PLANTS OF COAHUILA, EASTERN CHIHUAHUA, AND ADJOINING ZACATECAS AND DURANGO, II

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**TYPHACEAE**


*Chihuahua:* 3 mi. west of Camargo, *White.*

Widely distributed in our area along the rivers and elsewhere about permanent water.

**NAIADACEAE**


A submerged aquatic, widely distributed in America.

**POTAMOGETONACEAE**

*Zannichellia palustris* L. Sp. Pl. 969 (1753).

*Coahuila:* Monclova, *Marsh* 1688.

An aquatic of saline waters, world-wide in distribution.


*Coahuila:* Laguna de Jaco, washed up on the beach, *Stewart & Johnston* 1978.

A nearly cosmopolitan species, usually in saline waters.


Widely distributed over the world in brackish waters.


Widely distributed in the United States and ranging south to Central America.

*Potamogeton nodosus* Poir. in Lam. Encyc. Suppl. 4: 535 (1816).

*Chihuahua:* Sierra Hechiceros, Rancho Encampanada, along creek, *Stewart* 196; Ojo Caliente, Oct. 16, 1852, *Thurber* 823.

An aquatic, nearly world-wide in distribution.
ALISMACEAE


**Coahuila:** Torreon, periodically flooded land, 1898, *Palmer 406*. **Chihuahua:** Guadalupe, about pond, Oct. 11, 1852, *Thurber 805*.


**Coahuila:** Hermanas, *Marsh 2260*.

Eastern United States west to South Dakota and New Mexico, and south in Coahuila.


The type of this species, of southern New Mexico and trans-Pecos Texas, was collected by Wright (nos. 1899 and 679) in ponds in the bottom-land of the Rio Grande near San Elizario, Texas.


This species has been repeatedly collected in the wet bottom-lands along the Rio Grande between El Paso and old Fort Quitman, Texas. It ranges from central United States south into Mexico. The type came from near San Elizario, Texas.

GRAMINEAE


**Coahuila:** Saltillo, 1898, *Palmer 5, 266*; Parras, May 15, 1847, *Gregg*. **Zacatecas:** Valley 15 km. west of Concepcion del Oro, *Stanford et al. 556*.

A common, chiefly ruderal species of central Mexico. Collections have been generally identified as *B. laciniatus* Beal, but that is a montane plant obviously distinct from the weedy species concerned here.

**Bromus sp.**

**Chihuahua:** Sierra Organos, 1937, *LesSueur 211* in pt.

The collection is similar to the plant of Arizona and New Mexico referred to *B. carinatus*.

**Bromus sp.**

**Coahuila:** Mesa Grande, 40 km. northwest of Hac. Encantada, common in meadows, *Stewart 1633*; Hillcoat Mesa, west of Encantada Ranch, July 25, 1938, *Marsh 1436*.

Similar to the plants of the Chisos and Davis Mountains of Texas passing as *B. marginatus* and *B. polyanthus*.


Widely distributed in western United States and south to southern Mexico. A very variable species, particularly in the amounts and distribution of indument. The material from the Sierra del Pino and the Sierra...
Madera represents a hairy robust form with broad leaves and a large drooping panicle.


Coahuila and Nuevo Leon south to Central America. A very variable species with forms differing greatly in appearance, apparently even in a single locality. The cited collections have very narrow leaves and short-awned lemmas.


_Coahuila_: Mountains 24 km. northwest of Fraile, *Stanford et al. 405*.

A coarser, densely tufted plant, with the spikelets larger than in the type of the species from the Guadalupe Mts., Texas, but apparently better referred to *F. ligulata* than to the more northern *F. Thurberi*.

**Poa sp.**


I am unable to name this species. The collection from the Sierras Negras has been identified as *P. involuta* Hitchc.

**Poa sp.**

_Coahuila_: 6 mi. east of Saltillo, 1880, *Palmer 1366*.

The cited specimen has been identified as *P. Ruprechtii* Peyr.


_Coahuila_: Saltillo, 1905, *Palmer 532*.

Oklahoma and western Texas to southern California and south into northern Mexico. The species has been repeatedly collected about El Paso, Texas, and is to be expected in adjacent northern Chihuahua.

**Poa annua** L. Sp. Pl. 68 (1753).


Chihuahua: Chihuahua, 1908, *Palmer 28*.

A European grass, widely established in the United States and Mexico.


_Chihuahua_: Margin of Laguna de Santa Maria, April 20, 1852, *Wright 193* (isotype); near Laguna Santa Maria, 1899, *Nelson 6413*.

Known only from saline soils in northwestern Chihuahua, southwestern New Mexico, and southeastern Arizona. It much resembles *Distichlis stricta* in general habit.


_Coahuila_: Don Martin Dam, *Harvey 932*.

Kansas and New Mexico to Texas and northeastern Coahuila.

**Eragrostis reptans** (Michx.) Nees, Agrost. Bras. 514 (1829).

_Coahuila_: Don Martin Dam, mud flats, *Harvey 927, 928*.

Kentucky to South Dakota and Texas, south into northeastern Mexico.

Coahuila: Near Don Martin Dam, Harvey 948; Sabinas, Nelson 6823 (US); Saltillo, 1898, Palmer 389; valley-floor east of Puerto Caballo, near bushes by ephemeral charco, Johnston 8330; Sierra Cruces, 4 mi. west of Santa Elena, black loam on flats, Stewart 828; north of Sierra Cruces, west of San Rafael, on sabaneta, Johnston & Muller 1038; 7 mi. south of Jaco, about mogote, Johnston & Muller 1110. Chihuahua: Rancho El Pino, southeast of Sierra Rica, slopes, Stewart 2399; Pirámide, under oak tree on gravelly flat, Johnston 8119; 10 mi. southeast of Organos, under bushes at foot of grassy slope, Stewart & Johnston 2036A; Cañon del Coyote, 20 km. northwest of Santa Fe, in mogote, Stewart 2607; Chihuahua, LeSueur 83, 122; 20 km. south of Camargo, arroyo, Harvey 1377. Durango: Tlahualillo, barren hills, Pittier 475 (US).

A European weed, widely introduced in America. Where I have seen this plant in Coahuila and Chihuahua, however, it behaves like an indigeneous species, associating with indatable native species and growing with them in remote undisturbed places where a single introduced species is certainly not to be expected.


Coahuila: Saltillo, 1898, Palmer 811, 812; 7 mi. south of Jaco, about a mogote, Johnston & Muller 1109; Torreon, low ground along the Rio Nazas, 1898, Palmer 510. Chihuahua: Pirámide, moist rocky soil, Johnston 8137; Ojo Almagre, Sierra Almagre, wet sand in canyon, Johnston & Muller 1214; Chihuahua, Pringle 416, LeSueur 78; 3 mi. north of Charca Piedra, under bushes on silty plain, Johnston 7929; Camargo, banks of the Rio Conchos, Harvey 1404; 50 km. west of Camargo, Harvey 1414; Jimenez, banks of the Rio Florido, Harvey 1313.

Central Texas to Arizona and south into northern Mexico.

Eragrostis sp.

Coahuila: Saltillo, 1898, Palmer 376; Sierra del Pino, La Noria, meadows and open hillsides, Stewart 1205. Chihuahua: Rancho El Pino, southeast of Sierra Rica, slopes, Stewart 2400; canyon west of Organos, damp gravelly arroyo, Stewart & Johnston 2081.

Closely related to E. diffusa and perhaps only a form of it, differing in its dense elongate inflorescence. The branches of the panicle are very short and strict and bear crowded strictly ascending spikelets. In typical E. diffusa the panicle is open, with elongate spreading branches. I have seen the plant from Coahuila, Chihuahua, trans-Pecos Texas, and New Mexico.

Eragrostis mexicana (Hornem.) Link, Hort. Berol. 1: 190 (1827).


Texas to Arizona and south through Mexico to South America.


Western Texas to Arizona.


Eragrostis erosa Scribn. ex Beal, Grasses No. Am. 2: 483 (1896).

Coahuila: Villa Juarez, 1880, Palmer 1368 (type of E. Palmeri); Sierra del Pino, La Noria, arroyo banks, Johnston & Muller 664; Sierra Cruces, 5 mi. south of Santa

**Chihuahua:** Sierra Santa Eulalia, Oct. 1885, Pringle 415 (isotype of *E. erosa*).

Southern and western Texas south into Chihuahua, Coahuila, and northern Tamaulipas. An isotype of *E. caudata* (from Matamores) at the Gray Herbarium is evidently conspecific with the type of *E. Palmeri*. From isotypic material of *E. erosa* they differ only in their slightly smaller spikelets.


Central Texas west to Arizona and south into northern Mexico. A densely tufted perennial with tall erect culms. Habitually very similar to *E. caudata* but differing in having hairy nodes in the panicle, spreading spikelets, and a more open usually proportionately broader inflorescence. Some of the collections from northeastern Coahuila have rather small spikelets and approach *E. lugens* Nees, a widely distributed species in tropical America, which extends northward through Mexico to eastern Texas.


Coahuila: 4 mi. west of Cuatro Cienegas, common in strongly saline and gypseous soil on flat, *Johnston* 7129.

This species has been known only from salt marshes about the Gulf of Mexico and along the Pacific coast of Mexico and adjacent United States. The material from Cuatro Cienegas is sterile, but in all vegetative details it agrees with material from coastal salt marshes. The plant grows only a few centimeters high, from well-developed scaly rhizomes, and covers small areas of very saline gypsiferous soil.


Coahuila: Torreon, large masses on sandy banks of Rio Nazas, 18–24 inches high, with runners rooting at the nodes, Oct. 1898, *Palmer* 507.

A coarse grass with long trailing stolons, growing in sandy places. The species has been collected near the Rio Grande at Presidio and Castolon, Texas, and hence it may be expected in northern Coahuila and northeastern Chihuahua.


A salt grass widely distributed over western United States and Mexico. It has been collected at many stations along the Rio Grande.
Arundo Donax L. Sp. PI. 81 (1753).

Vernacular name: Carrizo.

Coahuila: Palm Canyon, near Múzquiz, Marsh 975; Monclova, 1880, Palmer 1345; Monclova, Harvey 1132.

Texas to California and southward. A plant of the Old World, now widely established in the warmer parts of America. Well established along the Rio Grande and elsewhere about ponds and streams in our area.


Collected along the Texan bank of the Rio Grande and hence to be expected in northern Coahuila and Chihuahua. Widely distributed in the warmer parts of the world.


Coahuila: San Lorenzo Canyon, 6 mi. southeast of Saltillo, 1905, Palmer 551; Sierra Mojada, April 19, 1892, Jones 482 (US). Chihuahua: Sierra Santa Eulalia, shaded places, April 6, 1885, Pringle 430 (isotype); Chihuahua, Wilkinson (US).

Edwards Plateau and Big Bend, Texas, south into our area. Piper and Hitchcock independently named this species, basing their names on the same group of specimens and indicating the same collections as the type. The species has been taken to be endemic to our area, but Mr. W. S. Boyle, who is monographing the genus, has properly indicated, through his identification of the Gray Herbarium material, that the species is also present in Texas.


Coahuila: Along arroyo south and west of Sierra Azul, Buena Vista Ranch, July 8, 1938, Marsh 1230, 1260.

Eastern United States west to Kansas and Arizona and south through eastern Coahuila to Nuevo Leon.


Vernacular names: Zacate borreguerro; Zacate pelillo; Zacatito.

Coahuila: Sierra del Carmen, Aug. 29, 1936, Marsh 692; between Santo Domingo and Piedra Blanca, open country, Wynd & Mueller 495; Cuatro Cienegas, Marsh 2050; Puerto del Norte, Cuatro Cienegas, Harvey 1204; near Sacramento, gravelly wash, Johnston 7085; Saltillo, 1898, Palmer 257, 413; 10 mi. east of Fraile, stony bahada, Johnston 7307; near Santa Elena, eastern foothills of Sierra Cruces, gravelly flat, Stewart 840; Puerto Ventanillas, south of Las Delicias, limestone slope, Stewart 2967; Parras, 1880, Palmer 1359. Chihuahua: Laguna Santa Maria, Nelson 6414; Chihuahua, LeSueur 11; 20 mi. south of Camargo, Harvey 1309. Durango: Torreon, rocky hills, Hitchcock 7547 (US); Tlahualillo, barren hills, Pittier 480; Cerro San Ignacio, Purpus 4615 (US). Zacatecas: Concepcion del Oro, very common, 1904, Palmer 263; valley 15 km. west of Concepcion del Oro, Stanford et al. 560; Cedros, footslopes and hills, Lloyd 89 (US).

