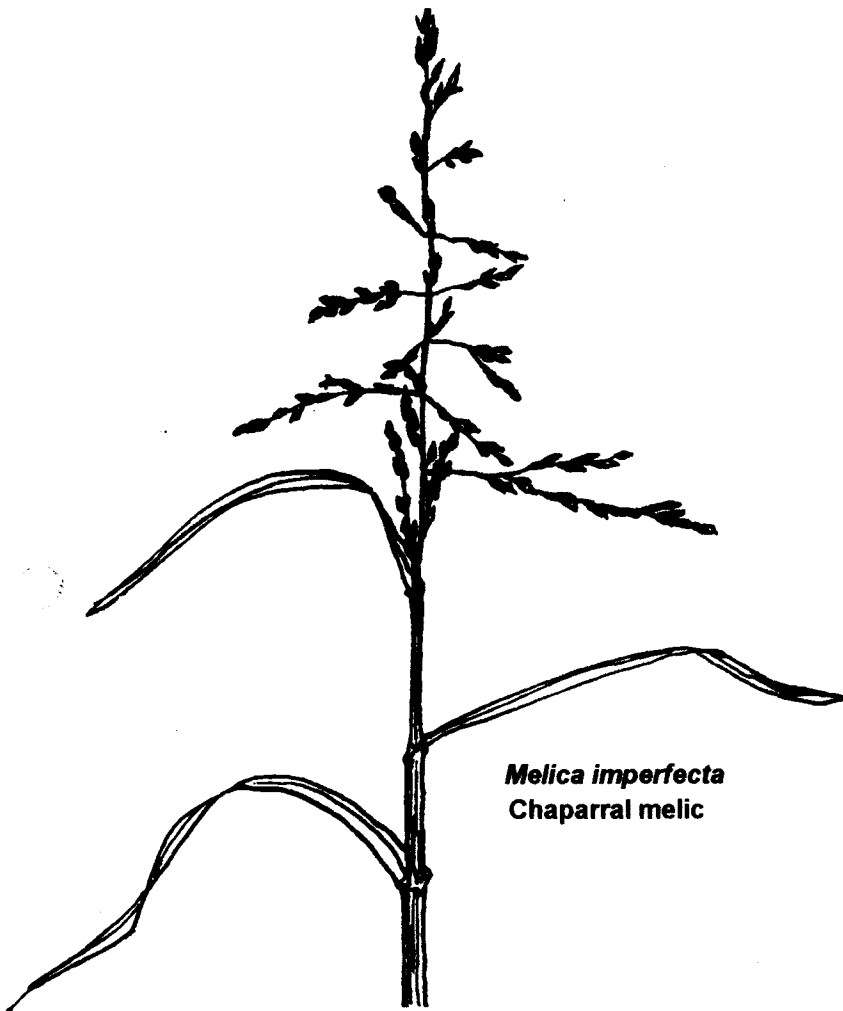


GRASSES IN SOUTHERN CALIFORNIA

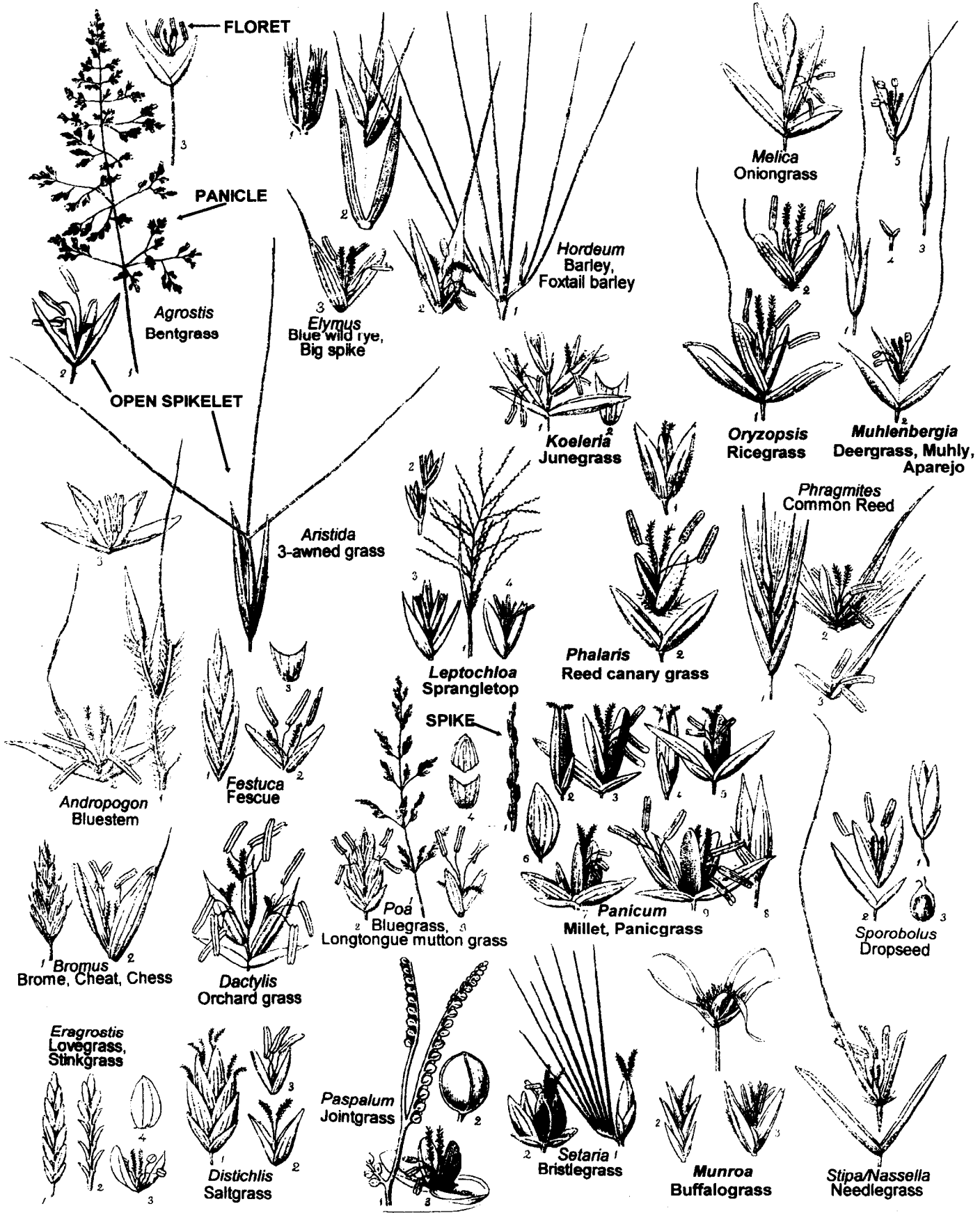
Grass Family (*Poaceae*, formerly *Gramineae*): Annual herbs to woody bamboo-like plants, generally with hollow stems and solid nodes. The most economically important family of plants in the world.



