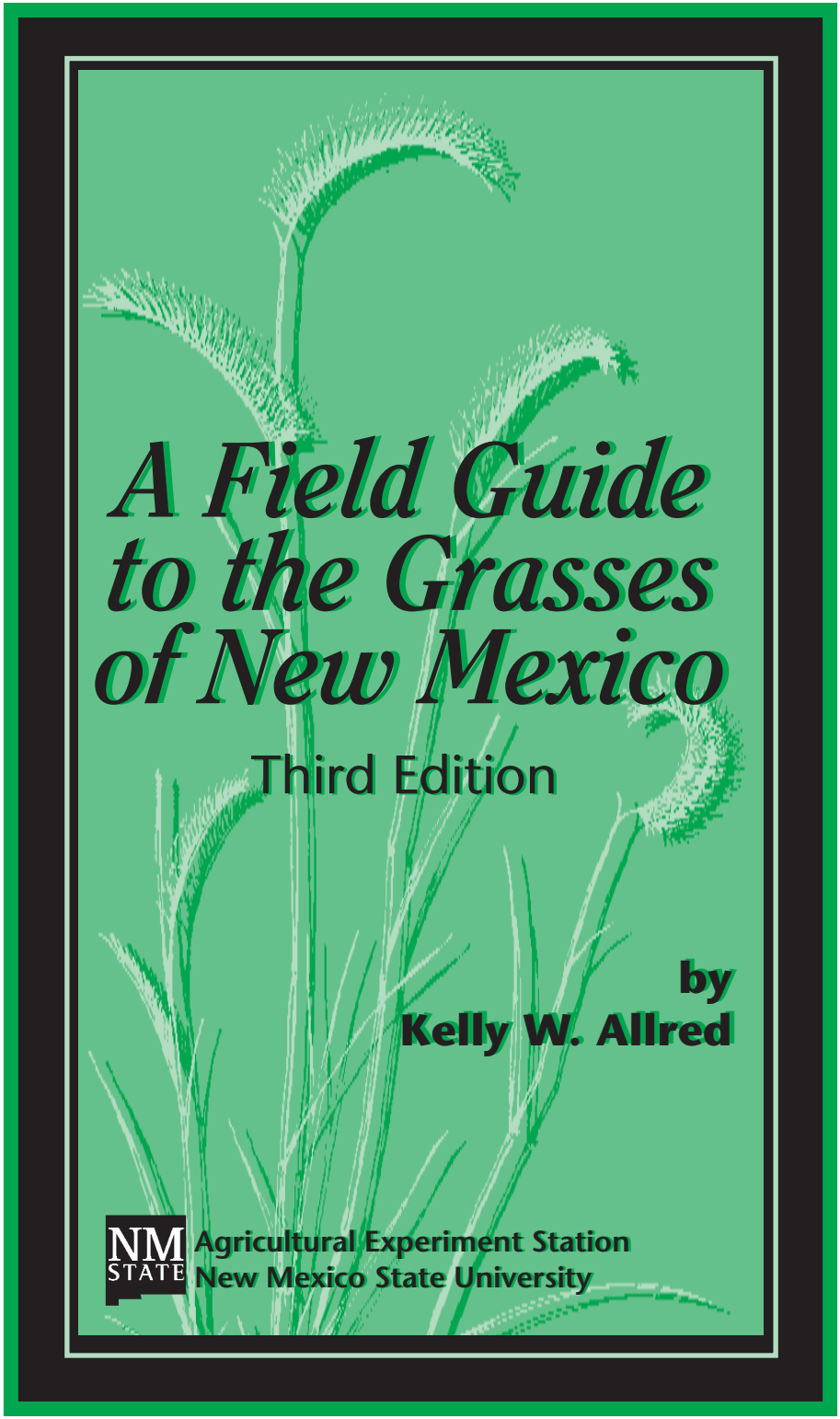

A Field Guide to the Grasses of New Mexico

Third Edition

by
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Acknowledgments

Muchisimas gracias to the numerous friends, colleagues, and students who have aided me through the years in my study of New Mexico grasses. The curators of numerous herbaria in New Mexico generously permitted me to freely examine their specimens. Students scrutinized and tested the keys, happily pointing out errors and omissions. Numerous fellow botanists, both in-state and out, brought additions and corrections to my attention, aided in identifying difficult specimens, and gave helpful criticism and encouragement. Much of the field work was carried out with financial support from the New Mexico Agricultural Experiment Station. Appreciation is also extended to the staff of the Department of Agricultural Communications, New Mexico State University, for their patience and perseverance. Deserving special thanks are my family, Jesse, Brady, Corby, and Lynda, for their unfailing support of my botanical pursuits.

K.W.A.

Preface to the Third Edition

It's hard for me to believe that the first edition of this little guide first appeared more than 10 years ago. How time flies when you're having fun! And fun it has been, wandering the mountain meadows, alkali flats, talus slopes, stream banks, alpine bogs, desert bajadas, slick-rock buttes, short-grass plains, aspen groves, salt marshes, oak mottes, cottonwood bosques, and the roadsides, vacant lots, sidewalks, gardens, shopping malls, parks, city dumps, cemetaries, dentist offices (ouch, was that sandbur?), and backyards throughout the great state of New Mexico. For grasses will be found everywhere we go (including the dried bouquet of Muhlenbergia capillaris in the dentist office), and we're never far from an exciting encounter with some member of this, the most enchanting and delightful of all plant families.

I have tried in this third edition to bring things up-to-date: nomenclature, classification, identification, and documentation. Reports of doubtful species have been checked, distribution maps revised, keys corrected and (I hope) improved, habitat reports clarified, and scientific names verified. I fully expect to have missed some things – this is a never-ending work of refinement – so feel free to send me corrections, suggestions, complaints, and, perhaps, a note of encouragement if you find the work helpful.

Names fascinate me, so I have included the meanings of the scientific names, genera and species. I hope you find it interesting and useful as well.

In this edition I have ventured to convey some of what it is about the study of grasses that captivates and intrigues. It may be the beautiful iridescent grains of Schismus arabicus, Steudel's mix-up of Bélanger and Berlandier, the incredible diversity in Aristida, playing "mousy-mousy" with Hordeum murinum, picking grasses from our socks (sandbur) or from our teeth (corn glumes), or the breath-taking views of high-elevation Festuca arizonica grasslands. But, don't be deceived: the joy is in the grasses, out-of-doors, and not in reading this little book. So get out there and start looking and learning!

I am pleased to dedicate this edition to my wife, Lynda Street Allred, in recognition of her long-suffering and tolerance of my pleasant obsession, and for patiently waiting by the side of the road while I picked up "just one more grass."

GRASSES are one of the outstanding natural resources of New Mexico. They provide natural feed, forage and habitat for countless animals, both wild and domesticated. Valuable topsoil is held in place against the ravages of erosion. Recreation and enjoyment of the out-of-doors is enriched by lawns, parks, athletic fields, meadows, mountain slopes, grasslands and plains, all of which are composed partly of grasses. Corn, wheat, sugar cane, rice, barley, oats and other grains enhance our food supply and bolster our diets. Life as we know it would not be the same without grasses.

In 1912, when E.O. Wooton and Paul C. Standley of the New Mexico College of Agricultural and Mechanic Arts (now New Mexico State University) published their bulletin, "The Grasses and Grass-like Plants of New Mexico," they accounted for 72 genera and 258 species of grasses growing within the pioneer state. In the ensuing years, botanists from within and without the state have collected and documented numerous additional species, so that 121 genera and 435 species of grasses are now known to grow in New Mexico (Table 1). With the addition of all infraspecific variation (subspecies, varieties, and forms), there is a total of 481 kinds of grasses reported for the state. All grasses known to grow in New Mexico are included in this guide, whether wild or cultivated, native or exotic, incorporating all native grasses, grass weeds, and domesticated grasses grown for lawns, crops, and ornamental uses.

The largest genus of grasses in New Mexico is *Muhlenbergia*, with 43 species, followed by Poa (20 species), *Bromus* and *Eragrostis* (19 species each), *Elymus* (18 species), *Panicum* (17 species), *Bouteloua* and *Festuca* (14 species each), and *Sporobolus* (13 species). It would be wise, therefore, for a newcomer to New Mexico grasses to become somewhat familiar with these genera.

There are 134 exotic grasses growing in the state, comprising 31% of the grass flora. Sixteen of these are known only as landscape ornamentals or turf grasses, however, so the number of exotic grasses found in the wild is somewhat less (118 species, 27%). Nearly one-third (28%) of our grasses are annuals.

Table 1. Statistical Summary of New Mexico Grasses [1]

Subfamilies	Tribes	Genera	Native Species	Exotic Species	Total Species	Total Taxa [2]
8	15	121	301	134	435	481

[1] Includes all grasses known to occur in the state, whether wild or cultivated, including ornamentals.

[2] Includes subspecies, varieties, and forms (but not informal races or phases).

The Grass Plant

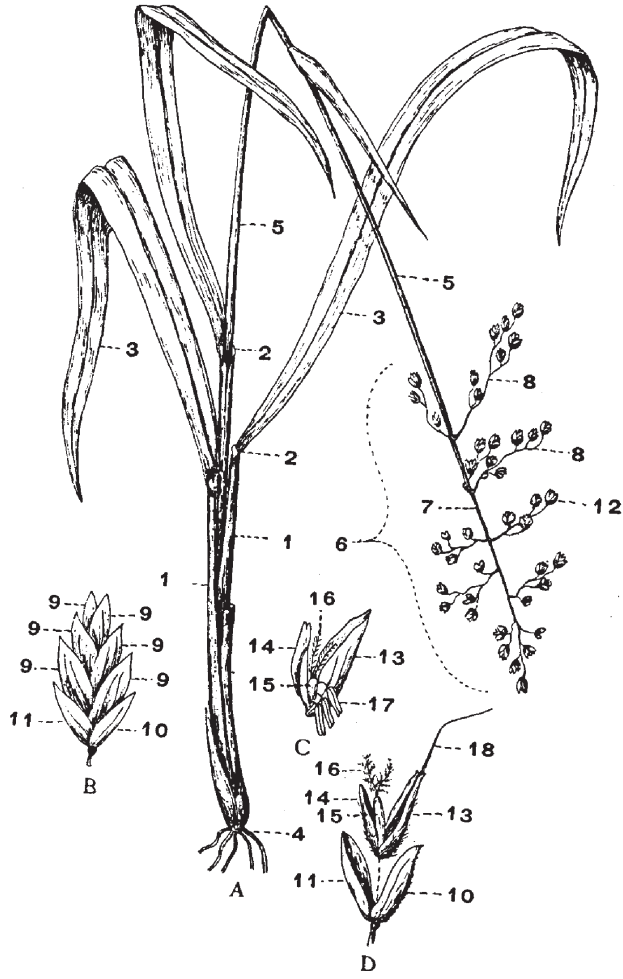
The parts of the grass plant are illustrated in Figures 1-5. Technical vocabulary has been kept to a minimum, but the glossary (pages 367-369) will aid those unfamiliar with some new terms.

Stems. The stems (culms) of grasses are jointed and usually round and hollow between the joints (nodes). Stems may be erect, or with bent, knee-like bases, to prostrate. They may trail on the ground and root at the nodes as do the runners of strawberry (stolons), or they may grow horizontally through the soil below ground (rhizomes) and be covered with scales. It is important to recognize whether a grass has rhizomes or stolons when attempting an identification.

Roots. The root system of grasses is always fibrous, with many equal-sized roots forming a thick mat or sod that binds the soil. Most of the roots arise from the lower nodes of the stems.

Leaves. The leaves of a grass plant always arise at the nodes. They are parallel-veined and generally have long, narrow blades. Most leaves consist of a sheath, ligule and blade. The sheath is attached at the node and wraps around the stem. A short membranous or hairy flap of tissue called the ligule occurs at the juncture of sheath and blade. The shape and structure of the ligule are important in identifying grasses without seedheads. Of our species, only those in the genus *Echinochloa* lack a ligule. The blade is the terminal, spreading portion of the leaf and normally has a strong midrib, with many smaller veins parallel to the midrib. Blades may be flat or rolled in some fashion. Some grasses may have finger-like projections at the base of the blade called auricles.

Flowers and Spikelets. The flowers of grasses are composed of stamens and pistil. These structures are so tiny they are rarely used in identification. Instead, one looks for differences in the bracts (modified leaves) that surround the flowers. Each flower has two bracts at the base, the lemma and the palea. This unit, consisting of lemma, palea and flower, is termed a floret. Florets are arranged alternately on two sides of a central stalk (rachilla), with two additional bracts called glumes at the base of the florets. There are no flowers associated with the glumes. This cluster of florets and glumes is called a spikelet, and is often supported by a stalk (pedicel). The bracts of the spikelet (glumes, lemmas, paleas) are sometimes awned, that is, with a stiff, bristle-like projection coming from the tip or back of the structure. Awns are usually continuations of the veins of the particular bract on which they are borne.



C. A floret taken from B.
D. A spikelet with a single floret.

A. The flowering shoot of a grass plant.
B. A spikelet with several florets.

1. Sheath of the leaf.
2. Collar region of the leaf.
3. Blade of the leaf.
4. Fibrous roots from the base of the plant.
5. Stem.
6. Inflorescence, or seedhead.
7. Rachis, or main axis, of the inflorescence.
8. Branch axis of the inflorescence.
9. Florets (lemmas) of a spikelet.
10. First glume of a spikelet.
11. Second glume of a spikelet.
12. A single spikelet.
13. Lemma.
14. Palea.
15. Ovary.
16. Stigmas.
17. Anthers.
18. Awn from the apex of the lemma.

Fig. 1. Parts of the grass plant. From Wooton and Standley's Grasses and Grass-like Plants of New Mexico (1912).

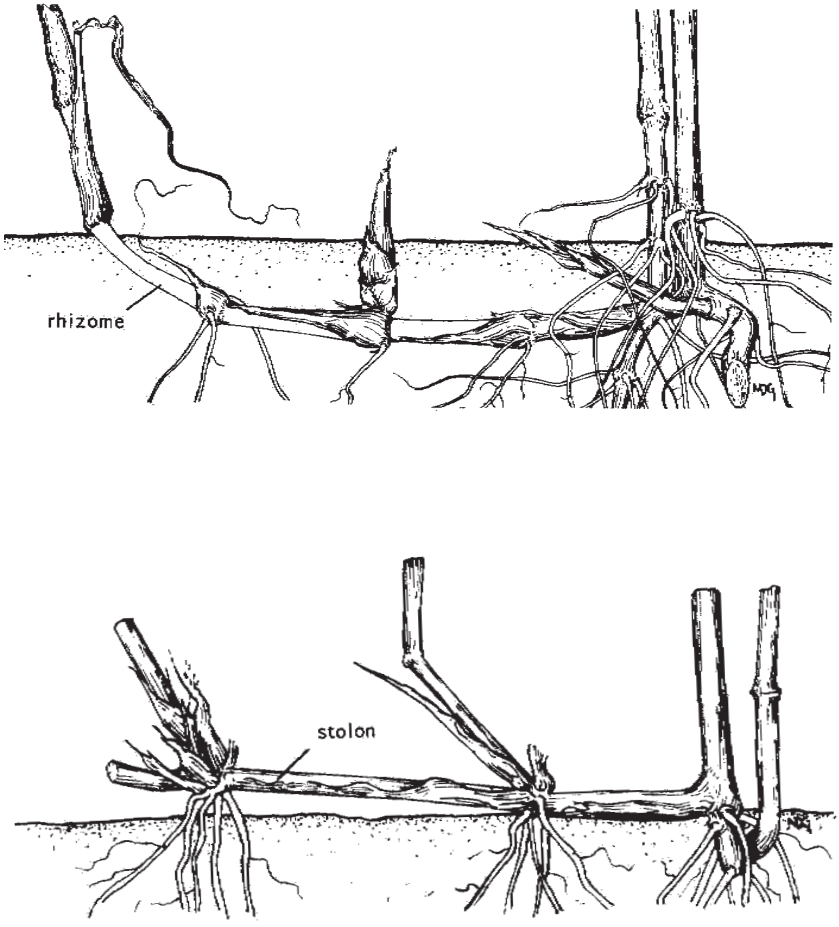


Fig. 2. Vegetative structures: rhizome and stolon (from Leithead et al., 1971).

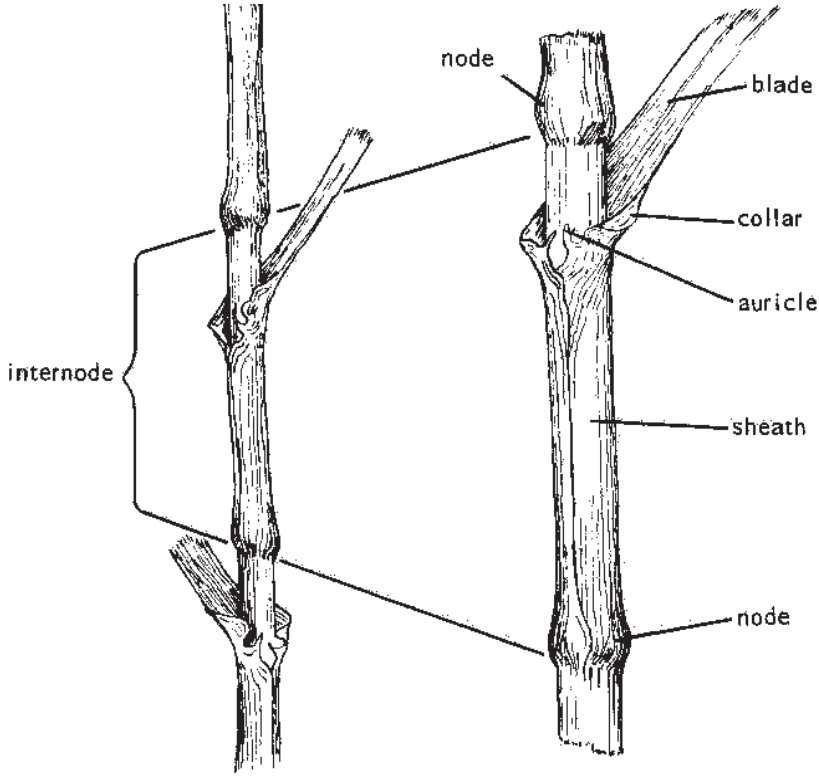


Fig. 3. Vegetative structures: culm and leaf (from Leithead et al., 1971).

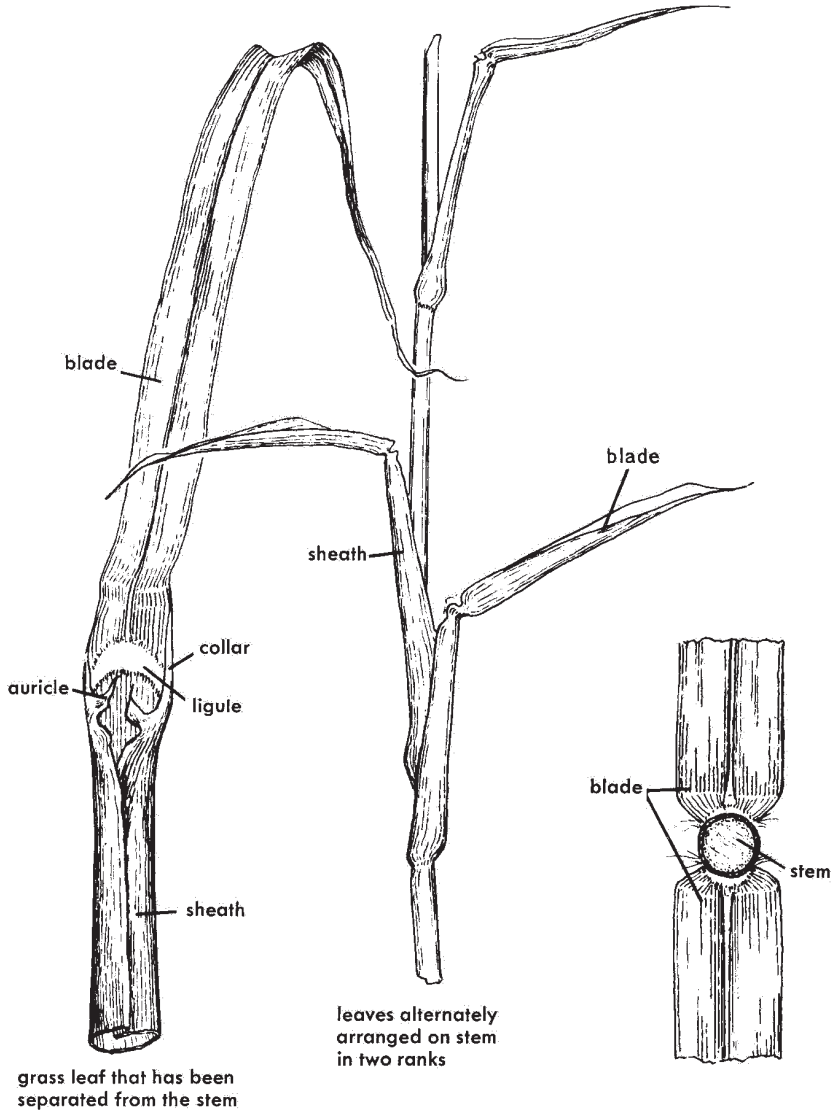


Fig. 4. Vegetative structures: culm and leaf (from Leithead et al., 1971).

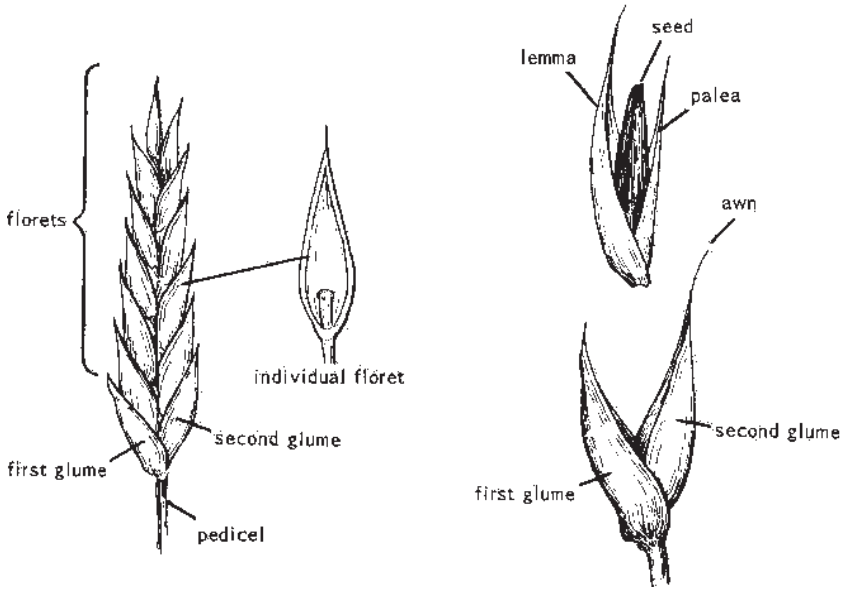


Fig. 5. Reproductive structures: spikelet (from Leithead et al., 1971).

It is often necessary to determine at what point the spikelet breaks apart at maturity to disperse the grains. This is called disarticulation, and generally occurs either above the glumes and between the florets (each floret, with a grain, falls separately), or below the glumes (the spikelet falls as a unit). Spikelets that disarticulate below the glumes leave nothing but the stalk of the spikelet. Those that disarticulate above the glumes leave the glumes on the plant.

Seedheads or Inflorescences. Spikelets are grouped together in the flowering portion of the plant, called an inflorescence or seedhead. The simplest type of inflorescence is a spike, with all the spikelets borne directly upon the main axis of the inflorescence. A modification of this pattern is the raceme, where each spikelet is borne on a stalk, but still only on the main axis. In both the spike and the raceme, there are no branches to the inflorescence. The most common type of inflorescence in grasses, however, is the panicle, with the spikelets borne on branches, and usually not on the main axis.

New Mexico Grasslands

[Adapted from Allred 1996, q.v. for further references]

Grasslands are the most extensive of the vegetation types comprising New Mexico rangelands, and cover roughly one-quarter of the state. They are also the largest of the North American vegetation formations, originally covering 40% of the land area of the United States, though now reduced to only about 16%. Grasslands occur most commonly on the plains, mesas, and bajadas bordering our mountain ranges, at elevations of 4,000 to 7,000 ft and with annual precipitation ranging from 8 to 20 in, although mountain grasslands are found on much higher and more moist sites in the high country.

Grasslands, of course, are dominated by various species of grasses (family Gramineae or Poaceae), with three or four species usually characterizing a site and producing most of the biomass. In terms of species diversity, however, grasses often compose much less than 50% of the species. Forbs are often very diverse; especially prominent are the plant families Compositae and Leguminosae. Shrubs are nearly absent in true grasslands, or confined to peculiar habitats within the grassland matrix, such as stream banks or rocky knolls.

New Mexico grasslands are of three general types: mountain grassland, plains-mesa grassland, and Chihuahuan desert grassland.

Mountain grasslands occur as clearings within thickly wooded coniferous forests, generally at elevations exceeding 8,000 ft. These small meadows and grassy slopes are often dominated by tall bunchgrasses and forbs. The grass species are almost exclusively cool-season, but muhly grasses (*Muhlenbergia*) are a conspicuous exception. Mountain grasslands at high elevations are likely a climax stage, with abrupt and definite boundaries with the surrounding subalpine coniferous forest, whereas those at low elevations often intergrade with montane coniferous forest and may be more of a transitional stage maintained by fire or disturbance. Most species are bunchgrasses, and important genera are *Deschampsia, Festuca, Koeleria, Muhlenbergia*, and *Poa*. Perhaps the most spectacular mountain grasslands are those associated with the "tall fescues," the dominants being *Festuca arizonica* and *F. thurberi* (not to be confused with tall fescue, F. arundinacea, an exotic from Europe). In subalpine to alpine areas, particularly on rocky ground, are found the "low fescues", such as *F. brachyphylla, F. minutiflora,* and *F. saximontana*. At mid-elevations, Festuca arizonica and Muhlenbergia montana form a conspicuous understory in open stands of Pinus ponderosa. In meadows and grassy clearings can be found several exotic grasses introduced for pasture improvement and vegetation rehabilitation: *Bromus inermis, Dactylis glomerata, Elymus elongatus, E. hispidus, Eragrostis curvula, Festuca arundinacea, Phleum pratense,* and *Poa pratensis* subsp. *pratensis*. In addition to the exotic subspecies of *Poa pratensis*, we have a native counterpart, subspecies *agassizensis*, whose dis-

tribution and extent in New Mexico are poorly known. It appears that many of our mountain grasslands, thought to be invaded by the exotic Kentucky bluegrass, actually contain expansive populations of the native subspecies.

Plains-mesa grassland, or blue grama grassland, is the largest of the grassland communities in New Mexico, ranging over vast areas of the central and eastern portions of the state. Some of the original grassland is now under cultivation, especially areas on the eastern side of the state. Plains-mesa grassland is the westernmost extension of the Great Plains prairie flora and includes individual species typical of the so-called short-grass, mid-grass, and tall-grass prairies. Communities are dominated by *Bouteloua gracilis*, with several co-dominants in various combinations, *Buchloë dactyloides, Elymus smithii*, and *Pleuraphis jamesii* being the most common. In the spring, *Hesperostipa neomexicana* is a conspicuous and widespread co-dominant, especially on calcareous soils. Little "prairie pockets" can be found within this grassland where *Andropogon gerardii, Panicum virgatum*, and *Schizachyrium scoparium* are common. The native plants of the plains-mesa grassland are drawn from every direction, and strong relationships exist with the deciduous forests to the east, the Rocky Mountains to the west, and the Sierra Madrean and Mexican Desert floras to the south. Woody plants are usually restricted to bottomlands, or widely scattered across the plains when not checked by fire, except under conditions of disturbance and heavy grazing, where shrubs may become dominant, to the exclusion of the grassland.

Blue grama grasslands are notably resistant to moderate grazing pressure and drought, returning to pre-grazing or pre-drought conditions within a relatively short time, if precipitation is adequate. But farming, with its complete disturbance of the soil by plowing, is especially damaging to this grassland. At least one study (Laycock 1989) has shown that 60 years of rest after plowing failed to bring back blue grama.

The grassland areas of the San Juan River basin are sometimes segregated as the Great Basin grassland because of the dominance of *Achnatherum hymenoides, Pleuraphis jamesii,* and *Sporobolus airoides*. *Bouteloua gracilis* is often present in lesser frequency. All of these species are present in the plains-mesa type, however, making it difficult to distinguish this as a separate grassland type.

Chihuahuan desert grassland refers to small areas of true grassland vegetation scattered within mixed-shrub transition zones in the Chihuahuan Desert. The term can be confusing, since some authors use desert grassland to refer to these transition zones where woody shrubs and grasses are intermingled in a savannah-type vegetation. Like other grasslands, Chihuahuan desert grassland is dominated in appearance and physiognomy by grasses, with a prominent forb component but only sparse shrubs. This vegetation type is found across southern New Mexico, with fingers extending northward, and is characterized by *Bouteloua eriopoda, Dasyochloa pulchella, Muhlenbergia porteri, Pleuraphis mutica,* and *Scleropogon brevifolius*, often in association with other Chihuahuan Desert grasses such as *Aristida, Panicum obtusum,* and *Sporobolus flexuosus*. Chihuahuan desert grassland is bounded by desert shrubland (creosote, mesquite) at its lower or drier boundary and by woodland (juniper, piñon) at its upper or more moist boundary. Extensive invasion by woody plants from these two shrub-dominated communities, especially the desert shrubland, has led to a shift of much of the true Chihuahuan desert grassland to desert shrub savanna, a transition community between the two.

The Chihuahuan desert grassland has undergone drastic changes during the last 150 years or so. A popular perception of early-day vegetation on the plains of New Mexico is that they were clothed with a thick carpet of grass, "high as a horse's belly," and this was assuredly true for some areas (though one may quibble over the height of the grass). The Animas Valley was described in 1854 as "a very broad and level plain … on which not a tree or a bush was to be seen. … covered with grass, but destitute of trees" (Bartlett 1854). Similarly, the plains northwest of present-day Lordsburg were characterized as "well covered with grass" and as "a vast plain of diluvion covered with grama grass" (Johnston 1848). Many early descriptions of the Jornada del Muerto, a 90 mile stretch of the El Camino Real from Las Cruces to Socorro, emphasized its grasses: "The whole extent, as far as vision reached ahead, was a level plain, covered thickly with the most luxurious grass, ... Hundreds and hundreds of thousands of acres, containing the greatest abundance of the finest grass in the world... (Beale 1858, in Humphrey 1958); "... table-lands destitute of wood and water, except at particular points, but covered with a luxuriant growth of the richest and most luxuriant grasses known to this continent" (Pope 1854 in Gardner 1951); and "... excellent grass the whole way" (Froebel, 1859 in Humphrey 1958). Gardner reported in 1951: "Long-time residents of Las Cruces have told the writer that within their memories grama grass hay was cut and baled in areas now covered with creosotebush or mesquite, and that many of the washes, instead of being raw gullies as they are today, were clothed with grass."

There is no question that the Chihuahuan desert grassland in New Mexico was much more extensive at the time of European contact than it is today. In many places, it has completely disappeared, in others, it has been greatly reduced in extent. On the Jornada del Muerto, it is estimated that true grass-

lands (with shrubs absent) diminished from 58% of the vegetation in 1858 to essentially nothing in 1963 (Buffington & Herbel 1965). This was accompanied by an equal increase in shrub-dominance, particularly by mesquite (*Prosopis glandulosa*). Similar, though less dramatic, stories can be told from numerous sites in the Chihuahuan Desert. Pristine black grama grasslands are now mostly relictual and greatly reduced from their former dominance in the desert ecosystem.

The causes for this remarkable loss of Chihuahua desert grassland are complex and varied, and a full explanation is beyond the scope of this review. What is clear from numerous studies, however, is that simplistic over-generalizations are mostly misleading and often incorrect. Equally clear, though, is that several factors are usually involved, often in concert. The most significant of these seem to be human activity, fire, herbivory (grazing), and drought.

A list of the ways mankind has altered New Mexico landscapes and vegetation is seemingly endless: hunting, farming, ranching, mining, logging, stream impoundment, fire suppression, ground water utilization, off-road vehicles, timber and fuel-wood harvesting, urban development, road building, air and water pollution, introduction of exotic organisms, fragmentation and loss of habitat, flood control, irrigation, wetland draining, camping, fishing, and the introduction of pesticides and herbicides. Grasslands were heavily used for grazing and farming, and wild hay operations as well. Goodding (1938) reported that in the early days "hundreds of tons" of bush muhly were gathered and sold at the forts for horse feed. Bahre (1991) underscored the influence of human activity on vegetation with his conclusion that "any attempt at understanding vegetation dynamics must begin with the assumption that the landscape has been disturbed [by human activities] until it can be demonstrated that the assumption is false."

Fire has long been a factor in the ecology of New Mexico plant communities, and fire is commonly invoked in either the creation or the maintenance of grassland. The assertion is that fire did little harm to perennial grasses, burning above-ground material only, but killed or severely damaged woody plants, especially seedlings of encroaching shrubs or trees. That fire was a common occurrence on the prairies of the great plains is unquestioned, but its importance in the maintenance of plains or desert grassland is sometimes debated. Fires may have been rare or infrequent in some areas of the desert grassland where fuels necessary to carry a flame were scant and scattered, but in grasslands and savannas with thicker vegetation, fire was more prevalent. From examining newspaper accounts in southeastern Arizona between 1859 and 1890, Bahre (1991) concluded "... that during that period (1) wildfires were much larger in areal extent, especially in the grasslands, than they are now; (2) the occurrence of large grassland fires seems to have declined after the 1880s, probably as a result of overgrazing; (3) the cessation of major grassland fires preceded the 'brush invasion' of the late 1890s; (4) Indians, especially Apaches, set wildfires; (5) wildfire suppression was favored by early

Anglo settlers; (6) wildfires occurred in all of the major vegetation types, including desertscrub; and (7) wildfires were fairly frequent."

Grasses vary in their response to fire. Grasses of the plains-mesa grassland are stressed by fire during drought periods when the soil is dry, but recover relatively rapidly from fires during moist seasons. In contrast, black grama, a characteristic species of the desert grassland, is not at all fire-tolerant. It is severely harmed and recovers slowly after fire (Wright 1980). This argues against fire being an important factor in the maintenance of black grama desert grasslands. In grasslands composed of fire-tolerant species, however, reduction of fire frequency has apparently allowed woody plants that were fire-intolerant to invade and establish in grasslands and savannas.

There is no question that the influence of grazing by both native and exotic herbivores has been both pervasive and profound. Herbel (1984) judged that in some cases the damage to individual plants by rodents and lagomorphs can be greater than that done by domestic cattle, being especially severe on poor condition range and thus exacerbating the problem. The effect of grazing by rodents and rabbits may be enough to retard or prevent plant succession or recovery.

The damage to grasslands by introduced herbivores, cattle and sheep in particular, should not be understated, however. Domestic livestock came to New Mexico with the Spanish colonists, beginning with Coronado's expedition of 1540. By 1850, there were about 33,000 cattle in in the territory, close to 300,000 by 1890, and well over a million by 1906. The number of sheep were even greater, estimated at about 5.2 million in 1882. Livestock estimates for 1906, including sheep, cattle, horses, and goats, totaled 7,250,000 head (Dick-Peddie 1993; Donart 1984). The effects of such enormous herds were considerable, especially in the southern ranges that had not previously sustained the great herds of bison. There is no doubt that this contributed in great part to the demise of our native desert grasslands. This was observed almost first-hand by E.O. Woooton, who wrote in 1912: "Large areas formerly occupied by these grasses [black grama and bush muhly] are now either sandy wastes or are more or less covered by weeds that are of no value – and all because of the shortsighted and utterly selfish policy followed in the management of range lands." There was one other factor, however, that is often overlooked, and, in conjunction with severe over-stocking, tolled the death knell for black grama grasslands in particular.

Droughts of two to four-years duration, or more, seem to occur at regular intervals in the West, roughly every 20 to 25 years (Scurlock, 1995). Notable episodes of drought particularly occurred in the years 1886, 1890-1893, and 1899-1904, among others, corresponding to periods of heavy stocking levels. Though the plains-mesa grassland is especially resistant to dessication, black grama grassland is not nearly so resilient. Following the 1950s drought, Paulsen and Ares (1962) reported.

By 1956, 20 quadrats had lost all vestiges of black grama — it had been missing from these quadrats for 1 to 7 years. This species had disappeared from all protected quadrats, 67 percent of the heavily grazed, 62 percent of the intermediately grazed, and 30 percent of the conservatively grazed. ... During drought, black grama stems die first. … If drought is particularly acute or extended, the entire root crown of the plant may die and the plant is then lost.

The complete loss of black grama plants during drought has been noted by others as well. Jesse Gerard, who worked on the Jornada plain from 1954 to 1967, observed first-hand the death of black grama plants, and concluded that "It didn't make any difference how it was grazed." By 1956, it was "darn near bare everywhere" (personal interview, April 26, 1996).

The combination of heavy herbivory by both native and domestic grazers, drought, fire, and other high-intensity human activities has had dramatic and far-reaching effects. Much or even most of the Chihuahuan desert grassland, as a unified biologic unit, has disappeared or been greatly reduced in size or distribution. Though the individual species still exist, the vast expanses of waving black grama grassland are now a rare site.

Mountain Grassland: high-elevation grassland of *Festuca arizonica*, *F. thurberi*, and *F. calligera*; Lincoln County, Sacramento Mountains, Lincoln National Forest.

Mountain Grassland: low meadow of exotic *Poa pratensis* subsp. *pratensis;* Sierra County, Blank Range, Gila National Forest.

Plains-mesa (blue grama) Grassland: short-grass prairie of *Bouteloua gracilis*, *Buchloë dactyloides*, and *Elymus smithii*, with *Yucca angustissima*; Union County, Santa Fe Trail, Cottonwood Camp.

CLASSIFICATION OF NEW MEXICO GRASSES

Grasses belong to the plant family named Gramineae or Poaceae. Because of the great diversity in form and structure, physiology, chemistry, anatomy, molecular compounds, genetic material, and habitat in this family, grasses have been classified into subdivisions known as subfamilies and tribes, with each tribe composed of genera and species. A useful summary of historical and current classifications may be found in the review by the Grass Phylogeny Working Group (2001). The following synopsis outlines our current understanding of the classification of this family, using only subfamilies, tribes, and genera found in New Mexico.

GRAMINEAE (Poaceae) Family

ARISTIDOIDEAE Subfamily
- Aristideae Tribe
  - *Aristida*.

ARUNDINOIDEAE Subfamily
- Arundineae Tribe
  - *Arundo, Phragmites*.

BAMBUSOIDEAE Subfamily
- Bambuseae Tribe
  - *Phyllostachys*.

CHLORIDOIDEAE Subfamily
- Cynodonteae (Chlorideae) Tribe
  - *Aegopogon, Bouteloua, Buchloë, Chloris, Crypsis, Cynodon, Hilaria, Pleuraphis, Schedonnardus, Spartina, Tragus, Trichloris Zoysia.*
- Eragrostideae (Eragrosteae) Tribe
  - *Blepharidachne, Blepharoneuron, Calamovilfa, Dactyloctenium, Dasyochloa, Distichlis, Eleusine, Eragrostis, Erioneuron, Leptochloa, Lycurus, Muhlenbergia, Munroa, Redfieldia, Scleropogon, Sporobolus, Tridens, Triplasis.*
- Pappophoreae Tribe
  - Cottea, Enneapogon, Pappophorum.

DANTHONIOIDEAE Subfamily
- Danthonieae Tribe
  - *Cortaderia, Danthonia, Schismus*.

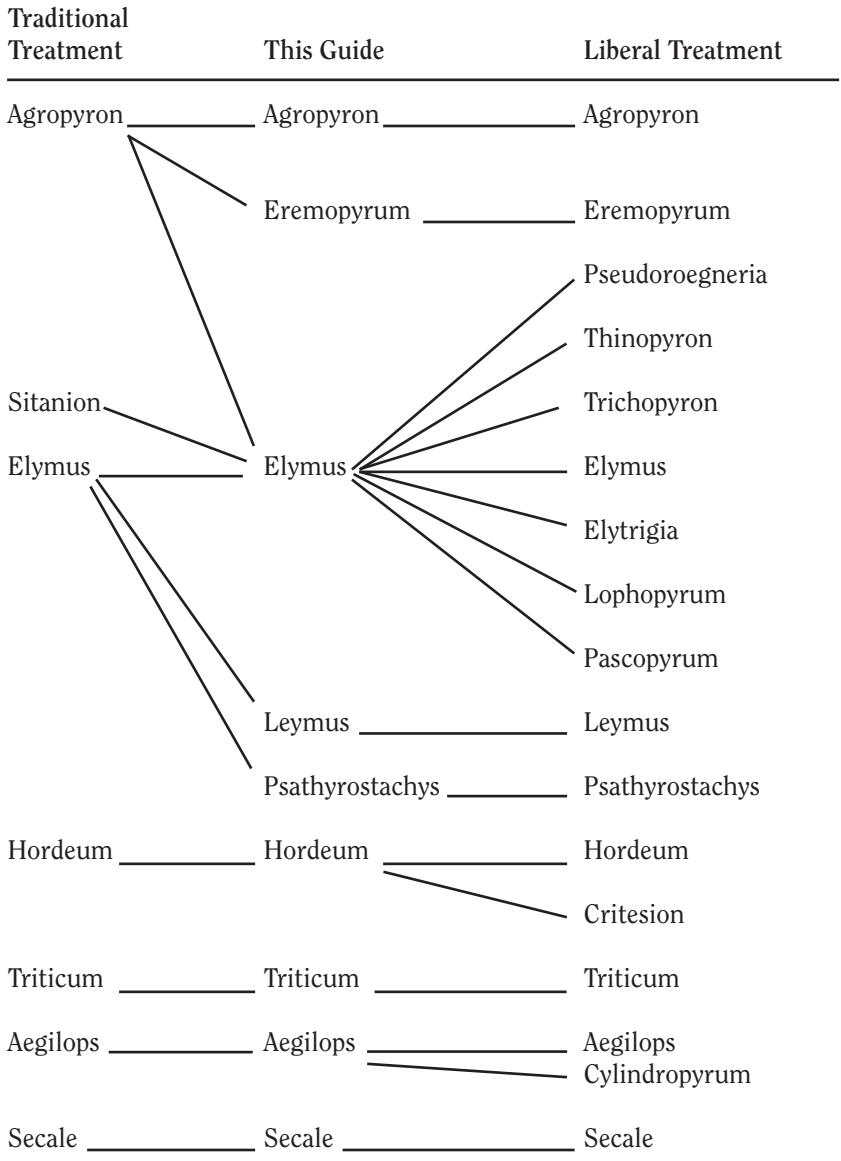
EHRHARTOIDEAE Subfamily
Oryzeae Tribe
Leersia.

PANICOIDEAE Subfamily
Andropogoneae Tribe
Andropogon, Bothriochloa, Coix, Elionurus, Hackelochloa, Heteropogon, Imperata, Miscanthus, Saccharum, Schizachyrium, Sorghastrum, Sorghum, Trachypogon, Tripsacum, Zea.
Paniceae Tribe
Brachiaria, Cenchrus, Dichanthelium, Digitaria, Echinochloa, Eriochloa, Panicum, Paspalum, Pennisetum, Melinis, Setaria, Stenotaphrum, Urochloa.

POOIDEAE Subfamily
Bromeae Tribe
Bromus.
Meliceae Tribe
Glyceria, Melica, Schizachne.
Poeae Tribe (includes the former Aveneae tribe)
Aveninae Subtribe: *Agrostis, Aira, Alopecurus, Anthoxanthum, Apera, Arrhenatherum, Avena, Beckmannia, Calamagrostis, Cinna,Deschampsia, Helictotrichon, Hierochloë, Holcus, Koeleria, Lagurus,Phalaris, Phleum, Polypogon, Sphenopholis, Trisetum.*
Poinae Subtribe: *Briza, Catabrosa, Catapodium, Dactylis, Festuca, Lolium, Poa, Puccinellia, Sclerochloa, Torreyochloa, Vulpia.*
Stipeae Tribe
Achnatherum, Hesperostipa, Nassella, Oryzopsis, Piptatherum, Piptochaetium.
Hordeae (Triticeae) Tribe
Aegilops, Agropyron, Elymus, Eremopyrum, Hordeum, Leymus, Psathyrostachys, Secale, Triticum.

The Hordeae (this name has priority over Triticeae) Tribe poses special problems in classification. Because of extensive hybridization among numerous species, even from different genera, the generic alignments of the species remain controversial. Based on analyses of chromosomes and hybridization, numerous changes have been proposed in recent years, many of which incorporate new genera into the system of classification (see Barkworth 1992). Some of these genera are recognized here (i.e., *Leymus* and *Psathyrostachys*), but some are not (i.e., *Lophopyrum* and *Pseudoroegneria*). To aid in tracking the changes from genus to genus within the Hordeae tribe, the following chart compares the generic alignments recognized in this guide with more traditional and liberal treatments.

Comparison of generic alignments in New Mexico Hordeae



HOW TO USE THE KEYS

I have tried to write the keys so they can be used with the naked eye or a hand lens (very useful, get one and keep it around your neck). Grasses are complex, and separating 481 different kinds can be a bit of a challenge at times. Just keep at it!

To identify a grass plant, start with the "Keys to the Genera" on page 20. The identification keys will present contrasting statements about the grass to be identified, i.e., "lemmas awned" or "lemmas awnless." Each statement will have the same number. (A pair of contrasting statements is called a "couplet;" each individual statement in a couplet is referred to as a "lead."). Choose the lead that best fits the plant, being sure to read the entire statement and keeping in mind variation within the population of plants. Follow the lead to the next couplet, and so on, until you locate the genus name.

A small word of advice from experience: If you have to ask yourself, in response to one of the leads, "Does this have ciliate hairs (or hooks, or awns, or shiny glumes, or whatever the feature may be)," then it probably doesn't, and you're advised to take the other choice (as long as you understand the terminology involved).

Then turn to "Keys to the Species of New Mexico Grasses" and find that particular genus. The genera are arranged alphabetically beginning on page 55. There will usually be a key to the species of that genus. Work through this key in the same way to reach a final determination of the species name. Check the information about habitats and distribution to help verify your identification.

For your convenience, a map of New Mexico counties and a metric rule are included on the inside front cover.

KEYS TO THE GENERA OF NEW MEXICO GRASSES

The treatment of the genera, with keys to their species, begins alphabetically on page 55.

1 Plants not known to flower in New Mexico, the spikelets not present; blades constricted at the base into a narrow stalk-like portion with a tuft of stiff bristles on each side: cultivated ornamentals .....***Phyllostachys***

1 Plants usually flowering each year, the spikelets present; blades not constricted at the base into a narrow stalk-like portion and without stiff bristles on each side; cultivated or wild grasses

2 All or some of the spikelets concealed and hidden from view within modified structures, such as spiny burs, involucres, bony rachis joints, dense fleshy cobs (ears), or detachable clusters of hard bracts .. GROUP I (page 22)

2 Spikelets not concealed and not hidden within modified structures, but evident and easily seen, sometimes closely subtended by foliage leaves or covered by hairs

3 One or more bristles (sterile branchlets) borne immediately below the spikelets, the bristles sometimes clustered into a bur or involucre

4 Spikelets disarticulating singly, leaving the bristles on the plant.....***Setaria***

4 Spikelets disarticulating with the involucre of bristles, the two falling together..... **Pennisetum**

3 Bristles not borne immediately below the spikelets, a bur or involucre absent

5 Glumes with numerous hooked prickles 1-2 mm long.....***Tragus***

5 Glumes lacking hooked prickles

6 Lemma with 7-13 awns (rarely 5) .....GROUP II (page 23)

6 Lemma with 1-3 awns or awnless

7 Flowering shoots 2 meters or more tall .....GROUP III (page 24)

7 Flowering shoots less than 2 meters tall

8 All or many of the spikelets sessile and borne on the main axis; inflorescence branches absent, the inflorescence a spike, spicate raceme, or dense head-like cluster of spikelets ..... GROUP IV (page 27)

8 All or most of the spikelets borne on branches, the inflorescence a panicle, or if branches absent then all the spikelets with evident pedicels and few (if any) sessile

9 Andropogoneae Tribe: Glumes mostly hardened (membranous in *Zea* and *Imperata*), completely enclosing the florets, dorsally compressed; spikelets borne in pairs, one spikelet sessile or subsessile and one spikelet pedicelled (sometimes the pedicelled spikelet absent, but the pedicel always present); lemmas very thin and translucent, delicate, awned or awnless; disarticulation below the glumes and nearly always in units consisting of a sessile spikelet with attached rachis joint and pedicel (the pedicelled spikelet present or absent)..... GROUP V (page 34)

9 Combination of features other than above

10 Spikelets with a single floret only ..... GROUP VI (page 37)

10 Spikelets with at least 2 florets, some may be small and poorly developed (look carefully)

11 Paniceae Tribe: Spikelets with 2 florets, the upper bisexual and usually with a hardened lemma at maturity, the lower male or neuter; lemma of the lower floret similar to the second glume in size and texture; disarticulation below the glumes; spikelets dorsally compressed .....GROUP VII (page 43)

11 Combination of features other than above

12 Lemmas with 3 nerves, the nerves usually prominent ..... GROUP VIII (page 45)

12 Lemmas with 5-many nerves, at least at the base, or the nerves not discernible..... .....GROUP IX (page 49)

GROUP I
Spikelets variously concealed

1 Spikelets enclosed in a bur (involucre) of bristles or stiff spines, the bur falling entire

2 Bur of sharp, stiff spines ..... ***Cenchrus***

2 Bur of bristles, without spines .....***Pennisetum***

1 Spikelets not enclosed in a bur (involucre) of bristles or spines

3 Plants mat- or sod-forming, with stolons or rhizomes

4 Sheaths strongly compressed-keeled; spikelets all alike and sunken into one side of a corky or succulent, flattened rachis; cultivated lawn grasses .....***Stenotaphrum***

4 Sheaths rounded; spikelets unisexual and different in appearance, the male on spicate, flag-like primary branches raised above the foliage, the female in bony clusters hidden in the foliage; native range grasses, but sometimes also grown as a lawn grass .....***Buchloë***

3 Plants not mat-forming, without stolons or rhizomes

5 Glumes with numerous hooked prickles 1-2 mm long .....***Tragus***

5 Glumes lacking hooked prickles

6 Female spikelets borne singly in hard, whitish beads at the ends of long stalks; ornamental or garden grasses only infrequently grown .....***Coix***

6 Female spikelets borne in cobs, or if bead-like then several borne adjacent to each other; cultivated or wild grasses

7 Spikelets borne in spicate racemes no more than 2 cm long; spikelets paired, the sessile one bisexual, grenade-shaped, and covered with square pits, the pedicelled one male and flattened; rare .....***Hackelochloa***

7 Spikelets borne in panicles or cobs more than 10 cm long; spikelets all unisexual, the sexes in different part of the same inflorescence or in separate inflorescences on the same plant

8 Male spikelets borne in a terminal panicle (tassel); female spikelets borne below in a thick axillary spike (cob) and covered by leaf sheaths, the styles (silk) protruding from the tip; cultivated grasses .....***Zea***

8 Male and female spikelets borne together in the same panicle, the male ones papery and in pairs at the terminal portion of the spicate branches, the female ones bony and at the base of the same branches; wild grasses, but probably not extirpated from the state ..... ***Tripsacum***

GROUP II
Lemma with 7-13 awns

1 Awns plumose, feathery, more-or-less equal in length .....***Enneapogon***

1 Awns glabrous to scabrous, not plumose and not equal in length

2 Glumes 1-nerved .....***Pappophorum***

2 Glumes many-nerved ..... ***Cottea***

GROUP III
Flowering shoots 2 meters or more tall

1 Grasses cultivated for ornament, landscaping, or as a harvested crop, occasionally escaping around fields or dwellings

2 Corn: male spikelets borne in a terminal panicle (tassel); female spikelets borne on the stem on a thick axillary spike (cob) covered by leaf sheaths (the ear), the styles (silks) protruding from the tip ....***Zea***

2 Plants not as above

3 Plants growing in large, thick tussocks with numerous flowering shoots; rhizomes lacking

4 Blades sharply saw-toothed on the margins; spikelets borne singly on rebranching branches of the inflorescence, with several florets extending beyond thin glumes ..... ***Cortaderia***

4 Blades scabrous to smooth on the margins; spikelets borne in pairs one spicate branches, with no florets extending beyond the stiff glumes

5 Panicle branches breaking apart at the nodes (joints) when mature.....***Saccharum***

5 Panicle branches remaining intact, the spikelets falling separately when mature .....***Miscanthus***

3 Plants not in large tussocks, the shoots single, or if clustered then with strong vigorous rhizomes

6 Plants annual, lacking rhizomes .....***Sorghum bicolor***

6 Plants perennial, with vigorous rhizomes

7 Panicles plume-like, with very dense silky hairs; plants commonly to 6 or 7 meters tall .....***Arundo***

7 Panicles slightly pubescent but not plume-like; plants rarely taller than 3 meters.....***Sorghum***

1 Grasses wild or weedy, or seeded for range or pasture improvement, but not crop or ornamental plants

8 Plants tufted, not developing rhizomes

9 Spikelets subtended by numerous bristles; plants annual..... ***Setaria magna***

9 Spikelets not subtended by bristles, but may be pubescent; plants perennial

10 Inflorescence a spike, no branches developed ..... ***Elymus***

10 Inflorescence a panicle with branches

11 Disarticulation above the glumes; spikelets awned

12 Basal sheaths compressed-keeled; spikelets purplish; awns less than 1.5 cm long..... ***Muhlenbergia***

12 Basal sheath round; spikelets greenish or tawny; awns 2-3 cm long ..... ***Achnatherum robustum***

11 Disarticulation below the glumes; spikelets awned or awnless; sheaths mostly rounded

13 Inflorescence branches 2-5 in number and mostly not rebranched, clustered toward the tip of the shoot..... ***Andropogon gerardii***

13 Inflorescence branches numerous and rebranched, not clustered toward the tip of the shoot ..... ***Panicum***

8 Plants developing rhizomes

14 Disarticulation below the glumes, the spikelets falling entire

15 Inflorescence a panicle of 2-5 spicate, unbranched primary branches clustered at the tip of the shoot, sometimes a few of the branches rebranching..... ***Andropogon gerardii***

15 Inflorescence a rebranched panicle, the numerous primary branches always rebranching

16 Outer bracts of the spikelet (glumes) membranous, thin and flexible, not hardened; upper floret hardened at maturity; spikelets awnless.....***Panicum***

16 Outer bracts of the spikelet (glumes) stiff, hardened; inner floret very thin and delicate, not at all hardened; spikelets awned, at least when young

17 Spikelets dull, fuzzy-hairy, the hairs standing out from the spikelet; awn persistent through maturity .....***Sorghastrum***

17 Spikelets somewhat shiny, glabrous or slightly pubescent, the hairs pressed against the spikelet; awn early-deciduous .....***Sorghum***

14 Disarticulation above the glumes, the glumes remaining on the plant and the florets falling

18 Panicles with unbranched spicate branches ..... ***Spartina***

18 Panicles with rebranched branches

19 Spikelets with a single floret .....***Calamovilfa***

19 Spikelets with several florets

20 Glumes nearly equal in length; rachilla glabrous; lemma long-hairy .....***Arundo***

20 Glumes unequal, the first about half as long as the second; rachilla beset with long silky hairs; lemma glabrous.....***Phragmites***

GROUP IV

Inflorescence a spike, spicate raceme, or dense head-like cluster, all or many of the spikelets sessile on the main axis, branches absent from the inflorescence.

1 Disarticulation below the glumes, the spikelets falling entire or in clusters, no spikelet parts left on the axis

2 Main axis of the inflorescence breaking apart at maturity

3 Spikelets borne in pairs of one sessile and one pedicelled (sometimes only the pedicel present); glumes mostly enclosing the spikelet, the florets mostly not visible (members of the Andropogoneae tribe)

4 Spikelets awned, the awns at least 5 mm long

5 Awns 1-2 cm long ..... ***Schizachyrium***

5 Awns 4-12 cm long

6 Racemes 4-8 cm long; awns 5-12 cm long; main axis (or most of it) breaking apart when mature..... ***Heteropogon***

6 Racemes 10-18 cm long; awns 4-6 cm long; main axis persistent ..... ***Trachypogon***

4 Spikelets awnless, or with awns 1-2 mm long

7 Racemes less than 3 cm long, glabrous or only sparsely pubescent; plants annual ..... ***Hackelochloa***

7 Racemes more than 4 cm long, densely wooly-pubescent; plants perennial ..... ***Elionurus***

3 Spikelets borne other than above; glumes may be longer than, but not enclosing the spikelet, the florets usually visible (Hordeae tribe)

8 Spikelets 3 at each node of the main axis, the lateral pair pedicelled, the central spikelet sessile; spikelets with one floret ..... ***Hordeum***

8 Spikelets mostly 1 or 2 at each node of the main axis, if 3 then not otherwise as above; spikelets with 2 to many florets

9 Spikelets mostly 1 at each node of the main axis

10 Plants annual

11 Spikes 0.6-2 cm long .....***Eremopyrum***

11 Spikes 5-10 cm long .....***Aegilops***

10 Plants perennial

12 Inflorescence very dense, almost head-like, the rachis obscured and viewed only with difficulty; fertile plants of alpine or subalpine habitats ..... ***Elymus scribneri***

12 Inflorescence less congested and somewhat elongate, not at all head-like, the rachis easily observed; sterile hybrid plants of low-elevation or mid-montane habitats

13 Awns of the lemma 4-17 mm long, usually erect; rachis internodes 2.5-6(7) mm long ... these are *Elymus longifolius x E. trachycaulus* hybrids [*Elymus saundersii* Vasey, *Agropyron saundersii* (Vasey) A.S. Hitchc.].

13 Awns of the lemma (14)18-37 mm long, spreading to recurved downward; rachis internodes mostly 7-10 mm long ... these are *Elymus longifolius* x *E. spicata* hybrids [*Elymotrigia saxicola* (Scribn. & Smith) Barkworth & Dewey, *Elymus saxicolus* Scribn. & Smith].

9 Spikelets mostly 2 at each node of the main axis

14 Glumes 3-7 mm long; anthers 4-5 mm long ....***Psathyrostachys***

14 Glumes 12-100 mm long; anthers, when present, about 2 mm long

15 Glumes 12-24 mm long; sterile hybrid plants ... these are *Elymus trachycaulus* x *Hordeum jubatum* hybrids [*Elyhordeum macounii* (Vasey) Barkworth & Dewey, *Elymus macounii* Vasey], arising at sites where both parents were present.

15 Glumes 25-100 mm long; fertile plants ..... ***Elymus***

2 Main axis of the inflorescence remaining intact

16 Plants strongly rhizomatous or stoloniferous perennials

17 Wild range grasses, not cultivated in lawns; spikelets falling in clusters of three

18 Plants stoloniferous, rhizomes absent; glumes fused at the base; blades usually with papillae-based hairs..... ***Hilaria***

18 Plants rhizomatous, forming robust tussocks or tufts; glumes free at the base; blades lacking papillae-based hairs ..... ***Pleuraphis***

17 Lawn grasses, occasionally escaping in weedy ground in residential areas; spikelets not falling in clusters of three

19 Plants mostly stoloniferous; blades fleshy and somewhat succulent; spikelets borne on one side of a flattened, succulent main axis ..... ***Stenotaphrum***

19 Plants mostly rhizomatous; blades thin and membranous, not at all succulent; spikelets variously disposed on short pedicels around the thin, non-succulent main axis ..... ***Zoysia***

16 Plants tufted annuals or perennials, not stoloniferous or rhizomatous

20 Plants cultivated lawn grasses or weedy in lawns

21 Spikelets pointed at the tip and arranged on one side of a thickened rachis ..... ***Stenotaphrum***

21 Spikelets blunt at the tip and arranged on both sides of the rachis ..... ***Sclerochloa***

20 Plants of various habitats, but never cultivated or weedy in lawns

22 Awns 4-6 cm long; plants perennial ..... ***Trachypogon***

22 Awns, if present, less than 2 cm long

23 Spikelets in clusters of 3, each spikelet with a short pedicel and all 3 pedicels joined at the base to form the cluster, which falls as a single unit; plants delicate annuals; Hidalgo County.....***Aegopogon***

23 Spikelets single or in pairs, not clustered as a bove; plants annual or perennial; distribution various

24 First glume with 2 or 3 awns; lower stems angled or flattened somewhat.....***Lycurus***

24 First glume with a single awn or awnless; lower stems rounded‘

25 Glumes awnless; lemma awned (use a lens) ..... ***Alopecurus***

25 Glumes awned

26 Glumes strongly flattened laterally, ciliate on the keeled midnerve.....***Phleum***

26 Glumes rounded on the back, not keeled, not ciliate on the midnerve but may be pubescent elsewhere.....***Polypogon***

1 Disarticulation above the glumes, the glumes often remaining on the inflorescence

27 Spikelets of two different kinds, the male spikelets awnless and the female spikelets with awns 9-10 cm long, the plants mostly dioecious and stoloniferous ..... ***Scleropogon***

27 Spikelets all similar, awnless or with awns mostly less than 6 cm long; plants tufted or if stoloniferous then with short awns

28 Spikelets in very dense ovoid, wooly heads, at most 2 times longer than wide, with longer awns conspicuous and protruding (resembling Polypogon); plants annual, with markedly pubescent leaves and sheaths; grown for ornament and dried bouquets, rarely escaping ..... ***Lagurus***

28 Plants not as above in every characteristic

29 Lemmas with 3 awns .....***Aristida***

29 Lemmas with one awn or awnless

30 Spikelets with one floret only

31 Plants annual; leaves with prominent, claw-like auricles 2-6 mm long; awns 50-160 mm long.....***Hordeum***

31 Plants perennial; leaves without auricles, or occasionally with small rounded auricles about 1 mm long; awns 1-4 mm

32 Spikelets strongly compressed; glumes flattened, keeled on the midnerve, completely enclosing the floret..... ***Phleum***

32 Spikelets not strongly compressed; glumes rounded on the back, only slightly keeled, not completely enclosing the floret ..... **Muhlenbergia**

30 Spikelets with more than one floret, some may be poorly developed, rudimentary, or vestigial

33 Spikelets in dense, sessile, head-like clusters that are mostly surpassed by and nestled within the foliage

34 Plants annual; blades flat; glumes shorter than the lower lemma .....***Munroa***

34 Plants perennial; blades rolled; glumes longer than the lower lemma.....***Dasyochloa***

33 Spikelets not in dense, head-like clusters, or if so then elevated well above the foliage

35 Lemmas with 3 conspicuous nerves

36 Lemmas conspicuously pubescent; spikelets with several well-developed florets; blades white-margined..... ***Erioneuron***

36 Lemmas glabrous or scabrous; spikelets with one well-developed floret and 1-3 rudiments above it; blades not white-margined ..... ***Bouteloua***

35 Lemmas with 1 or 5-several nerves

37 Plants low annuals; inflorescence not a true spike, but the branches very short with 1-3 spikelets borne on short pedicels nearly on the main axis; lemmas about 2 mm long, the glumes mostly shorter ..... ***Catapodium***

37 Plants, inflorescence, lemmas, and glumes not as above

38 Spikelets 2 or more per node of the rachis

39 Rhizomes present, evident, creeping ..... ***Leymus***

39 Rhizomes absent, occasionally short rhizomes developed but the plants still forming dense clumps

40 Glumes absent or reduced to one or two minute bristles; spikelets horizontally spreading or ascending at maturity ..... ***Elymus***

40 Glumes present; spikelets rarely horizontally spreading

41 Glumes 2-10 cm long ..... ***Elymus***

41 Glumes shorter than 1.5 cm

42 Glumes 2- to 5-nerved; anthers 1.5-3 mm long ..... ***Elymus***

42 Glumes 1-nerved; anthers 3-5 mm long ..... ***Psathyrostachys***

38 Spikelets mostly 1 per node of the rachis

43 Spikelets placed edge-wise to the rachis, the first glume absent on all but the terminal spikelets ..... ***Lolium***

43 Spikelets placed flat-wise to the rachis; both glumes present on all spikelets

44 Plants annual

45 Spikes very short, 0.6-2 cm long; plants usually less than 30 cm tall

46 Inflorescence exserted from the sheath at maturity; glumes and lemmas awn-tipped; blades with small auricles .....***Eremopyrum***

46 Inflorescence often partially enclosed in the upper sheath; glumes and lemmas blunt-tipped; blades lacking auricles .....***Sclerochloa***

45 Spikes longer, mostly 5-15 cm long; plants usually much more than 30 cm tall

47 Glumes narrow, linear, 1-nerved; spikelets with 2 florets..... ***Secale***

47 Glumes broad, oblong to ovate, 3- to several-nerved; spikelets mostly with 3-5 florets

48 Nerves of the lemma converging at the apex; plants commonly glaucous.....x***Triticosecale***

48 Nerves of the lemma more-or-less parallel, not converging at the apex; plants commonly green and not glaucous..... ***Triticum***

44 Plants perennial

49 Spikelets borne in pairs of one pedicelled and one nearly sessile; glumes awnless; lemmas awned, the awns 4-6 cm long..... ***Trachypogon***

49 Spikelets not as above

50 Glumes linear, needle-like, 1-nerved (occasionally broader at the base and 3-nerved).....***Leymus***

50 Glumes lanceolate or broader, usually 3- to 7-nerved

51 Spikelets spreading away from the rachis, placed very close together on the main axis; rachis internodes between the spikelets 0.3-3 mm long in the middle of the spike.....***Agropyron***

51 Spikelets mostly pressed against the rachis, or curving outward toward the tip of the spikelet; rachis internodes between the spikelets 4-25 mm long.....***Elymus***

GROUP V
Andropogoneae Tribe

1 Spikelets all unisexual, the male and female spikelets conspicuously different in form and borne either separately in the same inflorescence or in separate inflorescences on the same plant; plants monoecious

2 Female spikelets borne singly in hard, whitish beads at the end of long stalks; domesticated grasses .....***Coix***

2 Female spikelets in cobs, or if bead-like then not borne singly at the end of long stalks but adjacent to other bony spikelets; wild or domesticated grasses

3 Corn: male spikelets borne in a terminal panicle (tassel); female spikelets in a separate inflorescence and borne below on a thick axillary spike (cob) and covered by leaf sheaths (the ear), the styles (silks) protruding from the tip; domesticated grasses.....***Zea***

3 Male and female spikelets borne together in the same panicle, the male ones papery and in pairs at the terminal portions of the spicate branches, the female spikelets bony and at the base of the same branches; wild grasses ..... ***Tripsacum***

1 Spikelets unisexual or bisexual but usually not conspicuously different in form, borne in pairs and not separated one from the other; plants not monoecious

4 Each inflorescence a panicle with branches (occasionally a few inflorescences with a single branch), with or without inflated sheaths subtending the inflorescence (spathes)

5 Spikelets all similar in appearance and size

6 Pedicels without a spikelet borne at the tip

7 Flowering shoots mostly with one or a few large, terminal panicles 10 cm or more long.....***Sorghastrum***

7 Flowering shoots with numerous small panicles clustered together, each less than 3 cm long and each with a subtending spathe .....***Andropogon***

6 Pedicels with a spikelet borne at the tip

8 Pedicels and rame segments (rachis joints) with a central longitudinal groove or membrane, flattened in cross-section .....***Bothriochloa***

8 Pedicels and rame segments without a central groove or membrane, nearly round in cross-section

9 Panicles narrow and spike-like, with soft silky hairs, 1-3 cm wide and 8-18 cm long, the branches scarcely noticeable at arm's length .....***Imperata***

9 Panicles not as above, usually wider and/or shorter or the branches obvious at arm's length

10 Panicles with 2-5 primary branches; plants rarely cultivated for ornament, tufted or rhizomatous .....***Andropogon***

10 Panicles with more than 10 branches; plants cultivated for ornament, tufted and growing in large tussocks

11 Panicle branches breaking apart at the nodes (joints) when mature; blades and sheaths ciliate-margined near the collar area .....***Saccharum***

11 Panicle branches remaining intact, the spikelets falling separately when mature; blades and sheaths not ciliate-margined .....***Miscanthus***

5 Spikelets not all similar, the pedicelled ones often smaller in size or different in appearance when compared to the sessile ones

12 Pedicels and rame segments (rachis joints) with a central groove or membrane running lengthwise, flattened in cross section ..... ***Bothriochloa***

12 Pedicels and rame segments without a central groove or membrane, nearly round in cross section, at least at the apex

13 Inflorescence an open panicle with numerous (more than 5) rebranched branches; spikelets ovoid to nearly globose ..... ***Sorghum***

13 Inflorescence a panicle with 2-5 nearly digitate and mostly unbranched branches; spikelets lanceolate ..... ***Andropogon gerardii***

4 Each inflorescence a single unbranched spicate raceme without branches, subtended by a somewhat inflated bladeless sheath (spathe), the flowering shoot usually bearing numerous such inflorescences

14 Spikelets awnless, or with awns 1-2 mm long

15 Racemes less than 3 cm long, glabrous or only sparsely pubescent ..... ***Hackelochloa***

15 Racemes more than 4 cm long, densely wooly-pubescent ..... ***Elionurus***

14 Spikelets awned, the awns at least 5 mm long

16 Awns 0.5-2 cm long ..... ***Schizachyrium***

16 Awns 4-12 cm long

17 Racemes 4-8 cm long; awns 5-12 cm long; the main axis breaking apart at maturity, at least most of it..... ***Heteropogon***

17 Racemes 10-18 cm long; awns 4-6 cm long; the main axis persistent ..... ***Trachypogon***

GROUP VI
Spikelets with a single floret.

1 Glumes absent; leaf blades strongly saw-toothed on the edges .....***Leersia***

1 Glumes present, at least one; leaf blades smooth to slightly saw-toothed on the edges

2 Glumes and lemmas awnless

3 Inflorescence a panicle of evident, unbranched, spicate primary branches

4 Panicle branches all attached at the tip of the main axis ..... ***Cynodon***

4 Panicle branches attached along the length of the main axis, not only at the tip

5 Glumes equal in length or nearly so; spikelets nearly round in outline .....***Beckmannia***

5 Glumes unequal, the first glume shorter than the second; spikelets lanceolate in outline

6 Spikelets widely spaced, rarely overlapping, appearing embedded in the branches; blades spirally twisted..... ***Schedonnardus***

6 Spikelets very closely spaced, overlapping, not at all appearing embedded in the branches; blades not spirally twisted ..... ***Spartina***

3 Inflorescence a panicle of rebranched branches, or dense and spike-like

7 Disarticulation below the glumes

8 Spikelets nearly round in outline, the glumes somewhat inflated or puffy-looking .....***Beckmannia***

8 Spikelets mostly lanceolate in outline, the glumes not at all inflated or puffy-looking

9 Glumes softly pubescent on the midnerves; inflorescence dense and spike-like, rarely lobed ..... ***Alopecurus***

9 Glumes glabrous to scabrous, not softly pubescent; inflorescence usually lobed at least below ..... ***Polypogon***

7 Disarticulation above the glumes

10 Lemma hardened at maturity, enclosing the palea and flower

11 Lemma with 1 or 2 slender bracts, bristles, or scales at the base of the floret, these sometimes pubescent and often difficult to see without dissecting carefully ..... ***Phalaris***

11 Lemma without any bracts, bristles, or scales at the base of the floret

12 Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part ..... ***Piptatherum***

12 Florets terete; lemma margins slightly overlapping, the palea hidden

13 Blades flat or loosely rolled; lemma body sparsely pubescent with short appressed hairs, the callus very densely ringed with short hairs ..... ***Oryzopsis***

13 Blades rolled; lemma body densely long pubescent as is the callus ..... ***Achnatherum***

10 Lemma remaining thin and flexible, not hardened, not enclosing the palea

14 Lemma with a single nerve; ligule a ring of hairs

15 Plants turf-forming, planted for lawns; first glume absent, the second glume enclosing the floret ... ***Zoysia***

15 Plants tufted, not turf-forming, never used in lawns; glumes not as above

16 Lemma with a tuft of hairs at the base ..... ***Calamovilfa***

16 Lemma without a tuft of hairs at the base ..... ***Sporobolus***

14 Lemma with 3 or more nerves; ligule a membrane

17 Lemma and palea nerves densely pubescent ..... ***Blepharoneuron***

17 Palea nerves glabrous or scabrous; lemma nerves not densely pubescent but may be short-pubescent

18 Sheath margins fused together for half their length or more ..... ***Catabrosa***

18 Sheath margins overlapping most of their length

19 Palea about as long as the lemma; body of the glumes (not including awn tips) shorter than the lemma; lemma mostly 3-nerved ..... ***Muhlenbergia***

19 Palea half or less as long as the lemma; body of the glumes longer than the lemma; lemma obscurely nerved ..... ***Agrostis***

2 Glumes and/or lemmas awned

20 Inflorescence a panicle of several evident, unbranched, spicate, primary branches

21 Spikelets nearly round in outline, the glumes somewhat inflated ..... ***Beckmannia***

21 Spikelets lanceolate in outline, the glumes not at all inflated

22 Panicle branches all less than 2 cm long ..... ***Bouteloua***

22 Panicle branches mostly longer than 2 cm long ..... ***Spartina***

20 Inflorescence a panicle of rebranched branches, or a raceme, or in some the pedicels and branches poorly developed and the inflorescence spike-like

23 Lemma hard at maturity, usually enclosing the palea and flower, mostly with a well-developed and pointed callus

24 Ligule a ring of hairs; lemma terminating in three awns, the two lateral awns occasionally shortened and inconspicuous .....***Aristida***

24 Ligule a membrane; lemma terminating in a single awn, this may be deciduous

25 Palea hardened, longitudinally grooved and slightly longer than the lemma, protruding from between the lemma margins as a small point; lemma margins involute, fitting into the grooves of the palea .....***Piptochaetium***

25 Palea usually membranous, not grooved, shorter than or equaling the lemma, not protruding as a small point; lemma margins flat

26 Lemma margins strongly overlapping; palea less than 1/3 the length of the lemma, glabrous, lacking veins .....***Nassella***

26 Lemma margins not or only slightly overlapping; palea 1/3 to equaling the length of the lemma, always pubescent when short, sometimes glabrous when longer, 2-veined

27 Awns 6-20 cm long or more; glumes longer than 1.8 cm .....***Hesperostipa***

27 Awns 0.5-7.5 cm long, if longer than 6 cm then the glumes 1-1.5 cm long

28 Palea pubescent, the apex flat, the veins terminating below the apex; lemma coriaceous at maturity but not strongly indurate .....***Achnatherum***

28 Palea glabrous or pubescent, the apex appearing prow-tipped or pinched, the veins extending to the apex; lemma indurate at maturity

29 Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part.....***Piptatherum***

29 Florets terete; lemma margins slightly overlapping, the palea hidden

30 Blades flat or loosely rolled; lemma body sparsely pubescent with short appressed hairs, the callus very densely ringed with short hairs..... ***Oryzopsis***

30 Blades rolled; lemma body densely long pubescent as is the callus ..... ***Achnatherum***

23 Lemma not hard (somewhat so in Apera but then the rachilla prolonged beyond the palea), not enclosing the flower and palea; mostly without a well-developed callus

31 Inflorescence spike- or head-like, the branches absent or highly shortened

32 First glume 2-nerved with 2 or 3 awns; lower stems angled or flattened somewhat ..... ***Lycurus***

32 First glume 1-nerved with a single awn or awnless; lower stems rounded

33 Glumes plumose; spikelets in dense ovoid heads, rarely any more than 2 times longer than wide; plants annual with markedly pubescent sheaths and blades, grown for ornament and dried bouquets, rarely escaping..... ***Lagurus***

33 Plants not as above in all respects

34 Glumes awnless; lemma awned ..... ***Alopecurus***

34 Glumes awned

35 Glumes strongly flattened laterally, ciliate on the keeled midnerve..... ***Phleum***

35 Glumes rounded, not keeled, not ciliate on the midnerve, but may be pubescent on the body..... ***Polypogon***

31 Inflorescence a panicle with evident branches

36 Disarticulation below the glumes

37 First glume with 2 or 3 awns; spikelets falling in pairs

38 Plants perennial; awn of second glume longer than the body ..... ***Lycurus***

38 Plants annual; awn of second glume shorter than the body ..... ***Muhlenbergia***

37 First glume with a single awn or awnless

39 Spikelets nearly circular in outline; glumes and lemma awnless (glumes with a tiny point, but not awned) ..... ***Beckmannia***

39 Spikelets elongate, not circular in outline; glume and/or lemmas awned

40 Glumes awnless; lemma awned

41 Panicle loose, the branches at least 5 cm long and drooping at maturity ..... ***Cinna***

41 Panicle cylindrical, dense, the branches very short ..... ***Alopecurus***

40 Glumes awned

42 Glumes strongly flattened laterally, ciliate on the keeled midnerve ..... ***Phleum***

42 Glumes rounded, not keeled, not ciliate on the midnerve, but may be pubescent on the body ..... ***Polypogon***

36 Disarticulation above the glumes

43 Glumes strongly flattened laterally, ciliate on the keeled midnerve ..... ***Phleum***

43 Glumes rounded, not keeled, not ciliate on the midnerve

44 Lemma awned from the back, at about the middle or below

45 Floret with a tuft of hairs at the base; rachilla prolonged beyond the palea as a slender bristle..... ***Calamagrostis***

45 Floret without a tuft of hairs at the base; rachilla not prolonged beyond the palea.....***Agrostis***

44 ..... Lemma awned from the apex or just below

46 Rachilla prolonged beyond the palea as a slender bristle; plants annual .....***Apera***

46 Rachilla not prolonged beyond the palea; plants annual or perennial .....***Muhlenbergia***

GROUP VII
Paniceae Tribe

1 Spikelets subtended by one or more bristles or enclosed in an involucre of spines or bristles

2 Spikelets subtended by one to several bristles, these remaining on the plant when the spikelets fall .....***Setaria***

2 Spikelets enclosed in a bowl-like cluster (bur or involucre) of bristles or flattened spines, these falling with the spikelets and not remaining on the plant

3 Bur of sharp spines ..... ***Cenchrus***

3 Bur of bristles, without spines .....***Pennisetum***

1 Spikelets not subtended by bristles or spines

4 Inflorescence spike-like, the spikelets embedded in the side of a somewhat corky rachis.....***Stenotaphrum***

4 Inflorescence a panicle, the spikelets not at all embedded in the rachis

5 Spikelets covered with long, silky, reddish hairs 2-4 mm long .....***Melinis***

5 Spikelets glabrous or pubescent, but any hairs never as above

6 First glume usually less than 0.5 mm long, absent or vestigial

7 Inflorescence an open rebranched panicle, the spikelets on long pedicels .....***Digitaria***

7 Inflorescence a panicle of unbranched branches, the spikelets sessile or short-pedicelled

8 Spikelets with a small cup-like structure at the base (the first glume); lemma of upper floret awn-tipped.....***Eriochloa***

8 Spikelets without a cup-like structure at the base; lemma of upper floret not awn-tipped

9 Spikelets rounded on one side and flattened on the other, orbicular to ovate in outline; margins of the lemma of the upper floret firm and hard when mature, the apex rounded .....***Paspalum***

9 Spikelets not rounded and flattened as above, lanceolate in outline; margins of the lemma of the upper floret thin and translucent when mature, the apex acute to acuminate .....***Digitaria***

6 First glume usually more than 0.5 mm long, well-developed, evident

10 Ligule absent, the ligular region glabrous; plants annual .....***Echinochloa***

10 Ligule present, the ligular region often pubescent; plants annual or perennial

11 Lemma of the upper floret with a stiff bristle projecting from the otherwise blunt apex .....***Urochloa***

11 Lemma of the upper floret without a bristle, the apex rounded to acute

12 Inflorescence a panicle of simple or nearly simple spicate branches; spikelets nearly sessile; back of fertile lemma and second glume turned toward the branch axis; plants annual .....***Urochloa***

12 Inflorescence an open rebranched panicle, or if with simple branches (Panicum obtusum) then the plants stoloniferous perennials; spikelets often pedicelled; back of fertile lemma and second glume turned away from the branch axis; plants annual or perennial

13 Plants perennial, with two distinct growth phases: during the cool season producing a basal rosette of short broad blades and terminal panicles; during the warm season producing much-branched lateral shoots with small axillary panicles.....***Dichanthelium***

13 Plants annual or perennial, with a single growth phase; basal rosettes not produced; flowering during the warm season only .....***Panicum***

GROUP VIII
Lemmas 3-nerved; florets more than one.