Western Texas to southern Nevada and southern California, south to central Mexico. A common but unobtrusive widely distributed, almost ubiquitous, grass among the desert scrub on dry slopes and in desert valleys. A capable xerophyte that flowers throughout the summer and appears to remain unaffected by long droughts. Although it is frequently locally abundant, horses and cattle ignore it if any other food is available. During
long dry spells the plants appear to become shaggy-white-villous. The shaggy indument disappears after a rain and is apparently composed of myriads of hair-like water-soluble crystals which are products of transpiration.


Coahuila: Don Martin Dam, Harvey 933; calcareous soil near Piedras Negras, Pringle 8305; Puerto Santa Anna, Marsh 942; Yerda Spring, Marsh 295; Hillcoat Mesa, west of Encantada Ranch, July 25, 1938, Marsh 1448; Cañon Espantosa, Sierra San Vicente, Schroeder 136.

Kansas and Texas to Nevada and Arizona, south into northeastern Mexico.


Coahuila: 3 km. southwest of Fraile, in arroyo, Stanford et al. 331. Zacatecas: Concepcion del Oro, stony mesa, 1904, Palmer 280; valley 15 km. west of Concepcion del Oro, Stanford et al. 561.

Northern Zacatecas and Nuevo Leon southward to central Mexico. A low spreading plant, with stolons.


Coahuila: Saltillo, 1898, stony hillside, Palmer 414, 813; Saltillo, 1905, Palmer 735; base of mountains 3 mi. southeast of Saltillo, Johnston 7252; La Rosa, limestone hills, Shreve & Tinkham 9575; hills 20 mi. west of Saltillo, Shreve & Tinkham 9824; Sierra Guajes, Cañon Madera, east of Buena Vista, hillside, Stewart 1503; Sierra del Pino, rocky crest of ridge west of La Noria, Johnston & Muller 002; western base of Picacho del Fuste, rocky slope, Johnston 8441; Sierra Madera, Cañon Charretera, ledge on sunny hillside, Johnston 9102; San Antonio de los Alamos, top of tuff cliffs, Johnston 8253; Sierra Cruces, Cañon Tinaja Blanca, crest of sierras, Johnston & Muller 297; eastern foothills of Sierra Cruces, north of Santa Elena, rocky flats, Johnston & Muller 1384; west of Santa Elena, sunny hillside, Stewart 827. Chihuahua: Sierra Virulento, rocky slope, Johnston 8093 A; Sierra Santa Eulalia, Aug. 12, 1885, Pringle 406. Zacatecas: Concepcion del Oro, 1904, Palmer 265.

Although I am following Hitchcock in delimiting this species, I am convinced that it is an aggregate containing several undifferentiated species. Typical *T. grandiflora* is a plant with the habit of *T. pilosa*, having usually pale well-developed spikelets with acute or subulate lemma-lobes. *Triodia Nealleyi* is a species more closely related to *T. avenacea* and has a spicate crowded inflorescence, in which the individual spikelets are less obvious, smaller, usually reddish, and the lemma-lobes elongate-spread and obtuse. Both of these forms are present in our area. Plants from Chihuahua and Arizona are distinguishable, but are unnamed. Certain plants from the Sierra Guajes, Sierra del Pino, and Sierra Madera are also separable, but without a name. The aggregate of forms here included ranges from western Texas to Arizona and south in eastern Mexico to Hidalgo and Oaxaca.


Coahuila: Rio Grande Valley near Piedras Negras, Pringle 9019; Allende, Marsh 1798; 11 mi. south of Allende, tree-lined arroyo, Johnston 7017; Yerda Spring, Marsh 286; Monclova, 1880, Palmer 1371; near Rancho Teresa, south of Castaños, moist place in desert, Wynd & Mueller 178.
Central and southern Texas and northeastern Mexico.


Coahuila: Rio Grande Valley near Piedras Negras, Pringle 9023; 21 mi. south of Sabinas, Johnston 7041.

Texas and Kansas to Colorado and New Mexico, south into northeastern Coahuila.


Coahuila: Sierra del Carmen, Sept. 13, 1936, Marsh 908; Hillcoat Mesa, west of Encantada Ranch, July 25, 1938, Marsh 2270; 2 mi. northwest of Fronteras, road to Natadores, silty Larrea desert, Johnston 7174; near Sacramento, silty bajada, Johnston 7091; Santa Teresa, south of Castaños, Wynd & Mueller 196; 3 mi. east of Cuatro Cienegas, rocky bajada, Johnston 7110; between Hac. La Rosa and Hac. Lechuguilla, dry desert, Wynd & Mueller 62; 14 mi. east of Paia, Shreve & Tinkham 9891; hills 20 mi. west of Saltillo, Shreve & Tinkham 9820; mountains west of Saltillo, 1880, Palmer 2020; foothills of the Sierra Crucces north of Santa Elena, stony flats among brush, Johnston & Muller 1016, 1377; western base of the Picacho del Fuste, bushy rocky flat, Johnston 8414. Chihuahua: Sierra Santa Eulalia, dry calcareous soil, Pringle 405; arroyo 20 km. south of Camargo, Harvey 1376. Durango: Tlahualillo, barren hills, Pittier 468 (US).

Texas to Arizona and south into northern Mexico.

Blepharidachne Bigelowii (Wats.) Hack. in DC. Monogr. Phan. 6: 261 (1889).

Coahuila: Several miles west of Buenavista, on road between San Antonio de los Alamos and Puerto Caballo, banks of gyspiferous shales, small clumps 1–3 inches broad, pale, frequent, leaves very pungent, Johnston 8309; south of Laguna de Leche, confined to gyspiferous shales, rigid, erect, local, leaves pungent, Johnston 8615; northern foothills of the Sierra Crucces, about 10 mi. north of Santa Elena, gyspiferous shales, local, Johnston 9411; east base of Picacho de San José, gyspiferous shales, Johnston 9401. Texas: Rustler Springs, Culberson Co., 1928, Cory 1238; rocky hills near Frontera, north of El Paso, in small compact bunches, May 4, 1852, Wright 2028 (type); rocky hills near Frontera, May 4, 1852, Bigelow; Frontera, July 1852, Parry.

Known only from the collections cited. Where I have seen the plant it was confined to thin gypsum seams in Upper Cretaceous shales. Since gypsum is present in the areas in Texas where it has been collected, the probabilities are that the species is gypsophilous. The plant forms very strict stiff tufts less than a decimeter tall. The pale rigid leaves have a pungent tip. Because of its distinctive appearance it is readily recognizable, even in the sterile state.

Cottea pappophoroides Kunth, Rév. Gram. 1: 84 (1829).

Coahuila: Sierra Hechiceros, Cañó Indio Felipe, sides of dry arroyo, Stewart 175; gypsum beds in the valley between La Vibora and Matrimonio Viejo, Johnston 9340; 16 mi. south of Laguna del Rey, gypsum plain, Johnston 7816; Rancho Las Uvas, Valle Acatita, frequent on gypsum flats, Stewart 2695. Chihuahua: Chihuahua, rocky hills near Millers Dam, Sept. 12, 1885, Pringle 420; 20 km. south of Camargo, Harvey 1395. Durango: Torreon, rocky hill, Hitchcock 7543 (US).

Southern and western Texas to Arizona and south to southern Mexico; also in South America. The type came from Peru. Although obviously not confined to gypsum, the species frequently occurs on gypsum in Coahuila, and where I have seen it, it is locally confined to that substratum. On gypsum the plants form a very dense caudex of stem-bases and cleisto-
genes that becomes 3–7 cm. in diameter, although supporting only a relatively few leafy stems. Plants from other substrata develop very loose caudices or none at all. I can detect no other differences between these plants.


Central Texas to Arizona and south to Oaxaca; western South America. As with *Cottea*, this grass, although not restricted to gypsum, is encountered most frequently about gypsum beds and usually in greater abundance there than on other substrata.

**Pappophorum mucronulatum** Nees, Agrost. Bras. 412 (1829).


Texas to Arizona and northern Mexico.

**Pappophorum bicolor** Fourn. Mex. Pl. 2: 133 (1886).


Texas to Arizona and south into northeastern Mexico.

**Scleropogon brevifolius** Phil. Ann. Univ. Chile 36: 206 (1870).

*Vernacular names:* Colo del Zorro; Zacate del Burro.


Western Texas to Colorado and Arizona and south to southern Mexico; Argentina. A common and characteristic grass of the silty valley soils in Coahuila, especially of the flat area where some run-off temporarily accumulates during rains. Frequently associated with tobosa (*Hilaria mutica*) and common about the margin of well-developed tobosa flats. The sabanetas of Coahuila, level grassy places of varying size scattered in the desert scrub on the gentle slopes of the major valleys or in the broad open canyons, are usually dominated by this grass. The plant spreads by rhizomes and
large areas may be covered by a pure colony of the plant. The awns are usually stramineous but occasional plants have the awns pink and so permit an observer to determine the extent of an individual plant in the colony. I have noted plants covering three or four square meters and so dominating its particular area that adjoining plants of the species scarcely transgress upon it. The plants are extremely prolific and during the summer the female plants are a mass of fruiting inflorescences; although useless as animal food, they are an attractive element in the desert scene.

**Agropyron sp.**


The cited specimens belong to the group of *A. arizonicum* and *A. spicatum*, but differ from them in their large, elongate, attenuate, awn-tipped glumes.

**Elymus canadensis** L. *Sp. Pl.* 83 (1753).


Widely distributed in the United States, extending south into Chihuahua, Coahuila, and Nuevo Leon.


Western United States and adjacent Mexico; south along the eastern Sierra Madre to central Mexico.


Widely distributed in the United States; in Mexico extending south in the mountains to Central America.

**Sphenopholis obtusata** (Michx.) Scribn. *Rhodora* 8: 144 (1906).

Coahuila: Rio Grande Valley at Piedras Negras, April 17, 1900, *Pringle 8285*.

Widely distributed in the United States and south to southern Mexico.


Avena fatua L. Sp. PI. 80 (1753).

COAHUILA: Saltillo, old field, April 1898, Palmer 8.

A European weed, widely introduced in the United States and Mexico.


COAHUILA: West base of Picacho del Fuste, coarse tufts on limestone ledges on north slope, Johnston 3832; Carneros Pass, limestone ledges, Sept. 20, 1890, Pringle 3279 (isotype); Sierra de Parras, April 1905, Purpus 1125 in pt.

A rare species, known only from the stations cited above, and from Tehuacan, Puebla.


COAHUILA: Muzquiz, Sabinas River, 1936, Marsh 410; Muzquiz, 1938, Marsh 1157, 1169; Hermanas, 1939, Marsh 1621; Monclova, 1939, Marsh 1697; Saltillo, 1905, Palmer 527; Saltillo, 1898, Palmer 806; San Juan de la Vaqueria, May 25, 1847, Gregg 711; Parras, 1880, Palmer 2019; Parras, Feb. 1905, Purpus 1111. CHIHUAHUA: Chihuahua, low meadows, 1908, Palmer 29; Chihuahua, wet river bank in shade, 1908, Palmer 160; 2 km. west of Jimenez, Harvey 1315.

A species of the Old World, now widely distributed in wet soils in the warmer parts of America.


COAHUILA: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 547.

From Alaska south through western United States into northern Mexico.

Agrostis hiemalis (Walp.) B.S.P. Prelim. Cat. N. Y. 68 (1888).

COAHUILA: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 544.

Boreal North America south into the mountains of northern Mexico.


CHIHUAHUA: 2 km. west of Jimenez, Harvey 1317.

A European weed, widely distributed in the United States and northern Mexico.


Wet soils from southern Arizona south through Mexico, reaching South America.


Lycurus phleoides var. glaucifolius Real, Grasses No. Am. 2: 271 (1896).

COAHUILA: Sierra del Carmen, Aug. 14, 1936, Marsh 658; limestone hill near Santo Domingo, Wynd & Mueller 454; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1274, 1285; Mesa Grande, 40 km. northwest of Hac. Encantada, meadows, Stewart 1631; base of mountains 3 mi. southeast of Saltillo, Johnston 7250; Choj Grand, 27 mi. southeast of Saltillo, bunches in sandy gravel in canyon, 1904, Palmer 339; Sierra del Pino, La Noria, flats and meadows, Johnston & Muller 460, Stewart 1210; west base of Picacho del Fuste, banks of cemented gravels, Johnston 8444; Sierra Cruces, Cañon Tinaja Blanca, rocky slopes on crest at head of canyon, Stewart 1950; San Antonio de los Alamos, gravelly flats above cliffs, Johnston 8232a. CHIHUAHUA: rocky hills near Chihuahua, May 28, 1885, Pringle 426 (isotype of var. glaucifolius); Chihuahua, 1935, LeSueur 76. ZACATECAS: Valley 15 km. west of Concepcion del Oro, Stanford et al. 476.