Melica imperfecta
Chaparral melic



Distichlis spicata
Salt grass



SOME NATIVE GRASS GENERA

Panicles, Spikes, Spikelets, and Florets

Drawings from plates in Manual of Botany by Asa Gray, 6th Edition, 1890

THE GRASS FACTS

By Frank Landis

Why Grasses Are Important:

1. Numbers. There are 600-700 genera and 6000-10,000 species in the *Poaceae* (*Gramineae*), depending on who's counting. This makes them the third largest family in terms of genera (behind orchids and composites) and the fifth largest in terms of species (behind orchids, composites, legumes and *Rubiaceae*).

2. Ecology. Grasses occur on all continents and most islands, from sea shore to mountain top. About one quarter of the earth's plant cover is composed of grasses. While "woodland", "chaparral", "marsh", etc. refer to the environment and the structure of the plants, "grassland" refers simply to an area covered by grasses. So do the terms prairie, meadow, steppe, pampas, savanna, paramos and veldt. Grasses are with us in the cities, either as ornamentals or as weeds. You are never far from a grass.

3. Agriculture. We (civilized *Homo sap.*) are the People of the Grasses. Our three major crops (rice, wheat, maize) are all grasses. If any one of the three were wiped out, most humans in the world would starve before we could grow replacements. Whole groups of animals depend on grasses: cattle, sheep, antelope, bison, etc.

As an experiment, try for a day to eat a diet free of grasses and products derived from grasses: no bread, grains, pasta, cereal, dairy products, red meat or cane sugar. Fish and potatoes would work. In fact, the only traditional *agrarian* societies that do not depend on grasses are on some islands in Micronesia. Every continental society and most island societies use some grass, if only sugar cane or bamboo.

Why Grasses Are Hard To Key:

1. Sheer numbers. There are lots of grasses. However, the top three genera (*Panicum*, *Poa*, *Festuca*) account for over 1500 of those species and the top twenty genera account for over 4800 species. Most grass genera have only a few species and many are *easy* to recognize.

2. Wind pollination. Grasses (with a few exceptions) are wind pollinated. This means that they don't have big, easy-to-see, bug-attracting flowers. Instead grass flowers are reduced structures designed to release pollen into the wind and to trap pollen out of the wind. The flowers are so small and inconspicuous that keys rely on the associated bracts (lemma, glumes, palea) and inflorescence characters rather than floral morphology.

Incidentally, a few grasses are insect pollinated and tend to live in the understories of tropical rain forests. What does that tell you about air movement on the tropical rain forest floor?

3. Convergent evolution. We would expect grasses living in similar environments to have similar morphologies and this is the case. Most agrostologists (people who study grasses professionally) will refuse to key out a grass that isn't flowering for just this reason. Unfortunately grasses are also environmentally (wind) pollinated, so there's a lot of convergent evolution in the inflorescences as well.

4. Weird sex. We see chromosome scrambling (polyploidy, aneuploidy, etc.), vegetative propagation and various types of asexual reproduction in the grasses. Mostly we see hybridization. A majority of grass species are thought to be a result of hybridization, ancient or modern.

For example, bread wheat (*Triticum aestivum*) is not only hexaploid, it is the result of hybridization between three different species (in two genera depending on who's counting) as well as repeated bouts of chromosome reshuffling. You can find other *intergeneric* hybrids locally.

