer than the internodes of the rachis, with (10) 15-32 perigynia; perigynia appressed usually granular roughened, firm-walled and not easily ruptured, the ventral surface conspicuously nerved, the dorsal suture hardly if at all encroaching onto the body, or if so then the scales brown to dark brown
- 6 Pistillate scales brown to dark brown, the hyaline margins narrow to broad; perigynia slightly granular-roughened, not or sparingly serrulate distally, the nerves often reddish or tinged with brownish red, the dorsal suture conspicuous through the length of the beak and encroaching onto the body; plants 10-31 cm tall..... C. praeceptorum

- 6 Pistillate scales greenish or pale, occasional with light brown markings, the hyaline margins usually broad; perigynia conspicuous granular-roughened and serrulate distally (at 20 times or greater magnification), the nerves greenish or pale, the dorsal suture evident only on the beak if at all; plants 18-50 cm tall..... C. cansecens

KEY 4

- 1 Lowest bract and sometimes 1 or more upper bracts of at least some of the inflorescences as long or longer than the inflorescence..... C. athrostachya
- 1 Bracts lacking or shorter than the inflorescence or rarely equalling it
- 2 Pistillate scales as long and wide as the perigynia or nearly so; inflorescence pale green to stramineous or light reddish brown, rarely bicolored and/or tending to be spicate with the internodes of the rachis conspicuous, with (1) 3-6 (7) spikes
- 3 Perigynia 2.9-4.3 mm long, 1.0-1.5 mm wide; plants 11-28 cm tall, often of drying pools or at the edge of ponds and lakes, known from the western part of the Uinta Mts..... C. leporinella
- 3 Perigynia 4-8 mm long, 1.2-2.8 mm wide; plants of various stature and habitat, but often of drier places, distribution various
- 4 Perigynia with flattened, winged, and serrulate, often ill-defined beak; plants commonly with conspicuous rhizomes with short internodes, apparently rare..... C. xerantica
- 4 Perigynia with a terete entire beak; plants rarely with conspicuous rhizomes
- 5 Perigynia (5.7) 6-7.5 (8) mm long; plants lower montane to subalpine..... C. petasata
- 5 Perigynia 4-6 mm long; plants various
- 6 Spikes mostly all 2 or more times longer than the internodes of the rachis; inflorescence rather strict, 1.4-3.0 cm long; plants mostly 10-30 cm tall, subalpine and more commonly alpine..... C. phaeocephala
- 6 At least the lower 2-3 spikes only 1-2 times longer than the internodes of the rachis; inflorescence rather flexuous, sometimes over 3 cm long; plants mostly 40-80 cm tall, lower montane to subalpine..... C. praticola
- 2 Pistillate scales shorter and narrower than the perigynia; inflorescence various colored but often dark brown to blackish or bicolored with the perigynia lighter than the scales; tending to be capitate, with the internodes of the rachis concealed by the congested spikes; with various number of spikes
- 7 Perigynium with a flattened, winged, serrulate, often ill-defined beak
- 8 Perigynia 2.3-3.7 mm long, 1.0-1.2 mm wide; plants known from wet places in Uintah Co..... C. bebbii
- 8 Perigynia 4.5-8 mm long, 1.6-3.5 mm wide; plants usually of well-drained soil, of various distribution
- 9 Perigynia plano-convex; scales reddish brown with broad hyaline margins; plants known from the n. slope and e. end of the Uinta Mts..... C. multicostata
- 9 Perigynia strongly flattened except where distended by the achene; scales often brownish with green markings; plants of various distribution
- 10 Inflorescence spicate, the first 2 internodes collectively (8) 10-18 mm long; plants of the Tavaputs Plateau..... C. xerantica
- 10 Inflorescence capitate, the first 2 internodes collectively only 4-7 (9) mm long; distribution various
- 11 Perigynia 2.5-3.5 mm wide, commonly over 5.6 mm long, up to 45 or more per spike; spikes 7-12 mm wide; anthers 2.5-3.7 mm long; plants (15) 30-90 cm tall, of rather broad distribution..... C. egglestonii
- 11 Perigynia 1.6-2.5 mm wide, not over 5.6 mm long, to about 20 per spike; spikes 5-7 mm wide; anthers 1.5-2 mm long; plants 24-45 cm tall, known from w. of Rock Creek.. C. straminiformis
- 7 Perigynia with a narrow, more or less terete beak, this not serrulate in the distal portion
- 12 Perigynia 2.5-3.2 (3.5) mm long; inflorescence 0.7-1.8 cm long
- 13 Perigynia sharp edged but hardly wing-margined, not serrulate, 2.5-3.0 mm long; inflorescence dark brown to blackish; plants common, mostly above 9,000 ft..... C. illota
- 13 Perigynia wing-margined, serrulate, 2.5-3.5 mm long; inflorescence and distribution various; plants rare, known from below 9,000 ft..... C. limophila
- 12 Perigynia 3.2-7.1 mm long; inflorescence sometimes longer (the following taxa, except possibly C. multicostata, form a complex that might be considered at a subspecific level under C. macloviana Urv.)
- 14 Perigynia more or less strongly flattened except where distended by the relatively small achenes or else the scales dark brown to blackish; plants generally more common and widespread
- 15 The longer perigynia 5.2-7.1 mm long, 4-6.4 times longer than wide; spikes commonly averaging over 10 mm long, the lower 1 or 2 regularly 11-13 (15) mm long, often elliptic, smooth with the perigynia appressed; inflorescence often cuneate at the base..... C. ebenea

- 15 Perigynia either shorter than above or else only 1.6-4 times as long as wide; spikes averaging less than 10 mm long, the lower 1 or 2 mostly less than 11 mm long, usually ovate, with the perigynia more or less spreading; inflorescence usually truncate at the base
- 16 Perigynia 1.3-2.2 mm wide, the body green or brownish in age, the beak often darker brown; scales brownish; inflorescence often conspicuously bicolored from the green or paler perigynia contrasting with the brownish scales..... C. microptera
- 16 Perigynia (1.75) 2.2-2.8 mm wide, usually averaging over 2.2 mm wide, the body brown to dark brown, sometimes the winged margins greenish; scales brown to dark brown or blackish; inflorescence usually not conspicuously bicolored..... C. haydeniana
- 14 Perigynia more or less plano-convex, the perigynial cavity nearly filled by the plump achene; scales greenish, light brown or reddish brown; plants rather rare and somewhat restricted
- 17 Pistillate scales equalling or scarcely shorter than the appressed perigynia, at least some with broad, shining, white-hyaline margins 0.1-0.3 mm wide..... C. multcostata
- 17 Pistillate scales conspicuously shorter than the spreading perigynia, generally lacking white-hyaline margins or these usually less than 0.1 mm wide..... C. pachystachya

KEY 5

- 1 Spikes sessile, congested into a head, the internodes of the rachis obsolete or at least short and hidden by the closely aggregated spikes
- 2 Perigynia 1.1-1.8 mm wide, usually somewhat inflated, without flattened margins or these generally not conspicuous, the width nearly filled by the mature achene, papillate at least apically (this most conspicuous along the margins at 20X or greater magnification)..... C. nelsonii
- 2 Perigynia 2-3 mm wide, strongly flattened with conspicuous broad margins, conspicuously wider than the mature achene, more or less glossy on the faces, glabrous or sometimes ciliolate apically..... C. nova
- 1 Spikes sessile or peduncled, at least the lowest spike separated from the others by a conspicuous rachis internode
- 3 Lowest bract with a closed sheath 7-45 mm long; perigynia ciliolate-serrulate; spikes all on slender peduncles (section Ferrugineae)..... C. misandra
- 3 Lowest bract not sheathing or if so the sheath closed for less than 5 mm; perigynia glabrous or papillate; spikes various
- 4 Culms arising singly or few together from long creeping rhizomes, these covered with a yellowish feltlike tomentum; lateral spikes spreading or drooping, on slender peduncles; scales equaling or longer than the perigynia, not blackish or dark purple (section Limosae)..... C. paupercula
- 4 Culms tufted and rhizomes lacking or short, or if long then spikes strongly ascending to erect, if these spreading or drooping then the scales shorter than the perigynia, often blackish or dark purple
- 5 Pistillate scales conspicuously aristate, the awn 1-2 mm long; culms arising singly or few together from long rhizomes; leaves all on the culms, the lower ones reduced to bladeless sheaths; plants rare, of wet places..... C. buxbaumii
- 5 Pistillate scales acute to acuminate but not aristate; culms tufted; some leaves basal; plants various
- 6 Spikes not over 1.3 cm long; perigynia 2-2.8 mm long, green at maturity and strongly contrasting with the dark scales..... C. norvegica
- 6 At least the largest spike over 1.3 cm long and/or the perigynia over 2.8 mm long, these sometimes as dark as the scales at least distally
- 7 Upper spikes not particularly more crowded than the lower ones, all sessile or nearly so; inflorescence not over 1 cm wide; perigynia 1.9-3.6 mm long..... C. parryana
- 7 Upper spikes generally more crowded than the lower ones, the lowest one commonly on a conspicuous peduncles; inflorescence sometimes over 1 cm wide; perigynia 2.7-5 mm long
- 8 Perigynia light green, rarely with red markings, strongly contrasting with the dark scales; lateral spikes ascending, spreading, or drooping at maturity, each usually on a slender peduncle, at least some in each inflorescence commonly gynaeandrous..... C. bella
- 8 Perigynia olive green or commonly marked with dark red, purple or black, often about as dark as the scales distally; lateral spikes ascending to erect, the upper ones commonly sessile or short-pedunculate, all pistillate or infrequently gynaeandrous in C. atrata
- 9 Perigynia 2.7-3.5 mm long, 1.6-2.1 mm wide, consistently papillate, sometimes completely black or black-purple at maturity; lowest rachis internode 0.2-1 cm long; lowest spike sessile or on a peduncle to 0.3 cm long, the upper ones sessile or nearly so; plants 10-28 cm tall, rather rare, at or above timberline..... C. albonigra

- 9 Perigynia mostly over 3.5 mm long or over 2.1 mm wide, rarely papillate, sometimes partly or wholly greenish at maturity; lowest internode of the rachis ca 0.3-7 cm long; lowest spike sessile or on a peduncle to 4.5 cm long; plants (20) 25-100 cm tall, mostly below timberline..... C. atrata

KEY 6

- 1 Scales pale green; lowest peduncle enveloped at the base by a closed sheath 2-6 mm long, often originating near the base of or on the lower 1/2 of the culm..... C. aurea
- 1 Scales black or blackish purple, sometimes with a green or paler midstripe; lowest peduncle not enveloped in a closed sheath, or if so the sheath mostly less than 2 mm long, mostly originating from the upper 1/2 of the culm
- 2 Perigynia about as dark as the scales at maturity, slightly inflated; stigmas 2 or 3; style continuous with, persistent on, and of the same firm texture as the achene, strongly bent at maturity C. saxatilis
- 2 Perigynia greenish or at least paler than and strongly contrasting with the dark scales except in C. scopulorum, not inflated; stigmas 2; style jointed to, deciduous from, and of softer texture than the achene, straight (section Acute)
- 3 Flowering culms all or mostly arising laterally and not enveloped at the base by the previous year's tufts of leaves; lower culm leaves reduced to bladeless sheaths; plants reported for low elevations of the White River drainage in Colorado..... C. emori
- 3 Flowering culms arising from the center of the previous year's tufts of leaves and surrounded at the base with dried leaves of the previous year
- 4 Leaves 1-2.6 mm wide; plants caespitose with numerous fibrous roots, the larger roots covered with yellowish or yellow-brown feltlike hairs; pistillate spikes 3-4 mm wide; perigynia more or less conspicuously stipitate, rather quickly deciduous after maturity, faintly nerved on both sides..... C. lenticularis
- 4 Some of the leaves over 2.6 mm wide or the perigynia not nerved except on the margins; plants rhizomatous, the culms arising singly or few together; fibrous roots often rather few, if with feltlike hairs then these whitish; perigynia not or hardly stipitate
- 5 Perigynia nerved on both sides as well as on the margins, the beak (0.2) 0.4-0.6 mm long and bidentate and/or ciliolate; midrib of scales conspicuous throughout the length of the scale, at least some in each inflorescence usually excurrent into a mucro 0.5-1 (2) mm long; plants widespread in valleys and to mid montane..... C. nebrascensis
- 5 Perigynia nerveless except on the margins, the beak not over 0.3 mm long, entire or obliquely cleft, not ciliolate; midrib of scales often inconspicuous toward the apex, not excurrent; plants low to high montane
- 6 Lowest bract shorter than the inflorescence; mature perigynia usually about as dark as the scales at least where exposed beyond the scale; pistillate spikes 5-10 mm wide..... C. scopulorum
- 6 Lowest bract usually exceeding the inflorescence; mature perigynia greenish or suffused with red or reddish brown, but not so dark as the scales; pistillate spikes 3-5 mm wide C. aquatilis

KEY 7

- 1 Perigynia pubescent
- 2 Pistillate spikes with only 1-4 perigynia, the lower ones originating from near the base of the plant; plants 5-35 cm tall, densely caespitose, without rhizomes, usually growing on dry or at least well-drained soil; staminate spikes 5-12 mm long..... C. rossii
- 2 Pistillate spikes with more than 4 perigynia, originating from the upper half of the culm; plants often taller, rhizomatous or not, mostly of moist or wet places; staminate spikes (at least some) commonly over 12 mm long
- 3 Perigynia densely pubescent throughout; staminate spikes (1) 2-3 (4)
- 4 Leaves inrolled or folded at least the distal 3/4, often appearing terete, 1-1.5 (2) mm wide where rolled or folded; plants known from ponds and marshes in subalpine moraine toward the e. end of the Uinta Mts..... C. lasiocarpa
- 4 Leaves flat or nearly so, the larger ones commonly 2-6 mm wide; plants widespread..... C. lanuginosa
- 3 Perigynia sparsely pubescent; staminate spike solitary..... C. parryana
- 1 Perigynia glabrous
- 5 Style continuous with, persistent on, and of the same firm texture as the achene, not withering; staminate spikes more than 1 and/or usually 2.1-8.5 cm long; larger pistillate spikes various but commonly (1) 2-5 (10.5) cm long; perigynia usually 5-7 (10) mm long (sometimes smaller in C. saxatilis but then plants keyed both ways), more or less inflated
- 6 Leaf sheaths pubescent; plants known from along the White River in Colorado..... C. atherodes
- 6 Leaf sheaths glabrous; plants of various distribution (Section Vesicariae)

- 7 Pistillate scales narrowed to a serrulate-ciliolate awn; plants known from the flood plain of the Green River..... C. hystricina
- 7 Pistillate scales not awned; plants of higher elevations
- 8 Pistillate scales soon purple-black or black except at the often white hyaline acute tip; perigynia with the 2 marginal nerves evident, otherwise nerveless or faintly nerved dorsally, only slightly inflated, rather abruptly tapered to a short entire or inconspicuously bidentate beak, 3.2-5.2 mm long, commonly turning as dark, or nearly so, as the scale where exposed beyond it; stigmas 2 and 3; achenes lenticular or trigonous..... C. saxatilis
- 8 Scales green, stramineous, reddish brown, or if (rarely) dark brown then usually acuminate or caudate-acuminate; perigynia conspicuously nerved dorsally, conspicuously inflated, abruptly or gradually tapered to a conspicuously bidentate beak, 4-10 mm long, about the color of the scales, not blackish; styles 3; achenes trigonous
- 9 Perigynia spreading often strongly so at maturity, the ellipsoid to subglobose body more or less abruptly contracted to a conspicuous beak; plants with robust, long-creeping rhizomes, common..... C. rostrata
- 9 Perigynia appressed or slightly ascending, the lanceolate to lance-ovate body gradually tapering to the often poorly defined beak; plants tufted, with rather short rhizomes, uncommon..... C. vesicaria
- 5 Style jointed to, deciduous from, and of softer texture than the achene, withering; staminate spikes mostly 1, 0.3-2.1 cm long; pistillate spikes 0.5-2 (3) cm long; perigynia 1.9-5 mm long, not inflated
- 10 Peduncle of the lowest and often the upper pistillate spikes enveloped in a closed sheath 0.4-2 (4) cm long or longer
- 11 Plants with slender creeping rhizomes; lowest spike often borne on the lower half of the culm; stigmas 2 (3)..... C. aurea
- 11 Plants caespitose; rhizomes lacking or short; lowest spike usually borne on the upper half of the culm; stigmas 3
- 12 Pistillate spikes sessile or on erect or ascending peduncles, all crowded or the lowest one sometimes separated; inflorescence 2-5 (10) cm long; staminate spike 0.7-2.1 cm long..... C. oederi
- 12 Pistillate spikes borne on capillary, spreading or drooping peduncles, remote; inflorescence 5-30 cm long; staminate spike 0.3-0.9 cm long..... C. capillaris
- 10 Peduncles not enveloped in a sheath or this closed for less than 0.4 cm
- 13 Pistillate spikes 4-6 mm long, sessile; perigynia widely spreading, greenish; scales greenish or pale; plants caespitose..... C. interior
- 13 Pistillate spikes longer and/or at least one on a conspicuous peduncle; perigynia and/or scales brownish, blackish, or black-purple
- 14 Pistillate spikes borne on slender, spreading to drooping peduncles; perigynia pale green; scales greenish brown to purple-brown; culms arising singly or few together from long, creeping rhizomes; fibrous roots covered with a yellowish feltlike tomentum
- 15 Terminal spike 9-12 mm long, occasionally bisexual; lateral spikes often with a few staminate flowers at the base, never at the apex; leaves mostly with well-developed blades..... C. paupercula
- 15 Terminal spike (10) 15-21 mm long, staminate; lateral spikes sometimes with a few staminate flowers at the apex, never at the base; lower leaves usually bladeless..... C. limosa
- 14 Pistillate spikes sessile or on erect peduncles, or if the lower peduncles spreading then the perigynia and/or the scales often blackish or black-purple at least in part; culms tufted or arising singly or few together; fibrous roots not covered with a feltlike tomentum
- 16 Perigynia 1.9-3 (3.6) mm long; pistillate spikes 4-5 mm wide, commonly all sessile or nearly so..... C. parryana
- 16 Perigynia (3) 3.3-5.2 mm long; pistillate spikes 5-8 mm wide, at least the lowest one commonly on a conspicuous peduncle
- 17 Perigynia green or olive green, strongly contrasting with the dark scales; plants from 7,200-10,400 ft, of well-drained soil, tufted; rhizomes lacking or short..... C. raynoldsii
- 17 Mature perigynia as dark or nearly so at least in part as the blackish or black-purple scales; plants of higher elevations or mostly of wet places, commonly with short or long rhizomes
- 18 Perigynia slightly inflated, not flattened; leaf blades 1.5-3 mm wide; styles continuous with and persistent on the achene, contorted in age; stigmas 2 or 3; staminate spikes 1-2 (3); plants mostly of wet places..... C. saxatilis
- 18 Perigynia flattened, not inflated; leaf blades 2-6 mm wide; styles jointed with and deciduous from the achene, straight; stigmas 3; staminate spikes solitary; plants commonly on well-drained soil..... C. paysonis

Carex albonigra Mack Black-and-white-scaled s. The few records seen are all from above 11,000 ft on the Uinta Mts.; July-Aug. Intermediate between C. nova and C. atrata and perhaps intergrading into both of them.

Carex aquatilis Wahl. Water s. Common to locally abundant; widespread; from about 7,000 ft to above timberline; most abundant in wet and boggy meadows above 9,500 ft in the Uinta Mts.; June-Aug. Easily confused with C. lenticularis and C. nebrascensis, but consistently different from them. Reports of C. bigelowii Torr. (C. concolor Mack.) are apparently based on short-bracted specimens of C. aquatilis.

Carex atherodes Sprengel Awned s. Apparently known from wet lands along the White River in Río Blanco Co.; July-Sept.

Carex athrostachya Olney Slenderbeak s. Occasional; Uinta Mts.; in moist or wet places; 7,500-9,500 ft; abundant at the high water line of the mud flats at Moon Lake; June-Sept. Distinguished from similar species by the long lower bracts, but this character is variable, and not in every flowering culm do the bracts exceed the inflorescence. Specimens with reduced bracts resemble C. microptera, but the perigynia are narrower than in C. microptera.

Carex atrata L. Black-scales s., black s. (C. heteroneura W. Boott) We have 2 vars. as follows:

- 1 Perigynia not flattened, lanceolate or narrowly elliptic, olive green, becoming yellow-brown at maturity, seldom suffused with dark color except at the beak, not much wider than the mature achene; plants restricted..... var. atrosquama
- 1 Perigynia usually flattened, broadly elliptic to ovate or obovate, usually conspicuously suffused with dark purple or black, wider than the achene; plants widespread..... var. erecta

Var. atrosquama (Mack.) Kelso (C. atrosquama Mack.) Rare in open spruce woods and dry alpine tundra, from the area around the head of Blind Stream and S. Fork of Rock Creek in the Uinta Mts.; July-Aug.

Var. erecta W. Boott (C. epapillosa Mack.) Common; Uinta Mts.; moist openings in conifer forests, moist meadows, along streams, and occasionally above timberline; 7,500-12,700 ft; July-Sept. Rare specimens from our area have the scales slightly longer than the perigynia. These might be intermediate to var. chalciolepis (T. H. Holm.) Kukenthal (C. chalciolepis T. H. Holm.).

Carex aurea Nutt. Golden s. Common across the Uinta Mts., occasional elsewhere; along streams, around seeps, springs, and other wet places; about 7,000-11,000 ft; June-Aug. Carex hassei Bailey is a similar taxon of questionable status that has been separated from C. aurea by greenish rather than golden perigynia and appressed rather than spreading scales. Some of our plants resemble C. hassei, but the features used for separation seem inconsistent.

Carex bebbii Olney ex Fern. Beautiful s. (C. subfusca Boott in Wats. misapplied) The few specimens seen are from Whiterocks Canyon, and Whiterocks Bench; wet places; 6,000-7,400 ft; June-July.

Carex bella Bailey Showy s. Occasional; Uinta Mts. and Bruin Point, Tavaputs Plateau; 8,000 ft to above timberline; usually on well drained soil, sometimes showing a slight increase on areas cleared of timber; June-Aug.

Carex bipartita All. Two-parted s. The 3 specimens seen (Maguire 14497 UTC; Lewis 648, 648a in his personal herbarium) are from Gilbert Bench and w. exposure of Gilbert Peak, Uinta Mts.; stony, wet ground around seeps; 12,000-12,700 ft; July-Aug.

Carex breweri F. Boott (C. engelmannii Bailey) The 2 specimens seen are from Gilbert Bench (Lewis 628) and Blind Stream-S. Fork Rock Creek area (Goodrich 3265) in the Uinta Mts.; well-drained places in sandy soil and among rocks; 11,000-12,100 ft; Aug.

Carex brunnescens (Pers.) Poiret Brownish s. The 2 specimens seen are from Uintah Co., Uinta Mts.; wet places; about 7,300-9,500 ft; June-Aug.

Carex buxbaumii Wahl. Buxbaum s. Known from a few, small populations in the Uinta Mts., from Uinta and Whiterocks Canyons and Daggett Co.; wet or swampy meadows; 7,600-9,800 ft; June-Aug.

Carex canescens L. Silvery s., pale s. Common; Uinta Mts.; along drainages, edges of ponds and lakes, from canyon bottoms to near timberline, sometimes an early successional species on sandy bottoms of dry beaver ponds; June-Aug.

Carex capillaris L. Hairlike s. Known from shady seeps or springs or open meadows in Whiterocks, Lake Fork, and Rock Creek drainages, Uinta Mts.; 7,300-9,300 ft; June-Aug.

Carex capitata L. Capitata s. The 2 specimens seen (Lewis 512, 649 in his private herbarium) are from wet and boggy meadows at the head of the Uinta drainage (Painter Basin and Gilbert Bench), Uinta Mts.; 12,000-12,400 ft; July-Aug.

Carex diandra Schrank Lesser paniced s. The 1 specimen seen (Goodrich 19882) is from Uinta Canyon; boggy meadow; 7,500 ft.

Carex dioica L. [C. gynocrates Wormsk. ex Drejer] The few specimens seen are from the S. Fork of Rock Creek, Lake Fork Mt. (Mill Park) and Birch Creek (Daggett Co.); boggy, sunny or shady places, near or on limestone; 8,200-10,400 ft; July-Aug.

Carex disperma Dewey Softleaved s. Locally common; widespread; Uinta Mts.; bogs and seeps, often in shade; from about 7,500 ft to near timberline; June-Aug.

Carex douglasii W. Boott Douglas s. Common to abundant; widespread; dry, often alkaline places, sagebrush communities and in meadows that are moist in spring and dry in summer, sometimes in compact soil of roads and around livestock watering places; 4,800-9,000 ft; May-Aug.

Carex ebenea Rydb. Ebony s. Occasional to common; Uinta Mts.; edges of meadows, along streams, in open conifer woods, and on well-drained slopes, mostly in the pine-spruce zone but occasionally above timberline; June-Aug. See C. microptera.

Carex egglestonii Mack. Eggleston s. Occasional to common across much of the Uinta Mts. but more common toward the w. and on the W. Tavaputs Plateau; open slopes and openings in woods; 8,000 ft to timberline. Small specimens may be confused with C. straminiformis, but the perigynia are quite distinct, and the spikes of small plants are still larger than those of C. straminiformis.

Carex elynoides Holm. Blackroot s., kobresialike s. Uinta Mts.; common to dominant on dry, exposed ridges and slopes at subalpine and alpine elevations and rarely on exposed ridges at the upper limits of the sagebrush zone; July-Aug. Similar to and easily confused with Kobresia bellardii, which grows in the same habitat. The following key may help to distinguish plants of the 2 taxa:

- 1 Inflorescence of a solitary androgynous spike, the staminate flowers above and not mixed with the pistillate flowers; perigynium with sealed margins, enclosing the achene..... C. elynoides
- 1 Inflorescence (spike) consisting of small, few-flowered spikelets, the terminal spikelet staminate, the lateral spikelets mostly androgynous and thus staminate and pistillate flowers commonly mixed throughout most of the inflorescence; perigynial bract with unsealed margins, the achene exposed at least distally Kobresia bellardii

Carex emoryi Dewey Reported for low elevations of the White River drainage in Colorado.

Carex filifolia Nutt. Threadleaf s. Known in our area from Daggett and Moffat Cos.; pinyon-juniper communities; 6,000-7,000 ft; May-June.

Carex geyeri Boott Elk s. Common to dominant understory species in aspen, Douglas-fir, and lodgepole pine communities of the Uinta Mts. up to about 9,000 ft and infrequent to 10,000 ft, and Gamble oak communities of the E. Tavaputs Plateau, and occasionally in Douglas-fir and sagebrush-grass communities on the W. Tavaputs Plateau in and w. of the Avintaquin drainage. Abundance of this species in aspen communities seems to be correlated with sandy soil; June-Aug. Plants remain green throughout the winter even when covered with considerable snow pack.

Carex haydeniana Olney Cloud s. Common; Uinta Mts. on dry or moist but well-drained sites above and somewhat below timberline; June-Aug. See discussion under C. microptera.

Carex hoodii Boott Hood s. Occasional or locally common; from w. of Lake Fork in the Uinta Mts. and w. of Willow Creek on the W. Tavaputs Plateau; open aspen and conifer woods and open grassy slopes to about timberline; June-Aug. Wolf & Dever 5213 DINO!, reported by Bradley (1950) for Round Top Mt., belongs to C. occidentalis.

Carex hystericiana Muhl. ex Willd. Bottlebrush or porcupine s. The 2 specimens seen are from Jones Hole (A. Holmgren & N. Holmgren 14251 UTC) and Desolation Canyon (A. Ross sn UTC) along or near the Green River; 4,400-5,200 ft; June.

Carex illota Bailey Sheep s., small-headed s. Locally abundant; Uinta Mts.; wet, swampy and boggy meadows, along streams and around shores of ponds and particularly "pot holes" in alpine moraine in lodgepole pine and Engelmann spruce forests; (7,500) 9,500-11,500 ft; July-Aug.

Carex interior Bailey Inland s. The few specimens seen are from Rock Creek, Uinta, and Whiterocks drainages, Uinta Mts.; wet places along streams; 7,000-7,400 ft; July-Aug.

Carex lanuginosa Michx. Woolly s. Common to abundant; widespread; along streams, ditches, in swamps, and other wet places; about 4,800-9,500 ft; June-Aug.

Carex lasiocarpa Mack. Woolfruit s., slender s. Common to abundant, and forming closed stands, Ashley Creek, Sheep Creek, and probably Carter Creek drainages, Uinta Mts.; margins of and in swampy, small ponds (pot holes) in alpine moraine of the pine-spruce zone; July-Sept. Often associated with C. rostrata, but not extending into as deep of water.

Carex lenticularis Michx. (C. kelloggii W. Boott) Occasional; Uinta Mts.; wet areas; 7,000-11,000 ft. Similar to C. aquatilis.

Carex leporinella Mack. Sierrahare s. Locally common, w. of Lake Fork in the Uinta Mts.; wet and drying meadows, often in drying mud of ephemeral pools or at the edge of ponds and lakes; 9,000-10,200 ft; July-Sept.

Carex leptalea Wahl. Bristlestalked s. Known from small populations in Whiterocks and Uinta Canyons, Uinta Mts. where it is locally abundant in and around sphagnum bogs at about 7,300 ft; July-Aug.

Carex limophila Herm. The 2 specimens seen are from Whiterocks Canyon and near Hickerson Park, Uinta Mts.; wet places; 7,100-9,000 ft; July-Aug.

Carex limosa L. Mud s. Locally abundant, Uinta Mts.; quaking-bogs and wet meadows in the upper pine-spruce zone; locations where the plant is common are often underlain by gray clay; July-Aug. Similar to C. paupercula.

Carex microglochis Wahl. Known in our area from a subalpine, calcareous bog in the S. Fork of Rock Creek, Uinta Mts.; June-Aug.

Carex microptera Mack. Smallwing s. (C. festivella Mack.) Common to abundant; widespread; along ephemeral or permanent water courses, in open grassy slopes, moist but usually not wet meadows, and aspen and conifer woods; 7,200-11,200 ft; May-Aug. Cronquist and others (1977) have recognized the similarities of C. microptera, C. ebenea, and C. haydeniana to be such that the 3 might be regarded as varieties of a single species. Such a combination could also include C. subfusca W. Boott., C. pachystachya, and other

species. They are all similar. Intergradation between C. ebenea and C. haydeniana has been found in plants of the Big Park area of N. Fork Ashley Creek. However, such intergradation apparently is not common in our area.

Carex misandra R. Br. Few-flowered or shortleafed s. The 3 records seen are from the head of the Uinta drainage; alpine communities; 11,500-12,800 ft; July-Aug.

Carex multicostata Mack. Manyrib s. The 3 specimens seen are from the Uinta Mts., (Hickerson and Sheep Creek Parks, Daggett Co. and Pat Carrol Park, Uintah Co.); wet meadows and edge of wet meadows; 8,600-9,300 ft; July-Aug.

Carex muricata L. Narrowleaf s. (C. angustior Mack.) Locally abundant, Uinta Mts.; swampy or boggy meadows in the pine-spruce zone; (7,600) 8,100-10,400 ft; June-Aug. Similar to and not easily separated from C. interior.

Carex nardina Fries Spikenard s. (C. hepburnii F. Boott) The few specimens seen are from Rock Creek and westward in the Uinta Mts.; above timberline on dry slopes and ridges; June-Aug. Might easily be confused with C. elynoides.

Carex nebrascensis Dewey Nebraska s. (orthographic variant: C. nebraskensis) Common or abundant; widespread; wet meadows, swampy places, and along ditches, washes, and other water courses; 4,800-9,000 ft; May-Aug.

Carex nelsonii Mack. Occasional or locally common; Uinta Mts.; meadows and rocky slopes; mostly above timberline; June-Aug. Similar to small specimens of C. nova, but distinguished by inflated and rounded rather than flattened perigynia.

Carex neurophora Mack. Alpinenerved s. The 1 specimen seen (Lewis 731) is from 1-2 mi w. of our area, n. of Duchesne Ridge in Lake Creek, Provo River drainage. The closely related C. jonesii Bailey has also been reported for our area.

Carex nigricans C. A. Mey. Black alpine s. Occasional; Uinta Mts.; meadows, along streams, in conifer forests, and above timberline, perhaps most common along ecotones between meadows and forest communities; (8,000) 9,000-11,100 ft; June-Aug.

Carex norvegica Retz. Scandinavian s. (C. media R. Br.; C. vahllei Schkuhr) Across the Uinta Mts.; most common in the lodgepole pine-Engelmann spruce zone, occasionally at lower elevations in the major canyons, quite specific for moist sites, often along small drainages; 7,400-11,050 ft; June-Aug.

Carex nova Bailey (C. pelocarpa Herm.) Common; Uinta Mts.; along streams, in other moist places, and in rather dry exposed places; 9,160-12,100 ft; June-Aug. Carex pelocarpa has been distinguished from C. nova by features given in the following key:

- 1 Perigynia not granular-roughened, the margins smooth; achenes long-stipitate; scales acuminate, the midrib prominent; culms flexuous, the inflorescence often nodding..... C. pelocarpa
 1 Perigynia granular-roughened, the margins ciliate-scabrous; achenes short-stipitate; scales acute to short-cuspidate; with the midrib almost obsolete; culms stiff, the inflorescence erect..... C. nova

The features used to separate these 2 taxa do not seem consistent in our plants, but plants tending to have features of C. pelocarpa are from places drier than those with only the features of C. nova. However, the differences do not seem to warrant the recognition of 2 species.

Carex obtusata Lilj. Obtuse s. Occasional to abundant; widespread; sagebrush, aspen, and dry meadow communities; 6,500-9,000 ft; June-Aug.

Carex occidentalis Bailey Western s. Occasional; Uinta Mts. and Blue Mt.; open conifer forests or where these forests have been opened by logging or fire, perhaps in other communities; 7,200-10,600 ft; June-Aug.

Carex oederi Retz. Green s. (C. viridula Michx.) Rare or infrequent; Whiterocks and Uinta drainages; along streams and in wet places; 5,800-7,300 ft; June-Aug.

Carex pachystachya Cham. Chamisso s. Infrequent; Strawberry Valley and Uinta Mts.; wet meadows and wet places in woods; 7,300-9,000 ft; June-Aug. Hardly distinct from C. microptera.

Carex parryana Dewey The few specimens seen are from Strawberry Valley and Currant Creek drainage; sagebrush and meadow communities; 7,600-9,720 ft; June-Aug.

Carex paupercula Michx. The few specimens seen are from sphagnum bogs and streambanks in the Uinta Mts.; 9,000-10,400 ft; June-Aug. Similar to and easily confused with C. limosa.

Carex paysonis Clokey (C. podocarpa R. Br. misapplied; C. tolmiei F. Boott misapplied) The few specimens seen were collected by Mont Lewis from the headwaters of the Uinta and Lake Fork drainages, Uinta Mts. This is common on the n. slope of these mountains outside of our area; June-Aug.

Carex petasata Dewey Liddon s. Common; widespread; sagebrush and dry aspen communities, and open grassy slopes; 7,500-9,000 ft; June-Aug. Similar to and passing into C. praticola.

Carex phaeocephala Piper Dunhead s. Common to abundant; Uinta Mts.; exposed, rather dry, rocky places often above timberline; (9,300) 10,000-11,900 ft; July-Aug.

Carex praeceptorum Mack. Infrequent; widespread; Uinta Mts.; wet, boggy places, often associated with sphagnum moss; (10,000) 10,600-11,200 ft; July-Aug. Similar to and possibly only a small phase of C. canescens with which it is easily confused.

Carex praegracilis W. Boott Silver s. Common to abundant; widespread; swampy places, irrigated pastures, along ditches, washes, and other water courses, around seeps and springs, occasionally in rather dry places, tolerant of alkali; 4,700-8,000 ft; May-Aug.

CYPERACEAE

Carex praticola Rydb. Meadow s. Occasional, Uinta Mts. and W. Tavaputs Plateau; moist openings or open conifer or aspen woods; 7,300-10,000 ft; June-Aug. Easily confused with and probably passing into C. petasata.

Carex pyrenaica Wahl. Pyrenean s. The 2 specimens seen (Lewis 629, 630 in his personal herbarium) are from Gilbert Bench and a slope above this bench at the head of the Uinta drainage; meadow and hillside seep; 12,000-12,100 ft; Aug.

Carex raynoldsii Dewey Raynolds s. Locally common from w. of Rock Creek and s. of Granddaddy Basin in the Uinta Mts. and w. of the Avintaquin drainage of the W. Tavaputs Plateau, infrequent at the e. end of the Uinta Mts.; open slopes and in grass-forb communities, and openings in woods; July-Aug.

Carex rossii Boott Ross s. (C. brevipes W. Boott) Common; widespread; sagebrush-grass, pinyon-juniper, mt. brush, and ponderosa pine communities, also in lodgepole pine-Engelmann spruce forests where it often becomes abundant following logging or after fire, rarely above timberline; 7,000-11,300 ft; May-Aug. Features used to separate C. rossii and C. brevipes are not consistent enough in plants of our area to provide meaningful separation. Perhaps C. geophila Mack. enters our area at the se. corner in the Piceance Basin. The feature used to separate this from C. rossii (bract of lowest nonbasal pistillate spike not leaflike and shorter than the inflorescence) hardly warrants separation at the species level.

Carex rostrata Stokes Beaked s. Common across the Uinta Mts., occasional on the Tavaputs Plateau; wetlands of canyon bottoms, subalpine wet meadows, and swamps, abundant to dominant in "pot holes" of alpine moraine where it is a pioneer in hydrach succession and grows in water up to 1 or 2 ft deep; 7,100-10,500 ft; June-Aug.

Carex rupestris All. Curly or rock s. (C. drummondiana Dewey) Locally common; above timberline across the Uinta Mts. in dry exposed places; June-Aug.

Carex saxatilis L. Russet s. (C. physocarpa Presl.) Common to abundant; Uinta Mts.; shallow water and swampy or moist meadows; 9,000-12,500 ft; July-Sept.

Carex scirpoidea Michx. Canada single-spike s. (C. pseudoscirpoidea Rydb.) Common to abundant; Uinta Mts.; apparently rare in the limestone area s. of Granddaddy Basin and w. of Rock Creek; various communities above timberline, and occasionally in ecotones between conifer forest and meadows; 10,300-13,000 ft; June-Aug. Our plants are referable to var. pseudoscirpoidea (Rydb.) Cronq.

Carex scopulorum T. H. Holm Rocky Mt. or cliff s. Locally common in the Green Draw-Pipe Creek area of the e. Uinta Mts.; moist and wet meadows and along streams; 8,040-8,200 ft; July-Aug.

Carex siccata Dewey Dry or silvertop s. (C. foenea Svenson) The several records seen are from lodgepole pine-Engelmann spruce and aspen communities toward the e. end of the Uinta Mts. and from open slopes at the head of Hill Creek, Tavaputs Plateau; June-Aug.

Carex simulata Mack. Analogue s., short-beaked s. Widespread; wet, swampy, and boggy meadows, perhaps more common in calcareous than noncalcareous places; 6,000-9,400 ft; June-Aug.

Carex stenophylla Wahl. Needleleaf s. (C. eleocharis Bailey) Occasional to common; widespread; usually associated with sagebrush, rarely to alpine tundra; 7,000-10,720 ft; June-Aug.

Carex straminiformis Bailey Shasta s. Known in our area only from the head of Blind Stream w. of Rock Creek, Uinta Mts. and Red Ledge Ridge above Strawberry Valley; grassy openings in spruce forests and sagebrush-grass communities; 9,000-10,300 ft; June-Aug.

Carex subnigricans Stacey The 3 specimens seen are from Cow and Mill Parks in the Lake Fork and Yellowstone drainages and from Big Park, N. Fork, Ashley Creek; wet meadows and edge of wet meadows; 9,750-10,400 ft; June-Aug.

Carex vallicola Dewey Valley s. Common; widespread; sagebrush-grass, mt. brush, and dry aspen communities, also in grass-forb communities of open slopes; 7,000-9,500 (10,000) ft; June-Aug.

Carex vesicaria L. Blister or inflated s. Rarely collected, but perhaps more common than the paucity of collections indicate; 9,850-10,000 ft Uinta Mts.; in water and swampy meadows; July-Aug.

Carex xerantica Bailey Dryland s. The 2 specimens seen (Vickery & Wiens 1683 UT!, Hill Cr., E. Tavaputs Plateau, aspen-fir; Goodrich 6291, Strawberry Peak, W. Tavaputs Plateau open ridge top, 10,300 ft) are possibly unusual specimens of C. petasata.

Cyperus L. Flatsedge

Cyperus aristatus Rottb. Awned f. Annual plants 1-15 cm tall, with leaves basal or on the lower 1/4 of the culms, and with the leaflike involucral bracts more or less whorled and exceeding the inflorescence; leaf blades 0.5-2.5 mm wide; spikelets 4-10 mm long, borne in dense headlike clusters, the clusters on raylike peduncles or solitary, the peduncles to 3 cm long; scales 1-3 mm long, awn-tipped, deciduous; stamens 1; style trifid; achene trigonous. The 5 specimens seen are from flood plains of the Green and Yampa Rivers and from a heavily grazed meadow at Dry Gulch; 4,650-5,100 (6,600) ft.

Eleocharis R. Br. Spikerush

Plants perennial sometimes appearing annual, from rhizomes or fibrous roots, stoloniferous in 1 species; stems simple, slender, angled to terete or compressed; leaves reduced to bladeless sheaths, these at the base of the stem; inflorescence a solitary, terminal spikelet, lacking true involucre bracts, the lowest scale of the spike sometimes slightly modified; flowers bisexual, each one subtended by a scale; perianth of 0-6 (9) retrorsely scabrous bristles; style thickened at the base into a tubercle, this sometimes

appearing like a cap on the achene; stigmas 2 or 3; achenes lenticular or 3-angular. Eleocharis ovata (Roth) R. & S. (E. engelmanni Steud.) has been reported, but we have not seen any specimens. With its annual habit and 2 stigmas it is quite distinct from the taxa listed below.

- 1 Stigmas 2; achenes lenticular; base of style enlarged, forming a cap higher than wide on the achene; our most common spikerush..... E. palustris
- 1 Stigmas 3; achenes trigonous; base of style not enlarged nor forming a cap on the achene, or if so this wider than high
 - 2 Base of style enlarged, forming a low cap on the achene; culms often tufted
 - 3 Achenes pale gray-white or faintly yellow, longitudinally many ribbed, with cross ridges between the ribs; scales green or straw colored, the lowest one bearing a flower, not much if any broader than the upper ones; plants 3-12 cm tall, sometimes appearing annual; culms slender..... E. acicularis
 - 3 Achenes golden-yellow, 3-ribbed, the surface cellular roughened; upper scales mostly dark except for the hyaline tip, the lower sterile ones mostly much wider than the upper ones; plants sometimes taller than above..... E. bolanderi
 - 2 Base of style not much enlarged, not forming a cap on the achene
 - 4 Achenes 0.9-1.3 mm long; scales 1.5-2.5 mm long; spikelets 2.5-4 (6) mm long, with 2-9 (20) flowers; plants 2-6 (10) cm tall, sometimes appearing annual..... E. parvula
 - 4 Achenes 1.9-2.8 mm long; scales 2.5-5.5 mm long; spikelets various; plants (5) 10 cm tall or taller
 - 5 Some culms arching, taking root at the tip, (20) 40-100 cm long, more or less flattened distal, 1-2 mm wide; spikelets (5) 8-13 mm long, with (5) 10-25 flowers; lowest scale empty.. E. rostellata
 - 5 Culms erect, not taking root at the tip, 5-15 (20) cm tall, seldom over 1 mm thick, not flattened; spikelets 4-8 mm long, with 3-9 flowers, the lowest scale not empty
 - 6 Leaf sheaths entire; scales entire, soon dark purple to purple-black; culms arising singly or few together from slender, creeping rhizomes; perianth bristles minutely retrorsely barbellate..... E. pauciflora
 - 6 Uppermost sheath of at least some culms with a bristlelike blade 4-6 mm long; lowest scale with a blunt awn 1-3 mm long, the scales greenish, pale in age; culms densely tufted; creeping rhizomes lacking; perianth bristles smooth..... Scirpus caespitosus

Eleocharis acicularis (L.) R. & S. Needle s. Occasional; widespread; mostly in mt.; wet places, often on mud flats of drying ponds and reservoirs; (4,300) 7,185-10,500 ft; June-Sept.

Eleocharis bolanderi Gray The few specimens seen are from the Uinta Mts. from Lake Fork to Uinta Canyon, Duchesne Co. and Meadow Park, Daggett Co.; locally common; wet places to drying meadows; 8,100-8,500 ft; July-Aug.

Eleocharis palustris (L.) R. & S. Common s. (E. calva Torr.; E. macrostachya Britt. in Small) Our most common, widespread spikerush; wet lands, tolerant of alkali; from the bottom of the Basin to about 10,500 ft; May-Aug. The specimen referred to as E. montana H.B.K. (E. parishii Britt) by Flowers and others (1960) belongs here as does Graham 7768 reported as E. arenicola Torr. (Graham 1937).

Eleocharis parvula (R. & S.) Link Dwarf s. (E. coloradoensis Britt.) The few records seen are from the edge of ponds, lakes, and wet lowlands of the Basin in Uintah Co.; inconspicuous and likely more common than records indicate; June-Sept. With reduced perianth bristles and dull, minutely roughened achenes, our plants are referable to var. anachaeta (Torr.) Svenson.

Eleocharis pauciflora (Lightf.) Link Fewflowered s. Locally common to abundant; Uinta Mts.; boggy meadows of the upper pine-spruce zone and other wet places; 6,840-11,100 ft; July-Sept. See comment under Scirpus caespitosus.

Eleocharis rostellata (Torr.) Torr. Beaked s. The 3 records seen are from an irrigated pastures at Neola and Mt. Home and wet lands along the Duchesne River near Tabiona; May-Aug.

Eriophorum L. Cotton-grass; Cotton-sedge

Plants perennial, from long, scaly rhizomes; stems solid, simple; leaves with closed sheaths and grasslike blades or upper blades reduced; spikelets 1-several in a terminal inflorescence, subtended by 1-several leafy or scalelike involucre bracts; flowers bisexual, each subtended by a scale; the perianth of numerous whitish, much elongate (in fruit) bristles, these giving the inflorescence the appearance of a tuft of cotton; stamens 3; stigmas 3; achenes triangular in cross section.

- 1 Spikelets (2) 3-6 (8), borne on slender pedicels; lowest bract more or less leaflike, 2.5-5.5 cm long; anthers 2-4 mm long; upper leaves with well-developed blades mainly 2-6 mm wide; scales acute..... E. polystachion
- 1 Spikelet 1, sessile at the apex or the culm; bracts scalelike, less than 1 cm long; anthers less than 2 mm long; leaf blades obsolete or to about 1 mm wide; scales acuminate..... E. scheuchzeri

CYPERACEAE

Eriophorum polystachion L. (E. angustifolium Honck.) Seldom collected, but occasional across the Uinta Mts.; wet and boggy meadows and along streams in the pine-spruce zone and above timberline; July-Aug.

Eriophorum scheuchzeri Hoppe (E. chamissonis C. A. Meyer) The few records seen are all from the Whiterocks drainage and westward in the Uinta Mts.; wet and boggy meadows, along streams, and in rocky places in the pine-spruce zone and above timberline; July-Aug.

Kobresia Willd.

Plants perennial, caespitose, like Carex; culms obtusely triangular, solid; leaves narrow or filiform, basal or borne near the base of the culm (in ours); inflorescence a spike or of spikes, each spike with several spikelets; spikelets subtended by a small scale and consisting of a single pistillate flower and one or more staminate flowers; flowers without a perianth, the pistillate consisting of a pistil only, the staminate reduced to stamens, these subtended by and loosely folded in a scale, the scale (corresponding to the perigynia of Carex) with open margins and not closed around the achene as in Carex.

- 1 Plants 5-20 cm tall, from well-drained, exposed sites near or above timberline; spike solitary..... K. bellardii
- 1 Plants 25-35 cm tall, of wet places, below timberline; spikes (1) 3-12..... K. simpliciuscula

Kobresia bellardii (All.) Degland [K. mysosuroides (Vill.) Fiori & Paol.; K. sibirica Turcz. misapplied] Occasional to locally common; Uinta Mts.; on dry or somewhat moist places; in krummholtz or above timberline; June-Aug. Rather easily confuses with Carex elynoides (q.v.).

Kobresia simpliciuscula (Wahl.) Mack. Rare or locally common, Uinta Mts.; known from a calcareous bog in the S. Fork of Rock Creek (Duchesne Co.), and boggy meadows at and near Sheep Creek Park (Daggett Co.); June-Aug.

Scirpus L. Bulrush

Annual or perennial plants; leaves reduced to bladeless sheaths or with well-developed blades; involucre of 1-many scalelike or leaflike bracts; spikelets solitary to numerous, in a spicate, capitate, umbellate, or paniculate inflorescence; scales of spikelets spirally arranged, with or without an excurrent awn; flowers bisexual; perianth of 1-6 bristles, these sometimes obsolete; stamens 3 (rarely fewer); stigmas 2 or 3; achenes lenticular or trigonous, with or without a stylar apiculus, but without a tubercle.

- 1 Spikelets solitary; involucre of 2-3 modified empty scales less than 1 cm long; plants 4-20 cm tall, perennial, densely tufted, of wet and boggy subalpine meadows in the Uinta Mts..... S. caespitosus
- 1 Spikelets 2-many; involucre of 1-several more or less leaflike bracts; plants various but often taller, of lower elevations
 - 2 Plants annual, tufted, from fibrous roots, 3-25 cm tall; achenes dark gray-brown to blackish, conspicuously cross-ridged..... S. supinus
 - 2 Plants perennial, from rhizomes, often over 25 cm tall; achenes mostly lighter, not cross-ridged
 - 3 Involucre with 2 or more leaflike, spreading bracts
 - 4 Spikelets small and numerous; mostly 3-6 mm long and over 100 in an open umbellate inflorescence
 - 5 Stigmas 2; midrib of scales abruptly contracted into a short mucro; leaf sheaths mostly anthrocyanic; plants mostly of canyons..... S. microcarpus
 - 5 Stigmas 3; midrib of scales tapered into a short awn; plants known from low elevations of the Uinta Basin..... S. pallidus
 - 4 Spikelets larger and fewer, mostly 10-35 mm long and 3-40 (rarely more) in a compact or somewhat open umbellate inflorescence
 - 6 Stigmas 2; spikelets 3-25, all in a sessile cluster or in 1-4 additional clusters borne on peduncles to 6 cm long; plants common, widespread..... S. maritimus
 - 6 Stigmas 3; spikelets commonly 10-40, at least a few usually borne singly, the inflorescence usually umbellate with few to several raylike peduncles to 7 cm long, plants rare, known from Daggett Co..... S. fluviatilis
 - 3 Involucre with only 1 leaflike bract, this erect or nearly so
 - 7 Inflorescence open, with conspicuous branches; spikelets numerous, more than 20; culms terete, commonly 1 cm or more in diameter, 80-300 cm tall; leaves reduced to bladeless sheaths or the blades short and erect or nearly so
 - 8 Spikelets appearing dull orange or reddish-brown, the scales with striolae about the same color as the rest of the scale; scales mostly 2-3 (3.5) mm long; plants rather uncommon.... S. validus
 - 8 Spikelets appearing dull gray-brown, the scales with prominent red-brown striolae that contrast with the gray-white color of the rest of the scale; larger scales mostly 3.5-4 mm long; plants common..... S. acutus

- 7 Inflorescence headlike, with the sessile spikelets in a sessile cluster; spikelets 3-15; culms triangular or if subterete then usually with well-developed ascending-spreading leaf blades, commonly less than 1 cm in diameter, 10-116 cm tall..... S. pungens

Scirpus acutus Muhl. Hardstem b., tule b. [S. occidentalis (S. Wats.) Chase] Common to dominant, often forming closed clones, widespread; swamps and marshes at low elevations; not expected above 6,500 ft; June-Aug.

Scirpus caespitosus L. Deerhair b. Locally abundant; Uinta Mts.; subalpine, boggy meadows; 9,500-11,200 ft; July-Aug. With a single, terminal spike and nearly bladeless leaves, this is easily mistaken for an Eleocharis. However, with close examination the small bract that simulates a continuation of the culm can usually be seen. This is also distinguished from Eleocharis by the small blade (to 6 mm long) often on the uppermost sheath. It is separate from most species of Eleocharis by its high elevation habitat, but it is often associated with or growing near E. pauciflora from which it is distinguished by caespitose rather than a spreading-rhizomatous habit and paler color especially in the inflorescence. It often occupies portions of meadows that dry late in the season, while E. pauciflora is most common where the meadows are permanently wet.

Scirpus fluviatilis (Torr.) Gray River b. known from along the Green River at Browns Park, bulrush-cattail community at 5,410 ft (Neese 14802); July-Aug.

Scirpus maritimus L. Alkali b. (S. paludosus A. Nels.; S. robustus Pursh misapplied) Common; widespread; wet lands and along ditches and other waterways; up to about 7,000 ft; June-Aug.

Scirpus microcarpus Presl. Panicked b. (S. rubroinctus Fern.) Occasional in canyons of the Uinta Mts. (1 specimen seen from low in the Basin); wet places; up to about 8,000 ft; June-Aug.

Scirpus pallidus (Britt.) Fern. (S. atrovirens Willd. misapplied) The several specimens seen are from Uintah Co.; along ditches, washes, and the Green River, tolerant of alkali; not expected above 7,000 ft; June-Aug.

Scirpus pungens Vahl. Common threesquare. Common; widespread; wet places at low elevations, tolerant of alkali; not expected much over 7,000 ft; May-Aug. Reports of both S. americanus Pers. (S. olney Gray) and S. nevadensis Wats. are probably based on misidentified specimens of S. pungens.

Scirpus surpinus L. Known from Shepard Bottoms, National Wildlife Refuge, near Ouray (Folks sn UTC) July-Sept.

Scirpus validus Vahl. Softstem b., tule b. [S. lacustris L. ssp. validus (Vahl.) Koyama] Rather rare but apparently widespread; wet places; 5,380-7,120 ft; June-Aug.

DIPSACEAE Teasel Family

Dipsacus L. Teasel

Dipsacus fullonum L. Venus-cup t. (D. sylvestris Huds.) Robust biennial herbs 50-200 cm tall; stems angled, with prickles (these often recurved) on the angles; leaves of the basal rosette oblanceolate, crenate, to 60 cm long, usually withered in the second season; stem leaves usually lanceolate, crenate-serrate or the upper entire, sessile, connate, 10-30 cm long, prickly on the midrib below; inflorescence a dense (brushlike) head subtended by few to several linear, elongate, prickly involucre bracts shorter than or exceeding the head; each flower subtended by a chaffy awned receptacular bract that exceeds the flower; calyx a tuft of silky hairs about 1 mm long; corolla tubular, 8-12 mm long, white to light purple, 4-lobed; stamens 4, slightly exerted; ovary inferior, 1-chambered; style elongated; stigma entire; fruit an achene. The 1 specimen seen (Higgins & Welsh 14763) is from Grouse Canyon, Daggett Co., riparian community, common in a small area; 6,600 ft; July-Aug.

ELAEAGNACEAE Oleaster Family

Shrubs or trees; herbage conspicuously scurfy with silver or reddish-brown to golden stellate or scalelike hairs; leaves alternate or opposite, simple, entire; flowers bisexual or unisexual, radially symmetrical, mostly axillary; perianth of a single whorl; tepals 4, arising with the stamens at the apex of a floral tube; pistil 1; ovary superior, surrounded by the floral tube; fruit drupelike or berrylike, consisting of a nutlet or achene closely invested by the floral tube.

- 1 Leaves alternate; flowers bisexual; stamens 4; fruit dry and mealy, covered with scurfy scales..... Elaeagnus
 1 Leaves opposite; flowers unisexual; stamens usually 8; fruit succulent, juicy, not covered with scales..... Shepherdia

Elaeagnus L. Oleaster; Silverberry

- 1 Widest leaves over 15 mm wide; leaves and twigs with brown dots as well as silvery scurfy; plants of Daggett Co., 1-2 (5) m tall..... E. commutata
 1 Leaves less than 15 mm wide, except on vigorous young shoots; leaves and twigs without brown dots; plants widespread, common, to 10 m tall..... E. angustifolia

ELAEAGNACEAE

Elaeagnus angustifolia L. Russian olive. Introduced from Europe, cultivated, escaping, naturalized and often weedy; along water courses, roadsides, fencelines, and neglected pastures and fields; up to about 7,000 ft; May-June.

Elaeagnus commutata Bernh. Silverberry, silverbush. Entering our area from Wyoming, the few records seen are from Sheep Creek, Daggett Co.; along streams and reported for dry hillsides; 6,500-7,000 ft; May-June.

Shepherdia Nutt. Buffaloberry

- 1 Leaves silver-gray; shrubs or trees 2-7 m tall; mostly growing below 7,500 ft..... S. argentea
- 1 Leaves green and nearly glabrous above, the lower surface lighter and densely dotted with copper-colored or brownish stellate, scurfy scales; shrubs 0.5-1.5 m tall; mostly growing above 7,500 ft.....
..... S. canadensis

Shepherdia argentea (Pursh) Nutt. Silver b. [Lepargyrea argentea (Pursh) Greene] Common to abundant; widespread; along ditches, washes, other drainages, fencelines, powerlines, and in abandoned fields; mostly below 7,500 ft; May-June.

Shepherdia canadensis (L.) Nutt. Russet b. [Lepargyrea canadensis (L.) Greene] Occasional or common; Uinta Mts. and Tavaputs Plateau; aspen, fir, lodgepole pine, and spruce woods, and open ground, apparently more common on basic substrates but also on quartzite; 8,200-10,600 ft; July-Aug.

ELATINACEAE Waterwort Family

Annual herbs; leaves opposite; flowers axillary, inconspicuous, bisexual; sepals and petals 2-5, free or united at the base; stamens as many or twice as many as the petals; ovary superior; fruit a septical capsule, several to many seeded.

- 1 Plants glandular-puberulent; leaves denticulate, elliptic to oblanceolate; flowers 5-merous; sepals coarsely glandular-denticulate, pubescent, pointed..... Bergia
- 1 Plants glabrous; leaves entire, sessile or nearly so, linear to narrowly spatulate; flowers 2- or 3-merous; sepals not as above..... Elatine

Bergia L. Bergia

Bergia texana (Hook.) Seub. Texas b. Erect to decumbent annual with simple or freely branched stems 2-30 cm long; leaves 1-3 (4) cm long, gradually tapered or rather abruptly petioled at the base; stipules conspicuous, glandular-denticulate to glandular-pectinate; sepals about 3 mm long, strongly carinate; petals white, shorter than the sepals. The 2 specimens seen are from mud flats on the flood plain of the Green River at Leota Bottom near Ouray (Thorne & Goodrich 3578), and below the high waterline of Steinaker Reservoir (Goodrich 22007).

Elatine L. Waterwort; Mud-purslane

Elatine triandra Schkuhr Three stamen w. Annual plants 2-5 (15) cm tall, with ascending to erect branches; leaves 5-12 mm long, entire, linear to narrowly spatulate, the tips truncate to emarginate; flowers bisexual, 2- or 3-merous, usually solitary in the axils of leaves, minute; sepals and petals not united or the sepals united at the base; fruit a septical capsule with axil placentation; seed numerous, reticulate in longitudinal rows. The 1 specimen seen (Neese 15104) is from the Uinta Mts., Big Park on the road to Leidy Peak; drying mud and shallow water of pot holes; 9,880 ft; Aug.

EPHEDRACEAE Ephedra Family

Ephedra L. Mormon Tea; Ephedra; Jointfir; Brigham Tea

Freely branched dioecious (rarely monoecious) shrubs; stems jointed, longitudinally furrowed, green; leaves minute, scalelike, united at the base, whorled or opposite, seldom long-persisting; cones paired or in whorls, borne at the nodes of young branches, small, of several whorls of more or less membranous bracts, each bract of the staminal cones subtending a 2-lipped fleshy perianth and a staminal column with 5-8 anthers, the ovulate cones with 2 terminal ovules, each ovule enclosed in 2 integuments; seeds paired, enclosed in the hardened integumental envelope.

- 1 Leaves and bracts principally in 3's; seeds slender, acute apically, about twice as long as wide; stems divaricately branched, bluish-green, glaucous..... E. torreyana
- 1 Leaves and bracts in 2's; seeds plump, rather blunt apically
2 Branches divergent, glaucous-green; base of mature leaves light brown or gray, not persistent.....
..... E. nevadensis

- 2 Branches erect, fastigiate, broomlike, bright yellowish or green; base of mature leaves usually dark brown, persistent
- 3 Plants with spreading rhizomes, forming hummocky clumps or colonies in deep sand; stems sometimes viscid, with sand grains adhering; ovulate cones usually evidently pedicelled; known in our area from near the Colorado border e. of Raven Ridge..... E. cutleri
- 3 Plants mostly solitary, not forming colonies not rhizomatous, not viscid; ovulate cones sessile, the peduncles if present mostly less than 5 mm long; widespread..... E. viridis

Ephedra cutleri Peebles Cutler m. t. or e., Navajo e. [E. viridis var. viscida (Cutler) Benson]

Locally common in sand dunes near the Colorado border e. of Raven Ridge at about 5,700 ft; May-June. This is not always clearly distinct from E. viridis; also reported to hybridize with E. torreyana.

Ephedra nevadensis Wats. Nevada m. t. Occasionally reported from our area, but most of the material better assigned to E. viridis. Neese & Fullmer 11354 (9 mi e. of Jensen; juniper mixed shrub community), Harrison & Larsen 7748, (town of Mount Emmons, Duchesne Co.), Goodrich 4070 ANF (Tridell) and Lambert 78 (Dry Gulch, 7,500 ft) are our only records retained here.

Ephedra torreyana S. Wats. Torrey m. t. or e. Frequent, widespread across our area; shadscale, greasewood, mixed desert shrub, sagebrush, and pinyon-juniper communities; the records from below 6,000 ft; May-June.

Ephedra viridis Cov. Green m. t. or e. Common, widespread; shadscale, mixed shrub, sagebrush, pinyon-juniper, and pinyon-mt. mahogany-sagebrush communities, in shaly or more often rocky, gravelly, or sandy places, but usually not in sand dunes; to 8,000 ft; May-July. See note under E. cutleri.

EQUISETACEAE Horsetail Family

Equisetum L. Horsetail; Scouring Rush

Annuals or rhizomatous perennials; stems green (or, in E. arvense, the fertile ones without chlorophyll, ephemeral, pinkish), mostly stiff, erect, simple or with transverse partitions at each node, made up of a series of jointed, intersleaving, grooved internodes; leaves reduced to a ring of confluent scales forming sheaths at the nodes; reproduction by spores; spores borne in 5-10 sporangia clustered around each of numerous spore-bearing stalks, these covered by polygonal caps and closely spaced around a central axis to form a terminal conelike structure (strobilus).

- 1 Sterile stems with whorls of branches, green; fertile stems preceding the sterile ones, unbranched, pinkish or brownish, fleshy..... E. arvense
- 1 Stems all alike, unbranched
- 2 Leaf sheaths black-banded above and below an ash-gray center..... E. hyemale
- 2 Leaf sheaths mostly green, black-banded only at the tip, or sometimes the lower sheaths banded at the tip and base
- 3 Stems mostly 20-100 cm tall, 3-9 mm thick, with 15-34 vertical ridges; leaf sheaths 7-15 mm long, the teeth usually deciduous; strobilus 1.5-2.5 cm long, usually blunt at the tip.... E. laevigatum
- 3 Stems mostly 10-30 cm tall, 1-3 mm thick, with 5-12 vertical ridges; leaf sheaths 2-4 mm long, the teeth persistent; strobilus to 1 cm long, with a rigid pointed tip..... E. variegatum

Equisetum arvense L. Field h. Common to abundant; widespread; along water courses; up to about 8,000 ft; April-June.

Equisetum hyemale L. (E. prealtum Raf.) Common s. Occasional; along water courses and other wet places; up to about 7,500 ft; May-Oct.

Equisetum laevigatum A. Br. (E. kansanum Schaffn.) Occasional to common; along water courses and in other wet places; up to about 8,000 ft; May-June.

Equisetum variegatum Schleich. ex Weber & Mohr Variegated s. To be expected in similar habitat as the above species, but no specimens seen.

ERICACEAE Heath Family

Shrubs or subshrubs; leaves usually evergreen, alternate, opposite, or whorled, simple; inflorescence various; petals free or united; stamens equal to or twice as many as the corolla lobes, rarely fewer, arising from the outer margin of a disc or pouch of the corolla, the anthers inverted or erect, usually opening by terminal pores; pistil 1; ovary superior or inferior, (1) 4-12 chambered; styles erect; fruit various.

- 1 Leaves mostly opposite, revolute, dark green above, pale beneath; corolla rose-purple, bowl-shaped, 10-15 mm wide; plants not over 30 cm tall..... Kalmia
- 1 Leaves alternate
- 2 Twigs and lower side of leaves with few to numerous yellow resin-dots; leaves slightly to strongly revolute, dark green above, pale beneath; flowers in terminal umbellike racemes; petals not united..
..... Ledum

ERICACEAE

- 2 Twigs and leaves not as above; corolla united
- 3 Stems creeping, rooting (repent), scarcely woody, not over 1.5 mm thick; leaves evergreen, shiny, orbicular or broadly elliptic, 7-15 (20) mm long, about as wide, rounded at both ends, entire to obscurely serrulate, sometimes setose-serrulate toward the apex, the teeth hardly if at all visible without magnification; corolla campanulate, white or pink, 3-5 mm long; fruit a 5-lobed capsule, enclosed when ripe by the calyx or its fleshy base so as to appear as a berry..... Gaultheria
- 3 Stems not creeping or if so then woody, or plants otherwise different from above
- 4 Leaves deciduous, thin, usually conspicuously serrulate without magnification except in one species with blue fruits; ovary inferior..... Vaccinium
- 4 Leaves evergreen, thick, leathery, entire; fruit red or brownish; ovary superior... Arctostaphylos

Arctostaphylos Adans. Manzanita

Shrubs usually with smooth, reddish or brown bark; leaves alternate, evergreen, entire, thick, leathery; flowers borne in terminal racemes or panicles, each subtended by a bract; sepals nearly distinct, corolla united, urn-shaped, the lobes spreading; stamens (8) 10, included in the corolla; anthers with 2, curved to reflexed, hornlike appendages; ovary superior, 5 (4-10) chambered; fruit berrylike, with about 5 stony, 1-seeded nutlets.

- 1 Leaves widest at the middle, mostly (0.6) 1.5-3 cm wide; stems gnarled, ascending; shrubs 30-150 cm tall; fruit white or brown..... A. patula
- 1 Leaves widest toward the apex, 0.3-1.2 cm wide; stems creeping, the ascending branches or tips seldom over 15 cm tall; fruit red..... A. uva-ursi

Arctostaphylos patula Greene Greenleaf m. [A. parryana Lemmon misapplied; A. platyphylla (Gray) Kuntze] Occasional to locally common; Uinta Mts. and Blue Mt.; ponderosa pine and mt. brush communities, most abundant as a seral species on burned areas; 7,000-9,000 ft; June-July. Apparently occasionally hybridizing with the following species. Hybrid plants may be the basis for the report of A. nevadensis Gray (Graham 1937) for our area.

Arctostaphylos uva-ursi (L.) Spreng. Bearberry, kinnikinnik. Common across the Uinta Mts. and to Cold Springs Mt.; aspen and dry, conifer woods; 7,000-10,000 ft; June-July. See A. patula.

Gaultheria L. Wintergreen

Gaultheria humifusa (Grah.) Rydb. Alpine w. As described in the key. The few records seen are from w. of the Whiterocks drainage in the Uinta Mts.; moist conifer woods and meadows; 9,000-11,000 ft; July.

Kalmia L. Laurel

Kalmia polifolia Wang. Alpine l., swamp l., alpine bog kalmia. [K. microphylla (Hook.) Heller] Low subshrubs, not over 15 cm tall; older branches often appearing alternate, but young twigs and leaves opposite; leaves evergreen, green above, pale beneath, with revolute margins; flowers stalks slender, to 25 mm long, sometimes reddish; corolla united, 8-10 mm long, 10-15 mm wide, rose to light purple; fruit a 5-valved capsule, less than 1 cm long. Occasional; Uinta Mts.; wet to boggy places; probably limited to above 8,000 ft; July-Aug. Our plants are referable to var. microphylla (Hook.) Rehd.

Ledum L. Labrador Tea

Ledum glandulosum Nutt. Western L. t. Upright shrubs to 1 m tall; bark of older twigs marked with leaf scars; young twigs often with yellow resin-dots; leaves 1-4 cm long, 4-18 mm wide, dark green above, pale and often dotted with yellow resin beneath; flowers in clusters; petals separate, about 1 cm long, white; fruit a 5-valved capsule, the valves separating at maturity. The few records seen are from Rock Creek, Whiterocks, and Yellowstone drainages of the Uinta Mts.; wet ground in woods and sphagnum bogs; 7,400-11,000 ft; June-Aug.

Vaccinium L. Blueberry; Bilberry; Huckleberry; Whortelberry

Shrubs or subshrubs, often associated with acidic soils derived from quartzite; leaves alternate, simple, thin, deciduous (ours), serrulate or entire; flowers axillary or terminal, solitary or racemose; calyx more or less 4-6 lobed; corolla united, globose or urn-shaped, the 4-5 lobes reflexed; anthers with dorsal awns; ovary inferior; fruit a reddish or bluish berry.

- 1 Leaves entire; plants sometimes over 30 cm tall, growing in wet meadows, streamsides, and bogs; fruit blue..... V. occidentale
- 1 Leaves serrulate, the teeth usually conspicuous without magnification; plants various, often of somewhat drier places; fruit red or blue
- 2 Leaves (2) 3-7 cm long, (1) 2-3.5 cm wide; plants 10-60 cm tall, rare in our area..... V. globulare

- 2 Leaves mostly less than 3 (3.5) cm long, seldom over 1.5 cm wide, plants less than 30 cm tall, occasional to common in our area
- 3 Young branches bright green and strongly angled longitudinally; leaves often widest below the middle; fruit red, blue, or black
- 4 Leaves 10-33 (35) mm long; fruit dark red, blue, or black when ripe; flowers about 5 mm long; branches usually puberulent, less numerous than in the following species..... V. myrtillus
- 4 Leaves 5-15 mm long; fruit bright red when ripe; flowers about 4 mm long; branches glabrous or sparsely, finely puberulent, usually numerous..... V. scoparium
- 3 Young branches not green or dull brownish-green, not strongly angled; leaves often widest above the middle; fruit blue..... V. caespitosum

Vaccinium caespitosum Michx. Dwarf bi., dwarf h. Common to abundant; Uinta Mts.; Engelmann spruce forests and a little above timberline; June-July.

Vaccinium globulare Rydb. Blue h. (V. membranaceum Dougl. ex Torr. in Wilkes misapplied) Known in our area from 2 populations, these on Lightning Ridge, N. Fork Duchesne drainage and in Wolf Creek, Uinta Mts.; aspen and conifer woods; June-July. Within our populations are small plants with small leaves that approach those of V. myrtillus.

Vaccinium myrtillus L. Low bi. Common; Uinta Mts.; most common along narrow streamside meadows in the lodgepole pine-Engelmann spruce zone, and at the ecotone between meadows and woods; June-July.

Vaccinium occidentale Gray Western bog bl. Locally common to abundant; Uinta Mts.; apparently rare or lacking e. of the Whiterocks drainage; wet and boggy meadows and along streams; 9,000-11,500 ft; June-July.

Vaccinium scoparium Leib. Grouse w., Common to abundant; Uinta Mts.; often forming a ground cover under lodgepole pine and Engelmann spruce, occasionally above timberline, closely associated with acidic soils derived from quartzite; June-July.

EUPHORBIACEAE Spurge Family

Euphorbia L. Spurge; Euphorbia

Annual or perennial forbs with milky juice; flowers unisexual without calyx or corolla; pistillate and staminate flowers borne together in cuplike structures (involucres), the pistillate flower solitary and central, the staminate flowers 1-several, borne on the edge of the involucre, and consisting of a single stamen, the pistillate and staminate flowers and involucre collectively referred to as a cyathium, at casual observation appearing as a single flower; edge of the involucre often with glands, and with or without petaloid appendages; styles 3, usually 3-cleft; fruit a 3-celled, pedicel, usually nodding capsule.

- 1 Plants upright, perennial; inflorescence an umbel at least terminally; leaves alternate except for a whorl just below the umbel, 0.5-6 cm long; bracts of the umbel opposite
- 2 Leaves (0.5) 1-2 cm long, ovate to oblong; plants from deep taproots and branched crowns, native, of indigenous plant communities, 10-30 cm tall; umbel with 3-5 primary rays..... E. robusta
- 2 Leaves 2-6 cm long, linear; plants from robust rootstocks, introduced, weedy, mostly in areas of cultivation; umbel with 4-17 primary rays..... E. esula
- 1 Plants prostrate; flowers axillary; leaves opposite, 3-15 mm long, more or less oblique at the base
- 3 Plants perennial, from few to much branched caudices; stems to 15 cm long; leaves entire, some broadly ovate to orbicular..... E. fendleri
- 3 Plants annual, from simple, slender taproots; stems 5-35 cm long; leaves entire or often serrate at the apex, ovate or narrower
- 4 Seeds coarsely transcorrugated, the corrugations extending across the longitudinal ridges; leaves thick-margined, entire to denticulate, linear-oblong, mostly widest at the middle or below, strongly oblique at the more or less truncate base; involucres more or less turbinate..... E. glyptosperma
- 4 Seeds smooth on the faces to wrinkled or pitted but not coarsely transcorrugated; leaves not thick-margined, serrate, more nearly obovate-oblong or ovate-oblong and some broadest above the middle and tapering to a more or less wedge-shaped, weakly oblique base; involucres nearly campanulate..... E. serpyllifolia

Euphorbia esula L. Leafy s. Introduced from Eurasia; weedy with disturbance, increasing rapidly in Ashley Valley, to be expected elsewhere; ditchbanks, gardens, fields; 5,200-5,400 ft; June-July.

Euphorbia fendleri T. & G. Fendler e. [Chamaesyce fendleri (T. & G.) Small] Occasional; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 4,700-6,700 ft; May-Aug.

Euphorbia glyptosperma Engelm. in Torr. Ridgeseed s. or e. The 2 records seen are from a sidewalk in Roosevelt and a sagebrush-juniper-ponderosa pine community at 6,850 ft; July-Oct. See E. serpyllifolia.

Euphorbia robusta (Engelm.) Small ex Britt. & Brown Rocky Mt. s., robust e. [Tithymalus robustus (Engel.) Small] Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, ponderosa pine and dry aspen communities; 5,000-7,800 ft; May-June (July).

FABACEAE

Euphorbia serpyllifolia Pers. Thymeleaf s. or e. [Chamaesyce serpyllifolia (Pers.) Small] The 2 records seen are from desert shrub and juniper communities, both from sandy soils, to be expected across the lower elevations of the area; July-Oct. Similar to E. glyptosperma but generally less compact in habit as well as differing by the features of the key.

FABACEAE (LEGUMINOSAE) Pea Family

Plants herbs (our native species), shrubs or trees; leaves alternate, simple (rarely in ours) or pinnately or palmately compound, stipulate; flowers bisexual, irregular, usually in racemes; calyx 5-lobed; corolla papilionaceous (sweetpea type), with 5 petals but these appearing 4, the uppermost one (banner) the longest, the 2 lateral ones (wings) turned about 90 degrees to the banner, the lower 2 (keel) fused and appearing as a single keel-shaped petal, this parallel with and folded between the wings; stamens 10, the filaments free, or all united (monadelphous) into a tube that surrounds the pistil, or 9 united with the 10th one free (diadelphous); pistil 1; ovary superior; style and stigma 1; fruit (pod) dry, several-seeded, 1-carpeled, 1-or 2-loculed, and dehiscent along both sutures, or sometimes indehiscent, not constricted between the seeds (legume) or constricted between the seeds and breaking into 1-seeded segments at maturity (loment).

- 1 Plants shrubs mostly over 1 m tall; flowers yellow..... Caragana
- 1 Plants herbaceous, woody only at the base if at all; flowers yellow only in Thermopsis, Melilotus, and rarely in Astragalus
- 2 Leaves pinnately compound with more than 3 leaflets
 - 3 Leaves even-pinnate, the rachis ending in a tendril and not a leaflet
 - 4 Style bearded down one side as in a toothbrush; wings of corolla essentially free from the keel Lathyrus
 - 4 Style bearded at the apex with a tuft or ring of hairs as in a bottlebrush; wings of the corolla adherent to the keel..... Vicia
 - 3 Leaves odd-pinnate, the rachis ending in a terminal leaflet, this sometimes nearly filiform and a mere continuation of the rachis but not a tendril
 - 5 Pods covered with hooked bristlelike appendages, more or less cockleburlike; herbage gland-dotted; flowers dingy-white or cream; plants 40-120 cm tall..... Glycyrrhiza
 - 5 Pods without hooked bristlelike appendages, sometimes with a few bristlelike spines in Hedysarum but not at all cockleburlike; herbage not gland-dotted, or sometimes minutely so in Hedysarum but then the flowers pink to purple; plants various but often smaller than above
 - 6 Keel petals much longer than the wings; fruit strongly flattened and constricted between the seeds
 - 7 Stamens diadelphous; pods with 4-several seeds; plants native..... Hedysarum
 - 7 Stamens monadelphous but the upper filament partly free and appearing diadelphous; pods with 1-2 seeds; plants introduced..... Onobrychis
 - 6 Keel petals subequal to or shorter than the wings; fruit not both flattened and strongly constricted between the seeds
 - 8 Filaments of stamens all free to the base; flowers 15-27 mm long, blue-purple to blue; pods terete and constricted between the seeds; herbage silvery silky sericeous... Sophora
 - 8 Stamens diadelphous; flowers various; pods not constricted between the seeds; herbage various
 - 9 Keel with a forward-pointed beak; ventral suture of pods forming a partial or complete partition; plants mostly acaulescent..... Oxytropis
 - 9 Keel beakless; ventral suture of pods usually not produced internally; plants caulescent or occasionally acaulescent
 - 10 Flowers red-orange when fresh; plants introduced..... Sphaerophysa
 - 10 Flowers pinkish, purplish or whitish, not red-orange; plants native or introduced in a few taxa..... Astragalus
 - 2 Leaves trifoliolate or palmately compound (or simple in 3 taxa of Astragalus)
 - 11 Leaves palmately compound with 5 or more leaflets; flowers mostly in racemes
 - 12 Plants glandular-dotted, strongly malodorous, acaulescent or nearly so, from deep-seated tuberous roots; fruit 1-seeded, included in the calyx..... Pedimelum
 - 12 Plants not glandular-dotted, not particularly malodorous, more or less caulescent; fruit several seeded, usually strongly exerted from the calyx..... Lupinus
 - 11 Leaves trifoliolate or simple, rarely 4-5-foliolate in Trifolium and then flowers borne in heads
 - 13 Flowers yellow, 18-26 mm long; filaments of stamens free to the base; leaflets 3, entire; pods 25-70 mm long; plants caulescent..... Thermopsis
 - 13 Flowers not yellow or if so only 2-7 (10) mm long; stamens diadelphous; leaves various; pods 2-10 mm long or if longer (Astragalus) then leaves simple or plants acaulescent
 - 14 Leaves simple or if trifoliolate then the leaflets not jointed, all sessile and entire; flowers not in heads; herbage not glandular-dotted..... Astragalus
 - 14 Leaves trifoliolate; leaflets mostly toothed (sometimes only minutely so) or herbage glandular-dotted; the terminal leaflet jointed or stalked or flowers borne in heads

- 15 Leaflets entire; herbage glandular-dotted; flowers in racemes..... Psoralidium
 15 Leaflets toothed and/or flowers borne in heads; herbage not glandular-dotted
 16 Flowers in heads; corollas persistent, enveloping the pods, 4-20 mm long; pods straight.. Trifolium
 16 Flowers usually in racemes; corollas not persistent, 2-10 mm long; pods straight, curved, or coiled
 17 Leaflets toothed only on the upper third; racemes compact, seldom more than twice as long as wide..... Medicago
 17 Leaflets toothed on the upper 1/2 or more; racemes much elongate, several times longer than wide..... Melilotus

Astragalus L. Locoweed; Milkvetch; Vetch

Annual or perennial, caulescent or acaulescent herbs, mostly with alternate, odd-pinnate compound leaves, or rarely with simple or trifoliolate leaves; stipules adnate to the petiole base, free or connate-sheathing around the stem; inflorescence a raceme; flowers papilionaceous, each subtended by a single bract and sometimes with 1 or 2 bracteoles attached at the base of the calyx or on the pedicels; calyx 5-toothed; petals 5, pink, lavender, pink-purple, ochroleucous, or white, the keel shorter than the wings; stamens diadelphous; ovary enclosed in the staminal sheath, the style glabrous; pods unilocular or bilocular, sessile or stipitate, extremely variable in shape, size, and pubescence. Major portions of the keys are adapted from those of Welsh (1978).

- 1 Leaflets stiffly spinulose tipped, 3-9 per leaf; plants mat forming or erect; flowers 4.5-10 mm long, pink-purple, white, or ochroleucous; pods sessile, 4-10 mm long, declined or spreading at maturity; plants caulescent..... A. kentrophyta
 1 Leaflets not spinulose tipped or weakly so in A. detritalis, but then plants different from above in other features
 2 Leaves mostly simple; pods erect
 3 Plants caulescent, 7-60 cm tall; leaves ovate to orbicular, 1.5-6.5 cm long, 1.5-5 cm wide, glabrous; flowers 17-27 mm long, purplish or ochroleucous; pods 25-35 mm long, 11-16 mm thick, inflated, stipitate, the stipe 10-21 mm long..... A. asclepiadoides
 3 Plants acaulescent; leaves grasslike, linear or narrowly oblanceolate or spatulate, usually strigose with malpighian hairs; pods 4-13 mm long, 1.5-3 mm thick, sessile
 4 Leaves 0.8-6 cm long; racemes usually with less than 8 flowers, 0.2-3 cm long in fruit; plants 1.5-9 cm tall, widespread..... A. spatulatus
 4 Leaves 1-13 (17) cm long; racemes usually with more than 8 flowers, 4.5-24 cm long in fruit; plants 5-24 cm tall, apparently restricted to Uintah Co. below 6,500 ft and n. of Hwy. 40, confined to sandstone..... A. chloodes
 2 Leaves mostly with 3 or more leaflets, if a few leaves simple, then the leaves linear and plants caulescent
 5 Terminal leaflet confluent with the rachis, filiform or linear and appearing like a continuation of the rachis; lateral leaflets usually filiform or linear or leaves sometimes reduced to a simple filiform or linear rachis; plants rushlike, caulescent, mostly restricted to Uintah Co. except A. convallarius..... KEY 1 P. 142
 5 Terminal leaflet jointed to the rachis, expanded into a blade
 6 Plants acaulescent or subacaulescent or pulvinate caespitose, often whitish with dense pubescence; stems if present often with stipules longer than and concealing the internodes
 7 Plants densely silvery or grayish-white with dense villous, strigose, or tomentose, basifixed hairs; valves of the pods woolly, more or less concealed by dense pubescence except in A. argophyllus; flowers 15-31 mm long, mostly pink-purple, occasionally white; pods 11-30 (37) mm long, 5-13 mm thick, sessile or with a stipe to 2.5 mm long in A. utahensis..... KEY 2 P. 142
 7 Plants not densely pubescent, or if so the hairs malpighian; valves of the pods not concealed by pubescence, although sometimes rather densely pubescent..... KEY 3 P. 142
 6 Plants caulescent with well-developed leafy stems, strigose or otherwise pubescent, but still mostly greenish, glabrous in a few taxa
 8 Keys based mainly on features of the flowers
 9 Flowers yellow or cream, 9-17 mm long; pubescence malpighian; leaflets 0.5-6 mm wide; stipules all connate-sheathing; calyx 5.5-9.5 mm long; ovaries and pods sessile; plants ill-scented selenophytes of desert shrub and juniper communities, up to about 5,700 ft..
 A. flavus
 9 Flowers not yellow, if whitish then pubescence basifixed (except in A. canadensis with leaflets 6-16 mm wide); at least the upper stipules free; plants not ill-scented selenophytes (except in A. racemosus and A. bisulcatus with stipitate ovaries and pods); habitat various
 10 Calyx gibbous; ovaries stipitate; plants usually ill-scented selenophytes
 11 Flowers ochroleucous, sometimes with purple-tipped keel, 14-17 mm long, the pedicels 2-8 mm long; calyx 8.6-12 mm long, the teeth 3.3-6 mm long; ovaries glabrous..... A. racemosus

FABACEAE

- 11 Flowers pink-purple, rarely white, and 12-15 mm long or commonly whitish and 6-8 mm long, calyx teeth 1-3 mm long; ovaries strigose..... A. bisulcatus
- 10 Calyx not gibbous; ovaries various; plants not with the odor of selenium
- 12 Flowers 12.5-24 mm long; plants rare and restricted in our area except for A. agrestis..... KEY 4 P. 143
- 12 Flowers 5-12.5 mm long; plants rare or common..... KEY 5 P. 143
- 8 Keys based mainly on features of the fruit
- 13 Pods inflated, mostly over 8 mm thick (only 4-8 mm thick in A. pubentissimus but then pods shaggy-villous with hairs about 2 mm long), the valves often papery; stipules all free except in A. cicer and sometimes in A. lutosus..... KEY 6 P. 144
- 13 Pods not inflated, seldom over 8 mm thick, not shaggy-villous
- 14 Pods with stipe over 2 mm long, spreading-declined to pendulous; lower stipules connate-sheathing..... KEY 7 P. 145
- 14 Pods sessile or the stipe less than 2 mm long, erect or spreading (or declined in A. duchesnensis, A. miser, and A. wingatanus); stipules various..... KEY 8 P. 145

KEY 1

- 1 Pods bladderly-inflated, 12-30 mm long, half to nearly as wide as long, pendulous, stipitate, the stipe 1-3.3 mm long, the valves papery, usually bright red-mottled; flowers 6.3-9.5 mm long, purplish to pink, rarely white; pubescence of malpighian hairs; stems weak, sprawling to erect, from an elongate rhizomelike caudex..... A. ceramicus
- 1 Pods not bladderly-inflated, 13-50 mm long and linear or nearly so except in A. nelsonianus, the valves not papery; flowers sometimes larger than above, or if as small (A. convallarius) then usually ochroleucous; pubescence of basifixed hairs
- 2 Flowers 18-30 mm long; stems usually few-many together from a branched subterranean caudex
- 3 Flowers 24-30 mm long, white; pods 13-33 mm long, 6-12 mm thick, sessile, rounded in cross section; leaflets 3-13; plants of Daggett Co..... A. nelsonianus
- 3 Flowers 18-24 mm long, whitish or purple; pods 4-7.5 mm thick, if over 6 mm thick then long stipitate; leaflets (1) 3-9; plants of Uintah Co.
- 4 Pods with a stipe 9-12 mm long, the body 25-35 mm long, dorsiventrally compressed; flowers ochroleucous, sometimes purple tinged; leaflets 2-7 mm wide; calyx gibbous..... A. hamiltonii
- 4 Pods sessile, 15-35 mm long, laterally compressed; flowers pink-purple; leaflets 0.5-2 mm wide; plants odoriferous selenophytes..... A. saurinus
- 2 Flowers 6.5-12.5 mm long; stems usually solitary or few together from a slender or rhizomelike caudex
- 5 Flowers pink-purple with white wing-tips; stipules all free; terminal leaflet usually jointed to the rachis; pods 20-35 mm long, dorsiventrally compressed in the lower 1/2, becoming laterally compressed toward the apex; plants known from 4,700-5,400 ft..... A. duchesnensis
- 5 Flowers ochroleucous, sometimes tinged with purple; lower 1-3 stipules connate-sheathing; terminal leaflet confluent with and not jointed to the rachis; pods 13-50 mm long, laterally compressed; plants 4,900-8,500 ft..... A. convallarius

KEY 2

- 1 Pods bilocular, descending; racemes 7-20 flowered, the axis 1.5-18 cm long in fruit; leaves with 15-35 leaflets, 2-28 cm long, densely hirsute-tomentose with the longer hairs straight and spirally twisted; plants 6-45 cm tall..... A. mollissimus
- 1 Pods unilocular, ascending; racemes 2-8 flowered, the axis 0.3-2.6 mm long in fruit; leaves with 5-21 leaflets, 1.5-12 cm long; plants 1.5-15 cm tall
- 2 Leaves with fine, cottony, contorted or entangled hairs; pods both villous-tomentose and hirsute; plants mostly from within or below the pinyon-juniper zone
- 3 Flowers bright pink-purple, rarely white, 23-31 mm long; pods 17-30 mm long, 5.5-7.5 mm wide, sessile or with a stipe to 2.5 mm long..... A. utahensis
- 3 Flowers white or ochroleucous, often with a purple-tipped keel, 19-26 mm long; pods 13-26 mm long, 5-11 mm wide, sessile..... A. purshii
- 2 Hairs of leaves not contorted nor entangled; pods strigose, 15-37 mm long, 5-13 mm thick; flowers 15-25 mm long, dull pink-purple or white; plants mostly in and above the pinyon-juniper zone..... A. argophyllus

KEY 3

- 1 Plants pulvinate caespitose, from Daggett Co.; flowers 6-8 mm long, 2 or 3 per raceme; pods 4-5 mm long; leaves 6-20 mm long, with 3 leaflets, the leaflets 3-8 mm long, silvery-strigose, the hairs malpighian; peduncles 7-15 mm long..... A. aretioides
- 1 Plants not pulvinate caespitose, or if so then the flowers 10-40 mm long, and the pods 10-50 mm long; leaves often larger and often with larger and/or more numerous leaflets

- 2 Pods 10-14 mm long, 3.6-6 mm wide; flowers 12-16 mm long; pubescence basifixed; leaflets 5-17; some stipules usually connate-sheathing; plants known only from near Horseshoe Bend of the Green River..... A. equisolensis
- 2 Pods 15-50 (70) mm long, strigose with appressed hairs; flowers 15-40 mm long, or 12-20 mm long in A. detritalis but then the pubescence malpighian and leaflets 3-7
- 3 Pods bladderly-inflated, 35-65 (70) mm long, 15-31 mm thick stipitate, the stipe 2-4 mm long, the valves thin and papery, often mottled; pubescence basifixed; flowers 15-23 mm long..... A. megacarpus
- 3 Pods not bladderly-inflated, 2-16 mm thick, sessile, the valves not papery; pubescence malpighian
- 4 Leaflets 3-7, 3-30 mm long, 0.5-2.5 mm wide, narrowly oblanceolate to linear, spinulose-tipped; flowers 13-20 mm long; pods 15-38 mm long, 2-3.5 mm thick, erect; some and usually all the stipules connate-sheathing..... A. detritalis
- 4 Leaflets 5-21, rarely less, 4-15 mm long, 2-10 mm wide, obovate to oblanceolate, not spinulose-tipped; flowers 20-40 mm long; pods 5-15 mm thick, ascending but hardly erect; stipules mostly all free..... A. chamaeleuce

KEY 4

- 1 Calyx villous; raceme dense and headlike, the axis not over 2.5 cm long in fruit; flowers 17-24 mm long, pink-purple, ochroleucous, or white; plants widespread..... A. agrestis
- 1 Calyx strigose or glabrous; racemes various but sometimes longer than above; plants mostly uncommon and restricted
- 2 Flowers pink or pink-purple
- 3 Pedicels of flowers 3.5-8 mm long; flowers 1-7 per raceme, 15-23 mm long; ovaries stipate; axis of raceme not over 2.5 mm long; plants of the W. Tavaputs Plateau in s. Duchesne Co. from 7,500-9,000 ft..... A. megacarpus
- 3 Pedicels of flowers 1-4 mm long; flowers (2) 4-30 per raceme, of various length; ovaries sessile or subsessile
- 4 Axis of raceme 0.5-2.7 cm long, 4-14 flowered; flowers bicolored, the wing-tips white; stipules all free; pubescence basifixed; plants of Strawberry Valley in Wasatch Co..... A. cibarius
- 4 Axis of raceme often over 2.7 cm long and with more flowers; plants of Daggett Co.
- 5 Pubescence basifixed; stipules all free; peduncle 1-5 cm long; flowers (12.6) 14-21 mm long..... A. lentiginosus
- 5 Pubescence malpighian; lower stipules connate-sheathing; peduncle (4) 10-18 cm long; flowers 13-16 mm long..... A. adsurgens
- 2 Flowers white or ochroleucous, sometimes with faint purplish markings
- 6 Plants 2-10 cm tall, of shaly ridges and slopes of Green River shale; peduncles 0.5-2 cm long; leaves with 15-27 crowded to imbricate, strongly folded leaflets; flowers 9-17 mm long..... A. lutosus
- 6 Plants mostly over 10 cm tall; peduncles 3-22 cm long
- 7 Flowers 24-30 mm long; plants of Daggett Co.; see also lead 3 of KEY 1..... A. nelsonianus
- 7 Flowers 12.5-24 mm long; plants of various distribution
- 8 Stipules all free; pubescence basifixed; ovaries unilocular; flowers 14-24 mm long, if less than 17 mm then leaves with 7-15 leaflets
- 9 Flowers declined-nodding, 17-24 mm long, subtended by 2 bracteoles; lobes of the calyx often spreading; ovaries and pods sessile; leaflets 9-25; plants of Moffat and Uintah Cos..... A. pattersonii
- 9 Flowers spreading, 14-22 mm long; bracteoles lacking; lobes of the calyx erect; ovaries and pods stipate; leaflets 7-15; plants of the E. Tavaputs Plateau (see also lead 2 in KEY 6 to compare with A. megacarpus)..... A. oophorus
- 8 At least the lower stipules connate-sheathing; ovaries bilocular; flowers 12.5-17.5 mm long; leaves with (13) 15-35 leaflets
- 10 Pubescence malpighian; flowers nodding at anthesis; axis of raceme elongating to 16 cm long in fruit; plants native in Daggett Co..... A. canadensis
- 10 Pubescence basifixed; flowers declined to ascending at anthesis; axis of raceme elongating to 7 cm in fruit; plants introduced, seeded in rangeland seedings... A. cicer

KEY 5

- 1 Plants annual, usually of sandy places; calyx 2.7-3.8 mm long; flowers 5-7.6 mm long..... A. geyeri
- 1 Plants perennial, or if biennial then the calyx and flowers longer than above
- 2 Leaves with 5-27, crowded to imbricate, strongly folded leaflets; peduncle 0.5-2 cm long; flowers 2-10, ochroleucous with purple-tipped keel; plants 2-10 cm tall, of shaly ridges and talus slopes of Green River shale..... A. lutosus
- 2 Plants not as above in all features
- 3 Calyx and usually leaflets subvillous to villous, not strigose; leaflets 5-15; flowers pink-purple or ochroleucous

FABACEAE

- 4 Ovaries soon pilose, sessile; peduncles 1-3.5 cm long; stipules all free; plants common to abundant in desert shrub and pinyon-juniper communities along the lower and mid elevations of the Tavaputs Plateau, not in Wasatch Co..... A. pubentissimus
- 4 Ovaries glabrous, usually stipitate; peduncles 2-8.5 cm long; lower stipules connate-sheathing; plants rare, known from Duchesne and Wasatch Cos..... A. australis
- 3 Calyx and leaflets strigose
- 5 Flowers white or ochroleucous, sometimes with purplish markings
- 6 Stipules all free; leaflets 7-15; calyx 4.6-6.2 mm long; racemes with 2-9 flowers; pedicels 1.5-4.5 mm long; plants rare in our area, known from the Yampa River area..... A. wetherillii
- 6 At least the lower stipules connate-sheathing; leaflets 11-21; calyx 2.1-5.2 mm long; racemes with (1) 3-23 flowers; plants widespread and common
- 7 Stipules turning black in age; peduncles 0.2-4 cm long; ovaries sometimes stipitate..... A. tenellus
- 7 Stipules not turning black; peduncles 2-14 cm long; ovaries sessile..... A. miser
- 5 Flowers pink-purple or bluish
- 8 Stipules all free; stems arising singly or few together from a slender, rhizomelike caudex; plants of desert shrub and juniper communities, not above 5,500 ft; flowers 8.5-12.5 mm long; leaflets 5-15..... A. duchesnensis
- 8 At least the lower 1-3 pairs of stipules connate-sheathing; plants of higher elevations; flowers various; leaflets sometimes more than 15
- 9 Flowers 9-12 mm long, pink-purple; plants rare in our area, known from 8,800 ft on the E. Tavaputs Plateau; leaves with 15-26 leaflets..... A. alpinus
- 9 Flowers 5.5-8 mm long or if to 10 mm (A. miser) then bluish or blue-purple
- 10 Flowers bright pink-purple, ascending; plants rare, just entering our area on the Tavaputs Plateau
- 11 Flowers spreading at anthesis, 7-11 mm long; calyx 3.3-5.8 mm long, the tube 2.7-4.3 mm long; ovaries often pubescent (see also leads 9 and 10 in KEY 8)..... A. flexuosus
- 11 Flowers ascending at anthesis, 5.5-8 mm long; calyx 2.5-3.7 mm long, the tube 1.5-2.6 mm long; ovaries glabrous..... A. wingatanus
- 10 Flowers bluish or bluish-purple or whitish; spreading-declined; plants widespread and common, but the blue-flowered phase seldom encountered except at higher elevations of the Uinta Mts..... A. miser

KEY 6

- 1 Pods with stipe 2-8.5 mm long
- 2 Plants subcaulescent, known from the W. Tavaputs Plateau in Duchesne Co.; stems 1-5 cm long, the internodes mostly concealed by stipules; racemes with 3-5 (8) flowers, shorter than the basal leaves; ovaries and pods strigose; pods 35-65 mm long, 15-31 mm thick, with a stipe 2-4 mm long..... A. megacarpus
- 2 Plants usually obviously caulescent, just entering our area on the E. Tavaputs Plateau in Rio Blanco Co.; stems 5-20 cm long, rarely shorter, the internodes mostly longer than and not concealed by the stipules; racemes with 4-13 flowers, mostly exceeding the lowermost leaves; ovaries and pods glabrous; pods 25-55 mm long, 10-30 mm thick, with a 3.5-8.5 mm long stipe..... A. oophorus
- 1 Pods sessile or the stipe less than 2 mm long
- 3 Plants annual; pods strigose..... A. geyeri
- 3 Plants perennial, sometimes appearing annual or biennial in A. pubentissimus but then the pods shaggy-villous
- 4 Plants 2-10 cm tall, of shaly ridges and talus slopes of Green River shale; leaflets 15-27, crowded to imbricate, strongly folded; pods 15-37 mm long..... A. lutosus
- 4 Plants (5) 10-70 cm tall, not restricted as above; leaflets 7-17 or more in A. cicer but then plants taller and pods smaller
- 5 Leaves with 17-31 leaflets; lower stipules connate-sheathing; pods bilocular, pilose, 6-14 mm long; plants introduced, seeded in rangeland seedings..... A. cicer
- 5 Leaves with 5-17 leaflets; stipules all free; pods unilocular or if bilocular (A. lentiginosus) then glabrous or at most strigose, 12-26 mm long; plants native
- 6 Pods 4-8 mm thick, shaggy-villous, strongly curved..... A. pubentissimus
- 6 Pods 5-20 mm thick, glabrous or strigose
- 7 Pods unilocular; racemes 0.3-2.3 cm long, 3-9 flowered; flowers white, sometimes tinged with lavender, 7.5-11 mm long; plants of the Yampa River drainage..... A. wetherillii
- 7 Pods bilocular; raceme 1-18 cm long, (5) 11-30 flowered; flowers mostly blue-purple, 12.6-11.4 mm long; plants known from Daggett Co..... A. lentiginosus

KEY 7

- 1 Plants ill-scented selenophytes; pods triangular or obcordate in cross section
 - 2 Pods triangular in median cross section, glabrous, 9-45 per raceme, the stipe 4-6 mm long; calyx teeth 3.3-6 mm long..... A. racemosus
 - 2 Pods obcordate (bisulcate) in median cross section, often strigose, 25-80 per raceme, the stipe 3.5-9.6 mm long; calyx teeth 1-3 mm long..... A. bisulcatus
- 1 Plants not with the odor of selenium, pods rounded or flattened in cross section, the stipe 2-6 mm long
 - 3 Stipules turning black in drying; pods unilocular, strongly flattened..... A. tenellus
 - 3 Stipules not turning black; pods semibilocular
 - 4 Leaves with 7-15 leaflets; calyx and usually leaflets villous; pods glabrous, 13-27 mm long, 3-6 mm wide; corolla ochroleucous or suffused with pink; plants from the W. Tavaputs Plateau and Uinta Mts. in Wasatch and Duchesne Cos..... A. australis
 - 4 Leaves with 15-26 leaflets; calyx and leaflets strigulose; pods strigulose, 10-17 mm long, 1.5-4 mm thick; corolla pink-purple; plants of the E. Tavaputs Plateau..... A. alpinus

KEY 8

- 1 Stipules all free; pods 15-35 mm long, unilocular, with 21-38 ovules
 - 2 Pods 3.3-5 mm thick; calyx teeth 0.4-1 mm long..... A. duchesnensis
 - 2 Pods 5-12 mm thick; calyx teeth over 1 mm long
 - 3 Axis of the raceme 0.5-2.7 cm long in fruit; flowers pink-purple; plants known from Strawberry Valley..... A. cibarius
 - 3 Axis of the raceme 2-15 cm long in fruit; flowers white, the keel sometimes purplish; plants of Moffat and Uintah Cos..... A. pattersonii
- 1 At least the lower stipules connate-sheathing; pods less than 16 mm long except in A. miser, with fewer than 21 ovules except in A. agrestis
 - 4 Pods bilocular, erect; pubescence malpighian; plants of Daggett Co., not ill-scented
 - 5 Flowers pink-purple, 4-27, erect or steeply ascending at anthesis; pods 7-12 mm long, 2.3-3.8 mm thick, ovoid-oblong, with 14-18 ovules; stems from a caudex..... A. adsurgens
 - 5 Flowers ochroleucous, many, nodding at anthesis; pods 10-20 mm long, 2.9-5 mm wide, cylindroid, with 16-28 ovules; stems from creeping rhizomes..... A. canadensis
 - 4 Pods unilocular; pubescence basifixed except in A. flavus, which has ill-scented herbage
 - 6 Plants ill-scented selenophytes, of clay soils in salt desert shrub and juniper communities; pubescence malpighian; pods erect, 7-13 mm long; stipules all connate; calyx 5.5-9.5 mm long; flowers yellowish..... A. flavus
 - 6 Plants not with the odor of selenium, of various habitats; pods widely spreading to pendulous (perhaps upright in A. agrestis); upper stipules usually free; flowers not yellowish
 - 7 Pods silky-villous, 7-10 mm long, with 14-26 ovules, with a stipe 0.3-1 mm long; calyx 7-12.5 mm long, villous; raceme headlike, the axis 0.5-2.5 cm long in fruit..... A. agrestis
 - 7 Pods strigose or glabrous, longer than 10 mm, or if shorter then with only 3-9 ovules; calyx 2.1-5.2 mm long, strigose; racemes sometimes over 2.5 cm long in fruit
 - 8 Pods 6-12 mm wide, nearly terete in cross section; plants of Daggett Co. (see lead 3 in KEY 1)..... A. nelsonianus
 - 8 Pods 2-4.5 mm wide, usually flattened except in A. flexuosus
 - 9 Pods rounded in cross section; plants known from Rio Blanco Co..... A. flexuosus
 - 9 Pods somewhat to strongly flattened; plants of various distribution
 - 10 Pods glabrous, 9-15 mm long with 4-8 ovules, subsessile or with stipe to 1.7 mm long; plants just entering our area on the W. Tavaputs Plateau; flowers mostly pink-purple..... A. wingatanus
 - 10 Pods strigose; plants widespread; flowers white, ochroleucous, or occasionally pink-purple in A. miser; plants widespread
 - 11 Stipules turning black in drying; pods 7-16 mm long, mostly stipitate, with only 3-9 ovules, pendulous; peduncles 0.2-4 cm long..... A. tenellus
 - 11 Stipules not turning black; pods 12-25 mm long, sessile, with 8-19 ovules, mostly widely spreading; peduncles 2-14 cm long..... A. miser

Astragalus adsurgens Pallas Standing m. (A. striatus Nutt. ex T. & G.) Occasional; Daggett Co., the records seen are all from within 2-6 mi of Manila; juniper and sagebrush communities; 6,500-7,000 ft; May-July. The plant is also known from Carbon Co. to the s. of our area, and is to be expected in the Basin. Our plants are referable to ssp. robustior (Hook.) Welsh.

Astragalus agrestis Dougl. ex G. Don Field m. (A. hypoglottis L.) Occasional to common across the area; meadow, sagebrush, aspen, and riparian communities; 6,000-9,000 ft; June-July (Sept.).

Astragalus alpinus L. Alpine m. Known in our area by a single collection (N. Holmgren et al. 2321) from Florence Creek, E. Tavaputs Plateau, this from an aspen community at 8,800 ft, to be expected elsewhere; June-July.

Astragalus aretioides (Jones) Barneby Cushion orophaca or m. (A. sericoleucus Gray var. aretioides Jones) Our one specimen (F. Neese & J. S. Petterson 5527) is from volcanic ash barrens at 5,800 ft in Browns Park, Daggett Co; June.

Astragalus argophyllus Nutt. ex T. & G. Silver-leafed m. Common across the area; sagebrush, pinyon-juniper, mt. brush, and occasionally aspen communities; 6,000-8,000 ft; May-early June. Our plants are referable to var. martinii Jones.

Astragalus asclepiadoides Jones Milkweed m. Occasional across the bottom on the Basin; desert shrub communities, often on clay, or formations that weather to badlands; 4,800-6,200 ft; May-June.

Astragalus australis (L.) Lam. Subarctic m. (A. aboriginum Richards.) Known in our area from 2 collections (S. Goodrich 6311, 19100) from an open ridge top, 9,600 ft on Twelve Hundred Dollard Ridge, W. Tavaputs Plateau, Wasatch Co. and Farm Creek Peak, Uinta Mts., Duchesne Co; June-July. Weight 84 referred here by Graham (1937) belongs to A. miser.

Astragalus bisulcatus (Hook.) Gray Two-grooved l. or m. With 2 vars. in our area.

- 1 Corolla bright pink-purple, rarely white, 12-15 mm long; calyx purplish..... var. bisulcatus
 1 Corolla ochroleucous or whitish, the keel often purple-tipped, 6-8 mm long; calyx not purplish.....
 var. haydenianus

Var. bisulcatus Occasional to rather common in Daggett and e. Uintah Cos. and eastward in the Basin; streamside, pinyon-juniper, sagebrush, and desert shrub communities; 5,000-7,400 ft; May-July.

Var. haydenianus (Gray) Barneby (A. haydenianus Gray) Locally common at isolated stations across the Basin in sagebrush and mt. brush communities; 6,500-8,550 ft; June-Aug.

Astragalus canadensis L. Canada m. Two vars. reported for the area.

- 1 Pods and ovaries glabrous, terete at maturity, not sulcate on the back; calyx teeth 2.5-4.1 mm long; plants mostly 40-120 cm tall, reported for our area but we have seen no specimens..... var. canadensis
 1 Pods and ovaries pubescent, sulcate on the back at maturity; calyx teeth mostly 1-2.5 mm long; plants 10-50 cm tall..... var. brevidens

Var. brevidens (Gand.) Barneby Occasional; all records seen are from near Manila and Sheep Creek, Daggett Co.; along ditchbanks and streambanks; 6,000- 7,000 ft; May-June.

Astragalus ceramicus Sheld. Painted m. Occasional from near Maeser and e., mostly n. of Hwy. 40; mostly on sandy ground, often with scattered junipers; 5,000-6,000 ft; May-early June. Generally our plants are referable to var. ceramicus of Utah, sw. Colorado, New Mexico, and Arizona, but some are somewhat intermediate to var. imperfectus Sheld., of Idaho to S. Dakota and s. to w. Nebraska and New Mexico.

Astragalus chamaeleuce Gray in Ives Cicada m. [A. cymboides Jones misapplied? (Graham 1937)] Abundant; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 4,700-7,500 (8,000) ft; April-June (July). The similar A. amphioxys Gray (A. vespertinus Sheld.) has been reported for our area, based on Harrington 3881 (CS!) but this specimen belongs to A. chamaeleuce. Astragalus amphioxys is common to the s. of our area (Barneby 1964; Welsh 1978). The following key gives several features by which the 2 are different, but mature fruit is necessary for positive separation.

- 1 Flowers usually bicolor, ochroleucous or purple tinged to pink-purple, 20-40 mm long; pods spongy in texture, with a thick mesocarp separating the endocarp and papery exocarp, the wall 1-3 mm thick, with 37-46 ovules; axis of raceme 1-2 cm long in fruit..... A. chamaeleuce
 1 Flowers usually bright pink-purple, 16-31 mm long; pods coriaceous or woody in texture, sometimes succulent or fleshy when young, readily deciduous at maturity, the walls less than 1 mm thick, with 42-70 ovules; axis of racemes, 1-6.5 cm long in fruit..... A. amphioxys

Astragalus chloodes Barneby Grass m. Occasional or locally common; endemic to Uintah Co., from near Dry Fork to the Colorado-Utah line (possibly in Colorado) n. of Hwy. 40; crevices of sandstone outcrops; 5,000-6,000 ft; May-June (July). The plant indicated as an undescribed taxon and listed as A. moencoppensis Jones by Graham (1937) belongs here.

Astragalus cibarius Sheld. Browse m.; silky m. Known in our area by a single collection (Brotherson 1881) from the w. side of Strawberry Valley; May-June.

Astragalus cicer L. Chickpea m. Introduced from Eurasia; used on rangeland seedings in sagebrush, mt. brush, pinyon-juniper, aspen, and conifer communities, to be expected throughout the area but only 2 records seen (Neese & S. Welsh 8946 from the W. Tavaputs Plateau; Goodrich 21417 from Strawberry Valley); June.

Astragalus convallarius Greene Lesser rushy m.; timber poisonvetch. (A. diversifolius Gray misapplied) Widespread; many plant communities including: desert shrub, sagebrush, pinyon-juniper, riparian, and ponderosa pine; 4,900-8,500 ft; May-July. Our plants are referable to var. convallarius.

Astragalus detritalis Jones Debris m. Endemic, occasional to locally common across the Tavaputs Plateau and adjacent in the Basin from near Starvation Reservoir to the White River drainage and Vermillion Bluffs in Colorado; desert shrub, sagebrush, and pinyon-juniper communities; 5,600-9,000 ft; April-May.

FABACEAE

- 7 Banner reflexed beyond the midpoint, strigose on the back beneath the calyx lobe or over much of the back
 8 Stems velvety or woolly hairy; plants commonly of meadows or stream communities..... L. leucophyllus
 8 Stems with appressed, ascending, spreading or retrorse hairs, but not velvety or woolly; habitat various..... L. argenteus

Lupinus argenteus Pursh Silver l. The most common and widespread lupine of our area; extremely variable, with 3 vars., possibly also including L. caudatus. Most specimens can be assigned to a var. by use of the following key:

- 1 Leaflets commonly folded, narrowly oblanceolate; banner usually pubescent beneath the upper lip of the calyx; keel ciliate near the apex; plants from 4,900-10,100 ft..... var. argenteus
 1 Leaflets commonly flat, oblanceolate to broadly oblanceolate; banner usually glabrous dorsally; margin of keel glabrous or hairy only near the apex; plants from about 7,000-11,000 ft or higher
 2 Keel densely ciliate near the apex; flowers 5-7 mm long; plants uncommon, passing into the following var..... var. parviflorus
 2 Keel moderately to sparingly ciliate near the apex; flowers commonly 8 mm long or longer; plants common at high elevations..... var. rubricaulis

Var. argenteus [L. a. var. tenellus (Dougl.) Dunn; L. alpestris A. Nels.; L. laxiflorus Dougl. in part; L. tenellus Dougl.] Occasional or locally common; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, cottonwood, grass, and Douglas-fir and other conifer communities; 4,900-7,500 (10,100) ft; June-July.

Var. parviflorus (Nutt.) C. L. Hitchc. (L. parviflorus Nutt.) Reported (Welsh 1978) for Duchesne Co.

Var. rubricaulis (Greene) Welsh [L. a. var. boreus (C. P. Smith) Welsh] Occasional or locally common; Uinta Mts. and Tavaputs Plateau; streamside, aspen, conifer, and open slopes of forb-grass communities; 7,000-11,100 ft; July-Sept.

Lupinus brevicaulis Wats. Shortstem l. Occasional; widespread but no specimens seen from Daggett Co.; desert shrub, sagebrush, and juniper communities; 4,700-5,800 ft; May-June.

Lupinus caudatus Kellogg Tailcup l., spurred l. (L. c. ssp. caudatus; L. aduncus Greene; L. greenei A. Nels.) Occasional or locally common; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 5,000-8,000 ft; June-Sept. Possibly only a part of the L. argenteus complex.

Lupinus lepidus Dougl. ex Lindl. Pacific l. (L. caespitosus Nutt. in T. & G.) Occasional; Strawberry Valley, W. Tavaputs Plateau w. of the Avintaquin drainage; 1 record seen from Little Brush Knob, and 2 from Diamond Mt.; meadow, grass, sagebrush, and aspen-fir-spruce communities and on barren shaly slopes; 7,600-9,000 ft; mid June-July. Our plants are referable to var. utahensis (Wats.) C. L. Hitchc.

Lupinus leucophyllus Dougl. in Lind. Velvet l., white-leaved l. Infrequent or occasional; apparently widespread; most of the specimens seen are from just below the s. flank of the Uinta Mts. from Lake Fork to Whiterocks on flats of glacial outwash; sagebrush communities; June-Sept.

Lupinus polyphyllus Lindl. Extremely variable, 3 vars. have been reported for our area as follows:

- 1 Leaflets glabrous on upper surface or this pubescent only at the margin
 2 Caudex superficial, its divisions closely tufted..... var. polyphyllus
 2 Caudex subterranean, its divisions rhizomelike and stoloniferous, the stems including racemes diffuse....
 var. ammophilus
 1 Leaflets silky-strigose or pilosulous on both sides, gray or silvery when fresh, reddish brown when dry
 var. humicola

Var. ammophilus (Greene) Barneby Sand l. (L. ammophilus Greene) Two specimens from Rio Blanco Co. from pinyon-juniper and mt. brush communities appear to belong to this taxon, but this plant is known mostly from well s. of our area; June-July.

Var. humicola (A. Nels) Barneby Wyeth l. (L. wyethii Wats.) Occasional; widespread, but no specimens seen from Daggett Co. and only 1 from Duchesne Co., mostly e. of the Green River and s. of Hwy. 40 in Uintah Co. and e. into Moffat and Rio Blanco Cos.; desert shrub, sagebrush and juniper communities; 5,100-6,300 ft; May-mid June.

Var. polyphyllus Robinson l. (L. prunophilus Jones) The 2 specimens seen (Cox & Dunn 1234, 1302) are from Moffat Co. near Meeker.

Lupinus pusillus Pursh. Dwarf l., rusty l. Occasional; widespread, but no specimens seen from Daggett Co., and only a few from Duchesne Co.; desert shrub, sagebrush, and juniper communities; 4,700-6,000 ft; May-June. Most of our plants are referable to var. pusillus with peduncles commonly 1-3.5 cm long, inflorescence usually longer than the leaves, and banner 6-10 mm wide. Plants with peduncles seldom more than 1 cm long, inflorescence shorter than the leaves, and banner 5 mm wide or less are referable to var. intermontanus (Heller) C. P. Smith, which is reported for our area. References to var. rubens (Rydb.) Welsh [L. rubens Rydb.; L. p. ssp. rubens (Rydb.) Dunn], a plant from s. of our area, are not substantiated by specimens.

Lupinus sericeus Pursh. Silky l. (L. barbiger Wats.) Occasional or infrequent; E. and W. Tavaputs Plateaus and Strawberry Valley to Rock Cr.; sagebrush communities; 7,300-9,050 ft; June-Aug.

Lathyrus L. Peavine; Sweetpea

Perennial caulescent herbs, clambering, trailing, or climbing; leaves pinnately compound, the rachis ending in a tendril or bristle; flowers in axillary racemes; stamens 10, diadelphous; style bearded down one side as in a toothbrush; fruit a legume, oblong, several seeded.

- 1 Leaflets 2; stems winged; plants introduced, cultivated and escaping..... L. latifolius
- 1 Leaflets 4 or more; stems not winged; plants native
 - 2 Keel shorter than the wings; calyx glabrous or the teeth merely ciliate, the lower tooth usually longer than the tube; stipules foliaceous; petals pink-purple, rarely white..... L. pauciflorus
 - 2 Keel usually subequal to the wings; calyx often hairy, the lower tooth shorter than the tube; stipules not foliaceous; flowers white or pink-purple..... L. lanszwertii

Lathyrus lanszwertii Kellogg Thicketleaf p. With 2 intergrading vars.

- 1 Flowers white, occasionally pink or purple-tinged, mostly 15-22 mm long..... var. laetivirens
- 1 Flowers pink-purple or purple-tinged, commonly 12-17 mm long..... var. lanszwertii

Var. laetivirens (Greene) Welsh (L. leucanthus Rydb.) The few records seen are from the E. and W. Tavaputs Plateaus and upper Strawberry drainage; aspen-spruce-fir and mt. brush communities; 7,000-9,000 ft; June-Aug.

Var. lanszwertii (L. coriaceus White) Occasional; the few records seen are from the E. and W. Tavaputs Plateaus; aspen and aspen-fir communities; 8,800-9,600 ft; June-Aug.

Lathyrus latifolius L. Perennial p. Introduced from Europe, cultivated ornamental, persisting and escaping; the 1 record seen (Neese & Moore 7953) is from cultivation at Vernal.

Lathyrus pauciflorus Fern. Fewflower p., longtooth s. (L. utahensis Jones) The few records seen are from Strawberry Valley to Wolf Creek; aspen, tall forb, and Douglas-fir communities; 8,500-9,000 ft; July-Aug.

Lupinus L. Lupine

Annual or perennial herbs; leaves palmately compound; flowers borne in terminal racemes, blue, blue-purple, or rarely white (albino specimens); stamens 10, monadelphous, with 5 long filaments alternating with 5 short ones; fruit a laterally compressed legume, 2-several seeded. This is a difficult genus in which numerous morphologically intergrading and hybridizing taxa have been described. Wide-ranging taxa tend to intergrade with other taxa they contact, and identification of some specimens is arbitrary. The following key is mostly adapted from Welsh (1978). See that treatment for further discussion of difficulties in the group.

- 1 Plants annual, 3-24 cm tall; leaflets glabrous above except sometimes along the margins
 - 2 Racemes 1-2.5 cm long in flower, the axis 1.5-3 cm long in fruit; flowers 5.2-7 mm long; leaves mainly in a basal tuft; leaflets 5-18 mm long..... L. brevicaulis
 - 2 Racemes 1-17 cm long in flower, the axis 4-21 cm long in fruit; flowers 8.5-12 mm long; leaves mainly cauline; leaflets 11-48 mm long..... L. pusillus
- 1 Plants perennial, usually over 24 cm tall or else leaflets pubescent above
 - 3 Banner glabrous dorsally, reflexed below or above the midpoint; leaves mainly basal or cauline; leaflets glabrous or pubescent on upper surface; (note: some specimens of L. argenteus have features that conflict with those given in this lead, but that taxon is keyed both ways)
 - 4 Plants 3-12 cm tall, caespitose; racemes 1-4 cm long in flower, the axis 2-6 cm long in fruit; leaflets 3-25 mm long, 1-6 mm wide, pilose on both sides; peduncles 0-2 cm long; flowers 7-8.5 mm long..... L. lepidus
 - 4 Plants 13-90 cm tall; racemes 9-30 cm long in flower, the axis 10-35 cm long in fruit; leaflets 7-95 mm long, glabrous or pilose; peduncles 1.5-15 cm long; flowers 8-16 mm long, or if only 5-7 mm long then leaflets glabrous above
 - 5 A least some of the leaves basal or nearly so and with petioles 8-13 cm long or longer; leaflets pubescent or glabrous on the upper surface; plants of limited distribution..... L. polyphyllus
 - 5 Leaves well distributed along the stem, the petioles commonly less than 8 cm long; leaflets glabrous or sparsely pubescent on the upper surface; plants widespread..... L. argenteus
 - 3 Banner pubescent dorsally at least beneath the upper lip of the calyx, reflexed at or above the midpoint except in L. sericeus; leaves mainly cauline; leaflets pubescent on upper surface
 - 6 Calyx with a gibbous-saccate spur at the base of the upper lip; wings or keel or both ciliate below the claws (rarely glabrous)..... L. caudatus
 - 6 Calyx at most gibbous at base of upper lip; wings and lower edge of keel glabrous
 - 7 Banner reflexed at or below the midpoint, strigose to thinly strigose near the tip, or rarely hairy along the crest..... L. sericeus

Astragalus purshii Dougl. ex Hook. Pursh l. or m. (A. inflexus Dougl. misapplied) Occasional to common; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 4,900-7,200 ft; April-May (early June). Our plants are referable to var. purshii.