1 Some spikelets (female ones) with long awns 5 cm or more long; plants stoloniferous, monoecious or dioecious, with awnless male spikelets..... ***Scleropogon***

1 All spikelets with awns less than 1 cm long or awnless; plants stoloniferous or tufted, unisexual in Buchloë or bisexual

2 Spikelets in dense, sessile, head-like clusters closely subtended and mostly surpassed by the leaves

3 Disarticulation below the glumes, the spikelets in bony clusters and falling together; plants strongly stoloniferous perennials .....***Buchloë***

3 Disarticulation above the glumes, the spikelets not falling in bony clusters; plants annual or perennial, stoloniferous or tufted

4 Plants annual; blades mostly flat.....***Munroa***

4 Plants perennial; blades mostly rolled and needle-like

5 Plants tufted, lacking stolons; lemmas with 3 ciliate awns from the nerves ..... ***Blepharidachne***

5 Plants producing short stolons; lemmas with a single awn, the lateral nerves extending into lobes..... ***Dasyochloa***

2 Spikelets not in dense, sessile, head-like clusters, and/or elevated well above the leaves

6 Inflorescence a panicle of definite and obvious spicate or racemose unbranched primary branches

7 Spikelets all male, 2-flowered with orange-red anthers; lemmas awnless ..... ***Buchloë***

7 Combination of features otherwise

8 Panicle branches all digitate or in whorls near the apex of the main axis

9 Spikelets with 2-several well-developed, bisexual florets

10 Second glume and some lemmas short-awned or mucronate; rachis projecting as a stiff point beyond the terminal spikelet ..... ***Dactyloctenium***

10 Second glume and lemmas awnless; rachis not projecting beyond the terminal spikelet..... ***Eleusine***

9 Spikelets with 1 well-developed, bisexual floret with 1-4 rudimentary and mostly neuter florets above it

11 Spikelets awnless; the upper rudimentary floret single and represented by a minute scale ..... ***Cynodon***

11 Spikelets awned (awnless or mucronate in C. submutica); the upper rudimentary florets 1-4 in number and obvious

12 Lemma of the lower floret with 3 awns 8-12 mm long..... ***Trichloris***

12 Lemma of the lower floret with a single awn or awnless ..... ***Chloris***

8 Panicle branches distributed all along the main axis and most not in whorls, or with a single branch only

13 Spikelets with a single fertile, well-developed floret and with 1-3 smaller, rudimentary florets above .....***Bouteloua***

13 Spikelets with usually 3-many fertile, well-developed florets

14 Axils of primary panicle branches with tufts of long hairs; spikelets mostly few and widely spaced on each branch .....***Eragrostis***

14 Axils of primary panicle branches glabrous; spikelets mostly numerous and usually crowded on each branch .....***Leptochloa***

6 Inflorescence a raceme, or a panicle of rebranched primary branches

15 Sheath margins fused together for 1/2 their length or more

16 Spikelets less than 5 mm long .....***Catabrosa***

16 Spikelets usually more than 10 mm long .....***Bromus***

15 Sheath margins overlapping for most of their length

17 Lemmas pubescent on the nerves or at the base (except Tridens albescens), the midnerve usually exserted as an awn or short point (except Poa)

18 Ligules membranous; lemma midnerves not exserted as a small point .....***Poa***

18 Ligules a ring of hairs, or if membranous (Tridens eragrostoides) then the lemma midnerve exserted as a small point

19 Plants strongly rhizomatous; lemma nerves glabrous .....***Redfieldia***

19 Plants lacking rhizomes; lemma nerves pubescent (except Tridens albescens)

20 Palea densely long-ciliate on the upper half; plants annual ..... ***Triplasis***

20 Palea not long-ciliate on the upper half; plants perennial

21 Blades with white margins .....***Erioneuron***

21 Blades not white-margined .....***Tridens***

17 Lemmas glabrous on the nerves and at the base, awnless

22 Ligules a membrane

23 Spikelets sessile or nearly so, the pedicels much shorter than the spikelets; plants tufted.....***Koeleria***

23 Spikelets on long pedicels mostly much longer than the spikelets; plants spreading from stolons or rhizomes .....***Muhlenbergia***

22 Ligules a ring of hairs

24 Panicles dense, congested, spike-like, usually light greenish or whitish; lemmas notched at the apex with a minute point; plants perennial .....***Tridens***

24 Panicles usually open, loose, often olive or dark colored; lemmas lacking a minute notch and point; plants annual or perennial ..... ***Eragrostis***

GROUP IX
Lemmas with 5-many nerves; florets more than one.

1 Glumes and lemmas stiff-ciliate on the midnerves and keels; spikelets arranged in dense, one-sided clusters at the branch tips; sheath margins fused together ..... ***Dactylis***

1 Glumes and lemmas glabrous or variously pubescent but not ciliate on the midnerves and keels; spikelets not so arranged; sheath margins fused or overlapping

2 Sheath margins fused together 3/4 or more their length

3 Callus of the floret with a prominent tuft of stiff hairs (otherwise glabrous) and lemmas prominently awned..... ***Schizachne***

3 Callus of the floret lacking a tuft of hairs and/or lemmas awnless

4 Nerves of the lemma 7 in number, nearly parallel, not converging at the truncate or rounded apex ..... ***Glyceria***

4 Nerves of the lemma 3-11 in number, converging at the obtuse to acute apex, if parallel then less than 7 in number

5 Spikelets awned, or if awnless then longer than 15 mm; palea and grain strongly adherent to each other when mature ..... ***Bromus***

5 Spikelets awnless and shorter than 15 mm; palea and grain free from each other when mature

6 Spikelets on mostly racemose unbranched primary branches, hanging like flags away from the axis; upper florets empty, inrolled and represented by a club-shaped rudiment ..... ***Melica***

6 Spikelets variously arranged, but mostly on rebranched primary branches; upper florets usually not empty nor as above ..... ***Poa***

2 Sheath margins free from each other, overlapping, or fused only at the lower 1/3 or less

7 Disarticulation below the glumes

8 Florets 2 per spikelet, the upper with a short hooked awn, the lower awnless ..... ***Holcus***

8 Florets 2-several per spikelet, all either awnless or awned, but the awn never short and hooked

9 Lemmas mostly awnless; glumes dissimilar in shape, one narrowly lanceolate and the other obovate or spatulate..... ***Sphenopholis***

9 Lemmas prominently awned; glumes similar in shape..... ***Trisetum***

7 Disarticulation above the glumes

10 Spikelets (glumes and/or lemmas) awned

11 Inflorescence a panicle of unbranched, spicate primary branches all clustered toward the apex of the stalk; plants annual ..... ***Chloris***

11 Inflorescence a panicle, but the main branches rebranched or the spikelets on obvious pedicels; plants annual or perennial

12 Florets 3 per spikelet, the lower two florets sterile, silky with brownish hairs, and awned, the upper floret fertile, glabrous, awnless, hidden within the sterile florets and appearing as the hardened grain..... ***Anthoxanthum***

12 Florets not as above

13 Florets dissimilar, some awned, some awnless

14 Glumes large, more than 15 mm long..... **Avena**

14 Glumes small, less than 12 mm long

15 Plants perennial, robust, to 1 m or more tall; mountain plants ..... ***Arrhenatherum***

15 Plants annual, delicate, to 30 cm or so tall; disturbed ground..... ***Aira***

13 All florets alike and awned

16 Glumes not extending beyond the lowermost floret

17 Spikelets 2(4)-flowered; awn arising from the back of the lemma or from a deeply cleft apex

18 Plants 75-150 cm tall; awns 12-14 mm long; blades 4-10 mm wide..... ***Arrhenatherum***

18 Plants mostly less than 50 cm tall; awns 5-8 mm long; blades usually less than 4 mm wide ..... ***Trisetum***

17 Spikelets mostly 3- to many-flowered; awn arising from an entire apex

19 Plants perennial; flowers with 3 stamens ..... ***Festuca***

19 Plants annual; flowers with 1 stamen .... ***Vulpia***

16 Glumes, at least the second, equal to or surpassing the lowermost floret

20 Lemmas awned from the back or base

21 Spikelets not large, the glumes 2-8 mm long

22 Awn of the lemma attached above the middle; lemmas 4-9 mm long (sometimes slightly shorter..... ***Trisetum***

22 Awn of the lemma attached below the middle; lemmas 1.5-4 mm long (sometimes slightly longer)..... ***Deschampsia***

21 Spikelets large, the glumes 10-30 mm long

23 Plants annual; glumes 18-30 mm long ..... ***Avena***

23 Plants perennial; glumes 10-15 mm long ..... ***Helictotrichon***

20 Lemmas awned from an entire or cleft apex, if cleft the awn arising from the sinus at the tip of the midnerve, or lemmas awnless

24 Awns of the lemma minute and nearly obsolete, scarcely visible ..... ***Schismus***

24 Awns of the lemma well-developed, easily visible

25 Spikelets mostly 2-flowered, 3.5-6.5 mm long; rachilla extending beyond the uppermost floret ..... ***Trisetum***

25 Spikelets 3- to 7-flowered, 6-15 mm long; rachilla not extending beyond the uppermost floret ..... ***Danthonia***

10 Spikelets (glumes and lemmas) awnless or at most with an awn tip no more than 1 mm long

26 Glumes mostly longer than 2 cm and longer than the florets .... ***Avena***

26 Glumes shorter than 2 cm and/or shorter than the florets

27 Spikelets appearing 1-flowered, but the large fertile floret subtended by 1 or 2 smaller scales or bristles representing rudimentary florets, these often appressed to the fertile floret and not immediately apparent..... ***Phalaris***

27 Spikelets not as above

28 Glumes and lemmas at maturity stiff, firm, greenish to straw-colored; leaves distichous, the lower ones bladeless as the stems grade into rhizomes; lemmas 7- to 11-nerved, the nerves obscure; plants strongly rhizomatous, dioecious perennials of alkaline areas and flood plains ..... ***Distichlis***

28 Glumes and lemmas pliable, thin, often greenish to purplish (stiff in the annual Catapodium); leaves not distichous, the lower ones usually with well-developed blades; lemmas generally 5- to 7-nerved (9-nerved in the annual Schismus); plants annual or perennial, of various habitats

29 Glumes and lemmas spreading at right angles to the rachilla, inflated and papery; florets and spikelets about as wide as long; spikelets on long capillary pedicels, resembling the rattles of a rattlesnake ..... ***Briza***

29 Glumes, lemmas, florets, and spikelets not all as above

30 First glume 5- to 7-nerved; blades thread-like; small tufted annuals of sandy desert areas ..... ***Schismus***

30 First glume 1- to 3-nerved; blades thread-like to much broader; annuals and perennials of various habitats

31 Glumes, at least the second, equaling or surpassing the lowermost floret

32 Florets 3 in number, the lower (outer) 2 as large as the upper (middle) one but male, their margins prominently ciliate, the upper (middle) floret fertile, somewhat hardened, and pubescent at the tip ..... ***Hierochloë***

32 Florets not as above

33 Second glume broadened above the middle; palea colorless, scarious, white..... ***Koeleria***

33 Second glume broadened below the middle; palea colored, at least on the nerves .... ***Trisetum wolfii***

31 Glumes, at least one but usually both, not extending beyond the lowermost floret

34 Lemmas awned or narrowing at the apex to an awn-tip .....***Festuca***

34 Lemmas completely awnless, often blunt

35 Second glume broadened above the middle; palea colorless, scarious, white; pedicels puberulent .....***Koeleria***

35 Second glume, palea, and pedicels not <u>all</u> as above

36 Inflorescence scarcely branched, the spikelets on short stout pedicels ± on the main axis; plants annual .....***Catapodium***

36 Inflorescence noticeably branched, the spikelets not borne as above; plants annual or perennial

37 Sheath margins fused at least at the base; nerves of the lemma converging toward the acute apex; base of lemma with or without a tuft of cobwebby hair .....***Poa***

37 Sheath margins overlapping at the base; nerves of the lemma more-or-less parallel, not converging toward the truncate apex; base of lemma never with a tuft of cobwebby hairs

38 Nerves of the lemma conspicuous; plants with creeping rhizomes; blades mostly flat, 4-15 mm wide; plants of freshwater habitats ..... ***Torreyochoa***

38 Nerves of the lemma obscure; plants tufted, lacking rhizomes; blades rolled, or if flat then 1-3(4) mm wide; plants of usually alkaline or saline habitats.....***Puccinellia***

THE GENERA OF NEW MEXICO GRASSES

The genera are listed in alphabetical order. The meaning of the genus name is given in brackets, followed in parentheses by the subfamily and tribe to which each genus belongs. A brief description is given for the genus. For each species within the keys, the ***scientific name*** and nomenclatural authorities are followed by a COMMON NAME (upper-case), the meaning of the specific epithet (in parentheses), frequently encountered synonyms for the scientific name [in brackets], including all names used in "A Flora of New Mexico" (Martin and Hutchins 1980), whether annual or perennial, an indication of habitats where one is likely to encounter the particular grass, and comments about toxicity, range uses, and ecology. Exotic species are preceded by an asterisk (*). A map shows the county distribution within New Mexico. Nearly all of the species are illustrated. Keep in mind that the distributions of many of our grasses are still imperfectly known. Please notify the author of any new county records you might discover.

An attempt has been made to use the most correct nomenclature and classification. All conspicuous variation within a species is noted and, where appropriate, provided with a name at the level of subspecies or variety. For those cases where the variation is conspicuous or well known, but does not warrant formal taxonomic recognition, the term *phase* is employed, which is roughly equivalent to the category forma.

Fig. 6. *Achnatherum hymenoides*, **Indian Ricegrass**

ACHNATHERUM NEEDLEGRASS

[Gr. achne, scale, and *ather* awn, referring to the awned lemmas] (Pooideae: Stipeae)

Inflorescence a panicle. Spikelets 1-flowered, disarticulating above the translucent glumes. Lemmas rolled around the palea and flower, but the margins only slightly overlapping, awned from the tip, with a prominent, sharp callus at the base. Paleas leathery, short, and pubescent. In some species, hygroscopic twisting of the awn aids in seed burial. Species of *Achnatherum* were formerly recognized in the genus *Stipa*, which is now strictly Eurasian, or in *Oryzopsis*.

1 Lemma densely covered with long hairs; awn short, 3-5 mm long, quickly deciduous; panicle widely spreading at maturity, with dichotomous branches… ***A. hymenoides*** (Roemer & J.A. Schultes) Barkworth INDIAN RICEGRASS (membrane-like) [*Oryzopsis hymenoides* (Roemer & Schultes) Ricker ex Piper, Stipa hymenoides Roemer & Schultes]. Perennial; sandy plains and dunes, widespread. Indian ricegrass forms hybrids among many of the several species of *Achnatherum*; these are referred to *A. xbloomeri* [see lead 4, below]. This is an attractive grass with potential as an ornamental, especially suited to the more arid regions in the state, but will succumb to excess moisture. The seedhead has the same branching pattern as chicken-wire. Seeds have been used extensively by Native Americans for food since Archaic times. This species declines from heavily grazed range. Fig. 6.

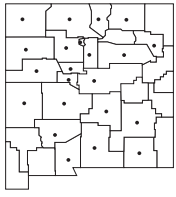


Fig. 7. *Achnatherum speciosum*, Desert Needlegrass

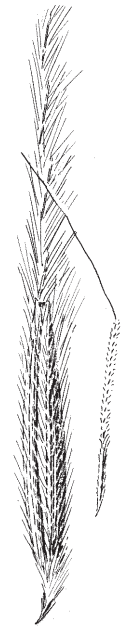
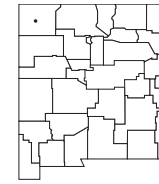


Fig. 8. *Achnatherum curvifolium*, Guadalupe Needlegrass

1 Lemma glabrous or covered with short appressed hairs; awn longer than 6 mm, persistent or deciduous; panicle narrow with ascending branches

2 Basal segment of the once-bent awn plumose with long hairs 4-8 mm long…***A. speciosum*** (Trinius & Ruprecht) Barkworth DESERT NEEDLEGRASS (showy) [*Stipa speciosa* Trinius & Ruprecht]. Perennial; desert canyons and rocky hills, known in New Mexico only from San Juan County. One of our most beautiful grasses. Fig. 7.



2 Basal segment of the awn glabrous or with hairs less than 2 mm long

3 Awn more-or-less readily deciduous; blades 1-2 mm wide…***A.*** x***bloomeri*** (Bolander) Barkworth BLOOMER'S RICEGRASS (for Hiram G. Bloomer, pioneer botanist of California) [*Oryzopsis bloomeri* (Bolander) Ricker, *Stipa bloomeri* Bolander, x*Stiporyzopsis bloomeri* (Bolander) B.L. Johnson]. These are hybrids among *Achnatherum hymenoides* and various other species of *Achnatherum*.

3 Awn persistent; blades various

Fig. 9. *Achnatherum aridum*, Mormon Needlegrass

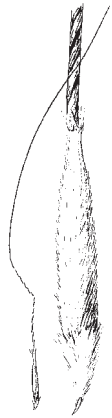
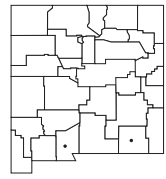


Fig. 10. *Achnatherum eminens*, Southwestern Needlegrass

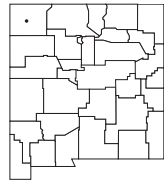
4 Lower segment of the awn (not the lemma tip) with hairs 1-2 mm long…***A. curvifolium*** (Swallen) Barkworth GUADALUPE NEEDLEGRASS (curved-leaved) [*Stipa curvifolia* Swallen]. Perennial; rocky ledges and cliffs in the southern mountains, often on igneous rock, rare. Fig. 8.



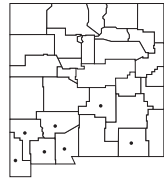
4 Lower segment of the awn (not the lemma tip) scabrous or with hairs less than 1 mm long

5 Awns 3-7.5 cm long, obscurely bent, the terminal segment flexuous or curving

6 Ligule minute, less than 1 mm long, hardly visible; panicle narrow, contracted, the main axis obscured… ***A. aridum*** (M.E. Jones) Barkworth MORMON NEEDLEGRASS (arid) [*Stipa arida* M.E. Jones, S. *mormonum* Mez]. Perennial; desert scrub vegetation, Four Corners region. Fig. 9.



6 Ligule 1-2 mm long, evident; panicle open when mature, the branches spreading, the main axis visible… ***A. eminens*** (Cavanilles) Barkworth SOUTHWESTERN NEEDLEGRASS (standing high, eminent) [*Stipa eminens* Cavanilles]. Perennial; rocky hills and plains in the southern region. Fig. 10.



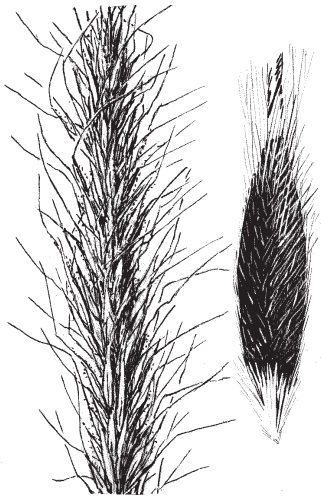


Fig. 11. *Achnatherum robustum,* Sleepygrass

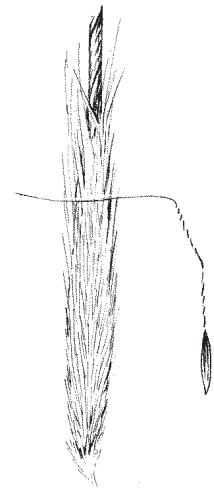
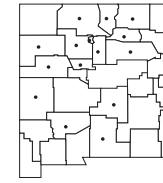


Fig. 12. *Achnatherum lettermanii*, Letterman's Needlegrass

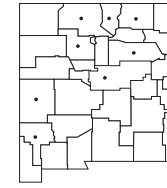
5 Awns 1-3 cm long, usually plainly bent, the terminal segment more or less straight

7 Palea approximately 2/3 the length of the lemma

8 Hairs at the tip of the palea about the same length as those below; mature stems 50-180 cm tall, 2-6 mm in diameter; blades mostly flat…**A. robustum** (Vasey) Barkworth SLEEPYGRASS (robust) [*Stipa robusta* Vasey, S. *vaseyi* Scribner]. Perennial; mountain grasslands, plains, disturbed pastures, widespread. Plants contain a narcotic that induces torpor in grazing horses, but is not lethal. Recent studies suggest the toxin is produced by endophytic fungi infesting the plants. *Achnatherum inebrians* (Hance) Keng of Mongolia, Tibet, and China produces the same effect. Fig. 11.



8 Hairs at the tip of the palea longer than those below; mature stems 25-80 cm tall, 1-2 mm in diameter; blades rolled and thread-like… **A. *lettermanii*** (Swallen) Barkworth LETTERMAN'S NEEDLE-GRASS (for George Letterman, Missouri botanist) [*Stipa lettermanii* Vasey]. Perennial; sagebrush flats and hills and into the mountains, in the northern and western regions. Fig. 12.



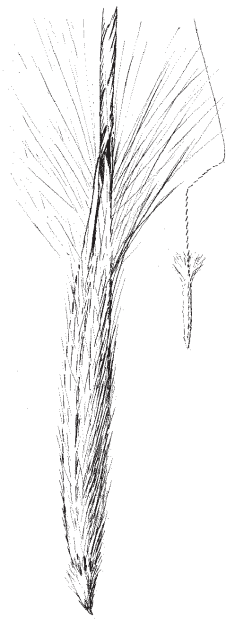


Fig. 13. *Achnatherum scribneri*, Scribner's Needlegrass

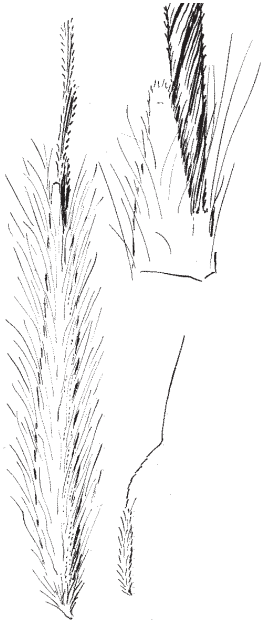
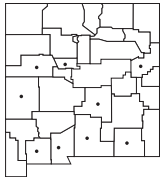


Fig. 14. *Achnatherum lobatum*, Littleawn Needlegrass

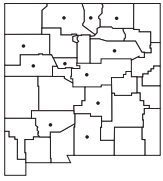
7 Palea 1/3 to 1/2 the length of the lemma

9 Hairs at the lemma tip 2.5-3 mm long; callus with a pointed extension... ***A. scribneri*** (Vasey) Barkworth SCRIBNER'S NEEDLEGRASS (for Frank Lamson-Scribner, renowed USDA agrostologist) [*Stipa scribneri* Vasey]. Perennial; dry rocky hills and woodlands, widespread. One specimen has been found in which the mature caryopses are popping out of the floret. Fig. 13.



9 Hairs at the lemma tip 1-2.2 mm long; callus blunt, without a pointed extension

10 Apical lemma hairs erect; lemma lobes 0.5-1.2 mm long; florets widest about midlength...***A. lobatum*** (Swallen) Barkworth LITTLEAWN NEEDLEGRASS (lobed) [*Stipa lobata* Swallen]. Perennial; rocky hills and woodlands, mostly in the southern region. Fig. 14.



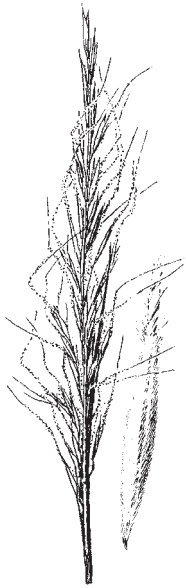
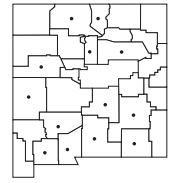


Fig. 15. *Achnatherum perplexum,* New Mexico Needlegrass

Fig. 16. *Aegilops cylindrica,* Jointed Goatgrass

10 Apical lemma hairs ascending to divergent; lemma lobes 0.2-0.5 mm long; florets widest below midlength...***A. perplexum*** Hoge & Barkworth NEW MEXICO NEEDLEGRASS (confused) [*Stipa columbiana* of NM reports]. Perennial; mountain grasslands, clearings, and dry slopes. The species is aptly named: it has been confused with *Achnatherum columbianum* and *Achnathern nelsonii*. Fig. 15



AEGILOPS GOATGRASS

[Gr. *aegiles*, preferred by goats, and *ops*, appearing like; a name used by Theophrastus for a grass that was similar to *Aegiles*, which is an unknown plant apparently palatable to goats] (Pooideae: Hordeae)

Inflorescence a cylindrical spike of conspicuously awned, jointed segments that break apart when mature. Because of its close biological relationship to wheat, the genus *Aegilops* is sometimes submerged within the genus *Triticum*.

****A. cylindrica*** Host JOINTED GOATGRASS (cylindrical) [*Triticum cylindricum* (Host) Cesati]. Annual weed of crop fields and roadsides, widely distributed throughout the state. A related species was probably one of the progenitors of wheat. Fig. 16.

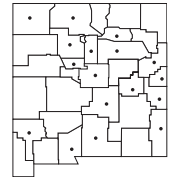


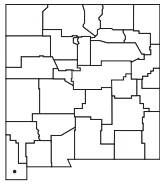
Fig. 17. *Aegopogon tenellus*, Fragile-grass

AEGOPOGON FRAGILE-GRASS

[Gr. aix, goat, and *pogon*, beard, referring tothe cluster of awns] (Chloridoideae: Cynodonteae)

Delicate annuals branching at the nodes. Inflorescence racemose, the spikelets borne on short pedicels, which join at the base to form a cluster of three spikelets, this falling entire from the rachis. Lemmas 3-nerved, the central extended into an awn.

A. tenellus (A.P. de Candolle) Trinius FRAGILE-GRASS (quite delicate). Rare annual found only in the bootheel region; also known from southern Arizona and south to northern South America. A form with rudimentary awns has been referred to var. *abortivus* (Fournier) Beetle. Fig. 17.

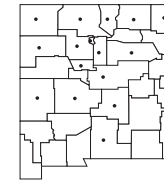


AGROPYRON CRESTED WHEATGRASS

[Gr. agros, field, and pyros, wheat, the two original species being weeds in wheat fields] (Pooideae: Hordeae)

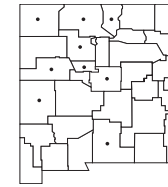
Inflorescence a spike, with a single spikelet at each node. Spikelets placed very close together, giving the seedhead a distinctive bristly appearance. Most species previously found in *Agropyron* are now treated in the genera *Elymus* or *Eremopyrum* in this work. We have three closely related species, sometimes treated as a single species with three subspecies, all introduced from Eurasia for soil stabilization and range improvement.

1 Spikelets diverging from the rachis at an angle of more than 40 degrees; glumes widespread, forming an angle of more than 120 degrees, giving the spike a bristly appearance; spikes at least 8 mm broad…****A. cristatum*** (Linnaeus) Gaertner FAIRWAY CRESTED WHEATGRASS (crested) [*Agropyron cristatum* (Linnaeus) Gaertner subsp. *pectinatum* (Bieberstein) Tzvelev, *A. pectiniforme* Roemer & Schultes]. Widespread. Fig. 18.

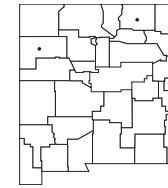


1 Spikelets diverging from the rachis at an angle of less than 35 degrees; glumes spreading at a narrow angle; spikes 5-10 mm broad

2 Lemmas with an awn 1-2(4) mm long; glumes forming an angle of approximately 60 degrees… ****A. desertorum*** (Fischer ex Link) Schultes DESERT CRESTED WHEATGRASS (of deserts) [*Agropyron cristatum* (Linnaeus) Gaertner subsp. *desertorum* (Fischer ex Link) Löve]. Widespread.



2 Lemmas awnless, sometimes mucronate; glumes forming an angle of approximately 45 degrees… ****A. fragile*** (Roth) P. Candargy SIBERIAN CRESTED WHEATGRASS (brittle) [*Agropyron cristatum* (Linnaeus) Gaertner subsp. *fragile* (Roth) Löve, *A. sibiricum* (Willdenow) Beauvois]. Known only from a few northern counties



AGROSTIS BENTGRASS

[Gr. *agros*, field, and the name for an unidentified Greek fodder plant in Classical times]
(Pooideae: Poeae)

Inflorescence a panicle. Spikelets one-flowered, the glumes exceeding the floret. *Agrostis perennans* (Walter) Tuckerman has been reported for the state, but no specimens from New Mexico have been located.

1 Palea well-developed, 0.5-2 mm long, 1/2 to 3/4 the length of the lemma

2 Panicle dense, compact, interrupted; spikelets usually disarticulating below the glumes…see *Polypogon viridis*

2 Panicle open or closed but not dense nor compact; spikelets disarticulating above the glumes

Fig. 18. *Agropyron cristatum*, Fairway Crested Wheatgrass

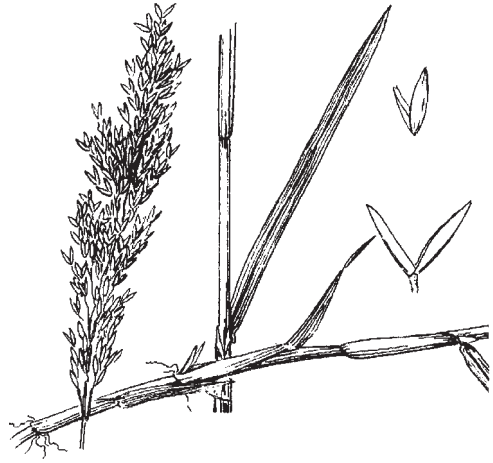


Fig. 19. *Agrostis stolonifera*, Creeping Bentgrass

3 Plants 3-20 cm tall; anthers 0.5-0.7 mm long; alpine and subalpine meadows and bogs...***A. humilis*** Vasey MOUNTAIN BENGRASS (dwarfish, low to the ground). Reported for the state by Holmgren & Holmgren (Poaceae, p. 175-464. IN: Intermountain Flora, vol. 6. New York Botanical Garden. 1977.), but I have not seen specimens in our New Mexico herbaria. To be found in the northern mountains.

3 Plants taller, mostly 40 or more cm tall; anthers 0.8-1.4 mm long; a variety of habitats, common at lower elevations

4 Panicles open during anthesis but contracted thereafter and when mature, mostly 1-1.5 cm broad, the branches erect-appressed; plants often stoloniferous and decumbent at the base, if short rhizomes developed then these bearing no more than 3 scale leaves …****A. stolonifera*** Linnaeus CREEPING BENTGRASS (bearing stolons) [*Agrostis alba* of numerous authors, *A. palustris* Hudson]. Moist pastures, ditches, streambanks, meadows, widespread. Introduced perennial from Europe for improved pastures, providing excellent forage, and also much used as a turfgrass for putting greens. Very similar to the next, which is probably more common in New Mexico. Fig. 19.

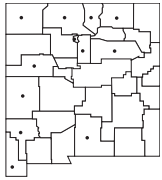
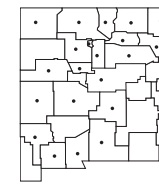


Fig. 20. *Agrostis gigantea*, Redtop

Fig. 21. *Agrostis variabilis*, Mountain Bentgrass

4 Panicles open both during and after anthesis, more than 1.5 cm broad, the branches ascending to widely spreading; plants with well developed rhizomes bearing more than 3 scale leaves, not stoloniferous, nearly erect at the base…****A. gigantea*** Roth REDTOP (gigantic) [*Agrostis alba* of numerous authors]. Moist pastures, ditches, streambanks, meadows, widespread. Introduced perennial from Europe for improved pastures, providing excellent forage. Very similar to the previous, which is probably less common in New Mexico. Fig. 20.



1 Palea obsolete or a small scale less than 0.4 mm long, never as much as 1/2 the length of the lemma

5 Panicle narrow, contracted, several times longer than broad, at least some of the branches spikelet-bearing to the base

6 Stems slender, not more than 20 cm tall; blades mostly not more than 1 mm wide…***A. variabilis*** Rydberg MOUNTAIN BENTGRASS (variable). Perennial, subalpine and alpine slopes, uncommon in the northern mountains. Fig. 21.

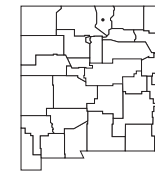
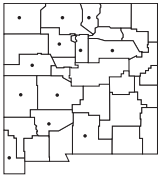


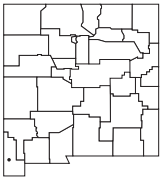
Fig. 22. *Agrostis exarata*, Spike Bentgrass

Fig. 23. *Agrostis elliottiana*, Elliott's Bentgrass

6 Stems usually stout; mostly much more than 20 cm tall; blades mostly 2-10 mm wide…***A. exarata*** Trinius var. ***minor*** Hooker SPIKE BENTGRASS (plowed up, alluding to furrows between the nerves; smaller). Perennial, moist mountain meadows, providing excellent forage for livestock, elk, and deer. Fig. 22.



5 Panicle open to diffuse, often less than 3 times longer than broad, the branches naked at the base



7 Lemmas with a slender awn; plants annual… ***A. elliottiana*** Schultes ELLIOTT'S BENTGRASS (for Stephen Elliott, pioneer botanist and legislator of South Carolina) [*Agrostis exigua* Thurber]. Annual, along streambanks and in moist woods of the southern desert mountains, uncommon. Fig. 23.

7 Lemmas awnless; plants perennial, though they may appear annual

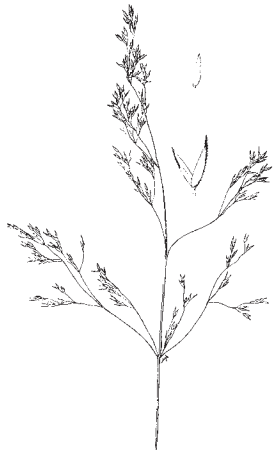
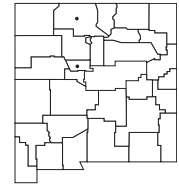


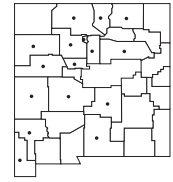
Fig. 24. *Agrostis idahoensis*, Idaho Bentgrass

Fig. 25. *Agrostis scabra*, Ticklegrass, Rough Bentgrass

8 Plants 10-30 cm tall; panicle branches rebranching at or below the middle…***A. idahoensis*** Nash IDAHO BENTGRASS (of Idaho). Perennial. Meadows and moist ground in the northern mountains. Fig. 24.



8 Plants mostly 30-90 cm tall; panicle branches rebranching above the middle…***A. scabra*** Willdenow TICKLEGRASS, ROUGH BENTGRASS (rough) [*Agrostis hiemalis* sensu Wooton & Standley]. Perennial. Meadows and grassy slopes of foothills to high mountains, sometimes surprisingly common. Very similar to the eastern *A. hyemalis* (Walter) Britton, Sterns, & Poggenburg, which some merge with this species. Fig. 25.



AIRA HAIRGRASS

[an old Greek name for darnel, now applied to a very different genus] (Pooideae: Poeae)

Delicate annuals with filiform blades. Inflorescence a panicle. Spikelets 2-flowered, the glumes larger than the florets, the lemmas awned or the lower lemma awnless.

****A. elegans*** Willdenow ex Kunth ANNUAL SILVER-HAIRGRASS (elegant). Found once in 1998; weakly adventive in ornamental plantings in Las Cruces, not likely persisting. Fig. 26.

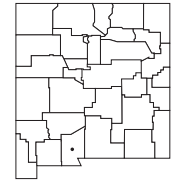


Fig. 26. *Aira elegans*, Annual Silver-Hairgrass

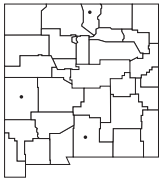
Fig. 27. *Alopecurus pratensis*, Meadow Foxtail

ALOPECURUS FOXTAIL

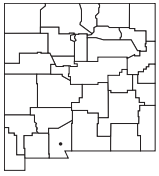
[Gr. *alopex*, fox, and *oura*, tail, referring to the narrow, sometimes bristly, panicle]
(Pooideae: Poeae)

Inflorescence a tightly packed, cylindrical spike, giving a superficial resemblance to the genus *Phleum* (but this genus lacks an awn). Spikelets one-flowered, with a delicate awn from the back of the lemma. Many grasses in addition to these are called foxtail. In New Mexico, we find "foxtails" in *Alopecurus, Bromus, Hordeum, Muhlenbergia*, and *Setaria*.

1 Spikelets 5-6 mm long



2 Glumes conspicuously ciliate on the keel…
****A. pratensis*** Linnaeus MEADOW FOXTAIL (of meadows). Perennial; moist woods and ciénegas; uncommon in the western mountains, being introduced for erosion control and reseeding. Variegated cultivars are occasionally grown for ornament. Fig. 27.



2 Glumes glabrous to scabrous on the keel…
****A. myosuroides*** Hudson SLENDER FOXTAIL, BLACKGRASS (resembling *Myosurus*, a genus in the Ranunculaceae family; *Myosurus alopecuroides* returns the allusion.) [*Alopecurus agrestis* Linnaeus]. Annual; known only from a single collection in the late 1800s from a farm in Las Cruces and probably no longer found in the state. Fig. 28.

Fig. 28. *Alopecurus myosuroides*, Slender Foxtail, Blackgrass

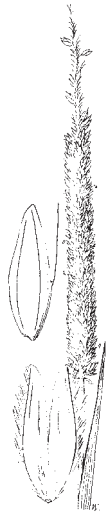
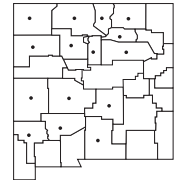


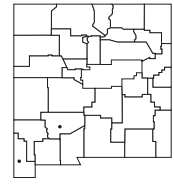
Fig. 29. *Alopecurus aequalis*, Shortawn Foxtail

Fig. 30. *Alopecurus carolinianus*, Carolina Foxtail

1 Spikelets 2-4 mm long

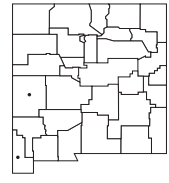


3 Awn slightly exserted beyond the lemma, scarcely visible without magnification…***A. aequalis*** Sobolewsky SHORTAWN FOXTAIL (even, equal). Perennial; ponds, ditches, low meadows, wet ground; widespread. Anthers are orange or golden-yellow when mature. Fig. 29.



3 Awn well-exserted beyond the lemma, easily visible without magnification

4 Plants annual; anthers 0.3-0.5 mm long…***A. carolinianus*** Walter CAROLINA FOXTAIL (of Carolina). Annual; moist ground; uncommon in the southwestern region. Fig. 30.



4 Plants perennial; anthers 1.2-2 mm long…***A. geniculatus*** Linnaeus WATER FOXTAIL (bent). Perennial; moist or wet ground; uncommon in the southwestern region. Fig. 31.

Fig. 31. *Alopecurus geniculatus*, Water Foxtail

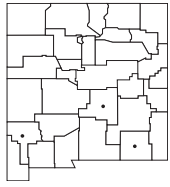
Fig. 32. *Andropogon glomeratus*, Southwestern Bushy Bluestem

ANDROPOGON BLUESTEM

[Gr. *andros*, man, and *pogon*, beard, referring to the hairy pedicelled (and usually staminate) spikelets] (Panicoideae: Andropogoneae)

Inflorescence branches breaking apart when mature. Spikelets awned, in pairs of one sessile and one pedicelled, although the pedicelled spikelet may be absent. Some species formerly placed in this genus are now treated in *Bothriochloa* and *Schizachyrium*.

1 Pedicelled spikelets vestigial or absent; sessile spikelets less than 4 mm long…***A. glomeratus*** (Walter) Britton, Sterns, & Poggenburg var. ***scabriglumus*** Campbell SOUTHWESTERN BUSHY BLUESTEM (wound up, as in a ball of yarn, alluding to the densely clustered inflorescences; rough-glumed). Perennial; seasonally wet places, seeps, and springs in the desert foothills. This has potential as a landscape ornamental and for dried arrangements. Fig. 32.



1 Pedicelled spikelets present, nearly as large as the s essile one; sessile spikelets at least 6 mm long… ***A. gerardii*** Vitmann BIG BLUESTEM (for John Gerard, English surgeon and pharmacist who produced the *Herball of Generall Historie of Plantes* in 1597). Perennial; prairies, plains, sand dunes, wooded slopes and forests. An excellent native forage grass. Some plains Indians used the stems for thatching, toy arrows, knitting needles, and basketry, as well as various ceremonial uses. We have three subspecies, which intergrade freely when sympatric:

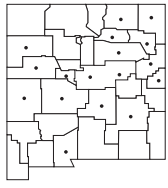
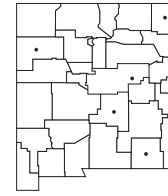


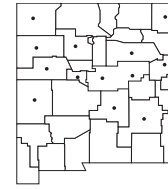
Fig. 33. *Andropogon gerardii*, Big Bluestem

a Awn of sessile spikelet 0-5 mm long; rhizomes well-developed; foliage glaucous…subsp. ***hallii*** (Hackel) Wipff HALL'S BLUESTEM, SAND BLUESTEM (for Elihu Hall, botanical collector from Illinois) [*Andropogon gerardii* Vitman var. *paucipilus* (Nash) Fernald, A. hallii Hackel]. Mostly on the eastern plains, but scattered populations elsewhere.



a Awn of sessile spikelet 8-20 mm long; rhizomes absent or well-developed; foliage generally green

b Hairs of panicle branch internodes (rachis joints) copious, 3-4 mm long and usually yellow or golden; rhizomes well-developed…subsp. ***chrysocomas*** (Nash) Wipff SAND BLUESTEM (golden-haired). Common nearly throughout the state in sandy ground and dunes.



b Hairs of panicle branch internodes sparse to copious, 1-2 mm long; rhizomes absent or short…subsp. ***gerardii*** [*Andropogon furcatus* Muhlenberg]. Common nearly throughout the state in a variety of communities. Fig. 33.

ANTHOXANTHUM VERNALGRASS

[Gr. *anthos*, flower, and *xanthos*, yellow, referring to the yellow inflorescence]
(Pooideae: Poeae)

Inflorescence narrow, spike-like. Spikelets with three florets, the two outer ones awned and sterile, the inner one smaller, awnless, and producing the grain.

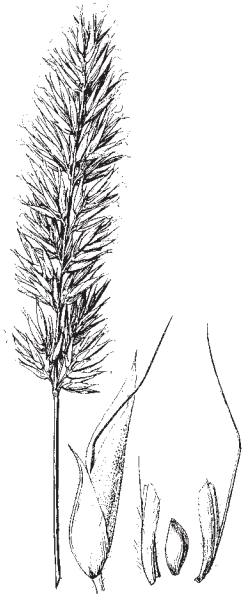


Fig. 34. *Anthoxanthum ordoratum*, Sweet Vernalgrass

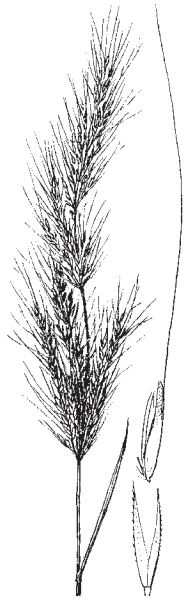
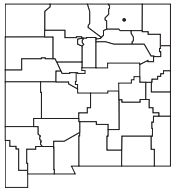


Fig. 35. *Apera interrupta*, Dense Silky-bent

****A. odoratum*** Linnaeus SWEET VERNALGRASS (fragrant). Perennial; disturbed, weedy ground, sporadic; known from a 1968 collection in Colfax County and a 1997 collection in Doña Ana County, perhaps being spread in seed or hay mixes of some kind. Plant tissues contain coumarin, which gives the plants a sweet fragrance, but also renders them unpalatable and potentially toxic when consumed in large amounts. Ostensibly, this is the best grass for stem straws, because of the sweetness of the shoots. When flowering, the stigmas are exserted prior to the anthers (protogynous); this pattern is consistent with other grasses that lack lodicules (as does *Anthoxanthum*). Fig. 34.



APERA SILKY-BENT

[Gr. a, not, and peros, maimed, perhaps alluding to presence of the long awn]
(Pooideae: Poeae)

Inflorescence a panicle. Spikelets one-flowered, the glumes exceeding the long-awned florets, the rachilla continued beyond the lemma.

****A. interrupta*** (Linnaeus) Beauvois DENSE SILKY-BENT (severed, interruped) [*Agrostis interrupta* Linnaeus]. Annual; disturbed moist sites; known only from a few collections in the central region of the state. The attachment of the awn slightly below the lemma tip and the continuation of the rachilla distinguish this from similar-appearing annual *Muhlenbergia*. Fig. 35.

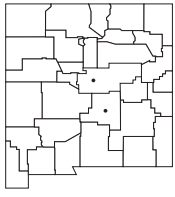


Fig. 36. *Aristida adscensionis*, Six-weeks Threeawn

Fig. 37. *Aristida oligantha*, Oldfield Threeawn

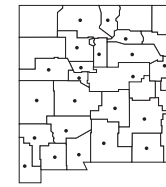
ARISTIDA THREEAWN

[L. *arista*, awn] (Aristidoideae: Aristideae)

Inflorescence a panicle, occasionally racemose or spicate. Spikelets one-flowered, the glumes thin and mostly longer than the floret. Floret with three awns, or in some species the two lateral awns very short or essentially absent, the base of the floret sharp-pointed and with a short tuft of hairs. Many species are poor forage grasses and their abundance indicates abused range lands, but they do provide important spring forage in the southern, desert portions of the state. The long awns of several species may be troublesome to grazing animals, and can cause severe injury to eyes, nostrils, and mouths of livestock, as well as descrease fleece value in sheep. All the species were called NEEDLE GRASS in the early days, as was *Scleropogon*. In eastern Europe, various species have been used in the making of paper, fabrics, and brushes.

1 Plants annual

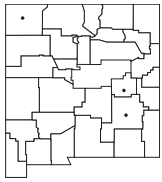
2 Awns mostly 1-2 cm long; glumes mostly 5-12 mm long…***A. adscensionis*** Linnaeus SIX-WEEKS THREEAWN (of Ascension Island) [*Aristida bromoides* Humboldt, Bonpland, & Kunth]. Annual; plains and mesas, disturbed sites throughout the world. Widespread in New Mexico and extremely variable in size, depending on moisture and other growth conditions; sometimes with loose, flexuous, delicate, spreading panicle branches, or with much shortened lateral awns.



The roots are used in India for making brushes and small whisk brooms. Fig. 36.

Fig. 38. *Aristida schiedeana*, Single Threeawn, Beggar-tick Grass

2 Awns 2-7 cm long; glumes mostly 20 mm or more long…****A. oligantha*** Michaux OLDFIELD THREEAWN (few-flowered). Annual; disturbed areas and old fields, an uncommon immigrant from the eastward plains. Fig. 37.



1 Plants perennial

3 Lateral awns shortened, rarely longer than 3 mm

4 First glume noticeably shorter than the second; inflorescence narrow, contracted, the branches erect…***A. purpurea*** Nuttall var. ***wrightii*** (Nash) Allred forma ***brownii*** (Warnock) Allred & Valdes-R. [see lead 13h, below].

4 First glume equal to or longer than the second; inflorescence open, the branches spreading from axillary swellings (pulvini) at maturity

5 First glume longer than the second; awn usually bent at a wide angle, the column twisted; blades flat and curling like woodshavings in age; base of blade glabrous (do not confuse with ligule hairs)…***A. schiedeana*** Trinius & Ruprecht var. ***orcuttiana*** (Vasey) Allred & Valdes-R. SINGLE THREEAWN, BEGGAR-TICK GRASS (for Christian Julius Wilhelm Schiede, German physician-botanist who collected plants in Mexico; for Charles Russell Orcutt, San Diego naturalist-botanist) [*Aristida orcuttiana* Vasey]. Perennial; mountain slopes and foothills in the piñon and ponderosa zones of the southwestern mountains. This species provides fair forage and is perhaps the most valuable of the Aristida species in this regard. Variety schiedeana occurs in Mexico. Fig. 38.

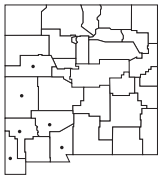
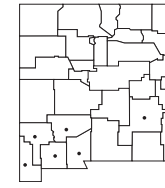


Fig. 39. *Aristida ternipes*, Spidergrass

Fig. 40. *Aristida divaricata*, Poverty Threeawn

5 First glume subequal to the second; awn mostly straight or only slightly bent, the column straight or slightly twisted; blades rolled or flattened at the base, but not curling like woodshavings; base of blade with scattered long hairs…***A. ternipes*** Cavanilles var. ***ternipes*** SPIDERGRASS (three-footed) [*Aristida divergens* Vasey, A. ternipes Cavanilles var. *minor* (Vasey) Hitchcock]. Perennial; dry plains and foothills of the southern region. Differing from var. *gentilis* [see lead 11, below] in having reduced lateral awns. Both varieties have a characteristic thickened midnerve of the lemma. Fig. 39.



3 Lateral awns longer than 3 mm, well-developed, though often shorter than the central awn

6 Panicle open, at least the lower branches spreading

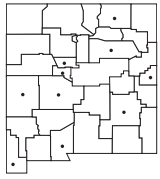
7 Primary panicle branches somewhat capillary and curving or drooping under the weight of the spikelets but without axillary swellings; awns mostly (2)3-8 cm long…***A. purpurea*** Nuttall PURPLE THREEAWN. [with 6 varieties in New Mexico: see lead 13, below].

7 Primary panicle branches stiffly divaricate to ascending from axillary swellings; awns mostly 1-2.5 cm long

Fig. 41. *Aristida havardii*, Havard's Threeawn

8 Anthers 0.8-1 mm long

9 Plants usually more than 25 cm tall, growing in elongate tufts; secondary branchlets present and usually well-developed; primary branches 5-13 cm long; apex of lemma strongly twisted 4 or more turns…***A. divaricata*** Humboldt & Bonpland ex Willdenow POVERTY THREEAWN (spreading apart). Perennial; dry plains and foothills in scattered locales throughout the state. The common name refers to its abundance on heavily grazed range lands. Fig. 40.



9 Plants usually less than 25 cm tall, growing in low hemispheric mounds; secondary branchlets absent or nearly so; primary branches 2-6 cm long; apex of lemma not twisted or twisted only 1 or 2 turns…***A. havardii*** Vasey HAVARD'S THREEAWN (for Valery Havard, French-born surgeon in the Army) [*Aristida barbata* Fournier]. Perennial; dry plains and foothills. Plants tend to grow in short, hemispheric tufts, like a basketball partially sunken into the ground. Fig. 41.

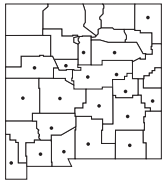


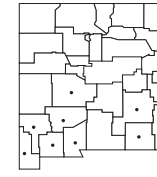
Fig. 42. *Aristida ternipes var. gentilis*, Hook Threeawn

8 Anthers 1.2-2 mm long or longer

10 Glumes strongly unequal, the first about 1/2 to 2/3 the length of the second…***A. purpurea*** Nuttall var. ***perplexa*** Allred & Valdes-R. [see lead 13a, below]

10 Glumes equal or nearly so in length

11 Base of blades with scattered, soft, weak hairs 1.5-3 mm long on the upper surface or margin…***A. ternipes*** Cavanilles var. ***gentilis*** (Henrard) Allred HOOK THREEAWN (three-footed; belonging to the same group or section) [*Aristida hamulosa* Henrard]. Perennial; dry plains and mesas in the southern regions. Differing from var. *ternipes* [see lead 5, above) in having well-developed lateral awns. Fig. 42.



11 Base of blades glabrous to minutely pubescent on the upper surface, lacking long hairs, any hairs present less than 0.5 mm long (do not confuse with hairs at the collar or summit of the sheath)

12 Blades flat, loosely curling like woodshavings in age; summit of lemma conspicuously twisted…***A. schiedeana*** Trin. & Rupr. var. ***orcuttiana*** (Vasey) Allred & Valdes-R. [see lead 5, above].

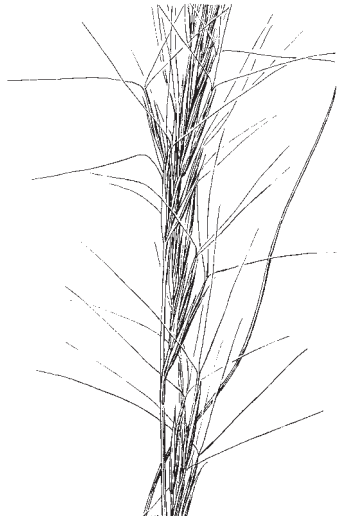
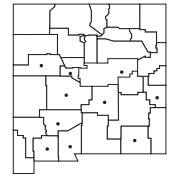


Fig. 43. *Aristida arizonica*, Arizona Threeawn

12 Blades rolled, straight to arcuate but not curling; summit of lemma not or only slightly twisted…***A. pansa*** Wooton & Standley WOOTON'S THREEAWN (expanded, open). Perennial; dry plains and mesas of the southern regions. The common name honors E.O. Wooton (1865-1945), premier botanist of New Mexico. We have two forms in New Mexico, a third occurs in Mexico:



a Spikelets spreading away from the branch, with swellings in the axils of the pedicels…forma ***dissita*** (I.M. Johnston) Allred & Valdes-R. (lying apart) [*Aristida dissita* I.M. Johnston].

a Spikelets appressed to the branch, without swellings in the axils of the pedicels…forma ***pansa***

6 Panicle closed, contracted, the branches erect-appressed

13 Glumes equal or nearly so; blades usually flat and curling like woodshavings in age…***A. arizonica*** Vasey ARIZONA THREEAWN (of Arizona). Perennial; somewhat dry mountain slopes and forest clearings, generally at medium elevations; widespread. Occasional populations may be found that intergrade with A. *purpurea* var. *neal-leyi*, with somewhat unequal glumes and shorter awns than normal. Fig. 43.

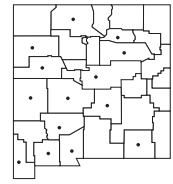
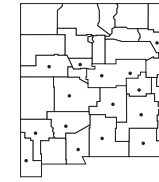


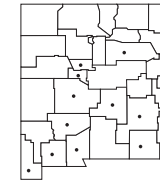
Fig. 44. *Aristida purpurea var. perplexa*, Jornada Threeawn

Fig. 45. *Aristida purpurea var. purpurea*, Purple Threeawn

13 Glumes noticeably unequal; blades usually rolled and not curling like woodshavings, but sometimes arcuate…***A. purpurea*** Nuttall PURPLE THREEAWN (reddish, violet, purple). Perennial; dry plains, slopes, foothills, sandy sites, disturbed ground; very widespread. This grass has good potential as an ornamental in dry areas, and is occasionally used in the 'rough' of golf courses. Pentatomid stink bugs in the genus *Mecidea* feed on immature seeds. There are 6 varieties in New Mexico, all widespread and none distinguished by habitat or distribution:



a Panicle branches with axillary swellings, causing the branches to spread abruptly from the main axis… var. ***perplexa*** Allred & Valdes-R. JORNADA THREEAWN (confused). Perennial; dry sandy plains and slopes. Common on the Jornada Experimental Range north of Las Cruces, but extending west into Arizona and south into Mexico. Plants of this variety were long confused with *Aristida pansa*. Fig. 44.



a Panicle branches without axillary swellings, the branches erect or drooping, but not spreading abruptly from the main axis

b Awns 4-10 cm long

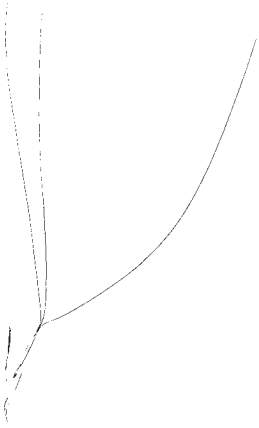


Fig. 46. *Aristida purpurea var. longiseta*, Red Threeawn

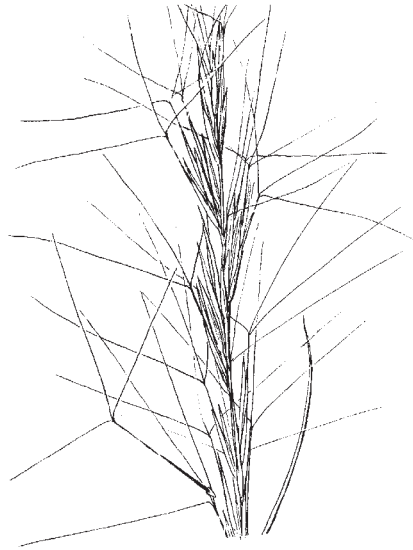
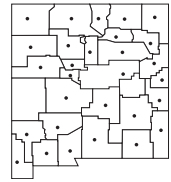


Fig. 47. *Aristida purpurea var. nealleyi*, Nealley's Three-awn

c Summit of lemma 0.1-0.3 mm broad; awns rather delicate, mostly 0.2 mm or less wide at the base, 4-5 cm long; second glume mostly shorter than 16 mm…var. ***purpurea*** PURPLE THREEAWN [*Aristida purpurea* Nuttall var. *laxiflora* Merrill]. Fig. 45.

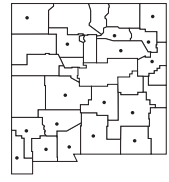
c Summit of lemma 0.3-0.8 mm broad; awns usually stout, more than 0.2 mm wide at the base, 4-10 cm long; second glume 14-25 mm long… var. ***longiseta*** (Steudel) Vasey RED THREEAWN (long-awned) [*Aristida longiseta* Steudel var. *rariflora* Hitchcock]. Called DOGTOWN GRASS in earlier years, when prairie dogs were prevalent on the western range and this grass rapidly invaded the bare ground around their colonies. Fig. 46.



b Awns (at least the central) 1-3.5 cm long

d Summit of lemma mostly less than 0.2 mm broad; awns delicate, mostly less than 0.2 mm wide at the base

e Panicle branches and pedicels erect, stiff, occasionally spreading…var. *nealleyi* (Vasey) Allred NEALLEY'S THREEAWN (for Greanleaf Cilley Nealley, USDA botanical collector) [*Aristida glauca* (Nees) Walpers]. Fig. 47.



e Panicle branches and pedicels drooping to flexuous…var. ***purpurea*** PURPLE THREEAWN. Fig. 45.

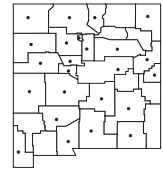
Fig. 48. *Aristida purpurea var. fendleriana*, Fendler's Three-awn

Fig. 49. *Aristida purpurea var. wrightii*, Wright's Three-awn

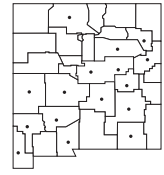
d Summit of lemma mostly broader than 0.2 mm; awns stout, mostly 0.2 mm or more wide at the base

f Mature panicle branches and pedicels capillary and flexuous or drooping…var. ***purpurea*** PURPLE THREEAWN. Fig. 45.

f Mature panicle branches and pedicels mostly stiff and straight



g Panicles mostly 3-14 cm long; blades mostly basal and less than 10 cm long…var. ***fendleriana*** (Steudel) Vasey FENDER'S THREEAWN (for Augustus Fendler, German-born botanical collector for Asa Gray who visited the Santa Fe area in 1846-47) [*Aristida fendleriana* Steudel]. Fig. 48.



g Panicles mostly 15-30 cm long; blades mostly cauline and more than 10 cm long…var. *wrightii* (Nash) Allred WRIGHT'S THREEAWN (for Charles Wright, notable botanical collector for Asa Gray) [*Aristida wrightii* Nash]. We have two easily distinguished forms:

h Both lateral and central awns well-developed...forma *wrightii* Fig. 49.

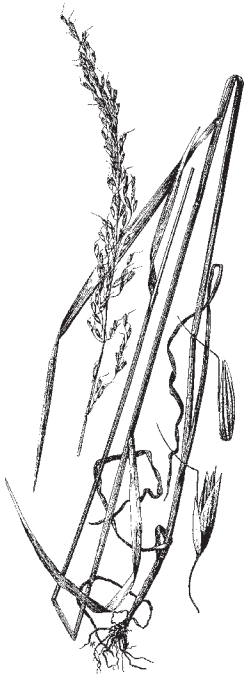
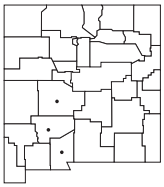


Fig. 50. *Arrhenatherum elatius*, Tall Oatgrass

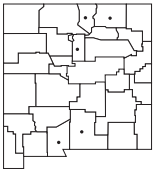


h Lateral awns reduced, nearly absent, only the central well-developed... forma ***brownii*** (Warnock) Allred & Valdes-R. BROWN'S THREEAWN (for Joseph R. Brown, west-Texas rancher) [*Aristida brownii* Warnock]. Rocky limestone slopes of the desert mountains; uncommon. This form is almost impossible to recognize in the field without closely examining all the plants of a population, looking for the reduced or absent lateral awns. The plants have the aspect of forma *wrightii,* with which they are always found, and from which they differ only in the shortened awns.

ARRHENATHERUM OATGRASS

[Gr. arren, masculine, and *ather*, awn, referring to the awned staminate floret] (Pooideae: Poeae)

Inflorescence a narrow panicle. Spikelets 2-flowered, the lower floret with a prominent awn, the upper floret usually nearly awnless.

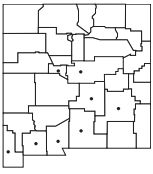


****A. elatius*** (Linnaeus) Beauvois ex J. & K. Presl TALL OATGRASS (taller). Perennial often with bulbous bases and yellowish roots. Introduced for hay and forage, found escaped in moist, shady places in the mountains. A form with white-striped leaves (cultivar 'Bulbosum Variegatum') is sometimes grown for ornament, and in some plants both florets are prominently awned [var. *biaristatum* (Peterman) Peterman]. Fig. 50.

ARUNDO REED

[L. *arundo*, ancient name for various reeds, stemming from the Celtic *aru*] (Arundinoideae: Arundineae)

Large bamboo-like grasses to 30 ft tall from vigorous, stout rhizomes. Inflorescence a silvery, plume-like panicle to 60 cm long. Glumes equal to each other in length and about the same length as the hairy florets.



****A. donax*** Linnaeus GIANT REED (a reed). Along ditches, culverts, roadsides, and where water accumulates, in the southern half of the state. Planted as a windbreak or for ornament because of the silvery, plume-like panicles. Similar to *Phragmites australis*, but that species has unequal glumes and glabrous florets (but with long-hairy rachillas), and the culms are generally smaller in diameter. Giant reed might also be confused with *Saccharum ravennae* (known only from Bernalillo and Chaves counties), but that species has prominently pubescent blades near the ligules. Dried stems are used in the making of reeds for woodwind musical instruments, as well as for tubes for flutes and musical pipes, animal calls, whistles, sucking straws, thatch, mats, baskets, pens and cages, fish traps, furniture, spear shafts and arrows, walking sticks, and fishing poles. This is an incredibly useful plant throughout the world. Plants are sometimes mistaken for sugar cane (*Saccharum officinarum* Linnaeus), but that plant is not known

Fig. 51. *Arundo donax,* Giant Reed

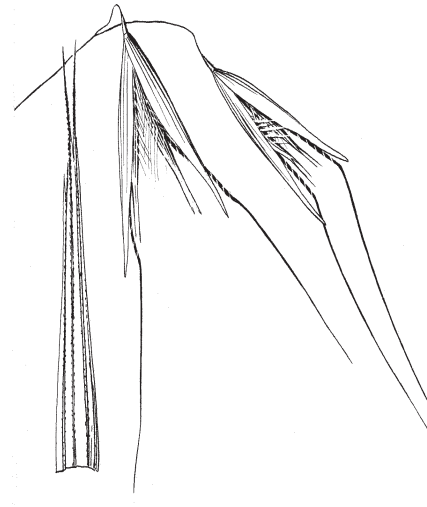


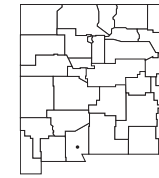
Fig. 52. *Avena barbata*, Slender Oats

from the state. A form with variegated leaves [cultivar 'Variegata'; var. *versicolor* (P. Mill.) Stokes] is very attractive as a landscape ornamental. Fig. 51.

AVENA OATS

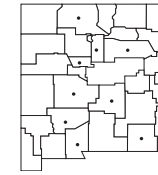
[L. avena, ancient name for oats, possibly an allusion to aveo, desire, because it was sought by cattle] (Pooideae: Poeae)

Annuals with panicle inflorescences. Spikelets mostly 2-flowered, with large, papery, several-nerved glumes. Florets awned or awnless.



1 Teeth at apex of lemma very thin, elongate, needle-like; pedicels capillary…****A. barbata*** Pott ex Link SLENDER OATS (bearded). Annual weed in fields and along roads; a few collections from Doña Ana County. Fig. 52.

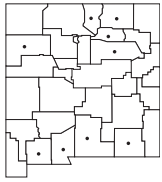
1 Teeth at apex of lemma acute but not elongate and needle-like; pedicels slender but not capillary



2 Awns usually absent or short and straight; lemmas glabrous on the back; florets falling together, when broken apart mechanically a portion of the rachilla remaining attached to the callus…****A. sativa*** Linnaeus COMMON OATS (planted or sown) [*Avena fatua* Linnaeus var. *sativa* (Linnaeus) Haussknecht]. Annual; commonly cultivated, sometimes escaping along the fields; widespread. Much more common in former years, when oats supplied feed for draft horses. Well known in the little ditty: "Mares eat oats, and does eat oats, and little lambs eat ivy; A kid'll eat ivy too, wouldn't you?"

Fig. 53. *Avena fatua*, Wild Oats

2 Awns usually well developed and bent abruptly; lemmas usually hairy on the back; florets separating and falling separately, leaving a circular scar or "sucker-mouth" at the callus…****A. fatua*** Linnaeus WILD OATS (foolish, perhaps derived from ergotized grains, or meaning tasteless, the grain not favored as food). Annual weed in grain fields and along roads; widespread; seedling blades twist in a counter-clockwise direction. Its easy dispersal and rampancy in the fields no doubt helped to bolster the euphemism 'sowing wild oats' for youthful excess. Awns are sensitive to moisture and humidity, and sometimes will wiggle about in the hand when breathed on. Soft stems of young plants are used by children (of whatever age) to make nooses for catching lizards. Fig. 53.



BECKMANNIA SLOUGHGRASS

[named for Johann Beckmann (d. 1811), German botanist] (Pooideae: Poeae)

Inflorescence a panicle of spike-like branches. Spikelets round in outline, disarticulating below the glumes.

B. syzigachne (Steudel) Fernald subsp. ***baicalensis*** (N.I. Kusnezow) T. Koyama & Kawano AMERICAN SLOUGHGRASS (chaff yoked together, scissor-like, referring to the glumes; from Lake Baikal, Russian Federation of the former Soviet Union) [*Beckmannia eruciformis* (Linnaeus) Host]. Annual; along irrigation ditches, marshes, sloughs in the northern plains and mountains. Spikelets occasionally have two florets. An important waterfowl grass. Fig. 54.

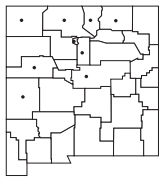


Fig. 54. *Beckmannia syzigachne*, American Sloughgrass

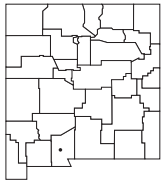
Fig. 55. *Blepharidachne bigelovii*, Bigelow's Desertgrass

BLEPHARIDACHNE DESERTGRASS

[Gr. *blepharis*, eyelash, and *achne*, chaff, alluding to the ciliate lemmas]
(Chloridoideae: Eragrostideae)

Inflorescence a short, congested, spicate panicle only slighted exserted above the subtending leaves. Spikelets 4-flowered, the lower one or two florets sterile or staminate, the third floret fertile, and the terminal floret reduced to a 3-awned rudiment. Disarticulation above the glumes, the florets falling together.

B. bigelovii (S. Watson) Hackel BIGELOW'S DESERTGRASS (for John Milton Bigelow, surgeon-botanist on early boundary surveys). Perennial; limestone knolls and ledges in Doña Ana and Eddy counties, uncommon. Plants have the initial appearance of *Dasyochloa pulchella*, but that species produces short stolons and the lemmas have a single awn. Fig. 55.

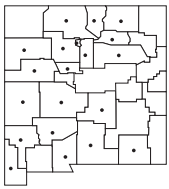


BLEPHARONEURON PINE DROPSEED

[Gr. *blepharis*, eyelash, and *neuron*, nerve, alluding to the ciliate nerves of the lemmas]
(Chloridoideae: Eragrostideae)

Inflorescence a panicle. Spikelets one-flowered, borne on very delicate, sinuous pedicels, awnless. Florets with a line of hairs on each nerve.

Fig. 56. *Blepharoneuron tricholepis*, Pine Dropseed



B. tricholepis (Torrey) Nash PINE DROPSEED (hairy scale). Perennial; rocky or gravely slopes in the mountains; widespread. A second species in this genus, *B. shepherdii* (Vasey) Peterson & Annable, is known in the mountains of Chihuahua, Mexico, in *Pinus-Quercus-Arctostaphylos* forests, and may be looked for in Hidalgo County; it is a slender annual with smaller florets (less than 2 mm long). Fig. 56.

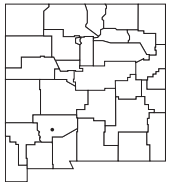
BOTHRIOCHLOA BLUESTEM

[Gr. *bothrios*, a small hole or pit, and chloa, grass, alluding to the pit on the dorsal face of the first glume of some species] (Panicoideae: Andropogoneae)

Inflorescence often silvery, the branches breaking apart at maturity. Spikelets silky hairy, awned. Species of *Bothriochloa* were formerly in the genus *Andropogon*. The glume pit developed in some species may have some function in pollination, the inner protuberance blocking the emergence of the anthers from the floret and thus leading to cleistogamous reproduction.

1 Pedicelled spikelets well-developed, about as long as the sessile ones

2 Sessile spikelets more than 5 mm long…***B. wrightii*** (Hackel) Henrard WRIGHT'S BLUESTEM (for Charles Wright, botanical collector for Asa Gray). Perennial; rocky, grassy foothills of the piñon zone in the southwestern mountains. First discovered in 1851 by Charles Wright, a member of the U.S.-Mexico boundary survey, and named scientifically by Eduard Hackel in 1885. Wright's notes indicated it was found in "pine hills from the Mimbres to the Cobre, large patches with scattered culms." The only other collection from the state was in 1904 near Hillsboro. Fig. 57.



2 Sessile spikelets less than 5 mm long

3 Panicle axis longer than the branches… ****B. bladhii*** (Retzius) S.T. Blake AUSTRALIAN BLUESTEM (for Peter Johan Bladh, Finnish naturalist) [*Bothriochloa caucasica* (Trinius) C.E. Hubbard, *B. intermedia* (R. Brown) A. Camus]. Perennial, introduced for range restoration, stabilization of roadsides, and erosion control. Intergrades with other Asian species of *Bothriochloa*, and some plants may be difficult to identify.

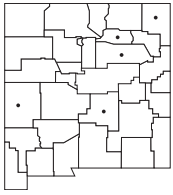
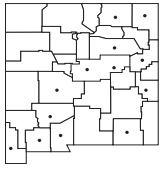


Fig. 57. *Bothriochloa wrightii*, Wright's Bluestem

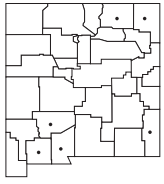
Fig. 58. *Bothriochloa songarica*, King Ranch Bluestem

3 Panicle axis shorter than the branches… ***B. ischaemum** (Linnaeus) Keng YELLOW BLUESTEM (resembling the grass genus *Ischaemum*). Perennial; introduced for improving dry-land pastures and roadside stabilization, escaping along road ways. We have two weak varieties in scattered locales throughout the state:



a Nodes glabrous…var. ***ischaemum***

a Nodes short-pubescent…var. ***songarica*** (Ruprecht ex Fischer & Meyer) Celerier & Harlan KING RANC BLUESTEM. Fig. 58.



1 Pedicelled spikelets much shorter than the sessile ones

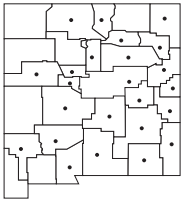
4 Sessile spikelets less than 4.5 mm long; awns less than 18 mm long

5 Panicle reddish; hairs subtending the sessile spikelet about 1/4 the length of the spikelet, sparse, not at all obscuring the spikelet… ***B. bladhii** (Retzius) S.T. Blake [see lead 3, above]. Fig. 59.

Fig. 59. *Bothriochloa bladhii*, Australian Bluestem

Fig. 60. *Bothriochloa laguroides*, Silver Bluestem

5 Panicle silvery; hairs subtending the sessile spikelets at least 1/2 the length of the spikelet or longer, copious, at least somewhat obscuring the spikelets…***B. laguroides*** (A.P. de Candolle) Herter subsp. ***torreyana*** (Steudel) Allred & Gould SILVER BLUESTEM (resembling the grass genus Lagurus; for John Torrey, celebrated American botanist) [*Andropogon/Bothriochloa saccharoides* as used by various authors]. Perennial; well-drained soils of grasslands, river valleys, and roadsides. The original collection of this taxon was made during the 1820 Long expedition, from "the Canadian River," which could have been in New Mexico, Oklahoma, or Texas. Subspecies *laguroides* occurs in Mexico and South America. Seedheads of this and other species contain flavonols and other aromatic oils, and chewing the seedhead is reputed to give a strong blueberry taste. Fig. 60.