5. Research. Grasses are the single most studied group of vascular plants, for obvious reasons. What this means is that grasses are over-described and species in some groups are separated based on minute differences. Also, due to weird sex and convergent evolution, most agrostologists have turned to microcharacters (genetics, biochemistry, microscopic features) to figure out who is related to whom. These techniques work wonderfully but can be *really* hard to spot in the field. Converting microcharacter data into classifications based on larger characters, as in *The Jepson Manual: Higher Plants of California*, 1993, James C. Hickman, editor, is an interesting challenge.

What To Do About It?

1. Don't panic!!! Most beginners, myself included, blow it the first few times they try to key out a grass. It's an unfamiliar group with tiny features. If you blow it, this does NOT mean that you are stupid, incompetent or grass-impaired. It means you are on a par with about 90% of everybody else who's tried keying a grass.

2. The worst response: "I can't key grasses." If you freak out at this point and decide you can't key grasses, you will become your single worst obstacle. Once you understand what to look for, your grass identification skills will improve radically. **YOU CAN DO IT!**

3. Practice, practice, practice. The only way to get good at keying and identifying grasses is to key and identify grasses. It's that simple. (Reprint of an essay first published in the July-August, 1997, TOYON.)

THE GRASSES OF SOUTHERN CALIFORNIA

By Betsey Landis

Southern California is a fascinating place to study grasses. The urban interface is sharply divided in this land of high density urban development surging against numerous hill and mountain ranges, desert vastness and ocean marshes and dunes. While cities may prevent the flowering of grass lawns in residential areas as "untidy" and causing a "lowering of property values", a short distance away grasses in natural areas are flowering, seeding, spreading and battling for a niche in our mild Mediterranean climate. Those citizens who seldom leave their urban habitat have no idea that grass flowers or the beauty there is in a field of wildflowers and native grasses. Conversely, native plant enthusiasts often become depressed about the loss of native grasslands and decide there are no more native grasses.

Here is a gentle introduction to grasses and grass genera that live in California, particularly southern California. The drawings of non-native grasses in the margins of the next two pages and of native grass genera backing the title page are from the *Manual of Botany* by Asa Gray, 6th edition, 1890. In this edition, completed after Dr. Gray's death, the editors expanded their botanical coverage from the East coast to the 100th meridian, which is about the middle of the Great Plains. The drawings of the spikelets and florets are so well done, however, that they are an excellent guide to the general characteristics of each genus. California species may vary in details, but the drawings will help to identify at least the genus of grass. Tables from *Southern California Native Plants for School Gardens* by Betsey Landis will help you determine habitat preferences, size, flowering season and other data for some native perennial grasses. A short glossary of terms introduces the specialized vocabulary of grasses with a word search and crossword puzzle for practice. For gardeners and budding botanists a list of references is included.

Many of the scientific names of grasses are literally root words, the original names given by Greeks and Romans (*Paspalum*, *Panicum*, *Lolium*, *Secale*, *Oryza*, *Elymus*) to cereal grasses they cultivated. Other names are more descriptive of the shapes of grasses or where they grow (*Sitanion*, now *Elymus*, known as Squirreltail for its bushy spike of florets, or *Sphenopholis* commonly called Prairie wedgegrass for its habitat and the shape of its scales). Some, like *Swallenia*, Eureka Valley dune grass, are named for people (Jason Swallen, American

agrostologist) and *Torreyochloa*, Weak mannagrass, named for J. Torrey, an 19th century American botanist.

The Jepson Manual: Higher Plants of California, 1993, edited by James Hickman, recognizes 115 genera of grasses in California. Fifty-one of those genera are exclusively non-native, introduced species. Thirty-one of the genera are exclusively native. The remaining thirty-three genera represent some native and some non-native species.

One grass, *Dissanthelium californicum*, recorded on the Channel Islands, may be extinct. Fifty-eight species of native grasses are listed in the CNPS Inventory of Rare and Endangered Vascular Plants of California, 5th edition, February, 1994.

Some non-native species, like *Avena* (wild oats), *Phalaris aquatica* (Harding grass) and *Sorghum halepense* (Johnson grass) are invasive, displacing native grasses and meadow wildflowers in our parks. *Arundo donax* (Giant reed) chokes rivers and riparian areas. Valley floors once covered in native grasses now are neatly patterned in clean-cut lawns, buildings, asphalt and concrete. Are any native grasses left?

Yes, native grasses survive in many places, especially where non-native species of grasses are sparse or have been removed. The protected grasslands on the Carrizo plains and the Santa Rosa plateau are well known. *Stipa*, *Nassella*, and *Achnatherum* sp. (Needlegrasses) grow in small meadows on the knees of coastal mountains, as understory in coastal sage scrub and, in the Santa Susanas and Simi Hills, in arroyos too narrow for cattle to graze. *Melica imperfecta* (Chaparral melic) crowns many north- or east-facing banks in Santa Monica Mountains and other western transverse mountain ranges. *Distichlis* sp. (Salt grass) grows in salt marshes and in desert washes/dry lakes. *Leymus condensatus* (Giant rye grass) clumps vigorously throughout southern oak woodland.