Astragalus racemosus Pursh Alkali m. Common across the Basin from Duchesne to near the Colorado-Utah line, abundantly collected from Duchesne Co., but seldom from Uintah Co., and apparently lacking from our part of Colorado; desert shrub, sagebrush, and pinyon-juniper communities; 5,400-7,200 ft; May-June. Our plants belong to var. treleasei C. L. Porter.

Astragalus saurinus Barneby Dinosaur m. Endemic to Uintah Co. from Twelve Mile Wash near Lapoint to Dinosaur National Monument and s. to Red Wash; on Duchesne River, Morrison, Chinle, Moenkopi, and other formations that weather to badlands; 4,700-5,600 ft; May-June. This was referred to as A. coltonii Jones by Graham (1937). Wolf & Dever 5005 and Weber 5318 DINO!, referred to as A. rafaelensis Jones (Holmgren 1962) belong here.

Astragalus spatulatus Sheld. Draba m., tufted m. [A. simplex Tidestrom; A. simplicifolius (Nutt.) Gray] Common; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities, on numerous substrates but often on rocky or shallow soils; 4,800-8,000 (8,600) ft; April-June.

Astragalus tenellus Pursh. Looseflower m., pulse m. Common; widespread; various plant communities including: pinyon-juniper, sagebrush, Douglas-fir, and aspen; (5,000) 6,000-9,500 ft; June-July.

Astragalus utahensis (Torr.) T. & G. Utah l. or m. Occasional from Duchesne and Indian Canyon and westward in Duchesne Co. n. to Tabiona and w. to Strawberry Valley; sagebrush, pinyon-juniper, mt. brush, and aspen-fir communities; 6,100-7,500 ft; May-June.

Astragalus wetherillii Jones Wetherill m. Known in our area from the Yampa River area in Moffat Co; May-June.

Astragalus wingatanus Wats. Fort Wingate m. Known in our area by 4 collections; these from Indian Canyon and Lake Canyon drainages, W. Tavaputs Plateau, Duchesne Co., and Hill Creek-Willow Creek, Tavaputs Plateau, Grand Co.; pinyon pine-Douglas-fir communities; 7,000 ft; May-June.

Caragana Fabr. Peashrub

Caragana arborescens Lam. Siberian p. Shrubs to 4 m tall or more; leaves 4-10 cm long; leaflets 8-12, 12-25 mm long, 5-15 mm wide, villous, becoming glabrate in age; stipules slender, occasionally persisting as spines; flowers 17-23 mm long, yellow; pods sessile, straight 35-55 mm long, 4-7 mm wide, glabrous. Introduced from central Siberia, cultivated ornamental and erosion-control plant, known in our area from experimental plantings on oil shale lands.

Glycyrrhiza L. Wild Licorice

Glycyrrhiza lepidota Pursh. American w. l. Perennial caulescent herbs from stout, deep-seated roots, 40-120 cm tall; leaves 8-19 cm long; leaflets 13-19, 8-53 mm long, 3-15 mm wide, mucronate, glabrous above, gland-dotted and puberulent beneath; racemes 20-50 flowered; flowers 9-13 mm long, dingy-white to cream; pods 13-20 mm long, the body 5-7 mm wide, densely covered with hooked prickles, cockleburlike. Occasionally or locally common; widespread; along water courses, moist low lands, ditchbanks, and about seeps; 4,700-6,300 ft and possibly to 7,500 ft; June-Aug.

Hedysarum L. Sweetvetch

Perennial caulescent herbs from taproots and caudices; flowers in axillary racemes, red-purple to pink or pink-purple; fruit a loment with 2-8 segments.

- 1 Veins of leaflets readily apparent; fruit segments winged; calyx lobes unequal, shorter than the tube; plants known in our area from Range Creek drainage, W. Tavaputs Plateau and near Tabiona..... H. occidentale
- 1 Veins of leaflets not apparent; fruit segments not winged; calyx lobes subequal, longer than the tube; plants widespread..... H. boreale

Hedysarum boreale Nutt. Northern s. (H. cinerascens Rydb.; H. utahense Rydb.) Occasional or locally common; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities, sometimes on barrens. Plants referable to var. boreale have glabrous loment, and are widespread from 4,700-8,400 ft; May-July. Plants referable to var. gremiale (Rollins) Northstrom & Welsh have small spines on the surface of the loment, and are endemic from Tridell to Dinosaur National Monument from 5,500-5,800 ft; June.

Hedysarum occidentale Greene Western s. The 4 records seen are from the Range Creek drainage, W. Tavaputs Plateau and near Tabiona; pinyon-juniper and mt. brush communities; 6,800-7,500 ft; June-July. The plants from the Tavaputs Plateau are referable to var. occidentale. Those from near Tabiona are referable to var. canone Welsh.

Astragalus duchesnensis Jones Duchesne m. Endemic to and locally common across the bottom of the Uinta Basin from near Ioka and Myton to the Colorado-Utah line and Raven Ridge of ne. Rio Blanco Co., also in Browns Park area of Daggett Co.; salt desert shrub and juniper communities on sandy and gravelly pediments; 4,700-5,400 (6,000 on Raven Ridge) ft; late April-early June.

Astragalus equisolensis Neese & Welsh Horseshoe Bend m. Endemic to the vicinity of Horseshoe Bend, Uintah Co.; on river terrace sand and gravels, desert shrub communities; 4,700-5,200 ft; April-May.

Astragalus eurekaensis Jones Eureka m. Our single record (Brotherson 1882) is from the w. side of Strawberry Valley on foothill knolls; April-June.

Astragalus flavus Nutt. in T. & G. Yellow m. (A. confertiflorus Gray) Widespread; common to locally abundant; desert shrub and juniper communities, usually on clays of Mancos Shale, Duchesne River, and other formations that weather to bad lands; 4,800-5,700 ft; May-June. Our plants are referable to var. flavus.

Astragalus flexuosus (Hook.) Don. Flexile m. The 1 specimen seen (Kelley & Sigstedt 82-86) is from Cow Creek (T4S, R94S, S17) Rio Blanco Co.; shale ridge top with sagebrush; 8,100 ft; July. Reported by Graham (1937) for Middle Fork Stuart Creek. Reported for Uintah Co. (Barneby 1964; Welsh 1978) based on erroneous label data on Harrison 5605 - the specimen actually from the San Rafael Swell, Emery Co. Except for shape and pubescence of the pods, this is much like A. wingatanus.

Astragalus geyeri Gray Geyer m. Occasional; widespread; desert shrub, sagebrush, and juniper communities; 4,500-6,000 ft, usually but not always on sandy soils; May.

Astragalus hamiltonii C. L. Porter Hamilton m. Endemic, from Whiterocks Bench to Vernal and vicinity of Raven Ridge at the Utah-Colorado border; usually on raw, eroding slopes of the Duchesne River Formation; desert shrub and juniper communities; 5,500-5,900 ft; May-June. Closely related to the more s. A. lonchocarpus Torr.

Astragalus kentrophyta Gray Kentrophyta. With 3 vars. in our area.

- 1 Pubescence entirely of basifixed hairs; plants prostrate, of high elevations, forming mats.....
 var. implexus
 1 Pubescence mostly of malpighian hairs; plants prostrate or erect, of low elevations
 2 Plants prostrate, from Daggett Co.; pods 3-4.5 mm long, beakless or nearly so..... var. jessiae
 2 Plants erect, from Duchesne and Daggett Cos.; pods 4-7 mm long, beaked..... var. elatus

Var. elatus Wats. [A. tegetarius Wats. var. elatus (Wats.) Barneby] Records seen are from Pariette Bench, Wells Draw, Argyle, and Nine Mile Canyons in se. Duchesne Co. and Sheep Creek Gap, Daggett Co.; desert shrub and pinyon-juniper communities; 5,000-6,000 ft; July-Sept.

Var. implexus (Canby) Barneby (A. tegetarius Wats. var. implexus Canby) Records seen are from exposed ridges and rocky slopes of the Uinta Mts. and high points of Current Creek-W. Fork Duchesne area; 9,000-10,700 ft; June-Aug.

Var. jessiae (Peck) Barneby The 3 records seen are from Daggett Co.; sagebrush and juniper communities; 5,800-6,700 ft; July-Sept.

Astragalus lentiginosus Dougl. ex Hook. Known in our area from a single collection (S. Goodrich 2285) from Kingfisher Island near Flaming Gorge, Daggett Co. The specimen is referable to var. platyphyllidius (Rydb.) Peck (broad-leaved m.).

Astragalus lutosus Jones Dragon m. Infrequent, or locally common; shale badlands of the Whiteriver drainage in Rio Blanco and Uintah Cos., most common in the Piceance Basin, also known from isolated populations on Reservation Ridge and in Willow Creek drainage of the W. Tavaputs Plateau; on Green River shale, ridges and talus slopes in salt desert shrub, pinyon-juniper-bullgrass, limberpine, and Douglas-fir communities; 5,400-8,600 ft; May-Aug. depending on elevation.

Astragalus megacarpus (Nutt.) Gray Great bladder m. The 5 records seen are all from the W. Tavaputs Plateau from Avintaquin Canyon to Chokeycherry Canyon and Argyle Canyon in s. Duchesne Co.; sagebrush, pinyon-juniper, ponderosa pine and Douglas-fir communities; 7,500-9,000 ft; May-June.

Astragalus miser Dougl. ex Hook. Weedy m. [A. decumbens (Nutt.) Gray] Common to abundant across the area; aspen and conifer woods, also in meadow, riparian, sagebrush, and alpine tundra communities; 7,800-10,700 ft; June-Aug. Our plants are referable to var. oblongifolius (Rydb.) Cronq. High elevation plants often differ in being smaller and having smaller leaflets, and often have blue rather than ochroleucous flowers.

Astragalus mollissimus Torr. Woolly l. or m. Occasional in e. Uintah Co. and Colorado, seldom collected in Duchesne Co., the 2 records seen from Daggett Co. are from the Browns Park area; desert shrub, sagebrush and pinyon-juniper communities; 4,800-6,000 ft; April-early June. Our plants belong to var. thompsonae (Wats.) Barneby.

Astragalus nelsonianus Barneby Nelson m. The 5 records seen are all from within 5 mi of Manila in Daggett Co. and Peterson & Wilken 83-283 (CS) from 2 mi se. of community of Powder Wash, Moffat Co.; sagebrush and juniper communities; 6,200-6,900 ft; May-early June.

Astragalus oophorus Wats. Apparently just entering our area on the E. Tavaputs Plateau in Colorado.

Astragalus pattersonii Gray in Brandegee Patterson l. or m. Infrequent; all records seen are from near Vernal and eastward; desert shrub and juniper communities; 4,800-6,040 ft; May.

Astragalus pubentissimus T. & G. Green River m. Common across the lower and middle elevations of the Tavaputs Plateau from Duchesne to Rangely; desert shrub and pinyon-juniper communities; 5,200-7,500 ft; May-June or to Sept. with late season moisture. Our plants are referable to var. pubentissimus.

Medicago L. Alfalfa; Lucerne; Medic

Annual or perennial caulescent herbs; leaves pinnately trifoliate, the leaflets serrate toward the apex; flowers borne in axillary, pedunculate racemes; fruit a legume, curved to spirally coiled, 1-several seed, indehiscent, reticulate or spiny.

- 1 Flowers 2-3 mm long, yellow; inflorescence less than 10 mm long in flower, but to 25 mm long in fruit; pods coiled through a single spiral, 1-seeded, unarmed; plants annual, prostrate to decumbent, rarely erect..... M. lupulina
- 1 Flowers 4-10 mm long, variously colored; inflorescence usually over 1 cm long in flower or pods armed with prickles
 - 2 Flowers 4-5 mm long, yellow, 2-5 per raceme; racemes less than 1 cm long; pods armed with prickles, several-seeded; plants annual, introduced from Europe, weedy on cultivated lands, to be expected in our area (bur clover) (M. hispida Gaertn.)..... M. polymorpha L.
 - 2 Flowers 6-10 mm long, yellow, blue, lavender, pink, purple, purple-black or white, 6-many on at least some racemes; racemes longer than 1 cm; pods unarmed, several-seeded; plants perennial..... M. sativa

Medicago lupulina L. Black m., hop clover. Introduced from Europe, weedy; lawns, fields, roadsides, and riparian and other indigenous communities but usually with disturbance; 5,100-7,500 ft and probably higher; June-Sept.

Medicago sativa L. Alfalfa, lucerne. Introduced from Eurasia; widely planted as a forage crop, and on rangelands and roadsides, persisting and escaping, over a wide elevational range, but seldom above 9,500 ft; June-Sept. Any of a number of cultivars can be expected as this plant has undergone intensive selection in development of plants suitable for heavy production on irrigated and fertilized fields and for use on dry rangelands. Plants with yellow flowers and pods merely curved and not coiled are often considered as a separate species (M. falcata L., yellow alfalfa). Among the cultivars used on rangelands are Ladak, Nomad, and Rambler.

Melilotus Mill. Sweetclover

Annual or biennial caulescent herbs, from taproots; leaves pinnately trifoliate, the leaflets dentate on the upper 1/2-3/4; flowers in racemes; pods straight, with 1 or 2 seeds, indehiscent.

- 1 Flowers white..... M. alba
- 1 Flowers yellow..... M. officinalis

Melilotus alba Medicus White s. Introduced from Europe, widely established, not so common as M. officinalis; often along roadsides; June-Sept. Flower color is the only obvious difference between this and M. officinalis.

Melilotus officinalis (L.) Pallas Yellow s. Introduced from Europe or the Mediterranean, widely established; often along roadsides; May-Sept.

Onobrychis Adans. Sainfoin

Onobrychis viciifolia Scop. Common s. Perennial caulescent herbs from caudices and taproots, 20-45 cm tall; leaves 3-12 cm long; leaflets 11-21 (27), 8-25 mm long, 2-7 mm wide, pilose mainly along the veins beneath, glabrous above; peduncles 8-19 cm long; racemes with 14-39 (50) flowers, the axis 4-15 cm long in fruit; flowers 10-13 mm long, red-purple, lavender or pink; stamens 10, essentially diadelphous; fruit a loment but this reduced to 1 segment with only 1 or 2 seeds, armed with prickles. Introduced from Europe; planted in rangeland and roadside seedings, escaping and persisting.

Oxytropis DC. Crazyweed; Locoweed; Oxytrope; Pointvetch; Stemless Loco

Perennial caulescent or more often acaulescent (ours) herbs from taproots and caudices; leaves alternate or often all basal; flowers in racemes, pink, pink-purple or white, the keel tip produced into a porrect beak; fruit a legume.

- 1 Flowers 5-10 mm long; leaflets 23-41; pods spreading-declined; stipules only shortly adnate to the petioles; plants subcaulescent to short caulescent, not pulvinate..... O. deflexa
- 1 Flowers 11-26 mm long, or only 7.5-12 mm in O. parryi but then leaflets only 7-17 and plants pulvinate; pods ascending to erect; stipules adnate to petioles for half their length or more; plants acaulescent
 - 2 Racemes with 1-5 flowers, subcapitate; plants pulvinate caespitose, 1-5 (10) cm tall
 - 3 Calyx swollen at full anthesis, becoming inflated and finally enclosing the pod; pods 6-10 mm long; plants of Daggett and Duchesne Cos., below 7,500 ft..... O. multiceps
 - 3 Calyx campanulate, not inflated nor enclosing the fruit; pods 13-25 mm long; plants not known from Daggett Co.

FABACEAE

- 4 Pods oblong-ellipsoid, not inflated, leathery in texture; flowers 7.5-12 mm long; plants of high points in Wasatch and Duchesne Cos..... O. parryi
- 4 Pods ovoid, inflated, papery in texture; flowers (11) 14-16.5 mm long; plants of the E. Tavaputs Plateau..... O. jonesii
- 2 Racemes with 6-40 flowers, elongate, only rarely subcapitate; plants caespitose but hardly pulvinate; 8-50 cm tall
 - 5 Petals bright pink-purple
 - 6 Plants pubescent with malpighian hairs; calyx not swollen; plants of the Tavaputs Plateau..... O. lambertii
 - 6 Plants with basifixed hairs; calyx somewhat swollen; plants of Daggett and Moffat Cos.. O. besseyi
 - 5 Petals white or tinged with purple; plants of broad distribution..... O. sericea

Oxytropis besseyi (Rydb.) Blank. Bessey l. (O. obnapiformis C. L. Porter) Occasional in Daggett and n. Moffat Cos.; desert shrub, sagebrush, and pinyon-juniper communities, mostly in sandstone or in sandy or sandy-clay soils; 5,800-6,900 ft; June. Most of the specimens from our area are more or less referable to var. obnapiformis (C. L. Porter) Welsh, which is intermediate to var. fallax Barneby from nearby Wyoming, but a few from Daggett Co. with only 5-7 leaflets crowded on a short rachis seem to belong to var. ventosa (Greene) Barneby.

Oxytropis deflexa (Pallas) DC. Drop-pod c., stemmed o. With 2 vars. in our area.

- 1 Flowers 9-10.5 mm long, blue-purple; plants subcaulescent, of mid and upper elevations of the Uinta Mts..... var. deflexa
- 1 Flowers 5-9 mm long, whitish, lilac or blue-purple; plants usually short caulescent, known from E. Tavaputs Plateau, and e. end of the Uinta Mts..... var. sericea

Var. deflexa The few records seen are from Log Hollow-Rock Creek divide, Rock Creek-Brown Duck divide, and Sheep Creek drainage, Uinta Mts.; a specimen was also seen from Hoop Lake-Spirit Lake road just to the w. of our area; open slopes with grasses and forbs, krummholz spruce, and talus; 9,240-11,300 ft; July-Aug.

Var. sericea T. & G. The few specimens seen are from the E. Tavaputs Plateau, Grand Co. and e. end of the Uinta Mts.; meadows, aspen woods, and drying streams; 8,500-9,000 ft; June-Aug. Also known from the n. slope of the Uinta Mts. just to the w. of our area.

Oxytropis jonesii Barneby Jones o. The 5 records seen are all from the E. Tavaputs Plateau, Grand and Uintah Cos.; shale and marl barrens, desert shrub and pinyon-juniper communities; 6,400-8,100 ft; June-Aug.

Oxytropis lambertii Pursh Lambert c. or l. The few records seen are from Avintaquin drainage to Range Creek on the W. Tavaputs Plateau and Piceance Basin of the E. Tavaputs Plateau; sagebrush, Douglas-fir-snowberry, and aspen communities, sometimes on open slopes of Green River shale; 7,100-10,050 ft; June-Aug. Our plants are referable to var. biglovi Gray.

Oxytropis multiceps T. & G. Flowery c., Rocky Mt. o. The 6 specimens seen are from Sheep Creek, Kingfisher Island, and Green Lakes, Daggett Co.; Vermillion Gap and Little Snake River, Moffatt Co.; and Red Creek, Duchesne Co.; sagebrush, pinyon-juniper, and ponderosa pine communities; 6,050-7,450 ft; May-June. Graham 8989 cited by Graham (1937) belongs to O. jonesii.

Oxytropis parryi Gray Parry c. or o. The specimens seen are from W. Tavaputs Plateau (Strawberry Peak), Red Creek Mt. and Uinta Mts. (as far e. as the Lake Fork drainage); windswept ridges and talus; 10,200-11,300 ft; July-Aug.

Oxytropis sericea Nutt. in T. & G. Silky c., l. or o. [O. albiflorus (A. Nels.) K. Schum.] The most common oxytrope of our area, very common on the W. Tavaputs Plateau and its flank, also in Daggett Co., and to Vermillion Bluffs, Moffatt Co.; only 2 specimens seen from Uintah Co.; desert shrub, pinyon-juniper, bullgrass, sagebrush, and lodgepole pine communities; 4,750-8,900 ft; late April-June. Our plants are referable to var. sericea.

Pedimelum Rydb. Breadroot

Pedimelum megalantum (Woot. & Standl.) Rydb. Large-flowered b. (Psoralea megalantha Woot. & Standl.) Subcaulescent to caulescent malodorous herbs with slender caudex branches arising from deep-seated tuberous roots, 4-25 cm tall; herbage strigose; leaves palmate compound; leaflets 5 (8), 9-34 mm long, 4-23 mm wide, punctate; inflorescence a raceme, with 6-24 flowers, 2-5 cm long; flowers 12-21 mm long, commonly purplish; pods included in the calyx. Occasional across Uintah Co. and into Colorado, only 1 specimen seen from Duchesne Co., and none from Daggett Co.; desert shrub, sagebrush, but most often juniper communities; 4,800-6,100 ft; May-June. Plants referred to as Psoralea mephitica Wats. by Graham (1937) belong here.

Psoralidium Rydb. Scurfpea

Psoralidium lanceolatum (Pursh) Rydb. Dune s., lemmon s. (Psoralea lanceolata Pursh) Caulescent herbs 15-68 cm tall, from rhizomes, glabrous or strigose; leaves commonly 3-foliate; leaflets 14-50 mm long, 1-9 mm wide; inflorescence a raceme, with 5-24 flowers; flowers 5-6 mm long, blue, white, or both; pods 1-seeded, glandular. Specimens seen are from near Lapoint to Dinosaur National Monument and s. to

near Bonanza Canyon, and from Daggett and Moffat Cos.; desert shrub and juniper communities, usually on sandy soil; 4,900-6,300 (8,500?) ft; May-June. Our plants are referable to var. lanceolatum.

Sophora L. Sophora

Sophora stenophylla Gray in Ives. Silvery or fringeleaf s. Perennial, caulescent, silvery pubescent herbs from deep-seated rhizomes, 13-41 cm tall; leaflets 9-15, linear or linear-oblong, 7-27 mm long, 0.5-4 mm wide; racemes 10-40-flowered; flowers 15-27 mm long, blue-purple to blue; pods spreading-declined, with a stipe 8-16 mm long, the body 15-60 mm long, 6-8 mm wide; terete but strongly constricted between the seeds when the seeds are more than 1; seeds 1-5. The 4 specimens seen are from Jensen to Ouray, Uintah Co.; desert shrub communities, sandy ground; 4,800-5,200 ft; May-June. A beautiful plant.

Sphaerophysa DC. Swainsonpea

Sphaerophysa salsula (Pallas) DC. Salt globepea. [Swainsonia salsula Pallas) Thub. in Engel. & Prantl.] Perennial caulescent herbs from rhizomes, 40-70 cm tall; leaves 3-10 cm long; leaflets 15-25, 3-18 mm long, 1-7 mm wide, retuse to obtuse and apiculate, strigose beneath, glabrous above; flowers 5-17 per raceme, 12-14 mm long, dull-red, fading lavender to brown; pods ascending to declined, on a stipe 4-7 mm long, bladderly-inflated, 13-24 mm long, 9-20 mm wide. Introduced from Asia. Graham (1937) reported Doult 4312 from Red Creek, 2 mi n. of Fruitland; 6,700 ft; Aug.

Thermopsis R. Br. Thermopsis; False Lupine; Yellow Lupine; Golden Pea; Yellow Pea

- 1 Pods straight, erect or ascending; plants mostly 20-70 cm tall or more, widespread throughout the area, mostly of wet places..... T. montana
- 1 Pods strongly curved, somewhat constricted between the seeds, spreading or recurved; plants mostly 10-40 cm tall, somewhat restricted, mostly of dry places or of seeps that dry in summer..... T. rhombifolia

Thermopsis montana Nutt. in T. & G. Mt. t. [T. pinetorum Greene; T. rhombifolia var. montana (Nutt.) Isely] Occasional or locally common; widespread; meadow, pasture, ditchbank, willow-streamside, and aspen communities; 5,300-8,400 ft; May-July. Our plants are referable to var. montana. Those with wide leaflets (1.5-4 cm wide) have been referred to T. pinetorum. Those with narrow leaflets (1 cm wide or less) are typical. Intermediates are too common for the distinction to have been much merit (Isely 1981).

Thermopsis ovata (Robins.) Rydb. [T. montana ssp. ovata Robins. ex Piper; T. m. var. ovata (Robins. ex Piper) St. John; T. rhombifolia var. ovata (Robins. ex Piper) Isely] has been listed for our area but this is a plant from well nw. of here. Thermopsis divaricarpa A. Nels. [T. rhombifolia var. divaricarpa (A. Nels.) Isely] has been indicated for our area, but this is a plant from central Colorado and n. where it is distributionally and morphologically intermediate between T. montana and T. rhombifolia, and it is the basis for Isely's quite logical inclusion of the T. montana complex into T. rhombifolia (Isely 1981). Because we are not confronted with the intermediates in our area, we found it convenient to maintain the separation at the species level.

Thermopsis rhombifolia Nutt. in Richards Occasional; Daggett Co. and Asphalt Ridge to Dinosaur National Monument and s. to Cliff Ridge and Hell's Hole Canyon in Uintah Co. and e. into Moffat and probably Rio Blanco Cos.; desert shrub, sagebrush, and pinyon-juniper communities; 5,000-6,600 ft; May-June.

Trifolium L. Clover

Annual or perennial herbs from taproots, caudices or rhizomes; leaves 3-foliolate or rarely palmate with 4-7 leaflets, commonly serrate, rarely entire; flowers borne in terminal or axillary pedunculate or sessile heads or subcapitate racemes; pods usually shorter than the calyx, indehiscent, 1-several seeded.

- 1 Plants acaulescent or subacaulescent, mostly 1.5-10 cm tall, native, mostly montane; stems not creeping
- 2 Flowers solitary or 2-4 per head, 15-23 mm long; heads essentially sessile; calyx glabrous; plants above timberline on the Uinta Mts..... T. nanum
- 2 Flowers 5-20 per head, either shorter than above or heads pedunculate; distribution various including above timberline on the Uinta Mts.
- 3 Plants densely pulvinate-caespitose and mat forming; leaflets toothed only on the upper 1/3, or subtentire; plants of Daggett Co..... T. andinum
- 3 Plants loosely caespitose, not especially mat forming; leaflets various; plants more widespread
- 4 Leaflets toothed; calyx pubescent with soft hairs; flowers 8.5-11 mm long; heads not subtended by involucre bracts; plants known from 5,350-9,000 ft, widespread..... T. gymnocarpon
- 4 Leaflets entire, or if toothed then the calyx glabrous; flowers (9) 11-17 mm long; heads subtended by involucre bracts; plants known from 9,000-12,000 ft, Uinta Mts.
- 5 Leaflets entire; calyx strigose..... T. dasyphyllum
- 5 Leaflets toothed; calyx glabrous..... T. parryi

FABACEAE

- 1 Plants caulescent, the stems with 1 or more elongate internode, or if appearing acaulescent then with creeping stems, mostly 10-60 cm tall, introduced in all but T. longipes
- 6 Flowers 13-20 mm long, reddish; heads immediately subtended by a trifoliate sessile bract; plants 18-60 cm tall..... T. pratense
- 6 Flowers shorter, white, reddish, or pink (if reddish only 5-9 mm long); heads on peduncles 0.5-15 cm long; plants 5-37 cm tall; stems sometimes creeping
- 7 Flowers 4-6 mm long, soon enclosed in the bladderly-inflated reticulate-veined calyx; heads subtended by an involucre..... T. fragiferum
- 7 Flowers 5-13 mm long, not enclosed by calyx; the calyx not inflated; heads without an involucre
- 8 Flowers 5-10 mm long; heads axillary from the uppermost nodes; plants cultivated and escaping
- 9 Plants creeping, rooting at the nodes; calyx tube glabrous or hairy only at the base, often with a purple spot below the sinus between the teeth, the teeth generally equal to or shorter than the tube; petals white; stipules 3-12 mm long..... T. repens
- 9 Plants erect or ascending, rarely decumbent; calyx tube with a few hairs below the sinus between the teeth, but without a purple spot, the teeth generally longer than the tube; petals white or pink to red; stipules 5-20 mm long..... T. hybridum
- 8 Flowers 11-13 mm long; heads solitary and terminal; plants native, erect or ascending but not creeping..... T. longipes

Trifolium andinum Nutt. in T. & G. Andean c. The 5 specimens seen are all from near Manila and Sheep Creek to Green Lakes, Daggett Co. and Peterson & Deardorff 83-91 (CS) reported for Vermillion Creek Gap, Moffat Co.; sagebrush, mt. brush, and ponderosa pine communities, usually in rocky places; 7,000-7,400 ft; May-June.

Trifolium dasyphyllum T. & G. Whiproot c., Uinta c. Occasional; Uinta Mts.; meadows and tundra; (9,500) 11,000-12,000 ft; July-Aug. Our plants are referable to var. uintense (Rydb.) Welsh.

Trifolium fragiferum L. Strawberry c. Introduced from Europe, probably widespread but seldom collected; pastures, meadows, roadsides, ditchbanks, seeps, and riparian communities; 5,100-5,600 ft and probably higher; June-Sept.

Trifolium gymnocarpon Nutt. in T. & G. Hollyleaf c., Nuttall c. Occasional and locally common; widespread; desert shrub-juniper, sagebrush, pinyon-juniper, mt. brush, ponderosa pine, Douglas-fir, and lodgepole pine communities; 5,350-9,000 ft; May-June.

Trifolium hybridum L. Alsike c. Introduced from Europe, cultivated and escaping; only 1 record seen (Neese 6269), but to be expected throughout the area; pastures, meadows, along roadside ditches, and riparian and other plants communities; up to about 9,000 ft; June-Sept.

Trifolium longipes Nutt. in T. & G. Longstalk c., Rydberg c. (T. rydbergii Greene) Occasional or locally common; specimens seen are all from the Uinta Mts.; meadow and aspen communities; 6,500-9,500 ft; June-Aug. Our plants are referable to var. reflexum A. Nels.

Trifolium nanum Torr. Dwarf c. Occasional above timberline across the Uinta Mts; July-Aug.

Trifolium parryi Gray Parry c. Occasional or locally common; Uinta Mts.; aspen, lodgepole pine-Engelmann spruce, meadow, and alpine tundra communities, and in snowflush areas; 9,000-12,000 ft; June-Aug. Our plants are referable to var. montanense (Rydb.) Welsh.

Trifolium pratense L. Red c. Introduced from Europe, widespread; pastures, meadows, roadside ditches, and riparian communities; up to about 8,000 ft; May-Sept.

Trifolium repens L. White c., Dutch c. Introduced from Europe, widespread; lawns, pastures, roadside ditches, meadows, around seeps and springs, and in riparian communities, often included in seed mixtures for lawns, and sometimes on disturbed ground; up to about 9,200 ft; June-Aug.

Vicia L. Vetch

Vicia americana Muhl. ex Willd. Perennial caulescent herbs 12-130 cm tall; leaves (excluding the tendrils) 2-3 cm long; leaflets 8-16, 3-44 mm long, 1-19 mm wide; the tendrils branched or simple; flowers 3-7 (10) per raceme, 13-22 (25) mm long, pink to pink-purple; fruit a legume, 23-35 mm long, 6-8 mm wide; on a stipe 2.5-4.5 mm long. With 2 vars. in our area.

- 1 Leaflets pubescent with short curved hairs, thickish, 20-40 mm long, 2-5 mm wide, nearly linear or narrowly elliptic, the lateral veins prominent diverging from the midrib at a narrow (about 10°-20°) angle; plants known from 5,200-6,000 ft..... var. minor
- 1 Leaflets glabrous or thin or both, 3-44 mm long, 1-19 mm wide, linear to broadly elliptic, the lateral veins prominent or not, diverging from the midrib at a wide (about 30°-40°) angle; plants known from 7,000-9,800 ft..... var. americana

Var. americana (V. oregana Nutt.; V. truncata Nutt. in T. & G.) Occasional; widespread; mt. brush, aspen, Douglas-fir, meadow, and Engelmann spruce-sub alpine fir communities; 7,000-9,800 ft; June-Aug.

Var. minor Hook. American v. (V. linearis (Nutt.) Greene; V. trifida Dietr.) Occasional; Tridell to Island Park and Red Wash in Uintah Co., Daggett Co. and into Colorado; desert shrub and juniper communities, often on Duchesne River, Morrison and other raw-eroding formations with high clay content; 5,200-6,000 ft; May-June.

FAGACEAE Beech Family

Quercus L. Oak

Quercus gambelii Nutt. Gambel o., scrub o. [Q. gunnisonii (Torr.) Rydb.; Q. novomexicana (A. DC.) Rydb.; Q. utahensis (A. DC.) Rydb.] Shrubs or small trees to about 5 m tall; young twigs reddish-brown, pubescent; leaves (4) 6-10 cm long, pinnately lobed over 1/2 way to the midrib, the lobes rounded to acute, pubescent or glabrous below, darker green above, alternate, simple; flowers small, without petals, unisexual, the staminate in pendulous catkins and with 5-10 stamens and a perianth of 4-7 lobes, the pistillate solitary or clustered in an involucre of flat scales and with a 6-lobed perianth; ovary 1-celled with 3 styles, superior; fruit a nut (acorn) about 12-20 mm long, partly enveloped in a cup (involucre of scales) 10-15 mm long. Occasional to abundant; forming clones; in the mt. brush zone as far e. as Tabiona and Blind Stream on the s. flank of the Uinta Mts., e. to the Avintaquin drainage of the W. Tavaputs Plateau, and common on the E. Tavaputs Plateau; May-June. This is an extremely variable species that has been given many names. Other members of the genus are planted in our area as shade trees or ornamentals.

FUMARIACEAE Fumitory Family

Annual to perennial herbs; leaves compound, glabrous and glaucous; flowers bisexual, irregular; sepals 2; petals 4, in 2 series, the outer 2 erect to spreading and one or both pouched or spurred at the base, the inner 2 smaller, usually fused and crested at the apex, not spurred; stamens 6, in 2 sets of 3 each; style 1, entire or 2-lobed; fruit a capsule with several seeds.

- 1 Leaves basal; flowers solitary and terminal; outer petals widely spreading to recurved at the apex, and pouched at the base; tiny plants 2-10 cm tall..... Dicentra
 1 Leaves alternate; flowers in racemes; outer petals erect or nearly so, one of them spurred at the base; plants mostly 10-50 cm tall..... Corydalis

Corydalis Medic. Scrambled Eggs

Corydalis aurea Willd. Golden smoke, golden corydalis. [C. montanum (Engelm.) Britt.; Capnoides aureum (Willd.) Kuntze] Plants annual or biennial from a taproot; stems prostrate to ascending, 10-50 cm long, generally branched; herbage glabrous, glaucous, succulent; leaves 2-several times pinnate with blades 2-8 cm long, the ultimate segments linear-oblong to elliptic, 3-8 mm long, 0.5-2 mm wide; flowers in axillary 1-6 cm long racemes; sepals 1-3 mm long, often deciduous by anthesis; corolla yellow, fading to white, 8-18 mm long, petals 4, the outer 2 more or less fused below with the upper petal, these broader than the lower and spurred, expanded to winged at the apex, the inner 2 petals erect, expanded and fused at the apex, clawed at the base; style elongate; fruit a capsule; seeds many, dark, shiny. Occasional to locally common; widespread; sagebrush, mt. brush, ponderosa pine, aspen, and fir communities, somewhat adventive with disturbance; 7,000-9,500 ft; May-Aug. Apparently our plants are referable to var. occidentalis Engelm. in Gray.

Dicentra Bernh. Bleedingheart

Dicentra uniflora Kell. Steer's head. Diminutive, scapose perennial from fascicled tuberous roots, 2-10 cm tall; base of petioles and scapes etiolated, subterranean, easily detached from the tuberous roots; leaves basal, the blades 1-5 cm long, divided into 3-5 leaflets, the leaflets with 3-9 deep lobes; scapes with 1 or 2 small bracts below the solitary terminal flower; sepals 2, green, deciduous in age; petals 4, white to pinkish, the outer 2 narrowly elongate with the upper 1/2 slender and widely spreading to recurved, the inner 2 erect, arrowhead-shaped and clawed, usually purple at the fused tips; capsules 1-1.3 cm long; seeds black and shiny. Entering the w. edge of our area on Strawberry Ridge; aspen, fir, and forb-grass communities; 8,000-9,000 ft; blooms as early as snow melt allows.

GENTIANACEAE Gentian Family

Annual or perennial, mostly glabrous herbs; leaves simple, entire, opposite or whorled, sessile and often fused at the base, stipules lacking; flowers bisexual, radially symmetrical, 4-5 merous; calyx more or less deeply lobed; corolla united or of nearly separate petals, the lobes often bearing conspicuous nectary glands or fringed appendages near the base or in the throat; stamens 4-5, arising from the corolla tube, alternate with the lobes; pistil 1; ovary superior; style elongate or obsolete; stigmas 2; fruit a capsule, usually 2-valved; seeds numerous.

- 1 Leaves in whorls of 3-5 (6), the lower ones 8-50 cm long, 3-15 cm wide; flowers greenish, usually spotted with purple; corolla 4-lobed to the base..... Frasera
 1 Leaves opposite, mostly much smaller; corolla various
 2 Corolla cleft to the base, the petals appearing separate; basal leaves with well-developed petioles Swertia

GENTIANACEAE

- 2 Corolla united, the tube usually longer than the lobes; basal leaves sessile if present
- 3 Corolla 5-lobed, mostly over 2 cm long, with pleated folds; plants perennial..... Gentiana
- 3 Corolla either 4-lobed or less than 2 cm long or without pleated folds; plants annual or biennial except in Gentianopsis barbellata
- 4 Leaves 3-8 mm long, with a connate-sheathing base; corolla pleated, the lobes not ciliate nor with fringed appendages within at the base..... Gentiana prostrata
- 4 Leaves often longer, without a connate-sheathing base; corolla not pleated
- 5 Corolla blue or yellowish, not salverform, the lobes either ciliate or with fringed appendages within
- 6 Corollas 2-5 (6) cm long, not fringed within at the base of the lobes, the lobes usually 4, with erose or fringed margins; flowers solitary or terminating long peduncles; plants annual or perennial..... Gentianopsis
- 6 Corollas not over 2 cm long, more or less fringed within at the base of the lobes, the lobes 4 or 5, the margins entire or nearly so; flowers solitary or several to many in clusters; plants annual..... Gentianella
- 5 Corolla pink, white or yellowish, salverform, neither ciliate nor with fringed appendages within..... Centaurium

Centaurium Hill Centaury

Centaurium exaltatum (Griseb.) Wight. Exalted c. Glabrous annual, stems 1-several, erect, simple or sparingly branched, 5-30 cm tall; basal leaves few or lacking, soon withering; stem leaves elliptic, lanceolate or oblanceolate, 5-30 mm long, entire; flowers solitary or in terminal cymes, the pedicels slender; calyx 6-10 mm long, cleft to near the base, the lobes narrow; corolla salverform, 7-20 mm long, the tube white to yellowish, about twice as long as the calyx when mature, the lobes rose-pink, rarely white, to 5 mm long; stamens 4 (5) arising at about midlength in the corolla. Scattered across the lower elevations of the area, usually in alkaline, moist areas, not expected much over 6,500 ft; July-Sept.

Frasera Walt. Green Gentian

Frasera speciosa Dougl. Elksear; showy elkweed. [Swertia radiata (Kellogg) Kuntze] Robust perennial from a simple caudex and stout taproot; stem solitary, erect, 40-100 (200) cm tall, to 3 cm thick at the base; basal leaves mostly oblanceolate, forming a rosette, generally withered by anthesis, stem leaves in whorls, sometimes opposite, the lower ones 10-30 cm long; flowers few to several, in axillary peduncled cymes; calyx lobes 1-2 cm long, lobed to near the base; corolla lobes about as long as the calyx lobes, greenish-white to yellow-green, usually spotted with purple, each with a fringed nectary gland; stamens 4; style 3-5 mm long. Scattered across the area, in various plant communities including sagebrush, aspen, riparian, and conifer, also on open rocky slopes and on talus; 7,500-10,500 ft; June-Aug. The differences between Frasera and Swertia are reported to disappear in European plants. We maintain 2 genera in accord with N. Holmgren in Cronquist and others (1984), to emphasis the differences in our two members of the complex; they bear little resemblance to each other except in technical features.

Gentiana L. Gentian

Herbs from taproots or rhizomes; leaves entire; flowers solitary to several in cymose clusters; calyx and corolla each united, the lobes (4) 5, the corolla often with pleated folds that bear appendages or teeth at the sinuses; stamens inserted on the corolla-tube; style short or none; stigmas 2; capsules 1-celled.

- 1 Flowers mostly solitary and terminal; corolla 8-22 mm long, whitish or greenish-purple to blue; leaves 3-8 mm long, those of the stem conspicuously sheathing; plants annual, not over 10 cm tall..... G. prostrata
- 1 Flowers solitary or not; corolla mostly over 25 mm long; leaves over 15 mm long; plants perennial, 5-40 cm tall
- 2 Corolla white or yellowish, spotted and striped with purple, about 35-45 mm long, basal and stem leaves over 3 times as long as wide..... G. algida
- 2 Corolla blue or purplish, occasionally with yellowish margins, mostly 25-35 mm long; leaves less than 3 times as long as wide
- 3 Leaves ovate to obovate, mostly less than 2 times as long as wide; plants glabrous; flowers often solitary (up to 3); calyx lobes minutely scabrous along the margin, the tube 6-9 mm long..... G. calycosa
- 3 Leaves generally 2 times as long as wide, finely ciliolate; stems finely puberulent in lines below the leaves; flowers usually several to many; calyx lobes more or less glandular-ciliolate; calyx tube 4-5 mm long..... G. affinis

Gentiana affinis Griseb. Rocky Mt. pleated g. (G. forwoodii Gray) Infrequent in and adjacent to the Uinta Mts. and Blue Mt.; moist or wet places often at the ecotone of dry and wet meadows; from about 6,000 ft to above timberline; July-Sept.

Gentiana algida Pall. Whitish g., arctic g. (G. romanzovii Ledeb.) Occasional; Uinta Mts.; wet and dry meadows and dry alpine tundra; 10,200-13,000 ft; July-Sept.

Gentiana calycosa Griseb. Explorer's g., mt. bog g., Rainier pleated g. [G. parryi Engelm. misapplied (Graham 1937)] Common; Uinta Mts.; dry and wet meadows, and alpine tundra; 10,000-11,500 ft; July-Sept.

Gentiana prostrata Haenke Moss g. [G. fremontii Torr.; Cimnalis fremontii (Torr.) W. A. Weber; C. prostrata (Haenke) A. & D. Love] Occasional; Uinta Mts.; wet meadows and moist places in conifer woods; 9,000-11,600 ft; July-Sept.

Gentianella Moench Gentians

Similar to Gentian except the corollas not pleated and the lobes without appendages or teeth in the sinuses, and plants annual.

- 1 Corolla yellowish..... G. tortuosa
- 1 Corolla bluish or whitish but not yellowish
 - 2 Flowers solitary on a naked peduncle 2-10 cm long; plants not over 10 cm tall..... G. tenella
 - 2 Flowers several to many in short-peduncled clusters from axils of leaves; plants sometimes over 10 cm tall
 - 3 Calyx lobes about equal; appendages inside the corolla tube at the base of the lobes with wholly separate fimbriae..... G. amarella
 - 3 Calyx lobes unequal, some leaflike and more or less enveloping the smaller ones; appendages inside the corolla tube at the base of the lobes with fimbriae that are united at the base..... G. heterosepala

Gentianella amarella (L.) Boerner Little g., Felwort. [Gentiana amarella L.; G. plebeia Cham.; G. strictiflora (Rydb.) A. Nels.; Gentianella amarella ssp. acuta (Michx.) Gillett] Occasional or locally common; widespread; along streams in aspen and conifer woods and alpine tundra; 7,320-11,500 ft; July-Sept.

Gentianella heterosepala (Engelm.) Holub (Gentiana amarella ssp. heterosepala J. S. Gillett; G. heterosepala Engelm.) Occasional; widespread; sagebrush, aspen, and conifer communities; 7,400-10,650 ft; July-Sept.

Gentianella tenella (Rottb.) Borner Lapland g. (Gentiana monantha A. Nels.; G. tenella Rottb.) Apparently uncommon; the few records seen are from subalpine dry and wet meadows, and turf of alpine tundra on the Uinta Mts; July-Aug. Our plants are referable to ssp. tenella.

Gentianella tortuosa Jones Tortuose g. Entering our area only in the extreme sw. portion on hills and slopes of Green River shale, Willow Creek drainage, W. Tavaputs Plateau; July-Aug.

Gentianopsis Ma Fringed Gentians

Similar to Gentiana but the corollas not pleated.

- 1 Plants perennial; flowers closely subtended by a pair or bractlike leaves; stems not over 15 cm tall; taproot yellowish..... G. barbellata
- 1 Plants annual; flowers on naked peduncles 2 cm long or longer; stems usually over 15 cm tall; taproot not particularly yellowish..... G. detonsa

Gentianopsis barbellata (Engelm.) Gillett (Gentiana barbellata Engelm.) The records seen are from gravelly ground and rock outcrops in limestone in Rock Creek and Lake Fork drainages of the Uinta Mts.; near and above timberline; Aug-Sept.

Gentianopsis detonsa (Rottb.) G. Don Smaller f. g. (Gentiana detonsa Rottb.; G. thermalis Kuntze) Seldom collected, the few records seen are from wet places at moderate elevations in and adjacent to the Uinta Mts. and around Strawberry Valley. Our plants are referable to var. elegans (A. Nels.) N. Holmgren.

Swertia L. Swertia

Swertia perennis L. Star or alpinebog s. (S. palustris A. Nels.) Perennial from short rhizomes; stem usually solitary, erect, 10-50 cm tall; usually unbranched; basal leaves prominent with distinct petioles, (2) 4-20 cm long, obovate or spatulate; stem leaves few, opposite or a few alternate, sessile, much reduced upward; flowers 1-3; calyx 3-10 mm long, the lobes lanceolate; corolla dull blue-purple, occasionally nearly white, generally streaked with green or purple, the lobes 6-14 mm long, widely spreading, each bearing small, fringed nectary-glands about 1 mm long; capsule about 1 cm long. Occasional; Uinta Mts. and extreme w. of W. Tavaputs Plateau; wet meadows, seeps and springs, and along streams; 8,500-11,500 ft; July-Aug.

GERANIACEAE Geranium Family

Annual or perennial herbs; leaves alternate or opposite; flowers bisexual, radially symmetrical, in cymes or umbels; sepals 5, separate, often awn-tipped; petals 5, separate; stamens usually 10, the filaments often dilated and sometimes fused at the base; pistil 1; ovary superior, with 3-5 (8) weakly fused carpels, the styles 5 and fused around an extension of the receptacle and forming a much elongate stylar column with 5 free stigmas at the apex; fruit a schizocarp, the 5 mericarps separating at maturity, each splitting upward from the base and with an elongate, coiled or twisted persistent style.

- 1 Leaves pinnately much dissected, the basal ones in a rosette; fertile stamens usually 5, 5 other stamens usually reduced to filaments..... Erodium
 1 Leaves palmately lobed to divided, the basal ones when present not forming a rosette; functional stamens 10..... Geranium

Erodium L'Her. Storksbill; Filaree

Erodium cicutarium (L.) L'Her. Heronsbill, alfileria. Winter annual forming a prominent rosette; stems erect to prostrate 3-60 cm long; herbage often turning red in age, often with gland-tipped hairs; stem leaves opposite, few, much reduced, pinnately divided or compound, but somewhat less dissected than the basal ones; inflorescence an umbel with (1) 2-12 flowers; sepals 3-7 mm long, persistent; petals 4-11 mm long, pink to rose-violet, readily deciduous; stamens 5, alternating with 5 scalelike staminodes; stylar column 1-5 (7) cm long; mericarps 4-7 mm long. In many plant communities, often rather weedy, usually on disturbed ground, lower elevations to about 8,000 ft; native of the Mediterranean region and not as abundant in our area of cold winters as in warmer areas of the Intermountain Region; April-Oct.

Geranium L. Wild Geranium

Plants perennial from a caudex; stems frequently dichotomously branched; leaves long-petiolate and usually opposite near the base of the stem, sessile and alternate in the inflorescence, mostly palmately lobed or divided, the blades more or less orbicular in outline; flowers 1 or 2 or more in cymes, borne on axillary peduncles; stamens 10, all fertile or rarely 3-5 reduced to staminodes; flowers and fruit as described in the family description.

- 1 Plants perennial; petals 12-22 mm long; stylar column 2-3.5 cm long
 2 Petals pink to purple, rarely white; stigmas (4) 5-7 mm long in fruit; mericarps 5-6 mm long; taproot ropelike with loose fibers, the pithy center brownish..... G. viscosissimum
 2 Petals white with pinkish or purplish veins; stigmas 4-5 mm long in fruit; mericarps 3-5 mm long; taproot without loose fibers, the pithy center pinkish..... G. richardsonii
 1 Plants annual; petals 6-8 mm long; stylar column about 1-1.8 mm long..... G. bicknellii

Geranium bicknellii Britt. Bicknell g. (G. carolinianum L. var. longipes Wats.) The 1 specimen seen (Hutchings 125 ANF) is from Daggett Co., Vernal-Manila road, burnt patches; 7,200 ft; July.

Geranium richardsonii Fisch. & Trautv. White g., Richardson g. Frequent; widespread; meadows, aspen and conifer woods, and rarely talus, generally of more moist or shaded areas than G. viscosissimum; (6,000?) 7,200-10,600 ft; June-Sept.

Geranium viscosissimum F. & M. Sticky purple g. (G. caespitosum James misapplied; G. fremontii Torr. misapplied) Occasional to common; widespread; most common in open grass-forb communities, also in sagebrush, and mt. brush communities, occasionally in aspen and conifer woods; 7,200-10,400 ft; June-Sept. Our plants are referable to var. nervosum (Rydb.) C. L. Hitchc. (G. nervosum Rydb.).

HALORAGIDACEAE Water Milfoil Family

Myriophyllum L. Water Milfoil

Myriophyllum spicatum L. Aquatic perennial herbs; leaves 3 or 4 per node of the slender stems, 1-3 cm long, pinnately dissected into 13-23 filiform segments; flowers verticillate, 3-5 per node, axillary or in an interrupted, usually emergent spike, unisexual or unisexual and bisexual ones mixed in the same spike, the upper ones usually staminate; sepals 2-4; petals 2-4, quickly deciduous, about 2.5 mm long; stamens 8; fruit an achene, about 2-3 mm long. Occasional; seldom collected; to be expected throughout the area in quiet streams and still waters of ponds and lakes, often brackish water, mostly at lower or mid elevations; July-Sept. Most of our plants are referable to var. exalbescens (Fern.) Jeps. (M. exalbescens Fern.) with entire to serrulate floral bracts equal to or shorter than the fruit. However, Goodrich 3433 UTC from 7,200 ft in Whiterocks Canyon seems to belong to var. spicatum (M. verticillatum L.) with serrate to pectinate floral bracts mostly longer than the fruit.

HIPPURIDACEAE Mare's Tail Family

Hippuris L. Mare's Tail

Hippuris vulgaris L. Perennial, submerged or emersed, usually aquatic herbs from creeping rootstocks, 10-40 (60) cm tall; leaves whorled, (4) 6-12 per node, 8-35 (50) mm long, 1-2 mm wide, linear, entire, glabrous; flowers mostly bisexual, without a conspicuous perianth, axillary in the whorls of leaves; fruit nutlike, 1-seeded, about 2 mm long. Occasional; widespread; swamps and ponds and slow-moving streams, sometimes in mud; 5,000-10,000 ft; June-Aug.

HYDROCHARITACEAE Frogs-bit Family

Elodea Michx. Waterweed

Submersed aquatic perennial herbs with fibrous roots; stems slender, branching, often rooting at the nodes; leaves sessile, entire, or finely serrulate; flowers small, borne on threadlike perianth tubes (these appearing as scape pedicels), the tubes often elongate and usually bringing the flower to the water surface, the base of the tube enclosed in a tubular bilobed spathe, regular, mostly unisexual, axillary, solitary or the staminate ones rarely 2-3; sepals 3, greenish; petals 3, whitish; stamens 9; stigmas 3, usually bilobed; fruit dry, indehiscent, ripening under water.

- 1 Upper and middle leaves opposite, the larger ones mostly (17) 20-26 mm long; spathes of pistillate flowers 3-7 cm long; petals of pistillate flowers 3.5-4 mm long; spathes of staminate flowers 2-5 cm long..... E. longivaginata
 1 Upper and middle leaves in whorls of 3, 5-17 mm long; spathes of pistillate flowers 1-2 cm long; petals of pistillate flowers 2.3-2.6 mm long; spathes of staminate flowers to 1.5 cm long..... E. canadensis

Elodea canadensis Michx. Canada w. The 1 specimen seen (Neese & Trent 12352) is from Stuntz Reservoir on Blue Mt., to be expected across the area.

Elodea longivaginata St. John Long-sheath w. The 1 specimen seen (Harrison 7980) is from Strawberry Reservoir, to be expected across the area.

HYDROPHYLLACEAE Waterleaf Family

Annual or perennial herbs, often rough-hairy or stipitate-glandular; leaves alternate or lowermost opposite, simple, entire, toothed, or pinnately compound; stipules lacking; flowers bisexual, solitary or in modified cymes, these often coiled at first and elongating with age; calyx cleft to the middle or more; corolla united, 5-lobed, regular or nearly so; stamens 5, alternating with the corolla-lobes, attached to the tube; ovary superior, the style usually cleft to divided, with 2 branches; fruit a capsule with 1-many seeds.

- 1 Leaves all basal; flowers solitary at the end of naked peduncles..... Hesperochiron
 1 Leaves not all basal; flowers not solitary, or if so then in the axils of leaves
 2 Flowers solitary in the axils of leaves, on ascending curved or declined pedicels, these 5-15 mm long in fruit; stems with minute reflexed prickles; herbage otherwise glabrate; calyx with reflexed appendages between each lobe..... Nemophila
 2 Flowers not solitary in axils of leaves, or if so then sessile or nearly so; stems not as above; herbage often pubescent or glandular or both; calyx without reflexed appendages
 3 Plants annual, not over 4 cm tall, not glandular; stems dichotomously branched, often prostrate, hirsute; leaves entire, linear or nearly so, clustered toward the ends of the branches, exceeding the flowers; flowers sessile and solitary in the upper leaf-axils; stamens unequally inserted on the corolla tube, included..... Nama
 3 Plants perennial or if annual then glandular and leaves not as above; flowers in cymes or racemes; stamens equally inserted on the corolla tube
 4 Flowers in capitate clusters, these well exceeded by the leaves; plants perennial from fleshy-fibrous roots, without a taproot or caudex, known from w. of Duchesne..... Hydrophyllum
 4 Flowers in cymes or racemes, some usually exceeding the leaves or else plants annual; plants perennials from taproots that are sometimes surmounted by caudices, or else annuals... Phacelia

Hesperochiron Wats.

Hesperochiron pumilus (Griseb.) T. C. Porter [Capnoorea pumila (Dougl.) Greene] Acaulescent, perennial herbs from a taproot; leaves all basal, the blades oblanceolate to elliptic or ovate, 2.5-5 cm long; peduncles few, 2-5 (8) cm long; calyx lobes 4-9 mm long, glabrous or nearly so except for the ciliate margin; corolla 6-15 mm long, rotate, white or tinged with lavender; the limb 1.5-3 cm wide, the tube densely hairy inside; style shortly 2-cleft; capsule, unilocular, many-seeded. A single specimen seen (C. DeMoisy Jr. 12 RM) is from Whiterocks; 6,000 ft, dry level ground.

Hydrophyllum L. Waterleaf

Hydrophyllum capitatum Dougl. ex Benth. Ballhead w. Perennial herbs, 10-40 cm tall; stems delicately attached to a short, rather deep rhizome to which a cluster of fleshy-fibrous roots is attached; leaves few, the blades 5-15 cm long, to 10 cm wide, pinnately divided into 5-11 segments, the upper segment confluent; flowers in 1-several globose clusters, in the axils of leaves; corolla 5-9 mm long, lavender-blue to white, bell-shaped; stamens well exerted. Occasional in and around Strawberry Valley to Currant Creek, and (apparently rare) in the Uinta Mts. w. of Rock Creek; mostly in aspen communities; 7,800-9,400 ft; May-June. Our plants are referable to var. capitatum.

Nama L.

Nama densum Lemmon As described in the key and flowers white to lavender, mostly 2.5-7 mm long, the limb 1-4 mm wide; style 0.3-2 mm long; capsules 2-3 mm long, with about 15 seeds. Occasional; Duchesne, Moffat and Uintah Cos.; desert shrub, pinyon-juniper, and sagebrush communities; 4,800-5,700 ft; May-Aug. Our plants are referable to var. parviflorum (Greenm.) C. L. Hitchc.

Nemophila Nutt.

Nemophila breviflora Gray Woodlove. Weak-stemmed annual, 3-30 cm tall, decumbent to erect; leaves alternate or the lower most opposite, 1.5-6 cm long including the petiole, 1.5-4 cm wide, pinnately divided into 3-7 segments, these usually entire; calyx lobed nearly to the base, the lobes 3-5 mm long, ciliate; corolla white or lavender, about 2 mm long, usually surpassed by the calyx; stamens included; style shallowly bifid; capsule 3-5 mm wide, 1-seeded, the seed 2-4 mm in diameter, reddish-brown, smooth to faintly pitted. The few records seen are from Strawberry Valley to Currant Creek, and 1 from Goslin Mt., Daggett Co., and one from the e. end of the Uinta Mts., and reported (Bradley 1950) for Cold Springs Mt.; mostly with aspen; April-June.

Phacelia Juss. Phacelia; Scorpionweed

Annual or perennial herbs, usually pubescent and sometimes glandular; flowers 5-merous, often borne in coiled, secund cymes that unfold and straighten as the flowers mature, the inflorescence then appearing racemose or paniculate; calyx lobed to near the base; corolla tubular to rotate, sometimes quickly deciduous; style shortly to deeply bifid; capsules with 1-many seeds.

- 1 Stamens and styles included in the corolla; plants annual, 2-25 cm tall
 - 2 Corollas yellow at least when fresh, persistent, 2.5-4 (5) mm long, about equalling or shorter than the calyx; plants hirsutulous, not glandular, approaching our area in Sweetwater Co., Wyoming..... P. lutea (H. & A.) J. T. Howell var. scopolina (A. Nels.) Cronq.
 - 2 Corolla not yellow, except sometimes for the tube, the limb white, blue, or lavender, deciduous; plants glandular
 - 3 Leaves toothed to pinnately divided, oblong to linear in outline; filaments and style glabrous; corolla whitish, the tube sometimes pale yellow, 2.5-4 mm long..... P. ivesiana
 - 3 Leaves entire or undulate, elliptic, ovate or orbicular; filaments hairy at least at the base
 - 4 Corolla 3.5-4.5 mm long, the limb 2-3 mm wide, white or bluish, the tube white or yellowish; leaves not clustered toward the ends of the branches; inflorescence exceeding the leaves..... P. incana
 - 4 Corolla 5-8 mm long, the limb to 1 cm wide, lavender-violet to purple, the tube often vivid yellow; leaves clustered toward the ends of the branches, sometimes exceeding the inflorescence..... P. demissa
- 1 Stamens and styles exerted from the corolla, only slightly so in P. franklinii but then plants usually taller
 - 5 Plants strongly stipitate-glandular, ill-scented, annual or biennial, from a taproot, without a caudex; stamens and styles surpassing the corolla by 3-6 mm or more
 - 6 Leaves simple, pinnately lobed but not cut to the midrib; plants widespread..... P. crenulata
 - 6 At least some of the leaves cut to the midrib or compound with 3 or more leaflets; plants of e. Uintah, Rio Blanco, and perhaps Moffat Cos..... P. glandulosa
 - 5 Plants not glandular, or if so as sometimes in P. franklinii then stamens surpassing the corolla by less than 3 mm; biennial or perennial
 - 7 Leaves entire, or with 1-2 (4) pairs of lobes or leaflets near the base and with a large, entire terminal segment
 - 8 Plants biennial or short-lived perennial from a taproot, usually with a single, erect stem over 50 cm tall or this surrounded by several ascending shorter stems; some of the middle and lower leaves usually with 1-2 (4) pairs of lateral lobes or leaflets at the base; herbage bristly-hirsute or hispid, hardly densely silvery-pubescent; flowers white to yellow-white..... P. heterophylla

- 8 Plants perennial from a taproot, surmounted by a branching caudex, usually with more or less equal, suberect to prostrate stems seldom over 50 cm tall; leaves all entire, rarely some of them with a pair of small lateral lobes near the base; herbage often densely silvery-pubescent with short hairs; flowers white to lavender..... P. hastata
- 7 Leaves toothed or pinnately lobed to pinnatifid the entire length, without a large, entire terminal segment
- 9 Filaments (1.5) 2-3 times longer than the corolla, exerted well over 3 mm; corolla pubescent withint; plants perennial, usually several-stemmed, common..... P. sericea
- 9 Filaments exceeding the corolla lobes by about 3 mm or less; corolla glabrous within; plants annual or biennial, single-stemmed or with a central stem surrounded by ascending shorter stems, apparently rare..... P. franklinii

Phacelia crenulata Torr. in Wats. (P. corrugata A. Nels.) Occasional to locally common in some years; widespread (no records seen from Daggett Co.); desert shrub, sagebrush, and pinyon-juniper communities; 4,700-6,500 (7,200) ft; May-June (July). Our plants with short stipitate-glandular hairs are referable to var. corrugata (A. Nels.) Brand.

Phacelia demissa Gray Locally common from Tridell e. to Dinosaur National Monument and Bonanza; desert shrub communities and often on clay barrens; 4,900-6,200 ft; May-June. Our plants with stems glandular-puberulent and with styles 1.5-2 mm long are referable to var. demissa.

Phacelia franklinii (R. Br.) Gray Known in our area from Strawberry Valley and Currant Creek and Willow Creek drainages of Strawberry River; silver sagebrush communities, often on recent alluvium; 7,700-8,500 ft; July-Aug.

Phacelia glandulosa Nutt. Glandular p. Apparently infrequent; extreme e. Uintah Co. se. of Bonanza, and Rio Blanco Co.; desert shrub, sagebrush, and mt. brush communities, and roadcuts, usually on clay soils; 5,000-8,400 ft; May-June. We have been unable to find Nielson 85, which was reported by Bradley (1950) for Lookout Mt., Moffat Co.

Phacelia hastata Dougl. ex Lehm. (P. leucophylla Torr.) Common from Strawberry Valley across the Uinta Mts. and flanks of these mountains and to Zenobia Peak; sagebrush, riparian, meadow, aspen, and open conifer communities or to a little above timberline, often on rocky ground; 7,000-10,600 ft; late June-early Oct.

Phacelia heterophylla Pursh Varileaf p. Occasional in Strawberry Valley to Tabiona, and on the E. Tavaputs Plateau (Hill and Stuart Creeks), and Harrington 1426 CS reported by Bradley (1950) for 10 mi w. of Maybell; mostly in aspen and mt. brush communities; 7,000-9,800 ft; June-July. Our plants belong to var. heterophylla. Apparently hybridizing with P. hastata (Cronquist and others 1984).

Phacelia incana Brand. Known in our area by 3 records: N. H. Holmgren & J. Reveal 1897 from lower Willow Creek s. of Ouray, Uintah Co.; S. L. Welsh 18489 and W. A. Weber and others 1926, both from Raven Ridge, Rio Blanco Co., on barren shale ridges; 5,200-5,600 ft; late May-June.

Phacelia ivesiana Torr. in Ives. Occasional; Tridell s. to Ouray and e. into Colorado; desert shrub, sagebrush, and juniper-mt. brush communities; 4,800-6,000 ft; May-June.

Phacelia sericea (Graham) Gray Silky p. (P. idahoensis Henderson misapplied) Common from Strawberry Valley and across the Uinta Mts. to the mts. of Moffat Co. and 2 specimens seen from the E. Tavaputs Plateau; sagebrush, aspen, and open conifer forest communities; 7,000-10,200 ft; mid May-July. Our plants are referable to var. ciliosa Rydb. Phacelia idahoensis (sometimes reported for our area) is a plant of n. and c. Idaho with stamens included or barely exerted from the corolla. Our plants have the stamens well exerted.

HYPERICACEAE St. Johnswort Family

Herbaceous plants, sometimes woody at the base; leaves opposite, simple, entire, punctate with translucent or dark colored glandular dots; flowers bisexual, regular, cymose; sepals 5 (rarely 4); petals separate, 5 (rarely 4), yellow; stamens few to many, often in 3-5 clusters with the filaments united below; ovary superior, 1-celled; fruit a capsule.

Hypericum L. St. Johnswort

- 1 Stems mostly prostrate, 3-15 (20) cm long; petals mostly less than 4 cm long, about equal to the sepals H. anagalloides
- 1 Stems erect, 20-60 cm tall; petals 7-14 mm long, longer than the sepals..... H. formosum

Hypericum anagalloides C. & S. Bog s. j. Rare or infrequent; Uinta Mts.; wet meadows, along streams, and in moist woods; 8,500-10,500 ft; July-Aug.

Hypericum formosum H. B. K. Western s. j. Occasional; Uinta Mts., Strawberry Valley, and probably Tavaputs Plateau; meadows and along streams; 7,000-9,000 ft; June-Aug.

IRIDACEAE Iris Family

Perennial herbs (ours); leaves mostly basal, linear or nearly so, usually in 2 ranks, sheathing at the base, the lower ones enfolding the upper, equitant; flowers bisexual, subtended by spathe-like bracts; perianth of 6 segments in 2 series of 3 each; stamens 3; ovary inferior, 3-chambered; style 3-cleft, distinct; fruit a many-seeded capsule.

- 1 Flowers over 5 cm wide, irregular; sepals and petals different; style branches larger and petaloid; capsules 3-5 cm long..... Iris
 1 Flowers not over 2 cm wide, regular; sepals and petals alike; style branches small; capsules less than 1 cm long..... Sisyrinchium

Iris L. Flag; Iris

Iris missouriensis Nutt. Rocky Mt. f., western blue f. Stems from thick rootstocks, 20-50 cm tall; leaves light green, glaucous, somewhat shorter to about as long as the flowering stem, up to 1 cm wide; sepals about 6 cm long, 2 cm wide, the claw yellowish-white, blade lilac or purple-veined on a paler background; petals somewhat shorter than the sepals, not veined; capsule 3-5 cm long. Common to locally abundant; widespread; meadows, along small streams, around seeps and springs, mostly in sunny places, often on soils of clay texture; up to about 8,000 ft; May-July.

Sisyrinchium L. Blue-eyed Grass

Caespitose perennial herbs with clusters of fibrous roots; stems slender, compressed, flattened, often conspicuously winged; leaves grasslike, sheathing at the base, the blades flat, linear; inflorescence enclosed (when young) or subtended (at maturity) by 2 bracts (spathes); flowers solitary or few; perianth bluish to violet; stamens with filaments united into a tube surrounding the style.

- 1 Stems mainly unbranched, the spathe bracts unequal, the inner bract 13-35 mm long, the outer bract (15) 20-75 mm long..... S. idahoense
 1 Stems mainly branched with a leaflike bract subtending 2 or more pedunculate spathes, the peduncles up to 14 cm long; spathe bracts subequal, the inner one 12-24 mm long, the outer one 13-26 mm long..... S. demissum

Sisyrinchium demissum Greene (S. radicum Bickn.) Occasional; along the s. flank of the Uinta Mts. and adjacent in the Basin from Rock Creek to Lapoint, Range Creek, W. Tavaputs Plateau; meadow and streamside communities and near seeps; 5,400-7,500 ft; June-Aug.

Sisyrinchium idahoense Bickn. Idaho b. (S. occidentale Bickn.) Occasional; widespread; wet meadows and streamside communities; 7,500-8,800 ft; June-Aug. Reports of S. angustifolium Mill. and S. montanum Greene (both from e. of our area), and S. halophilum Greene (from w. of our area), are likely based on plants of S. idahoense.

ISOETACEAE Quillwort Family

Isoetes L. Quillwort; Merlin Grass

Submerged or emergent perennial herbs; stems reduced to subterranean, cormlike structures with slender fibrous roots; leaves (sporophylls) onionlike, clustered at the summit of the cormlike stems, soft, linear, the main portion of the blade with a central vascular bundle (seen in cross section) flanked by 4 longitudinal air cavities and transversed by numerous partitions; reproduction by spores; sporangia borne on the expanded basal portion of the leaves, more or less covered by a velum; spores of 2 types - microspores (typically borne on inner leaves) and megaspores (typically borne on the outer leaves). The feature of the megaspores used in the following key are not detectable by means ordinarily available in the field. Power of 40X or greater is helpful and perhaps necessary.

- 1 Megaspores with separated tubercles, about 0.3-0.45 mm in diameter; leaves 6-25, 5-10 (15) cm long, stomata present but few; ligules cordate; velum narrow, covering about 1/4-1/3 of the sporangia; sporangia orbicular or oval, 3-4 (6) mm long..... I. bolanderi
 1 Megaspores with spines or with confluent ridges, about 0.5-0.65 mm in diameter; leaves 5-20 cm long; ligules deltoid or short-triangular
 2 Megaspores with spines; leaves 10-35, erect or recurved, not especially rigid; stomata present but few; velum covering 1/2 to all of the sporangia; sporangia oblong, spotted, 4-7 mm long..... I. echinospora
 2 Megaspores with confluent ridges becoming somewhat reticulate; leaves 9-30, rarely to 60, ridged; stomata lacking; velum narrow, covering about 1/3 of the sporangia, sporangia orbicular, 5-6 mm long..... I. lacustris

- Isoetes bolanderi Engelm. Permanent and ephemeral ponds, and shallow lakes in the conifer zone and perhaps above timberline on the Uinta Mts.
Isoetes echinospora Durieu (I. muricata Durieu) Listed for the Uinta Mts. (Cronquist and others 1977).
Isoetes lacustris L. (I. occidentalis Hend.) Listed for the Uinta Mts. (Cronquist and others 1977).

JUNCACEAE Rush Family

Perennial or annual grasslike herbs; stems terete or flattened, not jointed as in grasses, caespitose or arising singly or few together from rhizomes; leaves alternate and/or all basal, mostly 2-ranked, the blades linear, sometimes much reduced or lacking; inflorescence headlike to open-paniculate, subtended by an involucre bract; branches of the inflorescence, and the pedicles often subtended by scarious or hyaline bractlets; flowers bisexual, sometimes subtended by 2 bracteoles that are borne atop the pedicels and directly beneath the tepals; perianth much reduced, the petals and sepals hardly if at all differentiated and referred to here as tepals, the tepals membranous, rather scalelike, greenish or brownish, 6, in an outer and an inner series of 3 each; stamens (3) 6; pistil 1; ovary superior, with 1 or 3 chambers; style 1 with 3 stigmas; fruit with 1 or 3 chambers.

- 1 Seeds numerous in each capsule; leaves glabrous, the sheaths open; bracteoles subtending the flowers entire..... Juncus
- 1 Seeds 3 per capsule; leaf blades pubescent at least near the base except sometimes in Luzula parviflora, the sheaths closed; bracteoles subtending the flowers lacerate or dentate..... Luzula

Juncus L. Rush; Wiregrass

Perennial or annual herbs; stems terete or flattened; leaf blades flat, strongly folded, or terete and hollow with cross membranes at intervals (septate), or reduced to a bristle, or lacking; flowers as in the family.

- 1 Plants annual
 - 2 Plants 0.5-2 cm tall; the scapose stem with 1 flower; stamens (2) 3; leaves not over 0.5 cm long.... J. bryoides
 - 2 Plants (2) 5-30 cm tall, not scapose; inflorescence with (1) 3-20 flowers; stamens 6; leaves 0.5-10 cm long..... J. bufonius
- 1 Plants perennial
 - 3 Flowers (1) 2-3 (5) in a solitary terminal head; involucre bracts 2, about equaling or slightly exceeding the head, spathiform; plants densely tufted, without rhizomes, 3-15 (25) cm tall, uncommon; leaves basal..... J. triglumis
 - 3 Flowers either more numerous or not in a terminal head; plants various but generally differing from the above in 1 or more other features
 - 4 Stems with 0-2 (rarely more) leaf blades, the blades borne on the lower 1/5 of the plant, not hollow, not septate, the sheaths sometimes with a bristle tip (rudimentary blade); flowers not in heads but borne singly, each subtended by 2 scarious bracteoles; stems and leaves usually wiry; rhizomes lacking or short and plants caespitose except in J. arcticus
 - 5 Leaves all reduced to bladeless sheaths, the upper ones sometimes tipped with a bristle, this not over 5 mm long; inflorescence usually with more than 3 flowers; seeds not tailed
 - 6 Involucre bract about as long or longer than the stem; inflorescence appearing about or below midlength of the plant; stems seldom over 1 mm thick, somewhat tufted; plants of the Uinta Mts., above 9,500 ft, rare..... J. filiformis
 - 6 Involucre bract mostly shorter than the stem; inflorescence appearing well above midlength of the plant; stems often over 1 mm thick, mostly arising singly or few together from robust, dark rhizomes; plants widespread, mostly below 9,000 ft..... J. arcticus
 - 5 At least the uppermost leaf of most stems with a well-developed leaf blade well over 1 cm long, or if this leaf also bladeless in all stems then the inflorescence with only 1-3 flowers and seeds tailed
 - 7 Seeds tailed at each end, the tails 1/2 as long to longer than the body; leaves bladeless or the uppermost one often the only stem-leaf with a well-developed blade, the lower ones often ending in a bristle; the blades terete or channeled on the upper surface; auricles inconspicuous; inflorescence (1) 2-7 flowered; plants from 9,000-11,000 ft or higher
 - 8 Stems with bladeless leaves, the uppermost and sometimes the lower sheaths tipped with a bristle; tails of seeds equal to or longer than the body; capsules retuse, equal to or a little shorter than the tepals; tepals 5-8 mm long..... J. drummondii
 - 8 Most of the stems with a well-developed blade on at least the uppermost sheath, the lower sheaths often tipped with a bristle; tail of seeds about equal to or shorter than the body; tepals and capsules various

JUNCEAEAE

- 9 Capsules retuse at the apex; tepals 4-5 (5.5) mm long; only the uppermost sheath with a blade (blades entirely lacking on a few stems); tails of seeds about 1/2 as long as the body; anthers less than 1 mm long, the filaments longer than the anthers..... J. hallii
- 9 Capsules acute; tepals 5-7 mm long; upper and occasionally a lower sheath with a blade; tails of seeds equal or a little longer than the body; anthers 1.5-2 mm long, the filaments only about 0.3 mm long..... J. parryi
- 7 Seeds not tailed; stem leaves usually all with well-developed blades, the blades involute or strongly channeled; auricles more or less conspicuous; inflorescence often with more than 7 flowers; plants 4,800-10,000 ft
- 10 Outer tepals obtuse, sometimes incurved or with hooded tips, 1.5-2.2 mm long; leaf sheaths mostly extending halfway up the culm; plants with rhizomes (these usually rather short); known in our area from the flood plain of the Green River; 4,800-5,400 ft..... J. compressus
- 10 Outer tepals acute, straight, 3-5 mm long; leaf sheaths confined to the lower 1/3 of the stems; rhizomes hardly noticeable if present, plants not restricted to the flood plain of the Green River
- 11 Capsules retuse at the apex, completely 3-chambered; tepals with hyaline margins extending to the apex of the acute tip; panicles mostly less than 2 cm long; plants from about 7,000-10,000 ft, perhaps lower..... J. confusus
- 11 Capsules blunt but not retuse, incompletely 3-chambered; outer tepals with hyaline margins not extending onto the acuminate or acuminate-attenuate tip; panicles often over 2 cm long; plants commonly from 5,700-7,000 ft, perhaps higher or lower..... J. tenuis
- 4 Stems mostly with 2 or more well-developed leaf blades, at least the uppermost blade borne well above the lower 1/3 of the plant or else hollow and septate; flowers borne in 1 or more heads, each with or without subtending bracteoles; stems and leaves not especially wiry; rhizomes usually well developed
- 12 Leaves flat or strongly folded, not terete nor hollow, the sheaths with hyaline margins; capsules not exerted beyond the tepals
- 13 Outer tepals 2-3.5 mm long, obtuse, incurved, or slightly hooded; flowers not in heads but borne singly (see lead 10 above), each subtended by 2 bracteoles borne atop the pedicels and directly beneath the tepals..... J. compressus
- 13 Outer tepals either longer or acute or both; flowers borne in heads, without bracteoles, the pedicels and heads subtended by bracteoles but these not directly beneath the tepals
- 14 Leaves strongly folded with the narrow edge oriented toward the flattened stem; scarios margins of the sheaths extending well beyond the juncture with the stem and gradually tapering to inconspicuous auricles, or the auricles lacking, the blade more or less united beyond these scarios margins; tepals 2.5-4 mm long..... J. ensifolius
- 14 Leaves flat, not folded, the flat surface oriented toward the terete stem, the scarios margins of the sheaths not extending beyond the juncture with the stem; tepals various
- 15 Seeds with taillike appendages at both ends, the tails equaling the length of the body; heads sometimes more than 10-flowered; tepals granular-pappillate on the back..... J. regelii
- 15 Seeds without tails; heads seldom more than 10-flowered; tepals smooth on the back
- 16 Stamens 6; tepals 5-6 mm long; heads 1-8; plants widespread..... J. longistylis
- 16 Stamens 3; tepals 2-3.5 mm long; heads 2-40; plants known from the Piceance Basin.. J. marginatus
- 12 Leaves terete, hollow, often with internal cross-membranes at intervals (septate), if terete and hollow only toward the tip then the sheaths without hyaline margins and capsules exerted well beyond the tepals
- 17 Capsule tapering almost from the base into a mostly nondehiscent stylar beak, divergent in all directions in the mature heads; heads rarely solitary; tepals greenish, brownish or tawny, acuminate or acuminate-subulate; rhizomes sometimes swollen at the nodes; plants common in lowlands, and less common up to about 8,000 ft
- 18 Auricles 1.5-5 mm long; tepals mostly 4-5 mm long, rigid at the tip, acuminate-subulate; heads 10-15 mm in diameter, nearly globose; capsules about equaling the tepals; plants (20) 40-100 cm tall; stems to 6 mm thick; rhizomes with fusiform-tuberous nodes..... J. torreyi
- 18 Auricles not over 1 mm long; tepals mostly 2.5-4 mm long, acuminate but hardly subulate; heads 6-12 mm in diameter; capsules distinctly longer than the tepals; plants 10-40 (58) cm tall; stems 1-2 mm thick; rhizomes with slightly swollen nodes..... J. nodosus
- 17 Capsules rather abruptly narrowed above, ascending to slightly spreading in the heads, or if spreading in all directions then the heads solitary, the beak dehiscent or lacking; tepals deep brown or blackish-purple, rounded or acute; rhizomes not swollen at the nodes; plants mostly (not always) montane
- 19 Seeds tailed on both ends, the tails longer than the body; leaves folded or rolled, not truly terete at the base, becoming terete and hollow distally; the blades poorly differentiated from the sheath, the sheaths without hyaline margins; auricles lacking; capsules distinctly longer than the tepals..... J. castaneus
- 19 Seeds not tailed, or tails shorter than the body; leaves terete their whole length, blade distinct from the sheath, the sheaths with hyaline margins; auricles well developed

- 20 The longer tepals 3-5 mm long, or if shorter than the inflorescence with only 1 or rarely 2 heads, equal to or longer than the capsules; anthers various
- 21 Heads 1 or rarely 2, globose or nearly so, with 5-40 or more flowers; anthers 0.5-1 mm long, shorter than the filaments; tepals purplish-black..... J. mertensianus
- 21 Heads (1) 2-13, not or hardly globose, with about 3-15 flowers; anthers 1-2 mm long, longer than the filaments; tepals light brown to purplish-black..... J. nevadensis
- 20 Tepals 1.5-2.8 mm long, shorter than the capsules; inflorescence with (1) 3-25 heads; anthers to about 0.7 mm long
- 22 Outer tepals more or less acute, equal or shorter than the inner; capsules acute; branches of the inflorescence mostly spreading; plants not known from our area but to be expected J. articulatus L.
- 22 Outer tepals rounded, longer than the inner; capsule rounded at the apex; branches of the inflorescence mostly strongly ascending to erect..... J. alpinus

Juncus alpinus Vill. Alpine r. Rarely collected, the few records seen from the Uinta Mts. and flanks of these mts.; wet places; (5,350) 6,100-9,500 ft; July-Aug.

Juncus arcticus Willd. Wiregrass, Baltic r. (J. balticus Willd.) Common to abundant throughout the wetlands of the area, sometimes the dominant plant in heavily grazed pastures, tolerant of alkali, occasionally at moderate elevations, rare or lacking above 9,000 ft; May-July.

Juncus bryoides F. J. Hermann Minute r. (J. kelloggii Engelm. misapplied) The 4 specimens seen are from Diamond Mt., Daggett Co.; Pine Ridge, Uintah Co.; and Zenobia Peak, Moffat Co.; apparently mostly on spring-fed sandy soil or sandstone and quartzite; 7,875-8,200 ft; June-July.

Juncus bufonius L. Toad r. (J. sphaerocarpus Nees. misapplied) Occasional across the area; moist or ephemerally wet ground at low and moderate elevations; May-Sept.

Juncus castaneus Sm. The 1 specimen seen is from the n. slope of the Uinta Mts. just outside the area, reported by Graham (1937) for head of W. Fork of Whiterocks, to be expected across the alpine area of the Uinta Mts.

Juncus compressus Jacq. The 6 specimens seen are from the banks or flood plain of the Green River at Little Hole, Browns Park, Taylor Flat Bridge, and near Dinosaur Quarry; 4,800-5,400 ft; June-Aug.

Juncus confusus Cov. Colorado r. Occasional across the area; wet places; 7,000-9,800 ft; June-Aug. Similar to and closely related to J. tenuis, and might be considered a var. of that species (Cronquist and others 1977).

Juncus drummondii E. Mey. Drummond r. Common to abundant; Uinta Mts.; open woods, meadows, and open slopes of the spruce-pine zone, and on rocky ground and talus above timberline; 9,000-11,400 ft; June-Aug.

Juncus ensifolius Wikstr. Swordleaf r. (J. brunnescens Rydb.; J. saximontanus A. Nels.; J. tracyi Rydb.; J. xiphioides E. Meyer var. montanus Engelm.) Common; wet places across the area; 7,000-10,500 ft; May-Aug. A variable plant that has been divided into several taxa based on inconsistent features. The following 3 vars. are in the area:

- 1 Stamens usually 3, sometimes 6; plants rare in our area; the few specimens from isolated stations in our area may represent odd plants of var. montanus..... var. ensifolius
- 1 Stamens 6; plants common in our area
- 2 Heads seldom more than 10, each with 10-25 flowers, mostly 8-15 mm thick..... var. montanus (Engelm.) C. L. Hitchc.
- 2 Heads seldom less than 10, each with 4-12 flowers, usually 3-8 mm thick; plants wholly intergrading into the preceding var..... var. brunnescens (Rydb.) Cronq.

Juncus filiformis L. Thread r. Seldom collected, apparently rare; Uinta Mts.; wet meadows, streambanks, and other moist places; 9,000-10,500 ft; June-Aug. The report by Potter and others (1983) for along the Green River is based on a specimen (G 268!) of J. bufonius.

Juncus hallii Engelm. Hall r. Occasional; Uinta Mts.; often at the edge of moist meadows and open woods in the pine-spruce zone; 9,700-11,000 ft; June-Aug. Similar to J. parryi but distinct by virtue of the retuse capsules.

Juncus longistylis Torr. Longstyle r. Common; widespread; moist or wet places; 5,300-11,000 ft; June-Aug.

Juncus marginatus Rostk. Apparently known in the area from a single collection (WRE 799 CS) from the upper Piceance Basin.

Juncus mertensianus Bong. Mertens r. Common; Uinta Mts.; open moist woods, along streams, mostly in the pine-spruce zone; (7,200) 8,000-11,400 ft; June-Aug.

Juncus nevadensis Wats. Nevada r. (J. badius Suksd.) Occasional or locally common; Uinta Mts.; meadows and along streams; 7,600-10,000 ft; June-Aug. Much like J. mertensianus, but with 2-5 or more heads and with other minor differences.

Juncus nodosus L. Jointed r. Common in wet places across the area; 5,500-7,600 ft; July-Sept.

Juncus parryi Engel. Parry r. Occasional; Uinta Mts.; moist, often rocky, pine and spruce woods, and on rocky slopes above timberline; 9,800-11,000 ft; June-Aug.

Juncus regelii Buch. Regel r. The few specimens seen are from near Mirror Lake, Uinta Mts; July-Aug.

JUNCACEAE

Juncus tenuis Willd. Poverty r. (J. dudleyi Wiegand; J. interior Wiegand) Common; widespread; moist and wet places; 5,700-7,500 ft; June-Aug.

Juncus torreyi Cov. Torrey r. Common; widespread; along ditches and washes, and in wet lowlands, tolerant of alkali; 4,700-6,000 (7,000?) ft; May-July.

Juncus triglumis L. Three flowered r. [J. albescens (Lange) Fern.] Occasional across the Uinta Mts.; wet boggy places; 9,200-12,500 ft; July-Aug.

Luzula DC. Woodrush

Like Juncus, different by the features in the key.

- 1 Inflorescence on open panicles; flowers not congested; leaves glabrous at maturity, the blades flat, 3-13 mm wide; plants 25-70 cm tall..... L. parviflora
- 1 Inflorescence of congested headlike spike(s); leaves pubescent with long hairs along the margins near the collar; plants 5-20 (30) cm tall
 - 2 Flowers borne in a terminal compound spikelike inflorescence; leaves mostly 1-3 mm wide; plants below and above timberline..... L. spicata
 - 2 Inflorescence with 1 or more lateral spikes as well as the terminal one, some of the lateral ones often borne on elongated peduncles; leaves 2-6 mm wide, plants mostly below timberline..... L. campestris

Luzula campestris (L.) DC. Hairy w. [L. intermedia (Thuill) A. Nels.; L. multiflora (Retz.) Lej.] Occasional; Uinta Mts.; woods and along streams, pine-spruce zone; 8,000-11,000 ft; June-Aug.

Luzula parviflora (Ehrh.) Desv. Millet w. [L. piperi (Coville) Henry misapplied; L. wahlenbergii Rupr. misapplied; Juncoides parviflorum (Ehrh.) Cov.] Occasional; Uinta Mts. and toward Strawberry Valley; moist and wet places, mostly along streams; 7,500- 11,400 ft; June-Aug.

Luzula spicata (L.) DC. Spike w. Occasional to common; Uinta Mts.; in woods of the upper pine-spruce zone, and alpine tundra and rocky places above timberline; 10,400-12,500 ft; June-Aug.

JUNCAGINACEAE

Triglochin L. Arrowgrass

Plants perennial, herbaceous, glabrous, scapose, usually from rhizomes; leaves with a membranous ligule at the junction of the sheathing base and subterete to flattened blade; flowers bisexual, in bractless, spikelike racemes; tepals 6, green or purple-tinged, rather inconspicuous; stamens 6; carpels 3 or 6; style lacking or short; fruit of 1-seeded follicles, these united at first but later separating from the base upward.

- 1 Fruit linear to clavate, tapered to the base, 5-9 mm long; stigmas and fertile carpels 3; leaves less than 2 mm wide; ligules bilobed to the base; plants 15-30 (60) cm tall, mostly montane (above 7,500 ft) T. palustris
- 1 Fruit oblong, rounded at the base, 3-6 mm long; stigmas and fertile stamens 6; plants of valleys, up to 7,500 (8,600) ft
 - 2 Ligules entire or only slightly bilobed, (1) 1.5-5 mm long; leaf blades obcompressed, 1.5-2.5 (4) mm wide; stems closely tufted on a proliferating rhizome (10) 30-100 (120) cm tall, common.. T. maritima
 - 2 Ligules bilobed to the base or emarginate, 0.5-1 mm long; leaf blades nearly terete, 0.5-1 (1.5) mm wide; stems well spaced on the rhizomes, 15-30 (40) cm tall, rare..... T. concinna

Triglochin concinna Davy The 1 specimen seen (Neese & Peterson 5437) is from Spring Creek inlet of Flaming Gorge Reservoir, Daggett Co. near the Utah-Wyoming line, reported for Hells Half Mile along the Green River (Holmgren 1962); June-Aug.

Triglochin maritima L. Shore a. Common; widespread; wet alkaline lowlands, meadows and swamps; up to about 7,500 (8,600) ft; May-Sept.

Triglochin palustris L. Swamp a. The few specimens seen are from the Uinta Mts. and E. Tavaputs Plateau; wet meadows and along streams; 8,000-9,800 ft, to be expected down to 7,000 ft; July-Aug.

LAMIACEAE (LABIATAE) Mint Family

Annual to perennial herbs; stems generally 4-angled; leaves opposite, simple; stipules lacking; flowers bisexual, irregular (often 2-lipped) or occasionally nearly regular, the corolla united, the upper lip entire or 2-lobed and the lower lip often 3-lobed; stamens 2 or 4; pistil 1; ovary superior, 4-lobed; style 2-4 cleft; fruit of 4 nutlets, these laterally or basally attached and 1-seeded.

- 1 Inflorescence terminal, the flower whorls subtended by bracts much smaller than the stem leaves, the flowers usually so crowded as to conceal most of the internodes of the inflorescence; corollas (7) 10-20 (35) mm long; calyx (4) 6-12 mm long; stamens 4 except in Monarda

- 2 Leaves entire; corollas 8-20 mm long
- 3 Plants strongly odorous; stamens exerted; corolla white to pink-purple; leaves sessile or nearly so, 3-12 mm wide..... Mondardella
- 3 Plants not strongly odorous; stamens included; corolla blue or violet, rarely white or pink; lower leaves petioled, 5-30 mm wide..... Prunella
- 2 Leaves toothed
- 4 Corollas 25-35 mm long; inflorescence a head; stamens 2, somewhat exerted; calyx tube about 7-10 times longer than the short teeth, the teeth about 1 mm long..... Monarda
- 4 Corollas 7-14 mm long; inflorescence usually spikelike; stamens 4; calyx tube 1-2 times longer than the 2-5 mm-long teeth
- 5 Stamens conspicuously exerted..... Agastache
- 5 Stamens included or scarcely exerted
- 6 Bracts and sometimes leaves spinulose toothed; calyx 9-12 mm long, as long or nearly as long as the corolla, with the upper tooth nearly as broad as the 4 lower teeth together; plants not aromatic..... Dracocephalum
- 6 Bracts and leaves entire, serrate, or crenate, but not spinulose; calyx mostly shorter than above, and usually notably shorter than the corolla, the upper tooth not much if any broader than the others except in Prunella; plants various
- 7 Calyx 2-lipped, the upper lip broad and shallowly 3-toothed, the lower lip with 2 longer and narrower teeth; bracts subtending the dense verticils of flowers about 1 cm long, orbicular or fan-shaped, the midrib sometimes projected as a tooth, membranous and reticulate-veined in age; spikes solitary; corolla mostly blue or violet; plants 10-50 cm tall; leaves obscurely toothed..... Prunella
- 7 Calyx not 2-lipped, the 5 slender teeth more or less equal; bracts not as above; spikes 1 or more; corolla various; plants 20-120 cm tall; leaves conspicuously toothed
- 8 Leaves sessile or a few of the lower ones sometimes on petioles up to 1 cm long, the blades elliptic to lanceolate, not or hardly cordate at the base; calyx 6-9 mm long; corolla purplish, 11-16 mm long; herbage with spreading hairs, some of the hairs usually glandular (not aromatic?)..... Stachys
- 8 Leaves petioled, the blades triangular-ovate or triangular-lanceolate, the base more or less cordate; calyx 4-7 mm long; corolla pinkish or white, sometimes purple dotted, 7-12 mm long; herbage velvety-canescens and gland-dotted, but hairs hardly glandular; plants aromatic..... Nepeta
- 1 Inflorescence axillary, the flower whorls in the axils of well developed stem leaves, usually distant and not concealing the internodes; corolla less than 11 mm long except in Stachys and Scutellaria; calyx 2-9 mm long; stamens 2 or 4
- 9 Leaves entire, 5-15 mm long, sessile; stamens 2..... Hedeoma
- 9 Leaves toothed, or larger than above, petioled or sessile; stamens 4 except in Lycopus
- 10 Corollas 15-20 mm long, blue, sometimes marked with white; calyx 3.5-5 mm long, 2-lobed, not toothed; flowers usually about 2 per node; leaves blunt-toothed, sometimes only remotely so, or subentire..... Scutellaria
- 10 Corollas shorter or else calyx longer than above; flowers usually more than 2 per node; calyx toothed; leaves toothed
- 11 Leaves palmately lobed; bracts often trilobate; calyx 5-ribbed..... Leonurus
- 11 Leaves not palmately lobed; calyx often with more than 5 ribs
- 12 Calyx with 10 spinulose recurved teeth; stems and sometimes leaves white-woolly..... Marrubium
- 12 Calyx with 5 teeth, the teeth acute to spinulose but not recurved; plant glabrous or variously pubescent
- 13 Calyx 9-12 mm long; leaves or at least the bracts spinulose toothed (see lead 6 above)..... Dracocephalum
- 13 Calyx shorter than above or leaves and bracts with crenate or serrate teeth but these not spinulose
- 14 Corolla 11-16 mm long; calyx 6-9 mm long; leaves sessile or a few of the lower ones on petioles mostly less than 1 cm long, crenate; plants conspicuously pubescent with rather long and sometimes glandular hairs (see lead 7 above)..... Stachys
- 14 Corolla 3-7 mm long; calyx 2-5 mm long; leaves petioled or sessile, pinnately lobed or serrate; plants glabrous or hirsute
- 15 Stamens 4, well exerted; plants strongly aromatic; leaves petioled and serrate..... Mentha
- 15 Stamens 2, included; plants not or only weakly aromatic; if leaves petioled then usually pinnately lobed..... Lycopus

Agastache Clayt. Giant Hyssop; Horse-mint

Agastache urticifolia (Benth.) Kuntze Nettle-leaf h. Strongly aromatic herbs; stems 1-many, 40-100 (150) cm tall; herbage short-hairy to subglabrous, glandular in the inflorescence and on lower surfaces of leaves; leaves petioled, 2-10 cm long, 2-9 cm wide, cordate to lanceolate, coarsely crenate or serrate; inflorescence a terminal spike, 3-15 cm long; calyx 15 nerved, 5 toothed; corolla white or pale pink. Locally common; Strawberry Valley to Blind Stream, Uinta Mts. and to Timber Canyon, W. Tavaputs Plateau; aspen, tall forb, and mesic sagebrush communities, sometimes in snowflush areas; 7,000- 8,500 ft; late June-early Oct. Our plants are referable to var. urticifolia.

Dracocephalum L. Dragonhead

Dracocephalum parviflorum Nutt. American d. [Moldavica parviflora (Nutt.) Britt. in Britt. & Brown] Nonaromatic annual or short-lived perennial herb, 15-60 (80) cm tall; herbage glabrate to pubescent; leaf blades 1-6 (8) cm long, 1-2.5 cm wide, coarsely serrate-spinulose; inflorescence 2-10 cm long, spikelike, bracteate, the bracts leaflike, spinulose toothed, secondary spikes sometimes arising from axils of upper leaves; calyx 15-nerved, gland-dotted and villous-hirsute, the lobes spinulose; corolla blue to purplish. Widespread; mostly scattered; sagebrush, aspen, Douglas-fir, meadow, and streamside communities, often on recent alluvium, roadsides, and burned areas; 7,600-9,800 ft; July-Aug.

Hedeoma Pers. Pennyroyal

Hedeoma drummondii Benth. Drummond p. Plants perennial, from taproots, somewhat woody at the base, 10-25 cm tall, puberulent throughout, with several stems, the stems branching; leaves linear to narrowly elliptic; calyx strongly ribbed, the ribs about 13, the lower teeth surpassing the upper; corolla about 1 cm long. The 1 specimen seen (J. Walker & M. Waters 82-277) is from Stewart Gulch, Tavaputs Plateau; juniper-rabbitbrush community; 6,900 ft; also reported for Duchesne Co. (Cronquist and others 1984); June.

Leonurus L. Motherwort

Leonurus cardiaca L. Common m. Perennial from a branched caudex and fibrous roots, 40-150 cm tall; stems retrorsely strigose-puberulent on the angles; leaf blades 5-10 cm long, about as wide, the petiole about equaling the blade, the upper ones less palmately cleft than the middle ones and sometimes entire; calyx tube 5-angled with 5 spinulose lobes, the lower 2 lobes strongly spreading to deflexed; corolla about 1 cm long, pale pink, the upper lip white-villous. Introduced from Asia, formerly cultivated for a home remedy, few records seen but to be expected throughout our area; ditchbanks, riparian communities, and perhaps weedy in gardens; up to 7,000 ft; June-Aug.

Lycopus L. Bugleweed; Water-Horehound

Plants perennial from rhizomes, nonaromatic, usually gland-dotted; calyx 5-13 nerved, inconspicuously 2-lipped, with 5 subequal teeth; corolla regular, the limb 4-lobed, the upper lobe slightly broader than the others and often notched at the apex; nutlets 3-angled.

- 1 Leaves shallowly to deeply pinnately lobed, the blades mostly tapering to a short petiole; midnerves of the calyx lobes generally prolonged and spinulose; nutlets 1-1.4 mm long, gland-dotted mostly at the apex..... L. americanus
- 1 Leaves serrate, sessile or nearly so; midnerve of the calyx lobes not especially spinulose; nutlets 1.5-2 mm long, gland-dotted over the ventral surface..... L. asper

Lycopus americanus Muhl. American b. Occasional; widespread; riparian, meadow, and marsh communities, and along ditchbanks; up to about 7,600 ft; July-Aug.

Lycopus asper Greene Rough b. (L. lucidus Turcz. in Benth. misapplied) Occasional; widespread; riparian, meadow, and marsh communities, along ditchbanks, and edges of ponds and lakes, tolerant of alkali; up to 6,000 or perhaps 7,000 ft; July-Aug.

Marrubium L. Horehound

Marrubium vulgare L. Common h. Nonaromatic perennial herb from a taproot, 2-5 (8) dm tall; stems 1-several, erect to nearly prostrate; herbage gray or white with woolly hairs except sometimes on the upper leaf surfaces; leaves petioled, ovate to suborbicular, 1.5-4 (6) cm long, about as wide, crenate; calyx 10-nerved, with a ring of exserted hairs arising from within the throat; corolla 5-6 mm long, white or nearly so, the lips about equal. Introduced from Europe, somewhat weedy, to be expected across our area, apparently seldom collected; roadsides, dry waste places, often associated with disturbances; up to about 7,000 ft, perhaps higher; May-Sept.

Mentha L. Mint

Mentha arvensis L. Field m. [M. penardi (Briq.) Rydb.] Aromatic perennial herbs from rhizomes, 1-9 dm tall; stems more or less puberulent with retrorse or spreading hairs; leaves short-petioled, lance-elliptic to ovate, 2-7 (8) cm long, 0.6-4 cm wide, glandular punctate, otherwise glabrous or puberulent; calyx 10-nerved, gland-dotted, puberulent; corolla lavender, pink or white. Rather common; widespread; riparian, meadow, marsh, and streamside communities; 4,800-8,200 ft; mid June-Sept. Our plants are referable to var. canadensis (L.) Kuntze.

Monarda L.

Monarda fistulosa L. Wild bergamot. (M. menthaefolia Benth.) Perennial from creeping rhizomes, 3-7 dm tall, the herbage finely puberulent; leaf blades 2.5-8 cm long, 1-3 cm wide, lance-triangular to narrowly ovate; petioles mostly less than 1 cm long, the upper ones sometimes nearly obsolete; calyx 7-11 mm long, 13-15 nerved, white-hairy within and sometimes without; corolla 25-35 mm long, purple, puberulent, the upper lip exceeding the lower. Known from the Piceance Basin and Larson 14 (RM) from Kimberly-Williams Fork road 4 mi s. of Yampa River, Moffat Co.; moist places; July-Aug. Our plants are referable to var. menthaefolia (Graham) Fern.

Monardella Benth.

Monardella odoratissima Benth. Ultraodormint. Strongly aromatic perennial herb from a branching woody caudex and taproot, 10-35 cm tall; stems usually several to many, somewhat woody at the base; herbage glandular-punctate, puberulent; leaves 1-3.5 mm long, 2-12 mm wide, lanceolate to narrowly elliptic or ovate; inflorescence a head or headlike, 1.5-3 cm wide, subtended by an involucre of membranous, imbricate, broadly ovate bracts; bracts 7-15 mm long, greenish or whitish at the base, purplish at the apex, ciliate; calyx 10-15 nerved, the teeth ciliate to densely hairy within and without; corolla rose-lavender, violet, or rarely whitish. Entering our area on the W. Tavaputs Plateau; breaks, cliffs, exposed ridges, snowflush areas, and various plant communities; 9,000-10,000 ft; July-Sept. Our plants are referable to var. glauca (Greene) St. John.

Nepeta L.

Nepeta cataria L. Catnip. Aromatic, perennial herb from a taproot, 3-10 dm tall; herbage gray or white, velvety-pubescent, and gland-dotted at least above; leaves 2-8 cm long, 1.5-5 cm wide, coarsely crenate or serrate; flowers crowded or sometimes remote in spikelike terminal clusters, the clusters sometimes compound and paniculate; calyx 15-nerved, with 5 subequal teeth; corolla white or pinkish, often purple spotted, strongly 2-lipped, the lower lip with a dilated central lobe. Introduced from Eurasia, more or less weedy, seldom collected, to be expected across our area; roadsides, ditches, and waste places; up to 7,000 ft; June-Oct.

Prunella L. Self-heal

Prunella vulgaris L. Common s., heal-all. Perennial herb from a short, slender rhizome, 20-50 cm tall; stems generally unbranched, with crinkled, multicellular hairs at least above; leaves 1-7 cm long, 5-30 mm wide; spike 2-5 cm long, 1-2 cm wide; the bracts membranous toward the base, green or purplish above, ciliate, reticulate-veined in age; calyx usually 10-nerved, 2-lipped, the upper lip broad and shallowly 3-toothed, the lower lip deeply 2-toothed; corolla conspicuously 2-lipped, the upper lip hooded and entire, the lower lip spreading, 3-lobed, the central lobe the largest and minutely toothed. Specimens seen are from the s. slope of the Uinta Mts. and adjacent in the Basin, to be expected across the area; riparian and meadow communities, and along streams in woods; 5,600-8,100 ft; June-Aug.

Scutellaria L. Skullcap

Scutellaria galericulata L. Perennial herbs from slender rhizomes, 2-8 dm tall; stems weak but mostly erect, strigose-puberulent, especially along the angles, with descending hairs or glabrous or glandular; leaf blades 2-5 cm long, 6-20 mm wide, lanceolate to narrowly ovate-oblong, more or less truncate-subcordate at the base. Apparently widespread but uncommon and seldom collected; riparian and meadow communities; 4,800-7,500 ft; June-Sept.

Stachys L. Hedge Nettle

Stachys palustris L. Marsh h. n., woundwort, hedge nettle. (S. scopulorum Greene) Perennial herbs from rhizomes, 2-7 dm tall; stems with spreading or retrorse hairs on the angles and with viscid or gland-tipped hairs on the sides; leaves 3.5-9 cm long, 1-4 cm wide, crenate; calyx pubescent with both slender, gland-tipped hairs and long, stout, glandless ones; corollas purplish, with an internal ring of

LEMNACEAE

hairs. To be expected across the area but uncommon and seldom collected; riparian and meadow communities; up to about 6,500 ft; June- Aug. Our plants are referable to var. pilosa (Nutt.) Fern.

LEMNACEAE Duckweed Family

Lemna L. Duckweed

Small floating plants without stems, consisting of a leaflike thallus and usually a single, tiny, dangling root; flowers rarely developed, and plants usually propagating by buds; flowers (when developed) unisexual, inconspicuous, without perianth, 3 borne together in pouches on the upper surface or margins of the thallus, 2 of them staminate (each reduced to a single stamen), and 1 pistillate (a naked pistil); fruit an utricle. The following taxa seem to be separated on trivial overlapping features. More work is indicated. More collections are needed to understand this group in our area.

- 1 Fronds flat, smooth, veinless or 1-veined on the upper surface, 1-2.5 mm long, 0.7-1.5 mm wide, solitary or in pairs..... L. minuscula
- 1 Fronds with evident (with magnification) protuberances and faintly 3-veined on the upper surface, sometimes longer or wider than in L. minuscula, solitary or 2-5 cohering in colonies
- 2 Fronds 1.5-3.5 mm long, 1-2.5 mm wide, solitary or in groups of 2-3..... L. obscura
- 2 Fronds 3-6 mm long, 1.5-4 mm wide, in groups of 2-5..... L. minor

Lemna minor L. lesser d. The 1 specimen seen is from a pond in Strawberry Valley, 7,600 ft (Goodrich 21130).

Lemna minuscula Herter (L. minuta H.B.K.) The 3 specimens seen are from ponds and slow parts of streams; 5,275-8,580 ft.

Lemna obscura (Austin) Daubs The 3 specimens seen are from ponds on the flood plain of the Green River; 4,900-5,420 ft.

LENTIBULARIACEAE Bladderwort Family

Utricularia L. Bladderwort

Aquatic herbs with stems mostly submerged; leaves alternate or some whorled, 2-3 or more times pinnately dissected, bearing small urn-shaped bladders with a valvelike opening that traps insects and minute crustacea; flowers bisexual, in racemes; peduncles emergent, with auricled scales; corolla united, 2-lipped, yellow; stamens 2, twisted; fruit a capsule with 2-4 valves; seeds several.

- 1 Lower lip of flowers 10-20 mm long; ultimate segments of leaves filiform; bladders numerous; plants free floating, often in deep water..... U. vulgaris
- 1 Lower lip of flowers commonly 4-8 mm long; ultimate segments of leaves slender but flat, not filiform; bladders few; plants commonly of shallow water..... U. minor

Utricularia minor L. Lesser b. Known from Pelican Lake (Neese 15319a) and near Sims Peak, Uinta Mts. (Tuhy 1210 UTC); 4,800-10,100 ft.

Utricularia vulgaris L. Common b. Bridgeland; 5,280 ft (Goodrich 19741).

LILIACEAE Lily Family

Perennial herbs from bulbs, corms, rootstocks, or woody caudices; leaves simple, mostly entire with parallel veins; flowers regular or nearly so, mostly bisexual, the perianth of 6 united or separate tepals (the sepals and petals often alike and referred to collectively as tepals); stamens mostly 6; ovary superior or partly inferior in Zigadenus elegans; styles 3 or at least stigmas 3-lobed; fruit a capsule or a berry. In addition to the taxa treated below, the introduced (from Europe) dark daylily [Hemerocallis fulva (L.) L.] is cultivated, persists, and escapes mainly along ditches. This is clearly distinct from our native lilies by the 5-15 large (5-15 cm long), dull orange or reddish funnel-shaped flowers with yellowish centers and long-exserted stamens that are borne on a stout scape 0.5-1 m tall with several linear leaves clustered at the base that are about as long as the scape and about 1-3 cm wide.

- 1 Well-developed stem leaves lacking or few (fewer than 5) and mostly borne on the lower 1/3 of the stem, those of the upper stem if present usually much reduced; plants less than 30 cm tall and/or with bulbous bases
- 2 Inflorescence an umbel with 3-many rays; corolla not over 2 cm long or if so then united
 - 3 Corolla light to dark blue, united, about 2-3 cm long; stamens with free filaments; leaves 1 or 2, 25-50 cm long, 3-10 mm wide..... Triteleia
 - 3 Corolla white or pinkish, if united then the stamens with united filaments; leaves often more than 2 or else smaller than above

- 4 Tepals united below; filaments of stamens united into a tube; plants without onionlike odor; umbel 3-12 flowered..... Androstegium
- 4 Tepals separate; filaments not united; plant with onionlike odor; umbel sometimes over 12 flowered Allium
- 2 Inflorescence either not an umbel or if an umbel then with only 2-3 flowers, and corolla over 2 cm long and not united except at the base
- 5 Flowers 10 or more in a raceme or panicle; tepals white or cream, not over 15 mm long... Zigadenus
- 5 Flowers mostly 1 or 2, or if more then tepals over 15 mm long or not white
- 6 Flowers yellow, nodding
- 7 Tepals reflexed, 20-40 mm long; anthers exerted; leaves strictly basal or appearing opposite, 1-5 cm wide; capsules 3-6 cm long..... Erythronium
- 7 Tepals not reflexed, 12-25 mm long; anthers included; leaves alternate to semiwhorled, 0.2-1.2 cm wide; capsules 1.7-3 cm long..... Fritillaria
- 6 Flowers white, pinkish, or purple
- 8 Leaves (5) 10-20 mm wide; tepals linear, mostly purple, 15-30 mm long; flowers 5 or more...
..... Camassia
- 8 Leaves 1-10 mm wide; tepals not linear, white to lavender, either smaller or mostly larger than above; flowers 1 or 2, rarely more
- 9 Tepals 9-12 (14) mm long; plants seldom over 15 cm tall, from high elevations of the Uinta Mts..... Lloydia
- 9 Tepals (25) 30-40 (50) mm long; plants sometimes over 15 cm tall, not from high elevations of the Uinta Mts..... Calochortus
- 1 Stem leaves well developed (often more than 5), not confined to the lower 1/3 of the stem, those of the middle stem usually as large as those of the lower stem; plants often over 30 cm tall, from rootstocks or rhizomes except in Fritillaria
- 10 Leaves less than 15 mm wide
- 11 Stems mostly unbranched; plants 12-60 cm tall; leaves not scalelike, over 3 cm long; flowers 1-4, spreading or drooping in a terminal inflorescence; tepals 12-22 mm long, yellow, orange, or greenish-brown to chocolate-brown with yellowish or pale spots..... Fritillaria
- 11 Stems much branched; plants 50-200 cm tall; leaves scalelike, to 5 mm long; flowers numerous but solitary or in pairs in the axils of the scalelike leaves and branches; tepals 3-7 mm long, greenish-white..... Asparagus
- 10 Some of the leaves over 15 mm wide
- 12 Flowers 5-numerous in a terminal raceme or in panicles
- 13 Some leaves over 9 cm wide, with prominent veins; styles 3; tepals 6-17 mm long; stems thick and usually over 100 cm tall..... Veratrum
- 13 Leaves less than 9 cm wide, not prominently veined; tepals 2-7 mm long; stems rather slender, 20-100 cm tall..... Smilacina
- 12 Flowers 1-2 in axils of leaves or 1-3 at the ends of branches, on slender pedicels
- 14 Flowers 1 (2) in axils of leaves and on slender, bent, glabrous pedicels; style 4-5 mm long; fruit 10-12 mm long, yellow or red; stamens not exerted, unequal, the inner set longer than the outer set..... Streptopus
- 14 Flowers 1-2 (3) at the ends of branches on stoutish, pendulous, pubescent pedicels; style 9-12 mm long; fruit 7-10 mm long, orange or red; stamens slightly exerted, about equal....
..... Disporum

Allium L. Onion

Onion-scented herbs from bulbs; leaves sheathing, linear or terete, basal or nearly so; inflorescence a terminal umbel; tepals persistent even when dry, white to rose-purple, separate or nearly so; fruit a capsule.

- 1 Umbel nodding; tepals 4-6 mm long, shorter than the exerted stamens; leaves usually more than 3 per stem, 1-7 mm wide; involucre bracts deciduous by anthesis..... A. cernuum
- 1 Umbel not nodding; tepals 5-16 mm long, longer than the stamens; leaves various; involucre bracts persistent
- 2 Plants from slender bulbs that are attached to a short, stout rhizome, in moist woods in mts.; leaves 2-several, flat, 2-8 mm wide; stems flattened and narrowly winged, 20-60 cm tall; tepals 10-13 mm long, all about equal..... A. brevistylum
- 2 Plants from bulbs without rhizomes; leaves 4 or fewer or not over 4 mm wide; stems and scapes either terete or shorter than 20 cm
- 3 Plants 2-10 (13) cm tall; leaves 1-2, exceeding and up to twice as long as the scape; involucre bracts with 3 or more nerves, bulbs not covered with coarse netlike brown fibers
- 4 Leaves 2, concave-convex or nearly flat, not curled at the tip; scape slightly flattened; tepals 5-8 mm long at anthesis, white; inner bulb coats white, dark red, or purplish; outer bulb coats not with contorted reticulæ; ovary crestless; bulbs mostly 1-4 cm below the collar of the leaves; plants of mountains A. brandegei

LILIACEAE

- 4 Leaf 1, terete, often curled at the tip, but the curled portion often broken off; tepals 8-12 mm long at anthesis, pink or white; inner bulb coats white; outer bulb coats with contorted reticulae; ovary strongly crested; bulbs mostly 4-8 cm below the collar of the leaf; plants mostly of deserts..... A. nevadense
- 3 Plants mostly 10-35 (50) cm tall, if less than involucre bracts 1-nerved and bulbs covered with coarse netlike brown fibers; leaves 2-4, shorter than to slightly exceeding the scape
- 5 Bulb not covered with coarse, brown fibers; tepals 8-16 mm long, the outer 3 longer than the inner 3; involucre bracts 2, usually with 3 or more nerves..... A. acuminatum
- 5 Bulbs covered with a dense, netlike coat of coarse, brown fibers; tepals 5-8 (10) mm long, the outer ones not longer than the inner ones; involucre bracts 2 or 3, mostly 1-nerved
- 6 Tepals mostly pink, seldom white; scapes 15-60 cm tall; leaves 3 or occasionally 2 per stem; plants montane, mostly in moist meadows or along streams..... A. geyeri
- 6 Tepals white, seldom pink; scapes 6-20 (30) cm tall; leaves 2 or occasionally 3 per scape; plants of deserts and dry hills..... A. textile

Allium acuminatum Hook. Tapertip o. Common across Strawberry Valley and the flanks and lower slopes of the Uinta Mts. to the Yampa Plateau, and probably elsewhere; sagebrush, mt. brush, and aspen communities; 7,200-8,200 ft; May-June.

Allium brandegei Wats. Brandege o. Occasional to common; Strawberry Valley, W. Tavaputs Plateau (Avintaquin drainage and w.), and Uinta Mts. to Blue and Douglas Mts.; sagebrush, aspen, and open conifer communities; 7,000-10,600 ft; May-June depending on elevation.

Allium brevistylum Wats. Shortstyle o. Common; Uinta Mts.; riparian communities and along streams in aspen and conifer woods, occasionally alpine; 7,500-11,000 ft; June-Aug. Sometimes confused with A. geyeri, but different by features of the following key:

- 1 Bulbs arising from short rhizomes, not covered with netted fibers; tepals 10-14 mm long; rays 15 or fewer, the longest ones often over 15 mm long in fruit; ovary crestless; leaves 2-8 mm wide..... A. brevistylum
- 1 Bulbs not from rhizomes, covered by a dense coat of netted fibers; tepals 7-10 mm long; rays less than 15 mm long in fruit or more than 15 per umbel; ovary crested; leaves 1-4 mm wide..... A. geyeri

Allium cernuum Roth. Nodding o. Occasional and locally common; Uinta Mts. and Tavaputs Plateau; sagebrush, dry aspen, ponderosa pine, lodgepole pine, and meadow communities; 7,400-8,800 ft; July-Aug.

Allium geyeri Wats. Geyer o. (A. rubrum Osterh.) Occasional; Uinta Mts.; ephemeral and permanently wet meadows and streams, sagebrush, aspen, and ponderosa pine communities; 7,500-9,000 ft; May-June.

Allium nevadense Wats. Nevada o. Occasional; widespread; desert shrub, sagebrush, and juniper communities; 5,000-6,000 (7,400) ft; May-June.

Allium textile Nels. & Macbr. Textile o. Common; widespread; desert shrub, sagebrush, and juniper communities, on heavy clay to sandy soils; 4,700-6,500 (7,500) ft; May-June.

Androstephium Torr. Funnel-lily

Androstephium breviflorum Wats. Purple f. (Brodiaea paysonii A. Nels.) Scapose herbs from ovoid, fibrous-coated corms; scapes 10-30 cm tall; leaves several, as long or longer than the scape; flowers 3-12 in umbels; tepals united below, 15-20 mm long, light purple or whitish; stamens 6, adnate to the tepals, the filaments united. Common especially in Uintah Co.; widespread; desert shrub communities and the lower fringe of the juniper zone, often on clayey soils; up to about 5,700 ft; April-early June.

Asparagus L. Asparagus

Asparagus officinalis L. Herbs from branching rootstocks; young stems simple, succulent, thick, edible; older stems much branched, commonly 1-2 m tall; leaves scalelike, 1-2 cm long, with clusters of axillary, needlelike branches 1-2 cm long; flowers solitary or in pairs from axils of leaves and needlelike branches, bell shaped, borne on spreading or drooping, filiform pedicels; tepals 3-7 mm long; fruit a red berry, 6-8 mm in diameter. Introduced from Eurasia, cultivated and escaping; in valleys usually near cultivated lands, often along ditches and fence rows; July-Aug.

Calochortus Pursh Mariposa Lily; Segoe Lily

Glabrous herbs from deep-seated bulbs; leaves few, linear, reduced upward on the stem; flowers large and showy; tepals in 2 distinct sets, the inner set (petals) white, pink, lavender, or bluish, larger than the outer greenish set (sepals), with densely bearded conspicuous glands on the lower 1/2; fruit a 3-angled, elongate capsule.

- 1 Glands of petals oblong, surrounded by forked hairs; petals white or pale blue, with a purplish band above the gland; anthers acute, usually longer than the filaments; plants barely entering our area on the rim of the Tavaputs Plateau..... C. gunnisonii

- 1 Gland on petals circular, surrounded by simple hairs; petals white to pinkish-lavender, with a reddish-brown spot above the gland; anthers rounded, usually about equal to the filaments; plants common across the area..... C. nuttallii

Calochortus gunnisonii Wats. Gunnison m. or s. l. Entering our area along the rim of the Tavaputs Plateau from Argyle Canyon eastward; sagebrush, mt. brush, and aspen communities; 7,800-9,000 ft; (May) July-Aug.

Calochortus nuttallii T. & G. in Beckwith Sego l. Occasional to locally abundant; widespread; desert shrub, sagebrush, and juniper communities, and infrequent in mt. brush, dry aspen, and ponderosa pine communities; up to 6,000 (7,500) ft; May-June.

Camassia Lindl. Camas

Camassia quamash (Pursh) Greene Blue c. Perennial herbs from deep-seated ovoid bulbs, 20-70 cm tall; leaves basal, 10-50 cm long, 1-2.5 cm wide; flowers usually numerous, in bracteate racemes 5-30 cm long; tepals deep blue or bluish-purple, rarely white, 1.5-4 cm long; fruit a ovoid capsule 1-2.5 cm long. Entering our area in Strawberry Valley and Deep Creek, Wasatch Co.; sagebrush-grass and meadow communities; 7,000-7,880 ft; June-July. Our plants are referable to var. utahensis (Gould) C. L. Hitchc.

Disporum Salisb. ex D. Don Fairybells

Disporum trachycarpum (Wats.) Benth. & Hook. Herbs 30-60 cm tall; stems flexuous; leaves alternate, 3-10 cm long, 2-9 cm wide, ovate to ovate-oblong; flowers white, (8) 10-15 mm long; anthers white; fruit a berry. Occasional; Uinta Mountains.; along streams and in woods; 7,500 ft to near timberline; June-Aug.

Erythronium L. Dogtooth-violet

Erythronium grandiflorum Pursh [E. parviflorum (S. Wats.) Gooding] Perennial herbs from deep-seated, elongate corms; stems 10-30 (35) cm tall, with a pair of seemingly opposite, nearly basal, subsessile to petiolate leaves, the blades 10-20 cm long; flowers 2-4 (5), on nodding, naked peduncles; fruit a capsule. The few specimens seen are from Strawberry Ridge e. to the Rock Creek drainage in the Uinta Mts., and reported for Douglas Mt. (Bradley 1950); moist woods; 7,800-10,600 ft; May-June.

Fritillaria L. Fritillary

Erect, unbranched, glabrous perennial herbs from small bulbs; flowers spreading or nodding, 10-20 (25) mm long; fruit a membranaceous, 6-angled or winged capsule.

- 1 Flowers yellow or orange, fading red or purple, usually solitary, occasionally 2-3; style 1; stigmas discoid or obscurely 3-lobed; leaves 2 and alternate or appearing opposite or 2-8 and semiwhorled, (3) 6-15 (20) cm long, 2-12 mm wide..... F. pudica
- 1 Flowers purplish or greenish-brown to chocolate-brown with yellow or pale spots, not solitary; styles 3, united only at the base, the stigmas elongate; leaves several, alternate or semiwhorled, (4) 6-10 (12) cm long, 2-4 (7) mm wide..... F. atropurpurea

Fritillaria atropurpurea Nutt. Leopard or chocolate lily. Infrequent and scattered; widespread; seldom collected; many plant communities; 7,000-9,500 ft; May-June.

Fritillaria pudica (Pursh) Spreng. Yellow f., yellowbell. Parks & Tauzer 318 CS is from O-Wi-Yu-Kuts Flats 8,760 ft and Beetle & Porter 5546 RM! is from the summit of Blue Mt., to be expected elsewhere including Strawberry Valley; May-June, usually immediately after snow melt.

Lloydia Salisb. ex Reichenb.

Lloydia serotina (L.) Salisb. ex Reichenb. Alpine lily. Slender, erect, perennial herbs from short rhizomes, these sometimes simulating bulbs; leaves 2-few, the basal blades 2.4-10 (20) cm long, 0.8-1 mm wide; tepals white with greenish or purplish veins; fruit a capsule, 6-8 mm long. Occasional; Uinta Mts.; alpine communities; 11,000-12,500 ft; June-Aug.

Smilacina Desf. Solomon-plume; False Solomon Seal

Perennial herbs from creeping rhizomes, with unbranched stems; leaves alternate; flowers white; fruit a globose berry, greenish to reddish or purplish to black in age, 5-10 mm in diameter.