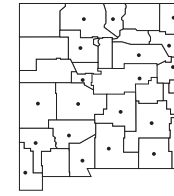


4 Sessile spikelets more than 4.5 mm long; awns more than 18 mm long

Fig. 61. *Bothriochloa springfieldii*, Springfield's Bluestem

Fig. 62. *Bothriochloa barbinodis*, Cane Bluestem

6 Panicle axis mostly less than 5 cm long, with 2-8 branches; rachises and pedicels densely white long-pubescent; nodes densely white long-pubescent with spreading hairs…***B. springfieldii*** (Gould) Parodi SPRINGFIELD'S BLUESTEM (for H. Wayne Springfield, USDA range scientist). Perennial; rocky to sandy slopes and plains in grasslands and woodlands. This is perhaps our most spectacular bluestem, with its very white hairs of panicle and node; a good choice for a native garden. Fig. 61.



6 Panicle axis 5-15 cm long, usually with numerous branches; rachises and pedicels long-pubescent but with off-white hairs; nodes bearded with stiff tan or off-white hairs

7 Panicles of the larger shoots 14-25 cm long; stems stout, stiffly erect, little-branched above the base, 1.2-2.5 m tall, bluish-glaucous below the nodes; nodes bearded with spreading hairs 3-6 mm long…***B. alta*** (Hitchcock) Henrard TALL BLUESTEM (tall). Perennial; plains and prairies, uncommon, usually along roadways and ditchbanks where extra water accumulates. This appears as an overly large, robust *Bothriochloa barbinodis*.

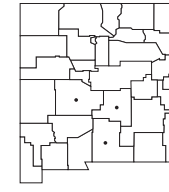
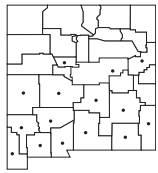


Fig. 63. *Bouteloua eriopoda*, Black Grama

7 Panicle mostly 7-13 cm long; stems tending to be bent at the base and much-branched in age, mostly 1.2 m or less tall, not bluish-glaucous below the nodes; nodes bearded with appressed hairs less than 3 mm long…***B. barbinodis*** (Lagasca) Herter CANE BLUESTEM (hairy noded). Perennial; desert and arid plains and grasslands. Homemade darts can be made by inserting cactus spines into a short section of the peduncle, leaving the seedhead for the fletching. Fig. 62.

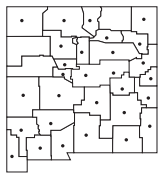


BOUTELOUA GRAMA

[for Claudio and Estéban Boutelou y Soldevilla, Spanish agriculturalists and gardeners who tended the plants brought back to Spain by the Royal Botanical Expedition to New Spain, commonly known as the Sessé and Mociño expedition, of 1787-1803] (Cloridoideae: Cynodonteae)

Inflorescence a panicle of spike-like branches. Some have recognized two segregate genera, *Bouteloua* and *Chondrosum*, but detailed studies of this proposal by Travis Columbus of the Rancho Santa Ana Botanic Garden, California, have shown this to be untenable.

1 Stem internodes (not the sheaths) wooly-pubescent…**B. *eriopoda*** (Torrey) Torrey BLACK GRAMA (wooly-footed) [*Chondrosum eriopodum* Torrey]. Perennial, desert grasslands, dry plains, and rocky slopes throughout the state. In New Mexico, only black grama and *Pleuraphis rigida* (exotic and rare) have wooly internodes. In the early reports of New Mexico vegetation, at least four different grasses were called black grama: *Bouteloua eriopoda, B. hirsuta, Muhlenbergia porteri*, and *Pleuraphis mutica*. This is unfortunate, considering the indicator status of B. eropoda in the desert grassland and its importance in reconstructing early vegetation types. Fig. 63.



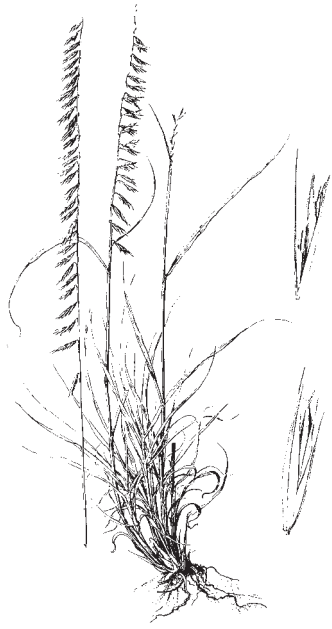


Fig. 64. *Bouteloua curtipendula*, Sideoats Grama

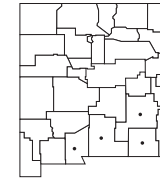
Fig. 65. *Bouteloua aristidoides*, Needle Grama

1 Stem internodes glabrous

2 Inflorescence branches deciduous at maturity; spikelets 1-16 per branch

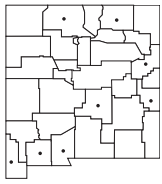
3 Branches of the inflorescence 15-80 per stem, or if less than 15 then the branches (including the spikelets) less than 1 cm long

4 Leaf blades 1-2(2.5) mm broad; plants not rhizomatous; anthers purple…***B. warnockii*** Gould & Kapadia WARNOCK'S GRAMA (for Barton H. Warnock, west-Texas botanist). Perennial; dry plains in desert grasslands, often on gypsum; uncommon in the southcentral and southeastern regions.

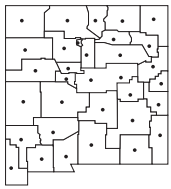


4 Leaf blades mostly more than 2.5 mm broad; plants with or without rhizomes; anthers red, orange, or yellow…***B. curtipendula*** (Michaux) Torrey SIDEOATS GRAMA (short-hanging, referring to the branches). Perennial; prairies, grasslands, woodlands, forest openings, usually on well-drained soils; an excellent forage grass that withstands grazing fairly well. Experienced cattlemen would say that it was a valuable grass "to sell a range on." We have two weak varieties:

a Plants tufted, without rhizomes…var. ***caespitosa*** Gould & Kapadia (tufted). Scattered locales, presumably less common than the next.



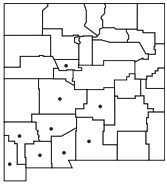
a Plants with short rhizomes from the bases of the clumps…var. ***curtipendula*** Widespread throughout the state. Fig. 64.



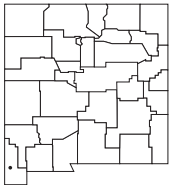
3 Branches of the inflorescence 1-13 per stem or if more than 13 then the branches (including the spikelets) 1.5 cm or more long

5 Plants annual…***B. aristidoides*** (Kunth) Grisebach NEEDLE GRAMA (resembling the grass genus *Aristida*). Annual; alluvial plains and uplands, disturbed rangelands. We have two varieties:

a Panicle branches with 2-4 spikelets, mostly 1.6 cm or less long to the tip of the terminal spikelet; rachis extended 6-10 mm beyond the point of attachment of the terminal spikelet…var. ***aristidoides*** Common. Fig. 65.

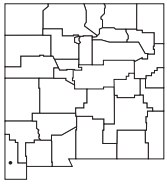


a Panicle branches with 6-10 spikelets, 1.5-3.5 cm long; rachis extended 2.5(7) mm beyond the point of attachment of the terminal spikelet…var. ***arizonica*** Jones (of Arizona). Uncommon in the bootheel region.



5 Plants perennial

6 Glumes and often the lemmas densely pubescent, the hairs not confined to the midnerves…***B. eludens*** Griffiths SANTA RITA GRAMA (elusive). Perennial; dry, rocky slopes and desert grasslands. Known only from a single collection in Hidalgo County. Named by David Griffiths because it had eluded numerous collectors in the southwest region. *Bouteloua chondrosoides* is easily confused with *B. eludens*, and has been reported from the state, though these reports have yet to be verified. The two may be distinguished by the following:

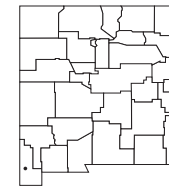


a Panicles 6-10 cm long, the branches 5-11 mm long and 12-16 in number, with 2-6 spikelets per branch...*B. eludens*

a Panicles 2.5-6 cm long, the branches 10-15 mm long and 3-8 in number, with 8-12 spikelets per branch...*B. chondrosoides* (Kunth) Bentham ex S. Watson SPRUCETOP GRAMA. Known from adjacent southeastern Arizona.

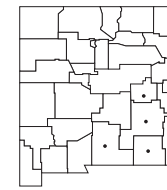
6 Glumes and lemmas glabrous, or scabrous to ciliate on the midnerves only

7 Middle inflorescence branches with 12-20 spikelets; lemma of lower floret 4-6 mm long…***B. repens*** (Kunth) Scribner & Merrill SLENDER GRAMA (creeping) [*Bouteloua filiformis* (Fournier) Griffiths]. Perennial; semi-arid rangelands and woodlands in the southwestern region.



7 Middle inflorescence branches with 4-16 spikelets; lemma of lower floret 4.5-8 mm long

8 Shoots from hard, stout, rhizomatous bases, the stems thus appearing more-or-less in linear progression and close together; basal sheaths mostly flattened, ribbon-like; middle branches mostly 2-3 cm long (excluding awns)…***B. radicosa*** (Fournier) Griffiths PURPLE GRAMA (rooted, referring to the hard bases). Perennial; dry rocky slopes, desert grasslands and woodlands; uncommon in the southern portion of the state. Fig. 66.



8 Shoots solitary or several together in somewhat concentric tufts or from weak rhizomes; basal sheaths little flattened, mostly somewhat keeled and not ribbon-like; middle branches mostly 0.7-2 cm long (excluding awns)…***B. repens*** (Kunth) Scribner & Merrill [see lead 7, above]

2 Inflorescence branches and glumes persistent on the plant; spikelets usually 20-60 per branch

9 Inflorescence reduced to a single branch

Fig. 66. *Bouteloua radicosa*, Purple Grama

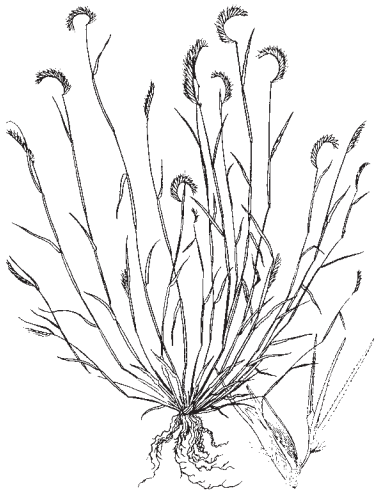
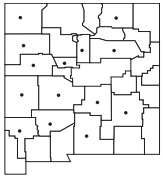


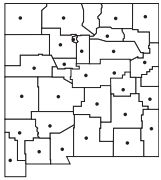
Fig. 67. *Bouteloua simplex*, Mat Grama

10 Plants annual…***B. simplex*** Lagasca MAT GRAMA (simple, single, referring to the single branch). Annual; dry plains, mesas, hills, disturbed ground in the mountains. Fig. 67.

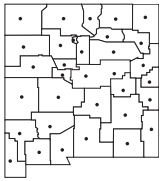


10 Plants perennial

11 Primary inflorescence branch extending well beyond the attachment of the terminal spikelet…***B. hirsuta*** Lagasca HAIRY GRAMA (shaggy, bristly) [*Chondrosum hirsutum* (Lagasca) Kunth]. Perennial; plains, rocky slopes, woodlands; widespread. Fig. 68.



11 Primary inflorescence branch not extending beyond the attachment of the terminal spikelet…***B. gracilis*** (Willdenow ex Kunth) Lagasca ex Griffiths BLUE GRAMA (slender) [*Bouteloua oligostachya* (Nuttall) Torrey ex A. Gray, *Chondrosum gracile* Willdenow ex Kunth]. Perennial; plains, mesas, grasslands, woodlands, forest openings. This is the state grass of New Mexico and is found in every county, from 4,000 to over 10,000 feet. It is undoubtedly the most valuable forage grass in the state, and blue grama plains provide excellent forage for livestock. It was called WHITE GRAMA in the early days of the territory, but it appears neither white nor blue. Some Native Americans used the seeds to make flour for breads and mush. Blackfoot Indians predicted the weather based on the number of primary branches produced during the current growing season: one meant a mild winter, two a colder one, and three a long severe winter coming. Plants are being used more and more in xeriscaping. Fig. 69.



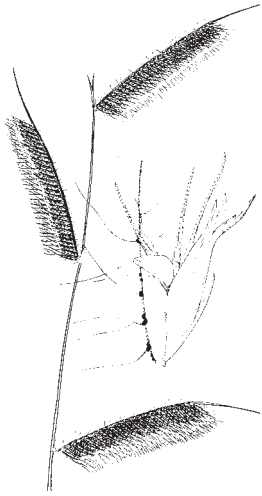


Fig. 68. *Bouteloua hirsuta*, Hairy Grama

Fig. 69. *Bouteloua gracilis*, Blue Grama

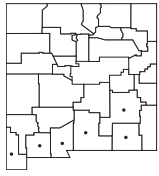
9 Inflorescence with 2 or more branches (*B. barbata* rarely with a single branch)

12 Second glume of some spikelets with stiff, bulbous-based hairs

13 Primary branch extending well beyond the attachment of the terminal spikelet…***B. hirsuta*** Lagasca [see lead 11, above]

13 Primary branch not extending beyond the attachment of the terminal spikelet

14 Lemma 2-3(3.5) mm long; inflorescence branches (2)3-6 in number…***B. parryi*** (Fournier) Griffiths PARRY'S GRAMA
(for Charles Christopher Parry, botanical explorer of the west) [*Chondrosum parryi* Fournier].
Annual; dry sandy plains in the southern regions.
Fig. 70.



14 Lemma 4-6 mm long; inflorescence branches 2(1-4) in number…***B. gracilis*** (Willdenow ex Kunth) Lagasca ex Griffiths [see lead 11, above]

13 Second glume glabrous or pubescent without bulbous-based hairs

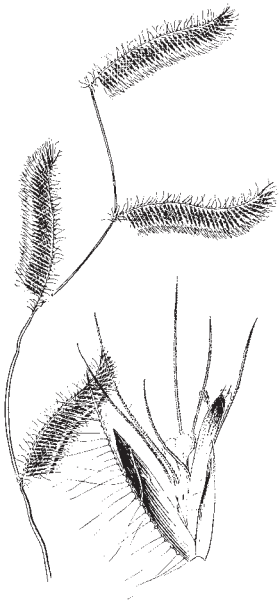
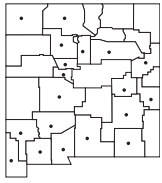


Fig. 70. *Bouteloua parryi*, Parry's Grama

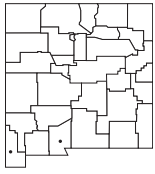
Fig.71. *Bouteloua barbata*, Sixweeks Grama

15 Plants annual…***B. barbata*** Lagasca SIXWEEKS GRAMA (bearded) [*Chondrosum barbatum* (Lagasca) W.D. Clayton]. Annual; alluvial flats and slopes, plains, dry woodlands, often disturbed ground. Fig. 71. We have two varieties in the state:



a Plants annual; culms usually decumbent and geniculate, occasionally rooting at the lower nodes; panicle branches mostly 10-18 in number... var. ***barbata*** Common.

a Plants short-lived perennial; culms erect from the base; panicle branches 15-30 in number... var. ***rothrockii*** (Vasey) Gould ROTHROCK'S GRAMA (for Joseph Trimble Rothrock, surgeon-botanist of the Wheeler Expedition) [*Bouteloua rothrockii* Vasey]. Dry plains and foothills in the desert grasslands of the southwestern region; uncommon.



15 Plants perennial

16 Inflorescence branches 2(1-4) in number

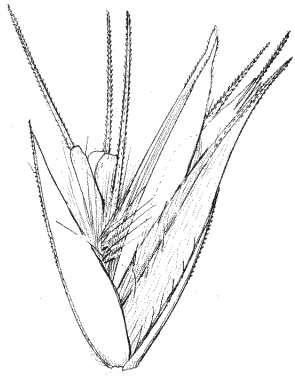
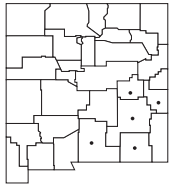


Fig. 72. *Bouteloua breviseta*, Gyp Grama

Fig. 73. *Bouteloua trifida*, Red Grama

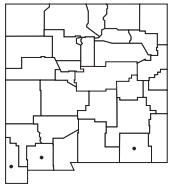
17 Stem usually with 2-3 nodes…***B. gracilis*** (Willdenow ex Kunth) Lagasca ex Griffiths [see lead 11, above]

17 Stem usually with 5 or more nodes, the plants somewhat bushy …***B. breviseta*** Vasey GYP GRAMA (short-awned). Perennial; gypsum plains, hills, and grasslands in the southeastern quarter of the state. Fig. 72.



16 Inflorescence branches 3-30 in number

18 Lemma of first floret glabrous …***B. trifida*** Thurber ex S. Watson RED GRAMA (three-parted). Perennial; calcareous, rocky slopes in the desert grasslands. Fig. 73.



18 Lemma of first floret pubescent at the base…***B. barbata*** Lagasca var. ***rothrockii*** (Vasey) Gould ROTHROCK'S GRAMA. [see lead 15, above]. Fig. 74.

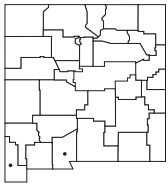


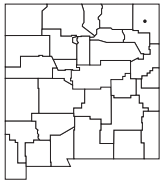
Fig. 74. *Bouteloua barbata var. rothrockii*, Rothrock's Grama

Fig. 75. *Briza minor*, Little Quaking Grass

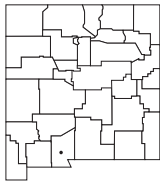
BRIZA QUAKING GRASS

[Gr. *brizein*, to nod, alluding to the drooping spikelets]
(Pooideae: Poeae)

Inflorescence an open, usually showy, panicle. Spikelets several-flowered, awnless, erect to drooping. Glumes broad, thin, spreading horizontally, as are the florets. Lemmas with several, indistinct nerves.



1 Spikelets 10-20 mm long, drooping...****B. maxima*** Linnaeus BIG QUAKING GRASS (largest). Annual; weakly adventive. Found recently in Union County. Plants are grown for ornament because of the spectacular seedheads.



1 Spikelets 2-5 mm long, mostly erect...****B. minor*** Linnaeus LITTLE QUAKING GRASS (smaller). Annual; weakly adventive. Found recently in Las Cruces, but not likely persisting. Seedheads are occasionally used in dried bouquets. Fig. 75.

Fig. 76. *Bromus inermis*
Smooth Brome

Fig. 77. *Bromus pumpellianus*,
American Smooth Brome

BROMUS BROME

[Gr. *bromo*, food, the ancient name for oats] (Pooideae: Bromeae)

Sheath margins fused together to near the top of the sheath. Inflorescence a panicle. Spikelets several-flowered, awned or awnless. Mature grains fused to the paleas. Perennial species are generally excellent forage grasses and provide important summer and fall grazing in the mountains, but the annuals are mostly weedy species that invade disturbed sites and overgrazed pastures. The annuals typically have hairy sheaths and blades. The genus is broken up by some into segregate genera: *Anisantha, Bromopsis, Bromus*, and *Ceratochloa*.

1 Plants perennial

3 Culm nodes usually glabrous; leaves (blades and sheaths) usually glabrous; lemmas mostly glabrous or scabrous; awns 0-3 mm long; ligules 0.5-1 mm long; seeded or disturbed sites, widespread…****B. inermis*** Leysser SMOOTH BROME (unarmed, or unawned) [*Bromopsis inermis* (Leysser) Holub]. Improved pastures, mountain slopes, roadside swales and slopes. Widely introduced from Europe for soil stabilization and forage. Also called HUNGARIAN BROME, alluding to its European origin. Fig. 76.

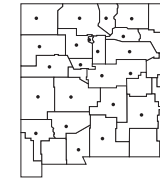
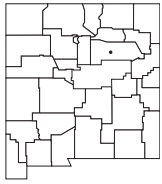


Fig. 78. *Bromus catharticus*, Rescuegrass

3 Culm nodes often pubescent; leaves often pilose; lemmas pubescent; awns 1-6 mm long; ligules 1.2-5 mm long; native plant communities, uncommon in the northern mountains…***B. pumpellianus*** Scribner AMERICAN SMOOTH BROME (for Raphael Pumpelly, geologist) [*Bromopsis pumpellianus* (Scribner) Holub, *Bromus inermis* Leysser var. *purpurascens* (Hooker) Wagnon]. This is our native, Rocky Mountain countpart to the European smooth brome, uncommon in the northern mountains. Fig. 77.



2 Rhizomes absent

4 Spikelets strongly flattened, the lemmas v-shaped in cross-section; second (upper) glume 5- to 9-nerved

5 Lemma awns 0-2.5 mm long…**B. catharticus* Vahl RESCUEGRASS (cleansing, cathartic) [*Bromus unioloides* (Willdenow) Kunth, B. *willdenovii* Kunth, *Ceratochloa cathartica* (Vahl) Herter]. Annual or short-lived perennial, widespread in the state in disturb ed ground, weedy sites, and roadsides; native to South America. MATUA GRASS is a popular cultivar of this species planted for improved pastures. There has been some confusion as to the correct name, but Pinto-Escobar (Nota sobre el ejemplar tipo de "*Bromus catharticus*" Vahl. Caldasia 11(54):9-16. 1976.) established the validity of the epithet *catharticus* Vahl. Fig. 78.

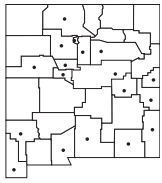
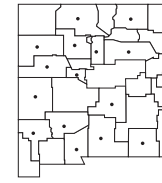


Fig. 79. *Bromus carinatus*, **California Brome, Mountain Brome**

5 Lemma awns 3-8 mm long (rarely as short as 2 mm)…***B. carinatus*** Hooker & Arnott CALIFORNIA BROME, MOUNTAIN BROME (keeled) [*Ceratochloa carinata* (Hooker & Arnott) Tutin]. Mountain slopes and forest clearings, widespread. Panicles have a characteristic look to them, with the branches extending stiffly outward and drooping slightly at the tips, much different than the often sympatric *Bromus ciliatus*. The following weak races have been recognized, sometimes treated as varieties or separate species:



a Sheaths not pilose at the throat/collar region; plants usually glabrous or scabrous throughout, including the spikelets……the *polyanthus* phase [Bromus polyanthus Scribner, Ceratochloa polyantha (Scribner) Tsvelev]. This is the common phase in New Mexico.

a Sheaths pilose at the throat/collar region, and usually also down the margins or throughout the sheath; spikelets glabrous to pubescent

b Blades 6-15 mm wide... …the *marginatus* phase MOUNTAIN BROME [*Bromus marginatus* Nees ex Steudel].

b Blades 3-6 mm wide... the *carinatus* phase CALIFORNIA BROME

4 Spikelets not strongly flattened, but more-or-less terete, the lemmas rounded on the back in cross-section; second (upper) glume 3-nerved

6 First glume 3-nerved

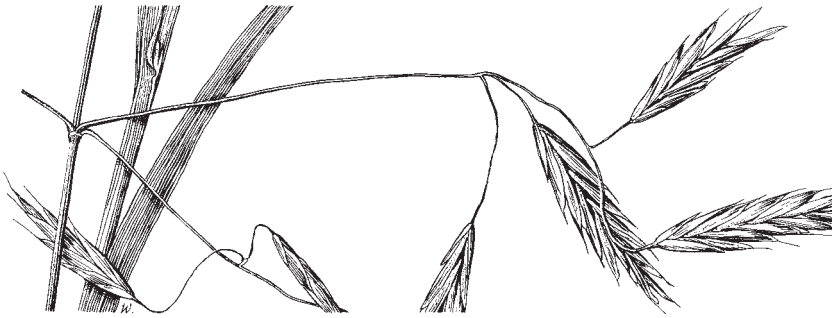
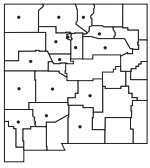
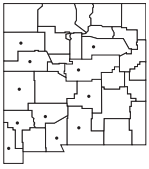


Fig. 80. *Bromus frondosus*, Weeping Brome

7 Glumes and pedicels puberulent; blades erect, the midrib not narrowed below the collar…***B. porteri*** (Coulter) Nash PORTER'S BROME (for Thomas Conrad Porter, Pennsylvania professor of botany, poet, classicist) [*Bromopsis porter*i (Coulter) Holub]. Ponderosa and spruce/fir forest, aspen groves, often at high elevations. The erect blades are quite distinctive in the field.

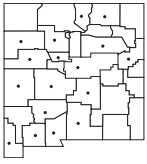


7 Glumes and pedicels glabrous; blades mostly lax or spreading, the midrib often narrowed below the collar…***B. frondosus*** (Shear) Wooton & Standley WEEPING BROME (full of leaves, leafy) [*Bromopsis frondosa* (Shear) Holub]. Semi-desert mountain scrub and riparian areas, mountain brush, oak and piñon/juniper woodlands, to ponderosa forests, mostly below 8100 ft. Fig. 80.



6 First glume 1(2)-nerved

8 Sheaths densely lanate, the hairs spreading from the sheath but becoming matted at the tips…***B. lanatipes*** (Shear) Rydberg SHAGGY BROME (wooly-footed, referring to the sheaths) [*Bromopsis lanatipes* (Shear) Holub]. Semi-desert riparian areas and mountain brush, oak and piñon/juniper woodlands and plains.



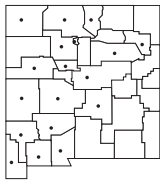
8 Sheaths glabrous to lightly pilose or hirtellous, if pubescent then not becoming matted

Fig. 81. *Bromus anomalus*, Nodding Brome

Fig. 82. *Bromus ciliatus*, Fringed Brome

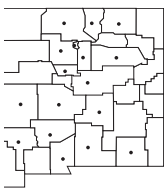
9 Glumes glabrous (use a hand lens)

10 Lemmas pubescent (usually densely so) across the back, not glabrous on the median portion; anthers 2-4 mm long…***B. anomalus*** Ruprecht ex Fournier NODDING BROME (irregular) [*Bromopsis anomala* (Ruprecht ex Fournier) Holub]. Mountain scrub, oak & piñon/juniper woodlands, ponderosa parklands, aspen groves, and mountain meadows, often growing with *B. ciliatus* and *B. richardsonii*, mid- to high elevations. Intergrades with these species as well as with *Bromus frondosus*. Fig. 81.

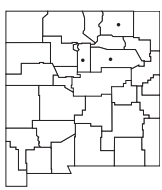


10 Lemmas densely pubescent on the margins but glabrous or nearly so (with scattered hairs) on the median portion across the back; anthers 1-3 mm long

11 Anthers 1-1.5 mm long; second glume 6-9 mm long; basal sheaths glabrous or with long hairs; upper culm nodes usually pubescent …***B. ciliatus*** Linnaeus FRINGED BROME (fringed) [*Bromopsis ciliata* (Linnaeus) Holub]. Common in ponderosa and spruce/fir forests and mountain meadows, but also at lower elevations. Intergrades with *B. richardsonii*, q.v. below. Fig. 82.



11 Anthers 1.5-3 mm long; second glume 8-13 mm long; basal sheaths pubescent with short or medium hairs; upper culm nodes usually glabrous…**B. richardsonii** Link RICHARDSON'S BROME (for Sir John Richardson, Scottish naturalist) [*Bromopsis richardsonii* (Link) Holub]. This species is very weakly differentiated from fringed brome in New Mexico, where intergradation is common, but perhaps more easily distinguished elsewhere, where it is more consistently recognized. The name *Bromus ciliatus* has priority if the two are merged.



9 Glumes pubescent (use a hand lens)

12 Blades 3-5 mm wide; lemmas 7-10 mm long; anthers 2-4 mm long…***B. anomalus*** Ruprecht ex Fournier NODDING BROME. [see lead 10, above]

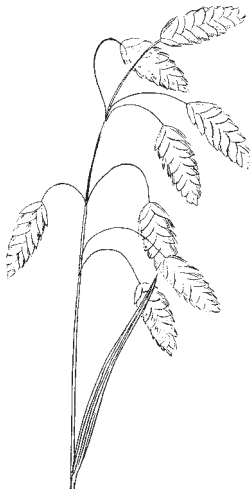
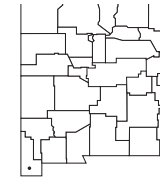


Fig. 83. *Bromus briziformis*, Rattle-snake Chess

Fig. 84. *Bromus secalinus*, Rye Chess

12 Blades 5-11 mm wide; lemmas 10-11 mm long; anthers mostly 1.5-2 mm long, rarely longer …***B. mucroglumis*** Wagnon SOUTHWESTERN BROME (with pointed glumes) [*Bromopsis mucroglumis* (Wagnon) Holub]. Mountain clearings and grassy sites in the bootheel region. This species is scarcely distinct from *Bromus lanatipes,* but seems to have pilose rather than lanate sheaths, wider blades, pubescent glumes, and smaller anthers.



1 Plants annual

13 Lemma awns 0-2.5 mm long

14 Lemmas lanceolate, broadest at the base, 9-14 mm long; anthers about 3-4 mm long…*****B. catharticus*** Vahl [see lead 5, above]

14 Lemmas inflated, broadest at the middle, 7-9 mm long; anthers 1 mm long or less…*****B. briziformis*** Fischer & Meyer RATTLESNAKE CHESS (resembling the grass genus *Briza*). Annual; weedy, dry sites. Known only from an old (early 1900s) collection from San Miguel County, more common northwestward. The sheaths are usually densely retrorsely hispid. Sometimes cultivated for the ornamental seedheads. The name chess is an old form of cheat, referring to an imposter in crop fields. Fig. 83.

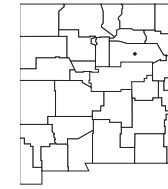
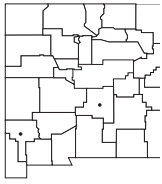


Fig. 85. *Bromus japonicus*, Japanese Brome, Meadow Brome

13 Lemma awns longer than 3 mm

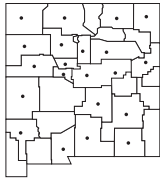
15 Lemmas 6-9(10) mm long at maturity

16 Awns mostly less than 5 mm long; lemmas rounded, the margins usually rolled around the grain; plants glabrous…****B. secalinus*** Linnaeus RYE CHESS (resembling the grass genus *Secale*). Annual; disturbed ground, weedy sites, sometimes a weed in crop fields, uncommon. Farmers once thought that this was a degenerate form of wheat. Fig. 84.



16 Awns mostly more than 5 mm long; lemmas somewhat flattened, the margins not rolled around the grain; plants pubescent

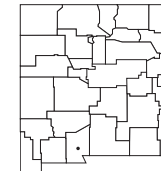
17 Panicles open, 6-20 cm long, the branches spreading …****B. japonicus*** Thunberg ex Murray JAPANESE BROME, MEADOW BROME (of Japan). Annual. The following races are recognized as separate species by some, but are distinguished with some difficulty:



a Panicle branches lax and drooping; awns flattened at the base; anthers 0.8-1.5 mm long; hairs on the leaf sheaths spreading or reflexed, soft and becoming matted on handling…the japonicus phase JAPANESE BROME [*Bromus japonicus* var. porrectus Hackel]. Fig. 85.

a Panicle branches stiffly ascending or spreading; awns round at the base; anthers 1.5-2 mm long; hairs on the leaf sheaths reflexed, straight…the *commutatus* phase MEADOW BROME [*Bromus commutatus* Schrader]

17 Panicles dense, compact, 3-8(10) cm long, the branches stiffly erect…****B. hordeaceus*** Linnaeus SOFT BROME (resembling the grass genus *Hordeum*). Annual; disturbed ground in Doña Ana County. Fig. 86. We have two weak subspecies:



a Awns flattened at the base, divaricate when mature …subsp. ***molliformis*** (Lloyd) Maire & Weiller (like B. mollis) [*Bromus molliformis* Lloyd].

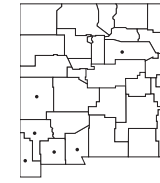
a Awns round at the base, straight or curving slightly outward when mature…subsp. ***hordeaceus*** [*Bromus mollis* Linnaeus, *B. racemosus* sensu M&H].

15 Lemmas (9)10-30 mm long at maturity

18 First glume 3- to 5-nerved; awns 4-8 mm long…***B. carinatus*** Hooker & Arnott [see lead 5, above]

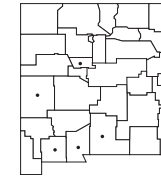
18 First glume mostly 1-nerved (occasionally 3-nerved in *B. diandrus*); awns (7)10-60 mm long

19 Panicle dense, compact, ovoid; panicle branches stout, erect, and mostly much shorter than 2 cm…****B. rubens*** Linnaeus FOXTAIL BROME, RED BROME (reddish) [*Anisantha rubens* (Linnaeus) Nevski, *Bromus madritensis* Linnaeus var. *rubens* (Linnaeus) Husnot]. Annual; dry, disturbed ground in the southwestern counties. Sometimes merged with *Bromus madritensis* Linnaeus. The dense red heads are distinctive. Fig. 87.



19 Panicle loose, open, elongate; panicle branches often spreading or drooping, and mostly much longer than 2 cm

20 Awns mostly 3-6 cm long; lemmas 20-35 mm long…****B. diandrus*** Roth RIPGUT BROME (with two stamens) [*Anisantha diandra* (Roth) Tutin, *Bromus rigidus* of numerous authors]. Annual; dry, disturbed ground, mostly in the southern counties. The stiff awns may cause severe injury to the nose, eyes, and underbelly of grazing animals. Fig. 88.



20 Awns mostly 1-3 cm long; lemmas 9-20 mm long

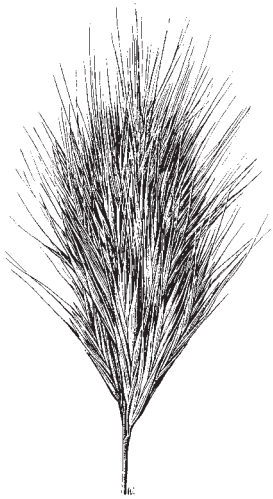


Fig. 87. *Bromus rubens*, Foxtail Brome, Red Brome

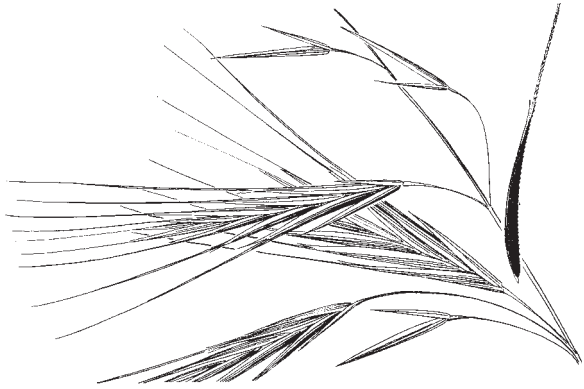


Fig. 88. *Bromus diandrus*, Ripgut Brome

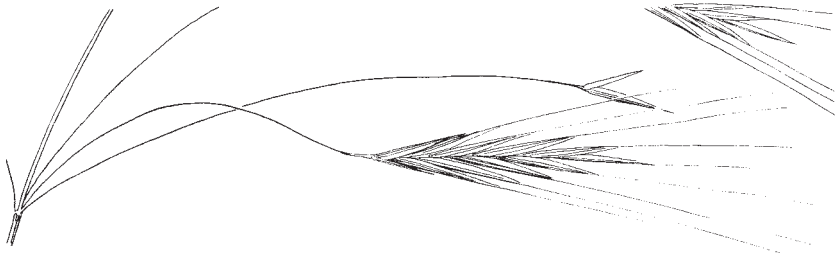
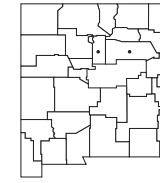


Fig. 89. *Bromus sterilis*, Poverty Brome

Fig. 90. *Bromus tectorum*, Cheatgrass, Downy Brome

21 Primary panicle branches mostly with 1(3) spikelets; awns 15-30 mm long; lemmas 14-20 mm long…****B. sterilis*** Linnaeus POVERTY BROME (barren, referring to habitats) [*Anisantha sterilis* (Linnaeus) Nevski]. Annual; dry, disturbed ground, a few scattered locales in the state but not common. Fig. 89.



21 Primary panicle branches mostly with more than 3 spikelets, at least on mature shoots; awns 10-18 mm long; lemmas 9-12 mm long…****B. tectorum*** Linnaeus CHEATGRASS, DOWNY BROME (of roofs, where one can find it growing) [*Anisantha tectorum* (Linnaeus) Nevski]. Annual; dry, disturbed ground, nearly throughout the state, an abundance indicating abused rangelands. It provides fair forage when young and vegetative, but the emergence of the seedhead renders the plants unpalatable. Plants with purplish or reddish panicles have been called forma *coloratus* Jansen & Wachter. The name cheatgrass derives from its being a 'cheat' or imposter in crop fields and seed mixes, sometimes reducing the yield by as much as 50%. Fig. 90.

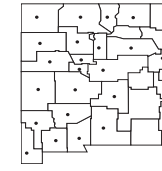


Fig. 91. *Buchloe dactyloides*, Buffalograss

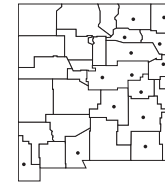
Fig. 92. *Calamagrostis purpurascens*, Purple Reedgrass

BUCHLOE BUFFALOGRASS

[Gr. *bukalos*, buffalo, and *chloë*, grass, a Greek rendering of the common name] (Choridoideae: Cynodonteae)

Plants grow in low, dense mats from stolons. Male spikelets borne in panicles raised above the foliage, the anthers orange. Female spikelets in bony burs nestled low among the leaves. Recent studies by Travis Columbus of the Rancho Santa Ana Botanic Garden, California, have shown the close relationship of this and the grama grasses (*Bouteloua*), and he proposes the merger of the two genera.

B. dactyloides (Nuttall) Engelmann BUFFALOGRASS (resembling Dactylis) [*Bouteloua dactyloides* (Nuttall) J.T. Columbus, *Sesleria dactyloides* Nuttall]. Perennial; plains and prairies in the eastern half of the state, with a disjunct population in the bootheel. Buffalograss is one of the dominants of the shortgrass prairie and furnishes important forage for livestock and wildlife. It has recently found favor as a xeriscape turf grass. Fig. 91.

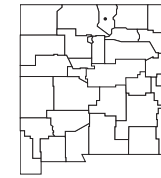


CALAMAGROSTIS REEDGRASS

[Gr. *calamos*, reed, and *agrostis*, a grass] (Pooideae: Poeae)

Inflorescence a panicle. Spikelets one-flowered, the glumes exceeding the floret. Lemma with a delicate awn arising from the back; this may be difficult to see without magnification.

1 Awns exserted well beyond the glumes, easily visible, 4.5-8 mm long…***C. purpurascens*** R. Brown PURPLE REEDGRASS (purplish). Perennial; open rocky slopes, meadows, and alpine plains at high elevations (above 11,000 ft) in the Sangre de Cristos Mountains; presently known only from Taos County. Panicles are spike-like and purplish. Fig. 92.



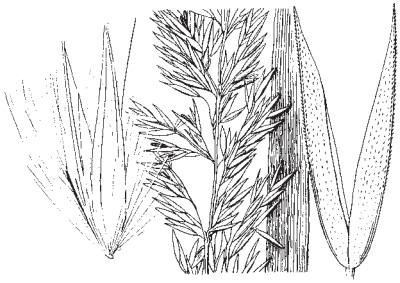


Fig. 93. *Calamagrostis scopulorum*, Jones's Reedgrass

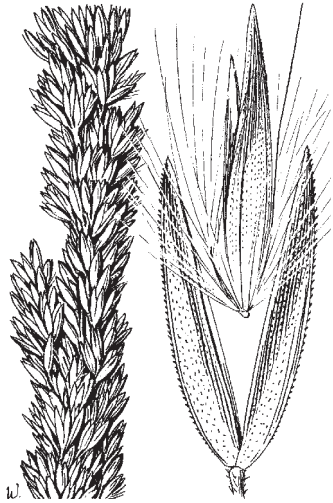
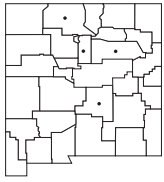


Fig. 94. *Calamagrostis inexpansa*, Slender Reedgrass

1 Awns scarcely if at all exserted beyond the glumes, less than 4.5 mm long

2 Pedicels glabrous or nearly so…***C. scopulorum*** Jones JONES'S REEDGRASS (of the Rocky Mountains). Perennial; known only from a single collection in San Juan County, at about 6000 ft, along a seep in a hanging garden of a piñon/juniper community. Northward, it is a species of more montane habitats. Panicles are spike-like and staw-colored when mature, and the foliage is pale bluish green. Fig. 93.



2 Pedicels evidently scabrous

3 Glumes oblong, the apex abruptly acute and not drawn out to an awn tip; blades 1-4 mm wide, usually rolled and stiffly ascending; lemmas not translucent on the upper 1/3; callus hairs 1/2 to2/3 as long as the lemma…***C. stricta*** (Timm) Koeler subsp. ***inexpansa*** (Gray) C.W.Greene SLENDER REEDGRASS (constricted; not expanded) [*Calamagrostis neglecta* of numerous authors]. Perennial; stream banks, wet meadows, seeps, and marshy or wet ground in the mountains, above 7500 ft. Fig. 94.

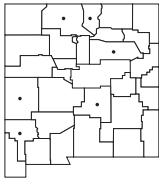
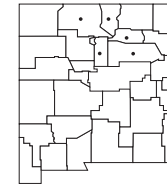


Fig. 95. *Calamagrostis canadensis*, **Canada Reedgrass**

3 Glumes lance-ovate, the apex of especially the first drawn out to an awn tip; blades 3-10 mm wide, mostly flat and lax; lemmas translucent on the upper 1/3; callus hairs 2/3 to as long as the lemma…***C. canadensis*** (Michaux) Beauvois CANADA REEDGRASS (of Canada) [*C. scribneri* Beal].



Perennial; wet meadows, seeps, marshy ground and other wet sites in the mountains, above 8000 ft, perhaps more frequent than the previous. Fig. 95. *Calamagrostis scribneri* Beal, not recognized herein, has been inconsistently and obscurely distinguished by the following:

a Sheaths puberulent across the collar and at the auricles; callus hairs about 2/3 the lemma length…*C. scribneri* Beal

a Sheaths glabrous across the collar and at the auricles; callus hairs equaling the lemma…*C. canadensis*

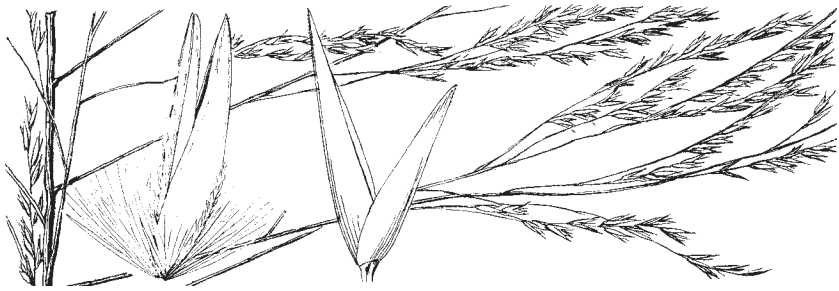


Fig. 96. *Calamovilfa gigantea*, Big Sandreed

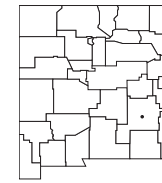
Fig. 97. *Calamovilfa longifolia*, Prairie Sandreed

Fig. 98. *Catabrosa aquatica*, Brookgrass

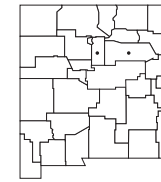
CALAMOVILFA SANDREED

[Gr. *calamos*, reed, and *Vilfa*, a genus that these grasses resemble]
(Chloridoideae: Eragrostideae)

Plants strongly rhizomatous. Inflorescence a panicle. Spikelets one-flowered, awnless. Floret with a tuft of straight hairs at the base.



1 Lemma and palea long-pubescent along the back above the callus hairs; plants 1-2.3 m tall…***C. gigantea*** (Nuttall) Scribner & Merrill BIG SANDREED (gigantic). Perennial, rhizomatous; sandy hills and dunes in the eastern plains; a valuable sand-binder. Hopis used the stems in kiva construction as a plaster additive. Fig. 96.

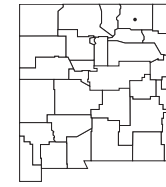


1 Lemma and palea glabrous above the callus hairs; plants 0.5-1.5 m tall…***C. longifolia*** (Hooker) Scribner PRAIRIE SANDREED (long-leaved). Perennial, rhizomatous; sandy hills and dunes in the eastern plains. Rare in New Mexico, known from only two collections, but common northward. Fig. 97.

CATABROSA BROOKGRASS

[Gr. *catabrosis*, devoured, alluding to the chewed appearance of the glumes and lemmas]
(Pooideae: Poeae)

Sheath margins fused 1/2-3/4 their length. Inflorescence a panicle. Spikelets generally two-flowered, awnless, the glumes shorter than the florets. Lemmas prominently 3-nerved.

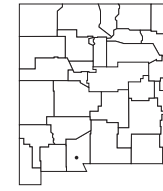


C. aquatica (Linnaeus) Beauvois BROOKGRASS (aquatic) [*C. aquatica* (Linnaeus) Beauvois var. *uniflora* S.F. Gray]. Perennial; panicle branches in half-whorls; quiet stream banks in the northern mountains, known only from Colfax County. Foliage is succulent and very palatable to livestock, and this may contribute to its rarity. Both one- and two-flowered plants from the western United States have been referred to var. *uniflora*, and the distinction between this and var. aquatica is tenuous at best. Fig. 98.

CATAPODIUM FERN-GRASS

[Gr. *kato*, beneath, and *podion*, foot, alluding to its small stature] (Pooideae: Poeae)

Low, tufted annuals with narrow racemose panicles. Spikelets several-flowered, awnless, short-pedicelled, the glumes short and stiff, the lemmas nearly terete.



****C. rigidum*** (Linnaeus) C.E. Hubbard ex Dony FERN-GRASS, RIGID FESCUE (stiff, rigid) [*Desmazeria rigida* (Linnaeus) Tutin, *Scleropoa rigida* (Linnaeus) Grisebach]. Annual; weakly adventive from horticultural plantings in the southern region, but likely to appear almost anywhere in the state. Plants have the aspect of sixweeks-fescue, but are more coarse and thickened. Fig. 99.

Fig. 99. *Catapodium rigidum,* Fern-grass, Rigid Fescue

Fig. 100. *Cenchrus spinifex,* Common Sandbur

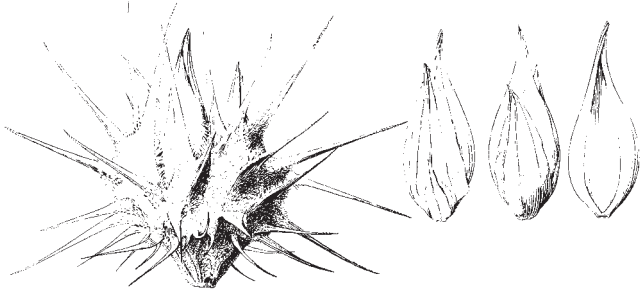
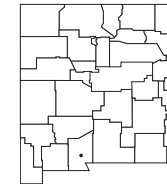


Fig. 101. *Cenchrus longispinus,* Innocent-weed, Long-spine Sandbur

CENCHRUS SANDBUR

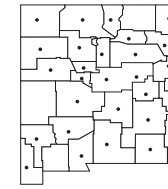
[Gr. *kenchros*, a kind of millet] (Panicoideae: Paniceae)

Spikelets concealed within spiny burs, which can inflict painful injury. These are pernicious weedy grasses that infest disturbed ground and roadsides.

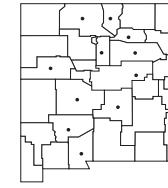


1 Burs with a single whorl of flattened spines subtended by 1-several whorls of bristles…****C. echinatus*** Linnaeus SOUTHERN SANDBUR (prickly). Annual; disturbed ground. Known only from a single, old collection in Doña Ana County, not likely to have persisted.

1 Burs with more than one whorl of flattened spines, the spines projecting at irregular intervals throughout the body of the bur



2 Burs mostly with 8-40 spines, the inner bristles 1-2 mm wide; upper floret of the spikelets 3.5-5.8 mm long; only one margin of the blade of uppermost leaf crinkled at the base…***C. spinifex*** Cavanilles COMMON SANDBUR (alluding to the grass genus *Spinifex*, which has spiny leaf blades) [*Cenchrus incertus* M.A. Curtis, *C. pauciflorus* Bentham in part]. Annual; disturbed ground, plains, grasslands. An extremely noxious weed. The barbed spines can inflict painful wounds. Fig. 100.



2 Burs mostly with 45-75 spines, the inner bristles 0.5-1 mm wide; upper floret of the spikelets 5-7.6 mm long; both margins of the blade of uppermost leaf conspicuously crinkled at the base…***C. longispinus*** (Hackel) Fernald INNOCENT-WEED, LONG-SPINE SANDBUR (long-spined) [*Cenchrus pauciflorus* Bentham in part]. Annual or occasionally perennial from short pseudo-rhizomes; disturbed ground, plains, grasslands. An extremely noxious weed. The barbed spines can inflict painful wounds. This or *Cencrhus spinifex* was encountered during the 1820 Long Expedition, which crossed through Union County. Edwin James, the surgeon-naturalist on the expedition, reported that the sandburs had become very common, the burs "falling into our mockasins, adhering to our blankets and clothing, and annoying us at every point." Fig. 101.

CHLORIS WINDMILLGRASS

[the Greek goddess of flowers] (Chloridoideae: Cynodonteae)

Inflorescence a panicle of spike-like branches, arranged windmill-like at the tip of the stem (digitate). Spikelets 2- to 3-flowered, disarticulating above the glumes, awned except for *Chloris submutica*. *Chloris divaricata* R. Brown, an Australian species adventive in coastal Texas and South Carolina, was reported for Eddy County by Barkworth (*Chloris*, p. 204-218. Flora of North America, vol. 25. Oxford University Press. 2003.), but validating specimens have not been seen. It has a deeply bilobed lower lemma.

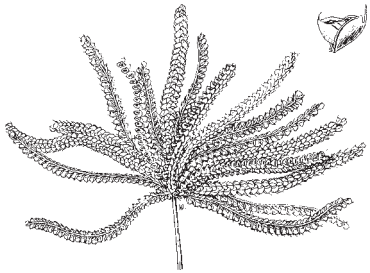


Fig. 102. *Chloris cucullata,* Hooded Windmillgrass

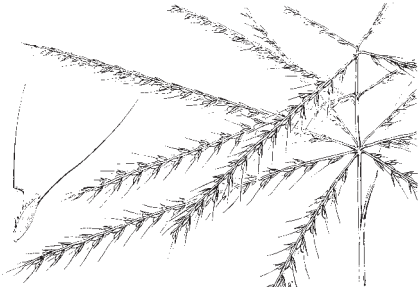


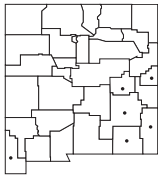
Fig. 103. *Chloris verticillata,* Tumble Windmillgrass

1 Lemma of the lower floret with 3 awns 8-12 mm long…see *Trichloris crinita*

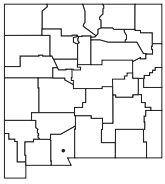
1 Lemma of the lower floret with a single awn or awnless

2 Lowermost lemma awnless or with a short awn less than 2 mm long

3 Upper floret inflated-spheroidal, bowl-shaped, about 1 mm wide…***C. cucullata*** Bischoff HOODED WINDMILLGRASS (hooded). Perennial; plains and grasslands, roadsides, disturbed ground of the eastern plains. Fig. 102.

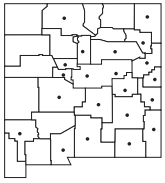


3 Upper floret not inflated, less than 0.5 mm wide…**C. submutica*** Kunth MEXICAN WINDMILLGRASS (nearly awnless). Perennial; infrequent adventive from Mexico, occasionally found in disturbed ground and fields in the southern region.



2 Lowermost lemma prominently awned, the awn more than 3 mm long

4 Panicle branches typically in several whorls along an axis 2 cm or more long…***C. verticillata*** Nuttall TUMBLE WINDMILLGRASS (whorled). Perennial; plains and grasslands, roadsides, widespread throughout much of the state, but apparently absent from the northwest quadrant. Fig. 103.



4 Panicle branches in a single terminal whorl, or if in several whorls then the axis less than 2 cm long

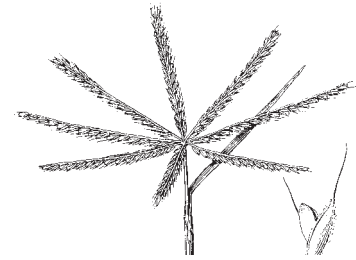
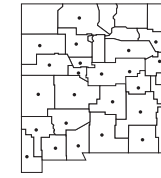


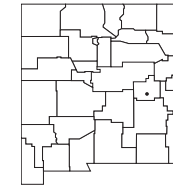
Fig. 105. *Chloris subdolichostachya,* Shortspike Windmillgrass

Fig. 104. *Chloris virgata,* Showy Windmillgrass

5 Tip of lower lemma with a tuft of spreading hairs to 2 mm long; plants annual…***C. virgata*** Swartz SHOWY WINDMILLGRASS (broom-like). Annual; disturbed fields, roadsides, and waste areas. Fig. 104.



5 Tip of lower lemma with short, appressed hairs; plants perennial…***C. subdolichostachya*** C. Mueller SHORTSPIKE WINDMILLGRASS (similar to *C. dolichostachya,* with long-spiked branches). Perennial; plains and grasslands, uncommon, known only by an early collection from Chaves County. Fig. 105.



CINNA WOODREED

[Gr. *kinni*, a name used by Theophrastus for some grass] (Pooideae: Poeae)

Inflorescence a panicle of whorled branches. Spikelets one-flowered, disarticulating below the 3-nerved glumes, the lemma with a short awn.

C. latifolia (Trevisan ex Goeppinger) Grisebach DROOPING WOODREED (broad-leaved). Perennial; blades up to 2 cm wide; moist places in mixed conifer woodlands and forests. Rare in New Mexico, known definitely from San Miguel and Taos counties, more common in the northward states; a report by Wooton & Standley(1915) from the Sandia Mountains cannot be verified. Fig. 106.

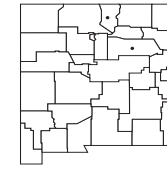


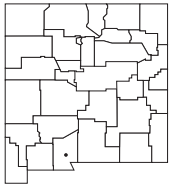
Fig. 106. *Cinna latifolia,* Drooping Woodreed

Fig. 107. *Coix lacryma-jobi,* Job's Tears

COIX JOB'S TEARS

[Gr. *koix*, a kind of palm, applied by Linaeus to this grass] (Panicoideae: Andropogoneae)

Large, coarse annuals occasionally grown for the bead-like female spikelets, or for food or beverage.

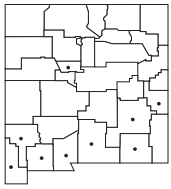


****C. lacryma-jobi*** Linnaeus JOB'S TEARS (Job's tears). Annual; occasionally cultivated in gardens. Fig. 107.

CORTADERIA PAMPASGRASS

[Latin rendering of the Spanish *cortadera*, cutting, referring to the blade margins] (Danthonioideae: Arundineae)

Very large grasses to 15 ft tall, growing in giant tussocks. Blades with sharp, saw-tooth edges. Inflorescence a large, silvery, plume-like panicle.



****C. selloana*** (J.A. & J.H. Schultes) Ascherson & Graebner PAMPASGRASS (for Friedrich Sellow, German botanist who collected in South America in 1814). Perennial; introduced as an ornamental landscape plant, with numerous cultivars; native to South America, where it tends to be a riparian species. A related species [*Cortaderia jubata* (Lemoine) Stapf] has escaped from cultivation in California, becoming a serious pest there. Fig. 108.

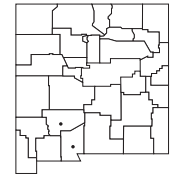
Fig. 108. *Cortaderia selloana,* Pampasgrass

Fig. 109. *Cottea pappophoroides,* Cottagrass

COTTEA COTTAGRASS

[for Heinrich Cotta (d. 1844), German plant physiologist] (Chloridoideae: Pappophoreae)

Inflorescence a panicle. Spikelets several-flowered, disarticulating above the glumes. Glumes several-nerved. Florets hairy, each with several awns.

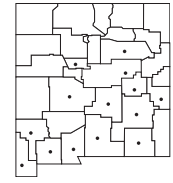


C. pappophoroides Kunth COTTAGRASS (resembling Pappophorum). Perennial; rocky volcanic hills and plains of the southern desert regions, seldom collected. Fig. 109.

CYNODON BERMUDAGRASS

[Gr. *cyno*, dog, and *odos*, tooth, taken from *chiendent*, the French common name] (Chloridoideae: Cynodonteae)

Plants mat- or turf-forming, with stolons and/or rhizomes. Inflorescence a panicle of spike-like branches arranged windmill fashion at the tip of the stem (digitate). Spikelets on e-flowered, awnless, disarticulating above the glumes, the rachilla continued beyond the lemma with a tiny rudimentary floret.



****C. dactylon*** (Linnaeus) Persoon BERMUDAGRASS (a finger). Perennial; a common lawn (if you don't mind brown grass during the winter) or improved pasture grass, also escaping into gardens, fields, and along roads. The shoots grow in a pattern of 2-3 short internodes alternating with a long internode, giving the appearance of several leaves clustered together on the culm. Bermudagrass is listed by the *Guiness Book of World Records* as the world's worst weed, but Wooton and Standley (1912) give it this compliment: "Once established, a Bermuda grass lawn may be more abused without killing it out than any other kind of grass."

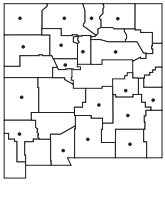
Fig. 110. *Cynodon dactylon,* Bermudagrass

It is said to be celebrated in Hindu sacred writings as the shield of India and preserver of nations, as without it the cattle would perish. It causes hayfever and dermititis in some people. Fig. 110.

DACTYLIS ORCHARDGRASS

[Gr. *daktylos*, a finger, referring to the digitate branches of the panicle] (Pooideae: Poeae)

Sheath margins fused together to near the top of the sheath. Inflorescence a panicle, the spikelets borne at the tips and clustered on one side of the branches. Spikelets several-flowered, awnless or awn-tipped, with a line of straight hairs on the nerves.



****D. glomerata*** Linnaeus ORCHARDGRASS (wound up, as in a ball of yarn, alluding to the densely clustered spikelets). Perennial; widely introduced for meadow and pasture improvement, thriving in moist, shaded sites. Blades are ideal for thumb-whistles, where one holds a blade vertically between the thumbs. Pollen of orchardgrass is a common cause of hay fever. A variegated form is grown for ornament. Also called COCKSFOOT. Fig. 111.

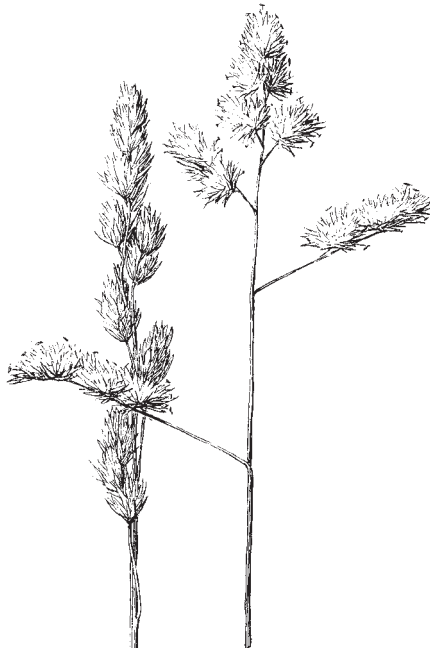


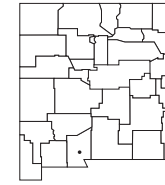
Fig. 111. *Dactylis glomerata,* Orchardgrass

Fig. 112. *Dactyloctenium aegyptium,* Bermudagrass

DACTYLOCTENIUM CROWFOOT

[Gr. *daktylos*, finger, and *ktenion*, little comb, alluding to the pectinate arrangement of the spikelets on the branches] (Chloridoideae: Eragrostideae)

Inflorescence a panicle, the spike-like branches arranged windmill fashion at the tip of the stem (digitate). Spikelets several-flowered, the glumes and lemmas with short awns. Lemmas 3-nerved.



****D. aegyptium*** (Linnaeus) Willdenow DURBAN CROWFOOT (of Egypt). Annual; an infrequent weed of cultivated fields, moist waste places, and lawns in the southern region. There are long straight hairs on the margins of the blades and collars. Fig. 112.

DANTHONIA DANTHONIA

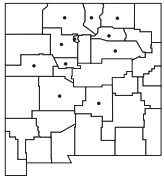
[for Étienne Danthione (d. 1815), French botanist] (Danthonioideae: Danthonieae)

Inflorescence a few-flowered panicle or raceme. Spikelets several-flowered, the glumes thin and papery and exceeding most of the florets. Lemmas hairy, awned from the sinus. *Danthonia californica* Bolander was reported in earlier editions, but no validating specimens have been found. With spikelets similar to *D. parryi*, it is distinguished by sharply divergent blades, bent backward or reflexed 90º or more.

Fig. 113. *Danthonia parryi,* Parry's Danthonia

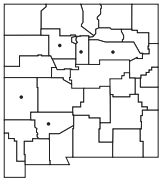
Fig. 114. *Danthonia spicata,* Poverty Danthonia

1 Pedicels and branches spreading outward at maturity, puberulent…***D. parryi*** Scribner PARRY'S DANTHONIA (for Charles Christopher Parry, botanical explorer of the west). Perennial; coniferous forests, mountain meadows and grasslands, mostly in the northern mountains. Fig. 113.



1 Pedicels and branches erect-appressed, glabrous or only slightly puberulent

2 Lemmas 3.5-5 mm long; blades curly…***D. spicata*** (Linnaeus) Beauvois ex Roemer & J.A. Schultes POVERTY DANTHONIA (spiked). Perennial; dry sandy (impoverished) soil in ponderosa pine forests. Asexually produced grains from cleistogamous spikelets are found in the basal leaf sheaths. Fig. 114.



2 Lemmas 7-8 mm long; blades more-or-less straight…***D. intermedia*** Vasey TIMBER DANTHONIA (intermediate). Perennial; forest meadows and clearings at high elevations in the northern mountains. Fig. 115.

DASYOCHLOA FLUFFGRASS

[Gr. *dasys, shaggy*, and chloa, grass, referring to the densely ciliate spikelets]

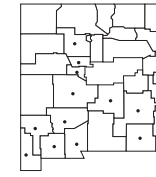
(Chloridoideae: Eragrostideae)

Low, stoloniferous (though often appearing tufted) perennial. Blades with white margins. Inflorescence a dense, head-like cluster of spikelets borne down among the, spine-tipped blades. Spikelets several-flowered, disarticulating above the glumes. Lemmas 3-nerved, hairy, with very short awn-tips. Previously included in the genera *Tridens, Triodia*, and *Erioneuron*.

Fig. 115. *Danthonia intermedia,* Timber Danthonia

Fig. 116. *Dasyochloa pulchella,* Fluffgrass

D. pulchella (Kunth) Willdenow ex Rydberg FLUFFGRASS (beautiful, which it is) [*Erioneuron pulchellum* (Willdenow ex Rydberg) Tateoka, *Tridens pulchellus* (Willdenow ex Rydberg) Hitchcock]. Perennial (though sometimes short-lived); desert flats and hills, particularly in the southern regions, but extending northward to Sandoval County. Florets are gathered by harvester ants (*Pogonomyrmex* species), taken below ground to the nest where the grain is excised, and the chaff is brought back up and piled in large mounds around the entrance to the nest. It has been called FROSTGRASS in the Sonoran Desert region. This species is a nomenclatural and systematic vagabond, passing through *Triodia, Koeleria, Uralepis, Tricuspis, Sieglingia, Tridens*, and *Erioneuron*, before finding (it is hoped) a permanent home in *Dasyochloa*. Fig. 116.

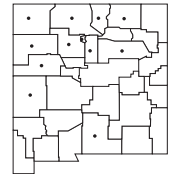


DESCHAMPSIA HAIRGRASS

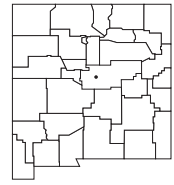
[for Louise Auguste Deschamps (d. 1842), surgeon-naturalist on the sailing vessel *La Recherche*, which was sent in search of the famous explorer Jean-François de Galaup de La Pérouse] (Pooideae: Poeae)

Inflorescence a panicle. Spikelets 2-flowered, disarticulating above the glumes, which exceed the florets. Lemmas awned from the back.

Fig. 117 *Deschampsia cespitosa,* Tufted Hairgrass



1 Plants perennial; blades 1-5 mm wide; panicle loose and open at maturity, the branches spreading; anthers 1-3 mm long…***D. cespitosa*** (Linnaeus) Beauvois TUFTED HAIRGRASS (tufted). Perennial; moist mountain meadows, grasslands, and moist forest openings at medium to high elevations. Sometimes spelled "caespitosa," but Linnaeus's original spelling was "cespitosa" and is acceptable. Numerous cultivars have been developed for landscaping ornamental use, but these seem not to be used in New Mexico. Fig. 117.



1 Plants annual; blades 0.5-1.5 mm wide; panicle narrow at maturity, the branches mostly erect; anthers less than 1 mm long…**D. danthonioides*** (Trinius) Munro in Bentham ANNUAL HAIRGRASS (resembling *Danthonia*). Annual; an infrequent weed of moist waste places. Fig. 118.

DICHANTHELIUM ROSETTEGRASS

[Gr. dicha, paired, and anthele, inflorescence, referring to the two kinds of panicles, one spring and one autumn] (Panicoideae: Paniceae)

Plants producing a rosette of short, winter leaves; in the spring producing a simple-flowering shoot with a terminal panicle; in the summer and fall producing highly branched

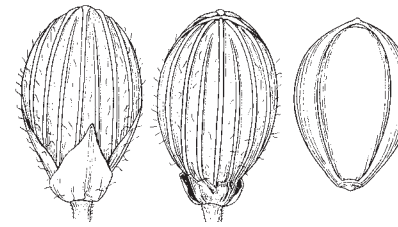


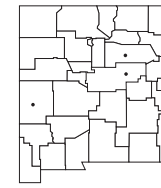
Fig. 119. *Dichanthelium perlongum,* Long-stalked Rosettegrass

Fig. 118 *Deschampsia danthonioides,* Annual Hairgrass

shoots with numerous axillary panicles. Species of *Dichanthelium* were formerly treated in the genus *Panicum*, which differs in several morphological, physiological, and anatomical features. The species are highly variable.

1 Basal leaf blades similar in shape to those of the lower cauline leaves, usually erect to ascending; culms branching from near the base in the fall, with 2-4 leaves, only the upper 2-4 internodes elongated; spikelets 2.4-3.4 mm long

2 Panicles 1-2 cm wide, narrow with appressed spikelets; upper cauline blades 10-20 cm long, distinctly longer than those below...***D. perlongum*** (Nash) Freckmann LONG-STALKED ROSETTEGRASS (very long). Moist shaded woodlands and canyon bottoms. Formerly included in *Dichanthelium linearifolium* (Scribner) Gould. Cleistogamous spikelets may be found in the lower sheaths. Fig. 119.



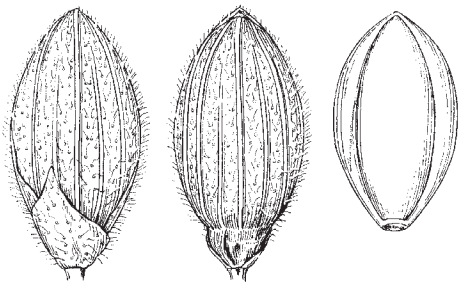
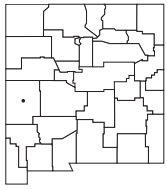


Fig. 120. *Dichanthelium wilcoxianum,* Wilcox's Rosettegrass

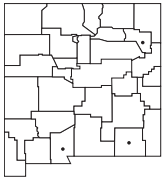
Fig. 121. *Dichanthelium acuminatum,* Wooly Rosettegrass

2 Panicles 2-4 cm wide, open with spreading spikelets; upper cauline blades 4-8 cm long, similar to those below...***D. wilcoxianum*** (Vasey) Freckmann WILCOX'S ROSETTEGRASS (for Timothy Erastus Wilcox, Army surgeon who collected in the western states) [*Panicum wilcoxianum* Vasey]. Moist open grassland clearings in the western mountains. Uncommon, known only from Catron County. Fig. 120.

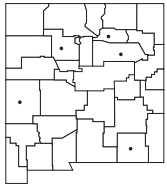


1 Basal leaf blades usually well-differentiated from those of the lower cauline leaves, spreading, forming a rosette; culms usually branching from the mid-culms in the fall, with many leaves, usually all the internodes elongated; spikelets 1.4-3.8 mm long

3 Spikelets 1.4-2 mm long…***D. acuminatum*** (Swartz) Gould & Clark WOOLY ROSETTEGRASS (taper-pointed, acuminate) [*Panicum huachucae* Ashe, *P. lanuginosum* Elliott, *P. lindheimeri* Nash, *P. tennesseense Ashe*]. Moist woodlands, streambanks, and shaded canyons in the southern counties. Our plants belong to var. *acuminatum*. Fig. 121.



3 Spikelets 2.7-3.8 mm long…***D. oligosanthes*** (Schultes) Gould var. ***scribnerianum*** (Nash) Gould SCRIBNER'S ROSETTEGRASS (few-flowered; for Frank Lamson-Scribner, renowned USDA agrostologist) [*Panicum helleri* Nash, *Panicum oligosanthes* Schultes, *Panicum scribnerianum* Nash]. Moist shaded places along mountain streams and rivers. Fig. 122.



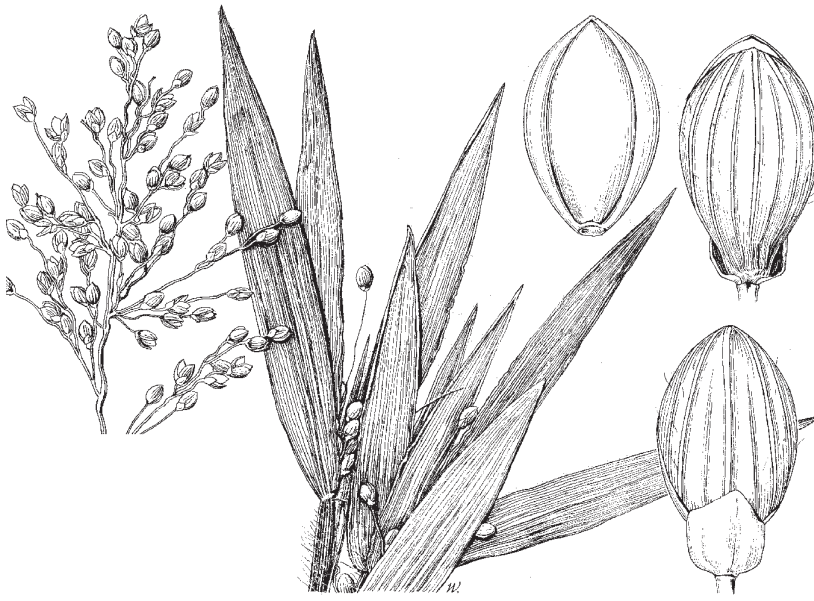


Fig. 122. *Dichanthelium oligosanthes,* Scribner's Rosettegrass

DIGITARIA CRABGRASS

[L. *digitus*, finger, alluding to the finger-like arrangement of the panicle branches]
(Panicoideae: Paniceae)

Inflorescence a panicle of spike-like or rebranching branches. Spikelets disarticulating below the glumes, the first of which is highly reduced. Margins of upper lemma membranous, the floret scarcely indurate. Only the upper floret produces a grain. The genus *Digitaria* has been expanded to include the genera *Trichachne* and *Leptoloma*, which differ by pubescence and panicle features that are not exclusive to these genera. The panicles of the annual species resemble those of bermudagrass. The name 'crabgrass' derives not from any resemblance to the crustacean, but its allusion to foul or sour (as in crab apple or a crabby person), that is, an undesirable grass in the lawn. 'Texas crab grass' is not a grass at all, but a party dip made from spinach, butter, onion, crabmeat, and parmesan cheese.

1 Spikelets on long pedicels; inflorescence an open, rebranching panicle…***D. pubiflora*** (Vasey ex L.H. Dewey) Wipff FALL WITCHGRASS (hairy-flowered) [*Leptoloma cognatum* (Schultes) Chase subsp. *pubiflora* (Vasey) Wipff & Hatch]. Perennial; sandy plains and rocky foothills and bajadas. Plants may be tufted or rhizomatous, the the rhizomatous forms have been confused with *Digitaria arenicola* Swallen, which has much larger spikelets and is found only in the Texas coastal sand dunes. Fig. 123.

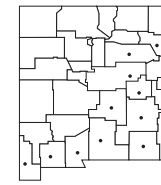


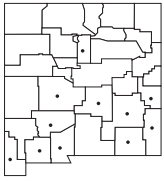
Fig. 123. *Digitaria pubiflora,* Fall Witchgrass

Fig. 124. *Digitaria californica,* Arizona Cottontop

1 Spikelets sessile or short pedicelled; inflorescence a panicle of unbranched spicate or racemose branches

2 Spikelets silky-pubescent with long, whitish hairs; plants perennial

3 Panicles with 3 or more nodes, the branches not subdigitate…***D. californica*** (Bentham) Henrard ARIZONA COTTONTOP (of California) [*Trichachne californica* (Bentham) Chase]. Perennial; rocky plains, foothills, and bajadas, mostly in the southern half of the state. One form produces stolons. Oddly, in spite of the specific epithet, this grass is not known from California (USA), but was originally named from material collected in Baja California (Mexico). Fig. 124.



3 Panicles with only 1-2 nodes, the branches subdigitate…**D. eriantha*** Steudel PANGOLA GRASS (wooly-flowered). Perennial; introduced for experimental planting in Quay County at the Tucumcari Research Station, New Mexico State University, and not known to escape.

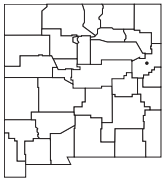
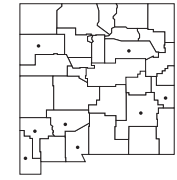


Fig. 125. *Digitaria sanguinalis,* Hairy Crabgrass

Fig. 126. *Digitaria ischaemum,* Smooth Crabgrass

2 Spikelets glabrous or with short, stiff hairs; plants annual.

4 Blades usually with prominent, stiff, bulbous-based hairs; lower lemma with prickles on the lateral nerves (use 10x or higher magnification)…****D. sanguinalis*** (Linnaeus) Scopoli HAIRY CRABGRASS (pertaining to blood, alluding to the sometimes blood-red coloration of the foliage). Annual; weed of gardens and open, moist, waste ground, widespread. This is a common grass of open, moist, disturbed ground, and generally does not invade dense turf as easily as *D. ischaemum*. Fig. 125.



4 Blades glabrous, only rarely with scattered hairs; lower lemma lacking prickles on the lateral nerves

5 Upper (second) glume nearly as long as the spikelet; spikelets 1.8-2.2 mm long …****D. ischaemum*** (Schreber) Schreber ex Muhlenberg SMOOTH CRABGRASS (resembling the grass genus *Ischaemum*). Annual; weed of lawns and gardens, currently known only from Colfax and Doña Ana counties, but expected elsewhere. Fig. 126.

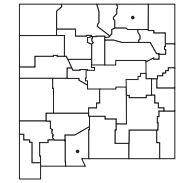
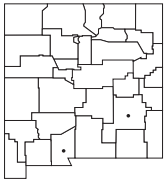


Fig. 127. *Distichlis spicata,* Inland Saltgrass

5 Upper (second) glume 1/3 to 1/2 the length of the spikelet; spikelets 2.2-3.2 mm long…****D. ciliaris*** (Retzius) Koeler SOUTHERN CRABGRASS (fringed). Annual; weed of moist waste places in the southern region.



DISTICHLIS SALTGRASS

[Gr. *distichos*, two-ranked, referring to the arrangement of the florets or leaves]
(Chloridoideae: Aeluropodeae)

Plants from vigorous rhizomes. Spikelets unisexual, but similar appearing, several-flowered, awnless.

D. spicata (Linnaeus) Greene var. ***stricta*** (Torrey) Beetle INLAND SALTGRASS (spiked; constricted) [*Distichlis stricta* (Torrey) Rydberg]. Perennial; floodplains, alkaline, swales, salt flats, widespread. Plants are vigorously rhizomatous. Male and female spikelets are nearly identical in appearance; the males are generally held higher above the foliage and are less plump than the females in a population. This is one of the most salt tolerant of New Mexico grasses, growing in soil with very high salinity values. They do this by absorbing salt from the soil into the roots, and accumulating the salt within the tissues of the plant. Excess salt is then secreted out of the plant through special glands on the epidermis of the leaves. One can actually see salt crystals on the leaf surfaces during the growing period, and a swipe of the tongue will confirm their presence. A related species in the same tribe, *Aeluropus littoralis* (Gouan) Parlatore, was cultivated experimentally in Doña Ana County in the 1930s, but it has not persisted. It is likewise rhizomatous and has lemmas with numerous nerves, but the spikelets are bisexual and the glumes and lemmas are scabrous on the nerves and keels. Fig. 127.