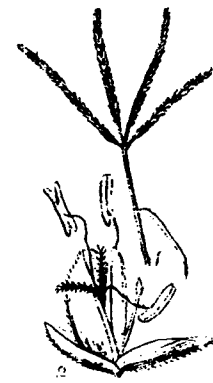
As an example, Mickey Long, County biologist, based at Eaton Canyon above Altadena, has updated the grass list for these parks (only native grasses are listed):

1. Vasquez Rocks Natural Area: *Achnatherum coronatum* (Giant needlegrass), *A. speciosum* (Desert needlegrass), *Leymus condensatus* (Giant wild rye), *Leymus triticoides* (Alkali ryegrass), *Melica imperfecta* (Chaparral melic), *Muhlenbergia rigens* (Deergrass), *Nassella cernua* or *pulchra* (Needlegrass sp.), *Oryzopsis* or *Achnatherum* sp. (Rice grass), *Poa segunda* (One-sided bluegrass), *Vulpia myuros* (Fescue), *Vulpia pacifica* (Pacific fescue).

2. Devil's Punchbowl: *Achnatherum speciosum* (Desert needlegrass), *Poa segunda* (One-sided bluegrass), *Elymus elymoides*, formerly *Sitanion hystrix*, (Bottlebrush squirreltail), *Hordeum jubatum* (Foxtail barley), *Muhlenbergia rigens* (Deer grass).

3. Placerita Canyon Natural Area: *Achnatherum coronatum* (Giant needlegrass).

At this time of year, fall, few natives like *Andropogon glomeratus* (Southwestern bushy bluestem) and some non-natives are growing or blooming, unless there is water available. Dried grasses that have shattered and scattered their seeds are almost impossible to identify.



Cynodon
Bermuda grass

Avena
Wild oats



Briza
Quaking grass



Dactylis
Orchard grass



**NON-NATIVE
GRASS
GENERA**



Holcus
Velvetgrass

The Jepson Manual describes *A. glomeratus*: "STEM 0.8-1.5 m. LEAF: sheath scabrous; ligule 1-2.2 mm; lower blades 3-6 dm, 3.5-6 mm wide. INFLORESCENCES many, compactly clustered, plume-like; branches generally 2-4. SPIKELET 4-4.5 mm; lower glume keel generally scabrous at base; callus hairs 1-2 mm; awn 0.5-2 mm. Moist, open, disturbed areas, seeps; <600m." *Andropogon* is found here and there throughout the state down to Baja CA.

The first step is to look at the illustration, where the branches and "plume-like" structure become obvious. The rest is confirmation of the identification.

The stem length is perhaps waist-high, the leaf blades are narrow and are slightly less than half the length of the stem. The leaf sheath covering the stem feels rough, "scabrous".

What is a "ligule"? When you wear a light jacket over a shirt, the jacket is like the leaf sheath. The shirt collar standing up inside the jacket collar is the "ligule".

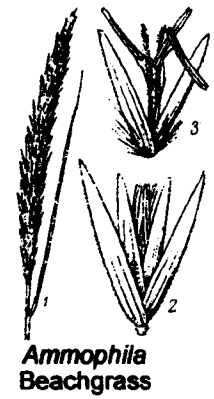
If your jacket has tabs at the front neck opening to button across your throat in a cold wind, those tabs are similar to the "auricles" in grasses.

The "glumes" are the bracts enclosing the floret like cupped hands.

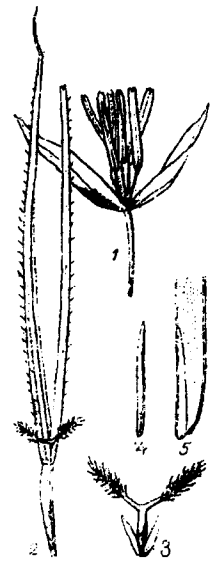
The "callus" is the enlarged, slightly hairy base of the floret, where the glumes are attached. Hairy enough in *Andropogon* to make the base feel scabrous.

The "awn" is a bristle at the tip of the spikelet. In *A. glomeratus* the awn is small, at best only half the length of the spikelet, which itself is small. In the pocket of your jacket should be a hand lens and a small ruler to check the dimensions of the various parts of the spikelet.

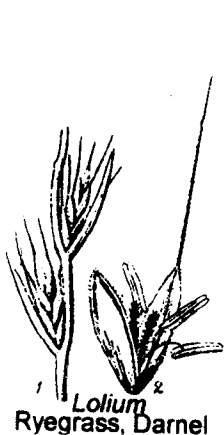
A. glomeratus is an upright plant. Some grasses have horizontal stems or "culms" that may go on the surface of the ground or underground as "rhizomes", rooting at each node and upturning at the growing tip, the "apex". Other grasses have "stolons", horizontal, thin, elongated stems that run above ground producing both roots and erect stems at each node.