Ranging from Oklahoma and western Texas west to Arizona and south
in Mexico to Guanajuato (the type locality), Hidalgo, and Puebla. The species is frequent on rocky soils in our area.


Known from a few stations in Baja California, Chihuahua, and Durango.


-Chihuahua: Volcanic hills 20 km. north of Chihuahua, open canyon, in gravel of stream-bed, Stewart & Johnston 2139; hills northeast of Chihuahua, wet ledges, Oct. 7, 1885, Pringle 399; rocky hills northwest of Chihuahua, gravel bars of stream, Oct. 21, 1885, Pringle 400.

-Trans-Pecos Texas to Arizona and south along the Sierra Madre, in Chihuahua and Sonora, to Durango.


-Chihuahua: Mapula Mts., thin soil of summits, Nov. 11, 1886, Pringle 824.

Known from a few collections in San Luis Potosi and the mountains of Chihuahua.


-Chihuahua: Portrero Peak, east of Mapula station, rocky banks of stream, Oct. 12, 1886, Pringle 818.

-North through Mexico to Hidalgo, Durango, and Chihuahua.


-Coahuila: Along seepage on limestone ledges at top of escarpment at west side of Potrero de la Mula, locally abundant, depressed, Johnston 9250. Chihuahua: Pirámide, shaded crevices at base of large rock-masses, Johnston 8122; Sierra Santa Eulalia, thin dry soil of ledges, 1885, Pringle 404.

-Trans-Pecos Texas to Arizona and south to Central Mexico.


-Coahuila: Sierra del Carmen, Sept. 13, 1936, Marsh 907; northeastern foothills of the Sierra Cruces, 5 mi. south of San Rafael, silty flat in arroyo, Johnston & Muller 1032; 3 mi. east of San José, silty flats, Johnston 8217. Chihuahua: 50 km. north of Jimenez, in arroyo, Harvey 1375. Zacatecas: Valley 15 km. west of Concepcion del Oro, Stanford et al. 517.

-Western Texas and adjacent New Mexico south into our area.


-Durango: Mapimi, dense masses in bottom of damp arroyo, 1898, Palmer 554.

-Western United States south into northern Mexico; also in southern South America. The species has been collected along the Rio Grande near El Paso and is to be expected in northern Chihuahua.


-Coahuila: Sierra de la Paila, Oct. 1910, Purpus 5006; Sierra Madera, Cañon Charretera, gravelly bed of arroyo, one plant, Johnston 8906; Sierra del Pino, La Noria,

Trans-Pecos Texas to Arizona and south to central Mexico.


Coahuila: Sierra del Carmen, Aug. 9–26, 1936, Marsh 624, 655; trail from southern extremity of Hillcoat Mesa to Buena Vista headquarters, July 27, 1938, Marsh 1511; Sierra Madera, Cañon Charretera, bed of arroyo and on rocky flats, Johnston & Muller 895, 587. Chihuahua: Encampanada, Sierra Hechiceros, sandy open slopes, Stewart 202; Pirámide, sheltered crevices about base of rock-masses, Johnston 8115; Organos, rocky open canyon, Stewart & Johnston 2066.

Trans-Pecos Texas to Arizona and south to Durango and Hidalgo. A species of the oak-belt, forming coarse clumps in rocky soil, commonly at the edges of thickets or on sheltered arroyo-banks. The material from eastern Coahuila has a denser stiffer plumbeous, rather than pinkish, panicle, and shorter awns than typical M. Emersleyi. This aberrant eastern material, well exemplified by Palmer 401, may deserve nomenclatural recognition.


Known from scattered stations in Chihuahua, and from San Luis Potosi to Puebla.

Muhlenbergia abata sp. nov.

Planta perennis gracilis humilis e rhizomatibus gracilibus oriens; cauli- bus numerosissimis gracilibus stricte ramosis saepe 1–3 dm. longis rigidulis laxe decumbentibus vel procumbentibus; vaginis quam internodiis \(\frac{1}{4}\) brevioribus vel eis non raro subaequilongis, maturitate solum partem infra medium internodii culmi amplentantibus, margine scabridulis; ligula ad 1 mm. longa apice rotundata basi decurrente; lamina rigidula plus minusve curvata, 3–6 cm. longa, 1–2 mm. lata, saepe arcte involuta, subtus glabra supra minute scabridula; paniculis scabridulis 2–4 cm. longis paucifloris interruptis angustis subspicatis infra medium brevissime stricteque pauci- ramosis; spiculis ca. 3 mm. longis strictis acutis elongatis 0.3–5 mm. longe pedicellatis; glumis subaequilongis hyalinis pallidis obscure uninervatis acutis 1.8–2 mm. longis; lemmatibus plumbeis obscurissime nervatis elongatis, supra medium sparse minuteque scabridulis, alibi glabris, apice acutis vel breviter sed distincte rostratis.


This is the species accepted as M. repens by Hitchcock, No. Am. Fl. 17: 451 (1935) and Man. Grasses U. S. 362. fig. 737 (1935). As discussed
under the following species, the name “M. repens” properly applies to the plant which Hitchcock called M. utilis. From the true M. repens (that is, M. utilis), the present plant differs in its distinctly larger spikelets, scabrid lemmas and pedicels, looser paler acute glumes more than half as long as the lemma, somewhat larger ligule, and coarser stems and leaves. It ranges in western Texas and southern New Mexico south through Chihuahua to San Luis Potosi.

**Muhlenbergia repens** (Presl) Hitchc. in Jepson, Fl. Calif. 1: 111 (1912).

*Sporobolus repens* Presl, Rel. Haenk. 1: 241 (1830).


Central Texas, southern California (where probably introduced), Durango, San Luis Potosi, and central Mexico. Hitchcock has treated this plant as M. utilis, cf. No. Am. Fl. 17: 451 (1935) and Man. Grasses U. S. 362. *fig. 738* (1935), and applied the name M. repens to the plant I have called M. abata. The original description of *Sporobolus repens* Presl, and Scribner’s illustration, Ann. Mo. Bot. Gard. 10: 53. *t. 30* (1899), of the isotype of Presl’s species at St. Louis leave little doubt as to the precise identity of the species. It is obviously one of the forms of M. utilis found in central and southern Mexico.


Western United States south into Chihuahua and Sonora.

**Muhlenbergia Porteri** Scribn. in Beal, Grasses No. Am. 2: 259 (1896).


Texas and Colorado to California and south into northern Mexico. A common grass in silty valley soils, usually growing in the shelter of bushes. The globose entangled masses of stems, 3—4 dm. in diameter and supported by the shrubbery a meter or more above the ground, are very characteristic features of the mogotes in Coahuila. The plant, when covered with its very abundant open airy purplish panicles, is conspicuous and attractive.


Arizona southward in the mountains of Sonora and Chihuahua to Sinaloa and Durango.


Coahuila: Western base of Picacho del Fuste, silty places on slopes, tufted, not common, Johnston 8422; tableland north of Cañon del Cuervo Chico, common on wide grassy valley, Johnston 8538; between Palos Blancos and San Pedro, east of Cuesta Zozaya, common on grassy valley on tableland, Johnston 9273, 9275; foot slopes at mouth of Cañon Santa Cruz, 20 km. south of Ocampo, Johnston 8174; 10 mi. east of Fraile, silty place at edge of bahada, Johnston 7304; north of Sierra Cruces, about mogote 5 mi. west of San Rafael, Johnston & Muller 1042; gypsum ridge east of Laguna Jaco, fairly common, Stewart & Johnston 1962; eastern foothills of Sierra Cruces, 8 mi. north of Santa Elena, stony flat, Johnston & Muller 1024; 3 mi. east of San José, silty flat about mogote, Johnston 8220; San Antonio de los Alamos, flat at summit of tuff cliffs, frequent, Johnston 8258; 10-15 km. east of San Antonio de los Alamos, sabaneta, in broad valley, Johnston 8288. Chihuahua: 1 mi. east of Pozo de Villa on Coahuilense boundary, silty plain, Johnston 8180; 2 mi. south of San Fernando, silty plain, Johnston 7938; Chihuahua, plains, Pringle 479 (US); arroyo 50 km. north of Jimenez, Harvey 1370.

Kansas to Texas and Arizona and south into Zacatecas.

**Muhlenbergia setifolia** Vasey, Bot. Gaz. 7: 92 (1882).

Coahuila: Sierra del Pino, La Noria, banks of arroyo, Johnston & Muller 662, 665; escarpment on west side of Potrero de la Mula, rocky sunny ridges, Johnston 9243; Sierra Madera, Cañon Charretera, openings in oak-chapparal on rocky flat, frequent, Johnston 9061; Saltillo, summit of a stony mountain, 1898, Palmer 415; San Lorenzo Canyon, 6 mi. southeast of Saltillo, bunch grass of medium size on canyon side, 1904, Palmer 400.

Western Texas south into Coahuila. The species is closely related to *M. rigida* and apparently separable from it by no single character. Its range is mostly just beyond the northern limit of *M. rigida*, but it grows with that species, along the northeastern limits of the latter, in eastern Coahuila. It is a smaller more slender plant than *M. rigida*, with looser tufts of stems and leaves, filiform involute leaf-blades, and narrower fewer-flowered green or brownish (not purple) panicles.


Coahuila: Sierra del Carmen, Sept. 8, 1936, Marsh 719; Mesa Grande, 40 km. northwest of Hac. Encantada, meadows and hillsides, common, Stewart 1628, 1630; Sierra del Pino, La Noria, gravelly flats among clumps of scrub oaks, Johnston & Muller 659; Puerto San Lazaro, dominant grass on upper slopes, Muller 3095; north end of Carneros Pass, among cacti, not common, Johnston 7289. Chihuahua: Sierra Organos, south of Organos at base of oak-clad slope, coarse tufts, rocky places, Stewart & Johnston 2065; Sierra Santa Eulalia, Sept. 17, 1885, Pringle 401.

Trans-Pecos Texas to Arizona and south to Central America. The species appears to be absent in northeastern Mexico and to reach its eastern limit along the western base of the Sierra Madre in Coahuila and Nuevo Leon. It has been collected in Hidalgo. In eastern Coahuila it is connected by intergrades with the closely related and generally more northerly ranging *M. setifolia*.


Coahuila: Sierra Madera, Cañon Charretera, coarse tufts in rocky arroyo-bottom just below pine-belt, 3-4 ft. tall, Johnston 8975, 9069; Saltillo, among large rocks on
outer rim of treeless mountain, 1898, Palmer 416; Saltillo, deep ravines, 1898, Palmer 379; San Lorenzo Canyon, 6 mi. southeast of Saltillo, high up canyon, large bunch grass, 1904, Palmer 399; Chojo Grande, 27 mi. southeast of Saltillo, bunch grass on canyon side, 1904, Palmer 341; north end of Carneros Pass, coarse tufts between bushes, Johnston 7288. Chihuahua: Rocky hills northeast of Chihuahua, cool slopes, Oct. 20, 1885, Pringle 403.

Trans-Pecos Texas to New Mexico and adjoining Mexico, south through Nuevo Leon and eastern Coahuila to eastern San Luis Potosi. The type of *M. dubia* came from the Chiantilla, Puebla. I have seen no authentic material and no collections from south of San Luis Potosi. Our plant is the same as the Texan material described as *M. acuminata* Vasey. Perhaps that name is the proper one for our present plant.


Coahuila: Locally common on the gypsum ridges east of Laguna de Jaco, Johnston & Muller 1074; Stewart & Johnston 1963; 10 mi. east of Fraile, abundant on valley floor, local, Johnston 7305; 6 mi. north of La Ventura, common on gypsum plain, local, Johnston 7642, Shreve & Tinkham 9607.

Known only from scattered stations in Coahuila, San Luis Potosi, Nuevo Leon, and southern Tamaulipas, apparently confined to gypsum.


Coahuila: Sierra del Carmen, Sept. 9, 1936, Marsh 717; Sierra Madera, Cañon Charretera, banks of arroyo in oak-belt, erect, tufted, Johnston 9076.

Known from Uvalde, Val Verde, and Jeff Davis Counties, Texas, and from Nuevo Leon and eastern Coahuila.


Chihuahua: Hills northeast of Chihuahua, cool wet ledges, 1885, Pringle 394.