Fig. 128. *Echinochloa crus-pavonis,* Gulf Coast Barnyardgrass

Fig. 129. *Echinochloa colonum,* Jungle-Rice

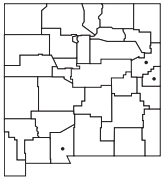
ECHINOCHLOA COCKSPUR

[Gr. *echinos*, hedgehog, and *chloa*, grass, an allusion to the awned spikelets]

(Panicoideae: Paniceae)

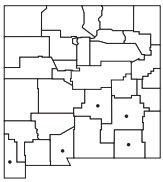
Ligule absent. Inflorescence a panicle of spike-like branches. Spikelets disarticulating below the glumes. Upper floret indurate, enclosing the grain.

1 Palea of lower floret absent or vestigial, much less than half as long as the lemma…***E. crus-pavonis*** (Kunth) Schultes var. ***macera*** (Wiegand) Gould GULF COAST BARNYARDGRASS (resembling a peacock's foot; lean). Annual; marshy ground and wet disturbed places, uncommon. This is the native variety of this species, the typical variety being exotic. Fig. 128.



1 Palea of lower floret well-developed, nearly as long as the lemma

2 Hairs of the panicle branches and spikelets not bulbous-based; panicle branches simple, usually 2(3) cm or less long; spikelets awnless, 2.5-3 mm long, arranged in four rows on the branch…****E. colonum*** (Linnaeus) Link JUNGLE-RICE (of the farmers, a contraction of *colonorum*, often rendered *colona*). Annual; moist disturbed ground, lawns, gardens, in the southern regions. Seedlings usually have purplish bars across the blades; this sometimes persists into the adult stages and has even been recognized as subsp. *zonalis* (Gussone) Wooton & Standley. Fig. 129.



2 Hairs of the panicle branches and/or spikelets bulbous-based; panicle branches usually rebranched, the lower branches usually more than 2 cm long; spikelets awnless or awned, 2.8-4 mm long (excluding the awns), mostly arranged in two rows on the panicle branch

3 Shiny apical portion of the fertile lemma obtuse or broadly acute, with a line of minute hairs, the tip sharply differentiated and withering; hairs of the panicle branches, at least some, longer than 3 mm…****E. crus-galli*** (Linnaeus) Beauvois LARGE BARNYARDGRASS (resembling a cock's foot). Annual; wet ground, muddy places, ditch banks, around stock ponds. Also known as BARNYARD MILLET, the seeds being used for grain. A related species not known from New Mexico, *E. frumentacea* Link, has been introduced from Asia and goes by the names Japanese millet and (a bit optimistically) billion-dollar grass; one finds it in hobby stores for dried bouquets. Fig. 130.

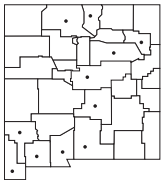
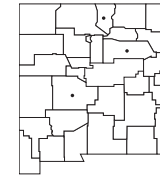


Fig. 130. *Echinochloa crus-galli,* Large Barnyardgrass

Fig. 131. *Echinochloa muricata,* Cockspur

3 Shiny apical portion of the fertile lemma narrowly acute to acuminate, without a line of minute hairs, with a gradual transition to a membranous, stiff tip; hairs of the panicle branches absent to rarely longer than 3 mm…****E. muricata*** (Beauvois) Fernald COCKSPUR (full of sharp points, muricate). Annual; moist to wet swales and seeps, disturbed ground, roadsides. Fig. 131. We have two varieties:

a Spikelets 3.5 mm or more long to base of awn or awn-tip of lemma of lower floret; lemma of lower floret usually with an awn 6 mm or more long, infrequently all spikelets awnless…var. ***muricata*** Rather uncommon, in scattered locales in the state.



a Spikelets less than 3.5 mm long to base of awn or awn-tip of lemma of lower floret; lemma of lower floret awnless or with an awn to 6(10) mm long…var. ***microstachya*** Wiegand (small-spiked). Widespread in the state.

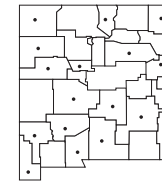


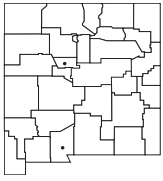
Fig. 132. *Eleusine indica,* Goosegrass

Fig. 133. *Elionurus barbiculmis,* Woolyspike Balsamscale

ELEUSINE GOOSEGRASS

[from *Eleusis*, the town where Ceres, the Greek goddess of the harvest, was worshipped]
(Chloridoideae: Eragrostideae)

Inflorescence a panicle spike-like branches arranged windmill fashion at the tip of the stem (digitate). Spikelets several-flowered, strongly flattened, awnless.

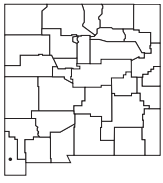


****E. indica*** (Linnaeus) Gaertner GOOSEGRASS
(of India). Annual; weed of lawns, cultivated fields, and moist waste places, becoming rather common the Doña Ana County. Related to FINGER MILLET [*Eleusine coracana* (Linnaeus) Gaertner], an important African grain in tropical regions of the world. Fig. 132.

ELIONURUS BALSAMSCALE

[Gr. *eleios*, a dormouse, and *oura*, tail, alluding to the thick, hairy inflorescence]
(Panicoideae: Andropogoneae)

Plants in dense tufts with hairy leaves. Inflorescence a hairy spike, eventually breaking apart. Spikelets awnless or with very short awn-tips. Sometimes spelled "Elyonurus."



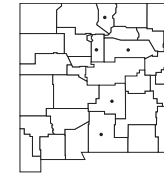
E. barbiculmis Hackel WOOLYSPIKE BALSAMSCALE
(bearded stem). Perennial; rocky, grassy slopes and foothills in the boothill region, uncommon. Fig. 133.

Fig. 134. *Elymus scribneri,* Scribner's Wheatgrass

Fig. 135. *Elymus hispidus,* Intermediate Wheatgrass

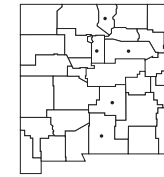
ELYMUS WILDRYE, WHEATGRASS

[Gr. *elymos*, a name for a kind of millet] (Pooideae: Hordeae)



Sheaths with claw-like auricles in some species. Inflorescence a spike, with one to several spikelets per node. Disarticulation and spikelet arrangement diverse. Several of the species included in *Elymus* in this guide may be placed by others in the genera *Agropyron, Lophopyrum, Pascopyrum, Pseudoroegneria, Sitanion,* or *Thinopyrum*. Other species formerly classed in *Elymus* may be found in *Leymus* herein. *Agropyron caninum* (Linnaeus) Beauvois has been reported for the state, but no validating specimens have been located as yet. Called couch-grass in Great Britain.

1 Spikelets mostly solitary at each node of the rachis

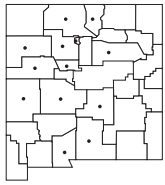


2 Inflorescence very dense, almost head-like, the rachis obscured and viewed only with difficulty; high elevation grasses mostly above 9,000 ft, but sometimes lower…***E. scribneri*** (Vasey) M.E. Jones SCRIBNER'S WHEATGRASS (for Frank Lamson-Scribner, renowned USDA agrostologist) [*Agropyron scribneri* Vasey]. The culms may be decumbent-prostrate to erect. Forms hybrids with *E. trachycaulus*; these recognized by broad glumes with prominent nerves and short, stout, outward-curving awns. Sometimes confused with *E. bakeri*, which has a more elongate spike in which the rachis is easily seen. Fig. 134.

2 Inflorescence less congested and somewhat elongate, not at all head-like, the rachis easily observed; elevation various

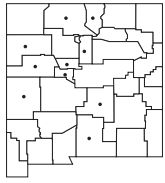
3 Glumes blunt, nearly truncate, thick and very firm; spikelets awnless

4 Plants with evident, long-creeping rhizomes… ***E. hispidus*** (Opiz) Melderis INTERMEDIATE WHEATGRASS (spiny, with stiff hairs) [*Agropyron hispidum* Opiz, *A. intermedium* (Host) Beauvois, *Elytrigia intermedia* (Host) Nevski, *Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey]. Perennial; introduced for range revegetation and erosion control, widespread in the forests and foothills. Very similar to tall wheatgrass (see next), which has exactly truncate glumes and is cespitose. When treated in *Elymus*, the epithet *intermedius* cannot be used for this species (being taken by the earlier *E. intermedius* Bieberstein); hence, our use of *E. hispidus*. Fig. 135. We have two subspecies:

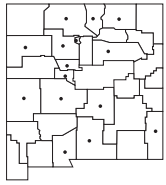


a Spikelets glabrous…subsp. ***hispidus***

a Spikelets pubescent…subsp. ***barbulatus*** (Schur) Melderis PUBESCENT WHEATGRASS (slightly or lightly bearded) [*Agropyron barbulatum* Schur, *A. trichophorum* (Link) Richter, *Elytrigia trichophora* (Link) Nevski]. This form is sometimes treated as a separate species, but it scarcely qualifies as a subspecies.



4 Plants densely tufted, lacking evident rhizomes…***E. elongatus*** (Host) Runemark TALL WHEATGRASS (elongate) [*Agropyron elongatum* (Host) Beauvois, *Elytrigia elongata* (Host) Nevski, *Thinopyron elongatum* (Host) Barkworth & Dewey]. Perennial; introduced for range revegetation, pasture improvement, and erosion control, widespread in the forests and foothills. Very similar to intermediate and pubescent wheatgrass (see previous), which have glumes with a tiny awn-tip or point projecting from the nerve and is rhizomatous. Fig. 136. We have two subspecies:



a Blade margins conspicuously thickened and indurate; upper (inner when rolled) blade surfaces usually sparsely pubescent…subsp. ***elongatus***

a Blade margins membranous, not thickened nor indurate; upper blade surfaces spinulose… subsp. ***ponticus*** (Podpeˇra) Melderis (from Pontus of ancient times, now Turkey) [*Elytrigia pontica* (Podpeˇra) Holub, *Lophopyrum ponticum* (Podpeˇra) Löve, *Thinopyron ponticum* (Podpeˇra) Z.W. Liu & R.R.-C. Wang, *Triticum ponticum* Podpeˇra].

3 Glumes acute to acuminate, thin and membranous to stiff, but not thick; spikelets awned or awnless

Fig. 136. *Elymus elongatus,* Tall Wheatgrass

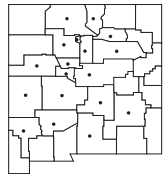
Fig. 137. *Elymus xpseudorepens,* False Quackgrass

5 Anthers 1-2 mm long

6 Glumes 1- to 2(3)-nerved; rachis tending to break apart at maturity; sterile hybrid plants…these are *E. trachycaulus x E. longifolius* hybrids, occurring where the two parents grow together

6 Glumes (3)5-nerved; rachis remaining intact; fertile to sterile plants

7 Plants mostly with rhizomes…***E. xpseudorepens*** (Scribner & Smith) Barkworth & Dewey FALSE QUACKGRASS (false *Elymus repens*). Perennial; widespread in the state on mountain slopes, grasslands, roadsides, generally below 9000 ft; very common in the southern mountains. This name has been applied to unstabilized hybrid plants between *Elymus trachycaulus x Elymus lanceolatus* or *Elymus repens*. Fig. 137.



7 Plants tufted

8 Awns present and divergent at maturity

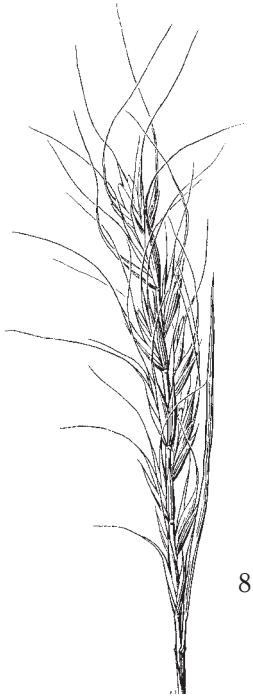
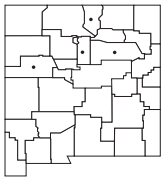


Fig. 138. *Elymus bakeri,* Baker's Wheatgrass

9 Plants of alpine slopes and meadows, generally above 10,000 ft but occasionally as low as 8500 ft; spikes mostly erect and straight; lemmas glabrous…***E. bakeri*** (E. Nelson) Löve BAKER'S WHEATGRASS (for Charles Fuller Baker, Colorado botanist) [*Agropyron bakeri* E. Nelson]. Perennial; in the northern mountains at high elevations. Sometimes confused with *Elymus scribneri* of similar habitats, that that species has a short spike in which the rachis is obscured (*E. bakeri* having an elongate spike with the rachis easily observed). Fig. 138.



9 Plants of lower habitats and elevations; spikes often flexuous or nodding; lemmas often pubescent…these are *E. canadensis x E. trachycaulus* hybrids.

8 Awns absent or, when present, erect-appressed even when mature…***E. trachycaulus*** (Link) Gould ex Shinners SLENDER WHEATGRASS (rough stem) [*Agropyron caninum* sensu M&H and W&S, *A. pauciflorum* (Schweinitz) Hitchcock, *A. tenerum* Vasey, *A. trachycaulum* (Link) Malte]. Perennial; mountain slopes, meadows, roadsides, from foothills to alpine. This species hybridizes with *Elymus canadensis, E. glaucus, E. lancolatus, E. longifolius, E. scribneri,* and *Hordeum jubatum*. Extremely variable, numerous subspecies or varieties have been recognized, but the features upon which they are based seem to segregate rather independently in our New Mexico populations and their formal recognition appears unwarranted. The following, however, are conspicuous and noteworthy, but their recognition remains tenuous:

a Spikes dense and congested with strongly over-lapping spikelets, the mid-internodes 4-5 mm long

b Spikes often purplish when mature; glumes more than 8 mm long; 9000-12000 ft elevations …subsp. ***violaceus*** (Hornemann) A. & D. Löve PURPLE WHEATGRASS (violet) [*Agropyron latiglume* (Scribner & Smith) Rydberg, *A. violaceum* (Hornemann) Lange]. Fig. 139.

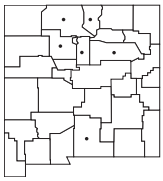
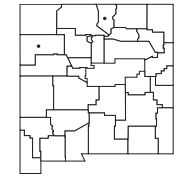


Fig. 139. *Elymus trachycaulus* subsp. *violaceus,* Purple Wheatgrass

Fig. 140. *Elymus trachycaulus* subsp. *subsecundus,* Bearded Wheatgrass

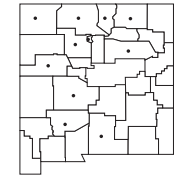
Fig. 141. *Elymus trachycaulus* subsp. *trachycalulus,* Slender Wheatgrass

b Spikes rarely purplish when mature; glumes less than 8 mm long; 6000-8000 ft elevations…subsp. ***novae-angliae*** (Scribner) Tsvelev NEW ENGLAND WHEATGRASS (of New England) [*Agropyron novae-angliae* Scribner].



a Spikes not dense, but slender with spikelets spaced apart and overlapping only slightly, the mid-internodes 5 mm or more long

c Lemma awns more than one-half as long as the lemma body…subsp. ***subsecundus*** (Link) A. & D. Löve BEARDED WHEATGRASS (somewhat one-sided) [*Agropyron subsecundum* (Link) Hitchcock, A. *unilaterale* Cassidy]. Fig. 140.



c Lemma awns absent to less than one-half as long as the lemma body…subsp. ***trachycaulus***. Fig. 141.

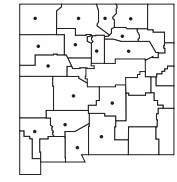
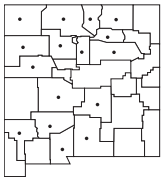


Fig. 142. *Elymus smithii,* Western Wheatgrass

5 Anthers 4-16 mm long

10 Plants with evident, long-creeping rhizomes

11 Glumes acuminate, asymmetrical or somewhat sickle-shaped, gradually tapering to an awn-tip; blades somewhat rigid and prominently ridged above …***E. smithii*** (Rydberg) Gould WESTERN WHEATGRASS (for Jared Gage Smith, USDA botanist-collector) [*Agropyron smithii* Rydberg, *Elytrigia smithii* (Rydberg) Nevski, *Pascopyrum smithii* (Rydberg) Löve]. Perennial; widespread throughout the state on plains, swales, grassy hills and slopes, forming thick stands often with a bluish tint. Called COLORADO BLUESTEM in much early literature (a much more descriptive name, the plants being more bluish than the so-called bluestems). This is a nutritious, important forage species that tolerates grazing well. Fig. 142.



The vagaries of applying correct botanical nomenclature can be illustrated by the following, written by Wooton and Standley (1912) for their "The Grasses and Grass-Like Plants of New Mexico," about the scientific name of western wheatgrass: "Within the past 10 or 15 years the name of this grass has been changed quite frequently. It was first referred to *Agropyron repens*, an Eastern species. Then it was recognized as *A. repens var. glaucum*. Then it was considered as a separate species and the usual custom followed and it was called *A. glaucum*. But the name was already in use for another and prior publication so two attempts were made to correct this. One author called it *A. occidentalis* and another *A. smithii*. The former name was taken up for some time though it appears the latter really has the claim of priority; hence it is used here, though its author uses the other in the 'Flora of Colorado'." Western wheatgrass has since passed through *Elytrigia smithii* and *Pascopyrum smithii*, but finds respite as *Elymus smithii* in this field guide (but there are proposals afoot, and catching, to send it back to *Pascopyrum*).

Fig. 143. *Elymus repens,* Quackgrass, Twitchgrass

Fig. 144. *Elymus lanceolatus, dasgstachys* phase, Thickspike Wheatgrass

Segregate taxa have been recognized based on the pubescence of sheaths and spikelets. These seem to be untenable, but some populations may be recognized as follows:

a Lemmas pubescent…the *molle* phase [*Agropyron molle* (Scribner & Smith) Rydberg].

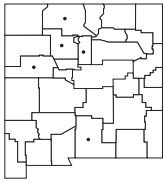
a Lemmas glabrous

b Sheaths glabrous…the *smithii* phase

b Sheaths finely and minutely puberulent, at least the lower ones…the *palmeri* phase [*Agropyron palmeri* (Scribner & Smith) Rydberg].

11 Glumes acute to acuminate, symmetrical, not gradually tapering to an awn-tip; blades often lax, not prominently ridged above

12 Blades flat, mostly 5-15 mm wide, dark green, often with a circular constriction toward the tip; anthers (3)4-7 mm long…****E. repens*** (Linnaeus) Gould QUACKGRASS, TWITCHGRASS (creeping) [*Agropyron repens* (Linnaeus) Beauvois, *Elytrigia repens* (Linnaeus) Nevski]. Perennial weed of moist disturbed ground, gardens, and flower beds, not common. Sheath auricles are developed. Fig. 143.



12 Blades rolled or less than 4 mm wide when flat, usually glaucous, lacking a constriction toward the tip; anthers 3-5 mm long…***E. lanceolatus*** (Scribner & Smith) Gould (lance-shaped) [*Agropyron lanceolatum* Scribner & Smith]. Perennial; moist to dry plains and forest clearings. Commonly used in reseeding mixes for land reclamation. We have two weak phases, both belonging to subsp. *lanceolatus* (the other subspecies, *psammophilus*, is from central to eastern Canada):

a Lemmas scabrous to long-hairy; plants of dry, often sandy habitats …the *dasystachys* phase THICKSPIKE WHEATGRASS [*Agropyron dasystachyum* (Hooker) Scribner, *Elytrigia dasystachya* (Hooker) Nevski]. Known only from the Four Corners region. Fig. 144.

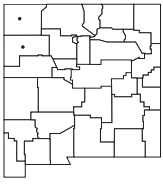


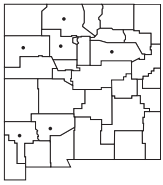
Fig. 145. *Elymus lanceolatus, riparius* phase, Streamside Wheatgrass

Fig. 146. *Elymus arizonicus,* Arizona Wheatgrass

Fig. 147. *Elymus spicatus, spicatus* phase, Bluebunch Wheatgrass

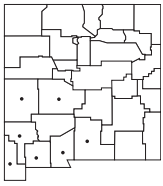
Fig. 148. *Elymus spicatus inermis* phase, Bluebunch Wheatgrass

a Lemmas glabrous to scaberulous; plants of more mesic habitats, often in clayey soils and along stream banks…the *riparius* phase STREAMSIDE WHEATGRASS [*Agropyron riparium* Scribner & Smith, *Elymus riparius* (Scribner & Smith) Gould]. More widespread, from the western regions of the state. Fig. 145.

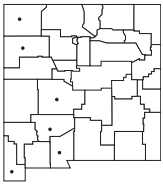


10 Plants lacking evident rhizomes, occasionally rhizomes weakly developed and short

13 Spike 15-30 cm long, often nodding; blades 4-6 mm wide…***E. arizonicus*** (Scribner & Smith) Gould ARIZONA WHEATGRASS (of Arizona) [*Agropyron arizonicum* Scribner & Smith, *Elytrigia arizonica* (Scribner & Smith) Dewey, *Pseudoroegneria arizonica* (Scribner & Smith) Löve]. Perennial; rocky slopes of the southern mountains. Fig. 146.



13 Spike 8-15 cm long, usually erect; blades 1-2 mm wide…***E. spicatus*** (Pursh) Gould BLUEBUNCH WHEATGRASS (spiked) [*Agropyron spicatum* (Pursh) Scribner & Smith, *Elytrigia spicata* (Pursh) Dewey, *Pseodoroegneria spicata* (Pursh) Löve]. Perennial; sagebrush flats, piñon/juniper foothills, dry slopes. Two completely interfertile races are sometimes encountered:



a Spikelets awned…the *spicatus* phase. Fig. 147.

a Spikelets awnless…the *inermis* phase [*Agropyron inerme* (Scribner & Smith) Rydberg]. Fig. 148.

1 Spikelets 2 or more at each node of the rachis

14 Rachis fragile and breaking apart at maturity

15 Glumes 1 mm or more in width and conspicuously hardened…***E. virginicus*** Linnaeus VIRGINIA WILDRYE (of Viginia). Perennial; moist woods in the southeastern mountains, not common. Fig. 149. Quite variable; the following phases might be recognized:

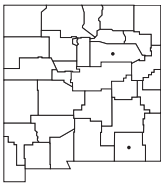


Fig. 149. *Elymus virginicus,* Virginia Wildrye

Fig. 150. *Elymus longifolius,* Longleaf Squirreltail

a Glumes and lemmas awnless or nearly so…the *submuticus* phase [*Elymus virginicus* Linnaeus var. *submuticus* Hooker].

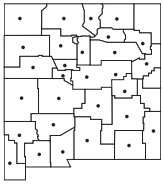
a Glumes and lemmas with awns 2-3 cm long…the *glabriflorus* phase [*Elymus virginicus* Linnaeus var. *glabriflorus* (Vasey) Bush].

15 Glumes less than 1 mm in width, flexible and not hard

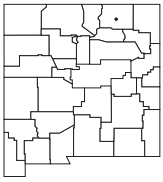
16 Lemma awns 4-17 mm long; rachis internodes 2.5-7 mm long…these are *Elymus longifolius x E. trachycaulus* hybrids [*Elymus xsaundersii* Vasey, *Agropyron xsaundersii* (Vasey) A.S. Hitchcock].

16 Lemma awns 20-80 mm long; rachis internodes mostly 5-12 mm long

17 Lowermost floret of each spikelet well-developed and fertile…***E. longifolius*** (Smith) Gould LONGLEAF SQUIRRELTAIL (long-leaved) [*Sitanion hystrix* (Nuttall) J.S. Smith in part, *S. longifolium* J.G. Smith, S. *molle* J.G. Smith, *S. pubiflorum* J.G. Smith, *Sitanion rigidum* sensu W&S]. Perennial; plains, grasslands, woodlands, clearings in forests, roadsides, widespread and ecologically diverse. This is the common squirreltail in New Mexico, and forms hybrids with several other *Elymus* species. Particularly common in the southern mountains are putative hybrids with *E. canadensis*, characterized by spikes that droop sharply down from the base of the main axis. Longleaf squirreltail is often mistaken for *Hordeum jubatum*, which has more slender awns without a central groove and three spikelets per node. Longleaf squirreltail is a poor competitor and only becomes abundant on rocky or sandy soil where other vegetation is scant. Fig. 150.



17 Lowermost floret of one or both spikelets at each node sterile and modified to a subulate or lanceolate awn, giving the appearance of an extra glume segment …***E. elymoides*** (Rafinesque) Swezey BOTTLEBRUSH SQUIRRELTAIL (resembling *Elymus*) [*Sitanion californicum* J.G. Smith, *S. hystrix* (Nuttall) J. S. Smith in part]. Perennial; plains and grassy slopes. Known only from a single collection in Colfax County, but common in the states northward.



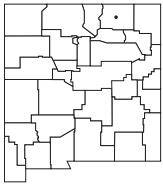
14 Rachis persistent, not breaking apart at maturity

Fig. 151. *Elymus hystrix,* Eastern Bottlebrush-Grass

Fig. 152. *Elymus canadensis,* Canada Wildrye

Fig. 153. *Elymus interruptus,* Texas Wildrye

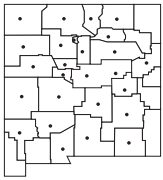
17 Glumes absent or reduced to one or two minute bristles; spikelets horizontally spreading or ascending at maturity…****E. hystrix*** Linnaeus EASTERN BOTTLEBRUSH-GRASS (a porcupine) [*Hystrix patula* Moench]. Perennial; a single old collection from Colfax County reported in 1967. This was most likely a one-time introduction that has not persisted; there are no records since that time. Fig. 151.



17 Glumes present and well-developed

18 Awns of the lemmas curving outward at maturity

19 Glumes 3- to 5-nerved…***E. canadensis*** Linnaeus CANADA WILDRYE (of Canada) [*Elymus robustus* Scribner & Smith]. Perennial; stream banks, ditch banks, flood plains, moist sandy soil. Seedheads nod gently and remain actractive through the winter. Fig. 152. We have two weak phases:

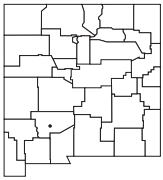


a Lemmas scabrous or stiff-hairy…the *canadensis* phase.

a Lemmas glabrous or nearly so…the *brachystachys* phase [*Elymus brachystachys* Scribner & Ball].

19 Glumes 1- to 2-nerved

20 Glumes 1-3 cm long…***E. interruptus*** Buckley TEXAS WILDRYE (severed, interruped) [*Elymus canadensis* Linnaeus var. *interruptus* (Buckley) Church]. Perennial; moist canyons and woodlands in rich soil. Known from a single collection from Kingston, Sierra County. Fig. 153.



20 Glumes 4-15 cm long, rarely slightly shorter …***E. longifolius*** (Smith) Gould [see lead 17, above].

18 Awns of the lemmas straight or nearly so at maturity

21 Glumes firm and hardened on at least the lower portion, the bottom bowed out slightly so the bases of the florets are easily visible; lemmas 6-9 mm long…***E. virginicus*** Linnaeus [see lead 15, above]

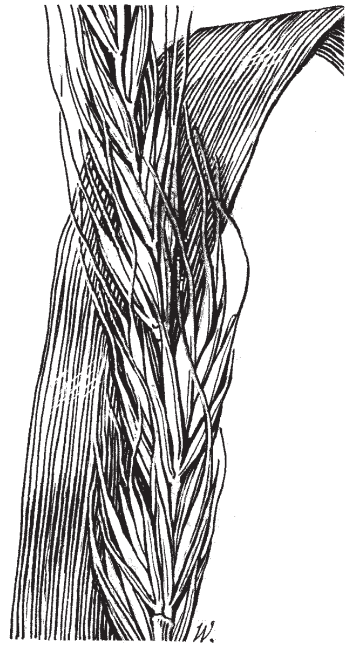


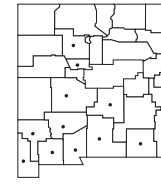
Fig. 154. *Elymus glaucus,* Blue Wildrye

21 Glumes thin, flat, not hardened nor bowed out at the base, but parallel and slightly united basally so the bases of the florets are obscured; lemmas 8-14 mm long…***E. glaucus*** Buckley BLUE WILDRYE (bluish). Perennial; open woods, aspen groves, edges of mountain meadows, never achieving very thick stands. New Mexico plants all seem to belong to var. *glaucus*, with glabrous foliage. Fig. 154.

ENNEAPOGON PAPPUSGRASS

[Gr. *ennea*, nine, and *pogon*, beard, referring to the nine awns of the lemma]
(Chloridoideae: Pappophoreae)

Culms flattened. Inflorescence a narrow, spike-like panicle. Spikelets several-flowered, the upper one or two florets sterile, disarticulating above the several-nerved glumes. Lemmas 9-awned.



E. desvauxii Desvaux ex Beauvois SPIKE PAPPUSGRASS (for Nicaise Auguste Desvaux, French botanist) [*Pappophorum wrightii* S. Watson]. Perennial; plains and alluvial hills in desert or arid grasslands. Nodes are conspicuously pubescent, and cleistogamous spikelets are often produced in the lower sheaths, and then dispersed as the culm breaks into segments. The correct name for this grass was explained in by Agnes Chase many years ago (Chase, M.A. 1946. *Enneapogon desvauxii* and *Pappophorum wrightii*, an agrostological detective story. Madrono 8:187-189.) Fig. 155.

Fig. 155. *Enneapogon desvauxii,* Pappusgrass

Fig. 156. *Eragrostis hypnoides,* Teal Lovegrass

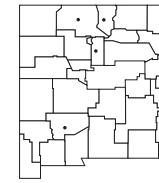
ERAGROSTIS LOVEGRASS

[Gr. *Eros*, god of love, and *agrostis*, grass] (Chloridoideae: Eragrostideae)

Inflorescence a panicle. Spikelets several-flowered, the glumes, lemmas, and grains fall off, leaving the paleas attached to a persistent rachilla. Lemmas 3-nerved, awnless. *Eragrostis pilosa* (Linnaeus) Beauvois, *E. poaeoides* Beauvois, and *E. lugens* have been reported for the state, but no specimens from New Mexico have as yet been located. A concoction prepared from *Eragrostis cilianensis* was thought to act as a love potion, hence the name.

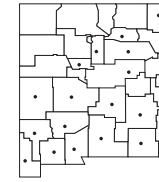
1 Plants annual

2 Plants with stolons, rooting at the nodes and forming mats…***E. hypnoides*** (Lamarck) Britton, Sterns, & Poggenburg TEAL LOVEGRASS (resembling a moss [*Hypnum*], alluding to its low, creeping habit). Annual; sand and mud bars along slow-moving streams and lakeshores, uncommon. My only field experience with this grass also involved two rattlesnakes. Fig. 156.



2 Plants lacking stolons

3 Lemma keels with tiny crater-like glands near the apex…****E. cilianensis*** (Allioni) Lutati ex Janchen STINKGRASS (of the Ciliani Estate, Italy) [*Eragrostis megastachya* (Koeler) Link]. Annual; disturbed and weedy ground, widespread. Consumption of stinkgrass in large amounts may be toxic to grazing animals, especially horses. The specific epithet derives not from ciliate, but from the Ciliani Estate, Italy, provenance of the original material described by Allioni. An early name in New Mexico was CANDY GRASS, on account of it's sweet odor. Fig. 157.



Several species in *Eragrostis* may have glandular pits or bands somewhere on the plant; all are known from states surrounding New Mexico, and some from within the state. Paul Peterson (Flora of North America, vol. 25. Oxford University Press. 2003. p. 66-67) provided a key to these species, which is adapted below:

a Panicles 0.5-2 cm wide, contracted, the primary panicle branches usually appressed; spikelets light yellowish, occasionally with reddish markings... ***E. lutescens*** Scribner [see lead 5, below]

a Panicles 2-18 cm wide, generally open, the primary panicle branches ascending to divergent; spikelets variously colored

b Spikelets 1.7-5.6 mm long, with 3-6 florets...****E. frankii*** C.A. Meyer ex Steudel [see lead 8, below]

b Spikelets 3-20 mm long, with 4-40 florets

Fig. 157. *Eragrostis cilianensis,* Stinkgrass

c Spikelets 0.6-1.4 mm wide; pedicels 1-10 mm long, lax, appressed or divergent...**E. pilosa* (Linnaeus) P. Beauvois INDIA LOVEGRASS. Weedy and disturbed ground. Known from adjacent southeastern Arizona. Plants may be nearly glandless.

c Spikelets 1.1-4 mm wide; pedicels 0.2-4 mm long, stiff, straight, usually divergent

d Lemmas 2-2.8 mm long, with 1-3 crater-like glands along the keels; spikelets 6-20 mm long, 2-4 mm wide, with 10-40 florets; rachilla but not the paleas persistent upon disarticulation; anthers yellow...***E. cilianensis*** (Allioni) Lutati ex Janchen [see lead 3, above]

d Lemmas 1.4-1.8 mm long, rarely with 1 or 2 crater-like glands along the keels; spikelets 4-8 mm long, 1.1-2.2 mm wide, with 7-12(20) florets; rachilla and paleas persistent upon disarticulation; anther reddish-brown

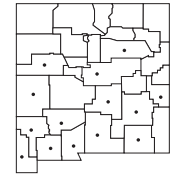
e Panicles with yellowish glandular bands below the nodes, often shiny; anthers 3; blade margins without crater-like glands; pedicels without glandular bands...***E. barrelieri*** [see lead 7, below]

Fig. 158 *Eragrostis mexicana,* Mexican Lovegrass

e Panicles sometimes with spotty glandular areas below the nodes, but not with yellowish glandular rings or bands; anthers 2; blade margins sometimes with crater-like glands; pedicels usually with glandular bands...**E. minor* Host LITTLE LOVEGRASS. Weedy, disturbed ground. Known from adjacent southern Colorado.

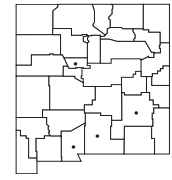
3 Lemma keels lacking glands

4 Grains with a prominent groove on the side opposite the embryo…***E. mexicana*** (Hornemann) Link MEXICAN LOVEGRASS (of Mexico) [*Eragrostis neomexicana* Vasey]. Annual; roadsides, moist disturbed sites, widespread. Our material belongs to subsp. *mexicana.* Fig. 158.



4 Grains lacking a prominent groove (slightly flattened in E. barrelieri)

5 Sheaths and lower blade surfaces with glandular pits or depressions…***E. lutescens*** Scribner SIX-WEEKS LOVEGRASS (yellowish). Annual; sandy, moist soil of streams and lakes, uncommon. Fig. 159.



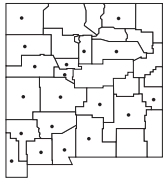
5 Sheaths and blades lacking glandular pits or depressions

6 Lateral pedicels appressed to the panicle branches, rarely diverging as much as 20 degrees…***E. pectinacea*** (Michaux) Nees ex Steudel (comb-like) [*Eragrostis diffusa* Buckley]. Annual; roadsides, fields, alkali flats, sandy plains, disturbed ground, widespread. Paleas are generally more persistent on the rachilla than in other species. This species is represented by two varieties in New Mexico:

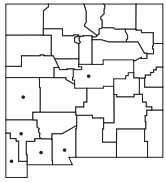
Fig. 159 *Eragrostis lutescens,* Six-Weeks Lovegrass

Fig. 160 *Eragrostis pectinacea,* Carolina Lovegrass

a Pedicels mostly appressed to the panicle branches, rarely diverging…var. ***pectinacea*** CAROLINA LOVEGRASS. Fig. 160.

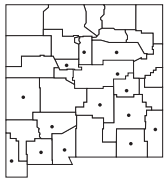


a Pedicels mostly spreading to divaricate from the panicle branches at maturity…var. ***miserrima*** (Fournier) J. Reeder DESERT LOVEGRASS (wretched) [*Eragrostis arida* Hitchcock, *E. tephrosanthos* Schultes]. Annual; disturbed sites, ditches, playas, sandy fields and plains, mostly in the southwestern quarter of the state. Fig. 161.



6 Lateral pedicels spreading to divaricate at maturity, often diverging as much as 90 degrees or more

7 Stem nodes nearly always subtended by a yellowish glandular ring; panicles few-flowered, the primary branches spikelet-bearing nearly to the base; pedicels stout and straight…****E. barrelieri*** Daveau MEDITERRANEAN LOVEGRASS (for Jacques Barrelier, French medical botanist). Annual; disturbed sites, flower beds, roadsides, common. Fig. 162.



7 Stem nodes usually not subtended by a yellowish glandular ring; panicles mostly many-flowered, the primary branches naked at the base; pedicels slender, capillary or flexuous

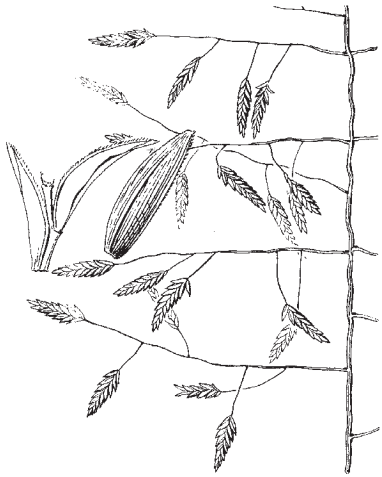
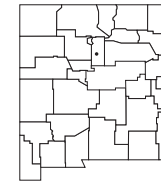


Fig. 161 *Eragrostis pectinacea var. miserrima,* Desert Lovegrass

Fig. 162 *Eragrostis barrelieri,* Mediterranean Lovegrass

8 Spikelets mostly 4- to 5-flowered; plants rare or extirpated…****E. frankii*** C.A. Meyer ex Steudel SANDBAR LOVEGRASS (for Joseph C. Frank, German botanical collector). Annual; disturbed ground, moist weedy sites. Known only from an 1847 collection by Augustus Fendler at Santa Fe. This most likely represents a short-lived introduction coming in with hay and livestock, that has not persisted since those early days of exploration in New Mexico. Fig. 163.



8 Spikelets mostly 8- to 15-flowered; plants relatively common…***E. pectinacea*** (Michaux) Nees ex Steudel var. ***miserrima*** (Fournier) J. Reeder [see lead 6, above]

1 Plants perennial

9 Plants with extensive creeping rhizomes; blades very stiff and sharp-pointed…***E. obtusiflora*** (Fournier) Scribner ALKALI LOVEGRASS (blunt florets). Perennial; along dry shores of Playas Lake in Hidalgo County. The leaf blades are very sharp-pointed and capable of puncturing the skin. In spite of this, the grass may be heavily grazed at times, according to reports. Fig. 164.

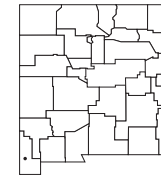
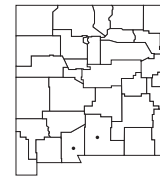


Fig. 163 *Eragrostis frankii,* Sandbar Lovegrass

Fig. 164 *Eragrostis obtusiflora,* Alkali Lovegrass

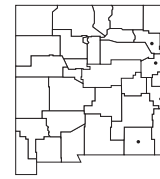
9 Plants lacking rhizomes or with short knotty rhizomes only; blades usually rather lax, not sharp-pointed

10 Spikelets 3-10 mm wide, disarticulating below the glumes at maturity and the spikelets falling entire…****E. superba*** Peyritsch WILMAN LOVEGRASS (superb). Perennial; introduced in seeding trials and for erosion control in the southern regions, uncommon.



10 Spikelets 1-5 mm wide, disarticulating above the glumes at maturity

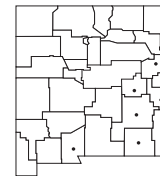
11 Spikelets sessile and borne on divergent unbranched primary branches…***E. sessilispica*** Buckley TUMBLE LOVEGRASS (sessile spike). Perennial; sandy hills and prairies on the eastern plains. Fig. 165.



11 Spikelets pedicelled, at least shortly so, and/or the primary panicle branches rebranched

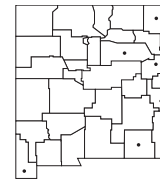
12 Lateral (not the terminal) pedicels 2 mm or less long

13 Mature spikelets 3-5 mm wide and arranged in overlapping clusters…***E. secundiflora*** Presl subsp. ***oxylepis*** (Torrey) S.D. Koch RED LOVEGRASS (spikelets turned to one side) [*Eragrostis beyrichii* J.G. Smith, *E. oxylepis* (Torrey) Torrey]. Perennial; sandy grasslands and prairies, roadsides, mostly on the eastern plains. Subspecies *secundiflora* grows from Mexico to South America. Fig. 166.



13 Mature spikelets less than 3 mm wide and not arranged in overlapping clusters

14 Panicle branches gummy, stout, and stiffly spreading…***E. curtipedicellata*** Buckley GUMMY LOVEGRASS (short-pedicelled). Perennial; sandy or clayey plains and grasslands on the eastern plains. Fig. 167.



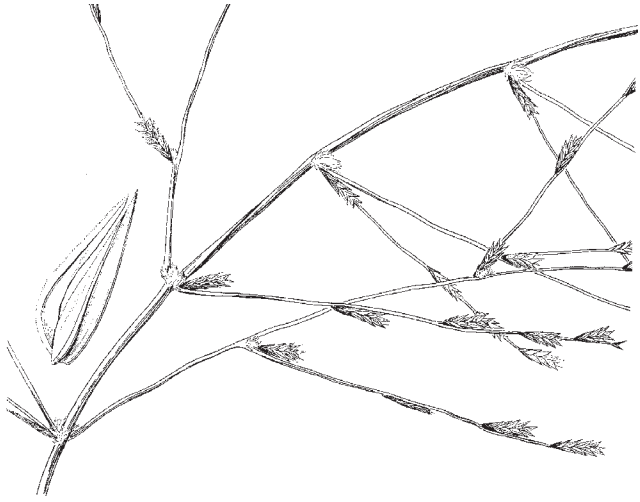


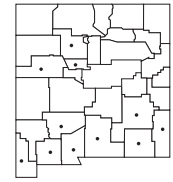
Fig. 165 *Eragrostis sessilispica,* Tumble Lovegrass

Fig. 166 *Eragrostis secundiflora,* Red Lovegrass

Fig. 167 *Eragrostis curtipedicellata,* **Gummy Lovegrass**

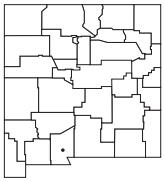
14 Panicle branches not gummy and stiff, but at least somewhat lax or drooping

15 Basal sheaths ± glabrous on the back; culms usually geniculate-based; lemmas mostly less than 1.8 mm long…****E. lehmanniana*** Nees LEHMANN'S LOVEGRASS (for Johann George Christian Lehmann, German botanist). Perennial; introduced from southern Africa for range land rehabilitation and roadside erosion control. Populations are remarkably uniform and form dense stands along roadsides. In recent years, with milder winters, we have seen this grass spread in the southern counties, venturing from the roadsides into surrounding range land. It is a noxious invader in southern Arizona. Fig. 168.

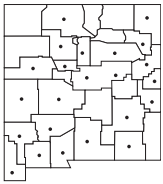


15 Basal sheath villous on the back; culms usually erect at the base; lemmas mostly more than 2 mm long…****E. curvula*** (Schrader) Nees WEEPING LOVEGRASS (curved, weeping). Perennial; introduced from southern Africa to the United States in 1927 for range land restoration and erosion control. We have two weak varieties, with intergrading variation expressed more fully in their native habitats in Africa:

a Panicles straw-colored; blades commonly less than 20 cm long…var. ***conferta*** Stapf BOER LOVEGRASS (crowded) [*Eragrostis chloromelas* Steudel]. Known mostly from experimental seedings in Doña Ana County, in the desert region. Plantlets are sometimes produced in the leaf axils.



a Panicles olive-green, 25-40 cm long; blades commonly more than 20 cm long…var. ***curvula*** WEEPING LOVEGRASS. Widespread throughout the state, from foothills to mid-elevations in the mountains. Plants form large clumps with fine-textured, weeping foliage and arching seedheads. Fig. 169.

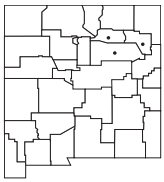


12 Lateral (not the terminal) pedicels longer than 2 mm

16 Mature spikelets 3-5 mm wide and arranged in dense, overlapping clusters…***E. secundiflora*** Presl [see lead 13, above].

16 Mature spikelets less than 3 mm wide and not arranged in dense, overlapping clusters

17 Paleas conspicuously ciliate; lateral nerves of lemma prominent; panicle breaking away when mature and tumbling before the wind…***E. spectabilis*** (Pursh) Steudel PURPLE LOVEGRASS (remarkable). Perennial; sandy soil, in the northeastern grasslands. Fig. 170.



17 Paleas smooth or minutely ciliate; lateral nerves of lemma prominent or obscure; panicle usually not breaking away

Fig. 168 *Eragrostis lehmanniana,* Lehman's Lovegrass

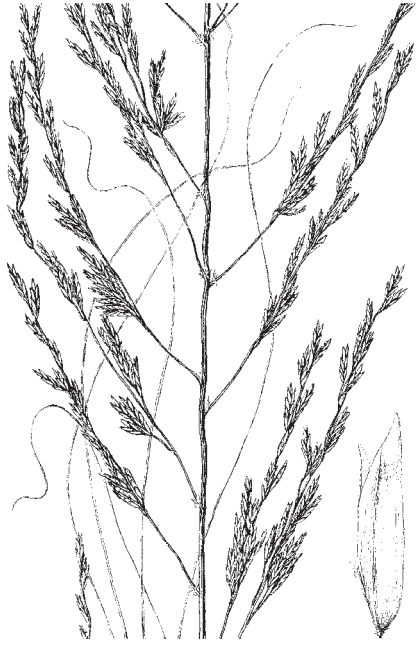
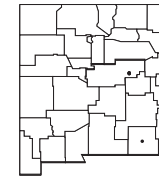


Fig. 169 *Eragrostis curvula,* Weeping Lovegrass

Fig. 170 *Eragrostis spectabilis,* Purple Lovegrass

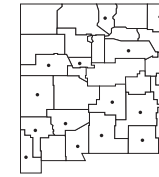
Fig. 171 *Eragrostis palmeri,* Rio Grande Lovegrass

18 New basal shoots breaking through the base of the sheaths (extravaginal); stem bases knotty…***E. palmeri*** S. Watson RIO GRANDE LOVEGRASS (for Edward Palmer, extraordinary botanical explorer). Perennial; rocky plains and mountain slopes, uncommon in the eastern/southeastern mountains. Fig. 171.



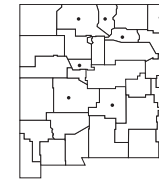
18 New basal shoots not breaking through the base of the sheath, but emerging out of the top or off to the side; stem bases not knotty

19 Mature lemmas mostly shorter than 2.2 mm…***E. intermedia*** A.S. Hitchcock PLAINS LOVEGRASS (intermediate). Perennial; sandy or rocky plains, prairies, mountain slopes, disturbed ground, widespread. Our plants belong to var. *intermedia*. Fig. 172.



19 Mature lemmas mostly longer than 2.2 mm, usually longer than 2.4 mm

20 Grains squarrish; lemmas reddish, acuminate with smooth tips; basal nodes and internodes crowded…***E. trichodes*** (Nuttall) Wood SAND LOVEGRASS (hair-like). Perennial; sandy prairies and open woodlands, mostly in the northeastern quarter of the state. Fig. 173.



20 Grains elongate to elliptic; lemmas greenish, acute with usually fringed tips; basal nodes and internodes not crowded…***E. erosa*** Scribner CHIHUAHUA LOVEGRASS (gnawed off, erose). Perennial; rocky limestone hills and mountain slopes, widespread, but common in the southern regions. Fig. 174.

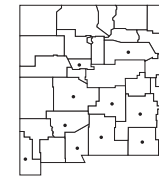


Fig. 172 *Eragrostis intermedia,* Plains Lovegrass

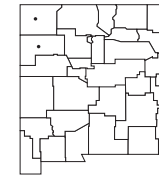
Fig. 173 *Eragrostis trichodes,* Sand Lovegrass

Fig. 174 *Eragrostis erosa,* Chihuahua Lovegrass

EREMOPYRUM ANNUAL WHEATGRASS

[Gr. *eremos*, desert, and *pyros*, wheat, alluding to its arid environments] (Pooideae: Hordeae)

Slender annuals. Margins of the sheaths of lower leaves fused together. Auricles well-developed. Inflorescence a spike with a single spikelet per node. Spikelets several-flowered, disarticulating both above and below the glumes, arranged on alternating sides of the main axis.

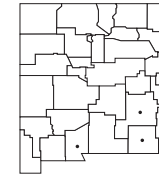


*__E. triticeum__ (Gaertner) Nevski ANNUAL WHEATGRASS (resembling the genus *Triticum*) [*Agropyron triticeum* Gaertner]. Annual; dry plains in the Four Corners region. Fig. 175.

ERIOCHLOA CUPGRASS

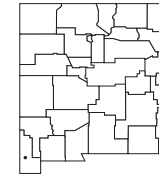
[Gr. *erio*, wooly, and *chloa*, grass, referring to the silky pubescence of many species] (Panicoideae: Paniceae)

Inflorescence a panicle of spike-like branches. Spikelets disarticulating below the glumes. First glume represented by a small dark cup at the base of the spikelet. Upper floret with a short awn-tip.



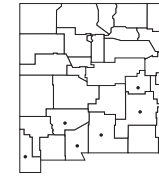
1 Pedicels glabrous or minutely pubescent; lemmas of upper floret with an awn 0.5-1.5 mm long …***E. contracta*** A.S. Hitchcock PRAIRIE CUPGRASS (contracted). Annual; loamy soil of prairies and swales in the southeastern quarter of the state. Fig. 176.

1 Pedicels with at least some hairs 1/2 to as long as the spikelet; lemmas of upper floret with an awn 0-0.5 mm long



2 Nerves on the second glume and lower lemma distinctly raised; lower floret usually with a palea; blades velvety-pubescent…***E. lemmonii*** Vasey & Scribner CANYON CUPGRASS (for John Gill Lemmon, California botanist). Annual; rocky, grassy slopes in the bootheel region. Fig. 177.

2 Nerves on the second glume and lower lemma not distinctly raised; lower floret lacking a palea; blades glabrous or sparsely long-pubescent…***E. acuminata*** (Presl) Kunth TEXAS CUPGRASS (acuminate) [*Eriochloa gracilis* (Fournier) A.S. Hitchcock]. Annual; disturbed moist ground, rocky slopes, in the southern half of the state. Fig. 178. We have two varieties:



a Spikelets 4-6 mm long, acuminate at the apex…var. ***acuminata***

Fig. 175 *Eremopyrum triticeum,* Annual Wheatgrass

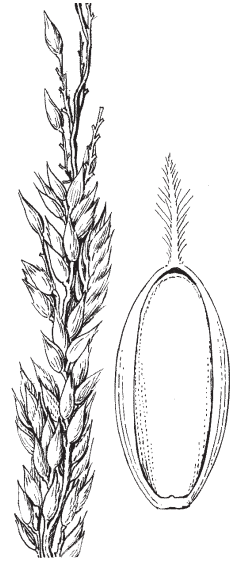


Fig. 176 *Eriochloa contracta,* Prairie Cupgrass

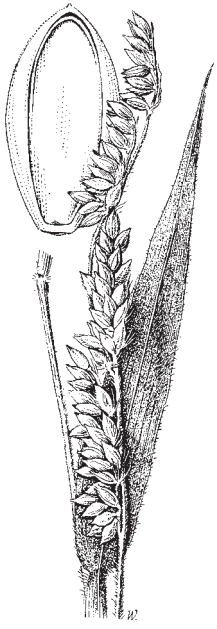


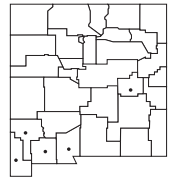
Fig. 177 *Eriochloa lemmonii,* Canyon Cupgrass

Fig. 178 *Eriochloa acuminata,* Texas Cupgrass

Fig. 179 *Erioneuron pilosum,*
Hairy Tridens

Fig. 180 *Eriochloa avenaceum,*
Large-Flowered Tridens

a Spikelets less than 4 mm long, obtuse to acute at the apex (not including the awn tip)…var. ***minor*** (Vasey) R.B. Shaw (smaller) [*Eriochloa gracilis* (Fournier) A.S. Hitchcock var. *minor* (Vasey) Hitchcock, *Eriochloa polystachya* sensu W&S].



ERIONEURON TRIDENS

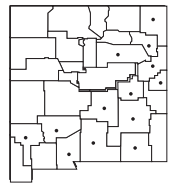
[Gr. *erio*, wooly, and *neuron*, nerve, alluding to the pubescent nerves of the lemmas] (Chloridoideae: Eragrostideae)

Blades white-margined. Inflorescence a spike-like panicle or cluster. Spikelets several-flowered, disarticulating above the glumes. Lemmas 3-nerved, hairy, with very short awn-tips. Species of *Erioneuron* were formerly treated in the genus *Tridens*.

1 Spikelets arranged in leafy clusters borne down among the pungent, spine-tipped blades; plants often stoloniferous and shorter than 10 cm…see *Dasyochloa pulchella*

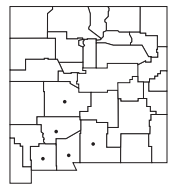
1 Spikelets borne on an elongated, leafless stalk elevated above the leaves; plants not or rarely stoloniferous and often taller than 10 cm

2 Tip of lemma acute or with a notch 0.5 mm or less deep…***E. pilosum*** (Buckley) Nash HAIRY TRIDENS (hairy, pilose) [*Tridens pilosus* (Buckley) Hitchcock]. Perennial; limestone hills and rocky outcrops, from the southwestern to the northeastern regions. Fig. 179.



2 Tip of lemma with a notch 1-2.5 mm deep

3 Spikelets of vigorous plants 10-15 mm long, usually silvery or only slightly purple-tinged; lemmas copiously pubescent at the base …***E. avenaceum*** (Kunth) Tateoka LARGE-FLOWERED TRIDENS (resembling the genus *Avena*) [*Erioneuron grandiflorum* (Vasey) Tateoka, *Tridens avenaceus* (Kunth) Hitchcock]. Perennial; limestone hills and rocky outcrops in the southcentral region. Fig. 180.



3 Spikelets seldom longer than 10 mm, usually purplish-tinged or brownish-purple; lemmas with some hairs but not copiously pubescent at the base…***E. nealleyi*** (Vasey) Tateoka NEALLEY'S TRIDENS (for Greanleaf Cilley Nealley, USDA botanical collector) [*Erioneuron avenaceum* (Kunth) Tateoka var. *nealleyi* (Vasey) Gould, *Tridens nealleyi* (Vasey) Wooton & Standley]. Perennial; limestone hills and rocky outcrops in the southcentral region. Mexican plants are known to be stoloniferous, but ours are all cespitose. Fig. 181.

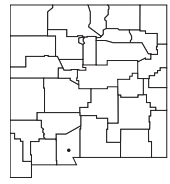


Fig. 181 *Erioneuron nealleyi,* Nealley's Tridens

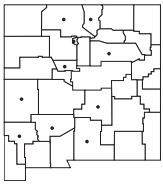
FESTUCA FESCUE

[ancient Latin name for a grass or straw, from the Celtic *fest*, pasture or food]
(Pooideae: Poeae)

Inflorescence a panicle. Spikelets several-flowered, disarticulating above the glumes, awned or at least the lemmas acuminate and awn-tipped. Annual fescues, which generally have only a single anther, are now treated in *Vulpia*.

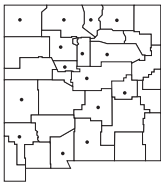
1 Blades mostly wider than 3 mm, usually at least somewhat lax and flat when fresh

2 Spikelets 2- to 4-flowered, 8-11 mm long; auricles absent; panicle branches spreading, at least below …***F. sororia*** Piper RAVINE RESCUE (referring to a sister, a related species). Perennial; moist, shaded slopes and stream banks in the mountains. Fig. 182.

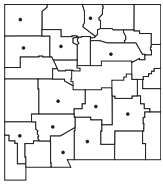


2 Spikelets (4)5- to 9-flowered, 10-17 mm long; small auricles usually developed; panicle branches usually ascending

3 Auricles lacking cilia (10x or greater); two panicle branches borne at the lowermost node, together rarely bearing more than 6 spikelets; old sheaths brown, decaying to fibers; blades 3-6(7) mm wide…****F. pratensis*** Hudson MEADOW FESCUE (of meadows) [*Festuca elatior* of many authors, *Lolium pratense* (Hudson) S.J. Darbyshire, *Schedonorus pratensis* (Hudson) P. Beauvois]. Perennial; introduced from Europe for lawns, improved pastures, and revegetation, widespread in scattered locales, but seemingly less common than tall fescue. This and the next are closely related to *Lolium perenne* Linnaeus, being interfertile, and they are sometimes merged with that genus, or treated as a separate genus (*Schedonorus*). The hybrid of *F. pratensis* x *Lolium perenne* has been named x*Festulolium loliaceum* (Hudson) P. Fournier (HYBRID FESCUE); it produces a panicle with the upper spikelets sessile and arranged in a spike and the lower spikelets stalked and on branches. Fig. 183.



3 Auricles with minute cilia (10x or greater); two or three panicle branches borne at the lowermost node, together usually bearing 5-15(30) spikelets; old she/aths pale straw-colored, often remaining intact; blades 3-12 mm wide…***F. arundinacea*** Schreber TALL FESCUE (reed-like) [*Festuca elatior* Linnaeus, *Lolium arundinaceum* (Schreber) S.J. Darbyshire, *Schedonorus arundinaceus* (Schreber) Dumort]. Perennial; introduced from Europe for lawns, improved pastures, and revegetation, widespread. Potentially toxic to grazing animals, sometimes causing summer fescue toxicosis and fescue foot. This and the previous are closely related to *Lolium perenne* Linnaeus, being interfertile, and they are sometimes merged with that genus. Fig. 184.



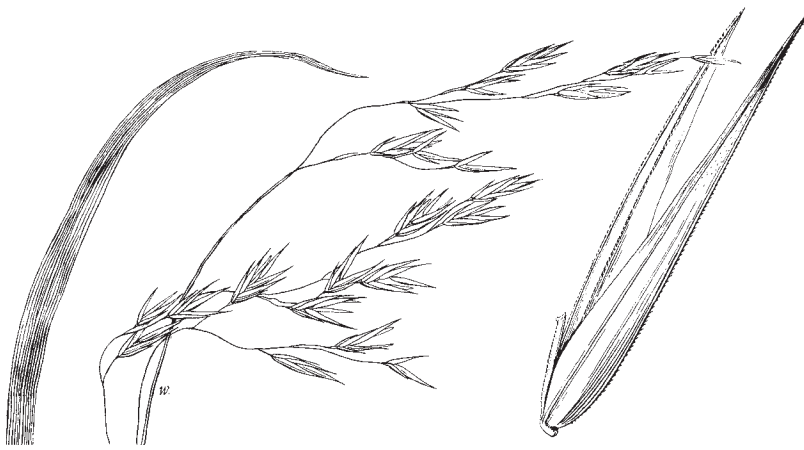


Fig. 182 *Festuca sororia,* Ravine Rescu

Fig. 183 *Festuca pratensis,* Meadow Fescue

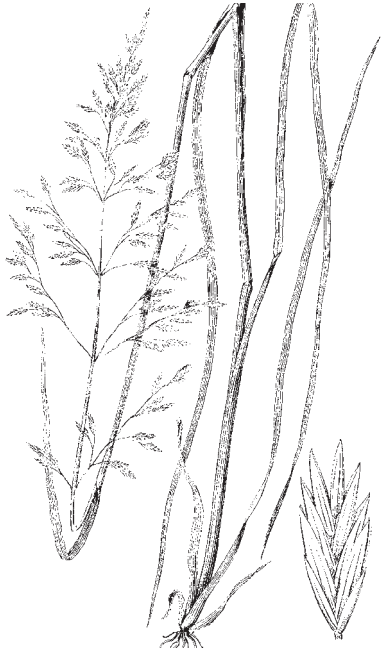
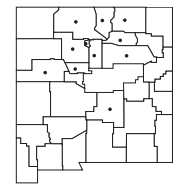


Fig. 184 *Festuca arundinacea,* Tall Fescue

Fig. 185 *Festuca thurberi,* Thurber's Fescue

1 Blades mostly less than 3 mm wide, usually rolled and somewhat stiff

4 Ligules 2.5-5(9) mm long; lemma awns 0-0.3 mm long; nodes usually visible and conspicuous; plants generally more than 50 cm tall…***F. thurberi*** Vasey THURBER'S FESCUE (for George Thurber, botanist with the Mexican boundary survey). Perennial; high mountain grasslands in the central cordillera. Provides good native forage for livestock. Fig. 185.



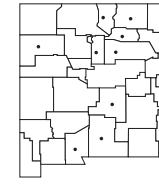
4 Ligules less than 2 mm long; lemma awns usually more than 0.5 mm long, occasionally shorter; nodes often not visible nor conspicuous; plant height various

5 Anthers 2-4 mm long

6 Basal sheaths reddish and separating into thread-like fibers (the whitish veins) in age

Fig. 186 *Festuca rubra,* Red Fescue

7 Shoots loosely clustered, usually with short rhizomes; blades lax, usually longer than 15 cm; sheath margins fused together near the summit, not overlapping (most easily seen in young tiller shoots, the sheaths often ripped in older flowering shoots)

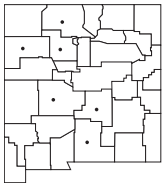


…***F. rubra*** Linnaeus RED FESCUE (red). Perennial; high mountain grasslands and open clearings, sometimes found in lawns. CREEPING FESCUE (subsp. *rubra*, strongly rhizomatous in some races) and CHEWINGS FESCUE (subsp. *commutata* Gaudin, weakly rhizomatous, after George Chewings, who produced seed in New Zealand beginning in the late 1800s) are sometimes used in lawn and turf mixtures. Fig. 186.

Fig. 187 *Festuca arizonica,* Arizona Fescue

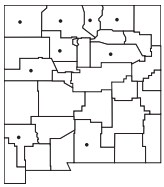
Fig. 188 *Festuca idahoensis,* Idaho Fescue

7 Shoots densely clumped from a branched underground caudex, lacking rhizomes; blades stiff (though arcuate), 6-12 cm long; sheath margins mostly overlapping, oly fused below…***F. calligera*** Piper SOUTHWESTERN FESCUE (beauty-bearing, more beautiful). Relatively rare, mostly in the southcentral mountains and growing with Arizona fescue.



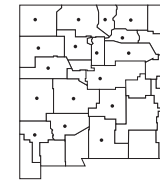
6 Basal sheaths usually not reddish nor separating into thread-like fibers

8 Blades, especially the older ones, strongly laterally compressed, thickened and stiff, 0.5-1 mm wide…**F. trachyphylla*** (Hackel) Krajina HARD FESCUE (rough-leaved) [*Festuca brevipila* Tracy, *Festuca ovina* Linnaeus var. *duriuscula* of many authors, not Linnaeus]. Perennial; introduced from Europe for reseeding, erosion control, and range land restoration. Grassy slopes of the northern mountains. Easily confused with Idaho fescue, but the thickened stiff blades of hard fescue are quite distinctive.



8 Blades, even the older ones, at least somewhat terete, not thickened, but thread-like, 0.2-0.4 mm wide

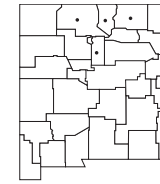
9 Peduncle and lower panicle branches densely scaberulous; body of larger lemmas 5-9 mm long, the awn 0.5-2.5 mm long; ovary apex pubescent…***F. arizonica*** Vasey ARIZONA FESCUE (of Arizona). Perennial; high mountain grasslands throughout the mountain regions of the state, our most common fescue. Fig. 187.



9 Peduncle and lower branches glabrous or nearly so; body of larger lemmas 3-5.5 mm long, the awn 1-7 mm long; ovary and grain apex glabrous or with a few sparse hairs

10 Body of larger lemmas 3.5-5 mm long, the awn 1-2.5 mm long; lower glume 2.5-3.5 mm long; ovary apex with a few sparse hairs at maturity (glabrous when very young); grain 2-3 mm long …***F. calligera*** Piper [see lead 7, above].

10 Body of larger lemmas (4.5)5-5.5 mm long, the awn 2-7 mm long; lower glume 3.5-4.5 mm long; ovary apex glabrous at maturity and when very young; grain 4-5 mm long…***F. idahoensis*** Elmer IDAHO FESCUE (of Idaho). Perennial; mountain grasslands of the central (mostly northern) cordillera, not common. Fig. 188.



5 Anthers 0.4-1.7 mm long, rarely longer

11 Plants found only as ornamentals and border plants (in New Mexico), never in native habitats; foliage markedly bluish-glaucous in dense hemispheric tufts; ovary and grain apex densely pubescent…***F. arvernensis*** Auquier, Kerguélen, & Markgraf-Dannenberg BLUE FESCUE (of Arverna, now Auvergne, France) [*Festuca ovina* Linnaeus var. *glauca* of authors]. Perennial; introduced from Europe as an ornamental landscape plant, ideal for borders and accents, with numerous cultivars. Easily recognized by its strongly bluish foliage.

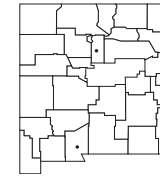


Fig. 189 *Festuca brachyphylla,* Shortleaf Fescue

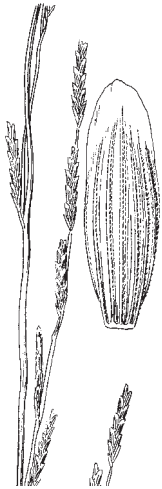
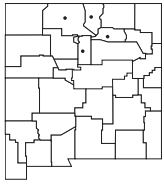


Fig. 190 *Glyceria borealis,* Northern Mannagrass

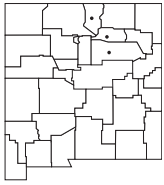
11 Plants not growing as ornamental landscape plants, planted infrequently as a pasture grass, common in native mountain habitats; growth form various, but usually not in dense hemispheric tufts; foliage somewhat glaucous to green; ovary and grain apex glabrous or pubescent

12 Plants 3-10 cm tall

13 Lemma body 2-3 mm long, with an awn 0.5-1.5 mm long; spikelets with 2, occasionally 3, florets; panicle branches at lowest node usually 2-3; ovary and grain apex pubescent…***F. minutiflora*** Rydberg SMALL-FLOWERED FESCUE (tiny-flowered). Perennial; alpine grasslands in the northern mountains.

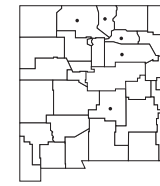


13 Lemma body 3-5.5 mm long, with an awn 2-3.6 mm long; spikelets with 3-4 florets, occasionally only 2; panicle branches at lowest node 1; ovary and grain apex glabrous…***F. brachyphylla*** J.A. Schultes ex J.A. & J.H. Schultes subsp. ***coloradensis*** Frederiksen SHORTLEAF FESCUE (short-leaved; of Colorado) [*Festuca ovina* Linnaeus var. *brachyphylla* and *Festuca ovina* Linnaeus var. *brevifolia* of NM reports]. Perennial; alpine grasslands in the northern mountains. Fig. 189.



12 Plants over 10 cm tall, usually 15-50 cm tall

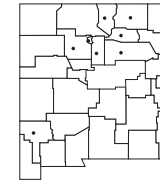
14 Basal sheaths reddish and splitting into thread-like fibers (the whitish veins) in age; ovary and grain apex pubescent …***F. earlei*** Rydberg EARLE'S FESCUE (for Franklin Sumner Earle, USDA agronomist). Perennial; grassy mountain slopes at medium to high elevations.



14 Basal sheaths mostly straw-colored to brownish, not splitting into thread-like fibers in age (occasionally so in *F. brachyphylla*); ovary and grain apex glabrous

15 Blades soft, striate from the veins showing, somewhat wrinkled in drying, with little or no sclerenchyma tissue; spikelets and foliage greenish; anthers 0.5-1.3 mm long; rachilla internodes of middle florets 0.6-0.8 mm long…***F. brachyphylla*** J.A. Schultes ex J.A. & J.H. Schultes [see lead 13, above].

15 Blades stiff, terete or sulcate, not striate nor wrinkled, the veins generally not visible because of a build-up of sclerenchyma tissue; spikelets and foliage often glaucous; anthers 1-1.7 mm long (rarely longer); rachilla internodes of middle florets 0.9-1.1 mm long …***F. saximontana*** Rydberg MOUNTAIN FESCUE (of rocky mountains) [*Festuca ovina* Linnaeus var. *rydbergii* Saint-Yves]. Perennial; mountain grasslands and forest clearings, mostly in the northern mountains.

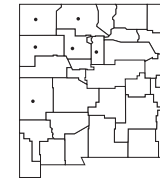


GLYCERIA MANNAGRASS

[Gr. *glykys*, sweet, referring to the seed of some species]
(Pooideae: Meliceae)

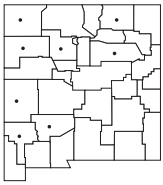
Sheath margins fused together. Inflorescence a panicle. Spikelets several-flowered. Lemmas truncate, with several parallel nerves, awnless. The common name alludes to the use of the grain for food.

1 Spikelets linear, nearly round in cross-section, 9-15(18) mm long, 8- to 12-flowered; lemmas 3.3-4 mm long…***G. borealis*** (Nash) Batchelder NORTHERN MANNAGRASS (northern). Perennial; shallow water at the borders of lakes and ponds in the northern mountains. Floating blades have non-wettable upper surfaces. Fig. 190.



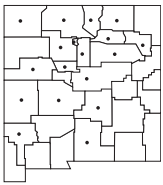
1 Spikelets ovate or oblong, somewhat compressed, 2.5-7 mm long, 3- to 6(7)-flowered; lemmas 1.5-3 mm long

2 Spikelets 4-7 mm long; first glume 1-2 mm long…***G. grandis*** S. Watson AMERICAN MANNAGRASS (large). Perennial; marshes, swampy ground, irrigation banks, and springs in the mountains. This is the largest of our *Glyceria*. Fig. 191.

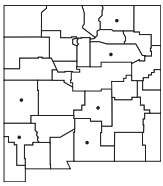


2 Spikelets 2.5-4 mm long; first glume 0.5-1(1.2) mm long

3 Blades 2-5 mm wide; first glume mostly 0.7 mm long; ligules 1-3 mm long, not pubescent; plants 30-100 cm tall…***G. striata*** (Lamarck) A.S. Hitchcock FOWL MANNAGRASS (furrowed, striped). Perennial; marshes and springs in the mountains, the most common species. Plants may produce cyanide, but stock poisonings are rare. Fig. 192.



3 Blades 5-12 mm wide; first glume mostly 1 mm long; ligules 2.5-6 mm long, minutely pubescent; plants (60)100-150 cm tall…***G. elata*** (Nash ex Rydberg) M.E. Jones TALL MANNAGRASS (elevated). Perennial; mountain springs and marshy ground in the mountains. A palatable forage grass. Fig. 193.



HACKELOCHLOA PIT-GRASS

[for Eduard Hackel (d. 1926), celebrated Austrian agrostologist]
(Panicoideae: Andropogoneae)

Leaves with prominent, stiff hairs. Inflorescence a spike, breaking into somewhat bony, grenade-like segments.

****H. granularis*** (Linnaeus) Kuntze PIT-GRASS (resembling grains or beads). Annual; reported by earlier works from dry desert plains, but no plants or specimens have been located. Known from southeastern Arizona, it may be looked for in the bootheel region. Common southward, it is a weedy grass of the sub-tropics of the world. Fig. 194.

HELICTOTRICHON ALPINE OAT

[Gr. *helicos*, twisted, and *trichos*, hair, referring to the twisted awn] (Pooideae: Poeae)

Inflorescence a narrow, spike-like panicle. Spikelets several-flowered. Glumes large, thin. Lemmas awned from the base.

Fig. 191 *Glyceria grandis,*
American Mannagrass

Fig. 192 *Glyceria striata,*
Fowl Mannagrass

Fig. 193 *Glyceria elata,* Tall Mannagrass

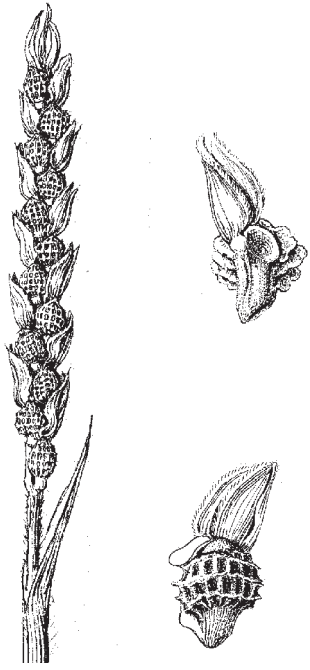
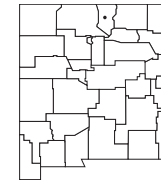


Fig. 194 *Hackelochloa granularis,* Pit-Grass

Fig. 195 *Helictotrichon hookeri,* Hooker's Alpine Oat

Fig. 196 *Helictotrichon mortonianum,* Morton's Alpine Oat

1 Panicles 5-15 cm long; blades flat or folded, mostly glabrous…***H. hookeri*** (Scribner) Henrard HOOKER'S ALPINE OAT (for William Jackson Hooker, father of Joseph Dalton Hooker, both eminent British botanists) [*Avena hookeri* Scribner, *Avenula hookeri* (Scribner) Holub]. Perennial; alpine and subalpine slopes and ledges. Known from a single collection in 1923 in Taos County. Fig. 195.



1 Panicles 2-5 cm long; blades rolled, usually pubescent …***H. mortonianum*** (Scribner) Henrard MORTON'S ALPINE OAT (for Julius Sterling Morton, U.S. Secretary of Agriculture). Perennial; alpine slopes and forest edges in the northern mountains. Fig. 196.

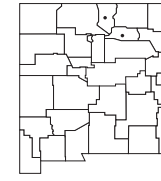


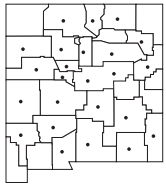
Fig. 197 *Hesperostipa neomexicana,* New Mexico Feathergrass

HESPEROSTIPA NEEDLE-AND-THREAD

[Gr. *hesperos*, western, and *Stipa*, alluding to its western North American distribution] (Pooideae: Stipeae)

Inflorescence a panicle. Spikelets 1-flowered, disarticulating above the translucent glumes. Lemmas rolled around the palea and flower, but the margins scarcely overlapping, awned from the tip, with a prominent, sharp callus at the base. Paleas long, hairy. Species of *Hesperostipa* were formerly recognized in the genus *Stipa*, which is now strictly Eurasian.

1 Terminal segment of awn plumose, with feathery hairs 2-3 mm long…***H. neomexicana*** (Thurber) Barkworth NEW MEXICO FEATHERGRASS (of New Mexico) [*Stipa neomexicana* (Thurber ex Coulter) Scribner]. Perennial; plains, grassy hills, rocky slopes, usually on limestone, widespread. Fig. 197.



1 Terminal segment of awn not plumose, any hairs present shorter than 1 mm

Fig. 198 *Hesperostipa spartea,* Porcupinegrass

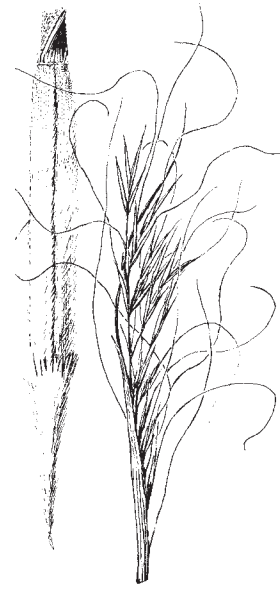
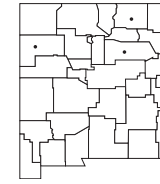
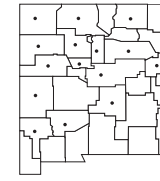


Fig. 199 *Hesperostipa comata,* Needle-and Thread

2 Lemmas 10-18 mm long above the callus; lower ligules rounded to truncate, thick, not cut or torn; margins of lower sheaths often ciliate…***H. spartea*** (Trinius) Barkworth PORCUPINEGRASS (a rope or cord, the grass being a source of fiber) [*Stipa spartea* Trinius]. Perennial; plains and prairies, scattered localities in the northern region. Fig. 198.



2 Lemmas 5-11 mm long above the callus; lower ligules usually acute, thin, often cut or torn; margins of lower sheaths mostly glabrous…***H. comata*** (Trinius & Ruprecht) Barkworth NEEDLE-AND-THREAD (long-haired, referring to the awns) [*Stipa comata* Trinius & Ruprecht]. Perennial; plains, prairies, woodland clearings. We have two subspecies:



a Terminal segment of the awn curling to flexuous; lower panicle branches usually included in the sheath…subsp. ***comata***. Fig. 199.

a Terminal segment of the awn straight; lower panicle branches mostly exserted from the sheath…subsp. ***intermedia*** (Scribner & Tweedy) Barkworth (intermediate) [*Stipa comata* Trinius & Ruprecht var. *intermedia* Scribner & Tweedy].