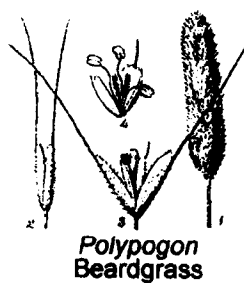
Ammophila
Beachgrass



Zizania
Wild rice



Lolium
Ryegrass, Darnel



Polypogon
Beardgrass



Eleusine
Goosegrass



Cenchrus
Sandbur



NON-NATIVE GRASS GENERA



Anthoxanthum
Vernal grass

BOTANICAL TERMS FOR GRASSES

auricle: ear-like structures extending from the lower end of the leaf blade.

awn: a bristle on the bracts or scales, usually an extension of a nerve.

bract: modified, reduced leaves located above the foliage leaves.

bristle: a stiff hair-like structure.

chaff: a thin dry scale or bract.

culm: specialized stem of grass.

floret: unit usually of two bracts (lemma and palea) enclosing a flower.

glume: a chaff-like bract.

grain: a swollen, seed-like structure.

grass family: the most economically important family of plants. Annual herbs to woody, hollow-stemmed plants like bamboo or cane.

lemma: lower of two bracts enclosing a flower above the glumes.

ligule: collar-like structure at junction of leaf blade and leaf sheath.

nerve: vascular strand of glume, lemma or leaf.

node: where the leaves arise from the stem.

palea: inner of the two bracts, directly below the grass flower.

rhizome: a prostrate elongated culm growing mostly underground, usually rooting at nodes and upturned at apex.

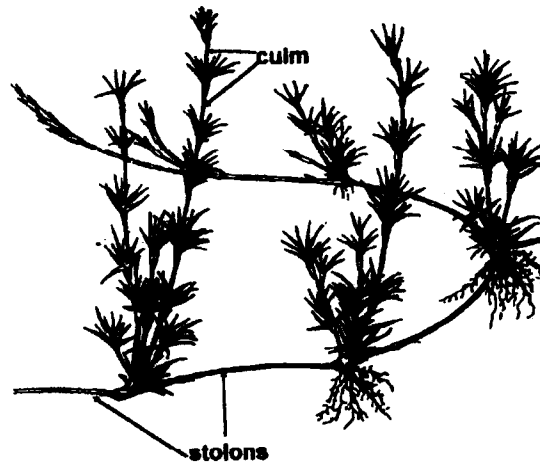
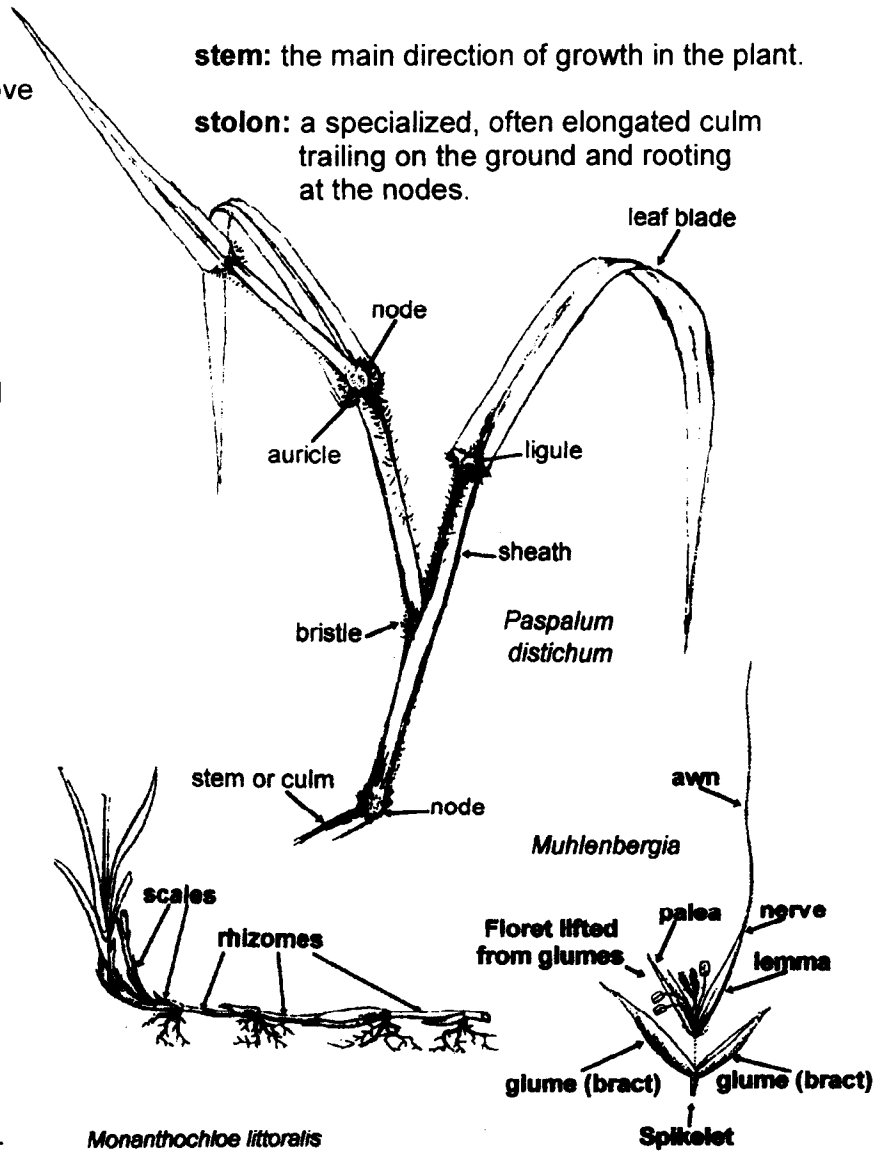
scale: a small dry bract.

sheath: part of leaf that covers all or part of a culm.

spikelet: in a panicle or flower spike, a unit usually of two empty bracts (glumes) at the base of one or more florets.

stem: the main direction of growth in the plant.

stolon: a specialized, often elongated culm trailing on the ground and rooting at the nodes.