- 1 Flowers rather loosely arranged in a few-flowered raceme; tepals (3) 5-7 mm long; stamens about equal to the tepals, the filaments slender; leaves 4-17 cm long, 1.5-5 cm wide; plants widespread across the area S. stellata

LILIACEAE

1 Flowers densely arranged in many-flowered panicles; tepals 1-2 mm long; stamens longer than the tepals, the filaments flattened; leaves 7-20 cm long, (3) 4-10 cm wide; plants apparently uncommon and restricted..... S. racemosa

Smilacina racemosa (L.) Desf. Western s. (S. amplexicaulis Nutt.) The 7 specimens seen are from Whiterocks Canyon and Rock Creek and w. in the Uinta Mts. to the Strawberry-Currant Creek drainage; mt. brush-tall forb, aspen, Douglas-fir, and Engelmann spruce communities; 8,500-10,500 ft; June-July.

Smilacina stellata (L.) Desf. Starry s. Common; widespread; many plant communities, but mostly along streams or rivers, and at the edge of lakes and ponds, often in shade of woods or rocks; 4,700-10,500 ft; May-June.

Streptopus Michx. Twisted Stalk

Streptopus amplexifolius (L.) DC. Perennial herbs, (30) 50-80 (120) cm tall; leaves lanceolate to ovate, 5-12 (15) cm long, 2.5-5 cm wide, the base cordate clasping; flowers white with a greenish or yellowish tinge, 9-15 mm long; fruit a berry. Occasional; Uinta Mts. to Strawberry Valley; along streams, usually in aspen and conifer woods; 7,300-10,600 ft; June-Aug.

Triteleia Dougl. ex Lindl.

Triteleia grandiflora Lindl. Wild hyacinth. (Brodiaea douglasii Ways.; B. grandiflora Macbr.) Perennial scapose glabrous herbs, 20-70 cm tall, from globose corms 1-2.5 cm long and 1-3 cm thick; leaves basal, linear, 25-50 cm long, 3-10 mm wide, persistent; flowers in simple umbels; pedicels 1-5 cm long; corolla united about 1/2 the length, about 2-3 cm long; capsules 6-12 mm long. Occasional to locally common; Strawberry Valley and one specimen without collector (UT 93874) from n. of Roosevelt; sagebrush-grass and meadow communities; June-July. Our plants are referable to var. grandiflora. Apparently mistaken as Dichelostemma pulchellum (Salisb.) A. A. Heller (Brodiaea capitata Benth.) by Graham (1937).

Veratrum L. False-Hellebore; Skunk Cabbage

Veratrum californicum Dur. California f. Perennial herbs from thick rhizomes; stems often over 2 cm thick, (50) 100-200 cm tall, mostly glabrous and simple below, becoming tomentose and branched above; leaves several, strongly nerved, 25-40 cm long, 10-20 cm wide, the upper ones smaller; inflorescence of many-flowered panicles; tepals 8-17 mm long, whitish or greenish, with greenish Y-shaped glands; fruit a 3-lobed, ovoid capsule. Locally abundant around Strawberry Valley and Uinta Mts., but apparently rare or lacking e. of the Yellowstone drainage; in seeps, around springs and ponds, along streams, tall forb, aspen, and spruce-fir communities; 7,500-11,000 ft; July-Aug.

Zigadenus Michx. Deathcamas

Perennial, simple-stemmed, glabrous herbs from deep-seated bulbs; leaves grasslike, sheathing, mostly basal, the cauline ones much reduced; flowers small, greenish to yellowish-white or white, unisexual or bisexual, the tepals with a greenish or yellowish gland near the base; stamens with flattened filaments; fruit a 3-lobed capsule.

1 Tepals (6) 7-11 mm long, not tapering to a claw, the gland deeply obcordate; plants montane.. Z. elegans
1 Tepals 3-6 mm long, those of the inner set narrowed to a claw at the base, the gland ovate; plants of foothills to midmontane

2 Inflorescence strictly racemose; plants of moist or wet places, apparently rare..... Z. venenosus

2 Inflorescence paniculate at least in part; plants mostly of dry places, common..... Z. paniculatus

Zigadenus elegans Pursh Mt. d. Common in the Uinta Mts. and infrequent in shady cliffs of canyons of the Green River; wet and dry meadows, along streams, aspen communities, dry rocky slopes, and alpine tundra; 5,600-11,500 ft; July-Aug.

Zigadenus paniculatus Wats. Foothill d. Common; widespread; mostly in sagebrush and pinyon-juniper communities; about 5,000-8,500 ft; May-June.

Zigadenus venenosus Wats. Meadow d. The 3 specimens seen (Goodrich 20654, 21176, 21599) are from the Uinta Mts., Meadow Park, Daggett Co., Dry Gulch, Duchesne Co. and Mosby Mt., Uintah Co.; moist and ephemerally moist meadows and edge of meadows; 7,560-7,820 ft; June-July.

LIMNANTHACEAE False Mermaid Family

Floerkea Willd. False Mermaid

Floerkea proserpinacoides Willd. Annual glabrous herbs, 4-30 cm tall; leaves 1-6 cm long, alternate, pinnately compound, with 3 or 5 leaflets, the leaflets 5-25 mm long and entire or 2-cleft; flowers regular, bisexual, solitary, axillary, on peduncles 1-3 cm long; sepals 2-3 mm long or longer in fruit; petals

separate, only about 1/2 as long as the sepals, white; stamens 6; ovary superior; fruit of 2 or 3 obovoid-globose, drupelike nutlets, about 2.5 mm long, tubercled. The 3 records seen are from Currant Creek and Strawberry Valley; wet meadows and aspen communities; 7,500-8,000 ft; June.

LINACEAE Flax Family

Plants herbaceous, glabrous or puberulent, often glaucous, annual or perennial; leaves alternate, simple, entire, sessile; flowers bisexual, regular, in racemes or cymose-panicles; sepals 5, imbricate, persistent; petals 5, separate, quickly deciduous; stamens 5, alternate with the petals, the filaments united at the base; ovary superior, of 5 united carpels; styles 5, distinct or united below; capsule 10-chambered (each of the 5 carpels with a false septum), each of the chambers with 1 seed.

Linum L. Flax

- 1 Petals blue; stigmas elongate or at least longer than wide..... L. perenne
 1 Petals yellow; stigmas capitate
 2 Styles free throughout; sepals not exceeding the capsule; petals 6-10 mm long; plants mostly above 8,000 ft..... L. kingii
 2 Styles mostly united; sepals usually longer than the capsule; petals various but often over 10 mm long; plants of lower elevations
 3 Stems and pedicels densely puberulent; plants annual..... L. puberulum
 3 Stems and pedicels glabrous or nearly so; plants perennial..... L. subteres

Linum kingii Wats. King f. Specimens seen are from the Uinta Mts. and W. Tavaputs Plateau; limestone and other basic substrates, sagebrush, mt. brush, bullgrass, Douglas-fir, and spruce communities, and open gravelly slopes; 7,900-10,800 ft; June-Aug.

Linum perenne L. Blue f., wild f. (L. lewisii Pursh) Common; widespread; many plant communities, including black sagebrush, mt. brush, bullgrass, meadow, aspen, and fir; 5,700-9,000 ft; May-July. Our plants are referable to var. lewisii (Pursh) Eat. & Wright.

Linum puberulum (Engelm.) Heller The 1 record seen (Neese & Chatterley 9921) is from near Starvation Reservoir, Duchesne Co.; roadside at 5,800 ft, more common to the s. of our area.

Linum subteres (Trel.) Winkler (L. aristatum Engelm. misapplied; L. rigidum Pursh misapplied) The 8 specimens seen are from the bottom of the Basin and lower elevations of the Tavaputs Plateau from Gate Canyon e. to Hill Creek (probably on into Colorado); desert shrub, and pinyon-juniper communities; 4,980-6,800 ft; June-July.

LOASACEAE Loasa Family

Mentzelia L. Blazingstar; Mentzelia; Stickleaf

Annual or perennial herbs; stems often glossy-white, the epidermis exfoliating; leaves alternate, simple, but sometimes deeply pinnatifid, covered with minute many-barbed hairs; flowers terminal or axillary, bracteate, bisexual, regular; calyx tube adnate to the ovary, the 5 narrow lobes free; petals 5 or appearing 10 with 5 of the outer filaments expanded and petaloid, free, cream or pale to bright yellow; stamens 10-many, the filaments free or fused into groups; ovary inferior; style 1; fruit a capsule.

- 1 Petals 2-10 mm long, 5 in number; filaments of stamens all filiform; capsules about 2-3 mm thick, 5-30 mm long; seeds angular, not flattened, not winged; plants annuals, mostly with slender stems
 2 Seeds grooved on the 3 angles, the faces smooth or minutely muricate, not obviously turbiculate, arranged in a single row the full length of the capsules; flower-bracts and upper leaves mostly ovate-lanceolate to ovate; inflorescence congested; capsules linear, not widened above; plants apparently just entering the area on the Tavaputs Plateau..... M. dispersa
 2 Seeds not especially grooved on the angles, turbiculate on the faces, irregularly arranged and not in a single row in the upper part of the capsule; flower-bracts often narrower than above; inflorescence usually open; capsules often widened above (clavate)
 3 Leaves all entire or the basal ones obscurely lobed, basal rosette lacking or loosely formed; petals often retuse..... M. thompsonae
 3 At least the lower leaves pinnatifid, basal rosette present; petals not or hardly retuse..... M. albicaulis
 1 Petals 7-80 mm long, 5 or apparently 10 with petaloid stamens; capsules 5-10 mm thick or thicker; seeds flattened, often winged; plants annual, biennial, or short-lived perennial
 4 Petals (2.5) 3-8 cm long, 5 with 5 of the outer filaments expanded and petaloid, but these somewhat smaller than the petals; capsules 15-35 mm long, about 1 cm thick; plants robust, 30-100 cm tall, with thick stems; leaves to 15 cm long..... M. laevicaulis
 4 Petals 0.7-2 cm long, 5 but apparently 10 with petaloid filaments equal or about equal to the petals; capsules, plants and leaves various but often smaller than above

LOASACEAE

- 5 Plants perennial, few to many stemmed, from a branching caudex; stems usually much branched; leaves mostly all pinnatifid into linear segments or the upper ones reduced to a simple, linear rachis; petals 9-11 mm long, about 2 times as long as wide; seeds hardly if at all winged..... M. multicaulis
- 5 Plants biennial or short-lived perennial, from a simple taproot; stems often solitary, erect, nearly simple below or somewhat branched; leaves not pinnatifid (except in M. sp.); petals mostly over 2 times as long as wide; seeds usually winged
- 6 Leaves all pinnatifid; petals 7-12 mm long, about 2-3 mm wide (cutleaf phase of)..... M. pumila
- 6 Leaves entire to lobed not pinnatifid; petals mostly either longer or wider than above
 - 7 Capsules 15-30 mm long; calyx tube 10-18 mm long; petals 16-20 mm long, pale straw-yellow; leaves 5-8 cm long; plants 30-80 cm tall..... M. rusbyi
 - 7 Capsules 8-15 mm long; calyx tube 6-10 mm long; petals 7-20 mm long, golden-yellow; leaves 2-5 (6) cm long; plants 10-40 cm tall
 - 8 Capsules turbinate, 5-13 mm wide when pressed, less than 3 times as long as wide; petals 10-20 mm long; plants not known from Daggett Co..... M. pterosperma
 - 8 Capsules cylindrical, about 5 mm wide, 3-4 times longer than wide; petals to 10 mm long; plants known only from Daggett Co..... M. pumila

Mentzelia albicaulis Dougl. in Hook. Whitestem m., small-flowered m. Occasional; widespread; desert shrub, sagebrush, and pinyon-juniper communities; mostly below 6,500 ft; May-early June. One specimen (Neese & Neese 7596) from near Ouray is referable to M. montana (Davids.) Davids. This taxon is sympatric with M. albicaulis across much of w. North America. It is rather weakly separated morphologically by the features of the following key:

- 1 Bracts subtending the flowers obscurely to conspicuously 3-toothed or 3-lobed toward the apex; capsules 1.5-2 cm long..... M. montana
- 1 Bracts subtending the flowers mainly entire or toothed in the lower 1/2; capsules 1.5-3.5 cm long..... M. albicaulis

Mentzelia dispersa Wats. Brushy m. The 2 specimens seen are from the W. Tavaputs Plateau, Carbon Co., also listed for near the Quarry, Dinosaur National Monument (Welsh 1957) and for nw. Colorado (Harrington 1954).

Mentzelia laevicaulis (Dougl.) T. & G. Blazingstar m. The single record seen (Goodrich 17544) is from Strawberry Pinnacles where the plant is locally common on shaley slopes at about 6,000 ft; June-Sept.

Mentzelia multicaulis (Osterh.) Goodman (sometimes mistakenly attributed to Darlington) Many-stemmed m. [M. humilus (Gray) Darlington misapplied] Scattered across the s. 3/4 of Uintah Co., extreme se. Duchesne Co. and w. Rio Blanco Co.; desert shrub, and pinyon-juniper communities, on nearly barren, harsh, calcareous substrates; 5,000-7,000 (9,000) ft; June-Sept.

Mentzelia pterosperma Eastw. Wingseed m. [M. integra (Jones) Tides.] Apparently infrequent; the few records seen are from the Tavaputs Plateau, Jensen, Ouray, and Diamond Mt. rim, no records seen from Colorado within our area; 4,900-7,300 ft; May-June.

Mentzelia pumila (Nutt.) T. & G. Golden b. We have 2 vars. as follows:

- 1 Leaves entire or sinuate (with rounded lobes and shallow rounded sinuses), the sinuses rarely cut past 1/2 the way to the midrib; plants of Daggett Co..... var. pumila
- 1 Leaves lobed to pinnatifid, the sinuses commonly deeper than above; plants not of Daggett Co..... var. lagarosa

Var. lagarosa K. Thorne Tavaputs plateau from Antelope Canyon to Watson; usually in sparsely vegetated desert shrub, sagebrush, and pinyon-juniper communities; 5,600-7,900 ft; July-Aug.

Var. pumila The few specimens seen are from the vicinity of Sheep Creek, Daggett Co.; silty clay of Woodside Shale and Park City Formations; 6,300-6,400 ft; June-July.

Mentzelia rusbyi Woot. Creamy b. [M. nuda (Pursh) T. & G. var. rusbyi (Woot.) Harrington] Scattered on the Tavaputs Plateau, 3 specimens seen from near Hanna, and one from Dry Fork Canyon, Uinta Mts.; sagebrush and mt. brush communities, usually on raw shaly slopes or areas of disturbance; 6,000- 8,100 ft; July-Aug. Graham 9775 (CM!), referred to M. chrysantha Engelm. Graham (1937), belongs here.

Mentzelia thompsonae Glad Thompson m. The 7 records seen are from Red Fleet Dam to Dinosaur National Monument, and 8 mi nw. of Rangely; desert shrub communities, Mancos Shale and other formations that weather to badlands; 4,880-6,200 ft; May.

LYTHRACEAE Loosestrife Family

Annual glabrous herbs; leaves simple, opposite, entire; flowers bisexual, regular, sessile or subsessile in the axils of leaves or bracts; calyx united, with 4-7 lobes; petals free, 4, small, often quickly deciduous; stamens 4; ovary superior; style 1; fruit a capsule; placentation axile.

- 1 Style usually exerted from the calyx, at least 1 mm long; leaves sessile, cordate-clasping; flowers 1-5 per axil; capsules about 4 mm long; petals purplish, about 2-3 mm long..... Ammannia

- 1 Style not exerted from the calyx, less than 1 mm long; leaves tapered at the base not cordate-clasping; flowers usually only 1 per axil; capsules about 3 mm long; petals white, about 1 mm long..... Rotala

Ammannia L. Ammannia

Ammannia robusta Heer & Regel Purple a. (A. coccinea Rottb. misapplied) Stems 4-angled, 4-50 cm tall, erect; leaves linear or linear-lanceolate, 2-4 (7) cm long, 2-8 mm wide, sessile, cordate-clasping at base; flowers 1-5 per axil; sepals 4, 3-4 mm long; petals about 1-3 mm long, readily deciduous; capsule nearly globose, about 4 mm long; style persistent; stigma capitate. The few records seen are from the margins of Pelican Lake and the flood plain of the Green River near Ouray; drying mud; 4,650 ft.

Rotala L.

Rotala ramosior (L.) Koehne in Mart. Toothcup. Stems angled, 4-15 cm long; leaves 1.5-3 cm long, the blades lanceolate to oblanceolate, usually attenuate or short-petiolate; flowers 1 (2-3) per axil, with an accrescent, campanulate hypanthium 3-4 mm long in fruit; stamens and style included in the hypanthium; capsule globose. To be expected on the flood plain of the Green River.

MALVACEAE Mallow Family

Plants herbaceous, usually pubescent with branched or stellate hairs; leaves alternate, simple, palmately veined, often palmately lobed; inflorescence various; flowers bisexual, rarely unisexual, regular, sometimes with an involucl of sepallike bractlets; sepals 5, separate; petals 5, separate, united to a staminal sheath; stamens numerous, united by their filaments; ovary superior; fruit a schizocarp, with several carpels.

- 1 Petals orange..... Sphaeralcea
 1 Petals not orange
 2 At least the upper leaf blades cleft over 1/2 the way to the midrib; sepals not subtended by sepallike bractlets; stamens in 2 rather distinct sets; plants erect, perennial, 20-100 cm tall.....
 Sidalcea
 2 Leaf blades not lobed more than 1/2 the way to the midrib; sepals subtended by an involucl of sepallike bractlets; stamens not divided into 2 sets
 3 Petals 20-37 mm long, rose-pink, rarely white; plants montane, perennial, erect, 30-100 (150) cm tall..... Iliamna
 3 Petals not over 15 mm long; plants seldom montane; stems decumbent to prostrate, 10-60 cm long
 4 Petals yellowish, fading to orange; plants perennial from elongate rhizomes; fruit with 5-10 carpels..... Malvella
 4 Petals whitish or pale blue; plants annual from a taproot; fruit with 10-15 carpels..... Malva

Iliamna Greene

Iliamna rivularis (Dougl.) Greene Wild hollyhock. [Sphaeralcea rivularis (Dougl.) Torr.] Perennial herbs, sparingly and minutely stellate-hairy; leaf blades cordate to truncate at the base, 3-7 lobed, 2-16 cm wide, the lobes crenate-serrate; carpels 6-10 mm long at maturity, hispid and stellate. Occasional, widespread; sagebrush, mt. brush, ponderosa pine, and Douglas-fir communities and rarely in meadows, increasing after fire; 7,000-9,000 ft; June-Oct.

Malva L.

Malva neglecta Wallr. Cheeses, cheeseweed, mallow. Annual or biennial herbs, more or less sparsely stellate; stems prostrate-spreading, 10-60 cm long; leaf blades 2-6 cm wide, rounded-reniform, crenate with 5-9 shallow lobes or almost lobeless; calyx 3-6 mm long; petals about 6-12 mm long; schizocarp with 10-15 rounded carpels. Introduced from Europe, somewhat weedy on disturbed ground, to be expected across the lower elevations of the area; May-Sept.

Malvella Jaub. & Spach

Malvella leprosa (Ortega) Krapov. Alkali-mallow. [Disella hederacea (Dougl.) Greene; Sida hederacea (Dougl.) Torr.] Perennial herbs, grayish stellate; stems 10-40 cm long; leaf blades reniform to orbicular, dentate, obscurely lobed or lobeless, 3-25 (30) mm long; calyx 5-7 mm long; petals 10-12 mm long; schizocarp with 5-10, 1-seeded, reticulate carpels. The few specimens seen are from the flood plain of the Green River near Ouray where the plant is locally common, and reported by Flowers and others (1960) for Lucern Valley, Daggett Co. 5,900 ft (area now inundated by Flaming Gorge Reservoir); July-Oct.

Sidalcea Gray Checkermallow

Erect, perennial herbs from taproots or short rhizomes, usually stellate; leaves alternate; lowermost leaves sometimes merely lobed, the upper ones commonly cut over 1/2 the way to the midrib; flowers in spicate racemes; calyx 5-cleft; carpels 5-10, 1-seeded.

- 1 Petals white or merely pinkish tinged, often drying yellow; anthers bluish-pink; leaf blades 6-20 cm wide..... S. candida
- 1 Petals pink or lavender; anthers usually yellow to white
 - 2 Plants from rather fleshy taproots; stems commonly hirsute below; calyx hirsute with pustulose hairs (at least in part); leaf blades 1.5-11 cm wide..... S. neomexicana
 - 2 Plants often rhizomatous; stems stellate to glabrous below; calyx seldom with pustulose hairs; leaf blades 2.5-17 cm wide..... S. oregana

Sidalcea candida Gray White c. The 5 specimens seen are from Strawberry Valley e. to Rock Creek and Greens Draw in the Uinta Mts. and the E. Tavaputs Plateau; streamside and meadow communities; 6,900-8,050 ft; July-Sept.

Sidalcea neomexicana Gray New Mexico c. Harrington 1566 CS reported by Bradley (1950) for edge of trees along a creek, Browns Park, 5,000 ft.

Sidalcea oregana (Nutt.) Gray Oregon c. All specimens seen are from Strawberry Valley; forb-grass and aspen-tall forb communities; 8,000-9,000 ft; July-Aug.

Sphaeralcea St. Hil. Globemallow

Plants perennial, glabrescent to canescent with stellate hairs; leaves toothed to palmately lobed or dissected; flowers in racemose to thyrsoid cymes, orange; schizocarp with 8-20 carpels each with 1 or 2 seeds, the carpels united at the reticulate, indehiscent base and free at the dehiscent apical portion. A confusing genus in which boundaries between species are often vague.

- 1 Sepals not subtended by bractlets or rarely so; leaves dissected, the major divisions cut to the midrib; inflorescence racemose, rarely with more than 1 flower per node..... S. coccinea
- 1 Sepals subtended by bractlets; leaves divided, lobed or merely crenate; inflorescence often with more than 1 flower per node
 - 2 Leaves divided to or nearly to the base..... S. grossulariifolia
 - 2 Leaves rarely divided more than 1/2 the way to the base
 - 3 Foliage green; plants sparingly pubescent; carpels nearly orbicular, obtuse or slightly mucronate at apex..... S. munroana
 - 3 Foliage gray-white; plants densely pubescent; carpels broadly ovate, usually acute or cuspidate at the apex..... S. parvifolia

Sphaeralcea coccinea (Nutt.) Rydb. Scarlet g. Common; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 4,700-7,200 ft; mid May-June and through Sept. with summer and early fall precipitation. Most of our material is more or less referable to ssp. dissecta (Nutt.) Kearney, but a few specimens from 7,000-7,200 (8,200) ft in the w. part of our area with broad leaf divisions are like ssp. elata (Baker) Kearney; rather than being referable to that ssp., they likely reflect introgression with S. munroana.

Sphaeralcea grossulariifolia (H. & A.) Rydb. Gooseberryleaf g. Of the 2 specimens seen, 1 (Neese 4449) has but 1 flower at most nodes and some at least are ebracteate and this seems allied to S. coccinea, the other (England 1937) is more typical; the first from Pariette Draw, the second from junction of Ouray Road and Hwy. 40; desert shrub communities; 4,700-5,000 ft; May-June.

Sphaeralcea munroana (Dougl.) Spach Munro g. Occasional to locally abundant; Strawberry Valley to near Tabonia; Vasey sagebrush communities and along roads; July-Aug. Some specimens of S. munroana have lobed leaves and grade toward the phase of S. coccinea with broad leaf divisions. Separation in this case seems to depend upon the presence or absence of bractlets subtending the sepals. Other specimens of S. munroana have simple crenate or undulate margined leaves as in S. parvifolia. This latter phase is so much like S. parvifolia that separation seems artificial. However, the 2 are considered to have different geographic ranges with S. munroana found from British Columbia to w. Montana and s. to California and Utah, and S. parvifolia found from Colorado to California and s. to New Mexico and Arizona. In our area S. munroana seems to be isolated in and near Strawberry Valley at higher, more mesic situations than S. parvifolia.

Sphaeralcea parvifolia A. Nels. Nelson g. Widespread; desert shrub and sagebrush communities and along roads; 4,800-5,400 ft; May-Aug. See S. munroana. The report of S. fendleri Gray for Island Park along the Green River (Potter and others 1983) is based on a specimen belonging here.

MARSILEACEAE Pepperwort Family

Marsilea L. Pepperwort; Water-clover

Marsilea vestita Hook. & Grev. Aquatic, emergent (or stranded in drying pools), plants consisting of long-petioled, 4-foliolate leaves scattered along a slender, creeping, superficial rhizome (stem) and axillary sporocarps; petioles 2-15 cm long; leaflets approximate, simulating a 4-leaf clover, 5-17 long, 3-17 mm wide, obdeltoid or fan-shaped, floating or emergent, more or less pubescent or the emergent ones sometimes glabrous; sporocarp solitary on short peduncles arising from the rhizomes, elliptic to ovate, 4-8 mm long, densely pubescent, commonly with 2 caudate basal teeth. The 3 specimens seen are from mud flats and drying pools of the flood plain of the Green River near Ouray.

MENYANTHACEAE Buckbean Family

Menyanthes L. Buckbean; Bogbean

Menyanthes trifoliata L. Plants perennial, aquatic or growing in mud, from creeping rootstock; leaves alternate but mostly basal, the petioles 5-25 cm long, sheathing at base, the blades 3-foliolate; leaflets 5-10 cm long, oval to elliptic, thick, glabrous, entire; flowers bisexual, racemose or paniculate; calyx deeply 5-parted, short; corolla united, short-funnelform, about 10-15 mm long, white or tinged with rose or purple, 5-cleft, the lobes covered on inner surface with long white hairs; stamens 5, alternate with the corolla lobes; ovary superior, 1-celled; style 1; stigma 2-lobed; fruit capsulelike but indehiscent or finally rupturing irregularly. Occasional; Uinta Mts.; in shallow pools, ponds, bogs, and lakes in the pine-spruce zone; July-Aug. Often included in GENTIANACEAE.

MORACEAE Mulberry Family

Humulus L. Hop

Humulus lupulus L. (H. americanus Nutt.) Perennial, herbaceous, dioecious vines; stems to 10 m long, scabrous with stiff, recurved hairs; leaves opposite, palmately 3-5 (7) lobed and coarsely toothed, those of the inflorescence alternate; flowers small, greenish, not showy, the staminate ones in loose panicles from upper leaf axils, the sepals and stamens 5, the many pistillate flowers in pairs under a large persistent bract, the many bracts forming a large conelike hop. Occasional; widespread; usually growing on bushes along streams or in other moist places; not expected much over 7,500 ft; July-Aug. The glands on the bracts of the hops secrete lupulin that is used for flavor in brewing of beer, and the plant is cultivated (but not in our area).

NAJADACEAE Waternymph Family

Najas L. Naiad

Najas guadalupensis (Spreng.) Morong Aquatic, submerged herbs with slender, branched stems; leaves simple, opposite or whorled, 12-25 mm long, 0.5-1 mm wide, usually inconspicuously serrate and tipped with 1 or 2 weak short spines; flowers unisexual, inconspicuous, the staminate ones consisting of 1 stamen and a spathe-like involucre, the pistillate ones consisting of a pistil with 2-4 stigmas; fruit a 1-seeded nutlet. To be expected in quiet water at lower elevations; no specimens seen.

NYCTAGINACEAE Four-o'clock Family

Annual or perennial, mostly glabrous or glandular, often glaucous herbs; stems usually swollen at the nodes; leaves simple, usually opposite, entire; flowers bisexual, regular, subtended by bracts, these sometimes united into a calyxlike involucre; perianth of a single whorl, corollalike, united, 3-5 lobed, the lower part of the tube closely investing the fruit; ovary superior but sometimes appearing inferior, 1-celled, 1-ovuled; fruit an achene, indehiscent, usually angled, ribbed, or winged.

- 1 Flowers solitary or 2-8 in a cluster; perianth rotate campanulate to campanulate-funnelform, the limb sometimes over 8 mm wide, the stamens exerted or at least evident in the open limb; flower clusters subtended by greenish leaflike bracts, or if these scarious then united; fruit smooth or angled..... Mirabilis
- 1 Flowers borne in heads, many per head; perianth salverform, the limb 2-8 mm wide, the stamens included; heads subtended by 4-6, free, scarious, involucreal bracts; fruit ribbed or winged
- 2 Plants annual; perianth about 15 mm long, the limb only about 2-3 mm wide; wings of the fruit 5-10 mm wide, continuous around the body of the fruit, thin, translucent, strongly veined, showy..... Tripterocalyx

NYCTAGINACEAE

- 2 Plants perennial; perianth 15-30 mm long, the limb 2-8 mm wide; wings of the fruit (if present) 1-2 mm wide, not continuous around the body of the fruit, thick, not translucent, not at all showy..... Abronia

Abronia Juss. Sandverbena

Perennial herbs; leaves opposite, sometimes all basal or nearly so, 2-9 cm long, variable in shape but mostly ovate-oblong to orbicular, viscid-puberulent to glabrous; flowers in heads, the heads long-pedunculate; perianth funnelform to salverform, white to pinkish, the tube slender and elongate, the limb 5-lobed; stamens usually 5.

- 1 Body of fruit glabrous, without wings; herbage glabrous; leaves orbicular to elliptic..... A. argillosa
 1 Body of fruit villous-glandular, more or less winged; herbage glabrous or glandular; leaves mostly elliptic..... A. elliptica

Abronia argillosa Welsh & Goodrich The 3 records seen are from the E. Tavaputs Plateau, Uintah Co.; pinyon-juniper communities; 5,600-6,000 ft; May-June.

Abronia elliptica A. Nels. [A. fragrans (Nutt.) Hook. misapplied] Occasional to common; widespread; desert shrub, sagebrush, pinyon-juniper, bullgrass, and ponderosa pine communities, on a great variety of sites including shaly slopes, clay flats, and sand dunes; 4,700-8,150 ft; May-mid June.

Mirabilis L. Four-O'clock

Plants perennial; leaves opposite, often glaucous; perianth white, rose, or reddish-purple.

- 1 Leaves linear to narrowly lanceolate, rarely to 1 cm wide, 3-10 cm long, sessile or nearly so; involucre bracts united into a calyxlike cup, scarious, subtending 1-3 flowers; perianth about 1 cm long, the limb to about 1 cm wide; stamens conspicuously exerted; fruit 4-5 mm long, 5-angled; plants 20-100 cm tall..... M. linearis
 1 Leaves ovate-oblong to suborbicular, mostly well over 1 cm wide, nearly sessile or with petioles to 3 cm long; involucre bracts free or united at the base, greenish, leaflike, subtending 4-8 flowers; perianth 2-5 cm long, the limb over 1 cm wide; stamens about equaling the perianth or a little longer; fruit 6-8 mm long, smooth; plants various
 2 Perianth 2-2.5 cm long; involucre bracts free or united at the base, each with a flower attached to the base of the midrib; peduncles glabrous or puberulent; petioles about 1-10 mm long; stamens 5-7; plants 20-40 cm tall..... M. alipes
 2 Perianth commonly 3-5 cm long; the campanulate involucre united for 1/2 or more of its length, free of the flowers; peduncles glandular pubescent; petioles 4-30 mm long; stamens 5; plants 30-100 cm tall..... M. multiflora

Mirabilis alipes (Wats.) Pilz. (Hermidium alipes Wats. var. pallidum C. L. Porter) Common in Uintah and Rio Blanco Cos., rare w. to Wells Draw, Duchesne Co., mostly s. of Hwy. 40 to the flank of the Tavaputs Plateau; desert shrub and pinyon-juniper communities; 4,700-6,350 ft; April-May.

Mirabilis linearis (Pursh) Heimerl Narrowleaf umbrellawort. [Allionia linearis Pursh; Oxybaphus diffusa Heller; O. linearis (Pursh) Robins] Infrequent or occasional; widespread; desert shrub, pinyon-juniper, and mt. brush communities; 4,800-7,400 ft; June-Sept. The report of Oxybaphus lanceolatus (Rydb.) Standl. (Potter and others 1983) is based on a fragmentary specimen (Y 186!) apparently belonging here.

Mirabilis multiflora (Torr.) Gray in Torr. Colorado f. The 1 specimen seen (England 2017) is from the head of Taylor Canyon, Bookcliff Divide, Grand Co.; roadcut in Green River Formation; 8,200 ft; July.

Tripterocalyx Hook. ex standl.

Tripterocalyx micranthus (Torr.) Hook. [T. pedunculatus (Jones) Standl.; Abronia micrantha Torr.] Annual, succulent herbs; stems 10-40 cm long, viscid-pubescent to glabrous; leaves 2-5 cm long, elliptic to ovate; bracts subtending the inflorescence 4-8 mm long; perianth about 15 mm long, the limb greenish-white or pinkish; fruit 1-3 cm long, with usually 3 showy wings. Infrequent; widespread; desert shrub, sagebrush, and juniper communities, on various soils from sand dunes to silty clay; 4,600-5,800 ft; May-June.

NYMPHAEACEAE Water-lily Family

Nuphar J. E. Smith Cow-lily; Yellow Pond-lily; Yellow Water-lily

Nuphar polysepalum Engelm. Rocky Mt. c. [Nymphaea polysepala (Engelm.) Greene] Perennial, aquatic herbs from thick, creeping rhizomes; leaves all basal with long submerged terete petioles and large cordate usually floating blades, these 10-45 cm long and about 3/4 as broad; flowers solitary, emersed, borne on long submerged terete peduncles, bisexual, regular; sepals usually 9 (7-12), 3-6 cm long, rounded to slightly retuse, the outer ones leathery, greenish, and shorter than the bright yellow to reddish tinged

inner ones; petals lanceolate, thick, inconspicuous, scarcely equaling the numerous reddish or purplish stamens; stigmas 2-2.5 cm wide; fruit a many-seeded, several-loculed, leathery, more or less berrylike, ovoid to nearly cylindrical capsule, 5-9 cm long, prominently ribbed. Occasional to common; Uinta Mts.; aquatic in ponds and shallow lakes, mostly in water 1 to 5 ft deep; 9,000-11,000 ft; July-Aug.

OLEACEAE Olive Family

Fraxinus L. Ash

Fraxinus anomala Torr. in Wats. Singleleaf a. Shrubs or small trees, 2-8 m tall; twigs 4-angled; leaves 2-5 cm long, simple or sometimes 3-foliolate, ovate to rhombic-elliptic, cuneate to subcordate at the base, entire or crenate; flowers polygamous, in panicles; calyx minute, 4-lobed or 4-toothed; corolla none; stamens 1-3; fruit a 1-seeded, single samara, 12-25 mm long, about 8-10 mm wide, winged all around. Rocky, sandy canyons along the Green River in the Split Mtn.-Dinosaur National Monument area and in Desolation Canyon; May-June. Several species of ash may be cultivated in the area for shade or ornament, but these all have pinnately compound leaves.

ONAGRACEAE Evening Primrose Family

Annual or perennial herbs (ours); leaves alternate or opposite or all basal, simple or pinnately compound, entire or toothed to pinnatifid; flowers bisexual, mostly regular; sepals and petals (2) 4, arising with the (2) 8 stamens from a floral tube or receptacle, free or the sepals united at the base; pistil 1; ovary inferior; style 1, the stigma discoid or 4-lobed; fruit a capsule (ours).

- 1 Flowers 2-merous, 1-2 mm long; fruit with hooked hairs; leaves opposite, more or less cordate, long-petioled; plants rare..... Circaea
- 1 Sepals and petals 4; stamens 8; fruit without hooked hairs; leaves alternate, or if opposite then not cordate and sessile or short-petioled
 - 2 At least the lower leaves opposite; sepals not reflexed; petals conspicuously bilobed at the apex, 2-14 mm long (except rounded at apex and to 22 mm long in Epilobium angustifolium); seeds with tufts of hair..... Epilobium
 - 2 Leaves alternate or all basal, sometimes opposite but then sepals reflexed at anthesis; petals entire or shallowly obovate at the apex; seeds without tufts of hair
 - 3 Petals 6-50 mm long; floral tube 1.5-15 cm long; plants mostly perennial
 - 4 Stigmas divided into 4 linear lobes; petals white, pink or yellow (if yellow then plants 30-150 cm tall with leafy stems or acaulescent with petals (10) 15-50 mm long..... Oenothera
 - 4 Stigmas capitate or shallowly lobed; petals yellow; plants caulescent and less than 25 cm tall or acaulescent and petals 6-13 mm long
 - 5 Plants perennial from a branched caudex, caulescent, the leafy stems 5-20 cm long; leaves 0.5-1.5 cm long, entire; petals 13-22 mm long..... Calylophus
 - 5 Plants annual, with petals 1-4 mm long, or if perennial then acaulescent from a taproot, with leaves (3) 5-20 cm long and entire to deeply sinuate-pinnatifid, and with petals to 13 mm long..... Camissonia
 - 3 Petals 1-4 (6) mm long; floral tube obsolete or to 0.3-1 cm long; plants annual or perennial (Gaura coccinea)
 - 6 Fruit hardened, indehiscent, with 1-4 seeds; inflorescence a many-flowered, rather dense spike, (5) 10-30 cm long; plants 0.2-2 m tall, pubescent with dense, minute, soft hairs and long spreading hairs on the stems and leaf margins..... Gaura
 - 6 Fruit not hardened, dehiscent, few to many seeded; inflorescence various; plants mostly less than 0.3 m tall, not pubescent as above
 - 7 Stems leafy throughout; leaves elliptic-lanceolate to oblong, serrulate, sessile, the mid-cauline ones as large as the lower ones, 3-6 mm wide or wider; flowers and capsules sessile..... Boisduvalia
 - 7 Plants not as above in all features
 - 8 Petals white or pink, to 3 mm long; floral tube lacking or less than 1 mm long; fertile stamens often only 4; flower buds pointed at the tip; capsules 3-15 mm long, 2-celled, straight, not at all coiled or contorted..... Gayophytum
 - 8 Petals yellow or cream-white in 1 species, sometimes reddish in age; flower buds rounded at the tip; capsules various but mostly over 15 mm long, 4-celled, often contorted or coiled in the white flowered species..... Camissonia

Boisduvalia Spach

Boisduvalia glabella (Nutt.) Walp. Annual taprooted herbs, 5-30 cm tall; stems simple or branched, below, the branched sometimes opposite; leaves mostly alternate, crowded, 1-1.5 cm long, serrulate; flowers axillary; sepals 2 mm long; petals 2-4 mm long, purplish; capsules 6-8 mm long, straight; seeds without a coma. The 1 specimen seen (Neese 14837) is from Diamond Mt. Plateau; mud at margin of Crouse Reservoir;

7,220 ft; no specimens found at UT to support the Flowers and others (1960) report for Sheep Creek, 5,900 ft (area now inundated by Flaming Gorge Reservoir); Aug.

Calylophus Spach.

Calylophus lavandulaefolius (T. & G.) Raven Lavenderleaf evening-primrose. (Oenothera lavandulaefolia T. & G.) Plants suffrutescent, caespitose, grayish strigose; flowers solitary in upper axils; floral tube 2.5-5 cm long; sepals 8-12 mm long; petals yellow, reddish in age; stamens subequal; capsules 8-20 mm long. Widespread but mostly scattered; desert shrub, sagebrush, and pinyon-juniper communities; 5,400-8,300 ft, often but not always on harsh substrates; mid May-June.

Camissonia Link Camissonia

Annual or perennial herbs (ours); leaves basal, alternate or occasionally a few opposite; flowers usually opening near sunrise, sometimes in afternoon, withering in less than a day, reddish or purplish as they wither; stamens and style yellowish; capsules straight to coiled.

- 1 Plants perennial, acaulescent; petals 6-13 mm long; floral tube 1-9 cm long; capsules sometimes over 3 mm wide
 - 2 floral tube 1-2.5 cm long; petals 6-8 (10) mm long; leaves pinnatifid; capsules hairy.. C. breviflora
 - 2 Floral tube 3-9 cm long; petals 8-13 mm long; leaves entire to dentate or lobed; capsules glabrous..
..... C. subacaulis
- 1 Plants annual, caulescent or subcaulescent; petals 1-6 mm long; floral tube about 0.1-0.3 cm long; capsules slender, not over 3 mm wide
 - 3 Capsules borne on pedicels 4-20 mm long; leaf blades generally contracted to a petiole
 - 4 Leaves 0.3-3 cm long, 0.1-0.6 cm wide, entire; petals white distally, yellowish toward the base, 1.5-2.5 mm long; capsules 1.2-1.8 cm long; pedicels 4-8 mm long; seeds with a thick, papillate wing surrounding the concave face; plants rare..... C. pterosperma
 - 4 Leaves 1-8 cm long, 0.5-3 cm wide, entire, toothed, or pinnatifid; petals yellow, 1.7-5 mm long; capsules (1) 1.5-3 cm long; pedicels 5-20 mm long; seeds not winged; plants various
 - 5 Plants more or less copiously beset with spreading white hairs about 0.5-1.5 mm long; pods mostly 1.25-2 mm thick; plants apparently rare and restricted..... C. walkeri
 - 5 Plants glabrous or puberulent but not pubescent as above; pods mostly 2-3 mm thick; plants common, widespread..... C. scapoidea
 - 3 Capsules sessile or on pedicels to 2 mm long; leaves sessile or gradually tapered to a petiole
 - 6 Plants with naked capillary stems, each bearing a crowded leafy inflorescence at its apex; capsules strongly flattened, 5-10 mm long; plants apparently rare in Moffat Co..... C. andina
 - 6 Plants not as above; capsules not flattened, 12-40 mm long; plants various
 - 7 Leaves (2) 4-15 mm wide, not linear; plants strigose, not glandular; petals about 2 mm long, white or cream; capsules 12-25 mm long, slightly enlarged at the base, often contorted or even coiled..... C. minor
 - 7 Leaves 1-2 mm wide, linear; plants glabrous or with scattered usually glandular hairs; petals 2.5-4 mm long, yellow; capsules 20-40 mm long, mostly linear and not enlarged at the base, often straight..... C. parvula

Camissonia andina (Nutt.) Raven [Oenothera andina (Nutt.) ex T. & G.] Approaching our area in Wyoming and apparently entering it in Moffat Co.

Camissonia breviflora (T. & G.) Raven Short-flowered c. (Oenothera breviflora T. & G.) The few records seen are all from Strawberry Valley; along streams and meadows; 7,500-8,000 ft; June-July.

Camissonia minor (A. Nels.) Raven Small-flowered c. [Oenothera minor (A. Nels) Munz] Infrequent; lower part of the Basin; desert shrub, and sagebrush communities; 4,500-5,200 ft; May-June.

Camissonia parvula (Nutt.) Raven [C. contorta (Dougl.) Raven misapplied; Oenothera contorta (Dougl.) Kearney var. flexuosa (A. Nels.) Munz; Sphaerostigma contortum (Dougl.) Walp. var. flexuosum A. Nels.] Occasional; across much of the Basin; desert shrub, sagebrush, and pinyon-juniper communities; 4,750-5,700 (8,100) ft; May-July.

Camissonia pterosperma (Wats.) Raven (Oenothera pterosperma Wats.) The 3 specimens seen are from Uintah Co., near Brush Creek and Doc's Beach n. of Vernal and from Bitter Creek; desert shrub, sagebrush, and juniper communities; 5,300-6,000 ft; May-June. The fruit is similar to that of C. scapoidea, but the leaves are strikingly different.

Camissonia scapoidea (T. & G.) Raven Barestem c. (Oenothera scapoidea T. & G.) Locally common; widespread; desert shrub, sagebrush, and pinyon-juniper communities; up to 6,500 ft; May-June.

Camissonia subacaulis (Pursh) Raven Long-leaved c. [Oenothera heterantha Nutt.; O. subacaulis (Pursh) Garrett] The specimens seen are from Currant Creek-Wolf Creek-Strawberry Valley area, also from nw. Colorado; aspen, sagebrush-aspen, meadow-silver sagebrush, and willow-streamside communities and along roads; 7,500-8,000 ft; June.

Camissonia walkeri (A. Nels.) Raven The 1 specimen seen (Brotherson 807) is from Split Mt. Gorge Campground.

Circaea L. Enchanter's Nightshade

Circaea alpina L. (C. pacifica Aschers. & Magn.) Plants perennial from slender rootstocks, 5-25 cm tall; stems glabrous below, sparsely strigose to short-pilose above and in the inflorescence; leaf blades cordate-ovate to ovate, 2-6 cm long, longer than the petioles; flowers in racemes, 2-merous, 1-2 mm long; sepals spreading to reflexed, white; petals notched, white; fruit 1 (2) seeded, more or less pear-shaped, about 2 mm long, covered with short, hooked hairs, about 2 mm long, borne on spreading to reflexed pedicels. The 2 specimens seen are from Whiterocks Canyon, Uinta Mts.; very wet places in shade of willows and alder; 7,650-7,680 ft; no specimen was found at UT to support the Flowers and others (1960) report for Eagle and Carter Creeks, 5,760 ft (the area now inundated by Flaming Gorge Reservoir); July-Aug.

Epilobium L. Willow-weed

Herbs, annual from taproots or perennial from rhizomes, the rhizomes sometimes with turions (small bulblike shoots); leaves opposite (at least the lower ones), sessile or short-petioled, entire or toothed; floral tube obsolete to well developed; petals white, pink, purple, or red; stamens 8, those alternate the petals shorter than the opposite ones; stigmas oblong or 4-lobed; fruit an elongate, usually slender capsule, 4-sided, 4-chambered, dehiscent; seeds wind-dispersed, with tufts of hair at the apex. The E. alpinum and E. ciliatum groups are complex. Recognition of the several so-called taxa within them requires the use of overlapping features. Identification is further vexed by hybrids. The treatment presented here is conservative.

- 1 Sepals, petals, and floral tube scarlet-red; flowers bilaterally symmetrical and somewhat penstemonlike with the floral tube expanded and simulating a tubular flower, 2-3 cm long including the floral tube; stamens exerted; plants from the extreme w. part of the area..... E. canum
- 1 Flowers not as above; plants widespread
 - 2 Plants annual, of dry places; upper leaves alternate; epidermis of lower stem exfoliating..... E. brachycarpum
 - 2 Plants perennial, of dry or wet places; leaves mostly all opposite (except in E. angustifolium); epidermis various
 - 3 Leaves alternate, 5-20 cm long; sepals 8-12 mm long; petals rounded and not notched at the apex, 7-22 mm long, lilac-purple to rose, rarely white; plants 50-250 cm tall..... E. angustifolium
 - 3 Leaves mainly opposite, 2-12 cm long; sepals 2-7 mm long; petals notched at the apex, 2-14 mm long, variously colored; plants 5-60 (100) cm tall
 - 4 Inflorescence and usually much of the stem canescent with minute hairs; leaves entire or nearly so, more or less revolute, sessile or nearly so; rootstocks with turions..... E. leptophyllum
 - 4 Inflorescence and stem glabrous to glandular or pubescent but not canescent; leaves entire or serrate, not revolute, sessile or petioled; rootstocks with or without turions
 - 5 Seeds (as seen at 20X) crested-papillate in parallel longitudinal ridges, or if not so then plants with turions; stems 1-several, mostly 20-100 cm tall..... E. ciliatum
 - 5 Seeds smooth or the papillae small and not in distinct lines; plants without turions; stems 5-40 (50) cm tall..... E. alpinum

Epilobium alpinum L. Alpine w. Occasional to common; Strawberry Valley and Uinta Mts.; wet places; 7,250-11,340 ft; June-Sept. We have followed Hitchcock in Hitchcock and Cronquist (1961) as did Welsh (1974) in treating the following intergrading taxa of the E. alpinum complex at the variety level.

- 1 Plants commonly 5-25 cm tall, sometimes matted, commonly found at 10,000- 11,340 ft; leaves generally ovate, 1-2 cm long; fruits commonly 2-4 cm long; petals pink, 3-6 mm long
 - 2 Inflorescence nodding at least when young; capsules linear, about 1 mm thick; seeds smooth, 0.7-1.4 mm long (E. anagallidifolium Lam.)..... var. alpinum
 - 2 Inflorescence more or less erect; capsules subclavate, about 1.5-2 mm thick; seeds papillate 1.4-2 mm long (E. clavatum Trel.)..... var. clavatum (Trel.) C. L. Hitchc.
- 1 Plants commonly 25-40 (50) cm tall, not matted, found at 7,250-10,000 (11,400) ft; leaves ovate to lanceolate, 1.5-5 cm long; fruits commonly 4-7 cm long; petals various
 - 3 Petals white or cream to pale pink, 2-5 mm long (E. lactiflorum Hausskn.)..... var. lactiflorum (Hausskn.) C. L. Hitchc.
 - 3 Petals pink, 5-8 mm long (E. hornemanii Reichb.)..... var. nutans (Hornem.) Hook.

Epilobium angustifolium L. Fireweed. Occasional; becoming abundant after fire or logging; widespread; lodgepole pine, spruce, and fir communities; 8,000-11,500 ft; July-Sept.

Epilobium brachycarpum Presl Autumn w. (E. paniculatum Nutt. ex T. & G.) Occasional; widespread; sagebrush, mt. brush, forb-grass, ponderosa pine, and aspen communities, disturbed ground and talus slopes; 7,300-9,000 ft; June-Sept.

Epilobium canum (Greene) Raven Wild fuschia, Garrett firechalice. [Zauschneria garrettii A. Nels.; Z. latifolia (Hook.) Greene var. garrettii (A. Nels.) Hilend.] The 1 specimen seen (Goodrich 16107) is from

ONAGRACEAE

the Currant Creek drainage, Wasatch Co.; crevices of a sandstone outcrop; also observed near Soldier Creek Dam in the Strawberry drainage; July-Sept. Our plants are referable to ssp. garrettii (A. Nels.) Raven.

Epilobium ciliatum Raf. Common w. The most common and widespread willow-weed of the area; aspen, conifer, riparian, and meadow communities; 4,900-9,500 (11,300) ft; June-Sept. The E. ciliatum complex is made up of intergrading taxa. Plants of each taxon hybridize with those of most if not all other taxa of the complex and with some of those in the E. alpinum complex. The following key provides further distinctions:

- 1 Seeds longitudinally ridged with rows of papilla (at 20X)
 - 2 Plants with underground turions, less often of disturbed places; petals 4.5-12 (14) mm long, rose-purple to rarely white; inflorescence mostly leafy and unbranched (E. glandulosum Lehm.)..... E. c. ssp. glandulosum Hoch & Raven
 - 2 Plants without underground turions, more often in disturbed places than above; petals 2-6 (9) mm long, white to pink; inflorescence not leafy, open and well branched (E. adenocaulon Hausskn.; E. watsoni Barb.)..... E. c. ssp. ciliatum
- 1 Seeds smooth, or if papillate then the papilla minute and not strongly aligned in rows; plants with underground turions
 - 3 Fruits sessile or subsessile, the pedicels not over 5 mm long; leaves mostly sessile and clasping (E. brevistylum Barb.; E. rubescens Rydb.)..... E. saximontanum Hausskn.
 - 3 Fruits with pedicels mostly 5-15 mm long; leaves sessile or short-petioled but not clasping [E. glandulosum var. tenu (Trel.) C. L. Hitchc.]..... E. halleanum Hausskn.

Epilobium leptophyllum Raf. Swamp w. The 3 specimens seen are from near Ouray, Roosevelt, and along the Duchesne River between Duchesne and Tabiona; wet places, tolerant of alkali; 4,670-6,000 ft; Aug.-Sept. The similar E. palustre L. with upper surface of leaves glabrous, might be expected in uplands or mountains, and reported by Bradley (1950) based on Boyd 74 (CS!), but this specimen belongs to E. halleanum.

Gaura L. Gaura

Leaves alternate; flowers in terminal spikes or racemes, subtended by small bracts, ephemeral; sepals reflexed at anthesis; petals whitish at first, becoming pink or reddish; fruit small, hard, indehiscent, with 1-few seeds.

- 1 Plants perennial, reported for Daggett Co., with clustered stems, rarely over 0.5 m tall; leaves 1-4 cm long; sepals 5-9 mm long; petals 3-7 mm long; floral bracts usually persistent..... G. coccinea
- 1 Plants annual or biennial, widespread; stems solitary, often branched from a taproot, to 2 m tall; larger leaves 1.5-3 mm long; floral bracts caducous..... G. parviflora

Gaura coccinea Pursh Scarlet g. Apparently entering our area in Daggett Co.
Gaura parviflora Dougl. in Hook. Small-flowered g. Infrequent but locally common; widespread; mostly along roadsides and other disturbed places; up to about 7,000 ft; June-Aug.

Gayophytum Juss. Groundsmoke

Annual herbs; stems slender, simple to much branched, the ultimate branches capillary; leaves alternate or occasionally the lower ones opposite, mostly sessile or nearly so, linear, entire; flowers borne in leaf axils, small; capsules terete or flattened, 2-celled, 4-valved. We have followed Arnow and others (1980) in recognizing only 2 taxa, and of the 40 specimens seen from our area, about 20 percent seemed intermediate between them.

- 1 Mature capsules sessile or on pedicels to 3 mm long or these sometimes longer in the lower axils, scarcely or not at all constricted between the seeds, mostly erect or upright, seldom spreading or deflexed, 6-15 mm long, longer than the pedicels; plants simple or sparingly branched or occasionally branched throughout..... G. racemosum
- 1 Mature capsules mostly on pedicels (1) 4-15 mm long, usually distinctly constricted between the seeds, spreading, sometimes deflexed, 2.5-15 mm long, shorter to longer than the pedicels; plants mostly diffusely branched..... G. ramosissimum

Gayophytum racemosum T. & G. (G. decipiens Lewis & Szweykowskii; G. helleri Rydb.) Occasional to locally abundant; widespread; sagebrush, pinyon-juniper, mt. brush, ponderosa pine, aspen, fir, and spruce communities; 6,000-10,300 ft; May-Aug. Sometimes sympatric with and apparently intergrading into G. ramosissimum.

Gayophytum ramosissimum Nutt. ex T. & G. Branched g. (G. diffusum T. & G.; G. lasiospermum Greene; G. nuttallii T. & G. misapplied) Occasional to locally abundant; widespread; sagebrush, pinyon-juniper, mt. brush, forb-grass, aspen, Douglas-fir, and ponderosa pine communities; 6,000-9,100 ft; June-Aug. Sometimes sympatric with and apparently intergrading into G. racemosum.

Oenothera L. Evening-primrose

Annual to perennial herbs; leaves alternate or basal; flowers regular, mostly opening in the evening; petals mostly somewhat obcordate; capsules membranous to woody, straight or coiled, 4-celled.

- 1 Plants acaulescent or subacaulescent with leaves basal or nearly so; floral tube 4-15 cm long
- 2 Petals white or pink when fresh, drying reddish or pinkish-lavender, 2.5-4 cm long; capsules not winged..... O. caespitosa
- 2 Petals yellow when fresh, often drying orange-red or purple; capsules more or less winged. Note: our 2 perennial taxa of Camissonia will key here except for their capitate stigmas. They also differ from the following 3 taxa in having mostly shorter petals (6-13 mm long) that remain yellow in age, and in having a persistent floral tube that is not deciduous from the capsule.
- 3 Leaves entire to undulate-toothed or lobed, glabrous; floral tube and sometimes sepals cinereous strigose throughout, rarely nearly glabrous; plants from a branched caudex, this more or less clothed with persistent leaf bases; capsules with seeds in 1 row in each cell; sepals 3-5 cm long; petals 3-5 cm long, drying reddish-orange..... O. howardii
- 3 Leaves rather sharply toothed to runcinate-pinnatifid, strigose at least along the margins and generally pubescent with scattered transparent glandular hairs; floral tube also with glandular hairs; capsules with seeds in 2 rows in each cell; sepals various; petals various
- 4 Sepals 1-2.5 cm long; petals 1-3 cm long, drying to purple; plants from a simple taproot; at least the upper 1/2 of leaf blades 5-12 mm wide excluding the teeth, 3-20 cm long; capsules (10) 20-40 mm long, the wings 2-5 mm wide; plants widespread..... O. flava
- 4 Sepals 2.5-5 cm long; petals 2.8-5 cm long, drying purplish-brown; plants from a branched root or caudex; leaf blades mostly narrow-linear, mostly 2-6 mm wide excluding the teeth or lobes, 6-25 cm long; capsules 14-22 mm long, the wings 1-2 mm wide; plants of ne. Uintah, Daggett, and Moffat Cos..... O. acutissima
- 1 Plants with leafy stems; floral tube 1.5-4.5 cm long
- 5 Petals yellow when fresh; stems 30-150 cm tall, often reddish; floral tube 2.5-4.5 cm long; leaves entire or dentate, 4-20 cm long
- 6 Petals 1-2 cm long; sepals 1-1.5 cm long..... O. biennis
- 6 Petals 2.5-4 cm long; sepals 2.5-4 cm long..... O. elata
- 5 Petals white or pink when fresh, sometimes rose-pink upon drying; stems 5-50 cm long; floral tube 1.5-3.5 cm long; leaves entire to deeply pinnatifid
- 7 Floral tube with a conspicuous, dense ring of hairs at the throat; capsules fusiform not curved nor contorted, 10-15 mm long, about 5 mm wide, membranous; leaves except the lower ones pinnatifid to the midrib, 1.5-2.5 cm long; petals 7-15 mm long O. coronopifolia
- 7 Floral tube without a ring of hairs; capsules nearly linear, broadest at the base and gradually tapering to the apex, straight, curved, or contorted, about 20-40 mm long, to 3 mm wide, leathery or nearly woody; leaves variable, entire to deeply pinnatifid, 2-6 cm long; petals about 10-20 mm long..... O. pallida

Oenothera acutissima Wagner Acute-leaf e. Endemic, e. Uinta Mts., Blue Mt., Cold Spring Mt. and Yampa Plateau; sandy summer-dry stream beds, dry rocky meadows, and rocky areas adjacent to streams; ponderosa pine and Vasey sagebrush communities; 7,000-8,355 ft; June-July.

Oenothera biennis L. Common e. [O. rydbergii House; O. strigosa (Rydb.) Mack. & Bush; O. villosa Thunb.] Specimens seen are from the lower parts of the Yellowstone, Uinta, and Whiterocks Canyons and adjacent in the Basin to Vernal, and 1 is from the E. Tavaputs Plateau; riparian, sagebrush, and ponderosa pine communities, roadsides, fencelines, and ditchbanks; 5,600-7,700 ft; July-Sept.

Oenothera caespitosa Nutt. Tufted e. With 2 intergrading ssp. in our area.

- 1 Capsules pediceled; floral tube (6) 7-14+ cm long; petals (2.5) 3-5 (6) cm long; leaf blades more or less lobed..... ssp. marginata
- 1 Capsules sessile; floral tube 3-7 (8.5) cm long; petals 2-4 (4.5) cm long; leaf blades nearly entire, undulate or shallowly lobed..... ssp. navajoensis

Ssp. marginata (Nutt.) Munz (O. marginata Nutt.) Occasional; widespread; sagebrush and mt. brush communities; up to 7,800 ft; May-June (July).

Ssp. navajoensis Wagner, Stockhouse & Klein Occasional; widespread; desert shrub, sagebrush, and pinyon-juniper communities; 4,700-6,500 ft; May-June. Perhaps more common especially at lower elevations than ssp. marginata.

Oenothera coronopifolia T. & G. Locally common; widespread; dry meadows, sagebrush, mt. brush, rabbitbrush-Basin wildrye, juniper, and ponderosa pine communities; 7,100-8,500 ft; June-Aug.

Oenothera elata H.B.K. [O. hookeri T. & G. var. angustifolia Gates] Occasional; widespread; riparian, sagebrush-rabbitbrush, ponderosa pine, Douglas-fir, and aspen communities, usually along flood plains, roadcuts, cutbanks of streams, gullies, and rocky drainages; 4,700-8,650 ft; July-Sept. Our plants are referable to ssp. hirsutissima (A. Gray ex Wats.) Dietrich.

ONAGRACEAE

Oenothera flava (A. Nels.) Garrett Long-tube e. Widespread; open ground about ephemeral pools and streams and rocky snowflush areas, roadbeds, ponderosa pine communities, and dry and wet meadows; 7,600-9,800 ft; July-Aug.

Oenothera howardii (A. Nels.) Wagner [O. brachycarpa (Gray) Britt. misapplied] Occasional; widespread; riparian, pinyon-juniper, and sagebrush communities, often on rather barren soil of harsh substrates; 5,800-6,800 ft; June.

Oenothera pallida Lindl. Pale e. (O. trichocalyx Nutt. ex T. & G.) Occasional to common; widespread; desert shrub, sagebrush, and pinyon-juniper communities; up to 8,200 ft; May-July or to Sept. with fall moisture. This is generally considered to be a perennial plant from long creeping rhizomes, but none of the specimens seen from our area are rhizomatous. They arise from taproots and are annual or perhaps biennial or short-lived perennial herbs that often flower the first year, and thus they are referable to ssp. trichocalyx (Nutt.) Munz. & Klein. The annual habit of some of our plants is the basis for reports of the more s. O. albicaulis Pursh for our area.

OPHIOGLOSSACEAE Adderstongue Family

Botrychium Sw. Grapefern

Botrychium lunaria (L.) Sw. Moonwort. Perennial, fernlike herbs from fleshy, erect rootstocks, 2-10 cm tall; fronds consisting of a single sterile leaf blade and a compound sporophyll both on a common stalk; sterile blade inserted at the base or near the middle of the common stalk, the blade 5-40 mm long, simple, lobed, or pinnately divided; fertile spikes simple or compound, 3-50 mm long; sporangia large, globose; spores yellow. Rare; Uinta Mts.; the 1 record seen (Harrison 7666) is from near Moon Lake; wet meadows and streamsides; 8,100 ft.

ORCHIDACEAE Orchid Family

Perennial herbs; leaves mostly sheathing, linear to orbicular, often coarsely parallel-ribbed; flowers usually bisexual, minute to showy and extremely zygomorphic; sepals and petals 3 each, sometimes fused in part, similar or more often the petals more showy, the lower petal (lip) larger and unlike the other perianth segments, often cylindric, sometimes bladderlike, sometimes prolonged at the base into a spur; fertile stamens 1 (2), an additional staminodium present in some genera; ovary inferior, with 1-3 chambers; stigmas 3; fruit a 3-valved, dry capsule; seeds minute, numerous.

- 1 Leaves reduced to bladeless sheaths; plants not green, lacking chlorophyll except in Corallorhiza trifida..... Corallorhiza
- 1 Leaves with at least 1 blade well developed, green
 - 2 Flowers mostly solitary, showy; stem from a globose (or nearly so) corm, with only 1 well-developed blade-bearing leaf, this also arising from the corm..... Calypso
 - 2 Flowers 2-many, spicate to racemose; plants not from corms; blade-bearing leaves arising from the stem, often more than 1
 - 3 Blade-bearing leaves usually 2, these opposite or subopposite, borne about midway on the stem; additional reduced or bractlike leaves sometimes present, these alternate
 - 4 Leaves 4-9 cm long; flowers 2-4; sepals 12-20 mm long; lip inflated, entire at the apex; stems viscid-villous throughout..... Cypripedium
 - 4 Leaves 1.5-3.5 cm long; flowers 2-13; sepals about 2-5 mm long; lip not inflated, retuse to deeply cleft at the apex; stems glabrous below the leaves, sometimes glandular-puberulent above the leaves..... Listera
 - 3 Blade-bearing leaves not as above
 - 5 Sepals 12-15 mm long, greenish with brownish veins; petals brownish-purple, the lip 15-18 mm long, not prolonged into a spur; stems leafy throughout; plants known from below 7,000 ft..... Epipactis
 - 5 Sepals 2-12 mm long, greenish or white; petals greenish or white, the lip 3-12 mm long, spurred or not; stems sometimes with reduced or bractlike leaves above; plants mostly from above 7,000 ft
 - 6 Scapes and flowers grandular pubescent; plants rhizomatous..... Goodyera
 - 6 Plant glabrous, from fibrous or flesh, fascicled roots
 - 7 Lip prolonged at the base into a spur; leaves basal or cauline, reduced leaves and bracts below the inflorescence (if present) usually not sheathing, or if so then solitary..... Habenaria
 - 7 Lip not prolonged into a spur; leaves with well-developed blades basal or on the lower 1/3 of the stem, usually sheathing, the sheath sometimes rather loosely enveloping the stem; upper leaves bractlike, these, at least the lower, usually sheathing.... Spiranthes

Calypso Salisb.

Calypso bulbosa (L.) Oakes Fairy slipper; Venus slipper. Plants from a perennial, fleshy, globose or ellipsoid corm, 5-15 (20) cm tall; a solitary blade-bearing leaf arising from the corm, the blade 3-6 cm long, broadly elliptic, ovate or cordate, the petiole about as long as the blade; stem scapose, enveloped by long-sheathing bladeless or bract-tipped sheaths; sepals and petals similar, purplish, with deeper colored veins (rarely whitish), lanceolate or linear, 15-23 mm long; lip ovate-oblong, slightly longer than the other perianth segments, about 10 mm wide, whitish, yellowish or pale reddish-brown in age, spotted and bearded on the upper side, the basal opening hooded by the petaloid, suborbicular, 7-12 mm long column. Seldom collected, but locally common in some years; Uinta Mts.; conifer woods; May-June.

Corallorhiza Chat. Coralroot

Plants perennial, saprophytic and without chlorophyll, herbaceous, fleshy when young, scapose, the scapes yellow, reddish, or reddish-brown; leaves reduced to sheaths, these enveloping the stem; inflorescence a bracteate raceme; pedicels erect or spreading in flower, reflexed in fruit, 1-2.5 mm long; sepals 3, the lateral pair sometimes extended under the base of the lip and forming a small pouch or spur; petals 3, the lateral pair sepal-like, the lip short-clawed; anther 1; capsule rounded, pendulous.

- 1 Plants yellow to greenish-yellow, 5-30 cm tall; scapes slender, seldom over 3 mm wide; sepals whitish, 5-6 mm long; corolla whitish..... C. trifida
- 1 Plants purplish or reddish-brown (yellow in albino forms), 15-70 cm tall; scapes mostly over 3 mm thick at least toward the base; sepals 6-16 mm long; corolla marked with purple
 - 2 Corolla lip entire, sometimes over 6 mm wide, white with prominent purple stripes, not spotted; sepals also striped with purplish lines..... C. striata
 - 2 Corolla lip undulate or erose along the margins or lobed toward the base, mostly less than 6 mm wide, often purple spotted, not strongly striped with purple lines; sepals lightly if at all striped
 - 3 Lip with an evident lobe on either side at the base; plants common..... C. maculata
 - 3 Lip without lateral lobes; plants rare..... C. wisteriana

Corallorhiza maculata Raf. Spotted c. [C. mertensiana Bong. misapplied by Graham (1937)] Most common in dry lodgepole pine and ponderosa pine woods, occasionally in aspen woods, most records seen are from the Uinta Mts., but a few from the Tavaputs Plateau; June-Aug.

Corallorhiza striata Lindl. Hooded c. The 3 specimens seen are from Strawberry Ridge, Rock Creek, and Blue Mt.; aspen and conifer woods; 7,200-8,800 ft; June-July.

Corallorhiza trifida Chat. Early c. Seldom collected in our area; the few records seen are from the w. end of the Uinta Mts.; along streams in conifer woods; July-Aug.

Corallorhiza wisteriana Conrad. Spring c. The 2 specimens seen (Neese 12011; Neese & Sinclair 15091) are from the Uinta Mts., along Hwy. 44 at Daggett-Uintah Co. line and on Mosby Mt.; duff of lodgepole pine forests; 8,600-9,515 ft; July.

Cypripedium L. Lady's Slipper

Cypripedium fasciculatum Kell Brownie l., clustered l. Stems arising singly from short rhizomes, 4-12 cm tall, densely viscid-villous, with a pair of opposite leaves borne at about mid-length, the blades broadly elliptic or orbicular, 4-9 cm long; 1-2 bladeless sheaths enveloping the base of the stem; 1 or more bractlike leaves below the inflorescence; sepals lanceolate, 1-2 cm long, greenish-brown or greenish-purple; petals similar to sepals but usually wider; lip ovoid, appearing inflated, shorter than the sepals and petals, greenish-yellow, with deep purple margins. The 4 records seen are from Mosby Mt., Eagle Creek, and East Park, Uinta Mts. and Diamond Mt.; lodgepole pine communities; 8,000-9,000 ft; June.

Epipactis Sw. Helleborine

Epipactis gigantea Dougl. [Amnesia gigantea (Dougl.) A. Nels.] Stems arising singly or several together from creeping rhizomes, 30-70 (100) cm tall, glabrous below, pubescent in the inflorescence; leaves sessile, 5-20 cm long, the sheaths enveloping the stem, the lower most reduced to sheaths, the lower blades ovate, the upper ones lanceolate or linear, greenish with brownish veins; petals sepal-like, 15-18 mm long, brownish-purple; lip 15-18 mm long, the sac with purplish lines, 3-lobed at the base, the blade or central lobe curved downward, greenish-yellow; capsules 2-2.5 cm long, ovoid, reflexed, yellowish with dark brown ridges. Two specimens (Neese 7655, 14844) are from Big Sand Wash Reservoir, another (A. Ross sn UTC) is from Desolation Canyon, reported by Graham (1937) from near Headquarters, Dinosaur National Monument.

Goodyera R. Br. Rattlesnake Plantain

Goodyera oblongifolia Raf. Plants 20-40 cm tall; from short rhizomes; leaves basal, the blades 3-7 cm long, ovate-lanceolate to elliptic-lanceolate, thickish, dark green and usually striped with white, especially along the midrib; scape with 2-4 small, membranous, non-green, sheathing bracts; flowers in a

spikelike raceme, mostly secund and often spiralled, usually pale greenish white, pubescent, about 6-10 mm long. The 1 specimen seen (Goodrich 22095) is from near the Daggett-Uintah Co. Line along Hwy. 191, dense lodgepole pine woods at 8,480 ft.

Habenaria Willd. Bog or Rein Orchid

Glabrous perennial herbs from tuberous or fleshy roots or occasionally rhizomes; leaves alternate, entire, solitary to several, gradually reduced upward, mostly with a sheathing base; inflorescence a spike or spikelike raceme, loosely to densely flowered; upper sepals often united with the petals; lateral sepals spreading to reflexed; lip curved upward to strictly decending; spur usually conspicuous, borne behind and longer or shorter than the lip. The last 4 species in the following key form a complex that has been separated by minor (if not trivial), inconsistent features. The variability recognized in the 3 vars. of H. dilatata is as great or greater than is found in the entire complex. Indeed the variations found in H. dilatata nearly encompass the entire complex as do the variations found in H. hyperborea. The 4 so-called species apparently hybridize freely (Cronquist and others 1977). This creates an array of hybrid variants that further complicates identification. Separation of troublesome specimens may serve more to waste time than for any useful purpose.

- 1 Stems with a solitary basal leaf; scapes without bracts, or with a solitary sheathing bract near the middle; spikes 3-7 cm long..... H. obtusata
- 1 Stems with 3 or more leaves; inflorescence often over 7 cm long
 - 2 Leaves clustered at or near the base of the stem, usually withering at or before flowering; stems with scalelike bracts; bracts subtending the flowers inconspicuous..... H. unalascensis
 - 2 Leaves scattered on the stem (sometimes mostly basal), usually green at flowering; stems with leaves or leaflike bracts; bracts subtending the flowers often conspicuous, at least the lower ones usually longer than the flowers
 - 3 Lip tridentate at the apex, about 3 mm wide, pendulous; bracts subtending each flower leaflike, green, mostly 2-4 cm long except the upper ones; spur to 1/2 as long as the lip..... H. viridis
 - 3 Lip entire at the apex; bracts subtending the flowers less than 2 cm long (see discussion at the end of the generic description above)
 - 4 Spur scrotiform; lip not at all widened toward the base; racemes usually open..... H. saccata
 - 4 Spur not scrotiform; lip usually widened toward the base, sometimes only slightly so; raceme mostly congested
 - 5 Flowers mostly white, rarely pale green; lip rhombic-lanceolate, prominent and rather abruptly dilated at the base..... H. dilatata
 - 5 Flowers greenish; lip linear to broadly lanceolate, not prominently dilated at the base
 - 6 Raceme usually elongate and loosely flowered; lip linear to linear-elliptic, often with a fleshy ridge in the center below the middle..... H. sparsiflora
 - 6 Raceme usually short and densely flowered; lip linear-lanceolate to lanceolate or slightly broader, without a fleshy ridge..... H. hyperborea

Habenaria dilatata (Pursh) Hook. White b. [Platanthera dilatata (Pursh) Lindl. ex Beck] The few records seen are from the Uinta Mts.; wet places, about springs, in meadows and bogs, and along streams; about 7,300-10,000 ft; June-Aug. Three vars. have been recognized for the Intermountain Region (Cronquist and others 1977). Separation is largely made on length of the spur in relation to length of the lip. No separation is offered here. The recently described H. zothecina Higgens & Welsh with lip not dilated at the base and 1.5-2 times longer than the spur will key here.

Habenaria hyperborea (L.) R. Br. Northern b. [Platanthera hyperborea (L.) Lindl.] Specimens seen are from the Uinta Mts.; wet places; 6,500-10,000 ft and rarely lower elevations in the Basin; June-Aug.

Habenaria obtusata (Banks) Richards Northern small b. [Platanthera obtusata (Banks ex Pursh) Lindl.] The few specimens seen are from S. Fork Rock Creek, Uinta Mts.; along streams and in boggy places in Engelmann spruce forests; 8,600-9,560 ft; June-July.

Habenaria saccata Greene Slender b. (Platanthera stricta Lindl.) Like H. hyperborea, rather tentatively separated by the criteria given in the key, suggested as possibly only a variety of H. hyperborea (Cronquist and others 1977).

Habenaria sparsiflora Wats. Canyon habenaria. [Platanthera sparsiflora (Wats.) Schlechter] Like H. hyperborea, separation is arbitrary at best in our area (see Arnow and others 1980).

Habenaria unalascensis (Sprengel) Wats. Alaska r. [Piperia unalascensis (Sprengel) Rydb.] The few records seen are from the Uinta Mts., to be expected across the area; in dry or moist conifer woods; 7,800-10,000 ft; June-July.

Habenaria viridis (L.) R. Br. Satyr r. [H. bracteata (Willd.) R. Br.; Coeloglossum viride (L.) Hartm.] Known from a wet area at 7,400 ft along Uinta River (Goodrich 2470).

Listera R. Br. Listera; Twayblade

Slender, inconspicuous herbs from small rhizomes; leaves 2, opposite or subopposite, sessile, borne at about midlength of the stem; flowers small, greenish or purplish in age, racemose; sepals and petals

similar, spreading to reflexed; lip somewhat longer than the sepals, pointing forward, usually with a pocketlike nectary under the stigma.

- 1 Lip cleft for about 1/2 its length into linear-lanceolate, more or less divergent lobes, glabrous, 3-6 mm long; leaves subcordate, opposite..... L. cordata
- 1 Lip retuse or shallowly notched at the apex, with rounded lobes, puberulent at least along the margins, 8-13 mm long; leaves elliptic to suborbicular
 - 2 Lip noticeably tapered to the base; petals strongly recurved; leaves ovate to suborbicular, opposite..... L. convallarioides
 - 2 Lip not much if at all tapered to the base; petals spreading-reflexed; leaves lanceolate to ovate-elliptic, subopposite..... L. borealis

Listeria borealis Morong Northern t. The few specimens seen are from S. Fork Rock Creek, Uinta Mts.; mossy, boggy places in shade of conifer trees; 9,320-9,560 ft; July-Aug.

Listeria convallarioides (SW.) Torr. Broadleaved t. Known from wet meadows and woods, Hades Canyon, Uinta Mts., Duchesne Co. (Flowers 1457 UT).

Listeria cordata L. R. Br. Heartleaf l. or t. The specimens seen are from the same locations as those of L. borealis.

Spiranthes Rich. Ladies-tresses

Perennial herbs from fascicled fleshy roots; stems 1-several, simple, erect, glabrous below, sometimes glandular-pubescent above; leaves mostly on the lower portion of the stem, alternate, sheathing, the blades mostly linear, occasionally oblong, rarely obovate, those of the stem reduced upward to bladeless sheaths; flowers cream, white, or greenish-white, spirally arranged in a dense spike; sepals glandular-hairy, united with the lateral petals into a tubular hood.

- 1 Lip constricted toward the middle (violin-shaped), recurved, sharply differentiated from the other perianth segments; plants known from above 7,500 ft..... S. romanzoffiana
- 1 Lip not constricted toward the middle, ovate, not recurved, not so sharply differentiated from the other perianth segments; plants known from below 7,500 ft..... S. porrifolia

Spiranthes romanzoffiana Sham. Hooded l. Occasional or common; Uinta Mts.; mostly in the lodgepole pine-Engelmann spruce zone, in woods and meadows, and clearings in woods made from logging or fire; about 8,500-11,000 ft; July-early Sept.

Spiranthes porrifolia Lindl. Creamy l. [S. romanzoffiana Cham. var. porrifolia Ames & Correll; S. diluvialis Sheviak] The 3 specimens seen are from riparian communities of the Green (Taylor Flat Bridge), Uinta, and Whiterocks Rivers; 5,500-6,850 ft; July-Sept.

OROBANCHACEAE Broomrape Family

Orobanche L. Broomrape; Cancer-root

Herbs perennial (ours), parasitic on the roots of other plants, lacking chlorophyll, whitish, yellowish to brown, often more or less fleshy; herbage glandular-hairy; leaves alternate or occasionally sub-opposite, bractlike; flowers solitary or in usually dense bracteate spikes or racemes; calyx often closely subtended by bractlets, with cylindrical or bell-shaped tube and 4-5 lobed limb or divided to the base; corolla united, 2-lipped, the upper lip 2-lobed, the lower 3-lobed and at least as long as the upper; stamens 4, mostly included; ovary superior, 1-chambered, the stigma 2-4 lobed or disc shaped; fruit a capsule.

- 1 Flowers sessile or on pedicels to about 2 cm long, closely subtended by 2 bractlets; calyx deeply cleft, the lobes much exceeding the tube
 - 2 Inflorescence a short corymb, 2.5-5 cm long; calyx lobes 9-16 mm long; plants 3-10 cm tall..... O. corymbosa
 - 2 Inflorescence an elongate spike or raceme, (3) 4-10 cm long; calyx lobes 5-10 (12) mm long..... O. ludoviciana
- 1 Flowers on scapelike pedicels 2-15 cm long, not closely subtended by 2 bractlets; calyx lobes shorter or a little longer than the tube
 - 3 Flowers (3) 4-10, pedicels about as long or shorter than the true stem; calyx lobes mostly equal to or shorter than the tube..... O. fasciculata
 - 3 Flowers 1-3, pedicels much longer than the stem; calyx lobes longer than the tube..... O. uniflora

Orobanche corymbosa (Rydb.) Ferris Flat-topped b. [O. californica C. & S. var. corymbosa (Rydb.) Munz.] The few specimens seen are from the lower edge of the Tavaputs Plateau and adjacent in the Basin; from areas of white, calcareous sandstone and marly shale or limestone in desert shrub and pinyon-juniper

OROBANCHACEAE

communities; June-Aug. Bradley 5339 DINO!, apparently the basis for the report (Holmgren 1962) of O. multiflora Nutt. for w. of Island Park, belongs here.

Orobanche fasciculata Nutt. Clustered b. [Thalesia fasciculata (Nutt.) Britton] Occasional; widespread; desert shrub, sagebrush, pinyon-juniper, and Douglas-fir-snowberry communities, often parasitic on sagebrush roots, but also on several other plants; 5,000-9,200 (10,000) ft; May-July.

Orobanche ludoviciana Nutt. Louisiana b. Graham 7556 (CM!) is from Douglas Canyon, w. of Dinosaur Quarry; 5,000 ft.

Orobanche uniflora L. Ghost-pipe, naked b. Apparently infrequent or rare but widespread; in many plant communities including desert shrub, sagebrush, pinyon-juniper, and spruce-fir; 6,200-10,000 ft; May-July. Our plants are referable to var. occidentalis (Greene) Taylor & Macbr. [O. u. var. minuta (Suksd.) Beck].

PAPAVERACEAE Poppy Family

Papaver L. Poppy

Papaver radicum Rottb. (P. nudicaule L. var. r. DC.) Plants caespitose; scapes 5-15 cm long, blackish hirsute; leaves basal, 2-10 cm long, deeply lobed or parted, the divisions sometimes incised-toothed to cleft, rarely entire; calyx densely black-hirsute; flowers solitary; sepals 2; petals 4, 1-3 cm long, yellow; stamens numerous; stigmas dislike; fruit a capsule dehiscent by pores just under the stigma, about 1 cm long. The few records seen are from above 12,000 ft on high peaks of the Uinta Mts. in Duchesne Co.; July-Aug.

PINACEAE Pine Family

Evergreen, monoecious, resinous trees or shrublike in krummholz condition at timberline; leaves (needles) needlelike; each ovule borne on the face of a scale or bract, not enclosed in an ovary; the scales several, firm to woody, borne along a central axis and forming a cone, the cones unisexual, the staminate cones rather soft, the scales not woody.

- 1 Leaves borne in fascicles of 2-5 together; scales of pistillate cones woody, rigid, often with a prickly point; twigs alternate..... Pinus
- 1 Leaves borne singly on the branches; pistillate scales softer more flexible than above, without a prickly point; twigs often opposite
- 2 Leaves more or less 4-angled in cross section (the angles detectable to the touch when leaves are rolled between thumb and fore finger), soon deciduous in dried specimens, borne on woody, peglike bases, these persistent on the twigs after the leaves have fallen; pistillate cones pendulous, the scales persistent, not subtended by a 3-pronged bract..... Picea
- 2 Leaves flat in cross section, not soon deciduous in dried specimens, not borne on peglike bases, leaving rounded, rather sunken scars when fallen; scales various
- 3 Pistillate cones yellow-green to purplish-black, erect; cone-scales deciduous, the subtending bracts concealed by the scales; leaves not twisting nor narrowed at the base, often curving outward and upward from the twigs; winter buds not reddish, blunt; twigs nearly all opposite..... Abies
- 3 Pistillate cones greenish when young, brown in age, pendulous, the scales not deciduous, subtended and exceeded by a conspicuous 3-pronged bract; leaves slightly twisting and narrowed at the petiolate base, not strongly curving upward from the twigs; winter buds reddish, pointed; twigs alternate and opposite Pseudotsuga

Abies Mill. Fir

Trees; young bark smooth, with resin blisters in age; leaves flat, linear, inserted singly, the basal scars circular; the pistillate cones erect, with thin, deciduous scales, and with bracts shorter than and concealed by the scales; seed winged.

- 1 Resin ducts of leaves next to the epidermis of the lateral margins; some leaves of the lower branches usually over 3 cm long; pistillate cones gray or yellow-green; trees rather uncommon in our area..... A. concolor
- 1 Resin ducts of leaves midway between the lateral margin and the midvein; leaves not over 3 cm long; pistillate cones blackish-purple; trees common in our area..... A. lasiocarpa

Abies concolor (Gord. & Glend.) Lindl. White f. The few records seen are from Rock Creek drainage and w. in the Uinta Mts. and from the Avintaquin drainage and w. on the W. Tavaputs Plateau, possibly in Daggett Co.; 7,500-9,000 ft.

Abies lasiocarpa (Hook.) Nutt. Subalpine f. Forming solid stands and even thickets to the exclusion of other vegetation on the Tavaputs Plateau and at isolated locations in the Uinta Mts. but mostly with lodgepole pine and Engelmann spruce on the vast areas of quartzite substrate of the Uinta Mts.; 7,500-

PINACEAE

11,000 ft. This tree is sometimes referred to as balsam or balsam fir, but this name is more acceptable for a closely related tree [A. balsamea (L.) Mill.] that grows in ne. United States and across Canada but is not found in our area.

Picea A. Dietr. Spruce

With features of the family and as listed in the key.

- 1 Young twigs usually puberulent; pistillate cones 4-6 (7.5) cm long; needles moderately sharp to rather blunt to the touch; plants mostly above 8,500 ft, not confined to drainages..... P. engelmannii
- 1 Young twigs glabrous; pistillate cones 6-10 cm long; needles sharp to the touch; plants mostly below 8,500 ft, often along drainages..... P. pungens

Picea engelmannii Parry Engelmann s. Abundant; widespread; Uinta Mts., no specimens seen from the Tavaputs Plateau; codominant with lodgepole pine at 9,000-10,500 ft, dominant from 10,500 ft up to timberline (about 11,000 ft) where the trees are reduced to windswept shrubs (krummholz).

Picea pungens Engelm. Colorado blue s., blue s. Mostly along drainages on the Uinta Mts. and Tavaputs Plateau, sometimes forming small stands out of drainages especially on the Tavaputs Plateau; 7,000-8,500 ft; a handsome tree, often cultivated as an ornamental.

Pinus L. Pine

Trees; conspicuous leaves borne in fascicles of 2-5, bound together at the base by a membranous sheath, needlelike or narrowly linear; pistillate cones with woody thickened scales, these often with prickles at the apex; seeds winged.

- 1 Leaves 5 per fascicle
 - 2 Cone scales ending in small but sharp prickles; leaves to 4 cm long, persisting for many years and providing a dense covering on the branches; trees known from the Tavaputs Plateau..... P. longaeva
 - 2 Cone scales with smooth margins; leaves 3-7 cm long, usually borne near the tip of the branches; trees widely distributed in our mountains..... P. flexilis
- 1 Leaves 2 or 3 per fascicle
 - 3 Leaves mostly greater than 7 cm long, 2 and often 3 per fascicle; cones mostly greater than 5 cm long P. ponderosa
 - 3 Leaves mostly less than 7 cm long, 2 per fascicle; cones less than 5 cm long
 - 4 Cone scales ending in short prickles; trees often over 8,000 ft except in canyons, mostly over 15 m tall at maturity; seeds less than 2 mm thick..... P. contorta
 - 4 Cone scales smooth; trees mostly below 8,000 ft, seldom exceeding 6 m tall; seeds over 2 mm thick P. edulis

Pinus contorta Dougl. Lodgepole p. (P. murrayana Balf.) The dominant tree of much of the subalpine zone of the Uinta Mts.; closely associated with soils derived from quartzite, forming thickets of stunted trees by prolific seed germination following fire or logging; common to dominant and forming solid stands at (7,500 ft in canyons) 8,000-10,000 ft, mostly in association with Engelmann spruce at 10,000-10,500 ft, occasionally above 10,500 ft and rarely to timberline. Lodgepole pine is the basis of the local pole and mine prop industry. It is somewhat small for a sawtimber tree, but because of its abundance, it has been the most important lumber tree of the area. Our trees are referable to var. latifolia Englem. ex Wats.

Pinus edulis Engelm. Pinyon; Pinyon p. Codominant with juniper and forming solid stands at higher elevations, apparently more sensitive to cold temperatures of long duration than juniper and not extending down as far into areas of cold air drainages and more common on the Tavaputs Plateau and on the n. slope of the Uinta Mts. than on the s. slope; (6,000) 6,500-8,000 ft. The seeds (pinyon nuts) are edible. The wood is pitchy, and that of long-dead trees is prized as firewood.

Pinus flexilis James Limber p., Rocky Mt. white p. Scattered, widespread, Uinta Mts. and Tavaputs Plateau; mostly on windswept dry ridges, but occasionally in more favorable sites with Douglas-fir and other conifers; 7,000-10,000 ft.

Pinus longaeva D. K. Bailey Intermountain bristlecone p. (P. aristata Engelm. misapplied) Confined to a few isolated locations on the W. Tavaputs Plateau; exposed slopes and ridges; 7,500-9,000 ft.

Pinus ponderosa Laws. Ponderosa p., yellow p. [P. scopulorum (Engelm.) Lemmon] Mostly 7,000-8,000 ft on the Uinta Mts. and to the Yampa Plateau, to 9,000 ft on the Tavaputs Plateau, down to 6,000 ft along drainages such as the Whiterocks and Uinta Rivers, and at a few isolated stations in very dry places just off the flank of the Uinta Mts., most abundant and forming the largest stands on the n. slope of the Uinta Mts.

Pseudotsuga Carr. Douglas-fir

Pseudotsuga menziesii (Mirb.) Franco D. [P. mucronata (Raf.) Sudw.; P. taxifolia (Poir) Britt.] Trees to 50 m tall; bark of young trees gray, smooth and thin, but becoming reddish-brown or brown and

PINACEAE

deeply fissured on older trees; limbs generally lacking on the lower portion of mature trees, more irregular in size in comparison to the uniform branches of fir and spruce; leaves 1.5-3 cm long, flat in cross section, slightly twisted in the minute petiolate base; cones 4-7 cm long, brown, each scale subtended by a prominent 3-pronged bract, the middle prong longer and narrower than the 2 lateral ones. Widely distributed and abundant on the Tavaputs Plateau where it often forms closed stands on n. exposures below elevations favored by subalpine fir, and sometimes on all exposures at higher elevations; widespread in the Uinta Mts. from 7,000-9,000 ft where associated with other conifers and aspen or forming solid stands on soils derived from limestone or shale, rare on soils derived from quartzite. Our trees belong to var. glauca (Beissn.) Franco and are slower growing and much smaller than the huge trees of var. menziesii of the Pacific Northwest.

PLANTAGINACEAE Plantain Family

Plantago L. Plantain

Annual or perennial herbs; leaves basal (ours), often in rosettes, usually strongly nerved, simple, entire, or occasionally toothed or lobed; flowers small, 4-merous, in congested bracteate spikes of heads; corolla united, scarious, not at all showy, persistent, often remaining on top of the mature fruit, the lobes spreading or deflexed; stamens (2) 4; ovary superior, appearing inferior, 1-4 chambered; style 1; fruit mostly a circumscissile capsule, with 1-4 seeds in each chamber.

- 1 Plants annual; leaves filiform to linear-oblongate, 1-5 (7) mm wide
 - 2 Leaves filiform, 1-2 (3) mm wide, glabrous or sparsely pubescent; capsules 4 (6) seeded; stamens generally 2..... P. elongata
 - 2 Leaves linear, often over 3 mm wide, silky-woolly throughout; capsules 2-seeded; stamens 4..... P. patagonica
- 1 Plants perennial; leaves lanceolate or wider, some over 7 mm wide
 - 3 Leaf blades broadly ovate, 1-3 times as long as wide, abruptly contracted to the petiole; seeds 6-30 per capsule; spikes 5-30 cm long; plants not woolly at the base..... P. major
 - 3 Leaf blades lanceolate to elliptic, 2-10 times as long as wide, gradually contracted to the petiole; seeds 2-4 per capsule; spikes either less than 8 cm long or else root crown bearing dense tufts of long hairs
 - 4 Root crown not bearing dense tufts of long hairs, sometimes sparsely brown-hairy; spikes 2-7 cm long at maturity; plants of montane, nonalkaline places..... P. tweedyi
 - 4 Root crown bearing dense tufts of long hairs; spikes often longer than 7 cm or else plants of lowlands and often in alkaline places
 - 5 Root crown with tufts of rust-colored hairs; capsule circumscissile below the middle; outer 2 sepals like the others, free; bracts acute..... P. eriopoda
 - 5 Root crown with tufts of white or tan hairs; capsule circumscissile at the middle; outer 2 sepals of at least the upper flowers fused, the resulting segment usually 2-notched at the apex; bracts acuminate or caudate-acuminate..... P. lanceolata

Plantago elongata Pursh Slender p. The 2 records seen are from salt desert shrub communities e. of the Green River; May-June. Our plants belong to var. elongata.

Plantago eriopoda Torr. Alkali p., redwool p. Rarely collected; apparently widespread; usually in moist alkaline lowlands; June-Aug.

Plantago lanceolata L. Buckhorn p., English p. Introduced from Europe; usually on disturbed sites at lower elevations, occasionally midmontane; May-Sept.

Plantago major L. Broadleaf p., common p. Native of Eurasia and perhaps parts of North America, widespread in the area; often a weed of lawns and in moist and wet, often disturbed places; up to 8,800 ft; June-Sept.

Plantago patagonica Jacq. Indian-wheat, woolly p. (P. purshii R. & S.) Infrequent to locally common; widespread; salt desert shrub, sagebrush, and pinyon-juniper communities; May-June. The name P. patagonica var. spinulosa (Dcne.) Gray is available for long-bracted plants that may be a result of introgression with P. aristata Michx.

Plantago tweedyi Gray Tweedy p. Occasional to common; most of the records seen are from w. of Lake Fork drainage in the Uinta Mts. and from Strawberry Valley; open ground, along roads, about ponds, dry meadows and open woodlands, mostly montane; above 8,000 ft; June-Aug.

POACEAE (GRAMINEAE) Grass Family

Plant annual or perennial, herbaceous, arising from fibrous roots or rhizomes, sometimes stoloniferous; stems mostly terete, rarely flattened, the internodes hollow or rarely solid, the nodes often swollen and prominent; leaves alternate, simple, the blades mostly linear or filiform, parallel-veined, strongly sheathing at the base, the sheath open or closed; auricles sometimes developed at the juncture of the sheath and blade (collar); ventral surface of the collar projected into a ligule, this mostly a membranous, translucent scale or occasionally a fringe of hairs or rarely lacking; inflorescence a spike, raceme,

panicle, or panicle of racemose or spikelike branches; flowers bisexual or unisexual in a few species, some sterile or rudimentary in just a few of our species, solitary or 2-many in a spikelet; spikelets consisting of a rachilla (axis), (1) 2 glumes (empty scales that subtend or enclose 1 or more florets), and 1 or more florets; florets consisting of 2 scales (a lemma and palea, the lemma usually enclosing the palea), usually 1-3 stamens, and 1 pistil with 3 stigmas; fruit a caryopsis, dry and indehiscent.

The separation of Agropyron, Elymus, Hordeum, and Sitanion is laden with exceptions and undermined by hybridization. The synonymy listed herein reflects several alternative treatments. In view of the rapidity of changes in recent years, we feel it best to wait for solidification of an alternative treatment before departing from the somewhat traditional one followed here. One plausible course is to include most species of Agropyron, Elymus, and Sitanion into one genus, Elymus. Such an approach has been taken by Gould (1947) and Arnow (in preparation). This greatly reduces nomenclatural and other problems presented by intergeneric hybrids.

- 1 Inflorescence an open or contracted panicle, if contracted the branches readily evident upon teasing the inflorescence apart, or of a solitary spikelet in Danthonia
- 2 Spikelets with 2 or more well-developed fertile florets (1 or more florets sometimes staminate)
 - 3 Glumes shorter than the first floret; florets (2) 4-15 per spikelet; lemmas awnless or awned from near the tip, awns not flattened..... KEY 1 P. 193
 - 3 One or both glumes longer than the lowest floret to as long as the spikelet; florets 2-4 per spikelet or more in Danthonia but then the awns of lemmas flattened; lemmas awnless or awned from the back or near the tip in Danthonia..... KEY 5 P. 195
- 2 Spikelets with 1 well-developed fertile floret
 - 4 Spikelets borne in burs or cuplike structures
 - 5 Burs spiny, not closely subtended by leaflike bracts; plants sometimes over 20 cm tall..... Cenchrus
 - 5 Burlike or cuplike structures awned but not spiny, closely subtended and sometimes partly enveloped by leaflike bracts; plants not over 20 cm tall..... Buchloe
 - 4 Spikelets not borne in burs or cuplike structures
 - 6 Pedicels and rachis joints densely long, villous, the hairs yellowish and 3-5 mm long; inflorescence of 2-5 digitate or approximate spicate branches; plants sparingly introduced.... Andropogon
 - 6 Pedicels and rachis joints not long villous as above; inflorescence various but if digitate then the branches usually more numerous
 - 7 Branches of inflorescence strongly 1-sided; spikelets sessile or nearly so and borne on 1-side of the branches..... KEY 6 P. 195
 - 7 Inflorescence not as above..... KEY 7 P. 196
- 1 Inflorescence a spike or spikelike raceme, or dense, spikelike panicle in which the branches are not evident, not of a solitary spikelet
 - 8 Spikelets borne in burs or cuplike structures..... (see lead 5 above)
 - 8 Spikelets not borne in burs or cuplike structures
 - 9 Inflorescence densely long villous, the hairs yellowish and 3-5 mm long, of 2-5 digitate or approximate spicate branches; plants sparingly introduced..... Andropogon
 - 9 Inflorescence not villous or else not branched as above, if digitate then usually with more branches
 - 10 Inflorescence of 1-many 1-sided spicate branches with spikelets borne on 1 side.. KEY 6 P. 195
 - 10 Spikes 1 (rarely more) per culm; spikelets borne on 2 or more sides of the rachis
 - 11 Spikelets bearing dense tufts of 3-6 mm long hairs at the point of attachment to the rachis; spikelets disarticulating below the glumes and leaving a bare zig-zagged rachis.. Hilaria
 - 11 Spikelets without tufts of hair as above; spikelets disarticulating above the glumes in most genera
 - 12 Inflorescence cylindrical or ovoid with spikelets borne on all sides of the rachis; spikelets with 1 floret, not over 6 mm long..... KEY 10 P. 197
 - 12 Inflorescence not cylindrical or ovoid, or if cylindrical then spikelets with more than 1 floret and often over 6 mm long; spikelets mostly borne on 2 sides of the rachis
 - 13 Ligule a fringe of hairs; leaves clustered on the lower 1/4 of the culms or an additional cluster subtending and partly concealing the inflorescence; lemmas with 3 prominent nerves..... (see Erioneuron and Munroa in leads 11 and 13 in KEY 3)
 - 13 Ligule not a fringe of hairs; culms generally bearing leaves on the upper 1/2; leaves not clustered just below the inflorescence; lemmas mostly with more than 3 nerves..... KEY 11 P. 197

KEY 1

- 1 Tall stout reeds generally over 1.5 m tall; rachilla with long silky hairs as long as the spikelets.... Phragmites

POACEAE

- 1 Plants not as above; hairs of rachilla lacking or shorter than above
- 2 Florets converted into bulblets; plants with bulbous bases..... Poa bulbosa
- 2 Florets not converted into bulblets; plants without bulbous bases except in Melica and Dactylis
 - 3 Lemmas awned or awn pointed, the awn over 2 mm long..... KEY 2 P. 194
 - 3 Lemmas awnless, or if awn pointed then the point less than 2 mm long
 - 4 Ligules a fringe of hairs; sheaths often with a tuft of pilose hairs at the summit and sometimes on the collar; lemmas with 1-3 prominent nerves (except in Distichlis).. KEY 3 P. 194
 - 4 Ligules not a fringe of hairs; sheaths various; lemmas with more than 3 nerves (except in Catabrosa), the nerves often obscure..... KEY 4 P. 194

KEY 2

- 1 Spikelets crowded and arranged 1-sided on the panicle branches; glumes and lemmas stiff-ciliate (use 10 times magnification)..... Dactylis
- 1 Spikelets not as above; glumes not ciliate; lemmas sometimes soft-ciliate
 - 2 Leaves flat, mostly 2 mm wide or wider; lemmas awned from between and just below the teeth of a bifid apex; awns usually longer than 5 mm except in Leptochloa
 - 3 Callus of florets bearded..... Schizachne
 - 3 Callus of florets not bearded
 - 4 Lemmas with 3 nerves, the nerves pubescent; panicle consisting of spikelike racemes, or spicate branches; plants annual, usually growing in mud or water; spikelets 7-12 mm long.... Leptochloa
 - 4 Lemmas with 5 or more nerves; panicle not as above; plants annual or perennial; some spikelets usually over 12 mm long..... Bromus
 - 2 Leaves mostly rolled, less than 2 mm wide; lemmas awned from the tip; apex of lemma entire; awn usually less than 5 mm long..... Festuca

KEY 3

- 1 Lemmas with 5-13 nerves, the nerves obscure; spikelets unisexual (7.5) 9-15 (20) mm long, the pistillate ones 3-12 flowered, the staminate ones 6-15 flowered; plant of alkaline lowlands, from robust, scaly rhizomes..... Distichlis
- 1 Lemmas with 1-3 prominent nerves; spikelets bisexual, either shorter than above or plants without rhizomes
 - 2 Plants mostly over 45 cm tall, perennial, from long creeping rhizomes, known from sandy areas se. of Vernal; spikelets 2-flowered..... Redfieldia
 - 2 Plants either less than 45 cm tall or annual; rhizomes lacking
 - 3 Plants perennial; lemmas densely pubescent on the back; culms leafless except at the base..... Erioneuron
 - 3 Plants annual; lemmas glabrous on the back; culms leafy above or with leaflike bracts
 - 4 Lemmas awn tipped; panicle contracted nearly hidden in a tuft of leaflike bracts; plants mostly of deserts..... Munroa
 - 4 Lemmas awnless, often glandular at the tip; panicle open, well exceeding the leaves; plants mostly weedy in gardens, fields, and waste places, flowering in mid summer and early autumn... Eragrostis

KEY 4

- 1 Glumes 0.5-3.5 mm long; lemmas 1.5-3 (4) mm long, glabrous; nerves of lemmas parallel and not converging at the apex; plants usually growing in wet soil, often along streams, or in water
 - 2 Lemmas with 3 prominent nerves, truncate; glumes erose..... Catabrosa
 - 2 Lemmas with more than 3 nerves, the nerves sometimes faint, not truncate; glumes various
 - 3 Leaf sheaths open with membranous margins; nerves of lemmas rather faint; plants mostly less than 50 cm tall, often growing in alkaline soil..... Puccinellia
 - 3 Leaf sheaths closed, the margins not membranous; nerves of lemmas usually prominent; plants often over 50 cm tall, growing in fresh or marshy water or along montane streams but not in alkaline conditions..... Glyceria
- 1 Glumes and/or lemmas mostly longer than above except sometimes in Poa and then the lemmas mostly pubescent; nerves of lemmas converging toward the apex of the lemma; plants of dry to moist places, but mostly not growing in water
 - 4 Spikelets crowded and arranged 1-sided on the panicle branches; glumes and lemmas stiff-ciliate.... Dactylis
 - 4 Spikelets not crowded nor arranged 1-sided on the panicle branches; glumes and lemmas not ciliate
 - 5 Plants with bulbous bases; glumes papery; upper florets empty; spikelets often purplish, at least some over 1 cm long..... Melica
 - 5 Plants without bulbous bases; spikelets not purplish, or if so then less than 1 cm long
 - 6 Spikelets 20-25 mm long..... Bromus
 - 6 Spikelets less than 15 mm long

- 7 Spikelets mostly less than 7 mm long, sometimes with purplish markings; lemmas 2-5 mm long, or if spikelets and lemmas longer than the lemmas pubescent, or the leaf blades folded or rolled, or some of the panicle branches widely spreading to reflexed..... Poa
- 7 Spikelets mostly over 7 mm long; lemmas 5-7 mm long, glabrous; leaf blades flat; panicle branches erect or slightly spreading
- 8 Panicle narrow, the branches short and bearing spikelets to near their base; auricles lacking; plants mostly unisexual; glumes more or less scarious, only the midrib green..... Leucopoa
- 8 Panicle spreading at the base, some of the branches elongate and not bearing spikelets at the base; auricles often present; plants bisexual; glumes usually green other than on the midrib..... Festuca

KEY 5

- 1 Glumes 18-29 mm long; panicles mostly with over 6 spikelets..... Avena
- 1 Glumes less than 18 mm long, or if to 20 mm then panicles with less than 6 spikelets
- 2 Spikelets 7-20 mm long; awns 5-20 mm long
- 3 Spikelets with 5-7 or more flowers; awns flattened, 5-11 mm long..... Danthonia
- 3 Spikelets mostly 2-flowered, the second floret smaller, staminate or perhaps sterile; awns not flattened, 8-18 mm long
- 4 Plants above timberline, less than 30 cm tall..... Helictotrichon
- 4 Plants well below timberline, over 30 cm tall..... Arrhenatherum
- 2 Spikelets 3-7 mm long; awns lacking or to 6 mm long
- 5 Leaf blades of fertile culms mostly less than 2 cm long; plants from long slender rhizomes; lemmas pubescent, awnless..... Hierochloa
- 5 At least some leaf blades of fertile culms over 2 cm long; rhizomes lacking or short
- 6 Lemmas awned and slightly bearded at the base and/or rachilla pubescent
- 7 Lemma awned from above the middle or awnless; ligules blunt to rounded, not over 4 mm long; panicles narrow, the branches ascending..... Trisetum
- 7 Lemmas awned from below the middle; ligules pointed, often over 4 mm long; panicles narrow as above or with widely spreading branches..... Deschampsia
- 6 Lemmas awnless or seldom with a minute awn, glabrous; rachilla glabrous (Plants of Trisetum wolfii have awnless lemmas and may key with Koeleria under this lead, but they have pubescent rachillas and usually grow in damper places than plants of Koeleria and they have a less densely flowered panicle)
- 8 Second glume widest toward the apex, contrasting in shape and size with the first glume; disarticulation below the glumes; plants annuals or short-lived perennials.... Sphenopholis
- 8 Second glume not wider toward apex, similar to first glume; disarticulation above the glumes; plants caespitose perennials..... Koeleria

KEY 6

- 1 Spikelet bearing branches not over 1 cm long; plants stoloniferous, not over 20 cm tall..... Buchloe
- 1 Some of the spikelet bearing branches over 1 cm long, or plants not stoloniferous and usually over 20 cm tall
- 2 Plants annual, leaves lax and flat, 2.5-15 mm wide or somewhat rolled and 1-5 mm wide in Leptochloa; ligules membranous or lacking
- 3 Ligules lacking; spikelets with awns usually over 5 mm long; plants weedy in gardens and waste places, flowering in late summer and fall..... Echinochloa
- 3 Ligules present; awns if present not over 4 mm long
- 4 Leaf sheaths and blades pilose with long, spreading hairs; ligules 0.5-1.5 (2.5) mm long; branches of inflorescence more or less digitate, (2) 6-16 cm long..... Digitaria
- 4 Leaf sheaths and blades glabrous or nearly so; ligules 2-11 mm long; branches of inflorescence not at all digitate
- 5 Lemmas awnless or awn-pointed; glumes fan shaped; spikelets 1-flowered; ligules 5-11 mm long..... Beckmannia
- 5 Lemmas with awns 2-4 mm long; glumes narrow; spikelets with 5-9 (12) florets; ligules 2-7 mm long..... Leptochloa
- 2 Plants perennial; leaves often rolled and less than 5 mm wide except in Spartina; ligules a fringe of hairs except in Schedonnardus
- 6 Rhizomes lacking; spikelets loosely scattered along and appressed to or partly sunken in the rachis..... Schedonnardus
- 6 Rhizomes usually present; spikelets often strongly divergent or at least not sunken in the rachis
- 7 Inflorescence with 1-3 or (20) 30-80 branches, the branches (if more than 1) strongly divergent; culms solid; plants of dry places..... Bouteloua
- 7 Inflorescence with 4-20 (30) branches, the branches erect; culms hollow; plants of moist or wet places..... Spartina

KEY 7

- 1 Both glumes shorter than their awns; lemmas awnless or with awns less than 2 mm long..... Polypogon
- 1 One or both glumes awnless or longer than their awns; lemmas sometimes with long awns (take care not to mistake these awns for those of the glumes)
- 2 Plants annual or short-lived perennials, mostly flowering in mid summer and fall, mostly weedy in gardens, fields, and waste places; ligules lacking or mostly of a fringe of hairs; blades flat, mostly over 5 mm wide; fertile florets rather plump, partly enveloped by a sterile floret that resembles the second glume
- 3 Ligules lacking; spikelets nearly sessile; sterile floret awned..... Echinochloa
- 3 Ligules present, often of a fringe of hairs; spikelets often on long pedicels; florets awnless
- 4 Ligules membranous basally and fringed above; plants 1-2 (3) m tall; leaf blades 1-4 cm wide; spikelets on short pedicels; panicle dense..... Sorghum
- 4 Ligules a fringe of hairs; plants less than 0.5 m tall; leaves often narrower; spikelets on long pedicels..... Panicum
- 2 Plants perennial or annual, usually not weedy as above; ligules membranous, or if of a fringe of hairs then the leaves usually rolled and less than 5 mm wide; sterile florets none or much reduced
- 5 Plants annual or short-lived perennial with weak root systems, of moist or wet places; glumes fanlike, widest at the middle or toward the apex (at least the second one); disarticulation below the glumes; panicles compact, the spikelets subsessile or on short pedicels; leaf blades mostly over 5 mm wide; spikelets with 1 or 2 florets
- 6 Glumes about equal, widest near the middle; panicle branches 3-angled, bearing spikelets on 2 sides; ligules 5-8 mm long; spikelets 1-flowered..... Beckmannia
- 6 Second glume widest at the apex; first glume smaller and linear; panicle branches not as above; ligules 1-4 mm long; spikelets 2-flowered..... Sphenopholis
- 5 Plants perennial, annual in Muhlenbergia filiformis but then the leaves not over 2 mm wide; root systems extensive; glumes subulate; disarticulation above the glumes; panicles various; blades various; spikelets almost never with more than 1 floret
- 7 Lemmas awned or with a bearded callus or both awned and bearded, if the awn not conspicuous then the callus hairs about as long as the lemma; awn sometimes early deciduous... KEY 8 P. 196
- 7 Lemmas awnless or the awn less than 1 mm long; callus beardless or the hairs less than 1/2 as long as the lemma..... KEY 9 P. 196

KEY 8

- 1 Lemmas awned from the back, with long callus hairs; awns included within the glumes, often hidden in the callus hairs or exerted out from the sides of the glumes..... Calamagrostis
- 1 Lemmas awned from the tip; awns extending beyond the tip of the glumes
- 2 Lemmas with 3 awns..... Aristida
- 2 Lemmas with 1 awn
- 3 Awn over 12 mm long; lemma often over 3 times longer than wide..... Stipa
- 3 Awn less than 12 mm long; lemma various but mostly less than 3 times longer than wide
- 4 Plants rhizomatous; awn persistent..... Muhlenbergia
- 4 Plants not rhizomatous; awn various
- 5 Glumes shorter than the lemma; awn persistent; some spikelets often with 2 florets.. Festuca
- 5 One or both glumes longer than the lemma; awn rather easily detached from the lemma..... Oryzopsis

KEY 9

- 1 Lemmas hard and shining with a varnished surface, pubescent with short hairs; leaves mostly 5-15 mm wide; glumes 4-6 mm long, not scabrous on the keel..... Phalaris
- 1 Lemmas membranous or glabrous; leaves 1-6 mm wide, or if wider then the glumes less than 4 mm long and usually scabrous on the keel
- 2 Glumes scabrous on the keel (use 15-20X magnification), awnless, longer than the lemma; lemmas glabrous..... Agrostis
- 2 Glumes not scabrous on the keel, or if so then short-awned, shorter than the lemma, or if longer than the lemma pubescent
- 3 Plants either annual or with rhizomes; panicles narrow, branches short and erect except in Muhlenbergia asperifolia
- 4 Glumes longer than the lemma, awnless; lemma awned from the back with a short, sometimes inconspicuous awn..... Calamagrostis
- 4 Glumes shorter than the lemma, or if longer then distinctly awn-tipped; lemmas not as above... Muhlenbergia
- 3 Plants neither annual nor with rhizomes; panicles either with spreading branches or else mostly included in the upper leaf sheath
- 5 Lemmas glabrous; collars more or less pilose; ligules of hairs..... Sporobolus

- 5 Lemmas pubescent on the nerves; collars glabrous; ligules membranous..... Blepharoneuron

KEY 10

- 1 Ligules a fringe of hairs; glumes and lemmas awnless, but spikelets subtended by 1-several awnlike bristles..... Setaria
 1 Ligules membranous; glumes or lemmas awned; spikelets not subtended by bristles; glumes ciliate
 2 Glumes exceeded in length by their awns, softly and densely pubescent toward the tip; awns and pubescence of glumes giving a fine, feathery appearance to the inflorescence..... Polypogon
 2 Glumes awnless or awns shorter than the glumes
 3 Lemmas awned from the back; glumes awnless; disarticulation below the glumes..... Alopecurus
 3 Lemmas awnless; glumes awn-pointed; disarticulation above the glumes..... Phleum

KEY 11

- 1 Spikelets mostly 1 per node of the rachis, scattered to dense in the spike
 2 Spikelets turned edgewise to the rachis, with only 1 glume (the side turned into the rachis without a glume)..... Lolium
 2 Spikelets not turned as above; glumes 2
 3 Plants annual, introduced, weedy or cultivated and occasionally escaping
 4 Spike not over 2 cm long..... Eremopyrum
 4 Spike over 2 cm long
 5 At least the upper glumes with awns over 1 cm long; awns of lemmas lacking or to 5 mm long except on the terminal lemma up to 6 (8) cm long; margins of leaf sheaths ciliate; auricles inconspicuous..... Aegilops
 5 Awns of glumes less than 1 cm long; awns of lemmas 2-70 mm long; leaf sheaths not ciliate; auricles usually well developed
 6 Florets 2-5 per spikelet; glumes mostly 3-nerved..... Triticum
 6 Florets 2 per spikelet; glumes 1-nerved, stiff, subulate..... Secale
 3 Plants perennial, introduced or native
 7 Rachis tardily disarticulating; culms not prostrate; plants sterile hybrids; glumes as well as lemmas with awns over 1 cm long..... X Agrositanion
 7 Rachis not disarticulating, or if so culms prostrate; plants growing at high elevations, not sterile hybrids
 8 Glumes narrow, awnlike; culms usually in robust bunches..... Elymus
 8 Glumes not awnlike, narrow in Agropyron smithii but then the culms arising singly or few together from long creeping rhizomes..... Agropyron
 1 Spikes with 2 or more spikelets per node of the rachis; some spikelets reduced to awns in Hordeum; spikelets congested in a dense spike; rhizomes usually absent or short
 9 Spikelets 3 per node of the rachis, the 2 lateral spikelets slightly pedunculate, empty, sometimes reduced to awns; central spikelet sessile and fertile with 1 floret, if florets all sessile (Hordeum vulgare) then plants annual and cultivated..... Hordeum
 9 Spikelets 2 or more per node of the rachis, all alike, each with 2 or more florets (only 1 floret often present as they are sometimes readily deciduous); plants perennial, native, not cultivated
 10 Awns of lemmas not over 6 mm long..... Elymus
 10 Awns of lemmas over 6 mm long
 11 Spikes about 5 mm wide; body of the lemmas 6-8 mm long; rachis disarticulating at the nodes..... X Agrohordeum
 11 Spikes wider; body of lemmas usually longer
 12 Rachis not breaking at the nodes; leaves flat, 5-20 mm wide; plants 40-100 cm tall; glumes usually not awnlike their entire length, not over 25 mm long including the awn if present..... Elymus
 12 Rachis breaking at the nodes at maturity; leaves 1-3 (5) mm wide; plants mostly 5-50 cm tall; glumes more or less awnlike their entire length, often over 25 mm long including the awn..... Sitanion

Aegilops L. Goatgrass

Aegilops cylindrica Host Jointed g. Plants annual, 20-50 cm tall; ligules less than 1 mm long; leaf blades flat or sometimes rolled, 2-5 mm wide; inflorescence a spike 4-12 cm long, more or less cylindrical; spikelets solitary at each node of the rachis, cylindrical, somewhat sunken in the concave internodes of the rachis, 2-5 flowered; glumes (6) 10-14 mm long, about as long as the spikelets, awned and toothed at the apex, the awn 1-20 mm long; lemmas 8-11 mm long, awned from a notched apex, the awn 1-5 mm long, awns of the terminal spikelet up to 6 (8) cm long. Introduced from Eurasia; waste places and disturbed ground at lower elevations; June-Aug.

X Agrohordeum Camas

X Agrohordeum macounii (Vasey) Legage Macoun wildrye. [Elymus macounii Vasey; X Elytesion macounii (Vasey) Barkw. & D. R. Dewey] Tufted perennial plants; culms 40-80 cm tall; leaves erect, flat to rolled, 2-6 mm wide; ligules not over 1 mm long; spike 4-12 cm long; spikelets (1) 2 per node of the rachis; glumes narrow with awns 5-10 mm long; lemmas 6-9 mm long, awned, awns 10-20 mm long. Occasional; drainage bottoms of the Tavaputs Plateau and along ditches, fence lines, and in waste places in the Basin; June-Sept. This is considered to be a sterile hybrid of Agropyron trachycaulum and Hordeum jubatum. The chief Agropyron features are the tendency for 1 spikelet per node of the rachis and the much reduced awns. Hordeum features are 2 spikelets per node of the rachis, disarticulating rachis, and narrow glumes with awns. Some populations in the Basin seem far removed from populations of A. trachycaulum, and the Agropyron parent of these populations could be some other member of the genus, such as A. repens.

Agropyron Gaertn. Wheatgrass

Plants perennial, with or without rhizomes; culms arising singly to densely tufted; leaf sheaths open; ligules membranous, mostly short, auricles often well developed and clasping the culm; inflorescence a spike with 1 spikelet (rarely more) per node of the rachis; spikelets most with 4-several florets; glumes awnless or awned. Occasionally and sometimes freely hybridizing with species of Elymus, Hordeum, and Sitanion. Included (and reasonably so) by some workers in Elymus.

- 1 Lemmas with awns over 6 mm long
 - 2 Inflorescence Sitanion-like (densely flowered, glumes and lemmas with long, divergent awns, and rachis breaking up at maturity); culms ascending to prostrate, rarely more than 4 dm tall, known in our area from high elevations in the Uinta Mts..... A. scribneri
 - 2 Inflorescence not as above; plants mostly erect, often over 4 dm tall, not prostrate
 - 3 Anthers not over 2 mm long; glumes usually 2/3-3/4 as long as the mature spikelets (excluding awns)..... A. trachycaulum
 - 3 Anthers over 3 mm long; glumes about 1/2 as long as the mature spikelets (excluding awns)
 - 4 Leaves flat, mostly over 5 mm wide, awns straight..... A. repens
 - 4 Leaves rolled (sometimes flat when young), less than 5 mm wide; awns divergent when dry..... A. spicatum
- 1 Lemmas awnless or with awns less the 6 mm long
 - 5 Plants with rhizomes
 - 6 Glumes subulate (tapering from near the base and awn-pointed); culms mostly arising singly..... A. smithii
 - 6 Glumes broader and tapering from the middle or above; culms arising singly or in bunches
 - 7 Lemmas pubescent over the back
 - 8 Glumes and lemmas pointed; leaf sheaths not ciliate..... A. dasystachyum
 - 8 Glumes and lemmas blunt, sometimes mucronate; leaf sheaths often ciliate (use 10 times magnification)..... A. intermedium
 - 7 Lemmas glabrous or ciliate
 - 9 Glumes and sometimes lemmas pointed; sheaths not conspicuously ciliate or occasionally so in A. dasystachyum
 - 10 Leaf blade flat, 5-15 mm wide
 - 11 Glumes about 1/2 as long as the spikelet; spike not secund..... A. repens
 - 11 Glumes 2/3 to as long as the spikelet; spike often secund..... A. X pseudorepens
 - 10 Leaf blades involute (sometimes flat when young), mostly less than 5 mm wide
 - 12 Culms solitary or in small tufts; rhizomes long; lower spikelets mostly longer than the internodes; some of the upper spikelets often more than 2 times as long as the internodes A. dasystachyum
 - 12 Culms densely tufted; rhizomes short or occasionally long; some lower spikelets often equalling or shorter than the internodes; upper spikelets mostly less than 2 times as long as the internodes (excluding awns if present)..... A. spicatum
 - 9 Glumes blunt or mucronate, lemmas often blunt; at least 1 side of the leaf sheath usually ciliate..... A. intermedium
 - 5 Plants without rhizomes
 - 13 Spikelets 3-4 times as long as the internodes of the rachis, ascending to spreading and not appressed to the rachis; spike dense; glumes and lemmas awn-pointed..... A. cristatum
 - 13 Spikelets not over 3 times as long as the internodes of the rachis, mostly closely appressed to the rachis; glumes and lemmas awn-pointed or entire
 - 14 Glumes and lemmas pointed; leaf sheaths not distinctly ciliate; plants native
 - 15 First glume to 7 mm long; glumes about 1/2 as long as the spikelets; spikelets seldom more than twice as long as the internodes of the rachis (excluding awns if present); leaves often rolled; anthers 4-6 mm long..... A. spicatum

- 15 First glume 7-10 mm long; glumes usually 2/3 to 3/4 as long as the spikelets; spikelets commonly 2-3 times as long as the internodes of the rachis; leaves often flat; anthers not over 2 mm long..
..... A. trachycaulum
- 14 Glumes rounded or sometimes mucronate; lemmas usually rounded; leaf sheaths often ciliate (use 10X magnification)
- 16 Spikes (15) 20-40 cm long; plants 70-150 (200) cm tall, not producing rhizomes; culms mostly over 4 mm thick..... A. elongatum
- 16 Spikes 8-20 cm long; plants 40-100 cm tall, mostly with rhizomes; culms seldom over 4 mm thick....
..... A. intermedium

Agropyron cristatum (L.) Gaertn. Crested w. [A. desertorum (Fisch.) Schultes; A. sibiricum (Willd.) Beauv.] Introduced from Eurasia, used extensively in rangeland seedings in the sagebrush and pinyon-juniper zone; May-June. Our plants may be any one of a number of intergrading taxa of a complex that is complicated by selective breeding for the purpose of producing commercial seed.