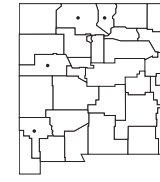


Fig. 200 *Heteropogon contortus,* Tanglehead

HETEROPOGON TANGLEHEAD

[Gr. *heteros*, different, and *pogon*, beard, alluding to the difference between the awnless staminate spikelets and the awned pistillate spikelets] (Panicoideae: Andropogoneae)

Blades rather wide and blunt when compared with other grasses, turning a characteristic rusty-brown in the fall. Inflorescence a spike, breaking apart when mature. Spikelets awned, becoming tangled.

H. contortus (Linnaeus) Beauvois ex Roemer & J.A. Schultes
TANGLEHEAD (twisted). Perennial; desert hills in the southwestern region. A related species, *H. melanocarpus* (Elliott) Bentham, occurs in Arizona, and perhaps may be found in the bootheel region; it is a tall rank annual with pits or glandular depressions on the first glumes of the staminate spikelets. Fig. 200.

HIEROCHLOË HOLYGRASS

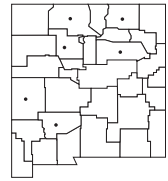
[Gr. *hieros*, sacred, and *chloë*, grass, alluding to its being strewn before the church doors on holy festival days in some parts of Prussia] (Pooideae: Poeae)

Inflorescence a panicle. Spikelets 3-flowered, awnless or short-awned, the outer florets male and larger than the inner, grain-producing floret. Some recent authors have proposed the merger of this genus into *Anthoxanthum*.

Fig. 201 *Hierochloe odorata,* Northern Sweetgrass, Holygrass

Fig. 202 *Hilaria belangeri,* Curly Mesquite

H. odorata (Linnaeus) Beauvois NORTHERN SWEETGRASS, HOLYGRASS (fragrant) [*Anthoxanthum nitens* (Weber) Y. Schouten & Veldkamp, *Hierochloë hirta* (Schrank) Borbas subsp. *arctica* (Presl) Weimarck]. Perennial; wet high mountain meadows and alpine slopes, flowering very early. Dried foliage emits a characteristic sweetish fragrance from the presence of coumarin within the tissues, which also renders the plants unpalatable and potentially toxic in large amounts. Leaf blades roll-up rapidly upon drying and have been used in weaving baskets. The grasses are used in Poland for flavoring vodka and for incense. Fig. 201.

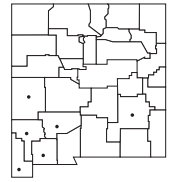


HILARIA CURLY MESQUITE

[for August Francois César Prouvançal de Saint-Hilaire (d. 1853), French botanist-entomologist] (Chloridoideae: Cynodonteae)

Plants stoloniferous. Blades with bulbous-based hairs on the margins. Inflorescence a spike. Spikelets in clusters of three, which fall from the stem as a unit. Central spikelet pistillate. Glumes somewhat indurate and fused together at the base. Rhizomatous members of this group are treated in the genus *Pleuraphis*.

1 Glumes of the lateral spikelets much shorter than the florets, pale; spikelets mostly 5 mm long…***H. belangeri*** (Steudel) Nash CURLY MESQUITE (for Chalres P. Bélanger, French botanist). Perennial with stolons; desert hills and rocky slopes in the southern mountains. The species was inadvertently named for Bélanger by Steudel, instead of after Jean Louis Berlandier, who collected the plant in Mexico. Fig. 202.



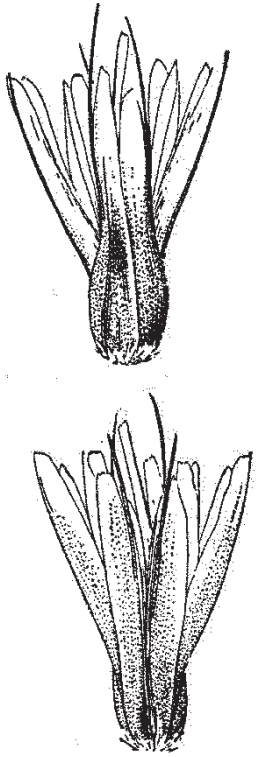
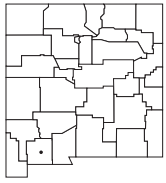


Fig. 203 *Hilaria swallenii,* Swallen's Curly Mesquite

Fig. 204 *Holcus lanatus,* Common Velvetgrass

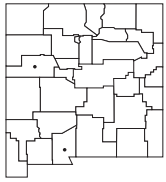
1 Glumes of the lateral spikelets about equaling the florets, blackish or purplish; spikelets 7-8 mm long…***H. swallenii*** Cory SWALLEN'S CURLY MESQUITE (for Jason Richard Swallen, agrostologist at the Smithsonian Institution). Perennial with stolons; desert hills and rocky slopes in the southwestern desert mountains, less common than the previous. Fig. 203.



HOLCUS VELVETGRASS

[Gr. *holco*, to draw, used in Classical days to remove hair from the body]
(Pooideae: Poeae)

Foliage velety-hairy. Inflorescence a narrow panicle. Spikelets mostly 2-flowered, the lower floret awnless, the upper floret with a small hooked awn at the tip.



****H. lanatus*** Linnaeus COMMON VELVETGRASS (wooly). Annual; adventive in cool, moist, waste places; native to Europe. The foliage has a distinctive gray-hairy look, giving a field of velvetgrass a fog-like appearance. Fig. 204.

Fig. 205 *Hordeum vulgare,* Barley

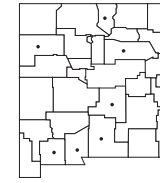
Fig. 206 *Hordeum murinum,* Wall Barley

HORDEUM BARLEY

[the classical Roman name for barley] (Pooideae: Hordeae)

Auricles developed in some species. Inflorescence a bristly spike, breaking apart when mature (except in the annual cultivated species). Spikelets borne in threes, the central sessile and the lateral pedicelled. Species with a disarticulating main axis and with the lateral spikelets reduced (all of ours except the annual cultivated species) are placed in the genus *Critesion* by some, but we maintain the genus in the more inclusive sense.

1 Rachis persistent, not breaking apart when mature; plants annual…****H. vulgare*** Linnaeus BARLEY (common). Annual; introduced crop also used for erosion control along roads, adventive along fields and roadsides. Barley is considered to be the first cereal grass to be domesticated, with 9,000 year old artifacts from Syria and Iraq. More than half of the barley grown in the United States is used as feed for livestock, and a quarter of the harvest is used in the brewing of beer and whiskey. Fig. 205. We have three cultivated races:



a Awns suppressed or variously deformed, commonly 3-cleft...the *trifurcatum* phase BEARDLESS BARLEY.

a Awns well-developed, not deformed nor 3-cleft

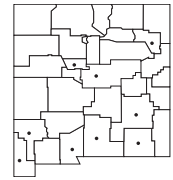
b Lateral spikelets sessile, fertile, well-developed, and prominently awned…the *vulgare* phase SIX-ROW BARLEY. There are numerous races and cultivars, including the celebrated "Ethiopian barley".

b Lateral spikelets pedicelled, sterile, much smaller in size, and nearly awnless …the *distichon* phase TWO-ROW BARLEY [*Hordeum distichon* Linnaeus]. This is the wild form of barley.

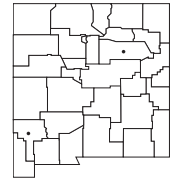
How to tell barley (*Hordeum vulgare*), rye (*Secale cereale*), and wheat (*Triticum aestivum*) apart: For the novice, and especially without a hand lens, these three common crops may be difficult to distinguish. These features may be helpful:
a) barley and rye have narrow, needle-like glumes; wheat has broad glumes.
b) barley has three spikelets per node; rye and wheat have a single spikelet per node. The hybrid between rye and wheat (*Triticosecale*) muddles the picture!

1 Rachis breaking apart when mature; plants annual or perennial

2 Glumes of the central spikelet with conspicuous ciliate margins; auricles usually well-developed, mostly longer than 1 mm…***H. murinum*** Linnaeus WALL BARLEY [*Critesion murinum* (Linnaeus) Löve]. Annual; weedy ground. The epithet *murinum* (adjective, neuter, from *murinus*, meaning mouse-like or mouse-colored) derives from *mus*, mouse, and not from *murus*, wall, notwithstanding the common name (of walls would be *muralis*). Appropriately, a game of "mousy-mousy" can be played by picking a spike, holding it upside down within a partly closed fist, and wiggling the fingers slightly to make the 'mouse' crawl to the top and escape. Fig. 206. We have two subspecies:



a Anthers of the central spikelet blackish, 0.2-0.5 mm long; prolongation of the rachilla of the lateral spikelets stout, orange-brown when mature…subsp. ***glaucum*** (Steudel) Tsvelev (bluish) [*Hordeum glaucum* Steudel, *H. stebbinsii Covas*]. Relatively common in scattered locales across the state.



a Anthers of the central spikelet yellowish, 0.7-1.4 mm long; prolongation of the rachilla of the lateral spikelets slender, greenish when mature…subsp. ***leporinum*** (Link) Arcangeli HARE BARLEY (resembling a hare) [*Hordeum leporinum* Link]. Uncommon in New Mexico.

2 Glumes of the central spikelet without ciliate margins, at most scabrous; auricles usually lacking or weakly developed and less than 1 mm long

3 Glumes of the central spikelets flattened at the base; plants annual or biennial, sometimes short-lived perennial under very favorable circumstances

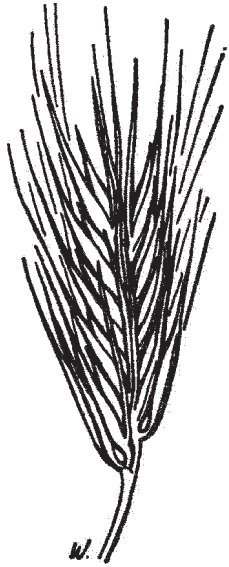
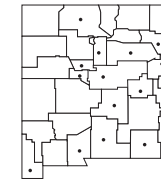


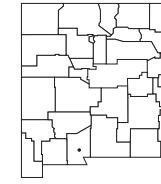
Fig. 207 *Hordeum pusillum,* Little Barley

Fig. 208 *Hordeum arizonicum,* Arizona Barley

4 Glumes of the central spikelet and the inner glume of the lateral spikelets prominenly expanded above the base…***H. pusillum*** Nuttall LITTLE BARLEY (little) [*Critesion pusillum* (Nuttall) Löve, *H. pusillum* Nuttall var. *pubens* A.S. Hitchcock]. Annual; waste places, particularly on the eastern half of the state. Fig. 207.



4 Glumes of the central spikelet not expanded, but the inner glume of the lateral spikelets slightly expanded above the base…*__H. arizonicum__* Covas ARIZONA BARLEY (of Arizona) [*Critesion arizonicum* (Covas) Löve]. Annual; weedy ground, uncommon, sporadically occurring in the southwestern counties. Fig. 208.



3 Glumes of the central spikelets setaceous, not flattened; plants perennial

5 Glumes 7-20 mm long; awns of the lemmas 5-10(20) mm long…***H. brachyantherum*** Nevski MEADOW BARLEY (short spike) [*Critesion brachyantherum* (Nevski) Barkworth & Dewey, *Hordeum nodosum Linnaeus*]. Perennial; moist mountain slopes and grassy hills, from mid- to high elevations. Fig. 209.

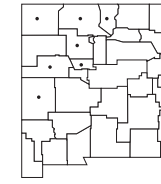


Fig. 209 *Hordeum brachyantherum,* Meadow Barley

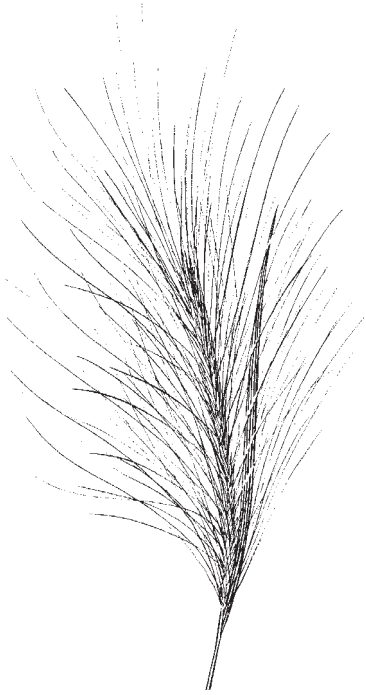
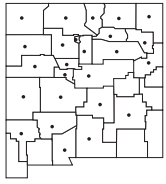


Fig. 210 *Hordeum jubatum,* Foxtail Barley

5 Glumes 20-150 mm long; awns of the lemmas 10-70 mm long…***H. jubatum*** Linnaeus FOXTAIL BARLEY (having a mane) [*Critesion jubatum* (Linnaeus) Nevski]. Perennial; moist ditches, meadows, roadsides, disturbed ground, becoming abundant in moist ground, nearly throughout the state. The long, golden awns may cause mechanical damage to the soft tissues of grazing animals, but also render the clumps extremely attractive. Some indigenous people feared this grass, thinking it could kill a person if it got into the mouth. Stabilized hybrids between *Hordeum jubatum* and *H. brachyantherum* are recognized as a subspecies of *H. jubatum*, following Baden & von Bothmer (A taxonomic revision of *Hordeum* sect. *Critesion*. Nordic J. Bot. 14(2):117-136. 1994.). Fig. 210.



a Glumes of the central spikelets (including awns) 30 mm or more long; lemma of central spikelet (including awn) 30 mm or more long…subsp. ***jubatum***

a Glumes of the central spikelets (including awns) 20-30 mm long; lemma of central spikelet (including awn) 20-40 mm long…subsp. ***intermedium*** Bowden (intermediate) [*Hordeum caespitosum* Scribner]. These are stabilized hybrids between *Hordeum jubatum* and *H. brachyantherm*.

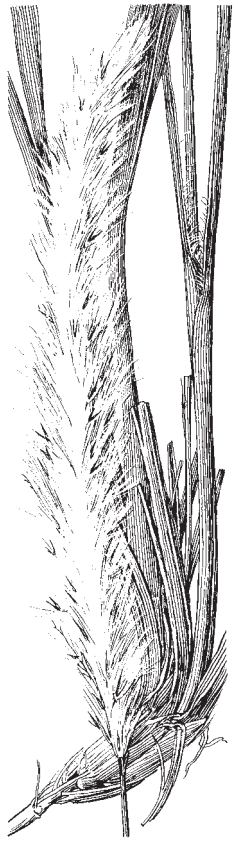


Fig. 211 *Imperata brevifolia,* Satintail

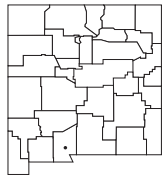
Fig. 212 *Koeleria macrantha,* Junegrass

IMPERATA SATINTAIL

[for Ferrante Imperato (d. 1625), Italian apothecary] (Panicoideae: Andropogoneae)

Densely tufted grasses with silvery, spike-like panicles, the spikelets clothed with long, silky hairs.

1 Spikelets about 3 mm long; foliage green; native, tufted grasses of floodplains but not found in New Mexico since 1939…***I. brevifolia*** Vasey SATINTAIL (short-leaved). Perennial; known only from old collections in Doña Ana County, along the Rio Grande floodplain, almost certainly extirpated. Fig. 211.

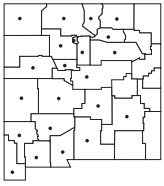


1 Spikelets 4-5 mm long; foliage reddish; rhizomatous grasses in cultivation as an ornamental…**I. cylindrica*** (Linnaeus) Beauvois var. ***koenigii*** (Retzius) T. Durand & Schinz JAPANESE BLOODGRASS 'RED BARON'
(cylindrical; perhaps for Charles Koenig, an early worker in the British Museum). Perennial with vigorous invasive rhizomes; introduced as an ornamental landscape plant but not yet known to escape to the wild in New Mexico; native to the Orient. The species is regarded as one of the world's 10 worst weeds and is listed as a noxious weed by the U.S.D.A., but the books tell us that this variety (cultivar 'red baron') is apparently less invasive. Observations of flower gardens over the past few years testify otherwise.

KOELERIA JUNEGRASS

[for Georg Ludwig Koeler (d. 1807), German botanist] (Pooideae: Poeae)

Tufted perennials. Inflorescence a panicle, narrow or open, the main axis and pedicels velvety hairy. Spikelets 2- to 4-flowered, disarticulating above the glumes and between the florets, awnless.

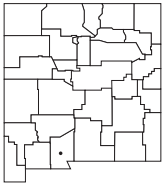


K. macrantha (Ledebour) J.A. Schultes JUNEGRASS (large-flowered) [*Koeleria cristata* of many authors, *Koeleria nitida* Nuttall]. Perennial; mountain slopes, foothills, and plains, widespread. Shiny glumes and puberulent pedicels are distinctive. During anthesis the panicle branches spread outward from the main axis, then return to a more appressed position after flowering. *Koeleria pyramidata* (Lamarck) Beauvois is a closely related European species. Fig. 212.

LAGURUS HARE'S TAIL

[Gr. *lagos*, hare, and *oura*, tail, referring to the wooly seed head] (Pooideae: Poeae)

Annual plants with softly pubescent sheaths (which are inflated) and blades. Spikelets in dense wooly heads, one-flowered, the glumes prominently ciliate and awnless, the lemmas glabrous and long-awned, with 2 tiny lateral awns.



****L. ovatus*** Linnaeus HARE'S TAIL (ovate-shaped). Annual; rarely escaping from cultivation for ornament and dried bouquets. Native to the Mediterranean region, this beautiful grass is found nearly worldwide because of its ornamental use. The wooly heads resemble *Polypogon monspeliensis*, which is very common in wet places in the wild, and has nearly glabrous sheaths and blades. Ten other grasses in the world carry the specific epithet '*laguroides*,' whose wooly or silky seedheads allude to *Lagurus*; our *Bothriochloa laguroides* is one of those.

Lagurus ovatus, Hare's Tail

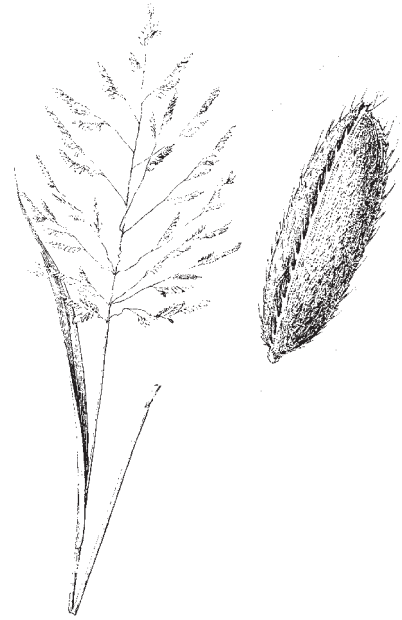


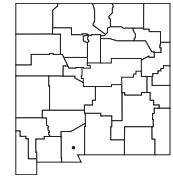
Fig. 213 *Leersia oryzoides,* Rice Cutgrass

LEERSIA CUTGRASS

[for Johann Leers (d. 1774), German botanist-pharmacist] (Ehrhartoideae: Oryzeae)

Blades sharply saw-toothed. Inflorescence an open, stiff panicle. Spikelets one-flowered, the glumes absent, strongly flattened, awnless.

L. oryzoides (L.) Swartz RICE CUTGRASS (resembling the genus *Oryza*, rice). Perennial, with inflated sheaths; river and stream banks in the southern region, sometimes clambering on adjacent vegetation. The margins of the blades are sharply serrate and easily capable of cutting flesh. Plants are of little or no value for livestock, but the seeds are used by water fowl. It is related to rice (*Oryza sativa* Linnaeus), not known to be grown in New Mexico. Fig. 213.



LEPTOCHLOA SPRANGLETOP

[Gr. *leptos*, slender, and *chloa*, grass] (Chloridoideae: Eragrostideae)

Inflorescence a panicle of spike-like branches. Spikelets several-flowered, awned or awnless. Lemmas with three prominent nerves. *Leptochloa nealleyi* Vasey was reported for New Mexico by Wooton & Standley (1915), but this is a species of the coastal prairies of Texas and Louisiana, and no specimens from the state have been found. Some [following McNeill, J. 1979. *Diplachne* and *Leptochloa* (Poaceae) in North America. Brittonia 31:399-404.] recognize the segregate genus *Diplachne*, but work by J.F.M. Valls [unpubl. dissertation, Texas A&M Univ.] and N. Snow [Nomenclatural changes in *Leptochloa* P. Beauvois sensu lato (Poaceae, Chloridoideae). Novon 8:77-80. 1998.] have shown that this segregation is unwarranted.

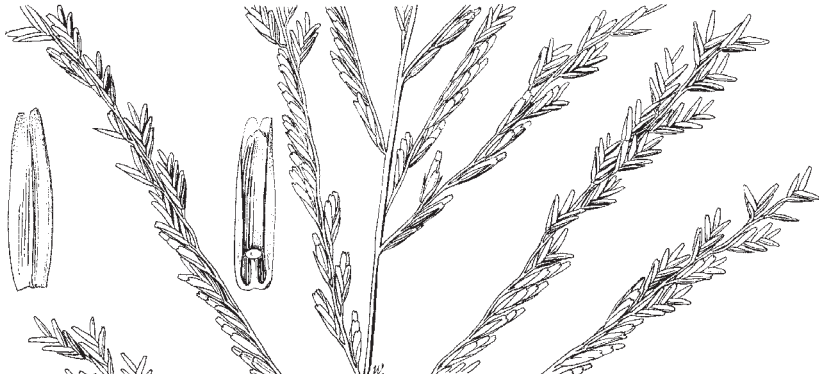
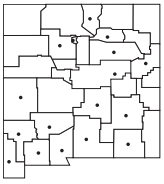
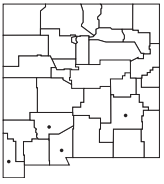


Fig. 214 *Leptochloa dubia,* Green Sprangletop



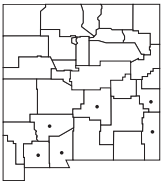
1 Plants perennial; lemmas notched at the apex…***L. dubia*** (Kunth) Nees GREEN SPRANGLETOP (doubtful). Perennial; rocky slopes, alluvial plains, roadsides, widespread; an excellent forage grass relished by livestock. Fig. 214.

1 Plants annual; lemmas rounded to pointed at the apex



2 Spikelets 2-3 mm long, 2- to 4-flowered; lemmas 1-2 mm long; sheaths sparsely to densely hairs with bulbous-based hairs…***L. panicea*** (Retzius) Ohwi subsp. ***brachiata*** (Steudel) N. Snow RED SPRANGLETOP (resembling *Panicum*; having arms) [*Leptochloa filiformis* (Lamarck) Beauvois, *L. mucronata* of New Mexico reports]. Annual; moist weedy ground in the southern regions. Fig. 215.

2 Spikelets 3-10 mm long, 4- to many-flowered; lemmas 2-5 mm long; sheaths glabrous to hairy, but the hairs not bulbous-based



3 Spikelets 3-5 mm long; lemmas sticky on the back; ligules 1-2.5 mm long…***L. viscida*** (Scribner) Beal GUM SPRANGLETOP (sticky, viscid). Annual; plains and swales in the southern region. Fig. 216.

3 Spikelets 6-10 mm long; lemmas not sticky on the back; ligules 2-8 mm long…***L. fusca*** (Linnaeus) Kunth (dark brown). Annual; weedy, moist ground. We have two subspecies:

Fig. 215 *Leptochloa panicea,* Red Sprangletop

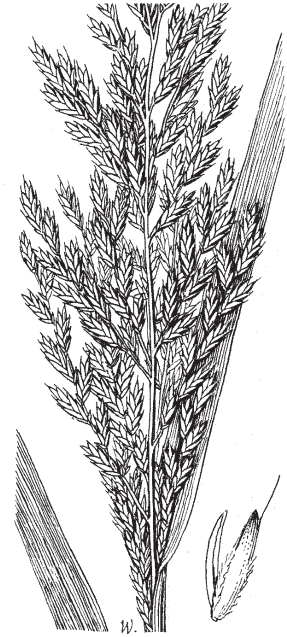
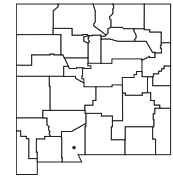
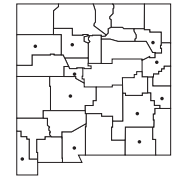


Fig. 216 *Leptochloa viscida,* Gum Sprangletop

a Lemmas truncate to obtuse, awnless or with a tiny point less than 0.5 mm long; panicles usually exserted from the sheath and exceeding the leaf blades…subsp. ***uninervia*** (J. Presl) N. SNOW MEXICAN SPRANGLETOP (one-nerved) [*Leptochloa uninervia* (Presl) Hitchcock & Chase]. Uncommon in Doña Ana County. Fig. 217.



a Lemmas obtuse to acute, with a slender awn 0.5-3.5 mm long; panicles usually partially enclosed in the sheath and overtopped by the leaf blades…subsp. ***fascicularis*** (Lamarck) N. Snow BEARDED SPRANGLETOP (in a bundle) [*Leptochloa fascicularis* (Lamarck) Gray]. Widespread in scattered locales throughout the state. Fig. 218.



LEYMUS WILDRYE

[anagram of *Elymus*] (Pooideae: Hordeae)

Inflorescence a spike, with one-several spikelets per node. Spikelets several-flowered, disarticulating above the very narrow glumes. Species of *Leymus* were formerly treated in the genus *Elymus*.

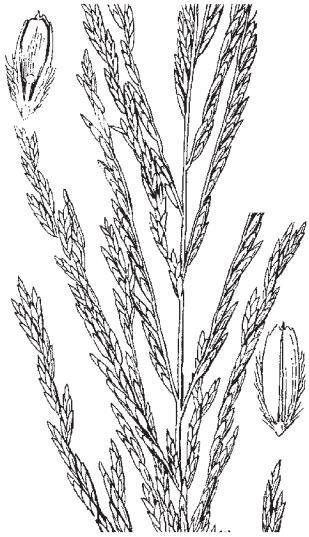
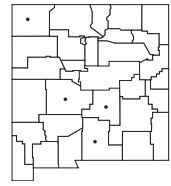


Fig. 217 *Leptochloa fusca* subsp. *uninervia,* Mexican Sprangletop

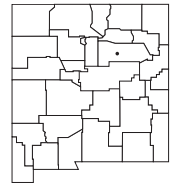
Fig. 218 *Leptochloa fusa* subsp. *fascicularis,* Bearded Sprangletop

1 Plants strongly rhizomatous, the rhizomes long and slender…***L. triticoides*** (Buckley) Pilger CREEPING WILDRYE (resembling the genus *Triticum*) [*Elymus triticoides* Buckley]. Perennial; our plants are from forest clearings in the mountains, but elsewhere the species is more common in meadows of clay flats and swales at much lower elevations. Earlier reports included Doña Ana County, but plants have not persisted there. Fig. 219.



1 Plants tufted, or occasionally with short rhizomes but still bunch-forming

2 Plants in giant clumps to 2 m or more tall, usually much taller than 100 cm; blades flat, 5-15 mm wide; spikelets usually 3-6 per node…**L. cinereus* (Scribner & Merrill) Löve GREAT BASIN WILDRYE (ash-colored) [*Elymus cinereus* Scribner & Merrill]. Perennial; adventive, known from a single collection in San Miguel County. An undocumented report of *Leymus condensatus* (J. Presl). A. Love from San Juan County most likely referred to *L. cinereus*, which is known from adjacent Colorado and Utah in addition to the introduction in New Mexico. Seedheads are prone to ergot infestation. Fig. 220.



2 Plants much smaller, rarely as much as 1 m tall and usually less than 70 cm tall; blades mostly involute or rarely flat, 2-5 mm wide; spikelets 1-2 per node

Fig. 219 *Leymus triticoides,*
Creeping Wildrye

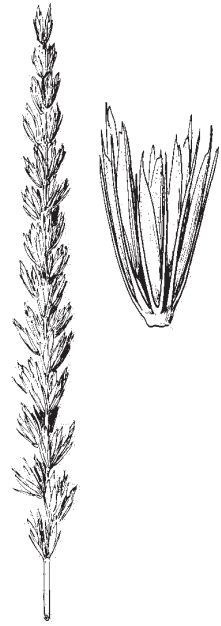
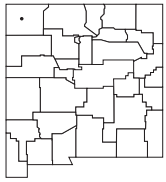


Fig. 220 *Leymus cinereus,*
Great Basin Wildrye

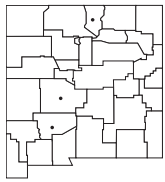
Fig. 221
Leymus salina,
Salina Wildrye

Fig. 222
Leymus ambiguus,
Rocky Mountain
Wildrye

3 Spikelets mostly one per node of the rachis; blades often flat or sometimes involute…***L. salina*** (M.E. Jones) A. Löve SALINA WILDRYE (of Salina Pass, Utah) [*Elymus salina* M.E. Jones]. Perennial; dry plains in the Four Corners region. The specific epithet refers to a geographical place name, and not to a saline habitat, and hence is not rendered *salinus*. Fig. 221.



3 Spikelets mostly 2 per node of the middle rachis (solitary at the apex and base of the spike); blades almost always involute…***L. ambiguus*** (Vasey & Scribner) D.R. Dewey ROCKY MOUNTAIN WILDRYE (doubtful) [*Elymus ambiguus* Vasey & Scribner]. Perennial; dry, rocky foothills and plains. Fig. 222.

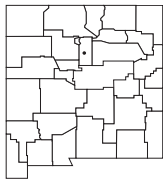


LOLIUM RYEGRASS

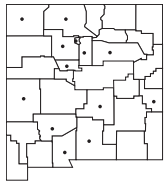
[the ancient Latin name, referred to by the Roman poet Virgil as a troublesome weed, possibly darnel] (Pooideae: Poeae)

Auricles well-developed. Blades glossy on one surface. Inflorescence a spike, with the spikelets one per node and placed edgewise on the main axis. Spikelets several-flowered, disarticulating above the glumes and between the florets. First glume absent except on the terminal spikelet. *Lolium* is sometimes circumscribed to include *Festuca* subgenus *Schedonorus* (or the genus *Schedonorus*), whose species are genetically similar enough to form fertile hybrids with *Lolium perenne*. We maintain a more traditional treatment, though recognizing the close relationship of the two groups.

1 Glume exceeding the uppermost floret…*****L. temulentum*** Linnaeus POISON DARNEL (drunken, referring to vomiting and impaired vision when eaten). Annual; moist weedy ground, known only from Santa Fe County; once a serious weed of oats and other crops, but now becoming less common in the United States with more efficient methods of grain cultivation and harvest. This is the tares sown in the wheat field in the parable of the Bible (Matthew, Chapter 13). Fig. 223.



1 Glume shorter than the spikelet, the florets extending beyond the glume…*****L. perenne*** Linnaeus RYEGRASS (perennial). A short-lived perennial, sometimes annual; introduced from Europe for lawns, roadsides, and pastures, escaping to moist weed ground. Vegetative clumps in lawns are usually easily recognized by their shiny blades and well-developed auricles. Two varieties are recognized, which form nearly completetly fertile hybrids (xL. *boucheanum* Kunth), resulting in full gradation in form between the two:



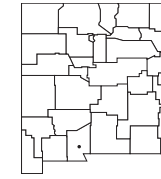
a Lemmas awnless or with an awn less than 1 mm long; vegetative leaf blades folded (conduplicate); plants generally perennial…var. ***perenne*** PERENNIAL RYEGRASS. Fig. 224.

Fig. 223 *Lolium temulentum,* Poison Darnel

Fig. 224 *Lolium perenne* var. *perenne,* Ryegrass

Fig. 225 *Lolium perenne* var. *aristatum,* Italian Ryegrass

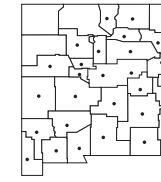
a Lemmas, at least some, with an awn more than 1 mm long; vegetative leaf blades rolled (convolute); plants annual, biennial, or short-lived perennials…var. ***aristatum*** Willdenow ITALIAN RYEGRASS (awned) [*Lolium multiflorum* Lamarck, L. *perenne* Linnaeus subsp. *italicum* (A. Braun) Syme]. Fig. 225.



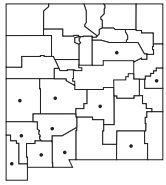
LYCURUS WOLFTAIL

[Gr. *lykos*, wolf, and *oura*, tail, referring to the bristly seedhead]
(Chloridoideae: Eragrostideae)

Inflorescence a narrow, spike-like panicle. Spikelets one-flowered, falling in pairs, one usually staminate or neuter, the other fertile. First glume 2-awned. Lemma awned. Called TEXAS TIMOTHY in a little state east of New Mexico.



1 Blades terminating in a slender, hair-like bristle as much as 10 mm long; ligules acute to acuminate, (3)5-6(10) mm long; plants tightly tufted…***L. setosus*** (Nuttall) C. Reeder BRISTLY WOLFTAIL (hairy) [*Lycurus phleoides* Kunth var. *glaucifolius* Beal]. Perennial; dry slopes, plains, and woodlands, widespread. Judging from early literature, this and the next were much more common in the early days than now, perhaps due to increasing range condition. Fig. 226.

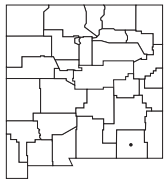


1 Blades without a bristle at the tip, or rarely short-pointed; ligules truncate in the central portion but with lateral acuminate projections on either side, 1.5-2(3) mm long; plants loosely tufted, the culms ascending to lax and geniculate…***L. phleoides*** Kunth COMMON WOLFTAIL (resembling the genus *Phleum*). Perennial; dry slopes, plains, and woodlands mostly in the southern regions. Fig. 227.

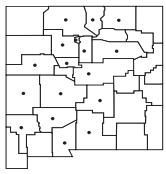
MELICA MELICA

[Gr. *meli*, honey, perhaps referring to the sweetness of its culms] (Pooideae: Meliceae)

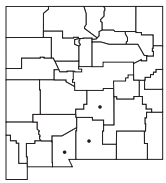
Sheath margins fused together to near the top of the sheath. Inflorescence a panicle of somewhat spike-like or raceme-like branches. Spikelets several-flowered, awnless, the upper floret empty.



1 Rudimentary floret at end of rachilla blunt, 0.5 mm long…***M. nitens*** (Scribner) Nuttall ex Piper THREE-FLOWER MELICA (polished, shining). Perennial; calcareous soil and rocky outcrops of the Guadalupe Mountains, Eddy County. Fig. 228.



1 Rudimentary floret at end of rachilla pointed, 2-5 mm long…***M. porteri*** Scribner PORTER'S MELICA (for Thomas Conrad Porter, Pennsylvania professor of botany, poet, classicist). Perennial; mountain slopes and forest clearings. We have two varieties:



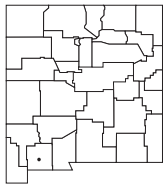
a Panicle branches mostly erect…var. ***porteri*** Widespread throughout the mountains of the state, but nowhere very common. Fig. 229.

a Panicle branches mostly spreading…var. ***laxa*** Boyle (loose). Southern mountains.

MELINIS RUBY GRASS

[Gr. *melini*, millet] (Panicoideae: Paniceae)

Inflorescence a pinkish or reddish, plume-like panicle. Spikelets borne on sinuous pedicels, densely silky hairy, disarticulating below the glumes.



****M. repens*** (Willdenow) Zizka NATAL GRASS, RUBY GRASS, MOLASSES GRASS (creeping) [*Rhynchelytrum repens* (Willdenow) C.E. Hubbard, *R. roseum* (Nees) Bews]. Perennial; adventive, native to tropical Africa; known in the wild only from a single collection in Luna County, thought not to have persisted. Plants are also being sold in nurseries for landscaping. It is an invasive weed in some parts of the world, but is hardly suited for our environments and cannot be considered a threat. Fig. 230.

Fig. 226 *Lycurus setosus,* Bristly Wolftail

Fig. 227 *Lycurus phleoides,* Common Wolftail

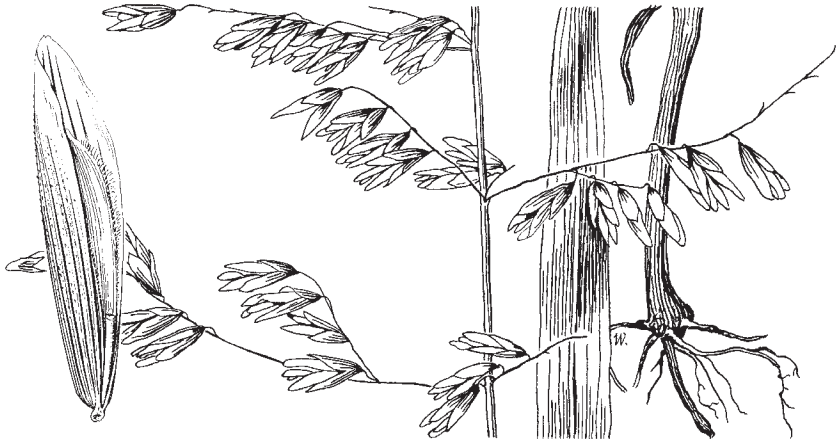


Fig. 228 *Melica nitens,* Three-Flower Melica

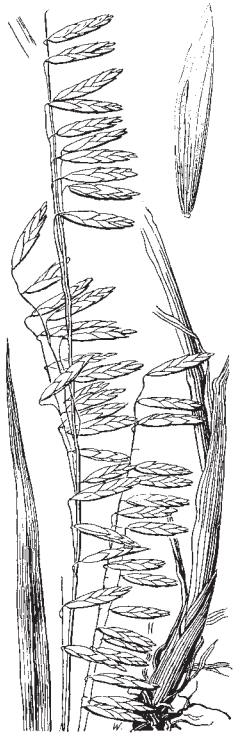


Fig. 229 *Melica porteri,* Porter's Melica

Fig. 230 *Melinis repens,* Natal Grass

MISCANTHUS SILVERGRASS

[Gr. *mischos*, pedicel, and *anthos*, flower, referring to the fact that both spikelet pairs are pedicelled] (Panicoideae: Andropononeae)

Large, tussock-forming grasses used in horticulture. Inflorescence a silky-hairy, fan-shaped panicle of persistent, spike-like branches. Spikelets with a tuft of hairs at the base, awned.

****M. sinensis*** Andersson EULALIA, CHINESE SILVERGRASS (of China). Perennial; introduced from the Orient as an ornamental landscape plant, with numerous cultivars. Grows in large clumps 5-8 ft. tall, with long arching blades. Forms with banded blades are known as PORCUPINE GRASS (blades stiff, upward-pointing) or ZEBRA GRASS (blades drooping). Fig. 231.

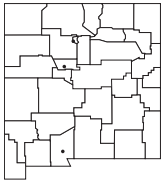


Fig. 231 *Miscanthus sinensis,* Eulalia, Chinese Silvergrass

Fig. 232 *Muhlenbergia brevis,* Short Muhly

MUHLENBERGIA MUHLY

[for Gotthilf Heinrich Ernst Muhlenberg (d. 1815), Pennsylvania-born, German-educated, Lutheran pastor and botanist of Lancaster, Pennsylvania] (Chloridoideae: Eragrostideae)

Ligule a membrane. Inflorescence various, but usually a panicle of some sort. Spikelets one-flowered, often awned. Lemmas 3-nerved. This is our largest genus of grasses, with 43 species in the state.

Seven species form large clumps or tussocks and are readily noticed in the field. They are identified in a separate key at the beginning of this treatment (Key I), with the key to all species following (Key II).

Key I. Large, tussock-forming species

1 Sheaths conspicuously compressed-keeled…**M. emersleyi** Vasey [see Key II, lead 31]

1 Sheaths rounded on the back

2 Glumes, excluding the awns 3/4 or more the length of the floret; spikelets awnless

3 Ligules 1-3 mm long; panicles tightly contracted, spike-like, the branch tips erect-appressed…***M. rigens*** (Bentham) A.S. Hitchcock [see Key II, lead 34]

3 Ligules 6-20 mm long; panicles loosely contracted, mostly not spike-like, the branch tips often spreading…***M. longiligula*** A.S. Hitchcock [see Key II, lead 34]

2 Glumes, excluding the awn, 2/3 or less the length of the floret; spikelets awned or awnless

4 Panicles open, very diffuse, 8-40 cm wide, strikingly reddish when mature; landscape plants, not known to escape to the wild…**M. capillaris*** (Lamarck) Trinius [see Key II, lead 43]

4 Panicles narrow or somewhat open, not reddish, or if so, then not in cultivation

5 Lemma awns 0-4(5) mm long

6 Awns (3)5-10 mm long; panicles reddish; glumes 1.5-2 mm long…***M. metcalfei*** M.E. Jones [see Key II, lead 36]

6 Awns 0-4(5) mm long; panicles greenish; glumes 2-3 mm long sometimes longer or shorter…***M. dubia*** Fournier [see Key II, lead 36]

5 Lemma awns 5-35 mm long

7 Glumes 1-1.3 mm long; lemma awns 10-35 mm long …***M. rigida*** (Kunth) Trinius [see Key II, lead 47]

7 Glumes 1.5-2 mm long; lemma awns 5-10 mm long, sometimes longer or shorter…***M. metcalfei*** M.E. Jones [see Key II, lead 36]

Key II. All species

1 Plants annual

2 First glume prominently 2-nerved, usually cleft; panicle branches falling as a unit, bearing 2-3(4) spikelets

3 Glumes about 1/2 the length of the floret; spikelets 4-6 mm long; lemma awns 5-15 mm long…***M. brevis*** C.O. Goodding SHORT MUHLY (short). Annual; grassy slopes and clearings in volcanic soils in the western half of the state. Fig. 232.

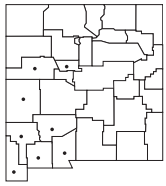
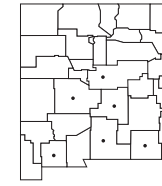


Fig. 233 *Muhlenbergia depauperata,* Six-Weeks Muhly

Fig. 234 *Muhlenbergia peruviana,* Peruvian Muhly

3 Glumes and floret about equal in length; spikelets 2.5-3.5 mm long; lemma awns 0.5-5(10) mm long…***M. depauperata*** Scribner SIX-WEEKS MUHLY (impoverished). Annual; grassly slopes and clearing in volcanic soils in the southcentral and eastern regions. Fig. 233.



2 First glume 1-nerved; panicle branches persistent

4 Lemma awns 10-30 mm long

5 Second glume (1)2- to 3-nerved, the apex truncate to acute, 2- or 3-toothed…***M. peruviana*** (Beauvois) Steudel PERUVIAN MUHLY (of Peru) [*Muhlenbergia pulcherrima* Scribner]. Annual; mountain meadows and ciénegas, known only from Catron County. Fig. 234.

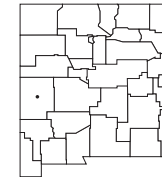


Fig. 235 *Muhlenbergia tenuifolia,* Mesa Muhly

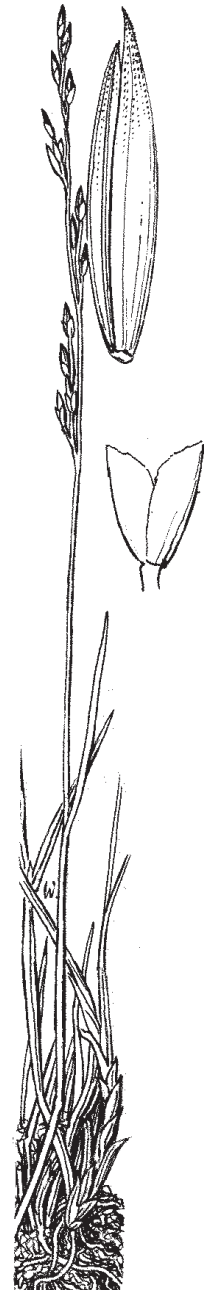


Fig. 236 *Muhlenbergia filiformis,* Pull-up Muhly

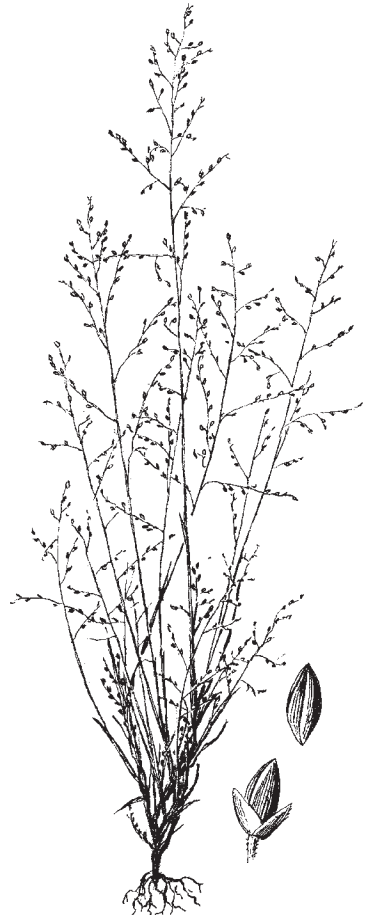
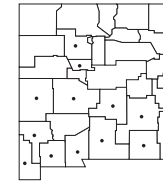


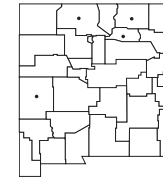
Fig. 237 *Muhlenbergia ramulosa,* **Red Muhly**

5 Second glume 1-nerved, the apex acute to acuminate…***M. tenuifolia*** (Kunth) Trinius MESA MUHLY (thin-leaved) [*Muhlenbergia monticola* Buckley, *M. neomexiana* Vasey]. Annual to short-lived perennial; rocky ledges and outcrops, canyons, sandy drainages. Fig. 235.



4 Lemma awns 0-5 mm long

6 Panicle narrow, contracted, the branches appressed to the main axis…***M. filiformis*** (Thurber ex S. Watson) Rydberg PULL-UP MUHLY (thread-like). Annual; alpine to subalpine meadows and marshes, mostly in the northern mountains, but populations also in the Mogollon Mts. Fig. 236.



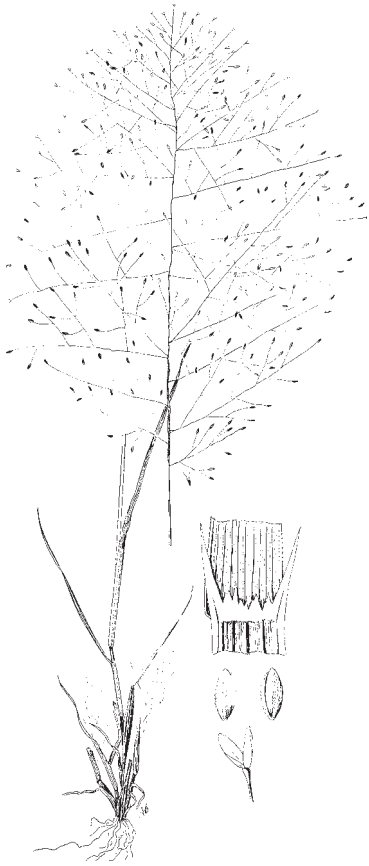
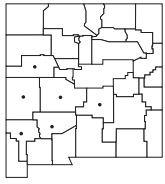


Fig. 238 *Muhlenbergia fragilis,* Delicate Muhly

6 Panicle open, the branches spreading

7 Glumes glabrous or nearly so

8 Pedicels 0.3-1 mm long, stout, of equal thickness throughout; blades lacking white margins…**M. ramulosa** (Kunth) Swallen RED MUHLY (much branched) [Muhlenbergia wolfii (Vasey) Rydberg]. Annual; moist soil in forest clearings in the central and western mountains. Fig. 237.



8 Pedicels 2-8 mm long, capillary but straight, narrowed downward; blades with thickened white margins…**M. fragilis** Swallen DELICATE MUHLY (brittle). Annual; moist sandy soil and rocky clearings in the western mountain regions. Fig. 238.

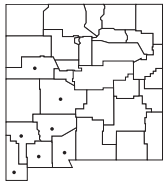
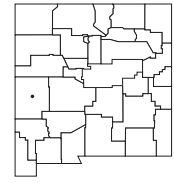


Fig. 239 *Muhlenbergia eludens,* Gravel-Bar Muhly

Fig. 240 *Muhlenbergia sinuosa,* Barrens Muhly

7 Glumes minutely-pubescent to long-pubescent, at least at the apex (use a lens)

9 Terminal pedicels 2 mm long, the lateral ones appressed to the branchlets…***M. eludens*** C.G. Reeder GRAVEL-BAR MUHLY (elusive). Annual; rocky woodlands and forest clearings in the western mountains. Known from only two collections. Fig. 239.



9 Terminal pedicels mostly longer than 5 mm, the lateral ones spreading to flexuous

10 Pedicels sinuous, often tangled with one another; anthers 0.9-1.4 mm long…***M. sinuosa*** Swallen BARRENS MUHLY (sinuous). Annual; moist soil of canyon bottoms, riparian habitats, and rocky hills in the central and western mountains. Fig. 240.

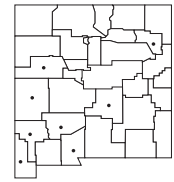
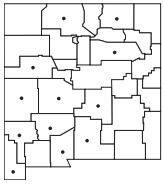


Fig. 241 *Muhlenbergia minutissima,* Least Muhly

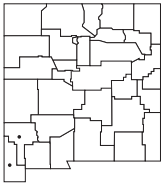
Fig. 242 *Muhlenbergia texana,* Texas Muhly

10 Pedicels straight or subflexuous, not tangled; anthers 0.3-0.5 mm long

11 Lemma awnless, 0.8-1.5 mm long…***M. minutissima*** (Steudel) Swallen LEAST MUHLY (very tiny). Annual; moist, sandy or rocky slopes, widespread. Fig. 241.



11 Lemma usually awned, 1.3-2 mm long…***M. texana*** Buckley TEXAS MUHLY (of Texas). Annual; rocky outcrops, sandy drainages, disturbed ground, in the bootheel region. Fig. 242.



1 Plants perennial

Fig. 243 *Muhlenbergia straminea,* Screwleaf Muhly

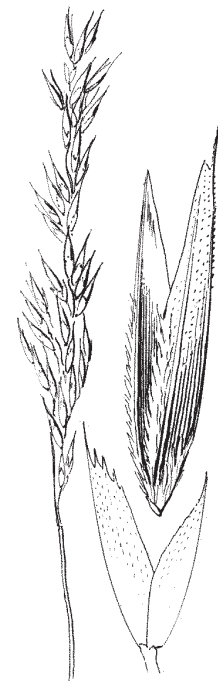
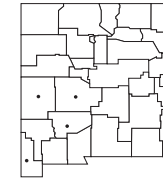


Fig. 244 *Muhlenbergia filiculmis,* Slimstem Muhly

12 Second glume evidently 3-nerved, often 3-toothed; lower sheaths flattened, ribbon-like

13 Sheaths usually becoming coiled and appearing like wood shavings; second glume acute, entire or occasionally toothed, nearly as long as the floret…***M. straminea*** A.S. Hitchcock SCREWLEAF MUHLY (straw-colored) [*Muhlenbergia virescens* of New Mexico works, not (Kunth) Trinius]. Perennial; rocky slopes and clearings, mostly in pine forest, southwestern mountains. Fig. 243.



13 Sheaths not conspicuously coiled (though flattened); second glume toothed to awned, shorter than the floret

14 Ligules 4-8 mm long; stems and blades very slender and narrow; plants usually 15-30 cm tall…***M. filiculmis*** Vasey SLIMSTEM MUHLY (with thread-like stems). Perennial; moist, sandy ground in high mountain grasslands and clearings, in the northern mountains. Fig. 244.

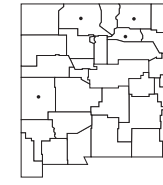
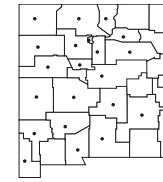


Fig. 245 *Muhlenbergia montana,* Mountain Muhly

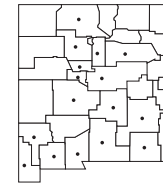
Fig. 246 *Muhlenbergia porteri,* Bush Muhly

14 Ligules 10-20 mm long and the tip often shredded; stems and blades more robust; plants 25-80 cm tall…***M. montana*** (Nuttall) A.S. Hitchcock MOUNTAIN MUHLY (of mountains). Perennial; rocky or grassy slopes, ledges, forest clearings, widespread. This is a common understory grass in ponderosa pine forests, providing abundant forage. Fig. 245.



12 Second glume 1-nerved, entire or fringed; lower sheaths usually not ribbon-like

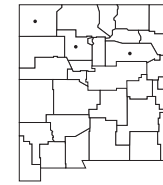
15 Stems stiff, wiry, much-branched, the plants bush-like…***M. porteri*** Scribner ex Beal BUSH MUHLY (for Thomas Conrad Porter, Pennsylvania professor of botany, poet, classicist). Perennial; dry plains, nearly throughout the state. This is an important species in the desert grasslands, nearly always found in the protection of shrubs. Early settlers and soldiers would gather large quantities of bush muhly for feed for their animals, and the grass was called HOE-GRASS for a time; called MESQUITE GRASS in Wooton and Standley (1912). Fig. 246.



15 Stems not as above, the plants not bush-like

16 Plants with evident, slender, creeping rhizomes

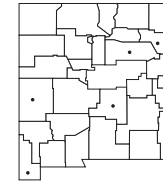
17 Callus hairs copious, as long as the body of the lemma…***M. andina*** (Nuttall) A.S. Hitchcock FOXTAIL MUHLY (of the Andes or other high mountains). Perennial; mountain meadows, forest clearings, gravely river beds, in the northern mountains. Fig. 247.



17 Callus hairs long-pubescent to glabrous, but the hairs much shorter than the body of the lemma

18 Awn of the lemma 6-25 mm long

19 Blades mostly 2-4 mm wide, mostly flat…***M. mexicana*** (Linnaeus) Trinius MEXICAN MUHLY (of Mexico). Perennial; moist thickets, woodlands, and canyon bottoms. The specific name is a misnomer, as the species does not occur in Mexico. Fig. 248. We have two weak varieties in New Mexico:



a Lemmas awnless to acuminate…var. ***mexicanus***

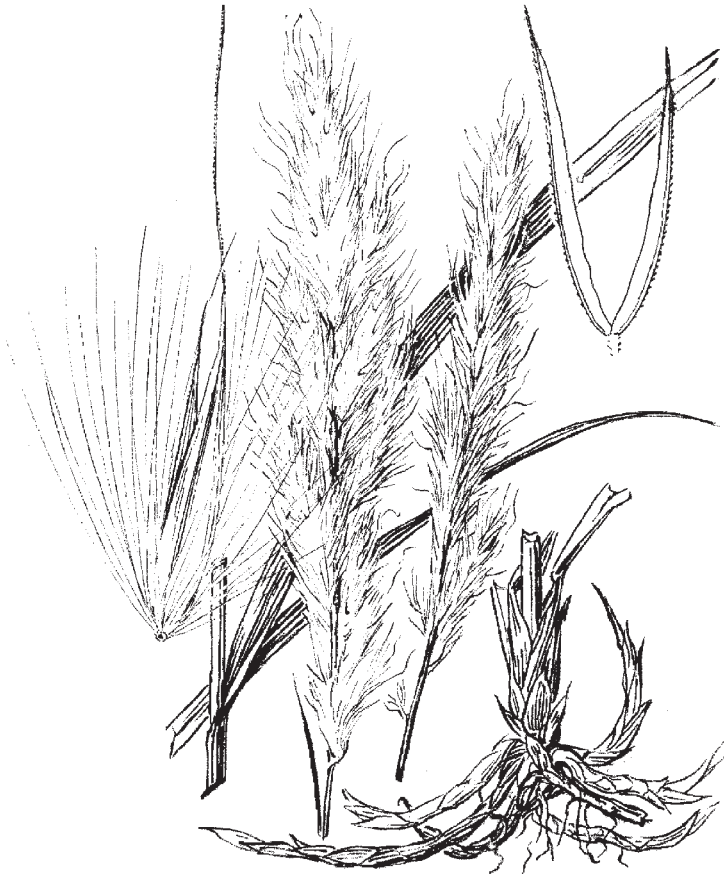


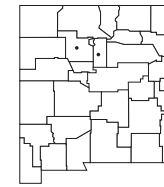
Fig. 247 *Muhlenbergia andina,* Foxtail Muhly

Fig. 248 *Muhlenbergia mexicana,* Mexican Muhly

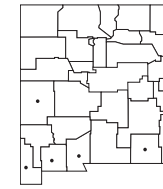
a Lemmas with awns 3-9 mm long…var. ***filiformis*** (Torrey) Scribner [*Muhlenbergia mexicana* (Linnaeus) Trinius forma *ambigua* (Torrey) Fernald].

19 Blades 0.5-2(2.5) mm wide, mostly rolled

20 Spikelets, excluding the awns, 4-5 mm long; awns 6-10 mm long; lemma sparsely pubescent below…***M. arsenei*** A.S. Hitchcock ARSENE'S MUHLY (for Frère Gustave Arsène [d. 1938], French clergyman-botanist at Sacred Heart Training College in Las Vegas, New Mexico). Perennial; poorly known from a few collections in Sandoval and Santa Fe counties. Fig. 249.



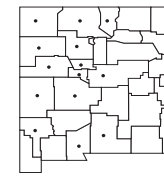
20 Spikelets, excluding the awns, 2-3 mm long; awns 10-25 mm long; lemma loosely long-pubescent below…***M. polycaulis*** Scribner CLIFF MUHLY (many-stemmed). Perennial; shaded ledges and grassy slopes in the southern regions. Fig. 250.



18 Awn of the lemma 0-3(5) mm long

21 Panicles open, loosely flowered with usually spreading to divergent branches at maturity

22 Awns 1-1.5(2) mm long; blades very stiff and pungent when mature; spikelets appearing clustered, especially when young…***M. pungens*** Thurber SANDHILL MUHLY (sharp, referring to the blade tips). Perennial; sand dunes and plains, mostly in the western regions. Rattlesnakes seem to enjoy these grasses, as well as agrostologists. Fig. 251.



22 Awns 0-0.3 mm long; blades usually soft and pliable, never pungent; spikelets not appearing clustered

Fig. 249 *Muhlenbergia arsenei,* Arsene's Muhly

Fig. 250 *Muhlenbergia polycaulis,* Cliff Muhly

Fig. 251 *Muhlenbergia pungens,* Sandhill Muhly

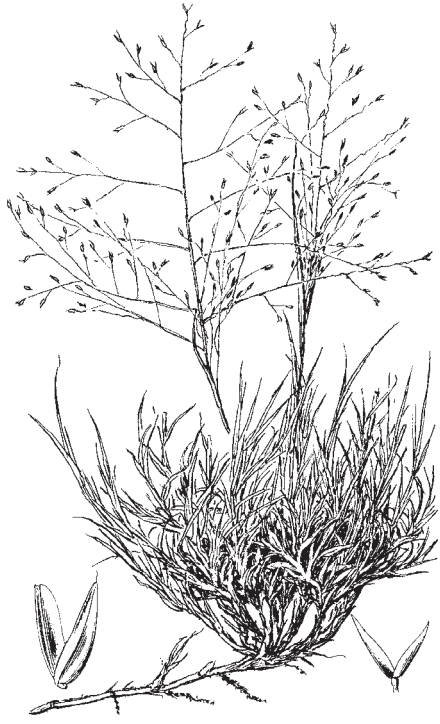
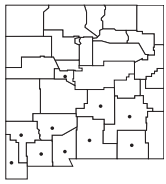


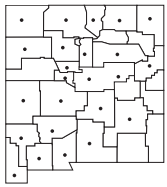
Fig. 252 *Muhlenbergia arenacea,* Ear Muhly

23 Ligules with pointed lateral extensions 1-2 mm long; blades with thickened white margins and midribs…***M. arenacea*** (Buckley) A.S. Hitchcock EAR MUHLY (of sandy ground)



[*Sporobolus auriculatus* Vasey]. Perennial; playas and clay flats in the southern regions, often growing with *Scleropogon brevifolius*. Spikelets often contain two florets. This species might be confused with *Muhlenbergia arizonica*, but that lacks prominent auriculate extensions on the side of the ligule and has awned florets. Fig. 252.

23 Ligules without lateral extensions; blades without thickened white margins or midribs …***M. asperifolia*** (Nees & Meyer ex Trinius) Parodi SCRATCHGRASS (rough-leaved)

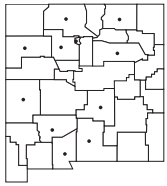


[*Sporobolus asperifolius* (Nees & Meyer ex Trinius) Nees]. Perennial; damp or wet ground along streams and rivers, floodplains. Plants branch profusely and take on a bushy growth. Spikelets frequently produce two florets, and are sometimes infected by a smut fungus (*Tilletia asperifolia*). Fig. 253.

21 Panicles contracted, narrow and usually densely flowered, the branches mostly erect to appressed

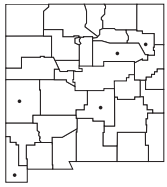
24 Blades (2.5)3-6 mm wide, mostly flat

25 Glumes 4.5-6 mm long, with awn-tips much exceeding the lemma…***M. racemosa*** (Michaux) Britton, Sterns, & Poggenburg GREEN MUHLY (raceme-like).



Perennial; canyon bottoms, riparian strands, irrigation ditches, moist prairies, roadsides. Fig. 254.

25 Glumes 2-3.5 mm long, without awn-tips and shorter than the lemma, or in the ambigua phase with slender awns 3-9 mm long…***M. mexicana*** (Linnaeus) Trinius [see lead 19, above]



24 Blades 0.5-2(3) mm wide, rolled

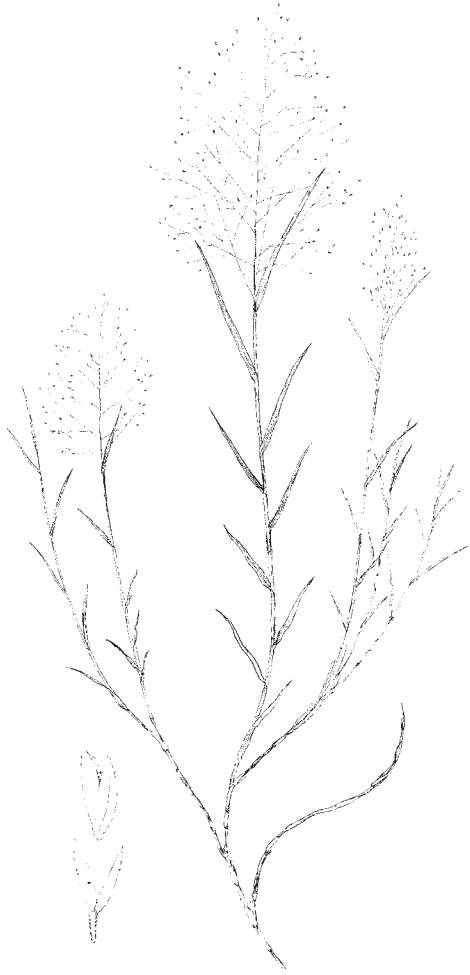


Fig. 253 *Muhlenbergia asperifolia,* Scratchgrass

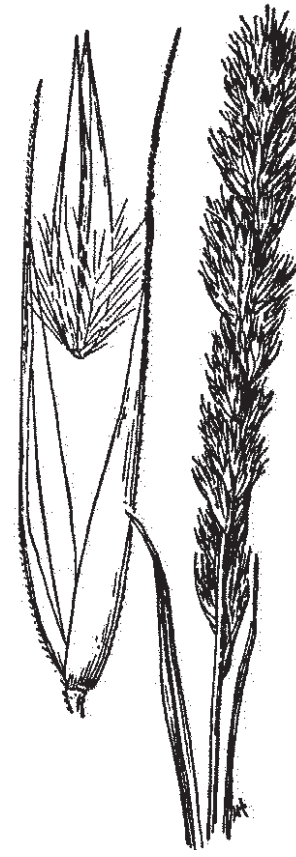


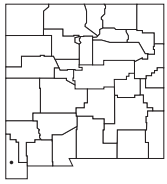
Fig. 254 *Muhlenbergia racemosa,* Green Muhly

Fig. 255 *Muhlenbergia glauca,* Desert Muhly

Fig. 256 *Muhlenbergia villiflora,* Hairy Muhly

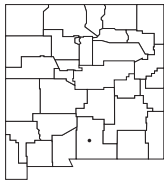
26 Lemma long-pubescent below

27 Blades 4 cm or more long; glumes acuminate or aristate…***M. glauca*** (Nees) B.D. Jackson DESERT MUHLY (bluish) [*Muhlenbergia lemmonii* Scribner]. Perennial; desert plains in the bootheel region. Fig. 255.



27 Blades 2-4(5) cm long; glumes acute

28 Lemma 2-2.5 mm long; glumes about _ as long as the floret…***M. villiflora*** A.S. Hitchcock var. ***villosa*** (Swallen) Morden HAIRY MUHLY (hairy-flowered; shaggy-haired) [*Muhlenbergia villosa* Swallen]. Perennial; dry plains; known in New Mexico from a single collection in Otero County. Fig. 256.



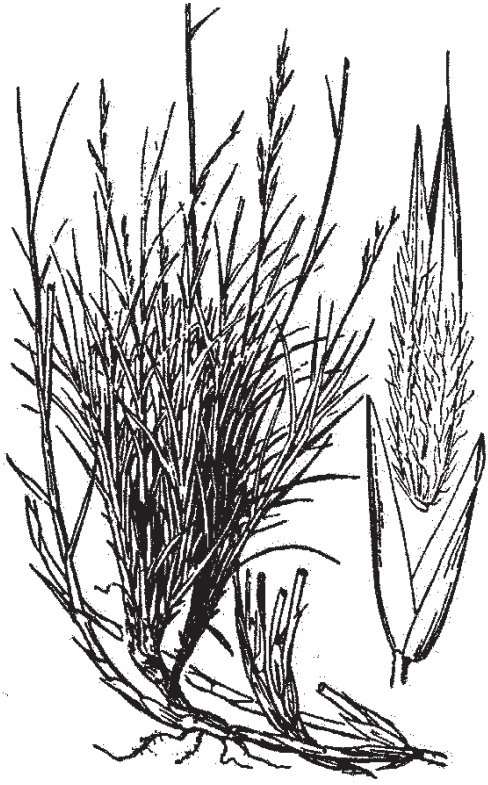
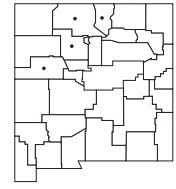


Fig. 257 *Muhlenbergia thurberi,* Thurber's Muhly

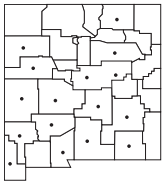
Fig. 258 *Muhlenbergia repens,* Creeping Muhly

28 Lemma 3-4 mm long; glumes shorter than to nearly as long as the floret…***M. thurberi*** (Scribner) Rydberg THURBER'S MUHLY (for George Thurber, botanist with the Mexican boundary survey). Perennial; dry hills in the northwestern region. Fig. 257.

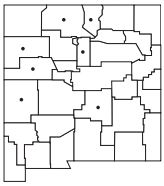


26 Lemma glabrous or scabrous only

29 Inflorescence usually included in the sheath at least below, with 9 nodes or fewer; ligules 0.5-1 mm long; lemmas about 3 mm long…***M. repens*** (Presl) A.S. Hitchcock CREEPING MUHLY (creeping). Perennial; flats, roadside swales, moist plains, widespread. The similar *M. utilis* (Torrey) A.S. Hitchcock, of high elevation wet meadows, has been confused with creeping muhly, and the name APAREJO GRASS has been misapplied to our common M. repens, but specimens of *M. utilis* have not been found in the state. Fig. 258.



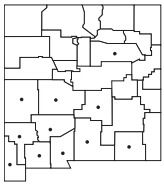
29 Inflorescence usually well-exserted from the sheath, with 11-12 nodes; ligules 1-2 mm long; lemmas 2-2.8 mm long…***M. richardsonis*** (Trinius) Rydberg MAT MUHLY (for Sir John Richardson, Scottish naturalist) [*Muhlenbergia squarrosa* Rydberg]. Perennial; mountain meadows and ciénegas; not commonly encountered. Fig. 259.



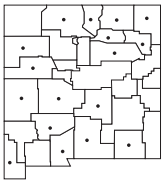
16 Plants tufted, or sometimes the bases decumbent and spreading, but lacking creeping rhizomes

30 Sheaths compressed-keeled; blades flat or folded

31 Panicles 20-40 cm long; plants 50-100 cm or more tall in large tussocks…***M. emersleyi*** Vasey BULLGRASS (for J.D. Emersley, botanical collector of the last century). Perennial; rocky hills and woodlands, mostly in the southern regions. Fig. 260.



31 Panicles 5-10 cm long; plants 20-60 cm tall in small tufts…***M. wrightii*** Vasey ex Coulter SPIKE MUHLY (for Charles Wright, botanical collector for Asa Gray). Perennial; plains and grassy hills and slopes, widespread. Fig. 261.



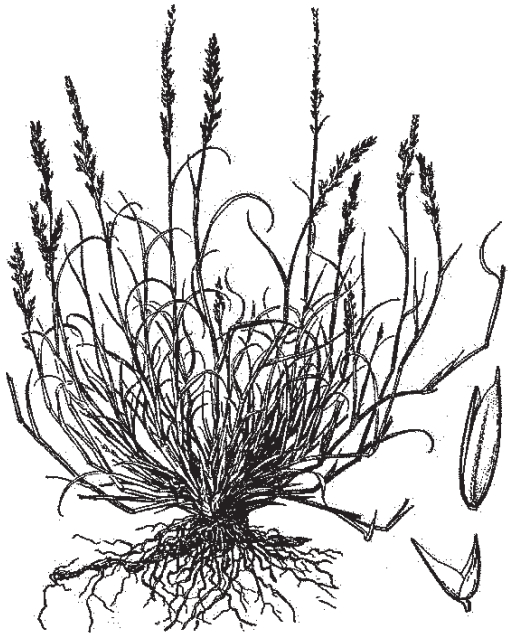


Fig. 259 *Muhlenbergia richardsonis,* Mat Muhly

Fig. 260 *Muhlenbergia emersleyi,* Bullgrass

Fig. 261 *Muhlenbergia wrightii,* Spike Muhly

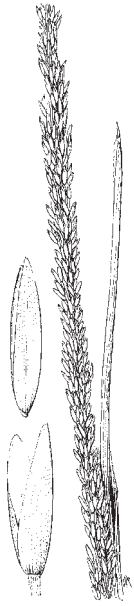


Fig. 262 *Muhlenbergia rigens,* Deergrass

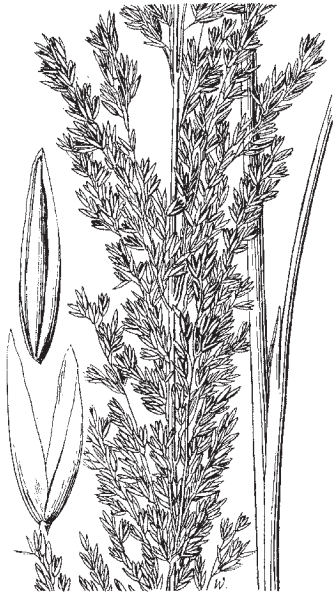


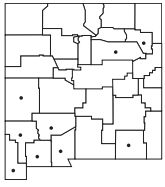
Fig. 263 *Muhlenbergia longiligula,* Longtongue Muhly

30 Sheaths rounded on the back; blades usually becoming rolled

32 Lemma awns 0-4(5) mm long

33 Glumes, excluding the awn, 3/4 or more the length of the floret

34 Ligules 1-3 mm long…***M. rigens*** (Bentham) A.S. Hitchcock
DEERGRASS (stiff, rigid) [*Muhlenbergia mundula* I.M. Johnston]. Perennial; dry woodland stream banks, rocky canyons, gullies, common in the southwestern region but in scattered locales elsewhere, also found increasingly as an ornamental landscape plant. Native Americans of the southwest would use the growth after burning in basketry. Fig. 262.



34 Ligules 6-20 mm long…***M. longiligula*** A.S. Hitchcock
LONGTONGUE MUHLY (long ligule). Perennial; canyons and rocky slopes, mostly in the southwestern region. Fig. 263.

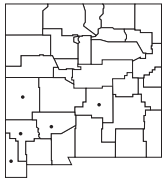
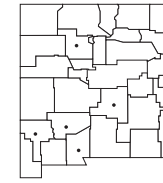


Fig. 264 *Muhlenbergia metcalfei,* **Metcalfe's Muhly**

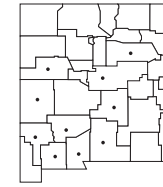
Fig. 265 *Muhlenbergia dubia,* **Pine Muhly**

33 Glumes, excluding the awn, 2/3 or less the length of the floret

35 Blades 25-60 cm long



36 Awns (3)5-10 mm long, sometimes longer; panicles reddish; glumes 1.5-2 mm long… ***M. metcalfei*** M.E. Jones METCALFE'S MUHLY (for Orrick Baylor Metcalfe [d. 1936], New Mexico botanical collector and student of E.O. Wooton). Perennial; canyons, rocky slopes, woodlands. Fig. 264.



36 Awns 0-4(5) mm long; panicles greenish; glumes 2-3 mm long…***M. dubia*** Fournier ex Hemsley PINE MUHLY (uncertain) [*Muhlenbergia acuminata* Vasey]. Perennial; woodlands, rocky mountain slopes, canyons. It is now being used as an ornamental, but not nearly as common as such in New Mexico as M. rigens. Fig. 265.

Fig. 266 *Muhlenbergia arizonica,* Arizona Muhly

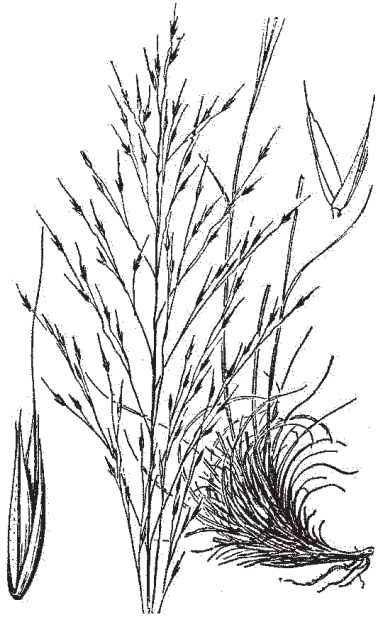


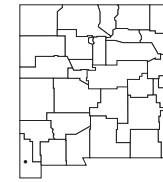
Fig. 267 *Muhlenbergia torreyi,* Ring Muhly

Fig. 268 *Muhlenbergia arenicola,* Sand Muhly

35 Blades 1-15 cm long

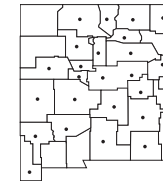
37 Mature panicles open, loosely flowered, 4-15 cm wide, at least the primary branches widely spreading

38 Blades flat, the margins white-cartilaginous…***M. arizonica*** Scribner ARIZONA MUHLY (of Arizona). Perennial; moist plains and rocky hillsides in the bootheel region, uncommon. This species might be confused with *Muhlenbergia arenacea*, but that has prominent auriculate extensions on the side of the ligule and awnless florets. Fig. 266.

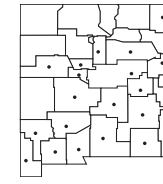


38 Blades mostly rolled or folded, rarely flat, the margins not white-cartilaginous

39 Blades strongly arcuate, curving, less than 1 mm wide, 1-3(4) cm long; leafy portion 1/8 to 1/16 the length of the plant; lateral pedicels commonly longer than the spikelets…***M. torreyi*** (Kunth) A.S. Hitchcock ex Bush RING MUHLY (for John Torrey, physician-botanist of the mid-1800s). Perennial; sandy plains, nearly throughout the state. An abundance of this grass often indicates an over-grazed range. Fig. 267.



39 Blades rather straight, 1-2 mm wide, 3-15 cm long; leafy portion 1/3 to 1/2 the length of the plant; lateral pedicels commonly shorter than the spikelet…***M. arenicola*** Buckley SAND MUHLY (sand-loving). Perennial; sandy plains, widespread. Fig. 268.



37 Mature panicles narrow, densely flowered, 0.5-2 cm wide, the primary branches erect to appressed

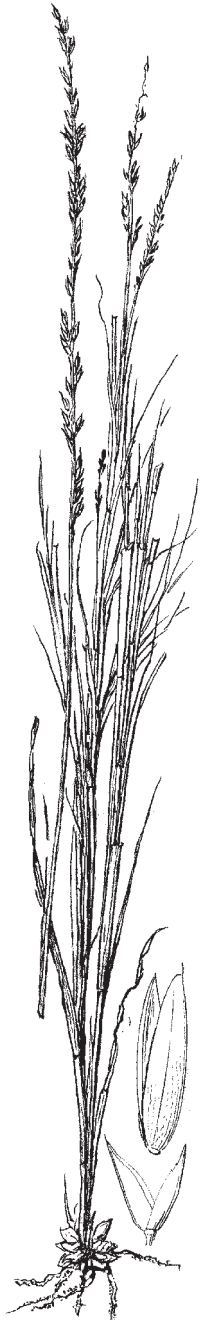
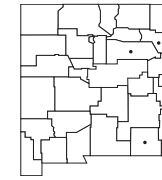
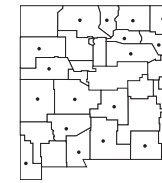


Fig. 269 *Muhlenbergia cuspidata,* Plains Muhly

Fig. 270 *Muhlenbergia capillaris,* Pink Muhly



40 Ligules 0.5 mm long; glumes gradually acute; stems minutely pubescent…***M. cuspidata*** (Torrey ex Hooker) Rydberg PLAINS MUHLY (furnished with a point). Perennial; plains and gravely slopes in the eastern region, uncommon. Cleistogamous spikelets may be borne in the basal sheaths. Fig. 269.