Illustrations

Rhizomes: Asa Gray, *How Plants Grow*, 1881.

Stolons: A.S. Hitchcock, *Manual of the Grasses of the U.S.*, 2nd Edit. 1950.

Spikelet: Asa Gray, *Manual of Botany*, 6th Edit. 1890.

PERENNIAL NATIVE GRASSES

from Southern California Native Plants for School Gardens

COMMON NAME	HABITAT (ALTITUDE)	FLOWER TIMES	GROWTH ly/MaxHt. Width	SOIL TYPE (pH)	WATER NEEDS	SUN or SHADE	ATTRACTS BIRDS or INSECTS	THORNS or SPINES	FRUITS: EDIBLE? YES or NO	NATIVE AMERICAN USES
1 Porcupine Grass	CSS, Chaparral (<5500')	Spring	6'/6' clumps	rocky,gravel (pH 6-8)	small	full sun	all	no	no:needle- like seeds	
<i>Achnatherum coronatum</i> (<i>Stipa coronata</i>)										
2 Indian Ricegrass	Creosote, P-J Woodland,Forest (<11,000')	Spring- Summer	2'/2' clumps	sandy (pH 7-8)	small drain well	full sun	all	no	yes:with processing	food:seeds
<i>Achnatherum hymenoides</i> (<i>Oryzopsis hymenoides</i>)										
3 Desert Needlegrass	Creosote, Joshua Tree Woodland, (<6500')Chaparral	Spring	2'/2' clumps	rocky,gravel (pH 7-8)	small	full sun	all	no	no:needle- like seeds	
<i>Achnatherum speciosum</i> (<i>Stipa speciosa</i>)										
4 Bentgrass	Riparian,Woodland, (<7000')Forest	Summer	3'/3'	clay,sandy	moderate	cool sun	all	no		
<i>Agrostis exarata</i>										
5 San Diego Bent Grass	Chaparral,Forest Woodland (650-10,000')	Spring- Summer	3'/3'	sandy,loam	small drain well	cool sun	all	no		
<i>Agrostis pallens</i> (<i>Agrostis diegoensis</i>)										
6 Beard Grass/Bluestem	Riparian,CSS, Chaparral, Creosote (<2000')	Fall- Winter	1'/1'	clay,silty	moderate	full sun	all	no		
<i>Andropogon glomeratus</i> var. <i>scabriglumis</i> (<i>Andropogon glomeratus</i>)										
7 Caned Bluestem	CSS,Chaparral, Island, Joshua Tree (<4000')Woodland	All year	4'/4' clumps	clay,gravel	small	full sun	all	no		
<i>Bothriochloa barbinodis</i>										
8 California Brome	CSS,Chaparral, (<8000')Woodland	Spring- Summer	4'/4'	clay,sandy	small	full sun	all	no		
<i>Bromus carinatus</i>										
9 Woodland Brome	Riparian,Chaparral, Woodland, Island (<3000')	Spring- Summer	4'/4'	sandy,loam	moderate	shade	all	no		
<i>Bromus laevipes</i>										
10 Salt Grass	Alkali Riparian, (<3000') Grass	Spring- Summer	1'/1' spreads	sandy,silt (pH 7-10)	moderate	full sun		no		condiment, tool:brush
<i>Distichlis spicata</i>										
11 Blue Wildrye	Chaparral, Woodland, Forest (<7500')	Summer	4'/4'	clay,sandy	moderate	full sun	all	no		
<i>Elymus glaucus</i> ssp. <i>glaucus</i>					drain well					
12 Wheat Grass	Chaparral,Forest (<5000')	Spring	4'/4'	clay,sandy	small	cool sun	all	no		
<i>Elymus stebbinsi</i> (<i>Agropyron parishii</i>)										