Trans-Pecos Texas to Arizona and south in the mountains of Baja California, Sonora, and Chihuahua to Durango.


Coahuila: Sierra Mojada, Cañon San Salvador, abundant on slopes, Muller 3312.

Trans-Pecos Texas to Arizona and south in the mountains of Baja California, Sonora, and Chihuahua. The type of the species (*Wright 732*) was collected "in declivities in the mountains near El Paso, Sept. 12, 1849."


Coahuila: Camp near Mt. Carmel canyon, Oct. 1852, Parry; Sierra del Carmen, Sept. 1, 1936, Marsh 872; limestone hill near Santo Domingo, Wynd & Mueller 453; Muzquiz, Marsh 540; Sierra Madera, Cañon del Agua, among rocks in oak-pinyon belt, in lower canyon, Muller 3258, 3259; Cuatro Ciénegas, Marsh 2053; Puerto San Lazaro, rock crevices on dry open slope, Muller 3071; Picachos Colorado, base of cliffs, Johnston & Muller 143; Sierra Cruces, eastern foothills near Santa Elena, among bushes along arroyo, Johnston & Muller 238; Sierra Cruces, Cañon Tinaja Blanca, about rock ledges on crest at head of canyon, Johnston & Muller 298; Sierra Mojada, Cañon San Salvador, abundant on slopes, Muller 3312. Chihuahua: Sierra San Carlos, base of limestone cliffs, Johnston & Muller 46; near Rancho Madera, southwestern base of Sierra Rica, confined to small gypsum outcrop on slope, Steward 2434; volcanic neck east of El Coyote, base of cliff, Johnston & Muller 1411; Sierra Almagre, among rocks in deep shaded canyon, Johnston & Muller 1177; Sierra de los Organos, 1937, LeSueur; Sierra Santa Eulalia, 2 km. north of San Antonio, Harvey 1513; Sierra Santa Eulalia, dry limestone ledges, Aug. 1885, Pringle 396.
Trans-Pecos Texas to Arizona and south into northern Mexico. In its extreme form, typical *M. monticola* is separated from typical *M. tenuifolia*, of central Mexico, by having narrow inflorescences with strict branches, strict spikelets, and green acute lanceolate glumes. *Muhlenbergia tenuifolia* has purple inflorescences, which have spreading or ascending branches on which the spikelets are divaricate or even reflexed. Its glumes are deep purple, smaller than in *M. monticola*, and commonly denticulate and obtusish and abruptly apiculate at the apex. In our area, the ranges of *M. monticola* and *M. tenuifolia* meet and the species intergrade very badly. I have arbitrarily referred to *M. monticola* those plants with narrow green or weakly purplish inflorescences (i.e., those with strict panicle-branches and strict spikelets), and to *M. tenuifolia* those plants having a usually darkly colored panicle with spreading branches and spikelets.

The type of *M. monticola* (Wright 731) was collected in Limpia Canyon in the Davis Mts., Texas. This typical form has been illustrated by Hitchcock, Man. Grasses U. S. fig. 788 (1935). Very similar plants have been collected elsewhere in trans-Pecos Texas. Material from Arizona, however, differs in having a distinctly looser panicle. Vasey, U. S. Dept. Agric., Div. Bot. Bull. 131: t. 19 (1892), has an illustration (sub *M. calamagrostidea*) of the Arizonan form. From Arizona this aberrant form extends south into the Sierra Madre of Sonora and Chihuahua, where the inflorescence becomes larger and more open and the spikelets divaricate or even reflexed. These large plants, except for the green, not purple, panicles, are remarkably similar in gross aspect to some forms of *M. tenuifolia* from about Mexico City, the type locality of that species. It is clear that the two species, *M. monticola* and *M. tenuifolia*, intergrade in the northern states of Mexico and that, if they are both to be recognized, this can be justified only for convenience and performed in an arbitrary manner.


**Vernacular name:** Zacate espumilla.

**COAHUILA:** Mouth of Cañon La Cruz, 20 km. south of Ocampo, gravelly bed of large arroyo, Johnston 9187; Cañon Bocatoche, open arroyo, Muller 3119; La Rosita, Shreve & Tinkham 9591; 2 mi. west of Saltillo, Harvey 1097; Saltillo, edge of garden under trees, 1898, Palmer 393; Sierra Cruces, near Santa Elena, hillsides, Stewart 284; San Antonio de los Alamos, gravelly flat above tuff cliffs, Johnston 8255; Parras, 1880, Palmer 1348; Sierra Parras, Oct. 1910, Purpus 5007; Sierra Negras, 9 km. south of Parras, Stanford et al. 165. CHIHUAHUA: Rocky hills near Chihuahua, May 28, 1885, Pringle 428; hills and plains near Chihuahua, Oct. 23, 1885, Pringle 397. ZACATECAS: Valley 15 km. west of Concepcion del Oro, Stanford et al. 506.

Ranging from central and southern Mexico north into our area. Over most of its range a well marked and readily recognized species, but in our area completely intergrading with the more northern *M. monticola*. The species is a weak perennial and, like *M. monticola*, favors sheltered places at bases of cliffs, along rocky arroyo banks, or on slopes in deep canyons.

*Muhlenbergia elongata* Scribn. in Beal, Grasses No. Am. 2: 251 (1896).

**CHIHUAHUA:** Rocky hills east of Chihuahua, ledges, 1885, Pringle 398 (isotype).

Known only from near Chihuahua and from extreme southwestern parts of the state (*Palmer 159*).
**Muhlenbergia Marshii sp. nov.**

Planta perennis; culmis ca. 1 m. altis erectis teretibus glabris dense caespitosis simplicibus, basi ad 3 mm. crassis, internodiis 1–1.5 dm. longis; vaginis internodia 3–5 cm. longe superantibus scabridulis; ligulis 1–1.5 mm. longis truncatis glabris; laminis 15–40 cm. longis 2–4 mm. latis involutis rigidulis utrinque scabridulis; panicula spiciformi 2.5–4 dm. longa 3–6 mm. crassa, haud vel vix interrupta, basi e vagina superiore saepe haud exserta, ramis infra medium paniculae 2–4 cm. longis strictis multifloris; spiculis strictis 0.5–0.5 mm. longe pedicellatis (aristis glumarum exclusis) ca. 4 mm. longis; glumis subequalibus 3 mm. longis pallidis vel plumbeis subhyalinis obscure medio-nervatis (nervis prominentulis scabridis) lanceolatis, paullo supra basim latioribus deinde sursum in aristam rectam 0.3–0.7 mm. longam gradatim contractis, vel non raro summum ad apicem basim aristae minutissime obscurissimeque truncatis vel emarginatis et lacerato-denticulis; lemmatibus (aristis rectis ad 0.5 mm. longis exclusis) ad 4 mm. longis glumas evidenter superantibus brunnescentibus supra medium 0.4–0.6 mm. latis deinde summum gradatim attenuatis, sparse minuittisse strigosim sublevibus 3-nervatis basi breviter perinconspecuque adpresseque villosis.

**Coahuila:** Sierra del Carmen, Sept. 8, 1936, E. G. Marsh Jr. 746 (type, Gray Herb.). Texas: Davis Mts., H. O. Canyon above Sawtooth, soil in cracks of rocks in stream-bed, tough tightly rooted clumps, July 1936, Hinckley.

A member of the species-complex passing as *M. rigens*, among the members of which it is readily distinguished by its short-awned glumes and lemmas and extreme eastern occurrence. The basal portion of the inflorescence bears elongate strict branches and is not exserted from the uppermost leaf-sheaths. In these characters it agrees with true *M. rigens* of central California and closely related forms from southern California and southern Arizona and adjacent Mexico. True *M. rigens* has a somewhat interrupted inflorescence composed of rather elongate strict branchlets, and it appears to be confined to western middle California.

**Muhlenbergia mundula sp. nov.**

Planta perennis; culmis ca. 1 m. altis erectis teretibus glabris dense caespitosis simplicibus basi ad 3 mm. crassis, internodiis 1–1.5 dm. longis; vaginis saepe scabridulis quam internodiis saepe 1–5 cm. longioribus; ligulis 1–1.5 mm. longis truncatis vel rotundatis; laminis 8–30 cm. longis 2–4 mm. latis involutis rigidulis; panicula spiciformi 15–30 cm. longa densa 4–9 mm. crassa haud interrupta, e vaginis superioribus evidenter exserta, ramulis inferioribus brevibus 5–15 mm. longis strictis multifloris; spiculis strictis 0–5 mm. longe pedicellatis; glumis 2–3 mm. longis pallidis vel plumeis subhyalinis obscure medio-nervatis, oblongis vel lanceolatis, apice acutis vel obtusis vel erosis raro attenuatis; lemmatibus 3–4 mm. longis 3-nervatis non raro scabridulis, supra basim latioribus deinde apicem versus gradatim attenuatis muticis.

Kearney 6342; Mule Mts., Goodding 907; Rincon Mts., Manning Camp, Blumer 3397; White Mts., Griffiths 5445.

This species includes most of the plants of Arizona, New Mexico, and northern Mexico which have passed as *M. rigens*. The plant illustrated by Hitchcock, Man. Grasses U. S., as *M. rigens* belongs to *M. mundula*. It is readily distinguished from true *M. rigens* of central California, and from closely related unnamed forms from southern California and southern Arizona, by having the spike well exserted from the upper leaf-sheaths and by having the lower branches of the panicle only 5–15 mm. rather than 20–30 mm. long. In appearance the species much resembles *M. leptoura*, of northwestern Chihuahua, but it differs from that species in having the glumes distinctly shorter than rather than equalling or surpassing the lemma.


**Chihuahua:** Mapula Mts., thin soil on summits, Oct. 26, 1886, Pringle 822.

Colorado and Utah south through Arizona, New Mexico, and trans-Pecos Texas into the mountains of northern Mexico. The species is known from the Davis, Chinati, and Chisos Mountains of Texas and is, accordingly, to be expected in the mountains of northern Coahuila and northeastern Chihuahua.


**Coahuila:** San Antonio de los Alamos, colony in loose gravelly soil on flats above tuff cliffs, Johnston 8244. **Chihuahua:** Near Rancho El Pino, 10 km. southeast of Sierra Rica, rocky slope, Stewart 2411; Los Medanos, 1935, LeSueur 74.

As currently accepted, this species ranges in western United States and south to Costa Rica. A critical study will probably show it to be an aggregate of several well-marked species of limited distribution. Hitchcock, Contr. U. S. Nat. Herb. 17: 308 (1913), sub *S. ramulosus*, reports the plant from the Sierra Santa Eulalia and from near Chihuahua.

*Sporobolus pulvinatus* Swallen, Jour. Wash. Acad. 31: 351 (1941).

**Coahuila:** South of Laguna de Leche, saline and perhaps gypseous silt in mogote, Johnston 8626; Saltillo, along ditch, Hitchcock 5580 (US). **Chihuahua:** 5½ mi. south of Ojinaga, outwash from saline and gypseous shales, Johnston 8005; sandy plains near Chihuahua, Sept. 22, 1886, Pringle 816. **Durango:** Flats on plains 3 mi. northeast of Bermejillo, Johnston 7787.

Texas and Oklahoma to Arizona and south into Mexico; South America.


**Coahuila:** 4 mi. west of Cuatro Ciénegas, coarse tufted grass on alkaline flat, Johnston 7133; Laguna de Jaco, saline meadow south of the lake, abundant, coarse tufts, Johnston & Müller 1102. **Chihuahua:** Villa Ahumada flat, 1935, LeSueur 74.

Widely distributed in saline soils in western United States and extending south into northern Mexico.

**Sporobolus regis** sp. nov.

Planta robusta ca. 12 dm. alta e rhizomate elongato nodoso (internodiis 10–12 mm. longis) 3–4 mm. crasso oriens; culmis simplicibus erectis con-
fertis foliosis; vaginis quam internodiis saepe subaequilongis vel usque ad 1 cm. brevioribus, extus pilis numerosis gracilibus 1–2 mm. longis adpressis pallide flavescentibus donatis, vetustioribus glabrescentibus; ligula subnulla 0.3 mm. longa vel breviore fimbriata vel dense et minute ciliolata; laminis 1–3 dm. longis 3–4 mm. latis saepe laxe involutis, subtus levibus, supra pallidioribus minute scabridis; paniculis apertis 3–4 dm. longis ad 15 cm. crassis, basi e vagina superiore haud exsertis, ramis alternis 2–12 mm. distans tibus ramulosis adscendentibus vel laxe adscendentibus 5–10 cm. longis, axills pilosis, ramulis laxe adscendentibus saepe purpureis; spiculis 2–2.5 mm. longis glaberrimis unifloris, pedicellis strictis 1–5 mm. longis; gluma externo 1.2–1.5 mm. longa hyalina late lanceolata acuta, supra basim in medio purpurea; gluma interio 1.5–1.8 mm. longa hyalina lanceolata enervata acuta; lemmate hyaline lanceolato-elliptico obscure uninervato, apice late acuto, longitudinem paleae aequante.