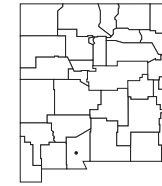


40 Ligules 1-2(4) mm long; glumes abruptly acute; stems minutely stiff-pubescent…***M. wrightii*** Vasey [see lead 31, above]. Widespread and much more common than the previous.

32 Lemma awns 7-40 mm long

41 Awns 7-10 mm long

42 Blades 20-60 cm long



43 Glumes awned; panicles 8-20 cm wide or more; exotic ornamental plants…**M. capillaris*** (Lamarck) Trinius PINK MUHLY (hair-like). Perennial; introduced as an ornamental landscape plant, not known to escape to the wild. Plants have very diffuse, reddish panicles, the spikelets on long capillary pedicels much longer than the spikelets. Native to the prairies and woodland openings east of New Mexico. Fig. 270.

43 Glumes awnless; panicles 2-4 cm wide; native plants…***M. metcalfei*** M.E. Jones [see lead 36, above]

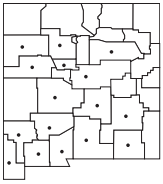
42 Blades 1-14 cm long; glumes acute to aristate

44 Blades mostly 1-3 cm long; glumes acute; lemmas and paleas sparsely but noticeably pilose on the lower half…***M. arsenei*** A.S. Hitchcock [see lead 20, above].

Fig. 271 *Muhlenbergia pauciflora,* New Mexico Muhly

Fig. 272 *Muhlenbergia spiciformis,* Long-Awn Muhly

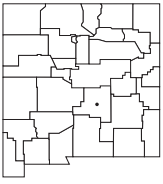
44 Blades mostly 4-14 cm long; glumes acuminate to aristate; lemmas and paleas glabrous or minutely scaberulous …***M. pauciflora*** Buckley NEW MEXICO MUHLY (few-flowered) [*Muhlenbergia neomexicana* Vasey]. Perennial; rocky slopes, ledges, and mountain outcrops, widespread. Plants have a characteristic bushy growth. Fig. 271.



41 Awns 10-40 mm long

54 Ligules 0.5-3 mm long

46 Glumes obtuse, 0.5-1 mm long; lemma awn 20-40 mm long…***M. spiciformis*** Trinius LONG-AWN MUHLY (spike-shaped) [*Muhlenbergia parviglumis* Vasey]. Perennial; canyons and moist woodlands, known only from Lincoln County. Fig. 272.



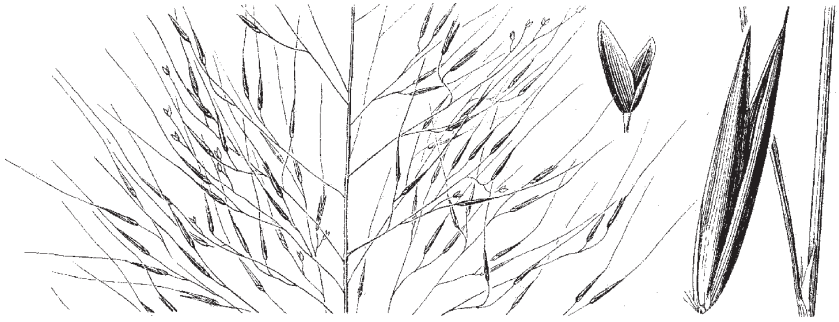
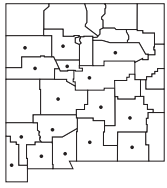


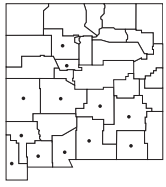
Fig. 273 *Muhlenbergia rigida,* Purple Muhly

46 Glumes acute to subaristate, 1-2 mm long; lemma awn mostly 10-15 mm long

47 Lemmas essentially glabrous, with only a few closely appressed callus hairs; ligules with lateral projections 1.5-3 mm long…***M. pauciflora*** Buckley [see lead 44, above].

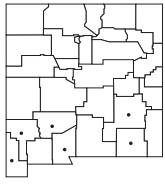


47 Lemmas pubescent on the lower half; ligules without lateral projections…***M. tenuifolia*** (Kunth) Trinius [see lead 5, above].



45 Ligules 3-15 mm long

48 Lemmas purple, scaberulous near the apex; glumes 1-1.3 mm long… ***M. rigida*** (Kunth) Trinius PURPLE MUHLY (stiff, rigid). Perennial; rocky hillsides, canyon slopes, and woodlands in the southern regions. Fig. 273.



48 Lemmas straw-colored, smooth and shining; glumes 1.5-2.1 mm long…***M. setifolia*** Vasey CURLYLEAF MUHLY (with bristle- or hair-like leaves). Perennial; dry gravely plains and hillsides, juniper woodlands, in the southern regions. Fig. 274.

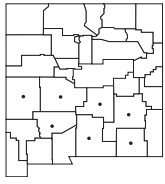


Fig. 274 *Muhlenbergia setifolia,* Curlyleaf Muhly

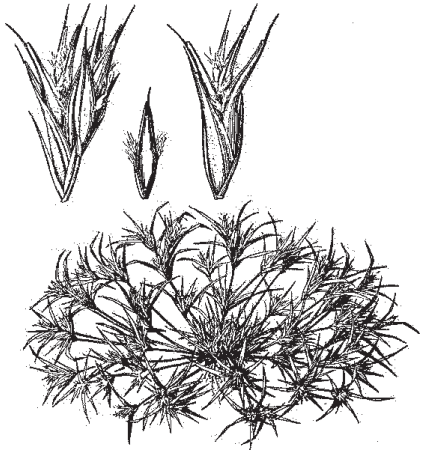
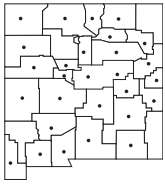


Fig. 275 *Munroa squarrosa,* False-Buffalograss

MUNROA FALSE BUFFALOGRASS

[for William Munro (d. 1880), British botanist-agrostologist and general in the Indian colonial army] (Chloridoideae: Eragrostideae)

Mat-forming annual grasses with stolons. Blades flat with white margins. Spikelets several-flowered, awned. Lemmas 3-nerved. Originally spelled "Monroa," but this is an obvious orthographic error that need not be perpetuated.



M. squarrosa (Nuttall) Torrey FALSE-BUFFALOGRASS (curled back) [*Munroa squarrosa* (Nuttall) Torrey var. *floccuosa* Vasey ex Beal]. Annual, producing short stolons; sandy plains and flats throughout the state. Plants seem to be more similar to *Dasyochloa* than to *Buchloë*, and an abundance indicates an abused range. Some plants are found with a white, wooly covering, appearing like floccose hairs. There have been two explanations for this: 1) that these are the remains of egg cases of a species of wooly aphid (see Hitchcock, A.S. & A. Chase. 1951. Manual of the Grasses of the United States. 2nd ed. USDA Misc. Publ. 200. 1051 p.); and 2) that these are hairlike, water soluble crystals that wash off in water, the product of transpiration and evaporation (see Parodi, L. R. 1934. Contribucion al Estudio de las gramineas del genero *Munroa*. Rev. Museo La Plata. XXXIV:171-193). This ought to be easily tested by a curious naturalist. The variety *floccuosa* was described from such a specimen. Fig. 275.

Fig. 276 *Nassella tenuissima,* Mexican Feathergrass

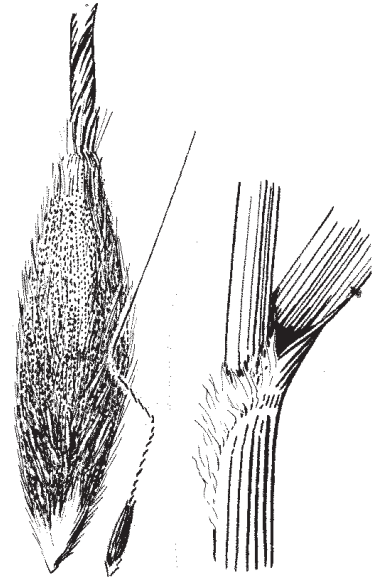


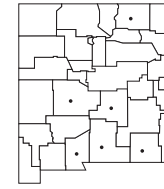
Fig. 277 *Nassella viridula,* Green Needlegrass

NASSELLA NEEDLEGRASS

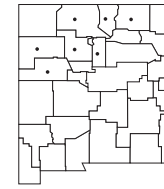
[L. *nassa*, a wicker basked with a narrow neck used for catching fish, referring to the shape of the lemma in lateral view] (Pooideae: Stipeae)

Inflorescence a panicle. Spikelets 1-flowered, disarticulating above the translucent glumes. Lemmas rolled around the palea and flower, the margins strongly overlapping, awned from the tip, with a prominent, sharp callus at the base. Paleas short, glabrous, lacking veins. Species of *Nassella* were formerly recognized in the genus *Stipa*, which is now strictly Eurasian.

1 Awns 4-5 cm long or more, capillary; lemmas 2-3 mm long; summit of sheath glabrous or obscurely pubescent…***N. tenuissima*** (Trinius) Barkworth MEXICAN FEATHERGRASS (very slender) [*Stipa tenuissima* Trinius]. Perennial; rocky slopes and woodlands, mostly in the southern regions. Plants are being sold in nurseries and are gaining popularity as an ornamental grass. The seedheades become tangled in the wind, forming very dense balls of florets. Fig. 276.



1 Awns 2-3 cm long, stout; lemmas 4-6 mm long; summit of sheath with a conspicuous tuft of hair…***N. viridula*** (Trinius) Barkworth GREEN NEEDLEGRASS (somewhat green) [*Stipa viridula* Trinius]. Perennial; grassy hills, plains, and flats in the northern regions. Fig. 277.



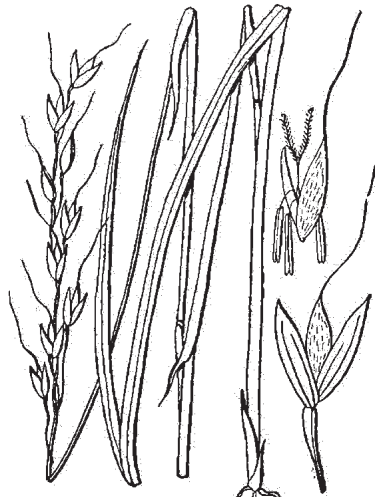


Fig. 278 *Oryzopsis asperifolia,* Mountain Ricegrass

ORYZOPSIS RICEGRASS

[Gr. *oruza*, rice, and *opsis* similar to, alluding to the similarity of some species to rice]
(Pooideae: Stipeae)

Inflorescence a panicle. Spikelets one-flowered, disarticulating above the thin, translucent glumes. Floret hard when mature, the lemma rolled around the palea and flower and the margins slightly overlapping, awned. The reorganization of the Stipeae leaves only a single species of *Oryzopsis* in New Mexico [see lead c, below]. Species formerly placed in *Oryzopsis* may be keyed by the following:

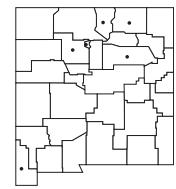
a Glumes 2.5-3.5 mm long; lemmas glabrous or pubescent, the margins not overlapping, hence the palea is exposed (*Piptatherum*)

b Lemmas pubescent, the awn 1-2 mm long or absent…see *Piptatherum pungens*

b Lemmas mostly glabrous, the awn 5-10 mm long (but deciduous in age)…see *Piptatherum micranthum*

a Glumes 4-10 mm long; lemmas sparsely to copiously pubescent, the margins overlapping so the palea is hidden

c Blades flat or loosely rolled; lemma body sparsely pubescent with short appressed hairs, the callus very densely ringed with short hairs…***Oryzopsis asperifolia*** Michaux MOUNTAIN RICEGRASS (rough-leaved). Moist wooded sites in the mountains, usually in the shade among conifers, often flowering very early. Its large grains have been used from time to time for flour, as witnessed by Frederick Pursh's observation of 1814: "I consider it worthy of the attention of farmers as the considerable large seeds contain the finest flour of any grain I know" (Fl. Amer. Sept. 1:60). Fig. 278.



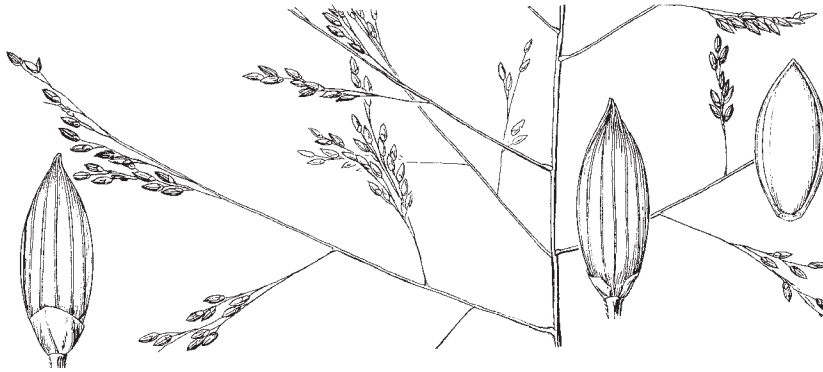


Fig. 279 *Panicum dichotomiflorum,* **Fall Panicum**

c Blades rolled; lemma body densely long pubescent as is the callus (*Achnatherum*)

d Panicle branches divaricately spreading; awn of the lemma 3-6 mm long…see *Achnatherum hymenoides*

d Panicle branches erect to ascending; awn of the lemma 7-18 mm long…see *Achnatherum xbloomeri*.

PANICUM PANICUM

[L. *panis*, bread] (Panicoideae: Paniceae)

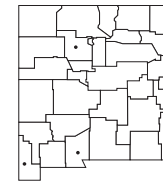
Inflorescence a panicle. Spikelets disarticulating below the glumes. Upper floret hardened, enclosing the grain. The cool-season members of this genus, with spring and summer growth phases, have been transferred to the genus *Dichanthelium*. Some annual species formerly included in *Panicum* may now be found in *Urochloa*.

1 Plants annual

2 Lemma of the upper floret wrinkled; spikelets nearly sessile on simple or nearly simple primary branches…see *Urochloa*

2 Lemma of the upper floret smooth, not wrinkled; spikelets pedicelled in a usually open freely rebranched panicle

3 First glume about 1/4 as long as the spikelet, obtuse or rounded at the tip; stems as much as 1 m long, coarse and often somewhat trailing…****P. dichotomiflorum*** Michaux FALL PANICUM (flower divided in two). Annual; moist stream banks, meadows, roadsides, not common. Culms are often zig-zag and somewhat flattened. Fig. 279.



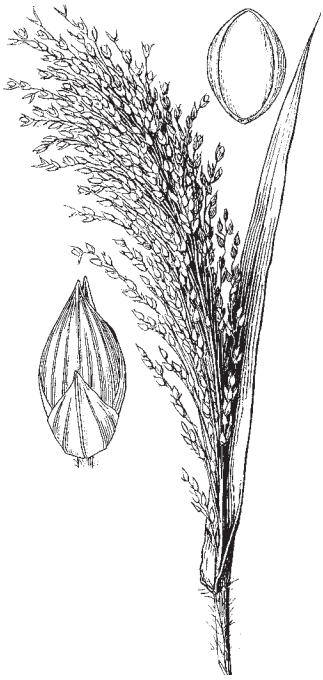


Fig. 280 *Panicum miliaceum,* Broomcorn Millet

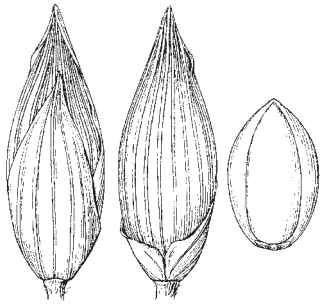


Fig. 281 *Panicum pampinosum,* Southwestern Witchgrass

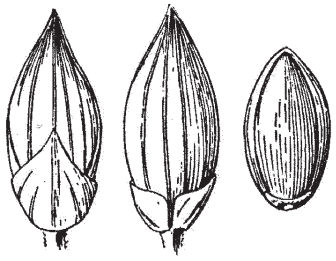
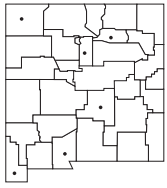


Fig. 282 *Panicum hillmanii ,* Hillman's Panicum

3 First glume more than 1/4 as long as the spikelet, acute to acuminate at the tip; stems various

4 Spikelets 4-6 mm long; panicle often nodding at maturity…****P. miliaceum*** Linnaeus BROOMCORN MILLET, HOG MILLET, PROSO MILLET (like millet). Annual; occasionally cultivated, adventive in waste places, sometimes found under bird feeders. The term millet is used for many grasses with edible grains, including species of *Echinochloa, Eleusine, Eragrostis, Panicum, Paspalum, Setaria,* and *Sorghum*. Fig. 280. With two subspecies:

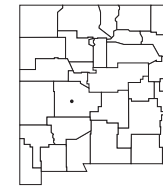


a Mature upper florets blackish, disarticulating at maturity; culms 0.7-2 m tall; panicles mostly erect, with well-developed axillary pulvini...subsp. ***ruderale*** (M. Kitagawa) Tzvelev A weed in corn and crop fields, the wild form.

a Mature upper florets straw- to orange-colored, not disarticulating; culms 0.2-1.2 m tall; panicles usually nodding, lacking axillary pulvini...subsp. ***miliaceum*** This is the subspecies used in bird seed, the domestic form.

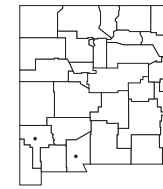
4 Spikelets less than 4 mm long; panicle usually not nodding

5 Mature panicles 2-3 cm long and congested among the leaves, never exceeding the foliage; plants 2-8 cm tall…***P. mohavense*** Reeder MOJAVE PANICUM (of Mohave). Annual; limestone ridges of the Oscura Mts, Socorro County.



5 Mature panicles longer, exceeding the leaves; plants usually taller

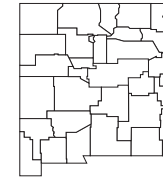
6 Panicle spike-like, the branches ± appressed to the main axis; spikelets globose; first glume 4/5 the length of the spikelet…***P. pampinosum*** A.S. Hitchcock & Chase SOUTHWESTERN WITCHGRASS (leafy, branching) [*Panicum hirticaule* Presl var. *pampinosum* (A.S. Hitchcock & Chase) Beetle]. Annual; plains and washes in the southwestern region, uncommon. Fig. 281.



6 Panicle open, lax, the branches divergent; spikelets various

7 Mature panicles more than half the length of the entire plant; panicle axils pubescent

8 Panicles remaining intact; palea of the lower floret present; lemma of the upper floret with a crescent-shaped scar at the base…***P. hillmanii*** Chase HILLMAN'S PANICUM (for Frederick Hebard Hillman, USDA botanist). Annual; roadsides, ditches, irrigated pastures on the eastern plains. Fig. 282.



8 Panicles breaking away at the peduncle and dispersing as a unit; palea of the lower floret absent (lodicules may be mistaken for a palea); lemma of the upper floret without a crescent-shaped scar at the base…***P. capillare*** Linnaeus COMMON WITCHGRASS (hair-like). Annual; roadsides and other disturbed sites. Some populations may accumulate toxic levels of nitrates. Panicles turn a bright red in the fall and are unmistakable along the road. The origin of the name 'witchgrass' is unknown, perhaps alluding to the broom-like panicles? Fig. 283. We have two varieties:

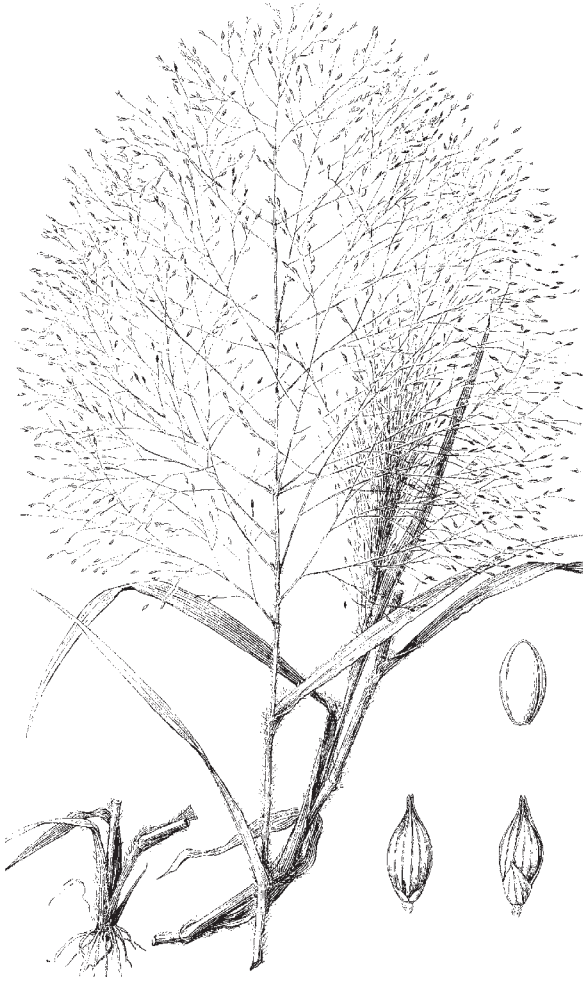
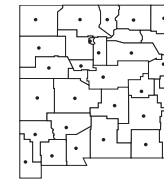


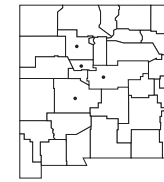
Fig. 283 *Panicum capillare,* Common Witchgrass

Fig. 284 *Panicum stramineum,* Arizona Witchgrass

a Spikelets (2.4)2.5-2.9(3.1) mm long; mature hardened fruit case 1.5 times as long as broad; widespread throughout New Mexico…var. ***brevifolium*** Rydberg & Shear (short-leaved) [*Panicum capillare* var. *occidentale* Rydberg]. Very common throughout the entire state.



a Spikelets 3-4(4.5) mm long; mature hardened fruit case 2 times as long as broad; infrequent in central New Mexico…var. ***barbipulvinatum*** (Nash) McGregor (bearded cushion) [*Panicum barbipulvinatum* Nash]. Much less common, from the central counties.

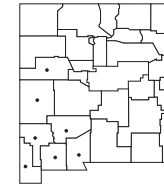


7 Mature panicles not more than 1/3 the length of the entire plant; panicle axils glabrous

9 Palea of lower floret well developed, as long as the upper floret; first glume 1/3-1/2 the length of the spikelet… ***P. stramineum*** A.S. Hitchcock & Chase ARIZONA WITCHGRASS (straw-colored) [*Panicum hirticaule* Presl var. *stramineum* (A.S. Hitchcock & Chase) Beetle]. Annual; damp soil and washes; bootheel region, if present in New Mexico. Included in previous editions of this guide, but no validating specimens from New Mexico can be located. Fig. 284.

9 Palea of lower floret 1/2 or less the length of the upper floret; first glume 1/2-3/4 the length of the spikelet

10 Upper floret ovoid to ellipsoid, not stipitate, lacking thickenings at the base, but with 2 small scars, the base with a cavity when mature and the palea usually protruding outward …***P. hirticaule*** Presl MEXICAN WITCHGRASS (hairy-stemmed). Annual; rocky or sandy slopes, plains, and washes, mostly in the southwestern regions, common. Fig. 285.



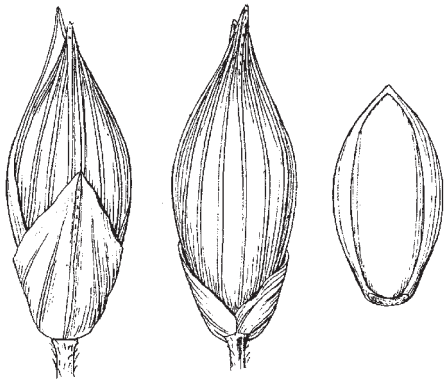
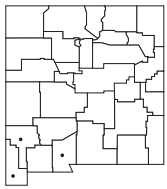


Fig. 285 *Panicum hirticaule,* Mexican Witchgrass

10 Upper floret obovoid at maturity, shortly stipitate, with 2 fleshy thickenings at the base, the base lacking a cavity and the palea not protruding but even with the lemma…***P. alatum*** Zuloaga & Morrone WINGED WITCHGRASS (winged). Annual; sandy to clayey disturbed ground, roadsides, swales, in the bootheel region. Plants belonging to this species were formerly treated in *Panicum hirticaule*. With two varieties:



a Upper floret smooth, shiny, not papillate except at the tip of the palea…var. ***minus*** (Andersson) Zuloaga & Morrone (smaller, inferior) [*Panicum hirticaule* Presl var. *minus* Andersson].

a Upper floret densely papillate all over…var. ***alatum***

1 Plants perennial

11 Terminal spikelet of each branch subtended by one or more bristles (vestigial branchlets)…see *Setaria*

11 Terminal spikelets not subtended by a bristle

12 Plants with two distinct growth phases: during the cool season producing a basal rosette of short broad blades and terminal panicles; during the warm season producing much-branched lateral shoots with small axillary panicles…see *Dichanthelium*

12 Plants annual or perennial, with a single growth phase; basal rosettes not produced; flowering during the warm season only

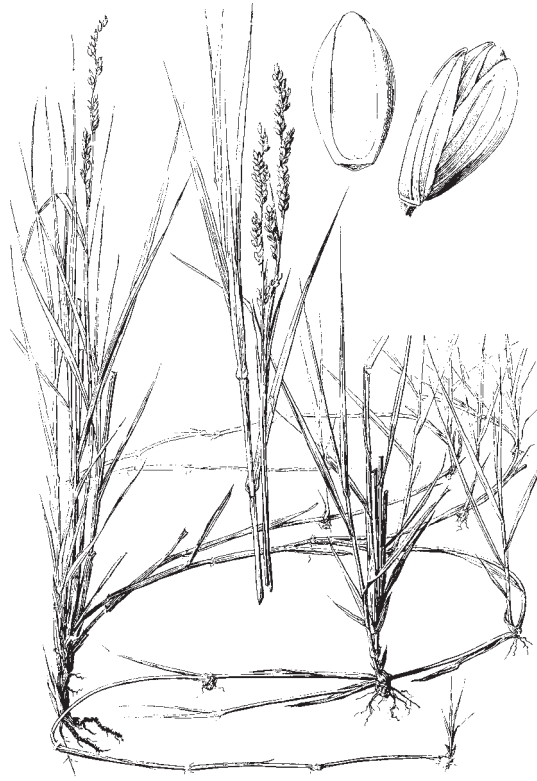
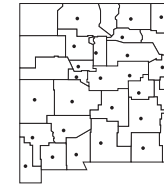


Fig. 286 *Panicum obtusum,* **Vine Mesquite**

13 First glume about as long as the second; primary panicle branches mostly unbranched; long stolons developed…***P. obtusum*** Kunth VINE MESQUITE (blunt). Perennial, the long stolons with conspicuously hairy nodes; heavy soils of swales, playas, flats, and low spots. Sometimes planted to control soil erosion, widespread. The name "mesquite grass" has been applied to many grasses growing on mesquite range, especially in Texas. Thus, we have vine mesquite and curly mesquite (*Hilaria belangeri*); sideoats grama and bush muhly have also been called "mesquite grass." Fig. 286.



13 First glume shorter than the second; primary panicle branches often rebranched; stolons not developed

14 Spikelets 4-8 mm long

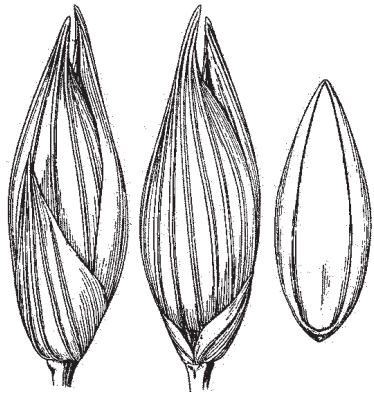


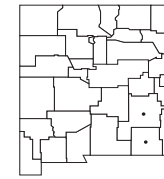
Fig. 287 *Panicum havardii,* Havard's Panicum

Fig. 288 *Panicum amarum,* Bitter panicum

Fig. 289 *Panicum virgatum,* Switchgrass

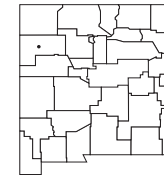
Fig. 290 *Panicum hallii,*
Hall's Panicum

15 Spikelets 6-8 mm long…***P. havardii*** Vasey HAVARD'S PANICUM (for Valery Havard, French-born surgeon in the Army). Perennial; sandy plains and dunes on the eastern plains. Fig. 287.



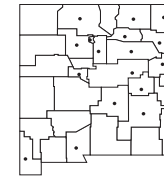
15 Spikelets 4-5(6) mm long

16 Panicles narrow, contracted…****P. amarum*** Elliott BITTER PANICUM (bitter). Perennial; planted for erosion control near Zuni, Cibola County. Native to the sandy beaches and plains of the Atlantic and Gulf coasts. Fig. 288.

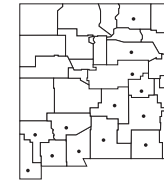


16 Panicles open, not contracted

17 Plants with stout scaly rhizomes; blades usually not curling…***P. virgatum*** Linnaeus SWITCH-GRASS (broom-like). Perennial; moist plains or meadows, roadsides, mostly in the eastern regions. An excellent forage grass where abundant, though it does have the rare capacity for photosensitisation. Occasionally used as an ornamental, for which it has been used for decades in Europe, and is now gaining in popularity in the United States. Fig. 289.



17 Plants tufted, lacking rhizomes; blades often curling…***P. hallii*** Vasey HALL'S PANICUM (for Elihu Hall, botanical collector from Illinois). Perennial; plains and rocky slopes, often on limestone, also clayey swales and flats. Earlier editions included Panicum lepidulum A.S. Hitchcock & Chase from Mexico and Central America that would key here. The report of *P. lepidulum* was based on a specimen subsequently determined to be *P. hallii.* Fig. 290. We have two varieties:



a Spikelets mostly appressed along the primary panicle branches; sheaths mostly papillose-hirsute…var. ***hallii***. Eastern and southern plains, widespread.

a Spikelets mostly spreading from the panicle branches, the panicle open; sheaths mostly glabrous…var. ***filipes*** (Scribner) Waller (thread-like base). Dry plains in the southeastern corner of the state, uncommon.

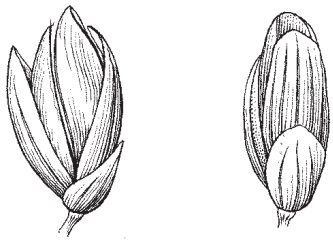
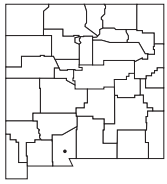


Fig. 291 *Panicum hians,* Gaping Panicum

Fig. 292 *Panicum antidotale,* Blue Panicum

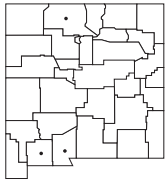
14 Spikelets less than 4 mm long

18 Palea of the lower floret inflated, enlarged, obovate…****P. hians*** Elliott GAPING PANICUM (open, gaping) [*Steinchisma hians* (Elliott) Nash]. Perennial; collected once in Las Cruces in 1895, undoubtedly adventive then and not persisting. Native to the eastern coastal plains. Fig. 291.



18 Palea of the lower floret not inflated as above

19 Stems hard and somewhat woody in age, becoming much-branched above; basal buds silky long-pubescent; spikelets 2.5-3 mm long…****P. antidotale*** Retzius BLUE PANICUM (an antidote for starving, referring to its forage value). Perennial; introduced for range restoration from India. Scales of the rhizome are densely brownish-pilose. Plants may accumulate toxic levels of nitrates, especially after fertilization and irrigation. Fig. 292.



19 Stems not hard and woody, or if so then not much-branched above; basal buds not silky long-pubescent

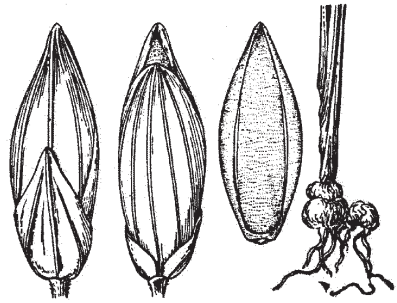
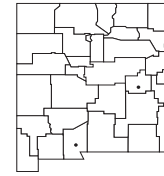


Fig. 293 *Panicum bulbosum,* Bulb Panicum

20 Spikelets appressed and usually closely clustered on simple or nearly simple panicle branches or on short spur branches

21 Lower floret male, producing anthers; plant usually dark green, the blades rarely curling…****P. coloratum*** Linnaeus KLEINGRASS (colored). Perennial; introduced for irrigated pastures, escaping along roadsides. Plants may cause severe cases of photosensitivity ("big-head") in sheep.

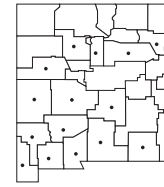


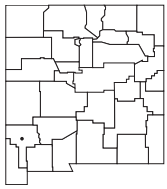
21 Lower floret neuter, anthers not produced; plants usually bluish green, the blades often curling…***P. hallii*** Vasey [see lead 16, above]

20 Spikelets not appressed on simple panicle branches, the pedicels and branches spreading and open

22 Lower floret finely wrinkled; sheaths keeled

23 Culms swollen and bulb-like at the base, only slightly compressed; rhizomes, if present, short and thin; spikelets 2.8-5.4 mm long; lower glumes 1.2-3.5 mm long, 1/2-4/5 as long as the spikelets…***P. bulbosum*** Kunth BULB PANICUM (having a bulb, in reference to the corm) [*Panicum bulbosum* Kunth var. *minus* Vasey]. Perennial; canyon bottoms and moist slopes in the mountains and foothills. Fig. 293.





23 Culms not swollen and bulb-like at the base, strongly compressed; rhizomes long and stout; spikelets 2.5-3.4 mm long; lower glumes usually less than 1.7 mm long, up to 1/2 as long as the spikelets... ***P. plenum*** Hitchcock & Chase CANYON PANICUM (full). Moist canyons and shaded sites in the southern mountains and foothills. Only obscurely differentiated from the previous and apparently uncommon in New Mexico.

22 Lemma of upper floret smooth and shiny; sheaths not keeled

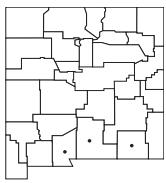
24 Plants with stout, scaly rhizomes; blades usually not curling…***P. virgatum*** Linnaeus [see lead 16, above]

24 Plants lacking rhizomes; blades often curling…***P. hallii*** Vasey [see lead 16, above]

PAPPOPHORUM PAPPUSGRASS

[Gr. *pappos*, grandfather, and *phoros*, bearing, alluding to the crown of long hairs (awns) on the florets] (Chloridoideae: Pappophoreae)

Inflorescence a narrow, spike-like panicle. Spikelets several-flowered, disarticulating above the large, translucent, one-nerved glumes. Lemmas with several awns.



P. vaginatum Buckley WHIPLASH PAPPUSGRASS (sheathed) [*Panicum mucronulatum* of numerous North American authors]. Perennial; infrequent in the southern plains and foothills. Fig. 294.

PASPALUM PASPALUM

[Gr. *paspalos*, a kind of millet] (Panicoideae: Paniceae)

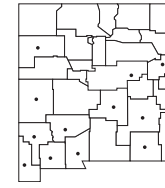
Inflorescence a panicle of spike-like branches. Spikelets borne on one side of the panicle branch, disarticulating below the glumes, mostly flattened on one side and convex on the other, awnless. Upper floret hardened, enclosing the grain.

1 Inflorescence branches 2 in number, attached less than 1 cm apart (1 or 2 additional branches occasionally present below)

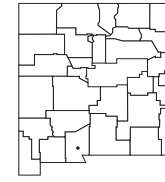
Fig. 294 *Pappophorum vaginatum,* Whiplash Pappusgrass

Fig. 295 *Paspalum distichum,* Knotgrass

2 Second glume and lemma of lower floret pubescent (sometimes obscurely so); ditchbanks and sloughs…***P. distichum*** Linnaeus KNOTGRASS (two-rowed) [*Paspalum distichum* var. *indutum* Shinners]. Perennial; weedy along distchbanks and ponds, slow-moving streams and sloughs; widespread in the southern half of the state. Forms with densely pilose sheaths were named var. *indutum* Shinners. Fig. 295.



2 Second glume and lemma of lower floret glabrous; planted for lawns and turf…*****P. vaginatum*** Swartz SEASHORE PASPALUM (sheathed). Perennial; infrequently grown as a turf grass in the southern communities, gaining in popularity. Native to the coastal regions from North Carolina to Texas. Fig. 296.



1 Inflorescences branches 1-numerous, when 2 in number then the branches more than 1 cm apart

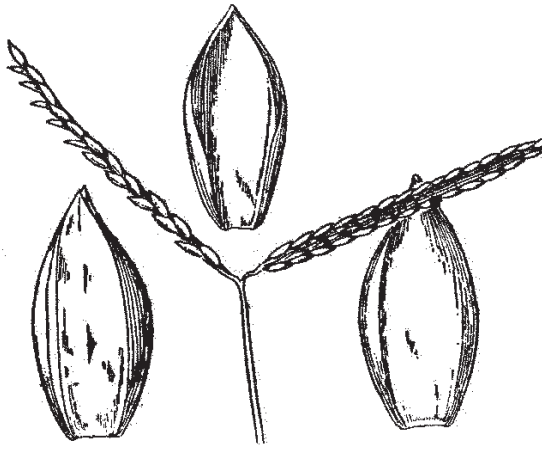


Fig. 296 *Paspalum vaginatum,* Seashore Paspalum

Fig. 297 *Paspalum dilatatum,* Dallisgrass

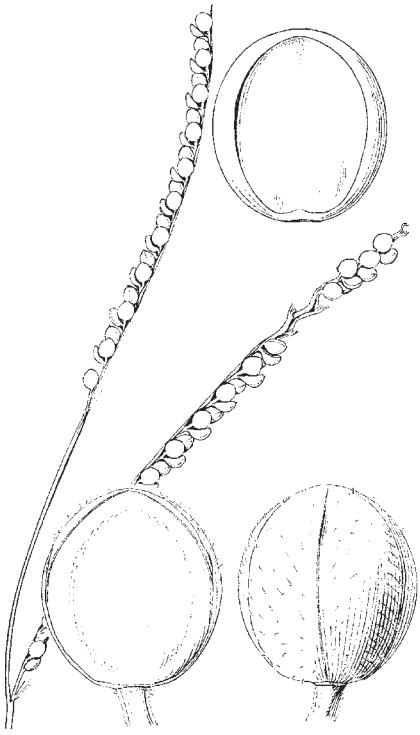


Fig. 298 *Paspalum stramineum,* Sand Paspalum

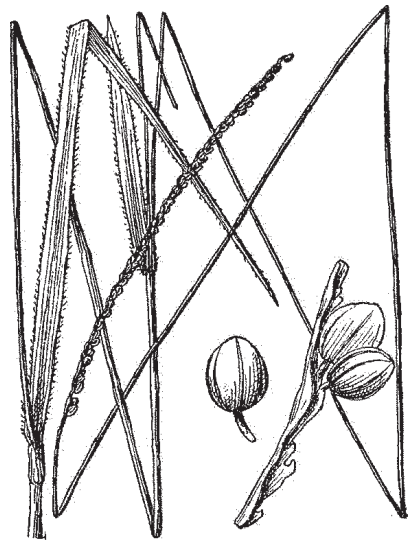
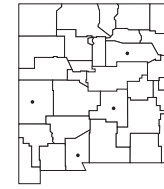


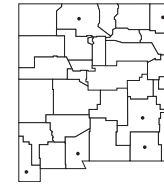
Fig. 299 *Paspalum ciliatifolium,*
Fringeleaf Paspalum

3 Spikelets 3-4 mm long, the margins conspicuously ciliate with soft hairs…****P. dilatatum*** Poiret DALLISGRASS (spread-out, extended). Perennial; introduced as a pasture grass about 1875 and persisting along roadsides and in old moist fields and waste places. It seems to be declining in popularity for irrigated pastures, at least in the west. Fig. 297.



3 Spikelets 1.5-2.6 mm long, the margins glabrous or minutely pubescent…***P. setaceum*** Michaux PASPALUM (having a bristle). Perennial; sandy plains and dunes, in scattered locales, but more frequent on the eastern plains. We have two varieties:

a Surface of blades pubescent; lower lemmas lacking evident midnerves…var. ***stramineum*** (Nash) Banks SAND PASPALUM (straw-colored) [*Paspalum stramineum* Nash]. Fig. 298.



a Surface of blades glabrous or nearly so, excluding the margins and midrib which are pubescent; lower lemmas with evident midnerves…var. ***ciliatifolium*** (Michx.) Vasey FRINGELEAF PASPALUM (fringed-leaf) [*Paspalum ciliatifolium* Michaux]. Fig. 299.

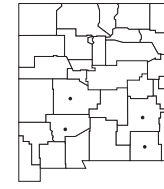


Fig. 300 *Pennisetum villosum,* Feathertop

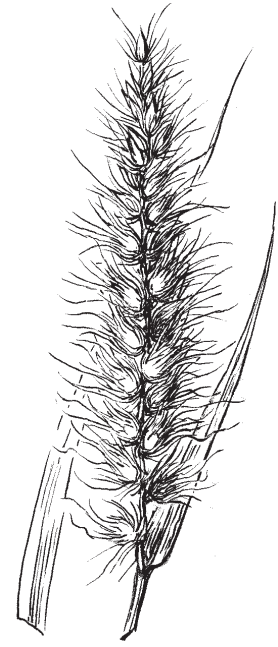


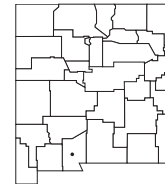
Fig. 301 *Pennisetum ciliare,* Buffelgrass

PENNISETUM FOUNTAINGRASS

[L. *penna*, feather, and *seta*, bristle, alluding to the plumose bristles of some species]
(Panicoideae: Paniceae)

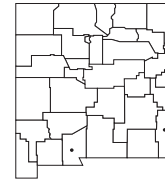
Inflorescence spike-like, bristly. Spikelets concealed within bristly burs, which fall from the main axis. *Pennisetum glaucum* (Linnaeus) R. Brown (PEARL MILLET) has been widely cultivated for food since prehistoric times in tropical Africa and Asia.

1 Panicles white to tawny, ovoid; longer bristles 4-5 cm long…****P. villosum*** R. Brown ex Fresenius FEATHERTOP (wooly). Perennial; cultivated as an ornamental landscape grass and not known to escape. Fig. 300.



1 Panicles purplish or rosy, generally elongate; longer bristles 1-3 cm long

2 Bristles 0.5-1 cm long; plants sprawling, escaped to the wild, not grown for ornament…****P. ciliare*** (Linnaeus) Link BUFFELGRASS (hairy) [*Cenchrus ciliaris* Linnaeus]. Perennial; adventive in a few places in the southern desert and foothill regions. Native to India and Africa and widely introduced in semi-tropical regions for forage. It is known to spread rapidly in more suitable environments. Fig. 301.



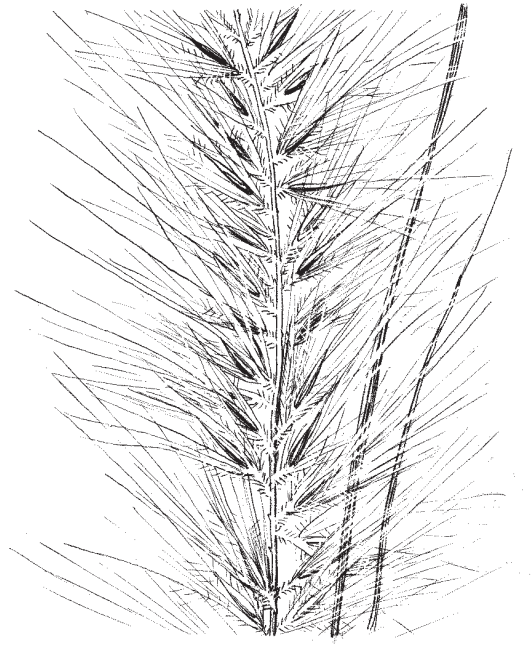
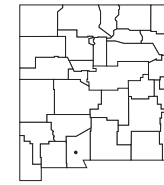


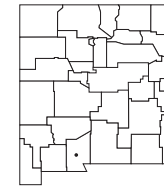
Fig. 302 *Pennisetum setaceum,* Fountaingrass

2 Bristles 2-3 cm long; plants in dense tussocks or clumps, not escaping to the wild, grown for ornament

3 Mid-culm blades 3-3.5 mm wide, convolute or folded, green, the midvein noticeable thickened…****P. setaceum*** (Forsskål) Chiovenda FOUNTAINGRASS (having a bristle) [*Pennisetum ruppelii* Steudel]. Perennial; introduced as an ornamental landscape plant in the southern regions; not known to escape to the wild. Fig. 302.



3 Mid-culm blades 6-11 mm wide, flat, green or more commonly reddish, the midvein not thickened…****P. advena*** Wippf & Veldkamp PURPLE FOUNTAINGRASS (foreign) [Cultivars 'Rubrum', 'Atropurpureum', 'Cupreum', & 'Purpureum' of *Pennisetum setaceum*]. Perennial; introduced as an ornamental landscape plant in the southern regions; not known to escape to the wild in New Mexico.



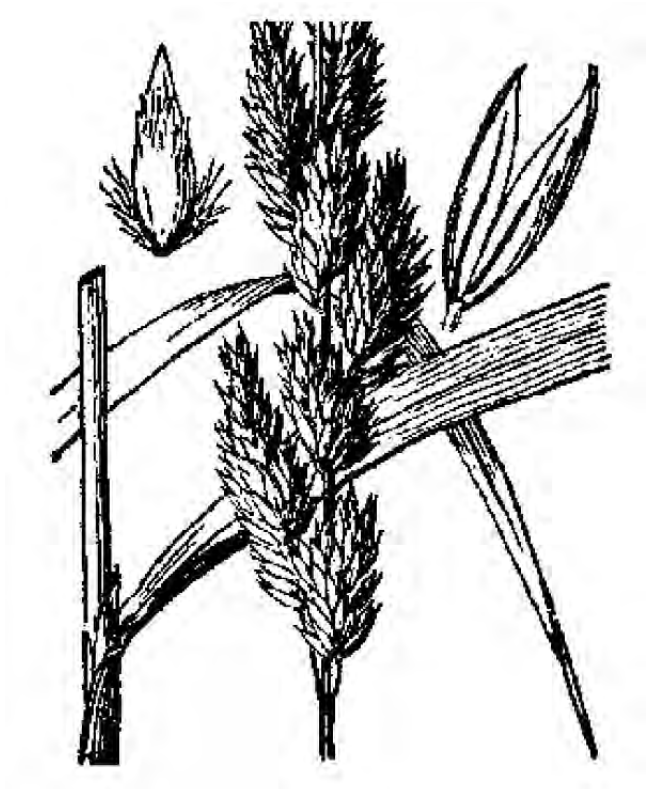


Fig. 303 *Phalaris arundinacea,* Reed Canarygrass

PHALARIS CANARYGRASS

[Gr. for a coot, so called because of the bald white head, referring to a grain enclosed in white scales] (Pooideae: Poeae)

Inflorescence a narrow panicle, often spike-like. Spikelets awnless, with one or two scales or bristle (representing vestigial florets) borne below the single well-developed, fertile floret. These are the canarygrasses, taking their name from *Phalaris canariensis*, the specific epithet meaning from the Canary Islands. The islands were named, not for the birds, but for their aboriginal dogs, the name deriving from the Latin, *Insulae Canariae*, dog islands, incorrectly Anglesized to Canary Islands.

1 Plants perennial, with rhizomes…***P. arundinacea*** Linnaeus REED CANARYGRASS (reed-like) [*Phalaroides arundinacea* (Linnaeus) Rauschert]. Perennial; marshy ground, sloughs, wet meadows, mostly in the northern regions. Forma *variegata* (Parnell) Cruce has whitish longitudinal stripes on the blades and is grown as an ornamental (as RIBBONGRASS or GARDENER'S GARTERS). Races of reed canarygrass from New Zealand are known to accumulate toxic alkaloids. Fig. 303.

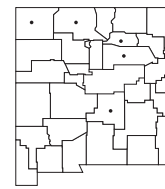
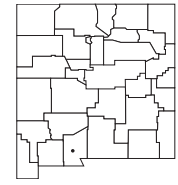


Fig. 304 *Phalaris minor,* Lesser Canarygrass

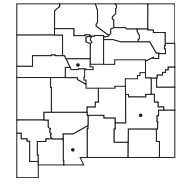
Fig. 305 *Phalaris canariensis,* Common Canarygrass

1 Plants annual, without rhizomes



2 Sterile floret (appearing as a scale) solitary, at the base and to one side of the large, fertile floret… ***P. minor*** Retzius LESSER CANARYGRASS (smaller). Annual; adventive weed escaping from agricultural fields in Doña Ana County, where it is sometimes grown for birdseed. Fig. 304.

2 Sterile florets (appearing as chaff or bristles) two, at the base and on both sides of the large, fertile floret

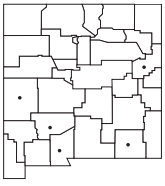


3 Glumes broadly winged, the wings obvious; sterile florets broad and chaffy, usually at least 1/2 as long as the fertile floret…***P. canariensis*** Linnaeus COMMON CANARYGRASS (of the Canary Islands). Annual; moist weedy ground; widely used in birdseed mixes and plants are commonly found around bird feeders. Indigenous people of eastern North America used the grains for food. Fig. 305.

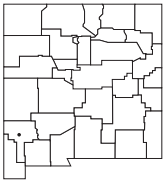
Fig. 306 *Phalaris caroliniana,* Carolina Canarygrass

3 Glumes wingless or if slightly winged then the wings narrow and obscure; sterile florets needle-like, mostly less than 1/2 as long as the fertile floret

4 Sterile florets 1.5-2.5 mm long; grain 2-2.3 mm long; panicle ovate-lanceolate… ***P. caroliniana*** Walter CAROLINA CANARYGRASS (of Carolina). Annual; moist weedy ground. Fig. 306.



4 Sterile florets 0.7-1.5 mm long; grain 1.4-1.6 mm long; panicle narrowly cylindrical…***P. angusta*** Nees ex Trinius TIMOTHY CANARYGRASS (narrow). Annual; known from a single old collection in Grant County (Mangas Spring), probably no longer present in New Mexico. Fig. 307.



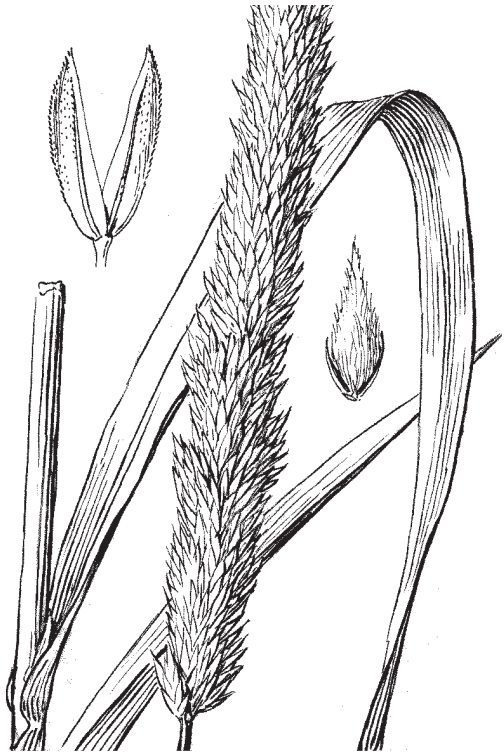


Fig. 307 *Phalaris angusta,* Timothy Canarygrass

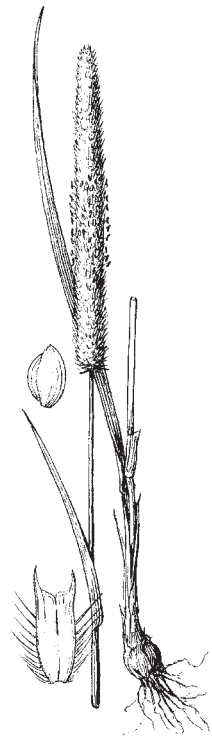
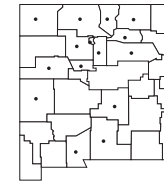


Fig. 308 *Phleum pratense,* Timothy

PHLEUM TIMOTHY

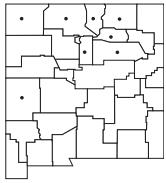
[Gr. phleos, name for some marsh reed; the common name of Timothy is for Timothy Hansen, who promoted its use in Virginia and the Carolinas about 1720] (Pooideae: Poeae)

Inflorescence very dense and spike-like (though technically a panicle with very short and obscure branches partially fused to the main axis). Spikelets one-flowered, strongly flattened. Glumes prominently ciliate and awned from the midnerve, enclosing the floret.



1 Panicles several times longer than wide, (3)4-16 cm long and 5-7.5(10) mm wide; awns of glumes 1-1.5 mm long…****P. pratense*** Linnaeus TIMOTHY (of meadows). Perennial; roadsides, fields, mountain meadows, introduced from Europe as a pasture grass. Plants developing a bract at the base of the panicle have been referred to forma *bracteatum* Ascherson & Graebner. Some plants will produce little plantlets from the spikelets (vivipary). Pollen is highly allergenic, and is often used in the preparation of vaccines. This grass was originally called CAT'S-TAIL in England, but even there it has secondarily aquired the North American name of TIMOTHY. Early on in North America, it was also called HERD'S GRASS, after John Herd, who found it growing along the Piscataqua River in New Hampshire in 1711. A 1747 letter from Benjamin Franklin to Jared Eliot states that the seed of Herd's grass that Franklin received turned out to be "mere timothy." Fig. 308.

Fig. 309 *Phleum alpinum,* Alpine Timothy

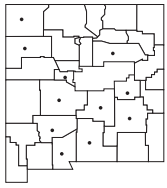


1 Panicles only 2 or 3 times longer than wide, 1-5(6) cm long and (7)8-12 mm wide; awns of glumes (1.2)1.5-2.5 mm long…***P. alpinum*** Linaeus var. ***commutatum*** (Gaudin) Richter ALPINE TIMOTHY (alpine; changed, altered). Perennial; subalpine meadows and mountain grasslands mostly in the northern mountains, providing good forage. This is the only species of *Phleum* native to North America. The sheaths subtending the seedhead become inflated. Fig. 309.

PHRAGMITES REED

[Gr. phragma, hedge, referring to its growth habit] (Arundinoideae: Arundineae)

Large, cane-like grasses from vigorous rhizomes. Inflorescence a plume-like panicle at the tips of the stems. Spikelets several-flowered, the rachilla long hairy, but the lemmas hairless. Glumes unequal in length. Seeds are infrequently produced.



P. australis (Cavanilles) Trinius ex Steudel var. ***berlandieri*** (Fournier) Reed COMMON REED (southern; for Jean Louis Berlandier, French botanical explorer in Mexico and Texas) [*Arundo phragmites* Linnaeus, *Phragmites communis* Trinius]. Perennial; forming dense thickets and fence-rows along streams, rivers, canals, and ditches and in wet ground of springs and seeps. Roots, shoots, and seeds have been used for food throughout the world. Known as CARRIZO in the southwest, plant parts were used for cordage, nets, mats, screens, arrow shafts, prayer sticks,

Fig. 310 *Phragmites australis,* Common Reed

baskets, pipes, and thatching. Calligraphers prized the hollow internodes for making quills. Large expanses of reed beds are effective filters of toxins and heavy metals as the water slowly passes through the mass of roots and rhizomes. Dried stalks can be ground and sifted to produce a flour with very high sugar concentrations. This is formed into a ball and scorched by the fire, yielding the grass equivalent of marshmallow. Fig. 310. Recent studies indicate we have three races of common reed in New Mexico:

a. Ligules 1-1.7 mm long; lower glumes 3-6.5 mm long; upper glumes 5.5-11 mm long; lemmas 8-13.5 mm long; leaf sheaths deciduous in age, the culms exposed in the winter, smooth and shiny...subsp. ***americanus*** Saltonstall, Peterson & Soreng This is our native race, found essentially throughout the state.

a. Ligules 0.4-0.9 mm long; lower glumes 2.5-5 mm long; upper glumes 4.5-7.5 mm long; lemmas 7.5-12 mm long; leaf sheaths not deciduous in age, the culms not exposed, smooth and shiny or ridged and not shiny

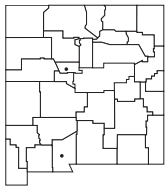
    b. Culm internodes smooth and shiny; apparently infrequent in the southern regions of the state...var. ***berlandieri*** (Fournier) Reed This race is perhaps native in New Mexico.

    b. Culm internodes ridged and not shiny; essentially throughout the state...subsp. ****australis*** This is an exotic race.

PHYLLOSTACHYS BAMBOO

[Gr. *phyllos*, leaf, and *stachys*, spike, referring to the leafy inflorescence (never seen in our plants)] (Bambusoideae: Bambuseae)

Woody, shrub-like grasses with yellow-green stems. Sheaths with stiff hairs at the collar. Blades deciduous at the narrowed, petiole-like base where it joins the sheath. Spikelets unknown for New Mexico material, the plants not known to flower in the state. Bamboos are known in New Mexico only in cultivation as landscape ornamentals.

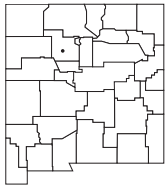


****P. aurea*** Carr ex A.& C. Rivière GOLDEN BAMBOO (golden). Perennial; introduced from Asia as an ornamental landscape plant, not common but known from Doña Ana and Bernalillo counties. The correct identification and nomenclature of our plants are uncertain.

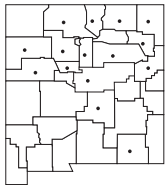
PIPTATHERUM RICEGRASS

[Gr. *pipto*, to fall, and *ather* awn, referring to the deciduous awns] (Pooideae: Stipeae)

Inflorescence a panicle. Spikelets one-flowered, disarticulating above the thin, translucent glumes. Floret awned, hard when mature, dorsally compressed, the lemma convolute but not completely enclosing the palea and flower, which are partially exposed. Species of *Piptatherum* were formerly recognized in the genus *Oryzopsis*.



1 Lemma pubescent, the awn 1-2 mm long (when present)…***P. pungens*** (Torrey) Barkworth SHORT-AWN RICEGRASS (sharp) [*Oryzopsis pungens* (Torrey) A.S. Hitchcock]. Pine forests in the northern mountains, not common. Fig. 311.



1 Lemma mostly glabrous (rarely pubescent), the awn 5-10 mm long (when present)…***P. micranthum*** (Trinius & Ruprecht) Barkworth LITTLESEED RICEGRASS (small-flowered) [*Oryzopsis micrantha* (Trinius & Ruprecht) Thurber]. Moist, shaded, often rocky, ground in the mountains and foothills. Fig. 312.

PIPTOCHAETIUM RICEGRASS, NEEDLEGRASS

[Gr. *pipto*, to fall, and *chaite*, bristle, referring to the deciduous awns] (Pooideae: Stipeae)

Inflorescence a panicle. Spikelets one-flowered, disarticulating above the translucent glumes. Lemmas hardened when mature, involute, the margins fitting into the longitudinal grooves of the hardened palea. Palea tip projecting beyone the lemma as a short point. Some species were formerly treated in *Oryzopsis* or *Stipa*.

Fig. 311 *Piptatherum pungens,* Shortawn Ricegrass

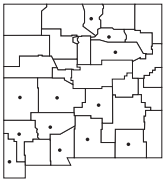
Fig. 312 *Piptatherum micranthum,* Littleseed Ricegrass

Fig. 313 *Piptochaetium fimbriatum,* Piñon Ricegrass

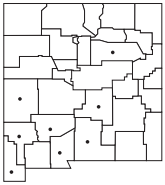
Fig. 314 *Piptochaetium pringlei,* Pringle's Needlegrass

1 Glumes 3-4 mm long; awns 0.5-1 cm long…see *Piptatherum micranthum*

1 Glumes 5-10 mm long; awns 1-3 cm long



2 Glumes about 5 mm long; blades rolled and thread-like, elongate and weeping…**P. fimbriatum** (Kunth) A.S. Hitchcock PIÑON RICEGRASS (fringed) [*Oryzopsis fimbriata* (Kunth) Hemsley, *Stipa fimbriata* Kunth]. Perennial; shaded, moist sites in woodlands, widespread, commonly under piñon. Fig. 313.



2 Glumes about 10 mm long; blades flat or loosely rolled, firm and somewhat erect…***P. pringlei*** (Beal) Parodi PRINGLE'S NEEDLEGRASS (for Cyrus Guernsey Pringle, prolific Vermont botanical collector) [*Stipa pringlei* Beal]. Perennial; pine and oak woodlands at medium elevations in the southern mountains. Fig. 314.

Fig. 315 *Pleuraphis rigida,* Big Galleta

PLEURAPHIS GALLETA

[Gr. *pleuron*, rib, and *raphis*, needle, referring to the short-awned nerve of glumes and lemmas] (Chloridoideae: Cynodonteae)

Plants rhizomatous. Blades lacking bulbous-based hairs on the margins. Inflorescence a spike. Spikelets borne in clusters of three, which fall from the stem as a unit. Central spikelet fertile. Glumes entirely membranous and free from one another at the base. Formerly in the genus *Hilaria*, which now includes only the stoloniferous members of this group.

1 Stems with pubescent internodes; persisting in Doña Ana County from test plantings…***P. rigida*** Thurber BIG GALLETA (stiff, rigid) [Hilaria rigida (Thurber) Bentham ex Scribner]. Perennial; introduced from California and Arizona for range reseeding trials, without success, but the plants remain in the test plots of the College Ranch of New Mexico State University. Of all New Mexico grasses, only this and *Bouteloua eriopoda* have hairy internodes. Fig. 315.

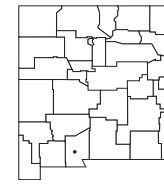
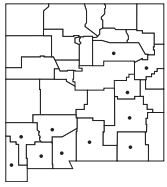


Fig. 316 *Pleuraphis mutica,* Tobosa

Fig. 317 *Pleuraphis jamesii,* Galleta

1 Stems with glabrous internodes

2 Glumes fan-shaped, broadest at the apex…***P. mutica*** Buckley TOBOSA (unawned) [*Hilaria mutica* (Buckley) Bentham]. Perennial; flats and swales, gravely hillsides, in the southern regions of the state. TOBOSA is one our important grasses of the southern plains, swales, and playas, but it becomes increasingly unpalatable with maturity. It or the next were confusingly called BLACK GRAMA in the early days in the southwest. This and *P. jamesii* are essentially indistinguishable by vegetative means. Fig. 316.



2 Glumes lanceolate, broadest at about the middle… ***P. jamesii*** Torrey GALLETA (for Edwin James, surgeon-naturalist with the 1820 Long Expedition) [*Hilaria jamesii* (Torrey) Benthan]. Perennial; plains and foothills, widespread, but infrequent in the southern regions. This is the northern equivalent of tobosa. The origin of the common name, which means cookie in Spanish, is unknown to me. Fig. 317.

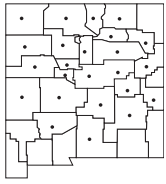


Fig. 318 *Poa bulbosa,* Bulbous Bluegrass

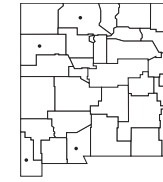
POA BLUEGRASS

[ancient Greek name for grass or fodder] (Pooideae: Poeae)

Sheath margins fused in some species. Inflorescence a panicle. Spikelets several-flowered, awnless. Glumes shorter than the lowermost floret. Lemmas mostly 5- to 7-nerved (but some only 3-nerved), often with a tuft of cobwebby hairs on the callus. *Poa pattersonii* Vasey and *P. stenantha* Trinius have been reported for the state, but no specimens have been located. *Leucopoa kingii* (S. Watson) W.A. Weber (SPIKE GRASS) was reported from along the San Juan River by Hall and Flowers (Vascular plants found in the Navajo Reservoir Basin, pp. 47-87. IN: D.M. Pendergast (ed.). Ecological studies of the flora and fauna of Navajo Reservoir Basin, Colorado and New Mexico. Univ. Utah Anthropological Papers, number 55. 1961.); it is distinguished by being dioecious and having strongly striate-nerved leaf blades.

Robert Soreng (Smithsonian Institution) assisted with this key.

1 Florets modified and forming small leafy plantlets; stems slightly to strongly bulb-like at the base…***P. bulbosa*** Linnaeus BULBOUS BLUEGRASS (having a bulb) [Poa bulbosa Linnaeus var. vivipara Koeler]. Perennial; moist hills and slopes in the mountains. The spikelets are exceptional in producing little plantlets instead of florets, which presumably fall and take root; European plants are less proliferous and routinely produce florets as expected. Plants may also be spread by detached corm-bases blowing about. Fig. 318.



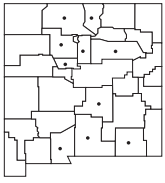
1 Florets not modified into small leafy plantlets; stems rarely somewhat bulb-like

Fig. 319 *Poa annua,* Annual Bluegrass

Fig. 320 *Poa bigelovii,* Bigelow's Bluegrass

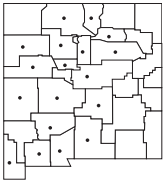
2 Anthers 1 mm long or less, nearly all of them well-developed; plants annual or perennial

3 Callus without a tuft of long hairs (but the nerves of the lemma pubescent); plants mostly annual…****P. annua*** Linnaeus ANNUAL BLUEGRASS (annual). Annual, sometimes long-lived; lawns, flower beds, moist disturbed ground, native to Europe. It has the potential to flower throughout the year under favorable growing conditions. In lawns, this grass can produce seedheads even when mowed regularly at a height of 1/4 inch, and the culms extend out nearly horizontal to the ground, leading to being called LOW SPEARGRASS. Exceptionally tall growth may produce stolons. Fig. 319.



3 Callus with a tuft of long, cobwebby hairs; plants annual or perennial

4 Panicles narrow, contracted; paleas pubescent on the keels; plants mostly annual or infrequently short-lived perennial…***P. bigelovii*** Vasey & Scribner BIGELOW'S BLUEGRASS (for John Milton Bigelow, surgeon-botanist on early boundary surveys). Annual; rocky hills, arroyo bottoms, wooded slopes, widespread. This is an important winter/spring forage grass in the southern foothills and plains. Fig. 320.



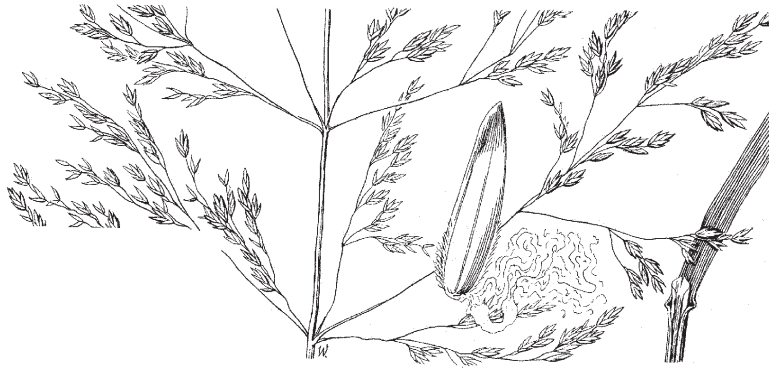
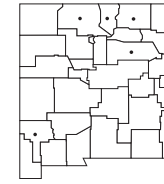


Fig. 321 *Poa palustris,* Fowl Bluegrass

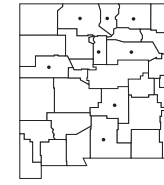
4 Panicles open when mature; paleas glabrous or pubescent; plants perennial

5 Sheath margins fused together 1/5 or less their length; first glume mostly 3-nerved… ***P. palustris*** Linnaeus FOWL BLUEGRASS (of marshes). Perennial; lemmas bronze-tipped; moist meadows, marshy ground, sloughs, at medium to high elevations; mostly in the northern regions. Culms are often decumbent-stoloniferous, rooting at the nodes. Plants can be quite variable and present considerable difficulty in identification, as with several other species in -this genus. Fig. 321.



5 Sheath margins fused together 1/4 to 2/3 their length; first glume mostly 1-nerved

6 Sheaths densely scabrous with downward pointing hairs, rarely glabrous; panicles (8)13-40 cm long, the internodes of the main axis mostly 4 cm or more long… ***P. occidentalis*** Vasey NEW MEXICO BLUEGRASS (western). Perennial; forest clearings and moist woods. Fig. 322.



6 Sheaths glabrous to sparsely scabrous with downward pointing hairs; panicle mostly less than 12 cm long, the internodes of the main axis shorter than 3.5 cm

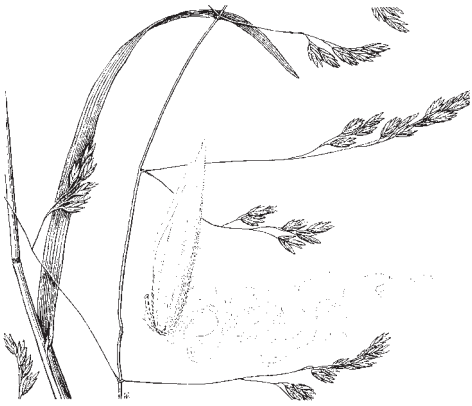


Fig. 322 *Poa occidentalis,* New Mexico Bluegrass

Fig. 323 *Poa leptocoma,* Bog Bluegrass

Fig. 324 *Poa reflexa,* Nodding Bluegrass

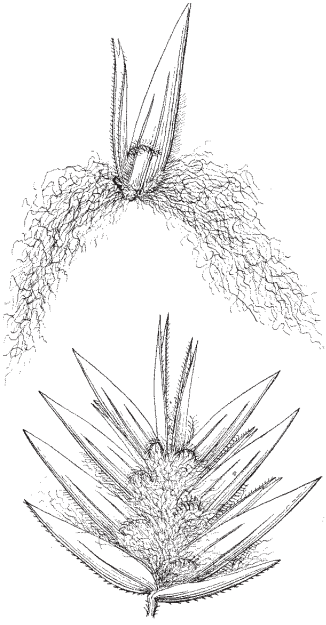
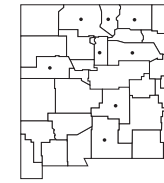
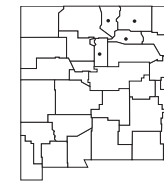


Fig. 325 *Poa arachnifera,* Texas Bluegrass

7 First glume linear-lanceolate, much narrower than the second; paleas glabrous to scabrous on the keels… ***P. leptocoma*** Trinius BOG BLUEGRASS (weakly hairy). Perennial; alpine or subalpine springs, meadows, and boggy ground. Fig. 323.



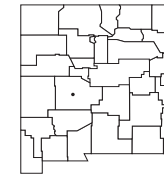
7 First glume about the same shape and width as the second, both broadly lanceolate; paleas short-pubescent on the keels…***P. reflexa*** Vasey & Scribner ex Vasey NODDING BLUEGRASS (bent back). Perennial; alpine or subalpine meadows, springs, bogs, ridges, and rocky ledges, in the northern mountains. Fig. 324.



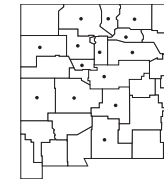
2 Anthers mostly longer than 1 mm, or vestigial and poorly developed; plants perennial

8 Stems and nodes strongly flattened; plants strongly rhizomatous

9 Lemmas 5-6 mm long; spikelets unisexual, the plants dioecious with the sexes on separate plants; rare…****P. arachnifera*** Torrey TEXAS BLUEGRASS (bearing spiders or webs, alluding to the very copious long hairs on the callus). Perennial; known only from a single collection from the Bosque del Apache wildlife refuge (Socorro County), presumably brought in by wildfowl. Fig. 325.



9 Lemmas 2-3 mm long; spikelets bisexual, with both sexes in the same floret...****P. compressa*** Linnaeus CANADA BLUEGRASS (flattened). Perennial; forest clearings, disturbed meadows, roadsides, often with Kentucky bluegrass. This species can be easily confused with Poa pratensis, but differs in having conspicuously flattened culms and nodes and lemmas with indistinct lateral nerves and less cobwebby hairs. Culms remain green long after the foliage has faded. It is not native to Canada, but to Europe. Fig. 326.



8 Stems and nodes round or nearly so; plants tufted or rhizomatous; sheath margins fused or open

10 Callus of the floret with a tuft of cobwebby hairs, these short-kinky to long-sinuous, borne on the back surface of the lemma and distinct from any hairs on the lemma midnerve

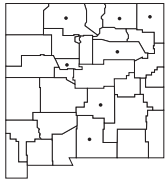
Fig. 326 *Poa compressa,* Canada Bluegrass

Fig. 327 *Poa tracyi,* Tracy's Bluegrass

11 Plants dioecious, with unisexual spikelets and the sexes on separate plants; long, delicate rhizomes developed; panicles oblong, compact, the terminal branches densely-flowered from near the base; rare…****P. arachnifera*** Torrey [see lead 9, above]

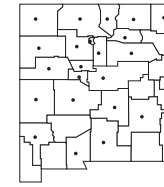
11 Plants bisexual, or if female then the panicle more open and the branches sparsely flowered; rhizomes present or absent

12 Sheath margins fused 1/2 their length or more; panicles mostly 13-29 cm long, the lower internodes of the main axis mostly longer than 3.5 cm; anthers averaging 2.2 mm long…***P. tracyi*** Vasey TRACY'S BLUEGRASS (for Samuel Mills Tracy, USDA agronomist and forage botanist). Perennial; rich humus and moist loam of forests and woodlands in the mountains. Tracy's collections became the beginning of the Tracy Herbarium of Texas A&M University. Fig. 327.



12 Sheath margins fused 1/2 their length or less; panicles mostly less than 13 cm long (longer in *Poa palustris*), the internodes of the main axis rarely longer than 3.5 cm; anthers mostly less than 1.9 mm long

13 Plants with strong rhizomes; sheath margins fused together 1/4 to 1/2 their length; panicle branches glabrous to moderately scabrous, round



14 Glumes distinctly keeled, scabrous on the nerves, the second glume plainly shorter than the first lemma; panicles often with 4 or more branches at the lowermost node (some occasionally vestigial); ligules mostly 1-2 mm long…***P. pratensis*** Linnaeus KENTUCKY BLUEGRASS (of meadows). Perennial; common throughout the state in a wide variety of habitats, generally in the mountains. This is the state grass of Kentucky, the "bluegrass state". We have three subspecies, two of which represent native populations:

a Blades pubescent above; lemmas, at least some, pubescent on the lateral nerves…subsp. ***alpigena*** (Lindman) Hiitonen (alpine) [*Poa alpignea* Lindman]. Known in New Mexico from a single collection in Colfax County, from the Philmont Scout Ranch, at 11,200 ft, perhaps the southernmost extension of this native, arctic subspecies.

a Blades mostly glabrous above; lemmas glabrous on the lateral nerves

b Stems geniculate at the base; basal leaves bright green, 2-3 mm broad, flat or channeled, ribbed on the back with well-separated ridges, the sheaths withering and disintegrating after a season or two; upper stem blade 3-8 cm long; lowermost panicle branches usually 5 at the node, spreading; spikelets mostly 3- to 4-flowered; upper glume 3-3.5 mm long; lowermost lemma very cobwebby at the base…subsp. ****pratensis*** This is the subspecies introduced from Europe (called smooth meadow grass there) for improved pastures, meadow reseeding, and lawns, escaping to similar moist sites in natural habitats. It does especially well on calcareous soil, hence its proliferation in Kentucky, leading to the common name. It tolerates close grazing (or mowing) and trampling, easily recovering by its extensive rhizome system. It has also been called JUNE GRASS, GREEN GRASS (when *P. compressa* is called bluegrass), and SPEAR GRASS. Fig. 328.