CSS=Coastal Sage Scrub
P-J Woodland=Pinon Juniper Woodland

PERENNIAL NATIVE GRASSES

from Southern California Native Plants for School Gardens

COMMON NAME NEW SCIENTIFIC NAME (OLD SCIENTIFIC NAME)	HABITAT (ALTITUDE) ('=feet)	FLOWER TIMES	GROWTH 1y/MaxHt Width	SOIL TYPE (pH)	WATER NEEDS	SUN or SHADE	ATTRACTS		THORNS or SPINES	FRUITS: EDIBLE? YES or NO	NATIVE AMERICAN USES
							BIRDS	INSECTS			
13 Meadow Barley <i>Hordeum brachyantherum</i> <i>ssp. californicum</i> (<i>Hordeum californicum</i>)	Riparian, Scrub, Grassland	Spring- Summer	2'/2'	clay,sandy	moderate drain well	full sun	all		no	no	
14 Bearded Spangletop <i>Leptochloa fascicularis</i>	Alkali Riparian, (<4000')Creosote	Summer- Fall	3'/3'	sandy,silt (pH 7-9?)	moderate drain well	full sun		no	no	no	
15 Giant Wild Rye <i>Leymus condensatus</i> (<i>Elymus condensatus</i>)	CSS,Chaparral, Woodland,Island (<7000')	Summer	10'/10' clumps	clay,sandy	small	full sun	all	no	yes:with processing	famine food, roof thatch, arrow shafts	
16 Creeping Wild Rye <i>Leymus triticoides</i> (<i>Elymus triticoides</i>)	Alkali Riparian, Woodland, Scrub (<7500')	Summer	4'/4' spreads	sandy,silt (pH 7-9?)	moderate	full sun		no	no		
17 Chaparral Melic <i>Melica imperfecta</i>	CSS,Chaparral, Woodland, Island (<5000')	Summer	3'/3' clumps	clay,rocky	small	cool sun	all	no	no		
18 Scratch-grass <i>Muhlenbergia asperifolia</i>	Alkali Riparian, (400-7000')Scrub	Summer- Fall	2'/2' spreads	sandy,silt (pH 7-9?)	moderate	full sun		no	no		
19 Deer Grass <i>Muhlenbergia rigens</i>	Chaparral,Grass, (<7000')Woodland	Summer	4'/4' clumps	sandy,gravel (pH 5-8)	moderate drain well	cool sun	all	no	no	basketry	
20 Nodding Needlegrass <i>Nassella cernua</i> (<i>Stipa cernua</i>)	CSS,Chaparral, Woodland,Grass (<4500')	Spring	3'/3' clumps	clay,sandy (pH 6-8)	small	full sun	all	no	no:needle- like seeds		
21 Foothill Needlegrass <i>Nassella lepida</i> (<i>Stipa lepida</i>)	CSS,Chaparral, Grassland, Island (<5500')	Spring	3'/3' clumps	clay,sandy (pH 6-8)	small	cool sun	all	no	no:needle- like seeds		
22 Purple Needlegrass <i>Nassella pulchra</i> (<i>Stipa pulchra</i>)	CSS,Chaparral, Woodland,Grass, (<5000')Island	Spring	3'/3' clumps	clay,sandy (pH 6-8)	small drain well	full sun	all	no	no:needle- like seeds		
23 Common Reed <i>Phragmites australis</i>	Riparian (<5000')	Summer- Fall	12'/12' spreads	silt	ample	full sun	all	no	no	thatch, twine,flutes	
24 Bluegrass <i>Poa secunda ssp.juncifolia</i> (<i>Poa juncifolia</i>)	Scrub,Forest (2300-9000')	Summer	3'/3'	clay,sandy (pH 6-9?)	small	full sun	all	no	no		

CSS=Coastal Sage Scrub
P-J Wc 'and=Pinyon Juniper Woodland

GRASS WORD SEARCH

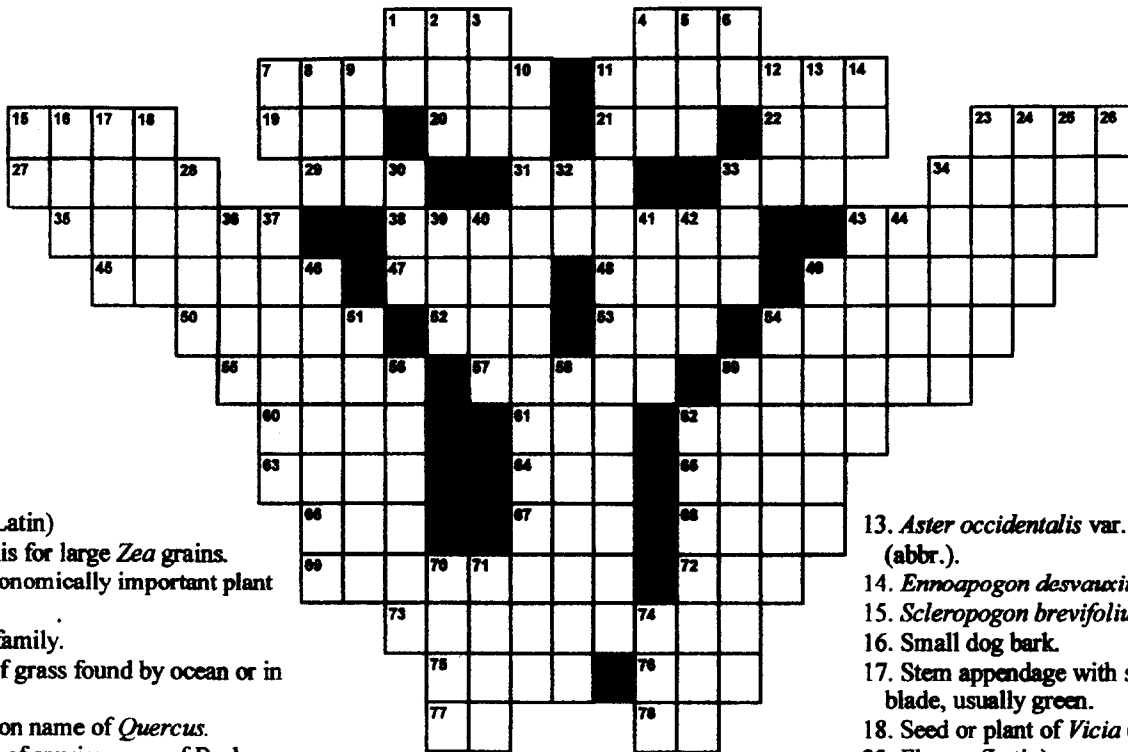
G	R	A	I	N	P	A	E	L	A	P
B	R	D	W	E	M	O	Z	I	H	R
R	N	A	U	R	I	C	L	E	U	S
A	O	Z	S	P	I	K	E	L	E	T
C	D	M	T	S	M	W	E	C	Q	E
T	E	R	O	L	F	V	H	W	L	M
E	M	U	L	G	R	A	O	E	I	L
L	L	C	O	E	F	Q	M	X	G	U
A	P	G	N	F	J	M	G	I	U	C
C	N	I	H	T	A	E	H	S	L	U
S	B	R	I	S	T	L	E	G	E	Y