Coahuila: Salt flat 4 km. southeast of Laguna del Rey, abundant, Sept. 18, 1942, Stewart 2653 (type, Gray Herb.).

A very well marked species, probably most closely related to S. airoides Torr. and S. Wrightii Munro. From these and most other members of the genus, S. regis differs in the very hairy leaf-sheaths, the tufts of hairs in the axils of the panicle-branches, and the very coarse rhizomes. The bases of the culms and the younger nodes of the rhizomes bear shredded remnants of old leaves.


Vernacular name: Zacaton.

Coahuila: 5 mi. north of Allende, oak thicket on plain, coarse tufts, culms 3–6 ft. tall, Johnston 7010; open country between Santo Domingo and Piedra Blanca, Wynd & Mueller 497; 20 mi. northwest of La Babia, open valley floor, Wynd & Mueller 499; Santa Anna Canyon, Marsh 495; trail from southern extremity of Hillcoat Mesa to Buena Vista headquarters, July 27, 1938, Marsh 1512; vicinity of Encantada Ranch headquarters and eastward, July 28, 1938, Marsh 1520; Cuatro Cienegas, Marsh 2038, 2081; Cuatro Cienegas, Puerto del Norte, Harvey 1220; Saltillo, in large bunches, dry alkaline clay soil, scarce, 1898, Palmer 1; Llano de Guaje near Tanque La India, the common grass about the bare flats, Johnston & Muller 778; Sierra del Pino, La Noria, large clumps in arroyo, Johnston & Muller 666; between Palos Blancos and San Pedro, road to Cuesta Zozaya, common in grassy valley on tableland, Johnston 9272; Laguna de Leche, the common grass about the margin of the dry lake, Johnston & Muller 8061; south of Laguna de Leche, saline soils below outcrops of Upper Cretaceous beds, Johnston 8624; east of Laguna de Jaco, about gypsum beds, 6–10 dm. tall, Stewart & Johnston 1959; Laguna de Jaco, saline soil at south end of lake, Johnston & Muller 1091; 11 km. northeast of Jimulco, Stanford et al. 72. Chihuahua: Presidio del Norte, 6–8 ft. tall, Parry; 11 mi. south of Ojinaga, along small arroyo in low hills, 3–5 ft. tall, Johnston 8034; Pirámide, low ground, heavy soil at edge of cornfield, 3–6 ft. tall, Johnston 8139; Carrizal, Aug. 18 or 19, 1846, Wislizenus 103; Meoqui, 1938, Le Sueur 34; 20 km. south of Camargo, Harvey 1396. Zacatecas: 15 km. west of Concepcion del Oro, Stanford et al. 528; 7 mi. north of San Tiburcio, heavy, probably alkaline soil among mesquites, Johnston 7362.

Trans-Pecos Texas to southern California and south to central Mexico. Hitchcock, Contr. U. S. Nat. Herb. 17: 309 (1913), reports the species from Chihuahua, Torreon, and Saltillo. It appears to be present in most parts of our area. Although I have accepted this species in the broad traditional sense, I suspect that it is an aggregate of several critical species.
The plants I have included in *S. Wrightii* vary greatly in size, appearance, and selection of habitats. The leaves are broad to narrow, dark or pale green, flat to involute. The plants may form large very coarse tussocks over a meter broad, and with culms nearly 2 m. tall, or low clumps 1–2 dm. tall, with the culms much less than a meter in height. The larger plants are mostly from permanently wet soils; the small plants come from the plains where water stands and evaporates after storms. The soils supporting the plant vary from those with no appreciable amount of salt to those with large amounts of alkali and even gypsum.

*Sporobolus cryptandrus* (Torr.) Gray, Man. 576 (1848).

Coahuila: Saltillo, sandy field, Hitchcock 5625 (US); Tanque Colorado, among bushes on red dunes, Johnston 8663; Los Medanos, 1935, LeSueur 60, 80; valley near Chihuahua, Oct. 4, 1885, Pringle 419.

Widely distributed in sandy places over the United States and south into northern Mexico. The two following species are probably no more than varieties.


Chihuahua: Los Medanos, 1935, LeSueur 80a; between Los Medanos and Samalayuca, sand hills, Sept. 1886, Pringle 815; Colonia Diaz, 1899, Nelson 6458.

Southwestern United States and northern Chihuahua. Differing from *S. cryptandrus* only in having a more open panicle, with the spikelets and ultimate branchlets spreading rather than appressed along the primary branches of the panicle.


Coahuila: North end of Cañada Oscuro, gravelly slopes among brush, common, Johnston 8400; south of Laguna de Leche, shaly bank among brush, frequent, Johnston 8023; Sierra Cruces, 8 mi. north of Santa Elena, stony flat among bushes, Johnston & Muller 1027. Chihuahua: Los Medanos, 1935, LeSueur 13, 58; 20 km. south of Camargo, Harvey 1367.

Southwestern United States and northern Mexico. Probably only a phase of *S. cryptandrus*, with the inflorescence bearing short strict crowded branches and branchlets and accordingly spike-like in form. Hitchcock has distinguished the robust plants of this form as *S. giganteus* and the more slender forms as *S. contractus*.


Coahuila: Castillon, confined to gypsum flat, infrequent, Johnston & Muller 1268; east of Laguna de Jaco, frequent, confined to gypsum, Johnston & Muller 1073, Stewart & Johnston 1954; Sierra Cruces, gypsum flats near Santa Elena, Johnston & Muller 247; gypsum bed west of Buena Vista, along road between San Antonio de los Alamos and Puerto Caballo, rare, Johnston 8314.

Western Texas and eastern New Mexico and south into Coahuila. Apparently confined to gypsum. The type-collection of the species was originally given as collected at “Brazos Santiago, Texas,” that is, near the mouth of the Rio Grande, where the species is neither known nor to be
expected. This is apparently the result of a clerical error. Nealley's specimens came from Screw Bean, a locality near the Pecos River, in Reeves County, Texas, where a large variety of gypsophiles has been collected.


Coahuila: Puerto del Norte, Cuatro Cienegas, July 1939, Harvey 1225 (type, US.); 4 mi. west of Cuatro Cienegas, common and conspicuous on saline and gypseous flats, 1938, Johnston 7132; 4 km. southeast of Laguna del Rey, abundant on salt flats, 1942, Stewart 2654; Noria de San Juan, southeast of Laguna del Rey, common on saline plain, 1942, Stewart 3008.

Endemic to our area, and apparently confined to saline gypseous soils. The species is most closely related to *S. phleoides* Hack., of saline soils in the deserts of western and northern Argentina. It differs from the southern plant in its paler color, involute leaves, more rigid tighter leaf-sheaths, broader erose or dentate glumes, non-rostrate palea, and much larger anthers.


**Piptochaetium fimbriatum** (H.B.K.) Hitchc. var. confine var. nov.

A forma typica austro-Mexicana glumis viridibus evidenter nervatis haud purpureis differt.

Coahuila: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 643; Hillocoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1284; Sierra Madera, Cañon Charretera, in shade in oak thickets, Johnston 9077; Sierra del Pino, La Noria, in thickets on arroyo-bank, Johnston & Muller 486 (type, Gray Herb.).

Ranging in the mountains along the Mexican Boundary, from trans-Pecos Texas (Chisos and Davis Mts.) west to Arizona, and from Coahuila and northern Nuevo Leon to northeastern Sonora. Typical *P. fimbriatum* comes from central Mexico and differs from our northern plant in having firmer obscurely veined purple glumes and usually less slender and flaccid leaves. Where I have seen the var. *confine* in Coahuila, it has always grown in very sheltered shaded places, usually under bushes in dense oak thickets, and it is seldom common.


Coahuila: Along trail from southern extremity of Hillocoat Mesa to Buena Vista Ranch headquarters, July 27, 1938, Marsh 1492; tableland north of Cañon del Cuervo Chico, basal slopes of low rounded limestone hills, Johnston 8564; north end of Carneros Pass, conspicuous grass among low shrubbery, Johnston 7297.

Western Texas and Colorado to Utah and Arizona and south through Coahuila to the mountains of Nuevo Leon.


Coahuila: Rio Grande Valley near Piedras Negras, April 17, 1900, Pringle 8292; Muzquiz, Dec. 5, 1936, Marsh 1077; Monclova, Marsh 1691, 1718.

Oklahoma south through central Texas into northeastern Coahuila. The
species appears to differ from *S. mucronata* H.B.K., of central and eastern Mexico, only in the large size of the spikelet and fruit and in the usually green rather than purpurenceous glumes. The material from Coahuila and adjacent Texas is distinctly smaller than the typical form of *S. leucotricha*, and some of the specimens have colored glumes.

**Stipa eminens** Cav. Icon. Pl. 5: 42. t. 467 (1799).

Coahuila: Limestone hill near Santo Domingo, Wynd & Mueller 460; Hillcoat Mesa, west of Encantada Ranch, July 25, 1938, Marsh 1400; Sierra Madera, lower part of Cañon Charretera, open flat, Johnston 9161; near Santa Rosa, limestone hills, Shreve & Tinkham 9576; north end of Carneros Pass, Johnston 7298; Sierra del Pino, La Noria, common grass on flats and meadows, Johnston & Muller 454, 663, Stewart 1207; tableland north of Cañon del Cuervo Chico, gravelly places on low limestone hills, Johnston 8562; Sierra Parras, April 1905, Purpus 1125 in pt.; Sierra Cruces, limestone foothills 8 mi. north of Santa Elena, Johnston & Muller 1025; Sierra Cruces, about volcanic ledges on ridge at head of Cañon Tinaja Blanca, Johnston & Muller 305. 


Coahuila: Saltillo, July 25, 1905, Palmer 626.

This species was based upon a specimen collected by Palmer July 25, 1905, “among rocks on summit of Sierra de la Puebla, near Saltillo.” The collection number is given as “Palmer 726.” The specimen in the Gray Herbarium, agreeing with the original description, and collected near Saltillo on the same date as the type, bears the number Palmer 626. This species has very slender involute leaves. It has been collected in Nuevo Leon (near Pablillo, Mueller 522) and in southern Tamaulipas (Miquihuana, Stanford et al. 553).


Coahuila: Saltillo, alt. 1650 m., March 1908, Arsène 3441 (isotype); Saltillo, alt. 1600 m., March 1908, Arsène 3467; Saltillo, in large bunches, banks of irrigation ditches, 1898, Palmer 3; Saltillo, dry ground, 1910, Hitchcock 815. Zacatecas: Valley 15 km. west of Concepcion del Oro, valley floor, 18 in. tall, Stanford et al. 553.

Known only from our area.

**Stipa editorum** Fourn. Mex. Pl. 2: 75 (1886).

Coahuila: 10 mi. east of Fraile, abundant and most conspicuous species on silty floor of valley, local, Johnston 7303. Zacatecas: 7 mi. north of San Tiburcio, heavy soil among mesquites, Johnston 7361.

Known from Coahuila, Zacatecas, Nuevo Leon, southern Tamaulipas, and Puebla. The species may possibly be gypsumophilous.

**Stipa multinodis** Scribn. ex Beal, Grasses No. Am. 2: 222 (1896).

Chihuahua: Sierra Santa Eulalia, Aug. 1885, Pringle 385 (isotype).

Closely related to *S. editorum*, with which it agrees in the many-noded strict culms 7–12 dm. tall and somewhat fruticulose at the base. It differs in a slightly smaller lemma and nearly absent ligule. The species is known only from the type collection.

Coahuila: Sierra Madera, Cañon Charretera, common in rocky bed of arroyo in oak belt, becoming 4 ft. tall, Johnston 9073; Saltillo, 1902, Palmer 317; Lirios, 1880, Palmer 1249; San Antonio de las Alanzanas, near mountain border, 3 ft. tall, Aug. 31, 1848, Gregg 349.

Colorado to Arizona and trans-Pecos Texas, and south through Coahuila to the mountains of Nuevo Leon. A large coarse grass apparently restricted to the oak and lower pine belts. The type came from the Chinati Mts., Texas, and accordingly the species is to be expected in the mountains of northeastern Chihuahua. In the United States this species has been reported to have narcotic effects on animals eating it. In the notes accompanying his collections from the mountains of southeastern Coahuila, cited above, Gregg states that the grass is "very injurious to animals, intoxicating and often killing them. Animals acquainted with it will not eat it."