Agropyron dasystachyum (Hook.) Scribn. Thickspike w. [A. albicans Scribn. & Sm.; A. griffithsii Scribn. & Sm. ex Piper; A. riparium Scribn. & Sm.; Elymus lanceolatus (Scribn. & Smith) Gould] Common; widespread; sagebrush-grass and pinyon-juniper communities; up to about 9,500 ft, becoming abundant after fire; June-Aug. Plants with glabrous lemmas have been separated as A. riparium, but this feature does not provide a consistent means of separation, and no real boundary can be found in our plants. Hybrids between this and A. spicatum have been designated as A. albicans. Frequently misidentified as A. smithii, which is rarely found in montane communities in our area.

Agropyron elongatum (Host) Beauv. Tall w. [Elymus elongatus (Host) Runemark; Elytrigia pontica (Podp.) Holub.; Thinopyrum ponticum (Podp.) Barkw. & D. R. Dewey] Introduced from Eurasia, used in pasture and rangeland seedings, most suited to soil that is wet for some part of the growing season and particularly useful in seeding wet or moist saline or alkaline lowlands; June-Aug.

Agropyron intermedium (Host) Beauv. [A. trichophorum (Link) Richt.; Elymus hispidus (Opiz) Melderis; Elytrigia intermedia (Host) Nevski; Thinopyrum intermedium (Host) Barkw. & D. R. Dewey] Introduced from Eurasia, used extensively in rangeland seedings and for cover on roadsides and other disturbed places, most common in sagebrush-grass and pinyon-juniper communities; June-Aug. Plants with glabrous lemmas [var. intermedium (intermediate w.)] and plants with pubescent lemmas [var. trichophorum (Link) Halac. (pubescent w.)] are both found in our area. The difference seems more a function of selective breeding in the development of cultivars than one of natural selection. Plantings seeded exclusively with certified pubescent w. seed show a mixture of pubescent and glabrous phases. In general the pubescent phase is more drought tolerant.

Agropyron X pseudorepens Scribn. & Sm. [Elymus X pseudorepens (Scribn. & Sm.) Barkw. & D. R. Dewey] Like A. repens, but with glumes 2/3 to as long as the spikelet. Possibly a hybrid of A. trachycaulum and A. dasystachyum (Cronquist and others 1977) or possibly A. repens. The specimens seen from the study area are robust plants to as much as 1-1.5 m tall with rather strongly secund spikes. This form has been treated as A. pseudorepens var. magum Scribn. & Sm. The few records seen are from the Tavaputs Plateau; woods and slopes of the aspen-spruce-fir zone; June-Aug.

Agropyron repens (L.) Beauv. Quackgrass. [Elymus repens (L.) Gould; Elytrigia repens (L.) Nevski] Introduced from Eurasia; often weedy along ditchbanks, in fields and lawns, occasionally along roads or around logging, livestock, and hunters camps in mountains where the seed has been introduced as a contaminant in hay; to about 9,000 ft; May-June.

Agropyron scribneri Vasey Spreading w., Scribner w. [Elymus scribneri (Vasey) Jones] Occasional on windswept ridges at or near timberline on the Uinta Mts; June-Aug.

Agropyron smithii Rydb. Western w., bluestem w. [Elymus smithii (Rydb.) Gould; Elytrigia smithii (Rydb.) A. Love; Pascopyrum smithii (Rydb.) A. Love] Occasional to common; widespread; desert shrub, sagebrush, and riparian communities, along roads and in waste places, tolerant of alkaline or saline conditions; mostly below 6,000 ft but along roadsides to 8,000 ft. June-Aug. This and A. dasystachyum are similar and are distinguished by the shape of the glumes. Also, the anthers of A. dasystachyum (3-5 mm long) average longer than those of A. smithii (2.5-3.5 mm long). Generally this has been confused with A. dasystachyum of montane communities. Specimens with 2 spikelets per node of the rachis are relatively common. This and the narrow glumes are features of Elymus.

Agropyron spicatum (Pursh) Scribn. & Sm. Bluebunch w. [A. inerme (Scribn. & Sm.) Rydb.; A. spicatum var. inerme (Scribn. & Sm.) Heller; Elymus spicatus (Pursh) Gould; Elytrigia spicata (Pursh) D. R. Dewey; Pseudoroegneria spicata (Pursh) A. Love] Common to abundant; widespread; sagebrush-grass, pinyon-juniper, mt. brush, and ponderosa pine communities, increasing rather rapidly after fire; June-Aug. Plants with awnless or short-awned lemmas have been called A. inerme or A. s. var. inerme. These plants are like long-awned plant in all other respects, and a continuum is found in awn length. Awnless and long-awned forms are found side by side. However, the awned form may be more common on mesic sites. Both forms are described in older manuals as being nonrhizomatous, but in recent years the rhizomatous nature of the species has been recognized (Hitchcock and Cronquist 1973). Plants of our area often have rhizomes and occasionally have robust, long-creeping rhizomes. This may be a result of crossing with rhizomatous species of the genus. Some such plants might be referred to as A. albicans. See A. dasystachyum.

Agropyron trachycaulum (Link) Malte Slender w. [A. caninum L. ssp. majis (Vasey) C. L. Hitchc.; A. latiglume (Scribn. & Sm.) Rydb.; A. pauciflorum (Schwein.) A. S. Hitchc.; A. subsecundum (Link) A. S.

Hitchc.; A. subsecundum var. andinum (Scribn. & Sm.) A. S. Hitchc.; Elymus subsecundus (Link) A. & D. Love; E. trachycaulus (Link) Gould ex Shinners] Common in montane communities; typically on mesic sites, occasional under aspen, abundant on open slopes, occasional in conifer woods where often becoming abundant following clear cutting of timber, also common above timberline, extending to rather low elevations in the dry drainages of the Tavaputs Plateau where moisture collects in depressions and from road run-off; June-Sept. Forming a diverse complex in which several species have been recognized, but similarities (Hitchcock and Chase 1950) and intergradation (Harrington 1954) have long been recognized; included in the A. caninum complex by Hitchcock and Cronquist (1973), but the name A. trachycaulus is retained for our plants by Cronquist and others (1977) and by Arnow and others (1980). The whole complex is distinguished from most of our native species of the genus by short anthers and the glumes being nearly as long as the spikelets. Specimens with 3-4 spikes per culm are rarely found in our area. The following key might help with varietal distinction of most specimens:

- 1 Lemmas awnless, or awns less than 6 mm long
 - 2 Spikelets scarcely imbricate, the tips rarely reaching the base of those above on the same side of the spike; spikes mostly more than 10 cm long; valleys to mid montane habitats..... var. trachycaulum
 - 2 Spikelets mostly closely imbricate; spikes mostly less than 10 cm long; mid montane to well above timberline..... var. latiglume (Scribn. & Sm.) Beetle
- 1 Lemmas with awns (5) 10-30 mm long
 - 3 Glumes 6-10 mm long; plants 20-30 cm tall, decumbent at the base; awn of lemma (5) 7-16 (20) mm long; spikes slender, 3-10 mm thick; high elevations..... var. glaucum (Pease & Moore) Malte
 - 3 Glumes 10-18 mm long; plants usually over 30 cm tall, erect or ascending; awn of lemma 17-40 mm long; spikes 6-13 mm thick; valleys and mid montane, often under aspen.... var. unilaterale (Cassidy) Malte

X Agrositanion Bowden Squirreltail Wheatgrass

A hybrid genus resulting from crosses between species of Agropyron and Sitanion.

- 1 Awns of the lemmas mostly (14) 18-37 mm long, spreading, often recurved; internodes of the rachis mostly 7-10 mm long..... X A. saxicola
- 1 Awns of the lemmas 4-17 mm long, straight; internodes of the rachis 2.5-6 (7) mm long... X A. saundersii

X Agrositanion saundersii (Vasey) Bowden (Elymus X saundersii Vasey) A hybrid between Agropyron trachycaulum and Sitanion hystrix with more or less disarticulating rachis and lowest floret sometimes reduced to a glumelike structure as in Sitanion and with 1 spikelet per node of the rachis as in Agropyron.

X Agrositanion saxicola (Scribn. & Sm.) Bowden [Agropyron saxicola (Scribn. & Sm.) Piper; Elymus saxicola Scribn. & Sm.; Pseudelymus saxicola (Scribn. & Sm.) Barkw. & D. R. Dewey] A hybrid between Sitanion hystrix and A. spicatum and probably other species of Agropyron, with the disarticulating rachis and longer awns of Sitanion and with 1 spikelet per node of the rachis as in Agropyron. Specimens with long rhizomes that are referable to this taxon have been collected from Reservation Ridge of the Tavaputs Plateau. The rhizomatous A. dasystachyum is present in the area and is indicated as a parent rather than A. spicatum.

Agrostis L. Bentgrass; Redtop

Plants perennial with or without rhizomes; culms arising singly or in tufts; leaf sheaths open, ligules membranous; auricles lacking; inflorescence an open or compact panicle; spikelets small, with a single floret; glumes awnless or awn-tipped, longer than the lemma. This genus presents much difficulty to species differentiation in the field. The absent or presence and length of the palea and other minute characteristics are critical criteria. The palea is not only small but it is also often concealed by the lemma and glumes, and a dissecting scope is helpful if not essential for positive separation of species. Plants of the various taxa show little variation in the spikelets, and it seems highly likely that the genus has been rather overworked by separating taxa on variations in the panicle (ie. compact to open and small to large) and by the presence or length of a minute rachilla (ie. lacking or 0.1-0.5 mm long). The length of the palea does seem to provide a consistent means for separation, but the features of the panicle and rachilla seem quite dubious in some cases.

- 1 Palea over 1/2 as long as the lemmas; plants sometimes with rhizomes
 - 2 Plants, with long creeping rhizomes 30-80 (130) cm tall, seldom growing above 9,500 ft; anthers 1 mm long or longer; panicle often over 5 cm long..... A. stolonifera
 - 2 Rhizomes lacking or short; plants 5-25 (35) cm tall, often found above 9,500 ft; anthers less than 1 mm long; panicle often less than 5 cm long
 - 3 Plants often 15-35 cm tall; leaf blades 1-4 mm wide, flat; panicle 1.5-15 cm long, the branches 0.5-5 cm long, typically angled and scabrous; glumes narrowly elliptic, barely exceeding the lemma; lemmas whitish..... A. thurberiana

- 3 Plants mostly less than 15 cm tall; leaf blades to 2 mm wide, rolled or flat; panicle to 6 cm long, the branches to 2 cm long, terete and mostly smooth; glumes lanceolate to ovate, averaging 0.2 mm longer than the lemmas; lemmas dark purple..... A. humilis
- 1 Palea less than 1/2 as long as the lemmas (plants tufted and without rhizomes or these short and thus unlike A. stolonifera; see discussion under A. humilis for further contrast)
- 4 Panicles more or less open to diffuse, often over 2 cm wide, the mostly ascending to widely spreading branches not bearing spikelets to the base and not concealing the main axis of the panicle..... A. scabra
- 4 Panicles contracted, often less than 2 cm wide, the erect branches often bearing spikelets to near the base and often dense enough to conceal parts or much of the main axis of the panicle
- 5 Panicles green, sometimes with pale purple markings; plants mostly growing below 9,500 ft; some of the wider leaves 2-5 mm wide..... A. exarata
- 5 Panicles purplish; plants mostly growing above 9,500 ft; leaves 0.5-2 mm wide..... A. variabilis

Agrostis exarata Trin. Spike b. Occasional to locally common; apparently widespread; mostly along streams and in other wet places; 7,000-9,500 ft; June-Sept.

Agrostis humilis Vasey Alpine b. Occasional to common; Uinta Mts.; wet meadows, bogs, and moist slopes; 9,700-11,500 ft; July-Sept. This has been separated from A. thurberiana by the length of the rachilla, slightly smaller stature, and slightly smaller panicles. Our specimens of these taxa show a continuum in rachilla length from lacking or through 0.1-0.5 (0.7) mm long. Plants with somewhat open panicles are sometimes mistaken for the smaller phase of A. scabra (A. idahoensis). The palea remains the positive means of separation, but rarely does the panicle or the stature approach even the small phase of A. scabra. Sympatric with and easily confused with A. variabilis (q.v.).

Agrostis scabra Willd. Winter b., ticklegrass. [A. hyemalis (Walt.) B.S.P. var. tenuis (Tuckerm.) Gleason] Occasional to common; Strawberry Valley and across the Uinta Mts.; one specimen seen from the E. Tavaputs Plateau; wet to rather dry places in many plant communities; 6,100-10,800 ft; July-Aug. A. idahoensis Nash has been separated from A. scabra as follows:

- 1 Plants 5-30 (40) cm tall; spikelets 1.3-2.3 (2.6) mm long; panicles not diffused, the branches usually forked below the middle..... A. idahoensis
- 1 Plants (20) 30-90 cm tall; spikelets (2.2) 2.5-3.2 mm long; panicles diffuse, the branches forked beyond the middle..... A. scabra

In the examination of numerous specimens in the field as well as in the herbarium no real morphological or ecological boundary is seen between the 2 forms. However, the trends in the overlapping features of the above key are apparent, and the extremes are different. Hitchcock and others (1969) reported numerous intermediate specimens. Some intermediate plants may be the result of hybridization between A. scabra and narrow-panicled species.

Agrostis stolonifera L. R., creeping b. (A. alba L. misapplied; A. palustris Huds.) Common; widespread; pastures, ditchbanks, roadsides, and moist areas in canyon bottoms of mountains; June-Sept. This variable species is represented in our area by the vars. stolonifera and palustris Huds. The width of panicle is often used in separation of these taxa, but this is highly subject to phenological stage. The panicle of var. stolonifera (typically open) is often narrow when young, and that of var. palustris (typically narrow) is often spreading at anthesis. Some specimens have been collected in which separate panicles of the same plant would key the plant to the 2 different vars. Much of the variation might be due to selective breeding as this is a cultivated pasture grass.

Agrostis thurberiana A. S. Hitch. Thurber b. Infrequent or locally common; Uinta Mts. moist or wet meadows; about 10,000-11,000 ft; July-Sept. Probably much less common but sympatric with A. humilis q.v.

Agrostis variabilis Rydb. Mt. b. (A. rossae Vasey misapplied) Occasional or common; Uinta Mts.; along streams, meadows, dry conifer woods, clear cuts, and open slopes above timberline; 9,750-11,500 ft; July-Sept. Small specimens of A. variabilis are easily mistaken for those of the sympatric A. humilis. Apparently the palea provides the only exclusive means of separation, but a few other features of minor importance are listed in the following key:

- 1 Plants mostly 5-15 cm tall, often with slender although short rhizomes, apparently nearly always growing in wet places; panicles seldom over 4 cm long, densely to loosely flowered, the branches erect and appressed or somewhat spreading; rachilla 0.3-0.7 mm long; lemmas not awned..... A. humilis
- 1 Plants 5-40 cm tall, tufted, without rhizomes, growing in wet places or on well-drained soil; panicles 2-12 cm long, mostly densely flowered, the branches erect, appressed or slightly spreading; rachilla lacking; lemmas infrequently awned..... A. variabilis

Alopecurus L. Foxtail

Perennial plants from fibrous roots or rhizomes; leaf sheaths open, blades usually flat; ligules membranous, auricles lacking; inflorescence a cylindrical or ovoid spikelike panicle, the branches short, erect, hidden in the dense spikelets and not evident without teasing the inflorescence apart and then hardly visible without magnification; spikelets 1-flowered, flattened, disarticulating below the glumes;

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glumes as long or longer than the lemma; lemmas awned from the back at or below the middle, the awn exerted from or hidden in the glumes.

- 1 Culms erect, arising singly or 2-3 together from long creeping rhizomes; plants native, rather rare, in moist or wet places in the Uinta Mts.; ligules blunt, 1-4 mm long; glumes woolly over their entire surface; panicles to 5 cm long..... A. alpinus
- 1 Culms more or less tufted, sometimes decumbent and rooting at the nodes; ligules various; glumes silky to villose, but the pubescence all or nearly all on the nerves and keel; panicles 3-10 cm long
- 2 Glumes rarely less than 4 mm long, acute; awn of lemma exceeding the glumes by 2-5 mm; inflorescence 5-12 mm wide..... A. pratensis
- 2 Glumes mostly less than 4 mm long, obtuse at the apex; awns various; inflorescence to about 5 mm wide
- 3 Awn not or scarcely exceeding the glumes, 0.7-2.5 mm long, nearly straight..... A. aequalis
- 3 Awn exerted beyond the glumes, (3) 5-8 mm long, abruptly bent..... A. geniculatus

Alopecurus aequalis Sobol. Short-awn f. Occasional; widespread; wet places, sometimes partly submerged for some of the season, often in recently deposited sand of streams and beaver ponds, also in places that are wet in spring but dry in summer; (5,800) 7,000-10,500 ft; June-Sept.

Alopecurus alpinus J. E. Sm. Alpine f. Rather rare; Uinta Mts. from the Whiterocks drainage eastward and Daggett Co.; wet meadows, swamps, and along streams; 7,600-10,600 ft; June-Aug.

Alopecurus geniculatus L. Water f., marsh f. Reports for our area have been based on intermediate specimens of A. aequalis and A. pratensis. The plant is known from adjacent to our area and might be expected in it.

Alopecurus pratensis L. Meadow f. Introduced from Eurasia; meadows, pastures, and edge of woods; to about 9,000 ft; June-Aug.

Andropogon L. Bluestem

Andropogon gerardii Vitman Big b., sand b., turkey-foot. (A. hallii Hackel) Plants perennial, glaucous, (50) 100-200 cm tall, from robust rhizomes; ligules 2-4 mm long, decurrent, ciliate at apex; leaf blades flat or loosely rolled, 3-9 mm wide; inflorescence of 2-5 digitate spicate, branches 4-8 (10) cm long; spikelets 7-12 mm long, 2-flowered (1 fertile and 1 sterile), in pairs, 1 sessile and 1 pediceled, the pedicel 3.5-6 mm long with yellow hairs 3-5 mm long; fertile lemma 5-8 mm long, slightly shorter than the sterile lemma, awned, the awn about 3-5 mm long. Known from a single collection (Neese 8445) near Starvation Reservoir where it has been introduced, common e. of the Rocky Mts. in the Plains; July-Sept.

Aristida L. Three-awn

Aristida purpurea Nutt. Purple t. (A. fendleriana Steud.; A. longiseta Steud.) Perennial plants growing in tufts, 15-40 cm tall; leaf blades mostly basal, not over 10 cm long, curling, pilose at the collar; ligules a ring of hairs, less than 1 mm long; panicle 2-6 cm long, narrow; glumes unequal, the first about 8 mm long, the second about twice as long, both awnless; lemmas 9-12 mm long, each with 3 awns, the awns 2-8 cm long, divergent. Occasional; desert shrub and sagebrush communities; up to about 7,000 ft; May-June. See Cronquist and others (1977) and Arnow and others (1980) for excellent discussions of the complexity of this taxon.

Arrhenatherum Beauv. Tall Oatgrass

Arrhenatherum elatius (L.) Presl Culms loosely tufted, 60-150 cm tall, sometimes bulbous at the base; leaf blades 3-10 mm wide, flat; ligules 1-3 mm long; panicle 15-25 cm long, narrow with ascending branches, or branches spreading at anthesis; spikelets 2-flowered, the first floret staminate and larger than and often enclosing the second, which is pistillate or bisexual; glumes unequal, the first 4-6 mm long, the second 7-9 mm long and as long as the spikelet; lemma of first floret about 6-8 mm long, awned from below the middle on the back with a bent awn 8-18 mm long; lemma of the second floret a little shorter or about equal to the first lemma, awned from above the middle on the back with a awn 3-4 mm long. Introduced from Europe, used extensively in the n. and e. United States as a pasture and hay crop, rather infrequent in our area; May-Aug.

Avena L. Oats

Robust annuals; leaf sheaths open, the blades flat; ligule membranous; auricles lacking; inflorescence an open panicle; spikelets 2-3 flowered, large, disarticulating above the glumes; florets bisexual, or the uppermost rudimentary; glumes subequal, longer than the first floret; lemmas awned from about mid length on the back.

- 1 Two florets per spikelet with stout, strongly bent awns; lemmas with brown hairs..... A. fatua
- 1 Awns lacking or present only on 1 floret and then straight or curved but not strongly bent; lemmas glabrous or scabrous..... A. sativa

Avena fatua L. Wild o. Introduced from Eurasia or North Africa; weedy in fields, along roadsides and waste places, sometimes sprouting in montane places where introduced as a contaminant in feed for livestock, but seldom maturing at the higher elevations; May-Sept.

Avena sativa L. Cultivated o. (A. fatua L. var. sativa Hausskn.) Introduced from Europe, cultivated, rarely escaping but not persisting; June-Aug. Similar to A. fatua, but distinguished by the features given in the key.

Beckmannia Host Sloughgrass

Beckmannia syzigachne (Steud.) Fern. American s. Plants robust annuals, often stoloniferous, 40-120 cm tall; ligules 5-9 mm long; blades flat, 5-12 mm wide; panicles about 10-30 cm long, narrow, congested; spikelets 1-flowered; glumes about equal, 2-3 mm long, fan shaped and widest near the middle, strongly keeled; lemma 2-4 mm long, lanceolate, usually projected just beyond the glumes. Occasional; widespread; water courses, marshes, and shorelines of ponds and reservoirs; 5,000-7,240 ft; June-Sept.

Blepharoneuron Nash Hairy Dropseed

Blepharoneuron tricholepis (Torr.) Nash Hairy d., pine d. Tufted perennial plants; culms 20-60 cm tall; basal leaves numerous, short, rolled and often curled when dry, culm leaves few; ligules about 1 mm long; panicles 5-10 cm long, somewhat open but with ascending branches; spikelets grayish-green or lead colored; glumes 2-3 mm long; lemmas slightly longer than the glumes, densely pubescent on the nerves. Infrequent; Strawberry Valley and across the s. slope of the Uinta Mts.; sagebrush, ponderosa pine, lodgepole pine, and Engelmann spruce communities; 7,400-9,600 ft; July-Oct.

Bouteloua Lag. Gramma Grass

Plant perennial; leaf sheaths open; ligule a fringe of hairs; inflorescence of 1-many spikes; spikelets in 2 rows on 2 sides of a 3-angled rachis, with 1 bisexual floret and 1-3 staminate or rudimentary florets above.

- 1 Spikelets densely crowded in 1-3 comblike spikes, more than 10 per spike; plants native.... B. gracilis
1 Spikelets borne in 20-80 spikes, less than 10 per spike; plants introduced..... B. curtipendula

Bouteloua curtipendula (Michx.) A. Gray Side-oats g. Known in our area from near Starvation Reservoir where it has been introduced, common e. and s. of our area in the Plains and sw. United States; July-Sept.

Bouteloua gracilis (H. B. K.) Lag. Blue g., curlygrass. Occasional to common on the Tavaputs Plateau, infrequent but scattered across the Uinta Mts.; sagebrush and pinyon-juniper communities; 5,500-8,000 ft and extending up to 9,500 ft on exposed ridges; July-Oct.

Bromus L. Brome; Chess

Annual or perennial plants; leaf sheaths closed for most their length, the blades flat; ligules membranous; auricles rarely present; inflorescence an open or compact panicle; spikelets many flowered, rather larger, disarticulating above the glumes; glumes unequal, shorter than the lower most lemma; lemmas awned from the tip between 2 small scarious teeth, or awnless in 2 of our species.

- 1 Plants annual
2 Lemmas awnless or awns less than 2 mm long..... B. brizaeformis
2 Awns of lemmas over 2 mm long
3 Glumes not over 9 mm long; lemmas not over 10 mm long; awns not over 14 mm long
4 Pedicels usually longer than the spikelets, awns 7-14 mm long, often divergent; panicle open, the branches spreading..... B. japonicus
4 Pedicels usually shorter than the spikelets; awns 4-9 mm long, straight; panicle rather compact, the branches erect or ascending..... B. hordeaceus
3 Second glume 8-11 mm long; lemmas 8-18 mm long; awns (7) 10-17 mm long..... B. tectorum
1 Plants biennial or perennial
5 Lemmas awnless (awns to 4 mm in a cultivar); plants with rhizomes..... B. inermis
5 Lemmas awned; plants without rhizomes
6 Spikelets flattened; lemmas keeled, 11-17 mm long, glabrous or hirsute; second glume 9-13 mm long; upper panicle branches not nodding; ligules 1-4 mm long..... B. carinatus
6 Spikelets rounded; lemmas not keeled, 9-13 mm long, hirsute; second glume 6-10 (12) mm long; upper panicle branches usually nodding; ligules 0.3-1 (1.5) mm long
7 Awns of lemmas (2.5) 3-5 mm long; glumes glabrous or scabrous on the midnerve, the lowest one mostly 1-nerved or occasionally 3-nerved at the base, gradually tapered from near the base; culms glabrous on and near the nodes; leaves 3-13 mm wide; lemmas usually more densely hairy along the margins than over the back..... B. ciliatus

- 7 Awns of lemmas 1.5-3 mm long; glumes mostly pubescent, the lowest one often 3-nerved, lateral nerves as well as the central nerve extending to near the tip, usually widest near the middle; culms pubescent on and near the nodes; leaves to 2.5 mm wide; lemmas not or only slightly more pubescent along the margins than over the back..... B. anomalus

Bromus anomalus Rupr. ex Fourn. Nodding c. [Bromopsis anomala (Fourn.) Holub.; B. porteri (Coulter.) Houlb] Common; widespread; sagebrush, mt. brush, ponderosa pine, Douglas-fir, aspen, and spruce-fir communities, more often in openings in woods than in shade of timber; 7,400-10,500 ft; June-Aug.

Bromus brizaeformis Fisher & Meyer Rattlesnake c. Apparently uncommon; more or less weedy on dry, disturbed sites at lower elevations; May-July.

Bromus carinatus Hook. & Arn. Mt. b. [B. marginatus Neese; B. polyanthus Scribn.; Ceratochloa marginata (Nees) Jackson] Common to abundant; Uinta Mts. and Tavaputs Plateau, most common w. of Rock Creek in the Uinta Mts., probably most common on open slopes, but also in aspen and conifer woods; 8,000-10,000 ft; June-Sept. Our plants are part of a large complex from which several species have been separated. Recently, that part of the complex involving our plants have been treated as a single species (Cronquist and others 1977; Arnow and others 1980). Many of the plants of our area fit quite well into that part of the complex that has been named as B. polyanthus in having awns less than 7 mm long and glabrous foliage or at least glabrous spikelets. However, separation of our plants between B. polyanthus and B. marginatus as often as not becomes an exercise in frustration.

Bromus ciliatus L. Fringed b. Occasional; widespread on the Uinta Mts.; only 1 specimen seen from the Tavaputs Plateau; willow, aspen, cottonwood, lodgepole pine, and Engelmann spruce communities; 7,400-11,000 ft; July-Aug. Plants of B. ciliatus and B. anomalus are rather easily confused, but are different in a number of subtle features. The narrower leaves in even robust specimens of B. anomalus are quite different than those of B. ciliatus. About 5 percent of the specimens examined from our area seem to have intermediate features.

Bromus hordeaceus L. Soft c. (B. mollis L.; B. racemosus L.) Introduced from Eurasia; more or less weedy, usually in places where the ground has been disturbed, apparently seldom collected from our area; May-July.

Bromus inermis Leyss. Smooth b. Introduced from Eurasia, used extensively to seed roadsides, rangelands in the aspen-upper sagebrush zone, and as a pasture and hay crop in cultivated areas where it has escaped along ditches, roadsides, and washes. Occasionally a cultivar with awns to 4 mm long has been planted; July-Sept.

Bromus japonicus Thunb. Japanese c. (B. commutatus Schrad.) Weedy in gardens, fields and along ditchbanks, roadsides, and other disturbed areas, seldom in indigenous plant communities; June-Oct. See Arnow and others (1980) for a discussion of B. japonicus and B. commutatus.

Bromus tectorum L. Downy b., downy c., cheatgrass. Introduced from Europe and widespread in our area, more or less weedy, locally abundant, often on disturbed ground and especially on warm exposures; to about 8,500 ft; April-June.

Buchloe Engelm. Buffalo-grass

Buchloe dactyloides (Nutt.) Engelm. Plants unisexual, perennial, matted, with creeping stolonlike stems, not over 20 cm tall; ligules a fringe of hairs; leaves pilose-hirsute, the blades curled, not over 5 cm long; staminate spikes 1-5, about 1 cm long, strongly 1-sided, with 8-20 spikelets; spikelets 4-6 mm long, with 2 florets; glumes 1-nerved, about 3 mm long; lemmas 3-nerved, about 5 mm long; pistillate spikelets partly enclosed in burlike, urn or cup shaped, thickened involucrelike structures, these 5-7 mm long with 3-5 awnlike lobes. The 1 specimen seen (Welsh & Moore 18709) is from the n. flank of Boars Tusk Ridge, 7 mi se. of Manila; sagebrush-grass community; 6,300 ft; June.

Calamagrostis Adans. Reedgrass

Plants perennial, from rhizomes or fibrous roots; leaf sheaths open, the blades flat or rolled; ligules membranous; auricles lacking; inflorescence an open or spikeletlike panicle; spikelets 1-flowered, disarticulating above the glumes; glumes longer than the floret, lemmas awned from the back, with a hardened callus base and bearing tufts of long hairs.

- 1 Awns of lemmas bent, often protruding from the tips or sides of the glumes; callus hairs less than 1/2 as long as the lemmas
- 2 Awns over 4 mm long, mostly exerted..... C. purpurascens
- 2 Awns to 4 mm long, slightly exerted or included in the glumes..... C. rubescens
- 1 Awns of lemmas mostly straight, included within the glumes; callus hairs 1/2 to as long as the lemma
- 3 Panicle open or occasionally contracted, the branches to 5 cm long..... C. canadensis
- 3 Panicle narrow, the branches erect, seldom over 3 cm long
- 4 Rhizomes short or absent; glumes 4-6.5 mm long; awns lacking or attached above the middle of the lemmas; plants of well-drained soil..... C. scopulorum
- 4 Rhizomes long creeping; glumes 2.5-4.5 mm long; awns attached below the middle of the lemmas; plants mostly of wet places..... C. stricta

Calamagrostis canadensis (Michx.) Beauv. Bluejoint. Common to abundant across the Uinta Mts.; 1 specimen seen from the E. Tavaputs Plateau; streambanks, wet meadows, bogs, and in rather dry to moist woods; 7,400-11,000 ft; July-Aug. Of wet places, with rhizomes, and small spikelets as in plants of C. stricta, but with spreading to open panicles and more often in shady places.

Calamagrostis purpurascens R. Br. Purple r. Occasional to common; Uinta Mts.; rocky, timbered slopes and above timberline; (7,500) 9,000-11,700 ft; July-Aug.

Calamagrostis rubescens Buckl. Pinegrass. Occasional to locally abundant; e. end of the Uinta Mts.; aspen and lodgepole pine communities; 8,100-8,500 ft; July-Sept.

Calamagrostis scopulorum Jones Jones r. Rather common from limestone hills in the Blind Stream and Rock Creek drainages of the Uinta Mts., specimens also seen from Chain Lakes and Ashley Gorge, Uinta Mts., Weber sandstone at Split Mt., Red Creek Mt. in Wasatch Co., and Book Cliffs of the E. Tavaputs Plateau; mt. brush, Ponderosa pine, Douglas-fir, and open spruce communities; 7,500-10,800 ft; July-Sept.

Calamagrostis stricta (Timm) Koeler Northern r. [C. inexpansa Gray; C. neglecta (Ehrh.) Gaertn., Mey., & Scherb.] Occasional to common; widespread; wet meadows, bogs, along streams, and other wet places, rarely in rather dry, rocky places; 5,500-10,500 ft; July-Aug.

Catabrosa Beauv. Brookgrass

Catabrosa aquatica (L.) Beauv. Perennial plants rooting at the nodes of decumbent bases; upright portion of culms 15-40 cm tall; leaf sheaths closed about 1/2 their length, the blade flat, 2-13 mm wide, prow-shaped at the tip; ligules membranous, 2-8 mm long; auricles lacking; panicles open with both long and short branches at the lower nodes; florets falling at maturity and leaving tiny glumes (about 1 mm long) at the ends of the panicle branches; lemmas awnless, blunt, 3-nerved, the nerves parallel and not converging at the apex of the lemmas. Widespread; aquatic in fresh water springs and streams, and sometimes in mud; from low elevations up to 10,600 ft; a reliable indicator of perennial springs; June-Sept.

Cenchrus L. Sandbur

Cenchrus longispinus (Hackel) Fern. Longspine s. Plants annual, 10-50 cm tall, occasionally taller; culms often prostrate and branched at the base, bent at the nodes; ligules a dense fringe of hairs, about 1 mm long or the marginal hairs up to 3 mm long; leaf blades flat or folded, 3-8 mm wide; inflorescence a spike-like panicle, 3-10 cm long, the axis geniculate, flattened and angled, bearing 4-15 (25) burs; bur urceolate, 3-8 mm long, with numerous spines, the longer spines 3-7 mm long; spikelets borne inside the burs, sessile, about 5-8 mm long; first glume 1-4 mm long; second glume 4-6 mm long; sterile lemmas 5-7 mm long; fertile lemma 5-7 (8) mm long. Weedy in sandy waste places, apparently uncommon in the Uinta Basin at lower elevations; July-Sept.

Dactylis L. Orchardgrass

Dactylis glomerata L. Perennial plants growing in small to large bunches; culms 30-90 cm tall; cauline leaf blades flat and lax, those of the innovations strongly folded; ligules of mature leaves about 5 mm long, lacerate especially in age; panicle 5-15 cm long, narrow, erect at first with lower branches spreading at maturity; lower branches somewhat distant, upper branches short and more congested; spikelets congested and arranged on sided on the panicle branches, about 7 mm long, 2-5 flowered; glumes rather unequal, the second one longer and broader and more prominently ciliate on the keel; lemmas stiff ciliate on margin and keel. Introduced from Europe, used as a pasture and hay crop on cultivated lands, in seeding rangelands, and stabilizing roadsides in the aspen and conifer zone, naturalized along ditchbanks and other moist areas; not expected much over 10,000 ft; June-Aug.

Danthonia DC. in Lam. & DC. Oatgrass

Tufted perennial plants; leaf sheaths open; ligule a fringe of short hairs; auricles lacking; inflorescence an open or contracted panicle, or reduced to a single spikelet; spikelets several flowered; disarticulation above the glumes; glumes unequal, generally longer than and mostly enclosing the florets; lemmas awned from just below the teeth of a bifid apex, the awn flat, twisted, and more or less bent.

- 1 Inflorescence with (3) 4-12 spikelets, the spikelets erect or strongly ascending, on glabrous or scabrous, straight pedicels; rachis more or less concealed in the dense spikelets..... D. intermedia
- 1 Inflorescence with 1-3 (5) spikelets, if the spikelets more than 2 then some of the conspicuously pubescent pedicels usually spreading and the rachis conspicuous with remote spikelets
 - 2 Inflorescence with 1 (2) spikelets; lateral spikelet, when present, usually smaller, borne on erect, straight pedicels 2-6 mm long; upper sheaths and/or blades usually conspicuously long-pilose, the hairs to 5 mm long..... D. unispicata
 - 2 Inflorescence with 2-3 (5) spikelets; spikelets about equal, the lateral ones borne on ascending to spreading, straight to wavy pedicels 6-15 mm long; sheaths and blades glabrous or nearly so except at the collar..... D. californica

Danthonia californica Bolander California o. The few records seen are from Strawberry Valley and occasional stations across the Uinta Mts., to Blue Mt.; meadows and rocky drainages in the ponderosa pine and aspen zones and from openings in lodgepole pine-Engelmann spruce forests; 6,900-9,700 ft; June-Aug.

Danthonia intermedia Vasey Timber o., dry-meadow o. Common; Uinta Mts.; upper lodgepole pine and Engelmann spruce zones, and above timberline, in dry portions of meadows, along streams, under conifer timber, and on rocky slopes and ridges; July-Aug.

Danthonia unispicata (Thurb.) Munro Onespike o. Infrequent or locally common; Blue and Cold Springs Mts. and across the Uinta Mts. (mostly e. of Dry Fork and Sheep Creek and rarely to Rock Creek); sagebrush and ponderosa pine communities; 6,900-8,400 ft; June-Sept.

Deschampsia Beauv. Hairgrass

Plants perennial, tufted; leaf sheaths open; ligules membranous; auricles lacking; inflorescence an open or contracted panicle; spikelets small (1) 2 (3) flowered, disarticulating above the glumes, the rachilla prolonged beyond the upper floret as a hairy bristle; glumes exceeding at least the lower floret; lemmas awned from about mid length, the callus hairy.

- 1 panicle branches widely spreading..... D. caespitosa
 1 Panicle branches ascending, somewhat appressed to the rachis and producing a narrow inflorescence.....
 D. elongata

Deschampsia caespitosa (L.) Beauv. Tufted h. (Aira caespitosa L.) Common to abundant; Strawberry Valley and across the Uinta Mts.; 1 specimen seen from the Tavaputs Plateau, and 1 from along the Green River at Browns Park; most common in moist to wet meadows and long streams, also in conifer woods and increasing on areas cleared of timber, and above timberline in turf and meadows; (5,500) 7,000-12,500 ft; July-Sept.

Deschampsia elongata (Hook.) Munro Slender h. Occasional; Strawberry Valley and to the canyon bottom of the N. Fork Duchesne River in the Uinta Mts.; dry meadows, aspen-tall forb, and spruce-fir communities; 7,400-9,600 ft; June-Sept.

Digitaria Heister Crabgrass

Digitaria sanguinalis (L.) Scop. Hairy c. Plants annual, prostrate to ascending, rooting at the nodes and occasionally forming mats, 10-100 cm tall; leaf sheaths and blades pilose with 2-3 mm long hairs, the blades 2.5-8 (10) mm wide; ligules 0.5-2.5 mm long, membranous; inflorescence of few to several more or less digitately arranged spicate racemes (2) 6-16 cm long; spikelets in pairs, on pedicels about 1-3 mm long, nearly appressed to the raceme branches, each with 1 sterile and 1 fertile floret; glumes 0.1-2 mm long; lemmas 2.5-3.5 mm long, the sterile one 5-nerved, the fertile one 1-3 nerved. A weed of lawns, gardens, and other places of cultivation; Aug.-Oct.

Distichlis Raf. Saltgrass; Alkaligrass

Distichlis spicata (L.) Greene [D. stricta (Torr.) Rydb.] Plants unisexual, arising from robust, scaly rhizomes; culms usually low, the staminate somewhat taller than the pistillate, usually not over 30 cm tall; leaves distributed about equally up the entire length of the culm, conspicuously 2 ranked, and rather harsh, the sheaths often hairy at the summit; ligules short, less than 1 mm long, of hairs; panicles narrow, the branches short erect; staminate spikelets straw colored and 10-25 mm long; pistillate spikelets light green, 8-15 mm long, several flowered. Common to locally abundant; moist, low alkaline areas, occasional on upland sites where soil pH is high; May-Sept. Our plants are referable to var. stricta (Torr.) Scribn. (inland saltgrass).

Echinochloa Beauv. Barnyard Grass; Cockspur

Echinochloa crus-galli (L.) Beauv. Robust annual plants, 15-100 cm tall; culms usually bent at the lower nodes; leaf blades flat, 4-12 (16) mm wide, sometimes papillate pubescent on the margins near the collar, otherwise mostly glabrous; ligules lacking; panicles 5-25 cm long, of 5-15 spicate or racemose, somewhat 1-sided branches; spikelets 3-3.5 mm long, consisting of 2 glumes, a sterile glumelike lemma, and a fertile floret; glumes about 1-3 mm long, awnless or awn-pointed; sterile lemma with an awn 1-30 mm long; fertile lemma 2-3.5 mm long, awnless or awn-pointed. Weedy in gardens, fields, ditchbanks, roadsides, and other disturbed places; mostly below 7,000 ft; July-Oct.

Elymus L. Wildrye

Plants perennial, from rhizomes or fibrous roots, often densely tufted; leaf sheaths open; ligules membranous; auricles usually present; inflorescence typically a solitary terminal spike with persistent or rarely disarticulating rachis; spikelets sessile or short-pedicel or occasionally rather long pedicel, mostly 2-4 (6) per node of the rachis, with 2-6 (10) florets, disarticulating above the glumes; glumes

narrow, mostly shorter than the lemmas; lemmas awnless or awned from the tip. Sometimes hybridizing with species of Agropyron and Sitanion.

- 1 Awns of lemmas over 9 mm long
 - 2 Glumes tapering from the base with awns that equal or exceed the length of the body; awns of lemmas sometimes over 20 mm long, strongly divergent in age; auricles usually conspicuous..... E. canadensis
 - 2 Glumes tapering from near the middle, awns of glumes lacking or shorter than the body; awns of lemmas not over 20 mm long, straight or slightly divergent in age; auricles usually inconspicuous
 - 3 Plants of woods, often associated with aspen, leaf blades flat or slightly involute, 4-12 mm wide; rachis usually not breaking up at maturity..... E. glaucus
 - 3 Plants mostly of saline or alkaline open places; leaf blades mostly firm and subinvolute, 2-5 mm wide; rachis usually breaking up at maturity..... X Agrohordeum
- 1 Awns of lemmas less than 9 mm long
 - 4 Spikes with 2-5 spikelets at most nodes of the rachis, densely flowered or interrupted below; rhizomes absent or short
 - 5 Spikelets mostly 2 per node of the rachis, often less than 12 mm long, mostly 3-flowered; ligules about 1 mm long; plants mostly less than 80 cm tall..... E. junceus
 - 5 Spikelets 3-5 per node of the rachis, mostly over 12 mm long, commonly 3-4 but up to 7-flowered; ligules over 2 mm long; plants often over 80 cm tall..... E. cinereus
 - 4 Spikelets 1-2 per node of the rachis, spike usually slender and often interrupted with spikelets rather distant; plants often with long creeping rhizomes
 - 6 Awns of lemmas 2.5-8 mm long; culms arising singly or few together from long creeping rhizomes; plants entering our area along the Green River and perhaps along the Yampa River, on sandy alluvium of flood plains..... E. simplex
 - 6 Awns of lemmas obsolete or to 3 mm long; culms few to several and tufted; plants widespread, common; often on clay soils of hills..... E. salina

Elymus canadensis L. Canada w. Occasional or common; widespread; mostly along ditchbanks, fence rows, and water courses; up to about 7,000 ft; June-Sept.

Elymus cinereus Scribn. & Merr. Great Basin w. [E. condensatus Presl. misapplied; Leymus cinereus (Scribn. & Merr.) A. Love] Occasional to common; widespread; lower elevations in canyons, along water courses, and other moist or rather dry places, mostly on alluvial soils; up to 8,000 ft; June-Aug. Specimens with compound spikes have occasionally been observed in our area. See E. salina.

Elymus glaucus Buckl. Blue w. Widely distributed in the Uinta Mts. where it is most common under aspen; to be expected on the Tavaputs Plateau but no specimens seen from there; June-Aug.

Elymus junceus Fisch. Russian w. [Psathyrostachys juncea (Fischer) Nevski] Introduced from Siberia, used recently for seeding rangelands of the Tavaputs Plateau and other areas in pinyon-juniper, sagebrush, and mt. brush communities; May-July.

Elymus salina Jones Salina w. [E. ambiguus Vasey & Scribn. var. salina (Jones) C. L. Hitchc.; Leymus salinus (Jones) A. Love] Abundant on the Tavaputs Plateau where often the dominant species on dry, steep canyon sides and alluvial fans, also common on dry areas of canyon bottoms and ridges where it is associated with sagebrush and pinyon-juniper, most abundant on clay soils derived from marl limestone or shale, but also on soils derived from calcareous sandstone, also locally common on Morrison Formation at Sheep Creek Gap and perhaps other points in Daggett Co. and occasionally in desert shrub communities on Duchesne River, Uinta, and other formations in the Basin; 5,600-9,200 ft; May-July. Bullgrass, hard grass, and that old bunch grass are all common names that have been applied to the species. The first two names depict the toughness of the foliage, which cures very well, and culms with spikes remain standing through 2 or more growing seasons. Some florets also persist, but most fall leaving the narrow glumes. Traditionally this has been treated as a nonrhizomatous species (Hitchcock and Chase 1950; Harrington 1954). It has also been described recently this way (Hitchcock and Cronquist 1973), but in a more recent work Holmgren and Holmgren (in Cronquist and others 1977) explained the type specimen as well as most of the topotype specimens to have rhizomes. Even though the plants often produce robust and occasionally long rhizomes, the rhizomes are often excluded in careless collecting. The caespitose nature of the species has probably also helped to obscure its rhizomatous nature as caespitose species are often considered nonrhizomatous. Failure to recognize the rhizomatous nature of this species has helped to make this one of the most frequently confused taxa of our area. Rhizomatous plants key to E. simplex or E. triticoides Buckley in some manuals. The treatment of Holmgren and Holmgren (in Cronquist and others 1977) does much to clarify the problem. With only 1 spikelet per node of the rachis this is often confused with species of Agropyron, but the narrow glumes set it apart from Agropyron. Specimens that appear much like a cross between this and Sitanion hystrix and between this and E. cinereus have been collected from the W. Tavaputs Plateau. Such plants are referable to the hybrid genus "Elysitanion Bowden".

Elymus simplex Scribn. & Williams Low creeping w. [E. triticoides Buckley var. simplex Scribn. & Will.; Leymus simplex (Scribn. & Williams) D. R. Dewey] Reported for sandy areas along the Green River in Daggett Co. (Cronquist and others 1977).

Eragrostis Beauv. Lovegrass

Caespitose annuals (ours) or perennials; leaf sheaths open, tufted at the throat with hairs; ligules of short dense hairs; inflorescence an open or contracted panicle; spikelets with 6-14 florets, disarticulating above the glumes; glumes shorter than the first floret; lemmas 3-nerved, awnless; palea as long as the lemma.

- 1 Plants with minute glandular depressions on the panicle branches and sometimes on the keels of lemmas, 10-25 cm tall rarely taller; panicles 4-15 (23) cm long
 2 Spikelets 2.5-3 mm wide; panicles usually dense; anthers 0.5 mm long; glands on lemmas prominent....
 E. cilianensis
 2 Spikelets about 1.5 mm wide; panicles open; anthers 0.2 mm long; glands on lemmas sometimes obscure
 E. minor
 1 Plants not glandular on the panicle branches nor the lemmas, 15-80 cm tall or taller; panicles various
 3 Caryopsis ventrally flattened or more commonly grooved throughout the length; plants commonly 50-80 cm tall or taller; panicles 15-30 (36) cm long; spikelets 0.6-1.5 mm wide..... E. orcuttiana
 3 Caryopsis rounded ventrally; plants 15-60 (75) cm tall; panicles 5-20 (35) cm long; spikelets 1.2-2 mm wide..... E. pectinacea

Eragrostis cilianensis (All.) Mosher Stink grass. Introduced from Europe; weedy in gardens, ditchbanks, fields, roadsides, or waste places; not expected over 7,000 ft; July-Oct.

Eragrostis minor Host (E. poaeoides Beauv.) The 1 specimen seen (Neese et al. 11022) is from a sidewalk in Roosevelt.

Eragrostis orcuttiana Vasey Weedy in gardens and other disturbed areas; July-Oct.

Eragrostis pectinacea (Michx.) Nees. (E. diffusa Buckl.) The few specimens seen are from the flood plain of the Green River and about towns; July-Oct.

Eremopyron (Ledeb.) Juab. & Spach

Eremopyrum triticeum (Gaertn.) Nevski Annual wheatgrass. (Agropyron triticeum Gaertn.) Plants annual; culms arising singly or 2-3 together, glabrous except retrorse hirsute below the spike; auricles usually conspicuous, ligules to 1 mm long; leaf blades flat to involute, 1-4 (6) mm wide; spikes 0.8-2 cm long, more or less densely flowered, the rachis sometimes disarticulating in age; spikelets with 3-6 flowers, ascending to spreading; glumes 4-7.5 mm long, 1-nerved, awn-tipped; lemmas 5-7.5 mm long, awn-tipped. Introduced from Eurasia, only recently entering our area; the one specimen seen (Neese & Trent 11804) is from Split Mt. campground; disturbed greasewood community; 5,000 ft; May-June.

Erioneuron Nash

Erioneuron pilosum (Buckley) Nash Hairy tridens. (Tridens pilosus A. S. Hitchcock; Triodia pilosa Merrill) Plants perennial but weakly rooted; culms 10-20 (30) cm tall, usually with a single node above the tuft of basal leaves; ligule a fringe of hairs, about 0.5 mm long; leaves basal or on the lower 1/3 of the culm, sparingly pilose on the collar, the blades flat or folded, less than 2 mm wide, 1-6 cm long; panicles 1.5-3 (5) cm long, ovoid, headlike or racemose with 3-9 nearly sessile spikelets; spikelets 8-14 (20) mm long, 3-6 mm wide, with 6-12 (18) flowers; glumes about 4-8 mm long, pilose on the 3-nerves, the mid nerve extending into a 1-2 mm long awn; apparently just entering our area through Desolation Canyon; the only record seen (Neese 4267) is from Sand Wash; May-July.

Festuca L. Fescue

Perennial, densely tufted plants; leaf sheaths open or partly closed; ligules membranous; auricles lacking or well developed; inflorescence a raceme or narrow to open panicle; spikelets 2-12 (20) flowered, disarticulating above the glumes; glumes shorter than the lowermost lemma; lemmas awnless, awn-pointed, or awned from the tip.

- 1 Lemmas awnless; plants usually over 40 cm tall
 2 Blades flat; ligules less than 2 mm long; auricles often conspicuous..... F. pratensis
 2 Blades rolled; ligules over 2 mm long; auricles lacking..... F. thurberi
 1 Lemmas awned, or if only awn-tipped then plants usually less than 25 cm tall
 3 Plants annual, mostly in and below the pinyon-juniper zone; spikelets with 5-13 flowers.....
 F. octoflora
 3 Plants perennial, mostly above the pinyon-juniper zone; spikelets various
 4 Florets 1-3 per spikelet; panicles spreading, the branches strongly angled, and densely ciliate on the angles; plants 20-50 cm tall..... F. dasyclada
 4 Florets mostly more than 3 per spikelet or else the plants less than 20 cm tall; panicle open or closed, the branches not as above..... F. ovina

Festuca dasyclada Hackel ex Beal Occasional to locally common in the Piceance Basin of the E. Tavaputs Plateau and Willow Creek drainage of the W. Tavaputs Plateau; most common on shaly slopes of the Green River Formation; 7,200-8,600 ft; June-Aug.

Festuca octoflora Walter Sixweeks f. [Vulpia octoflora (Walter) Rydb.] Occasional or common; Daggett Co. and from Vernal and e. in Uintah Co. and in Colorado, no specimens seen from Duchesne Co.; sagebrush, pinyon-juniper, mt. brush, ponderosa pine, and dry meadow communities; 4,900-7,000 ft; May-June.

Festuca ovina L. Sheep f. (F. idahoensis Elmer) Forming a highly variable complex in which extreme forms are different, but a continuum is found through the entire complex. Several schemes have been devised to separate taxa, but they contain overlapping criteria. All too often separation of taxa in the complex becomes an exercise in frustration and we feel the distinction is best at the varietal level. Harrington (1954) noted frequent intergradation between the small and intermediate forms. Festuca idahoensis (the large form) was placed as a var. of F. ovina when first published in 1896 (F. ovina var. ingrata Hackel ex Beal). Gould (1968) indicated that it was no more than a var. of F. ovina as did Arnou (in Arnou and others 1980). The intergrading vars. seem to be expressions of ecology. Separation may be attempted with the following key, and many specimens can be reasonably assigned to a var., but this distinction is arbitrary with many other specimens especially in those of intermediate ecology. In addition to the vars. treated in the following key, Eurasian vars. are occasionally planted in our area. Variety ovina is used in lawn plantings. Variety duriuscula (L.) Koch has been used in experimental seedings on lands disturbed in the exploration of oil shale. Festuca rubra L., noted for its shade tolerance, might also be cultivated in lawns and escaped. Perhaps this is a cultivar of F. ovina in which the distinguishing features (slightly rhizomatous, slightly wider blades, sometimes hairy leaf sheaths, and slightly larger spikelets) are maintained by selective breeding.

- 1 Panicles open (5) 7-15 cm long; spikelets (4) 5-7 flowered; first glume 2.5-5 mm long; second glume 4-6.5 mm long; lemmas 4.5-7.5 mm long; awns 2-5 mm long; anthers 2.5-4 mm long; basal leaves often over 10 cm long; plants (30) 40-100 cm tall, mostly in mesic sagebrush (sometimes silver sagebrush) communities, and meadows; primarily of moderate elevations in Strawberry Valley and Uinta Mts..... F. o. var. ingrata Hackel ex Beal
- 1 Panicles narrow, 1.5-7 (10) cm long; spikelets 2-4 (5) flowered; first glume 2-4 mm long, second glume 2.8-5 mm long; lemmas 3-5.5 mm long; awns 1-3 mm long or lacking; anthers 0.7-1.7 mm long; basal leaves mostly less than 10 cm long; plants 4-35 (40) cm tall
 - 2 Culms mostly over 25 cm tall, 2-3 times the height of the basal leaves; anthers over 1 mm long; plants of sagebrush communities and open woods and dry meadows to near timberline, common to abundant on the Uinta Mts., rare or infrequent on the Tavaputs Plateau..... F. o. var. rydbergii St. Yves
 - 2 Culms mostly 4-25 cm tall, usually less than 2 times the height of the basal leaves; anthers mostly not over 1 mm long; plants of woods and rocky slopes in the upper pine-spruce zone to well above timberline on the Uinta Mts. [F. o. ssp. brachyphylla (Schultes) Piper]..... F. o. var. brevifolia (R. Br.) Wats.

Festuca pratensis Huds. Meadow f. (F. elator L.) Introduced from Europe, planted in pastures and for hay, escaping and persisting along ditches, roadsides, and other places; up to about 9,000 ft; June-Aug.

Festuca thurberi Vasey Thurber f. Entering our area along the upper elevations of the Tavaputs Plateau from s. and e. of Minnie Maud (Nine Mile) Creek; oak, aspen, and open conifer communities; July-Aug.

Glyceria R. Br. Mannagrass

Plants perennial, rhizomatous, of wetlands; stems erect or decumbent and rooting at the nodes; leaf sheaths closed at least in upper leaves; ligules membranous; auricles lacking; inflorescence an open, often drooping panicle; spikelets 3-14 flowered, often purple tinged, disarticulating above the glumes; glumes unequal, shorter than the first lemma; lemmas awnless, with 5-9 rather prominent nerves, the nerves sometimes slightly ridged, parallel and not converging at the apex of the lemma.

- 1 Spikelets linear, 4-5 times longer than wide; ligules 4-12 mm long; panicle narrow, the branches erect G. borealis
- 1 Spikelets less than 3 times longer than wide; panicle open
 - 2 Ligules 3-9 mm long; leaf sheaths open for nearly their entire length; lemmas with 5 nerves..... Puccinellia pauciflora
 - 2 Ligules various; sheaths closed from just below the collar; lemmas with (5) 7-9 nerves
 - 3 Ligules of upper stem leaves mostly 4-9 mm long; glumes acute, the first 1.2-2 mm long; lemmas 2-2.7 mm long, mostly elliptic, usually purple at maturity, not distinctly membranous at the tips; stamens (2) 3; leaf blades 4.5-12 (15) mm wide..... G. grandis
 - 3 Ligules of upper stem leaves 1-4 (6) mm long; glumes mostly blunt, the first 0.4-1.3 mm long; lemmas 1.4-2.3 mm long, mostly obovate, green or purple tinged, distinctly membranous margined at the tips; stamens 2; leaf blades 2-12 mm wide..... G. striata

POACEAE

Glyceria borealis (Nash) Batchelder Northern m. Widespread, but seldom collected; Uinta Mts.; the few records seen are from canyon bottoms of the major drainages and from a few ponds in the pine-spruce zone, in wet places and in standing water of up to 1 ft deep; 7,600-9,750 ft; July-Aug.

Glyceria grandis S. Wats. American m. Infrequent; the few records seen are from wet areas in the Basin and along the major drainage bottoms of the Uinta Mts; 5,300-7,500 ft; June-Aug. Similar to G. striata, but averaging somewhat taller, otherwise different by the features given in the key.

Glyceria striata (Lam.) A. S. Hitchc. Fowl m. [G. elata (Nash) Jones] Locally common; Uinta Mts., Strawberry Valley, and perhaps on the Tavaputs Plateau; mostly along streambanks in woods and other wet places; 7,000-10,500 ft; May-Sept.

Helictotrichon Besser Perennial Oatgrass

Helictotrichon mortonianum (Scribn.) Henrard Alpine oat. Tufted perennial plants, 5-20 cm tall; leaf sheaths open, the blades rolled, about 1-2 mm wide; ligules about 1 mm long, membranous, ciliate; panicle 2-7 cm long, narrow, the short branches erect usually with a single spikelet; spikelets mostly 2-flowered; the second floret smaller than the first, with a shorter awn, apparently staminate or sterile, borne on a densely long-hairy rachilla about as long as the floret; glumes 8-12 mm long, equal or exceeding the lemmas; lemmas 6-9 mm long, the callus bearded with hairs 1-2 mm long, the awns 10-15 mm long, attached near the middle of the lemma. Occasional across the Uinta Mts.; alpine communities; 11,000-12,000 ft; July-Aug.

Hierochloa R. Br. Sweetgrass

Hierochloa odorata (L.) Beauv. Vanilla grass. Culms arising singly or few together from slender rhizomes, 20-50 (70) cm tall; leaf sheaths open, blades of the culm often reduced, the upper one acute-triangular, not over 1 cm long, the lower ones to 3 cm long, blades of sterile shoots more elongate; ligules about 1.5-6 (8) mm long; panicle 3-10 (12) cm long, more or less open; spikelets 3-6 mm long, 2-3 (4) mm wide; glumes about as long as the spikelets, translucent or greenish toward the base; lemmas about as long or longer than the glumes, greenish at first but maturing to yellow-brown, 3 per spikelet, the central one bisexual and glabrous except at the tip, the 2 lateral ones staminate and pubescent over the back, all 3 lemmas awnless. Occasional on canyon bottoms along water courses and in wet meadows of the pine-spruce zone to perhaps somewhat above timberline, records seen are all from the Uinta Mts.; 7,400-11,500 ft, but to be expected along the flood plains of the Green River and other water courses at low elevations; June-Aug. This grass is often fragrant at maturity.

Hilaria H. B. K. Galleta

Hilaria jamesii (Torr.) Benth. Galleta. Perennial plants from large, scaly rhizomes, 20-40 cm tall; culms solid, the nodes often pubescent; leaves mostly basal, the sheaths open, the blades soon involute, reduced in size upward on the culm, basal leaves often curled when dry; collars usually pilose; ligules 1-4 mm long, ciliate or lacerate; inflorescence a spike, often purplish but pale upon drying; spikelets long pilose at the base, arranged in groups of 3, each group 6-11 mm long; 2 lateral spikelets staminate and more than 1-flowered, central spikelet fertile and 1 (2)-flowered, the spikelets falling as a unit after maturity leaving a bare, zig-zag rachis; glumes of lateral spikelets single-awned, 1 awned from near the tip, the others awned from below the middle; glumes of central spikelet with several awns; lemmas 4-7 (9) mm long; awns of lemmas mostly inconspicuous without magnification, and hidden in the groups of spikelets, but some to about 5 mm long and visible without magnification. Occasional to common; widespread; dry hills and flats, desert shrub, sagebrush, and pinyon-juniper communities; 4,700-6,800 ft; May-Aug.

Hordeum L. Barley

Plants annual or perennial, tufted; leaf sheaths open; ligules membranous; auricles lacking or well developed; inflorescence a dense terminal, solitary spike, the rachis readily disarticulating at the nodes at maturity; spikelets 3 at each node of the rachis, 1-flowered, the central spikelet generally sessile with a well-developed, fertile floret, the lateral spikelets short-pedicel with staminate or rudimentary florets; glumes awnlike their whole length or in some species expanded toward the base; lemmas usually awned from the tip. Hordeum vulgare (cultivated barley) differs from the above description in having a persistent rachis and sessile lateral spikelets with fertile florets. Sometimes hybridizing with species of Agropyron.

- 1 Plants perennial
 - 2 Awns of lemmas to 15 mm long..... H. brachyantherum
 - 2 Awns of lemmas over 20 mm long..... H. jubatum
- 1 Plants annual
 - 3 Awns of lemmas 5-16 cm long or lacking, rachis not disarticulating; leaf blades 5-15 mm wide; plants cultivated, occasionally escaping, 60-130 cm tall..... H. vulgare

- 3 Awns of lemmas 0.2-0.8 cm long; rachis disarticulating; blades 1-5 mm wide; plants not cultivated, 10-40 (60) cm tall..... H. pusillum

Hordeum brachyantherum Nevski Meadow b. [H. nodosum L. misapplied; Critesion brachyantherum (Nevski) Barkw. & D. R. Dewey] Occasional to common; widespread; typically in meadows and other places where water other than direct precipitation is available to keep the ground moist for much of the growing season; (6,000) 6,500-10,500 ft; June-Aug. A cross between this and Agropyron trachycaulum has been collected from the E. Slope in the Blind Stream Drainage of the Uinta Mts. Hordeum characteristics of the cross are narrow, awned glumes, disarticulating rachis, and some tendency for more than 1 spikelet per node of the rachis. Agropyron characteristics are all spikelets sessile, predominantly 1 spikelet per node of the rachis, and more than 1 floret per spikelet.

Hordeum jubatum L. Foxtail, foxtail b. [Critesion jubatum (L.) Nevski] Occasional to abundant; widespread; weedy along roadsides and in waste places, abundant in heavily grazed, degraded pastures; most often in alkaline places at lower elevations, occasionally in montane places where sometimes introduced in hay at hunting, livestock, and logging camps; May-Sept.

Hordeum pusillum Nutt. Little b. [Critesion pusillum (Nutt.) A. Love] The 1 specimen seen (Goodrich 12317) is from a desert shrub community on heavy clay soil in the Island Park area, to be expected in other areas at low elevations; April-June.

Hordeum vulgare L. Barley. Cultivated and occasionally growing along roadsides and waste places for a season, but not persisting in our area without cultivation; June-Aug.

Koeleria Pers. Junegrass

Koeleria macrantha (Ledeb.) Schult. [K. cristata (L.) Pers. misapplied; K. gracilis Pers.; K. nitida Nutt.] Tufted perennial plants 20-60 cm tall; leaves mostly basal, the sheaths open, the blades flat or folded, 1-3 mm wide, seldom over 10 cm long; ligules about 0.2-2 mm long, ciliate along the margins (use 10X magnification); panicle dense and spikelike, opening at anthesis then closing again, the branches appressed, 1-30 mm long; glumes 3-6 mm long, the second glume about as long as the spikelet, with translucent margins and green center; lemmas about 5 mm long, similar to glumes in color. Occasional; widespread; most common in sagebrush, pinyon-juniper, mt. brush, dry meadow, aspen, and Douglas-fir communities; 5,600-9,000 ft. Listed (Lewis 1970) for dry meadows above timberline on the Uinta Mts; June-Aug. The translucent nature of the spikelet components give a shining appearance to the panicle. This is particularly noticeable at anthesis when the totally translucent paleas are exposed and again after the plants cure and the green centers of the glumes and lemmas have faded. A few specimens from our area have short rhizomes. This is uncommon for the species, but has been also reported Harrington (1954). See Arnow and others (1980) for discussion of synonymy. North American plants have been referred to as K. pyramidata (Lam.) Beauv. (Correll and Johnston 1970), but the relationship of our plants to this European species is yet to be clarified. The minutely soft-hairy pedicels and panicle branches (the hairs visible at 10X) distinguish this from the sometimes similar Poa fendleriana and Trisetum wolfii.

Leptochloa Beauv. Sprangletop

Leptochloa fascicularis (Lam.) Gray Bearded s. Tufted annual, 10-70 cm tall; ligules 2-7 mm long, membranous; leaf sheaths open the blades 1-6 mm wide, flat or rolled; panicles 7-40 cm long, with a few to many spikelike or racemose branches arranged along the main axis; spikelets 5-12 flowered, (5) 7-12 mm long, linear; glumes 2-6 mm long; lemmas 3-6 mm long or uppermost smaller, appressed-pubescent at least at the base of each of the 3 nerves, minutely bifid at the apex, awn-pointed or with awns up to about 4 mm long. The 3 specimens seen are from mud of an ephemeral pond near Myton and from the flood plain of the Green River from near Jensen and Ouray; July-Oct.

Leucopoa Griseb.

Leucopoa kingii (Wats.) W. A. Weber Spike fescue. [Festuca kingii Cassidy; Hesperochloa kingii (Wats.) Rydb.] Plants perennial, usually unisexual, densely tufted, 30-65 (80) cm tall, sometimes with short rhizomes; leaf sheaths open, the bases persistent, the blades flat or rolled in age, 2-9 mm wide, firm and ascending to erect; ligules membranous, about 1-4 mm long; auricles lacking; inflorescence a narrow panicle with short erect branches; spikelets pale, with 3-6 florets, about 6-12 mm long, disarticulating above the glumes, the staminate ones usually maturing before the pistillate; glumes 3-7 mm long, awnless, scarious, only the midrib greenish; lemmas 4-8 mm long, scabrous, awnless or awn-tipped. Locally common to abundant, especially on Reservation Ridge and associated ridges of the W. Tavaputs Plateau, occasional from Strawberry Valley to Blind Stream in the Uinta Mts., apparently rare e. of there, 1 record for Uinta Canyon, none from Uintah or Daggett Cos., but found on Blue Mt. in Moffat Co.; sagebrush, aspen, oak, Douglas-fir, and spruce communities, often on exposed ridges; 7,400-10,000 ft; May-Aug. The more or less scarious glumes help to distinguish this from species of Poa and Festuca.

Lolium L. Ryegrass

Lolium perenne L. (L. multiflorum Lam.) Plants annual, biennial or short-lived perennial, sometimes appearing annual; culms tufted, mostly 30-80 cm tall, rarely taller; leaf sheaths open, the blades flat or slightly inrolled, 2-8 (10) mm wide; ligules membranous, to 1.5 mm long; auricles generally well developed; inflorescence a spike, 7-25 cm long; spikelets with (3) 4-15 flowers, 8-15 (20) mm long, laterally compressed, solitary at each node, turned edgewise to the rachis, the side next to the rachis without a glume, both glumes present on the terminal spikelet; lemmas 5-8 mm long, awnless or awned from the tip, the awn up to 8 mm long. Introduced (native to Eurasia and Africa), sometimes used in lawn mixtures as a nurse crop, sometimes a contaminant in commercial seed used for other plantings; May-July. We have followed Arnou and others (1980) in placing L. multiflorum in synonymy here. Apparently the differences are largely a function of selective breeding for development of commercial seed.

Melica L. Oniongrass

Perennial plants from bulbous bases and/or short, thick rhizomes; leaf sheaths closed; ligules membranous; auricles lacking; inflorescence a contracted or spreading panicle; spikelets with 2-several fertile florets and 1-4 progressively reduced florets above (the terminal floret often reduced to a mostly club-shaped rudiment), disarticulating above or below the glumes; glumes mostly shorter than the lowermost lemmas; lemmas firmer than the glumes.

- 1 The first glume mostly less than 1/2 as long as the spikelet, 3.5-5 (6) mm long; ligules 1-3.2 mm long; bulbs spaced along a slender rhizome at intervals of about 1-3 cm long, the rhizome generally forming a "tail" on the bulb, but this easily broken and often lacking in herbarium specimens..... M. spectabilis
 1 The first glume mostly over 1/2 as long as the spikelet, 5-10 mm long; ligules 2-5 (7) mm long; bulbs generally tightly clustered on a short, thick rhizome, or rhizome lacking..... M. bulbosa

Melica bulbosa Geyer ex Porter & Coulter 0. Occasional; widespread; sagebrush, mt. brush, ponderosa pine, and aspen communities; 7,700-10,500 ft; June-Aug.

Melica spectabilis Scribn. Purple o. Apparently uncommon; 6 specimens seen are from Wasatch Co. and 1 is from Daggett Co. [Wolf & Dever 5171 DINO!, reported for Moffat Co. (Bradley 1950) belongs with M. bulbosa]; grassy slopes, woods, and openings in aspen and spruce-fir woods; 8,280-9,800 ft; June-Aug.

Muhlenbergia Schreb. Muhlygrass; Muhly

Annual or perennial plants from fibrous roots or rhizomes; culms simple or sometimes branched; leaf sheaths open; ligules membranous; auricles lacking; inflorescence an open or contracted to spike-like panicle; spikelets almost always 1-flowered, disarticulating above the glumes; glumes shorter or occasionally slightly longer than the lemma; lemma awnless or awned, glabrous or with bearded callus.

- 1 Plants annual, may appear perennial when forming mats, 5-20 (40) cm tall; growing in wet places mostly in mountains; rhizomes lacking..... M. filiformis
 1 Plants perennial, 5-100 cm tall, with robust scaly rhizomes
 2 Lemmas glabrous; panicles and plants various
 3 Panicle narrow, the branches short, erect; plants 5-30 (45) cm tall; leaves rolled..... M. richardsonis
 3 Panicle open and diffuse at maturity; plants 10-50 (70) cm tall; leaves flat or folded
 4 Lemmas awnless; spikelets 1.5-2 mm long; plants common, widespread of moist to wet alkaline places..... M. asperifolia
 4 Lemmas awned, the awn about 1 mm long; spikelets 2.5-4 mm long; plants rare, known from Moffat Co., of dry sandy places..... M. pungens
 2 Lemmas pubescent at least at the base; panicles narrow; plants 25-100 cm tall
 5 Leaves 1-2 mm wide..... M. thurberi
 5 At least some leaves over 2 mm wide
 6 Callus hairs as long or longer than the lemma; awn of lemma 2-8 mm long..... M. andina
 6 Callus hairs much shorter than the lemmas; lemmas awnless or awn-tipped
 7 Internodes dull, puberulent; ligules to 0.6 mm long; anthers 0.8-1.5 mm long; lemma pilose at the base and margins..... M. glomerata
 7 Internodes polished, except near apex; ligules 0.6-1.5 mm long; anthers 0.4-0.8 mm long; lemmas pilose at the base only..... M. racemosa

Muhlenbergia andina (Nutt.) A. S. Hitchc. Foxtail m. The only records seen are from a roadside just w. of Flaming Gorge Dam (A. Shippee sn) and along the Green River at Dinosaur National Monument (Neese 12367); July-Sept.

Muhlenbergia asperifolia (Nees & Mey.) Parodi Scratchgrass, alkali m. Widespread; most often in moist or ephemerally moist alkaline soil of low elevations in the Basin, heavily grazed pastures, margins of

ponds, along ditches and streams, and waste places, extending up the drainages of the Tavaputs Plateau to about 7,000 ft; June-Sept.

Muhlenbergia filiformis (Thurb.) Rydb. Pull-up m. Strawberry Valley and the Uinta Mts.; wet meadows, bogs, streamsides, and other wet places, occasionally in rather dry conifer woods or sagebrush-grass communities; (5,300) 7,500-10,500 ft; June-Aug.

Muhlenbergia glomerata (Willd.) Trin. The 1 record seen (Goodrich 15196) is from a sphagnum bog in Whiterocks Canyon, Uinta Mts.; 7,360 ft; July-Sept. Similar to and perhaps not distinct from M. racemosa, but our plants differ as listed in the key and are found in wet, indigenous communities rather than on dry often disturbed ground as is typical for M. racemosa.

Muhlenbergia pungens Thurb. in Gray Sandhill m. Two specimens at RM (Dorn 3865, T9N R102W S15; Nielson 96, Cold Springs Mt., near Browns Park, 7,000 ft) are from the nw. corner of Moffat Co.; sandy places.

Muhlenbergia racemosa (Michx.) B.S.P. Creeping m., green m. Two records seen (Goodrich 2024, 20843) from a dry rocky slopes in the N. Fork Duchesne and Wolf Creek Canyons, N. Holmgren et al. 467 DINO! is from Echo Park, Dinosaur National Monument; 7,160-7,500 ft; July-Sept.

Muhlenbergia richardsonis (Trin.) Rydb. Mat m. [M. squarrosa (Trin.) Rydb.] Occasional or locally common; widespread; sagebrush, cottonwood, and moist to dry meadow communities, often along roads and in other disturbed places where the soil has been compacted; 5,800-9,500 ft; July-Sept.

Muhlenbergia thurberi Rydb. Thurber m. (M. curtifolia Scribn.) One specimen seen (V. Swain sn UTC) is from top of Willam Creek (Willow Creek?) Uintah Co.; dry soil; another specimen (Holmgren et al. 441 DINO!) is from Echo Park, Dinosaur National Monument; July-Sept.

Munroa Torr.

Munroa squarrosa (Nutt.) Torr. False buffalograss. Plants low, sprawling annuals; culms seldom over 20 cm long, leafless and often stolonlike except with tufts of leaves toward the apex, the tufts of leaves subtending or partly concealing the inflorescence; leaf sheaths ciliate near the collar; ligules a fringe of hairs, not over 1 mm long; leaf blades flat or rolled, 1-3 (4) cm long, not over 3 mm wide; panicles much reduced and often partly concealed in tufts of leaves, with 2-4 spikelets; spikelets 6-8 mm long, with 3-5 florets; glumes about 3-4 mm long; lemmas 3-5 mm long, 3-nerved, the central nerve prolonged into a short awn 0.5-2 mm long. The 3 records seen are from near Duchesne and Ashalt Ridge; desert shrub and pinyon-juniper communities, and roadsides; 5,100-5,800 ft. Sept. Apparently not well adapted to the cold climate of the Uinta Basin.

Oryzopsis Michx. Ricegrass

Caespitose perennial plants without rhizomes; leaf sheaths open; ligules membranous; auricles lacking; inflorescence an open or contracted panicle; spikelets with 1 floret, disarticulating above the glumes; glumes equal to or a little shorter than the lemma; lemmas often plump, rather firm, the callus sometimes bearded, awned from the tip, the awn straight or bent, readily deciduous.

- 1 Lemmas 2.7-5.5 mm long; awns 7-18 mm long; rare sterile hybrids involving O. hymenoides and species of Stipa..... see O. hymenoides
- 1 Lemmas either less than 2.7 mm long or else the awns less than 7 mm long
 - 2 Panicle narrow, erect, racemose, the branches seldom over 2 cm long
 - 3 Some leaves flat, mostly (3) 5-9 mm wide; lemmas 5-7 mm long; glumes 5-8 mm long... O. asperifolia
 - 3 Leaves rolled, less than 3 mm wide; lemmas 3-5 mm long; glumes 3-6 mm long..... O. exigua
 - 2 Panicles open at maturity with some branches usually over 2 cm long
 - 4 Spikelets 6-8 mm long excluding the awn; hairs of lemmas about equal or longer than the body; ligules 3-8 mm long..... O. hymenoides
 - 4 Spikelets 2-4 mm long excluding the awn; lemmas glabrous; ligules 0.2-2 mm long..... O. micrantha

Oryzopsis asperifolia Michx. Roughleaf r. The several records seen are from moist woods of the s. slope and e. end of the Uinta Mts., and from Eagle Creek of the n. slope; 7,400-9,000 ft; July-Sept.

Oryzopsis exigua Thurb. Little r. Sporadic across the Uinta Mts.; mostly with lodgepole pine and ponderosa pine, rather common in the recent, large burn in Rock Creek; 8,300-8,960 ft; July-Aug.

Oryzopsis hymenoides (R. & S.) Ricker Indian r. Common to abundant; widespread; mt. brush, sagebrush, pinyon-juniper, ponderosa pine, and desert shrub communities, increasing rapidly and becoming abundant in burned and chained areas of the pinyon-juniper zone; 4,700-10,000 ft; June-Sept. Indian ricegrass rarely crosses with species of Stipa. The hybrids are referable to X Stiporyzopsis bloomeri (Boland.) Johnson. The 1 specimen seen (Goodrich 6641) is from Reservation Ridge, Tavaputs Plateau, cutover Douglas-fir stand.

Oryzopsis micrantha (Trin. & Rupr.) Thurb. Littleseed r. Most common on the Tavaputs Plateau where occasional to locally frequent on alluvial soils of the canyon bottoms in partial shade of tall shrubs or in rocky places, a few specimens also seen from widely scattered stations across the Uinta Mts. to Blue Mt. and near Browns Park, most of these from rocky places; 6,500-9,100 ft; June-Aug.

Panicum L. Panic Grass

Annuals or perennials; leaf sheaths open; ligules a ring of hairs; auricles lacking; inflorescence a compact to open panicle; spikelets dorsiventrally compressed to terete, disarticulating below the glumes, with 2 florets, the lower floret staminate or much reduced and sterile, much like the second glume; fertile lemma usually hardened, often shiny and smooth, the margins rolled around the edges of the hardened palea, dorsiventrally compressed, awnless.

- 1 Second glume and sterile lemma short pilose all over; basal leaves forming a winter rosette..... P. acuminatum
- 1 Second glume and sterile lemma glabrous except sometimes on the nerves apically; basal leaves similar to the culm leaves, not forming a winter rosette
- 2 Spikelets 4-6 mm long; panicle branches ascending, the panicle usually over twice as long as broad.. P. miliaceum
- 2 Spikelets less than 4 mm long; panicle branches widely spreading; the panicle mostly less than twice as long as wide..... P. capillare

Panicum acuminatum Swartz (P. hauchuacea Ashe; P. lanuginosum Ell.; P. tennesseense Ashe; Dichantheium acuminatum (Swartz) Gould & Clark; D. lanuginosum (Elliott) Gould] The 2 specimens seen are from near Whiterocks (Neese & Goodrich 8188) and Echo Park on the Green River (N. Holmgren et al. 473 DINO!); riparian communities; 5,100-5,770 ft; July-Sept. Holmgren (1962) referred the latter specimen to P. scribnerianum Nash (P. oligosanthos Schult.).

Panicum capillare L. Old witchgrass. Weedy, gardens, fields, ditchbanks, roadsides, and waste places; not expected over 7,000 ft; July-Sept.

Panicum miliaceum L. Broom corn millet, hog millet. Infrequently cultivated in our area and sometimes spontaneous for a season or two after cultivation in gardens and fields, but apparently not persisting; July-Sept.

Phalaris L. Canarygrass

Phalaris arundinacea L. Reed c. Perennial plants with robust rhizomes, 50-130 (200) cm tall; leaf sheaths open or closed near the base; ligules membranous, 2-5 (10) mm long; leaf blades flat, 5-15 (25) mm wide; panicles 5-25 (30) cm long, narrow, densely flowered, rather spikelike, the short branches appressed; spikelets appearing as if with a single floret, but with 2 inconspicuous florets (about 1 mm long) that are reduced to sterile lemmas, which are often appressed to the base of the fertile floret where they appear as pubescent lines; glumes 3.5-7.5 mm long; lemmas of fertile floret 3-4 mm long, hard and with a shining, varnishlike surface, glabrous or scattered pubescent on the back to rather densely ciliate along the margins and especially toward the tip; paleas mostly enclosed in the lemma, but sometimes partly exposed, similar to the lemmas in pubescence. Occasional, abundant along ditches; widespread; along streams, ditches, and other wet places; from low elevations up to about 10,000 ft; June-Aug.

Phleum L. Timothy

Perennial plants; leaf sheaths open, the blades flat; ligules membranous; auricles minute or lacking; inflorescence a spikelike, cylindrical or ellipsoid panicle in which the branches are not visible without both teasing the panicle apart and magnification; spikelets with 1 floret, disarticulating above the glumes; glumes equal or nearly so, longer than the lemmas, prominently keeled, the keel prolonged into a short awn-point and beset on the back with stiff ciliate hairs, the hairs about equal to the width of the glumes.

- 1 Panicles seldom over 4 cm long, often 1 cm wide or wider; awns of the glumes (1.2) 1.5-3.2 mm long, the terminal ones often noticeably exerted from the panicle; culms mostly less than 50 cm tall, not bulbous at the base; plants mostly growing above 8,000 ft..... P. alpinum
- 1 Panicles mostly over 4 cm long, usually less than 1 cm wide; awns of the glumes (0.6) 1-1.6 mm long, the terminal ones not noticeably exerted from the panicle; culms often over 50 cm tall, usually bulbous at the base; plants most common below 8,000 ft..... P. pratense

Phleum alpinum L. Alpine t. Occasional to common on the Uinta Mountain and Strawberry Valley, apparently rare or absent over much of the Tavaputs Plateau; meadows, woods, along streams, and above timberline; 7,500-11,500 ft; June-Aug.

Phleum pratense L. Timothy. Introduced from Europe, used in seeding pastures and as a hay crop, escaping and persisting in moist places; 4,700-9,000 ft; June-Sept.

Phragmites Trin. Reed

Phragmites australis (Cav.) Trin. ex Steud. Common r. (P. communis Trin.) Stout perennial plants 2-3 m tall with large creeping rhizomes to 5 m long and to over 1 cm thick; leaf sheaths open; ligules

membranous, 1-3 mm long, short ciliate at apex; leaf blades 1-4 cm wide, flat; panicle 15-40 cm long, plumelike from the long silky hairs of the rachillas; spikelets 10-15 mm long, disarticulating above the glumes, usually 3-6 flowered; first glume 3-7 mm long, the second glume 6-10 mm long; lemmas 8-15 mm long, tapering to an awnlike apex. Widespread; locally common to dominant; water courses, marsh lands, margins of ponds and lakes, and other wet places; not expected over 7,000 ft; July-Oct.

Poa L. Bluegrass

Annual or perennial plants; culms arising singly or few together from rhizomes or densely tufted from fibrous roots; leaf sheaths open for at least half their length, the blades usually folded and keeled with a prowlike tip, or flat to tightly rolled; ligules membranous; auricles lacking; inflorescence an open to contracted panicle; spikelets compressed to terete, small, rarely over 10 mm long, (1) 2-15 flowered, disarticulating above the glumes; glumes shorter than the lowest floret; lemmas keeled or rounded, awnless. This is a perplexing if not an exasperating genus. It is comprised of numerous species that are distinguished by minor variations. Compressed and keeled as opposed to rounded lemmas and degree of pubescence of lemmas are used as critical criteria. These criteria require experience and a good magnifying lens. Immediate results should not be expected with the first few attempts at species separation. See Cronquist and others (1977) and Arnow and others (1980) for further discussions of problems in this genus. Poa arida Vasey and P. glaucifolia Scribn. & Williams have been indicated for our area, but these are plants from far to the e.

- 1 Plants bulbous at the base; florets often converted into bulblets with awned tips; bulblets subtended by awned bracts..... P. bulbosa
- 1 Plants not bulbous at the base; florets not converted into bulblets, awnless
 - 2 Plants low spreading annuals, may appear to be perennials when growing in tufts; panicle open, the branches 1 or 2 at a node, 1-2 (3) cm long, spreading at maturity or even reflexed; lemmas pubescent on keel and marginal nerves; habitat often roadsides, around watering places for livestock or other moist places where the soil has been disturbed..... P. annua
 - 2 Plants perennial, not as above in all other features
 - 3 Spikelets rounded or little (rarely strongly) compressed, narrow, 7-10.5 mm long; glumes not keeled; lemmas rounded on the back, not keeled or scarcely so, glabrous or puberulent; rachilla internodes 0.6-1.9 mm long; anthers 1-4.2 mm long; bunchgrasses without rhizomes (an extremely variable complex)..... P. secunda
 - 3 Spikelets compressed or sometimes subterete in P. arctica (a rhizomatous species), commonly less than 6 mm long or else plants commonly rhizomatous; glumes keeled; lemmas keeled, glabrous or often pilose or even with a tuft of cobwebby hairs at the base; rachilla internodes mostly less than 0.6 mm long; anthers mostly less than 1 mm long; rhizomes various or lacking
 - 4 Rhizomes present
 - 5 Panicle narrow, the branches appressed, erect or somewhat spreading at anthesis
 - 6 Plants unisexual, bunchgrass with long-lived bases; some spikelets usually 6-8 (10) mm long; panicles more or less shiny..... P. fendleriana
 - 6 Plants bisexual, culms arising singly or few together; spikelets mostly less than 6 mm long; panicles not especially shiny
 - 7 Culms strongly flattened, 2-edged, sometimes slightly winged on the edges; lemmas usually sparsely if at all webbed, usually bronze-tipped, 2-3 mm long, firm and nearly coriaceous; plants rather uncommon in our area; panicle remaining narrow at maturity..... P. compressa
 - 7 Culms terete, not winged; lemmas copiously webbed at the base with long tangled hairs, 2.5-4 mm long, not firm nor coriaceous; plants common in our area; panicle spreading at maturity..... P. pratensis
 - 5 Panicle open at maturity, most of the branches spreading
 - 8 Lemmas glabrous to pilose on marginal nerves and keel, lacking a tuft of cobwebby hairs at the base, or if web weakly developed then plants likely hybrids; florets pistillate or bisexual; spikelets 4-10 (11) mm long; lemmas 4-6 mm long (P. curta also keyed here).... P. nervosa
 - 8 Lemmas either with a tuft of cobwebby hairs at base or pubescent over the back as well as on the keel and marginal nerves; florets bisexual; spikelets 3-7 (8) mm long; lemmas 2.5-5 (6) mm long
 - 9 Lemmas copiously cobwebby at the base, glabrous above or nearly so except on keel and marginal nerves; lower panicle branches (2) 4-5 (9) per node; first glume 2-3 mm long; ligules 1-2 mm long or to 3 mm on upper culm leaves; plants mostly growing below 9,500 ft..... P. pratensis
 - 9 Lemmas scantily if at all cobwebby at base, pubescent on midnerves and internerves as well as on the keel and marginal nerves; lower branches of the panicle (1) 2 (4) per node; first glume 2.5-5 mm long; ligules 1-4 mm long; plants mostly growing above 9,500 ft..... P. arctica
 - 4 Plants without rhizomes

POACEAE

- 10 Panicles 2-6 (9) cm high, about as broad as high; spikelets about 4-7 mm long, about 1/2 as broad as long; lemmas sparsely to densely white-hairy on the keel and marginal nerves and usually sparsely hairy between the nerves; blades of leaves 2-6 cm long, flat for nearly the entire length, those of the culm 2-6 mm wide; plants mostly 5-20 (30) cm tall, in upper conifer zone and above timberline..... P. alpina
- 10 Plants not as above in all respects
 - 11 Panicle open, the branches spreading to reflexed; lemmas mostly with a tuft of cobwebby hairs at the base
 - 12 Lower panicle branches 1-2 per node, often reflexed at maturity, bearing spikelets on the outer 1/2; leaf sheaths closed about 1/2 their length; anthers mostly less than 1 mm long (P. reflexa also keyed here)..... P. leptocoma
 - 12 Lower panicle branches mostly more than 2 per node, seldom reflexed, bearing spikelets for over 1/2 their length; leaf sheaths closed about 1/4 their length; anthers usually 1 mm long or longer
 - 13 Ligules of upper stem leaves acute to obtuse, 2-6 mm long; lemmas ultimately bronze-tipped and mostly firm at the obtuse or occasionally acutish apex; panicles (7) 10-25 cm long usually, drooping; plants mostly 15-130 cm tall, growing in wet or mesic sites up to about 9,000 ft..... P. palustris
 - 13 Ligules of upper stem leaves obtuse to truncate, 0.5-2 mm long; lemmas mostly purple-tipped, sometimes bronze-tipped but then distinctly membranous-margined at the mostly acute apex; panicles 4-10 (17) cm long; plants usually less than 40 cm tall, growing on dry or mesic sites, often above 8,500 ft..... P. glauca
 - 11 Panicle contracted, the branches short, not spreading, not reflexed; lemmas without a tuft of cobwebby hairs at the base
 - 14 Spikelets all pistillate, rarely all staminate, 4-12 mm long; plants (10) 15-50 (70) cm tall; panicle often pale (a variable complex)..... P. fendleriana
 - 14 Spikelets bisexual, 2-7 mm long; plants 2-25 (50) cm tall; panicle often purplish from the purple-tipped lemmas
 - 15 Lemmas glabrous; plants 2-7 (12) cm tall, growing well above timberline; panicles 0.7-2 (3) cm long, densely flowered..... P. lettermanii
 - 15 Lemmas pubescent, sometimes scarcely so; plants 5-25 cm tall or taller, of moderate to high elevations; panicles 1-9 cm long, loosely to densely flowered
 - 16 Lemmas 2-3.5 mm long; lower leaf blades 1-5 cm long; second glumes averaging less than 3.5 mm long..... P. glauca
 - 16 Some lemmas usually over 3.5 mm long; at least some lower leaf blades usually over 5 cm long; second glumes averaging more than 3.5 mm long..... P. pattersonii

Poa alpina L. Alpine b. Occasional to common; Uinta Mts.; meadows, open woods and above timberline; (9,000) 10,000-13,000 ft; July-Aug.

Poa annua L. Annual b. Occasional; widespread; moist places, along streams, around livestock watering places, roadsides and other areas where the soil has been disturbed; up to about 9,000 ft; June-Sept.

Poa arctica R. Br. Arctic b. (P. grayana Vasey) Occasional; Uinta Mts. and W. Tavaputs Plateau, mostly on exposed ridges or slopes; (8,400) 10,000-13,000 ft; July-Aug.

Poa bulbosa L. Bulbous b. Introduced from Europe, occasional to locally abundant on disturbed soil, sagebrush, pinyon-juniper, ponderosa pine, and aspen-Douglas-fir communities; 7,000-8,100 ft; May-July. Both normal and modified bulblet type florets may occur in the same panicle, or entire panicles often consist of just 1 type of floret.

Poa compressa L. Canada b. Occasional; apparently widespread; usually in moist places in meadows or along water courses, but occasionally in places as dry as sagebrush and ponderosa pine communities; 7,200-8,820 ft; June-Aug.

Poa fendleriana (Steud.) Vasey Muttongrass. (P. longiligula Scribn. & Williams) Widespread; common; sagebrush-grass, pinyon-juniper, mt. brush, and ponderosa pine communities, and above timberline; May-July depending upon elevation. Of the many specimens examined from our area, all are pistillate but 1. The staminate specimen is from a population that has rhizomes up to 10 cm long. The presence of rhizomes and anthers may reflect influence of a rhizomatous member of the genus (Cronquist and others 1977). Arnow and others (1980) have combined P. epilis Scribn. and P. cusickii Vasey with P. fendleriana. We see merit in this concept, for not only are plants of these taxa morphologically alike, but they are sexually alike in having all pistillate florets. Although strong ecological differences are seen in the group, the differences are not conclusive. Separation of these taxa would seem more reasonable at the varietal level, but no new combinations are intended here. They have been separated by criteria given the following key. Most of the specimens seen from our area can be separated by the key, but in the examination of numerous specimens a continuum was found, and separation of troublesome specimens probably serves more to waste time than to provide valuable information.

- 1 Lemmas glabrous on the back
 - 2 Leaves tightly rolled; specimens seen are from ridges and meadows above timberline of the Uinta Mts. P. cusickii

- 2 Leaves folded or flat; specimens seen are generally from more protected habitats and slightly lower elevations but sometimes growing side by side with plants of the above taxon..... P. epilis
- 1 Lemmas pubescent on the keel and marginal nerves at least below; plants from a wide range of habitats and elevations including above timberline, some specimens collected side by side with those of the above taxa..... P. fendleriana

Poa glauca Vahl Inland b. [P. interior Rydb.; P. nemoralis L. var. interior (Rydb.) Butt. & Abbe; P. rupicola Nash] Occasional to common; Uinta Mts. and W. Tavaputs Plateau; Vasey sagebrush, aspen subalpine meadow, and alpine tundra communities, and open conifer woods and talus slopes; about 8,000 ft to well above timberline; June-Sept. With 2 more or less distinct phases in our area that have been separated as follows:

- 1 Lemmas scantily webbed at the base; plants 20-50 (70) cm tall, mostly below timberline; panicles 4-15 cm long, with spreading-ascending branches..... P. interior
- 1 Lemmas not webbed but villous at the base; plants 5-25 (35) cm tall, mostly near or above timberline; panicles 1-5 (7) cm long, with ascending or appressed branches..... P. rupicola

At what point the lemmas cease to be webbed and begin to be villous is highly interpretive, and the plants of the complex intergrade in all other features. We follow Arnow and others (1980) in reducing these taxa to synonymy under the circumboreal P. glauca, which shows the same range of variation in Eurasia as in America. The complex is further complicated by large specimens approaching those of P. palustris.

Poa leptocoma Trin. Bog b., nodding b. Occasional; specimens seen are from the Uinta Mts.; open aspen and conifer woods, meadows and above timberline; 9,000-12,000 ft; June-Aug. Poa reflexa Vasey & Scribn. is separated from P. leptocoma by the following key:

- 1 First glume tapered to a finely acute, nearly awnlike tip; lemmas 3-5 mm long, glabrous between keel and marginal nerves; palea glabrous or scabrous to ciliate on the keels with minute, stiff hairs; spikelets 4-7.5 mm long..... P. leptocoma
- 1 First glume usually abruptly acute at the tip; lemmas 2.2-3 (3.5) mm long, at least some of them sparsely hairy between keel and marginal nerves; palea ciliate with soft, crinkled hairs on the keels, sometimes minutely so; spikelets 3-4 (5) mm long..... P. reflexa

Holmgren and Holmgren (in Cronquist and others 1977) suggested that it may be more realistic to recognize these at the varietal level, and the combination P. leptocoma var. reflexa (Vasey & Scribn.) Jones is available. The two are sympatric on the Uinta Mts.

Poa lettermanii Vasey Seldom collected; rocky places above timberline on the Uinta Mts.; records seen are all from above 12,000 ft, most of which are from near the head of the Uinta Drainage; Aug.

Poa nervosa (Hook.) Vasey Wheeler b. Many specimens from our area do not yield to traditional criteria given for separation of P. nervosa and P. curta Rydb. (shortleaf b.), and considerable disagreement among various authors on descriptions of these taxa has been found while preparing this treatment. Arnow (in preparation) has kept the 2 separate. The following key is adapted from her work:

- 1 Panicle internodes elongate, the lower most generally averaging at least 3 cm long, at flowering most of the branches horizontally spreading to deflexed; sheaths glabrous or scabridulous, not distinctly hairy; florets pistillate or bisexual..... P. curta
- 1 Panicle internodes variable, the lowermost usually averaging less than 3 cm long, the branches ascending to spreading but not reflexed; sheaths (sometimes only the upper) retrorsely hairy; florets mostly pistillate..... P. nervosa

By using these features listed by Arnow, our plants are quite reasonably separated, and plants with features of P. curta are occasionally found from the Rock Creek drainage and w. to Strawberry Valley; forb-grass-sedge-meadow, tall forb, aspen, and spruce communities; 7,500-10,500 ft; June-Aug. Plants with features of P. nervosa are common, widespread from Strawberry Valley and across the Uinta Mts. (no specimens seen from the Tavaputs Plateau); aspen, lodgepole pine, Engelmann spruce, and less often tall forb communities; 7,500-11,200 ft; June-Sept. The distinction is not always clear as occasional specimens with short internodes have glabrous sheaths, and some populations (apparently rarely) have sheaths that vary from glabrous to pubescent. Plants (especially those of P. curta) might be confused with those of P. leptocoma and P. reflexa, but they have pistillate florets, stamens lacking or much reduced and translucent or functional and over 1 mm long; lemmas glabrous or pubescent but not webbed at the base; rhizomes often well developed. In the latter 2 taxa, plants have bisexual florets, with anthers less than 1 mm long; lemmas webbed (sometimes scantily) at the base; rhizomes lacking.

Poa palustris L. Fowl b. Occasional; Strawberry Valley and across the Uinta Mts. to be expected elsewhere; along streams and rivers; 6,400-8,000 ft; July-Aug.

Poa pattersonii Vasey Apparently rather uncommon; Uinta Mts.; upper conifer zone and above timberline; July-Aug. With rather large and strongly flattened spikelets and long-lived bases, this could pass for a small phase of P. fendleriana, but the flowers are bisexual.

Poa pratensis L. Kentucky b. Introduced from Europe, the principal species used in lawn mixtures in our temperate climate, aggressive and well established in indigenous communities at low and moderate elevations (up to about 9,000 ft), often the dominant understory plant in thick stands of rubber rabbitbrush on canyon bottoms of the Tavaputs Plateau and under aspen where grazing pressure has been heavy; May-Oct. England 786 (UI!), the basis for listing P. trivialis L. in Goodrich and others (1981), belongs here.

Poa secunda Presl Sandberg b. [P. sandbergii Vasey; P. scabrella (Thurb.) Benth.] Common to abundant; widespread; sagebrush and salt desert shrub communities, and exposed, dry sites to above timberline; April-July depending on elevation. We have followed Arnow (1981) in placing P. sandbergii in synonymy. Poa secunda seems to be the basic element of a rather large apomictic complex in which there are no boundaries, but in which the extremes are so vastly different that this is a perplexing group to work with. As many as 16 or more taxa have been described. Many of these are generally accepted in synonymy, but several have been listed in recent manuals. Intergradation in the complex is of frequent occurrence, and such a continuum is formed that separation at the species level is impractical and often serves more to waste time than for any useful purpose. Separation of taxa has largely been based on pubescence or lack of pubescence of the lemmas. Based on this character alone, 2 groups (Nevadenses & Scabrellae) with 4 species each have been separated. However, this feature is not consistent enough within the complex to provide confident separation of species let alone groups of species. Although there appears a rather strong trend for plants of dry habitats to have pubescent lemmas and those from moist or wet habitats to have glabrous lemmas, a complete range from glabrous to pubescent can be found in single populations and to a lesser degree in different spikelets of the same plant and even in different lemmas of the same spikelet. Stature of plants, length of leaves and length of ligule have also been used as means of separation, but these features also form a continuum. As noted by Hitchcock (in Hitchcock and others 1969) one of the most consistent combinations of features is that plants with open panicles have glabrous lemmas and short ligules. However, in one form or another, nearly all of the segregates intergrade into each other, and the variability in the whole complex is not any greater than found in many sexual species, and he suggested that the whole complex could appropriately be regarded as a single species. Kellogg (1985) has treated nearly all of the complex as a single species. Although we prefer a single species approach to this complex, some discussion of the so called taxa within the complex seems helpful to describing the variation. Thus, the following key, which is patterned after a traditional approach, is provided for some of the phases:

- 1 Lemmas scabrous over the back
 - 2 Panicle open, the branches spreading, divergent at anthesis; plants 2-6 dm tall, mostly of moderate to high elevations..... P. gracillima
 - 2 Panicle contracted, the branches appressed or ascending or somewhat spreading at anthesis
 - 3 Culms seldom over 30 cm tall, greatly exceeding the basal leaves; plants maintaining a distinct identity over large areas in desert shrub and black sagebrush communities, but intergrading into other taxa of the complex in more mesic communities; leaves usually rolled; inflorescence often marked with purple..... P. secunda
 - 3 Culms mostly over 30 cm tall; plants of rather mesic communities; basal leaves folded; inflorescence greenish or slightly marked with purple..... P. canbyi
- 1 Lemmas glabrous over the back
 - 4 Ligules long decurrent, often over 3 mm long..... P. nevadensis
 - 4 Ligules short, 0.5-3 mm long, not long decurrent
 - 5 Leaf blades involute, mostly less than 1.5 mm wide, greenish; plant usually in alkaline lowlands P. juncifolia
 - 5 Leaf blades flat or folded, 1.5-3.5 mm wide, often glaucous; plants growing on nonalkaline soils P. ampla

Poa ampla Merr. Big b. Mostly taller (40-120 cm) than P. secunda with more open inflorescence, larger spikelets, and shorter ligules; similar in stature to P. canbyi and intergrading into that taxon in pubescence of lemmas, but usually with more open panicles; confluent with P. gracillima in stature, open panicle, and pubescence of lemmas, and clearly allied to P. secunda and P. canbyi through this phase. Sagebrush and aspen communities in mountains; June-Aug.

Poa canbyi (Scribn.) Howell More robust than P. secunda, 30-100 cm tall, often with wider and denser panicle, and with less purple color. Intergrading in stature and other features into P. scabrella (a taxon not recognized in our area) and then in turn into P. secunda through the P. scabrella phase. Sagebrush and aspen communities in mountains; June-Aug.

Poa gracillima Vasey Slightly to considerably larger than P. secunda, and with more open panicle and less rolled leaves, similar to P. ampla (q.v.) in the open inflorescence and intergrading into that taxon in pubescence of lemmas. The spreading of the panicle is dependant to some degree on phenology, and at anthesis the panicle of even the desert form of P. secunda is spreading. Open woods and slopes at rather high elevations, often near timberline; June-Aug.

Poa juncifolia Scribn. Alkali b. Similar to P. ampla but with involute leaves, greenish not glaucous foliage, and shorter on the average, 2-7 (9) dm tall. Usually in alkaline lowlands; May-July.

Poa nevadensis Vasey Nevada b. Separated from P. secunda by glabrous lemmas and taller stature, but completely intergrading into P. secunda in these and all other features including the long decurrent ligule. Sagebrush, aspen, and moist to wet meadow communities; June-Aug.

Polypogon Desf. Beardgrass

Polypogon monspeliensis (L.) Desf. Rabbitfoot grass. Plants annual, 3-50 (80) cm tall; ligules 2-6 (10) mm long; leaf blades usually flat, 2-10 mm wide; panicle 1-10 cm long, dense and somewhat spikelet; spikelets 1-flowered; glumes about equal, 2-3 mm long, scabrous on the keel, slightly lobed and awned at the apex, the awns 4-10 mm long; lemmas about 1/2 as long as the glumes, smooth and shiny, minutely toothed at the apex, awnless or with a short awn. Locally common; widespread; moist places, often in but not confined to saline or alkaline areas; not expected much over 7,000 ft; May-Aug.

Puccinellia Parl. Alkaligrass

Plants tufted, with or without rhizomes, perennial; leaf sheaths open; ligules membranous; auricles lacking; inflorescence an open to contracted panicle; spikelets 3-9 flowered, subterete, disarticulating above the glumes; glumes usually shorter than the lowermost lemma; lemmas awnless, with 5-7 indistinct to conspicuous parallel nerves, the lateral nerves not extending through the membranous margins of the lemmas.

- 1 Plants rhizomatous, along fresh water streams; ligules 3-9 mm long; leaves flat, 4-15 mm wide; lemmas prominently nerved..... P. pauciflora
- 1 Plants without rhizomes, mostly of lowlands and canyon bottoms, occasional in seeps on hill sides, mostly in saline or alkaline places; ligules 1-3 mm long; leaves rolled or flat, 1-3 (4) mm wide; lemmas obscurely nerved
- 2 Lower panicle branches to 15 cm long, spreading but rarely reflexed at maturity; lemmas 1.8-3.5 mm long, glabrous or minutely hairy; ligules 1-3 mm long..... P. nuttalliana
- 2 Lower panicle branches rarely over 6 cm long; ascending when young, often reflexed at maturity; lemmas to 1.4-3 mm long, with minute hairs at the base, these hairs visible only with magnification; ligules 0.9-2.2 mm long..... P. distans

Puccinellia distans (L.) Parl. Weeping a. Occasional; widespread; wet or moist soil along streams or near springs or seeps, roadsides, alkaline and rarely nonalkaline meadows; 5,400-7,600 ft or up to about 8,000 ft in canyons of the Tavaputs Plateau, rarely to 8,600 ft in Uinta Mts., usually associated with saline or alkaline conditions; May-Sept. Puccinellia distans and P. nuttalliana are reported to intergrade in Colorado (Harrington 1954). Arnov and others (1980) states that it is often impossible to separate individual specimens of the 2 by means of ligules or by components of the spikelets. The shorter deflexed panicle branches of P. distans provides a more reliable means of separation, but the panicle branches are not deflexed in young plants.

Puccinellia nuttalliana (Schult.) A. S. Hitchc. Nuttall a. [P. airoides (Nutt.) Wats. & Coult. in Gray] Infrequent; apparently widespread; alkaline or saline lowlands and along streams; 5,000-6,100 ft; June-Aug. See P. distans.

Puccinellia pauciflora (Presl) Munz Weak mannagrass. [Glyceria pauciflora Presl; Torreyochloa pauciflora (Presl) Church] Apparently throughout the Uinta Mts.; rather uncommon; along streams and other wet places; not expected over 10,500 ft; June-Aug. This species is keyed with the genus Glyceria in this work because it looks like a Glyceria. The lemmas have prominent nerves as in Glyceria. It grows in Glyceria habitat rather than habitat typical of Puccinellia. It is included in Puccinellia by the open leaf sheaths, which is probably no more significant than the features by which it is aligned with Glyceria.

Redfieldia Vasey

Redfieldia flexuosa (Thurb.) Vasey Blowoutgrass, sandgrass. Plants perennial from long creeping rhizomes, 50-120 cm tall; leaf sheaths imbricate, open; ligule a fringe of hairs, about 1 mm long; leaf blades loosely rolled, 2-5 mm wide; panicle 20-50 cm long, diffuse; spikelets 5-8 mm long, with (1) 2-6 florets; glumes 2-5 mm long; lemmas 4-6 mm long, strongly keeled, 3-nerved, nerves sometimes projecting slightly beyond the lemma, the callus with silky hairs. Infrequent or locally common; Snake John Wash, Kennedy Wash, and Coyote Wash drainages in e. Uintah Co. and probably into Colorado; desert shrub, Indian ricegrass, and juniper communities, sandy soils, and in dunes; 4,900-5,700 ft; late June-Sept.

Schedonnardus Steud.

Schedonnardus paniculatus (Nutt.) Trel. Tumblegrass. Plants tufted perennials, 10-40 cm tall; leaf sheaths open; ligules membranous, 1-4 mm long; leaf blades usually folded, 1-2 mm wide; inflorescence 10-20 cm long, consisting of a few spreading or divercate branches with sessile spikelets that are borne on one side of and slightly depressed in the branches; spikelets 3-5 mm long, 1-flowered; glumes 1.5-5 mm long;

POACEAE

lemmas 3-5 mm long, awnless. This is not indicated for our area by Harrington (1954) or by Cronquist and others (1977), and the 1 record (Goodrich sn UT) from our area (roadside at the town of Tridell) could be a waif.

Schizachne Hackel

Schizachne purpurascens (Torr.) Swallen False melica. Perennial plants with loosely tufted bases; culms 30-70 cm tall; leaf sheaths closed; ligules membranous, about 1-2 mm long; leaf blades flat, 2-5 mm wide; panicle 6-17 cm long, the branches spreading, sometimes drooping, each bearing 1-3 spikelets; spikelets with 3-7 florets, about 2-3 cm long including the awns, often purplish, disarticulating above the glumes; glumes shorter than the first floret, 4-9 mm long; lemmas 8-10 (12) mm long, the callus pilose with hairs 1-2 mm long, awned from between a bifid apex as in Bromus; awns 8-15 mm long, more or less divergent. Locally infrequent or occasional; Uinta Mts. (Whiterocks Canyon, Rock Creek of the s. slope, and Eagle Creek of the n. slope); moist woods; 7,200-7,500 ft; June-Aug.

Secale L.

Secale cereale L. Winter rye. Tall annual plants, 60 to over 100 cm tall; leaf sheaths open, the blades flat, 3-10 mm wide; ligules membranous, 1-2 mm long; auricles to about 1 mm long; inflorescence a spike, 5-15 cm long, dense; spikelets mostly 2-flowered; glumes narrow in comparison to the broad lemmas, 5-12 mm long; lemmas to about 15 mm long with an awn 1-5 cm long. A cultivated cereal crop, often rather weedy in fields and on roadsides, spontaneous in some years especially on disturbed sites but not persisting for many years; mostly at low elevations but occasionally reaching maturity in montane places up to about 9,000 ft; June.

Setaria Beauv. Bristlegrass

Plants annual; leaf sheaths open, the blades flat or folded to inrolled; ligules membranous-based but with a distal fringe of hairs; auricles lacking; inflorescence a spikelike panicle in which the branches are hardly visible without teasing the inflorescence apart and then hardly visible without magnification, densely flowered, cylindric, bristly; spikelets 2-flowered, the lower floret sterile or staminate, the upper fertile, disarticulating below the glumes, but above the subtending bristles; glumes unequal, the first less than 1/2 as long as the spikelet, the second about as long as the spikelet and similar to the lower lemma. Both the glumes and the lemmas are awnless. The bristly appearance of the spikelets is a function of the bristles that subtend the spikelets or groups of spikelets.

- 1 Second glume about 1/2 as long as the spikelet; each spikelet subtended by 4-20 antrorsely scabrous bristles 3.5-9 mm long; fertile lemma strongly cross wrinkled at maturity; sheaths galbrous... S. glauca
- 1 Second glume as long or nearly so as the spikelet, appearing like an empty lemma, each spikelet subtended by 1-4 bristles; fertile lemmas smooth to obscurely wrinkled; sheaths ciliate toward the summit
- 2 Bristles 2-6 mm long, 1 (2) subtending each spikelet, retrorsely scabrous; panicle branches usually conspicuously whorled..... S. verticillata
- 2 Bristles (4) 5-11 mm long, 1-3 (4) subtending each spikelet, antrorsely scabrous; panicle branches not conspicuously whorled..... S. viridis

Setaria glauca (L.) Beauv. Yellow b. Introduced from Europe, more or less weedy; the 1 specimen seen (Neese & Nelson 15032) is from a garden at Vernal; Aug.

Setaria verticillata (L.) Beauv. Bur b. Weedy in gardens, fields, ditchbanks, roadsides, and other waste places; not expected over 7,000 ft; July-Sept.

Setaria viridis (L.) Beauv. Green b. Weedy in gardens, fields, ditchbanks, roadsides, and waste places; not expected over 7,000 ft; July-Sept.

Sitanion Raf. Squirreltail

Sitanion hystrix (Nutt.) J. G. Smith Squirreltail. [S. longifolium J. G. Smith; Elymus elymoides (Raf.) Swezey] Tufted perennial plants without rhizomes, 10-50 cm tall; leaf sheaths open, the blades flat or rolled, 1-3 (5) mm wide, often strongly nerved; ligules membranous, less than 1 mm long; auricles lacking to well developed; inflorescence a densely flowered spike, 4-10 cm long, bristly from the long divergent awns of glumes and lemmas; spikelets 2 per node of the rachis, 1-6 flowered, those at the base of the spike often reduced to glumelike structures, disarticulating at each node of the rachis; glumes awnlike their whole length, 5-9 cm long; lemmas 7-10 mm long, with divergent awns about as long as those of the glumes. Common on a variety of dry sites over a wide elevational range from salt desert shrub communities to above timberline; May-Oct. Sometimes hybridizing with species of Agropyron and Elymus. See Elymus salina. Sitanion jubatum J. G. Smith has been indicated for the Intermountain area, but apparently this is generally restricted to California (Wilson 1963).

Sorghum Moench

Sorghum bicolor (L.) Moench Sorghum. (S. vulgare Pers.) Robust annuals, 1-2 (3) m tall; leaves glabrous, the blades 1-4 (5) cm wide; ligules 1.5-5.5 mm long, membranous below, fringed distally; panicles 10-25 (35) cm long, dense; spikelets 3-6 (9) mm long, awnless, shiny, conspicuously pubescent. Introduced from Eurasia, cultivated primarily for silage as is corn, rarely escaping, probably not persisting in the cold climate of the Uinta Basin.

Spartina Schreb. Cordgrass

Perennials from robust scaly rhizomes; leaf blades flat but rolled in age, firm, tough; sheaths open; ligule a ring of hairs; inflorescence a racemose panicle with 2-many spicate branches; spikelets densely crowded on one side of the comblike branches, sessile, in 2 rows, 1-flowered, disarticulating below the glumes.

- 1 Second glume awned, the awn 1-7 mm long, conspicuously exceeding the lemmas; spicate branches 4-15 cm long; plants (0.7) 1-1.3 m tall; leaf blades 6-11 mm wide; ligules 1-3 mm long..... S. pectinata
 1 Second glume awnless or mucronate, the mucro to 0.5 mm long, not conspicuously exceeding the lemmas; spicate branches 2-5 (7) cm long; plants 0.3-0.7 (1) m tall; leaf blades 2.5-5 (8) mm wide; ligules 0.5-1.5 mm long..... S. gracilis

Spartina gracilis Trin. Alkali c. The 4 specimens seen are from 10 mi sw. of Bonanza, along the White River and from Kolb Camp and Browns Park along the Green River; sandy soil; 5,400-5,600 ft; June-Aug.

Spartina pectinata Link Prairie c. Occasional to locally common at isolated places along the Green and Yampa Rivers up stream from Jensen; June-Sept.

Sphenopholis Scribn. Wedgegrass; Wedgescale

Sphenopholis obtusata (Michx.) Scribn. Prairie w. Plants annual or short-lived perennial, 20-90 cm tall, rarely taller; leaf sheaths open, the blades flat, 1.5-8 (12) mm wide; panicle 3-20 cm long, dense and spikelike or open; spikelets 1.5-5 mm long, 2-flowered, disarticulating below the glumes and falling as a unit; glumes 1-3 (4) mm long, the first linear, the second widest near the tip, much wider than the first; lemmas 2-3 (4.4) mm long, awnless. Occasional; the few specimens seen are from Altamont to Tridell; pastures and riparian and wet meadow communities and along ditches; 5,400-6,000 ft; July- Sept.

Sporobolus R. Br. Dropseed

Plants tufted perennials; leaf sheaths open, often ciliate on margins near summit; ligule a ring of hairs or short ciliate membrane; auricles lacking; inflorescence an open to congested panicle, sometimes enveloped in the uppermost leaf sheaths; spikelets 1-flowered, disarticulating above or below the glumes; glumes thin, translucent, mostly shorter than the lemma; lemma awnless; fruit hard, rounded, small, falling from the floret at maturity.

- 1 Spikelets 4-6 mm long; anthers 1.5-2.5 mm long; plants rare..... S. asper
 1 Spikelets 1.5-2.5 mm long; anthers 0.4-1.5 mm long; plants various
 2 Panicle open and diffuse, the longer branches to over 10 cm long; leaf sheaths ciliate pilose only on the margin near the collar, the collar glabrous; ventral surface of leaf blades often with a row of pilose hairs to 5 mm long just above the ligule..... S. airoides
 2 Panicles contracted or often included in the upper leaf sheath for the entire length, the branches if spreading mostly less than 5 cm long; leaf sheaths ciliate pilose well below the collar, the collar long pilose well around to the opposite side of the culm from the sheath margins; ventral surface without a row of pilose hairs as above
 3 Panicle branches spreading if not confined within the upper sheath..... S. cryptandrus
 3 Panicle strongly contracted, densely flowered, nearly cylindrical, the branches appressed even when exerted from the upper leaf sheath..... S. contractus

Sporobolus airoides (Torr.) Torr. Alkali sacaton. Locally abundant; widespread; alkaline or saline bottom lands such as on the flood plains of the major drainages, occasional at alkaline seeps in canyons of the Tavaputs Plateau; 4,700-6,000 (7,000) ft; June-Oct.

Sporobolus asper (Michx.) Kunth Tall d. Known from near the Green River about 4 mi se. of Dinosaur Quarry; juniper-snakeweed community; 4,900 ft; Sept. (Neese & Trent 12319). The panicle is contracted even when exerted from the upper sheath as in S. contractus from which it differs by the features of the key and by glabrous sheaths.

Sporobolus contractus A. S. Hitchc. Spike d. Two specimens seen (Welsh 380 from the e. side of Split Mt. Gorge, Dinosaur National Monument, and England 1054 from Browns Park); atriplex-ricegrass community, alluvial and sandy soils; 5,000-5,800 ft; June-Sept.

Sporobolus cryptandrus (Torr.) Gray Sand d. Occasional to abundant; widespread; usually on sandy ground, sagebrush and desert shrub communities, and along roads; 4,700-7,200 ft; June-Sept.

Stipa L. Needlegrass

Tufted perennial plants without rhizomes; leaf sheaths open; ligules membranous; auricles lacking; inflorescence an open or contracted panicle; spikelets 1-flowered, the floret terete and hardened at maturity, disarticulating above the glumes; glumes exceeding the body of the lemma; lemma awned from the tip, usually with overlapping margins, usually pubescent at least at the base, the callus well developed and pubescent with hairs usually longer than those of the body; awns often bent, the lowest segment often twisted.

- 1 Awns deciduous, 7-18 mm long; lemmas sometimes rather plump; rare sterile hybrids involving Oryzopsis hymenoides and species of Stipa..... See O. hymenoides
- 1 Awns persistent, over 12 mm long; lemmas not plump
 - 2 Awns 6-18 (24) cm long; glumes 15-20 (40) mm long..... S. comata
 - 2 Awns less than 5 cm long; glumes less than 15 mm long
 - 3 Palea glabrous, less than 1/2 as long as the lemma; florets plumb, 5-6 times longer than wide; leaf sheaths usually villous at the throat; plants sparingly introduced..... S. viridula
 - 3 Palea pubescent; florets nearly linear, usually over 6 times longer than wide; leaf sheaths glabrous or sparsely villous at the throat; plants native
 - 4 Lemma densely villous, the whitish hairs 1-4 mm long..... S. pinetorum
 - 4 Lemma not densely villous, the hairs not over 2 mm long
 - 5 Palea at least 2/3 as long as the lemma; awns of lemmas (10) 15-22 (25) mm long; callus blunt, pubescent except at the base; leaf blades involute, 1-1.5 mm wide..... S. lettermanii
 - 5 Palea about 1/2 as long as the lemma; awns of lemmas 20-30 (50) mm long; callus sharp pointed with a curved glabrous base; leaf blades rolled or flat, sometimes over 2 mm wide..
..... S. nelsonii

Stipa comata Trin. & Rupr. Needle-and-thread grass. With 2 intergrading varieties.

- 1 Terminal segments of the awn flexuous, usually over 5 cm long; lower branches of the panicle usually partly included in the sheath..... var. comata
- 1 Terminal segments of the awn nearly straight, rather firm, usually less than 5 cm long; panicle usually exerted from the sheath..... var. intermedia

Var. comata Common to abundant; widespread; desert shrub, black sagebrush, Wyoming sagebrush, pinyon-juniper, and occasionally mt. big sagebrush communities; 4,800-7,200 ft; May-June.

Var. intermedia Scribn. & Tweedy Common; widespread; mt. big sagebrush, aspen-sagebrush, and ponderosa pine communities; 7,000-10,000 ft; June-Aug.

Stipa lettermanii Vasey Letterman n. Occasional to common; widespread; sagebrush, dry meadow, and alpine communities, openings in aspen and conifer woods, dry ridges and rimrock; 8,000-11,500 ft; June-Oct. Usually conspicuously distinct from S. nelsonii ssp. nelsonii, but much like and possibly intergrading into S. nelsonii ssp. dorei. The length of the awns is the most obvious difference. However, this feature is only useful at the extremes. The shape of the callus provides a consistent difference, but this feature requires considerable experience and frequent review. The most reliable feature, offering the greatest contrast, is the length of the palea. Unfortunately, observation of this feature requires teasing the hardened lemma apart while viewing the parts under a dissecting scope.

Stipa nelsonii Scribn. Subalpine n., Nelson n. (S. williamsii Scribn.; S. columbiana Macoun misapplied) Common to abundant; a variety of montane plant communities, possibly attaining the greatest abundance in aspen communities and on open slopes, occasionally to near timberline; 6,500-10,500 ft; June-Aug. Plants of this taxon have long been known as S. columbiana but the Holotype of S. columbiana belongs with S. lemmonii (Vasey) Scribn. a plant not known from our area. Two ssp. have been recognized for our area.

- 1 Awns mostly less than 20-30 mm long; culms mainly 30-60 cm tall; panicles often conspicuously tinged with purple; plants widespread, but probably more common on the Uinta Mts. than on the Tavaputs Plateau ssp. dorei Barkworth & Maze
- 1 Awns 21-41 mm long; culms up to 150 cm tall; panicles not or faintly tinged with purple; plants widespread but probably more common on the Tavaputs Plateau than on the Uinta Mts..... ssp. nelsonii

Stipa pinetorum Jones Pine n. The few specimens seen are from the W. Tavaputs Plateau and from Bear Top Mt., Daggett Co.; sagebrush and pinyon-juniper-mt. brush communities and shale barrens; 7,600-8,820 ft; July-Aug.

Stipa viridula Trin. Green n. Used in experimental seedings on lands disturbed in oil shale development; June-Aug. Bradley reported Harrington 176 for Blue Mt., 8,000 ft, and indicated that specimen

to be at FC (CS). This specimen was not found there in 1985, but Boyd 176, from the same location and elevation, was. This specimen belongs to S. nelsonii.

Trisetum Pers. Trisetum

Plants tufted perennials; leaf sheaths open; ligule membranous; auricles lacking; inflorescence an open or spikelike panicle; spikelets 2 (3-5) flowered, disarticulating above (occasionally below) the glumes; rachillas long-hairy; glumes shorter or longer than the lowest floret; lemmas awnless or awned from the back above mid-length, the callus glabrous to short-hairy.

- 1 Lemmas with awns 3-7 mm long..... T. spicatum
 1 Lemmas awnless or awn not over 2 mm long..... T. wolfii

Trisetum spicatum (L.) Richter Spike t. (T. montanum Vasey) Common to abundant in the Uinta Mts., rare or infrequent on the Tavaputs Plateau; many plant communities including conifer and aspen woods, openings in woods, streamsides, and alpine; 7,200-13,400 ft; June-Aug. Two forms have been recognized for our area. They have been separated by features of the following key:

- 1 Panicle dense and spikelike; leaves usually basal; culms 5-50 (75) cm tall; plants densely tufted..... T. spicatum
 1 Panicle loose and open, not spreading but not spikelike either; culms usually leafy (30) 40-80 cm tall; plants loosely tufted..... T. montanum

Plants clearly with features of T. spicatum are common in the upper conifer zone in open places and above timberline. Plants with features of T. montanum are common in aspen and conifer woods. However, there seems to be no clear morphological difference. The features of the above key are all overlapping as well as features given in several other manuals treating the 2 taxa. In conifer woods of the Uinta Mts., plants of this complex have the growth form of T. montanum (culms single or a few arising together in small tufts, and panicles interrupted). A few years after clear cutting, plants of the other phase with tufted culms and dense panicles are the common type. The differences seem to be functions of ecology and we consider our plants as belonging to a single taxon. Perhaps T. montanum is a good taxon outside our area.