Fig. 328 *Poa pratensis,* Kentucky Bluegrass

b Stems erect at the base; basal leaves pale grayish blue-green, 0.8-2 mm broad, folded and somewhat revolute, strongly ribbed on the back with the ribs almost touching, the sheaths remaining intact through several seasons; upper stem blade 1-3 cm long; lowermost panicle branches usually 2-3 at the node (up to 5), ascending; spikelets mostly 2-flowered; upper glume 2-2.7 mm long; lowermost lemma only slightly cobwebby… subsp. ***agassizensis*** (Boivin & D. Löve) Taylor & MacBryde (of ancient glacial Lake Agassiz, Manitoba, Canada, in turn named for Jean Louis Rodolphe Agassiz, prominent geologist and zoologist who championed the glacial

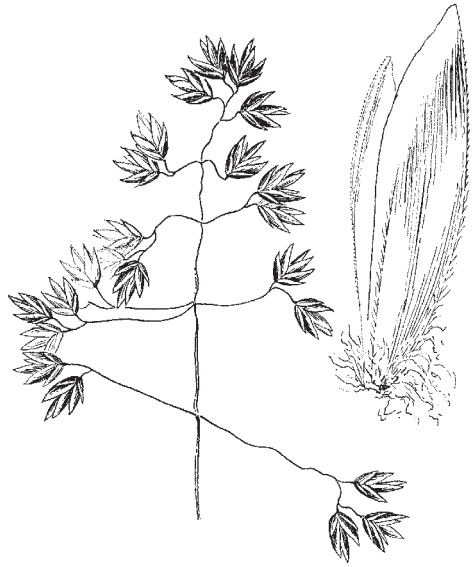
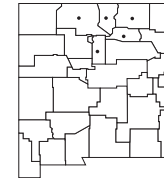


Fig. 329 *Poa arctica* subsp. *grayana,* **Gray's Artic Bluegrass**

theory) [Poa agassizensis Boivin & D. Löve]. A native subspecies, but it's distribution in New Mexico is poorly known. Many (perhaps most?) of our upland meadows and drier mountain grasslands contain this subspecies.

14 Glumes weakly keeled, nearly glabrous, the second glume subequal to or longer than the first lemma; panicles usually with fewer than 4 branches at the lowermost node; ligules 2-4 mm long…***P. arctica*** R. Brown ARCTIC BLUEGRASS (arctic). Perennial; forests and subalpine and alpine meadows in the northern mountains, usually in deep, rich soil. We have two subspecies:

a Stems mostly single, not wiry, with several sterile shoots; ligules truncate to acute; panicle branches flexuous…subsp. ***grayana*** (Vasey) A. & D. Löve & Kapoor GRAY'S ARCTIC BLUEGRASS (for Asa Gray, preeminent North American botanist) [*Poa grayana* Vasey]. Fig. 329.

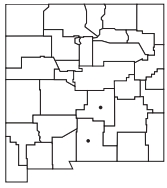


a Stems often tufted with several together, wiry, with relatively few sterile shoots; ligules acute to acuminate; panicle branches relatively stiff, not flexuous…subsp. ***aperta*** (Scribner & Merrill) Soreng (open).

Fig. 330 *Poa trivialis,* Rough Bluegrass

13 Plants tufted, lacking rhizomes (in wet habitats occasionally producing decumbent stems that root at the nodes); sheath margins fused together 1/4 or less their length (to 1/2 in P. trivialis); panicle branches distinctly scabrous, mostly angled

15 Ligules 3-10 mm long; lemmas sparsely pubescent on the keel near the base and mostly glabrous on the marginal nerves and between the nerves; first glume very narrow, sickle-shaped, 1-nerved…
P. trivialis* Linnaeus ROUGH BLUEGRASS (commonplace, ordinary). Perennial; shaded, moist sites in the mountains, known as yet only from Lincoln and Otero counties. Sometimes used as a turf grass at golf courses. Fig. 330.



15 Ligules mostly less than 4 mm long; lemmas pubescent on the keel and marginal nerves and often between the nerves; first glume narrow to broad, not sickle-shaped, 1- to 3-nerved

16 Panicles mostly 10-30 cm long, abundantly rebranched; culms often decumbent and rooting at the nodes, stout and leafy well above the middle, 25-120 cm tall…***P. palustris*** Linnaeus [see lead 5, above]

Fig. 331 *Poa interior,* Interior Bluegrass

16 Panicles mostly less than 12 cm long, sparingly rebranched if at all; stems never decumbent and rooting at the nodes, leafy or not, mostly less than 50 cm tall

17 Lemmas glabrous between the nerves; leaves green…***P. interior*** Rydberg INTERIOR BLUEGRASS (inner, interior). Perennial; alpine and subalpine ledges, meadows, and forest clearings in the northern mountains. Fig. 331.

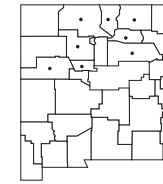
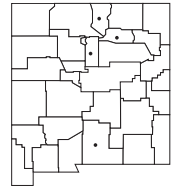


Fig. 332 *Poa glauca* subsp. *rupicola,* Greenland Bluegrass

Fig. 333 *Poa glauca* subsp. *glauca,* Greenland Bluegrass



17 Lemmas mostly pubescent between the nerves; leaves glaucous…***P. glauca*** Vahl GREENLAND BLUEGRASS (bluish). Perennial; alpine and subalpine ridges, grassy slopes, meadows, and mossy ledges in the mountains. We have two subspecies:

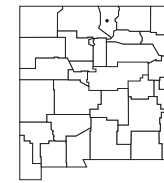
a Calluses of all florets entirely glabrous; dwarf alpine plants with the lemmas hairy between the nerves…subsp. ***rupicola*** (Nash ex Rydberg) W.A. Weber TIMBERLINE BLUEGRASS (growing on rocks) [*Poa rupicola* Nash]. Fig. 332.

a Calluses usually with cobwebby hairs; if dwarf alpine plants, then calluses of at least the basal florets with at least a vestige of a web or the lemmas glabrous between the nerves…subsp. ***glauca*** Fig. 333.

10 Callus not with cobwebby hairs as above, glabrous or with hairs similar to and continuous with those of the lemma keel, or in *P. secunda* with short, straight hairs around the top of the callus and not restricted to the back side of the lemma

18 Plants unisexual, all the spikelets of a plant either male or female

19 Plants rhizomatous; uppermost stem blade well-developed; rare in New Mexico…***P. wheeleri*** Vasey WHEELER'S BLUEGRASS (for George Montegue Wheeler, Army engineer of numerous government surveys in the late 1800s) [*Poa nervosa* (Hooker) Vasey var. *wheeleri* (Vasey) C.L. Hitchcock]. Perennial; mountain slopes in rich soils, sagebrush to subalpine zones in the northern mountains; as yet known only from Taos County. Fig. 334.

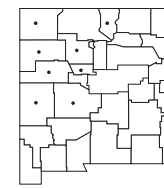


19 Plants mostly tufted; uppermost stem blade very reduced; common in New Mexico…***P. fendleriana*** (Steudel) Vasey MUTTONGRASS (for Augustus Fendler [d. 1883], German-born botanical collector for Asa Gray, who visited the Santa Fe area in 1846-47). Perennial; woodlands, rocky hills, mountain slopes. We have three subspecies:

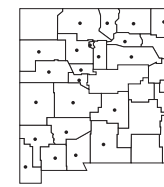
a Lemmas commonly scabrous to glabrous on the keels…subsp. ***albescens*** (A.S. Hitchcock) Soreng MEXICAN MUTTONGRASS (becoming white) [*Poa albescens* A.S. Hitchcock]. Known only from the bootheel region.

a Lemmas commonly pubescent on the keels

b Ligules of middle to upper stem leaves 1.8-11 mm long…subsp. ***longiligula*** (Scribner & T.A. Williams) Soreng LONG-TONGUE MUTTONGRASS (long-ligule) [*Poa longiligula* Scribner & T.A. Williams]. Widespread in the northwestern quarter of the state. Fig. 335.



b Ligules of middle to upper stem leaves 0.2-1(2) mm long…subsp. ***fendleriana*** Widespread nearly throughout the state; highly prized by sheepmen for forage, whence the common name. Fig. 336.



18 Plants bisexual, the spikelets with both anthers and pistil in a single floret

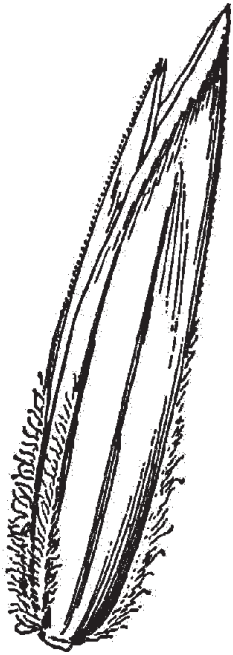


Fig. 334 *Poa wheeleri,* Wheeler's Bluegrass

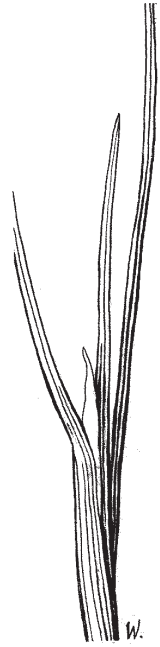


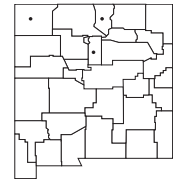
Fig. 335 *Poa fendleriana* subsp. *longiligula,* Longtongue Muttongrass

Fig. 336 *Poa fendleriana* subsp. *fendleriana,* Muttongrass

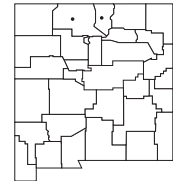
Fig. 337 *Poa secunda* subsp. *secunda,* Sandberg's Bluegrass

Fig. 338 *Poa secunda* subsp. *juncifolia,* Alkali Bluegrass

20 Lemmas glabrous to scabrous; sheath margins not fused together…***P. secunda*** Presl SANDBERG'S BLUEGRASS (to one side) [*Poa ampla* Merrill]. Perennial; forest clearings, sagebrush plains, meadows, disturbed ground. We have two subspecies:



a Lemmas prominently hairy…subsp. ***secunda*** [*Poa canbyi* (Scribner) Piper, *P. sandbergii* Vasey, *P. scabrella* (Thurber) Vasey]. Fig. 337.



a Lemmas glabrous to scabrous...subsp. ***juncifolia*** (Scribner) R.J. Soreng (with leaves like *Juncus*) [*Poa ampla* Merrill, *P. nevadensis* Vasey] ALKALI BLUEGRASS. Fig. 338.

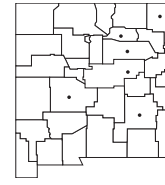
20 Lemmas prominently pubescent or puberulent; sheath margins fused together or not

Fig. 339 *Poa arida,* Plains Bluegrass

21 Plants rhizomatous

22 Sheath margins fused together 1/3 to 1/2 their length; glumes weakly keeled; plants subalpine to alpine…**P. arctica** R. Brown subsp. **grayana** (Vasey) Löve, Löve, & Kapoor [see lead 14, above]

22 Sheath margins overlapping most of their length, fused 1/5 or less; glumes strongly keeled; plants of plains and valleys…**P. arida** Vasey PLAINS BLUEGRASS (of arid land) [Poa glaucifolia Scribner & Williams]. Perennial; prairies and floodplains. Fig. 339.



21 Plants tufted, not rhizomatous

23 Stem bases enclosed in persistent, thickened, closely overlapping sheaths; panicle branches widely spreading at maturity; spikelets ovate to subcordate; blades 2-4 mm wide…**P. alpina** Linnaeus ALPINE BLUEGRASS (alpine). Perennial; alpine to subalpine slopes, meadows, talus, and moist ledges. A viviparous form is common in Europe. Fig. 340.

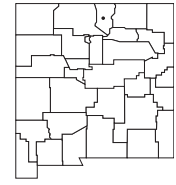


Fig. 340 *Poa alpina,* Alpine Bluegrass

23 Stem bases not enclosed in persistent sheaths as above; panicle branches not widely spreading; spikelets ovate to more elongate, not at all cordate at the base; blades usually less than 2 mm wide

24 Lemmas keeled on the back, the pubescence on the nerves longer and more dense than between the nerves; ligules 1-3 mm long…***P. glauca*** Vahl subsp. ***rupicola*** (Nash ex Rydberg) W.A. Weber [see lead 17, above]

24 Lemmas rounded on the back, minutely pubescent all across the base, the hairs on nerves and between nerves similar; ligules 2-7 mm long …***P. secunda*** Presl [see lead 20, above]

Fig. 341 *Polypogon viridis,*
Water Polypogon, Water Bentgrass

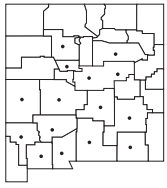
Fig. 342 *Polypogon monspeliensis,*
Rabbitfootgrass

POLYPOGON POLYPOGON

[Gr. *poly*, many, and *pogon*, beard, referring to the numerous awns] (Pooideae: Poeae)

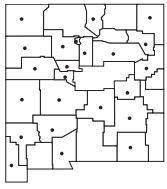
Inflorescence a narrow, congested, spike-like panicle. Spikelets one-flowered, mostly with long awns, disarticulating below the glumes

1 Glumes awnless…****P. viridis*** (Gouan) Breistroffer WATER POLYPOGON, WATER BENTGRASS (green) [*Agrostis semiverticillata* (Forsskål) Christensen, *Polypogon semiverticillata* (Forsskål) Hylander]. Perennial; wet ground of springs, seeps, ponds, ditch banks, and the like; widespread. Fig. 341.



1 Glumes awned

2 Awns 2-10 mm long; glumes obtuse to shallowly lobed at the tip …****P. monspeliensis*** (Linnaeus) Desfontaines RABBITFOOTGRASS (of Montpellier, France). Annual; ditch banks, seeps, wet disturbed ground, widespread. The 'furry' panicles are unmistakable. Plants sometimes spread by stolons and may appear to be perennial. This sometimes hybridizes with *Agrostis stolonifera*, yielding the next. Fig. 342.



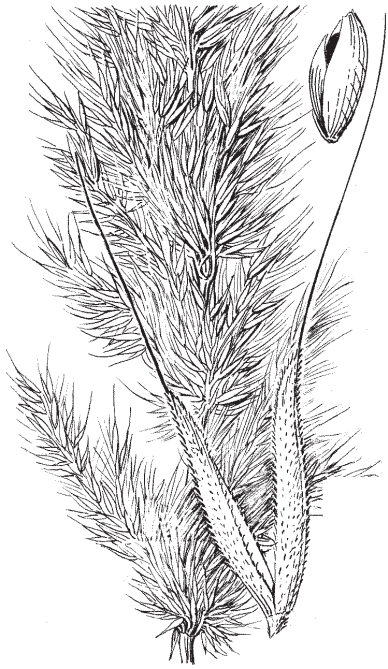
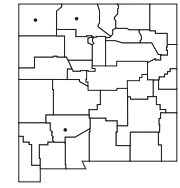


Fig. 343 *Polypogon interruptus,* Ditch Polypogon

Fig. 344 *Psathyrostachys juncea,* Russian Wildrye

2 Awns 1-3(5) mm long; glumes acute and entire to minutely cleft at thetip…****P. interruptus*** Kunth DITCH POLYPOGON (severed, interruped) [*xAgropogon littoralis* (Small) C.E. Hubbard, *Polypogon littoralis* Small]. Short-lived perennial; wet ground, ditches, seeps, and springs; rarely collected. These are mostly male-sterile hybrids (anthers devoid of pollen) between *Polypogon monspeliensis* and *Agrostis stolonifera*. Fig. 343.

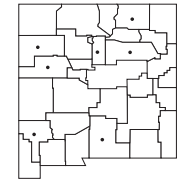


PSATHYROSTACHYS WILDRYE

[Gr. *psathyros*, shattering, and *stachys*, spike, referring to the disarticulating axis]
(Pooideae: Hordeae)

Plants with short rhizomes. Inflorescence a spike. Spikelets 2- to 3-flowered, borne 2-3 together at each node. Glumes awl-shaped. Lemmas awn-tipped. Formerly treated in *Elymus*.

****P. juncea*** (Fischer) Nevski RUSSIAN WILDRYE (rush-like) [*Elymus junceus* Fischer]. Perennial; introduced from northern Asia for range restoration and erosion control; scattered localities. The needle-like glumes are distinctive, but these may also be found in *Leymus*. Fig. 344.

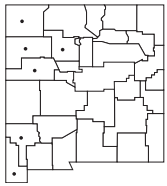


PUCCINELLIA ALKALIGRASS

[for Benedetto Puccinelli (d. 1850), Italian botanist] (Pooideae: Poeae)

Inflorescence a panicle. Spikelets several-flowered, nearly round in cross-section, awnless. Glumes shorter than the lowermost florets. Lemmas with several, more-or-less parallel nerves.

1 Plants annual, 3-10(15) cm tall…***P. parishii*** A.S. Hitchcock PARISH'S ALKALIGRASS (for Samuel Bonsall Parish, California botanist). Annual; alkali flat and seeps; formerly thought to be rare, but now known from numerous scattered localities in the western half of the state. Fig. 345.

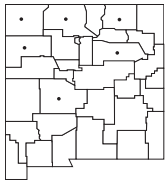


1 Plants perennial, 15 cm or more tall

2 Lemmas with conspicuous nerves; plants with creeping rhizomes; blades mostly flat, 4-15 mm wide; freshwater habitats…see *Torreyochloa pauciflora*

2 Lemmas with obscure or indistinct nerves; plants tufted, lacking rhizomes; blades rolled, or if flat then 1-3(4) mm wide; usually alkaline or saline habitats

3 Plants with yellow-green herbage and erect culms; panicles 10-28 cm long, the branches as much as 15 cm long; lemmas (1.8)2-3 mm long, with an obtuse tip; anthers 0.7-1.2 mm long…***P. nuttalliana*** (Schultes) A.S. Hitchcock NUTTALL'S ALKALIGRASS (for Thomas Nuttall, early botanist in North America) [*Puccinellia airoides* S. Watson & Coulter]. Perennial; alkali flats and floodplains in the northern half of the state. A bit of nomenclatural trivia: The combination *Puccinellia airoides* proposed by Watson & Coulter in 1889 is considered a new name and not a valid new combination, as it was based on the later homonym Poa *airoides* Nuttall (1818), antedated by *Poa airoides* Koeler (1802). Therefore, *airoides* does not take priority over the *nuttalliana* epithet of 1824 (see Example 2, Article 72.2 of the International Code of Nomenclature). Fig. 346.



3 Plants with blue-green herbage and geniculate-based culms; panicles 5-14 cm long, the branches to about 8 cm long; lemmas 1.4-2.2 mm long, with a broadly rounded to truncate, fringed tip; anthers 0.5-0.8 mm long…****P. distans*** (Jacquin) Parlatore WEEPING ALKALIGRASS (separated, apart). Perennial; alkali flats and floodplains, apparently less common than the previous. Native to Eurasia and becoming naturalized in much of northern North America. Fig. 347.

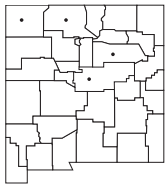


Fig. 345 *Puccinellia parishii,*
Parish's Alkaligrass

Fig. 346 *Puccinellia nuttalliana,*
Nuttall's Alkaligrass

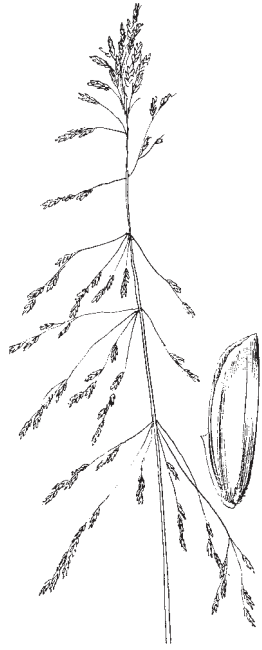


Fig. 347 *Puccinellia distans,*
Weeping Alkaligrass

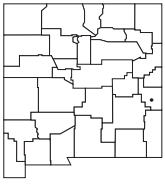
Fig. 348 *Redfieldia flexuosa,* Blowout Grass

Fig. 349 *Saccharum ravennae,* Ravenna-Grass

REDFIELDIA BLOWOUT GRASS

[for J.H. Redfield (d. 1895), American botanist] (Chloridoideae: Eragrostideae)

Plants strongly rhizomatous and rooting at the nodes when covered by sand. Inflorescence an open panicle. Spikelets 1- to 6-flowered, borne on long pedicels, disarticulating above the glumes. Lemmas 3-nerved, the base with long hairs.



R. flexuosa (Thurber) Vasey BLOWOUT GRASS (bent, curved, flexuous). Perennial with strong rhizomes; sandy hills and dunes. Plants root at the nodes of the culm, allowing continued growth and anchorage as the plant is covered by blowing sand. There are no specimens of this in any of the state's herbaria, but a plant from Roosevelt County was identified by a botanist of the Soil Conservation Service (now Natural Resource Conservation Service). Also, Heerwagen (in Grasslands of the Great Plains, by J.E. Weaver and F.W. Albertson, Johnsen Pub. Co., Lincoln, Nebraska, 1956), reported that this grass was an uncommon pioneer on blowouts in the sand dunes of eastern New Mexico. Determined searches by our eastern botanists may yet yield a vouchered record. Fig. 348.

SACCHARUM SUGARCANE

[L. *saccharum*, sugar, for the sweet juice] (Panicoideae: Andropogoneae)

Plants tufted, very large, to 4 m tall or more. Inflorescence a dense, plume-like panicle, the spike-like branches breaking apart when mature. Spikelets copiously silky-hairy, the slender awn obscured by the hair. Includes the genus *Erianthus*. Sugarcane (*Saccharum officinarum* Linnaeus) is not known to occur in the state.

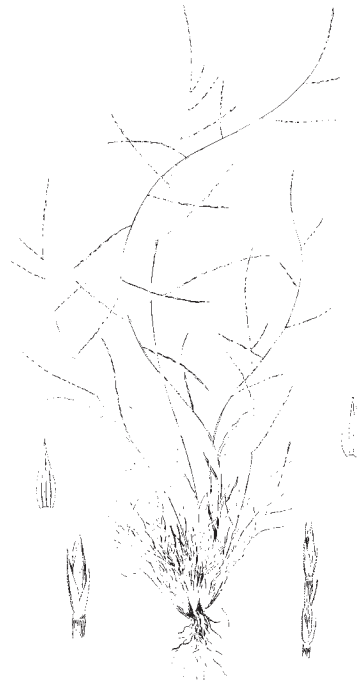
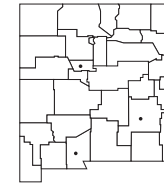


Fig. 350 *Schedonnardus paniculatus,* Tumblegrass

****S. ravennae*** (Linnaeus) Murray RAVENNA-GRASS
(from the valley of Ravenna, Italy) [*Erianthus ravennae* (Linnaeus) Beauvois]. Perennial; infrequently cultivated as an ornamental landscape plant; native to northern Africa and Mediterranean region. Sometimes called "hardy pampasgrass" in areas too cold for *Cortaderia selloana*. Flowering shoots as tall as 4 m or more. Ravenna-grass has escaped from the Albuquerque Zoo (aided by rebellious elephants and giraffes) and has spread along the Rio Grande there; plants can also be found along the Pecos River near the Bitter Lakes Wildlife Refuge, Chaves County, and appear to be spreading rather rapidly there also. Fig. 349.

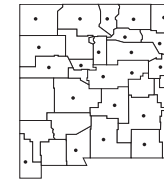


SCHEDONNARDUS TUMBLEGRASS

[Gr. *schedon*, near, and *Nardus*, a genus of grass, referring to Steudel's placement of this grass next to *Nardus* in his classification] (Chloridoideae: Cynodonteae)

Plants tufted. Blades strongly twisted. Inflorescence a panicle of wiry, spike-like branches, breaking at the base and tumbling entire. Spikelets one-flowered, sessile, awnless or awn-tipped, widely spaced on the branches.

S. paniculatus (Nuttall) Trelease TUMBLEGRASS
(having a panicle). Perennial; plains and grasslands nearly throughout the state. The twisted blades are distinctive. The scant foliage provides little forage and plants generally increase with grazing. Fig. 350.



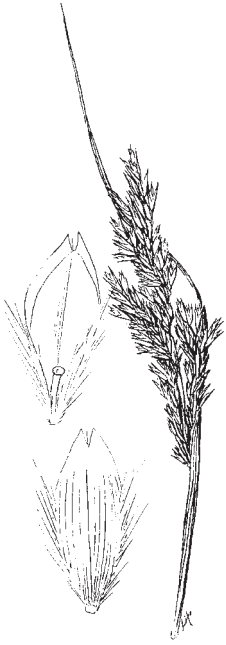


Fig. 351 *Schismus arabicus,* Arabian Mediterraneangrass

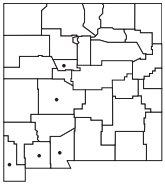
Fig. 352 *Schismus barbatus,* Bearded Mediterraneangrass

SCHISMUS MEDITERRANEANGRASS

[Gr. *schizein*, to split, alluding to the cleft lemma apex] (Danthonioideae: Danthonieae)

Inflorescence a few-flowered panicle, nearly racemose. Spikelets several-flowered, the thin glumes exceeding the florets. Lemmas cleft or mucronate at the tip. Grain strikingly pale orange-iridescent.

1 Teeth at tip of lemma narrowly triangular, clearly longer than broad; palea reaching at most to the middle of the lemma teeth, usually only as far as the base of the cleft…****S. arabicus*** Nees ARABIAN MEDITERRANEANGRASS (of Arabia). Annual; adventive in dry waste places and fields, originally in the southern regions of the state, but now common as far north as Albuquerque, and maybe beyond. Fig. 351.



1 Teeth at tip of lemma broadly triangular, about as broad as long; palea reaching at least as far as the lemma teeth and often projecting well beyond…****S. barbatus*** (Loefling ex Linnaeus) Thellung BEARDED MEDITERRANEANGRASS (bearded). Annual; adventive in dry waste places, as yet known only from the bootheel region, coming eastward from Arizona. Fig. 352.

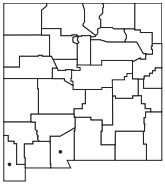


Fig. 353 *Schizachne purpurascens,* False Melic

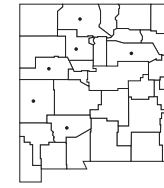
Fig. 354 *Schizachyrium cirratum,* Texas Bluestem

SCHIZACHNE FALSE MELIC

[Gr. *schizein*, to split, and *achne*, chaff, referring to the cleft lemmas] (Pooideae: Meliceae)

Inflorescence a few-flowered panicle or raceme. Spikelets several-flowered, the glumes shorter than the lower florets. Lemmas several-nerved, awned, with a tuft of hair at the base.

S. purpurascens (Torrey) Swallen FALSE MELIC (becoming purplish) [*Avena striata* Michaux]. Perennial; moist woods, pine forests, streamsides, and meadows. Glumes are often strongly flushed with purple. Fig. 353.



SCHIZACHYRIUM BLUESTEM

[Gr. *schizein*, to split, and *achyron*, chaff, referring to the cleft apex of the fertile lemma] (Panicoideae: Andropogoneae)

Plants tufted. Inflorescence a spike subtended by a bladeless sheath (spathe), several of these clustered on the flowering shoot. Spikelets awned, disarticulating below the glumes. Previously included in the genus *Andropogon*.

1 Pedicelled spikelets the same length as the sessile spikelets…***S. cirratum*** (Hackel) Wooton & Standley TEXAS BLUESTEM (curled) [*Andropogon cirratus* Hackel]. Perennial; woodlands and rocky hills. Fig. 354.

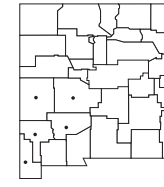
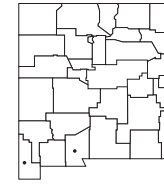


Fig. 355 *Schizachyrium sanguineum,* Santa Fe Bluestem

Fig. 356 *Schizachyrium neomexicanum,* New Mexico Bluestem

1 Pedicelled spikelets shorter than the sessile spikelets

2 First glume of the sessile spikelet pubescent on the back…***S. sanguineum*** (Retzius) Alston var. ***hirtiflorum*** (Nees) Hatch SANTA FE BLUESTEM (blood-red; hairy-flowered) [*Andropogon feensis* Fournier, A. *hirtiflorus* (Nees) Kunth var. *feensis* (Fournier) Hackel]. Perennial; woodlands and rocky hills in the southern mountains and foothills. Fig. 355.



2 First glume of the sessile spikelet glabrous on the back

3 Rachis and pedicels straight and relatively thick at maturity, the rame relatively copiously hairy (as compared to the nex)…***S. neomexicanum*** (Nash) Nash NEW MEXICO BLUESTEM (of New Mexico) [*Andropogon scoparius* Michaux var. *neomexicanus* (Nash) Hitchcock]. Perennial; sandy plains and hills, often on gypsum, and originally described from the White Sands; sometimes considered a variety of the next. Fig. 356.

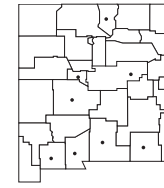


Fig. 357 *Schizachyrium scoparium,* Little Bluestem

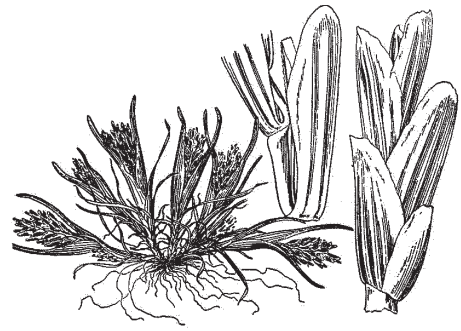
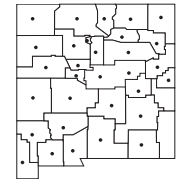


Fig. 358 *Sclerochloa dura,* Hardgrass

3 Rachis and pedicels flexuous, curved away from one another, thin, the rame less hairy (as compared to the previous)…***S. scoparium*** (Michaux) Nash LITTLE BLUESTEM, SAGE GRASS (broom-like) [*Andropogon scoparius* Michaux, *Andropogon scoparius* Michaux var. *frequens* C.E. Hubbard]. Perennial; throughout the state on hills, plains, woodlands, rocky slopes. Our plants belong to var. *scoparium*. Several cultivars have been developed for ornament. Fig. 357.



SCLEROCHLOA HARDGRASS

[Gr. *skleros*, hard, and *chloa*, grass, alluding to the firm glumes] (Pooideae: Poeae)

Plants low annuals. Inflorescence a small raceme clustered among the foliage. Spikelets 3-flowered, the upper floret sterile, disarticulating below the thick glumes. Lemmas blunt, with 5 more-or-less parallel nerves.

S. dura* (Linnaeus) Beauvois HARDGRASS (hard). Annual; adventive in lawns and moist waste places, uncommon in scattered localities. Fig. 358.

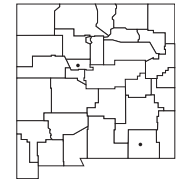
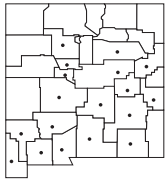


Fig. 359 *Scleropogon brevifolius,* Burrograss

SCLEROPOGON BURROGRASS

[Gr. *skleros*, hard, and *pogon*, beard, referring to the hard-based awns]
(Chloridoideae: Eragrostideae)

Low, mat-forming grasses from slender stolons. Blades short, folded, white-margined. Spikelets unisexual and usually on separate plants, the male awnless, the female with long awns. Florets several per spikelet, 3-nerved, all falling together.

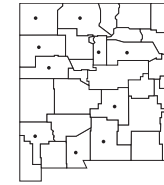


S. brevifolius Philippi BURROGRASS (short-leaved)
[*Scleropogon longisetus* Beetle]. Perennial; grassy plains and clay flats, often with tobosa, widespread. Spikelets disarticulate above the glumes, with all the florets falling together. This dispersal unit is held more-or-less upright by the many downward-curving awns, forming a spider-like structure that creeps and skitters by across the clay flats where the species is common, powered by very the gentle puffs of air arising from heat convection off the desert floor. The pointed florets catch and are embedded in the cracks and crevices of the drying clay, effectively planting the grains. It was called NEEDLE GRASS in the early days, as was *Aristida purpurea*. This grass increases under heavy grazing, and a 1938 Soil Conservation Service bulletin reported that burrograss was "…a heavenly gift to fools who insist on grazing the last spear of grass from the range." Fig. 359.

SECALE RYE

[classical Latin name for rye] (Pooideae: Hordeae)

Tufted annual plants. Blades flat. Inflorescence a spike, with a single spikelet borne at each node. Spikelets 2-flowered, disarticulating above the very narrow glumes. Lemmas awned.

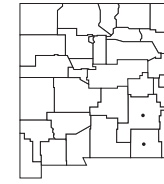


****S. cereale*** Linnaeus RYE (grain). Annual; introduced as a cultivated crop plant, and also widely used for erosion control along roadsides, occasionally escaping around fields, but not persisting long. Plants are susceptible to ergot infestation by numerous fingi, particularly *Claviceps purpurea*. Unlike wheat, barley, and oats, which are normally self-pollinated, rye is cross-pollinated. Hybrids between rye and wheat are known agronomically as triticale, and are here treated in the hybrid genus *xTriticosecale*, q.v. Fig. 360.

SETARIA BRISTLEGRASS

[L. *seta*, bristle, referring to the reduced branchlets forming the bristles at the base of the spikelets] (Panicoideae: Paniceae)

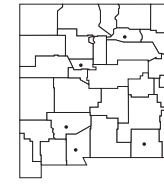
Inflorescence a narrow, bristly, spike-like panicle. Spikelets borne on very short branches and subtended by persistent bristles (which represent sterile branchlets), disarticulating below the glumes, the bristles remaining on the plant. *Setaria scheelei* (Steudel) A.S. Hitchcock has been reported for the state from time to time, but no validating specimens have ever been located.



1 A single bristle usually present at the base of only the terminal spikelet of each branch…***S. reverchonii*** (Vasey) Pilger subsp. ***ramiseta*** (Scribner) W.E. Fox REVERCHON'S BRISTLEGRASS (for Julien Reverchon, French botanist who resided in Dallas, Texas; branched bristles) [*Setaria ramiseta* (Scribner) Pilger]. Perennial; dry plains and scrublands in the southeastern region, uncommon. Fig. 361.

1 Bristles present below all or nearly all the spikelets

2 Bristles with downward-pointing barbs, thus the seedheads readily clinging to clothing and to each other



3 Margins of the upper sheaths thin and translucent, glabrous, often with a slight auricle at the summit; blades stiff-pubescent on both surfaces…****S. adhaerens*** (Forsskål) Chiovenda CLINGING BRISTLEGRASS (to adhere). Annual; weedy sites, roadsides, lawns, widespread. Some botanists merge this and the next, but we consider them adequately distinct. The seedheads cling tenaciously to socks and pant legs, and mischievous little boys have been known to toss the entangling burrs into the long tresses of little girls fleeing before them. Fig. 362.

Fig. 360 *Secale cereale,* Rye

Fig. 361 *Setaria ramiseta,*
Reverchon's Bristlegrass

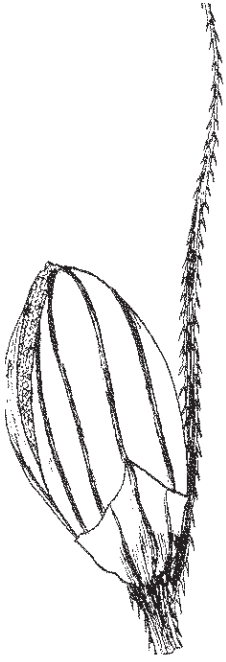
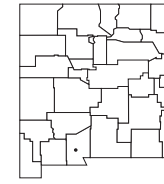


Fig. 362 *Setaria adhaerens,*
Clinging Bristlegrass

Fig. 363 *Setaria verticillata,*
Hooked Bristlegrass

Fig. 364 *Setaria parviflora,* Knotroot Bristlegrass

3 Margins of the upper sheaths not thin and translucent, pubescent, lacking an auricle at the summit; blades scabrous or stiff-pubescent on the upper surface only…***S. verticillata*** (Linnaeus) Beauvois HOOKED BRISTLEGRASS (whorled). Annual; weedy ground, known only from an old collection in Doña Ana County, perhaps no longer present in the state. Fig. 363.



2 Bristles with upward-pointing barbs, the seedheads not readily clinging

4 Margins of the sheaths glabrous; bristles 4-13 below each spikelet; second glume 1/2 to 2/3 the length of the adjacent upper lemma

5 Plants perennial from hard, knotty, nearly rhizomatous bases, the stems arising singly or in small tufts; spikelets 2-2.8 mm long…**S. parviflora** (Poiret) Kerguélen KNOTROOT BRISTLEGRASS (small-flowered) [*Setaria geniculata* (Lamarck) Beauvois]. Perennial; open moist habitats in the foothills of the southern mountains, not common. Fig. 364.

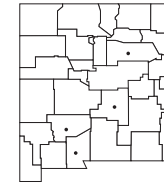
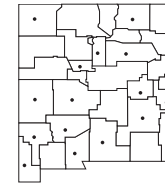


Fig. 365 *Setaria pumila,* Yellow Bristlegrass

Fig. 366 *Setaria grisebachii,* Grisebach's Bristlegrass

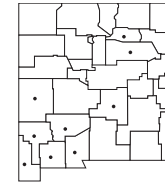
5 Plants annual, the stems in large or small tufts; spikelets 2.8-3.4 mm long…***S. pumila*** (Poiret) Roemer & Schultes YELLOW BRISTLEGRASS (dwarfish, pygmy) [*Setaria glauca* (Linnaeus) Beauvois, *Setaria lutescens* (Weigel) F. T. Hubbard]. Annual; weedy ground along roads, fields, in lawns, widespread. Spikelets are quickly recognized by the upper lemma being finely corrugated and extending beyond the adjacent glume. Sometimes called PIGEON-GRASS. Fig. 365.



4 Margins of the sheaths pubescent (rarely glabrous in S. leucopila); bristles 1-3 below each spikelet; second glume 3/4 to equalling the length of the adjacent upper lemma

6 Plants annual, though often coarse and robust

7 Panicles contracted, but relatively loose and often lobed or interrupted below, the main axis visible…***S. grisebachii*** Fournier GRISEBACH'S BRISTLEGRASS (for August Heinrich Rudolf Grisebach, German botanist). Annual; canyon bottoms, rocky hills, and stream banks. A form of this species with very poorly developed bristles has been found in the Diamond Creek drainage area of the Black Range, Sierra County. Fig. 366.



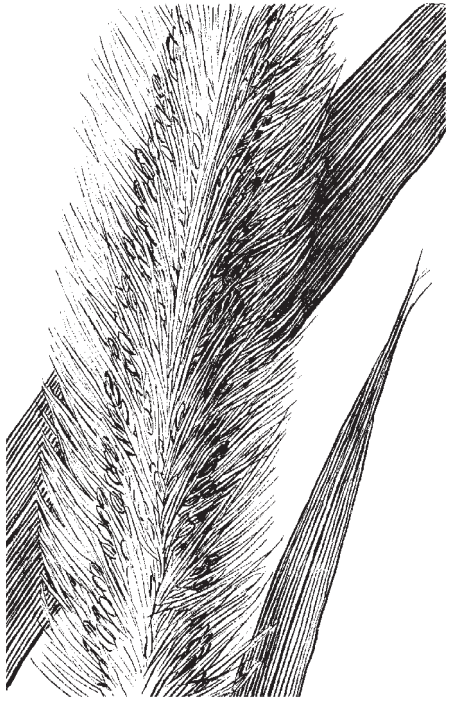


Fig. 367 *Setaria magna,* Giant Foxtail

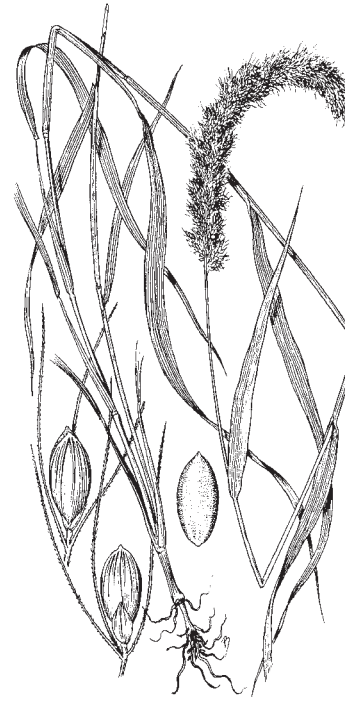
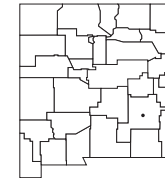


Fig. 368 *Setaria italica,* Foxtail Millet

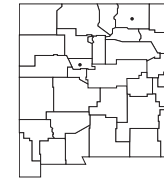
7 Panicles dense, cylindrical and spike-like, lobed and interrupted in S. italica, otherwise the main axis obscured

8 Terminal panicles 18 cm or more long, as much as 40 cm long; shoots 1.2-3 m tall…****S. magna*** Grisebach GIANT FOXTAIL (great). Annual; marshy ground, known only from the Bitter Lake Refuge in Chaves County. The large seeds are valuable for wildlife. Fig. 367.

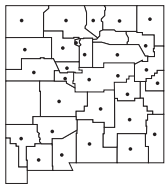


8 Terminal panicles 3-15 cm long; shoots mostly 0.2-0.7 m tall

9 Panicles lobed; disarticulation above the glumes, the upper floret falling away from the spikelet; upper lemma smooth and shiny; spikelets about 3 mm long…****S. italica*** (Linnaeus) Beauvois FOXTAIL MILLET (of Italy). Annual; a cultivated crop in many parts of the world, also present in birdseed mixes, escaping but rarely persisting for long. Very similar to the next and perhaps not specifically distinct. Fig. 368.



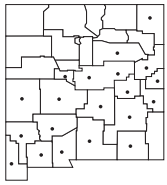
9 Panicles not lobed, cylindrical; disarticulation below the glumes; upper lemma transversely wrinkled; spikelets 1.8-2.2 mm long…****S. viridis*** (Linnaeus) Beauvois GREEN BRISTLEGRASS (green). Annual; common weed in disturbed ground, widespread. Very similar to the preceeding and perhaps not specifically distinct. Children (and young-at-heart grassy old folks) play wooly-bear caterpillar with the seedheads, by squeezing the inflorescence in the hand and watching it wiggle. Fig. 369.



6 Plants perennial

10 Palea of the lower floret nearly as long as the palea of the upper floret; spikelets mostly 1.9-2.1 mm long, appearing globose; blades, at least some, 7-15 mm wide…***S. macrostachya*** Kunth PLAINS BRISTLEGRASS (large-spiked). Perennial; rocky hills of the southern mountains in the bootheel region.

10 Palea of the lower floret 1/2 to 3/4 as long as the palea of the upper floret; spikelets 2.1-2.7 mm long, not globose; blades typically 2-5(7) mm wide…***S. leucopila*** (Scribner & Merrill) K. Schumann PLAINS BRISTLEGRASS (white-haired) [*Setaria macrostachya* of many U.S. authors]. Perennial; plains, rocky hills and slopes, widespread. Scarcely distinct from the previous. A strain is known south of Carlsbad that produces vigorous rhizomes. Fig. 370.



SORGHASTRUM INDIANGRASS

[*Sorghum*, a genus of grass, and L. *astrum*, a poor imitation of, alluding to the resemblance to the genus *Sorghum*] (Panicoideae: Andropogoneae)

Tall plants with short rhizomes. Sheaths with erect lobes or auricles at the collars. Inflorescence a panicle. Spikelets coppery or rusty colored, hairy, awned, disarticulating below the glumes, the panicle branches breaking apart.

S. nutans (Linnaeus) Nash INDIANGRASS (nodding). Perennial; grasslands, open woods, prairies, and moist rocky hillsides, widespread. A tall handsome plant with golden panicles, with potential as a ornamental. Several cultivars have been developed for forage and pasture use. A form with pinkish rather than chestnut-colored hairs is known from the southwestern mountains. Fig. 371.

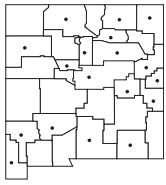


Fig. 369 *Setaria viridis,* Green Bristlegrass

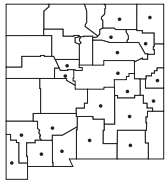
Fig. 370 *Setaria leucopila,* Plains Bristlegrass

Fig. 371 *Sorghastrum nutans,* Indiangrass

Fig. 372 *Sorghum halepense,* Johnsongrass

SORGHUM SORGHUM
[from *sorgho*, the French name of the plant] (Panicoideae: Andropogoneae)

Blades flat with a prominents midrib. Inflorescence a panicle. Spikelets ovate-lanceolate, awned (though the awn deciduous), disarticulating below the glumes.



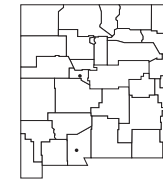
1 Plants perennial, with strong rhizomes; rame segments breaking apart easily…****S. halepense*** (Linnaeus) Persoon JOHNSONGRASS (of Aleppo, Turkey). Perennial; an aggressive weed of fields, ditches, and moist waste places, widespread. Johnsongrass may accumulate cyanide under stress conditions and become toxic to livestock, but it can also provide valuable forage. In the words of Wooton and Standley (1912): "It has very pronounced enemies and some friends, because under certain conditions it is a very troublesome plant and under others it is quite beneficial." The name remembers William Johnson of Alabama, who was active in promoting this grass for forage in the mid-1800s. Fig. 372.

1 Plants annual, lacking rhizomes; rame segments persistent, not breaking apart easily…****S. bicolor*** (Linnaeus) Moench SORGHUM, MILO (two-colored). Annual; introduced as a cultivated crop, infrequently escaping along fields but not persisting long. Of the many races and cultivated forms, one may recognize two subspecies in New Mexico that seem to comprise most of the variation:

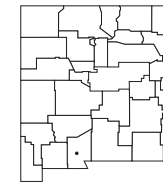
Fig. 373 *Sorghum bicolor* subsp. *bicolor,* Sorghum, Milo

Fig. 374 *Sorghum bicolor* subsp. *xdrummondii,* Sudangrass

a Panicle axis much thicker than the branches, tough; blades more than 2 cm wide; grains exceeding glumes, exposed…subsp. ***bicolor*** [*Sorghum vulgare Persoon*]. Cultivated races include grain sorghum, sweet sorghum or sorgo, pop sorghum (like popcorn), and broomcorn (used in the making of whisk brooms; not broomcorn millet, which is *Panicum miliaceum*); it also may be used in the brewing of beer. Fig. 373.



a Panicle axis only slightly thicker than the branches, fragile; blades less than 2 cm wide; grains enclosed by the glumes…subsp. ***xdrummondii*** (Nees ex Steudel) deWet SUDAN-GRASS (for Thomas Drummond, Scottish botanical explorer) [*Sorghum sudanense* (Piper) Stapf]. Adventive around and in crop fields. A hybrid between the two subspecies, called Scotchman, has recently found favor as a pasture and hay grass. Fig. 374.



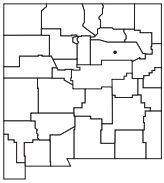
SPARTINA CORDGRASS

[Gr. *spartine*, a cord made from *Spartium junceum* (Spanish broom, a leguminous shrub), alluding to the cord-like, tough leaf blades of some species] (Chloridoideae: Cynodonteae)

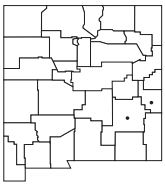
Plants strongly rhizomatous. Inflorescence a panicle of spike-like branches. Spikelets one-flowered, flattened, eventually disarticulating below the glumes.

Fig. 375 *Spartina gracilis,* Alkali Cordgrass

Fig. 376 *Spartina pectinata,* Prairie Cordgrass



1 Blades mostly less than 5 mm wide; panicle branches mostly less than 8 in number, 2-4 cm long…***S. gracilis*** Trinius ALKALI CORDGRASS (slender). Perennial; marshes and wet prairies, known only from San Miguel County. Fig. 375.



1 Blades more than 5 mm wide; panicle branches mostly 10 or more in number, 4-8 cm long…***S. pectinata*** Bosc ex Link PRAIRIE CORDGRASS (comb-like). Perennial; marshes and wet prairies on the eastern plains, uncommon. Fig. 376.

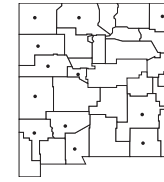
SPHENOPHOLIS WEDGESCALE

[Gr. *sphen*, wedge, and *pholis*, scale, alluding to the shape of the glumes]
(Pooideae: Poeae)

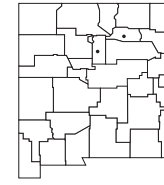
Inflorescence a shiny panicle. Spikelets 2- to 3-flowered, awnless, disarticulating below the glumes. Glumes dissimilar, wedge-shaped.

Fig. 377 *Sphenopholis obtusata,* Prairie Wedgescale

1 Second glume rounded to broadly obovate, somewhat hood-shaped, 1/3 to 1/2 as wide as long; panicles dense, spike-like…***S. obtusata*** (Michaux) Scribner PRAIRIE WEDGESCALE (blunt). Perennial; moist or wet ground along streams, springs, canals, and ditches; widespread. Fig. 377.



1 Second glume blunt to acute, oblanceolate, not hood-shaped, 1/6 to 1/3 as wide as long; panicles loose, somewhat open…***S. intermedia*** (Rydberg) Rydberg SLENDER WEDGESCALE (intermediate) [*Sphenopholis obtusata* (Michaux) Scribner var. *major* (Torrey) Erdman]. Perennial; moist ground in the forests; known only from San Miguel and Santa Fe counties. Sometimes confused with *Koeleria macrantha*, but that species has minutely fuzzy pedicels and panicle branches. Fig. 378.



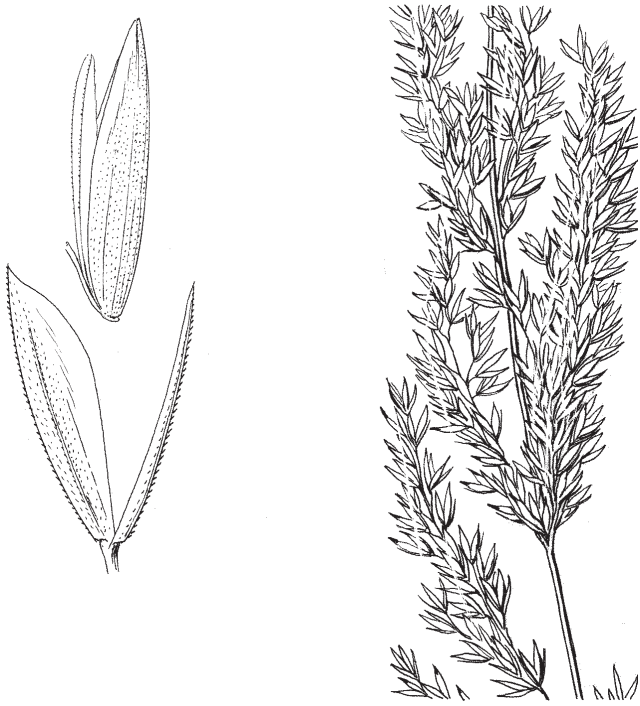


Fig. 378 *Sphenopholis intermedia,* Slender Wedgescale

SPOROBOLUS DROPSEED

[Gr. *spora*, *seed*, and *ballein*, to throw, alluding to the fact that the grain is not fused to the ovary, allowing it to drop from the panicle] (Chloridoideae: Eragrostideae)

Inflorescence a panicle. Spikelets tiny, one-flowered, awnless, disarticulating above the glumes. Lemmas one-nerved, glabrous. In the pioneer days in New Mexico and Arizona, dropseed grains were mixed with sugar and carried in a pouch or sack and used as a concentrated food. This was called 'pinole' or 'pinoche', a term often applied to any mixture of grain and sugar. Several of the perennial species have conspicuous tufts of hair at the summit of the sheaths: *S. contractus*, *S. cryptandrus*, *S. flexuosus*, and *S. giganteus*

1 Plants annual

2 Spikelets all less than 2 mm long; glumes very unequal; panicles narrow when in flower and open at maturity, the lower branches whorled, with 7-15 branches per node…***S. pyramidatus*** (Lamarck) A.S. Hitchcock WHORLED DROPSEED (pyramid-shaped, alluding to the panicle) [*Sporobolus pulvinatus* Swallen]. Annual; sandy plains, clay flats, disturbed ground, widespread. Fig. 379.

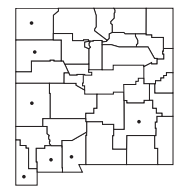
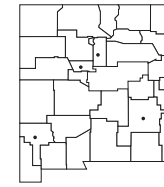


Fig. 379 *Sporobolus pyramidatus,* Whorled Dropseed

Fig. 380 *Sporobolus neglectus,* Puffsheath Dropseed

2 Spikelets, at least some, more than 2 mm long; glumes equal or nearly so; panicles narrow, the lower branches often included in the subtending sheath, with 1-3 branches per node

3 Florets glabrous; spikelets 1.6-3 mm long…
**S. neglectus* Nash PUFFSHEATH DROPSEED
(disregarded, not chosen). Annual; sandy fields, floodplains, stream banks, disturbed ground, scattered localities but not common. Axillary cleistogamous panicles of this and the next species yield seeds of two different sizes and growth patterns. Larger seeds at the tip of the panicle germinate in the spring after one overwintering period, and smaller seeds near the base of the panicle require two overwintering periods separated by a rest period (McGregor 1990). Fig. 380.



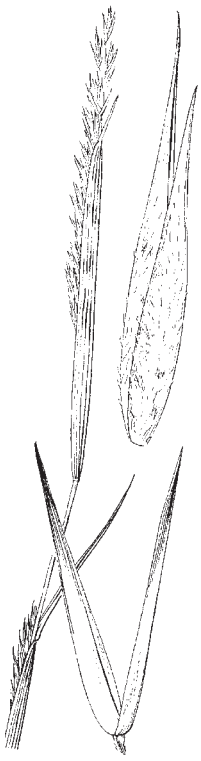
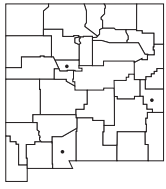


Fig. 381 *Sporobolus vaginiflorus,* Poverty Dropseed

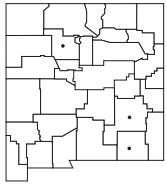
Fig. 382 *Sporobolus texanus,* Texas Dropseed

3 Florets pubescent; spikelets 2.3-6 mm long… ***S. vaginiflorus** (Torrey ex Gray) Wood POVERTY DROPSEED (sheathed flowers). Annual; sandy ground and disturbed ground, uncommon, known from old collections in Bernalillo and Doña Ana counties. Fig. 381.



1 Plants perennial

4 Lateral pedicels 5-25 mm long…**S. texanus** Vasey TEXAS DROPSEED (of Texas). Perennial; low plains, marshes, and swales, uncommon. Fig. 382.

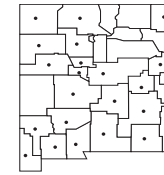


4 Lateral pedicels 4 mm or less long

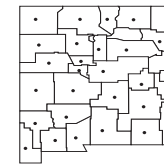
5 Spikelets 1-2(2.9) mm long

6 Panicles dense and spike-like, the branches appressed

7 Stems robust, 1-2 m tall, 2-7 mm in diameter at the base…***S. giganteus*** Nash GIANT DROPSEED (gigantic, mighty). Perennial; sandy hills and plains, widespread. Fig. 383.

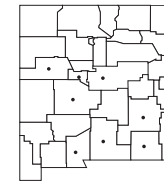


7 Stems more slender, commonly less than 1 m tall, 1.5-3.5 mm in diameter at the base…**S. contractus** A.S. Hitchcock SPIKE DROPSEED (contracted, drawn together). Perennial; sandy hills and plains, widespread. Fig. 384.



6 Panicles open, the branches spreading at least from the middle and at the tip, the lower portion often enclosed in the subtending sheath

8 Base of the plant knotty, nearly rhizomatous; blades stiff, spreading at right angles; stems mostly less than 30 cm tall…***S. nealleyi*** Vasey GYPGRASS (for Greanleaf Cilley Nealley, USDA botanical collector). Perennial; sandy, alkaline, and mostly gypsiferous plains and flats. Clumps tend to die in the middle, forming circular "bird nests." Fig. 385.



8 Base of plant tufted, not knotty; blades erect or ascending; stems often taller than 30 cm (except *S. pyramidatus*)

9 Primary panicle branches with sticky glandular streaks or patches; lowermost branches in definite whorls; stems 10-60 cm tall…***S. pyramidatus*** (Lamarck) A.S. Hitchcock [see lead 2, above]

9 Primary panicle branches lacking any sticky glandular patches; lowermost branches whorled or not, often in the sheath; stems often 40-120 cm or more tall

10 Sheaths with many long hairs at the summit; roots thin

11 Mature panicles nodding, the branches and pedicels divaricate and flexuous, usually tangled with other branches or other panicles; hairs at the collar 1-1.5 mm long; first glume 1-1.3 mm long…***S. flexuosus*** (Thurber ex Vasey) Rydberg MESA DROPSEED (bent, curved, flexuous). Perennial; sandy plains and mesas, widespread. Panicle branches eventually break off, leaving the recurved, swollen base with a tiny spine-remnant of the branch. Fig. 386.

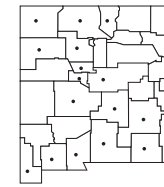


Fig. 383 *Sporobolus giganteus,* Giant Dropseed

Fig. 384 *Sporobolus contractus,* Spike Dropseed

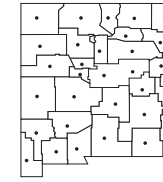
Fig. 385 *Sporobolus nealleyi,* Gypgrass

Fig. 386 *Sporobolus flexuosus,* Mesa Dropseed

Fig. 387 *Sporobolus cryptandrus,* Sand Dropseed

Fig. 388 *Sporobolus airoides,* Alkali Sacaton

11 Mature panicles erect, often entirely included in the sheath, the branches erect to spreading but not at all flexuous nor tangled; hairs at the collar 2-4 mm long; first glume 0.5-1(1.5) mm long…***S. cryptandrus*** (Torrey) A. Gray SAND DROPSEED (hidden man or stamen). Perennial; sandy plains, mesas, roadsides, waste places, throughout the state. Fig. 387.



10 Sheaths glabrous or with only a few long hairs at the summit; roots thick

12 Panicles 10-45 cm long; branchlets naked below, the pedicels 0.5-2 mm long, often spreading…***S. airoides*** (Torrey) Torrey ALKALI SACATON (resembling the grass genus Aira). Perennial; sandy, gravely, clayey plains, flats, mesas, playas, floodplains, throughout the state. Clumps grow to nearly a meter across, and floodplains and playa beds can be covered with an almost solid expanse of these plants. Palatable only when green. Fig. 388.

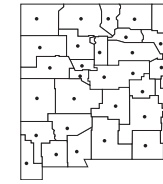
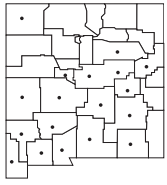


Fig. 389 *Sporobolus wrightii,* Giant Sacaton

Fig. 390 *Sporobolus compositus,* Tall Dropseed

12 Panicles 20-60 cm long; branchlets densely flowered to the base, the pedicels less than 0.5 mm long, appressed to the branchlets…***S. wrightii*** Munro ex Scribner GIANT SACATON (for Charles Wright, botanical collector for Asa Gray) [*Sporobolus airoides* (Torrey) Torrey var. *wrightii* (Scribner) Gould]. Perennial; swales, playas, ditches, often in hard-packed soil, though not as tolerant of alkali as the preceeding; widespread. According to Wooton and Standley (1912), it was preferred by liverymen over alfalfa for hay for buggy horses rented out to hard service. Used as an ornamental in some boulevard medians in Albuquerque. Fig. 389.



5 Spikelets, at least some, 3 mm or more long 13 Second glume shorter than the lemma, the floret extending beyond the glume…***S. compositus*** (Poiret) Merrill TALL DROPSEED (put together, joined) [*Sporobolus asper* (Beauvois) Kunth]. Perennial; plains and grasslands, sometimes roadsides, in scattered localities. Smaller inflorescences are almost always produced in the axils of the sheaths. Fig. 390.

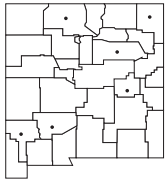
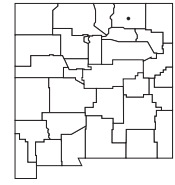


Fig. 391 *Sporobolus heterolepis,* **Prairie Dropseed**

13 Second glume equal to or longer than the lemma, the floret not extending beyond the glume, but often surpassed by it

14 Panicles usually spike-like; spikelets 2.5-3.5 mm long; grain not globe-shaped; blades as much as 10 mm wide…***S. giganteus*** Nash [see lead 7, above]

14 Panicles usually loose, the branches spreading; spikelets 4-6 mm long; grain globe-shaped; blades 1-2 mm wide…***S. heterolepis*** (A. Gray) A. Gray PRAIRIE DROPSEED (different scale, alluding to the two glumes). Perennial; grasslands and woodlands in the northeastern counties. Fig. 391.

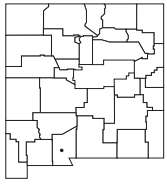


STENOTAPHRUM ST. AUGUSTINEGRASS

[Gr. *stenos*, narrow, and *taphros*, trench, referring to the cavities in the thickend rachis]
(Panicoideae: Paniceae)

Plants turf-forming from creeping stolons. Blades blunt, thick and semi-succulent. Inflorescence a thick spike. Spikelets borne in pairs on one side of the spike, awnless.

Fig. 392 *Stenotaphrum secundatum,* St. Augustinegrass



***S. secundatum** (Walter) Kuntze ST. AUGUSTINEGRASS (one-sided, referring to the arrangement of the spikelets on the fleshy spike). Perennial; cultivated as a coarse-textured lawn grass for shaded areas in the southern counties; apparently native to the West Indies and perhaps southward, but it was present along the southeastern coast before 1800, whence the common name. Seed production is practically nil, and sod must be planted by plugs. A form with longitudinally striped leaves (var. *variegatum* A.S. Hitchcock) is sometimes grown as a hanging basket plant. Fig. 392.

Stipa

Recent studies in the Stipeae have resulted in the relegation of all North American members of *Stipa* to five segregate genera, which are keyed below. The genus *Stipa* remains an Eurasion taxon.

a Palea hardened, longitudinally grooved and slightly longer than the lemma, protruding from between the lemma margins as a small point; lemma margins involute, fitting into the grooves of the palea…***Piptochaetium***

a Palea usually membranous, not grooved, shorter than or equaling the lemma, not protruding as a small point; lemma margins flat

b Lemma margins strongly overlapping; palea less than 1/3 the length of the lemma, glabrous, lacking veins…***Nassella***

Fig. 393 *Torreyochloa pallida,* Weak Mannagrass

b Lemma margins not or only slightly overlapping; palea 1/3 to equaling the length of the lemma, always pubescent when short, sometimes glabrous when longer, 2-veined

c Awns 6-20 cm long or more; glumes longer than 1.8 cm…***Hesperostipa***

c Awns 0.5-7.5 cm long, if longer than 6 cm then the glumes 1-1.5 cm long

d Palea pubescent, the apex flat, the veins terminating below the apex; lemma coriaceous at maturity but not strongly indurate…***Achnatherum***

d Palea glabrous or pubescent, the apex appearing prow-tipped or pinched, the veins extending to the apex; lemma indurate at maturity

e Florets dorsally compressed; lemma margins not overlapping, the palea exposed, at least in part…***Piptatherum***

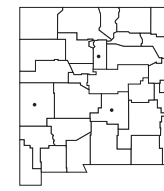
e Florets terete; lemma margins slightly overlapping, the palea hidden…***Oryzopsis***

TORREYOCHLOA MANNAGRASS

[for John Torrey (d. 1873), celebrated New England botanist] (Pooideae: Poeae)

Plants rhizomatous. Sheath margins overlapping. Inflorescence a panicle. Spikelets several-flowered, awnless, disarticulating above the glumes. Lemmas with several parallel nerves. Sometimes placed in the genera *Puccinellia* or *Glyceria*.

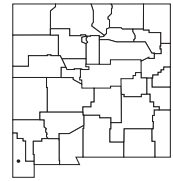
T. pallida (Torrey) Church var. ***pauciflora*** (J.S. Presl) J.I. Davis WEAK MANNAGRASS (pale; few-flowered) [*Glyceria pauciflora* Presl, *Torreyochloa pauciflora* (Presl) Church]. Perennial; wet ground of high-mountain streams and fresh-water ponds, where it is eagerly grazed by elk. Fig. 393.



TRACHYPOGON CRINKLE-AWN

[Gr. *trachys*, rough, and *pogon*, beard, alluding to the plumose awns] (Panicoideae: Andropogoneae)

Inflorescence a persistent spike. Spikelets in pairs, the sessile one sterile and awnless, the pedicelled one fertile and long-awned.

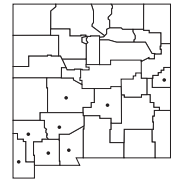


T. secundus (Presl) Scribner CRINKLE-AWN (one-sided, alluding to the arrangement of the spikelets). Perennial; rocky hills and slopes in the mountains of the bootheel region. Proposals have been made to submerge this name within *Trachypogon plumosus* (Humboldt & Bonpland ex Willdenow) Nees or *T. spicatus* (Linnaeus) Kuntze, but this seems to warrant more careful study and the name *T. secundus* is maintained in the traditional sense. Fig. 394.

TRAGUS BURGRASS

[Gr. *tragos*, male goat, in honor of Hieronymus Bock (d. 1554), whose surname translates into Greek as *Tragus*] (Chloridoideae: Cynodonteae)

Blades with stiff hairs along the margins. Inflorescence spike-like. Spikelets clustered in burs of 2-5 spikelets, the fur falling as a unit when mature. Glumes with prominent hooked prickles.

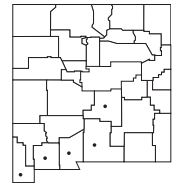


****T. berteronianus*** Schultes SPIKE BURGRASS (for Carlo Giuseppe Bertero, Italian botanist and explorer) [*Nazia aliena* of authors]. Annual; disturbed ground in the desert plains and bajadas. *Tragus racemosus* (Linnaeus) Allioni has been reported for the state, but no validating specimens have been located. It differs from *T. berteronianus* in having larger clusters ("burs") with 2-4 fertile and 1-2 sterile spikelets, rather than the smaller clusters with a single fertile and a single sterile spikelet of *T. berteronianus*. Fig. 395.

TRICHLORIS FALSE-RHODESGRASS

[L. *tres*, three, and *Chloris*, referring to the three-awned lemmas and the resemblance to the genus *Chloris*] (Chloridoideae: Cynodonteae)

Inflorescence a panicle, the branches whorled at the tip. Spikelets with a single floret and 1-2 reduced florets above it, disarticulating above the glumes. Lemmas 3-nerved and 3-awned. Placed within *Chloris* in previous works, but easily distinguished by its 3-awned lemmas.



T. crinita (Lagasca) Parodi FALSE RHODESGRASS (hairy) [*Chloris crinita* Lagasca]. Perennial; disturbed ground, moist fields and drainages in the desert grasslands. Occasionally used by local florists in dried bouquets. Fig. 396.

TRIDENS TRIDENS

[L. *tres*, three, and *dens*, tooth, alluding to the tip of the lemma] (Chloridoideae: Eragrostideae)

Inflorescence a panicle, sometimes few-flowered and raceme-like. Spikelets several-flowered, disarticulating above the glumes. Lemmas 3-nerved, awnless or slightly awn-tipped, in most species with prominent hairs on the nerves.

Fig. 394 *Trachypogon secundus,* Crinkle-Awn

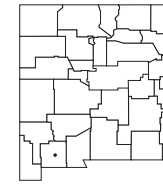
Fig. 395 *Tragus berteronianus,* Spike Burgrass

Fig. 396 *Trichloris crinita,* False Rhodesgrass

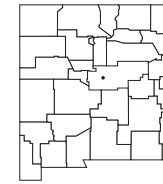
Fig. 397 *Tridens eragrostoides,* Lovegrass Tridens

1 Panicles open, loose, the branches spreading to drooping

2 Lemmas 2-3 mm long, only the midnerve projecting as a short point…*__T. eragrostoides__ (Vasey & Scribner) Nash LOVEGRASS TRIDENS (resembling the genus *Eragrostis*). Perennial; desert plains and bajadas in brushy country; known from a single collection in Luna County. Fig. 397.

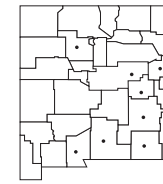


2 Lemmas 4-4.5 mm long, the midnerve and lateral nerves projecting as short points…*__T. flavus__ (Linnaeus) A.S. Hitchcock PURPLE-TOP (yellow). Perennial; prairies and grassy hills; known from a single collection in Torrance County and perhaps not persisting. Inflorescence branches are covered with glandular dots. Occasionally found in dried bouquets. Fig. 398.



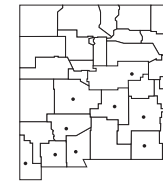
1 Panicles narrow, contracted, the branches erect

3 Nerves of the lemma glabrous or pubescent only at the base…__T. albescens__ (Vasey) Wooton & Standley WHITE TRIDENS (becoming white) [*Triodia albescens* Vasey]. Perennial; low swales and ditch banks in the plains, deserts, and prairies. Fig. 399.

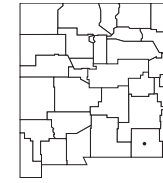


3 Nerves of the lemma plainly pubescent…__T. muticus__ (Torrey) Nash SLIM TRIDENS (awnless). Perennial. We have two varieties:

a Second glume 1-nerved, typically 5 mm or less long, occasionally longer…var. __muticus__ Dry flats and hills, often on limestone, widespread in the southern and central regions. Fig. 400.



a Second glume 3- to 7-nerved, typically 6-8 mm long…var. __elongatus__ (Buckley) Shinners ROUGH TRIDENS (elongate) [*Tridens elongatus* (Buckley) Nash]. Slightly more mesic sites than the above, in the southeastern region, uncommon. Fig. 401.



TRIPLASIS SANDGRASS

[Gr. *triplasios*, trifarious, alluding to the lemma tip] (Chloridoideae: Eragrostideae)

Sheaths often inflated, with axillary cleistogamous spikelets. Inflorescence a few-flowered panicle or raceme. Spikelets few-flowered, disarticulating above the glumes. Lemmas ciliate on the three nerves, awn-tipped. Palea copiously hairy.

Fig. 398 *Tridens flavus,*
Purple-Top

Fig. 399 *Tridens albescens,*
White Tridens

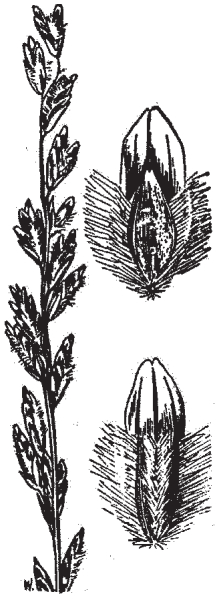


Fig. 400 *Tridens muticus,*
Slim Tridens

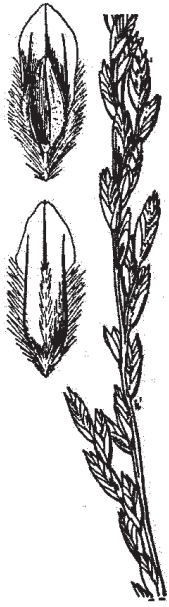
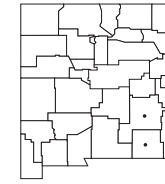


Fig. 401 *Tridens elongatus,*
Rough Tridens

Fig. 402 *Triplasis purpurea,* Purple Sandgrass

Fig. 403 *Tripsacum lanceolatum,* Mexican Gamagrass

T. purpurea (Walter) Chapmman PURPLE SANDGRASS (reddish, violet, purple). Annual; hot sandy flats, dunes, and plains, disturbed ground, in the southeastern region. Small, vestigial inflorescences are produced in the swollen sheath axils, which are blown about when old culms break into internode segments. Fig. 402.



TRIPSACUM GAMAGRASS

[Gr. *tribein*, to rub, alluding to the smooth joints of the female spikelets]

(Panicoideae: Andropogoneae)

Large, tussocky grasses with flat blades. Inflorescence a panicle of spike-like branches. Spikelets unisexual, dissimilar, the female ones bony and at the base of each branch, the male ones chaffy and extending to the ends of the branches.

T. lanceolatum Ruprecht ex Fournier MEXICAN GAMAGRASS (lance-shaped). Perennial; moist canyon bottoms and hills of the bootheel region. Known from a single collection from Hidalgo County in the late 1800s; probably now extirpated from the state. Fig. 403.

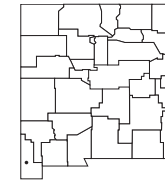


Fig. 404 *Trisetum wolfii,*
Wolf's Trisetum

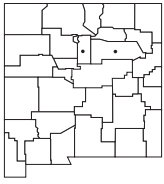
Fig. 405 *Trisetum interruptum,*
Prairie Trisetum

TRISETUM TRISETUM

[L. *tres*, three, and *seta*, bristle, alluding to the awn and 2 lateral teeth of the lemma apex]
(Pooideae: Poeae)

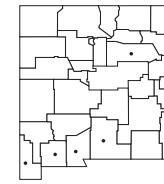
Inflorescence a narrow panicle, the short branches puberulent. Spikelets 2- or 3-flowered, disarticulating above the translucent glumes. Lemmas awned from the back (awnless in one species).

1 Lemmas awnless or more commonly with short awns less than 2 mm long, scarcely visible…***T. wolfii*** Vasey
WOLF'S TRISETUM (for John Wolf, Illinois botanist and naturalist on the Wheeler expedition to the west). Perennial; marshy ground around seeps and springs at high elevations in the montains. Sometimes confused with *Festuca thurberi*, but in that species the lemmas are awn-tipped (rather than short-awned from the back) and the blades narrower. Fig. 404.



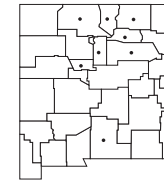
1 Lemmas with awns longer than 3 mm, easily visible

2 Plants annual; spikelets disarticulating below the glumes and falling as a unit…***T. interruptum*** Buckley PRAIRIE TRISETUM (severed, interruped). Annual; dry, rocky, desert hills, mostly in the southern counties. Fig. 405.

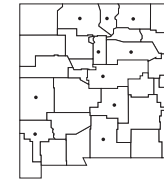


2 Plants perennial; spikelets disarticulating above the glumes and between the florets

3 Panicles dense and spike-like, the branches mostly less than 1 cm long and erect-appressed; stems 5-50(75) cm tall; leaves mostly basal…***T. spicatum*** (Linnaeus) Richter SPIKE TRISETUM, SPIKE OATS (spike-like). Perennial; alpine to subalpine ridges, slopes, and forest clearings, mostly in the northern mountains. This is a circumboreal species that has been divided into as many as 14 subspecies by some European botanists. It intergrades somewhat with the next, which is mostly found at lower elevation. Fig. 406.



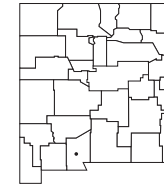
3 Panicles loose and more-or-less open, the branches mostly 2-6 cm long and spreading; stems usually (30)40-80 cm tall; leaves mostly cauline…***T. montanum*** Vasey ROCKY MOUNTAIN TRISETUM (of the mountains) [*Trisetum spicatum* (Linnaeus) Richter subsp. *montanum* (Vasey) Weber]. Perennial; mountain woodlands and grasslands, clearings, grassy slopes. Intergrades somewhat with the previous, which is mostly found at higher elevations. Fig. 407.



x**TRITICOSECALE** TRITICALE

[combination of *Triticum* and *Secale*] (Pooideae: Hordeae)

Tufted annuals resembling wheat, with well-developed foliage. Inflorescence a spike with a single spikelet at each node. Spikelets several-flowered, disarticulating above the glumes, which are broad and rigid. Lemmas awned.



*x***Triticosecale** Wittman ex A. Camus TRITICALE [x*Triticale* Tschermak-Seysenegg ex Müntzing]. Annual; a rather common, though non-persistent, waif of agriculture. The name x*Triticosecale* refers to artificial hybrids between wheat (*Triticum*) and rye (*Secale*). There is no valid specific epithet, and the crop generally goes by the common name, triticale. Cultivars may be referred to in the normal way, e.g., x*Triticosecale* 'Newton' or x*Triticosecale* 'Bokolo'. The hybrid has been known since the late 1800s, but not until the last 50 years or so has the crop been developed commercially. The genetics of the crop are extremely complex, involving multiple hybridizations, backcrossings, and artificially induced chromosome doubling. The morphological variation is correspondingly diverse, and a plant rarely falls strictly intermediate to the two parents. Triticale is most commonly confused with wheat, since the glumes are broad in both, but triticale is usually glaucous and has lemma nerves converging toward the apex.

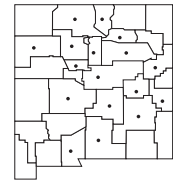
Fig. 406 *Trisetum spicatum,* Spike Trisetum

Fig. 407 *Trisetum montanum,* Rocky Mountain Trisetum

TRITICUM WHEAT

[Roman common name for wheat, deriving ultimately from *tero*, to grind]
(Pooideae: Hordeae)

Auricles often developed at the corners of the sheaths. Inflorescence a spike. Spikelets few- to several-flowered, borne singly at the nodes, disarticulating above the glumes and either between the florets or the rachilla continuous. Glumes broad and rigid. Lemmas awned or awnless. Numerous strains are known in cultivation.