Coahuila: Sierra del Carmen, Sept. 1, 1936, Marsh 878; Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 538; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1314; Saltillo, bunches on shady slope of hill, 1904, Palmer 455; Saltillo, 1909, rare, Arsène 3469; Chojo Grande, 27 mi. southeast of Saltillo, 1904, Palmer 341; north end of Carneros Pass, among low bushes, Johnston 7296; Carneros Pass, limestone hills, Sept. 20, 1890, Pringle 3274.

New Mexico and trans-Pecos Texas south through Coahuila and Nuevo Leon to Puebla; Argentina.

Aristida adscensionis L. Sp. Pl. 82 (1753).

Coahuila: Sierra del Carmen, July 29, 1936, Marsh 675; 21 mi. south of Sabinas, heavy soil, Johnston 7043; Santa Anna Canyon, Marsh 433; Cuatro Cienegas, Marsh 2059 in pt.; Saltillo, 1898, Palmer 388; Chojo Grande, 27 mi. southeast of Saltillo, in ravine, 1904, Palmer 333; 42 mi. west of Saltillo, Shreve & Tinkham 9839; west base of Picacho del Fuste, cemented gravels, Johnston 8415; San Antonio de los Alamos, on canyon-wall and on gravelly flats at top of cliffs, Johnston & Muller 874, Johnston 8252; Las Uvas, east side of Valle Acatita, gypseum in arroyo, Stewart 2696; Parras, 1880, Palmer 1352; Torreon, 1898, Palmer 512. Chihuahua: Los Medanos, 1935, LeSueur 30; Chihuahua, 1935, LeSueur 3; rocky hills near Chihuahua, Aug. 1885, Pringle 390; Sierra Organos, 1937, LeSueur 191; 60 km. north of Escalon, Harvey 1306.

A variable annual species widely distributed in the warmer parts of America and the Old World. This species has been consistently described as always having the lemma with three awns. Three of the collections cited above (Pringle 390, Johnston 8252 and 8415) have the lateral awns minute or nearly wanting, but otherwise they agree closely with the specimens associated with them.

Aristida ternipes Cav. Icon. Pl. 5: 46 (1799).


Ranging from trans-Pecos Texas to Arizona and south through Sonora and Chihuahua; reaching northern South America.


Trans-Pecos Texas to southern California and south to Guatemala. Very closely related to *A. ternipes* and differing from that species chiefly in having the neck of the fruit twisted and bent. Our plants represent the northern phase of the species (*A. Orcuttiana*), which is weakly distinguished from the typical southern phase by usually having glabrous and somewhat firmer, paler glumes.


Western Kansas and western Texas to California and south through Chihuahua and Sonora, reaching Guatemala. Much resembling the two previous species and having a similar very lax panicle with long slender abruptly and widely spreading branches, but differing in having three well-developed awns on the lemma. The collection from near Pirámide has the fruiting lemma with a stout untwisted neck and accordingly belongs to the form distinguished as *A. hamulosa* Henr.


*Aristida Roemeriana* Scheele, Linnaea 32: 343 (1849).


A variable and ill-defined species ranging from Texas south through northeastern Mexico to Hidalgo. It is a plant with small spikelets with strongly unequal, usually purpureous, glumes in a rather loose panicle with more or less nodding branches. It intergrades completely with *A. purpurea*, *A. longiseta*, *A. Reverchoni*, *A. curviglolia*, *A. dissita*, and *A. glauca*, all intergrading and variable species, and like them incapable of precise definition. The condition is probably the result of free and much repeated interspecific hybridization and subsequent segregation and re-
combination of characters. Since technical characters of the spikelet are as variable and erratic as those found in the form of inflorescence and the gross aspect of the plant, I have preferred to use these latter in defining the “species” in this most difficult genus of grasses.


**Chiuhua**: Sierra Santa Eulalia, dry ledges, Sept. 8, 1885, Pringle 389.

Texas to southern California and south into Chihuahua. A plant with very strict subsessile clusters of spikelets forming a spike about 15 cm. long. The awns are rather slender and usually pinkish. The plant intergrades with *A. Roemeriana, A. curvifolia, A. longiseta, A. dissita,* and *A. glauca.* Hitchcock and Henrard treated this plant as a synonym of *A. glauca,* but that is a plant of eastern Mexico with looser spikelet-clusters and a more interrupted spike, more suggestive of a slender form of *A. curvifolia* than of the present species.

**Aristida curvifolia** Fourn. Mex. Pl. 2: 78 (1886).

**Aristida Wrightii** Nash in Small, Fl. S. E. U. S. 116, 1327 (1903).


Ranging from Texas to Arizona and south to southern Mexico. A rather coarse and stiff plant with strict subsessile clusters of spikelets forming a stiff interrupted spike 15–30 cm. long. Differing from *A. Reverchoni,* with which it intergrades, in the stiffer brownish awns, firmer non-purpurescent glumes, somewhat interrupted longer spike, and frequently loosely appressed spikelet-clusters. It intergrades with *A. pansa, A. arizonica, A. Reverchoni,* and *A. Roemeriana.*

To this species I have referred most of the larger plants of Texas and northeastern Mexico which Hitchcock placed in *A. Wrightii* and in *A. glauca.* Hitchcock attempted to distinguish *A. glauca* and *A. Wrightii* by attributing to the former a more slender and elongate, usually somewhat twisted, beak to the lemma, but I find these characters too indefinite and variable to be of any use, if not actually illusionary. Henrard placed great emphasis on the obtuse somewhat dentate tips of the glumes found in the type of *A. curvifolia,* but this character is variable and, furthermore, appears sporadically in various species of northern Mexico and the western United States. Otherwise the species seems nearly the same as the Texan plant described as *A. Wrightii.*


**Coahuila**: Along trail between southern end of Hillcoat Mesa and Buena Vista headquarters, July 27, 1938, *Marsh 1493;* western base of Picacho del Fuste, gypseum beds on north-facing mountain side, *Johnston 8399;* western base of Picacho del
Western Texas and New Mexico south into our area. A plant with branched inflorescence, the branches short, stiffly ascending, and bearing crowded appressed spikelets in dense spicate clusters. The species intergrades with *A. divaricata*, *A. dissita*, and *A. curvijolia*. Typically it has three subequal awns. Among the collections above cited, however, *Johnston 8209, 8399, and 8414* are plants otherwise agreeing with *A. pansa* but having only a well-developed middle awn, the lateral ones being reduced and nearly wanting. Another collection, *Johnston 8419*, consists of plants with three subequal awns and was mixed with plants, otherwise similar, having the lateral awns reduced and nearly wanting. The plants with single awns suggest *A. Schiedeana*, but they are obviously variations of *A. pansa*. Curiously they come from the same area in Coahuila where I found a homologous form of *A. adscensionis*.

**Aristida dissita** sp. nov.

Planta perennis caespitosa 3–7 dm. alta periconspicue minuteque pubescens et scabridula; culmis numerosis confertis simplicibus teretibus inconspicue striatis; vaginis striatis quam internodiis longioribus, margine ad apicem villosis; ligula subnulla dense breviterque villoso-ciliata; laminis 1–2 dm. longis rigidulis rectis vel saepe plus minusve curvatis glauco-viridibus, saepe involutis et ad 0.5–1 mm. crassis, raro subplanis et ad 1.5 mm. latis, supra minuto hispidulis et scabridulis, subtot sublevisibus; panicula exserta elongata 1–3 dm. longa saepe 6–8 cm. crassa aperta dissipitiflora adscendente ramosa; rhachi teretis superne subangulata, ramis in nodis solitariis vel binis vel raro trinis gracilibus angulo ca. 45° ab rhachi divergentibus, infra medium paniculae 3–5 cm. distantibus, supra medium 1–3 cm. distantibus; spiculis 0–5 (raro ad 10) mm. longe pedicellatis angulo ca 45° a ramis divergentibus, supra medium ramis 2–8 laxe dispositis; glumis violaceis vel purpureo-viridibus angustis acuminatis, non raro in arista inconspicua gracili terminatis, glabris uninervatis carinatis, gluma exteriores (7–) 8–9 mm. longa; gluma interna (8–) 9–10 mm. longa, quam exteriores 1–2 mm. longiores; fructibus angustissimis graciliter attenuatis nigrescentibus non tortis praesertim supra medium non raro minutissime scabridibus; aristis subaequalibus 12–18 mm. longis rectis tenuibus; callo ca. 0.9 mm. longo acuto barbat.  


This species keys to *A. pansa* in Hitchcock’s treatment of the genus in the Manual of the Grasses of the United States, 440 (1935), and in North
American Flora, 17: 376 (1935), and is probably closely related to that species. It agrees with A. pansa in having an inflorescence with moderately elongate ascending branches, but it differs in having the spikelets spreading from the branch and hence very loosely disposed, rather than closely appressed to the branch and forming a spicate cluster. The proposed species frequently suggests A. barbata, but that plant has a proportionately broader panicle with longer and more widely spreading branches, as well as larger and more widely spreading spikelets on more elongate pedicels. Some of the cited material of A. dissita has been identified as A. hamulosa, but that species is readily distinguished by its elongate widely spreading or even reflexed panicle-branches and its larger very strict spikelets in spicate clusters. The same characters readily separate it from A. divaricata, the species to which the type collection was referred by Hitchcock, Contr. U. S. Nat. Herb. 22: 549 (1924). In trans-Pecos Texas the panicle-branches of A. dissita shorten and become more strict and it passes into A. Reverchoni, A. pansa, A. Roemeriana, and even A. curvifolia. The loose inflorescence of A. dissita, with its ascending panicle-branches, up to 7 cm. long, and loosely disposed ascending spikelets, gives the species a distinctive aspect and permits its ready recognition. It is difficult to understand why the plant should have remained so long without a name.

Tragus Berteronianus Schult. Mant. 2: 205 (1824).

Coahuila: Palm Canyon, near Muzquiz, Marsh 1000; Saltillo, 1898, Palmer 396; north end of Sierra Cruces, sabaneta west of San Rafael, Johnston & Muller 1035.

Chihuahua: Presidio del Norte, Bigelow; Rancho El Pino, 10 km. southeast of Sierra Rica, Stewart 2403; 10 mi. southeast of Orinoco, under bushes at foot of grassy slope, local, Stewart & Johnston 2036; hills and plains near Chihuahua, Aug. 1885, Pringle 421; Meoqui, 1935, LeSueur 40; 10 km. east of Carrillo, extensive clumps on lower slopes of dunes, Muller 3321.

Texas to Arizona and south to South America and in the warmer parts of the Old World. Although stated by some authors to be introduced into our area, it behaves like an indigenous species. It associates with indubitably native species in scattered localities far from human habitations, and it was collected in Texas, New Mexico, and Arizona far from settlements by the early botanists exploring that then frontier area a hundred years ago. Hitchcock, Contr. U. S. Nat. Herb. 17: 216 (1913), reports collections of the species from Tlahualilo, Durango, and from Sabinas and Soledad, Coahuila.


Vernacular name: Tobosa.

Coahuila: Sierra del Carmen, Sept. 6, 1936, Marsh 853; Rancho Agua Dulce, eastern slope of Sierra San Manuel, Wynd & Mueller 481; Hilcoat Mesa, west of Encanta
tada Ranch, July 25, 1938, Marsh 1434; El Berrendo, Harvey 1175; near La Rosa, Shreve & Tinkham 9905; between Hac. La Rosa and Hac. Lechuguilla, dry desert, Wynd & Mueller 61; 6 mi. north of Castillon, dominant on large flat, Johnston & Muller 191; northeastern foothills of Sierra Cruces, 5 mi. south of San Rafael, silty flat in arroyo, Johnston & Muller 1031; 7 mi. south of Jaco, small flat among mesquites, Johnston & Muller 1115.

Chihuahua: Chihuahua, plains, Pringle 485; Meoqui, 1935, LeSueur 40; 10 km. east of Jimenez, Harvey 1348; 5 mi. east of Carrillo, extensive clumps on lower slopes of dunes, Muller 3321.