Trisetum wolfii Vasey Occasional; Uinta Mts.; meadows, along streams, and in moist open woods; 9,000-11,100 ft; June-Aug.

Triticum L. Wheat

Triticum aestivum L. Common w. Plants annual or winter annual, 50-100 cm tall, occasionally taller; culms often branched near the base; ligules about 1 mm long; auricles prominent; leaf blades flat, 2-20 mm wide; spikes 3-18 cm long; spikelets 9-12 mm long, with 2-5 (9) florets; glumes 6-11 mm long, with antrorsely scabrous awns 1-6 mm long; lemmas 7-12 mm long, with awns 2-20 (the beardless form) or 45-75 cm long (the bearded form). Cultivated and occasionally growing along roadsides and waste places for a season, but not persisting in our area without cultivation; June-Aug.

POLEMONIACEAE Phlox Family

Annual or perennial herbs or low shrubs; leaves simple or compound, alternate, opposite, or appearing whorled; flowers bisexual; calyx united, (4) 5-lobed; corolla united, (4) 5-lobed; stamens (4) 5, attached to the corolla tube; ovary superior; style simple, usually with a 3-lobed stigma; fruit a (2) 3-chambered capsule.

- 1 Leaves simple, entire or rarely lobed
 2 Stems leafless except for a pair of persistent, 2-3 mm long cotyledons at the base and a whorl of sessile or connate bracts just below the inflorescence; plants 1-5 cm tall..... Gymnosteris
 2 Stems leafy
 3 Plants perennial; leaves opposite, not trilobate, linear to awl-shaped; corolla limb 8 mm wide or wider..... Phlox
 3 Plants annual, or if perennial then with alternate or trilobate leaves; corolla limb mostly smaller
 4 Plants tomentose or woolly, known from Daggett and Moffat Cos., perennial, leaves entire..... Gilia spicata
 4 Plants not tomentose or woolly, widespread, annual, or if perennial known from Wasatch Co. and leaves (at least some) trilobate
 5 Flowers (1) 2 at the tips of stems and branches and often evidently axillary; leaves mostly opposite, entire; plants annual; calyx tube with green ribs ending in teeth, the green ribs alternating with thin hyaline membranes that are ruptured by the developing fruit..... Microsteris

POLEMONIACEAE

- 5 Flowers in headlike clusters, rarely solitary in depauperate plants; leaves mostly alternate, entire or lobed; plants annual or perennial; calyx tube of nearly uniform texture, the tube not ruptured by the developing fruit..... Collomia
- 1 Leaves palmatifid, pinnatifid, or pinnately compound
 - 6 Some or all of the leaves opposite or appearing whorled, sessile, palmatifid into linear or needlelike segments, the segments sometimes appearing as whorls of filiform leaves
 - 7 Plants annual, from taproots, herbaceous throughout; corollas not over 6 mm long, the limb 2-5 mm wide..... Linanthus
 - 7 Plants perennial, from woody bases, the stems sometimes woody; corollas 8-25 mm long, the limb about 10-20 mm wide
 - 8 Leaves cleft into 5-9 strongly spreading filiform segments 10-15 (20) mm long, these not ridged nor pungent; plants restricted..... Linanthastrum
 - 8 Leaves toothed or deeply palmatifid into 3-7 ascending or spreading awl-shaped or linear segments 3-10 (15) mm long, these rather ridged and pungent; plants widespread... Leptodactylon
 - 6 Leaves alternate, pinnatifid or pinnately compound
 - 9 Corolla yellow, 5-8 mm long; leaves pinnatifid into firm, more or less prickly segments; plants annual, 1-5 (10) cm tall; mostly from 7,000-8,500 ft..... Navarretia
 - 9 Corolla not yellow or yellow only in part, often over 8 mm long; leaf segments not firm or prickly; plants perennial, or if annual then mostly from below 7,000 ft
 - 10 Leaves once pinnate or once pinnatifid, the leaflets or segments entire, elliptic or ovate, or if narrower than verticillate; plants perennial, mostly above 7,000 ft; calyx tube of uniform texture throughout, not ruptured by the maturing capsule; corollas white or blue, 7-25 (30) mm long..... Polemonium
 - 10 Leaves usually more than once pinnate or pinnatifid; the segments narrow, or if once pinnatifid then plants annual and mostly below 7,000 ft; calyx tube with alternating green and scarious portions, the scarious portions ruptured by the maturing capsules; corolla various.. Gilia

Collomia Nutt. Collomia

Annual or perennial herbs; leaves alternate or the lower ones opposite; flowers mostly in headlike clusters; corolla funnellform or nearly so, lavender to pink, rarely white; stamens arising at the same or different levels within the corolla tube; capsule with 1 (2) seeds per chamber.

- 1 Plants annual, from simple taproots, widespread; leaves entire; corolla 7-15 mm long, narrowly funnellform
 - 2 Corollas 15-30 mm long, the lobes 5-10 mm long..... C. grandiflora
 - 2 Corollas 7-15 mm long, the lobes mostly less than 5 mm long..... C. linearis
- 1 Plants perennial, from branched caudices and slender taproots, more or less mat-forming; rare, known from Wasatch Co.; leaves entire or toothed or lobed; corolla 15-25 (35) mm long, broadly funnellform.... C. debilis

Collomia debilis (Wats.) Greene Alpine c. The 1 specimen seen (Goodrich 17794) is from Willow Creek, W. Tavaputs Plateau; from crusted, calcareous slopes of Green River shale; 8,400 ft; July-Aug. Occasional in the Wasatch Range to the w. of our area. Our plants are referable to var. debilis.

Collomia grandiflora Dougl. ex Lindl. Known from Sturat Creek-Baxter Pass area of Rio Blanco and Garfield Cos.; June-Aug.

Collomia linearis Nutt. Narrowleaf c. Occasional to common; widespread; sagebrush, pinyon-juniper, mt. brush, dry meadow, ponderosa pine, and aspen communities, often on disturbed soil; 7,000-7,800 ft; June-Aug.

Gilia R. & P. Gilia

Annual or perennial herbs; leaves various; flowers solitary and axillary or in terminal and axillary clusters; corolla bell-shaped to salverform; stamens attached at the same or nearly the same level in the corolla tube; capsules with 1-many seeds per chamber. We have followed Arnow and others (1980) and Cronquist and others (1984) by not recognizing the separation by Grant (1956) of Ipomopsis from Gilia.

- 1 Plants annual; corolla 4-12 mm long; stamens included
 - 2 Plants tomentose throughout and especially in the inflorescence; flowers rather congested in a headlike cluster; stems leafy; leaves entire or more often 3-parted in the upper 1/2, or occasionally with up to 5 segments..... G. pumila
 - 2 Plants not tomentose throughout, especially not in the inflorescence; flowers not congested or if so stems not leafy; leaves pinnatifid or pinnately lobed
 - 3 Inflorescence congested, headlike, closely subtended by a cluster of leaves about as large as the cluster at the base of the plant; stems mostly leafless between the basal and terminal clusters of leaves..... G. polycladon

- 3 Inflorescence open; leaves in a basal rosette and scattered on the stems, not clustered beneath the inflorescence
- 4 Plants, especially in the lower part, with some cobwebby tomentum on the leaves or at least in the axils of leaves; leaves pinnatifid, appearing compound, the primary divisions often toothed or lobed; corollas (5) 7-12 mm long, the lobes not tridentate; inflorescence with gland-tipped hairs, the glands often purplish or blackish..... G. inconspicua
- 4 Plants without tomentum; leaves pinnately lobed, or merely toothed, the lobes mostly entire; corollas 4-6 mm long, the lobes often tridentate; gland-tipped hairs of the inflorescence not purplish or blackish..... G. leptomeria
- 1 Plants perennial, or if biennial or perhaps annual, then the corollas over 12 mm long or the anthers mostly exerted
- 5 Corollas scarlet red, 2-5 cm long..... G. aggregata
- 5 Corollas not red, 0.4-2 cm long
- 6 Plants glandular, not villous-tomentose; inflorescence open to spikelike, but flowers not borne in congested lateral clusters; corollas 6-20 mm long; stamens exerted beyond the corolla lobes; leaves closely pinnatifid
- 7 Stems usually much branched, sometimes from near the base; inflorescence open with branches commonly over 5 cm long, not at all spikelike or racemelike; corolla lobes blue; capsules 2.5-4 mm long..... G. pinnatifida
- 7 Stems mostly simple (in ungrazed specimens); inflorescence often spikelike or racemelike, or with branches to about 5 cm long; corolla white or pale blue-white or blue; capsules 4-6 mm long..... G. stenothyrsa
- 6 Plants villous-tomentose with more or less crinkly, multicellular hairs, sometimes glandular as well; flowers borne in rather tight terminal or lateral clusters; corollas about 4-8 mm long; the stamens included or barely exerted beyond the tube but shorter than the lobes
- 8 Plants seldom much branched (in ungrazed specimens), known from Daggett and Moffat Cos.; inflorescence mostly spikelike and elongate, usually several times longer than wide; and flowers not in headlike clusters at the ends of branches (in ungrazed or unbroken specimens); taproot and caudex simple..... G. spicata
- 8 Plants often branched, widespread; inflorescence not spikelike; flowers in headlike clusters and the ends of branches
- 9 Styles including stigmas equaling or exceeding the corolla tube; calyx villous or villous-tomentose; occasionally only sparsely so; corolla bright white even in dried specimens (the lobes sometimes flecked with blue-purple), the tube slightly if at all surpassing the calyx; anthers shorter than their filaments..... G. congesta
- 9 Styles including the stigmas shorter than and well included in the corolla tube; calyx with short glandular hairs only, or rarely with a few short-villous hairs; corolla cream white at least in dried specimens; the tube surpassing the calyx; anthers about as long as their filaments..... G. roseata

Gilia aggregata (Pursh) Spreng. Scarlet g., skyrocket g. [G. pulchella Dougl.; Ipomopsis aggregata (Pursh) V. Grant] Common; widespread; sagebrush, pinyon-juniper, rabbitbrush-wildrye, mt. brush, ponderosa pine, and Douglas-fir communities; 5,500-9,500 (10,400) ft; mid May-Sept. Our plants are referable to var. aggregata.

Gilia congesta Hook. Ballhead g., many-flowered g. [Ipomopsis congesta (Hook.) V. Grant] Common; widespread; desert shrub, sagebrush, and pinyon-juniper communities, on a wide range of soil types and substrates including: sand dunes, rock crevices, and clay and shale barrens; 5,000-7,000 ft; May-July. Our plants are referable to var. congesta. See G. roseata.

Gilia inconspicua (Smith) Sweet Shy g., sinuate g. (G. ophthalmoides A. Brand; G. sinuata Dougl.) Occasional or locally common across much of the e. 2/3 of Uintah Co. and in Daggett Co. and e. into Colorado, only 1 specimen seen from Duchesne Co.; desert shrub, sagebrush and pinyon-juniper communities; 4,750-7,100 ft; May-June. We have followed Cronquist and others (1984) in using the name of G. inconspicua in a broad sense.

Gilia leptomeria Gray (G. micromeria Gray) Occasional in Daggett and Uintah Cos. and e. into Colorado, no specimens seen from Duchesne Co.; desert shrub, sagebrush, and pinyon-juniper communities; 4,700-6,200 ft; May-June.

Gilia pinnatifida Nutt. in Gray Sticky g. (G. calcarea Jones; G. mcvickeriae Jones) Occasional; e. 1/4 of Uintah and Daggett Cos., and into Colorado; desert shrub and pinyon-juniper communities; 5,200-6,600 ft; June-July. Rodeck 4425 DIN01, apparently the basis for the Holmgren (1962) report of G. haydeni Gray, belongs here.

Gilia polycladon Torr. in Emory [Ipomopsis polycladon (Torr.) V. Grant] Occasional; widespread; desert shrub, sagebrush, and juniper communities, often on sandy soil; 4,800-5,500 ft; May-June.

Gilia pumila Nutt. Dwarf g. [Ipomopsis pumila (Nutt.) V. Grant] Occasional or locally common; widespread; desert shrub, sagebrush, and juniper communities, often on sandy ground; 4,700-6,000 ft; May-June. Often mistaken for Eriastrum diffusum (Gray) Mason - a plant known from far s. of our area.

Gilia roseata Rydb. [Ipomopsis roseata (Rydb.) V. Grant] Occasional; n. of Hwy. 40 and s. of the Uinta Mts. from Rock Creek and Duchesne e. to Tridell; sagebrush, pinyon-juniper, and rarely desert shrub

communities, apparently associated with but not exclusively on glacial outwash from the major canyons of the Uinta Mts.; 5,900-7,600 ft; June-July. Specimens from Dinosaur National Monument and northward and eastward referred here (Bradley 1950; Welsh 1957) belong to the widespread and similar G. congesta, which is apparently rare or lacking from the range of G. roseata in our area.

Gilia spicata Nutt. Spike g. [Ipomopsis spicata (Nutt.) V. Grant] The 2 records seen are from near Manilla, Daggett Co.; juniper communities; 6,200-8,900 ft; June. Our plants are referable to var. spicata.

Gilia stenothyrsa Gray Occasional; widespread in Rio Blanco, Duchesne and Uintah Cos.; desert shrub, sagebrush, and pinyon-juniper communities; 5,600-7,900 ft; May-Sept. Most specimens from our area have white or pale blue-white flowers, but those seen from the W. Tavaputs Plateau in s. Duchesne Co. have blue flowers.

Gymnosteris Greene Gymnosteris

Gymnosteris parvula (Rydb.) Heller Small-flowered g. Annual herbs, 1-4 cm tall; stems leafless; bracteal leaves 3-13 mm long, narrowly lanceolate to ovate; flowers sessile in a compact terminal cluster or solitary in small plants; calyx 2.5-4 mm long; corolla white or pinkish, the tube 2-5 mm long, the lobes 0.7-1.5 mm long. The 5 specimens seen are from Taylor Mt., Diamond and Blue Mt. and Yampa Plateau; sagebrush, ponderosa pine, and lodgepole pine communities, often in sandy places; 7,400-9,000 ft; June.

Leptodactylon H. & A. Prickly Phlox; Prickly Gilia

Plants more or less woody at the base; leaves palmately parted into needlelike divisions, lower ones opposite, the upper ones opposite, subopposite, or alternate, with smaller leaves fascicled in the axils of the primary ones; flowers sessile, solitary or a few in a cluster, showy; calyx ruptured by the maturing fruit; corolla white, cream-colored, or purplish in the throat, salverform with funnellform throat, the tube longer than the calyx, the lobes often loosely spirally closed during the day.

- 1 Plants depressed-pulvinate, more or less mound-forming; not over 5 cm tall; sepals, petals, and stamens 4; corollas 12-16 cm long; leaf division 1-7 mm long..... L. caespitosum Nutt.
- 1 Plants not pulvinate; stems over 5 cm long; sepals, petals, and stamens 5 or sometimes 4 in L. watsonii; corollas 15-25 cm long; leaf divisions often over 7 mm long
- 2 Leaves all opposite, the divisions 7-15 mm long; corollas 18-25 mm long, the lobes 9-12 mm long; plants woody only at the base, mostly of rock crevices..... L. watsonii
- 2 Upper leaves subopposite or alternate, the divisions 3-9 mm long; corollas 15-20 mm long, the lobes 6-8 mm long; plants often woody well above the base, of various habitats, widespread and common..... L. pungens

Leptodactylon caespitosum Nutt. Mat p. The 5 specimens seen or reported are from Browns Park, Vermillion Creek Gap and 2 mi e. of Shell Creek Ranch; white tuffaceous semibarrens and other harsh substrates; 5,700-5,750 ft; June.

Leptodactylon pungens (Torr.) Nutt. Common p. Occasional or common; widespread; desert shrub, sagebrush, pinyon-juniper, and ponderosa pine communities; 4,700-8,150 ft; May-July. Our plants are referable to var. pungens.

Leptodactylon watsonii (Gray) Rydb. Rock p. Four specimens seen (Parks and others 704; Neese and others 12052 BRV) from Cross Mt. Canyon, Yampa River (A. Collotzi & M. Collotzi 456 UTC) from 2 mi w. of Nelo, (A. Holmgren & N. Holmgren 14236 UTC) from Canyon of Lodore; crevices of cliffs and rocky canyons and hills; 5,500-5,800 ft; June-July.

Linanthastrum Ewan Linanthastrum

Linanthastrum nuttallii (Gray) Ewan Nuttall l., Nuttall gilia, Nuttall flaxflower. [Linanthus nuttallii (Gray) Greene ex Mlkn.] Perennial herbs with woody bases, 12-25 (30) cm tall, much branched; leaves opposite, (3) 5-9 parted, into spinulose-tipped linear segments, the segments 1-1.5 (2) cm long; flowers in small headlike or loose clusters, scarcely exerted from a tuft of leaves; calyx 6-9 mm long, ruptured by the maturing capsules; corolla 7-14 mm long, funnellform or salverform, white or cream-colored, or yellow, the tube woolly pubescent externally; the limb about 1 cm wide; stamens about equal, inserted equally at the base of the short throat; capsules with 2-4 seeds per chamber but only 1 developing sometimes. Known from Doc's Beach just n. of Maeser, juniper-shrub-grass community, sandy soil (Atwood 7228) and from Granddaddy Lake, crevices, 10,500 ft (Garrett 133 UT); June-Aug. Our plants are referable to ssp. nuttallii var. nuttallii.

Linanthus Benth. Linanthus

Linanthus septentrionalis Mason Northern l. [L. harknessii (Curran) Greene var. septentrionalis (Mason) Jeps. & Bailey] Annual herbs 5-20 cm tall; leaves opposite, palmately divided into 3-5 filiform or linear segments, 4-20 mm long; flowers mostly solitary on filiform pedicels; calyx about 2-4 mm long, ruptured by the maturing fruit; corolla 2.5-6 mm long, white to light blue or lavender, with a funnellform

throat and short tube; stamens equally inserted and included in the corolla throat; capsules with 2-5 seeds in each chamber. Occasional; widespread; sagebrush, juniper, and mt. brush communities, often on sandy soils; 6,200-8,000 ft; late May-July.

Microsteris Greene Microsteris

Microsteris gracilis (Hook.) Greene Pink m., little polecat. [M. humilis (Dougl.) Greene; M. micrantha (Kell.) Greene] Annual herbs 3-15 (25) cm tall, puberulent or glandular-puberulent at least above; leaves opposite or alternate, 6-50 mm long to 8 mm wide, linear to lanceolate or oblanceolate, entire; flowers mostly in pairs at the ends of stems and branches, one subsessile the other conspicuously pedicellate, or sometimes solitary; calyx ruptured by the developing capsule; corolla salverform, 5-15 mm long, the tube white or yellowish, the limb pink or lavender; stamens unequally inserted on the corolla; capsules with 1 seed per chamber. Occasional; widespread; sagebrush, mt. brush, and ponderosa pine communities, often on disturbed ground; 7,000-8,600 ft; May-July. Our plants are referable to var. humilior (Hook.) Cronq.

Navarretia R. & P. Navarretia

Navarretia breweri (Gray) Greene Yellow-flower n., Brewer n., Brewer gilia, pincushion plant. Annual herbs, 2-10 cm tall, glandular-puberulent; leaves alternate, 1-3 cm long, pinnatifid into pungent-tipped, linear segments 3-20 mm long; flowers sessile or nearly so in clusters at the ends of branches and stems, the clusters closely subtended by bracts that are similar to the leaves; calyx sometimes ruptured by the maturing capsules, the lobes longer than the tube, pungent-tipped; corolla 5-8 mm long, funnelliform to salverform, yellow; stamens unequally inserted on the corolla; capsules with (1) 2-3 seeds per chamber. Occasional; widespread; sagebrush, pinyon-juniper, ponderosa pine, forb-grass, and aspen communities, often on open or disturbed ground; 7,000-9,000 ft; June-July.

Phlox L. Phlox; Sweet William; Sweet William Moss

Perennial herbs from a taproot and sometimes branching caudex; stems sometimes woody at the base; leaves opposite or the upper ones sometimes alternate, sessile, entire, linear or needlelike, the primary ones often with fascicles of axillary leaves; flowers solitary or variously clustered, usually terminal; calyx tube ruptured by the developing capsule; corolla salverform, white, pink, or blue; stamens unequally inserted on the corolla tube; capsules with 1-several seeds per chamber.

- 1 Plants not tufted or mat-forming, sometimes over 10 cm tall; stems more or less erect; principal leaves 1.5-8 cm long, 1-2.5 mm wide, more or less well spaced on the stems and not concealing the internodes, not in a basal cluster or mat; flowers evidently pedicellate in loose branched cymes or solitary in small plants; style 6-25 mm long..... P. longifolia
- 1 Plants tufted or mat-forming, less than 10 cm tall; stems often sprawling or creeping; principal leaves in a basal cluster or mat, and closely spaced on the stems; flowers sessile or inconspicuously pedicellate, solitary; styles 2-5 mm long except in P. multiflora
- 2 Plants mostly densely pubescent with villose or cobwebby hairs; leaves 2-10 (13) mm long; corollas blue, lavender or white, the tube 5-14 mm long
 - 3 Leaves (2.5) 4-10 (13) mm long, loosely overlapping, linear lanceolate, the larger ones over 5 mm long; plants loosely caespitose, not mound-forming, not as arachnoid as in the following; widespread, common; corolla lobes 4-8 mm long..... P. hoodii
 - 3 Leaves 2-5 mm long, strongly overlapping, triangular; plants densely caespitose, more or less mound-forming, strongly arachnoid; known from Moffat Co.; corolla lobes 3-5 mm long... P. bryoides
- 2 Plants glabrous, glandular or sparsely pubescent with villous hairs; leaves 5-30 mm long, mostly over 10 mm long or else plants glandular; corollas white rarely blue, the tube 8-15 mm long
 - 4 Intercostal membrane with a small linear keel; styles 2-5 mm long; plants not at all glandular, mostly of the Tavaputs Plateau; leaves (5) 8-15 (20) mm long, 0.5-1.5 mm wide, firm, needlelike.. P. austromontana
 - 4 Intercostal membrane flat; styles 5.5-8 mm long or if only 2-5 mm long then plants glandular at least in the calyx, of the Uinta Mts. and Strawberry Valley
 - 5 Style 5.5-8 mm long; calyx glabrous or pubescent with short-villous or crinkly hairs; leaves relatively soft, glabrous or nearly so, the larger ones 12-30 mm long, 1-2 mm wide; corolla lobes 6-11 mm long; plants of Daggett and Uintah Cos. and eastward..... P. multiflora
 - 5 Styles 2-5 mm long; calyx with glandular hairs; leaves firm, glandular or hairy (at least ciliate), rarely glabrate, 5-12 (17) mm long, about 1 mm wide; corolla lobes 5-7 mm long; plants of Duchesne and Wasatch Cos..... P. pulvinata

Phlox austromontana Cov. Desert p. (P. densa Brand; P. diffusa Benth. ssp. subcarinata Wherry) Occasional on the E. Tavaputs Plateau and flank of the plateau to the Piceance Basin, apparently rare on the W. Tavaputs Plateau as far w. as Lake Canyon; 1 record seen from Jones Hole; sagebrush, pinyon-

POLEMONIACEAE

juniper, mt. brush, and Douglas-fir communities; 6,000-8,000 ft; May-June. Phlox diffusa in the strict sense is well removed to the n. and w. of our area. Reports are based on ssp. subcarinata, which belongs here.

Phlox bryoides Nutt. Moss p. The 1 specimen seen (Peterson & Wilken 83-311) is from Lookout Mt.; Vermillion Bluffs on a ridge top at 7,100 ft where intermediate plants (P. muscoides Nutt.) were found just below the ridge tops and plants of P. hoodii (q.v.) were found below among shrubs on deeper soils (Wilken, personal communication); May-June.

Phlox hoodii Rich. Hood p. (P. canescens T. & G.) Common; widespread; desert shrub, sagebrush, pinyon-juniper, mt. brush, and ponderosa pine communities; 4,800-8,400 ft.; March-May. Occasionally small specimens of P. hoodii approach those of P. bryoides (q.v.). Apparently these taxa hybridize and hybrids or at least intermediate plants are more or less referable to P. muscoides.

Phlox longifolia Nutt. Wild s. w., longleaf p. [P. l. ssp. calva Wherry; P. l. ssp. cortenza (A. Nels.) Wherry; P. grahamii Wherry] Common; widespread; desert shrub, sagebrush-grass, pinyon-juniper, rabbitbrush, mt. brush, and rarely in aspen-conifer communities; 4,700-8,000 ft; April-July. Phlox grahamii was described from rust-infested specimens (Graham 7884 CM!) from the mouth of Sand Wash on the w. side of the Green River. The specimens were referred to by Graham (1937) as P. speciosa Pursh.

Phlox multiflora A. Nels. Many-flowered p., flowery p. The several specimens seen are from the Whiterocks drainage and e. and from Daggett Co. in the Uinta Mts., and e. through Moffat Co.; sagebrush-grass, mt. brush, and aspen-conifer communities and rocky ridges; 7,100-9,500 ft; June-July. Our material is referable to ssp. depressa (A. Nels.) Wherry.

Phlox pulvinata (Wherry) Cronq. Alpine tufted p. (P. caespitosa Nutt. misapplied) Occasional; Strawberry Valley and Uinta Mts. as far e. as the Yellowstone drainage and in the uplands of Moffat Co.; lodgepole pine-spruce communities, open slopes, ridges, and fell fields, often on sandy or rocky ground; (7,500) 9,000-11,200 ft; June-Aug.

Polemonium L. Jacobs Ladder; Polemonium

Perennial, usually glandular, often malodorous herbs; leaves alternate, pinnatifid or more often pinnately compound; flowers in terminal or axillary clusters or rarely solitary; calyx not ruptured by the maturing capsule; corolla broadly funnelform, blue, white, or purple; stamens about equally inserted on the corolla tube, the filaments usually hairy near the base; capsules with 1-10 seeds per chamber.

- 1 Leaflets 1-6 mm long, divided into 3-5 segments, these appearing as whorls of tiny leaves; corolla tube exceeding the calyx and longer than the corolla lobes; plants 5-20 (30) cm tall, from above 10,000 ft on the Uinta Mts..... P. viscosum
- 1 Leaflets mostly 10-50 mm long, entire; corolla tube not or scarcely exceeding the calyx, about equal or to 1/2 as long as the corolla lobes; plants of various elevations
 - 2 Stems few to several together from a taproot and branched caudex, 5-40 (60) cm tall; basal leaves prominent; flowers blue, rarely white; styles usually 10 mm long, the branches to 1.5 mm long; plants from 9,000-11,100 ft..... P. pulcherrimum
 - 2 Stem solitary, from a taproot or short rhizomes, (20) 40-120 cm tall; basal leaves various; flowers purple, white, or rarely blue; styles about 15 mm long, the branches various; plants from 7,400-9,500 ft
 - 3 Corolla purple; style branches to about 2 mm long; plants of wet places, stem arising from a short rhizome; upper few leaves greatly reduced..... P. caeruleum
 - 3 Corolla white or rarely blue; style branches 2-3.5 mm long; plants of well-drained soil, from taproots; upper leaves not greatly reduced..... P. foliosissimum

Polemonium caeruleum L. Western j., western p., skunkweed. (P. occidentale Greene) Occasional or locally common; Strawberry Valley and across the Uinta Mts. but no specimens seen from Uintah Co.; wet and boggy meadows, around seeps and springs, and in streamside-willow communities; 7,000-10,050 ft; June-Aug. Our plants are referable to var. pterosperma Benth.

Polemonium foliosissimum Gray Leafy p., leafy j. With 2 vars. in the area.

- 1 Corolla white..... var. alpinum
- 1 Corolla blue..... var. foliosissimum

Var. alpinum A. Brand (P. albiflorum Eastw.) Occasional to common; Strawberry Valley and e. on the W. Tavaputs Plateau to the Avintaquin drainage, and to the Rock Creek drainage on the Uinta Mts.; tall forb, aspen, Vasey sagebrush-snowberry, meadow and streamside-willow communities; 7,500-9,600 ft; June-Aug.

Var. foliosissimum Occasional; E. Tavaputs Plateau to Cathedral Bluffs, and base of Mosby Mt.; Vasey sagebrush, rabbitbrush-basin wildrye communities, and streambanks and shaly barrens; 7,400-8,400 ft; June-July.

Polemonium pulcherrimum Hook. Skunkleaf p., showy p., pretty j. (P. delicatum Rydb.) Occasional; Uinta Mts.; 1 record seen from Bruin Point, W. Tavaputs Plateau; meadows, along streams, and among rocks, aspen, lodgepole pine, fir, and spruce woods; 9,000-11,100 ft; June-Aug. Our plants are referable to var. delicatum (Rydb.) Cronq.

Polemonium viscosum Nutt. Sticky p., skunk p., sticky sky-pilot. Occasional; Uinta Mts.; talus, fell fields, rockstrips, and Engelmann spruce and alpine tundra communities; 10,200-12,700 ft; July-Aug.

POLYGALACEAE Milkwort Family

Polygala L. Milkwort

Polygala verticillata L. Annual herbs, 8-40 cm tall; stems erect, divergently branched; leaves 1-2 (3) cm long, 1-3 mm wide, simple, entire, linear, at least the lower and sometimes the upper in whorls of 2-5; lower branches of the inflorescence usually opposite or whorled; inflorescence of dense conic or cylindrical spikelike racemes 6-15 mm long; flowers bisexual, regular, inconspicuous, whitish or greenish; tepals 5, the outer 3 herbaceous and minute, the inner 2 slightly larger (about 1 mm long), free or united at the base; fruit a capsule, about 2 mm long. The 1 record seen (Hutchings 285) was from 2 mi s. of Whiterocks; meadow with Juncus, Carex, and Agrostis; 6,800 ft; July.

POLYGONACEAE

Herbs or shrubs; leaves alternate, basal, rarely opposite or whorled, simple, usually entire; flowers bisexual or unisexual, the perianth small, of 3-6 tepals in 1-2 series; tepals free or united below the middle, scarious or petaloid; stamens (3) 6-9; pistil 1, the ovary superior, 1-chambered; styles 2-3 (4) or lacking; stigmas sessile; fruit a 3-angled or lenticular achene.

- 1 Leaves without stipules; flowers borne few-several together in involucre; inflorescence a head, an umbel, or a dichotomously or trichotomously branched cyme and/or plants pubescent at least in part; tepals more or less petaloid..... Eriogonum
- 1 Leaves with scarious stipules, these often sheathing the stem above the nodes; flowers not borne in involucre, axillary or in spikes, racemes, or panicles; plants glabrous or at most scabrous; tepals petaloid or not
 - 2 Leaves all basal or the stem with 1 leaf just below the inflorescence, the blades cordate to reniform, about as wide or wider than long, with the petiole about as long or longer than the blade; plants montane at (9,600) 10,500-13,000 ft..... Oxyria
 - 2 Leaves not all basal, the blades linear, elliptic to oblong, sessile to petioled; distribution various
 - 3 Tepals 5, remaining about equal in size in fruit; flowers axillary or in spikes or spicate panicles; stigmas sub-globose..... Polygonum
 - 3 Tepals 6, the inner set enlarging in fruit and forming small to large scarious veiny wings on the fruit; flowers borne in crowded to remote whorls of panicles; stigmas with numerous filiform branches..... Rumex

Eriogonum Michx. Wild Buckwheat; Eriogonum

Annual or perennial herbs or shrubs; leaves basal or cauline and mostly alternate, opposite or whorled in a few taxa, simple, entire, lacking stipules; inflorescence capitate, racemose, umbellate, or cymose; involucre subtending the flowers, campanulate, cylindric or turbinate, 4-8 toothed or lobed, sessile or peduncled; flowers bisexual, each with a threadlike pedicel, the pedicel included or exerted from the involucre; perianth parted or deeply cleft into 6 small, more or less petaloid segments; stamens 6-9; styles 3-parted; achene 3-angled, or 3-winged. A complex genus with several intergrading and hybridizing taxa. Flowers are reduced and quite uniform. Separation of taxa is largely based on flower color and vegetative features.

- 1 Plants annual; leaves all basal except in E. salsuginosum..... KEY 1 P. 230
- 1 Plants perennial; leaves basal and/or cauline
 - 2 Plants tall forbs with mostly simple, strigose stems from a more or less chambered taproot; achenes winged, exerted beyond the flowers, usually yellowish; flowers yellow..... E. alatum
 - 2 Plants not as above; achenes not winged, usually blackish or brownish; flowers white or yellow
 - 3 Inflorescence sessile or nearly so in a basal rosette, the flowers not elevated above the leaves; plants densely pulvinate caespitose..... KEY 3 P. 230
 - 3 Inflorescence on a conspicuous stem or peduncle, the flowers elevated above the leaves; plants various
 - 4 Flowers with a 1-2 mm long stipelike base about as slender as the pedicel; inflorescence an umbel or occasionally a head..... KEY 2 P. 230
 - 4 Flowers sessile, expanded immediately from the joint with the pedicel; inflorescence various
 - 5 Flowers borne in heads, white or pinkish when fresh (rarely yellow in E. ovalifolium - keyed both ways); leaves not over 2 cm long; plants pulvinate caespitose, 1-10 (25) cm tall, flowering in late April-June..... KEY 3 P. 230
 - 5 Flowers not borne in heads, or if so then yellow; leaves sometimes over 2 cm long; plants not caespitose, or if so then hardly pulvinate, flowering through the summer and fall

POLYGONACEAE

- 6 Woody stems not dying back to the ground level each year; leaves not at all basal nor basally disposed; plants clearly shrubby..... KEY 4 P. 230
- 6 Aerial stems dying back to or near ground level each year, mostly not woody; leaves basal or basally disposed; plants herbs or subshrubs..... KEY 5 P. 231

KEY 1

- 1 Leaves tomentose to lanate at least beneath; flowers white or cream, glabrous outside; stems glabrous; peduncles strongly spreading to deflexed
 - 2 At least some of the involucre pedunculate, the peduncles to 2 cm long; tepals not cordate at the base; white or pinkish; leaf blades 4-22 mm wide..... E. cernuum
 - 2 Most of the involucre sessile or nearly so, the peduncles rarely over 1 mm long except in an occasional one; tepals cordate at the base, yellowish to reddish; leaf blades mainly 8-40 mm wide... .. E. hookeri
- 1 Leaves glabrous to pilose but not tomentose or lanate; flowers yellow and pubescent outside except in E. gordonii and then the stems pilose at least in the lower part; peduncles erect to strongly spreading
 - 3 Flowers glabrous outside, white but turning pinkish or reddish; lower part of stems pilose; leaves yellow-green above, pilose..... E. gordonii
 - 3 Flowers hirsute to pilose outside, yellowish or reddish; stems glabrous or stipitate glandular
 - 4 Leaves basal and cauline, the basal ones ephemeral; plants glabrous or nearly so.. E. salsuginosum
 - 4 Leaves all basal; plants glandular or pilose at least below
 - 5 Stems usually inflated, glabrous, glaucous; branches of the inflorescence glabrous; peduncles straight or slightly curved; leaves long-pilose beneath, often glabrous above, not glandular; involucre forming a distinct tube..... E. inflatum
 - 5 Stems not inflated, often glandular; branches of the inflorescence stipitate-glandular; peduncles often strongly bent; leaves sometimes glandular, pilose or not; involucre of 2 distinct whorls each of 3 foliaceous bractlike lobes..... E. flexum

KEY 2

- 1 Stems with a whorl of leaflike bracts near the middle; flowers white to cream..... E. heracleoides
- 1 Stems scapose, without bracts as above or rarely with a solitary bract; flowers yellow or white to cream in 1 var. of E. umbellatum
 - 2 Flowers pubescent on the outside, 6-10 mm long including the stipe; plants from a thickened caudex with short branches..... E. jamesii
 - 2 Flowers glabrous on the outside, 3-7 mm long including the stipe; plants from a much-branched stoloniferous or rhizomatous caudex, the branches elongate and spreading..... E. umbellatum

KEY 3

- 1 Heads sessile or nearly so, the peduncles if present not over 5 mm long, not exceeding the leaves; heads rather few flowered, the flowers rather inconspicuous in the tight rosettes of leaves; leaves 0.7-1.5 mm wide, 3-6 mm long; plants 1-3 cm tall, forming dense mounds or mats
 - 2 Leaves silky villose with straight hairs; perianth segments pubescent internally as well as externally, whitish; plants of broad distribution..... E. tumulosum
 - 2 Leaves with crinkly hairs; perianth segments glabrous internally, pubescent externally, pale yellow when fresh; plants known from upper Vermillion Creek..... E. acaule
- 1 Heads pedunculate, the peduncles mostly well over 10 mm long, equaling or surpassing the leaves; heads with several to many flowers, the flowers conspicuous; at least the larger leaves over 2 mm wide and often over 6 mm long; plants 2-30 cm tall, caespitose, sometimes mat forming
 - 3 Leaves (1.5) 2-6 mm wide, 4-12 mm long, oblanceolate to spatulate; plants up to 3 cm tall; flowers 3-4 mm long..... E. shockleyi
 - 3 Leaves 4-20 mm wide, nearly as wide as long, ovate to orbicular; plants mostly 5-30 cm tall; flowers (3) 4-7 mm long..... E. ovalifolium

KEY 4

- 1 Flowers bright yellow (a series of crosses involving E. corymbosum, and either E. brevicaulis or E. viridulum)..... E. X duchesnense
- 1 Flowers white, pink or pale cream
 - 2 Leaves 4-35 mm long, 1-8 mm wide, linear or narrowly elliptical..... E. microthecum
 - 2 Leaves longer and/or wider than above
 - 3 Scapose portion of stem and branches of the inflorescence tomentose; leaves not basally disposed.. .. E. corymbosum
 - 3 Scapose portion of stem and branches of the inflorescence glabrous; leaves more or less basally disposed..... E. lonchophyllum

KEY 5

- 1 Flowers white or pink, rarely cream; stems and branches greenish or not
- 2 Inflorescence a raceme..... E. racemosum
- 2 Inflorescence not a raceme
- 3 Inflorescence capitate or nearly so; plants of Mt. Bartles and vicinity..... E. brevicaule
- 3 Inflorescence open, dichotomously or trichotomously branched; plants widespread
- 4 Leaf blades broadly elliptic, (1.5) 2-4 cm long; leaves strictly basal; plants herbs, flowering throughout the summer, common across the area..... E. batemanii
- 4 Leaf blades linear to narrowly lanceolate or elliptic, (2) 3-5 (7) cm long; leaves basal or some lower cauline; plants herbs or subshrubs or shrubs; flowering in mid-summer to fall
- 5 Scapose portion of stem and branches of the inflorescence tomentose; involucre 3.5-4 mm long; flowers 3.4-4.5 mm long, white; plants mostly of the Bad Land Cliffs of the Tavaputs Plateau..... E. corymbosum
- 5 Scapose portion of stem and branches of the inflorescence glabrous; involucre 2.5-3.5 (4) mm long; flowers 2-3 mm long..... E. lonchophyllum
- 1 Flowers yellow, or if cream the stems and branches usually greenish
- 6 Leaves ovate to orbicular; flowers in a solitary head..... E. ovalifolium
- 6 Leaves linear or lanceolate; flowers various
- 7 Scapes and branches densely tomentose; inflorescence capitate to umbellate; plants of Duchesne and Wasatch Cos..... E. brevicaule
- 7 Scapes and branches of the inflorescence glabrous and greenish; inflorescence cymose or umbellate
- 8 Leaves 1-2 (3) mm wide, linear or narrowly oblanceolate, loosely to tightly revolute, glabrous to rather sparsely pubescent on the upper surface; plants of Duchesne, Uintah, and extreme w. Rio Blanco Cos.
- 9 Leaves 1-7 cm long, tightly revolute; woody branches of the caudex and leaf-bearing portions of stems elongate, often over 1.5 cm long and up to 4 (6) cm long; inflorescence 0.5-1.5 (2.2) times as long as the green scapose part of the stem, the branches about equal; flowers bright yellow; plants flowering from mid Aug.-Oct., common across the bottom of the Basin from Duchesne to the Green River, uncommon e. of the river..... E. viridulum
- 9 Leaves 1-2.5 cm long, sometimes not tightly revolute; woody branches of the caudex and leaf-bearing portions of stems short, seldom over 1.5 cm long; inflorescence 1.5-3.6 (5) times as long as the greenish scapose portion of the stem; forks of the inflorescence sometimes with a much-reduced branch; flowers cream to pale yellow; plants flowering in mid July-Aug., apparently confined to e. of the Green River..... E. ephedroides
- 8 Leaves 1-9 mm wide, oblanceolate or spatulate or less commonly linear, slightly or not at all revolute, rather densely pubescent on the upper as well as the lower surface; plants of Daggett, Moffat, and Rio Blanco Cos..... E. brevicaule

Eriogonum acaule Nutt. The 1 specimen seen (Peterson & Deardorft 83-131) is from 2 mi ne. of confluence of Shell Creek and Hells Canyon, Moffat Co.; barren hillsides with saltbrush and wheatgrass; 6,820 ft; June.

Eriogonum alatum Torr. Wing e. Occasional; widespread; sagebrush, pinyon-juniper, and mt. brush communities; 7,000-8,500 ft; late June-July (Aug.).

Eriogonum batemanii Jones Common; widespread (no specimens seen from Daggett Co.); desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 4,650-6,500 (8,250) ft; mid June-Oct. Welsh 377 referred to as E. spatulatum Gray and Bradley 5304 DINO!, referred to as E. bicolor Jones (Welsh 1957 and probably the source for Holmgren 1962), belong here.

Eriogonum brevicaule Nutt. Shortstem w. With 3 vars. in our area.

- 1 Tepals white, pink, or reddish in age; plants of Mt. Bartles and vicinity..... var. promiscuum
- 1 Tepals yellow
- 2 Scapes and branches densely tomentose; inflorescence capitate to umbellate; plants of Duchesne and Wasatch Cos..... var. laxiflorum
- 2 Scapes and branches glabrous, green or blue-gray glaucous; inflorescence cymose; plants of Daggett, Moffat, and Rio Blanco Cos..... var. brevicaule

Var. brevicaule [E. campanulatum (Nutt.) Stokes] Common from Sheep Creek and e. across Daggett Co. through Moffat Co., and from near Rangely to Massadona, Rio Blanco Co.; desert shrub, sagebrush, and pinyon-juniper communities; 5,600-6,600 ft; (late June) July-Aug. Some specimens from Rio Blanco Co. with linear leaves (ie. B. Welsh & Moore 301) are much like those of E. viridulum.

Var. laxiflorum (T. & G.) Reveal (E. medium Rydb.) Represented in our area by 2 phases that are occasionally seen in the same population. The phase with a capitate inflorescence (E. chrysocephalum Gray) is common across the W. Tavaputs Plateau from Argyle Canyon w. to Strawberry Valley an n. to Tabiona; sagebrush, pinyon-juniper, bullgrass, and open Douglas-fir communities, usually on raw shaley or marl limestone ground; 6,800-8,800 ft; late May-Sept. The phase with open inflorescence (var. pumilum Stokes ex Jones) is occasional across Duchesne Co., n. and e. of the above var. from Duchesne to the foothills of the

POLYGONACEAE

Uinta Mts. near the town of Whiterocks; desert shrub, pinyon-juniper, and open aspen and conifer communities; 5,800-7,400 ft; June-Sept.

Var. promiscuum Welsh Endemic, locally common on Mt. Bartels and vicinity, W. Tavaputs Plateau; pinyon-juniper-sagebrush-snowberry communities, usually on shaly or marly outcrops; 7,200-8,800 ft; July-Aug. Plants of this local taxon intergrade into E. lonchophyllum as well as E. corymbosum var. hylophilum.

Eriogonum cernuum Nutt. Nodding e. Common; widespread (no specimens seen from Daggett Co.); many plant communities including desert shrub, sagebrush, and pinyon-juniper, often on areas of disturbances; 4,700-7,600 ft; July-Sept. Our plants are referable to var. cernuum.

Eriogonum corymbosum Benth. in DC. Big w. b. We have 2 vars. as follows. A Third var. [var. glutinosum (Jones) Jones; E. aureum Jones] has been reported for our area based on a vegetative specimen (Graham 1937). This is a yellow-flowered taxon known from well s. of our area.

- 1 Leaf blades not over 3 cm long or if so then over 1 cm wide, usually crenate-revolute... var. corymbosum
 1 Leaf blades 3-9 cm long, less than 1 cm wide, usually revolute but not crenate..... var. hylophilum

Var. corymbosum (E. divergens Small; E. c. var. erectum Reveal & Brotherson; E. effusum Nutt. misapplied) Occasional or locally common; widespread; desert shrub, sagebrush, bullgrass, and pinyon-juniper communities; 5,150-8,700 ft; Aug.-Sept. Goodrich 14991 comes from a single yellow flowered plant in a large population of white flowered plants. See E. X duchesnense.

Var. hylophilum (Reveal & Brotherson) Welsh (E. hylophilum Reveal & Brotherson) Endemic, locally common in the Bad Land Cliffs of the W. Tavaputs Plateau near the summit of Gate Canyon in se. Duchesne Co. near the Carbon Co. line; sagebrush and pinyon-juniper communities; 6,300-8,250 ft; late July-Aug. One specimen (Neese 6576) from lower McCook Ridge, E. Tavaputs Plateau appears to be this or a cross of E. corymbosum and E. lonchophyllum (q.v.), which may be the origin of var. hylophilum.

Eriogonum X duchesnense Reveal Locally common; all records seen are within a 20 mi radius n. and w. of Duchesne; sagebrush and pinyon-juniper communities; 6,000-7,000 ft; Aug.-Sept. The name applies to plants of hybrid origin from E. corymbosum and the yellow flowered E. brevicaule. Crosses involving E. viridulum also have been noted in the area (Neese 8496-8500; Goodrich 14988-14993). These plants will also key here.

Eriogonum ephedroides Reveal Ephedra e. Endemic, locally common e. of the Green River from Nutters Hole to McCook Ridge, also along lower Evacuation Creek in se. Uintah Co. and on Raven Ridge in adjacent Rio Blanco Co.; desert shrub, pinyon-juniper, and sagebrush communities, mostly on barren hillsides on Green River Shale Formation; 5,000-6,400 ft; mid July-Aug. Much like E. viridulum from which it is distinguished by a series of small and mostly overlapping features. The separation might be more realistic at the varietal level, and such a treatment is provided by Welsh (1984c) under E. brevicaule.

Eriogonum flexum Jones Infrequent or locally common in Uintah Co. from Tridell e. to Dinosaur National Monument and to Rangley in Rio Blanco Co.; desert shrub and scattered juniper communities, on raw eroding clay or sandy-clay soil of the Duchesne River and Mancos Shale Formations; 4,800-5,900 ft; May-June.

Eriogonum gordonii Benth. in DC. Occasional from Tridell to Dinosaur National Monument and Red Wash and s. to Ouray; desert shrub communities, mostly on Duchesne River, Mancos Shale, and other formations that weather to badlands; 4,800-6,000 ft; mid June-July (Oct.).

Eriogonum heracleoides Nutt. Wyeth e. Common from Strawberry Valley across the Uinta Mts. and to Cold Spring Mt., Moffat Co.; sagebrush, mt. brush, dry aspen, ponderosa pine, and silver sagebrush-grass-meadow communities; 7,200-8,300 ft; mid June-July.

Eriogonum hookeri Wats. Infrequent from Duchesne to Rangley and from Dinosaur National Monument s. to Hill Creek; desert shrub, sagebrush, and pinyon-juniper communities; 4,800-6,000 ft; mid July-early Sept.

Eriogonum inflatum Torr. & Frem. in Frem. Desert trumpet e. (E. fusiforme Small) Occasional or locally common across the bottom of the Basin from Archadia e. to Island Park and to Willow Creek at the lower edge of the E. Tavaputs Plateau; desert shrub communities on formations that weather to badlands; 4,700-5,400 ft; June-mid July. Our plants are referable to var. fusiforme (Small) Rydb.

Eriogonum jamesii Benth. (E. arcuatum Greene) Occasional or locally common in Wells Draw and Minnie Maud Creek to Nutters Ridge on the Tavaputs Plateau and on Blue Mt.; sagebrush and pinyon-juniper communities; 6,000-7,500 ft; late June-early Sept. Our plants with leaves 1-3 cm long and 5-15 mm wide, and inflorescence divided 1-3 times or more are referable to var. flavescens Wats.

Eriogonum lonchophyllum T. & G. With 2 vars. as follows:

- 1 Leaves (2) 4-10 mm wide; flowers white or pale greenish-cream, seldom at all pinkish, with pale to dark green midrib; plants 30-50 cm tall, sometimes woody above ground level, from e. Uintah Co.....
 var. saurinum
 1 Leaves 1-4 (6) mm wide; tepals white, often pinkish tinged especially toward the base, the midrib often dark green, pinkish or reddish-brown in age; plant to 30 cm tall, hardly if at all woody above ground level, mostly of the Roan Cliffs and Piceance Basin and n. into Moffat Co..... var. lonchophyllum

Var. lonchophyllum Umbrella plant. (E. intermontanum Reveal; E. sarothriforme Gand.; E. scoparium Small; E. tristichum Small) Occasional to locally common across the Roan Cliffs from Range Creek, Emery Co. e. into the Piceance Basin and n. into Moffat Co., and with a disjunct anomalous phase near the old mining town of Rainbow; sagebrush and mt. brush communities, usually on shaley ground; (6,000) 7,000-9,000 ft; mid July-Sept. One specimen (Neese 6576) from lower McCook Ridge is intermediate between E.

lonchophyllum and E. corymbosum var. hylophilum with involucre the size of the former and flowering stems and branches of the inflorescence tomentose as in the latter. With var. saurinum, the above 2 taxa form a complex that are hardly separable except that they apparently are more or less isolated geographically. Plants from near the old mining town of Rainbow are as much like the plants of var. saurinum from near Vernal as they are like those of the Roan Cliffs, and they are distributionally intermediate. This Rainbow phase possibly represents hybridization of E. corymbosum and E. lonchophyllum (Welsh 1984c). This is the likely origin of var. saurinum and E. corymbosum var. hylophilum with the features of E. lonchophyllum dominant in var. saurinum and the features of E. corymbosum dominant in var. hylophilum. We can not tell the plants from the Roan Cliffs (E. intermontanum) from those of the Piceance Basin. Through this basin these plants are more or less continuous through short-leaved phases (E. scoparium and E. tristichum) with E. lonchophyllum. The only apparent differences are in the degree by which leaves extend up to stems, and in the tendency toward clustered involucre. In plants of the Tavaputs Plateau, the leaves are basal or nearly so, with the tomentose, leaf-bearing portion of the stem mostly less than 1.5 cm long. In plants from other parts of Colorado and n. New Mexico, the tomentose, sheath-covered, leafy portion of the stem is often over 1.5 cm long, but this feature is not consistent, and plants with nearly all basal leaves occasionally occur as far away as New Mexico.

Var. saurinum (Reveal) Welsh (E. saurinum Reveal) Endemic, locally common from Island Park s. to Dinosaur National Monument and e. to Maeser and Asphalt Ridge; desert shrub, sagebrush, juniper, and juniper-serviceberry communities, forming nearly pure stands on acidic Mowery Shale, but also on Carmel, Curtis, Entrada, Mesa Verde, and other formations that are not acidic; 5,200-6,200 ft; late July-early Oct. Plants of var. saurinum have the glabrous features of var. lonchophyllum (q.v.) and some of E. brevicaulis and the more leafy and woody features of E. corymbosum. A population on Raven Ridge (Goodrich 21997-22001) with yellow as well as whitish flowers strongly suggests a close relationship to E. brevicaulis. Specimens referred to E. effusum Nutt. by Welsh (1957) belong here.

Eriogonum microthecum Nutt. Slenderbush e. (E. simpsonii Benth. in DC.) Occasional to common; widespread; desert shrub, sagebrush, pinyon-juniper, and mt. brush communities; 4,800-8,000 ft; July-Sept. Plants with flat leaves 2.5-6 (8) mm wide and stems glabrous to floccose are referable to var. laxiflorum Hook., and those with involute leaves 1-2.5 (3) mm wide and tomentose to lanate stems are referable to var. foliosum (T. & G.) Reveal. Apparently hybridizing with E. brevicaulis (Neese 14531).

Eriogonum ovalifolium Nutt. Cushion e. Common; widespread; desert shrub, sagebrush, and pinyon-juniper communities on many kinds of substrates; 4,800-7,500 ft, perhaps higher; late April-June (July). The taxon has white flowered (var. ovalifolium) and yellow flowered (var. multiscapum Gand.) phases. The 2 phases are sympatric over a wide range in w. North America and have been found in the same populations. In our area the white phase is most common.

Eriogonum racemosum Nutt. Redroot e. The few records seen are from or adjacent to the s. flank of the Uinta Mts. and mostly from Duchesne Co.; sagebrush communities; 6,300-7,000 ft; mid Aug.-Oct.

Eriogonum salsuginosum (Nutt.) Hook. (Stenogonum salsuginosum Nutt.) Common from Tridell e. to Dinosaur National Monument and to Bonanza (possibly to Rangley) and s. to Ouray, mostly in Uintah Co.; 1 specimen from extreme e. edge of Duchesne Co. in Pleasant Valley, also at Sheep Creek Gap in Daggett Co.; desert shrub communities and often on raw, clayey soils of formations that weather to badlands; 4,700-5,600 (6,300) ft; mid May-June (early July).

Eriogonum shockleyi Wats. Shockley w. b. Occasional; widespread in Duchesne and Uintah Cos.; only 2 records seen from e. Daggett Co., no records seen from Colorado; desert shrub, sagebrush, and pinyon-juniper communities on a variety of substrates; 4,800-6,200 ft; June. With whitish rather than yellowish flowers, our plants are referable to var. longilobum (Jones) Reveal.

Eriogonum tumulosum (Barneby) Reveal Endemic, the following specimens seen: 10 from within a 10 mi radius nw. of Duchesne; 1 from near Hanna, Duchesne Co.; 1 from near Steinaker Reservoir, Uintah Co.; and 6 from the Gates of Lodore to Vermillion Gap, Moffat Co.; desert shrub, sagebrush-juniper, and pinyon-juniper communities; 5,800-7,520 ft; May-June.

Eriogonum umbellatum Torr. With 4 more or less distinct vars. in our area.

- 1 Flowers cream or white..... var. majus
 1 Flowers yellow
 2 Leaves tomentose below, floccose to glabrous above..... var. umbellatum
 2 Leaves glabrous on both sides or loosely floccose toward the margins
 3 Inflorescence a head or headlike, not much over 1 cm long; stems usually not much over 5 cm long; plants of the Uinta Mts.; 9,200-11,500 ft..... var. porteri
 3 Inflorescence mostly umbellate, rarely headlike, over 1 cm long; stems to 50 cm long; plants rare in the Uinta Mts..... var. aureum

Var. aureum (Gand.) Reveal The few records seen are from the Tavaputs Plateau, upper Strawberry drainage and from Moffat Co.; sagebrush, bullgrass, forb-grass, aspen, and conifer communities; mostly 8,300-9,500 ft; (late June) July-Aug.

Var. majus Hook. (E. u. var. dichrocephalum Gand.; E. subalpinum Greene) Common in Strawberry Valley, apparently rare (or seldom collected) across the Uinta Mts. to Daggett Co. (no records seen from Uintah

POLYGONACEAE

Co.) and e. across the W. Tavaputs Plateau to Indian Canyon, to be expected elsewhere; sagebrush, mt. brush, dry meadow, and open lodgepole pine communities, and on open rocky slopes; 7,000-10,000 ft; July-Aug.

Var. porteri (Small) Stokes (E. porteri Small) Common in the Uinta Mts. from the Uinta River drainage and westward; on open, rocky ground, dry meadows, and open conifer forests; 8,200-11,500 ft; July-Aug.

Var. umbellatum Sulfur e. (E. neglectum Greene) Common across the Uinta Mts. and their flanks to Blue and Douglas Mts., occasional on the Tavaputs Plateau from Argyle Canyon e. to the Piceance Basin; sagebrush, pinyon-juniper, mt. brush, ponderosa pine, Douglas-fir, and bullgrass communities; 5,700-8,600 ft; June-July.

Eriogonum viridulum Reveal Green e. Endemic, locally common to abundant from Starvation Reservoir e. to Island Park and Raven Ridge near Bonanza in Duchesne and Uintah Cos.; salt desert shrub and juniper communities, most common on raw, eroding slopes of the Duchesne River and Uinta Formations, but also on other formations that typically weather to badlands including Dakota, Frontier, Morrison, Mowery, and Mancos Shale; 4,800-6,500 (7,000?) ft; mid Aug.-Oct. Probably a derivative of the E. brevicaulis complex, but more or less different by the features of the key and usually with cymes more densely flowered. Closely related to probably intergrading into E. ephedroides q.v. Occasionally hybridizing with E. corymbosum and possibly with E. microthecum.

Oxyria Hill Mountain Sorrel

Oxyria digyna (L.) Hill Perennial herbs with sour juice, from a taproot and branched crown, 6-20 cm tall rarely taller, scape or stems with 1 leaf; leaves 1-5 cm wide; inflorescence 3-10 cm long, rarely longer; flowers bisexual; tepals 4, 1-2.5 mm long, green to bright red in age, the outer 2 tepals strongly keeled, reflexed by the mature fruit, the other 2 tepals flat, erect, deciduous; stamens 6; styles 2, with expanded, fringed stigmas; achenes flattened, winged, 4-6 mm wide at maturity. Occasional; Uinta Mts.; lodgepole pine, Engelmann spruce, and alpine communities, mostly in rocky places; (rarely down to 9,600 ft on shady cliffs) 10,500-13,000 ft; June-Aug.

Polygonum L. Knotweed; Smartweed; Ladysthumb

Annual or perennial herbs, often cosmopolitan weeds; stems often with swollen joints; leaves alternate or alternate and basal, simple, entire; stipules thinly membraneous, fused and sheathing the stem, usually fringed, split, or lacerate; flowers perfect (functionally dioecious in P. cuspidatum and P. viviparum), the perianth segments usually more or less petaloid, 5-parted, the outer often largest; achenes enclosed in the persistent perianth, lenticular or trigonous, often smooth and shining.

- 1 Robust cultivated ornamentals to 1.5 m or more tall, occasionally adventive or persisting; leaves ovate, broadly rounded or truncate at base, the larger ones 8 cm or more broad
- 2 Plants annual; flowers perfect, rose to crimson, borne in terminal densely flowered, showy drooping racemes; achene lenticular, calyx not enlarging..... P. orientale
- 2 Plants perennial from rhizomes, forming clumps, dioecious; flowers white or greenish-white, borne in showy panicle racemes from the upper axils; achene trigonous, enclosed in enlarging 3-winged calyx P. cuspidatum
- 1 Adventive weeds or indigenous plants, not or rarely cultivated, generally much less than 1 m tall; leaves various but usually much narrower than 8 cm
- 3 Plants twining, the stems sprawling or climbing; leaves hastate to triangular cordate..... P. convolvulus
- 3 Plants not twining or climbing; leaves usually tapered to the petiole, never hastately lobed
- 4 Flowers borne in peduncled spikes or spikelike racemes, these terminal or terminal and axillary, the pedicels not adnate to the leaf sheaths; leaves not jointed at the base
- 5 Plants perennial; inflorescences all terminal
- 6 Flowers bright pink to rose-red; plants aquatic or semiaquatic (rarely terrestrial), stems prostrate to ascending, rooting at the nodes; basal leaves absent; stem leaves floating or emergent, petioled, elliptic to lanceolate, mostly 1.5-6 cm wide..... P. amphibium
- 6 Flowers white or pale pinkish; plants terrestrial (though often growing in wet places), erect from a tuberous caudex; basal leaves present, petioled, stem leaves sessile, narrowly lanceolate to linear, strongly reduced upward, to 1 cm wide
- 7 Inflorescence short-cylindric; flowers crowded in a dense headlike raceme mostly 1-2 cm wide, 1.5-4 times longer than wide; lower flowers not replaced by bulblets; plants mostly 15-35 cm tall..... P. bistortoides
- 7 Inflorescence a slender, elongate, spikelike raceme 0.4-0.8 cm wide, mostly many times longer than wide; lower flowers replaced by bulblets; plants mostly 5-15 cm tall..... P. viviparum
- 5 Plants annual; inflorescence terminal and axillary

- 8 Lower leaf surface glabrous to short hairy, neither glandular-punctate nor white-woolly; stipular sheath prominently ciliate with bristles ca 1 mm long; perianth usually distinctly pink or rose colored..... P. persicaria
- 8 Lower leaf surface glandular punctate beneath or sometimes white-woolly; stipular sheath without bristles (sometimes obscurely short-ciliate with soft hairs); perianth usually greenish or merely pink-tinged..... P. lapathifolium
- 4 Flowers axillary in 1 to few flowered clusters, or if in terminal spikelike racemes then subtended by bractlike leaves, the pedicels adnate to the leaf sheaths; inflorescence never peduncled; leaves with a hingelike joint at the base of the blade
- 9 Leaves and flowers densely crowded above, forming a leafy-bracteate terminal spike; plants mainly less than 10 cm tall..... P. kelloggii
- 9 Flowers more remote, in small axillary clusters or solitary, or if in terminal spikes the bracts much reduced, not leafy; plants size various
- 10 Plants usually prostrate or decumbent; more or less equitably leafy and floriferous throughout; leaves flat mostly obtuse or rounded at the top, sometimes deciduous by fruiting; achenes dull brown, finely striate-roughened..... P. aviculare
- 10 Plants erect, the leaves reduced upwards, the flowers borne mostly in the upper axils in a lax racemelike inflorescence, rarely floriferous throughout; leaves mostly acute; achenes smooth and glossy
- 11 Plants usually 5 dm or more tall, introduced weeds of disturbed places, stems terete, finely striate; leaves flat; mature achenes light to dark brown; pedicels erect
- 12 Calyx margins yellowish-green; achenes mostly 3.0-3.6 mm long; plants of dry or wet places..... P. ramosissimum
- 12 Calyx margins roseate; achenes mostly 2.0-2.6 mm long; plants of wet, usually brackish places..... P. argyrocoleon
- 11 Plants rarely as much as 5 dm tall, usually much shorter, native, of disturbed places or not; stems angled; leaves revolute; mature achenes black; pedicels erect or deflexed..... P. douglasii

Polygonum amphibium L. Water 1. [P. coccineum Muhl.; P. natans (Michx.) A. Eaton] Occasional across the Basin; in mud and shallow water of reservoir and lake margins, river bottoms, streams and swamps, in Scirpus, cattail, Tamarix, meadow, and aquatic communities; 4,600-9,400 ft; June-Aug.

Polygonum argyrocoleon Steud. Uncommon; the few specimens placed here are from saline marshland in Uintah Co. (at the Duchesne River near Randlett and at Stewart and Pelican Lakes) and from a chained pinyon-juniper community of Nutters Ridge, Duchesne Co.; June-Sept. Polygonum argyrocoleon, reported by Kearney and Peebles (1969) and Munz (1973) as an Asian introduction widely established in California and Arizona, has not previously been recognized as part of the Utah flora, specimens having been referred to the similar but generally more robust P. ramosissimum. More collections are needed.

Polygonum aviculare L. Dooryard-grass, prostrate k., dishwater-grass, devil's shoe-strings. [P. buxiforme Small; P. aviculare var. littorale (Link) Koch; P. monspeliensis Thieb. ex Pers.] Common; sidewalks, roadsides, or otherwise disturbed and trampled areas, usually in at least moderately mesic places; 4,600-8,700 ft; June-Oct. An extremely various cosmopolitan species-complex. Material long designated in this country as P. aviculare may include as well P. arenastrum Bordeau (Styles 1962); as the older name it would take precedence over P. aviculare if the 2 taxa are treated conspecifically. It seems better to retain here the traditional name P. aviculare until our material is examined by monographers. Flowers and others 96 (UT) reported as P. erectum L. for Williams Ranch (area now inundated by Flaming Gorge Reservoir) belongs here.

Polygonum bistortoides Pursh American bistort. (P. bistortoides var. liniarifolium Small) Common; Uinta Mts.; in wet or drying meadows and on rocky or morainal slopes, in alpine forb-grass, carex-wet meadow, Dryad, and sagebrush-grassland communities and in openings in lodgepole pine or spruce-fir forests; 7,050-11,500 ft; June-Aug.

Polygonum convolvulus L. Black bindweed, dullseed cornbind. Introduced from Europe; no specimens seen, but reported by Graham (1937) from a garden at Lapoint (Graham 9987). To be expected in waste places along fences and in gardens.

Polygonum cuspidatum Sieb. & Zucc. Fleece-flower. The few specimens seen are from a roadside near the Duchesne River near Rock Creek road junction, and along ditches and canals at Lapoint and Vernal, cultivated, adventive, and persisting; Aug.-Sept.

Polygonum douglasii Greene Douglas k. We have 2 well-marked vars.:

- 1 Flowers deflexed, the base with a persistent peglike stipe 0.1-0.2 mm long; pedicel and stipe roseate..... var. douglasii
- 1 Flowers erect, the base sessile, dehiscent without a peglike stipe; pedicel prevailing green..... var. johnstonii

Var. douglasii Widespread; juniper-mt. brush to the sub alpine zones, usually in openings or dry meadows, in silver sage, Purshia-sagebrush, and forb-grass communities, in lodgepole-aspen-fir parkland,

POLYGONACEAE

and in rocky openings in conifer forests; 7,500-10,300 ft; July-Sept. Reports of P. d. var. latifolium (Engelm.) Greene [P. montanum (Small) Greene] are probably based on specimens belonging here.

Var. johnstonii Munz Sawatch k. (P. sawatchense Small) Widespread; mostly in the pinyon-juniper and mt. brush zones, usually in sagebrush openings with Purshia, snowberry, forbs, or grass; our records from 7,000-8,500 ft; June-Sept.

Polygonum kelloggii Greene Kellogg k. (P. watsonii Small) Occasional to locally common in the Uinta Mts., and reported by Graham (1937) from the Tavaputs Plateau; in openings of mt. brush, silver sage, aspen, lodgepole, and spruce-fir communities, usually in vernal wet places at margins of drying swales, in wet meadows, and in rock crevices; 7,400-10,600 ft; June-Sept.

Polygonum lapathifolium L. Pale s., willow-weed, curly top l. (P. incanum Schmidt.) Uncommon; our records from along the Green River in Brown's Park, Daggett Co. (Neese & England 6669), and from the Ouray National Wildlife Refuge (B. Welsh & Moore 177, 215); on sand bars and mud flats, disturbed marsh communities.

Polygonum orientale L. Prince's feather, kiss-me-over-the-fence. A single specimen (Neese 15047) from a Vernal garden, where (according to the owner, Celestia Rasmussen) it has been self-seeding for many years.

Polygonum persicaria L. Spotted l. [Persicaria maculata (Raf.) S. F. Gray] Occasional; weed of disturbed places along flood plains and ditches and in gardens and pastures; July-Oct.

Polygonum ramosissimum Michx. Bushy k. Uncommon; the 2 somewhat doubtful records (Goodrich 14982, 13600) from Duchesne Co. (Sowers Canyon and Hancock Cove), in swampy ground.; Aug.-Sept.

Polygonum viviparum L. Alpine bistort, viviparous bistort. Common; montane and alpine zones in the Uinta Mts.; wet or drying sedge-grass meadows, openings of spruce-fir and lodgepole pine forests, and rocky meadows of the upper slopes of high peaks; 8,100-11,900 ft; June-Sept.

Rumex L. Dock; Sorrel

Annual or perennial glabrous or scabrous herbs; leaves alternate and basal, simple, entire or nearly so (or hastate in R. acetosella); tepals (4) 6 in 2 series with 3 in each series, subequal at flowering, the outer ones not enlarged, mostly inconspicuous, the inner 3 enlarged and winglike on the mature fruit, and then referred to as valves; valves enveloping the achene, membranous, veiny, sometimes bearing a grainlike swelling (callus) on the midvein; stamens 6; styles 3, with numerous threadlike branches; achenes sharply 3-angled.

- 1 Plants mostly unisexual, montane, 15-50 (70) cm tall, acid to the taste; valves small, without callosities; stems slender
 - 2 At least a few (often several) of the leaf blades strongly hastate, 1-4 cm long; pedicel jointed immediately below the flower; plants more or less weedy from spreading shallow roots... R. acetosella
 - 2 Leaf blades not hastate, the larger ones 4-7 cm long or longer; pedicels jointed below midlength; plants from a thick taproot..... R. paucifolius
- 1 Plants bisexual, montane or of low elevations, of various stature, not acid to the taste; valves usually conspicuously enlarged and/or bearing callosities; stems often stout
 - 3 Plants rhizomatous, of dry places at low elevations, rarely over 40 cm tall; valves 1-3 cm wide at maturity
 - 4 Valves 5-10 mm wide from midrib to margin (about 10-20 mm wide overall); basal tuft of leaves well developed in young plants; rhizomes bearing enlarged tubers..... R. hymenosepalus
 - 4 Valves 10-15 mm wide from midrib to margin (about 20-30 mm wide overall); basal tuft of leaves lacking even in young plants; rhizomes lacking tubers..... R. venosus
 - 3 Plants not rhizomatous, of various habitats but often where moist to wet, often over 40 cm tall; valves less than 1 cm wide at maturity
 - 5 Valves conspicuously toothed or with bristly margins, the teeth or bristles from 1/2 as long to longer than the width of the body, with callosities
 - 6 Plants annual, 5-50 (80) cm tall; valves bristly, many of the bristles longer than the width of the body, each valve with a narrow callus as high or higher than wide; pedicels jointed at the base; leaves linear-oblong, elliptic, to lanceolate, to 2 (3.5) mm wide..... R. maritimus
 - 6 Plants perennial, of various stature but often over 50 cm tall; valves either sharply dentate and not bristly or else usually only 1 of the 3 valves with a callus; pedicels jointed below the middle but usually distinctly above the base
 - 7 Leaf blades truncate to cordate basally, less than 3 times as long as wide; valves more or less bristly, usually only 1 of the 3 with a narrow callus; plants 60-120 cm tall..... R. obtusifolius
 - 7 Leaf blades narrowed to the petiole, over 3 times as long as wide; valves sharply dentate, each with a rounded callus; plants known from Pelican Lake and along the flood plains of the Green and Duchesne Rivers..... R. stenophyllus
 - 5 Valves entire or minutely toothed with rounded teeth, with or without callosities
 - 8 Valves cordate at the base, the larger ones 5-8 mm wide, at least 1 of the 3 with a callus; plants (0.6) 1-2 m tall; leaves mostly basal, the larger blades 20-30 cm long, to 15 cm wide, truncate to cordate basally..... R. patientia

- 8 Valves not cordate, often less than 5 mm wide, or none of them with a callus; plants and leaves various
- 9 Most fruits with all 3 valves with reticulate callosities; veins on the lower surface of leaves conspicuously raised and scabrous, the intervals granular-scabrous; lower leaves larger than the mid-stem leaves, often with undulate crisped margins; larger petioles often over 4 cm long; stems rarely branched below the inflorescence; plants (30) 50-150 cm tall..... R. crispus
- 9 Valves without callosities (or if with callosities as in R. salicifolius, then plants different from above in several other features)
- 10 Lower leaves mostly smaller than those of mid-stem, usually withering and deciduous before the upper leaves, the petioles rarely over 4 cm long, the blades linear, linear-elliptic, or rarely narrowly lanceolate, (4) 5-8 times as long as wide, mostly gradually tapered to the petiole; stems often branched below the inflorescence or at least some of the larger leaves with smaller leaves in the axils; valves with or without callosities; plants common, 20-60 cm tall..... R. salicifolius
- 10 Basal leaves larger than the progressively reduced stem leaves, the longer petioles well over 4 cm long, the blades oblong-ovate to oblong-lanceolate, mostly truncate or cordate at the base, the larger ones 10-30 cm; stems unbranched below the inflorescence, without smaller leaves in the axils of larger ones; valves without callosities; plants uncommon, 50-150 cm tall..... R. occidentalis

Rumex acetosella L. Sheep s. Introduced from Europe; occasional from Strawberry Valley and across the Uinta Mts. to the Yellowstone drainage, and infrequent e. of there, also E. Tavaputs Plateau; sagebrush, forb-grass, aspen, snowbank, and open lodgepole pine and Engelmann spruce communities; 7,400-11,000 ft; July-early Sept.

Rumex crispus L. Curly d. Introduced from Europe; occasional; widespread and somewhat weedy; roadsides, ditches, fencelines, margins of ponds, gardens, fields, floodplains, and riparian communities; 4,700-7,500 (10,100) ft; June- Aug.

Rumex hymenosepalus Torr. Canaigre. Occasional to locally common; all specimens seen are from Daggett and Uintah Cos.; desert shrub, sagebrush, and juniper communities, often on sandy clay to heavy clay soils; 4,700-5,600 ft; May-June.

Rumex maritimus L. Golden d. (R. fueginus Phil.; R. persicarioides L.) Occasional; widespread; drying mud and in shallow water at margins of ponds, lakes, flood plains of riparian communities, and along ditches and streams; 4,700-7,700 ft; July-early Oct. Our plants are referable to var. fueginus (Phil.) Dusen.

Rumex obtusifolius L. Bitter d. The 1 specimen seen (Goodrich 21203) is from Uinta Canyon, probably introduced via hay.

Rumex occidentalis Wats. Western d. The 4 specimens seen are from Rock Creek, Uinta and Whiterocks Canyons, and Cart Creek, Uinta Mts.; riparian communities; 7,600-8,130 ft; Aug.

Rumex patientia L. Patience d. Introduced from Europe; Graham (1937) cited 1 specimen from Post Canyon, E. Tavaputs Plateau; 7,800 ft; July.

Rumex paucifolius Nutt. Alpine or mt. s. Infrequent to occasional; Wasatch Co. (Strawberry Valley to Current Creek and W. Tavaputs Plateau) and Daggett Co. (Uinta Mts.); dry meadow, sagebrush, aspen, and streamside communities, and roadsides; 7,500-9,650 ft; June-Aug.

Rumex salicifolius Weinm. Willowleaf d. [R. triangulivalvis (Danser) Rech.] Most common from Strawberry Valley and across the Uinta Mts., infrequent on the E. Tavaputs Plateau and low elevations in the Basin; aspen, tall forb, sagebrush-aspen, spruce, and rarely saltgrass-willow communities, margins of ponds and reservoirs, and along roads; (5,300) 7,500-11,000 ft; June-Aug. Plants without callosities on the valves have been referred to as var. montigenitus Jeps. (R. utahensis Rech. f.). Those with callosities on at least some of the valves have been referred to as var. mexicanus (Meisn.) C. L. Hitchc. (R. mexicanus Meisn. in DC.). The distinction seems rather arbitrary as it splits plants of otherwise uniform populations. Both vars. are considered a part of the ssp. triangulivalvis Danser complex.

Rumex stenophyllus Ledeb. Introduced from Eurasia; locally common to abundant along the Green River from Jensen to s. of Ouray and up the Duchesne River to Myton, and at Pelican Lake; flood plains, lake margins, and disturbed swamp communities; 4,700-4,900 ft; Aug.-Sept.

Rumex venosus Pursh Veiny d., winged d., wild begonia. The 1 specimen seen (Neese & Welsh 7392) is from Kennedy Wash, 7 mi se. of Red Wash Townsite; desert shrub community, sandy soil; 5,100 ft, and Harrington 1910 (CS) reported (Bradley 1950) for 10 mi w. of Maybell, sand dunes, 5,900 ft; May.

POLYPODIACEAE Common Fern Family

Stem consisting of a creeping to short and erect or branching caudex, bearing scales or hairs; (aerial stems lacking); leaves 1-3 times pinnate (ours), with petioles unfolding with fiddle-head shape as they mature; reproduction by spores, the spores grouped in sporangia, the sporangia generally grouped into asorus; sori marginal or on the lower surface of leaves, naked or more often covered by a membranous indusium.

- 1 Leaves once pinnate, or bipinnate with fewer than 40 ultimate segments

POLYPODIACEAE

- 2 Base of plant with dense tufts of brown-woolly hairlike scales; leaflets more than 5, entire or lobed but not toothed..... Pellaea
- 2 Base of plant not brown-woolly; leaflets toothed or 5 or fewer in number
 - 3 Leaves 20-50 cm long; leaflets 25-50 per side of the rachis, spinulose-serrate, the larger ones 1-4.5 cm long; petioles scaly throughout or nearly so, less than 1/3 as long as the blades..... Polystrichum
 - 3 Leaves 3-15 cm long; leaflets fewer, if more than 3 per side of the rachis then otherwise different from the above; petioles not scaly, over 1/3 longer than the blades..... Asplenium
- 1 Leaves 2-3 times pinnate, mostly with more than 40 ultimate segments
 - 4 Leaf blades (excluding petioles) (25) 30-100 cm long or longer; plants usually of moist woods or wet places
 - 5 Basal pair of primary leaflets (pinnae) often the largest, the other pairs progressively reduced toward the tip of the leaf; leaflets more or less villose or villose-puberulent beneath..... Pteridium
 - 5 Middle pair of primary leaflets larger than the basal or apical pairs; the leaflets glabrous or puberulent beneath along the midrib..... Athyrium
 - 4 Leaf blades (excluding petioles) 2-25 (35) cm long; plants mostly in rock crevices of cliffs and ledges or on talus slopes
 - 6 Plants with 2 types of strongly contrasting leaves, 1 type sterile with flattened, rounded ultimate segments with lobed or dentate or serrate margins, the other type fertile with linear, revolute, entire ultimate segments; the fertile leaves taller than the sterile ones... Cryptogramma
 - 6 Plants not as above
 - 7 Leaves strongly villose-tomentose beneath with tawny or rust colored hairs..... Cheilanthes
 - 7 Leaves glabrous or glandular or sparsely pubescent, but not villose-tomentose
 - 8 Petioles wiry, persisting for some years, the old persistent bases 1-8 cm long, generally more numerous than the leaves of the current season; veins of the ultimate leaflets not prominent; indusium various..... Woodsia
 - 8 Petioles delicate, not persisting; veins of the ultimate leaflets conspicuous, ending in the tips of the marginal teeth; sori cupped in a quickly deciduous indusium..... Cystopteris

Asplenium L. Spleenwort

Leaves clustered on a thickened rootstock beset with slender dark scales; petioles slender, wiry, green to brown; sori elongate, borne on veinlets; indusium hyaline, flaplike, attached along the vein that bears the sorus, and opening along the side toward the midvein of the leaf segment.

- 1 Leaf blades irregularly forked, with 2-5 narrow segments 10-20 mm long, the segments entire or with a few slender teeth and with a single compound sorus running its whole length..... A. septentrionale
- 1 Leaf blades uniformly pinnate, with about 7-25 opposite or offset pairs of leaflets, the leaflets 3-8 mm long, about as broad as long, crenulate or denticulate and with few to several sori..... A. viride

Asplenium septentrionale (L.) Hoffm. Grass-fern. The 2 specimens seen (T. F. Wieboldt 1460A UTC and Goodrich 21900) are from Red Canyon Rim, Daggett Co. and vicinity of Lena Peak, Uintah Co.; rock crevices; 7,400-8,850 ft.

Asplenium viride Huds. Green s. The 3 specimens seen are from Dyer Mt. and S. Fork of Rock Creek, Uinta Mts.; crevices of limestone outcrops; 10,200-10,500 ft.

Athyrium Roth Ladyfern

Athyrium felix-femina (L.) Roth Common l. Leaves closely clustered on a short, stout rootstock that is densely clothed with dark marcescent petiole bases, (25) 30-100 cm long or rarely longer; petiole flattened below, 3-10 mm wide, bearing brown or blackish scales toward the base, blade 2-3 times pinnate with about 20-35 pairs of opposite or offset primary leaflets; the larger ones 4-5 cm long, 1-5 cm wide, each with 12-20 pairs of toothed to pinnatifid mostly offset pinnules; indusium often deciduous; sori borne toward the center of the ultimate leaflets. The few records seen are from the Uinta Mts.; sphagnum bogs and other wet places in woods; 7,320-8,000 ft.

Cheilanthes Sw. Lipfern

Cheilanthes feei Moore Fee l. Leaves few to several and congested on a short thick caudexlike rhizome, the rhizome densely beset with long narrow hyaline scarious brown scales; petioles mostly 3-10 cm long, dark purplish-brown, the blade 3-13 cm long, 1.5-4 cm wide, 3-4 times pinnate, loosely and copiously villose-tomentose beneath usually with tawny or rusty hairs, primary leaflets mostly in 6-12 opposite or offset pairs, the ultimate segments 1-1.5 mm long, rounded, the margins in rolled; sori borne on ends of veins just within the margins of the ultimate leaflets, the point of attachment covered by the reflexed margins that form a continuous unmodified or partly scarious indusium. The few specimens seen are from

scattered locations along canyons of the Green River and flanks of the Uinta Mts.; rock crevices of rock outcrops and cliffs; 7,000-7,400 ft.

Cryptogramma R. Br. Rockbrake

Cryptogramma crisa (L.) R. Br. American r., parsley-fern. (C. acrostichoides R. Br.) Leaves congested on a stout rootstock, some sterile other fertile as described in the key, 5-25 cm long or the fertile ones to 35 cm long including the petiole; old persistent petioles and scales 4-6 mm long clothing the rootstock; ultimate segments of sterile leaves to 8 mm long and 4 mm wide, those of the fertile leaves 4-12 mm long, 1-2 mm wide, sori eventually covering the whole lower surface of the revolute pinnula. Occasional, Uinta Mts.; crevices of ledges and cliffs and among rocks on talus slopes; mostly above 9,500 ft to timberline.

Cystopteris Bernh. Bladderfern

Cystopteris fragilis (L.) Bernh. Brittle b. Leaves scattered on a scaly, thickened rootstock, delicate, 5-35 (40) cm long, the blades 1.5-8 cm wide, (1) 2-3 times pinnate with 8-18 pairs of opposite or offset primary leaflets; numerous, with prominent veins on the lower side, with sori borne along the veins, ultimate leaflets cupped in a deciduous indusium. Occasional; Uinta Mts.; crevices of rocks in ledges and cliffs, talus slopes, boulder fields, and often but not always on the shady side of rocks; 6,500 ft to above timberline.

Pellaea Link Cliffbrake

Rhizomes branching, forming a multicapital caudex appearing brown-woolly with dense, brown scales; leaves evergreen, firm, 1-2 times pinnate, glabrous or sparsely hairy; petioles slender and wiry, reddish-brown or blackish-purple, the bases often persistent; sori borne on vein ends just within the reflexed margins of leaflets that form a continuous indusium, the mature sporangia often conspicuously exerted.

- 1 Petioles with a series of cross-grooves, the persistent bases more numerous than the active leaves; middle and lower leaflets usually bifid, often with unequal segments and mittenlike..... P. breweri
 1 Petioles mostly without cross-grooves, the persistent bases usually fewer than the active leaves; leaflets not bifid, the lower ones often with 1-2 pairs of secondary leaflets..... P. glabella

Pellaea breweri DC. Eat. Brewer c. The few records seen are from canyons of the Yampa and Green Rivers in and near Dinosaur National Monument, Dry Fork Canyon, and w. edge of the area; rock crevices of cliffs and ledges.

Pellaea glabella Mett. Dwarf c., smooth c. [P. suksdorfiana Butters; P. atropurpurea (L.) var. suksdorfiana (Butters) Morton] Reported from Dinosaur National Monument and Douglas Mt. (Zenobia Peak) area; rock crevices of ledges and cliffs and talus; mostly from s. of our area; quite easily confused with the preceding taxon, and possibly all of our specimens belong there.

Polystichum Roth Hollyfern

Polystichum lonchitis (L.) Roth Mtn. h. Evergreen fern with short petioles and elongate nearly linear blades; leaflets with a large tooth or lobe at the base; sorus round, with a peltate indusium. Known from among rocks in Hades Canyon, 9,500 ft, Duchesne Co. (Flowers 3215 UT).

Pteridium Gled. ex Scop. Bracken; Brackenfern

Pteridium aquilinum (L.) Kuhn. Western b. Plants arising from deep-seated elongate, branching rhizomes, often forming colonies; leaves (30) 50-200 cm tall overall, the erect petioles usually shorter than the blade, the blade 2-3 times pinnate, glabrous or sparsely hairy above, more or less densely villose or villose-puberulent beneath; primary leaflets widely spreading, often at right angles to the rachis; sori borne on the veins of the ultimate leaflets, protected by the narrowly in-rolled indusium margin of the leaf segments and on the inner side by a delicate, hyaline indusium. Scattered but locally abundant; Uinta Mts.; rather moist to wet places in woods; 7,000-10,000 ft. Our plants are referable to ssp. aquilinum var. pubescens Underw.

Woodsia R. Br. Woodsia

Leaves usually tufted on a thickened short rhizome that is covered with yellowish to dark brown scales and beset with few to numerous persistent, slender, wiry petioles from previous years; sori laminar, provided with an inconspicuous inferior indusium consisting of septate hairs (W. scopulina) or a small sac that soon ruptures irregularly to form a small disc with spreading, unequal segments (W. oregana), the differences in the indusia not detected without high magnification.

POLYPODIACEAE

- 1 Leaves glabrous or rarely glandular, 7-25 cm long overall, the petiole about 1 mm thick, dark reddish-brown toward the base, the blade 4-15 cm long, 1-4.5 cm wide, with 7-17 pairs of primary leaflets..... W. oregana
- 1 Leaves glandular and with glandless, septate hairs, at least on 1 side, 8-35 cm long, the petiole mostly 1-2 mm thick, the blade up to 22 cm long, and up to 7 cm wide, with 9-25 pairs of primary leaflets..... W. scopulina

Woodsia oregana DC. Eat. Oregon w. The few records seen are from rocky canyons of the Uinta Mountains and Dinosaur National Monument; 6,700-7,500 ft. Small plants of W. scopulina are much like those of W. oregana. The 2 apparently hybridize (Cronquist and others 1977).

Woodsia scopulina DC. Eat. Rocky Mt. w. Specimens seen are from Uinta and Lake Fork drainages of the Uinta Mts.; among rocks at or above timberline; (8,560) 10,800-11,600 ft.

PORTULACACEAE Purslane Family

More or less succulent, usually glabrous annual or perennial herbs; leaves alternate, opposite, or basal, simple, entire; flowers bisexual, regular or nearly so; sepals mostly 2 (6-8 in Lewisia); petals separate, mostly 4-5, imbricate; stamens usually as many as and opposite the petals; ovary superior or partly inferior, 1-celled, the styles 2-5 or sometimes more; fruit a loculicidal or circumscissile capsule; seeds 1-many, often smooth and shining.

- 1 Plants weedy annuals, often in gardens; stems prostrate with alternate as well as opposite leaves; flowers yellow, inconspicuous..... Portulaca
- 1 Plants perennial, not weedy, erect or ascending; leaves various
 - 2 Flowers in a headlike cluster, numerous; leaves basal or nearly so, forming rosettes; plants rare, known from 11,900 ft..... Calyptridium
 - 2 Flowers not in a headlike cluster, solitary or if few then leaves not forming rosettes and usually 1 or more pairs cauline
 - 3 Plants scapose; scapes sometimes with a pair of bracts at or below the middle, mostly simple and with a solitary, terminal flower, rarely forked; or stems with 1 pair or a whorl of 3-5 leaves near ground level and with 1-6 flowers, but then the leaves not over 3 mm wide; capsules circumscissile near the base, the lid sometimes splitting upward; sepals more than 2 or petals or stamens more than 5 or stigmas more than 3..... Lewisia
 - 3 Stems usually with 1 or more pairs of opposite leaves well above the base; at least some of the leaves over 3 mm wide; stems often with more than 1 flower; capsules dehiscent downward by 3 valves; sepals 2; petals and stamens mostly 5; stigmas 3
 - 4 Stems with 3 or more pairs of opposite leaves, from rhizomes or stolons..... Montia
 - 4 Stems with 1 pair of opposite leaves, from globose corms or fleshy thickened taproot..... Claytonia

Calyptridium Nutt.

Calyptridium umbellatum (Torr.) Greene Pussypaws. (Spraguea umbellata Torr.) Plants annual or short lived perennial, 2-10 cm tall, glabrous; leaves 1-3 cm long; heads 2-4 cm in diameter; sepals 2, white to pink, enlarging and often purplish in age, 4-10 mm long; petals 4, much smaller than the sepals, quickly withered, stamens 3; styles 2-lobed; capsules fully dehiscent by 2 valves; seeds several. Known from rocky alpine slopes at 11,900 ft, head of Lake Fork drainage, Uinta Mts. (Wiens 5499 UT).

Claytonia L. Springbeauty

Perennial glabrous plants; stems usually with 1 pair of opposite leaves; inflorescence of terminal racemes, 1-2 bracts at the base of the racemes; sepals 2, persistent; petals 5; stamens 5; styles 3; ovary superior; capsules dehiscent downward by 3 valves; seeds 1-6.

- 1 Plants from fusiform, fleshy taproots; basal leaves several, spatulate, or orbiculate; inflorescence not exceeding the leaves..... C. megarrhiza
- 1 Plants from globose corms; basal leaves few or none, oblanceolate to ovate; inflorescence exceeding the leaves..... C. lanceolata

Claytonia lanceolata Pursh Lanceleaf s., western s. Occasional to locally abundant in Strawberry Valley and surrounding hills, Blue Mt., Diamond Mt., and Uinta Mts. w. of Rock Creek and e. of Dry Fork, no specimens seen from between these drainages; sagebrush, aspen and various conifer communities, often at the edge of melting snow; 7,600-10,200 ft; May-July. Our materials are referable to var. lanceolata.

Claytonia megarrhiza (Gray) Parry Alpine s. Apparently infrequent; Uinta Mts.; near or above timberline; July-Aug. Plants of the area are referable to var. megarrhiza.

Lewisia Pursh Bitterroot; Lewisia

Perennial, somewhat fleshy, succulent, scapose plants from corms or thick fleshy roots and a short caudex; inflorescence scapose; scapes often with a pair or whorl of bracts; sepals, petals, stamens, and styles various in number; ovary superior; capsule circumscissile at the base then splitting upward.

- 1 Flowers (1) 2-10 (15) in a subumbellate inflorescence; stems delicate, tapering to and easily detached from a bulblike globose corm; petals 4-7 mm long; stamens (3) 5; styles 3-5..... L. triphylla
- 1 Flowers solitary; stems from caudices or fleshy roots; petals 6-35 mm long; stamens 4-50; styles 3-8
 - 2 Sepals 4-9, 10-25 mm long, petallike; petals 12-18, 10-35 mm long; flowers usually exceeding the leaves; stems with a whorl of bracts, jointed just below the bracts; stamens 20-50; styles 4-8.....
..... L. rediviva
 - 2 Sepals 2, 2-12 mm long; petals 5-9, 6-17 mm long; leaves usually exceeding the flowers; stems with a pair of bracts, not jointed; stamens 4-14; styles 3-6..... L. pygmaea

Lewisia pygmaea (Gray) Robins. Least 1. [Oreobroma pygmaea (Gray) Howell] Occasional or locally common; Uinta Mts., Blue Mt., and Strawberry Valley, no specimens seen from the Tavaputs Plateau except where adjacent to Strawberry Valley; many plant communities; 7,500 ft to above timberline; May-Aug. Plants of the area are referable to var. pygmaea.

Lewisia rediviva Pursh B. Infrequent or occasional; specimens seen are all from Daggett and Moffat Cos.; sagebrush and pinyon-juniper communities, rocky hills and ridges; 7,200-8,400 ft; June-July.

Lewisia triphylla (Wats.) Rob. in Gray Threeleaf 1. Known from near Mirror Lake, Uinta Mtns., 10,600 ft (Goodrich 14705), and from adjacent to our area in the vicinity of Mirror Lake; open conifer woods and open rocky slopes, often near melting snow; June-Aug.

Montia L.

Montia chamissoi (Ledeb. ex Spreng.) Greene Water springbeauty. Glabrous perennial herbs from slender often bulblet-bearing rhizomes and nearly leafless stolons, 5-20 cm tall; leaves mostly cauline, mostly opposite, sessile or short petioled, 1.5-5 cm long, 3-17 mm wide, mostly oblanceolate, entire; flowers 3-10, in terminal and axillary racemes, often replaced by bulblets; pedicels to 3 cm long; sepals 2; petals 5, 4-8 mm long, white or pinkish; stamens usually 5; capsules 1-1.5 mm long, obovoid; seeds 1-3, black. Occasional and locally common; Strawberry Valley; silver sagebrush-grass and meadow communities; June-July.

Portulaca L. Purslane

Portulaca oleracea L. Glabrous, succulent annual; stems prostrate, 2-30 cm long, freely branched and radially spreading; leaves 5-40 mm long; 3-20 mm wide; flowers sessile, solitary, axillary and in small clusters at the tips of branches; sepals 2, ovate, 3-4 mm long, united below, the tube fused to the lower part of the ovary; petals 5 (4-6), yellow, about equal to the sepals; stamens 5-12; ovary partly inferior, 1-chambered; the stigmas 4-6; capsule 4-9 mm long, circumscissile below the persistent sepals; seeds black. Common garden weed and in other places of cultivation, probably not persisting without cultivation; not expected over 7,000 ft; May-Oct. After weeding, the succulent stems are capable of taking root before they dry. Successful weeding requires removing all plant parts away from cultivated areas.

POTAMOGETONACEAE Pondweed Family

Potamogeton L. Pondweed

Aquatic in shallow or sometimes deep ponds and lakes and slow-moving streams, perennial, rhizomatous herbs; leaves alternate or some opposite, simple, entire or minutely toothed; stipules prominent, but sometimes deciduous; flowers bisexual, sessile or subsessile in whorls, on axillary peduncles; perianth inconspicuous, of 4 oval, short-clawed segments; stamens 4, fused with the claws of the perianth segments; pistils 4, free, each 1-chambered; the short style persistent as a beak on the achenes or lacking. The stipules are often referred to in the keys. They are often best observed on younger leaves as they often quickly shred into threadlike fibers and fall away.

- 1 Leaves 0.2-5 mm wide, linear to filiform, all submerged; peduncles slender or short; spikes usually interrupted with well-spaced whorls of flowers or less than 1.5 cm long; leaves or stipules sheathing
- 2 Leaves sheathing at the base, the blade diverging from the stem well above the point of attachment (node), the sheath 5-30 mm long; stipules fused with the sheathing part of the leaves and exerted beyond the sheath as a ligule; spikes 10-50 mm long, usually with interrupted or well-spaced whorls or flowers; peduncles 1-15 (25) cm long
- 3 Style lacking, the achenes beakless, the stigma persisting on the achene as a small flat disc; leaves 0.2-5 mm wide, 1-7 nerved, obtuse to minutely apiculate; sheaths 0.5-2 cm long.....
..... P. filiformis

POTAMOGETONACEAE

- 3 Style persisting on the achenes as a beak to 0.5 mm long; leaves to 0.8 mm wide, 1-3 nerved, mostly long tapering; sheaths 1-3 cm long..... P. pectinatus
- 2 Leaves not sheathing; stipules free from the leaves and sheathing the stems, the sheath 3-15 mm long; spikes 1-15 mm long
- 4 Spikes 1-5 mm long; peduncles 3-15 (20) mm long; sheaths of stipules 5-15 mm long; achenes with an irregularly toothed or wavy dorsal ridge..... P. foliosus
- 4 Spikes 6-15 mm long; peduncles (4) 10-50 (80) mm long; sheaths of stipules 3-8 mm long; achenes with an obscure dorsal keel..... P. pusillus
- 1 Some of the leaves over 5 mm wide, all submerged or more often some floating; peduncles comparatively stout; spikes rather densely flowered throughout and not much interrupted, 1-6 cm long, submerged or emerged; leaves not sheathing; stipules not sheathing or weakly so in P. crispus
- 5 Leaves sessile or the blades gradually tapering to short petioles, the petioles not over 5 mm long, all submerged, or if some floating then the floating ones only slightly if at all different from the submerged ones
- 6 Leaves all sessile, auriculate-clasping at the base, or if not clasping then wavy and finely serrate, all submerged, linear or lanceolate; stems not reddish
- 7 Leaves finely serrate, linear or nearly so, merely sessile or slightly clasping, 3-12 mm wide, 2 or more pairs of opposite ones often present; stipules 0.3-0.8 cm long, more or less sheathing but soon shredding into filiform fibers; spikes 1-2 cm long, submerged.... P. crispus
- 7 Leaves entire, conspicuously auriculate-clasping, (5) 10-20 mm wide, all alternate; stipules 1-2 cm long, not sheathing; spikes 1.5-4 cm long, elevated just above the surface of the water P. richardsonii
- 6 At least the upper leaves usually short-petioled, sometimes all sessile, but not clasping, not wavy or serrate, some floating or all submerged, more or less narrowly elliptic, linear or narrowly lanceolate
- 8 Leaves (5) 7-15 (20) mm wide; stipules (1) 1.5-2.5 (4) cm long; stems often reddish or reddish brown..... P. alpinus
- 8 Leaves (10) 20-40 (50) mm wide; stipules (2.5) 3-8 cm long; stems not reddish; plants often with floating strongly petiolate leaves with expanded blades..... (see P. gramineus and P. illinoensis below)
- 5 Floating and sometimes submerged leaves conspicuously divided into expanded blades and elongate petioles, the petioles over 5 mm long
- 9 Submerged leaves apparently reduced to bladeless petioles, 10-20 cm long, 1-2 mm wide; floating leaves lance-ovate to ovate-elliptic (3) 5-10 cm long, (1.5) 2.5-5 (6.5) cm wide, long-petioled; stipules 4-10 cm long, strongly fibrous; achenes 3-5 mm long..... P. natans
- 9 Submerged leaves expanded into distinct blades, the blades (1) 3-50 mm wide; broadly linear to ovate, sessile or petioled
- 10 Submerged leaves sessile, (1) 3-10 (12) mm wide; stipules 0.5-3 cm long; floating leafblades (1.5) 2-5 (7) cm long, 1-2 (2.5) cm wide; achenes 2-2.8 mm long..... P. gramineus
- 10 Submerged leaves subsessile to long-petioled; if subsessile or short-petioled then (10) 20-40 (50) mm wide; stipules (2.5) 3-8 cm long; floating leafblades (3) 5-12 cm long, (1.5) 2-6 cm wide; achenes 3-4 mm long
- 11 Submerged leafblades subsessile or with petioles to about 4 cm long, the blades (10) 20-40 (50) mm wide, elliptic to oblong-elliptic or oblanceolate; floating leafblades (when present) 2-6 cm wide, with petioles 2-9 cm long; achenes not reddish..... P. illinoensis
- 11 Submerged leafblades on petioles 2-10 (13) cm long, 9-20 (30) cm long, 1-2 (3.5) mm wide, linear-lanceolate to lance-elliptic; floating leafblades (1.5) 2-4 cm wide, on petioles up to 20 cm long; achenes reddish in age..... P. nodosus

Potamogeton alpinus Balbis. Northern, reddish, or mt. lake p. The 4 specimens seen are from the Uinta Mts., near Neola, and confluence of the Green and Yampa Rivers, to be expected elsewhere; ponds and slow-moving streams; 5,060-10,100 ft.

Potamogeton crispus L. Curly-leafed p. Introduced from Europe, naturalized; the 1 specimen seen (Welsh & Moore 18694) is from Daggett Co.

Potamogeton filiformis Pers. Fineleaf p. Occasional; widespread; aquatic; 5,400-8,200 ft. See Cronquist and others (1977) for discussion and keys to vars.

Potamogeton foliosus Raf. Leafy p. The few records seen are from widely scattered locations; 7,600-8,600 ft.

Potamogeton gramineus L. Variableleaf p. The 5 specimens seen are from the Uinta Mts.; 8,200-10,300 ft. Extremely variable, forming hybrids with nearly any pondweed it comes in contact with and especially with P. nodosus and P. illinoensis. See Cronquist and others (1977) for further discussion.

Potamogeton illinoensis Morong. Illinois p. No specimens seen, but to be expected.

Potamogeton natans L. Floatingleaf p. One specimen seen (Goodrich 15270) from 9,700 ft in the Uinta Mts. appears to belong to this taxon.

Potamogeton nodosus Poir. Longleaf p. (P. americanus C. & S.; P. fluitans Roth.) Known from along the Green River at the confluence with the Yampa River (N. Holmgren 444 DINO), near Ouray (Folks 137 UTC),

and Stewart Lake (Jensen & Dargan 153 UTC); 4,700-5,100 ft. See Cronquist and others (1977) for discussion of nomenclatural problems.

Potamogeton pectinatus L. Fennel-leaf p. The 5 records seen are from Uintah Co.; 4,700-7,800 ft. To be expected across the area.

Potamogeton pusillus L. Baby p. (P. berchtoldii Fieber) The 2 specimens seen are from Strawberry Reservoir (Jensen & Dargan 89 UTC) and E. McKee Draw n. of Vernal (Goodrich 21888); also Harrington 3706 is reported for Blue Mt. (Bradley 1950); 7,500-8,160 ft.

Potamogeton richardsonii (Benn.) Rydb. Richardson p. [P. perfoliatus L. ssp. richardsonii (Benn.) Hulten] The 2 specimens seen (S. Welsh & Neese 1984; Neese 14637) are from Yellowstone drainage, Uinta Mts., 9,350 ft and Pelican Lake, 4,800 ft. Potamogeton praelongus Wulfen (whitestem p.) might be found in the area. With clasping sessile leaves, it would key here with P. richardsonii. The following key may help distinguish the 2:

- 1 Stems usually zigzag; leaves oblong-lanceolate, (5) 10-25 (35) cm long, (10) 20-30 mm wide; stipules 3-10 cm long, rigid, usually persistent; peduncles 10-30 (60) cm long; achenes 4-5 mm long..... P. praelongus
- 1 Stems not zigzagged; leaves lanceolate to ovate-lanceolate, 1.5-10 cm long, 5-20 mm wide; stipules 1-2 cm long, soon shredding into fibers; peduncles 1.5-25 cm long; achenes 2.5-3.5 mm long..... P. richardsonii

PRIMULACEAE Primrose Family

Herbs, often scapose, leaves simple, basal, alternate, or opposite; flowers bisexual, radially symmetrical, 5 (4-9) merous; stamens equal in number to and opposite with the petals; pistil 1; ovary superior or inferior in a few species, with 1 style; fruit a capsule with free central placentation.

- 1 Leaves all cauline, numerous and overlapping, opposite below, alternate above; flowers axillary, the perianth of a single whorl..... Glaux
- 1 Leaves all basal; flowers in a terminal umbel subtended by a whorl of small bracts, the perianth of a more or less united calyx and united corolla
 - 2 Flowers at least 15-28 mm long; leaves 1-30 cm long; plants perennial
 - 3 Flowers nodding at anthesis; corolla lobes strongly reflexed; anthers exerted; plants not malodorous..... Dodecatheon
 - 3 Flowers erect; corolla lobes spreading but not reflexed; anthers included; plants sometimes malodorous..... Primula
 - 2 Flowers 3-5 mm long; leaves 0.5-3.5 cm long; plants annual..... Androsace

Androsace L. Rock-jasmine

Low scapose annuals; herbage often puberulent with simple or branched, sometimes gland-tipped hairs; leaves in a basal rosette; flowers 2-numerous, in umbels subtended by an involucre of small bracts; calyx top-shaped to hemispheric, 5-lobed, the tube becoming chartaceous in fruit; corolla funnel-form to bell-shaped, with a short tube, with 5 spreading to reflexed lobes; capsule thin-membranous.

- 1 Leaves abruptly narrowed and petiolate; corolla less than 3 mm long, the lobes reflexed; calyx hemispheric, about 2 mm long, not keeled, the lobes 3-veined; plants glabrous or sparingly glandular-puberulent above; seeds yellow, 0.2-0.3 mm long..... A. filiformis
- 1 Leaf blades tapering to the base, not distinctly petiolate; corolla often over 3 mm long, the lobes spreading to erect; calyx more or less turbinate, keeled, the lobes 1-veined; plants generally puberulent; seeds dark brown, 0.7-1 mm long
 - 2 Bracts subtending the umbel not more than 3 times as long as wide, abruptly acute at the apex; calyx lobes mostly erect, the tips incurved at maturity; corolla scarcely exceeding the calyx tube..... A. occidentalis
 - 2 Bracts subtending the umbel often more than 3 times as long as wide, mostly long-tapered at the apex; calyx lobes erect to spreading, the tips not incurved; corolla somewhat longer than the calyx tube.. A. septentrionalis

Androsace filiformis Retz. Slender r. Known from Current Creek Dam site (Brotherson 1782).
Androsace occidentalis Pursh Western r. Harrington 3916 CS from Yampa Canyon near the mouth of Hells Canyon, 5,200 ft is listed by Bradley (1950).
Androsace septentrionalis L. Pygmyflower r. Occasional or common; widespread; many plant communities, in wet or dry places; 7,000-12,500 ft; June-Aug.

Dodecatheon L. Shootingstar

Perennial scapose herbs from short rhizomes bearing fleshy fibrous roots; leaves basal, petioled, entire to obscurely toothed; scapes 1 or 2; flowers (1) few to many, nodding on slender pedicels of an involucre umbel; calyx lobes reflexed at flowering, erect in fruit; corolla lobes strongly reflexed; stamens opposite

PRIMULACEAE

the corolla lobes and united around the style, the connectives between the anthers usually deep purple; style threadlike, slightly exceeding the stamens, the stigma globose or nearly so; capsule ovoid.

- 1 Flowers 4-merous; filaments to 1 mm long, usually free throughout; stigma typically broader than the style..... D. alpinum
- 1 Flowers (4) 5-merous; filaments 1-3 mm long, usually fused to form a tube; stigma about as wide as the style..... D. pulchellum

Dodecatheon alpinum (Gray) Greene Alpine s. Occasional; Uinta Mts.; bogs, meadows, seeps, springs, along streams, and around edges of lakes and ponds; 7,200-11,500 ft; June-Aug.

Dodecatheon pulchellum (Raf.) Merr. Beautiful s. (D. pauciflorum Greene; D. radicum Greene) Occasional; widespread but no specimens seen from the Tavaputs Plateau; meadows and along streams, tolerant of but not restricted to alkaline or saline places; 5,000-8,000 ft; May-July.

Glaux L. Saltwort; Sea Milkwort

Glaux maritima L. Common s. m. Perennial herbs from rhizomes; stems 3-30 cm long, erect, simple or branched; herbage glabrous and glaucous; leaves entire, somewhat succulent, sessile or nearly so, mostly linear, occasionally oval, 4-25 mm long, 1-7 (10) mm wide; flowers solitary and sessile in the leaf axils; calyx petallike, bell-shaped, 3-5 mm long, pink or white, the 5 lobes ovate; petals lacking; stamens 5, arising at the base of the ovary and alternate with the calyx lobes; capsule ovoid, 2-3 mm long. Occasional or common; widespread; wet or moist alkaline or saline meadows, seeps, along ditches and streams; up to about 7,000 ft; June-Sept.

Primula L. Primrose

Perennial scapose glabrous herbs; leaves simple, entire or nearly so; flowers borne in umbels, 5-merous; calyx and corolla united, corolla salverform, the lobes emarginate to bilobed; stamens attached in the upper 1/3 of the corolla tube, included.

- 1 Leaves 6-30 cm long, not glaucous beneath; calyx 8-15 mm long, not glaucous; corolla tube 8-15 mm long, the lobes 5-13 mm long; plants stipitate-glandular throughout, malodorous, somewhat fleshy, widespread..... P. parryi
- 1 Leaves 1-4 cm long, glaucous beneath with a whitish crustlike bloom; calyx about 5-6 mm long, glaucous like the lower surface of leaves; corolla tube 6-8 mm long, yellow, the lobes about 5 mm long, blue or pale lavender; plants not or inconspicuously stipitate-glandular, rare..... P. incana

Primula incana Jones American p., pale p. Two specimens seen: Goodrich 19523 is from Daggett Co., (Uinta Mts.) Sheep Creek Park, wet meadow, 8,600 ft; and Garrett 6143 (UT) is rather ambiguous as to location but is likely from the same locality; June-Aug.

Primula parryi Gray Parry p. Occasional; Uinta Mts.; rocky places, often near springs or streams, but also in or at the edge of boulder fields away from water; mostly near or above timberline, occasionally down to 8,000 ft; June-Sept.

PYROLACEAE Wintergreen Family

Suffrutescent or herbaceous perennials; leaves simple, alternate, opposite or appearing whorled, evergreen or much reduced and lacking chlorophyll; flowers bisexual, regular or irregular; sepals and petals 4 or 5, more or less distinct (petals united in Pterospora); stamens twice as many as petals; pistil 1; ovary superior, 4 or 5 celled; style 1; fruit a capsule.

- 1 Leaves green, well developed; stems not fleshy; petals separate
 - 2 Leaves evergreen, not strictly basal, whorled; the blades about 3 times as long as wide, serrate; flowers corymbose; styles short, inconspicuous..... Chimaphila
 - 2 Leaves deciduous, mostly basal not whorled; the blades mostly less than 2 times as long as wide, entire or serrulate; flowers racemose or solitary; style usually conspicuous
 - 3 Flowers solitary, terminal; petals 7-12 mm long..... Moneses
 - 3 Flowers 2-several, racemose; petals 3-7 mm long..... Pyrola
- 1 Leaves lacking chlorophyll, not green, much reduced, bractlike; stems fleshy at anthesis..... Pterospora

Chimaphila Pursh Pipsisewa

Chimaphila umbellata (L.) Bart. Common p., prince's pine. Low undershrubs from creeping rootstock, decidedly woody only at the base, 10-25 (30) cm tall; leaves whorled, thick, evergreen, 3-9 cm long, about 5-15 mm wide, dark green above, pale beneath, the margins serrate; petals separate, 5-6 mm long, white to pink; fruit a capsule, 5-7 mm in diameter. Occasional to frequent; Uinta Mts.; conifer and mixed conifer-aspen stands; 7,000-9,000 ft; June-Aug. Our plants are referable to var. occidentalis (Rydb.) Blake.

Moneses Salisb.

Moneses uniflora Gray Woodnymph. (Pyrola uniflora L.) Plants perennial, from slender creeping rhizomes; leaves basal or on the lower 1/3 of the stem; scapes or stems 3-15 cm tall, with (1) 2 bracts about midlength; flowers solitary and terminal; sepals about 1/4 as long as the petals, usually reflexed; petals about 7-12 mm long, separate, white; stamens 10; style 2-4 mm long, straight; fruit a capsule, nearly globose, 6-7 mm thick. The 4 specimens seen are from Whiterocks Canyon and from Rock Creek and w. in the Uinta Mts.; wet places, usually in woods; 8,600-10,000 ft; July-Aug.

Pterospora Nutt. Pinedrops

Pterospora andromedea Nutt. Woodland p. Saprophytic, glandular, herbs, without chlorophyll and not green; stems unbranched, 30-100 cm tall, reddish-brown, fleshy at anthesis, fibrous in age and remaining standing for 1 or more years after dry; leaves reduced to narrow bracts; inflorescence a raceme, usually equal in length to the rest of the stem, loosely flowered; flowers 5-8 mm long, on pendulous or recurved pedicels 5-15 mm long, from the axils of linear bracts; sepals about 1/2 as long as the glabrous, pale yellow, globose-urceolate united corolla; fruit a depressed-globose capsule, 8-12 mm wide. Occasional; Uinta Mts.; conifer woods, mostly in humus; June-Aug.

Pyrola L. Shinleaf; Wintergreen

Perennial, glabrous herbs from slender rhizomes; leaves simple, entire or serrate, all basal or crowded toward the base of the plant; scape or stem with 1-3 bracts; inflorescence a raceme; calyx persistent, united, 5-lobed; petals 5, separate, deciduous; stamens 10, the anthers awned; ovary superior, 5-celled; style straight or strongly curved; fruit a globose capsule.

- 1 Styles not over 2 mm long, straight, without a collar or ring below the peltate-lobed stigma; petals 2-4 mm long; racemes not secund..... P. minor
- 1 Style 3-8 mm long, petals 4-7 mm long
 - 2 Racemes secund, style 3-4 mm long, straight, without a collar or ring below the peltate-lobed stigma; scapes often surmounting a short, leafy and bracteate stem; petals white or greenish-white..... P. secunda
 - 2 Racemes not secund; style curved or bent to 1 side, with a collar below the lobed stigma; leaves basal or nearly so
 - 3 Petals pale yellowish, 5-6 mm long; style 3-6 mm long; leaf blades 1-2.5 (3.5) cm long.. P. virens
 - 3 Petals pinkish or purplish-red, 5-7 mm long; style 5-8 mm long; leaf blades (1) 3-8 cm long, about as wide..... P. asarifolia

Pyrola asarifolia Michx. Liver-leaf w. (P. uliginosa Torr.) Occasional; Uinta Mts.; 1 specimen seen from the E. Tavaputs Plateau; wet places, mostly in woods; 7,000-9,000 ft; late June-Aug.

Pyrola minor L. Lesser w. Occasional; Uinta Mts.; often along streams in conifer woods; 7,300-10,000 ft; June-Aug.

Pyrola secunda L. One-sided w. Common; Uinta Mts.; 1 record seen from Blue Mt. and 1 from Bruin Point, W. Tavaputs Plateau; woods, often along streams; 7,300-11,000 ft; late June-Aug.

Pyrola virens Schweigg Green w. (P. chlorantha Sw.) Occasional; Uinta Mts.; moist places, often in woods along streams; 7,300-9,600 ft; June-Aug.

RANUNCULACEAE Buttercup Family

Annual or perennial herbs; leaves all basal or alternate, simple or compound, entire to variously toothed or lobed, without stipules, the petiole often dilated at the base; flowers unisexual or bisexual, regular or irregular; sepals 3-15, often deciduous; petals lacking or present, separate; stamens numerous, rarely few; ovaries superior, 1-numerous; fruit of achenes, follicles, or berries.

- 1 Stems scapose or nearly so; leaves simple, entire, or crenate
 - 2 Plants annual, lacking stolons; leaves linear, entire; flowers not at all showy, petals and sepals 2-3 mm long; inflorescence slender, spikelike in fruit..... Myosurus
 - 2 Plants perennial; if leaves linear and entire then plants with stolons; petals 3 mm long or longer; inflorescence a head or headlike
 - 3 Leaves 3-4.5 cm wide; flowers white or cream, with 5-9 petaloid sepals; fruit a head of follicles; plants without stolons..... Caltha
 - 3 Leaves less than 3 cm wide; flowers yellow, with 5 (11) petals and 3-8 sepals; fruit of achenes; plants with stolons..... Ranunculus
- 1 Stems not scapose, or if so then the leaves deeply dissected to compound
 - 4 Leaves opposite or whorled, plants perennial
 - 5 Leaves opposite, pinnately or ternately compound; plants vines except in 1 species; achenes with long, plumose styles..... Clematis

- 5 Leaves basal and in 1-3 opposite or whorled sets near the inflorescence, mostly palmately divided; plants not vines; styles not elongate nor plumose except in one species..... Anemone
- 4 Leaves alternate or basal
 - 6 Flowers irregular, bright blue or purple, rarely white, the uppermost sepal with a spur or hood; petals not spurred; leaves palmately lobed or divided; fruit of 2-5 follicles
 - 7 Upper sepal spurred..... Delphinium
 - 7 Upper sepal hooded..... Aconitum
 - 6 Flowers regular, sepals without spurs or hoods (the petals spurred in Aquilegia), not purple, if blue then the petals with slender spurs; leaves and fruits various
 - 8 Leaves ternately or pinnately decomposed; flowers not yellow except in Aquilegia flavescens and then with spurred petals; plants not aquatic
 - 9 Flowers showy, the petals and petaloid sepals mostly over 5 mm long, the petals with slender spurs; fruit of follicles..... Aquilegia
 - 9 Flowers hardy showy, petals and sepals (if present) 2-5 mm long, petals not spurred; fruit not of follicles
 - 10 Ultimate segments of the leaves 2-10 cm long 1-8 cm wide; fruit a white or red berry..... Actaea
 - 10 Ultimate segments of leaves smaller; fruit of achenes..... Thalictrum
 - 8 Leaves not more than once compound or if so then plants aquatic; flowers often yellow; petals not spurred
 - 11 Flowers white or cream; plants not aquatic; fruit of follicles; flowers often solitary..... Trollius
 - 11 Flowers yellow, or if white then plants aquatic; fruit of achenes; flowers 1-many.. Ranunculus

Aconitum L. Monkshood

Aconitum columbianum Nutt. in T. & G. Plants perennial, 60-150 cm tall; leaves palmately parted into 3-5 divisions, these cleft or toothed, the blade 5-15 cm wide; flowers in a simple or few-branched raceme, mostly blue, occasionally white, bisexual, irregular; sepals 5, petaloid and equal to or longer than the 2-5 petals, the upper sepal with a 1-2 cm long hood. Common; widespread; along streams, around seeps and springs; 7,000-9,500 ft; late June- early Sept.

Actaea L. Baneberry

Actaea rubra (Ait.) Willd. (A. arguta Nutt.) Plants perennial, 20-80 cm tall, from thick rootstocks; leaves ternately decomposed; inflorescence a terminal raceme; sepals 3-5, quickly deciduous; petals 4-10, shorter than the stamens; fruit a red or white, shiny berry, 6-8 mm long. Occasional; along streams and other moist places, often in woods; 7,000-8,500 ft; late May-early July.

Anemone L. Anemone; Windflower

Perennial herbs with erect scapelike stems; basal leaves long petioled, palmately parted or divided; stem leaves in a pair or whorl forming an involucre below the inflorescence; sepals petaloid, 4-20; petals none; stamens numerous; fruit a head of compressed, pubescent, often woolly achenes.

- 1 Sepals over 2 cm long; styles to 20-35 mm long, plumose..... A. patens
- 1 Sepals not over 2 cm long; styles not over 5 mm long, not plumose
 - 2 Stems 1-flowered, 10-20 cm tall; basal leaves not over 5 cm wide..... A. parviflora
 - 2 At least some stems usually with more than 1 flower, sometimes over 20 cm tall; basal leaves over 5 cm wide..... A. multifida

Anemone multifida Poir. (A. cylindrica Gray misapplied; A. globosa Nutt. ex Pritz.) Common from around Strawberry Valley and across the Uinta Mts.; in numerous plant communities including sagebrush-grass, aspen and conifer, also alpine ridges and talus slopes, in wet or dry places; 7,300-11,200 ft; July-Aug.

Anemone parviflora Michx. Small-flowered a. The few specimens seen are from the S. Fork of Rock Creek, Uinta Mts.; moist places in spruce communities; July.

Anemone patens L. Pasque flower, wild crocus, lionsbeard. [A. nuttalliana DC.; Pulsatilla ludoviciana (Nutt.) Heller] Rare or locally common; Uinta Mts.; most of the specimens seen are from e. of the Whiterocks drainage of the s. slope and from Daggett Co. and 1 specimen (Lambert & Woods 20 ANF!) from Yellowstone Pass at 11,500 ft; aspen, sagebrush-grass and lodgepole pine communities; mostly about 8,500 ft; May-June. Our plants are more or less equal to those of Siberia and as such are referable to var. multifida Pritz. At the species level, our plants would be referable to A. nuttalliana DC. (Hitchcock and others 1964).

Aquilegia L. Columbine

Perennial herbs; leaves 2-3 times ternate; flowers bisexual, regular, showy; sepals 5, petaloid; petals 5, the blade little if at all larger than the sepals, with a hollow spur that extends back through the sepals; stamens numerous; fruit of follicles.

- 1 Flowers white or blue, the spurs 2.5-5 cm long or rarely longer; plants not glandular..... A. caerulea
 1 Flowers pinkish, reddish, or yellowish at least in part, or if white or cream then the spurs not over 2.5 cm long or plants glandular
 2 Spurs and petals pinkish, or reddish, the spurs not incurved; leaves not glandular pubescent; plants of the Tavaputs Plateau except in A. formosa
 3 Sepals 7-11 (15) mm long, erect, not at all spreading, scarlet, sometimes with a greenish or yellowish tip; spurs 10-15 (20) mm long, scarlet; petal blades 6-11 mm long; stamens hardly exerted; plants of the Tavaputs Plateau..... A. elegantula
 3 Sepals 12-20 (27) mm long, widely spreading, pinkish-red to pale in age, or if scarlet then plants of the Uinta Mts.; spurs 15-25 mm long, pinkish-red or scarlet; petal blades various; stamens usually strongly exerted as a function of the spreading sepals and petals
 4 Sepals and spurs pinkish or paler; spurs 18-25 mm long; petal blades 7-9 mm long; plants of the Tavaputs Plateau..... A. barnebyi
 4 Sepals and spurs scarlet; spurs 15-20 mm long; petal blades 2-7 mm long; plants rare, of the Uinta Mts..... A. formosa
 2 Spurs and petals white or pale yellow sometimes pinkish tinged, the spurs with more or less incurved tips or leaves glandular pubescent; plants of the Uinta Mts. and Dinosaur National Monument
 5 Leaves glabrous or finely puberulent; flowers pale yellow or suffused with pink; the spurs incurved at the tips, 10-20 mm long; plants known from the w. part of the Uinta Mts..... A. flavescens
 5 Leaves and stems glandular, the blades sometimes long-pilose beneath; flowers white or suffused with blue or pink, the spurs not incurved at the tips, 15-30 mm long; plants known from rocky places in Dinosaur National Monument along the Yampa and possible Green Rivers..... A. micrantha

Aquilegia barnebyi Munz Oil shale c. Endemic, infrequent across the Tavaputs Plateau from the Avintaquin drainage to the Piceance Basin; pinyon-juniper, Douglas-fir, and bristlecone pine communities, often on dry, open, shale or marl limestone slopes; 5,500-7,000 ft; mid June-early July. Perhaps totally confluent with A. triternata Payson. Graham 9456, referred to as A. chrysantha Gray (Graham 1937), belongs here.