FIND THE FOLLOWING GRASS WORDS IN THE PUZZLE:

AURICLE
AWN
BRACT
BRISTLE
CHAFF
CULM
FLORET
GLUME
GRAIN
GRASS FAMILY

LEMMA
LIGULE
NERVE
NODE
PALEA
RHIZOME
SCALE
SHEATH
SPIKELET
STEM
STOLON

NATIVE GRASS CROSSWORD



ACROSS

1. Bread (Latin)
4. Stout axis for large *Zea* grains.
7. Most economically important plant family.
11. Grass family.
15. Type of grass found by ocean or in desert.
19. Common name of *Quercus*.
20. Initials of spurious son of Bach.
21. What wet sheaves of wheat do.
22. Soil layer tightly bound by grass and grass roots.
23. General term for grain given farm animals.
27. Food baked from processed grains.
29. Large edible starchy root (*Dioscorea* genus).
31. Berry or grape (Latin).
33. Bear (Spanish)
34. Having wings.
35. In the distance (2 words).
38. Genus of hawk.
43. Previously.
45. Touch (2 words).
47. Entrance.
48. Common name of *Phragmites*.
49. Sweet products of *Saccharum officinarum*.
50. Pipe or channel (Greek).
52. Russian space station.
53. First name of author Fleming.
54. Genus of chaparral grass.
55. Gets smart, ___ up.
57. Fend off.
59. Able to live.
60. Vinegar (Latin).
61. "Let's Lop Weeds" (abbr.)
62. Specialized stems of grasses.
3. Short for Rudolph.

64. To (Scots).
65. Jug (Spanish)
66. L-shaped room.
67. Help.
68. Not closed-in.
69. Young sprout.
72. Past tense of light.
73. Genus of dune grass.
75. Pretty flower.
76. Immigration and Naturalization Service (abbr.)
77. *Stipa speciosa* (abbr.).
78. *Poa glauca* (abbr.).

DOWN

1. *Pascopyrum smithii* (abbr.)
2. Snake in the grass.
3. Nickname for Edward.
4. Sound a dove makes.
5. Common name of *Avena*.
6. *Bromus carinatus* (abbr.)
7. Move away.
8. Elongated branch of a sedge flower.
9. Also known as (abbr.).
10. Common name (plural) of *Sitanion*.
11. Common name of *Sphenopholis*.
12. Shape of snake in motion.

13. *Aster occidentalis* var. *occidentalis* (abbr.).
14. *Ennoapogon desvauxii* (abbr.)
15. *Scleropogon brevifolius* (abbr.)
16. Small dog bark.
17. Stem appendage with stalk and blade, usually green.
18. Seed or plant of *Vicia* (vetch).
23. Flower (Latin).
24. Fruits of *Zea*.
25. Summer (French).
26. *Deschampsia elongata* (abbr.).
28. Female deer (plural).
30. Angry.
32. *Viola purpurea* (abbr.).
33. Fort near Monterey, California.
34. One visage (2 words).
36. 2/3 of flower.
37. Relating to foliage.
39. Short for combined.
40. Cordage--from coconut husks.
41. Small bluish duck.
42. Even (poetic).
43. Underground storage organs.
44. Servant of Thor (Norse myth.).
46. Common name of *Festuca*.
49. Ocean sailor.
51. ___ grass, common name of *Stipa* or *Achnatherum*.
54. Common name of *Panicum*.
56. Stalk-like portions linking ovaries to stigmas in many pistils.
58. Clearly, as in the Dakotas.
59. Common name (plural) of *Vulpia*.
62. Losing heat.
70. Departments of Water and Power (abbr.).
71. Southeast Asian country.
74. Pinch.

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