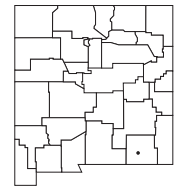
****T. aestivum*** L. WHEAT (of the summer). Annual; internodes hollow; cultivated crop in most regions of the state. This is the common bread wheat of agriculture, the "staff of life", a hexaploid derived from a wild goatgrass (*Aegilops* sp.) and emmer wheats. Both awned (bearded) and awnless (beardless) forms exist in cultivation. Artificial hybrids between wheat and rye (*Secale*) are found in x*Triticosecale* (q.v.), which may be easily confused with wheat but are usually more glaucous and with the nerves of the lemma converging toward the apex. Sometimes confused with barley (*Hordeum vulgare*) and rye (*Secale cereale*), q.v. Fig. 408.

UROCHLOA SIGNALGRASS

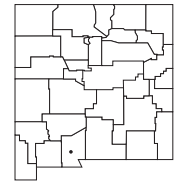
[Gr. *oura*, tail, and *chloa*, grass, in reference to the tail-like bristle terminating the upper lemma of *U. panicoides*] (Panicoideae: Paniceae)

Blades flat. Inflorescence a panicle of spike-like branches. Spikelets disarticulating below the glumes, awnless except for a stiff bristle on the upper floret on some species. Our native species were formerly classed in the genera *Brachiaria* and (before that) *Panicum*.

1 Spikelets with conspicuous and dense villous hairs (easily visible without magnification) on the second glume and lemma of lower floret…***U. ciliatissima*** (Buckley) R.D. Webster FRINGED SIGNALGRASS (very fringed) [*Brachiaria ciliatissima* (Buckley) Chase]. Annual; sandy plains and desert grasslands; uncommon in the southeastern region. Fig. 409.



1 Spikelets glabrous or with short, inconspicuous hairs (hardly visible without magnification)



2 Leaf margins noticeably crinkled; lemma of upper floret with a stiff bristle projecting from an otherwise blunt apex…****U. panicoides*** Beauvois LIVERSEED GRASS (resembling the genus *Panicum*). Annual; weedy ground along sidewalks, in flower beds, lawns, waste ground. This grass is listed as a noxious weed by the federal government, and is found in a few localities in Doña Ana County, and it appears to be spreading slowly. The recent Flora of North America treatment for *Urochloa* reports that populations of this species in New Mexico have been destroyed, but a new site was found as recently as December 2003.

2 Leaf margins not crinkled, smooth; lemma of the upper floret without a bristle, the apex rounded to acute

Fig. 408 *Triticum aestivum,* Wheat

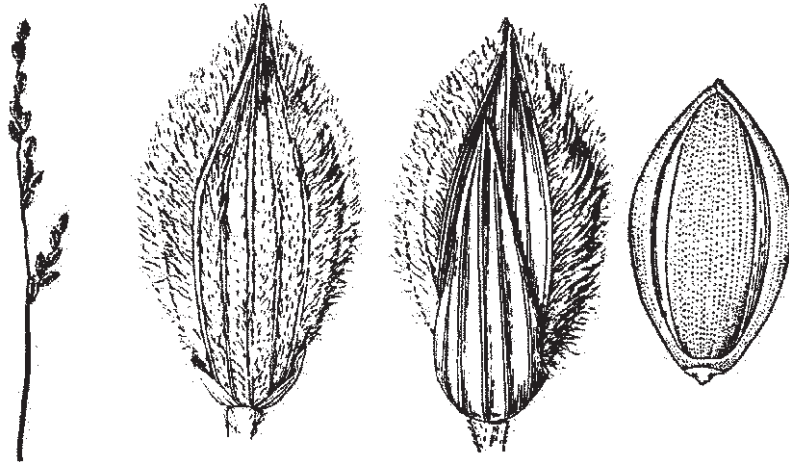
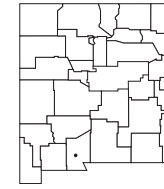


Fig. 409 *Urochloa ciliatissima,* Fringed Signalgrass

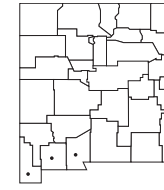
Fig. 410 *Urochloa texana,* Texas Signalgrass

3 Spikeletes 5-6 mm long; plants often 50 cm or more tall…***U. texana*** (Buckley) R.D. Webster TEXAS SIGNALGRASS (of Texas) [*Brachiaria texana* (Buckley) S.T. Blake, *Panicum texanum* Buckley]. Annual; disturbed weedy ground; uncommon in the southern region. Also called TEXAS MILLET because of the large grains. Fig. 410.

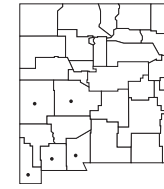


3 Spikelets 2-4 mm long; plants rarely taller than 50 cm and usually much shorter (in ours)

4 Spikelets glabrous or nearly so, mostly 2-3 mm long, the base ± truncate; upper lemma with deep transverse furrows…***U. fusca*** (Swartz) Hansen & Wunderlin BROWNTOP SIGNALGRASS (in a bundle) [*Brachiaria fasciculata* (Swartz) Parodi, *Panicum fasciculatum* Swartz var. *reticulatum* (Torrey) Beal, *Urochloa fasciculata* (Swartz) R.D. Webster]. Annual; disturbed ground of the southwestern region. This and the next intergrade somewhat and not all spikelets match all the features in the key. Fig. 411.



4 Spikelets definitely puberulent, mostly 3-4 mm long, the base drawn out somewhat and attenuate; upper lemma with minute bumps but lacking obvious transverse furrows…***U. arizonica*** (Scribner & Merrill) Morrone & Zuloaga ARIZONA SIGNALGRASS (of Arizona) [*Brachiaria arizonica* (Scribner & Merrill) S.T. Blake, *Panicum arizonicum* Scribner & Merrill]. Annual; disturbed ground and rocky slopes in the deserts and woodlands of the southwestern region. This and the previous intergrade somewhat and not all spikelets match all the features in the key. Fig. 412.



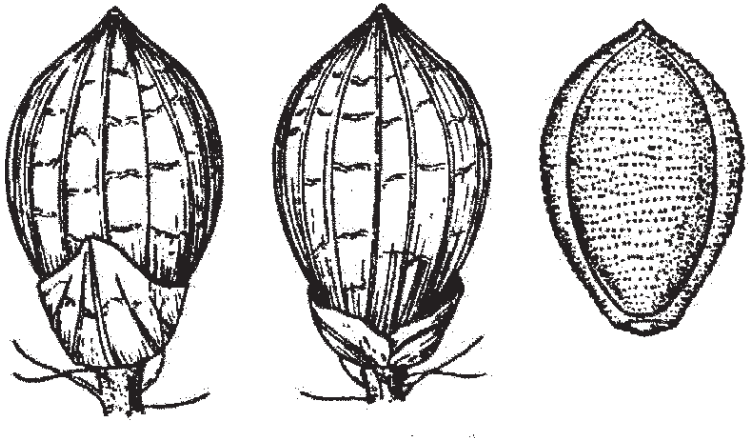


Fig. 411 *Urochloa fusca,* Browntop Signalgrass

Fig. 412 *Urochloa arizonica,* Arizona Signalgrass

Fig. 413 *Vulpia myuros,*
Rattail Sixweeks-Fescue

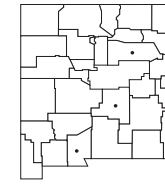
Fig. 414 *Vulpia hirsuta,*
Rattail Sixweeks-Fescue

VULPIA SIXWEEKS-FESCUE

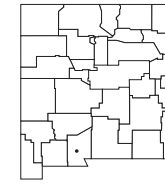
[L. *vulpes*, fox, alluding to the resemblance of some inflorescences to fox tails]
(Pooideae: Poeae)

Annuals with scant foliage. Inflorescence a few-flowered panicle or raceme. Spikelets several-flowered, awned, disarticulating above the glumes and betweent the florets. These species have been treated in *Festuca*, from which they differ in being annual and having only a single anther in each floret.

1 First glume less than 1/2 the length of the second glume, often nearly absent…***V. myuros*** (Linnaeus) K.C. Gmelin RATTAIL SIXWEEKS-FESCUE (mouse-tail) [*Festuca myuros* Linnaeus]. Annual; dry, disturbed ground, mostly in the southern regions. We have two varieties:



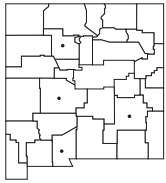
a Lemmas not ciliate on the margins near the tip; awn of the lowermost floret 7.5-17 mm long…var. ****myuros*** This is the exotic race. Fig. 413.



a Lemmas ciliate on the margins near the tip; awn of the lowermost floret 9.5-22 mm long…var. ***hirsuta*** Hackel (shaggy, bristly) [*Festuca megalura* Nuttall]. This is the native race. Fig. 414.

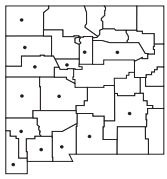
1 First glume more than 1/2 the length of the second glume

2 Spikelets with 5-17 florets when mature, the internodes of the rachilla averaging about 0.5 mm long; awns 0.5-6 mm long…***V. octoflora*** (Walter) Rydberg SIXWEEKS-FESCUE (eight-flowered) [*Festuca octoflora* Walter]. Annual; dry, disturbed ground, roadsides, rocky slopes and plains, widespread. We have three varieties:



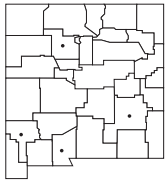
a Spikelets, excluding the awns, mostly 4-5.5 mm long; awn of lowermost floret 0.3-3 mm long…var. ***glauca*** (Nuttall) Fernald (bluish) [*Festuca tenella* Willdenow].

a Spikelets, excluding the awns, mostly 5-10 mm long; awn of lowermost floret2.5-6(9) mm long



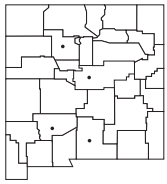
b Lemma glabrous or slightly scabrous on the back, often scabrous on the margin…var. ***octoflora*** Fig. 415.

b Lemma prominently long-scabrous to densely pubescent on the back, at least near the tip…var. ***hirtella*** (Piper) Henrard (slightly bristly).

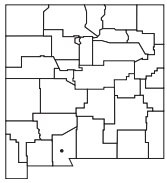


2 Spikelets with 2-4(8) florets when mature, the internodes of the rachilla averaging about 1 mm long; awns 3-20 mm long

3 Panicle branches and pedicels erect at maturity, without swellings in the axils…****V. bromoides*** (Linnaeus) S.F. Gray BROME SIXWEEKS-FESCUE (resembling the genus *Bromus*) [*Festuca dertonensis* (Allioni) Ascherson & Graebner]. Annual; dry, disturbed ground. Fig. 416.



3 Panicle branches or pedicels spreading or reflexed at maturity, at least below, with swellings usually present in the axils…***V. microstachys*** (Nuttall) Munro in Bentham SMALL SIXWEEKS-FESCUE (with a small spike) [*Festuca microstachys* Nuttall]. Dry, disturbed ground in the southern regions. We have two varieties:



a Spikelets pubescent…var. ***microstachys*** Doña Ana County. Fig. 417.

a Spikelets glabrous…var. ***pauciflora*** (Scribner ex Beal) Lonard & Gould (few-flowered) [*Festuca pacifica* Piper]. Hidalgo County. Fig. 418.

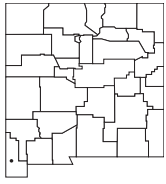


Fig. 415 *Vulpia octoflora,* Sixweeks-Fescue

Fig. 416 *Vulpia bromoides,* Brome Sixweeks-Fescue

Fig. 417 *Vulpia microstachys,* Small Sixweeks-Fescue

Fig. 418 *Vulpia pauciflora,* Small Sixweeks-Fescue

Fig. 419 *Zea mays,* Corn, Maize

ZEA CORN
[Gr. *zeia*, a kind of grain] (Panicoideae: Andropogoneae)

Tall, robust, annual grasses with broad, flat blades, often developing proproots at the base of the shoot. Spikelets unisexual and borne in different inflorescences, the male spikelets in tassles at the tips of the stems, the female spikelets borne on fleshy cobs and concealed in "ears" in the axils of the leaves. The "silk" of the ear are the styles and stigmas from the pistils.

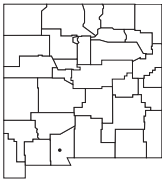
****Z. mays*** Linnaeus CORN, MAIZE (specific epithet of Caribbean origin). Annual; cultivated throughout the state. Our plants belong to subspecies *mays*. The other subspecies are native grasses of the southern Mexican highlands with hard, bony ears that are completely inedible. Corn is the only major domesticated cereal from the New World, and is a singularly human artifact, incapable of reproducing itself in the wild. It was a staple in the diet of most American Indians, and was unknown in the Old World until after Columbus. Allusions to corn in the Bible refer to wheat, rye, or some other grain. Most of the corn grown in the United States is 'hybrid corn,' being derived from crossing two inbred lines. Varieties of corn include pod, dent, flint, pop, flour, and sweet. Our intricate relationship with corn is celebrated in Mitchell, South Dakota, during the Corn Palace Festival, where a palace made of corn ears is contructed anew each year. Children (and adults) can be entertained by the whimsical rhyme (sung to the tune of "Four and Twenty Blackbirds…"): "Sing a song of popcorn when the snowstorms rage; fifty little round men put into a cage; shake them till they laugh and leap crowding to the top; watch them burst their little coats, pop, pop, pop." They probably don't sing this song in Corn, Oklahoma, however, as the name of this Mennonite community comes from the German korn, meaning grain, referring to their fields of wheat. Fig. 419.

Fig. 420 *Zoysia matrella,* Manilla Zoysiagrass

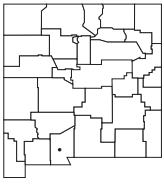
ZOYSIA ZOYSIAGRASS

[for Karl von Zois, Austrian botanist of 1700s] (Chloridoideae: Cynodonteae)

Low, turf-forming grasses from creeping rhizomes, introduced from Asia as lawn and fairway grasses in the southern regions. Inflorescence a spike-like raceme. Spikelets one-flowered, awnless, disarticulating below the glumes. The two species are difficult to distinguish, and have been hybridized to produce turf strains, futher leading to intergradation in form. They are not known outside of cultivation in New Mexico.



1 Pedicels 1.6-3.5 mm long; spikelets 1-1.4 mm wide; culm internodes 2-10 mm long; blades ascending…****Z. japonica*** Steudel JAPANESE ZOYSIAGRASS (of Japan). Commercial seed is available for cultivars of this species.



1 Pedicels 0.6-1.6 mm long; spikelets 0.6-1 mm wide; culm internodes 5-40 mm long, at least some on a plant more than 14 mm long; blades spreading…****Z. matrella*** (Linnaeus) Merrill MANILLA ZOYSIAGRASS (little mother, origin). Fig. 420.

DOUBTFUL OR EXCLUDED SPECIES

Achnatherum pinetorum (M.E. Jones) Barkworth : Reported for New Mexico by Kartesz (1999) without documentation; awaits verification.

Agrostis perennans (Walter) Tuckerman : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Bothriochloa reevesii (Gould) Gould : Reported for New Mexico by Vega (2000), from Guadalupe Co., but the specimen cited (Arsène & Benedict 16669, MO) is *Bothriochloa springfieldii* (Gould) Parodi.

Bouteloua chondrosoides (Kunth) Bentham ex S. Watson : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Bouteloua ramosa Vasey : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Bromus purgans Linnaeus : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Chasmanthium latifolium (Michaux) Yates : A single specimen supposedly from New Mexico was seen by Yates (1966); there was most likely an error in the label information, as this is a species of moist woodlands in the southeastern United States and no other occurrences in the state have been recorded.

Danthonia californica Bolander : Reported by Allred (1993), Darbyshire (2003), & Martin & Hutchins (1980), but no validating specimens have ever been found; these reports most likely refer to *D. parryi* Scribner.

Eragrostis lugens Nees : Reported by Martin & Hutchins (1980) and Wooton & Standley (1915), but no validating specimens have been located.

Eragrostis ciliaris (Linneaus) R. Brown : Reported erroneously for New Mexico in Peterson (2003); no specimens of this species are known for the state.

Eragrostis pilosa (Linnaeus) Beauvois : Reported by Martin & Hutchins (1980) and Wooton & Standley (1915), but no validating specimens have been located.

Eragrostis poaeoides Beauvois ex Roemer & Schultes [=*Eragrostis minor* Host] : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Festuca brachyphylla J.A. Schultes ex J.A. & J.H. Schultes subsp. *brachyphylla* : Reported in Roalson & Allred (1995), but this subspecies is not known in New Mexico; it is replaced in New Mexico by subsp. *coloradensis* Frederiksen.

Gymnopogon ambiguus (Michaux) Britton, Sterns, & Poggenburg : Reported by Smith (2003) for New Mexico, based on an 1853 collection from Doña Ana County; the species has not been found since and occurs naturally from central Texas eastward.

Leptochloa nealleyi Vasey : Reported by Wooton & Standley (1915), but this is a species of the coastal prairies of Texas and Louisiana and no validating specimens have been found from New Mexico.

Muhlenbergia utilis (Torrey) Hitchcock : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Neeragrostis reptans (Michaux) Nicora : Reported by Hatch (1980), but a check of the specimen (Sopyn s.n., TAES) showed it to be *Eragrostis hypnoides* (Lamarck) Britton, Sterns, & Poggenburg.

Panicum capillare Linnaeus var. *capillare* : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Panicum lepidulum A.S. Hitchcock & Chase : Reported by Allred (1993) and Martin & Hutchins (1980), but the specimen in question (Benham 9718, UNM) is *Panicum hallii* Vasey.

Panicum stramineum A.S. Hitchcock & Chase : Reported by Allred (1993), but no validating specimens have been located. Zuloaga & Morrone (1996) do not include New Mexico in their distribution for this species.

Poa stenantha Trinius : Reported by Martin & Hutchins (1980), but no validating specimens have been located.

Pogonarthria falcata (Hackel) Rendle : Planted in reseeding trials in 1930s at the College Ranch of New Mexico State University, but no plants have persisted.

Setaria scheelei (Steudel) Hitchcock : Reported by Martin & Hutchins (1980), and thence by Barkworth et al. (2003), but no validating specimens have ever been located.

Setaria vulpiseta (Lamarck) Roemer & J.A. Schultes : Some have expanded this South American taxon to include our North American *Setaria macrostachya* Kunth; we maintain the two entities in a more strict sense, with the latter in New Mexico.

Stipa nelsonii Scribner subsp. *dorei* Barkworth & Maze sensu stricto : Reported by Allred (1993), but not occurring in New Mexico; replaced in New Mexico by *Achnatherum perplexum* Hoge & Barkworth.

Tragus racemosus (Linnaeus) Allioni : Reported by Martin & Hutchins (1980), Hitchcock & Chase (1951), and Campbell & Little (1935), but no validating specimens have been located in any of the state's herbaria or at US. It is known from adjacent southeastern Arizona.

REFERENCES AND LITERATURE CITED

Alderson, J. & W.C. Sharp. 1995. Grass Varieties in the United States. CRC Press, Lewis Publishers, New York. 296 pp.

Allred, K.W. 1993. A Field Guide to the Grasses of New Mexico. 1st Edition. Agric. Exp. Sta. New Mexico State University. 259 p.

Allred, K.W. 1996. Vegetative changes in New Mexico rangelands. New Mexico Journal of Science 36:168-231.

Bahre, C.J. 1991. A Legacy of Change: Human Impact on Vegetation in the Arizona Borderlands. University of Arizona Press.

Barkworth, M.E. 1992. Taxonomy of the Triticeae: a historical perspective. Hereditas 116:1-14.

Barkworth, M.E., K.M. Capels, S. Long, & M.B. Piep. 2003. Poaceae, part 2. IN: Flora of North America, vol. 25. Oxford University Press.

Barnard, C.M. & L.D. Potter. 1984. New Mexico Grasses: A Vegetative Key. Albuquerque: University of New Mexico Press.

Bartlett, J.R. 1854. Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, connected with the United States and Mexican Boundary Survey during the years 1850, '51, '52, and '53. Vol. 1:1-506; vol. 2:1-624. D. Appleton & Co., New York

Buffington, L.C. & C.E. Herbel. 1965. Vegetational changes on a semidesert grassland range. Ecological Monographs, 35, 139-164.

Campbell, R.S. & E.L. Little, Jr. 1935. Notes on the flora of the Jornada Experimental Range, New Mexico. Mimeograph copy at NMCR.

Copple, R.F. & C.P. Pase. 1978. A Vegetative Key to Some Common Arizona Range Grasses. USDA For. Ser. Gen. Tech. Rep. RM-53.

Darbyshire, S.J. 2003. "*Danthonia*," pp. 301-306. IN: Barkworth, M.E., K.M. Capels, S. Long, & M.B. Piep (eds.). Flora of North America, Vol. 25. Oxford University Press.

Dick-Peddie, W.A. 1993. New Mexico Vegetation: Past, Present, and Future. Univ. New Mexico Press, Albuquerque. 244 p.

Donart, G.B. 1984. The history and evolution of western rangelands in relation to woody plant composition. p. 1235-1258. IN: National Research Council/National Academy of Sciences. Developing Strategies for Rangeland Management. Westview Press, Boulder.

Gardner, J.L. 1951. Vegetation of the creosotebush area of the Rio Grande Valley in New Mexico. Ecol. Monogr. 21:379-403.

Goodding, L.N. 1938. Notes on native and exotic plants in region 8. USDA-SCS, Bull. 247.

Grass Phylogeny Working Group. 2001. Phylogeny and subfamilial classification of the grasses (Poaceae). Ann. Missouri Bot. Gard. 88(3):373-457.

Hafenrichter, A.L., J.L. Schwendiman, H.L. Harris, R.S. MacLauchlan, & H.W. Miller. 1979. Grasses and Legumes for Soil Conservation in the Pacific Northwest and Great Basin States. USDA Handbook No. 339.

Hatch, S.L. 1980. New grass distribution records for Arizona, New Mexico, and Texas. Great Basin Naturalist 40:221-222.

Herbel, C.H. 1984. Successional patterns and productivity potentials of the range vegetation in the warm, arid portions of the southwestern United States. p. 1333-1365. IN: National Research Council/National Academy of Sciences. Developing Strategies for Rangeland Management. Westview Press, Boulder.

Hitchcock, A.S. & A. Chase. 1951. Manual of the Grasses of the United States. 2nd ed. USDA Misc. Publ. 200. 1051 p.

Humphrey, R.R. 1958. The desert grassland: a history of vegetational change and an analysis of causes. Bot. Rev. 24:193-252.

Johnston, A.R. 1848. Journal of Captain A.R. Johnston, First Dragoons. p. 565-614. IN: *U.S.30th Congress, 1st Session, House Executive Document No. 41,* Washington, D.C.

Kartesz, J.T. 1999. A Synonymized Checklist and Atlas with Biological Attributes for the Vascular Flora of the United States, Canada, and Greenland. First Edition. In: Kartesz, J.T., and C.A. Meacham. Synthesis of the North American Flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill, NC.

Laycock, W.A. 1989. Secondary succession and range condition criteria: introduction to the problem, p. 1-15. IN: Lauenroth, W.K. and Laycock, W.A. Secondary Succession and the Evaluation of Rangeland Condition. Westview Press, Boulder, Colorado.

Leithead, H.L., L.L. Harlett, & T.N. Shiflet. 1971. 100 Native Forage Grasses in 11 Southern States. USDA Agric. Handb. No. 389.

McGregor, R.L. 1990. Seed dormancy and germination in the annual cleisto-gamous species of *Sporobolus* (Poaceae). Trans. Kansas Acad. Sci. 93(1–2):8 11.

Martin, W.C. & C.R. Hutchins. 1980. A Flora of New Mexico. Vol. 1. Vaduz, West Germany, J. Cramer. 1276 p.

Paulsen, H.A., Jr. and Ares, F.N. 1962. Grazing values and management of black grama and tobosa grassland and associated shrub ranges. U.S.D.A. Forest Service Technical Bulletin No. 1270.

Peterson, P.M. 2003. *"Eragrostis,"* pp. 65-105. IN: Barkworth, M.E., K.M. Capels, S. Long, & M.B. Piep (eds.). Flora of North America, Vol. 25. Poaceae, part 2. Oxford University Press.

Roalson, E.H. & K.W. Allred. 1995. A Working Index of New Mexico Vascular Plant Names (including supplements), Edition 1. New Mexico State University Agric. Exp. Sta. Res. Rep. 702.

Scurlock, D. 1995. Environmental history. p. 12-28. IN: Finch, D.M. and Tainter, J.A. (eds.). Ecology, diversity, and sustainability of the middle Rio Grande basin. U.S.D.A. Forest Service General Technical Report RM-GTR-268.

Smith, J.P. Jr. 2003. *"Gymnopogon,"* pp. 231-232. IN: Barkworth, M.E., K.M. Capels, S. Long, & M.B. Piep (eds.). Flora of North America, Vol. 25. Oxford University Press.

Thornburg, A.A. 1982. Plant Materials for Use on Surface-Mined Lands in Arid and Semiarid Regions. USDA-Soil Conservation Service publication SCS-TP-157.

Vega, A.S. 2000. Revisión taxonómica de las especies Americanas del género *Bothriochloa* (Poaceae: Panicoideae: Andropogoneae). Darwiniana 38(1-2):127-186.

Wooton, E.O. & P.C. Standley. 1912. The Grasses and Grass-like Plants of New Mexico. New Mexico Agr. Exp. Sta. Bull. 81. 175 p.

Wooton, E.O. & P.C. Standley. 1915. Flora of New Mexico. Contr. U.S. Natl. Herb. 19:1-794.

Wright, H.A. 1980. The role and use of fire in the semidesert grass-shrub type. U.S.D.A. Forest Service General Technical Report INT-85.

Yates, H.O. 1966. Revision of grasses traditionally referred to *Uniola*. II. Chasmanthium. Southw. Nat. 11(4), 415-455.

Zuloaga, F.O. & O. Morrone. 1996. Revision de las especies Americanas de *Panicum* subgenero *Panicum* seccion *Panicum* (Poaceae: Panicoideae: Paniceae). Ann. Missouri Bot. Gard. 83:200-280.

APPENDIX I

Important Grass Weeds

Many grasses grow where they are not wanted, in flower beds, gardens, crop fields or sidewalks, and as such, qualify as weeds. The nuisance and trouble caused by these plants can be considerable and it is advantageous to recognize their presence early so control measures can be taken. The common grass weeds of New Mexico are listed below by habitats they are likely to infest.

Of Lawns and Turf

Annuals:	Rescuegrass	*Bromus catharticus*
	Sandbur	*Cenchrus spinifex*
	Durban crowfootgrass	*Dactyloctenium aegyptium*
	Smooth crabgrass	*Digitaria ischaemum*
	Goosegrass	*Eleusine indica*
	Cupgrass	*Eriochloa acuminata*
	Wall barley	*Hordeum murinum subsp. glaucum*
	Annual bluegrass	*Poa annua*
	Hardgrass	*Sclerochloa dura*
	Yellow bristlegrass	*Setaria pumila*
Perennials:	Bermudagrass	*Cynodon dactylon*

Of Pastures

Annuals:	Cheatgrass	*Bromus tectorum*
	Showy windmillgrass	*Chloris virgata*
	Stinkgrass	*Eragrostis cilianensis*
	Witchgrass	*Panicum capillare*
	Yellow bristlegrass	*Setaria pumila*
Perennials:	Purple threeawn	*Aristida purpurea*
	Silver bluestem	*Bothriochloa laguroides*
	Longleaf squirreltail	*Elymus longifolius*
	False quackgrass	*Elymus x pseudorepens*
	Foxtail barley	*Hordeum jubatum*
	Scratchgrass	*Muhlenbergia asperifolia*

Of Cultivated Fields, Orchards, and Gardens

Annuals:	Wild oat	*Avena fatua*
	Rye chess	*Bromus secalinus*
	Hairy crabgrass	*Digitaria sanguinalis*
	Junglerice	*Echinochloa colonum*

	Barnyardgrass	*Echinochloa crus-gallii*
	Carolina lovegrass	*Eragrostis pectinacea*
	Red sprangletop	*Leptochloa panicea*
	Canarygrass	*Phalaris canariensis*
	Clinging bristlegrass	*Setaria adhaerens*
	Yellow bristlegrass	*Setaria pumila*
	Green bristlegrass	*Setaria viridis*
Perennials:	Bermudagrass	*Cynodon dactylon*
	Perennial ryegrass	*Lolium perenne*
	Johnsongrass	*Sorghum halepense*

Of Disturbed Ground, Waste Places, Fields, and Roadsides

Annuals:	Apera	*Apera interrupta*
	Sixweeks threeawn	*Aristida adscensionis*
	Wild oat	*Avena fatua*
	Needle grama	*Bouteloua aristidoides*
	Japanese brome	*Bromus japonicus*
	Cheatgrass	*Bromus tectorum*
	Sandbur	*Cenchrus spinifex*
	Showy windmillgrass	*Chloris virgata*
	Mediterranean lovegrass	*Eragrostis barrelieri*
	Little barley	*Hordeum pusillum*
	Wall barley	*Hordeum murinum subsp. glaucum*
	Witchgrass	*Panicum capillare*
	Hillman's panicum	*Panicum hillmanii*
	Mediterraneangrass	*Schismus arabicus*
	Sixweeks fescue	*Vulpia octoflora*
Perennials:	Purple threeawn	*Aristida purpurea*
	Spidergrass	*Aristida ternipes*
	King Ranch bluestem	*Bothriochloa ischaemum*
	Bermudagrass	*Cynodon dactylon*
	Longleaf squirreltail	*Elymus longifolius*
	Weeping lovegrass	*Eragrostis curvula*
	Foxtail barley	*Hordeum jubatum*
	Sand dropseed	*Sporobolus cryptandrus*

APPENDIX II

Poisonous or Harmful Grasses

The grasses listed here are recorded as being potentially poisonous or harmful. Many of them are valuable forage or crop plants and only cause problems under special or unusual circumstances.

Poisonous Grasses

Alkaloid Accumulation	
Smooth brome	*Bromus inermis*
Tall fescue	*Festuca arundinacea*
Reed canarygrass	*Phalaris arundinacea*
Mediterranean canarygrass	*Phalaris minor*
Coumarin Production	
Sweet vernalgrass	*Anthoxanthum odoratum*
Sweetgrass	*Hierochloë odorata*
Cyanide Production	
Grama grasses	*Bouteloua species, at low levels*
Goosegrass	*Eleusine indica*
Fowl mannagrass	*Glyceria striata*
Johnsongrass	*Sorghum halepense*
Sorghum, milo	*Sorghum bicolor*
Dermititis	
Bermudagrass	*Cynodon dactylon*
Fescues	*Festuca species*
Ergot Infestation	
Wheatgrasses	*Agropyron and Elymus species*
Smooth brome	*Bromus inermis*
Wildrye	*Elymus species*
Perennial ryegrass	*Lolium perenne*
Dallisgrass	*Paspalum dilatatum*
Galleta	*Pleuraphis jamesii*
Tobosa	*Pleuraphis mutica*
Kentucky bluegrass	*Poa pratensis*
Rye	*Secale cereale*
Fungal Toxins	
Tall fescue	*Festuca arundinacea*
Hay Fever and Asthma	
Threeawns	*Aristida species*
Giant reed	*Arundo donax*
Oats	*Avena species*

Grama grasses	*Bouteloua species*
Bromegrasses	*Bromus species*
Bermudagrass	*Cynodon dactylon*
Orchardgrass	*Dactylis glomerata*
Saltgrass	*Distichlis spicata*
Lovegrasses	*Eragrostis species*
Fescues	*Festuca species*
Ryegrass	*Lolium perenne*
Bluegrasses	*Poa species*
Sorghum	*Sorghum bicolor*
Johnsongrass	*Sorghum halepense*
Dropseeds	*Sporobolus species*
Wheat	*Triticum aestivum*
Corn	*Zea mays*
Nitrate Accumulation	
Oats	*Avena species*
Rescuegrass	*Bromus catharticus*
Barnyardgrass	*Echinochloa crusgallii*
Barley	*Hordeum vulgare*
Perennial ryegrass	*Lolium perenne*
Blue panicum	*Panicum antidotale*
Witchgrass	*Panicum capillare*
Sorghum	*Sorghum bicolor*
Johnsongrass	*Sorghum halepense*
Wheat	*Triticum aestivum*
Corn	*Zea mays*
Oxalate Accumulation	
Blue panicum	*Panicum antidotale*
Kleingrass	*Panicum coloratum*
Buffelgrass	*Pennisetum ciliare*
Photosensitivity	
Oats	*Avena species*
Bermudagrass	*Cynodon dactylon*
Kleingrass	*Panicum coloratum*
Broomcorn millet	*Panicum mileaceum*

Other: Stinkgrass (*Eragrostis cilianensis*) produces an unknown toxin that affects grazing horses. Sleepygrass (*Achnatherum robustum*) contains one or more narcotics that induce torpor in horses. Fungal infection and the accumulation of toxic glycolipids in *Lolium* species can cause ryegrass toxicity.

Grasses Causing Mechanical Injury
These grasses may cause injury to grazing animals through stiff awns or bristles that penetrate soft tissues.

Threeawns	*Aristida species*
Ripgut brome	*Bromus diandrus*
Cheatgrass	*Bromus tectorum*
Sandburs	*Cenchrus species*
Needle-and-thread	*Hesperostipa comata*
New Mexico feathergrass	*Hesperostipa neomexicana*
Tanglehead	*Heteropogon contortus*
Foxtail barley	*Hordeum jubatum*
Rye	*Secale cereale*
Bristlegrass	*Setaria species*
Wheat	*Triticum aestivum*

APPENDIX III

Grasses for Pasture and Range Improvement

Many strains or races of grasses have been developed for pasture improvement, range rehabilitation and land conservation. Seeds of the species listed below are available from commercial seed companies. The habitats, growing conditions, and purpose for which each race is adapted should be studied carefully before buying large quantities of seed. See Alderson & Sharp (1995), Hafenrichter et al. (1979), and Thornburg (1982) for more detailed information on each of these species and their particular uses.

Irrigated Pasture Improvement

Redtop	*Agrostis stolonifera*
Meadow foxtail	*Alopecurus pratensis*
California brome	*Bromus carinatus*
Rescuegrass	*Bromus catharticus*
Smooth brome	*Bromus inermis*
Bermudagrass	*Cynodon dactylon*
Orchardgrass	*Dactylis glomerata*
Tall wheatgrass	*Elymus elongatus*
Western wheatgrass	*Elymus smithii*
Tall fescue	*Festuca arundinacea*
Perennial ryegrass	*Lolium perenne*
Blue panic	*Panicum antidotale*
Kleingrass	*Panicum coloratum*
Switchgrass	*Panicum virgatum*
Dallisgrass	*Paspalum dilatatum*
Reed canarygrass	*Phalaris arundinacea*
Timothy	*Phleum pratense*
Kentucky bluegrass	*Poa pratensis*
Sudangrass	*Sorghum bicolor* subsp. *drummondii*
Johnsongrass	*Sorghum halepense*
Winter wheat	*Triticum aestivum*

Rangeland Improvement, Revegetation, and Erosion Control

Crested wheatgrass	*Agropyron cristatum*
Meadow foxtail	*Alopecurus pratensis*
Big and sand bluestem	*Andropogon gerardii*
Giant reed	*Arundo donax*
Cane bluestem	*Bothriochloa barbinodis*
Australian bluestem	*Bothriochloa bladhii*

Caucasian bluestem	*Bothriochloa bladhii* complex
King Ranch bluestem	*Bothriochloa ischaemum*
Yellow bluestem	*Bothriochloa ischaemum*
Sideoats grama	*Bouteloua curtipendula*
Black grama	*Bouteloua eriopoda*
Blue grama	*Bouteloua gracilis*
California brome	*Bromus carinatus*
Mountain brome	*Bromus carinatus*
Smooth brome	*Bromus inermis*
Buffalograss	*Buchloë dactyloides*
Prairie sandreed	*Calamovilfa longifolia*
Bermudagrass	*Cynodon dactylon*
Orchardgrass	*Dactylis glomerata*
Tufted hairgrass	*Deschampsia caespitosa*
Arizona cottontop	*Digitaria californica*
Inland saltgrass	*Distichlis spicata*
Tall wheatgrass	*Elymus elongatus*
Blue wildrye	*Elymus glaucus*
Intermediate wheatgrass	*Elymus hispidus*
Pubescent wheatgrass	*Elymus hispidus*
Streambank wheatgrass	*Elymus lanceolatus*
Thickspike wheatgrass	*Elymus lanceolatus*
Bottlebrush squirreltail	*Elymus longifolius*
Western wheatgrass	*Elymus smithii*
Bluebunch wheatgrass	*Elymus spicatus*
Slender wheatgrass	*Elymus trachycaulus*
Boer lovegrass	*Eragrostis curvula*
Weeping lovegrass	*Eragrostis curvula*
Plains lovegrass	*Eragrostis intermedia*
Lehmann's lovegrass	*Eragrostis lehmanniana*
Wilman's lovegrass	*Eragrostis superba*
Sand lovegrass	*Eragrostis trichodes*
Arizona fescue	*Festuca arizonica*
Tall fescue	*Festuca arundinacea*
Idaho fescue	*Festuca idahoensis*
Red fescue	*Festuca rubra*
Thurber fescue	*Festuca thurberi*
Curly mesquite	*Hilaria belangeri*
Green sprangletop	*Leptochloa dubia*
Mountain muhly	*Muhlenbergia montana*
Bush muhly	*Muhlenbergia porteri*
Spike muhly	*Muhlenbergia wrightii*
Green needlegrass	*Nassella viridula*
Indian ricegrass	*Oryzopsis hymenoides*
Blue panic	*Panicum antidotale*

Kleingrass	*Panicum coloratum*
Switchgrass	*Panicum virgatum*
Reed canarygrass	*Phalaris arundinacea*
Common reed	*Phragmites australis*
Galleta	*Pleuraphis jamesii*
Tobosa	*Pleuraphis mutica*
Bulbous bluegrass	*Poa bulbosa*
Big bluegrass	*Poa secunda,* the *ampla phase*
Russian wildrye	*Psathyrostachys juncea*
Little bluestem	*Schizachyrium scoparium*
Rye	*Secale cereale*
Plains bristlegrass	*Setaria leucopila*
Indiangrass	*Sorghastrum nutans*
Alkali sacaton	*Sporobolus airoides*
Sand dropseed	*Sporobolus cryptandrus*
Mesa dropseed	*Sporobolus flexuosus*
Wheat	*Triticum aestivum*
Annual fescue	*Vulpia myuros*

APPENDIX IV

Characteristics of Important Range and Wildlife Grasses

The following chart summarize the major features of selected grasses that are important forage species for livestock or wildlife, or are prominent members of the state's grassland flora. The grasses are arranged alphabetically by subfamily, tribe, genus, and species. Duration refers to either annual or perennial. Season denotes the common season of growth, either during the cool season or the warm season. Origin refers to either native or exotic to New Mexico. Form suggests the common growth habit. Response is a generalization of the grass's response to grazing pressure; a decreaser is a grass that is a part of the native flora, but decreases in abundance with heavy grazing; an increaser is also present in the native flora or has become naturalized, but increases in abundance with grazing pressure; an invader is a species not originally present in the native flora, but rapidly invades heavily grazed or disturbed habitats. Value denotes its generalized importance as a forage plant.

Characteristics of Important Range and Wildlife Grasses

Scientific name	Common name	Duration	Season	Origin	Form	Response	Value
Aristidoideae Subfamily: Aristideae Tribe							
Aristida adscensionis	Sixweeks threeawn	annual	warm	native	bunch	invader	poor
Aristida arizonica	Arizona threeawn	perennial	warm	native	bunch	increaser	fair/poor
Aristida divaricata	Poverty threeawn	perennial	warm	native	bunch	increaser	fair/poor
Aristida schiedeana	Orcutt's threeawn	perennial	warm	native	bunch	increaser	fair
Aristida purpurea	Purple threeawn	perennial	warm	native	bunch	invader	poor/fair
Aristida ternipes	Spidergrass	perennial	warm	native	bunch	invader	poor
Arundinoideae Subfamily: Arundineae Tribe							
Phragmites australis	Common reed	perennial	cool	native	rhizomatous	inc	poor
Chloridoideae Subfamily: Cynodonteae (Chlorideae) Tribe							
Bouteloua aristidoides	Needle grama	annual	warm	native	bunch	invader	poor
Bouteloua barbata	Sixweeks grama	annual	warm	native	bunch	invader	poor
Bouteloua curtipendula	Sideoats grama	perennial	warm	native	bunch	decreaser	excel/good
Bouteloua eriopoda	Black grama	perennial	warm	native	stoloniferous	decreaser	excellent
Bouteloua gracilis	Blue grama	perennial	warm	native	bunch	increaser	excellent
Bouteloua hirsuta	Hairy grama	perennial	warm	native	bunch	increaser	good
Buchloë dactyloides	Buffalograss	perennial	warm	native	rhizomatous	increaser	good
Chloris crinita	False rhodesgrass	perennial	warm	native	bunch	increaser	good/excel
Chloris cucullata	Hooded windmillgrass	perennial	warm	native	bunch	invader	fair
Chloris virgata	Showy windmillgrass	annual	warm	native	bunch	increaser	fair/poor
Chloris verticillata	Tumble windmillgrass	perennial	warm	native	bunch	invader	poor
Cynodon dactylon	Bermuda grass	perennial	warm	exotic	rhizomatous	decreaser	excellent
Hilaria belangeri	Curly mesquite	perennial	warm	native	stoloniferous	increaser	fair
Pleuraphis jamesii	Galleta	perennial	warm	native	rhizomatous	increaser	good
Pleuraphis mutica	Tobosa	perennial	warm	native	rhizomatous	increaser	good
Schedonnardus paniculatus	Tumblegrass	perennial	warm	native	bunch	invader	poor
Spartina pectinata	Prairie cordgrass	perennial	warm	native	rhizomatous	invader	poor/fair

Chloridoideae Subfamily: Eragrostideae Tribe							
Blepharoneuron tricholepis	Pine dropseed	perennial	warm	native	bunch	decreaser	good
Calamovilfa gigantea	Big sandreed	perennial	warm	native	rhizomatous	increaser	fair
Dasyochloa pulchella	Fluffgrass	perennial	warm	native	bunch/stoloniferous	invader	poor
Distichlis spicata	Saltgrass	perennial	warm	native	rhizomatous	increaser	fair/good
Eragrostis barrelieri	Mediterranean lovegrass	annual	warm	exotic	bunch	increaser	poor
Eragrostiscilianensis	Stinkgrass	annual	warm	exotic	bunch	invader	poor
Eragostis curvula	Weeping lovegrass	perennial	warm	exotic	bunch	increaser	fair
Eragrostis intermedia	Plains lovegrass	perennial	warm	native	bunch	decreaser	good
Eragostis lehmanniana	Lehmann's lovegrass	perennial	warm	exotic	bunch	increaser	good
Eragrostis mexicana	Mexican lovegrass	annual	warm	native	bunch	invader	poor?
Eragrostis pectinacea	Carolina lovegrass	annual	warm	native	bunch	increaser	fair/poor
Eragrostis trichodes	Sand lovegrass	perennial	warm	native	bunch	decreaser	excellent
Erioneuron pilosum	Hairy tridens	perennial	warm	native	bunch	invader	poor
Leptochloa dubia	Green sprangletop	perennial	warm	native	bunch	decreaser	excellent
Leptochloa filiformis	Red sprangletop	annual	warm	native	bunch	invader	poor
Lycurus phleoides / setosus	Wolftail	perennial	warm	native	bunch	decreaser	good
Muhlenbergia emersleyi	Bullgrass	perennial	warm	native	bunch	increaser	good
Muhlenbergia montana	Mountain muhly	perennial	warm	native	bunch	decreaser	good
Muhlenbergia porteri	Bush muhly	perennial	warm	native	bush	decreaser	excellent
Muhlenbergia rigens	Deergrass	perennial	warm	native	bunch	increaser	poor
Muhlenbergia torreyi	Ring muhly	perennial	warm	native	patch	invader	poor
Muhlenbergia wrightii	Spike muhly	perennial	warm	native	bunch	decreaser	excellent
Scleropogon brevifolius	Burrograss	perennial	warm	native	mat	invader	poor
Sporobolus airoides	Alkali sacaton	perennial	warm	native	bunch	decreaser	fair
Sporobolus cryptandrus	Sand dropseed	perennial	warm	native	bunch	increaser	fair/good
Sporobolus flexuosus	Mesa dropseed	perennial	warm	native	bunch	increaser	good
Sporobolus wrightii	Sacaton	perennial	warm	native	bunch	decreaser	good
Tridens albescens	White tridens	perennial	warm	native	bunch	increaser	good
Tridens muticus	Slim tridens	perennial	warm	native	bunch	decreaser	fair/good

Scientific name	Common name	Duration	Season	Origin	Form	Response	Value
		Chloridoideae Subfamily: Pappophoreae Tribe					
Enneapogon desvauxii	Spike pappusgrass	perennial	warm	native	bunch	invader	poor
Pappophorum vaginatum	Whiplash pappusgrass	perennial	warm	native	bunch	decreaser	fair
		Danthonioideae Subfamily: Danthonieae Tribe					
Danthonia parryi	Parry's danthonia	perennial	cool	native	bunch	increaser	fair
Schismus spp.	Mediterraneangrass	annual	cool	exotic	bunch	increaser	poor
		Panicoideae Subfamily: Andropogoneae Tribe					
Andropogon gerardii	Big bluestem	perennial	warm	native	bunch	decreaser	excellent
Bothriochloa barbinodis	Cane bluestem	perennial	warm	native	bunch	increaser	fair
Bothriochloa ischaemum	Yellow bluestem	perennial	warm	exotic	bunch	increaser	good
Bothriochloa laguroides	Silver bluestem	perennial	warm	native	bunch	increaser/	fair
Bothriochloa springfieldii	Springfield's bluestem	perennial	warm	native	bunch	increaser	fair
Elionurus barbiculmis	Wooly balsamscale	perennial	warm	native	bunch	increaser	fair
Heteropogon contortus	Tanglehead	perennial	warm	native	bunch	decreaser	good
Schizachyrium scoparium	Little bluestem	perennial	warm	native	bunch	decreaser	good
Sorghastrum nutans	Indiangrass	perennial	warm	native	bunch	decreaser	excellent
Sorghum halepense	Johnsongrass	perennial	warm	exotic	rhizomatous	invader	good
Trachypogon secundus	Crinkleawn	perennial	warm	native	bunch	decreaser	fair
		Panicoideae Subfamily: Paniceae Tribe					
Pennisetum ciliare	Buffelgrass	perennial	warm	exotic	bunch	decreaser	good
Digitaria californica	Arizona cottontop	perennial	warm	native	bunch	decreaser	good
Echinochloa spp.	Barnyard grasses	annual	warm	nat/ex	bunch	increaser	good
Eriochloa acuminata	Cupgrass	annual	warm	native	bunch	decreaser	good
Panicum bulbosum	Bulb Panicum	perennial	warm	native	bunch	decreaser	good
Panicum capillare	Witchgrass	annual	warm	native	bunch	invader	poor
Panicum hallii	Hall's Panicum	perennial	warm	native	bunch	decreaser	fair
Panicum hirticaule	Mexican witchgrass	annual	warm	native	bunch	decreaser	fair
Panicum obtusum	Vine mesquite	perennial	warm	native	stoloniferous	increaser	fair

Panicum virgatum	Switchgrass	perennial	warm	native	bunch	decreaser	good
Paspalum dilatatum	Dallisgrass	perennial	warm	exotic	bunch	increaser	good
Paspalum distichum	Knotgrass	perennial	warm	native	stoloniferous	decreaser	good
Setaria grisebachii	Grisebach'sbristlegrass	annual	warm	native	bunch	decreaser	fair
Setaria leucopila	Plains bristlegrass	perennial	warm	native	bunch	decreaser	good
		Pooideae Subfamily: Bromeae Tribe					
Bromus carinatus	Mountain brome	ann/per	cool	native	bunch	decreaser	excellent
Bromus catharticus	Rescuegrass	ann/per	cool	exotic	bunch	invader	excellent
Bromus ciliatus	Fringed brome	perennial	cool	native	bunch	decreaser	excellent
Bromus inermis	Smooth brome	perennial	cool	exotic	rhizomatous	decreaser	excellent
Bromus japonicus	Japanese brome	annual	cool	exotic	bunch	invader	poor
Bromus tectorum	Cheatgrass	annual	cool	exotic	bunch	invader	poor/fair
		Pooideae Subfamily: Hordeae Tribe					
Aegilops cylindrica	Jointed goatgrass	annual	cool	exotic	bunch	invader	poor
Agropyron cristatum	Crested wheatgrass	perennial	cool	exotic	bunch	decreaser	good
Elymus canadensis	Canada wildrye	perennial	cool	native	bunch	decreaser	good
Elymus hispidus	Intermediate wheatgrass	perennial	cool	exotic	rhizomatous	decreaser	excellent
Elymus longifolius	Longleaf squirreltail	perennial	cool	native	bunch	increaser	fair
Elymus smithii	Western wheatgrass	perennial	cool	native	rhizomatous	decreaser	good
Elymus spicatus	Bluebunch wheatgrass	perennial	cool	native	bunch	decreaser	excellent
Elymus trachycaulus	Slender wheatgrass	perennial	cool	native	bunch	decreaser	excellent
Hordeum jubatum	Foxtail barley	perennial	cool	native	bunch	incr/inv	poor
Hordeum murinum	Wall barley	annual	cool	native	bunch	incr/inv	poor
Hordeum pusillum	Little barley	annual	cool	native	bunch	incr/inv	poor
Psathyrostachys juncea	Russian wildrye	perennial	cool	exotic	bunch	decreaser	good
		Pooideae Subfamily: Meliceae Tribe					
Glyceria striata	fowl mannagrass	perennial	cool	native	bunch	decreaser	fair

Scientific name	Common name	Duration	Season	Origin	Form	Response	Value
		Pooideae Subfamily: Poeae Tribe					
Agrostis exarata	Spike bent	perennial	cool	native	bunch	decreaser	excellent
Agrostis gigantea	Redtop	perennial	cool	exotic	stoloniferous	decreaser	excellent
Avena fatua	Wild oats	annual	cool	exotic	bunch	invader	good
Calamagrostis canadensis	Canada reedgrass	perennial	cool	native	bunch	increaser	fair
Dactylis glomerata	Orchardgrass	perennial	cool	exotic	bunch	decreaser	excellent
Deschampsia caespitosa	Tufted hairgrass	perennial	cool	native	bunch	decreaser	excel/good
Festuca arizonica	Arizona fescue	perennial	cool	native	bunch	decreaser	good
Festuca arundinacea	Tall fescue	perennial	cool	exotic	bunch	decreaser	good
Festuca brachyphylla	Short-leaf fescue	perennial	cool	native	bunch	increaser	fair
Festuca minutiflora	Small-flowered fescue	perennial	cool	native	bunch	increaser	fair
Festuca pratensis	Meadow fescue	perennial	cool	exotic	bunch	decreaser	good
Festuca thurberi	Thurber's fescue	perennial	cool	native	bunch	decreaser	good
Koeleria macrantha	Junegrass	perennial	cool	native	bunch	decreaser	excellent
Lolium perenne	ryegrass	perennial	cool	exotic	bunch	decreaser	excellent
Phalaris arundinacea	Reed canarygrass	perennial	cool	native	rhizomatous	decreaser	excellent
Phleum alpinum	Alpine timothy	perennial	cool	native	bunch	decreaser	excellent
Phleum pratense	Timothy	perennial	cool	exotic	bunch	decreaser	excellent
Poa bigelovii	Bigelow's bluegrass	annual	cool	native	bunch	decreaser	good
Poa compressa	Canada bluegrass	perennial	cool	exotic	rhizomatous	decreaser	excellent
Poa fendleriana	Muttongrass	perennial	cool	native	bunch	decreaser	excellent
Poa palustris	Fowl bluegrass	perennial	cool	native	bunch	decreaser	good/excel
Poa pratensis	Kentucky bluegrass	perennial	cool	exotic	rhizomatous	decreaser	good/excel
Poa secunda	Sandberg's bluegrass	perennial	cool	native	bunch	decreaser	good
Torreyochloa pauciflora	weak mannagrass	perennial	cool	native	rhizomatous	decreaser	good
Trisetum montanum	Rocky Mountain trisetum	perennial	cool	native	bunch	decreaser	good
Vulpia octoflora	Sixweeks fescue	annual	cool	native	bunch	invader	poor

Pooideae Subfamily: Stipeae Tribe							
Achnatherum hymenoides	Indian ricegrass	perennial	cool	native	bunch	decreaser	good
Achnatherum perplexum	New Mexico needlegrass	perennial	cool	native	bunch	increaser	fair
Achnatherum robustum	Sleepygrass	perennial	cool	native	bunch	increaser	toxic
Hesperostipa comata	Needle-and-thread	perennial	cool	native	bunch	decreaser	good
Hesperostipa neomexicana	New Mexico feathergrass	perennial	cool	native	bunch	decreaser	good
Hesperostipa spartea	Porcupine grass	perennial	cool	native	bunch	decreaser	excellent
Nassella tenuissima	Finestem needlegrass	perennial	cool	native	bunch	increaser?	fair
Nassella viridula	green needlegrass	perennial	cool	native	bunch	decreaser	good
Piptatherum micranthum	Littleseed ricegrass	perennial	cool	native	bunch	decreaser	good
Piptochaetium fimbriatum	Piñon ricegrass	perennial	cool	native	bunch	decreaser	good

APPENDIX V

Vegetative Identification of Important Range Grasses

It is often necessary to identify grasses during periods other than when they are flowering, when spikelets and inflorescences are not available. This can be a daunting endeavor at first, but as familiarity is gained with a particular species of grass, one finds an increased ability to recognize it under very diverse conditions of growth. The following list of features is presented to help gain this kind of familiarity for at least some of the more important and conspicuous range or mountain grasses of the state. The list is not meant to be exhaustive. Further help in vegetative identification of southwestern grasses can be found in Barnard and Potter (1984) or Copple and Pase (1978).

Grasses cultivated for lawns, turf, or ornament

Perennials:	Giant cane	*Arundo donax*
	Blue grama	*Bouteloua gracilis*
	Buffalograss	*Buchloë dactyloides*
	Job's tears	*Coix lacryma-jobi*
	Pampasgrass	*Cortaderia selloana*
	Bermudagrass	*Cynodon dactylon*
	Tall fescue	*Festuca arundinacea*
	Blue fescue	*Festuca arvernensis*
	Meadow fescue	*Festuca pratensis*
	Japanese bloodgrass	*Imperata cylindrica* 'red baron'
	Perennial ryegrass	*Lolium perenne*
	Eulalia	*Miscanthus sinensis*
	Seashore paspalum	*Paspalum vaginatum*
	Fountaingrass	*Pennisetum setaceum, P. advena, P. villosum*
	Reed canarygrass	*Phalaris arundinacea f. variegata*
	Bamboo	*Phyllostachys species*
	Ravenna grass	*Saccharum ravennae*
	St. Augustinegrass	*Stenotaphrum secundatum*
	Zoysiagrass	*Zoysia species*

Plants with stolons or with stems conspicuously rooting at the nodes

Annuals:	Teal lovegrass	*Eragrostis hypnoides*
	False buffalograss	*Munroa squarrosa*
Perennials:	Black grama	*Bouteloua eriopoda*
	Buffalograss	*Buchloë dactyloides*

Bermudagrass	*Cynodon dactylon*
Fluffgrass	*Dasyochloa pulchella*
Inland saltgrass	*Distichlis stricta*
Lehmann's lovegrass	*Eragrostis lehmanniana*
Curly mesquite	*Hilaria belangeri*
Bush muhly	*Muhlenbergia porteri*
Vine mesquite	*Panicum obtusum*
Burrograss	*Scleropogon brevifolius*
St. Augustinegrass	*Stenotaphrum secundatum*

Plants with vigorous rhizomes

Sand bluestem	*Andropogon gerardii*
Giant cane	*Arundo donax*
Smooth brome	*Bromus inermis*
Reedgrasses	*Calamagrostis specie*
Big sandreed	*Calamovilfa gigantea*
Bermudagrass	*Cynodon dactylon*
Intermediate wheatgrass	*Elymus hispidus*
False quackgrass	*Elymus x pseudorepens*
Western wheatgrass	*Elymus smithii*
Alkali lovegrass	*Eragrostis obtusiflora*
Rice cutgrass	*Leersia oryzoides*
Ear muhly	*Muhlenbergia arenicola*
Scratchgrass	*Muhlenbergia asperifolia*
Mexican muhly	*Muhlenbergia mexicana*
Sandhill muhly	*Muhlenbergia pungens*
Green muhly	*Muhlenbergia racemosa*
Creeping muhly	*Muhlenbergia repens*
Havard's panicum	*Panicum havardii*
Switchgrass	*Panicum virgatum*
Reed canarygrass	*Phalaris arundinacea*
Galleta	*Pleuraphis jamesii*
Tobosa	*Pleuraphis mutica*
Common reed	*Phragmites australis*
Arctic bluegrass	*Poa arctica*
Plains bluegrass	*Poa arida*
Canada bluegrass	*Poa compressa*
Kentucky bluegrass	*Poa pratensis*
Indiangrass	*Sorghastrum nutans*
Johnsongrass	*Sorghum halepense*
Cordgrass	*Spartina species*

Shoots highly branched above ground, becoming bushy

Annuals:	Sixweeks threeawn	*Aristida adscensionis*
	Oldfield threeawn	*Aristida oligantha*
	False buffalograss	*Munroa squarrosa*
Perennials:	Big bluestem	*Andropogon gerardii*
	Spidergrass	*Aristida ternipes*
	Black grama	*Bouteloua eriopoda*
	Big sandreed	*Calamovilfa gigantea*
	Fluffgrass	*Dasyochloa pulchella*
	Rosettegrasses	*Dichanthelium species*
	Bush muhly	*Muhlenbergia porteri*
	Scratchgrass	*Muhlenbergia asperifolia*
	New Mexico muhly	*Muhlenbergia pauciflora*
	Green muhly	*Muhlenbergia racemosa*
	Blue panicum	*Panicum antidotale*
	Galleta	*Pleuraphis jamesii*
	Tobosa	*Pleuraphis mutica*
	Bamboo	*Phyllostachys species*

Shoots and sheaths flattened or compressed-keeled

Annuals:	Sandbur	*Cenchrus species*
	Hooded windmillgrass	*Chloris cucullata*
	Tumble windmillgrass	*Chloris virticillata*
	Showy windmillgrass	*Chloris virgata*
	Junglerice	*Echinochloa colonum*
	Goosegrass	*Eleusine indica*
Perennials:	False Rhodesgrass	*Chloris crinita*
	Orchardgrass	*Dactylis glomerata*
	Thurber's fescue	*Festuca thurberi*
	Tanglehead	*Heteropogon contortus*
	Green sprangletop	*Leptochloa dubia*
	Wolftail	*Lycurus phleoides*
	Bullgrass	*Muhlenbergia emersleyi*
	Ring muhly	*Muhlenbergia torreyi*
	Spike muhly	*Muhlenbergia wrightii*
	Dallisgrass	*Paspalum dilatatum*
	Canada bluegrass	*Poa compressa*
	Tumblegrass	*Schedonnardus paniculatus*
	Santa Fe bluestem	*Schizachyrium sanguineum*
	Little bluestem	*Schizachyrium scoparium*
	St. Augustinegrass	*Stenotaphrum secundatum*

Plants forming dense conspicuous tussocks at least 20 cm across and 45 cm high

Perennials:	Sleepygrass	*Achnatherum robustum*
	Big bluestem	*Andropogon gerardii*
	False Rhodesgrass	*Chloris crinita*
	Pampasgrass	*Cortaderia selloana*
	Woolspike balsamscale	*Elionurus barbiculmis*
	Tall wheatgrass	*Elymus elongatus*
	Weeping lovegrass	*Eragrostis curvula*
	Thurber's fescue	*Festuca thurberi*
	Arizona fescue	*Festuca arizonica*
	Pine muhly	*Muhlenbergia dubia*
	Bullgrass	*Muhlenbergia emersleyi*
	Longtongue muhly	*Muhlenbergia longiligula*
	Metcalfe's muhly	*Muhlenbergia metcalfei*
	Deergrass	*Muhlenbergia rigens*
	Purple muhly	*Muhlenbergia rigida*
	Switchgrass	*Panicum virgatum*
	Fountaingrass	*Pennisetum setaceum*
	Alkali sacaton	*Sporobolus airoides*
	Giant sacaton	*Sporobolus wrightii*
	Crinkle-awn	*Trachypogon secundus*

Flowering shoots commonly more than 2 m tall

Big bluestem	*Andropogon gerardii*
Giant cane	*Arundo donax*
Big sandreed	*Calamovilfa gigantea*
Pampasgrass	*Cortaderia selloana*
Tall wheatgrass	*Elymus elongatus*
Eulalia	*Miscanthus sinensis*
Bullgrass	*Muhlenbergia emersleyi*
Blue panicum	*Panicum antidotale*
Havard's panicum	*Panicum havardii*
Switchgrass	*Panicum virgatum*
Common reed	*Phragmites australis*
Ravenna grass	*Saccharum ravennae*
Giant foxtail	*Setaria magna*
Indiangrass	*Sorghastrum nutans*
Sorghum, milo	*Sorghum bicolor*
Prairie cordgrass	*Spartina pectinata*
Corn	*Zea mays*

Ligule absent

	Barnyardgrasses	*Echinochloa* species

Margins of sheath fused together, not overlapping

Annuals:	Bromegrasses	*Bromus* species
	Wall barley	*Hordeum murinum*
	Annual bluegrass	*Poa annua*
Perennials:	Bromegrasses	*Bromus* species
	Orchardgrass	*Dactylis glomerata*
	Red fescue	*Festuca rubra*
	Mannagrasses	*Glyceria* species
	Melica	*Melica* species
	Bluegrasses	*Poa, some* species
	False melic	*Schizachne purpurascens*

Sheath hairy, other than just at summit

Margin only:	Sleepygrass	*Achnatherum robustum*
	Jointed goatgrass	*Aegilops cylindrica*
	Goosegrass	*Eleusine indica*
	Tall wheatgrass	*Elymus elongatus*
	Thickspike wheatgrass	*Elymus lanceolatus*
	Gummy lovegrass	*Eragrostis curtipedicellata*
	Plains lovegrass	*Eragrostis intermedia*
	Green needlegrass	*Nassella viridula*
	Grisebach's bristlegrass	*Setaria grisebachii*
	Plains bristlegrass	*Setaria leucopila*
	Giant foxtail	*Setaria magna*
	Hooked bristlegrass	*Setaria verticillata*
	Green bristlegrass	*Setaria viridis*
	Spike dropseed	*Sporobolus contractus*
	Sand dropseed	*Sporobolus cryptandrus*
	Mesa dropseed	*Sporobolus flexuosus*
	Giant dropseed	*Sporobolus giganteus*
On back:	Big bluestem	*Andropogon gerardii*
	Sideoats grama	*Bouteloua curtipendula*
	Nodding brome	*Bromus anomalus*
	Fringed brome	*Bromus ciliatus*
	Japanese brome	*Bromus japonicus*
	Red brome	*Bromus rubens*
	Cheatgrass	*Bromus tectorum*
	Poverty danthonia	*Danthonia spicata*
	Wooly rosettegrass	*Dichanthelium acuminatum*
	Scribner's rosettegrass	*Dichanthelium oligosanthes*
	Arizona cottontop	*Digitaria californica*
	Hairy crabgrass	*Digitaria sanguinalis*

	Western wheatgrass	*Elymus smithii*
	Spike pappusgrass	*Enneapogon desvauxii*
	Weeping lovegrass	*Eragrostis curvula*
	Red sprangletop	*Leptochloa panicea*
	Witchgrass	*Panicum capillare*
	Mexican witchgrass	*Panicum hirticaule*
	Slim tridens	*Tridens muticus*
	Spike trisetum	*Trisetum spicatum*
	Arizona signalgrass	*Urochloa arizonica*
	Fringed signalgrass	*Urochloa ciliatissima*

Tuft of conspicuous hairs at summit of sheath or corners of collar

Annuals:	Needle grama	*Bouteloua aristidoides*
	Carolina lovegrass	*Eragrostis pectinacea*
	False buffalograss	*Munroa squarrosa*
	Mediterraneangrass	*Schismus arabicus*
Perennials:	Threeawns	*Aristida,* many species
	Cane bluestem	*Bothriochloa barbinodis*
	Springfield's bluestem	*Bothriochloa springfieldii*
	Sideoats grama	*Bouteloua curtipendula*
	Black grama	*Bouteloua eriopoda*
	Hairy grama	*Bouteloua hirsuta*
	Buffalograss	*Buchloë dactyloides*
	False Rhodesgrass	*Chloris crinita*
	Bermudagrass	*Cynodon dactylon*
	Parry's danthonia	*Danthonia parryi*
	Fluffgrass	*Dasyochloa puchellum*
	Woolspike balsamscale	*Elionurus barbiculmis*
	Gummy lovegrass	*Eragrostis curtipedicellata*
	Plains lovegrass	*Eragrostis intermedia*
	Indiangrass	*Sorghastrum nutans*
	Tall dropseed	*Sporobolus asper*
	Spike dropseed	*Sporobolus contractus*
	Sand dropseed	*Sporobolus cryptandrus*
	Mesa dropseed	*Sporobolus flexuosus*
	Giant dropseed	*Sporobolus giganteus*
	Slim tridens	*Tridens muticus*

Blades noticeably hairy

Hairs bulb-based:

	Sideoats grama	*Bouteloua curtipendula*
	Hairy grama	*Bouteloua hirsuta*
	Arizona signalgrass	*Brachiaria arizonica*
	Fringed signalgrass	*Brachiaria ciliatissima*
	Buffalograss	*Buchloë dactyloides*

	Wooly rosettegrass	*Dichanthelium acuminatum*
	Arizona cottontop	*Digitaria californica*
	Hairy crabgrass	*Digitaria sanguinalis*
	Barnyardgrass	*Echinochloa crus-gallii*
	Hairy tridens	*Erioneuron pilosum*
	Curly mesquite	*Hilaria belangeri*
	Witchgrass	*Panicum capillare*
	Mexican witchgrass	*Panicum hirticaule*
	Purple sandgrass	*Triplasis pupurea*

Hairs not bulb-based:

	Jointed goatgrass	*Aegilops cylindrica*
	Big bluestem	*Andropogon gerardii*
	Japanese brome	*Bromus japonicus*
	Cheatgrass	*Bromus tectorum*
	Showy windmillgrass	*Chloris virgata*
	Tall wheatgrass	*Elymus elongatus*
	Western wheatgrass	*Elymus smithii*
	Spike pappusgrass	*Enneapogon desvauxii*
	Hairy tridens	*Erioneuron pilosum*
	Velvetgrass	*Holcus lanatus*
	Red sprangletop	*Leptochloa panicea*
	Spike burgrass	*Tragus berteronianus*
	Slim tridens	*Tridens muticus*
	Rocky Mt. trisetum	*Trisetum montanum*

Blades with white margins

Annuals:	Delicate muhly	*Muhlenbergia fragilis*
	False buffalograss	*Munroa squarrosa*
Perennials:	Cane bluestem	*Bothriochloa barbinodis*
	Silver bluestem	*Bothriochloa laguroides*
	Fluffgrass	*Dasyochloa pulchella*
	Arizona cottontop	*Digitaria californica*
	Tridens	*Erioneuron species*
	Wolftail	*Lycurus phleoides, L. setosus*
	Johnsongrass	*Sorghum halepense*

Auricles developed

Annuals:	Jointed goatgrass	*Aegilops cylindrica*
	Annual wheatgrass	*Eremopyrum triticeum*
	Wheat	*Triticum aestivum*
Perennials:	Crested wheatgrass	*Agropyron species*
	Baker's wheatgrass	*Elymus bakeri*
	Canada wildrye	*Elymus canadensis*
	Tall wheatgrass	*Elymus elongatus*

Blue wildrye	*Elymus glaucus*
Thickspike wheatgrass	*Elymus lanceolatus*
Longleaf squirreltail	*Elymus longifolius*
Quackgrass	*Elymus repens*
Scribner's wheatgrass	*Elymus scribneri*
Western wheatgrass	*Elymus smithii*
Bluebunch wheatgrass	*Elymus spicatus*
Slender wheatgrass	*Elymus trachycaulus*
Tall fescue	*Festuca arundinacea*
Meadow fescue	*Festuca pratensis*
Wall barley	*Hordeum murinum*
Creeping wildrye	*Leymus triticoides*
Perennial ryegrass	*Lolium perenne*

APPENDIX VI

New Mexico Grasses Used (or with the potential to be used) as Landscape Ornamentals

Indian ricegrass	*Achnatherum hymenoides*
Meadow foxtail	*Alopecurus pratensis*
Big bluestem	*Andropogon gerardii*
Bushy bluestem	*Andropogon glomeratus*
Purple threeawn	*Aristida purpurea*
Tall oatgrass	*Arrhenatherum elatius*
Giant reed	*Arundo donax*
Cane bluestem	*Bothriochloa barbinodis*
Yellow bluestem	*Bothriochloa ischaemum*
Silver bluestem	*Bothriochloa laguroides*
Sideoats grama	*Bouteloua curtipendula*
Blue grama	*Bouteloua gracilis*
Buffalograss	*Buchloe dactyloides*
Pampas grass	*Cortaderia selloana*
Orchardgrass	*Dactylis glomerata*
Tufted hairgrass	*Deschampsia cespitosa*
Canada wildrye	*Elymus Canadensis*
Weeping lovegrass	*Eragrostis curvula*
Purple lovegrass	*Eragrostis spectabilis*
Blue fescue	*Festuca arvernensis*
Foxtail barley	*Hordeum jubatum*
Japanese bloodgrass	*Imperata cylindrica*
Great Basin wildrye	*Leymus cinereus*
Natal grass	*Melinis repens*
Eulalia	*Miscanthus sinensis*
Pink muhly	*Muhlenbergia capillaris*
Pine muhly	*Muhlenbergia dubia*
Bullgrass	*Muhlenbergia emersleyi*
Deergrass	*Muhlenbergia rigens*
Finestem needlegrass	*Nassella tenuissima*
Switchgrass	*Panicum virgatum*
Purple fountaingrass	*Pennisetum advena*
Fountaingrass	*Pennisetum setaceum*
Feathertop	*Pennisetum villosum*
Reed canarygrass	*Phalaris arundinacea*
Common reed	*Phragmites australis*
Ravennagrass	*Saccharum ravennae*
Little bluestem	*Schizachyrium scoparium*
Indiangrass	*Sorghastrum nutans*
Alkali sacaton	*Sporobolus airoides*
St. Augustine grass	*Stenotaphrum secundatum*

APPENDIX VII

Glossary

Acute. Sharply pointed, with a terminal angle between 45° and 90°.
Acuminate. Having a long, slender, drawn-out point with a terminal angle less than 45°.
Annual. Completing its life cycle in a single growing season, reproducing and continuing from season to season solely by seed.
Appressed. Closely pressed against another structure; with an angle of divergence of less than 15°.
Auricle. An ear-like or flap-like lobe of tissue at the base of the blade or the summit of the sheath.
Awn. A bristle-like appendage, almost always derived from the nerves of a structure.
Axil. The angle (space) between an axis and a structure attached to it, as between an inflorescence branch and the stalk of a spikelet.
Axillary. Borne in an axil.
Bisexual. Having both male (stamens) and female (pistil) reproductive structures present; may be said of flowers, florets, spikelets, shoots, inflorescences, plants, etc.
Blade. The flat, expanded, upper portion of the grass leaf, attached to the sheath.
Bract. A modified, scale-like leaf without differentiation of blade or stalk.
Bur. A rough or spiny covering or cluster of spikelets.
Callus. Thickened, hardened base of the lemma where it joins the rachilla.
Ciliate. Fringed with conspicuous hairs along a margin or edge.
Collar. The outer, or back, region at the junction of sheath and blade.
Decumbent. A growth form in which the basal portion of the stem lies against the ground, while the upper part is erect or ascending.
Dioecious. As applied to grasses, having unisexual spikelets (not flowers), with the sexes borne on separate plants; plants are then either male or female.
Disarticulation. The separation or shattering of the spikelets; generally occurring either above or below the glumes.
Distichous. Two-ranked on opposite sides of an axis.
Entire. Without indentations or incisions on the margin, smooth.
Flexuous. Sinuous or coarsely wavy.
Floret. The unit composed of the lemma, palea, and flower.
Glabrous. Without hairs.
Glumes. The lowermost two bracts of a grass spikelet; glumes are empty, without associated flowers.
Hair. A general term for plant trichomes, not hairs in the mammalian sense.

Inflorescence. The seedhead or flowering portion of a grass stem; delimited by the uppermost (last) leaf on the stem.
Internode. The region of a stem between two nodes, or joints.
Involucre. A cup-, bowl-, or vase-like structure, often composed of bristles that surround a cluster of spikelets, which are hidden within the involucre.
Lemma. One of the pair of bracts that are borne immediately below the flower; it is attached directly to the rachilla.
Lanceolate. Lance-shaped, pointed at the tip and widest toward the base.
Ligule. A membranous flap of tissue or hairy ring borne at the inner junction of sheath and blade.
Margin. The edge of a structure.
Membranous. Thin, flexible, generally with the texture of soft leaves, often translucent.
Monoecious. As applied to grasses, having unisexual spikelets (not flowers), with both sexes borne on the same plant.
Nerve. A vein of a leaf or other organ, such as a glume or lemma; nerves are often raised or ridged.
Node. The region, or joint, on the stem where leaves are attached; also applied to joints of an inflorescence or of an axis of some kind.
Obovate. Inversely egg-shaped, with the terminal half broader than the basal.
Obtuse. Bluntly pointed or rounded at the apex, with the terminal angle more than 90°.
Ovate. Egg-shaped, pointed at the tip and widest below the middle.
Palea. One of the pair of bracts that are borne immediately below the flower; it is often 2-nerved.
Panicle. As used in grasses, an inflorescence where nearly all the spikelets are borne on branches in some fashion and few, if any, are borne on the main axis.
Pedicel. The stalk of the spikelet.
Pedicelled. Having a pedicel, stalked.
Perennial. Living for two or more growing seasons.
Plumose. Plume-like; having hairs that are feather-like and branched.
Prickle. A minute, sharp-pointed outgrowth of the epidermis, rarely longer than 1 mm.
Pubescence. Hairiness, the covering of hairs.
Pubescent. Bearing some kind of hair.
Raceme. As used in grasses, an inflorescence without any branches where the spikelets are borne on stalks on the main axis.
Racemose. Raceme-like; usually describing an arrangement with stalked spikelets upon an unbranched axis; often used to describe primary branches of a panicle inflorescence; may also describe a weakly developed panicle with stalked spikelets.

Rachilla. The main axis of the spikelet, to which are attached the glumes and lemmas.
Rachis. A main axis, usually the central axis of an inflorescence, but also used to refer to the axis of an unbranched primary branch.
Rhizomatous. Having rhizomes.
Rhizome. An underground, more-or-less horizontal stem, with nodes, inter-nodes, and scale-like leaves.
Scabrous. Having very short, stiff hairs, which often lie in one direction.
Sessile. Without a stalk. sheath. The basal portion of the grass leaf, wrapped around the stem, with the blade attached at its upper end.
Spicate. Spike-like; usually describing an arrangement with sessile spikelets upon an unbranched axis; often used to describe primary branches of a panicle inflorescence; may also describe a very narrow panicle that appears to be a spike.
Spike. An inflorescence without any branches where the spikelets are borne without stalks on the main axis.
Spikelet. The main unit of flowering in grasses; generally composed of a central axis to which are attached glumes and florets.
Stolon. An above-ground stem that grows horizontally along the ground, often rooting at the nodes.
Stoloniferous. Having stolons.
Subtend. To occur immediately below and close to another structure, as when the lemma and palea subtend the grass flower, or, phrased another way, the grass flower is subtended by the lemma and palea.
Truncate. Ending squarely, as if cut off at right angles.
Tufted. Growing in clumps or bunches, not sod-forming; caespitose.
Tussock. As used here, a rather large clump of grass, often at least 30 cm in diameter and 45 cm high.
Unisexual. Having only one sex present, represented by either stamens (male) or pistils (female); may be said of flowers, florets, spikelets, shoots, inflorescences, plants, etc.

Index to Scientific and Common Names

The following index lists grasses by genera, species, common names, and synonyms. In cases in which the scientific name and the common name are the same (i.e., *Danthonia* and Danthonia), the scientific name is listed first.

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A Field Guide to the Grasses of New Mexico will be useful to wildflower and nature enthusiasts, students, ecologists, range managers, ranchers and farmers, and environmental scientists.

This comprehensive guide describes over 460 different kinds of grasses growing in New Mexico, with nearly half the species illustrated.

- **Introductory Material** explains the structure and terminology of the grass plant and summarizes the scientific classification of New Mexico grasses.

- **Keys** allow the correct identification of grass plants growing in the state, giving the correct scientific and common names (including common names in Spanish), notes on habitat and uses, and county-level range maps.

- **Appendices** provide information on important grass weeds, poisonous or harmful grasses, grasses for pasture and range improvement, life history characteristics of important range and wildlife grasses, and vegetative identification.