Aquilegia caerulea James in Long Colorado c. Common in Strawberry Valley and across the Uinta Mts., and apparently infrequent on the Tavaputs Plateau; aspen, riparian, wet meadow, conifer, and alpine tundra communities and in boulder fields; 7,500-11,700 ft; mid June-mid Aug. A few high elevation specimens grade toward A. scopulorum Tidestrom, but we have seen no specimens from the area that would clearly key to A. scopulorum. Hybridizes with A. flavescens (Arnold and others 1980).

Aquilegia elegantula Greene Westernred c. Occasional; E. Tavaputs Plateau; aspen, conifer, and wet meadow communities; 8,000-9,000 ft; June-July.

Aquilegia flavescens Wats. Yellow c. The 1 specimen seen (Goodrich 896) is from N. Fork Duchesne Canyon; 7,400 ft; Aug.

Aquilegia formosa Fisch. in DC. Sitka c. The 1 specimen seen (Graham 10009 CM, from a crack of a cliff above the stream in Brush Creek Gorge at 6,500 ft) represents a disjunction from the Great Basin.

Aquilegia micrantha Eastw. Alcove c. (A. pallens Payson) The 2 specimens seen (A. Holmgren & T. Jensen 13960 UTC; Rodeck 4427 UTC) are from Triplet Falls and Mantle Ranch in Dinosaur National Monument, Moffat Co.; moist rocks. The report by Graham (1937) for Little Brush Creek Canyon is based on a specimen (Hermann 4911 MO!) belonging to A. caerulea.

Caltha L. Marshmarigold

Caltha leptosepala DC. [C. rotundifolia (Hutch) Greene] Perennial, glabrous, fleshy, scapose herbs, 5-40 cm tall; leaves all basal or rarely a reduced one on the stem, the blades elliptic or orbicular, 3-10 cm long, 1.5-5 cm wide, crenate, undulate, or nearly entire, the petiole about as long to twice as long as the blade; sepals 5-15, 10-20 mm long, whitish or somewhat bluish, petaloid; petals lacking; stamens numerous; fruit a head of follicles 12-20 mm long each with several seeds. Common to abundant; Strawberry Valley and Uinta Mountains; wet or drying meadows, along streams and around seeps and springs; (8,000) 9,000-12,000 ft; June-Aug. Our plants belong to var. leptosepala.

Clematis L. Virgin-bower

Perennial herbs or vines; leaves opposite, compound, flowers unisexual or bisexual; sepals 4-5, petaloid; petals lacking; stamens numerous, the outer ones often with dilated, petaloid filaments; fruit of many congested achenes with elongate, plumose styles.

RANUCULACEAE

- 1 Plants herbaceous, not vines; sepals and stamens erect, the sepals united at least near the base..... C. hirsutissima
- 1 Plants vines, somewhat woody, sepals and stamens spreading, the sepals not united
 - 2 Sepals white, about 1 cm long, flowers often numerous in corymbose cymes, dioecious or polygamodioecious..... C. ligusticifolia
 - 2 Sepals yellow or blue, rarely white, over 1 cm long
 - 3 Flowers yellow; outer filaments not petaloid..... C. orientalis
 - 3 Flowers purple, lavender or blue, rarely white; outer filaments sometimes petaloid
 - 4 Leaves mostly biternate (with 3 primary and 3 secondary divisions), with up to 9 leaflets; leaflets toothed to deeply lobed..... C. columbiana
 - 4 Leaves with 3 leaflets, once compound; leaflets mostly entire or shallowly lobed..... C. occidentalis

Clematis columbiana (Nutt.) T. & G. [C. pseudoalpina (Kuntze) A. Nels.] Occasional; E. and W. Tavaputs Plateaus and w. of Rock Creek in the Uinta Mts.; mostly in Douglas-fir but also in aspen, mt. brush, and sagebrush communities; 7,000-10,050 ft; May-Aug.

Clematis hirsutissima Pursh. Sugarbowls. Occasional; widespread; in a variety of plant communities including sagebrush-grass, aspen-tall forb, riparian, and grass-forb; 7,500-9,600 ft; late May-early July.

Clematis ligusticifolia Nutt. in T. & G. Western v. Common; widespread; usually along water courses where it forms great entanglements on trees, shrubs, fences, and other upright objects; up to 7,500 ft; June-Aug.

Clematis occidentalis (Horrem.) DC. [C. columbiana (Nutt.) T. & G. misapplied] Occasional; Uinta Mts.; mostly along drainages or canyon bottoms in aspen and conifer woods and occasionally in mt. brush and sagebrush communities; 7,400-8,200 ft; late May-mid June.

Clematis orientalis L. (Possibly the correct name for this plant is C. aurea Nels. & Macbr.). Apparently introduced, cultivated, escaping; the 1 specimen seen (A. Holmgren & Jensen 13955 UTC) is from Green River Bridge at Jensen.

Delphinium L. Larkspur

Perennial herbs; leaves alternate, variously palmately lobed or divided; inflorescence a terminal raceme; flowers bisexual, irregular; sepals 5, petaloid, the upper one with a spur; petals in 2 sets of 2 each, the lower 2 narrowed to a claw, the upper 2 prolonged into the spur of the upper sepal; stamens many; fruit of follicles, these usually 3.

- 1 Stems mostly less than 50 cm tall, easily detached from the bulblike root or cluster of roots, not ashy-puberulent..... D. nuttallianum
- 1 Stems mostly over 50 cm tall, or if shorter then ashy-puberulent, not easily detached from the fibrous-woody roots
 - 2 Stems and leaves ashy-puberulent, not glandular; flowers a bright blue; sinuses of the lower petals obsolete; plants mostly growing at the lower edge of and below the pinyon-juniper zone.... D. geyeri
 - 2 Stems not ashy-puberulent, sometimes glandular; flowers dark blue or purple; sinuses of lower petals 1-2.5 mm deep; plants of higher, cooler places
 - 3 Rachis thinly to densely glandular-hairy; sepals blue-purple in part; stems 1-several; plants common in mts..... D. occidentale
 - 3 Rachis glabrous or pubescent but not glandular; sepals blue; stems usually 1; plants apparently rare and limited to the extreme e. part of the area..... D. ramosum

Delphinium geyeri Greene Geyer 1. Occasional to locally common; Daggett and Uintah Cos. and eastward; desert shrub, sagebrush, and juniper communities, on sandy or clayey soil; up to about 7,000 ft; late May-early June.

Delphinium nuttallianum Pritz. ex Walp. Nuttall 1. Common across the area; desert shrub, sagebrush, and pinyon-juniper communities, occasionally in openings of aspen and conifer woods; 4,900-10,400 ft; May-June. Our plants have been referred to D. bicolor Nutt., D. dumetorum Greene, D. menziesii DC., and D. nelsonii Greene.

Delphinium occidentale Wats. Dunccecap 1. [D. cucullatum A. Nels.; D. reticulatum (A. Nels.) Rydb.] Common to locally abundant; widespread; tall forb, aspen, conifer, and streamside communities and on open rocky slopes; 8,000-10,500 (11,000) ft; late June-Aug.

Delphinium ramosum Rydb. Entering the e. edge of our area.

Myosurus L. Mousetail

Annual low herbs (mostly 1-7 cm tall); leaves all basal, linear to narrowly spatulate, entire or few-toothed; scapes 1-several; flowers solitary, minute (about 1-3 mm long), terminal; sepals 5, spurred at the base, the spur about equal or shorter than the blade, deciduous; petals lacking or 5, as small as the sepals; fruit an achene, the achenes numerous, crowded on and forming a dense, cylindrical head on the short to much elongating receptacle.

- 1 Achenes more or less conspicuously beaked, the beak 0.8-2 mm long, giving the short or elongate head a slightly bristly appearance, the head 0.5-2 cm long..... M. apetalus
- 1 Achenes inconspicuously beaked, the beak 0.2-0.5 mm long; the usually elongate head smooth or nearly so, 0.5-3 (6) cm long..... M. minimus

Myosurus apetalus Gray (M. aristatus Benth. ex Hook.; M. minimus ssp. montanus Campbell) The 7 specimens seen are from the s. slope of the Uinta Mts., Blue Mt., and Douglas Mt.; edge of ponds, in ephemeral ponds, dry rocky creek beds, and damp drainages; 7,600-9,000 ft; June-July. See Arnow and others (1980) for a discussion of the above synonymy, and for a listing of features that tend to distinguish this from the following taxon.

Myosurus minimus L. The 1 specimen seen (Neese 14812) is from Rye Grass Draw, Browns Park, Daggett Co.; drying mud of an ephemeral pool; 5,700 ft; Aug.

Ranunculus L. Buttercup; Crowfoot; Water-buttercup

Annual or perennial herbs; leaves all basal or alternate, simple, entire to variously lobed or dissected, sometimes compound; flowers solitary or few; sepals 5, usually quickly deciduous; petals usually 5, but sometimes less or more, yellow (white in a few aquatic species); stamens 10 or more, rarely fewer; fruit of achenes, these borne in heads.

- 1 Leaves all simple, entire or crenate-serrate, but not lobed
 - 2 Plants erect, without stolons; leaf blades lanceolate or ovate, the basal ones (1) 3-15 cm long; petals 7-11 mm long..... R. alismaefolius
 - 2 Plants decumbent to prostrate, with well-developed strawberrylike stolons, often growing in mud at the edge of streams, lakes, and ponds; leaf blades to 3.5 cm long; petals 2-5 mm long
 - 3 Leaf blades all entire, some usually 2 or more times longer than wide; petals 2-4 mm long; achenes less than 50 per head, not longitudinally ribbed; plants from 7,600-11,000 ft in the Uinta Mts... .. R. flammula
 - 3 Leaf blades usually crenate, about as wide as long; petals 4-5 mm long; achenes 50-200 per head; plants widespread, 5,000-8,500 ft..... R. cymbalaria
- 1 At least some of the stem leaves lobed to dissected or compound
 - 4 Plants aquatic or semiaquatic
 - 5 Submerged leaves dissected into filiform segments; petals white; achenes prominently cross-corrugated..... R. aquatilis
 - 5 Leaves not dissected into filiform segments, the segments sometimes linear, but then the petals yellow; achenes not prominently cross-corrugated
 - 6 Plants annual, often growing in mud; stems fistulose, often over 3 mm thick, not rooting at the nodes; leaves sometimes over 3 cm wide; achenes (50) 100- 200 in a cylindrical cluster..... R. sceleratus
 - 6 Plants perennial, aquatic; stems not fistulose, less than 3 mm thick, freely rooting at the nodes; leaves less than 3 cm wide
 - 7 Lobes of leaves 3, rounded, not extending over 1/2 the way to the base of the blade, entire or with 1-2 shallow teeth; petals 3-4.5 mm long; beak of achene inconspicuous, 0.15-0.25 mm long..... R. hyperboreus
 - 7 Lobes of leaves 3 or more, cut to near the base of the blade, often again lobed or divided; petals 3-7 (10) mm long; beak of achene 0.5-1 mm long, flattened..... R. flabellaris
 - 4 Plants not aquatic nor semiaquatic
 - 8 Some or all of the basal leaves entire, serrate or shallowly lobed, the lobes not extending over 1/4 the length of the blade; achenes pubescent
 - 9 Blades of basal leaves entire or 3-lobed, not crenate, mostly 2-4 times as long as wide; petals (6) 8-15 mm long; plants 3-10 (19) cm tall, glabrous except for the achenes.... R. glaberrimus
 - 9 Blades of basal leaves crenate to crenate-serrate, mostly about as wide as long; petals various; plants 5-40 (50) cm tall, glabrous or pubescent
 - 10 Cauline leaf segments 3-10 mm wide or wider; basal leaf blades cuneate to truncate but not cordate; petals mostly 5-7 mm long; plants glabrous or pubescent..... R. inamoemus
 - 10 Cauline leaf segments 1-3 mm wide; basal leaf blades truncate to cordate; petals 8-10 mm long or lacking; stems with spreading hairs..... R. cardiophyllus
 - 8 Basal leaves compound, or if simple then divided over 1/2 the way to the base; achenes glabrous except tomentose in R. testiculatus
 - 11 Basal leaves distinctly compound with 1 or more well-developed rachis segments; stems sometimes fistulose, often hirsute, 20-100 cm long; petioles often hirsute
 - 12 Style more than 1 mm long even in bud; achene beak 2-4 mm long; basal leaves with 1 or 2 rachis segments, the lateral leaflets often sessile or nearly so; stems erect to decumbent but not rooting at the nodes..... R. orthorhynchus
 - 12 Style less than 1 mm long at flowering; achene beak to about 1.6 mm long; basal leaves with only 1 rachis segment, some of the lateral leaflets usually with petiolules; stems erect to prostrate, sometimes rooting at the nodes

RANUNCULACEAE

- 13 Stems slightly if at all fistulose; petals 6-17 mm long, generally over 8 mm long, or if shorter than numerous; sepals erect to spreading; beak of achene recurved..... R. repens
- 13 Stems mostly fistulose; petals 4-8 mm long, mostly 5; sepals usually reflexed; beak of achene straight or nearly so..... R. macounii
- 11 Basal leaves simple, sometimes divided to the base with the divisions or lobes again variously lobed but without a rachis; stems and petioles various but rarely hirsute
- 14 Plants scapose, more or less finely tomentose, 2-8 cm tall; sepals persistent after anthesis; achenes tomentose, persistent and forming a burlike head in fruit..... R. testiculatus
- 14 Plants not as above
 - 15 Stems fistulose (15) 20-40 (60) cm tall, glabrous to copiously hirsute; plants rare; beak of achenes various
 - 16 Beak of achenes recurved and hooked, pointed, about 1-2 mm long
 - 17 Petals 8-16 mm long; basal leaves with petioles up to 6 cm long; pedicels to 12 cm long; stamens 35-80; ultimate lobes of leaves linear..... R. acriformis
 - 17 Petals 2-4 mm long; basal leaves with petioles up to 20 cm long; pedicels to 6 cm long; stamens 10-20; ultimate lobes of leaves broader than linear; plants reported for the area but no specimens seen..... R. uncinatus D. Don
 - 16 Beak of achenes straight, blunt, about 0.2 mm long; plants rather frequent... R. sceleratus
- 15 Stems not fistulose, 4-15 (25) cm tall, mostly glabrous at least below; beak of achenes straight to recurved, but not hooked
 - 18 Both stem and basal leaves regularly lobed to the base or nearly so, the ultimate segments linear to narrowly elongate and entire
 - 19 Leaves mostly 3 lobed; plants from a cluster of thickened, fleshy roots; petals 2-7 mm long..... R. jovis
 - 19 Leaves mostly dissected into more numerous segments; plants from a cluster of slender, fibrous roots; petals 5-19 mm long..... R. adoneus
 - 18 Some of the leaves not lobed to the base or the lobes not linear
 - 20 Petals 3-5 mm long; beak of achene 0.5 mm long, recurved; plants apparently rare at the crest of the Uinta Mts..... R. gelidus
 - 20 Petals (5) 7-15 mm long; beak of achene 0.8-1.5 mm long, straight to slightly curved; plants rather common in the Uinta Mts..... R. eschscholtzii

Ranunculus acriformis Gray Sharptail b. The 2 specimens seen (Goodrich 18831; Peterson 83-357) are from Strawberry Valley and Middle Mt. near Three Corners area; meadows; 7,600-8,580 ft; June-Aug.

Ranunculus adoneus Gray. Alpine b. Occasional; Uinta Mts.; meadows and open, rocky slopes; 9,500 ft to above timberline; June-Aug., often at the edge of snowmelt.

Ranunculus alismaefolius Geyer ex. Benth. Dwarf plainleaf b. (R. calthaeflorus Greene) Common; Strawberry Valley to the Lake Fork drainage in the Uinta Mts., and on the E. Tavaputs Plateau, to be expected elsewhere; sagebrush, aspen, conifer, and meadow communities; 8,000-9,500 ft; May-July.

Ranunculus aquatilis L. Hairleaf w. Aquatic, widespread; valleys and foothills in ponds, ditches, and slow-moving streams. Three hardly distinct and intergrading vars. are reported for the area.

1 Leaves petiolate, the petiole arising from the summit of the stipular enlargement, commonly collapsing when withdrawn from water..... var. capillaceus

1 Leaves sessile, the first divisions arising from the summit of the stipular enlargement, often not collapsing when withdrawn from water

2 Pedicels recurved basally; petals 2-4 mm wide; stamens 5-10; achenes 30-80, the beak 0.2-0.5 mm long..... var. subrigidus

2 Pedicels not recurved; petals 2.5-6 mm wide; stamens 10-20; achenes 7-25, the beak 0.7-1.1 mm long.. var. longirostris

Var. capillaceus (Thuill.) DC. [R. trichophyllus Chaix; Batrachium trichophyllum (Chaix.) Bosch] Our most common var., widespread; 4,670-9,000 ft; late June-Aug.

Var. longirostris (Goodr.) Laws. Longbeak b. (R. longirostris Goodr.) Apparently widespread, but seldom collected; in habitat as above var.; July-Aug.

Var. subrigidus (Drew) Breitung Ring b. [R. circinnatus Sibth. var. subrigidus (Drew) L. Benson] The 1 specimen seen (Neese 14831) is from Pot Creek, Hay Mt., Daggett Co.; 7,050 ft; Aug.

Ranunculus cardiophyllus Hook. Heartleaf b. Infrequent; Uinta Mts. and E. Tavaputs Plateau; meadows and edge of meadows with sagebrush, aspen, and conifers; 7,500-8,600 ft; June-July.

Ranunculus cymbalaria Pursh. Rocky Mt. b., shore b. (R. c. var. saximontana Fern.) Common; widespread; edge of ponds, lakes, along water courses, wet meadows, around seeps and springs, often where the ground is ephemerally wet, tolerant of alkali; 5,000-8,500 ft; June-Aug.

Ranunculus eschscholtzii Schlecht. Occasional; Uinta Mts.; meadows, along streams, snow-flush areas, and among boulders; 10,200-11,100 ft; June-July. Often at the edge of snowmelt.

Ranunculus flabellaris Raf. Yellow w. The 2 records seen (Brotherson 2427; Goodrich 15024) are from Rock Creek, Uinta Mts.; aquatic; 7,600 ft; July-Aug.

Ranunculus flammula L. Creeping spearwort b. (R. reptans L. var. strigulosus Freyn) Common; Uinta Mts.; edge of ponds, in ephemeral ponds, along streams in aspen and conifer woods; 7,600-11,000 ft; (June) July-Aug.

Ranunculus gelidus Kar. & Kir. Arctic b. The single record seen (S. Welsh et al. 19007) is from Anderson Pass (Kings Peak), Uinta Mts.; from a fell field and rock strip at 12,450 ft; July. Also known from the n. slope of the Uinta Mts. The Uinta Mt. plants may belong to an undescribed taxon.

Ranunculus glaberrimus Hook. Sagebrush b. Common across much of the area (no records seen from Duchesne Co. but to be expected there); mt. big sagebrush, aspen, lodgepole pine, ponderosa pine, and pinyon-juniper communities; (5,600) 7,000-9,000 ft; April-June. Often at the edge of snowmelt. Our plants are referable to var. ellipticus Greene.

Ranunculus hyperboreus Rottb. Far northern b. Three specimens seen. One (Goodrich 19521) has leaves that are mostly not cordate at the base and less than 1 cm long, and it is referable to var. hyperboreus. Another (Goodrich & Jepson 15969) has leaves cordate at the base with some over 1 cm long, and it is referable to var. natans (C. A. Meyer) Regel. (R. natans C. A. Meyer). The third (Walker 0560 CS) has leaves mostly less than 1 cm long, with some cordate. The first from Sheep Creek Park, Uinta Mts., Daggett Co., from shallow open water of quaking bogs at 8,620 ft; Aug. The second from Hickerson Park (within 5 mi of the former), shallow water and mud of a beaver pond at 9,000 ft; July. The third from Cold Springs Mt., Moffat Co. at 8,400 ft. Further collections are needed to determine the proper placement of our plants.

Ranunculus inamoenus Greene Pleasant b. (R. alpeophilus A. Nels.) Common; Strawberry Valley, Uinta Mts., and E. Tavaputs Plateau; aspen, conifer, oak, sagebrush, meadow and streamside communities, and MacLeod 866 (CS) reported for Whisley Springs, Moffat Co.; 7,500-11,200 ft; late May-early Aug. Our plants are referable to var. alpeophilus (A. Nels.) L. Benson.

Ranunculus jovis A. Nels. The 3 records seen are from Strawberry Valley and MacLeod 866 (CS) reported for Whisky Springs, Moffat Co.; aspen and fir communities; 8,000-9,000 ft; May-June.

Ranunculus macounii Britt. Bristly c. Occasional to common; Strawberry Valley; flanks of the Uinta Mts., and Tavaputs Plateau; riparian, and meadow-sagebrush-grass communities and around seeps and springs; 5,500-7,300 ft; May-Aug.

Ranunculus orthorhynchus Hook. Straightbeak b. Common; Strawberry Valley to the W. Fork of Duchesne River; aspen, streamside, and meadow-sagebrush communities; 7,800-9,600 ft; June-Aug. Our plants are referable to var. platyphyllus Gray.

Ranunculus repans L. Creeping b. No specimens of native plants seen, but plants of the cultivated and escaping var. pleniflorus Fern. are found along ditches in valleys. Plants of this var. often have numerous petals that are shorter than those of native plants.

Ranunculus sceleratus L. Blister b. Occasional; widespread; mud, ephemeral ponds, slow-moving water, and occasionally along streambanks; 4,900-7,000 ft; June-Oct. Our plants are referable to var. multifidus Nutt. in T. & G.

Ranunculus testiculatus Crantz Bur b. [Ceratocephala testiculata (Crantz) Roth] Introduced from Eurasia, adventive and weedy; various plant communities, often on disturbed ground; not expected much over 7,500 ft; April-early June.

Thalictrum L. Meadowrue

Perennial herbs; leaves alternate, ternately decomposed; flowers small; sepals 4 or 5, green or petaloid (not over 5 mm long); petals none; stamens many; fruit of achenes. The leaves are like those of Aquilegia.

- 1 Stems leafless or with a small leaf near the base, 5-30 cm tall..... T. alpinum
- 1 Stems with leaves, 25-80 cm tall
 - 2 Ultimate leaflets 2-5 mm long, about as wide; plants of the Piceance Basin, of open sunny places....
..... T. heliophilum
 - 2 Some of the ultimate leaflets over 5 mm long; plants not restricted as above, often of shady places
 - 3 Flowers bisexual; stigmas in anthesis usually shorter than the sepals, these 5; filaments clavate
..... T. sparsiflorum
 - 3 Flowers unisexual; stigmas in anthesis usually longer than the sepals, these usually 4; filaments
filiform..... T. fendleri

Thalictrum alpinum L. Alpine m. The few records seen are from the Uinta Mts.; boggy meadows, mostly on or in the vicinity of limestone; 8,600-9,200 ft; July-Aug.

Thalictrum fendleri Engelm. Fendler m. Widespread; common in aspen woods, occasional in riparian and conifer communities; 7,500-10,000 ft; June-July. T. venulosum Trel. (veiny m.) might also be in the area. This is distinguished from T. fendleri by turgid (not compressed), thick-walled achenes with the base slightly if at all oblique.

Thalictrum heliophilum Wilken. Sun-loving m. Endemic, Cathedral Bluffs and Roan Cliffs; Green River Shale barrens; 8,200-8,600 ft; July-Aug.

Thalictrum sparsiflorum Turcz. ex Fisch. & Mey. Few-flowered m. Infrequent; Uinta Mts.; riparian communities, lake margins, and open conifer woods; 7,400-11,000 ft; June-July.

Trollius L. Globeflower

Trollius laxus Salisb. [T. albiflorus (Gray) Rydb.] Perennial glabrous herb; stems 20-60 cm tall with 2-4 leaves; leaf blades nearly orbicular in outline, palmately parted or divided, the lobes cleft to incised; sepals 5-15, petaloid, white, 15-20 mm long, quickly deciduous; petals 5-8, 3-5 mm long, linear; stamens numerous; fruit of follicles 8-12 mm long, each many seeded. Occasional; Uinta Mts.; along streams, in meadows and lodgepole pine and Engelmann spruce woods; 9,000-10,800 ft; June-July. The head of follicles is similar to that of Caltha.

RHAMNACEAE Buckthorn Family

Shrubs; leaves simple, alternate; flowers small, regular or nearly so, sepals united at the base; petals free; stamens the same number as and opposite the petals.

- 1 Fruit dry, capsulelike, separating at maturity into 3 nutlets; flowers bisexual; sepals 5, united at the base; petals 5, 2-3 mm long; leaves with 3 conspicuous nerves running the entire length of the blades; shrubs 0.3-1 (2) m tall, widespread..... Ceanothus
- 1 Fruit dry, drupelike, not separating as above; flowers unisexual; sepals 4, free; petals 4, about 1 mm long; leaves with but 1 prominent vein (midrib); shrubs (1) 2-3 m tall, known from the E. Tavaputs Plateau in Colorado..... Rhamnus

Ceanothus L. Ceanothus; Buckbrush; Wild-lilac

Leaves with 3 major nerves; flowers bisexual in a crowded inflorescence; sepals 5, calyx adnate by a disc to the lower part of ovary; petals hooded and clawed; stamens 5; ovary usually 3-lobed, 3-celled with a 3-cleft style; fruit capsulelike but separating at maturity into 3 nutlets.

- 1 Leaves evergreen, glossy-varnished above, 2-8 (10) cm long, 2-6 cm wide; serrulate for nearly the whole length..... C. velutinus
- 1 Leaves deciduous, not glossy-varnished as above, 1-2.5 cm long, often narrower than above
 - 2 Leaves mostly over 2 times as long as wide, entire, green above, whitish below from dense, fine, matted pubescence (use strong magnification); branches spinescent; plants of the Uinta Mts..... C. fendleri
 - 2 Leaves mostly less than 2 times as long as wide, often serrulate at the apex, not densely pubescent below; branches not spinescent; plants of the W. Tavaputs Plateau..... C. martinii

Ceanothus fendleri Gray Fendler c. Occasional or locally common; Uinta Mts.; sagebrush, ponderosa pine, and lodgepole pine communities; 7,000-9,000 ft; June-July.

Ceanothus martinii Jones Martin c. Occasional; all specimens seen are from the W. Tavaputs Plateau; sagebrush and mt. brush communities; 7,500-9,000 ft; June-July.

Ceanothus velutinus Dougl. Snowbush c. Occasional as scattered bushes or sometimes forming thickets on burned areas; Uinta Mts., Blue Mt., and extreme w. of W. Tavaputs Plateau; mostly mt. brush, ponderosa pine, and aspen communities; 7,000-9,000 ft; June-Aug.

Rhamnus L. Buckthorn

Rhamnus smithii Greene Unarmed shrubs (1) 2-3 m tall; leaves 2-7 cm long, alternate, elliptic to oblong-lanceolate or ovate-oblong, serrate to crenulate; flowers 1-3 in the axils of leaves; ovary free from the calyx; fruit about 8 mm long, about as wide, glabrous, blackish. Occasional; apparently only in the Colorado portion of the E. Tavaputs Plateau.

ROSACEAE Rose Family

Shrubs, trees, or herbs, annual or perennial; leaves alternate, basal, or rarely opposite; stipules usually present; flowers bisexual or rarely unisexual, radially symmetrical, solitary or in clusters; floral tube flat or saucer shaped to tubular, commonly lined with a glandular disc, the sepals, petals and stamens arising at or near the summit of the disc; sepals 5 (4-10), often alternating with sepallike bracts in the herbaceous species and then appearing to be 10; petals 5 (4-10), lacking, or numerous, separate; stamens 1-numerous; pistils 1-many; ovary superior or partly to completely inferior, 1-5 chambered; styles 1-5, free or rarely fused; fruit extremely variable, an achene, drupe, drupelet, follicle, or pome. Several cultivated fruit trees of our area (apple, apricot, cherry, peach, pear, and plum) belong to this family. These are not included in this treatment as they seldom persist outside of cultivation. However, they sometimes do, and particularly apricot, plum, and some forms of apple.

- 1 Plants herbaceous, or if woody at the base then not over 60 cm tall
- 2 Leaves simple, linear or elliptic, all basal

- 3 Leaf blades crenate, green above, densely white pubescent below; flowers solitary; styles plumose; plants from above 10,500 ft..... Dryas
- 3 Leaf blades entire, sericeous and grayish-green on both sides; flowers numerous, small, in a cylindrical headlike or paniculate inflorescence; styles not plumose; plants of lower elevations Petrophytum
- 2 Leaves compound
- 4 Leaves with 3 leaflets
- 5 Leaflets entire except for 3-5 teeth at the apex; petals not over 3 mm long; stamens 5..... Sibbaldia
- 5 Leaflets with more than 5 teeth; petals often over 3 mm long; stamens 10 or more
- 6 Petals white; plants stoloniferous; fruit (strawberry) of achenes on a fleshy (red when ripe) receptacle..... Fragaria
- 6 Petals yellowish, red, or purplish; plants mostly not stoloniferous; fruit not as above.... Potentilla
- 4 Leaves with more than 3 leaflets
- 7 Leaflets on small petiolules; petals lacking; sepals 4, purplish; stamens strongly exerted, purplish..... Sanguisorba
- 7 Leaflets mostly sessile; petals present; sepals 5, alternating with sepallike bracteoles and appearing 10; stamens not especially exerted
- 8 Stamens 5; petals no longer than the sepals, about 2-3 mm long; leaflets 3-17 mm long, deeply divided with entire segments, not toothed..... Ivesia
- 8 Stamens 10-30 or more; petals mostly longer than above; leaflets often over 17 mm long, often toothed
- 9 Achenes pubescent; styles persistent, 3-50 mm long, sometimes plumose at least on the upper half..... Geum
- 9 Achenes glabrous or papillose glandular; styles readily deciduous, 0.8-3 mm long, not plumose..... Potentilla
- 1 Plants shrubs, mostly over 60 cm tall
- 10 Leaves compound
- 11 Stems armed with sharp bristles or prickles
- 12 Leaflets 5-11, mostly less than 3.5 cm long; petiole and rachis mostly free of bristles; petals pink or red..... Rosa
- 12 Leaflets 3-5, some usually over 3.5 cm long; petioles and rachis with bristles; petals white Rubus
- 11 Stems unarmed
- 13 Leaflets 9-13, over 3 cm long; plants mostly over 2 m tall..... Sorbus
- 13 Leaflets 3-7, less than 3 cm long; plants not over 2 m tall (Potentilla fruticosa)..... Potentilla
- 10 Leaves simple
- 14 Leaves 3-7 lobed or parted, not over 2 cm long, the lobes entire; flowers yellow
- 15 Leaves parted into linear divisions (actually compound in most leaves), silky-pubescent; twigs silky-pubescent, not glandular (Potentilla fruticosa)..... Potentilla
- 15 Leaves lobed; twigs often glandular
- 16 Most leaves 5-lobed; pistils (3) 5, style 2-6 cm long, plumose; plants often over 1 m tall, entering our area in Desolation Canyon..... Cowania
- 16 Leaves 3-lobed (seldom more); pistils 1 (2), style 0.3-0.6 cm long, not plumose; plants seldom over 1 m tall, widespread..... Purshia
- 14 Leaves entire, crenate or serrate, not lobed, or if so then the lobes serrate or crenate and leaves over 2 cm long; flowers not yellow
- 17 Leaves entire, linear, seldom over 1 cm wide
- 18 Flowers inconspicuous, petals lacking; fruit an achene; style plumose, 1-8 cm long; leaves 0.5-3 cm long..... Cercocarpus
- 18 Flowers with conspicuous petals; fruit a pome; style not plumose, less than 1 cm long; leaves 2-4 cm long..... Peraphyllum
- 17 Leaves lobed, crenate, or serrate, if only inconspicuously serrate then leaves not linear and often over 1 cm wide
- 19 Leaves lobed, often about as wide as long, the lobes crenate
- 20 Leaves over 8 cm wide; fruit raspberrylike (Rubus parviflorus)..... Rubus
- 20 Leaves less than 8 cm wide; fruit not as above..... Physocarpus
- 19 Leaves serrate or crenate, not lobed
- 21 Twigs armed with thorns..... Crataegus
- 21 Twigs unarmed
- 22 Leaves serrate for about their whole length, some usually over 4 cm long or over 2 cm wide, lower surface glabrous..... Prunus
- 22 Leaves entire toward the base, seldom to 4 cm long or 2 cm wide, sometimes pubescent beneath

ROSACEAE

- 23 Leaves with rounded bases; petals over 5 mm long; fruit a berrylike pome..... Amelanchier
- 23 Leaves with a wedge-shaped base; petals lacking or less than 3 mm long; fruit not as above
- 24 Flowers numerous in panicles; petals about 2 mm long; fruit a woody capsule; styles not elongate, not plumose; bark of older branches shredding in long strips; leaves less than 2 cm long..... Holodiscus
- 24 Flowers solitary or in small clusters; petals lacking; fruit an achene, the styles 3-10 cm long, plumose; bark of older branches not shredding as above, leaves sometimes over 2 cm long..... Cercocarpus

Amelanchier Medic. Serviceberry

Unarmed shrubs; leaves simple, alternate, serrate above, rounded and usually entire at the base; flowers racemose; floral cup campanulate more or less adnate basally to the ovary with flared disc; sepals 5; petals 5, white; stamens 12-20; pistils 2-5; ovary 2-5 celled, inferior; fruit a pome, reddish to purplish, often glaucous.

- 1 Leaves (1.5) 2-5 cm long; petals (5) 9-15 (25) mm long; fruit glabrous or pubescent; styles and seeds 4-5..... A. alnifolia
- 1 Leaves 0.5-2 (3) cm long; petals 5-10 mm long; fruit mostly pubescent; styles and seeds (2) 3-4 (5).... A. utahensis

Amelanchier alnifolia Nutt. Saskatoon s. [A. florida Lindl. misapplied; A. pallida Greene; A. pumila (Nutt.) Roem.] Common; widespread; sagebrush, mt. brush, and aspen communities and along water courses; 6,000-8,500 (9,000) ft; May-July.

Amelanchier utahensis Koehne. Utah s. (A. prunifolia Greene) Usually on drier sites and at lower elevations than A. alnifolia and occasionally in rock outcrops in desert shrub communities. Hardly distinct from A. alnifolia, and separated by more of a trend in features than by any decisive means.

Cercocarpus H.B.K. Mountain-mahogany

Shrubs or small trees; leaves simple, alternate; flowers 1-several in axillary clusters; floral tube turbinate, 3-8 mm long, persistent around but free of the ovary, bearing 15 or more stamens, 5-lobed; petals lacking; pistil 1; fruit a hardened achene, the style persistent, much elongate, plumose.

- 1 Leaves persistent, linear, the margins entire and revolute
- 2 Leaves 3-12 (18) mm long, linear, the margins usually tightly rolled and concealing the lower surface; shrubs 0.5-2 m tall, intricately branched; styles 1-3 cm long..... C. intricatus
- 2 Leaves 10-42 mm long, elliptic to oblong, the margin revolute, but some of the lower leaf-surface usually visible; shrubs or small trees 2-5 m tall; styles 4.5-8 cm long..... C. ledifolius
- 1 Leaves deciduous, rhombic, obovate, oblanceolate, or orbicular, serrate on the upper 1/2, slightly if at all revolute..... C. montanus

Cercocarpus intricatus Wats. Dwarf m. Littleleaf m. [C. arizonicus Jones; C. ledifolius var. intricatus (Wats.) Jones] Rather abundant in the sandstone formations of the Reaves and Glades of Daggett Co., also on Navajo and other sandstone formations along the s. flank of the Uinta Mts., Split Mt. and e. into Colorado, no specimens seen from Duchesne Co.; May-June.

Cercocarpus ledifolius Nutt. Curlleaf m. (C. 1. var. intercedens Schneid.) In the Uinta Mts. most abundant on the n. slope and particularly abundant along the rim and slopes of Cart Creek to Jackson Creek, and upper elevations of Death Valley, and on Diamond Mt., on the s. slope, occasional to abundant in canyons and especially on Weber sandstone on the W. Tavaputs Plateau most abundant in the Timber Canyon drainage and decreasing common to rare eastward, a few isolated shrubs as far e. as Sowers Canyon; apparently rare on the E. Tavaputs Plateau; 7,500-9,000 ft; May-June.

Cercocarpus montanus Raf. True m., birchleaf m. (C. betuloides Nutt. in T. & G.) Common; widespread; pinyon-juniper and mt. brush communities; 6,000-8,500 ft; May-June. Occasionally hybridizing with C. ledifolius, the hybrids often treelike with persistent leaves as in C. ledifolius and with expanded and serrate leaves as in C. montanus.

Cowania D. Don Cliffrose

Cowania mexicana D. Don (C. stansburiana Torr.) Shrubs or small trees to 3.5 m tall; bark of older stems shredding; twigs reddish-brown to green, pubescent and glandular in the first season; leaves 6-15 mm long, trilobate or pinnately 3-5 lobed to parted, dark green and glandular dotted above, white tomentose below, ciliate on the margins, often persisting into late winter; floral tube turbinate or campanulate, free of the ovary; sepals 5; petals yellow, sometimes pale, 6-10 mm long; fruit an achene with a persistent, elongate, plumose style. Entering our area in Desolation Canyon; May-June. Our plants are assigned to var. stansburiana (Torr.) Jeps.

Crateagus L. Hawthorn; Haw; Haws

Shrub or small trees, usually armed with spines or thorns; leaves simple, alternate, serrate or lobed; flowers in cymose corymbs; floral cup saucer-shaped or campanulate, adnate to the ovary; sepals 5, reflexed after anthesis; petals 5, whitish, soon deciduous; stamens 5-25; ovary inferior, of 1-6 carpels, 1-5 celled; styles 1-5, distinct; fruit a pome.

- 1 Stamens about 20; nutlets not pitted or deeply concave on the ventral surface; fruit not bright red or scarlet when ripe; leaves usually not over 4 cm long, crenate-serrate, the teeth small, or entire near the base..... C. saligna
- 1 Stamens about 10; nutlets pitted or deeply concave on the ventral surface; fruit usually scarlet or bright red when mature, but darker when old; leaves (2) 3-6 (9) cm long, irregularly and rather sharply serrate
- 2 Leaf blades less than 2 times as long as wide, often distinctly lobed; spines usually numerous, often over 3 cm long; fruit about 7-8 mm in diameter..... C. erythropoda
- 2 Leaf blades about 2 times as long as wide, not lobed or scarcely so; spines usually few and mostly less than 3 cm long; fruit about 10 mm in diameter..... C. douglasii

Crataegus douglasii Lindl. Douglas h. (C. rivularis Nutt.) Occasional; widespread; canyons and following water courses into valleys; 5,900-8,000 ft; May-June. We have 2 vars. as follows:

- 1 Petals 3-3.8 mm long, 2-4.2 mm wide; leaves slender, at least 2-4 times longer than broad; fruit 6-8 mm thick when dried; plants of Duchesne and perhaps Uintah Cos..... var. duchesnensis Welsh
- 1 Petals 4.5-8 mm long, 5-7.8 mm wide; leaves commonly less than twice longer than broad; fruit 8-12 mm thick when dried; plants of Daggett and possibly Uintah Cos. and eastward.. var. rivularis (Nutt.) Sarg.

Crataegus erythropoda Ashe Cerro h. Listed by Graham (1937) for along the White River, 4 mi below the mouth of Piceance Creek; May-June.

Crataegus saligna Greene Willow h. Apparently Colorado only; canyons and streams; 6,000-7,500 ft.

Dryas L. Dryad; Mountain-avens

Dryas octopetala L. White d. Low herbs or subshrubs, the woody stems at or below ground level; leaves basal, the blades 1-4 cm long, 0.3-1 cm wide, lanceolate to lance-oblong, crenate, dark green above, white tomentose beneath, often strongly revolute; scapes 1-11 cm long; flowers solitary, regular, bisexual; petals white or rarely yellowish, 9-15 mm long; fruit an achene with a persistent, plumose style, the styles forming a whiskered head. Locally common; Uinta Mts.; alpine tundra and meadows; 11,400-13,000 ft; June-July.

Fragaria L. Strawberry

Plants perennial, herbaceous, with stoloniferous stems; leaves basal, trifoliate, coarsely crenate-serrate; flowers showy, solitary or in bracteate cymes; floral cup saucerlike; sepals 5, ovate to lanceolate, alternate with sepallike bracteoles; petals 5, white; stamens 20-25; pistils numerous; achenes born on an enlarged, fleshy and juicy, red receptacle.

- 1 Terminal tooth of leaflets usually longer than the 2 adjacent lateral teeth; petioles spreading-hairy; flowering stems usually equaling or surpassing the leaves; leaves yellow-green, not glaucous above..... F. vesca
- 1 Terminal tooth of leaflets usually shorter than the 2 adjacent lateral teeth; petioles with appressed or appressed-ascending hairs; flowering stems usually shorter than the leaves; leaves rather bluish-green above, often somewhat glaucous..... F. virginiana

Fragaria vesca L. Starvling s. [F. bracteata Heller; F. ovalis (Lehm.) Rydb.] Occasional to common; widespread; woods and openings and along streams in mountains; 7,000-10,500 ft; June-July. Our plants are referable to var. bracteata (Heller) Davis.

Fragaria virginiana Duchn. Broadpetal s. [F. americana (T. C. Porter) Brill.; F. glauca (Wats.) Rydb.; F. v. var. glauca Wats.; F. v. var. platypetala (Rydb.) Hall] Occasional to common; widespread; woods and meadows; 7,500-10,800 ft; June-July. For a distinction between var. platypetala and var. glauca see Hitchcock and Cronquist (1961). Also see Welsh (1982) for additional discussion.

Geum L. Avens

Perennial herbs with irregularly pinnate or trifoliate leaves; flowers solitary or bracteate-cymose; floral cup saucer-shaped or campanulate; sepals 5, alternating with sepallike bracteoles, and thus sepals appearing to be 10; petals 5, yellow, pink or purplish; stamens numerous; pistils numerous; fruit an

ROSACEAE

achene, pubescent, with a straight, bent, or jointed, sometimes elongate and plumose style, the terminal segment often deciduous.

- 1 Sepals and petals reddish or the petals pale yellow, erect and forming a bowl-shaped flower 1-1.5 cm long; styles 2.5-5 cm long, plumose except at the tip, not strongly bent; stem leaves opposite; plants of moist or well-drained soil, well below timberline..... G. triflorum
- 1 Petals bright yellow, sepals green or purple tinged, spreading or ascending, 4-10 mm long, not forming a bowl-shaped flower; styles about 0.3-0.5 cm long, glabrous or very pubescent, or subplumose at the tip; stem leaves alternate; plants various
- 2 Leaf segments rarely over 1 cm wide; styles straight, not subplumose at the tip; plants growing near or above timberline, seldom over 30 cm tall..... G. rossii
- 2 Larger leaf segments well over 1 cm wide; style strongly bent and subplumose near the tip; plants of wet places below timberline, usually over 30 cm tall
- 3 Lower (persistent) segments of the style glabrous or slightly hirsute near the base, not glandular, terminal segment of basal leaves somewhat larger than the main lateral lobes but with similar cuneate base..... G. allepicum
- 3 Lower (persistent) segment of the style slightly glandular pubescent; terminal segment of basal leaves much larger than the main lateral lobes and usually rounded to subcordate at the base..... G. macrophyllum

Geum allepicum Jacq. Aleppo a. (G. decurrens Rydb.; G. strictum Ait.) Two specimens seen: Harrington 1572 Browns Park, Moffat Co., and R. Foster & D. Foster 4981 from Steer Ridge, E. Tavaputs Plateau, Uintah Co.; meadows and along streams; 5,000-7,400 ft; June-Aug.

Geum macrophyllum Willd. Largeleaf a. Occasional; widespread; moist often shadey places; 6,000-9,400 ft; June-Aug. The dense achenes with their slender styles form a burlike head when mature.

Geum rossii (R. Br.) Ser. Alpine a. (G. turbinatum Rydb.; Sieversia turbinata Greene) Common; Uinta Mts.; in rocky places mostly above timberline; June-Aug. Our plants are referable to var. turbinatum (Rydb.) C. L. Hitch. Often confused with Potentilla ovina var. decurrens.

Geum triflorum Pursh Prairie smoke, purple a., old man's beard, old man's whiskers. [G. ciliatum Pursh; Sieversia ciliata (Pursh) D. Don] Common in Strawberry Valley and in the Uinta Mts. in Daggett and Uintah Cos., no specimens seen from Duchesne Co.; sagebrush-grass, meadow, and mt. brush communities and open woods; 7,500-10,000 ft; May-June.

Holodiscus Maxim. Mountain-spray

Holodiscus dumosus (Nutt.) Heller (H. microphyllus Rydb.) Shrubs about 25-150 cm tall; bark of older stems shredding in gray strips; twigs of the season pubescent, light reddish-brown; leaves 5-25 mm long, usually with a few teeth on the upper 1/2, wedge-shaped and entire toward the base, the upper surface green, the lower whitened with pubescence; inflorescence a narrow racemelike panicle, 3-10 cm long; floral tube saucer-shaped; sepals 5; petals 5, about 1-3 mm long, white or pinkish; fruit a villose achene, these usually 5 per flower. Widespread; most common on rocky canyon walls; 6,000-9,000 (10,600) ft; June-Aug.

Ivesia T. & G.

Ivesia gordonii (Hook.) T. & G. (Horkelia gordonii Hook.) Plants perennial from a woody caudex; stems 5-40 cm tall, subscapose; herbage with sessile and stalked glands; basal leaves 3-20 cm long, pinnately compound with 20-50 sessile, crowded leaflets 2-17 mm long, these again divided into 2-5 segments that are palmately or pinnately lobed into linear-oblancheolate ultimate segments; stem leaves 1 or 2, greatly reduced; flowers in a capitate solitary headlike, or several dense headlike clusters in a cymose inflorescence; floral tube campanulate; sepals yellow-green, 2.5-4 mm long, alternating with linear bracteoles; petals shorter than the sepals, yellow or white in age, deciduous; stamens 5; fruit an achene, these 1-6 per flower, about 2 mm long, with a deciduous, filiform style 3-4 mm long. Common to abundant in rocky places near and above timberline especially toward the western end of the Uinta Mts., less common on sandstone at mid elevations eastward in these mountains to Diamond and Blue Mts.; June-Aug. Plants with an open inflorescence are common on sandy ground near the head of Rhoads Canyon to Cold Spring. Some specimens from Diamond Mt. are densely pubescent.

Peraphyllum Nutt. In T. & G. Squawapple

Peraphyllum ramosissimum Nutt. Shrubs to 2 m tall; leaves 2-4 cm long, narrow oblanceolate, entire or serrulate; sepals triangular, reflexed; petals 7-10 mm long, pale pink; ovary inferior, of 2 carpels, but 4-celled; styles 2; fruit a fleshy, 4-seeded globose pome 10-15 mm in diameter, yellowish to reddish-brown. Common to abundant; E. Tavaputs Plateau; mt. brush communities.

Petrophytum (Nutt.) Rydb. Rockmat; Rock spiraea

Petrophytum caespitosum (Nutt.) Rydb. Tufted r., Rocky Mt. r. (Spiraea caespitosa Nutt. in T. & G.) Mat-forming half shrubs, the woody stems mostly in contact with the ground or rocks; leaves basal, 3-17 mm long, 1.5-4.5 mm wide, gray-pubescent, entire; scapes 0.5-12 cm tall; flowers in dense, short headlike or open panicles; sepals 1-2 mm long; petals 1-3 mm long, white; stamens numerous; fruit a follicle. Scattered across much of the area, rare or perhaps lacking on much of the Tavaputs Plateau; face of or in the cracks of limestone and sandstone outcrops; 7,000-9,000 ft; July-Sept.

Physocarpus Maxim. Ninebark

Shrubs with exfoliating bark; leaves simple, palmately lobed, alternate, usually with stellate hairs; inflorescence of terminal corymbs; flowers perfect; floral cup turbinate to campanulate; sepals 5; petals 5, white; stamens 20-40, pistils superior, 1-5, more or less united; fruit a woody capsule with folliclelike parts, seeds 2-4.

- 1 Inflorescence with 1-6 flowers; pistil and style solitary; leaf blades 0.3-2 cm long..... P. alternans
- 1 Inflorescence with more than 6 flowers; pistils and styles 2-3; leaf blades (0.8) 2-8 cm long
 - 2 Leaves mostly 0.7-2.5 cm long; mature carpels swollen, not flattened; plants rare in our area..... P. monogynus
 - 2 Leaves mostly 2-8 cm long; mature carpels flattened; plants common..... P. malvaceus

Physocarpus alternans (Jones) J. T. Howell [Opulaster alternans (Jones) Heller] The few records seen are from Red Canyon area, Daggett Co. near Gates of Ladore, Moffat Co., vicinity of White River near the Utah-Colorado border, and from Indian Canyon of the W. Tavaputs Plateau; rocky canyons, and shaly or marly limestone slopes; 5,610-6,500 ft; May-June.

Physocarpus malvaceus (Greene) Kuntze Mallow n. [Opulaster malvaceus (Greene) Kuntze] Common; widespread; aspen and Douglas-fir woods and occasionally with other trees; 7,000-10,000 ft; June-July.

Physocarpus monogynus (Greene) Kuntze The 1 record seen (S. Welsh & K. Taylor 15095) is from Range Creek, W. Tavaputs Plateau, aspen-Douglas-fir community at 7,000 ft; June-July. Similar to and possibly not distinct from P. malvaceus.

Potentilla L. Cinquefoil; Five-finger

Plants shrubs or annual to perennial herbs; leaves alternate, pinnately or palmately compound; flowers bisexual, solitary or in terminal and axillary cymes; floral tube saucer-shaped or bowl-shaped; sepals 5, alternating with 5 sepallike bracts; petals 5, early deciduous; stamens 10-40; pistils numerous, borne on a receptacle; ovaries superior; fruit an achene, glabrous, style soon deciduous, minute, arising from the apex or side of the achene.

- 1 Plants shrubs..... P. fruticosa
- 1 Plants herbaceous
 - 2 Petals red to purple; plants of bogs, rhizomatous, often with trailing and sometimes floating stems; leaflets (3) 5-7, pinnate..... P. palustris
 - 2 Petals yellow, rarely white; plants of various habitats, with trailing stems only in P. anserina and then usually with more than 7 leaflets per leaf
 - 3 Flowers solitary on slender scapes; plants creeping; strongly stoloniferous; leaves pinnate with 5-25 main leaflets interspersed by smaller ones, bicolored, silvery-white beneath..... P. anserina
 - 3 Flowers not as above; plant not creeping; leaves various
 - 4 Basal leaves lacking or withering at or before anthesis; stems branched usually at or below the middle; plants annual, biennial or short-lived perennial, on roadsides and moist or wet disturbed sites
 - 5 Lower and upper leaves pinnately compound with 5-7 (11) leaflets; mature achenes with a wedge-shaped appendage on the inner margin; stamens mostly 20; petals 3-4 mm long, yellow; calyx various..... P. paradoxa
 - 5 At least the upper leaves ternate or palmate, if the lower ones pinnate then leaflets crowded and subpalmate; achenes without appendages; petals various; stems and calyx with glandular or pustulate hairs
 - 6 Pubescence of the lower stem mostly of strongly spreading, straight or nearly so, unicellular, pustular based hairs, a few hairs sometimes glandular; stamens (15) 20; petals mostly 3/4 as long to equaling the sepals; leaflets (3) 5; achenes usually undulate-corrugate longitudinally..... P. norvegica
 - 6 Pubescence of the lower stem, softer, glandular, multicellular, or semitomentose; stamens 10-15; petals usually less than 3/4 as long as the sepals; leaflets mostly 3; achenes smooth or nearly so
 - 7 Pubescence of the lower stem semitomentose or more or less lanate, not glandular, the hairs unicellular; calyx eglandular..... P. rivalis

ROSACEAE

- 7 Pubescence of the lower stem more or less moniliform, often glandular, many of the hairs multicellular; calyx mealy-glandular..... P. biennis
- 4 Basal leaves mostly well developed and persistent at anthesis; plants branched only in the inflorescence, perennial
- 8 Leaves pinnately compound with 5 or more leaflets
 - 9 Ovaries and achenes with styles basally attached, the style thickened at the base, about 1 mm long; leaflets not tomentose, often fan-shaped; herbage glandular; petals not over 2 mm longer than the sepals..... P. glandulosa
 - 9 Ovaries and achenes with style attached near the apex; leaflets tomentose beneath (except in P. ovina var. decurrens); petals various, but often over 2 mm longer than the sepals
 - 10 Styles thickened and warty-papillose; calyx glandular..... P. pennsylvanica
 - 10 Styles filiform not papillose
 - 11 Leaflets tomentose at least below, (1) 2-4.5 cm long; plants 20-60 cm tall, usually ascending..... P. hippiana
 - 11 Leaflets glabrous to sericeous, if densely sericeous or tomentose then not over 1 cm long, often with 3-5 teeth, rarely more; plant seldom over 20 cm tall, often decumbent..... P. ovina
- 8 Leaves palmate or subpalmate, if subpalmate then usually with only 5 leaflets
 - 12 Styles thickened and somewhat warty-papillose at the base, usually thickened to just below the stigma, to 1 mm long; leaflets 3 or 5, 1-3 cm long, tomentose at least below; petioles strigose and tomentose; plants alpine on the Uinta Mts., 3-10 (15) cm tall
 - 13 Some of the leaflets subpalmate with 5 leaflets..... P. rubricaulis
 - 13 Leaves ternate..... P. hookeriana
 - 12 Styles slender, 1.5-3 mm long; leaflets sometimes more than 5, if tomentose beneath then sometimes over 3 cm long; petioles various; plant on but not restricted to alpine elevations of the Uinta Mts.
 - 14 Upper leaf-surfaces and calyx glandular; stems 1-10 cm tall; petioles to 5 cm long; plants rare in our area..... P. concinna
 - 14 Upper leaf-surfaces and calyx glabrous, sericeous, or tomentose but not glandular; stems and petioles various but often longer than above
 - 15 Leaflets entire on the lower 1/2, toothed distally, cuneate, not bicolored, green to grayish-green; anthers mostly 0.5-0.7 mm long; stems decumbent to ascending..... P. diversifolia
 - 15 Leaflets toothed on the lower 1/2 as well as distally; anthers 0.8-1.3 mm long; stems ascending to erect..... P. gracilis

Potentilla anserina L. Silverweed c. Occasional along the flood plain of the Green River, tolerant of alkali; 4,725-6,100 ft; May-Sept.

Potentilla biennis Greene Biennial c. The few records seen are all from Strawberry Valley to Duchesne Co.; along roads, in canyons, and streamsides, often where the ground has been disturbed; June-July.

Potentilla concinna Richards Elegant c., pretty c. [P. c. var. bicrenata (Rydb.) Welsh & Johnston, P. c. var. modesta (Rydb.) Welsh & Johnston] Apparently rare in our area. The 5 specimens seen are from Badland Cliffs, Three Corners area, top of Mt. Bartles, and Reservation Ridge; 8,000-10,000 ft. Also known from the n. slope of the Uinta Mts. just outside our area.

Potentilla diversifolia Lehm. Varileaf c. (P. glaucophylla Lehm.; P. perdissecta Rydb.) Specimens seen are from the Uinta Mts.; open woods, wet and dry meadows, and along streams; 9,350-11,500 ft; June-Aug. Our plants with leaflets merely toothed or cut 70 percent to the midrib are referable to var. diversifolia. Plants with leaflets cut 70-90 percent to the midrib have been found on the n. slope of the Uinta Mts. adjacent to our area. These plants are referable to var. perdissecta (Rydb.) C. L. Hitchc. and can be expected in our area. Grading into P. gracilis and possibly into P. hippiana.

Potentilla fruticosa L. Brush c. [Dasiphora fruticosa (L.) Rydb.] Common; widespread; various plant communities from dry sagebrush to stream banks, and wet meadows; 7,000-10,500 ft; June-Aug.

Potentilla glandulosa Lehm. Gland c., wedge-leaf c. [Dryocallis glandulosa (Lindl.) Rydb.] Occasional; Strawberry Valley and across the Uinta Mts., no specimens seen from the Tavaputs Plateau; various plant communities including mt. brush, aspen, tall forb, conifer woods, and in rocky places; 7,000-10,000 ft; May-Aug. Our plants are referable to var. intermedia (Rydb.) C. L. Hitchc., which var. is intermediate to P. arguta Pursh (Dryocallis convallaria Pursh). This and the closely related P. fissa Nutt. might be expected in the area, but we can not separate our plants into more than 1 taxon.

Potentilla gracilis Dougl. ex Hook. Intergrading into P. diversifolia and P. hippiana. Four intergrading vars. are represented in our area as follows:

- 1 Calyx glandular-pubescent, sparsely hirsute; leaves greenish and finely glandular-pubescent (as well as hirsute) on both surfaces, the leaflets mostly toothed about (1/4) 1/2 (3/4) the way to the midvein.... var. brunescens
- 1 Calyx generally not glandular, usually densely strigose to hirsute; leaves seldom glandular, variously cut

- 2 Leaflets divided 2/3 or more the way to the midrib into more or less linear lobes, these over 5 mm long var. elmeri
- 2 Leaflets cut 2/3 or less the way to the midrib, the segments various but usually not linear or less than 5 mm long or both
- 3 Leaflets strongly bicolor, green above and densely white-pubescent beneath; plants common..... var. pulcherrima
- 3 Leaflets about equally greenish on both sides var. glabrata

Var. brunnescens (Rydb.) C. L. Hitchc. (P. brunnescens Rydb.) The 2 specimens seen (Welsh 425a; Brotherson 1796) are from Blue Mt. and Current Creek; sagebrush-grass-meadow and aspen communities; June.

Var. elmeri (Rydb.) Jeps. (P. pectinisecta Rydb.) The several specimens seen are from Strawberry Valley, W. Tavaputs Plateau (Argyle Canyon), from near Lapoint, and Blue Mt.; moist and wet meadows and along streams, tolerant of some alkali; 5,400-8,500 ft; June-July.

Var. glabrata (Lehm.) C. L. Hitchc. (P. nuttallii Lehm.; P. viridescens Rydb.) The few specimens seen are from the Strawberry valley and Uinta Mts.; aspen-salix and boggy meadow communities; 7,380-8,000 ft; June-Aug.

Var. pulcherrima (Lehm.) Fern. (P. pulcherrima Lehm.; P. filipes Rydb.) Occasional to common; widespread; sagebrush-grass, aspen, pine-spruce, mt. brush, and meadow communities and rocky slopes; 7,400-11,000 ft; June-Aug. Intergrading somewhat in to P. gracilis and P. hippiana.

Potentilla hippiana Lehm. Horse c. (P. effusa Dougl. ex Lehm) Infrequent or locally common; Uinta Mts. and E. Tavaputs Plateau; sagebrush-grass communities, subalpine dry meadows, and open rocky ground; 7,400-10,600 ft; June-Aug. A densely white-pubescent phase reaches our area in Daggett Co. This phase is referable to P. effusa, but it is sympatric and completely mergent (Hitchcock and others 1961).

Potentilla hookeriana Lehm. Apparently rare; Uinta Mts. above timberline; specimens seen are from just outside our area on the n. slope; July-Aug.

Potentilla norvegica L. Norwegian c., rough c. (P. monspeliensis L.) Infrequent to occasional; Strawberry Valley, Uinta Mts., and E. Tavaputs Plateau; wet meadow, sagebrush-grass communities, pine-spruce woods, lake margins, and alluvial bottoms; 7,600-11,000 ft; July-Aug.

Potentilla ovina Macoun Sheep c. With 2 vars. in the area as follows:

- 1 Leaflets densely to uniformly sericeous, grayish-green or gray, often with a lower layer of sparse tomentum, 5-10 mm long, often with more than 6 teeth; leaf rachis 2-6 cm long..... var. ovina
- 1 Leaflets glabrous to sparsely sericeous-strigose, usually green, never tomentose, 10-20 mm long, often with 3-5 teeth; leaf rachis 3-12 cm long..... var. decurrens

Var. decurrens (Wats.) Welsh & Johnston (P. decurrens (Wats.) Rydb.; P. plattensis Nutt. misapplied) Common to abundant; Uinta Mts.; dry and moist meadows, pine and spruce woods, krummholz, alpine tundra, rarely in sagebrush communities; 8,100-12,000 ft; June-Aug.

Var. ovina Occasional at scattered locations in the Uinta Mts. where usually associated with limestone or other basic substrates; 8,530-11,100 ft; June-Aug.

Potentilla palustris (L.) Scop. Purple c., marsh c. (Comarum palustris L.) The few specimens seen are from S. Fork Ashley Cr. drainage, Uinta Mts.; bogs and margins of ponds; 9,640-9,740 ft; July-Aug.

Potentilla paradoxa Nutt. Contrary c. The 3 specimens seen are from drying mud flats of the flood plain of the Green River at Browns Park and Leota Bottoms at 4,700-5,400 ft; June-Aug.

Potentilla pennsylvanica L. Pennsylvania c. Occasional or locally common; widespread; sagebrush-grass and pinyon-juniper communities and exposed windswept ridges; 6,000-10,000 ft; June-Aug. Our plants are referable to var. pennsylvanica.

Potentilla rivalis Nutt. Brook c., river c. (P. leucocarpa Rydb.; P. pentandra Engelm.) Five specimens seen from the flood plain of the Green and White Rivers in the vicinity of Ouray and Neese 14839 from mud at the margin of Crouse Reservoir on Diamond Mt.; 4,655-7,225 ft; June-Sept. Most of our plants have 3-foliate leaves and are referable to var. millegrana (Engelm.) Wats.

Potentilla rubricaulis Lehm. (P. nivea L. misapplied) The few specimens seen are from or near limestone in the vicinity of S. Fork of Rock Creek and Log Hollow of the Uinta Mts.; on slopes and ridges above timberline; 10,500-11,200 ft and on is from Brownie Canyon at 7,900 ft; July-Aug. Reported for Zenobia Peak (Bradley 1950) but specimens we have seen from there belong to P. ovina. Reports of P. quinquefolia Rydb. might be based on specimens of P. rubricaulis or of P. hookeriana. These and P. concinna are part of a complex of poorly understood plants.

Prunus L. Cherry; Plum

Trees or shrubs; leaves alternate, mostly serrate, usually with glands either along the margins of the leaf base or at the petiole apex; floral cup mostly campanulate; sepals 5; petals 5; stamens 20-30; pistil 1; ovary superior; fruit a drupe.

- 1 Flowers and fruit borne in elongated racemes; fruit cherrylike with a round stone; plants native..... P. virginiana

ROSACEAE

1 Flowers and fruit borne singly or 2-4 in umbellate clusters; fruit a plum with a flattened stone; plants cultivated and escaping, usually along ditchbanks and fencelines..... P. americana

Prunus americana Marsh American p., wild p. Cultivated, persisting, occasionally escaping; along ditches and natural drainages at lower elevations, not expected above 7,500 ft; May-June.

Prunus virginiana L. Chokecherry. [P. melanocarpa (A. Nels.) Rydb.] Common; widespread; canyons and mountain sides; 6,500-9,000 ft; May-June. Our plants are referable to var. melanocarpa (A. Nels.) Sarg. The young racemes have been mistaken for the catkins of birch. The fruit has been used for making jelly and syrup.

Purshia DC. Bitterbrush

Purshia tridentata (Pursh) DC. Low shrubs, commonly to 60 cm but up to 100 cm tall; twigs of the season pubescent; leaves mostly 5-15 mm long, 3-lobed, wedge shaped, green above, whitish-pubescent beneath; flowers spicy-fragrant; floral cup turbinate; sepals 5; petals 5-10 mm long, yellow; fruit an achene, tapering to a point at each end. Widespread; abundant on the Uinta Mts., comparatively uncommon on the W. Tavaputs Plateau; sagebrush, pinyon-juniper, and mt. brush communities and sometimes extending down into salt desert shrub communities; 5,600-9,000 ft; May-June.

Rosa L. Rose

Shrubs or woody vines; branches typically armed with prickles; leaves alternate, pinnately compound with 3-11 toothed leaflets; floral tube globose or ellipsoid, often constricted near the apex; sepals 5; petals 5 (in our native species); pistils few-numerous, the ovaries superior; fruit hardened achenes enclosed in a fleshy red, orange or purple floral tube (hip). Rosa manca Greene with flowers solitary as in R. nutkana but small as in R. woodsii is apparently distinguished from these taxa by doubly serrate leaflets with gland-tipped teeth. This might be expected on the Tavaputs Plateau. A number of cultivated species are planted in our area. Some of these are persistent. None are included here.

1 Flowers usually clustered; sepals 2-3.5 mm wide at the base; petals to 2.5 cm long, floral tube 3-5 mm wide at flowering, 6-12 (20) mm long in fruit..... R. woodsii

1 Flowers usually solitary; sepals 3-6 mm wide at the base; petals 2.5-4 cm long; floral tube 5-9 mm wide at flowering and 15-20 mm long in fruit..... R. nutkana

Rosa nutkana Presl. Bristly Nutka r. (R. melina Greene) To be expected throughout our mountains; woods and open ground; 6,000-10,000 ft or higher; May-Aug.

Rosa woodsii Lindl. Woods r. [R. chrysocarpa Rydb.; R. puberulenta Rydb.; R. ultramontana (Wats.) Heller] Common; widespread; often along waterways, in numerous plant communities; 4,700-10,000 ft and perhaps higher; May-Aug. The closely related and possibly synonymous R. acicularis Lindl. has been listed for the area (Graham 1937), but we can not detect 2 taxa in our specimens.

Rubus L. Raspberry; Thimbleberry

Shrubs; stems biennial from a perennial base, with or without prickles; leaves of first years shoots different from those of flowering stems of the 2-year-old shoots, alternate, simple or ternately to pinnately compound; flowers solitary or clustered; floral cup saucer-shaped or campanulate; sepals 5; petals 5, white; stamens 15 or more; ovaries superior; fruit a cluster of weakly coherent drupelets.

1 Stems armed with prickles; leaves compound..... R. idaeus

1 Stems unarmed; leaves simple, large..... R. parviflorus

Rubus idaeus L. Red r. (R. melanolasius Focke; R. strigosus Michx.) Widespread; canyons and mountains, streamsides, often rocky places; 7,000-9,000 ft or higher; May-July. This is the same species that is cultivated for raspberries. The native material is referable to ssp. sachalinensis (Levl.) Focke [ssp. melanolasius (Dieck) Focke]. The cultivated material is referable to ssp. idaeus.

Rubus parviflorus Nutt. Western t. Strawberry Valley and across the Uinta Mts. at least to Whiterocks Canyon; canyons and water courses, usually in woods; 7,000-9,500 ft; June-July.

Sanguisorba L. Burnet

Sanguisorba minor Scop. Small b. Perennial herbs from a simple or branched caudex, monoecious or dioecious; stems 1-several, erect, 20-60 cm tall; leaves pinnately compound; leaflets mostly 9-21, 6-20 mm long, crenate to serrate; flowers mostly unisexual, the pistillate borne above the staminate, sessile in a compact terminal headlike cluster, the cluster 8-20 (30) mm long, to about 1 cm wide, globose ovoid or oblong; floral tube ovoid; sepals 4, 3-5 mm long, green or red; petals lacking; stamens 10 or more, pistils 2, the ovaries superior with a terminal style and branched stigma; fruit of 1-2 achenes enclosed in a 4

angled, woody, narrowly winged floral tube 5-8 mm long. Introduced from Eurasia, used in seeding rangelands in pinyon-juniper and sagebrush types; May-July.

Sibbaldia L.

Sibbaldia procumbens L. Perennial herbs, densely tufted or even mat forming, from short rhizomes; stems 5-10 cm long; leaves ternate compound, the leaflets 3-20 (30) mm long, wedge-shaped, rounded and 3-5 toothed at the apex, mostly basal, those of the stem much reduced; flowers in dense axillary and terminal cymes; floral cup saucer-shaped; sepals 5, 2.5-4 mm long, spreading at flowering time, erect at fruiting, alternating with 5 sepallike bracts; petals 5, about half as long as the sepals, yellow to nearly white; stamens 5; ovaries superior, the deciduous style about 1 mm long; fruit of 5-10 (20) ovoid achenes, these 1.5 mm long, short stipitate on a slightly enlarged receptacle. Occasional to common; Uinta Mts.; fir, pine, and spruce woods, meadows, krummholz, and alpine tundra; 9,000-12,000 ft; July-Aug.

Sorbus L. Mountain-ash

Sorbus scopulina Greene Shrubs about 3-5 m tall; young twigs with long soft hairs; leaves pinnately compound with 11-15 leaflets; leaflets 2-9 cm long, 0.7-3 cm wide, serrate; flowers small, congested into a flat-topped inflorescence; floral cup turbinate; sepals 5; petals 5, 4-6 mm long, white; ovary inferior; styles 2-5, the stigmas capitate; fruit a pome, red or orange, 6-10 mm in diameter. The few records seen are from w. of Lake Fork (Moon Lake), Uinta Mts. Reported (Graham 1937) for Blanchett (Blanchard) Park, Dry Fork drainage and for W. Fork Douglass Creek, E. Tavaputs Plateau. This is more common in the Wasatch Range to the w. of our area.

RUBIACEAE Madder Family

Galium L. Bedstraw; Cleavers

Annual or perennial herbs, sometimes shrubby at the base; stems 4-angled or sometimes terete; leaves opposite or apparently whorled, entire, sessile or short-petioled; stipules free or nearly so, often as large as the leaves, thus with the leaves appearing whorled; flowers unisexual or bisexual, small, 3-4 merous, in axillary or terminal cymes or cymose panicles, rarely solitary; calyx obsolete; corolla white or greenish-white or cream, usually rotate or cup-shaped, the tube shorter than the 3-4 flaring lobes; ovary inferior and 2-lobed; styles 2, free or fused basally, each with a minute globose stigma; fruit a schizocarp with 2 globose or ellipsoid, indehiscent, dry mericarps.

- 1 Stems usually many from a woody caudex, more or less woody below and often freely branched; flowers unisexual; fruits densely covered with long straight hairs; plants of dry places below 7,400 ft..... G. multiflorum
- 1 Stems 1-several from a taproot or rhizome, not woody at the base; flowers bisexual; fruits glabrous or variously pubescent; habitat various but seldom dry
 - 2 Flowers more or less numerous in a terminal compound, conspicuous inflorescence; stems erect; plants perennial from rhizomes; fruits glabrous or pubescent; stems various
 - 3 Ovaries and fruits with short, hooked hairs, or some of them nearly glabrous; margins of leaves and angles of stems with retrorse scabrous hairs; stems rather weakly ascending, tending to recline; plants about 10-30 cm tall, rather rare, known from the Piceance Basin..... G. mexicanum
 - 3 Ovaries and fruits glabrous; leaves and stems glabrous or somewhat scabrous, but then the hairs not noticeably retrorse; stems rather stout, erect; plants 20-80 cm tall, not restricted as above
 - 4 Flowers bright yellow; leaves 6-8 per whorl, 1-nerved, linear; stems puberulent..... G. verum
 - 4 Flowers white; leaves 4 per whorl, 3-nerved; stems glabrous at the nodes..... G. boreale
 - 2 Flowers 1 or few together, axillary; inflorescence rather inconspicuous; stems often prostrate or ascending and scrambling over other vegetation; fruits often pubescent; stems often hispid on the angles
 - 5 Leaves 2-4 per whorl, 2 per whorl at some of the upper nodes; herbage glabrous or nearly so; stems erect or ascending; flowers solitary in leaf axils; fruit with hooked hairs; plants annual..... G. bifolium
 - 5 Leaves 4-6 (8) per whorl; stems often retrorse hispid on the angles, often trailing to ascending, often scrambling over other vegetation
 - 6 Upper surface and midnerves of leaves as well as angles of stems retrorse hispid; plants annual; leaves 6-8 per whorl; fruits with hooked bristles..... G. aparine
 - 6 Upper surface and midnerve of leaves not as above; plants perennial; leaves 4-6 per whorl
 - 7 Fruit glabrous, nearly black at maturity; leaves 1-6 mm wide, rounded to obtuse at apex.... G. trifidum
 - 7 Fruit with hooked bristles; leaves 5-15 mm wide, abruptly tapered to a short apiculate tip G. triflorum

RUBIACEAE

Galium aparine L. Catch b., cleavers, goose-grass. Reported for our area but no specimens seen. Most plants of the Intermountain area are referable to var. echinospermum (Wallr.) Farw.

Galium bifolium Wats. Twinleaf b., low mt. b. Occasional; widespread; apparently more common toward the w. of the area; mt. brush, aspen, forb, and spruce-fir communities; 6,800-10,600 ft; June-Aug.

Galium boreale L. Northern b. Occasional; W. Tavaputs Plateau, Strawberry Valley, and Uinta Mts.; mt. brush, aspen, riparian, and various conifer communities and meadows; 7,000-10,500 ft; June-Aug.

Galium mexicanum H.B.K. The 1 specimen seen (Neese et al. 11978) is from 6 mi w. of Rio Blanco, Piceance Basin, sandstone talus; pinyon-juniper zone; 7,200 ft; July. The specimen has leaves that are only 3-10 mm long, 1-3 mm wide and widest at or above the middle. It is referable to ssp. asperillum (Gray) Demp. Ssp. asperulum (Gray) Demp. with somewhat larger leaves is known from the Wasatch Range and might be expected in our area.

Galium multiflorum Kellogg Many-flowered b., shrubby b. (G. coloradoense Wight) Occasional or locally common; Uintah Co. e. of Whiterocks and e. through Rio Blanco and Moffat Cos.; desert shrub, pinyon-juniper, and dry mt. brush communities, often on rocky or raw slopes; 5,700-7,400 ft; May-June, with fruit through Aug. Our plants are referable to var. coloradoense (Wight) Cronq.

Galium trifidum L. Small b., small c. (G. brandegei Gray) Occasional; specimens seen are from in and around Strawberry Valley and across the Uinta Mts. and their flanks; willow-streamside, aspen, meadow, and riparian communities, and lake-margins; 6,000-11,000 ft; June-Aug. Our plants are referable to var. subbiflorum Wieg.

Galium triflorum Michx. Sweetscented b., fragrant b. Three specimens seen from the Uinta Mts. and 1 from the E. Tavaputs Plateau; riparian and meadow communities; 7,600-8,200 ft; July-Aug.

Galium verum L. Ladys b., yellow b. Introduced from Europe, cultivated, sometimes escaping; reported but no specimens seen.

RUPPIACEAE Ditch-grass Family

Ruppia L. Ditch-grass; Wedgeonweed

Ruppia maritima L. Aquatic herbs with filiforms branching stems, 60-100 cm long; leaves opposite or alternate, threadlike, 2-10 cm long, not over 0.5 mm wide, with a basal stipular sheath 6-10 mm long; flowers bisexual, minute, 1-3 in axillary, pedunculate spikes, the peduncles 2-30 mm long, straight or coiled; perianth lacking; stamens (1) 2; pistils 4 (8); fruit small, indehiscent, drupelike, borne on a slender stipe that progressively elongates as the fruit matures and often becoming twisted, the stipes 1-2.5 cm long in fruit. The 2 specimens seen (Neese 14655, 15319) are from Pelican Lake. Aug.

SALICACEAE Willow Family

Dioecious dwarf shrubs to large trees; leaves alternate, simple, entire, serrate, crenate, rarely lobed, usually stipulate, but the stipules often readily deciduous; flowers borne in aments (catkins) without a perianth, each subtended by a small, scalelike bract (commonly referred to as a scale); staminate flowers of (1) 2-many stamens; pistillate flowers of a single pistil with 2-4 carpels and as many stigmas; placentation parietal or basal; fruit a sessile or stipitate capsule with 2-4 valves; seeds numerous, small, covered with long white hairs, dispersed easily by wind.

1 Trees with pendulous aments; leafbuds covered by several, usually resinous scales, each flower subtended by a cup-shaped disc, without obvious glands; stamens 6-many; scalelike bracts subtending the flowers lacinate or fimbriate (except in P. alba) otherwise glabrous or ciliate..... Populus

1 Trees, shrubs, or dwarf shrubs with mostly ascending to erect aments; leaf buds covered by a single nonresinous scale; each flower subtended by 1 or 2 basal glands, but without a disc; stamens (1) 2-8, rarely more; scalelike bracts subtending the flowers entire or occasionally shallowly toothed, often densely pubescent..... Salix

Populus L. Cottonwood; Poplar

Small to large trees; leaf buds covered by several overlapping scales, resinous in most taxa; aments pendulous, mostly appearing before the leaves, and often soon deciduous, the scalelike bracts quickly deciduous, deeply lobed to lacinate, often dilated (entire or nearly so and not dilated in P. alba); each flower subtended by a cuplike disc; stamens 6-60 or more, the filaments free; inserted on the disc; capsules pedicellate, with 2-4 valves, glabrous in our taxa.

1 At least some of the mature leaves deeply 3-5 lobed and aceriform, often densely tomentose beneath; bracts of flowers entire or shallowly toothed, long pilose-ciliate; twigs of the season and winter buds often white-woolly; stigmas lobes slender; plants introduced, cultivated and escaping..... P. alba

1 Leaves not deeply lobed, not aceriform, merely toothed, glabrous or nearly so; scales of flowers deeply lobed to lacerate

- 2 Bark white and smooth except blackened and rough where scarred, covered with a whitish powdery bloom; bracts of flowers more or less persistent, deeply lobed or cleft, ciliate with long white hairs; leaves orbicular to reniform-cordate; bud scales shiny but hardly resinous; stamens 6-14; capsules 4-6 mm long, with 2 carpels; stigmas slenderly lobed; plants not confined to water courses..... P. tremuloides
- 2 Bark turning gray or brown and roughly furrowed on older trunks; bracts of flowers lacinate-fringed, otherwise glabrous or inconspicuously short hairy; stamens 12-60 or more; capsules mostly longer, with 2-4 carpels; stigmas broadly dilated; plants mostly cultivated or growing along water courses or edges of lakes and ponds
- 3 Leaves 0.67-1.3 times as long as wide, about as wide or wider than long, deltoid to rhombic or ovate; petioles compressed laterally
- 4 Bud scales and twigs of the season pubescent; leaf blades commonly with 4-10 (15) fine to coarse teeth on each side; branches widely spreading and the crown often as broad or broader than the tree is tall; plants native, sometimes cultivated, mostly common along the Green River and its major tributaries..... P. fremontii
- 4 Bud scales and twigs mostly glabrous; leaf blades commonly with 15-25 (30) fine teeth on each side; branches ascending to erect and the crown mostly longer than wide; plants introduced, cultivated, sometimes persisting
- 5 Leaf blades rhombic-ovate, cuneate at the base, seldom over 7 cm long, capsules 2-valved; branches often comparatively small, strongly ascending to erect and the crown narrow and columnar (in the trees planted in our area)..... P. nigra
- 5 Leaf blades more or less deltoid or broadly ovate, broadly cuneate at the base, some regularly over 7 cm long; capsules with 2 or more valves; branches large, spreading-ascending, the crown not columnar..... P. X canadensis
- 3 Leaves (1) 1.2-7 (10) times longer than wide, ovate to lanceolate; petioles terete or dorsiventrally compressed
- 6 Leaf blades (1.8) 2.5-6 (9.5) times longer than wide; petioles 1/5-1/3 (2/5) as long as the blades, dorsiventrally compressed; carpels 2..... P. angustifolia
- 6 Leaf blades 1-2.4 times as long as wide; petioles 1/5-3/4 as long as the blades, subterete or somewhat flattened; carpels 2 or 3; plants hybrids, intergrading into P. angustifolia on one hand and into P. fremontii and other broadleaf populars on the other..... P. acuminata

Populus acuminata Rydb. Lanceleaf c. Along streams and rivers, edges of ponds and lakes, often in mouths of canyons where the parental types come together, probably cultivated; 5,000-6,500 ft.

Populus alba L. White p. Introduced from Eurasia, cultivated, escaping, more or less naturalized; fencelines, ditchbanks, abandoned homesteads, and neglected fields; up to about 6,500 ft; May-June.

Populus angustifolia Jones Narrowleaf c. Common; widespread; along water courses, often in canyons; 5,000-7,500 (8,000) ft; May-June.

Populus X canadensis Moench. Carolina p., gray p. Probably originated in France as a cross between P. deltoides Marsh. and P. nigra, widely cultivated, persisting at old homes and occasionally escaped along ditches or other water courses; up to about 7,000 ft; May-June.

Populus fremontii Wats. Fremont c. [P. f. var. wislizenii Wats. misapplied; P. wislizenii (Wats.) Sarg. misapplied; P. sargentii Dode misapplied] Common to abundant along the flood plain of the Green River and up to about 6,000 ft or perhaps 7,000 ft along its major tributaries, and at scattered locations away from drainages, perhaps occasionally cultivated.

Populus nigra L. Black p. Introduced from Europe for shade and windbreaks. Trees of our area are from a staminate clone with strongly ascending branches that produce a narrow, nearly cylindrical crown. Trees of this clone are referable to var. italica Duroi (Lombardy p.).

Populus tremuloides Michx. Aspen, quaking aspen. [P. aurea Tidestrom; P. tremula (L.) ssp. tremuloides (Michx.) Love & Love] Common to dominant; widespread, forming large clones and aggregates of clones in canyons and on mt. sides; 7,000-10,000 ft or cultivated at lower elevations; May-June.

Salix L. Willow

Depressed, mat-forming dwarf shrubs to large trees; buds covered with 1 nonresinous scale; aments erect to spreading, rarely drooping, developing before (precocious), with (coetaneous), or after (serotinous) the leaves, the bracts mostly entire, occasionally with a slightly toothed apex; flowers with 1, occasionally 2 minute glands near the base; stamens (1) 2-8 (12), the filaments free or united toward the base, inserted on the base of the bracts; capsules sessile or stipitate, glabrous or pubescent.

Identification of the willows is compounded by unisexual plants, aments that are sometimes precocious and mostly early deciduous, and variations between the usually smaller leaves of the flowering branches that often lack or have inconspicuous stipules and the usually much larger leaves and stipules of vegetative branches and particularly of vigorous young shoots. Thus, herbarium specimens of each species present specimens of 3 or 4 phases (pistillate, staminate, flowering twigs with or without the deciduous aments, and vegetative twigs). Vigorous young shoots sometimes add a 5th dimension. At times whole plants in the field present only 1 or 2 of the various phases.

To facilitate identification of plants of the different phases, pistillate, staminate and vegetative features have been included in many of the leads in the key. Thus, some of the leads are rather long and

SALICACEAE

features not applicable to a particular specimen will need to be skipped. An alternative approach to lengthy leads is separate keys for the different sexual and vegetative phases. Many such keys have been written, but these sometimes also contain a mixing of vegetative and sexual features.

- 1 Plants shrubs or dwarf shrubs not over 1 (1.5) m tall, subalpine to alpine
 - 2 Plants depressed dwarf shrubs 1-10 (20) cm tall mostly alpine, often forming mats, the stems creeping on or below the ground surface..... KEY 1 P. 264
 - 2 Plants (10) 20-100 cm tall or taller, subalpine or alpine, not forming mats on the ground, the stems ascending to erect..... KEY 2 P. 264
- 1 Plants shrubs or trees, mostly over 1.5 m tall, of valleys to montane
 - 3 Leaves (8) 10-20 (32) times longer than wide; plants often strongly colonial, spreading underground and forming patches and occasionally thickets, our most common and widespread low-land willow..... S. exigua
 - 3 Leaves less than 8 times as long as wide
 - 4 Bracts persistent, dark brown to blackish, or if pale green or pale brown in age then silky pilose with the hairs exceeding the bracts by 1-2 mm and the capsules pubescent (rarely glabrous in unusual specimens); stamens 2 per flower, the filaments glabrous or pilose in a few species; plants shrubs or occasionally treelike, native..... KEY 3 P. 265
 - 4 Bracts of at least the pistillate aments quickly deciduous, pale green or yellowish tan in age, short pubescent, the hairs hardly if at all exceeding the bract by more than 1 mm; capsules glabrous; stamens more than 2 per flower, or if only 2 then plants introduced trees, the filaments pilose; plants mostly trees or treelike except in S. lasiandra, mostly of valleys and lower montane
 - 5 Plants native, shrubs or small trees; stamens 3-9 per flower; stipes of capsules mostly 1-2 mm long, obviously longer than the gland..... KEY 4 P. 266
 - 5 Plants introduced trees; stamens 2, capsules sessile or the stipes mostly less than 1 mm long and hardly longer than the gland..... KEY 5 P. 266

KEY 1

- 1 Bracts of aments pale green or yellowish, glabrous dorsally; filaments 1.5-2 mm long; style obsolete or to 0.2 mm long, shorter than the stigmas; leaves elliptic to orbicular, 1.4-2.6 times longer than wide, glaucous and strongly reticulate-veined beneath, the tips mostly rounded or obtuse..... S. reticulata
- 1 Bracts of aments blackish, pilose dorsally; filaments over 2 mm long; styles 0.5 mm long or longer, longer than the stigmas; leaves elliptic or narrow elliptic, (1.25) 2.3-4.7 times longer than wide, glaucous or not, not strongly reticulate veined beneath, the tips mostly pointed
 - 2 Leaves 2-5 (7) mm wide, 2-4.7 times longer than wide, sessile or the petiole to 3 mm long; plants seldom over 3 cm tall, aments 0.5-2.2 cm long..... S. cascadenis
 - 2 Leaves 5-20 mm wide, mostly 2-3 times longer than wide, with petiole 3-13 mm long; plants mostly 5-10 (20) cm tall; aments (1) 2-4 cm long..... S. arctica

KEY 2

- 1 Capsules glabrous, the style and stigma together less than 1 mm long; leaves permanently pubescent on both sides, the lower surface not glaucous but often more densely pubescent and thus lighter than the upper surface; twigs of the season glabrous or thinly villous-puberulent..... S. wolfii
- 1 Capsules mostly pubescent at least until mature or style and stigma together over 1 mm long; leaves often glaucous beneath, glabrous or pubescent
 - 2 Mature leaves glabrous, dark green and shiny above, strongly glaucous and glabrous or with a few hairs beneath; twigs of the season glabrous or scattered pubescent, dark chestnut to lustrous purplish-black; aments precocious or coetaneous, sessile or nearly so or rarely on a stalk to 0.5 (1) cm long, this not bearing nor subtended by bractlike leaves; style and stigma collectively 1.5 mm long or longer; filaments of stamens glabrous..... S. planifolia
 - 2 Mature leaves pubescent on both sides, but sometimes glabrate or glabrous in age; twigs of the current season densely pubescent; aments coetaneous or subserotinous, borne on stalks to 2 (4) cm long, these usually bearing and subtended by bractlike leaves; style and stigmas collectively up to 1.5 mm long; filaments of stamens sometimes pilose
 - 3 Bracts of aments pale green when young, tan in age; capsules 3-5 mm long, pubescent even in age, crowded and nearly sessile so as to mostly conceal the rachis at the center of the aments, the stipes seldom over 0.5 mm long; pistillate aments 0.8-2 (2.5) cm long, 8-10 mm wide; staminate aments about 0.8-1 (1.2) cm long, 5-6 mm wide, the filaments densely pilose at the base and for 1/2 to 3/4 their length, the pilose portion often equaling or exceeding the scale, the anthers usually less than 0.5 mm long; petioles 1-4 mm long, seldom exceeding the bud even on vegetative twigs..... S. brachycarpa
 - 3 Bracts of aments brown to blackish, sometimes light brown to whitish-tan but not green even when young; capsules (4) 5-7 (8) mm long, sometimes glabrate in age, dense but often not so crowded as to conceal the rachis at the center of the ament, the stipes 0.5-2 mm long; pistillate aments

(1.8) 2.5-5 cm long, 11-15 mm wide; staminate aments 0.8-2 (4) cm long, sometimes over 6 mm wide, the filaments glabrous or pilose but usually not so conspicuously pilose as above, the anthers mostly over 0.5 mm long; petioles (1) 2-6 (10) mm long, equaling or often exceeding the bud, especially on vegetative twigs..... S. glauca

KEY 3

- 1 Capsules glabrous; leaves not both glaucous and pubescent on the lower surface when fully expanded; hairs of aments mostly crisped-villous and more or less tangled, except in S. wolfii with aments 0.8-2 (3) cm long or in S. planifolia and then plant keyed both ways
 - 2 Leaves glaucous beneath, not or scarcely pubescent when fully expanded
 - 3 Aments sessile or on a stalk, the stalk to 0.5 (1) cm long, not bearing not subtended by bractlike leaves; pubescence of aments straight or nearly so; leaves mostly entire, often slightly revolute; twigs dark chestnut to lustrous purplish-black, essentially glabrous; plants often less than 1.5 m tall and also keyed in KEY 2..... S. planifolia
 - 3 Aments usually stalked, the stalk usually subtended by or bearing 1-4 bractlike leaves; pubescence of aments crisped-villous; leaves serrate, serrulate, or entire, not at all revolute; twigs variously colored, glabrous or those of the current season more often pubescent; plants often over 1.5 m tall (small, vegetative specimens of S. amygdaloides might be keyed here)
 - 4 Styles 0.7-1.5 (1.8) mm long; leaves of fertile and vegetative twigs often less than 3 times longer than wide, evidently crenulate-serrate or subentire; bark of older twigs not ashy gray or whitish; plants apparently uncommon, mostly montane..... S. monticola
 - 4 Styles 0.2-0.7 mm long; leaves of vegetative twigs 2-5 times longer than wide, serrulate or entire; bark of older twigs usually ashy gray or white; plants widespread, mostly of valleys and lower montane..... S. lutea
 - 2 Leaves not glaucous beneath, although sometimes lighter colored from pubescence; pubescent at least in part on both sides when fully expanded, but sometimes glabrate in age (vegetative specimens of S. lasiandra might be keyed here but this has glabrous as well as nonglabrous leaves and the petioles often have wartlike glands near the base of the blade, and the plants are commonly 3-6 m tall or taller)
 - 5 Aments precocious or coetaneous (1.5) 2-5 cm long, with dense crisped-villous, tangled hairs; leaves subglabrous in age, with inconspicuous hairs, entire or sometimes serrulate; plants (1.5) 2-4 m tall..... S. boothii
 - 5 Aments coetaneous, 0.8-1.5 (3) cm long, with hairs straight or nearly so; leaves permanently pubescent throughout on both sides even in age, the hairs readily conspicuous with a 10 power lens, entire; plants 0.6-1.5 (2) m tall, also keyed in KEY 2..... S. wolfii
- 1 Capsules pubescent or plants keyed both ways; leaves glaucous and pubescent on the lower surface when fully expanded; hairs of aments straight or slightly wavy but hardly crisped-villous, not tangled; aments sometimes longer than in S. wolfii
 - 6 Twigs strongly blue glaucous, the bloom sometimes deciduous, but then the twigs glabrous or sometimes puberulent; larger leaves mostly 3-5 times longer than wide, sericeous beneath; capsules densely pubescent
 - 7 Pistillate aments 2-5 cm long; capsules sessile or the stipes to 1 mm long, the style and stigmas together 0.8-1.3 mm long; staminate aments about 2 cm long, the filaments glabrous; aments sessile or nearly so, with or more often without subtending bractlike leaves, precocious or subcoetaneous; bracts of the aments blackish; leaves permanently silvery, silky-sericeous to subtomentose beneath, dark green and glabrous above in age..... S. drummondiana
 - 7 Pistillate aments 1-2 cm long; capsules stipitate, the stipes 2-3 mm long, the style and stigmas together about 0.5 mm long; staminate aments 8-15 mm long, the filaments pilose on the lower 1/2; aments borne on 2-10 mm long, bracteate-leafy stalks; coetaneous or subprecocious; bracts of the aments dark at the tip and pale below; leaves sericeous when unfolding, sparsely or moderately sericeous especially beneath when fully expanded, glabrate in age especially above... S. geyeriana
 - 6 Twigs not glaucous or those of the current season often pubescent, or leaves not sericeous; the larger leaves various but sometimes wider than above; capsules pubescent or glabrous
 - 8 Plants shrubs 0.6-3 m tall, midmontane to above timberline, the stems less than 4 cm thick; leaves mostly less than 2 cm wide, occasionally wider on vegetative twigs, elliptic to narrowly lanceolate..... KEY 2 P. 264
 - 8 Plants shrubs or small trees, commonly 3-4 m tall or taller, but sometimes shorter when young, of valleys or montane, the stems of mature plants often 4-10 cm thick or thicker, leaves sometimes over 2 cm wide, oblong, obovate, oblanceolate, or elliptic
 - 9 Bracts of aments pale green or tan to light brown in age, silky pilose, the hairs exceeding the bract by about 1 mm; aments coetaneous; capsules long-beaked, loosely arranged so as to expose much of the rachis; filaments of stamens 3-6 mm long; leaves mostly elliptic, occasionally lanceolate or obovate; twigs of the season with mostly appressed or ascending hairs or occasionally glabrous..... S. bebbiana
 - 9 Bracts of aments black or purplish-black, reddish or pale only at the base, pilose, the hairs exceeding the bract by about 2 mm; pistillate aments precocious, or subprecocious, the capsules

SALICACEAE

not long beaked, densely arranged and mostly concealing the rachis; staminate aments strictly precocious, the filaments about 10 mm long; leaves obovate or oblanceolate; twigs of the season with mostly widely spreading hairs..... S. scouleriana

KEY 4

- 1 Leaf blades glaucous and pale beneath, commonly 2-7 cm long (longer on young plants); plants usually small trees or treelike with a solitary or few trunk(s), not known from above 6,000 ft; petioles without glands; bracts of aments 1-2 mm long; staminate aments 2-10 cm long, often over 3.5 times longer than wide; bud scales with free overlapping margins, usually pointed at the tip..... S. amygdaloides
- 1 Leaf blades not glaucous beneath, about equally colored on both sides, commonly 5.5-11 cm long (longer on young shoots); plants mostly multistemmed shrubs; commonly found from 5,000-8,000 ft; petioles of larger leaves often with wartlike glands near the base of the blade; bracts of aments 3-4 mm long; staminate aments 1-3.5 cm long, 2-3.5 times as long as wide; bud scales fused, without free overlapping margins..... S. lasiandra

KEY 5

- 1 Pistillate aments 1-2.5 (3) cm long, the capsules 1-2.5 mm long; staminate aments to 4 cm long; petioles glandless; trees weeping, with slender, greatly elongate, pendulous branches, seldom if ever escaping from cultivation, not discussed in the text
- 2 Leaves mostly 3-15 mm wide, mostly deciduous in Oct.; twigs often bright yellow; capsules sessile (weeping willow)..... S. babylonica L.
- 2 Leaves 15-22 mm wide, often persisting into Nov.; twigs greenish or yellow-green; capsules with stipe exceeding the gland; plant hybrids of S. babylonica x S. fragilis (Niobe or Wisconsin weeping willow)..... S. X blanda Anderss.
- 1 Pistillate aments mostly over 3 cm long, the capsules 3-6 mm long; petioles sometimes with small glands near the base of the blade; trees with spreading or upright branches, not weeping, frequently escaping from cultivation..... S. fragilis

Salix amygdaloides Andress. Peach-leaf w. Occasional; many specimens seen from Uintah Co., only 1 each from Daggett and Duchesne Cos.; along water courses, around ponds, and other wet places; up to about 5,600 ft; May-June.

Salix arctica Pall. Arctic w. (S. anglorum Cham. var. antiplasta Schneid.; S. petrophila Rydb.) The few specimens seen are from the w. end of the Uinta Mts.; near or above timberline. Our plants are referable to var. petraea Andress.

Salix bebbiana Sarg. Bebb w. Occasional; widespread (no specimens seen from the E. Tavaputs Plateau and only 1 from the W. Tavaputs Plateau); along water courses; mostly 6,000-8,800 ft; May-June.

Salix boothii Dorn Booth w. [S. myrtillofolia Andress. misapplied; S. pseudocordata (Andress.) Rydb. misapplied; S. pseudomyrsinites Andress misapplied] Common; widespread; water courses and other wet places in mountains; 7,000-9,000 (perhaps 10,000) ft; May-June.

Salix brachycarpa Nutt. Barrenground w., short-fruited w. Locally common; w. in the Uinta Mts. to the Rock Creek drainage and rare to the e. of this drainage; 1 record from the W. Tavaputs Plateau in Wasatch Co., and 1 from the E. Tavaputs Plateau in Grand Co.; limestone or other basic substrates, dry open ground in spruce-fir zone, rocky or talus slopes and in moist or wet places; 6,800-10,600 ft; June-Aug.

Salix cascadiensis Cockerell Cascade w. Occasional; Uinta Mts.; at and above timberline; June-Aug.

Salix drummondiana Barratt in Hook. Drummond w. (S. subcoerulea Piper) Common; Uinta Mts. and Strawberry Valley; along water courses; 7,000-10,300 ft (rarely higher); May-June.

Salix exigua Nutt. Coyote w., dusky w., narrow-leaf w. (S. interior Rowlee misapplied; S. melanopsis Nutt. misapplied) Our most common low-land willow; widespread; water courses, around ponds, neglected fields or pastures where water is allowed to flood and other moist places; up to about 7,500 (8,900 on basic substrates) ft; May-July. Specimens with pubescent capsules are referable to var. exigua. Those with glabrous sapsules (most of ours) are referable to var. stenophylla (Rydb.) Schnied.

Salix fragilis L. Crack w. Introduced from Eurasia, cultivated and escaping along ditches and other water courses; up to about 7,000 ft; May-June.

Salix geyeriana Andress. Geyer w. Common; Uinta Mts., Strawberry Valley, and W. Tavaputs Plateau; water courses and other wet places; 7,200-9,500 ft; May-July.

Salix glauca L. Glaucous w., grayleaf w. (S. pseudolapponum Seem. in Engler) Common; Uinta Mts.; water courses, talus slopes, edge of boulder fields, snowbank areas, and dry alpine tundra but then usually near krummholz; 9,100-12,000 ft; June-Aug.

Salix lasiandra Benth. Whiplash w., caudate w. (S. caudata Heller) Common; widespread (no specimens seen from the E. Tavaputs Plateau); along water courses and other wet places; 5,000-8,000 ft; May-June. Our plants are referable to var. caudata (Nutt.) Sudw.

Salix lutea Nutt. Yellow w. [S. rigida Muhl. misapplied; S. r. var. watsonii (Bebb.) Cronq. misapplied] One of our most common valley and lower montane willows; along water courses and other wet places; up to 7,400 (7,700) ft; May-June. Our plants are referable to var. lutea. Salix lutea var.

ligulifolia Ball. [S. ligulifolia (Ball) Ball] has been reported with some question for the area (Graham 1937) but this is a plant from s. of our area.

Salix monticola Bebb. ex Coult. (S. pseudomonticola Ball) Rare or at least rarely collected in our area, the 1 specimen seen (N. Holmgren & Reveal 1873) is from the E. Tavaputs Plateau, also reported for the Uinta Mts.; water courses and other wet places.

Salix planifolia Pursh Plain-leaf w. [S. phyllicifolia L. var. monica Bebb.) Jeps.; S. phyllicifolia ssp. planifolia (Pursh) Hittonen] Common to abundant; Uinta Mts.; along water courses, often along streams in subalpine meadows, wet meadows and other wet places; 9,500-12,000 ft or rarely down to 7,400 ft; May-July.

Salix reticulata L. [S. nivalis Hook.; S. n. var. saximontana (Rydb.) Schneid.; S. saximontana Rydb.] Uinta Mts.; the few specimens seen are from the Mirror Lake area, and from adjacent to our area in Summit Co., on the n. slope of the Uinta Mts.; rocky slopes and alpine tundra; 10,500-13,000 ft; June-Aug.

Salix scouleriana Barratt in Hook. Scouler w. (S. flavescens Nutt.) Occasional; Uinta Mts. and Strawberry Valley; well-drained slopes in timber and along water courses and other moist places; 7,600-9,300 ft; May-June.

Salix wolfii Bebb. in Rothr. Wolf w. Occasional to locally common; Uinta Mts.; 1 record from Willow Creek drainage, W. Tavaputs Plateau; along water courses and other wet places; (8,100) 9,000-10,100 ft; June-July.

SANTALACEAE Sandalwood Family

Comandra Nutt. Bastard Toadflax

Comandra umbellata (L.) Nutt. (C. pallida DC.) Perennial glabrous, glaucous herbs 10-40 cm tall, with horizontal rhizomes fasened at their ends to the underground parts of other perennial plants; leaves alternate, simple, sessile, entire, 15-35 mm long, linear, lanceolate to oblong; flowers regular, bisexual, in small terminal or crowded axillary clusters appearing terminal, the clusters forming a corymbose inflorescence, petals lacking; perianth 5- parted, rose, pink, green, or white, 3-4 mm long; stamens 5; ovary inferior; fruit drupaceous, 1-seeded, globose or ovoid. Occasional to frequent; widespread; many plant communities, but often with sagebrush and mt. brush species; 5,000-9,600 ft; May-July. Our plants are referable to var. pallida (A. DC.) Jones.

SAXIFRAGACEAE Saxifrage Family

Perennial herbs or shrubs; leaves simple (sometimes deeply lobed), alternate, opposite or basal; flowers usually bisexual, regular or nearly so; the 4-5 sepals, 4-5 petals, and stamens usually borne on a well-developed floral tube or cup, this often with a disc; the sepals sometimes appearing as lobes of the floral tube; fruit of follicles, a capsule, or a berry. This is a diverse family that is divided into 3 or 4 families by some authors.

- 1 Plants woody shrubs usually over 60 cm tall
 - 2 Leaves alternate, lobed and toothed; floral tube and sepals often corollalike; petals shorter than the sepals; ovary inferior; fruit a berry (GROSSULARIACEAE)..... Ribes
 - 2 Leaves opposite, entire; floral tube and sepals calyxlike; petals longer than the sepals (HYDRANGEACEAE)
 - 3 Petals 4, 9-17 mm long; sepals 4, rarely 5; stamens 20 or more; petioles 1-3 mm long..... Philadelphus
 - 3 Petals 5, about 3-4 mm long; sepals 5; stamens 10; leaves sessile Fendlerella
- 1 Plants herbaceous (SAXIFRAGACEAE)
 - 4 Leaves all basal, distinctly and often abruptly petioled, the blades entire, dentate or crenate or lobed less than 1/2 the way to the midrib; flowers on naked scapes or the scapes with a solitary bract; stamens 5 or 10
 - 5 Flowers solitary and terminal; petals 5-14 mm long; leaves entire; scape with a solitary bract well below the inflorescence; plants glabrous; fertile stamens 5..... Parnassia
 - 5 Flowers not solitary; petals 2-4 mm long; leaves not entire, or if so plants pubescent; scape bractless below the inflorescence
 - 6 Flowers in simple, narrow, elongate, spikelike racemes, not subtended by bracts; petals parted or divided into filiform segments; leaves toothed and lobed; plants from rhizomes, not clothed at the base by persistent leaf bases..... Mitella
 - 6 Flowers not in spikelike racemes, or if so then subtended by bracts; petals entire; leaves not toothed and lobed, or if so then plants from woody caudices and clothed at the base with persistent leaf bases
 - 7 Leaves crenate-toothed and lobed; stamens 5; stipules fused to and decurrent on the petioles; plants often of dry rocky places..... Heuchera
 - 7 Leaves subentire, crenate, or coarsely dentate, but not lobed; stamens 10; stipules lacking or free of the petioles; plants mostly of dry meadows or wet places..... Saxifraga

SAXIFRAGACEAE

- 4 Leaves not all basal or sometimes so in depauperate plants, but then the blades not distinctly petioled or else lobed more than 1/2 the distance to the midrib; stamens 10
- 8 Leaves parted or divided to the midrib, the basal blades abruptly petioled; the petioles 0.5-1.0 cm long; petals deeply lobed or cleft, with 3-7 lobes; plants from bulblet-bearing slender rhizomes and fibrous roots..... Lithophragma
- 8 Leaves entire, toothed or lobed, but not divided more than 1/2 the distance to the midrib, or if so then sessile or nearly so; petals entire; plants not from bulblet-bearing slender rhizomes
- 9 Leaf blades with 9-12 lobes, the lobes sharply dentate; plants 20-30 cm tall, of Cathedral Bluffs, Rio Blanco Co..... Sullivantia
- 9 Leaf blades entire or with 3-7 lobes and the lobes not dentate; plants 1-15 (20) cm tall, of the Uinta Mts..... Saxifraga

Fendlerella Heller

Fendlerella utahensis (Wats.) Heller Diffusely branched shrubs to 1 m tall; twigs strigose; leaves numerous, opposite, fascicled on older twigs, oblong to spatulate, strigose, 5-15 mm long, with 3 faint nerves; sepals 1-1.5 mm long; petals 5, 2-4 mm long, whitish; stamens 10; styles 3; fruit a capsule, about 3-4 mm long. The 4 records seen are from or near Weber Sandstone in or near Dinosaur National Monument; 4,800-6,000 ft; May-June.

Heuchera L. Alumroot

Heuchera parvifolia Nutt. Common a. [H. p. var. major Rosend., Butt. & Lak.; H. p. var. microcarpa Rosend., Butt. & Lak.; H. p. var. utahensis (Rydb.) Garrett] Scapose perennial herb from a branched caudex; (12) 20-70 cm tall, usually with gland-tipped or simple hairs; basal leaves orbicular or reniform, (1) 2-6 cm wide, wider than long, shallow to deeply 5-7 lobed, the lobes more or less cleft and crenate; inflorescence a narrow, racemose or spikelike panicle, somewhat expanded at maturity; flower tube yellow-green; sepals less than 2 mm long, recurved; petals about 1 mm long, white; stamens 5; styles 2, divergent; fruit a capsule, (4) 6-10 mm long. Occasional; widespread; usually in rocky places, many plant communities; 7,000-8,400 ft (rarely to timberline); May-Aug.

Lithophragma (Nutt.) T. & G. Woodlandstar

Perennial herbs from bulblet-bearing, fibrous roots or rhizomes; herbage often stipitate-glandular, often reddish or purplish; leaves opposite or alternate, the lower ones the largest, on slender petioles, the blades orbicular to reniform, palmately 3-5 lobed, parted, or divided, or compound with 3-5 wedge-shaped segments that are again lobed or parted; upper leaves reduced, sometimes sessile; flowers in simple or compound racemes; sepals 5; petals 5, ternately or palmately cleft or divided with 3-5 lobes; stamens (7-9) 10; styles 3.

- 1 Plants with few to several purple bulblets in the inflorescence and usually in axils of the upper leaves; inflorescence with (1) 2-4 normal flowers, sometimes branched, with dark purple stipitate glands; lower pedicels 1.5-3 times longer than the floral cup; floral cup campanulate, 3-4 mm long at anthesis, 4-6 mm long in fruit including the lobes (sepals); leaves glabrous or sparsely pubescent; petals mostly 5-lobed..... L. glabra
- 1 Plants without bulblets in the inflorescence or leaf axils; inflorescence mostly with 4-7 flowers, a simple raceme, with whitish or pale purplish stipitate glands; lower pedicels 0.5-1.5 times longer than the floral cup; floral cup turbinate, (3) 4-6 mm long at anthesis, 6-7 mm long in fruit including the lobes; leaves moderately to densely pubescent; petals mostly 3-lobed..... L. parviflora

Lithophragma glabra Nutt. Fringcup w. (L. bulbifera Rydb.) Our most common woodlandstar; widespread; mostly montane in sagebrush, mt. brush, and aspen communities; 6,600-9,000 ft; April-June. Our plants are referable to var. ramulosa (Suksd.) Goodrich.

Lithophragma parviflora (Hook.) Nutt. Smallflower w. Records seen are from Strawberry Valley and 1 from near Whiterocks and reported (Bradley 1948; Holgmren 1962) for Dinosaur National Monument; sagebrush and aspen communities; 7,500-8,000 ft; April-June.

Mitella L. Miterwort

Perennial herbs from rhizomes, scapose or the stem with 1 or 2 reduced, bractlike leaves; plants often stipitate-glandular especially in the inflorescence; basal leaves more or less cordate-orbicular, more or less palmately lobed and crenate or serrate; inflorescence a spikelike raceme; sepals 5; petals 5, mostly lobed or dissected; stamens 5; ovary more or less inferior; fruit a capsule.

- 1 Inflorescence strongly secund, seldom with more than 1 flower per node, the pedicels 0.5-2 mm long; petals 2-3 lobed at the tip, rarely entire; stamens opposite the sepals; calyx lobes whitish, oblong,

over 1 mm long; leaf margins with low rounded lobes, these mucronate or not, often stiff-ciliate; scapes often hirtellous or hirsute as well as glandular toward the base..... M. stauropetala
 1 Inflorescence seldom strongly secund, often with 2 flowers at some of the lower nodes, the pedicels 2-7 mm long; petals pinnately dissected into 4-10 filiform segments; stamens alternate with the sepals; calyx lobes greenish, triangular, less than 1 mm long; leaf margins with acute or rounded teeth, the teeth mucronate with a somewhat glandular short point, not stiff-ciliate; scapes glandular or glabrate but not hirtellous or hirsute toward the base..... M. pentandra

Mitella pentandra Hook. Fivestar m. Records seen are from the Uinta Mts. and Strawberry Valley; moist woods and along streams; 7,800-10,800 ft; June-Aug. Separated by a series of small features from M. stauropetala, but still easily confused especially in specimens with a somewhat secund inflorescence. The petals are distinct but inconspicuous and often early deciduous.

Mitella stauropetala Piper Smallflower m. (M. stenopetala Piper) The few records seen are from Rock Creek and N. Fork Duchesne drainages, Uinta Mts. and from around Strawberry Valley; along streams and other wet places; 7,000-10,000 ft; May-Aug.

Parnassia L. Grass-of-Parnassus

Perennial herbs, scapose the scape sometimes with a solitary, sessile bract; flowers solitary, terminal; sepals 5; petals 5; fertile stamens 5, with a cluster of more or less fused often fleshy staminodes opposite each of the petals; stigmas 4, but appearing simple and 4-lobed.

1 Petals fringed on the lower 1/2; petioles (1.5) 3-16 cm long; leaf blades cordate to truncate basally, 12-45 mm wide, wider than long; bract mostly borne above the middle of the scape..... P. fimbriata

1 Petals entire; petioles 0.7-4 cm long; leaf blades cuneate or obtuse basally (rarely cordate or truncate), 5-20 mm wide, mostly longer than wide; bract mostly borne below the middle of the scape.....
 P. palustris

Parnassia fimbriata König Rocky Mt. p. Occasional; specimens seen are from Uinta Mts., Duchesne Co.; along streams, around springs, lake shores and other wet places; 7,600-9,300 ft; July-Aug.

Parnassia palustris L. (P. parviflora DC.) Occasional; Uinta Mts. and E. Tavaputs Plateau, to be expected elsewhere; riparian communities and other wet places; about 7,000-9,300 ft; July-Aug.

Philadelphus L. Mockorange

Philadelphus microphyllus Gray Littleleaf m. (P. occidentalis A. Nels.) Shrubs 80-110 cm tall; bark reddish brown to light brown, shredding from older stems; leaves 8-35 mm long, mostly entire; flowers borne singly or few together at the ends of branches, rather showy, pleasantly scented; petals 4, rarely 5, 9-17 mm long, white; stamens 20-60; styles 3-5, fruit a leathery or woody capsule. Whiterocks Canyon and Sheep Creek and eastward in the Uinta Mts., probably to Blue Mtn.-Douglass Mt., also on Tavaputs Plateau as far w. as Mt. Bartles; mostly in rocky canyon sides; 6,000-8,500 ft; June-July. Our plants are referable to ssp. occidentalis (A. Nels.) C. L. Hitchc. The report of Fendlera rupicola Gray for along the Yampa River (Potter and others 1983) is based on a specimen belonging here.

Ribes L. Current; Gooseberry

Shrubs with armed or unarmed twigs and branches; leaves alternate, simple, palmately lobed, generally toothed; flowers bisexual (1) 2-many in axillary clusters or short to elongate racemes; sepals and petals (4) 5 each, separate, arising from the apex of a saucer-shaped or cylindrical floral tube, the tube often the conspicuous, showy part of the flower, the petals usually shorter than the sepals; stamens (4) 5, arising alternately with and at or just below the base of the petals; ovary inferior or partly so; styles 1 or 2; fruit a berry, often crowned with the persistent floral parts.

1 Plants armed with spines and/or prickles; styles divided to near the base; flowers various; pedicels various.

2 Berries and base of flowers with few to many bristlelike, gland-tipped hairs; floral cup saucer shaped; racemes with 3-15 flowers; styles not pilose; pedicels jointed; disarticulating in fruit (gooseberry currents)

3 Racemes with 3-8 flowers; berries red; leaves with glandular and nonglandular hairs, the blades cleft 3/4 the way to nearly all the way to the base; plants common, widespread..... R. montigenum

3 Racemes (5) 7-15 flowered; berries black or purple-black; leaves glandular only or with a few hairs along the veins and margin, the blades lobed 2/3 the way to the base or less; plants uncommon, known from Duchesne Co..... R. lacustre

2 Berries and base of flowers without gland-tipped hairs; floral tube narrow; racemes with 1-3 flowers; styles pilose; pedicels not jointed, not disarticulating (gooseberries)

SAXIFRAGACEAE

- 4 Superior part of the floral tube 4-5 mm long; nodal spines usually 3; branchlets finely puberulent and sometimes with internodal bristles; berries purple-black, plants from the s. slope of the Uinta Mts..... R. setosum
- 4 Superior part of the floral tube 2-3.5 mm long; nodal spines 1 (rarely 3) or lacking; branchlets usually glabrous; rarely with internodal bristles; berries reddish-purple; plants common, widespread..... R. inerme
- 1 Plants without spines or prickles; styles mostly united to above the middle and often to near the apex; flowers (1) 3-many per raceme; pedicels jointed just below the ovary, often disarticulating in fruit (currents)
- 5 Flowers bright yellow, often reddish in part in age, glabrous; ovaries and berries glabrous; leaves not cordate, with 3 (rarely 5) primary lobes, the lobes seldom more than 3-lobed or 3-toothed; berries black or golden..... R. aureum
- 5 Flowers not yellow, often pubescent or glandular; ovaries and berries with sessile or stipitate glands (except R. inerme); leaves often pubescent, mostly cordate basally, with (3) 5-7 primary lobes, these with usually more than 3 teeth or lobes; berries various
- 6 Leaf blades, flowers, and fruit stipitate-glandular, if sparingly so then flowers pinkish and berries red; floral tube 4-11 mm long, campanulate to cylindrical; anthers glandular apically
- 7 Flowers (1) 2 or 3 per raceme, pinkish, the floral tube less than 3 mm wide; berries red; leaf blades 7-30 (44) mm wide, not pilose-hirsute..... R. cereum
- 7 Flowers 4-12 per raceme, greenish white to cream, the floral tube 3-6 mm wide; berries blackish; larger leaf blades 30-100 mm wide, pilose-hirsute and stipitate-glandular..... R. viscosissimum
- 6 Leaf blades not stipitate-glandular, glabrous or with hairs on the veins, or with sessile glands; flowers not pinkish; berries red only in R. inerme; floral tube less than 4 mm long, variously shaped; anthers eglandular
- 8 Flowers 1-3 per raceme; styles pilose; divided to below the middle; floral tube pilose within; berries reddish or purplish; leaves without sessile, crystalline glands; ovaries and berries glabrous or at least not glandular as in the following; plants common and widespread, often with spines and also keyed above in lead 4..... R. inerme
- 8 Flowers 8-30 per raceme; styles not pilose, mostly united to above the middle; floral tube not pilose within; berries blackish; leaves often with sessile crystalline glandular dots; ovaries and berries either with stipitate or with sessile glands; plants uncommon
- 9 Ovaries, berries, floral tube, petioles, lower surface of leaves, and young twigs with scattered, crystalline, yellowish, sessile, glandular dots; racemes 4-10 (17) cm long with about 20-30 flowers; plants strongly aromatic; larger leaf blades 5-12 cm wide..... R. hudsonianum
- 9 Ovaries and berries with stipitate glands; floral tube not with glandular dots; petioles and young twigs puberulent, without or with inconspicuous glandular dots; lower surface of leaves with inconspicuous clear, crystalline, sessile, glandular dots; racemes about 1-4 cm long, with about 8-16 flowers; plants not strongly aromatic; larger leaves 4-8 cm wide..... R. wolfii

Ribes aureum Pursh Golden c. Common; widespread; along washes and streams and other moist or wet places, sometimes cultivated for the fruit from which jelly and syrup are made; 4,800-8,500 ft; May-June.

Ribes cereum Dougl. Wax c.; squaw c. (R. inebrians Lindl.) Common; widespread; mts. and canyons, various plant communities; 6,500-11,000 ft; May-July.

Ribes hudsonianum Richards. Wild black c. (R. oxyacanthoides L.; R. petiolare Dougl.) The 2 records seen are from Rock Creek and Lake Fork (Moon Lake) drainages, Uinta Mts.; riparian communities; 7,500-8,100 ft; May-July. No specimen was found at UT in 1984 to support the listing by Flowers and others (1960) for this plant at Carter Creek, Daggett Co.

Ribes inerme Rydb. Whitestem g. Common in mountains and canyons across the area; often along water courses; 7,000-11,000 ft; May-July.

Ribes lacustre (Pers.) Poir. Prickly c. The few records seen are from Duchesne Co. in the Uinta Mts.; moist woods and along drainages; 8,000-9,000 ft; June-July.

Ribes montigenum McClat. Gooseberry c. Occasional to abundant across much of the mountainous part of the area; no specimens seen from the E. Tavaputs Plateau; conifer woods, and on rocky slopes; 8,500 ft to above timberline; June-Aug.

Ribes setosum Lindl. Missouri g. The few records seen are from the s. slope of the Uinta Mts.; about seeps and springs and riparian communities; 7,000-9,050 ft; May-July.

Ribes viscosissimum Pursh Sticky c. Occasional to common across much of the area, no specimens seen from the E. Tavaputs Plateau; aspen and conifer woods, often increasing on burned areas; 7,500-10,000 ft; June-July.

Ribes wolfii Roth. Rothrock c. (R. mogollonicum Greene) Reported for Baxter Pass, E. Tavaputs Plateau at the se. edge of the area (Graham 1934), also in the Wasatch Range to the w. of our area.

Saxifraga L. Saxifrage

Plants perennial herbs; herbage usually stipitate-glandular at least in part; leaves alternate or basal, entire or variously toothed or lobed; sepals and petals each usually 5, arising together with the stamens from the apex of a floral tube or receptacle; stamens 10, the filaments slender or expanded and sometimes petallike; styles 2 (3-5); fruit a capsule.

- 1 Leaves all basal, the blades subentire to coarsely toothed but not lobed, commonly over 15 mm long, usually distinctly petioled; flowers mostly more than 10; plants common and widespread
- 2 Inflorescence open; leaf blades coarsely and sharply dentate, orbicular or reniform; petioles 1.2-23 cm long, usually longer than the blades; plants 16-67 cm tall..... S. odontoloma
- 2 Inflorescence congested, occasionally interrupted; leaf blades entire or obscurely crenate, rhombic, obovate, or ovate, cuneate at the base; petioles 0.3-2.5 cm long, usually shorter than the blades; plants 3-20 (30) cm tall..... S. rhomboidea
- 1 Leaves cauline, at least in part, or if all basal then the plants with leaves less than 15 mm long, not distinctly petioled, or if so then the blades lobed but not toothed; flowers 1-5, or rarely more; plants rather rare, of high elevations in the Uinta Mts.
- 3 Petioles evident, 0.5-4.5 cm long, usually longer than the blades; blades orbicular or reniform, palmately lobed or trilobed, cordate or truncate basally, some usually over 5 mm wide
- 4 Bulblets present in upper leaf axils and inflorescence, not at petiole bases of lowest leaves; hypanthium about 1 mm long, not turbinate..... S. cernua
- 4 Bulblets not present in upper leaf axils and inflorescence, often present at petiole bases of lowest leaves; hypanthium 2-3 mm long, turbinate..... S. debilis
- 3 Leaves sessile or essentially so; blades linear to oblanceolate, entire or 3- to 7-lobed, not cordate or truncate basally, 0.5-5 mm wide
- 5 Leaves toothed or lobed; petals white; sepals erect or somewhat spreading, about 1/2 as long as the floral tube; plants glandular, not stoloniferous
- 6 Plants depressed-caespitose; leaves lobed, those of the stem generally less deeply lobed than the basal ones; petals gradually narrowed to the base, clawless or shortly clawed; filaments longer than the sepals..... S. caespitosa
- 6 Plants not depressed-caespitose; leaves merely toothed, those of the stem often more prominently toothed than the basal ones; petals abruptly narrowed to a short claw; filaments shorter than the sepals; known from just outside our area, above timberline on the Uinta Mts..
..... S. adscendens L.
- 5 Leaves entire; petals yellow, but fading whitish; sepals spreading to reflexed, more than 1/2 as long as the floral tube, the floral tube sometimes obsolete
- 7 Plants stoloniferous; sepals ascending; herbage stipitate-glandular; leaves ciliate.....
..... S. flagellaris
- 7 Plants not stoloniferous; sepals spreading to reflexed; herbage not stipitate-glandular (or only the stem sparingly so); leaves glabrous
- 8 Petals 4-5 mm long, short-clawed; sepals 2-3 mm long, glabrous; leaves 4-8 mm long, 0.5-1.5 mm wide; stems with minute stipitate glands, not pilose; plants 2-6 cm tall... S. chrysantha
- 8 Petals 7-10 (15) mm long, not clawed; sepals 4-5 mm long, often pilose; leaves often over 8 mm long and some over 1.5 mm wide; stems often rusty pilose; plants 6-20 cm tall.....
..... S. hirculus

Saxifraga caespitosa L. The 4 records seen are from the head of the Yellowstone and Uinta drainages, Uinta Mts.; alpine tundra, rockstripes, and fell fields; above timberline to 13,000 ft; July-Aug.