Durango: 3 mi. northeast

Ranging from western Oklahoma and central Texas west to Arizona and south into our area. A common and widespread grass characteristic of flats where water collects after storms and stands for some time before evaporating. The tobosa flats are most common on the clay soils of the calcareous areas, where they vary from a few square meters in extent up to considerable size. In the igneous areas in eastern Chihuahua, tobosa flats are found chiefly on the bottoms of the larger basins. In Coahuila, in calcareous clays, tobosa flats may be encountered in varying abundance from the bottom of the broad valleys up the long slopes to the bases of the mountains and even on flat places in open canyons in the foothills. The soils of tobosa flats may be moderately gypsiferous, but they seldom if ever are saline. Tobosa growing in favorable situations with continually renewed soil-moisture is considered a good feed for stock. The tobosa developing on flats where it is subjected to irregular wettings and long periods of drought is said to become excessively siliceous and rapidly wears down the teeth of stock subsisting on it. Because of this fact, stock-men distinguish the ecological forms of tobosa and have various names for them. As a botanist I have even been severely criticized for insisting they were all one species.


Texas to Arizona and south into northern Mexico. The present northern plant is very closely related to *H. cenchroides* H.B.K., of central Mexico, and is perhaps not specifically distinct.


Ranging along the western Sierra Madre, from northwestern Chihuahua and adjacent Sonora south to South America.

Microchloa Kunthii Desv. Opusc. 75 (1831).

Chihuahua: Pirámide, sheltered places about the bases of large rock masses, *Johnston 8120*; dry gravelly soil on mesa west of Chihuahua, Aug. 6, 1885, *Pringle 425*.

Baja California and northern Chihuahua south to Argentina.


Zacatecas: Concepcion del Oro, 1904, *Palmer 268*.
Texas and Oklahoma to Arizona and southward through Mexico; Argentina. Hitchcock, Contr. U. S. Nat. Herb. 17: 350 (1913), reports the species from Cedros and Pico de Tiera, Zacatecas. A perennial species usually growing among brush on rocky hillsides and flats.

**Leptochloa filiformis** (Lam.) Beauv. Ess. Agrost. 71, 166 (1812).


**Leptochloa viscida** (Scribn.) Beal, Grasses No. Am. 2: 434 (1896).


Wet places, Texas to California and northern Mexico.

**Leptochloa fascicularis** (Lam.) Gray, Man. 588 (1848).


Wet, frequently brackish soils. Widely distributed in the warmer parts of America.


Collected on the Texas bank of the river (Boquillas, Mariscal Canyon, and mouth of Tornillo Creek) in the Big Bend of the Rio Grande and presumably on the Coahuilán bank of the river also. Widely distributed in wet places in the warmer parts of America.


Widely distributed weedy plant, introduced from the Old World.


Introduced from the Old World, now widely distributed in the warmer parts of America. A common plant in moist soils, along river bottoms, about fenced tankos, along irrigation ditches, and frequently a tenacious weed in cultivated soils.


Wet saline soils from Florida to Texas and south to Central America; Argentina. In eastern Mexico it has been collected inland in Coahuila and about Hacienda Angostura, east of San Luis Potosi.
Chloris virgata Sw. FI. Ind. Occ. 203 (1797).

Coahuila: Sierra del Carmen, Sept. 8, 1936, Marsh 749; 20 mi. northwest of La Babia, open valley floor, Wynd & Mueller 443; Santa Anna Canyon, Marsh 429; Monclova, Marsh 1848; west of Puerto de las Monjas, 1–4 ft. tall, low ground, Johnston 8640; Parras, along arroyo in thickets, 1898, Palmer 448; Parras, 1880, Palmer; 7 mi. south of Joco, about mogote, Johnston & Muller 1105; meadow about charco southeast of Almagre, Johnston & Muller 1226. Chihuahua: Rancho El Pino, southeast of Sierra Rica, Stewert 2397; Los Medanos, 1935, LeSueur 63; Meoqui, 1935, LeSueur 31; Jimenez, banks of the Río Florido, Harvey 1318.

Texas to southern California, and south to Argentina. Hitchcock, Contr. U. S. Nat. Herb. 17: 332–333 (1913), reports specimens from Chihuahua City, Torreon, Tlahualilo, and Saltillo. This annual grass is most commonly found in and about mogotes, growing through low bushes on bajillos, in fenced areas about tanques, or in other areas where silty soil is frequently well moistened. In well watered situations it may grow over a meter high. In some unfavored places depauperate plants less than a decimeter high may be found.


From our area south to central Mexico.


Coahuila: 11 mi. south of Allende, along tree-lined arroyo, Johnston 7018; Sabinas River, Muzquiz, Marsh 399.

Texas and northeastern Coahuila.


Coahuila: Parras, among weeds on bank of ditch, 1898, Palmer 450.

From our area south to Costa Rica.


Coahuila: Palm Canyon, near Muzquiz, Marsh 984.

Texas and northeastern Mexico.


Arizona to trans–Pecos Texas, along the Río Grande Valley to Laredo, and south into our area; southern South America.


Hitchcock, Contr. U. S. Nat. Herb. 17: 335 (1913), reports a collection (Nelson 6827) from Sabinas, Coahuila. Southern Texas, west to Val Verde County, and south in eastern Mexico; also in Andean South America.


Coahuila: Saltillo, corn field, 1898, Palmer 397, 398; Chojo Grande, 27 mi. south-
east of Saltillo, appearing after rains in level places near water-course, 1904, Palmer 332.

Western Texas and Colorado to Arizona, south to central Mexico.


**Coahuila:** Carneros Pass area, 1880, Palmer 1357 (type of var. *vestita*). Chihuahua: Pirámide, gravelly plain near rock masses, Johnston 8132; center of large grassy plain 7 mi. northeast of La Morita, common, Johnston 7971; base of Sierra Santa Eulalia, sandy alluvium of streams in rocky hills, Pringle 413.

New Mexico to Arizona and south to San Luis Potosí.


**Vernacular name:** Pata del Cuervo.

**Coahuila:** Sacramento, gravelly arroyo, Johnston 7086; Cuatro Cienegas, Marsh 2065; 4 mi. east of Cuatro Cienegas, ditch by road, Johnston 7117; near Rosario, about edge of mogote, stems spreading, Johnston 8824; 20 km. north of junction of Monclova and Torreon roads, Harvey 1109; 42 mi. east of Saltillo, Shreve & Tinkham 9837; Saltillo, near ditch, prostrate, 1898, Palmer 400, 401; south base of Picacho San José, gravelly flat, erect, Johnston & Muller 804; 3 mi. east of San José, silty plain, ascending, Johnston 8216; 7 mi. south of Joco, about mogote, decumbent, Johnston & Muller 1106; Torreon, bank of Rio Nazas in railroad cut, 1898, Palmer 514; plains near Jimulco, 1902–1905, Pringle 11216, 13626. Chihuahua: Presidio del Norte, Bigelow, Parry; 5½ mi. south of Ojinaga, outwash from saline shales, Johnston 8006; 4½ mi. northwest of San Francisco, grassy flat, ascending, Stewart & Johnston 2010; Los Medanos, LeSueur 59; Villa Ahumada, flats, LeSueur 65; Chihuahua, hills and plains, Pringle 490.

Texas to southern California and south to southern Mexico. This small rapidly growing annual grass is widely distributed in our area, especially about mogotes, ditches, and similar sites where run-off collects after storms and the soil is moistened at frequent intervals during the summer.


**Vernacular names:** Grama; Navajitas.

**Coahuila:** Sierra del Carmen, Aug. 14, 1936 and Sept. 1, 1936, Marsh 657, 887; trail from Encantada Mesa to Fresno Mesa, July 14, 1938, Marsh 1307; 3 mi. southeast of Saltillo, common on slopes at base of mountains, Johnston 7249; Sierra del Pino, La Noria, common on gravelly flats, Johnston & Muller 451, Stewart 1204; west base of Picacho del Fuste, rocky flats, Johnston 8425; Sierra Madera, Cañon Charretera, openings in brush on rocky flats, Johnston 9058; eastern foothills of Sierra Cruces near Santa Elena, rocky flats and slopes, Johnston & Muller 217, 1385, Stewart 831. Chihuahua: Sierra Virulento, east of Rancho Virulento, rocky terrace, Johnston 9084; Sierra Organos, 1937, LeSueur 165; hills and plains near Chihuahua, Pringle 409.

Widely distributed in the western United States and south to Guatemala. Well-drained soils on plains and hillsides. Usually growing with the more common *B. gracilis*.


Reported by Griffiths and Hitchcock from Cedros, Zacatecas (Lloyd 105), where it is said to make turf on the plains. Otherwise the species is known only from central Mexico, from San Luis Potosí to Puebla.


**Vernacular names:** Chino; Zacate Chino.

**Coahuila:** 20 km. south of Ocampo, gravelly flats at base of mountains, Johnston...
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Southern trans-Pecos Texas south into our area. A common and characteristic grass on stony slopes and flats along the base and in the foothills of the limestone mountains of Coahuila, particularly in the Palma Belt, where it is usually abundant and a major forage grass.

In recent treatments of *Bouteloua*, the present species, *B. ramosa*, has been treated as a synonym of *B. breviseta* Vasey. These two species, however, although obviously closely related, differ in distribution, soil preference, habit of growth, and in some minor morphological characters. *Bouteloua breviseta* is a plant of highly gypsiferous soils in the northern half of trans-Pecos Texas and in southeastern New Mexico. Its leaves are strongly involute and its spikes are pale and erect or stiffly ascending. *Bouteloua ramosa*, ranging south of *B. breviseta*, is a plant of stony, prevailingly limestone, flats and slopes. Its leaf-blades are usually nearly flat, with the upper surface much less hairy than in *B. breviseta*. The dark-colored spikes are stouter and much more spreading. The stems become more fruticulose, are strictly erect, and form denser tufts.


Vernacular names: Grama; Navajitas.

Widely distributed in the western United States and south to central Mexico. A generally distributed grass in our area. It is abundant in some of the larger valleys and on the igneous oak-clad hills of eastern Chihuahua, where it may become the dominant plant over large areas. In the limestone areas of Coahuila it is rather common on the tablelands and larger valleys in the oak and lower pine belts. On the lower slopes of the limestone mountains it is frequent with other grasses among the bushes on rocky flats and slopes in the Palma Belt. It avoids clay, and along the foot of limestone mountains it is found where the soil is stony.


Coahuila: Sierra del Carmen, Sept. 13, 1936, Marsh 806; west base of Picacho del Fuste, cemented gravels on flats, not common, stems pallid, sprawling, Johnston 8420; San Antonio de los Alamos, summit of high tuff cliffs, gravelly flat, Johnston 8251, 8257; west end of Sierra Fragua, Aguaje Pajarito, frequent on rocky flats, stems grayish, erect or ascending, Johnston 8718; eastern foothills of Sierra Cruces near Santa Elena, gypsum flat, Johnston & Muller 245; Sierra Cruces, 8 mi. north of Santa Elena, stony flat among bushes, stems laxly ascending, Johnston & Muller 1021, 1025; south base of Picacho San José, rocky slope, stems wiry, ascending, Johnston & Muller 802.

Chihuahua: 1 mi. east of Pozo de Villa, silty plain, among bushes, Johnston 8175; Presidio del Norte, Sept. 1, 1852, Bigelow; east base of Sierra Virulento, rocky bench, Johnston 8085; 4½ mi. northwest of San Francisco, fairly abundant on grassy flat, Stewart & Johnston 2012; Sierra Organos, Aug. 31, 1885, Pringle 411; south of San Fernando, silty soil on plain, common, Johnston 7937; 6 mi. west of Piloncillo, lava slope, Johnston 7875.

Western Texas to Arizona and northern Mexico. A generally distributed but not abundant grass in northern Coahuila and eastern Chihuahua. Its pallid lax loosely ascending frequently somewhat sprawling stems and woolly leaf-sheaths give the plant a very distinctive appearance.


Coahuila: Valley floor 3-4 km. east of Puerto Caballo, with tobosa, common, Johnston 8319; south of Laguna de Leche, flats formed by planed-off Upper Cretaceous beds, slightly saline and gypsumiferous soil, Johnston 8618; 1-2 mi. west of Matrimonio Viejo, about mogote at base of slightly saline and gypsumiferous slope, Johnston 9370.

Zacatecas: Cedros, Lloyd 170, 183 (US); 7 mi. north of San Tiburcio, heavy slightly saline soil on flats with mesquites, abundant, Johnston 7358.

Ranging from our area south and east to southern Tamaulipas (Cañon de las Minas et Victoria, Karwinski 1479, type) and San Luis Potosí. Griffiths, I.c., collected the species at Alonzo, east of San Luis Potosí, and gives an illustration, pl. 76, of the habitat. The species appears to be confined to slightly saline and gypsumiferous clays. In habit it suggests small slender plants of *B. gracilis*, but it has smaller pale spikes.