Saxifraga cernua L. The 1 record seen (Harrison et al. 10057) is from the n. slope of Kings Peak, among rocks; 12,800 ft; July-Aug.

Saxifraga chrysantha Gray Goldbloom s. The 1 record seen is from Anderson Pass at the flank of Kings Peak; fell field; 12,450 ft; July-Aug. Other records seen are from the Uinta Mts. outside of our area.

Saxifraga debilis Engelm. Occasional; Uinta Mts.; rocky places; 10,000-13,000 ft; July-Aug.

Saxifraga flagellaris Willd. Stoloniferous s. The 1 specimen seen (Neese & Neese 15339A) is from Kings Peak, Uinta Mts.; 13,700 ft; Aug.

Saxifraga hirculus L. Yellow marsh s. The 4 specimens seen are from Sheep Creek and Hickerson Parks, Uinta Mts.; boggy meadows; 8,600 ft; July-Aug.

Saxifraga odontoloma Piper Brook s. [S. arguta D. Don misapplied; Micranthes arguta (D. Don) Small misapplied] Occasional or locally common; widespread; wet or moist soil around springs, along streams, often in woods; 7,500-11,000 ft; June-Aug.

Saxifraga rhomboidea Greene Diamondleaf s. Occasional to common; Uinta Mts.; wet or dry rocky meadows, conifer woods, alpine tundra; 7,500-12,000 ft; June-Aug.

Sullivantia T. & G.

Sullivantia purpusi (Brand) Rosendahl Perennial herbs, from small rootstocks, 15-30 cm tall; leaves mostly basal, but stems usually with at least 1 well-developed leaf and 1-few smaller leaves, the basal

SCROPHULARIACEAE

ones on long petioles that are 2-4 times longer than their blades; leaf blades, orbicular, palmately lobed, the lobes irregularly and sharply dentate; inflorescence open with spreading branches, glandular; calyx 2-4 mm long, the tube longer than the sepals; petals 2-3 mm long, whitish; stamens 10; ovary half-inferior; styles 2; fruit a 2-beaked capsule. Endemic, the 2 specimens seen are from Cathedral Bluffs, Rio Blanco Co., from Green River Shale barrens; 8,400 ft. Reported for wet rocks from 7,000-7,500 ft (Harrington 1954).

SCROPHULARIACEAE Figwort Family

Perennial herbs, a few chlorophyll-containing hemiparasites or saprophytes (Castilleja, Orthocarpus, Cordylanthus, and Pedicularis); leaves basal, alternate or opposite, simple, entire or variously toothed to dissected, without stipules; flowers perfect, irregular (regular or nearly so in Limosella, Veronica, Verbascum, and Synthyris); calyx of 4-5 distinct or united sepals (2-lobed or bractlike in Besseyia, Cordylanthus, and Synthyris); corolla 4-5 lobed or rarely lacking (Besseyia), often strongly 2-lipped, beaked or galeate; stamens attached to the corolla tube, typically 4 and didynamous or 4 fertile and 1 sterile (Penstemon and Scrophularia), or 2 (Synthyris and Veronica) or 5 (Verbascum); ovary 1, superior, 2-loculed; fruit capsular, sometimes poricidal.

- 1 Principal leaves all basal, if the scapose stems with much reduced leafy-bracts then stamens 2; plants rarely over 15 cm tall
 - 2 Leaves entire or with a few inconspicuous teeth; flowers solitary or 2; stamens 4
 - 3 Corolla yellow; flowers on capillary scapes or peduncles well elevated above the leaves..... Mimulus primuloides
 - 3 Corolla bluish, white or pink, not much if at all exceeding the leaves
 - 4 Flowers sessile among the leaves, showy; leaves not constricted to a petiole, not over 3 cm long; plants of dry places..... Penstemon
 - 4 Flowers on scapes 0.8-2 (3) cm tall, not especially showy; leaf blades more or less constricted to a petiole, the petiole longer than the blade, the largest ones often over 3 cm long including the petiole; plants of wet places..... Limosella
 - 2 Leaves with numerous small teeth or pinnatifid; flowers few to several on usually bracteate scapes; stamens 2
 - 5 Leaves with numerous small teeth, not pinnatifid; corolla lacking..... Besseyia
 - 5 Leaves pinnatifid; corolla blue..... Synthyris
- 1 Leaves not all basal, those of mid-stem often about as large as those at the base or plants usually well over 15 cm tall; stamens 2 only in Veronica
 - 6 Corolla tube strongly spurred at the base, yellow, 10-24 mm long; plants introduced, perennial, from spreading roots..... Linaria
 - 6 Corolla tube not spurred, if pouched at the base then not yellow and smaller than above; plants various
 - 7 Leaves opposite, those of the inflorescence sometimes alternate, entire or toothed
 - 8 Calyx united, the tube longer than the teeth, enveloping and exceeding the capsule; corolla yellow except in Mimulus lewisii and sometimes M. rubellus..... Mimulus
 - 8 Calyx divided or, if united then the tube equal to or shorter than the lobes, rarely exceeding the mature capsule; corolla not yellow
 - 9 Leaf blades strongly serrate and conspicuously petiolate, the larger ones 5-15 cm long with petioles 1-3 (5) cm long; flowers in terminal, openly branched nearly naked inflorescences; corolla yellowish-green, often suffused with maroon; plants 40-150 cm tall, erect, perennial..... Scrophularia
 - 9 Leaf blades entire or obscurely crenate, or if serrate then sessile or else plants much smaller than above; flowers axillary, or in leafy or bracteate verticils or thymes
 - 10 Corolla nearly rotate, the tube rarely over 3 mm long, the lobes to 1 cm long; stamens 2, exserted; capsules conspicuously flattened..... Veronica
 - 10 Corolla not rotate, the tube usually over 5 mm long except in Collinsia; fertile stamens 4
 - 11 Plants perennial; corolla usually over 1 cm long; fertile stamens 4, and a 5th one (staminodium) sterile..... Penstemon
 - 11 Plants annual; corolla not over 6 mm long; stamens 4, staminodium lacking..... Collinsia
 - 7 Leaves alternate, entire, toothed, or lobed to divided
 - 12 Leaves and bracts all entire, densely woolly and feltlike, those of the basal rosette 10-40 cm long; corolla nearly regular, 5 lobed, yellow; anthers 5; flowers in densely flowered spikes; plants robust, biennial, (30) 50-120 cm tall, the stems to 2 cm thick..... Verbascum
 - 12 Leaves or bracts or both toothed to divided, or if entire then plants not as above in other features
 - 13 Leaves serrate or pinnately or bipinnately lobed to divided and the lobes or segments serrate or crenate and mostly 10 or more in 5 or more offset or opposite pairs; plants perennial..... Pedicularis

- 13 Leaves entire or divided into linear or acute entire segments, these rarely more than 5 per leaf; plants annual or perennial
- 14 Plants perennial except in C. exilis and then with erect usually simple stems 30-100 cm tall; bracts subtending the flowers brightly colored, red- orange, yellow, or reddish-purple, usually 3-cleft at least apically; corolla scarcely or not at all petaloid, usually greenish at least in part, 2-lipped, the upper lip straight-beaked, elongate, much exceeding the inconspicuous lower lip, which is reduced to 3 thickened toothlike lobes..... Castilleja
- 14 Plants annual, less than 30 cm tall or else much branched; bracts subtending the flowers greenish; corolla various, the lower lip usually well developed
- 15 Lower stem leaves 3-parted into linear or filiform segments; calyx bractlike, cleft to the base, entire or shortly bifid, subtended by 2 bracts, the outer leaflike, the inner resembling the calyx..... Cordylanthus
- 15 Lower stem leaves simple, entire, linear to narrowly lanceolate; calyx tubular-campanulate, cleft about halfway or less, 4-lobed, subtended by a single leaflike bract..... Orthocarpus

Besseya Rydb. Alpine Kittentails

Besseya wyomingensis (A. Nels.) Rydb. [B. cinerea (Raf.) Pennell misapplied] Perennial bracteate-scapose herb; stems mostly 10-25 cm tall; leaves basal, mostly 5-15 cm long, the blades elliptic or lanceolate to ovate, crenulate to serrate, about equaling the petioles; cauline leaves bractlike, sessile, ovate to lanceolate, 1-2 cm long; inflorescence a denselyflowered, more or less white-hairy spike 2-6 cm long, 1-1.6 cm wide; calyx 2-lobed, external to, not surrounding, the ovary, about 4 mm long; stamens 2; stamens and style exerted; capsule compressed, orbicular, about equaling the calyx. Known in our area only from alpine tundra near the summit of Big Ridge, 10 mi n. of Tabiona, about 11,000 ft; July-Aug. Our plants apparently are generally more diminutive than those that occur in the foothills and high plains of Idaho eastward to South Dakota and Nebraska.

Castilleja Mutis ex L. f. Paintbrush; Indian Paintbrush; Painted-cup

Plants perennial or (rarely) annual, herbaceous; leaves alternate, sessile, entire, toothed, or parted; flowers strongly bilaterally symmetrical, usually greenish and inconspicuous and less showy than the subtending bracts, borne in terminal spikes or spikelike racemes. Apparently frequently parasitising sagebrush.

- 1 Plants annual, growing in wet usually alkaline places of valleys; stems usually solitary, erect, wandlike; leaves and bracts linear-lanceolate, all entire..... C. exilis
- 1 Plants perennial, of mountains, or if of lower elevations then usually of dry places; stems clustered; leaves and bracts various
- 2 Bracts predominantly yellowish
- 3 Upper leaves and bracts deeply lobed or divided, the lobes linear or narrowly lanceolate
- 4 Plants small, less than 15 cm tall, of tundra habitats in the Uinta Mts.; inflorescence viscid-villous, sometimes tinged with purple..... C. pulchella
- 4 Plants mainly well over 15 cm tall, of low to mid-elevation habitats well below tundra communities
- 5 Calyx decidedly more deeply cleft below than above; plants from the Tavaputs Plateau and Daggett Co..... C. flava
- 5 Calyx slightly more deeply cleft above than below; plants widespread, yellow-bracted phases of..... C. chromosa
- 3 Leaves and bracts entire, the bracts broad, obtuse; plants of the Uinta Mts..... C. sulphurea
- 2 Bracts predominantly red to purple, rarely yellowish or somewhat pink or orange
- 6 Calyx more prominently colored than the relatively inconspicuous mostly green subtending bract, divided decidedly deeper below than above; plants of mid-altitudes..... C. linariifolia
- 6 Calyx less conspicuous than the brightly colored subtending bract and largely concealed by it, divided subequally above and below; distribution various
- 7 Plants of high mountains, mostly of mesic places of the alpine or subalpine zones
- 8 Leaves mostly deeply cleft, with linear spreading lobes, wavy margined; plants glandular pubescent..... C. applegatei
- 8 Leaves entire or the upper ones shallowly lobed at the tip; plants not markedly glandular-pubescent
- 9 Bracts broadly lanceolate to ovate, shallowly lobed, magenta or purple, rarely red; galea 8-12 mm long..... C. rhexifolia
- 9 Bracts lanceolate to narrowly lanceolate, mostly divided to below the middle, red or reddish-orange; galea 12-18 mm long..... C. miniata
- 7 Plants mostly of dry places, of deserts to lower mountains, never of alpine or subalpine habitats
- 10 Corolla relatively large, the upper portion of the galea and the lower lip usually plainly exerted from the calyx; stems somewhat decumbent at base, the lower scaly portion

elongate, devoid of chlorophyll, often buried in sand or rock crevices; plants of the Tavaputs Plateau and from the vicinity of Dinosaur National Monument..... C. scabrida
 10 Corolla relatively smaller, the lower lip and most of the galea largely concealed by the calyx; stems mainly erect or ascending, green nearly throughout, the lower scaly portion short and compact; plants widespread, in many communities..... C. chromosa

Castilleja applegatei Fern. Sticky p., pine p. (C. viscida Rydb.) Occasional; Uinta Mts. from e. Wasatch Co. to w. Uintah Co.; in rocky places of spruce, fir, lodgepole pine, aspen, and montane meadow communities and in alpine rock stripes, talus, and fell fields; 9,200-11,700 ft; June-Aug. Our plants are referable to var. viscida (Rydb.) Ownbey.

Castilleja chromosa A. Nels. Desert p. Common; widespread; greasewood, shadscale, mixed desert shrub, sagebrush, pinyon-juniper, and mt. brush communities on many substrates; 4,700-8,500 ft; late April-July. One of the most frequently collected of our species.

Castilleja exilis A. Nels. Marsh p. Occasional; our records from Duchesne, Uintah, and Daggett Cos.; somewhat alkaline or saline places; seeps, marshes, wet meadows, swamps, ditchbanks, lake margins, and mudflats, in saltgrass, sedge, rush, cattail, or other wet land communities; 4,700-7,000 ft; July-Aug. Our plants have been referred to C. minor Gray, and N. Holmgren in Cronquist and others (1984) indicates a close relationship for these 2 taxa.

Castilleja flava Wats. Yellow p-c., yellow p. Common; Tavaputs Plateau in Duchesne, Carbon, and Grand Cos. and the se. corners of Wasatch, Utah, and Uintah Cos., also in Daggett Co.; rare or absent in the Uinta Mts. and the central portion of the Basin; in sagebrush communities with Elymus salina, little rabbitbrush, mt. brush, snowberry, and in openings of Douglas-fir communities; 7,200-10,000 ft; June-Aug. Our plants are referable to var. flava.

Castilleja linariifolia Benth. in DC. Wyoming p-c., Wyoming p. Common; widespread; juniper-pinyon, mt. brush, aspen, ponderosa pine, and Douglas-fir communities, usually with sagebrush and grass; 6,000-9,000 ft; June-Sept.

Castilleja miniata Dougl. Scarlet p. Common; Uinta Mts.; usually in mesic or wet, sometimes rocky meadows, often with sagebrush, in aspen, ponderosa pine, lodgepole pine, Engelmann spruce, and subalpine fir communities, less frequently in the subalpine zone; 10,000-11,300 ft; July-early Sept.

Castilleja pulchella Dougl. Beautiful p. (C. occidentalis Torr. misapplied) Fairly common across the crest of the Uinta Mts.; tundra of alpine or subalpine rock stripes, fell fields, ridges, and meadows; 10,800-12,500 ft; July-Sept.

Castilleja rhexifolia Rydb. Splitleaf p-c., splitleaf p. (C. leonardii Rydb.) Occasional; scattered across the Uinta Mts.; mostly in rocky places of openings in Engelmann spruce or spruce-subalpine fir communities in the subalpine zone; 10,000-11,300 ft; July-early Sept.

Castilleja scabrida Eastw. Rough p. Occasional on the Tavaputs Plateaus, Blue Mt., and near Dinosaur National Monument, apparently absent from the Uinta Mts.; characteristically in pinyon-juniper communities with sagebrush, occasionally in Elymus salina-shadscale or mt. brush communities in sandy soil or sandstone outcrops, or in mixed sand and clay from shale strata; 5,000-8,200 ft; late April-July. Ours is referable to var. scabrida.

Castilleja sulphurea Rydb. Sulphur p. (C. septentrionalis Lindl. misapplied) Common across the Uinta Mts.; tall forb-aspen, open spruce-fir, and subalpine to alpine wet meadow, or boulder slope communities; 8,800-11,500 ft; late June-Aug.

Collinsia Nutt. Blue-eyed Mary

Collinsia parviflora Lindl. Small tap-rooted annual, stems 1-15 cm tall, simple or few-branched from the base, with 2-5 usually remote pairs of leaves; leaves few, opposite, simple, entire, sessile or narrowed to a petiolelike base, narrowly oblong to elliptic, rounded at apex, 5-30 mm long, 1-10 mm wide; flowers axillary, solitary; calyx 3-6 mm long, the lobes acute, narrowly triangular, in fruit slightly accrescent and enclosing the capsule; corolla tubular, 2-lipped, 4-6 mm long, the central lower lobe shorter and narrower than the lateral 2. Widespread; many communities, in moderately moist sites; 6,600-9,000 ft; April-early July. One of our commonest early spring flowers.

Cordylanthus Nutt. ex Benth. in DC. Birdsbeak

Tap-rooted annuals, the root yellow staining; leaves pinnately or palmately divided, the segments linear to filiform; flowers clustered in few-flowered heads near the ends of branchlets; calyx cleft to the base anteriorly, bractlike, 2-lobed apically, subtended by an opposing bract, an additional leaflike bract present below each flower or spike; corolla tubular below, expanding midway to a slightly expanded or pouchlike throat, 2-lipped distally, the lips about equal, the upper forming a hoodlike beak.

1 Corolla predominantly dingy yellow, abruptly dilated midway into a pouch-like throat, obscurely puberulent with hairs to 0.1 mm long; herbage puberulent, not glandular..... C. ramosus

1 Corolla predominately purple, gradually widened to a funnellform throat, evidently densely white-pilose on the lower throat with hairs mostly 0.5-1 mm long, herbage glandular-pubescent..... C. kingii

Cordylanthus kingii Wats. King b. [Adenostegia kingii (Wats.) Greene] Occasional to locally common; s. slope of the Uinta Mts. and on the E. and W. Tavaputs Plateaus in Uintah and e. Duchesne Cos.; usually on dry clay soils in desert shrub, pinyon-juniper, sagebrush, and mt. brush communities; 5,000-7,300 ft; June-Oct. Our plants have more flowers and larger floral bracts than typical for the species. Addition taxonomic status can be expected (Cronquist and others 1984).

Cordylanthus ramosus Nutt. ex Benth. Much-branched b. [Adenostegia ramosa (Nutt.) Greene] Occasional; our records from the vicinity of Fruitland, Brush Creek, Diamond, and Blue Mts., and near Manila; pinyon-juniper, sagebrush-grass, and mt. brush communities; 6,600-8,200 ft; late June-Aug.

Limosella L. Mudwort

Limosella aquatica L. Fibrous rooted perennial herb; leaves all basal, petiolate, exceeding the flowers, the petioles elongating when submerged, the blades floating, elliptic, 3-18 mm long, 1-7 mm wide; scapes slender, bearing a single flower, or sometimes stoloniferous and bearing a rooting tuft of leaves and flowers at the tip; corolla white, regular, 5-lobed, about equaling the calyx; capsule subglobose, about 3 mm long. Probably throughout our area but frequently overlooked; our few records from along the Strawberry and Green rivers and scattered locations across the Uinta Mts.; in mud or quiet shallow water of sand bars, reservoir and pothole margins, and wet fresh-water meadows; 5,000-9,920 ft; late June-Nov.

Linaria Mill Toadflax

Perennial herbs from creeping roots; leaves alternate or the lower ones opposite, sessile, entire; calyx of 5, essentially distinct segments; corolla yellow, the tube spurred at the base, strongly bilabiate, the throat nearly closed by the palate; stamens 4, didynamous.

- 1 Leaves linear, 2-4 mm wide, narrowed to a short petiolelike base, not clasping; flowers in a compact spike; calyx 2.5-3.2 mm long; corolla 10-14 (18) mm long; plants 20-60 (80) cm tall..... L. vulgaris
- 1 Leaves lance-ovate to ovate, 10-35 mm wide, broad and more or less clasping at the base; flowers in a more or less loose raceme; calyx 5-9 mm long; corolla 14-24 mm long; plants 40-70 (100) cm tall..... L. dalmatica

Linaria dalmatica (L.) Miller Dalmation t. Introduced from the Mediterranean Region, weedy, the 2 specimens seen are from Vernal (Nelson sn UI) and Strawberry Valley (Goodrich 21756); roadsides; 5,300-7,620 ft; June-July.

Linaria vulgaris Hill Butter and eggs. Introduced from Eurasia; the 1 specimen seen (Goodrich 21084) is from the edge of Twin Potts Reservoir, Duchesne Co., weedy, to be expected elsewhere.

Mimulus L. Monkeyflower

Plants herbaceous, often glandular, annual or perennial; leaves opposite, entire or toothed; flowers axillary, solitary; calyx 5 angled or keeled, the midrib of each lobe prominent, lobes usually much shorter than the tube; corolla slightly to strongly 2-lipped, usually spotted in the throat; stamens 4, didynamous; capsule cylindric, enclosed in the slightly to strongly accrescent calyx.

- 1 Corolla less than 0.8 (1.1) cm long; plants strictly annual
 - 2 Leaves mostly ovate, the blade abruptly narrowed to an evident slender petiole; leaves and calyx ribs green..... M. floribundus
 - 2 Leaves elliptic or lanceolate to oblanceolate, often narrowly so, narrowing gradually to a sessile base; leaves and especially calyx ribs red-tinged
 - 3 Calyx lobes short-ciliate (use 10X lens); corolla 7-10 mm long, exceeding calyx by 2-3 mm; internodes mostly exceeding leaves; stem usually single except in larger individuals.. M. rubellus
 - 3 Calyx lobes without cilia; corolla 4-7 mm long, exceeding calyx by 1-1.5 mm; internodes mostly shorter than the leaves; stems usually branched from base even in depauperate individuals..... M. suksdorfii
- 1 Corolla 1.2 cm or longer; plants perennial (sometimes annual in M. guttatus)
 - 4 Corolla rose-pink, 3-4.8 cm long, the throat yellow, rose-spotted..... M. lewisii
 - 4 Corolla yellow, 1.2-3.5 cm long, usually red spotted
 - 5 Leaves clustered in a subcaulescent basal tuft, the inflorescence scapose, 1 (2) flowered, the flowers 1.2-1.8 mm long, borne well above the leaves; plants producing rooting rosettes of leaves at the tips of slender stolons, mat forming..... M. primuloides
 - 5 Stems evidently caulescent, the flowers axillary; not as above in all respects
 - 6 Calyx regular or nearly so, calyx lobes similar, narrowly acute to acuminate, about 1/3 as long as the tube; corolla inconspicuously 2-lipped, the throat open; herbage viscid glutinous; ill-smelling, soft, mat-forming perennial from slender rhizomes..... M. moschatus
 - 6 Calyx bilaterally symmetrical, the upper lip longer and usually broader than the other 4, at least the lateral lobes broadly triangular, obtuse, 1/5 or less as long as the tube; corolla strongly 2-lipped, the throat more or less closed by the well-developed palate

SCROPHULARIACEAE

- 7 Plants 2 dm or less tall; stems 1-3 (5) flowered, relatively slender, usually 2.5 mm or less in diameter, usually decumbent, rooting at the nodes and forming mounds; leaves seldom exceeding 2.5 cm in length..... M. tilingii
- 7 Plants variable in size, but often taller than 2 dm, stems usually 5-many flowered, often some robust, 3 mm or more in diameter, mostly erect, not forming mounds; commonly some leaves more than 2.5 cm long...
..... M. guttatus

Mimulus floribundus Dougl. in Lindl. Mealy m., floriferous m. Diminutive annual of vernal moist, often disturbed sites. The 2 specimens seen are from drying mud of an ephemeral pool, Rye Grass Draw, Taylor Flats, 5,700 ft, Daggett Co. (Neese 14813); and Dutch Oven Springs, Douglas Mt., 7,270 ft (M. MacLeod 15b DINO).

Mimulus guttatus Fisch. ex DC. Common m., yellow m. Common in foothill to subalpine communities of the Uinta Mts.; stream banks, boggy meadows, shallow water, and rock crevices near springs and seeps. Our records from 6,000-10,000 ft; late May-June. Some of our material may be referable to the scarcely separable M. glabratus H. B. K. ssp. utahensis Pennell, characterized by slightly shorter calyx lobes and a more open corolla throat.

Mimulus lewisii Pursh Lewis m. Uncommon; our few records from the Duchesne, Sheep Creek, Whiterocks, Yellowstone, and Uinta drainages of the Uinta Mts.; among rocks in seeps, along mt. streams and lake margins, and in wet meadows, mostly in spruce and lodgepole associations; 8,000-11,700 ft; July-Aug.

Mimulus moschatus Dougl. in Lindl. Musk m. Uncommon; Strawberry Valley, near Moon Lake, and near Flaming Gorge Reservoir (Skull Cr.) in Daggett Co.; wet meadows and cold spring-fed bogs, usually in sedge-willow communities; 7,000-8,500 ft; June-Aug.

Mimulus primuloides Benth. Primrose m. The 1 collection seen (Weight 125 RM! ANF!) is from Gilbert Basin, Uinta Mts., Duchesne Co.; moist sedge-grass meadow; 11,000 ft; July 16, 1928; more common in states to the w. of our area.

Mimulus rubellus Gray Uncommon or perhaps overlooked, s. slope of the Uinta Mts. and on Diamond and Blue Mt. Plateaus; dry to moist, often sandy soil in ponderosa, juniper, sagebrush and grass communities; 5,100-7,400 ft; May-June. Diminutive annual; flowers axillary, or solitary in depauperate plants, the corolla yellow or purplish.

Mimulus suksdorfii Gray Suksdorf m. Infrequent; widespread; dry to moderately moist sagebrush-grassland, juniper-grassland, silver sage-grassland meadows, and rabbitbrush communities, usually in sandy soil; 5,100-7,700 ft; May-July. Much branched, resembling (but somewhat smaller in all its parts) the preceding species, separable by features of the key.

Mimulus tilingii Regel Subalpine m., Tiling m. Uncommon; cool wet places, montane to alpine communities. Our only record clearly referable to this species (Goodrich 14463) is from the w. extremity of the Uinta Basin near Daniels Pass, Wasatch Co. in a riparian-willow community; 8,000 ft; July-Aug. Usually but not always separable from M. guttatus by the moundlike habit, more slender stems, and smaller leaves.

Orthocarpus Nutt. Owl-clover

Taprooted annuals; leaves simple and entire below, gradually becoming bracteate and 3-lobed in the inflorescence; inflorescence a simple or branched spike or spikelike raceme, obscurely glandular pubescent; corolla yellow, 2-lipped, the upper lip beaklike, the lower somewhat pouched.

- 1 Upper lip of the corolla evidently exceeding the lower, hooked at the tip; stems usually freely corymbosely branched, the lateral branches about equaling or slightly exceeding the terminal one.....
..... O. tolmei
- 1 Upper and lower lips about equal, the upper inconspicuously curved at the tip; stems strict, simple or less often sparingly branched, the terminal branch when present much overtopping the lateral ones.....
..... O. luteus

Orthocarpus luteus Nutt. Yellow o. Occasional; footslopes of the Uinta Mts., to Blue Mt. and apparently rare on the E. Tavaputs Plateau; moderately dry to wet places, rocky or gravelly slopes in sagebrush-grassland, lodgepole, aspen, and ponderosa communities and in grassy meadows with sedges, rushes, and willows; 7,400-9,600 ft; late June-Sept.

Orthocarpus tolmei W. & A. Tolmei o. Common at the w. end of the Basin, and in Daggett Co., no specimens seen from Uintah Co.; gravelly benchlands, mt. ridges, and meadows, with sagebrush and grass in mt. brush, aspen, Douglas-fir, and spruce associations; 6,000-10,200 ft; late June-Sept.

Pedicularis L. Lousewort

Perennial herbs; stems erect, unbranched; leaves crenate to (usually) pinnately lobed to dissected; inflorescence spicate, bracteate; calyx irregular, cleft into 5, 4, or 2 lobes; corolla 2-lipped, the lower lip of 3 into 5, 4, or 2 lobes; corolla 2-lipped, the lower lip of 3 spreading lobes, the upper hooded, enclosing the stamens, the tip truncate or variously elongated and curved; fruit an asymmetrical capsule.

- 1 Inflorescence dense, subcapitate, equaling or (usually) much shorter than the leaves; corolla dull dark purple, the tube paler..... P. centranthera
- 1 Inflorescence elongate, much surpassing the leaves; corolla white to yellow, or pinkish purple
- 2 Corolla pinkish purple (rarely white in albino individuals); hooded upper lip much elongated at tip into an upward curving beak 7-11 mm long, resembling an elephant's head..... P. groenlandica
- 2 Corolla white to yellow; hood truncate or with a beak 1-2 mm long (to 7.5 mm in 1 species, but then strongly downcurving)
- 3 Leaves crenate to serrate..... P. racemosa
- 3 Leaves pinnately to bipinnately divided
- 4 Leaves mostly basal, stem leaves reduced upward; hood of upper lip attenuate at the tip, narrowed to a beak 1-2 mm long..... P. parryi
- 4 Leaves mostly cauline, the lower and middle stem leaves well developed; hood of upper lip truncate, blunt
- 5 Corolla 2.5-3.5 cm long; hooded upper lip with 2 slender acute lateral teeth near the tip..... P. procera
- 5 Corolla 1.8-2.5 cm long; hooded upper lip without lateral teeth..... P. bracteosa

Pedicularis bracteosa Benth. in Hook. Bracted l. (P. paysoniana Pennell) Uncommon; Uinta Mts.; moderately moist to wet soil or rocky places of spruce, lodgepole and Douglas-fir communities and margins of meadow openings; 8,200- 11,100 ft. Also reported from the Tavaputs Plateau (N. Holmgren in Cronquist and others 1984); July-Aug. Our plants are referable to var. paysoniana (Pennell) Cronq.

Pedicularis centranthera Gray in Torr. Dwarf l. The few specimens seen are from the Avintaquin drainage and n. to Hwy. 40 in Duchesne Co. and from the E. Tavaputs Plateau; pinyon-juniper communities; 6,900-7,760 ft; late April-June.

Pedicularis groenlandica Retz. Elephanthead, elephantella. Common across the Uinta Mts. where it is restricted to boggy cold wet meadows and stream banks, in spruce, lodgepole and aspen associations, apparently absent from Strawberry Valley, the Tavaputs Plateau and Diamond Mt.; 7,800-12,500 ft; late June-Aug.

Pedicularis parryi Gray Parry l. Occasional in the Uinta Mts., common in Strawberry Valley; riparian or meadow communities with sedge, grass, and silver sage, in openings of aspen, spruce, and lodgepole forests, and in rocky places of the alpine zone on rock stripes and morainal slopes. Our records show a bipartate distribution in the Basin--in the central part of the Uinta Mts. near the crest at 10,500-12,500 ft, and in Strawberry Valley growing at elevations down to 7,500 ft; June-Aug.

Pedicularis procera Gray Gray l. (P. grayi A. Nels.) We have seen no specimens from the Basin, but this species is reported by N. Holmgren (in Cronquist and others 1984) for the E. Tavaputs Plateau; to be expected in moderately moist aspen or conifer woods or edges of mt. meadows; 7,600 ft and above.

Pedicularis racemosa Dougl. in Hook. Leafy l. Occasional; Uinta Mts.; fir, spruce, lodgepole, and aspen woods; 9,000-10,600 ft; July-Aug. Our plants are referable to var. alba (Pennell) Cronq.

Penstemon Mitch. Beardtongue; Penstemon

Glabrous to glandular-pubescent, perennial herbs or subshrubs; leaves basal and opposite, simple, entire or occasionally toothed, the lower petioled, becoming sessile upward, reduced and more or less bractlike in the inflorescence; inflorescence of axillary cymes, often verticillate; calyx 5- cleft; corolla tubular to funnellform, more or less bilabiate; fertile stamens 4, didynamous, a fifth sterile filament (staminode) present; anthers glabrous or variously bearded; stigma globose; capsule 2-valved, many-seeded.

- 1 Corolla bright red, narrowly tubular, neither markedly 2-lipped nor the lobes much spreading..... P. eatonii
- 1 Corolla some shade of pink, purple, or blue, the tube expanded distally into a more or less funnellform throat or with lobes widely spreading, or both, mostly 2-lipped
- 2 Leaves, at least some, sharply and prominently toothed; corolla 25-35 (40) mm long
- 3 Anthers copiously woolly, the sacs dehiscing fully and across the connective, explanate; filaments glabrous; indigenous, rare, on limestone, w. Uinta Mts..... P. montanus
- 3 Anthers glabrous, the sacs various; filaments various; plants introduced
- 4 Anther sacs dehiscing across the apex only, horseshoe shaped; filaments hairy near the anthers; cauline leaves sessile but neither auriculate-clasping nor connate-perfoliate; corolla purple to violet, the tube gradually expanding into the throat..... P. venustus
- 4 Anther sacs dehiscing throughout, becoming opposite, not horseshoe shaped; filaments glabrous; mid and upper cauline leaves auriculate-clasping to connate-perfoliate; corolla whitish, pale pink, or lavender-pink with prominent red-violet guide-lines on the lower lip, the tube abruptly expanding into a strongly inflated throat..... P. palmeri
- 2 Leaves entire (rarely obscurely serrate); anthers glabrous or pubescent; corollas seldom over 25 mm long
- 5 Plants caespitose, creeping, forming mats; flowers subsessile, borne among the leaves
- 6 Plants evidently acaulescent, the leaves densely clustered in tufts; corolla throat rounded below, not strongly plicate; plants of Daggett and Moffat Cos..... P. acaulis

SCROPHULARIACEAE

- 6 Plants caulescent, the leaves distributed along the stem; corolla throat flattened below, plicate with 2 longitudinal ridges; plants of wider distribution..... P. caespitosus
- 5 Plants not caespitose, not forming mats; flowers held above the leaves on erect stems
 - 7 Stamens and staminode included in or barely exerted from the tube, hidden within the throat; corolla nearly regular, not markedly 2-lipped, the throat and lobes broadly funnelform, the lobes erect; anthers glabrous, peltately flat-opening; staminode yellow-bearded; calyx and corolla glandular-pubescent; corolla light blue with purple guidelines in the throat; endemic to the Tridell area..... P. goodrichii
 - 7 Stamens and staminode well exerted from the tube, more or less equaling the throat and evident; corolla 2-lipped or the lobes at least spreading or reflexed; otherwise not as above in all respects
 - 8 Anther sacs pubescent on surface, sometimes sparsely so
 - 9 Plants mostly less than 15 cm (rarely to 20 cm) tall; anthers sparsely bearded with hairs less than 0.2 mm long; near timberline and above in mostly Precambrian quartzite morainal detritus and alpine tundra and talus of the high Uinta Mts..... P. uintahensis
 - 9 Plants mostly much taller than 15 cm; not as above in all respects
 - 10 Leaves, stems, and inflorescence densely puberulent throughout; corolla deep blue-purple, mostly 18-22 mm long, the tube widening imperceptibly to an indefinite throat; widespread in pinyon-juniper and salt desert communities..... P. fremontii
 - 10 Lower leaves and stem mostly glabrous, at least not densely puberulent; inflorescence glabrous or glandular puberulent
 - 11 Hairs of the anther sac slender, flexuous, mostly longer than the length of the anther sac
 - 12 Corolla pale blue or pale lavender-blue; inflorescence relatively broad, the lower peduncles and pedicels often exceeding 2 cm, somewhat spreading, the inflorescence thus not markedly secund; anther sac usually densely woolly with long tangled hairs that somewhat obscure the surface; coming into the Basin only at the se. margin on the Tavaputs Plateau..... P. comarrhenus
 - 12 Corolla blue to dark blue; inflorescence narrow, the peduncles and pedicels mostly shorter than 1.5 cm, somewhat appressed, the inflorescence strongly secund; anther sac often somewhat less densely woolly, the surface not obscured; widespread..... P. strictus
 - 11 Hairs of the anther sac mostly shorter than the length of the sac, often straight, at least the sac not woolly with tangled hairs
 - 13 Hairs of the anther sac slender, somewhat flexuous, mostly as long as the width of the sac..... P. scariosus
 - 13 Hairs of the anther sac stiff, straight, shorter than the width of the sac
 - 14 Pedicels, calyx, and corolla glabrous; anther sacs diverging at about 90-120 degrees, not dehiscent fully, the line of dehiscence somewhat lateral; middle and upper leaves broadly ovate, clasping; inflorescence a nearly cylindrical thyrse..... P. cyananthus
 - 14 Pedicels, calyx, and corolla finely glandular (sometimes obscurely so--then best seen on backs of corolla lobes of unopened flowers); anther sacs diverging nearly 180 degrees, dehiscent fully (but not across the connective), the line of dehiscence median; middle and upper stem leaves lanceolate to narrowly lanceolate, scarcely clasping; inflorescence secund..... P. subglaber
 - 8 Anther sac glabrous on surface (occasionally scabrous or short ciliate along line of dehiscence)
 - 15 Anther sacs dehiscent at top only, across the apex and connective; anthers horseshoe-shaped
 - 16 Corolla 14-21 mm long, the lobes blue, the tube lavender; anthers sacs about 1 mm long; middle stem leaves mostly less than 7 mm wide, many of them obtuse; plants mostly less than 3 dm tall..... P. leonardii
 - 16 Corolla 20-27 mm long, lavender throughout; anther sacs ca 1.5 mm long; middle stem leaves mostly greater than 8 mm wide, elliptic, sharply acute, noticeably firm and plane; plants mostly over 3 dm tall..... P. platyphyllus
 - 15 Anther sacs dehiscent throughout or in distal portion
 - 17 Plants essentially glabrous throughout
 - 18 Inflorescence verticillate, the fascicles of flowers separated; leaves thin; plants of mts.
 - 19 Corollas 6-10 (12) mm long, the throat mostly less than 2 mm wide; tufts of basal leaves usually prominent; flowers tightly congested in the fascicle(s), sessile or nearly so, the individual pedicels not evident, usually declined; staminode bearded with yellow-brown hairs at apex (in distal 1.5 mm); calyx 3-6 mm long, the lobes acuminate; anther sacs mostly 0.5-0.7 mm long..... P. procerus
 - 19 Corollas 12-15 (17) mm long, the throat mostly wider than 2.5 mm; basal leaves absent or poorly developed; fascicles not so tightly congested, the individual pedicels usually evident; flowers usually horizontal or ascending; staminode yellow-bearded at apex in distal 3-5 mm; calyx 2.5-3.5 mm long, the lobes,

- triangular to ovate, abruptly narrowed to an acute or mucronate tip; anther sacs 1 mm long...
 P. watsonii
- 18 Inflorescence a more or less continuous thyrse, if somewhat verticillate the fascicles little separated; leaves thick, leathery; plants of lower elevations, mostly of pinyon-juniper and salt desert communities
- 20 Leaves narrowly lanceolate to linear, mostly much more than 4 times longer than wide; plants of ne. Uintah and Moffat Cos., restricted to sandy soils..... P. angustifolius
- 20 Leaves ovate, broadly lanceolate, or broadly spatulate, usually much less than 4 times longer than wide
- 21 Corolla pink; basal rosette lacking or poorly developed; staminode not much widened at apex, glabrous or merely short-barbellate; plants endemic near Roosevelt, Myton, and Randlett, Duchesne and Uintah Cos. on clay semibarrens of the Uinta formation.....
 P. flowersii
- 21 Corolla blue to blue-purple or occasionally lavender pink; basal rosette well developed, the basal leaves petiolate, often broadly spatulate; staminode prominently dilated at apex, bearded with hairs 0.2-2 mm long
- 22 Corolla glabrous externally, the throat and lobes often prominently veined within on all sides with wine red guidelines; staminode hairs mostly 0.5-2 mm long; plants widespread..... P. pachyphyllus
- 22 Corolla finely glandular puberulent externally, without prominent guidelines; staminode hairs mostly 0.2-0.5 mm long; plants known from Willow Creek, E. Tavaputs Plateau..... P. carnosus
- 17 Plants pubescent to glandular-pubescent, either on leaves and stem or in inflorescence
- 23 Corolla glabrous externally
- 24 Corolla 6-10 (12) mm long, the throat mostly less than 2 mm wide; tufts of basal leaves usually prominent; flowers tightly congested in the fascicles(s), sessile or nearly so, the individual pedicels not evident; flowers usually declined; staminode bearded with yellow-brown hairs at apex (in distal 1.5 mm); anthers mostly 0.5-0.7 mm long..... P. procerus
- 24 Corolla and anthers larger; tufts of basal leaves lacking or poorly developed; fascicles usually not so congested as to obscure individual pedicels; flowers horizontal to ascending; staminode bearded in the distal 3-5 mm
- 25 Calyx short, 2.5-3.5 mm long, the lobes triangular to ovate, abruptly narrowed to an acute or mucronate tip, narrowly scarious margined; middle stem leaves mostly abruptly narrowed to a cordate or rounded base, often somewhat clasping, broadest near the base.....
 P. watsonii
- 25 Calyx longer, mostly 4-6 mm, the lobes tapering to a caudate or long-acuminate tip, the margins broadly and prominently scarious-margined; middle stem leaves mostly gradually narrowed at base, not clasping, widest near the middle..... P. rydbergii
- 23 Corolla glandular-puberulent externally
- 26 Calyx less than 5 mm long; corolla less than 15 mm long, blue-purple..... P. humilis
- 26 Calyx and corolla larger, the corolla lavender-pink to blue
- 27 Corolla flattened beneath, plicate with 3 longitudinal ridges, dark blue above but with a nearly white longitudinal strip beneath; staminode yellow-bearded for about 1/2 the length; leaves all cauline, finely puberulent; n. Daggett and Moffat Cos..... P. radicosus
- 27 Corolla rounded beneath, not markedly ridged
- 28 Stems relatively tall and slender, mostly much exceeding 20 cm; corolla dirty white to dark wine-purple, the lower lip projecting, exceeding the upper; basal leaves finely serrate, sometimes obscurely so; montane to alpine communities..... P. whippleanus
- 28 Stems mostly less than 20 cm; upper corolla lobes equaling or exceeding the spreading or reflexed lower ones; leaves all entire (rarely obscurely toothed in P. grahamii and P. cleburnei)
- 29 Corolla throat constricted at the orifice, broadest near the middle; palate copiously and prominently bearded with long crinkled yellow hairs; staminode shaggy-villous at the tip and on upper surface with yellow hairs greater than 2 mm long; corolla lavender-blue with dark purple guidelines; Daggett Co. and adjacent Wyoming..... P. cleburnei
- 29 Corolla not constricted at the orifice, broadest at the throat; not as above in both color and distribution
- 30 Staminode prominently exerted, curved at the tip, densely bearded on all sides nearly to the base with short golden hairs; corolla lavender or lavender-pink with red-purple guidelines, 26-34 mm long; throat strongly inflated, 10-13 mm broad; endemic to shale barrens of the Green River Formation in e. Uintah and adjacent Rio Blanco Cos..... P. grahamii
- 30 Staminode neither prominently exerted nor curved, bearded only on the upper surface in the distal 2/3 or less; corolla blue to blue-purple, less than 20 mm long, the throat less than 8 mm broad, little or not at all inflated; plants of central Duchesne County

SCROPHULARIACEAE

- 31 Lower leaves and stem glabrous to puberulent; inflorescence densely glandular pubescent; stems mostly 10-20 cm tall; longer basal leaves 4-7 cm long; staminode slender throughout..... P. moffatii
- 31 Leaves, stems and inflorescence densely cinereous-puberulent, not glandular; stems 2.5-10 (12) cm tall; longer basal leaves 2-3.5 (4) cm long; staminode cuneately widened at tip..... P. duchenensis

Penstemon acaulis Williams Stemless p. Uncommon, restricted in distribution, occurring in Daggett Co. near Manila and in Brown's Park, in Moffat Co. in the Yampa and Vermillion Creek drainages, and in Sweetwater Co., Wyoming; on sandy, gravelly, or ashy ridges and knolls in pinyon-juniper and sagebrush communities, 5,800-7,700 ft; May-early July. Plants of this species have the most condensed habit of any of the genus. We have two varieties, these intergrading in the Browns Park area:

- 1 Leaves linear, less than 1.6 mm wide and 2 cm long; plants of Brown's Park west to Manila.. var. acaulis
- 1 Leaves, at least some, more broadly linear to oblanceolate; plants of Browns Park east to near Greystone, Moffat Co. (P. yampensis Pennell) var. yampaensis (Pennell) Neese

Penstemon angustifolius Pursh Narrowleaf p. Locally common; in sandy soil mostly on stabilized blow sand; sagebrush and juniper communities; 5,000-5,800 ft; May-June. Ours, var. vernalensis N. Holmgren, is endemic to an area from Vernal, Maeser, and Steinaker Reservoir se. to the Utah-Colorado border and adjacent corners of Rio Blanco and Moffat Cos. and in Brown's Park, Daggett Co. Note: the specimens from Brown's Park (Neese & Peterson 5547, 5561), which are relatively small stature and have slightly smaller flowers, have been referred to P. arenicola A. Nels., but calyx, corolla, and anther sizes, as well as habit, fall better within the range of variation of P. angustifolius var. vernalensis, to which we refer them. Unfortunately, label data that indicated them to be growing on white tuffaceous substrates are in error--they were collected on adjacent aeolian sand. We have seen no specimens of P. arenicola [a species of nearby Wyoming reported to occur in Daggett and Wasatch Cos. (Cronquist et al. 1984), but it may occur in the Basin. The taxa differ in the following features:

- 1 Anther sacs less than 1 mm long (mostly about 0.8 mm); corolla (10) 12-14 mm long; palate sparsely white-bearded..... P. arenicola
- 1 Anther sacs over 1 mm long (mostly 1.2-1.3 mm); corollas 15-20 mm long; palate glabrous..... P. angustifolius

Penstemon caespitosus Nutt. Mat p. Common; widespread; sagebrush, pinyon-juniper, and mt. brush-grassland communities; 6,500-8,600 ft; June-July. We have 2 well marked vars. separated as follows:

- 1 Leaves linear or linear-lanceolate, mostly 1-2 mm wide, more than 5 times longer than wide, green, scabrous-puberulent but only slightly cinereous; Uinta Mts. in Duchesne, n. Uintah, and Daggett Cos., also in Strawberry Valley, Wasatch Co..... var. caespitosus
- 1 Leaves lanceolate to spatulate, mostly 2-4 mm wide, about 3 times as long; Tavaputs Plateau, Duchesne and Uintah Cos., Utah, and Rio Blanco Co., Colorado..... var. perbrevis (Pennell) N. Holmgren

Penstemon carnosus Pennell Fleshy p. Known from a small area in Willow Creek drainage, East Tavaputs Plateau; desert shrub and juniper communities; May-June.

Penstemon cleburnei Jones Uncommon in the vicinity of Manila and Dutch John, Daggett Co., and adjacent Wyoming; sagebrush-grass or salt desert shrub communities, sandy loam to clay soils; 6,200-8,000 ft; late May-early June.

Penstemon comarrhenus Gray Dusty p. Uncommon; aspen, Douglas-fir, mountain brush, and mesic sagebrush-rabbitbrush communities. A species of generally more s. distribution, it enters the Basin on the rim of the Tavaputs Plateau. The study material approaches P. strictus in key characters; southward the species are more sharply differentiated.

Penstemon cyananthus Hook. Wasatch p. Entering the Uinta Basin only at its w. edge and on Bear Mt., Daggett Co. (T. Smith sn); montane to subalpine, in aspen-conifer, sagebrush, and grassland communities. Common to the w. of the Basin in the Wasatch Mts.; June-Aug.

Penstemon duchesnensis (Penl.) Neese Duchesne p. (P. dolius Jones var. duchesnensis N. Holmgren) Locally common on gravel slopes for about 10 mi on either side of Duchesne in pinyon-juniper communities; 5,400-6,600 ft; mid May-June. The low gray-puberulent plants sometime form large colorful patches along the roadside.

Penstemon eatonii Gray Firecracker p. Locally common; entering the Basin on the Tavaputs Plateau and extending as far e. as the Avintaquin and Curren Creek drainages; mt. sagebrush communities on rocky slopes and roadcuts; 7,300-7,500 ft; May-June. Our plants are referable to var. eatonii.

Penstemon flowersii Neese & Welsh Flowers p. Endemic to the Basin; known from about 15 mi e. and w. of the Duchesne-Uintah Co. line near Myton, locally common; shadscale communities on semibarren, gravelly, clay slopes and benches of the Uinta Formation; 4,900-5,400 ft; May.

Penstemon fremontii T. & G. Fremont b. Endemic to our area and adjacent Wyoming, common almost throughout the Basin, but infrequent in Daggett Co.; arid benches and slopes in shadscale, mixed desert shrub-grassland, and pinyon-juniper communities, clay to sandy gravels; 5,000-8,000 ft; May-June.

Penstemon goodrichii N. Holmgren Goodrich p. Endemic, rare, but sometimes locally abundant; known only from between Roosevelt and Maeser in Duchesne and Uintah Cos., mostly in the Tridell vicinity; shadscale, sagebrush, and juniper communities in red to gray clays and sandy clays of the Duchesne River Formation; 5,600-6,200 ft; late May-June.

Penstemon grahamii Keck Graham b. Endemic, uncommon; sporadically present on white to tan, steep, barren, shale slopes and ridges of the Parachute member of the Green River Formation in se. Uintah Co., on Raven Ridge near Mormon Gap in Rio Blanco Co., and in the vicinity of Sand Wash along the Green River near the Carbon-Uintah Co. line. Growing with shadscale, Forsellesia, Elymus salina, and scattered pinyon-juniper; 5,600-6,300 ft (about 5,000 ft at Sand Wash); May.

Penstemon humilis Nutt. Low p. Common; widespread, apparently absent from the E. Tavaputs Plateau; montane sagebrush-grassland, also in pinyon-juniper, mt. brush, aspen, and ponderosa pine communities in somewhat sandy soils; 6,000-9,000 ft; late May-June. Our plants are referable to var. humilis.

Penstemon leonardii Rydb. Leonard p. Rare; our few records are from the w. end of the Basin in Wasatch Co. in sagebrush meadows and on steep rocky slopes, Uinta Mts.; 9,000-10,000 ft; late June-Aug.

Penstemon moffatii Eastw. Uncommon; known in the Basin from near Starvation Reservoir; pinyon-juniper woodlands. Distribution of this seldom-collected species is mostly s. of our area, in desert shrub communities, clay soil; May-June. Wolf & Dever 5101 DINO! from Round Top Mt., referred here by Bradley (1950) belongs to P. humilis.

Penstemon montanus Greene Cordroot p. Rare; known in our area only from steep limestone talus in the S. Fork Rock Creek drainage, Duchesne Co.; 9,500-10,000 ft (Goodrich 15030, 15109); July-Aug.

Penstemon pachyphyllus Rydb. Thick leaf p. Locally common, sandy to clay soils, salt desert shrub, sagebrush, pinyon-juniper, and mt. brush communities, 5,300-8,800 ft. May-June specimens from the Basin referred to P. osterhouii belong here. Two intergrading varieties are present in our area; most material may be separated as follows:

- 1 Staminode sparsely bearded with hairs 0.2-1 mm long, these not obscuring the broadly dilated tip; plants mostly of Daggett and northern Uintah Cos..... var. mucronatus (N. Holmgren) Neese
- 1 Staminode densely bearded with tangled hairs 1-2 mm long that obscure the apex; plants mostly of Duchesne and southern Uintah Cos. and adjacent Colorado..... var. pachyphyllus

Penstemon palmeri Gray Palmer p., balloon flower. Native to s. Utah, Arizona, California, and Nevada, used in roadside seedings and introduced to our area on a roadcut about 0.5 mi s. of Soldier Creek Dam on the Strawberry River (A. Stephenson sn BRY) where the plant is now abundant.

Penstemon platyphyllus Rydb. Our only record (Harrison 406H) is from Indian Canyon 28 mi w. of Duchesne on bare eroding slopes, 8,200 ft. Otherwise endemic to the Wasatch Mts.

Penstemon procerus Dougl. Littleflower p. Common; widespread; montane and alpine meadows, silver sagebrush-grassland and conifer communities; mostly above 8,500 (rarely as low as 7,600) ft; late June-Aug. Materials from the Basin which are transitional between P. procerus and P. rydbergii have been recognized at infraspecific level within both species. Further study of the complex is needed, and varietal designation of our materials is not here attempted.

Penstemon radicosus A. Nels. Matroot p. Uncommon; coming into our area in Daggett Co. (Phil Pico Mt. and Goslin Mt.) and on Diamond Mt. in Moffat Co. near the Utah border; mt. brush zone, sagebrush, grass, serviceberry, and juniper communities; our 3 records are from 7,800-8,200 ft; June-July.

Penstemon rydbergii A. Nels. Rydberg p. High elevations in the Uinta Mts., especially common in the w. portion, meadows and open rocky slopes; July-Aug. See P. procerus. MacLeod 13A DINO!, apparently the basis of the Holmgren (1962) report for Blue Mt., belongs to P. procerus.

Penstemon scariosus Pennell This is a variable taxon comprising a series of more or less habitat-specific phases, these differing in plant size and habit, leaf size and shape, flower size and color, and degree of glandularity. Only a portion of the variation has been recognized at infraspecific rank. The following key serves to separate most of the variation in our area, but not all material will "key" satisfactorily:

- 1 Corolla glandular externally, blue-purple, stems often decumbent, curved upward, the leaves unilaterally oriented; upper stems, pedicels, and calyx often strongly suffused with purple; anther sacs less than 1.9 mm long; leaves narrow, mostly much less than 1 cm broad; Plants of Blue Mountain and the Yampa Plateau Welsh 480, referred to P. cyanocaulis Payson (Welsh 1957) belongs here..... var. cyanomontanus
- 1 Corolla glabrous externally, blue or blue-lavender; stems mostly erect, straight, the leaves not unilaterally oriented; inflorescence seldom markedly cyaneous; anther sacs 1.7-2.2 mm long; leaves narrow or not; distribution otherwise
 - 2 Leaves lanceolate, mostly over 7 mm wide; tuft of basal leaves prominent at flowering time; corolla blue, often longer than 23 mm; plants of the W. Tavaputs Plateau and in the Uinta Mts..... var. garrettii
 - 2 Leaves linear to linear-lanceolate, rarely over 7 mm wide; tuft of basal leaves withered, at least not prominent at flowering; corolla pale blue to lavender, usually less than 22 mm long; plants of extreme e. Uintah Co. and closely adjacent Colorado on shale barrens of the Green River Formation... var. albifluvis

Var. albifluvis (England) N. Holmgren (P. albifluvis England) Locally common; shadscale-Elymus salina communities, usually growing with Cirsium barnebyi, Eriogonum ephedroides, Lesquerella, Machaeranthera grindelioides and scattered pinyon-juniper; 5,000-6,800 ft; May-July. Plants in the Big Pack Mt. area are transitional to var. garrettii.

Var. garrettii. (Pennell) N. Holmgren (P. garrettii Pennell) Occasional to locally common in the Uinta Mts. and on the W. Tavaputs Plateau; sagebrush, snowberry, and Purshia-grasslands, and in openings of pinyon-juniper, mt. brush, and Douglas-fir-spruce communities, often on calcareous substrates; 6,700-10,000 ft; May-Aug. A small and dark colored phase from Green River shale near the head of Buffalo-Willow Creeks of the Strawberry River drainage may deserve taxonomic recognition. Populations from the e. end of the Uinta Mts. are transitional to the following variety.

Var. cyanomontanus Neese Common in crevices of exposed sandstone bedrock on the summit of Blue Mt. and adjacent Colorado; sagebrush-grassland and Ponderosa pine communities. Populations from sandstone and quartzite substrates on Diamond Mt. to Mosby Mt. are similar but usually somewhat less glandular-pubescent; 7,000-8,200 ft; June-July.

Penstemon strictus Benth. Rocky Mt. p. Widespread; occasional to locally abundant; apparently more common on the Tavaputs Plateau than in the Uinta Mts.; sagebrush, pinyon-juniper, mt. brush, aspen, and conifer communities; mostly 7,000-9,500 ft, rarely down to 6,000 ft (Daggett Co.) or to 10,000 ft (near Mt. Bartles); June-Aug.

Penstemon subglaber Rydb. Occasional or locally abundant in the Uinta Mts. and the far w. portion of the Tavaputs Plateau, apparently more common at the w. end of the Basin; sagebrush-grass, lodgepole pine, aspen, and conifer communities and on roadcuts; 7,000-10,000 ft; mid June-Aug. This is a tall and showy species that sometimes grows in great masses on roadcuts. Pink forms occur.

Penstemon uintahensis Pennell Uinta p. Endemic; Uinta Mts.; mostly on Precambrian quartzite, but the type specimen (from Dyer Peak) and a few others are from limestone; near and above timberline on morainal ridges, fell fields, talus slopes, and rock strips, in alpine meadow, spruce-sedge, and tundra communities; 10,500-12,200 ft; July-Aug.

Penstemon venustus Dougl. Lovely p. Known in Utah from a single occurrence (Goodrich 19243), the single large plant growing on a rocky road embankment about 2 mi w. of Mt. Home; a Pacific Northwest species apparently introduced in roadside seeding.

Penstemon watsonii Gray Watson p. Widespread; occasional to frequent in the w. portion of the Uinta Mts. and on the Tavaputs and Yampa Plateaus; in the montane and upper pinyon-juniper zone, sagebrush-grassland, mt. brush, and aspen communities 7,000-9,200 ft; mid June-Aug.

Penstemon whippleanus Gray Whipple p. Occasional across the Uinta Mts., rare along the rim of the Tavaputs Plateau; upper montane and alpine zone in openings in aspen-conifer communities and on slopes and ridges; our records between 8,600-11,000 ft; July-Aug.

Scrophularia L. Figwort

Scrophularia lanceolata Pursh Lanceleaf f. Perennial herbs; stems several, erect, mostly unbranched except in the inflorescence, to about 1.5 m tall; leaves opposite, petiolate, lanceolate, sharply serrate, the blades to about 12 cm long; inflorescence a thyrsoid panicle; corollas urceolate, greenish and usually tinged with yellow, red, or brown, 2-lipped, 5-lobed, the lobes rounded, the upper 2 the longest, projecting forward, the lower middle 1 sharply reflexed; capsule ovoid. Occasional; our few records from Strawberry Valley, the Uinta Mts., Blue Mt., W. Tavaputs Plateau, and the Piceance Basin, in moderately moist sites in sagebrush, snowberry, mt. brush, conifer, and aspen communities; 7,000-10,400 ft; June-July.

Synthyris Benth. Kittentails

Synthyris pinnatifida Wats. Cutleaf k. Low scapose perennial beginning to flower early while leaves are still immature; leaves all basal, pinnate-pinnatifid, at maturity to 18 cm long; inflorescence a scapose, bracteate, densely flowered raceme overtopping the leaves, condensed at first, elongating in fruit; corolla blue to blue-purple, 4 lobed, nearly regular, about 6 mm long; stamens dark blue, exerted; capsule suborbicular, moderately flattened, notched at apex. Rare; our only records from subalpine limestone ridges n. of Tabiona and from the n. slope of the Uinta Mts. near the head of Sheep Creek, Daggett Co.; open Engelmann spruce and lodgepole pine forests; 8,900-10,880 ft; June-July. Our plants are referable to var. pinnatifida.

Verbascum L. Mullein

Verbascum thapsus L. Common m., woolly m. Robust perennial; herbage densely woolly with branching hairs, first-year leaves forming a rosette, oblanceolate to spatulate, tapered to a short petiole, to 30 or more cm long, those of the flowering stem decurrent, reduced upward, becoming sessile, lanceolate, bractlike in the inflorescence; stem stout, typically simple but sometimes branching in the inflorescence, to 2 dm tall; inflorescence a densely flowered, spikelike raceme; corolla yellow, slightly irregular, rotate. A widely distributed introduced weed, native of Eurasia, growing along roadsides and in moderately moist, gravelly, disturbed places. Occasional at low to middle elevations throughout the Basin; June-Sept.

Veronica L. Speedwell; Brooklime

Perennial or annual low herbs, often of wet places; leaves opposite, simple, sessile or short-pedicellate; calyx deeply 4-lobed; corolla white to lavender or (usually) blue, subrotate, 4-lobed, the upper lobe broader, the lower narrower than the lateral ones; stamens 2; capsule compressed, suborbicular or obcordate to 2-lobed, the style arising from the notch between the 2 valves.

- 1 Flowers in many-flowered axillary racemes (rarely solitary in the axils in depauperate plants); herbage glabrous
 - 2 Leaves all short-petiolate; racemes relatively lax, few-flowered, flowers fewer than 25 even in well-developed individuals..... V. americana
 - 2 Leaves sessile (the lower most rarely short-pedicellate); racemes more densely flowered, bearing 30 or more flowers on well-developed racemes..... V. anagallis-aquatica
- 1 Flowers solitary in the axils of a terminal raceme; herbage variously pubescent
 - 3 Erect annuals
 - 4 Capsule obcordate, the partition 3/4 or more as long as the capsule; fruiting pedicels about 1 mm long, much shorter than the blunt subtending bract; style obsolete, 0.3 mm long or less; calyx lobes scarcely enlarging in fruit, not prominently veined..... V. peregrina
 - 4 Capsule prominently 2-lobed, the partition 1/3 or less as long as the lobes; fruiting pedicel 4-7 mm long, equaling or exceeding the acute subtending bract; style 1-1.4 mm long; calyx lobes accrescent, prominent and noticeably veiny in fruit..... V. biloba
 - 3 Rhizomatous perennials
 - 5 Capsule longer than broad; style about 1 mm long; inflorescence congested, headlike during early flowering, elongating in fruit..... V. wormskjoldii
 - 5 Capsule slightly broader than long; style about 3 mm long; inflorescence elongate, scarcely headlike even when young..... V. serpyllifolia

Veronica americana Schwein. in DC. American s., American b. Common across the Uinta Mts., also on the W. Tavaputs Plateau, probably elsewhere; near springs, muddy places, and along water courses in slow-moving shallow water; our records from 6,000-8,500 ft; June-Aug.

Veronica anagallis-aquatica L. Water s. Common; footslopes of the Uinta Mts., also along the Green River and in the Piceance Basin of Colorado, and probably throughout the Basin, naturalized along water courses and in mud or shallow water near springs, seeps, and canals; native of Eurasia and Africa; valley bottoms to 8,200 ft; June-Aug.

Veronica biloba L. Twolobe s. The 4 specimens seen are from widely scattered locations in Duchesne, Moffat, and Uintah Cos.; sagebrush, pinyon-juniper, and aspen-Douglas fir communities, increasing with disturbance; mostly about 6,000-8,500 ft; May-July.

Veronica peregrina L. Purslane s. Our records from Daggett, Uintah, e. Duchesne, and Moffat Cos., especially common on Diamond Mt. also middle elevations in the Uinta Mts.; wet to drying soil, sometimes in rocky places, margins of reservoirs and swales, canal banks, and meadows, often in areas of disturbance; 5,800-9,000 ft; June-Aug. Our plants are referable to var. xalapensis (H.B.K.) St. John & Warren.

Veronica serpyllifolia L. Thyme-leaf s. (V. humifusa Dickson) Occasional; wet places in the Uinta Mts., and in Moffat Co.; lake margins, meadows, and along streams, often under willows, in lodgepole, spruce, and aspen zones; 7,500-11,000 ft; June-Aug. Our plants belong to var. humifusa (Dickson) Vahl.

Veronica wormskjoldii R. & S. Alpine s., Wormskjold s. Uinta Mts.; common in wet meadows and along streams and lake margins with sedge and willow, often in rocky places, in spruce, fir, lodgepole, and alpine communities; 8,100-11,200 ft; June-Aug.

SELAGINELLACEAE Selaginella Family

Selaginella Beauv. Spikemoss

Evergreen, low growing, usually matted, perennial herbs; stems prostrate or some ascending to erect; stems covered with scalelike leaves (in a similar way to those of juniper); leaves not over 5 mm long; flowers lacking; reproduction by spores, the spores borne in the axils of leaflike sporophylls, inconspicuous and usually hidden in the sporophylls.

- 1 Sporophylls and leaves not awn-tipped (a few sometimes with minute awn-points); plants of canyons associated with the Green River and Ashley Creek Gorge..... S. mutica
- 1 Sporophylls and leaves awn-tipped; plants of the Uinta Mts.
 - 2 Awn-tip of leaves (0.3) 0.5-2 mm long; leaves of the lower or convex side of the stems somewhat longer than those of the corresponding level on the upper or concave side of the stems..... S. densa
 - 2 Awn-tip of leaves 0.2-0.4 mm long; leaves of a given level on the stem alike..... S. watsonii

Selaginella densa Rydb. Occasional; Uinta Mts.; rocky places and alpine tundra; (7,000) 8,000-12,000 ft, perhaps higher.

SELAGINELLACEAE

Selaginella mutica D. C. Eaton The few specimens seen are from rocky canyons along the Green River and Ashley Creek Gorge.

Selaginella watsonii Underwood. Occasional to common (more common than S. densa); Uinta Mts.; rocky places; (7,000) 8,000-13,000 ft.

SOLANACEAE Nightshade or Potato Family

Plants herbaceous or woody; leaves alternate; flowers bisexual, usually regular; sepals mostly 5, more or less united; corolla united, more or less 5-lobed; stamens 5, alternate with the corolla lobes, inserted on the corolla tube; ovary superior; fruit a berry or a capsule. The cultivated potato and tomato are members of the family. All of the taxa discussed below are considered to contain poisonous principles (Kingsbury 1964).

- 1 Plants woody, often over 1 m tall..... Lycium
- 1 Plants herbaceous, often annual, mostly less than 1 m tall
 - 2 Corolla less than 2 cm long, or if longer then the plants with numerous long straight prickles; flowers few; fruit a berry..... Solanum
 - 2 Corolla 2 cm long or longer (except in Hyocymus with numerous flowers in terminal second racemes and with fruit a capsule); plants without prickles
 - 3 Corolla 5-11 cm long, the limb over 3 cm wide; leaf blades 10-20 cm long, nearly as wide, on stout petioles..... Datura
 - 3 Corolla shorter or limb narrower or both; leaf blades various but often smaller or sessile or nearly so
 - 4 Flowers solitary or 2-6 together from axils of upper leaves, the corolla 3-5 cm long, broadly campanulate; fruit a succulent berry, about 1-1.5 cm in diameter, plants not glandular..... Physalis
 - 4 Flowers not all from axils of leaves; the corolla either less than 3 cm long or else narrowly tubular-funnelform; fruit a capsule; plants glandular
 - 5 Corolla 2-4 cm long, white or greenish white; stamens included; flowers in terminal paniculate racemes; capsules not completely included in the calyx, about 1 cm long; some leaves usually with petioles..... Nicotiana
 - 5 Corolla 1.5-2 cm long, whitish with reddish or purplish veins; stamens exerted; flowers numerous in terminal second racemes as well as in axils of upper leaves; capsules completely included in the calyx, about 1-1.4 cm long; leaves sessile, sometimes clasping.... Hyocymus

Datura L. Thornapple; Jimson Weed

Datura stramonium L. J. w. Coarse weedy ill-scented annual herbs, 30-100 cm tall, glabrous or nearly so; leaves coarsely toothed, to shallowly lobed; calyx 3-6 cm long, the lobes about 4-7 mm long, the persistent portion 406 mm long; corolla white to violet; fruit a large capsule dehiscent into 4 valves. Reported by Graham (1937) from a garden in Lapoint. Introduced from tropical America, naturalized in much of the moister and warmer areas of the United States, probably not persistent in the climate of the Uinta Basin. Datura wrightii Regel (Indian apple) with corolla 8-20 cm long; persistent portion of the calyx mostly (10) 15-20 mm long, and entire to coarsely sinuste dentate leaves has been planted as an ornamental. This is native to areas well s. of our area. It may not persist here either.

Hyocymus L. Henbane

Hyocymus niger L. Black h. Coarse weedy annual or biennial, viscid- villose herbs; stems 30-100 cm tall; leaves 6-20 cm long, ovate to lanceolate, irregularly lobed, cleft or pinnatifid; fruiting calyx 2-2.5 cm long. Introduced from Europe, adventative but rather infrequent; roadsides and waste places; not expected over 8,000 ft; June-Aug.

Lycium L. Desert-thorn; Wolfberry

Lycium barbarum L. Matrimony vine, tea vine. (L. halimifolium Mill.) Sprawling or more or less erect glabrous shrubs, 0.75-2 (6) m tall; leaf blades 2-6 cm long, oblong to elliptic or lanceolate; calyx about 4 mm long; corolla about 5-10 mm long, purple to reddish; stamens slightly exerted; fruit a reddish orange fleshy berry to about 1 cm in diameter. Introduced from China; cultivated mostly at old homesteads, persisting and escaping, occasionally forming thickets and becoming a pest on neglected pastureland; not expected above 6,000 ft; May-Oct.

Nicotiana L. Tobacco

Nicotiana attenuata Torr. ex Wats. Coyote t., wild t. Annual viscid- puberulent herbs 30-60 cm tall; leaf blades 3-10 cm long, ovate to lanceolate, the upper ones linear; calyx 6-9 mm long; fruit a capsule, about 1 cm long. Two specimens seen are from Bonanza and the Tavaputs Plateau; desert shrub and pinyon-

juniper-Douglas-fir communities, Flowers et al. 177 UT is from Sheep Creek, Daggett Co., and MacLeod 37b DINO! is from 4.3 mi sw of Gray Stone; wet meadows; 5,900-7,200 ft; July-Sept.

Physalis L. Groundcherry; Husktomato

Physalis longifolia Nutt. Popweed. (P. subglabrata Mack, & Bush.; P. virginiana Mill. misapplied) Perennial herbs from rhizomes 20-80 cm tall, glabrous or with a few long hairs; leaf blades 4-10 cm long, entire or undulate; corolla yellowish with a brown center. Probably introduced from the eastern half of the United States, more or less weedy; gardens, ditchbanks, roadsides, edge of fields, usually where the ground is frequently disturbed; up to about 7,000 ft; June-Sept. Our plants are referable to var. longifolia.

Solanum L. Nightshade

With features listed above for the family and: stamens with short filaments and large anthers which are more or less united around the style, usually slightly exerted; fruit a many-seeded berry, enveloped or subtended by the persistent calyx.

- 1 Plants with numerous long straight prickles especially on petioles, stems and calyces; leaves 1-2 times pinnatifid; corolla 18-28 mm long, yellow..... S. rostratum
- 1 Plants not armed with prickles
 - 2 Plants climbing, vinelike, perennial, slightly woody toward the base; leaves hastate or 2 lobed at the base; corolla lavender, about 1 cm long; berries glossy red..... S. dulcamera
 - 2 Plants annual herbs not climbing; leaves various; corolla white or bluish-white, sometimes purple spotted; berries greenish or yellowish
 - 3 Leaves pinnately lobed to divided..... S. triflorum
 - 3 Leaves entire or shallowly lobed..... S. sarrachoides

Solanum dulcamera L. Bittersweet n., climbing n. Introduced from Eurasia; the 3 records seen are from roadside-ditch-fencelines near Vernal, Whiterocks, and Neola, to be expected elsewhere in wet places at lower elevations; June-Sept.

Solanum rostratum Dunal Buffalo bur, Kansas or Texas thistle. Native of the Great Plains; our 1 record (J. Goodrich sn) is from disturbed ground at a construction site at Tridell; July-Sept.

Solanum sarrachoides Sendt. in Mart. Introduced from S. America, more or less weedy, rarely collected; ditchbanks, roadsides, and gardens; 5,600-6,000 ft; July-Sept. Solanum nigrum L. might be expected in our area and reported (Flowers and others 1960) for Lindwood (area now inundated by Flaming Gorge Reservoir), but no supporting specimen found at UT. This differs by the features of the following key:

- 1 Herbage with spreading, glandular hairs; calyx conspicuously enlarged in fruit; berry yellow to dark green at maturity, but black in dried specimens..... S. sarrachoides
- 1 Herbage with appressed or slightly spreading, nonglandular hairs; calyx not much if at all enlarged in fruit; berry blackish at maturity..... S. nigrum

Solanum triflorum Nutt. Cutleaf n. Occasional; widespread; often along roads or other disturbed places, many plant communities; 6,000-8,200 ft; July-Sept.

SPARGANIACEAE Bur Reed Family

Sparganium L. Bur Reed

Plants monoecious, aquatic or growing in wet mud, perennial, herbaceous, from rhizomes with fibrous roots; stems erect or floating, leaves alternate, 2 ranked, narrowly elongate, erect or floating, expanded and sheathing at the base, usually transverse-septate at the base; flowers unisexual, in sessile or peduncled globose heads; staminate heads above the pistillate, 1-several, the flowers numerous, each consisting of 3-5 stamens, and 3-5 minute, scalelike bracts; pistillate heads 1-2, arising from the axils of leaflike bracts, each flower consisting of a solitary pistil subtended by 3-6 free, oblanceolate to fan-shaped, membranous, inconspicuous perianth segments; ovary mostly 1 celled, narrowed at the base; style simple or forked; fruit a beaked achene.

- 1 Stigmas 2, rarely 1 in occasional flowers; leaves 7-15 mm wide; inflorescence branched; achenes rounded, to 5 (6) mm wide, abruptly narrowed to the beak; plants 50-200 cm tall, erect, to be expected at low elevations, no specimens seen..... S. eurycarpum Engelm.
- 1 Stigmas 1, rarely 2 in occasional flowers; plants mostly less than 100 cm tall, erect or floating; leaves various; inflorescence mostly simple; achenes essentially fusiform, to about 3 mm wide, gradually tapered to the beak

SPARGANIACEAE

- 2 Staminate heads solitary (rarely 2); anthers at least half as wide as long, 0.3-0.8 mm long; achene beak 1-1.5 mm long including the stigma; leaves floating or erect and aerial, 2-6 (8) mm wide..... S. minimum
- 2 Staminate heads mostly 2 or more; anthers less than half as wide as long, 0.8-1.5 mm long; achene beak 1.5-5 mm long
- 3 Achene beak 1.5-2 mm long including the stigma; leaves 1-8 mm wide, mostly submerged or floating; mature pistillate heads 1-2 cm wide; stigmas 0.8-1.2 mm long..... S. angustifolium
- 3 Achene beak 3-4 (5) mm long including the stigma; leaves (3) 5-12 (15) mm wide, mostly erect and areial; mature pistillate heads 2-3 cm across; stigmas 1-2 mm long..... S. emersum

Sparganium angustifolium Michx. Occasional to common; Uinta Mts.; floating or submersed in pools, shallow ponds, and margins of lakes, or stranded on mud especially in reservoirs. The few records seen are from 8,700-10,500 ft.

Sparganium emersum Rehmman [S. multipedunculatum (Morong.) Rydb.] Occasional; widespread; wet places and in water but mostly emersed; 5,600-8,500 ft. Our plants are referable to var. multipedunculatum (Morong) Reveal.

Sparganium minimum Fries. Infrequent or at least seldom collected; Uinta Mts.; floating or emersed in pools and shallow ponds.

TAMARICACEAE Tamarisk Family

Tamarix L. Tamarisk

Tamarix ramosissima Ledeb. (T. gallica L. misapplied; T. pentandra Pall. misapplied) Shrubs or small trees 2-7 m tall; bark of branches reddish-brown; current years twigs green and same color as leaves; leaves scalelike, appressed to the branches and often appearing more as a part of the branches than definite leaves, 1-3 mm long, entire, alternate; inflorescence of numerous spikes, the spikes sometimes paniculate, slender, elongate; flowers 5-merous, minute but numerous and thus conspicuous; sepals erose-denticulate; petals 1-2 mm long, white to pink; fruit a capsule, 3-4 mm long; seeds tufted with hairs. Common to abundant; widespread; flood plains and other lowlands where the soil is wet for a part of the year, but also in rather dry soil, tolerant of alkali; not expected over 7,000 ft; May-Sept.

TYPHACEAE Cat-tail Family

Typha L. Cat-tail

Perennial herbs from creeping rhizomes; stems tall and erect; leaves alternate, long, linear, sheathing at the base; inflorescence of spikes or spikelike racemes, the staminate portion above the pistillate and pale, the pistillate portion brown to dark brown, cylindrical; flowers unisexual, densely crowded; perianth of hairlike bristles (these providing the wind-buoyant structure by which the seeds are dispersed); stamens 2-7, the filaments united; ovary superior, styles 1-2; fruit a nutletlike achene.

- 1 Each fertile flower subtended by a linear bract that is noticeably thicker and equaling or slightly longer than the perianth hairs, these bracts often with globose or peltatelike inflated apices; stigmas linear or with a slightly dilated portion below the apex; pistillate part of the spike light cinnamon brown, 15-28 cm long, 1.5-2.5 cm thick, separated from the staminate part by naked stalk 1-5 (8) cm long; leaves rounded on the back, 6-9 (12) mm wide; plants mostly 2.5-3 (4) m tall..... T. domingensis
- 1 Flowers not subtended by bracts; stigmas dilated in the apical portion; pistillate part of the spike dark brown, 10-19 cm long, 1.5-3.5 cm tick, contiguous with the staminate part or separated by an interval of up to 1.5 cm long; leaves flat 6-20 mm wide; plants 1-3 m tall..... T. latifolia

Typha domingensis Pers. Southern c. Reported for our area (Flowers and others 1960) but no specimens seen. Plants of this taxon have often been incorrectly referred to as T. angustifolia L., which is known from well n. of our area. See T. latifolia.

Typha latifolia L. Common c. Occasional to abundant; widespread; forming clones around ponds and in wet lowland places; up to about 7,000 ft. In addition to the features listed in the key, this taxon is distinguished from T. domingensis by a smooth appearance of the pistillate part of the spike rather than the minutely roughened appearance that the slightly protruding stigmas and bracts give to the spike of T. domingensis. Apparently not as salt tolerant as T. domingensis (Arnow and others 1980). These 2 taxa form hybrids that would confuse separation of the 2. However, such hybrids are not reported for our area (Cronquist and others 1977). Wolf & Dever 5054 DINO! reported as T. angustifolia (Welsh 1957) belongs here.

ULMACEAE Elm Family

- 1 Leaves entire or with a few teeth; plants native, shrubs or small trees..... Celtis
- 1 Leaves distinctly serrate; plants introduced, trees..... Ulmus

Celtis L. Hackberry

Celtis reticulata Torr. Hackberry. (C. douglasii Planch.; C. occidentalis L. misapplied) Shrubs or small trees; bark becoming corky and wartlike on the trunk but often remaining smooth on the larger branches; leaves alternate, simple, 2-10 cm long, broadly ovate to ovate-lanceolate, rounded to cordate and unequal at the base, entire or rarely with a few teeth; smooth to scabrous above, glabrous to hairy beneath, somewhat palmately-veined; flowers bisexual or unisexual, axillary, solitary or in small clusters, small; calyx 4-6 parted or lobed; corolla none; stamens 4-5; ovary superior, 1-celled, style none; stigmas 2; fruit a drupe with thin flesh and hard-shelled seed. Occasional; canyons along Green River at or near Dinosaur National Monument and Desolation Canyon, with distribution like that of Fraxinus anomala; May-June. Harrington (1954) treats this taxon as a part of C. occidentalis L. in view of many intergradations found in Colorado material. We have followed several contemporary works that maintain the name C. reticulata for our plants.

Ulmus L. Elm

Ulmus pumila L. Siberian e. Trees to 30 m tall; bark gray, deeply fissured on older trees; leaves alternate; petioles 3-10 mm long; leaf blades narrowly elliptic to lanceolate, 2-7 cm long or to 12 cm long on sucker shoots, often slightly oblique at the base, singly or doubly serrate, often with tufts of white hairs in the axils of the veins of the lower surface; flowers appearing before the leaves, bisexual; calyx purplish, 4-9 lobed, about 2-3 mm long; corolla lacking; stamens exerted; fruit a flat, winged, suborbicular, glabrous samara to about 15 mm long, notched. Introduced from the Old World, a rather weedy tree, often of disturbed places, a poor choice for a cultivated tree but often planted in the area because it grows fast and provides shade in only a few years, and it is cold tolerant; probably not over 7,000 ft; April-May.

URTICACEAE Nettle Family

Monoecious or dioecious herbs; leaves simple; flowers inconspicuous, the perianth of 4 greenish segments; staminate flowers of 4 stamens and sometimes with a rudiment of a pistil; pistillate flowers of a single pistil; fruit an achene enclosed by the perianth segments.

- 1 Leaves entire, alternate; stipules lacking; plants annual, with procumbent to ascending stems 5-40 cm long, pubescent with nonstinging hairs..... Parietaria
 1 Leaves toothed, opposite, stipular; plants perennial, erect, 30-100 (200) cm tall, with hairs stinging Urtica

Parietaria L. Pellitory

Parietaria pensylvanica Muhl. ex. Eild. Hammerwort. Annual herbs with procumbent, sprawling, or ascending, weak stems, pubescent with simple hairs, those of the inflorescence minute and often hooked; leaves with slender petioles, the blades 5-50 (70) mm long, 5-25 mm wide, rhombic-ovate to lanceolate; flowers sessile or nearly so, clustered in the axils of leaves, the clusters subtended by involucre bracts 2-5 mm long; staminate, pistillate, and sometimes bisexual flowers intermixed. The 3 specimens seen are from Big Brush Creek and Browns Park; rocky ledges along a creek and drying mud of an ephemeral pool; 5,600-5,700 ft; June-Aug.

Urtica L. Nettle

Urtica dioica L. Stinging n. (U. strigosissima Rydb.) Plants perennial herbs, from rhizomes, armed with stinging hairs, and usually otherwise pubescent, mostly unisexual; leaves opposite, (5) 7-15 cm long, with (5) 10-15 mm long stipules, the blades narrowly to broadly lanceolate, serrate; flowers clustered in axillary panicles or branching spikes. The following 2 vars. known in our area belong to ssp. gracilis (Ait.) Seland. (U. gracilis Ait.)

- 1 Lower surface of leaves glabrous or essentially so except for occasional stinging hairs; stems not obscured by pubescence; plants of the E. Tavaputs Plateau..... var. procera
 1 Lower surface of leaves more or less densely hirtellous; stems usually obscured by pubescence; plants widespread but apparently not of the E. Tavaputs Plateau..... var. occidentalis

Var. occidentalis Wats. [U. holosericea Nutt.; U. dioica var. holosericea (Nutt.) C. L. Hitchc.; U. dioica ssp. holosericea (Nutt.) R. F. Thorne; U. brewerii Wats.] Occasional and locally abundant; Strawberry Valley and across the Uinta Mts. and adjacent to them; various plant communities, mostly on disturbed ground or along streams or in canyons; 6,200-8,500 ft; July-Sept.

Var. procera (Muhl.) Wedd. [U. lyallii Wats.; U. dioica var. lyallii (Wats.) C. L. Hitchc.] The few specimens seen are from the E. Tavaputs Plateau; sagebrush-rabbitbrush, mt. brush, and wet meadow communities; 7,000-8,200 ft; Aug.-Sept.

VALERIANACEAE Valerian Family

Valeriana L. Valerian

Perennial herbs, with faint or rather strong foul odor; leaves simple and entire to pinnatifid or pinnate compound, opposite; flowers mostly bisexual, in panicles or flat-topped clusters; calyx small, 9-17 lobed, obscure at flowering, the lobes narrow, elongate and plumose at fruiting; corolla united, funneliform to nearly salverform, the limb mostly 5 lobed, more or less 2-lipped, the tube sometimes pouched at the base; stamens 3; ovary inferior, 3-chambered but 2 of these obsolete and only 1 bearing seed; styles 1, with a 3-lobed stigma; fruit an achene.

- 1 Basal leaves gradually tapering to an indistinct petiole, 7-40 cm long, thick, with several veins running nearly parallel to the midrib; inflorescence an open panicle; plants from a tap root, 30-120 cm tall..... V. edulis
- 1 Basal leaves sharply differentiated into a petiole and blade, the blades 2-8 cm long, thin, with spreading lateral veins; inflorescence of 1 or more corymbiform clusters, plants from branched rhizomes
- 2 Corolla 4-7 mm long usually puberulent externally near the base; stems usually puberulent or granular; stem leaves entire to pinnatifid; plants 15-45 cm tall..... V. acutiloba
- 2 Corolla 1.5-4 mm long, glabrous; lower part of stems glabrous; stem leaves pinnatifid to pinnately compound; plants 30-90 cm tall..... V. occidentalis

Valeriana acutiloba Rydb. Sharpleaf v. [V. capitata Pallas ex Link ssp. acutiloba (Rydb.) F. G. Mey] The 5 specimens seen are from Range Creek and Bruin Point of the W. Tavaputs Plateau, Red Creek and Racetrack Mt. in Wasatch Co., and Big Ridge, Uinta Mts.; mt. brush communities and openings in spruce-fir woods; 6,800-10,900 ft; June-Aug. Our plants are referable to var. pubicarpa (Rydb.) Cronq.

Valeriana edulis Nutt. Edible v. (V. furfurascens A. Nels.) Occasional; specimens seen are from Strawberry Valley and Uinta Mts. to be expected across the area; many plant communities including: riparian, meadow, open conifer, aspen, and rarely sagebrush, also rarely in cirque basins; 7,500-10,700 ft; June-Aug.

Valeriana occidentalis Heller Western v. Infrequent; Strawberry Valley to the Avintaquin drainage and Uinta Mts. (mostly w. of Rock Creek) on Cold Springs Mt.; riparian, aspen, and tall forb communities; 7,500-9,000 ft; May- July.

VERBENACEAE Vervain Family

Annual or perennial herbs; leaves opposite; flowers bisexual, borne in bracteate spikes; corolla united; stamens 4; ovary superior, 2- or appearing 4-celled; style 1, 1-2 lobed; fruit of 2-4, 1-seeded nutlets.

- 1 Plants annual; leaves irregularly toothed and cleft, often with 1 or 2 pairs of pinnatifid lower primary segments that are smaller than the terminal one; spikes terminal on stems and branches; calyx and corolla 5-lobed; nutlets 4..... Verbena
- 1 Plants perennial; leaves with 1-4 pairs of teeth above the middle; spikes lateral; calyx and corolla 4-lobed; nutlets 2..... Phyla

Phyla Lour. Fogfruit

Phyla cuneifolia (Torr.) Greene [Lippia cuneifolia (Torr.) Steud.] Stems 20-100 cm long, creeping often rooting at the nodes; leaves 1-3 cm long, thick and rigid, canescent-strigose; peduncles about 1-5 cm long; spikes globose and headlike in flower, elongating in fruit; corollas about 4 mm long, white, pink or purple-rose. Graham (1934) cited Dougl 895 for along the bank of the Green River at Ouray.

Verbena L. Verbena; Vervain

Verbena bracteata Lag. & Rodr. (V. bracteosa Michx.) Stems 10-50 cm long, usually several radiating from a taproot, mostly decumbent or prostrate, or solitary and somewhat upright in small plants, hirsute; leaves 1-4 cm long, more or less hirsute, passing abruptly into the lance linear bracts of the spikes, the bracts 2 or more times longer than the flowers; corollas almost hidden in the bracts, bluish, pinkish or rarely white, the tube about 4 mm long, the limb 2-3 mm wide. Occasional to common; widespread; many plant communities, mostly along roads or other disturbed ground; up to about 7,500 (8,000) ft; June-Oct.

VIOLACEAE Violet Family

Viola L. Violet

Perennial herbs; leaves simple, alternate, sometimes opposite or basal; stipules present; flowers bisexual, mostly bilaterally symmetrical, 5-merous, solitary or clustered; sepals separate or slightly fused at the base, lanceolate or linear, persistent in fruit; petals separate, the lower ones usually the

largest and pouched or spurred at the base, the upper ones usually strongly arched backwards; stamens 5, united around the pistil; ovary superior; style 1; fruit a rounded capsule that expels the seeds rather forcefully upon opening.

- 1 Petals predominately yellow on the face, often marked with purple on the back; flowering stems mostly with well-developed leaves at least on the lower 1/2; leaves seldom cordate at the base
- 2 Leaf blades coarsely veined, generally not greater than 4 cm long, usually deltoid, truncate at the base, coarsely few-toothed or lobed, not regularly serrate or dentate, often glaucous and more or less purplish at least along the veins; upper petals deep purple on the back; capsules puberulent... V. purpurea
- 2 Leaf blades not coarsely veined, lanceolate or elliptic-lanceolate, tapered or abruptly narrowed to the petiole, entire to finely serrate or dentate, (2) 4-10 cm long, generally not glaucous, not purplish even along the veins; upper petals often yellow on the back except along the veins; capsules glabrous or puberulent..... V. nuttallii
- 1 Petals predominately bluish or white on the faces, sometimes with a yellow base, with or without purple on the back; flowering stems with or without leaves; leaves often with a cordate base
- 3 Flowering stems without leaves, or leaves borne on the lower 1/4 of the stem; the scape often with a pair of opposite or alternate bracts about midlength
- 4 Flowering stems and leaves arising separately from the rhizomes or stolons; rhizome mostly less than 1.5 mm thick; flowers 12 mm long or less; petals white or pale lavender, rarely violet, the lateral pair glabrous or sparsely bearded toward the base..... V. palustris
- 4 Flowering stems and leaves arising together from a short, stout, mostly erect rootstock often over 1.5 mm thick; flowers usually 14-22 mm long; petals mostly light to deep violet, the lateral pair bearded with crinkled white hairs..... V. nephrophylla
- 3 Flowering stems with well-developed leaves, some born on the upper 3/4 of the stem
- 5 Petals predominately bluish, often white toward the base; flowering stems with leaves on the lower 3/4; spur of the lowest petal 3-7 mm long, prolonged behind base of sepals..... V. adunca
- 5 Petals predominately white on the faces, sometimes yellow at the base; flowering stems with leaves on the upper 3/4; spur of the lowest petal less than 3 mm long..... V. canadensis

Viola adunca Sm. Blue v. Our most common blue or white flowered viola; widespread; riparian and wet meadow communities and other wet places; 7,000 ft to slightly above timberline; May-July.

Viola canadensis L. Canada white v. (V. rugulosa Greene) Apparently uncommon but widespread; the few records seen are from riparian communities; April-Sept.

Viola nephrophylla Greene Bog v. Infrequent; widespread; moist or wet ground; 5,000-10,000 ft; May-June.

Viola nuttallii Pursh Yellow prairie v. (V. praemorsa Dougl.; V. vallicola A. Nels.) Occasional; widespread (no specimens seen from the Tavaputs Plateau except in the vicinity of Strawberry Valley); sagebrush and mt. brush communities and in shade of woods and along streams; 5,000-10,000 ft; May-June.

Viola palustris L. Marsh v. [V. macloskeyi Lloyd var. pallens (Banks) C. L. Hitchc. misapplied; V. pallens (Banks) Brain. misapplied by Graham (1937)] Apparently infrequent; the few records seen are from the Uinta Mts., but to be expected elsewhere; meadow and streamside communities; 8,000-10,000 ft; June-July. Our plants are referable to var. brevipes (Baker) R. J. Davis.

Viola purpurea Kell. Goosefoot v., pine v. [V. utahensis Baker & Clausen; V. venosa (Wats.) Rydb.] Seldom collected in our area; apparently widespread; to be expected in sagebrush, mt. brush, and other plant communities, and in snowflush areas at higher elevations; May-July. Like V. nuttallii, but supposedly different by the overlapping criteria given in the key. In general, our plants are like those described for the central Wasatch Front (Arrow and others 1980) in that some plants are extreme and readily placed in one or other of the taxa, but other plants combine the characters traditionally used for separation.

VISCAEAE (LORANTHACEAE) Mistletoe Family

Monoecious or dioecious herbs or shrubs, parasitic on gymnosperms; stems brittle, with swollen jointed nodes, frequently much branched; leaves opposite, simple, entire, reduced to scales; flowers inconspicuous, unisexual, without petals, solitary or clustered at the nodes or in axillary spikes or cymes; sepals 2-4 (5), free, erect, persisting in fruit; stamens 2-4, free or fused to base of sepals; ovary inferior; style 1; stigma entire; fruit fleshy, berrylike, 1-seeded.

- 1 Plants parasitic on species of Juniperus; stems generally terete; pistillate flowers mostly with 3 tepals; fruit subglobose, sessile, white to pinkish at maturity..... Phoradendron
- 1 Plants parasitic on conifers other than Juniperus; stems generally angled; pistillate flowers mostly with 2 sepals; fruit somewhat flattened, borne on recurved pedicels, greenish or grayish... Arceuthobium

Arceuthobium Bieb. Dwarf Mistletoe

With features of the family and as listed in the key. Reference: Hawksworth and Wiens (1972).

VISCACEAE

- 1 Stems with at least some of the branching whorled, the branches more or less spreading in all directions from the nodes; staminate flowers whorled; flowering in Feb.-March; parasitic on Pinus contorta and P. ponderosa..... A. americanum
- 1 Stems opposite, or if more than 2 per node then the extra branches arising in the same plane as the primary ones and the several branches fanlike; staminate flowers not whorled; flowering at various times; not or rarely parasitic on Pinus contorta or P. ponderosa
- 2 Plants parasitic on Pseudotsuga (rarely on Abies and Picea), less than 4 cm long, scattered near the apex of the host branch; basal diameter of main shoots 0.1-1.5 mm; flowering in Feb.-March; host plant often forming a witches broom (a dense mass of distorted branches)..... A. douglasii
- 2 Plants parasitic on Pinus, often over 4 cm long, not specific for the apex of the host branch; basal diameter of main shoots 1.5-4 mm; flowering in Aug.-Sept.; host plant not forming a witches broom
- 3 Plants olive green to brownish, parasitic on Pinus edulis..... A. divaricatum
- 3 Plants yellow green or light gray, parasitic on Pinus flexilis and P. longaeva..... A. cyanocarpum

Arceuthobium americanum Nutt. ex Engelm. in Gray Lodgepole pine d. m. Occasional to common; infesting lodgepole pine and rarely infesting ponderosa pine except where it is associated with lodgepole pine, rarely on limber pine; Uinta Mts.

Arceuthobium cyanocarpum Coult. & Nels. Limber pine d. m. [A. campylopodum Engelm. forma cyanocarpum (A. Nels.) Gill] Infrequent or perhaps occasional on limber pine and bristlecone pine; Uinta Mts. and Tavaputs Plateau.

Arceuthobium divaricatum Engelm. ex Wheeler Pinyon d. m. [A. campylopodum Engelm. forma divaricatum (Engelm.) Gill] Occasional on pinyon pine.

Arceuthobium douglasii Engelm. ex Wheeler Douglas-fir d. m. Occasional to common on Douglas-fir, rarely on species of Abies and Picea where these species are associated with Douglas-fir; Uinta Mts. and Tavaputs Plateau.

Phoradendron Nutt. Mistletoe

Phoradendron juniperinum Engelm. in Gray Juniper m. With features of the family and as listed in the key. Parasitic on Juniperus. No specimens seen from our area.

ZANNICHELLIACEAE

Zannichellia L. Horned Pondweed; Poolmat

Zannichellia palustris L. Aquatic, submerged herbs; stems slender, branching; leaves opposite or whorled, linear, entire, not over 0.5 mm wide, stipules scarious, free from the leaf bases; flowers unisexual, both staminate and pistillate ones from the same axil, subtended or enclosed in a hyaline bract, inconspicuous, the staminate of a single stamen, the pistillate of 2-10 carpels, styles persistent; fruit a nutlet 2-4 mm long. The few specimens seen and reports are from along the Green River and Blue Mt.; shallow water, to be expected across the area.

ZYGOPHYLLACEAE Caltrop Family

Tribulus L. Puncture Vine

Tribulus terrestris L. Annual, prostrate plants; stems radiating out over the ground from the taproot, 30-100 cm long or perhaps longer; leaves once pinnately compound, opposite, 2-5 cm long, with 4-8 pairs of opposite leaflets, these 3-15 mm long; flowers peduncled, from axils of leaves; petals 5, separate, yellow, 3-5 mm long; stamens 10, style 1; stigma 5 lobed; fruits (burlike or macelike) with hard sharp spines to 6 mm long. Introduced from the Old World, weedy on disturbed ground; at lower elevations. The 1 specimen seen (Neese & Chatterley 9922) is from a roadside at Starvation Reservoir, Duchesne Co. The burlike fruits flatten tires and cause painful injury to livestock and to people especially when bare footed.

EXCLUDED NAMES

Specimens of the following taxa cited by Graham (1937) were requested but not included in loans we received from various herbaria. It is possible that these specimens have been annotated to and filed under taxa other than indicated by Graham. Barbarea stricta Andrezej (B. vulgaris R. Br.), Delphinium virescens Nutt., and Lupinus laxiflorus Dougl. (L. arbustus Dougl. ex Lindl.).

Graham also listed several grasses mentioned by Pammel (1913) for which he did not see specimens. We have seen specimens to support the inclusion of these grasses except Stipa scribneri Vasey, which is a taxon from far south of our area.

The specimen of Penstemon saxosorum Pennell (Brown sn) reported for Douglass Mt. by Bradley (1950) to be at Fort Collins (CS) was not found at that herbarium when we requested it in 1985.

It is assumed that specimens from the work of Flowers and others (1960) in the Flaming Gorge Reservoir Basin would have been deposited at UT. However, a search at that Herbarium in 1984 failed to produce specimens to support the listing of the following taxa: Angelica dilatata A. Nels. (A. wheeleri Wats.), Aplopappus watsonii Gray (Haplopappus watsonii Gray), Aulospermum jonesii Coult. & Rose [Cymopterus purpureus var. jonesii (Coult. & Rose) Goodrich, Carex stipata Muhl., Cressa truxillensis H.B.K., Euphorbia albomarginata T. & G., Juncus orthophyllus Cov., J. tweedyi Rydb., Laphamia stansburii Gray [Perityle stansburyi (Gray) Macbr.], Opuntia polycantha var. trichophora (Engelm. in Bigelow) Coult., Penstemon comatus Pennell, Physalis neomexicana Rydb., and Potentilla micropetata Rydb. [P. glandulosa var. micropetala (Rydb.) Welsh & Johnston]. Duplicates of one collection of Layia glandulosa (Hook.) H. & A. (flowers sh) from Hideout Forest camp, 5,900 ft are deposited at BRY, UT, and UTC. The locations given for these taxa are now inundated by Flaming Gorge Reservoir.

There are 2 species (Ranunculus gmelinii DC. and Stipa arida Jones) listed by Holmgren (1962) for which we have not seen specimens.

While working on this project, we have not seen specimens to support the listing by Goodrich and others (1981) of the following names: Astragalus lentiginosus var. palans (Jones) Jones, Bromus erectus Huds., Carex foetida All. (C. vernacula L. H. Bailey), C. luzulina Olney (C. ablata Bailey), Cryptantha echinella Greene, C. minima Rydb., Cuscuta cuspidata Engelm., Delphinium andersonii Gray, Erigeron aphanactis (Gray) Greene, E. coulteri Porter in Port. & Coult., E. elatior (Gray) Greene, Eriogonum corymbosum var. orbiculatum (Stokes) Reveal & Brotherson, Grindelia arizonica Gray var. stenophylla Steyermark, G. fastigiata Greene, G. squarrosa var. quasiperennis Lunell, Haplopappus croceus Gray [Pyrrocoma crocea (Gray) Greene], H. pygmaeus (T. & G.) Gray, Lactuca ludoviciana (Nutt.) Riddell, L. trisulea L., Mentzelia densa Greene, M. multiflora (Nutt.) Gray, Oenothera caespitosa var. caespitosa, O. c. var. montana (Nutt.) Durand, Penstemon jamesii Benth., P. mensarum Pennell, Phacelia alba Rydb., Polygonum polygaloides Meisn., Ranunculus acris L., R. uncinatus (D. Don) Hook. var. earle (Greene) Benson, Ribes leptanthum Gray, Rorippa teres (Michx.) Stuckey, Rudbeckia hirta L., Solidago gigantea Ait. var. serotina (Kuntze) Cronq., Trifolium procumbens L., and Veronica catenata Pennell.

Potter and others (1983) listed Amaranthus palmeri Wats. for which we have not seen any specimens.

ADDENDA

Page 42 add:

Artemisia arbuscula Nutt. Low s. [A. tridentata ssp. a. (Nutt.) H. & C.] Locally abundant on Goslin Mt., Daggett Co. where adjacent to Mt. big sagebrush but on shallower soils (Goodrich 22228). This is similar in stature to A. nova from which it differs in the consistently whiter leaves in which glandular dots are not conspicuous with a 10 power lens, and in the consistently white pubescent involucre bracts.

Page 129 add:

Carex backii F. Boott in Hook. Back s. V. E. McNeilus sn (BRY) is from Eagle Creek just above Flaming Gorge Reservoir. This would key with the sedges of KEY 7 (page 127) from which it differs in all spikes androgynous; staminate flowers few, inconspicuous, and exceeded by the upper perigynia; lower pistillate scales leaflike, greatly exceeding the perigynia, commonly 1-7 cm long; and achenes about 3 mm long.

Page 148 add:

Coronilla L.

Coronilla varia L. Crown vetch. Perennial herbs with spreading to diffuse stems up to 1 m long; leaves odd pinnate; leaflets (9) 11-15 (21), 1-2 cm long, oblong or elliptic to obovate, acute to truncate or retuse; flowers borne in axillary, long-pedunculate, headlike umbels, the peduncles usually exceeding the leaves; umbels with (10) 14-20 flowers; calyx about 2 mm long, campanulate, 5-toothed, more or less bilabiate; corolla mostly 10-12 mm long, white to pink, the keel purple-tipped, the petals all clawed, these exceeding the calyx, banner nearly round, with an arched claw; wings almost concealing the acute keel; stamens 10, diadelphous; style slightly exerted beyond the wings and keel; fruit a loment, linear, slender, 4-angled, about 2-5 cm long, constricted between the seeds. Introduced from Europe, known in our area from a recent collection (A. Stephenson sn BRY) from along the road to Soldier Creek Dam where only a few plants were seen in 1986. This has spread rapidly in Cache Co., Utah where it has come to be considered a weedy plant on agricultural lands. In the key to genera of FABACEAE, this would separate just before lead 8 as follows:

Calyx about 2 mm long, shorter than and not concealing the claws of the petals; banner with an arched claw; pods linear, 4-angled, to 5 cm long, constricted between the seeds; flowers in headlike umbels

Calyx mostly longer, concealing the claws of the petals; claw of the banner not arched; pods not as above in all features

Page 157 add:

Lomatogonium A. Br. Felwort

Lomatogonium rotatum (L.) Fries Marsh f. [Pleurogyne rotata (L.) Griseb.] Annual herbs, 10-25 cm tall; leaves opposite, entire, the lower ones early withering, the upper ones 1-3 cm long, narrowly lanceolate, not sheathing; flowers mostly axillary, on slender pedicels from the scattered upper leaves; sepals (2) 4-5, narrow, usually exceeding the corolla, nearly distinct, 5-15 mm long; corolla rotate, 6-15 mm long, lobed to near the base, blue to pale blue or white; stamens (4) 5; stigmas 2, decurrent over 1/2 the length of the ovary; fruit a 2-valved, septicidally dehiscent capsule. Patricia and Noel Holmgren have indicated a recent specimen of theirs from wet meadows at Sheep Creek Park, Daggett Co. might belong here (personal conversation). This would key on page 155 with Swertia from which it differs in the annual habit and decurrent stigmas.

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INDEX

- Abies* 190
 *balsamea** 191
 concolor 190
 lasiocarpa 190
Abronia 180
 argillosa 180
 elliptica 180
 *fragrans** 180
 *micrantha** 180
Acer 18
 glabrum 18
 var. *glabrum** 18
 var. *tripartitum** 18
 grandidentatum 18
 *interior** 18
 *interis** 18
 negundo 18
 ACERACEAE 18
Achillea 37
 *lanulosa** 37
 millefolium 37
 ssp. *lanulosa* 37
 var. *alpicola* 37
 var. *lanulosa* 37
Aconitum 266
 columbianum 266
 Actaea 246
 *arguta** 246
 rubra 246
 Actinea* 61
 *acaulis** 61
 *grandiflora** 62
 *richardsonii** 62
 *torreyana** 62
 Adderstongue Family 186
*Adenostegia** 275
 *kingii** 275
 *ramosa** 275
Adoxa 18
 moschatellina 18
 ADOXACEAE 18
Aegilops 197
 cylindrica 197
 Agastache 168
 urticifolia 168
 var. *urticifolia* 168
 Agave Family 18
 AGAVACEAE 18
Agoseris 37
 *arizonica** 37
 aurantiaca 37
 *elata** 37
 glauc 37
 var. *dasycephala* 37
 var. *glauc* 38
 var. *laciniata* 38
 *gracilens** 37
 *taraxifolia** 38
 X *Agrohordeum* 198
 macounii 198
Agropyron 198
 *albicans** 199
 *caninum** 199
 ssp. *majis** 199
 cristatum 199
 dasystachyum 199
 *desertorum** 199
 elongatum 199
 *griffithsii** 199
 *inerme** 199
 intermedium 199
 var. *intermedium* 199
 var. *trichophorum* 199
 *latiglume** 199
 *pauciflorum** 199
 X *pseudorepens* 199
 var. *magum* 199
 repens 199
 *riparium** 199
 *saxicola** 200
 scribneri 199
 *sibiricum** 199
 smithii 199
 spicatum 199
 var. *inerme** 199
 *subsecundum** 199
 var. *andinum** 200
 trachycaulum 199
 var. *glaucum* 200
 var. *latiglume* 200
 var. *trachycaulum* 200
 var. *unilaterale* 200
 *trichophorum** 199
 *triticeum** 208
 X *Agrositanion* 200
 saundersii 200
 saxicola 200
Agrostis 200
 alba 201
 exarata 201
 humilis 201
 *hyemalis** 201
 var. *tenuis** 201
 *idahoensis** 201
 *palustris** 201
 *rossae** 201
 scabra 201
 stolonifera 201
 var. *palustris* 201
 var. *stolonifera* 201
 thurberiana 201
 variabilis 201
 *Aira** 206
 *caespitosa** 206
 AIZOACEAE 19
 Alder 74
 Mountain 74
 Alfalfa 151
 Alfileria 158
 Alisma 19
 *geyeri** 19
 gramineum 19
 plantago-aquatica 20
 ALLISMACEAE 19
 *linearis** 38
 tomentosa 38
 Amelanchier 254
 alnifolia 254
 *florida** 254
 *pallida** 254
 *prunifolia** 254
 *pumila** 254
 utahensis 254
 Ammannia 177
 *coccinea** 177
 Purple 177
 robusta 177
 Amnesia* 187
 *gigantea** 187
 Amsinckia 75
 retrorsa 75
 Ansonia 30
 jonesii 30
 *latifolia** 30
 ANACARDIACEAE 21
Anaphalis 38
 margaritacea 38
 *subalpina** 38
 Andropogon 202
 gerardii 202
 *hallii** 202
 Androsace 243
 filiformis 243
 occidentalis 243
 septentrionalis 243
 Androstrophium 172
 breviflorum 172
 Anemone 246
 *cylindrica** 246
 *globosa** 246
 multifida 246
 *nuttalliana** 246
 parviflora 246
 patens 246
 var. *multifida* 246
 Small-flowered 246
 Angelica 23
 ampla 23
 *arguta** 23
 *dilatata** 291
 Giant 23
 *lyallii** 23
 pinnata 23
 roseana 23
 Rose 23
 Small-leaf 23
 *wheeleri** 291
 Antennaria 38
 alpina 39
 var. *media* 39
 anaphaloides 39
 *aprica** 39
 *concinna** 39
 corymbosa 39
 dimorpha 39
 *formosa** 39
 Alkaligrass 219
 Nuttall 219
 Weeping 219
 Alkali-mallow 177
 Alkali sacaton 221
 Allionia* 180
 *linearis** 180
 Allium 171
 acuminatum 172
 brandegei 172
 brevistylum 172
 cernuum 172
 geyeri 172
 nevadense 172
 *rubrum** 172
 textile 172
 Allocarya* 81
 *nitans** 81
 Alnus 72
 incana 74
 *tenuifolia** 17
 Alopecurus 201
 aequalis 202
 alpinus 202
 *geniculatus** 202
 pratensis 202
 Alpine forget-me-not 79
 Alpine kittentails 273
 Alpine lily 173
 Alsine* 109
 *baicalensis** 109
 *borealis** 109
 *crispa** 109
 *curtisii** 109
 *jamesiana** 109
 *laeta** 109
 *longifolia** 109
 *longipes** 109
 Alumroot 268
 Common 268
 Alyssum 85
 alyssoioides 85
 Desert 85
 desertorum 85
 minus 85
 Pale 85
 Yellow 85
 Amaranth 20
 AMARANTHACEAE 20
 Amaranth Family 20
 Amaranthus 20
 albus 20
 blitoides 20
 *graecizans** 20
 *hybridus** 20
 *palmeri** 291
 powellii 20
 Redroot 20
 retroflexus 20
 Ambrosia 38
 acanthicarpa 38
 *artemisiifolia** 38

* Synonyms, misapplied names, or taxa known from outside our area.

- luzuloides 39
 media* 39
 microphylla 39
 parvifolia 39
 pulcherrima 39
 rosea* 39
 rosulata* 38, 39
 umbrinella 39
 Anthemis 39
 cotula 39
 APIACEAE 21
 Aplopappus* 58
 armerioides* 58
 acaulis* 58
 leucanthemifolius* 63
 nuttallii* 63
 watsonii* 291
 APOCYNACEAE 30
 Apocynum 30
 androsaemifolium 30
 cannabinum 30
 floribundum* 30
 hypericifolium* 30
 medium* 30
 scopulorum* 30
 sibiricum* 30
 Apple
 Balsam 119
 Indian 284
 Applebush 118
 Aquilegia 247
 barnebyi 247
 caerulea 247
 chrysantha* 247
 elegantula 247
 flavescens 247
 formosa 247
 micrantha 247
 pallens* 247
 scopulorum* 247
 triternata* 247
 Arabis 85
 confinis 87
 demissa 87
 var. languida 87
 var. russeola* 87
 divaricarpa* 87
 drummondii 87
 exilis* 87
 fendleri 87
 var. fendleri 87
 var. spatifolia 87
 fernaldiana* 88
 formosa* 87
 glabra 87
 var. glaber 87
 hirsuta 87
 var. pycnocarpa 87
 holboellii 87
 var. pendulocarpa 87
 var. pinetorum 87
 var. retrofracta* 87
 var. secunda 87
 lemmonii 87
 lignifera 87
 lyallii 87
 var. lyallii 87
 microphylla 87
 var. macouni 87
 nuttallii 87
 pendulina* 87
 var. russeola* 87
 perennans 87
 pulchra 87
 var. duchesnensis 87
 var. pallens 87
 retrofracta* 87
 rupestris* 87
 selbyi 87
 sparsiflora 88
 var. subvillosa 88
 vivariensis 88
 Arceuthobium 289
 americanum 290
 campylopodium* 290
 forma cyanocarpum* 290
 forma divaricatum* 290
 cyanocarpum 290
 divaricatum 290
 douglasii 290
 Arctium 39
 minus 39
 Arctostaphylos 138
 nevadensis* 138
 parryana* 138
 patula 138
 platyphylla* 138
 uva-ursi 138
 Arenaria 105
 burkei* 106
 congesta 106
 var. congesta 106
 eastwoodiae* 106
 fendleri 106
 var. eastwoodiae 106
 filiorum 106
 hookeri 106
 kingii* 106
 ssp. uintahensis* 106
 var. uintahensis* 106
 lateriflora 106
 nuttallii 106
 obtusiloba 106
 propinqua* 106
 rossii* 106
 rubella 106
 sajanensis* 106
 uintahensis* 106
 Aristida 202
 fendleriana* 202
 longiseta* 202
 purpurea 202
 Arnica 39
 Broadleaf 40
 chamissonis 40
 cordifolia 40
 diversifolia 40
 foliosa* 40
 fulgens 40
 Hairy 40
 Heartleaf 40
 latifolia 40
 longifolia 40
 Longleaf 40
 mollis 40
 nevadensis 40
 parryi 40
 pumila* 40
 rydbergii 40
 Sierra 40
 sororia* 40
 Arrhenatherum 202
 elatius 202
 Arrowgrass 166
 Shore 166
 Swamp 166
 Arrowhead 20
 Artemisia 41
 arbuscula 292
 var. nova* 43
 biennis 42
 bigelovii 42
 campestris 42
 ssp. borealis 42
 var. scouleriana 42
 cana 42
 ssp. viscidula 42
 var. viscidula* 42
 carruthii 42
 dracunculoides* 42
 dracunculus 42
 frigida 42
 gnaphaloides* 42
 longiloba 42
 ludoviciana 42
 var. incompta 42
 var. ludoviciana 42
 mexicanca* 42
 michauxiana 43
 norvegica 43
 var. piceetorum 43
 nova 43
 pedatifida 43
 pygmaea 43
 scopulorum 43
 spiciformis 43
 spinescens 43
 spithamaea* 43
 tridentata 43
 ssp. arbuscula* 292
 ssp. spiciformis 43
 ssp. tridentata 44
 ssp. vaseyana 44
 var. pauciflora 44
 var. vaseyana* 44
 ssp. wyomingensis 44
 var. tridentata* 44
 var. vaseyana* 44
 var. wyomingensis* 44
 ASCLEPIADACEAE 30
 Asclepias 31
 asperula 31
 var. asperula 31
 capricornu* 31
 cryptoceras 31
 var. cryptoceras 31
 hallii 31
 labriformis 31
 speciosa 31
 subverticillata 31
 Ash 181
 Mountain- 261
 Singleleaf 181
 Asparagus 172
 officinalis 172
 Aspen 263
 Asperugo 75
 procumbens 75
 Asplenium 238
 septentrionale 238
 viride 238
 Aster 44, 63
 ascendens* 45
 Alkali marsh 45
 Alpine leafy bract 45
 arenosus* 62
 bigelovii* 63
 Blueleaf 45
 brachyactis 45
 canescens* 63
 chilensis 45
 ssp. ascendens 45
 Ditchbank 45
 eatonii 45
 Eaton 45
 Engelmann 45
 engelmannii 45
 ericoides* 45
 var. pansus* 45
 Everywhere 45
 falcatus* 45
 Fewhead 45
 foliaceus 45
 var. canbyi 45
 var. parryi 45
 fremontii* 45
 frondosus 45
 glabriusculus* 73
 glaucodes 45
 Heath 62
 Heath-leaved 45
 hesperius 45
 integrifolius 45
 junciformis* 45
 Leafy 45
 leucanthemifolius* 63
 leucelene* 62
 Marsh 45
 Nuttall 45
 occidentalis 45
 var. occidentalis 45
 Pacific 45
 pansus 45
 parryi* 45
 pauciflorus 45
 perelegans 45
 rubrotinctus* 63
 Siskiyou 45
 Thickstem 45
 Tufted white prairie 45
 venustus* 73
 Western mountain 45
 xylorrhiza* 73
 ASTERACEAE 31
 Astragalus 141
 aboriginum* 146
 adsurgens 145
 ssp. robustior 145
 agrestis 145
 alpinus 145
 amphioxys* 146

aretioides 146
 argophyllus 146
 var. martinii 146
 asclepiadoides 146
 australis 146
 bisulcatus 146
 var. bisulcatus 146
 var. haydenianus 146
 canadensis 146
 var. brevidens 146
 var. canadensis* 146
 ceramicus 146
 var. ceramicus 146
 var. imperfectus* 146
 chamaeleuce 146
 chloodes 146
 cibarius 146
 cicer 146
 coltonii* 148
 confertiflorus* 147
 convallarius 146
 var. convallarius 146
 cymboides* 146
 decumbens* 147
 detritalis 146
 diversifolius* 146
 duchesnensis 147
 equisolensis 147
 eurekaensis 147
 flavus 147
 var. flavus 147
 flexuosus 147
 geyeri 147
 hamiltonii 147
 haydenianus* 146
 hypoglottis* 145
 inflexus* 148
 kentrophyta 147
 var. elatus 147
 var. implexus 147
 var. jessiae 147
 lentiginosus 147
 var. palans* 291
 var. platyphyllidus 147
 lonchocarpus* 147
 lutosus 147
 megacarpus 147
 miser 147
 var. oblongifolius 147
 moencoppensis* 146
 mollissimus 147
 var. thompsonae 147
 nelsonianus 147
 oophorus 147
 pattersonii 147
 pubentissimus 147
 var. pubentissimus 147
 purshii 148
 var. purshii 148
 racemosus 148
 var. treleasei 148
 rafaellensis 148
 saurinus 148
 sericoleucus* 146
 var. aretioides* 146
 simplex* 148
 simplicifolius* 148
 spatulatus 148
 striatus* 145
 tegetarius* 147
 var. elatus* 147
 var. implexus* 147
 tenellus 148
 utahensis 148
 vespertinus* 148
 wetherillii 148
 wingatanus 148
 Athyrium 238
 felix-femina 238
 Atriplex 112
 argentea 113
 canescens 113
 confertifolia 113
 corrugata 113
 cuneata* 113
 dioica 113
 gardneri 113
 var. cuneata 113
 var. gardneri 113
 var. tridentata 113
 hastata* 114
 heterosperma 113
 hortensis 113
 nuttallii* 113
 var. cuneata* 113
 var. gardneri* 113
 var. tridentata* 113
 oblanceolata* 113
 patula 114
 var. patula* 114
 var. triangularis 114
 powellii 114
 rosea 114
 saccaria 114
 var. caput-medusae 114
 var. saccaria 114
 spinosa* 116
 tenuissima* 114
 triangularis* 114
 tridentata* 113
 truncata 114
 wolfii 114
 Aulospermum* 291
 jonesii* 291
 Avena 202
 fatua 203
 var. sativa* 203
 sativa 203
 Avens 255
 Aleppo 256
 Alpine 256
 Largeleaf 256
 Purple 256
 Bahia 45
 dissecta 45
 integrifolia* 65
 nudicaulis* 65
 oblongifolia* 65
 ourolepis* 65
 Ragleaf 65
 Ball cactus 100
 Ballon flower 281
 Balsam apple 119
 Balsamorhiza 46
 hirsuta* 46
 hispidula* 46
 hookeri 46
 var. hispidula 46
 var. neglecta 46
 sagittata 46
 Balsamroot 46
 Arrowleaf 46
 Hooker 46
 Baneberry 246
 Barbarea 88
 orthoceras 88
 stricta* 291
 vulgaris* 291
 Barberry 73
 Barberry Family 73
 Barley 210
 Foxtail 211
 Little 211
 Meadow 211
 Barnyard grass 206
 Bassia 114
 Fivehook 114
 hyssopifolia 114
 Bastard toadflax 267
 Batrachium* 250
 trichophyllum* 250
 Bearberry 138
 Beardgrass 219
 Beardtongue 277
 Fremont 280
 Graham 281
 Beckmannia 203
 syzigachne 203
 Bedstraw 261
 Catch 262
 Fragrant 262
 Ladys 262
 Low mountain 262
 Many-flowered 262
 Northern 262
 Small 262
 Shrubby 262
 Sweetscented 262
 Twinleaf 262
 Yellow 262
 Beech Family 155
 Bee-plant 103
 Beggarticks 46
 Devils 46
 Nodding 46
 Begonia 237
 Wild 237
 Bellflower 102
 Arctic 102
 Creeping 102
 Scotch 102
 Bentgrass 200
 Alpine 201
 Creeping 201
 Mountain 201
 Spike 201
 Thurber 201
 Winter 201
 BERBERIDACEAE 73
 Berberis*
 fremontii* 74
 repens* 73
 Bergia 136
 texana 136
 Texas 136
 Berteroa 88
 incana 88
 Berula 23
 erecta 23
 Stalky 23
 Besseyia 273
 cinerea* 273
 wyomingensis 273
 Betula 74
 fontinalis* 74
 glandulosa 74
 occidentalis 74
 BETULACEAE 74
 Bidens 46
 cernua 46
 frondosa 46
 Bilberry 138
 Dwarf 139
 Low 139
 Bindweed
 Black 235
 Field 118
 Hedge 118
 Small 118
 Birch 74
 Bog 74
 Red 74
 River 74
 Scrub 74
 Water 74
 Birch Family 74
 Bird rape 88
 Common 88
 Birdsbeak 274
 King 275
 Much-branched 275
 Biscuit-root 28
 Nineleaf 28
 Bistort
 Alpine 236
 American 235
 Viviparous 236
 Bitterbrush 260
 Bittercrush 89
 Heartleaf 89
 Large mountain 89
 Pennsylvania 89
 Bitterroot 241
 Bladderfern 239
 Brittle 239
 Bladderpod 95
 Alpine 95
 Silver 96
 Utah 96
 Bladderwort 170
 Common 170
 Lesser 170
 Bladderwort Family 170
 Blanket flower 57
 Common perennial 57
 Blazingstar 175
 Creamy 176
 Golden 176
 Bleeding heart 155

Blepharoneuron 203
 tricholepis 203
 Blitum* 115
 capitatum* 115
 Blowout grass 219
 Bluebell 102
 Bluebells 80
 Arizona 80
 Mountain 80
 Oblongleaf 80
 Shortstyle 80
 Spindleroot 80
 Streamside 80
 Blueberry 138
 Western bog 139
 Blue-eyed grass 162
 Idaho 162
 Blue-eyed Mary 274
 Bluegrass 215
 Alkali 218
 Alpine 218
 Annual 216
 Arctic 216
 Big 218
 Bog 217
 Bulbous 216
 Canada 216
 Fowl 217
 Inland 217
 Kentucky 218
 Nevada 219
 Nodding 217
 Sandberg 218
 Shortleaf 217
 Wheeler 217
 Bluejoint 205
 Blue mustard 89
 Bluestem 202
 Big 202
 Sand 202
 Bogbean 179
 Bog orchid 188
 Northern 188
 Northern small 188
 Slender 188
 White 188
 Boisduvalia 181
 glabella 181
 Bolophyta* 64
 ligulata* 64
 Boneset 62
 False 62
 Borage Family 74
 BORAGINACEAE 74
 Botrychium 186
 lunaria 186
 Bouncing-bet 108
 Bouteloua 203
 curtipendula 203
 gracilis 203
 Boxelder 18
 Brachyactis* 45
 angusta* 45
 frondosa* 45
 Bracken 239
 Western 239
 Brackenfern 239
 Brassica 88
 arvensis* 88
 campestris 88
 juncea 88
 kaber 88
 nigra 88
 rapa* 88
 BRASSICACEAE 82
 Breadroot 152
 Large-flowered 152
 Brickellbush 46
 Littleleaf 46
 Mohave 46
 Tasselflower 46
 Brickellia 46
 grandiflora 46
 microphylla 46
 var. scabra 46
 var. watsonii* 46
 oblongifolia 46
 scabra* 46
 watsonii* 46
 Brigham tea 136
 Bristlegrass 220
 Bur 220
 Green 220
 Yellow 220
 Bristlethistle 47
 Brodiaea*
 capitata* 174
 douglasii* 174
 grandiflora* 174
 paysonii* 172
 Brome 203
 Downy 204
 Fringed 204
 Mountain 204
 Smooth 204
 Bromopsis* 204
 anomala* 204
 porteri* 204
 Bromus 203
 anomalus 204
 brizaeformis 204
 carinatus 204
 ciliatus 204
 commutatus* 204
 erectus* 291
 hordeaceus 204
 inermis 204
 japonicus 204
 marginatus* 204
 mollis* 204
 polyanthus* 204
 racemosus* 204
 tectorum 204
 Brookgrass 205
 Brooklime 283
 American 283
 Broomrape 189
 Clustered 190
 Flat-topped 189
 Louisiana 190
 Naked 190
 Broomrape Family 189
 Buchloe 204
 dactyloides 204
 Buckbean 179
 Buckbean Family 179
 Buckbrush 252
 Buckthorn 252
 Buckthorn Family 252
 Buckwheat 229
 Wild 232
 Big 232
 Budsage 43
 Buffaloberry 136
 Russet 136
 Silver 136
 Buffalo bur 285
 Buffalo-grass 204
 False 213
 Bugleweed 168
 American 168
 Rough 168
 Bugseed 116
 Common 116
 Bullgrass 207
 Bullrush 134
 Alkali 135
 Deerhair 135
 hardstem 135
 Panicked 135
 River 135
 Softstem 135
 Tule 135
 Bur
 Buffalo 285
 Cockle- 73
 Bur clover 151
 Burdock 39
 Bur-head 20
 Burnet 260
 Small 260
 Bur reed 285
 Bur reed Family 285
 Bursage 38
 Skeleton leaf 38
 Burweed 38
 Butter and eggs 275
 Buttercup 249
 Alpine 250
 Arctic 251
 Blister 251
 Bur 251
 Creeping 251
 Creeping spearwort 251
 Dwarf plainleaf 250
 Far northern 251
 Heartleaf 250
 Longbeak 250
 Pleasant 251
 Ring 250
 Rocky Mountain 250
 Sagebrush 251
 Sharptail 250
 Shore 250
 Straightbeak 250
 Buttercup Family 245
 CACTACEAE 100
 Cactus
 Ball 100
 Fishhook 101
 Basin hookless 101
 Whipples 101
 Hedgehog 100, 101
 Pincushion 100
 Strawberry 100
 Cactus Family 100
 Calamagrostis 204
 canadensis 205
 inexpansa* 205
 neglecta* 205
 purpurascens 205
 rubescens 205
 scopulorum 205
 stricta 205
 CALLITRICHACEAE 102
 Callitriche 102
 hermaphroditica 102
 heterophylla 102
 palustris 102
 verna* 102
 Calochortus 172
 gunnisonii 173
 nuttallii 173
 Caltha 247
 leptosepala 247
 var. leptosepala 247
 rotundifolia* 247
 Caltrop Family 290
 Calylophus 182
 lavandulaefolius 182
 Calypso 187
 bulbosa 187
 Calyptridium 240
 umbellatum 240
 Calystegia 118
 sepium 118
 var. angulata 118
 Camas 173
 Blue 173
 Camassia 173
 quamash 173
 var. utahensis 173
 Camelina 88
 microcarpa 88
 Camissonia 182
 andina 182
 Barestem 182
 breviflora 182
 contorta* 182
 Long-leafed 182
 minor 182
 parvula 182
 pterosperma 182
 scapoidea 182
 Small-flowered 182
 Short-flowered 182
 subcaulis 182
 walkeri 182
 Camomile 39
 Campanula 102
 petiolata* 102
 rapunculoides 102
 rotundifolia 102
 uniflora 102
 CAMPANULACEAE 102
 Camphorfume 114
 Mediterranean 114
 Camphorosma 114
 monspeliacum 114

- Campion
 Apetalous 107
 Drummond 107
 Moss 108
 Canaigre 237
 Canarygrass 214
 Reed 214
 Cancer-root 189
 Candytuft 99
 Wild 99
 Caper Family 102
 Capnoides* 155
 aureum* 155
 Capnorea* 159
 pumila* 159
 CAPPARACEAE* 102
 CAPPARIDACEAE 102
 CAPRIFOLIACEAE 103
 Capsella 89
 bursa-pastoris 89
 Caragana 148
 arborescens 148
 Caraway 24
 Cardamine 89
 cordifolia 89
 infausta* 89
 pennsylvanica 89
 Cardaria 89
 draba 89
 chalepensis* 89
 pubescens 89
 Carduus 47
 nutans 47
 Carex 121
 ablata 291
 albonigra 129
 angustior* 131
 aquatilis 129
 atherodes 129
 athrostachya 129
 atrata 129
 var. atrosquama 129
 var. chalciolepis* 129
 var. erecta 129
 atrosquama* 129
 aurea 129
 backii 292
 bebbii 129
 bella 129
 bigelowii* 129
 bipartita 129
 brevipes* 132
 breweri 129
 brunnescens 129
 buxbaumii 129
 canescens 129
 capillaris 129
 capitata 129
 chalciolepis* 129
 concolor* 129
 cusickii 124
 diandra 129
 dioica 129
 disperma 129
 douglasii 129
 drummondiana* 132
 ebenea 130
 egglestonii 130
 eleocharis* 132
 elynoides 130
 emori 130
 engelmannii* 129
 epapillosa* 129
 festivella* 130
 filifolia 130
 foenea* 132
 foetida* 291
 geophila* 132
 geyeri 130
 gynocrates* 129
 hassei* 129
 haydeniana 130
 hepburnii* 131
 heteroneura* 129
 hoodii 130
 hystricina 130
 illota 130
 interior 130
 jonesii* 131
 kellogii* 130
 lanuginosa 130
 lasiocarpa 130
 lenticularis 130
 leporinella 130
 leptalea 130
 limophila 130
 limosa 130
 luzulina* 291
 macloviana* 125
 media* 131
 microglochin 130
 microptera 130
 misandra 131
 multicostata 131
 muricata 131
 nardina 131
 nebrascensis 131
 nebraskensis* 131
 nelsonii 131
 neurophora* 131
 nigricans 131
 norvegica 131
 nova 131
 obtusata 131
 occidentalis 131
 oederi 131
 pachystachya 131
 parryana 131
 paupercula 131
 paysonis 131
 pelocarpa* 131
 petasata 131
 phaeocephala 131
 physocarpa* 132
 podocarpa* 131
 praeceptorum 131
 praegracilis 131
 praticola 131
 pseudoscirpoidea* 132
 pyrenaica 132
 raynoldsii 132
 rossii 132
 rostrata 132
 rupestris 132
 saxatilis 132
 scirpoidea 132
 var. pseudoscirpoidea 132
 scopulorum* 132
 siccata 132
 simulata 132
 stenophylla 132
 stipata* 291
 straminiformis 132
 subfusca* 129
 subnigricans 132
 tolmiei* 131
 vahlii* 131
 vallicola 132
 vernacula* 291
 vesicaria 132
 viridula* 131
 xerantica 132
 Carnation 107
 Carpet-weed Family 19
 Carrot Family 21
 Carum 24
 carvi 24
 CARYOPHYLLACEAE 105
 Castilleja 273
 applegatei 274
 var. viscida 274
 chromosa 274
 exilis 274
 flava 274
 var. flava 274
 leonardii* 274
 linariifolia 274
 miniata 274
 minor* 274
 pulchella 274
 occidentalis* 274
 rhexifolia 274
 scabrida 274
 var. scabrida 274
 septentrionalis* 274
 sulphurea 274
 viscida* 274
 Catabrosa 205
 aquatica 205
 Catchweed 75
 Common 75
 Catnip 169
 Catseye 75
 Barneby 77
 Cushion 78
 Graham 78
 Low 78
 Recurved 78
 Rollins 78
 Roughened 78
 Silky 78
 Smallflower 77
 Table 78
 Torrey 79
 Tufted 77
 Watson 79
 Winged 78
 Yellow 78
 Cattail 286
 Common 286
 Southern 286
 Cattail Family 286
 Caulanthus 89
 crassicaulis 89
 var. crassicaulis 89
 var. glaber 89
 Ceanothus 252
 Fendler 252
 fendleri 252
 Martin 252
 martinii 252
 Snowbush 252
 velutinus 252
 Cedar 120
 Rocky Mountain red 120
 White 120
 CELASTRACEAE 110
 Celtis 287
 douglasii* 287
 occidentalis* 287
 reticulata 287
 Cenchrus 205
 longispinus 205
 Centaurea 47
 maculosa 47
 picris* 47
 repens 47
 Centaurium 156
 exaltatum 156
 Centaury 156
 Exalted 156
 Cerastium 106
 Alpine 107
 arvense 107
 beerianum 107
 Big 107
 brachypodium* 107
 buffumae* 107
 fontanum 107
 Nodding 107
 nutans 107
 oreophilum* 107
 Starry 107
 vulgatum* 107
 Ceratocephala* 251
 testiculata* 251
 Ceratocloa* 204
 marginata* 204
 Ceratoides 114
 lanata 114
 CERATOPHYLLACEAE 110
 Ceratophyllum 110
 demersum 110
 Cercocarpus 254
 arizonicus* 254
 betuloides* 254
 intricatus 254
 ledifolius 254
 var. intercedens* 254
 var. intricatus* 254
 montanus 254
 Chaenactis 47
 alpina 47
 Douglas 47
 douglasii 47
 steviodes 47
 Chamaechaenactis 47
 scaposa 47
 Chamaesyce*
 fendleri* 139

serpyllifolia* 139
 Chamomilla 47
 suaveolens 47
 Charlock 88
 Cheatgrass 204
 Checkermallow 178
 New Mexico 178
 Oregon 178
 White 178
 Cheeses 177
 Cheeseweed 177
 Cheilanthes 238
 feei 238
 CHENOPODIACEAE 110
 Chenopodium 114
 acerfolium* 115
 album 115
 var. album 115
 var. berlandieri 115
 atrovirens 115
 berlandieri* 115
 capitatum 115
 var. capitatum* 115
 var. parvicapitatum 115
 chenopodioides* 115
 dessicatum 115
 fremontii 115
 var. atrovirens* 115
 var. fremontii 115
 var. incanum 115
 gigantospermum* 115
 glaucum 115
 hians* 115
 humile* 115
 hybridum 115
 incanum* 115
 leptophyllum 115
 overi* 115
 pratericola* 115
 rubrum 115
 salinum* 115
 Cherry 259
 Chess 203
 Downy 204
 Japanese 204
 Nodding 204
 Rattlesnake 204
 Soft 204
 Chicken sage 70
 Chickweed
 Alpine 106
 Field 106
 Sticky 109
 Chicory 50
 Chimaphila 244
 umbellata 244
 var. occidentalis 244
 Chimaya 25
 Chokecherry 260
 Chorisporea 89
 tenella 89
 Chrysanthemum 48
 balsamita 48
 leucanthemum 48
 Chrysopsis* 60
 foliosa* 60
 fulcrata* 60
 hispida* 60
 villosa* 60
 viscida* 60
 Chrysothamnus 48
 depressus 48
 graveolens* 49
 greenei 48
 lanceolatus* 50
 linifolius 48
 nauseosus 48
 ssp. albicaulis 49
 ssp. consimilis 49
 ssp. graveolens 49
 ssp. hololeucus 49
 ssp. leiospermus 49
 ssp. nauseosus* 49
 ssp. pinifolius* 49
 ssp. psilocarpus 49
 ssp. salicifolius 49
 ssp. speciosus* 49
 ssp. turbinatus 49
 ssp. uintahensis 49
 var. abbreviatus* 49
 var. albicaulis* 49
 var. bigelovii* 49
 var. consimilis* 49
 var. gnaphaloides* 49
 var. graveolens* 49
 var. psilocarpus* 49
 var. salicifolius* 49
 var. turbinatus* 49
 parryi 49
 ssp. affinis 49
 ssp. attenuatus 49
 ssp. howardii 50
 var. attenuatus* 49
 var. howardii* 50
 stenophyllum* 50
 vaseyi* 48
 viscidiflorus 50
 ssp. elegans* 50
 ssp. lanceolatus 50
 ssp. linifolius* 48
 ssp. pumilis* 50
 ssp. stenophyllum* 50
 ssp. viscidiflorus 50
 var. elegans* 50
 var. lanceolatus* 50
 var. stenophyllum* 50
 var. tortuifolia* 50
 var. viscidiflorus* 50
 Cicely 49
 Sweet 49
 Western 49
 Cichorium 50
 intybus 50
 Cicuta 24
 douglasii* 24
 maculata 24
 var. angustifolia 24
 occidentalis* 24
 Cimnalis* 157
 fremontii* 157
 prostrata* 157
 Cinquefoil 257
 Biennial 258
 Brook 259
 Brush 258
 Contrary 259
 Elegant 258
 Gland 258
 Horse 259
 Marsh 259
 Norwegian 259
 Pennsylvania 259
 Pretty 258
 Purple 259
 River 259
 Rough 259
 Sheep 259
 Silverweed 258
 Varileaf 258
 Wedge-leaf 258
 Circaea 183
 alpina 183
 pacifica* 183
 Cirsium 50
 arvense 51
 barnebyi 51
 calcareum 51
 clavatum 51
 coloradoense* 51
 drummondii* 51
 var. acaulescens* 51
 eatonii 51
 var. eatonii 51
 var. murdockii 51
 foliosum* 51
 lanceolatum* 52
 megacephalum* 52
 ownbeyi 51
 polyphyllum* 51
 pulchellum* 51
 scariosum 51
 scopolorum 52
 undulatum 52
 vulgare 52
 Clammyweed 103
 Roughseed 103
 Western 103
 Claretcup 100
 Claytonia 240
 lanceolata 240
 var. lanceolata 240
 megarrhiza 240
 var. megarrhiza 240
 Cleavers 261, 262
 Small 262
 Clematis 247
 aurea* 248
 columbiana 248
 hirsutissima 248
 ligusticifolia 248
 occidentalis 248
 orientalis 248
 pseudoalpina* 248
 Clementsia* 119
 rhodantha* 119
 Cleome 103
 lutea 103
 serrulata 103
 Cleomella 103
 palmerana 103
 Cliffbrake 239
 Brewer 239
 Dwarf 239
 Smooth 239
 Cliffrose 254
 Clover 153
 Alsike 154
 Andean 154
 Bur 151
 Castle Valley 113
 Dutch 154
 Dwarf 154
 Hollyleaf 154
 Hop 154
 Longstalk 154
 Nuttall 154
 Owl- 276
 Parry 154
 Red 154
 Rydberg 154
 Strawberry 154
 Uinta 54
 Water- 179
 Whiproot 154
 White 154
 Cocklebur 73
 Cockspur 206
 Coeloglossum* 188
 viride* 188
 Cogswellia* 28
 grayi* 28
 juniperina* 28
 macrocarpa* 28
 nevadensis* 28
 platycarpa* 28
 Coldenia* 82
 nuttallii* 82
 Coleosanthus* 46
 grandiflora* 46
 Collinsia 274
 parviflora 274
 Collomia 224
 Alpine 224
 debilis 224
 var. debilis 224
 grandiflora 224
 linearis 224
 Narrowleaf 224
 Columbine 247
 Alcove 247
 Colorado 247
 Oil shale 247
 Sitka 247
 Westernred 247
 Yellow 247
 Comandra 267
 pallida* 267
 umbellata 267
 var. pallida 267
 Comarum* 259
 palustris* 259
 Common fern Family 237
 COMPOSITAE* 31
 Coneflower 65
 Cutleaf 65
 Western 65
 Conioselinum 24
 scopolorum 24
 Conium 24
 maculatum 24
 Conringia 89
 orientalis 89

CONVOLVULACEAE 118
 Convolvulus 118
 americanus* 118
 arvensis 118
 sepium* 118
 Conyza 52
 canadensis 52
 Copperweed 64
 Corallorhiza 187
 maculata 187
 mertensiana* 187
 striata 187
 trifida 187
 wisteriana 187
 Coralroot 187
 Early 187
 Hooded 187
 Spring 187
 Spotted 187
 Cordgrass 221
 Alkali 221
 Prairie 221
 Cordylanthus 274
 kingii 275
 ramosus 275
 Corispermum 116
 hysopifolium* 116
 villosum 116
 CORNACEAE 119
 Cornbind 235
 Dullseed 235
 Coronilla 292
 varia 292
 Cornus 119
 instolonea* 119
 sericea* 119
 stolonifera 119
 Corydalis 155
 aurea 155
 var. occidentalis 155
 Golden 155
 montanum* 155
 Coryphantha 100
 neomexicana* 100, 101
 vivipara 100
 var. vivipara 100
 Costmary 48
 Cottongrass 133
 Cottonsedge 133
 Cottonwood 263
 Fremont 263
 Lanceleaf 263
 Narrowleaf 263
 Cowania 254
 mexicana 254
 var. stansburiana 254
 stansburiana* 254
 Cowcockle 109
 Cowherb 109
 Cow-lily 180
 Rocky Mountain 180
 Cowparsnip 26
 Crabgrass 206
 Hairy 206
 CRASSULACEAE 119
 Crataegus 255
 douglasii 255
 var. duchesnensis 255
 var. rivularis 255
 erythropoda 255
 rivularis* 255
 saligna 255
 Crazyweed 151
 Drop-pod 152
 Flowery 152
 Lambert 152
 Parry 152
 Silky 152
 Crepis 52
 acuminata 52
 atrabarba 52
 glauc* 52
 intermedia 52
 modocensis 52
 occidentalis 52
 runcinata 52
 var. glauca 52
 var. hispidulosa 53
 scopulorum* 52
 Cress 97
 Cressa* 291
 truxillensis* 291
 Critesion* 211
 brachyantherum* 211
 jubatum* 211
 pusillum* 211
 Crowfoot 249
 Bristly 249
 Crown vetch 292
 CRUCIFERAE* 82
 Cryptantha 75
 affinis 77
 ambigua 77
 bakeri* 78
 Barneby 77
 barnebyi 77
 breviflora 77
 caespitosa 77
 circumscissa 78
 Cushion 78
 echinella* 291
 fendleri 78
 flava 78
 flavoculata 78
 gracilis 78
 Graham 78
 grahamii 78
 humilis 78
 var. nana 78
 kelseyana 78
 Low 78
 mensana 78
 minima* 291
 nana* 78
 paradoxa 78
 pattersonii* 78
 pterocarya 78
 Recurved 78
 recurvata 78
 Rollins 78
 rollinsii 78
 Roughened 78
 rugulosa* 79
 scoparia* 78
 sericea 78
 Silky 78
 Smallflower 77
 stricta 78
 Table 78
 Torrey 79
 torreyana 79
 Tufted 77
 Watson 79
 watsonii 79
 Winged 78
 Yellow 78
 Cryptogramma 239
 acrostichoides* 239
 crispa 239
 CUCURBITACEAE 119
 Cudweed 57
 Cottonbatting 57
 Lowland 57
 Marsh 57
 Sticky 57
 CUPRESSACEAE 120
 Curlygrass 203
 Current 269
 Golden 270
 Gooseberry 270
 Prickly 270
 Rothrock 270
 Squaw 270
 Sticky 270
 Wax 270
 Wild black 270
 Cuscuta 120
 approximata 121
 cephalanthi* 120
 cuspidata* 291
 denticulata 121
 glabrior 121
 indecora 121
 occidentalis* 120
 pentagona 121
 planifolia* 121
 CUSCUTACEAE 120
 Cycloloma 116
 atriplicifolium 116
 Cymopterus 24
 acaulis 25
 var. acaulis 25
 var. fendleri 25
 bulbosus 25
 duchesnensis 26
 fendleri* 25
 hendersonii 26
 longipes 26
 planosus* 26
 purpurascens 26
 purpureus 26
 var. jonesii* 291
 var. purpureus 26
 var. rosei 26
 rosei* 26
 terebinthinus 26
 var. calcareus 26
 Cynoglossum 79
 officinale 79
 Cynomarathrum* 28
 nuttallii* 28
 CYPERACEAE 121
 Cyperus 132
 aristatus 132
 Cypress Family 120
 Cyripedium 187
 fasciculatum 187
 Cystopteris 239
 fragilis 239
 Dactylis 205
 glomerata 205
 Daisy
 Desert 73
 Glaber 55
 Ox-eye 48
 Dandelion 70
 Common 71
 Desert 63
 Dwarf alpine 71
 Horned 71
 Mountain 37
 Danthonia 205
 californica 206
 intermedia 206
 unispicata 206
 Dasiphora* 258
 fruticosa* 258
 Datura 284
 stramonium 284
 wrightii 284
 Daylily 170
 Dark 170
 Deathcamas 174
 Foothill 174
 Meadow 174
 Mountain 174
 Delphinium 248
 andersonii* 291
 bicolor* 248
 cucullatum* 248
 dumetorum* 248
 geyeri 248
 menziesii* 248
 nelsonii* 248
 nuttallianum 248
 occidentale 248
 ramosum 248
 reticulatum* 248
 virescens* 291
 Deschampsia 206
 caespitosa 206
 elongata 206
 Descurainia 90
 brachycarpa* 90
 californica 90
 halictorum* 90
 incisa* 90
 longipedicellata* 90
 pinnata 90
 richardsonii 90
 var. brevipes 90
 var. macrosperma* 90
 var. sonnei 90
 var. viscosa 90
 serrata* 90
 sophia 90
 Desert dandelion 63
 Desert-parsley 27
 Desert-thorn 284
 Devil's shoe-strings 235

Dianthus 107
 barbatus 107
 Dicanthelium* 214
 acuminatum* 214
 lanuginosum* 214
 Dicentra 155
 uniflora 155
 Dichelostemma* 174
 pulchellum* 174
 Digitalia 206
 sanguinalis 206
 DIPSACEAE 135
 Dipsacus 135
 fullonum 135
 sylvestris* 135
 Disella* 177
 hederacea* 177
 Dishwater-grass 235
 Disporum 173
 trachycarpum 173
 Distichlis 206
 spicata 206
 var. stricta 206
 stricta* 206
 Ditch-grass 262
 Ditch-grass Family 262
 Dock 236
 Bitter 237
 Curly 237
 Golden 237
 Patience 237
 Veiny 237
 Western 237
 Willowleaf 237
 Winged 237
 Dodder 120
 Dodder Family 120
 Dodecatheon 243
 alpinum 244
 pauciflorum* 244
 pulchellum 244
 radicatum* 244
 Dogbane 30
 Hemp 30
 Spreading 30
 Dogbane Family 30
 Dog fennel 39
 Dogtooth-violet 173
 Dogwood 119
 red-osier 119
 Dogwood Family 119
 Dondia 118
 torreyana 118
 Dooryard-grass 235
 Double-bladderpod 96
 Douglas-fir 191
 Draba 90
 Alaska 92
 aurea 91
 brachystylis* 91
 cana 91
 Carolina 92
 crassa 91
 crassifolia 91
 cuneifolia 91
 var. cuneifolia 91
 var. platycarpa* 91
 densifolia 91
 var. daviesiae 91
 var. densifolia 91
 Few-seeded 92
 fladnizensis* 92
 Golden 91
 juniperina* 92
 Lancefruit 92
 lanceolata* 91
 lonchocarpa 92
 var. exigua 92
 var. lonchocarpa 92
 micrantha* 92
 Mountain 92
 nemorosa 92
 nitida* 92
 nivalis* 92
 oligosperma 92
 var. juniperina 92
 var. oligosperma 92
 var. pectinipila* 92
 pectinipila* 92
 rectifruca 92
 reptans 92
 Rockcress 91
 Rocky Mountain 91
 Slender 92
 sobolifera* 92
 spectabilis* 91
 stenoloba 92
 var. nana 92
 uncinalis* 92
 ventosa 92
 Wedgeleaf 91
 Wind River 92
 Woods 92
 Dracocephalum 168
 parviflorum 168
 Dragonhead 168
 American 168
 Dropseed 221
 Hairy 203
 Pine 203
 Sand 222
 Spike 221
 Tall 221
 Dryad 255
 White 255
 Dryas 255
 octopetala 255
 Drymocalis* 258
 convallaria* 258
 glandulosa* 258
 Duckweed 170
 Lesser 170
 Duckweed Family 170
 Dugaldia* 59
 hoopesii* 59
 Dusty-maiden 47
 Alpine 47
 Dwarf mistletoe 289
 Douglas-fir 289
 Limber pine 289
 Lodgepole pine 289
 Pinvon 289
 Dyssodia 53
 papposa 53
 Echinocactus* 101
 simpsonii* 101
 whipplei* 101
 Echinocereus 100
 coccineus* 100
 mojavensis* 100
 octacanthus* 100
 triglochidiatus 100
 Echinochloa 206
 crus-galli 206
 Echinocystis 119
 lobata 119
 Echinodorus 20
 rostratus 20
 Echinopsilon* 114
 hyssopifolium* 114
 ELAEAGNACEAE 135
 Elaeagnus 135
 angustifolia 136
 commutata 136
 ELATINACEAE 136
 Elatine 136
 triandra 136
 Elderberry 104
 Blueberry 104
 Red 104
 Eleocharis 132
 acicularis 132
 arenicola* 132
 bolanderi 132
 calva* 132
 coloradoensis* 132
 engelmannii* 132
 macrostachya* 132
 montana* 132
 ovata* 132
 palustris 132
 parishii* 132
 parvula 132
 var. anachaeta 132
 pauciflora 132
 rostellata 132
 Elephantella 277
 Elephanthead 277
 Elksear 156
 Elkweed 156
 Showy 156
 Elm 287
 siberian 287
 Elm Family 286
 Elodea 159
 canadensis 159
 longivaginata 159
 Elymus 206
 ambiguus* 207
 var. salina* 207
 canadensis 207
 cinereus 207
 condensatus* 207
 elongatus* 199
 elymoides* 220
 glaucus 207
 hispidus* 199
 junceus 207
 lanceolatus* 199
 macounii* 198
 x pseudorepens* 199
 repens* 199
 salina 207
 x sanudersii* 200
 saxicola* 200
 scribneri* 199
 simplex 207
 smithii* 199
 spicatus* 199
 subsecundus* 200
 trachycaulus* 200
 triticoides* 207
 var. simplex* 207
 Elysitanion 207
 Elytesion* 198
 macounii* 198
 Elytrigia* 199
 intermedia* 199
 pontica* 199
 repens* 199
 smithii* 199
 spicata* 199
 Enceliopsis 53
 argophylla* 53
 nudicaulis 53
 nutans 53
 Enchanter's nightshade 183
 Ephedra 136
 Cutler 137
 cutleri 137
 Green 137
 Navajo 137
 nevadensis 137
 Torrey 137
 torreyana 137
 viridis 137
 var. viscida* 137
 EPHEDRACEAE 136
 Ephedra Family 136
 Epilobium 183
 adenocaulon* 183
 alpinum 183
 var. alpinum 183
 var. clavatum 183
 var. lactiflorum 183
 var. nutans 183
 anagallidifolium* 183
 angustifolium 183
 brachycarpum 183
 brevistylum* 184
 canum 183
 ssp. garrettii 183
 ciliatum 184
 ssp. ciliatum 184
 ssp. glandulosum 184
 clavatum* 183
 glandulosum* 184
 var. tenue* 184
 halleanum 184
 hornemannii* 183
 lactiflorum* 183
 leptophyllum 184
 palustre* 184
 paniculatum* 183
 rubescens* 184
 saximontanum 184
 watsonii* 184
 Epipactis 187
 gigantea 187
 EQUISETACEAE 137

- Equisetum 137
 arvense 137
 hyemale 137
 kansanum* 137
 laevigatum 137
 prealtum* 137
 variegatum 137
 Eragrostis 208
 cilianensis 208
 diffusa* 208
 minor 208
 orcuttiana 208
 pectinacea 208
 poeaoides* 208
 Eremopyrum 208
 triticeum 208
 Eriastrum* 225
 diffusum* 225
 ERICACEAE 137
 Erigeron 55
 acris 55
 var. debilis 55
 aphanactis* 291
 argentatus* 56
 caespitosus 55
 canadensis* 52
 compactus 55
 var. consimilis 55
 compositus 55
 concinus* 56
 coulteri* 291
 divergens 55
 eatonii 55
 elator* 291
 engelmannii 55
 filifolius* 56
 flagellaris 55
 formosissimus* 55
 glabellus 55
 goodrichii 55
 leiomerus 55
 lonchophyllus 56
 macranthus* 56
 melanocephalus* 56
 nanus 56
 nematophyllus 56
 ochroleucus 53
 peregrinus 56
 ssp. callianthemus 56
 pulcherrimus 56
 pumilus 56
 ssp. concinnoides 56
 ssp. intermedius 56
 salsuginosus* 56
 simplex 56
 speciosus 56
 var. macranthus 56
 var. mollis 56
 var. speciosus 56
 var. uintahensis 56
 subtrinervis* 56
 superbus 56
 uintahensis* 56
 untermannii 56
 ursinus 56
 utahensis* 56
 vetensis* 56
 viscidus* 55
 Eriogonum 229
 acaule 231
 alatum 231
 arcuatum* 2312
 aureum* 232
 batemanii 231
 bicolor* 231
 brevicaule 231
 var. brevicaule 231
 var. laxiflorum 231
 var. promiscum 231
 var. pumilum* 231
 campanulatum* 231
 cernuum 232
 var. cernuum 232
 chrysocephalum* 231
 corymbosum 232
 var. corymbosum 232
 var. erectum* 232
 var. glutinosum* 232
 var. hylophilum 232
 var. orbiculatum* 291
 Cushion 233
 Desert trumpet 232
 divergens* 232
 x duchesnense 232
 effusum* 232
 Ephedra 232
 ephedroides 232
 flexum 232
 fusiforme* 232
 gordonii 232
 Green 232
 heracleoides 232
 hookeri 232
 hylophilum* 232
 inflatum 232
 var. fusiforme 232
 intermontanum* 232
 jamesii 232
 var. flavescens 232
 lonchophyllum 232
 var. lonchophyllum 232
 var. saurinum 232
 medium* 232
 microthecum 232
 var. foliosum 232
 var. laxiflorum 232
 neglectum* 232
 Nodding 232
 ovalifolium 233
 var. multiscapum 232
 var. ovalifolium 233
 porteri* 234
 racemosum 233
 Redroot 233
 salsuginosum 233
 sarrothriiforme* 232
 saurinum* 233
 scoparium* 232
 shockleyi 233
 var. longilobum 233
 simpsonii* 233
 Slenderbush 233
 spathulatum* 231
 subalpinum* 233
 Sulfur 234
 tristichum* 232
 tumulosum 233
 umbellatum 233
 var. aureum 233
 var. dichrocephalum* 233
 var. majus 233
 var. porteri 234
 var. umbellatum 234
 viridulum 234
 Wing 234
 Wyeth 232
 Erioneuron 208
 pilosum 208
 Eriophorum 133
 angustifolium* 134
 chamissonis* 134
 polystachion 134
 scheuchzeri 134
 Eritrichium 79
 argenteum* 79
 elongatum* 79
 nanum 79
 var. elongatum 79
 Erodium 158
 cicutarium 158
 Erysimum 92
 asperum 92
 capitatum* 92
 cheiranthoides 92
 inconspicuum 92
 parviflorum 92
 repandum 92
 wheeleri* 92
 Erythronium 173
 grandiflorum 173
 parviflorum* 173
 Eupatorium 56
 maculatum 56
 Euphorbia 139
 albomarginata* 291
 esula 139
 Fendler 139
 fendleri 139
 glyptosperma 139
 Ridgeseed 139
 Robust 139
 robusta 139
 serpyllifolia 140
 Thymeleaf 140
 EUPHORBIACEAE 139
 Eurotia* 114
 lanata* 114
 Euthamia* 69
 occidentalis* 69
 Evening-primrose 185
 Acute-leaf 185
 Common 185
 Lavenderleaf 182
 Long-tube 186
 Pale 186
 Tufted 185
 Evening-primrose Family 181
 FABACEAE 140
 FAGACEAE 155
 Fairybells 173
 Fairy slipper 187
 False boneset 62
 False buffalograss 213
 False flax 88
 Hairy 88
 Littlepod 88
 False-hellebore 174
 California 174
 False lupine 153
 False melica 220
 False mermaid 174
 False mermaid Family 174
 False solomon seal 173
 False yarrow 47
 Fanweed 99
 Felwort 292
 Marsh 292
 Fendlera* 269
 rupicola* 269
 Fendlerella 268
 utahensis 268
 Fennel 39
 Dog 39
 Fern
 Bladder- 239
 Bracken- 239
 Grass- 238
 Holly- 239
 Lady- 238
 Lip- 238
 Parsley- 239
 Fernleaf lovage 27
 Fescue 208
 Meadow 209
 Sheep 209
 Sixweeks 209
 Spike 211
 Thurber 209
 Festuca 208
 dasyclada 209
 elator* 209
 idahoensis* 209
 kingii* 211
 octoflora 209
 ovina 209
 ssp. brachyphylla* 209
 var. brevifolia 209
 var. duriuscula 209
 var. ingrata 209
 var. ovina 209
 var. rydbergii 209
 pratensis 209
 rubra* 209
 thurberi 209
 Feverfew 64
 Fiddleneck 75
 Rough 75
 Figwort 282
 Lanceleaf 282
 Figwort Family 272
 Filaree 158
 Fir 190
 Balsam 191
 Douglas- 191
 Subalpine 190
 White 190
 Fireweed 183
 Fishhook cactus 101
 Basin hookless 101
 Whipples 101
 Five-finger 257

- Flag 162
 Rocky Mountain 162
 Western blue 162
 Flatsedge 132
 Awned 132
 Flax 175
 Blue 175
 False 88
 King 175
 Wild 175
 Flax Family 175
 Flaxflower 226
 Nuttall 226
 Fleabane 53
 Basin 56
 Bear River 56
 Bitter 55
 Dwarf 56
 Eaton 55
 Engelmann 55
 Fernleaf 55
 Low 56
 Oneflower 56
 Oregon 56
 Peregrine 56
 Rockslide 55
 Showy 56
 Smooth 55
 Spearleaf 56
 Spreading 55
 Subalpine 56
 Tufted 55
 Trailing 55
 Yellow 55
 Fleece-flower 235
 Flixweed 90
 Floerkea 174
 proserpinacoides 174
 Fogfruit 288
 Forget-me-not
 Alpine 79
 Small-flowered 81
 Wild 79
 Forsellesia 110
 meionandra 110
 spinescens* 110
 Four-o'clock 180
 Colorado 180
 Four-o'clock Family 179
 Foxtail 201, 211
 Alpine 202
 Marsh 202
 Meadow 202
 Short-awn 202
 Water 202
 Foxtail barley 211
 Fragaria 255
 americana* 255
 bracteata* 255
 glauca* 255
 ovalis* 255
 vesca 255
 var. bracteata 255
 virginiana 255
 var. glauca* 255
 var. platypetala* 255
 Franseria* 38
 acanthicarpa* 38
 discolor* 38
 linearis* 38
 tomentosa* 38
 Frasera 156
 speciosa 156
 Fraxinus 181
 anomala 181
 Fringed gentians 157
 Smaller 157
 Fritillaria 173
 atropurpurea 173
 pudica 173
 Fritillary 173
 Yellow 173
 Frogs-bit Family 159
 FUMARIACEAE 155
 Fumitory Family 155
 Funnel-lily 172
 Purple 172
 Gaillardia 57
 aristata 57
 flava 57
 gracilis* 57
 pinnatifida* 57
 Galium 261
 aparine* 262
 var. echinospermum* 262
 bifolium 262
 boreale 262
 brandegei* 262
 coloradoense* 262
 mexicanum 262
 ssp. asperrimum 262
 ssp. asperulum* 262
 multiflorum 262
 var. coloradoense 262
 trifidum 262
 var. subbiflorum 262
 triflorum 262
 vernum 262
 Galleta 210
 Garrett firechalice 183
 Gaultheria 138
 humifusa 138
 Gaura 184
 coccinea 184
 parviflora 184
 Scarlet 184
 Small-flowered 184
 Gayophytum 184
 decipiens* 184
 diffusum* 184
 helleri* 184
 lasiospermum* 184
 nuttallii* 184
 racemosum 184
 ramosissimum 184
 Gentian 156
 Arctic 157
 Explorer's 157
 Green 156
 Moss 157
 Mountain bog 157
 Rainier pleated 157
 Rockv Mountain pleated 157
 Smaller fringed 157
 Whitish 157
 Gentian Family 155
 Gentiana 156
 affinis 157
 algida 157
 amarella* 157
 barbellata* 157
 calycosa 157
 detonsa* 157
 forwoodii* 157
 fremontii* 157
 heterosepala* 157
 monantha* 157
 parryi* 157
 plebeia* 157
 prostrata 157
 romanzovii* 157
 strictiflora* 157
 tenella* 157
 thermalis* 157
 GENTIANACEAE 155
 Gentianella 157
 amarella 157
 spp. acuta* 157
 ssp. heterosepala* 157
 heterosepala 157
 tenella 157
 ssp. tenella 157
 tortuosa 157
 Gentianopsis 157
 barbellata 157
 detonsa 157
 var. elegans 157
 Gentians 157
 Fringed 157
 Lapland 157
 Little 157
 Tortuose 157
 GERANIACEAE 158
 Geranium 158
 Bicknell 158
 bicknellii 158
 caespitosum* 158
 carolinianum* 158
 var. longipes* 158
 fremontii* 158
 Mint 48
 nervosum* 158
 Richardson 158
 richardsonii 158
 Sticky purple 158
 viscosissimum 158
 var. nervosum 158
 White 158
 Wild 158
 Geranium Family 158
 Geum 255
 allepicum 256
 ciliatum* 256
 decurrens* 256
 macrophyllum 256
 rossii 256
 var. turbinatum 256
 strictum* 256
 triflorum 256
 turbinatum* 256
 Ghost-pipe 190
 Giant hyssop 168
 Giant whitetop 94
 Gilia 224
 aggregata 225
 var. aggregata 225
 Ballhead 225
 Brewer 227
 calcarea* 225
 congesta 225
 var. congesta 225
 Dwarf 225
 haydeni* 225
 inconspicua 225
 leptomeria 225
 Many-flowered 225
 mcvickerae* 225
 micromeria* 225
 Nuttall 226
 ophthalmoides* 225
 pinnatifida 225
 polycladon 225
 Prickly 226
 pulchella* 225
 pumila 225
 roseata 225
 Scarlet 225
 Shy 225
 sinuata* 225
 Sinuate 225
 Skyrocket 225
 spicata 226
 var. spicata 226
 Spike 226
 stenothyrsa 226
 Sticky 225
 Glasswort 117
 Marshfire 117
 Glaucocarpum 92
 suffrutescens 92
 Glaux 244
 maritima 244
 Globeflower 252
 Globemallow 252
 Gooseberryleaf 178
 Munro 178
 Nelson 178
 Scarlet 178
 Glossopetalon* 110
 meionandra* 110
 Glyceria 209
 borealis 209
 elata* 210
 grandis 210
 pauciflora* 219
 striata 210
 Glycyrrhiza 148
 lepidota 148
 Glyptopleura 57
 marginata 57
 Gnaphalium 57
 chilense 57
 palustre 57
 uliginosum 57
 viscosum 57
 Goatgrass 197
 Jointed 197
 Goatsbeard 72
 Goldaster 60
 Hairy 60

Goldenaster 60
Hairy 60
Goldeneye 60
 Showy 60
Golden pea 153
Goldenrod 68
 Baby 69
 Canada 68
 Coast 69
 Low 69
 Missouri 68
 Mountain 69
 Parry 69
 Rock 64
 Slender 69
 Western 69
Golden smoke 155
Goldenweed 58
 Lanceleaf 59
 Stemless 58
 Thrifty 58
 Whitestem 59
Goodyera 187
 oblongifolia 187
Gooseberry 269
 Missouri 270
 Whitestem 270
Goosefoot 114
 Fremont 115
 Mapleleaf 115
 Oakleaf 115
 Red 115
Goosefoot Family 110
Goose-grass 262
Gourd Family 119
GRAMINEAE* 192
Gramma grass 203
 Blue 203
 Sideoats 203
Grapefern 186
Grape 73
 Oregon 73
Grass
 Alkali- 219
 Barnyard 206
 Beard- 219
 Bent- 200
 Blue- 215
 Blue eyed 162
 Blowout- 219
 Bristle- 2210
 Brook- 205
 Buffalo 204
 False 213
 Canary- 214
 Cheat- 204
 Cord- 221
 Crab- 206
 Curly- 203
 Dishwater- 235
 Ditch- 262
 Dooryard- 235
 Goat- 197
 Goose- 262
 Gramma 203
 Hair- 206
 June- 211
 Love- 208
 Manna- 209
 Merlin 162
 Muhly- 212
 Mutton- 216
 Needle- 222
 Needle-and-thread 222
 Oat- 205
 Tall 202
 Old witch- 212
 Onion- 212
 Orchard 205
 Pine- 205
 Quack 199
 Rabbitfoot 219
 Reed- 205
 Rice- 213
 Rye- 212
 Salt- 206
 Sand- 219
 Scratch- 212
 Slough- 203
 Stink 208
 Sweet- 210
 Tickle- 201
 Tumble- 219
 Vanilla 210
 Wedge- 221
 Wheat- 198
 Wire- 165
 Grass Family 192
 Grass-fern 238
 Grass-of-parnassus 269
 Rocky Mountain 269
 Grayia 116
 brandegei* 118
 spinosa 116
 Greasebush 110
 Greasewood 117
 Green-bush 110
 Green gentian 156
 Greenthread 71
 Navajo-tea 71
 Grindelia 58
 aphanactis* 58
 arizonica* 291
 var. stenophylla* 291
 fastigiata* 291
 squarrosa 58
 var. quasiperennis* 291
 var. serrulata 58
 var. squarrosa 58
 Gromwell 80
 GROSSULARIACEAE* 267
 Groundcherry 285
 Groundsel 65
 Arrowleaf 68
 Balsam 67
 Black 67
 Broom 67
 Butterweed 67
 Common 68
 Dryland 67
 Fremont 67
 Lambstongue 67
 Lobeleaf 67
 Saffron 67
 Tall 67
 Thickleaf 67
 Water 67
 Woolly 67
Groundsmoke 184
 Branched 184
Gumweed 58
 Curlycup 58
Gutierrezia 58
 microcephala* 58
 pomariensis 58
 sarrothrae 58
 var. pomariensis* 58
Gymnosteris 226
 parvula 226
 Small-flowered 226
Habenaria 188
 bracteata* 188
 Canyon 188
 dilatata 188
 hyperborea 188
 obtusata 188
 saccata 188
 sparsiflora 188
 unalascensis 188
 viridis 188
 zothecina 188
Hackberry 287
Hackelia 79
 floribunda 79
 gracilentia* 79
 jessicae* 79
 leptophylla* 79
 micrantha 79
 patens 79
Hairgrass 206
 Slender 206
 Tufted 206
Hairy dropseed 203
Hairy tridens 208
Halimolobos 93
 virgatus 93
Halogeton 116
 glomeratus 116
HALORAGIDACEAE 158
Hammerwort 287
Haplopappus 58
 acaulis 58
 var. acaulis 58
 armerioides 58
 var. armerioides 59
 var. gramineus 59
 clementis 59
 croceus* 291
 lanceolatus 59
 macronema 59
 nuttallii* 63
 parryi* 69
 pygmaeus* 291
 racemosus* 59
 uniflorus* 59
 watsonii* 291
Harebell 102
Harebell Family 102
Hare's-ear 89
Haw 255
Hawksbeard 52
 Dandelion 52
 Gray 52
 Modoc 52
 Slender 52
 Tapertip 52
 Western 52
Hawkweed 60
 Houndstongue 60
 Slender 60
 White 60
Haws 255
Hawthorn 255
 Cerro 255
 Douglas 255
 Willow 255
Heal-all 169
Heath aster 62
Heath Family 137
Hedeoma 168
 drummondii 168
Hedge nettle 169
 Marsh 169
Hedgehog cactus 100
 Scarlet 100
Hedysarum 148
 boreale 148
 var. boreale 148
 var. gremiale 148
 cinerascens* 148
 occidentale 148
 var. canone 148
 var. occidentale 148
 utahense* 148
Helenium 59
 autumnale 59
 var. montanum 59
 hoopesii 59
 montanum* 59
Helianthella 59
 Fivenerve 59
 microcephala 59
 Oneflower 59
 quinquenervis 59
 uniflora 59
Helianthus 59
 annuus 60
 aridus* 60
 lenticularis* 60
 nuttallii 60
 petiolaris 60
Helictotrichon 210
 mortonianum 210
Helioomeris 60
 multiflora 60
Heliotrope 79
 Salt 79
Heliotropium 79
 curassavicum 79
 var. obovatum 79
 spathulatum* 79
 xerophilum* 79
Helleborine 187
Hemerocallis 170
 fulva 170
Hemlock
 Poison 24
 Water 24
 Waterparsnip 29
Hemlock-parsley 24

Hemp 30
 Indian 30
 Henbane 284
 Black 284
 Heracleum 26
 lanatum 26
 sphondylium* 26
 ssp. lanatum* 26
 Hermidium* 180
 alipes* 180
 var. pallidum* 180
 Heronsbill 158
 Hesperis 93
 matronalis 93
 Hesperochiron 159
 pumilus 159
 Hesperochloa* 211
 kingii* 211
 Heterotheca 60
 fulcrata* 60
 horrida* 60
 villosa 60
 viscida* 60
 Heuchera 268
 parvifolia 268
 var. major* 268
 var. microcarpa* 268
 var. utahensis* 268
 Hieracium 60
 albiflorum 60
 cynoglossoides 60
 gracile 60
 Hierochloa 210
 odorata 210
 Hilaria 210
 jamesii 210
 HIPPURIDACEAE 259
 Hippuris 259
 vulgaris 259
 Hoary cress 89
 Globe-podded 89
 Heart-podded 89
 Hollyfern 239
 Mountain 239
 Hollyhock 177
 Wild 177
 Holodiscus 256
 dumosus 256
 microphyllus* 256
 Honeysuckle 104
 Bearberry 104
 Utah 104
 Honeysuckle Family 103
 Hop 179
 Hop clover 151
 Hop sage 116
 Spiny 116
 Hordeum 210
 brachyantherum 211
 jubatum 211
 nodosum* 211
 pusillum 211
 vulgare 211
 Horehound 168
 Common 168
 Water- 168
 Horkelia* 256
 gordonii* 256
 Horned pondweed 290
 Hornwort 110
 Hornwort Family 110
 Horsebrush 71
 Cottonthorn 71
 Gray 71
 Littleleaf 71
 Nuttall 71
 Horse-mint 168
 Nettle-leaf 168
 Horsetail 137
 Field 137
 Horsetail Family 137
 Horseweed 52
 Canadian 52
 Houndstongue 79
 Common 79
 Huckleberry 138
 Blue 139
 Dwarf 139
 Humulus 179
 americanus* 179
 lupulus 179
 Husktomato 285
 Hutchinsia 93
 procumbens 93
 Hyacinth 174
 Wild 174
 HYDRANGEACEAE* 267
 HYDROCHARITACEAE 159
 HYDROPHYLLACEAE 159
 Hydrophyllum 160
 capitatum 160
 var. capitatum 160
 Hymenopappus 61
 arenosus* 61
 cinereus* 61
 eripodus* 61
 filifolius 61
 var. alpestris 61
 var. cinereus 61
 var. lugens* 61
 var. luteus 61
 var. megacephalus* 61
 Fineleaf 61
 lugens* 61
 luteus* 61
 Hymenoxys 61
 acaulis 61
 var. arizonica 61
 var. caespitosa 61
 depressa* 62
 grandiflora 62
 Graylocks 62
 lapidicola 62
 Pinque 62
 richardsonii 62
 Stemless 61
 torreyana 62
 Hyocyamus 284
 niger 284
 HYPERICACEAE 161
 Hypericum 161
 anagalloides 161
 formosum 161
 Iliamna 177
 rivularis 177
 Indian hemp 30
 Indian paintbrush 273
 Indian parsley 28
 Indian potato 28
 Indian-wheat 192
 Ipomopsis*
 aggregata* 225
 congesta* 225
 polycladon* 225
 pumila* 225
 roseata* 225
 spicata* 226
 IRIDACEAE 162
 Iris 162
 missouriensis 162
 Iris Family 162
 Isatis 93
 tinctoria 93
 ISOETACEAE 162
 Isoetes 162
 bolanderi 163
 echinospora 163
 lacustris 163
 muricata* 163
 occidentalis* 163
 Iva 62
 axillaris 62
 xanthifolia 62
 Ivesia 256
 gordonii 256
 Ivy 21
 Poison 21
 Jacobs ladder 228
 Leafy 228
 Pretty 228
 Western 228
 Jimson weed 284
 Joe-pye-weed 56
 Spotted 56
 Jointed goatgrass 197
 Jointfir 136
 JUNCACEAE 163
 JUNCAGINACEAE 166
 Juncoides* 166
 parviflorum* 166
 Juncus 163
 albescens* 166
 alpinus 165
 arcticus 165
 articulatus* 165
 badius* 165
 balticus* 165
 brunnescens* 165
 bryoides 165
 bufonius 165
 castaneus 165
 compressus 165
 confusus 165
 drummondii 165
 dudleyi* 166
 ensifolius 165
 var. brunnescens 165
 var. ensifolius 165
 var. montanus 165
 filiformis 165
 hallii 165
 interior* 166
 kelloggii* 165
 longistylis 165
 marginatus 165
 mertensianus 165
 nevadensis 165
 nodosus 165
 orthophyllus* 291
 parryi 165
 regelii 165
 saximontanus* 165
 sphaerocarpus* 165
 tenuis 165
 torreyi 166
 tracyi* 165
 triglumis 166
 tweedyi* 291
 xiphioides* 165
 var. montanus* 165
 Junegrass 211
 Juniper 120
 Boneseed 120
 Common 120
 Prostrate 120
 Rocky Mountain 120
 Utah 120
 Juniperus 120
 communis 120
 var. depressa 120
 osteosperma 120
 scopulorum 120
 sibirica* 120
 utahensis* 120
 virginicum* 120
 var. scopulorum* 120
 Kalmia 138
 Alpine bog 138
 microphylla* 138
 polifolia 138
 var. microphylla 138
 Kentrophyta 147
 Kinnikinnik 138
 Kiss-me-over-the-fence 236
 Kittentails
 Alpine 273
 Cutleaf 282
 Knapweed 47
 Russian 47
 Spotted 47
 Knotweed 234
 Bushy 236
 Douglas 235
 Kellogg 236
 Prostrate 235
 Sawatch 236
 Kobresia 134
 bellardii 134
 mysuroides* 134
 sibirica* 134
 simpliciuscula 134
 Kochia 116
 americana 16
 iranica* 116
 prostrata 116
 scoparia 116
 vestita* 116
 Kochia weed 116

Koeleria 211
 *crystata** 211
 *gracilis** 211
 macrantha 211
 *nitida** 211
 *pyramidata** 211
 Krynitzkia 76
 Kuhnia 62
 chlorolepis 62
 *rosmarinifolia** 62
 var. *chlorolepis** 62

 LABIATAE* 166
 Labrador tea 138
 Western 138
 Lactuca 62
 *ludoviciana** 291
 *oblongifolia** 62
 *pulchella** 62
 serriola 62
 tatarica 62
 ssp. *pulchella* 62
 trisulea 291
 Ladies-tresses 189
 Creamy 189
 Hooded 189
 Ladyfern 238
 Common 238
 Lady's slipper 187
 Brownie 187
 Clustered 187
 Ladysthumb 234
 Curlytop 236
 Spotted 236
 Water 235
 Lambsquarters 114
 LAMIACEAE 166
 Laphamia* 291
 *stansburii** 291
 Lappula 80
 *echinata** 80
 *myosotis** 80
 *occidentalis** 80
 redowskii 80
 var. *cupulata* 80
 squarrosa 80
 *texana** 80
 Larkspur 248
 Duncecap 248
 Geyer 248
 Nuttall 248
 Lathyrus 149
 *coriaceus** 149
 lanszwertii 149
 var. *laetivirens* 149
 var. *lanszwertii* 149
 latifolius 149
 *leucanthus** 149
 pauciflorus 149
 *utahensis** 149
 Layia 291
 glandulosa 291
 Laurel 138
 Alpine 138
 Swamp 138
 Ledum 138
 glandulosum 138
 LEGUMINOSAE* 140

 Lemna 170
 minor 170
 minuscule 170
 *minuta** 180
 obscura 170
 LEMNACEAE 170
 LENTIBULARIACEAE 170
 Leontodon* 71
 *taraxacum** 71
 Leonurus 168
 cardiaca 168
 *Lepargyrea** 136
 *argentea** 136
 *canadensis** 136
 Lepidium 93
 barnebyanum 94
 campestre 94
 densiflorum 94
 var. *densiflorum* 94
 var. *ramosum* 94
 integrifolium 94
 lasiocarpum 94
 var. *georginum* 94
 latifolium 94
 *medium** 95
 montanum 94
 var. *alyssoides** 95
 var. *eastwoodiae** 95
 var. *jonesii* 95
 var. *montanum* 95
 var. *spathulatum* 95
 perfoliatum 95
 ramosissimum 95
 virginicum 95
 var. *pubescens* 95
 Leptochloa 211
 fascicularis 211
 Leptodactylon 226
 caespitosum 226
 pungens 226
 var. *pungens* 226
 watsonii 226
 Lesquerella 95
 alpina 95
 ssp. *alpina* 95
 ssp. *condensata** 95
 ssp. *parvula* 96
 var. *alpina** 96
 var. *condensata** 95
 var. *parvula** 96
 *condensata** 95
 var. *laevis** 96
 congesta 96
 hemiphysaria 96
 var. *lucens* 96
 *intermedia** 96
 ludoviciana 96
 *montana** 96
 parviflora 96
 rectipes 96
 *subumbellata** 96
 utahensis 96
 Lettuce 62
 Chicory 62
 Prickly 62
 Leucelene 62
 ericoides 62

 Leucopoa 211
 kingii 211
 Lewisia 241
 Least 241
 pygmaea 241
 var. *pygmaea* 241
 rediviva 241
 Threeleaf 241
 triphylla 241
 Leymus* 207
 *cinereus** 207
 *salinus** 207
 *simplex** 207
 Ligusticum 26
 Fernleaf 27
 filicinum 27
 var. *tenuifolium** 27
 Porter 27
 porteri 27
 Slender-leafed 27
 tenuifolium 27
 LILIACEAE 170
 Liliopsida 1, 7
 Lily
 Alpine 173
 Chocolate 173
 Cow- 180
 Day- 170
 Funnel- 172
 Leopard 173
 Mariposa 172
 Sego 172
 Water- 180
 Yellow water- 180
 Lily Family 170
 LIMNANTHACEAE 174
 Limosella 275
 aquatica 275
 LINACEAE 175
 Linanthastrum 226
 Nuttall 226
 nuttallii 226
 ssp. *nuttallii* 226
 var. *nuttallii* 226
 Linanthus 226
 *harknessii** 226
 var. *septentrionalis** 226
 Northern 226
 *nuttallii** 226
 septentrionalis 226
 Linaria 275
 dalmatica 275
 vulgaris 275
 Linnaea 103
 borealis 103
 Linum 175
 *aristatum** 175
 kingii 175
 *lewisii** 175
 perenne 175
 var. *lewisii* 175
 puberulum 175
 *rigidum** 175
 subteres 175
 Lionsbeard 1246
 Lipfern 238
 Fee 238

 Lippia* 288
 *cuneifolia** 288
 Listera 188
 borealis 189
 convallarioides 189
 cordata 189
 Heartleaf 189
 Lithophragma 268
 *bulbifera** 268
 glabra 268
 var. *ramulosa* 268
 parviflora 268
 Lithospermum 80
 incisum 80
 *lanceolatum** 80
 ruderales 80
 Little polecat 227
 Lloydia 173
 serotina 173
 LOASACEAE 175
 Loasa Family 175
 Locoweed 141, 151
 Bessey 152
 Lambert 152
 Patterson 147
 Pursh 148
 Silky 152
 Two-grooved 146
 Utah 148
 Woolly 147
 Lolium 212
 *multiflorum** 212
 perenne 212
 Lomatium 27
 Bigseed 28
 dissectum 28
 Fernleaf 28
 foeniculaceum 28
 var. *macdougallii* 28
 grayi 28
 var. *grayi* 28
 juniperinum 28
 *leptocarpum** 28
 macrocarpum 28
 Narrowleaf 28
 *nevadense** 28
 nuttallii 28
 *simplex** 28
 Threadleaf 28
 triternatum 28
 ssp. *platycarpum* 28
 Lomatogonium 292
 rotatum 292
 Lonicera 104
 involutrata 104
 var. *involutrata* 104
 utahensis 104
 Loosestrife Family 176
 LORANTHACEAE* 289
 Lousewort 276
 Bracted 277
 Dwarf 277
 Gray 277
 Leafy 277
 Parry 277
 Lovage 26
 Fernleaf 27
 Porter 27

Slender-leafed 27
Lovegrass 208
Lucerne 151
Lupine 149
Dwarf 150
Pacific 150
Robinson 150
Rusty 150
Sand 150
Shortstem 150
Silky 150
Silver 150
Spurred 150
Tailcup 150
Velvet 150
White-leaved 150
Wyeth 150
Yellow 153
Lupinus 149
aduncus* 150
alpestris* 150
ammophilus* 150
arbusus* 291
argenteus 150
var. argenteus 150
var. boreus* 150
var. parviflorus 150
var. rubricaulis 150
var. tenellus* 150
barbiger* 150
brevicaulis 150
caespitosus* 150
caudatus 150
ssp. caudatus* 150
greenii* 150
laxiflorus* 150, 291
lepidus 150
var. utahensis 150
leucophyllus 150
parviflorus* 150
polyphyllus 150
var. ammophilus 150
var. humicola 150
var. polyphyllus 150
prunophilus* 150
pusillus 150
ssp. rubens* 150
var. intermontanus 150
var. pusillus 150
var. rubens* 150
rubens* 150
sericeus 150
tenellus* 150
wyethii* 150
Luzula 166
campestris 166
intemediata* 166
multiflora* 166
parviflora 166
piperi* 166
spicata 166
wahlenbergii* 166
Lychnis 107
apetala 107
var. montana 107
drummondii 107
kingii* 107
Lycium 284
barbarum 284
halimifolium* 284
Lycopus 168
americanus 168
asper 168
lucidus* 168
Lygodesmia 63
exigua* 63
grandiflora 63
juncea* 63
LYTHRACEAE 176
Machaeranthera 63
bigelovii* 63
canescens 63
var. canescens 63
var. commixta 63
glabriuscula* 73
grindelioides 63
var. grindelioides 63
leucanthemifolia* 63
linearis* 63
rubricaulis* 63
venusta* 73
Madder Family 261
Madia 63
glomerata 63
Madwort 75, 85
Magoliopsida 2
Mahogany 254
Mountain 254
Birchleaf 254
Curlleaf 254
Dwarf 254
Littleleaf 254
True 254
Mahonia 73
fremontii* 74
repens 73
Malacothrix 63
sonchoides 64
torreyi 64
Malcolmia 96
africana 96
Mallow 177
Alkali- 177
Mallow Family 177
Malva 177
neglecta 177
MALVACEAE 177
Malvella 177
leprosa 177
Mammillaria* 100
vivipara* 100
Mannagrass 209
American 209
Fowl 209
Northern 209
Weak 219
Manzanita 138
Greenleaf 138
Maple 18
Bigtooth 18
Rocky Mountain 18
Maple Family 18
Mare's tale 159
Mare's Tale Family 159
Mariposa Lily 172
Gunnison 173
Marrubium 168
vulgare 168
Marshmarigold 247
Marsilea 179
vestita 179
MARSILEACEAE 179
Matricaria* 47
matricarioides* 47
Matrimony vine 284
Mayweed 47
Meadowrue 251
Alpine 251
Fendler 251
Few-flowered 251
Sun-loving 251
Veiny 251
Medic 151
Black 151
Medicago 151
falcata* 151
hispida* 151
lupulina 151
polymorpha* 151
sativa 151
Melica 212
bulbosa 212
spectabilis 212
Melilotus 151
alba 151
officinalis 151
Mentha 169
arvensis 169
var. canadensis 169
penardi* 169
Mentzelia 175
albicaulis 176
Blazingstar 176
Brushy 176
chrysantha* 176
densa* 291
dispersa 176
humilus* 176
integra* 176
laevicaulis 176
Many-stemmed 176
montana 176
multicaulis 176
multiflora* 291
nuda* 176
var. rusbyi* 176
pterosperma 176
pumila 176
var. lagarosa 176
var. pumila 176
rusbyi 176
Small-flowered 176
Thompson 176
thompsonae 176
Whitestem 176
Wingseed 176
MENYANTHACEAE 179
Menyanthes 179
trifoliata 179
Mertensia 80
arizonica 81
var. grahamii* 81
var. leonardii* 81
bakeri* 81
brevistyla 81
ciliata 81
fusiformis 81
lanceolata* 81
oblongifolia 81
viridis 81
var. cana* 81
var. dilatata* 81
Micranthes* 271
arguta* 271
Microseris 64
Nodding 64
nutans 64
Microsteris 227
gracilis 227
var. humilior 227
humilis* 227
micrantha* 227
Pink 227
Milfoil 37
Water 158
Milkvetch 141
Alkali 148
Alpine 145
Browse 146
Canada 146
Chickpea 146
Cicada 146
Cushion 146
Debris 146
Dinosaur 148
Draba 148
Dragon 147
Duchesne 147
Eureka 147
Field 145
Flexile 147
Fort Wingate 148
Geyer 147
Grass 147
Great bladder 147
Green River 147
Hamilton 147
Horseshoe Bend 147
Lesser rushy 146
Looseflower 148
Milkweed 146
Nelson 147
Painted 146
Paterson 147
Pulse 148
Pursh 148
Silky 146
Silver-leafed 146
Standing 145
Subarctic 146
Tufted 148
Two-grooved 146
Utah 148
Weedy 147
Wetherill 148
Woolly 147
Yellow 147
Milkweed 30
Horsetail 31
Pallid 31

Showy 31
 Milkweed Family 30
 Milkwort 229
 Sea 224
 Milkwort Family 229
 Millet 214
 Broom corn 214
 Hog 214
 Mimulus 275
 floribundus 276
 glabratus* 276
 ssp. utahensis* 276
 guttatus 276
 lewisii 276
 moschatus 276
 primuloides 276
 rubellus 276
 suksdorfii 276
 tilingii 276
 Mint 169
 Field 169
 Ultraodor- 169
 Mint Family 166
 Mint geranium 48
 Minuartia* 106
 filiolum* 106
 nuttallii* 106
 obtusiloba* 106
 rossii* 106
 rubella* 106
 Mirabilis 180
 alipes 180
 linearis 180
 multiflora 180
 Mistletoe 290
 Dwarf 289
 Juniper 290
 Mistletoe Family 289
 Mitella 268
 pentandra 269
 stauropetala 269
 stenopetala* 269
 Miterwort 268
 Fivestar 268
 Smallflower 268
 Mockcucumber 119
 Wild 119
 Mockorange 269
 Littleleaf 269
 Moehringia* 106
 lateriflora* 106
 Moldavica* 168
 parviflora* 168
 Molly 116
 Gray 116
 Green 116
 Monarda 169
 fistulosa 169
 var. menthaefolia 169
 menthaefolia* 169
 Monardella 169
 odoratissima 169
 var. glauca 169
 Moneses 245
 uniflora 245
 Monkeyflower 275
 Common 276
 Floriferous 276
 Lewis 276
 Mealy 276
 Musk 276
 Primrose 276
 Subalpine 276
 Suksdorf 276
 Tiling 276
 Yellow 276
 Monkshood 246
 Monolepis 117
 Dwarf 117
 Nuttall 117
 nuttalliana 117
 pusilla 117
 Montia 241
 chamissoi 241
 Moonwort 186
 MORACEAE 179
 Mormon tea 136
 Cutler 137
 Green 137
 Nevada 137
 Torrey 137
 Morning-glory 118
 Orchard 118
 Morning-glory Family 118
 Moschatel 18
 Moschatel Family 18
 Motherwort 168
 Common 168
 Mountain-ash 261
 Mountain-avens 255
 Mountain dandelion 37
 Orange 37
 Pale 37
 Mountain lover 110
 Mountain mahogany 254
 Birchleaf 254
 Curlleaf 254
 Dwarf 254
 Littleleaf 254
 True 254
 Mountain-spray 256
 Mountain sorrel 234
 Mouse-ear 106
 Mousetail 248
 Mud-purslane 136
 Mudwort 275
 Mugwort 41
 Michaux 43
 Western 42
 Muhlenbergia 212
 andina 212
 asperifolia 212
 curtifolia* 213
 filiformis 213
 glomerata 213
 pungens 213
 racemosa 213
 richardsonis 213
 squarrosa* 213
 thurberi 213
 Muhly 212
 Alkali 212
 Creeping 213
 Foxtail 212
 Green 213
 Mat 213
 Pull-up 213
 Sandhill 213
 Thurber 213
 Muhlygrass 212
 Mulberry Family 178
 Mules-ears 73
 Mullein 282
 Common 282
 Woolly 282
 Munroa 213
 squarrosa 213
 Muskroot 18
 Musk thistle 47
 Mustard
 African 96
 Black 88
 Blue 89
 Field 88
 Indian 88
 Jim Hill 98
 Tansy- 90
 Tower 87
 Treacle 92
 Wild 88
 Mustard Family 82
 Muttongrass 216
 Myosotis 81
 micrantha 81
 Myosurus 248
 apetalus 249
 aristatus* 249
 minimus 249
 ssp. montanus* 249
 Myriophyllum 158
 exalbescens* 158
 spicatum 158
 var. exalbescens 158
 var. spicatum 158
 verticillatum* 158
 Naiad 179
 Nailwort 107
 Creeping 108
 Rocky Mountain 108
 NAJADACEAE 179
 Najas 179
 guadalupensis 179
 Nama 160
 densum 160
 var. parviflorum 160
 Nasturtium 96
 obtusum* 97
 var. alpinum* 97
 officinale 96
 palustre* 97
 sinuatum* 97
 Navarretia 227
 Brewer 227
 breweri 227
 Yellow-flowered 227
 Needle-and-thread grass 222
 Needlegrass 222
 Green 222
 Letterman 222
 Nelson 222
 Pine 222
 Subalpine 222
 Nemophila 160
 breviflora 160
 Neolloydia* 101
 texensis* 101
 Nepeta 169
 cataria 169
 Nettle
 Hedge 169
 Stinging 287
 Nettle Family 287
 Nicotiana 284
 attenuata 284
 Nightshade 285
 Bittersweet 285
 Climbing 285
 Cutleaf 285
 Enchanter's 183
 Nightshade Family 284
 Ninebark 257
 Mallow 257
 Nuphar 180
 polysepalum 180
 NYCTAGINACEAE 179
 Nymphaea* 180
 polysepala* 180
 NYMPHAEACEAE 180
 Oak 155
 Gambel 155
 Scrub 155
 Oat 210
 Alpine 210
 Oatgrass 205
 California 206
 Dry-meadow 206
 Onespike 206
 Perennial 210
 Tall 202
 Timber 206
 Oats 202
 Cultivated 203
 Wild 203
 Odostemon* 73
 aquifolium* 73
 Oenothera 185
 acutissima 185
 albicaulis* 186
 andina* 182
 biennis 185
 brachycarpa* 186
 breviflora* 182
 caespitosa 185
 ssp. marginata 185
 ssp. navajoensis 185
 var. caespitosa* 291
 var. montana* 291
 contorta* 182
 var. flexuosa* 182
 coronopifolia 185
 elata 185
 ssp. hirsutissima 185
 flava 186
 heterantha* 182
 hookeri* 185
 var. angustifolia* 185
 howardii 186
 lavandulaefolia* 182
 marginata* 185

minor* 182
 pallida 186
 ssp. trichocalyx 186
 pterosperma* 185
 rydbergii* 185
 scapoidea* 182
 strigosa* 185
 subacaulis* 182
 trichocalyx* 186
 villosa* 185
 Old man's beard 256
 Old man's whiskers 256
 Old witchgrass 214
 OLEACEAE 181
 Oleaster 135
 Oleaster Family 135
 Olive Family 181
 ONAGRACEAE 181
 Onion 171
 Brandegee 172
 Geyer 172
 Nevada 172
 Nodding 172
 Shortstyle 172
 Tapertip 172
 Textile 172
 Oniongrass 212
 Purple 212
 Onobrychis 151
 viciifolia 151
 Onopordum 64
 acanthum 64
 OPHIOGLOSSACEAE 186
 Opulaster* 257
 alternans* 257
 malvaceus* 257
 Opuntia 100
 erinacea 101
 var. utahensis 101
 fragilis 101
 hystricina* 101
 juniperina* 101
 phaeacantha* 101
 polyacantha 101
 var. juniperina 101
 var. polyacantha 101
 var. rufispina* 101
 var. trichophora* 291
 rhodantha* 101
 rutila* 101
 Orache 112
 Garden 113
 Red 114
 Spear 114
 Tumbling 114
 Orchardgrass 205
 Orchid Family 186
 ORCHIDACEAE 186
 Oregon grape 73
 Oreobroma* 241
 pygmaea* 241
 Oreocarya 75
 Oreochrysum* 69
 parryi* 69
 Oreoxis 28
 alpina 28
 OROBANCHACEAE 189
 Orobanche 189
 californica* 189
 var. corymbosa* 189
 corymbosa 189
 fasciculata 190
 ludoviciana 190
 multiflora* 190
 uniflora 190
 var. minuta* 190
 var. occidentalis 190
 Orogenia 28
 linearifolia 28
 Orophaca 146
 Cushion 146
 Orthocarpus 276
 luteus 276
 tolmei 276
 Oryzopsis 213
 asperifolia 213
 exigua 213
 hymenoides 213
 micrantha 213
 Osmorhiza 213
 chilensis 213
 depauperata 213
 divaricata* 213
 obtusa* 213
 occidentalis 213
 Owl-clover 276
 Tolmei 276
 Yellow 276
 Oxybaphus 180
 diffusa* 180
 lanceolatus* 180
 linearis* 180
 Oxyria 234
 digyna 234
 Oxytenia 64
 acerosa 64
 Oxytropis 151
 Jones 152
 Rocky Mountain 152
 Parry 152
 Silky 152
 Stemmed 152
 Oxytropis 151
 albiflorus* 152
 besseyi 152
 var. fallax* 152
 var. obnapiformis 152
 var. ventosa 152
 deflexa 152
 var. deflexa 152
 var. sericea 152
 jonesii 152
 lambertii 152
 var. biglovii 152
 multiceps 152
 obnapiformis* 152
 parryi 152
 sericea 152
 var. sericea 152
 Pachistima 110
 myrsinites 10
 Pachystima* 110
 Paintbrush 273
 Beautiful 274
 Desert 274
 Marsh 274
 Pine 274
 Rough 274
 Scarlet 274
 Splitleaf 274
 Sticky 274
 Sulphur 274
 Wyoming 274
 Yellow 274
 Painted-cup 273
 Splitleaf 274
 Wyoming 274
 Yellow 274
 Panic grass 214
 Panicum 214
 acuminatum 214
 capillare 214
 huachucae* 214
 lanuginosum* 214
 miliaceum 214
 oligosanthes* 214
 scribnerianum* 214
 tennesseense* 214
 Papaver 190
 nudicaule* 190
 var. radicum* 190
 radicum 190
 PAPAVERACEAE 190
 Paperflower 65
 Parietaria 287
 pennsylvanica 287
 Parnassia 269
 fimbriata 269
 palustris 269
 parviflora* 269
 Paronychia 107
 pulvinata 108
 sessiliflora 108
 Parrya 96
 nudicaulis* 96
 platycarpa* 96
 rydbergii 96
 Parsley
 Desert- 27
 Indian 28
 Spring 24
 Parsley Family 21
 Parsley-fern 239
 Parsnip 29
 Cow- 26
 Parthenium 64
 alpinum* 64
 var. ligulatum* 64
 ligulatum 64
 Pascopyrum* 199
 smithii* 199
 Pasque flower 246
 Pastinaca 29
 sativa 29
 Paxistima* 110
 Pea 153
 Golden 153
 Yellow 153
 Pea Family 140
 Pearlwort 108
 Arctic 108
 Pearly-everlasting 38
 Peashrub 148
 Siberian 148
 Peavine 149
 Fewflower 149
 Perennial 149
 Thickleaf 149
 Pedicularis 276
 bracteosa 277
 var. paysoniana 277
 centranthera 277
 grayi* 277
 groenlandica 277
 parryi 277
 paysoniana* 277
 procera 277
 racemosa 277
 var. alba 277
 Pediocactus 101
 simpsonii 101
 Pediomelum 152
 magalantum 152
 Pellaea 239
 atropurpurea* 239
 var. suksdorfiana* 239
 breweri 239
 glabella 239
 suksdorfiana* 239
 Pellitory 287
 Pennycress 99
 Field 99
 Pennyroyal 168
 Drummond 168
 Penstemon 277
 acaulis 280
 var. acaulis 280
 var. yampensis 280
 albifluvis* 282
 angustifolius 280
 var. vernalensis 280
 arenicola* 280
 caespitosus 280
 var. caespitosus 280
 var. perbrevis 280
 carnosus 280
 cleburnei 280
 comarrhenus 280
 comatus* 291
 Cordroot 281
 cyananthus 280
 cyanocaulis* 281
 doliu* 280
 var. duchesnensis* 280
 Duchesne 280
 duchesnensis 280
 Dusty 280
 eatonii 280
 var. eatonii 280
 Firecracker 280
 Fleshy 280
 Flowers 280
 flowersii 280
 Fremont 280
 fremontii 280
 garrettii* 282
 Goodrich 281
 goodrichii 281
 Graham 281
 grahamii 281

- humilus* 281
 var. humilus 281
*jamesii** 291
Leonard 281
leonardii 281
Littleflower 281
Lovely 282
Low 281
Mat 280
Matroot 281
*mensarum** 291
moffatii 281
montanus 281
Narrowleaf 280
*osterhoutii** 281
pachyphyllus 281
 var. mucronatus 281
 var. pachyphyllus 281
Palmer 281
palmeri 281
platyphyllus 281
procerus 281
radicosus 281
Rocky Mountain 282
Rydberg 281
rydbergii 281
*saxosorum** 291
scariosus 281
 var. albifluvis 282
 var. cyanomontanus 282
 var. garrettii 282
Stemless 280
strictus 282
subglaber 282
Thickleaf 281
Uinta 282
uintahensis 282
venustus 828
Wasatch 280
Watson 282
watsonii 282
Whipple 282
whippleanus 282
*yampaensis** 280
Peppergrass 93
Broadleaf 94
Clasping 95
Field 94
Prairie 94
Virginia 95
Pepperweed 93
Pepperwort 179
Pepperwort Family 179
Peraphyllum 256
 ramosissimum 256
Perennial oatgrass 210
Perideridia 29
 gairdneri 29
 ssp. borealis 29
*Perityle** 291
 *stansburyi** 291
*Persicaria** 236
 *maculata** 236
Petradoria 64
 pumila 64
Petrophytum 257
 caespitosum 257
Phacelia 160
 *alba** 291
 *corrugata** 161
 crenulata 161
 var. corrugata 161
 demissa 161
 var. demissa 161
 franklinii 161
 Glandular 161
 glandulosa 161
 hastata 161
 heterophylla 161
 var. heterophylla 161
 *idahoensis** 161
 incana 161
 ivesiana 161
 *leucophylla** 161
 *lutea** 161
 *var. scopulina** 160
 sericea 161
 var. ciliosa 161
 Silky 161
 Varileaf 161
Phalaris 214
 arundinacea 214
Philadelphus 269
 microphyllus 269
 ssp. occidentalis 269
 *occidentalis** 269
Phleum 214
 alpinum 214
 pratense 214
Phlox 227
 Alpine tufted 228
 austromontana 227
 bryoides 228
 *caespitosa** 228
 *canescens** 228
 *densa** 227
 Desert 227
 *diffusa** 227
 *ssp. subcarinata** 227
 Flowery 228
 *grahamii** 228
 Hood 228
 hoodii 228
 longifolia 228
 *ssp. calva** 228
 *ssp. cortenza** 228
 Longleaf 228
 Many-flowered 228
 Moss 228
 multiflora 228
 ssp. depressa 228
 muscoides 228
 Prickly 226
 pulvinata 228
 *speciosa** 228
Phlox Family 223
*Phoradendron** 290
 *juniperinum** 290
Phragmites 214
 australis 214
 *communis** 214
Phyla 288
 cuneifolia 288
Phytolacca 285
 longifolia 285
 var. longifolia 285
 *neomexicana** 291
 *subglabrata** 285
 *virginiana** 285
Physaria 96
 acutifolia 97
 *australis** 97
 *chambersii** 97
 *didymocarpa** 97
 *var. australis** 97
 floribunda 97
 grahamii 97
 repanda 97
 stylosa 97
Physocarpus 257
 alternans 257
 malvaceus 257
 monogynus 257
Picea 191
 engelmannii 191
 pungens 191
Pickleweed 117
 Marshfire 117
Pigmy-weed 119
Pigweed 20, 114, 116
 Prostrate 20
 Redroot 20
 Tumble 20
 Winged 116
PINACEAE 190
Pincushion cactus 100
Pincushion plant 227
Pine 191
 Intermountain bristle
 cone 191
 Limber 191
 Lodgepole 191
 Pinyon 191
 Ponderosa 191
 Rocky Mountain White 191
 Yellow 191
Pineappleweed 47
Pinedrops 245
 Woodland 245
Pine Family 190
Pinegrass 205
Pink 107
 Rush 63
 Wild 108
Pink Family 105
Pinus 191
 *aristata** 191
 contorta 191
 var. latifolia 191
 edulis 191
 flexilis 191
 longaeva 191
 *murrayana** 191
 ponderosa 191
 *scopulorum** 191
 Pinyon 191
*Piperia** 188
 *unalascensis** 188
Pipsissewa 244
 Common 244
Plagiobothrys 81
 *cognatus** 81
 *nelsonii** 81
 *scopulorum** 81
 scouleri 81
 var. penicillatus 81
Plainsmustard 98
 Flaxleafed 98
Plant
 Pincushion 227
 Skeleton 63
PLANTAGINACEAE 192
Plantago 192
 *aristata** 192
 elongata 192
 var. elongata 192
 eriopoda 192
 lanceolata 192
 major 192
 patagonica 192
 var. spinulosa 192
 *purshii** 192
 tweedyi 192
Plantain 192
 Alkali 192
 Broadleaf 192
 Buckhorn 192
 Common 192
 English 192
 Rattlesnake 187
 Redwood 192
 Slender 192
 Tweedy 192
 Woolly 192
Plantain Family 192
*Platanthera** 188
 *dilatata** 188
 *hyperborea** 188
 *obtusata** 188
 *sparsiflora** 188
 *stricta** 188
Platyschkuhria 65
 *oblongifolia** 65
 integrifolia 65
 var. desertorum 65
 *var. oblongifolia** 65
 var. ourolepis 65
*Pleurogyne** 292
 *rotata** 292
Plum 259
 American 260
 Wild 260
Poa 215
 alpina 216
 *ampla** 218
 annua 216
 arctica 216
 *arida** 215
 bulbosa 216
 *canbyi** 218
 compressa 216
 curta 217
 cusickii 216
 epilis 216
 fendleriana 216
 glauca 216
 *glaucofolia** 215
 *gracillima** 218
 *grayana** 216
 *interior** 216
 *juncifolia** 218

- leptocoma 217
 var. reflexa* 217
 lettermanii 217
 longiligula* 216
 nemoralis* 217
 var. interior* 217
 nervosa 217
 nevadensis* 219
 palustris 217
 pattersonii 217
 pratensis 218
 reflexa 217
 rupicola* 217
 sandbergii* 218
 scabrella* 218
 secunda 218
 trivialis* 218
 POACEAE 192
 Pointvetch 151
 Poison
 Hemlock 24
 Ivy 21
 Polanisia 103
 dodecandra 103
 ssp. dodecandra 103
 var. trachysperma 103
 trachysperma* 103
 Polecat 227
 Little 227
 Polemonium 228
 albiflorum* 228
 caeruleum 228
 var. pterosperma 228
 delicatum* 228
 foliosissimum 228
 var. alpinum 228
 var. foliosissimum 228
 Leafy 228
 occidentale* 228
 pulcherrimum 228
 var. delicatum 228
 Showy 228
 Skunk 229
 Skunkleaf 228
 Sticky 229
 viscosum 229
 Western 228
 POLEMONIACEAE 223
 Polygala 229
 verticillata 229
 POLYGALACEAE 229
 POLYGONACEAE 229
 Polygonum 234
 amphibium 235
 arenastrum* 235
 argyrocoleon 235
 aviculare 235
 var. littorale* 235
 bistortoides 235
 var. linearifolium* 235
 buxiforme* 235
 coccineum* 235
 convolvulus 235
 cuspidatum 235
 douglasii 235
 var. douglasii 235
 var. johnstonii 236
 var. latifolium* 236
 erectum* 235
 incanum* 236
 kelloggii 236
 lapathifolium 236
 monspeliensis* 235
 montanum* 236
 natans* 235
 orientale 236
 persicaria 236
 polygaloides* 291
 ramosissimum 236
 sawatchense* 236
 viviparum 236
 watsonii* 236
 POLYPODIACEAE 237
 Polypogon 219
 monspeliensis 219
 Polystichum 219
 lonchitis 219
 Pond-lily 180
 Yellow 180
 Pondweed 241
 Baby 243
 Curly-leaf 242
 Fennel-leaf 243
 Fineleaf 242
 Floatingleaf 242
 Illinois 242
 Leafy 242
 Longleaf 242
 Mountain lake 242
 Northern 242
 Reddish 242
 Richardson 243
 Variableleaf 242
 Whitestem 243
 Pondweed Family 241
 Poolmat 290
 Popcornflower 81
 Scouler 81
 Poplar 262
 Black 263
 Carolina 263
 Gray 263
 Lombardy 263
 White 263
 Poppy 190
 Poppy Family 190
 Populus 262
 acuminata 263
 alba 263
 angustifolia 263
 aurea* 263
 x canadensis 263
 deltoides* 263
 fremontii 263
 var. wislizenii* 263
 nigra 263
 var. italica 263
 sargentii* 263
 tremula* 263
 ssp. tremuloides* 263
 tremuloides 263
 wislizenii* 263
 Popweed 285
 Portulaca 241
 oleracea 241
 PORTULACEAE 240
 Potamogeton 242
 alpinus 242
 americanus* 242
 berchtoldii* 243
 crispus 242
 filiformis 242
 fluitans* 242
 foliosus 242
 gramineus 242
 illinoensis* 242
 natans 242
 nodosus 242
 pectinatus 243
 perfoliatus* 242
 ssp. richardsonii* 243
 praelongus* 243
 pusillus 243
 richardsonii 243
 POTAMOGETONACEAE 241
 Potato
 Indian 28
 Potato Family 284
 Potentilla 257
 anserina 258
 arguta* 258
 biennis 258
 brunnescens* 259
 concinna 258
 var. bicrenata* 258
 var. modesta* 258
 decurrens* 259
 diversifolia 258
 var. diversifolia 258
 var. perdissecta 258
 effusa* 259
 filipes* 259
 fissa* 258
 fruticosa 258
 glandulosa 258
 var. intermedia 258
 var. micropetala* 291
 glaucophylla* 258
 gracilis 258
 var. brunnescens 259
 var. elmeri 259
 var. glabrata 259
 var. pulcherrima 259
 hippiana 259
 hookeriana 259
 leucocarpa* 259
 micropetala* 291
 monspeliensis* 259
 nivea* 259
 norvegica 259
 nuttallii* 259
 ovina 259
 var. decurrens 259
 var. ovina 259
 palustris 259
 paradoxa 259
 pectinisecta* 259
 pennsylvanica 259
 var. pennsylvanica 259
 pentandra* 259
 perdissecta* 258
 plattensis* 259
 pulcherrima* 259
 quinquefolia* 259
 rivalis 259
 var. millegrana 259
 rubricaulis 259
 viridescens* 259
 Povertyweed
 Dwarf 117
 Nuttall 117
 Stinking 62
 Prairie rocket 92
 Prairie smoke 256
 Prairie wedgescale 221
 Prenanthes 65
 exigua 65
 Prickly gilia 226
 Common 226
 Mat 226
 Rock 226
 Prickly phlox 226
 Common 226
 Mat 226
 Rock 226
 Pricklypear 100
 Brittle 101
 Plains 101
 Primrose 244
 American 244
 Pale 244
 Parry 244
 Primrose Family 243
 Primula 244
 incana 244
 parryi 244
 PRIMULACEAE 243
 Prince's feather 236
 Prince's pine 244
 Princesplume 98
 Prunella 169
 vulgaris 169
 Prunus 259
 americana 260
 melanocarpa* 260
 virginiana 260
 var. melanocarpa 260
 Psathyrostachys* 207
 juncea* 207
 Pseudocymopterus*
 hendersonii* 26
 montanus* 27
 X Pseudelymus* 200
 saxicola* 200
 Pseudorogneria* 199
 spicata* 199
 Pseudostellaria* 109
 jamesiana* 109
 Pseudotsuga 191
 menziesii 191
 var. glauca 192
 var. menziesii* 192
 mucronata* 191
 taxifolia* 191
 Psilostrophe 65
 bakeri 65
 Psoralea* 152
 lanceolata* 152
 megalantha* 152
 mephitica* 152
 stenostachys* 152

Psoralidium 152
 lanceolatum 152
 var. lanceolatum 153
 Pteridium 239
 aquilinum 239
 ssp. aquilinum 239
 var. pubescens 239
 Pterospora 245
 andromedeae 245
 Pteryxia* 24
 hendersonii* 26
 terebinthina* 26
 Ptiloria* 70
 exigua* 70
 tenuifolia* 70
 Puccinellia 219
 airoides* 219
 distans 219
 nuttalliana 219
 pauciflora 219
 Puccoon 80
 Trumpet 80
 Pulsatilla* 246
 ludoviciana* 246
 Puncture vine 290
 Purshia 260
 tridentata 260
 Purslane 241
 Sea- 19
 Purslane Family 240
 Pussypaws 240
 Pussytoes 38
 Alpine 39
 Littleleaf 39
 Low 39
 Pearly 39
 Plains 39
 Rose 39
 Rush 39
 Showy 39
 Umbel 39
 Pyrola 245
 asarifolia 245
 chlorantha* 245
 minor 245
 secunda 245
 virens 245
 uliginosa* 245
 uniflora* 245
 PYROLACEAE 244
 Pyrrocoma* 59
 clementis* 59
 crocea* 59
 lanceolata* 59

 Quailplant 79
 Quackgrass 199
 Quaking aspen 263
 Quercus 155
 gambelii 155
 gunnisonii* 155
 novomexicana* 155
 utahensis* 155
 Quillwort 162
 Quillwort Family 162

 Rabbitbrush 48
 Greene 48

 Little 50
 Low 50
 Mountain 50
 Stickyleaf 50
 Parry 49
 Rubber 48
 Green 49
 Mountain 49
 Sanddune 49
 Threadleaf 49
 Uinta 49
 White 49
 Rabbitfoot grass 219
 Ragweed 38
 Bur 38
 RANUNCULACEAE 245
 Ranunculus 249
 acriformis 250
 acris* 291
 adoneus 250
 alpeophilus* 251
 alismaefolius 250
 aquatilis 250
 var. capillaceus 250
 var. longirostris 250
 var. subrigidus 250
 calthaeiflorus* 250
 cardiophyllus 250
 circinnatus* 250
 var. subrigidus* 250
 cymbalaria 250
 var. saximontana* 250
 eschscholtzii 250
 flabellaris 250
 flammula 251
 gelidus 251
 glaberrimus 251
 var. ellipticus 251
 gmelinii* 251
 hyperboreus 251
 var. hyperboreus 251
 var. natans 251
 inamoenus 251
 var. alpeophilus 251
 jovis 251
 longirostris* 250
 macounii 251
 natans* 251
 orthorhynchus 251
 var. platyphyllus 251
 repens 251
 var. pleniflorus 251
 reptans* 251
 var. striguosus* 251
 sceleratus 251
 var. multifidus 251
 testiculatus 251
 trichophyllus* 250
 uncinatus* 291
 var. earle* 291
 Raspberry 260
 Red 260
 Rattlesnake plantain 187
 Redfieldia 219
 flexuosa 219
 Redroot 20
 Redtop 201
 Reed 214
 Common 214
 Reedgrass 204
 Jones 205
 Northern 205
 Purple 205
 Rein orchid 188
 Alaska 188
 Satyr 188
 Resinweed 58
 RHAMNACEAE 252
 Rhamnus 252
 smithii 252
 Rhus 21
 radicans* 21
 var. rydbergii* 21
 trilobata 21
 var. trilobata 21
 Ribes 269
 aureum 270
 cereum 270
 hudsonianum 270
 inebrians* 270
 inerme 270
 lacustre 270
 leptanthum* 291
 mogollonicum* 270
 montigenum 270
 oxyacanthoides* 270
 petiolare* 270
 setosum 270
 viscosissimum 270
 wolfii 270
 Ricegrass 213
 Indian 213
 Little 213
 Littleseed 213
 Roughleaf 213
 Rillscale 113
 Ringweed 116
 Tumble 116
 Rockbrake 239
 American 239
 Rockcress 85
 Beauty 87
 Drummond 87
 Fendler 87
 Hairy 87
 Holboell 87
 Lemmon 87
 Littleleaf 87
 Lyall 87
 Nuttall 87
 Sicklepod 88
 Spreading 87
 Woody 87
 Rock goldenrod 64
 Rock-jasmine 243
 Pygmyflower 243
 Slender 243
 Western 243
 Rockmat 257
 Rocky Mountain 257
 Tufted 257
 Rock spiraea 257
 Rorippa 97
 alpina* 97
 curvipes 97
 var. alpina 97
 var. curvipes 97
 var. integra 97
 hispidula* 97
 islandica 97
 var. glabra 97
 var. hispidula 97
 nasturtium-aquaticum* 96
 obtusula* 97
 var. alpina* 97
 palustre* 97
 sinuata 97
 sphaerocarpa* 97
 tenerrima 97
 teres* 291
 Rosa 260
 acicularis* 260
 chrysocarpa* 260
 manca* 260
 melina* 260
 nutkana 260
 puberulenta* 260
 ultramontana* 260
 woodsii 260
 ROSACEAE 252
 Rose 260
 Bristly Nutka 260
 Woods 260
 Rose Family 252
 Rotala* 177
 ramosior* 177
 RUBIACEAE 261
 Rubus 260
 idaeus 260
 ssp. idaeus 260
 ssp. melanolasius* 260
 ssp. sachalinensis 260
 melanolasius* 260
 parviflorus 260
 strigosus* 260
 Rudbeckia 65
 hirta* 291
 laciniata 65
 var. ampla 65
 occidentalis 65
 Rumex 236
 acetosella 237
 crispus 237
 fueginus* 237
 hymenosepalus 236
 maritimus 237
 var. fueginus 237
 mexicanus* 237
 obtusifolius 237
 occidentalis 237
 patientia 237
 paucifolius 237
 persicarioides* 237
 salicifolius 237
 ssp. triangulivalis 237
 var. mexicanus* 237
 var. montigenitus* 237
 stenophyllus 237
 triangulivalvis* 237
 utahensis* 237
 venosus 237
 Ruppia 262
 maritima 262
 RUPPIACEAE 262

Rush 163
 Alpine 165
 Baltic 165
 Colorado 165
 Drummond 165
 Hall 165
 Jointed 165
 Longstyle 165
 Mertens 165
 Minute 165
 Nevada 165
 Parry 165
 Poverty 166
 Regel 165
 Scouring 137
 Swordleaf 165
 Thread 165
 Three flowered 166
 Toad 165
 Torrey 166
 Rush Family 163
 Rush pink 63
 Russian olive 136
 Russian thistle 117
 Rye
 Wild- 206
 Winter 206
 Ryegrass 212

 Sacaton 221
 Alkali 221
 Sage
 Bud- 43
 Chicken 70
 Hop 116
 Red 116
 Prairie 42
 White 114
 Winter 114
 Sagebrush 41
 Alkali 42
 Alpine 43
 Big 43
 Basin 44
 Mountain 44
 Vasey 44
 Wyoming 45
 Bigelow 42
 Black 43
 Bud 43
 Carruth 42
 Early 42
 Fringed 42
 Low 292
 Pygmy 43
 Rocky Mountain 43
 Silver 42
 Snowfield 43
 Spike 43
 Vasey 44
 Sagina 108
 saginoides 108
 Sagittaria 20
 cuneata 20
 Sainfoin 151
 Common 151
 SALICACEAE 262
 Salicornia 117

europaea 117
 ssp. rubra* 117
 rubra* 117
 Salix 263
 amygdaloides 266
 anglorum* 266
 var. antiplasta* 266
 arctica 266
 var. petraea 266
 babylonica 266
 bebbiana 266
 x blanda 266
 boothii 266
 brachycarpa 266
 cascadensis 266
 caudata* 266
 drummondiana 266
 exigua 266
 var. exigua 266
 var. stenophylla 266
 flavescens* 267
 fragilis 266
 geyeriana 266
 glauca 266
 interior* 266
 lasiandra 266
 var. caudata 266
 ligulifolia* 267
 lutea 266
 var. ligulifolia* 267
 var. lutea 266
 melanopsis* 266
 monticola 267
 myrtilifolia* 266
 nivalis* 267
 var. saximontana* 267
 petrophila* 266
 phylicifolia* 267
 var. monica* 267
 spp. planifolia* 267
 planifolia 267
 pseudocordata* 266
 pseudolapponeum* 266
 pseudomonticola* 267
 pseudomyrsinites 266
 reticulata 267
 rigida* 266
 var. watsonii* 266
 saximontana* 267
 scouleriana 267
 subcoerulea* 266
 wolfii 267
 Salsify 72
 Vegetable-oyster 73
 Yellow 73
 Salsola 117
 iberica 117
 kali* 117
 pestifer* 117
 Saltbush 112
 Castle Valley 113
 Fourwing 113
 Gardner 113
 Mat 113
 Three-toothed 113
 Salt globepea 153
 Saltgrass 206
 Inland 206

Saltwort 117,244
 Sambucus 104
 caerulea 104
 cerulea* 104
 coerulea* 104
 melanocarpa* 104
 microbothrys* 104
 pubens* 104
 racemosa 104
 ssp. pubens 104
 var. melanocarpa* 104
 var. microbothrys 104
 Samphire 117
 Sandalwood Family 267
 Sandbur 205
 Longspine 205
 Sandgrass 219
 Sandspurry 108
 Red 109
 Saltmarsh 109
 Sandverbena 180
 Sandwort 105
 Arctic 105
 Ballhead 105
 Bluntleaf 105
 Boreal 105
 Fendler 105
 Hooker 105
 Nuttall 105
 Reddish 105
 Sanguisorba 260
 minor 260
 SANTALACEAE 267
 Saponaria 108
 officinalis 108
 vaccaria* 109
 Sarcobatus 117
 vermiculatus 117
 Saxifraga 271
 adscendens* 271
 arguta* 271
 caespitosa 271
 cernua 271
 chrysantha 271
 debilis 271
 flagellaris 271
 hirculus 271
 odontoloma 271
 rhomboidea 271
 SAXIFRAGACEAE 267
 Saxifrage 271
 Brook 271
 Diamondleaf 271
 Goldbloom 271
 Stoloniferous 271
 Yellow marsh 271
 Saxifrage Family 267
 Schedonnardus 219
 paniculatus 219
 Schizachne 220
 purpurascens 220
 Schoenocrambe 98
 argillacea 98
 linifolia 98
 Scirpus 134
 acutus 135
 americanus* 135
 atrovirens* 135

caespitosus 135
 fluviatilis 135
 lacustris* 135
 ssp. validus* 135
 maritimus 135
 microcarpus 135
 nevadensis* 135
 occidentalis* 135
 olney* 135
 pallidus 135
 paludosus* 135
 pungens 135
 rubrotinctus* 135
 robustus* 135
 supinus 135
 validus 135
 Sclerocactus 101
 glaucus* 101
 parviflorus* 102
 whipplei 101
 var. glaucus 101
 var. roseus 102
 Scorpionweed 160
 Scouring rush 137
 Common 137
 Variegated 137
 Scrambled eggs 155
 Scratchgrass 212
 Scrophularia 282
 lanceolata 282
 SCROPHULARIACEAE 272
 Scurfpea 152
 Dune 152
 Lemmon 152
 Scutellaria 169
 galericulata 169
 Sea milkwort 244
 Common 244
 Seapurslane 19
 Secale 220
 cereale 220
 Sedge 121
 Analogne 132
 Alpinenerved 131
 Awned 129
 Back 292
 Beaked 132
 Beautiful 129
 Black 129
 Black alpine 131
 Black-and-white-scaled 129
 Blackroot 130
 Blackscales 129
 Blister 132
 Bottlebrush 130
 Bristlestalked 130
 Brownish 129
 Buxbaum 129
 Canada single-spike 132
 Capitate 129
 Cliff 132
 Cloud 130
 Curly 132
 Douglas 129
 Dry 132
 Dryland 132
 Dunhead 131
 Ebony 130

Egglestone 130
 Elk 130
 Few-flowered 131
 Golden 129
 Green 131
 Hairlike 129
 Hood 130
 Inland 130
 Inflated 132
 Kobresialike 130
 Lesser paniced 129
 Liddon 131
 Manyrib 131
 Meadow 132
 Mud 130
 Narrowleaf 131
 Nebraska 131
 Needleleaf 132
 Obtuse 131
 Pale 129
 Porcupine 130
 Pyrenean 132
 Reynolds 132
 Rock 132
 Rocky Mountain 132
 Ross 132
 Russet 132
 Scandinavian 131
 Shasta 132
 Sheep 130
 Short-beaked 132
 Shortleafed 131
 Showy 129
 Sierrahare 130
 Silver 131
 Silvertop 132
 Silvery 129
 Slender 130
 Slenderbeak 129
 Small-headed 130
 Smallwing 130
 Softleaf 129
 Spikenard 131
 Threadleaf 130
 Two-parted 129
 Valley 132
 Water 129
 Western 131
 Woolfruit 130
 Woolly 130
 Sedge Family 121
 Sedum 119
 debile 119
 lanceolatum 119
 rhodanthum 119
 stenopetalum* 119
 Seepweed 117
 Bush 118
 Slender 118
 Western 118
 Sego lily 172, 173
 Gunnison 173
 Selaginella 283
 densa 283
 mutica 284
 watsonii 284
 SELAGINELJACEAE 283
 Selaginella Family 283
 Self-heal 169
 Common 169
 Selloa* 69
 glutinosa* 69
 Senecio 65
 admirabilis* 67
 ambrosioides* 67
 atratus 67
 canus 67
 crassulus 67
 crocatulus 67
 cymbalarioides* 67, 68
 dimorphophyllus 67
 var. dimorphophyllus 67
 douglasii 67
 eremophilus 67
 var. kingii 67
 fendleri* 67
 fremontii 67
 harbourii* 67
 hookeri* 67
 hydrophyllus 67
 integerrimus 67
 var. exaltatus 67
 millelobatus* 67
 multicapitatus* 67
 multilobatus 67
 pauperculus 67
 pudicus 67
 purshianus* 67
 pseudoreus* 67
 rubricaulis* 67
 serra 67
 spartioides 67
 sphaerocephalus 67
 streptanthifolius 67
 triangularis 68
 uintahensis* 67
 vulgaris 68
 werneriaefolius 68
 Serviceberry 254
 Saskatoon 254
 Utah 254
 Sesuvium 19
 verrucosum 19
 Setaria 220
 glaucula 220
 verticillata 220
 viridis 220
 Shadscale 113
 Shepherdia 136
 argentea 136
 canadensis 136
 Shepherds-purse 89
 Shinleaf 245
 Shootingstar 243
 Alpine 244
 Beautiful 244
 Showy elkweed 156
 Sibbaldia 261
 procumbens 261
 Sida* 177
 hederacea* 177
 Sidalcea 178
 candida 178
 neomexicana 178
 oregana 178
 Sieversia* 256
 ciliata* 256
 turbinata* 256
 Silene 108
 acaulis 108
 antirrhina 108
 drummondii* 107
 Menzies 108
 menziesii 108
 Moss 108
 Sleepy 108
 Silverberry 135, 136
 Silverbush 136
 Silverscale 133
 Sinapsis* 88
 arvensis* 88
 Sisymbrium 98
 altissimum 98
 elegans* 98
 linifolia* 98
 loeselii* 98
 Sisyrinchium 162
 angustifolium* 162
 demissum 162
 halophilum* 162
 idahoense 162
 montanum* 162
 occidentale* 162
 radicatum* 162
 Sitanion 220
 hystrix 220
 jubatum* 220
 longifolium* 220
 Sium* 29
 suave* 29
 Skeleton leaf bursage 38
 Skeleton plant 63
 Skullcap 169
 Skunkbush 21
 Skunk cabbage 174
 Skunkweed 228
 Sky-pilot 229
 Sticky 229
 Skyrocket 87
 Slipper 187
 Fairy 187
 Lady's 187
 Venus 187
 Sloughgrass 203
 American 203
 Smallflower rocket 92
 Smartweed 234
 Pale 236
 Smelowskia 98
 Alpine 98
 calycina 98
 var. americana 98
 lineariloba* 98
 Siberian 98
 Smilacina 173
 amplexicaulis* 174
 racemosa 174
 stellata 174
 Smoke
 Golden 155
 Ground- 184
 Prairie 256
 Smotherweed 114
 Snakeweed 58
 Broom 58
 Sneezeweed 59
 Common 59
 Orange 59
 Snowberry 104
 Longflower 104
 Mountain 104
 Western 104
 Soapwort 108
 SOLANACEAE 284
 Solanum 285
 dulcamara 285
 rostratum 285
 nigrum* 285
 sarrachoides 285
 triflorum 285
 Solidago 68
 altissima* 68
 canadensis 68
 var. salebrosa 68
 ciliosa* 68
 elongata* 68
 decumbens* 69
 gigantea* 291
 var. serotina* 291
 lepidula* 68
 missouriensis 68
 multiradiata 69
 var. scopulorum 69
 nana 69
 occidentalis 69
 parryi 69
 petradoria* 64
 sparsiflora 69
 spatulata 69
 var. nana 69
 var. neomexicana 69
 trinervata* 69
 Solomon-plume 173
 Starry 174
 Western 174
 Sonchus 69
 arvensis 69
 ssp. uliginosus* 69
 var. glabrescens* 69
 asper 69
 oleraceus 69
 uliginosus 69
 Sophora 153
 Fringeleaf 153
 Silvery 153
 stenophylla 153
 Sorbus 261
 scopolina 261
 Sorghum 221
 bicolor 221
 vulgare* 221
 Sorrel 236
 Alpine 237
 Mountain 234, 237
 Sheep 237
 Sowthistle 69
 Common 69
 Field 69
 Prickly 69
 SPARGANIACEAE 285
 Sparganium 285
 angustifolium 286

emersum 286
 var. multipedunculatum 286
 eurycarpum* 285
 minimum 286
 multipedunculatum* 286
 Spartina 221
 gracilis 221
 pectinata 221
 Spearscale 114
 Speedwell 283
 Alpine 283
 American 283
 Purslane 283
 Thyme-leaf 283
 Two-lobed 283
 Water 283
 Wormskjold 283
 Spergularia 108
 marina 109
 rubra 109
 Sphaeralcea 178
 coccinea 178
 ssp. dissecta 178
 ssp. elata* 178
 fendleri* 178
 grossulariifolia 178
 munroana 178
 parvifolia 178
 rivularis* 117
 Sphaeromeria 69
 argentea 70
 capitatum 70
 Sphaerophysa 153
 salsula 153
 Sphaerostigma* 182
 contortum* 182
 var. flexuosum* 182
 Sphenopholis 221
 obtusata 221
 Spiderflower 103
 Bee 103
 Yellow 103
 Spike fescue 211
 Spikemoss 283
 Spikerush 132
 Beaked 132
 Common 132
 Dwarf 132
 Fewflowered 132
 Needle 132
 Spiraea* 257
 caespitosa* 257
 Spiranthus 189
 diluvialis* 189
 porrifolia 189
 romanzoffiana 189
 var. porrifolia* 189
 Spleenwort 238
 Green 238
 Sporobolus 221
 airoides 221
 asper 221
 contractus 221
 cryptandrus 221
 Spraguea* 240
 umbellata* 240
 Sprangletop 211
 Bearded 211
 Springbeauty 240
 Alpine 240
 Lanceleaf 240
 Water 240
 Western 240
 Springparsley 24
 Longfoot 26
 Onion 25
 Plains 25
 Purple 26
 Uinta Basin 26
 Utah 26
 Spruce 191
 Blue 191
 Colorado blue 191
 Engelmann 191
 Spurge 139
 Leafy 139
 Ridgeseed 139
 Rocky Mountain 139
 Thymeleaf 139
 Spurge Family 139
 Squawapple 256
 Squawbush 21
 Squirreltail 220
 Stachys 169
 palustris 169
 var. pilosa 170
 scopulorum* 169
 Stafftree Family 110
 Stanleya 98
 arcuata* 98
 Bushy 98
 integrifolia 98
 Perennial 98
 pinnata 98
 var. integrifolia* 98
 var. pinnata 98
 viridiflora 98
 Stanleyella* 99
 wrightii* 99
 Starwort 109
 Longstalk 109
 Northern 109
 Sticky 109
 Umbellate 109
 Steer's head 155
 Stellaria 109
 borealis* 109
 calycantha 109
 var. bongardiana 109
 var. sitchana 109
 crispa* 109
 jamesiana 109
 longifolia* 109
 longipes 109
 var. altocaulis* 109
 var. longipes 109
 var. monantha 109
 umbellata 109
 Stemless loco 151
 Stenogonum* 233
 salsuginosum* 233
 Stenotus* 58
 acaulis* 58
 armerioides* 58
 Stephanomeria 70
 exigua 70
 runcinata 70
 tenuifolia 70
 var. tenuifolia 70
 var. uintaensis 70
 Stickleaf 175
 Stickseed
 Common 79
 Desert 80
 European 80
 Jessica 79
 Western 79
 Stink grass 208
 Stinkweed 99
 Stipa 222
 arida* 291
 columbiana* 222
 comata 222
 var. comata 222
 var. intermedia 222
 lemmonii* 222
 lettermanii 222
 nelsonii 222
 ssp. dorei 222
 ssp. nelsonii 222
 pinetorum 222
 scribneri* 291
 viridula 222
 williamsii* 222
 x Stiporyzopsis 213
 bloomeri 213
 St. Johnswort 161
 Bog 161
 Western 161
 St. Johnswort Family 161
 Stonecrop 119
 Lanceleaf 119
 Redpod 119
 Weakstem 119
 Stonecrop Family 119
 Stoneseed 80
 Fringed 80
 Yellow 80
 Storksbill 158
 Strawberry 255
 Broadpetal 255
 Starvling 255
 Streptanthella 98
 Beaked 98
 longirostris 98
 Streptanthus 99
 cordatus 99
 Heartleaved 91
 Streptopus 174
 amplexifolius 174
 Suaeda 117
 calceoliformis 118
 depressa* 118
 diffusa* 118
 fruticosa* 118
 intermedia* 118
 maritima* 118
 nigra* 118
 occidentalis 118
 torreyana 118
 Sugarbowl 248
 Sullivantia 271
 purpusi 271
 Sumac 21
 Sumac Family 21
 Summer cypress 116
 Belvedere 116
 Sumpweed 62
 Poverty 62
 Rag 62
 Sunflower 60
 Common 60
 Nuttall 60
 Wild 60
 Sunflower Family 31
 Swainsonia* 153
 salsula* 153
 Swainsonpea 153
 Sweetanise 29
 Sweet cicely 29
 Western 29
 Sweetclover 151
 White 151
 Yellow 151
 Sweetgrass 210
 Sweetpea 149
 Sweettooth 149
 Sweetroot 29
 Bluntseed 29
 Spreading 29
 Sweetvetch 148
 Northern 148
 Western 148
 Sweet William 107, 227
 Wild 228
 Sweet William moss 227
 Swertia 157
 Alpine bog 157
 palustris* 157
 perennis 157
 radiata* 156
 Star 157
 Symphoricarpos 104
 albus* 104
 longiflorus 104
 occidentalis 104
 oreophilus 104
 var. utahensis 104
 rotundifolius* 104
 tetonensis* 104
 utahensis* 104
 vaccinoides* 104
 Synthyris 282
 pinnatifida 282
 var. pinnatifida 282
 TAMARICACEAE 286
 Tamarisk 286
 Tamarisk Family 286
 Tamarix 286
 gallica* 286
 pentandra* 286
 ramosissima 286
 Tanacetum 70
 capitatum* 70
 nuttallii* 70
 vulgare 70
 Tansy 70
 Tansyaster 63
 Discoid 63
 Tansymustard 90
 Blue 90

- California 90
Western 90
Taraxacum 70
ceratophorum 71
erythospermum* 71
laevigatum* 71
lyratum 71
officinale 71
Tarragon 42
Tarweed 63
Cluster 63
Teasel 135
Venus-cup 135
Teasel Family 135
Tea vine 71
Tetradymia 71
canescens 71
glabrata 71
nuttallii 71
spinosa 71
Tetraneuris* 61
acaulis* 61
grandiflora* 62
torreyana* 62
Thalesia* 190
fasciculata* 190
Thalictrum 251
alpinum 251
fendleri 251
heliophilum 251
sparsiflorum 251
venulosum* 251
Thesperma 71
subnudum 71
Thelypodopsis 99
argillaceae* 98
elegans 99
wyomingensis* 99
Thelypodium 99
integrifolium 99
var. gracilipes 99
var. integrifolium 99
laxiflorum 99
lilacinum* 99
paniculatum* 99
rhomboideum* 99
var. gracilipes* 99
sagittatum 99
suffutescens* 92
wrightii* 99
Thelypody 99
Thermopsis 153
divaricarpa* 153
Mountain 153
montana 153
ssp. ovata* 153
var. montana 153
var. ovata* 153
ovata* 153
pinetorum* 153
rhombifolia 153
var. divaricarpa* 153
var. montana* 153
var. ovata* 153
Thimbleberry 260
Western 260
Thinopyrum* 199
intermedium* 199
ponticum* 199
Thistle
Barneby 51
Bull 52
Canada 51
Cotton 64
Eaton 51
Elk 51
Fish Lake 51
Gray 52
Kansas 285
Meadow 51
Musk 47
Russian 117
Scotch 64
Texas 285
Thistle Family 31
Thlaspi 99
alpestre* 99
arvensis 99
fendleri* 99
glaucum* 99
montanum 9
Thornapple 284
Three-awn 202
Purple 202
Threesquare 135
Common 135
Ticklegrass 201
Tickseed 116
Tickweed 79
Jessie 79
Western 79
White 79
Tillaea 119
aquatica 119
Timber poisonvetch 146
Timothy 214
Alpine 214
Tioullia 82
nuttallii 82
Tithymalus* 139
robustus* 139
Toadflax
Bastard 267
Dalmation 275
Tobacco 284
Coyote 284
Wild 284
Toothcup 177
Toothwort 89
Torreyochloa* 219
pauciflora* 219
Townsendia 71
hookeri 72
incana 72
leptotes 72
mensana 72
minima* 72
montana 72
var. caelelilimensis 72
var. montana 72
strigosa 72
Toxicodendron 21
radicans* 21
var. rydbergii* 21
rydbergii 21
Tragopogon 72
dubius 73
porrifolius* 73
Tribulus 290
terrestris 290
Tridens* 208
Hairy 208
pilosus* 208
Trifolium 153
andinum 154
dasphyllum 154
var. unitense 154
fragiferum 154
gymnocarpon 154
hybridum 154
longipes 154
var. reflexum 154
nanum 154
parryi 154
var. montanense 154
pratense 154
procumbens* 291
repens 154
rydbergii* 154
Triglochin 166
concinna 166
maritima 166
palustris 166
Triodia* 208
pilosa* 208
Tripterocalyx 180
micranthus 180
pedunculatus* 180
Trisetum 223
montanum* 223
spicatum 223
Spike 223
wolfii 223
Triteleia 174
grandiflora 174
var. grandiflora 174
Triticum 223
aestivum 223
Trollius 252
albiflorus* 252
laxus 252
Tule bulrush 135
Tumblegrass 219
Tumblemustard 98
Loesel 98
Tumbleweed 117
Turkey-foot 202
Twayblade 188
Broadleaved 189
Heartleaf 189
Northern 189
Twinberry 104
Black 104
Twinflower 103
Longtube 103
Twinpod 96
Common 97
Twisted stalk 174
Typha 286
angustifolia* 28
domingensis* 286
latifolia 286
TYPHACEAE 286
ULMACEAE 286
Ulmus 287
pumila 287
Ultraodormint 169
UMBELLIFERAE* 21
Umbrella plant 232
Umbrellawort 180
Narrowleaf 180
Urtica 287
brewerii* 287
dioica 287
ssp. gracilis 287
ssp. holosericea* 287
var. holosericea* 287
var. lyallii* 287
var. occidentalis 287
var. procera 287
gracilis* 287
holosericea* 287
lyallii* 287
strigosissima* 287
URTICACEAE 287
Utricularia 170
minor 170
vulgaris 170
Utahia* 101
sileri* 101
Vaccaria 109
pyramidata 109
segetalis* 109
Vaccinium 138
caespitosum 138
globulare 138
membranaceum* 138
myrtilus 138
occidentale 138
scoparium 138
Valerian 288
Edible 288
Sharpleaf 288
Western 288
Valeriana 288
acutiloba 288
var. pubicarpa 288
capitata* 288
ssp. acutiloba* 288
edulis 288
furfurascens* 288
occidentalis 288
VALERIANACEAE 288
Valerian Family 288
Vanilla grass 210
Venus slipper 187
Veratrum 174
californicum 174
Verbascum 282
thapsus 282
Verbena 288
bracteata 288
bracteosa* 288
VERBENACEAE 288
Verbesina* 73
encelioides* 73
Veronica 283
americana 283
anagallis-aquatica 283
biloba 283

- catenata* 291
 humifusa* 283
 peregrina 283
 var. xalapensis 283
 serpyllifolia 283
 var. humifusa 283
 wormskjoldii 283
 Vervain 288
 Vervain Family 288
 Vetch 141, 154
 American 154
 Crown 292
 Poison- 146
 Timber 146
 Vicia 154
 americana 154
 var. americana 154
 var. minor 154
 linearis* 154
 oregana* 154
 trifida* 154
 truncata* 154
 Viguiera* 60
 multiflora* 60
 Viola 288
 adunca 288
 canadensis 289
 macloskeyi* 289
 var. pallens* 289
 nephrophylla 289
 nuttallii 289
 pallens* 289
 palustris 289
 var. brevipes 289
 praemorsa* 289
 purpurea 289
 rugulosa* 289
 utahensis* 289
 vallicola* 289
 venosa* 289
 VIOLACEAE 288
 Violet 288
 Blue 289
 Bog 289
 Canada white 289
 Goosefoot 289
 Marsh 289
 Pine 289
 Yellow prairie 289
 Violet Family 288
 Virgin-bower 247
 Western 248
 VISCACEAE 289
 VITACEAE 4
 Vulpia* 209
 octoflora* 209

 Wallflower 92
 Rough 92
 Small 92
 Wormseed 92
 Wapato 20
 Water-buttercup 249
 Hairleaf 250
 Yellow 250
 Water-clover 179
 Watercress 96
 Water hemlock 24

 Water-horehound 168
 Waterleaf 160
 Ballhead 160
 Waterleaf Family 159
 Water-lily 180
 Yellow 180
 Water-lily Family 180
 Water milfoil 158
 Water milfoil Family 158
 Waternymph Family 179
 Waterparsnip
 Cutleaf 23
 Hemlock 29
 Water-plantain 19
 Common 20
 Narrowleaf 19
 Water-plantain Family 19
 Waterstarwort 102
 Waterstarwort Family 102
 Waterweed 159
 Canadian 159
 Long-sheath 159
 Waterwort 136
 Three stamen 136
 Waterwort Family 136
 Wedgegrass 221
 Prairie 221
 Wedgeonweed 262
 Wedgescale 114, 221
 Wheat 223
 Common 223
 Indian- 192
 Wheatgrass 198
 Annual 208
 Bluebunch 199
 Bluestem 199
 Crested 199
 Intermediate 199
 Pubescent 199
 Scribner 199
 Slender 199
 Spreading 199
 Squirreltail 200
 Tall 199
 Thickspike 199
 Western 199
 White sage 114
 Whitetop 89
 Giant 94
 Globe-podded 89
 Heart-podded 89
 Whitlow-grass 90
 Alaska 92
 Carolina 92
 Whitlow-wort 107
 Whortleberry 138
 Grouse 139
 Wild begonia 237
 Wild bergamot 169
 Wild buckwheat 229
 Big 232
 Shockley 233
 Shortstem 231
 Wild cabbage 89
 Thickstemmed 89
 Wild candytuft 99
 Wild crocus 246
 Wild forget-me-not 79

 Wild fushia 183
 Wild geranium 158
 Wild hollyhock 177
 Wild hyacinth 174
 Wild licorice 148
 American 148
 Wild-lilac 252
 Wild mockcucumber 119
 Wild pink 108
 Wildrye 206
 Blue 207
 Canada 207
 Great Basin 207
 Low creeping 207
 Macoun 198
 Russian 207
 Salina 207
 Willow 263
 Arctic 266
 Barrenground 266
 Bebb 266
 Booth 266
 Cascade 266
 Caudate 266
 Coyote 266
 Crack 266
 Drummond 266
 Dusky 266
 Geyer 266
 Glaucous 266
 Grayleaf 266
 Narrow-leaf 266
 Niobe 266
 Peach-leaf 266
 Plain-leaf 266
 Scouler 266
 Short-fruited 266
 Weeping 266
 Whiplash 266
 Wisconsin weeping 266
 Wolf 266
 Yellow 266
 Willow Family 262
 Willow-weed 183, 236
 Alpine 183
 Autumn 183
 Common 184
 Swamp 184
 Windflower 246
 Winged pigweed 116
 Wintercress 88
 American 88
 Erectpod 88
 Winterfat 114
 Wintergreen 245
 Alpine 138
 Green 245
 Lesser 245
 Liver-leaf 245
 One-sided 245
 Wintergreen Family 244
 Winter rye 220
 Winter sage 114
 Wiregrass 163, 165
 Wirelettuce 70
 Slender 70
 Witchgrass 214
 Old 214

 Witlow-grass 90
 Alaska 92
 Carolina 92
 Whitlow-wort 107
 Woad 93
 Dyers 93
 Wolfberry 284
 Woodlandstar 268
 Fringecup 268
 Smallflower 268
 Woodlove 160
 Woodnymph 245
 Woodrush 166
 Hairy 166
 Millet 166
 Spike 166
 Woodsia 239
 oregana 240
 Oregon 240
 Rocky Mountain 240
 scopolina 240
 Wormwood 41
 Biennial 42
 Boreal 43
 Wortelberry 138
 Grouse 139
 Woundwort 169
 Wyethia 73
 amplexicaulis 73
 arizonica* 73
 Badlands 73
 Mules-ears 73
 scabra 73

 Xanthium 73
 italicum* 73
 saccharatum* 73
 strumarium 73
 Xanthocephalum* 58
 sarothrae* 58
 var. pomariense* 58
 Xylorhiza 73
 glabriuscula 73
 venusta 73

 Yampa 29
 Yarrow 37
 False 47
 Yellowcress 97
 Hispid 97
 Marsh 97
 Spreading 97
 Yellowbell 173
 Yellow lupine 153
 Yellow pea 153
 Yucca 18
 gilbertiana* 18
 Harriman 18
 harrimaniae 18
 var. harrimaniae 19
 var. neomexicana 19

 Zannichellia 290
 palustris 290
 ZANNICHELIIACEAE 290
 Zauschneria* 183
 garrettii* 183
 latifolia* 183

var. garrettii* 183
 Zigadenus 174
 elegans 174
 paniculatus 174
 venosus 174
 Zizia 29
 aptera 29
 Zuckia 118
 arizonica* 118
 brandegei 118
 var. arizonica 118
 var. brandegei 118
 ZYGOPHYLLACEAE 290

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