Coahuila: Road to Don Martin Dam, 9 km. from Nuevo Leon border, Harvey 925; Allende, Marsh 1788; Palm Canyon, near Muzquiz, Marsh 977; Verda Spring, Marsh 290; Santa Anna Canyon, Marsh 467; Zacate, Marsh 503; Hermanas, Marsh 1620; 2 mi. northwest of Fronteras, road to Natadores, silty desert plain, Johnston 7171; Monclova, 1880, Palmer 1355 (type); Cañon Bocotacho, dominant grass of drier valley-floor, clumps 3 in. in diameter, Muller 3110; on desert near Rancho Santa Teresa, south of Castaños, Wynd & Mueller 205; dry desert between Hac. La Rosa and Hac. Lechuguilla, Wynd & Mueller 65; Saltillo, summit of stony treeless mountain, 1898, Palmer 402; Saltillo, 1905, Palmer 522; base of mountains 20 km. south of
Ocampo, one plant in mogote, *Johnston 9179*; south of Laguna de Leche, slightly saline and gypseous silty flat, *Johnston 8619*; Sierra Cruces, north of Santa Elena, rocky flat among bushes, *Johnston & Muller 1020, 1379*. **Chihauhua:** Base of Sierra Santa Eulalia, dry gravelly soil, *Pringle 412*.

Western Texas to southern Nevada and Arizona, south to San Luis Potosí.


Western Texas to southern California and south to central Mexico; South America.


**Chihauhua:** Volcanic hills 20 km. north of Chihuahua, locally common along base of rocky slope, *Stewart & Johnston 2129*; rocky hills northeast of Chihuahua, forming close sod on small patches, *Pringle 410*.

Trans-Pecos Texas to Arizona and south to southern Mexico. Apparently favoring igneous rocks.


**Coahuila:** Calcareous mesa near Piedras Negras, April 20, 1900, *Pringle 8018*.

Oklahoma south through central and eastern Texas into adjacent Mexico.


**Coahuila:** Don Martin Dam, *Harvey 934*; Caracol Mts., 1880, *Palmer 1354*; Puerto San Lazaro, common on rocky arroyo banks, *Muller 3051*.

Coahuila to Arizona and south to southern Mexico.


**Coahuila:** South end of Cañada Oscuro, confined to gypsum beds on the escarpment near Tanque La Luz, locally very common, *Johnston 8401* (isotype); high west end of the Sierra Fragua, north of Puerto Colorado, one large colony on east slope just below high crest, *Johnston 8751*; 1 km. northeast of Parritas, east side of Valle Acatita, common on gypsum mesas, *Stewart 2763*.

A very distinct species, of which only the three collections cited above are known. Near Tanque La Luz in Cañada Oscuro, and a mile or so to the southeast, on the steep north-facing slopes at the mouth of Cañon del Cuervo Chico, the grass was common on all the gypsum beds exposed on the escarpment. Its behavior was that of a marked gypsophile. On the steep west-facing slope up which I climbed from near Aguaje Pajarito to the high western crest of the Sierra Fragua, I found the grass again common. Here it was confined to a sharply delimited belt over a hundred feet wide. It was associated with some gypsum indicators, but the soil on which it grew was not pure gypsum, only very moderately gypseous at most. My collection no. 8751 came from a small colony near the ridge crest, and the only
one observed away from the belt of the plant just mentioned. The soil
gave no indications of being gypsiferous and no recognized gypsophiles were
growing with it. Mr. Stewart's collection from near Rancho Parritas came
from gypsum.

The plant has a very distinctive habit of growth. The stems, 15-45 cm.
long, are ascending or decumbent. The clump appears to die in the middle
and soon forms loose spongy rings of growth 5-10 dm. in diameter.

**Bouteloua curtipendula** (Michx.) Torr. in Emory, Notes Mil. Recon. 154 (1848).

Coahuila: Desert 25 mi. southwest of Sabinas, Wynd & Mueller 217; Sierra del
Carmen, Aug. 12, 1936, Marsh 642; Sierra del Carmen, Cañon Sentenela, Wynd &
Mueller 642; Yerda Spring, Marsh 252, 264; Palm Canyon, Marsh 980; Santa Anna
Canyon, Marsh 546; trail from south end of Hillcoat Mesa to Buena Vista head-
quartes, July 27, 1938, Marsh 1507; Monclova, Harvey 1151; Sierra Gloria, Marsh
1946; La Rosita, Shreve & Tinkham 9592; Saltillo, 1898, Palmer 407; Buena Vista,
frequent, July 24, 1848, Gregg 301; Chojo Grande, 27 mi. southeast of Saltillo, 1904,
Palmer 371; 3 km. southwest of Fraile, Stanford et al. 327; Sierra Cruces, near Santa
Elena, abundant on open hillsides, up to 10 dm. tall, Stewart 832; San Antonio de los
Alamos, gravelly flat on top of cliffs, Johnston 8254; west end of Sierra Fragua near
Aguaje Pajariro, rocky flats, Johnston 8792; Sierra Negras, 9 km. south of Parras,
Stanford et al. 195; 11 km. northeast of Jimulco, Stanford et al. 51. Chihuahua:
Yerda Spring, 1904, Griffiths 8408; Carneros Pass, tufts among bushes,
Johnston 7299. Zacatecas: Valley 15 km. west of Concepcion del Oro, plant 18 inches
tall, Stanford et al. 536.

Widely distributed in central and eastern United States and south to
Central America; South America. A common and widely distributed grass
in our area, frequent in the grasslands of eastern Chihuahua. In the lime-
stone mountains of Coahuila, with B. ramosa, forming the best pasturage
for horses and cattle on the rocky slopes and flats in the foothills, and with
B. gracilis the good pasturage on the tablelands and mountain valleys. In
the eastern parts of our area the plants tend to have few spikelets in each
spike and to intergrade with B. uniflora.


Coahuila: Trail from Encantada Mesa to Fresno Mesa, July 20, 1938, Marsh
1376; Sierra del Pino, La Noria, meadow at lower edge of pine belt, Johnston & Muller
450, Stewart 1217; Sierra Madera, Cañon Charretera, openings in oak thickets on rocky
flat, Johnston 9060; Saltillo, 1906, Griffiths 8408, Carneros Pass, tusfts among bushes,
Johnston 7299. Zacatecas: Valley 15 km. west of Concepcion del Oro, plant 18 inches
tall, Stanford et al. 536.

Known from Crockett and Val Verde Counties, Texas, south through
eastern Coahuila to southwestern Nuevo Leon. This species is very
closely related to B. curtipendula and is perhaps no more than an extreme
form of that species. The material cited above agrees closely with the type
collection. In all the specimens, only a single spikelet is borne at the base
of the spike-rachis, which is prolonged above and distinctly overtops the
lower glume of the spikelet. Material of B. curtipendula from eastern
Coahuila and Nuevo Leon frequently has reduced spikes and some speci-
mens have occasional spikes bearing only a single spikelet. In these spikes
the rachis is slightly shorter than or about equal to the first glume, and
it does not distinctly surpass it, as in typical B. uniflora. Since the eastern
material of *B. curtipendula* tends to have the dark-colored spikelets usually present in *B. uniflora* and to simulate that species in habit, the differences seem more technical than important.


_CHIHUAHUA:_ Presidio del Norte, Bigelow, Parry; 10 mi. south of Ojinaga, one colony in ravine in low hills, *Johnston 8018*.

In Texas known from the Big Bend area, near Presidio, and near Porvenir. The plant in Texas and adjoining Mexico seems confined to areas of gypsumous, frequently saline, Upper Cretaceous clays and shales. The type came from Presidio, Texas. The species is also reported from the Pacific slope of Mexico, from Sonora to El Salvador, cf. Swallen, Jour. Wash. Acad. **27**: 500 (1937).


_CHIHUAHUA:_ Sandy soil near Juarez, Sept. 26, 1902, _Pringle_; near Colonia Diaz, _Nelson 6457_.

Central United States south into Chihuahua.


_COAHUILA:_ Saltillo, banks of ravine in compact mat, 1898, _Palmer 7_; 2 mi. west of Saltillo on road to Torreon, _Harvey 1087_; valley near Fraile, _Stanford et al. 271, 288_.

_CHIHUAHUA:_ Rancho El Pino, southeast of Sierra Rica, wet sandy arroyo, common, _Stewart 2405_; 10 km. east of Jimenez, _Harvey 1346_. _ZACATECAS:_ Concepcion del Oro, cemetery, 1904, _Palmer 267_; valley 15 km. west of Concepcion del Oro, _Stanford et al. 552_; Cedros, sinks and flats, _Lloyd 211_.

Central United States and south in eastern Mexico to Puebla.

**Phalaris canariensis** L. Sp. Pl. 54 (1753).

_COAHUILA:_ Monclova, 1939, _Marsh 1693_.

A Mediterranean species, introduced in various parts of America.

**Phalaris caroliniana** Walt. Fl. Carol. 74 (1788).

_COAHUILA:_ Muzquiz, 1936, _Marsh 1078_. _CHIHUAHUA:_ Common, forming large pure stands in low meadows and along ditches, 1908, _Palmer 32_.

Widely distributed in the southern half of the United States and in adjoining Mexico.

**Trichachne insularis** (L.) Nees, Agrost. Bras. 86 (1829).

_COAHUILA:_ Santa Anna Canyon, _Marsh 430_; hills 20 mi. west of Saltillo, _Shreve & Tinkham 9829_. _CHIHUAHUA:_ Rocky hills near Chihuahua, Aug. 1885, _Pringle 378_.

Florida to New Mexico and south to Argentina. A coarse plant in the tropics but becoming small in stature in our area and frequently rather similar in aspect to _T. californica_, but readily distinguished from it by its proportionately narrower, lanceolate spikelets, bearing sordid or tawny, rather than pure white or purplish, hairs.

**Trichachne Hitchcockii** Chase, Jour. Wash. Acad. **23**: 454 (1933).

_COAHUILA:_ Sierra Cruces, limestone hillside just west of Santa Elena, rare, _Johnston 8195_.

Known from a few collections from Texas (San Antonio west to Sanderson) and south to San Luis Potosi.
Trichachne californica (Benth.) Chase, Jour. Wash. Acad. 23: 455 (1933).

Coahuila: Don Martin Dam, Harvey 935; Hermanas, Marsh 1026; Monclova, 1880, Palmer 1341; mouth of Cañon Cuervo Chico, under bushes on rocky flat, Johnston 8570; Rosario, among bushes in mogote, Johnston 8825; 14 mi. east of Paia, Shreve & Tinkham 9899; north of Sierra Cruces, about mogote west of San Rafael, Johnston & Muller 1040. Chihuahua: Rancho El Pino, southeast of Sierra Rica, rocky slope, Stewart 2409; Coahuilan boundary 1 mi. east of Poza de Villa, among bushes on silty plain, Johnston 8173; Chihuahua, 1935, LeSueur 77.

Texas to Colorado and Arizona, and south to central Mexico.


Coahuila: Muzquiz-La Mariposa, 1936, Marsh 1049; Monclova, 1939, Harvey 1165; Saltillo, 1898, Palmer 387. Chihuahua: Presa de Chihuahua, 1936, LeSueur 142; 5 km. west of Camargo, 1939, Harvey 1415.

Widely introduced European garden weed.


Coahuila: Sabinas, Nelson 8822 (US); Santo Domingo, open slopes of igneous hill, Wyud & Mueller 482; Sierra Cruces, edge of gypsum bed in arroyo south of Santa Elena, only one plant seen, Johnston 9405. Chihuahua: 4 mi. southeast of Organos, in low bushes on grassy slope, fairly common, Stewart & Johnston 2047; Chihuahua, hills and plains, Pringle 489 (US).

Eastern United States to Minnesota and Texas and west along the boundary to Arizona; south through eastern Mexico to San Luis Potosi.


Texas to Arizona and south to Central America.

Eriochloa punctata (L.) Desv. ex Hamilt. Prodr. Ind. Occ. 5 (1825).

Coahuila: Monclova, Harvey 1147.

Louisiana and eastern Texas south in eastern Mexico to Vera Cruz; South America.


Coahuila and Chihuahua south to Oaxaca.


Along streams and ditches and other wet places, widely distributed in America.


Coahuila: Yerda Spring, Marsh 262; Santa Anna Canyon, Marsh 435; Palm Canyon, Marsh 324; Muzquiz, Marsh 1156; Mesa Grande, northwest of Hac. Encantada, wet arroyo, fairly common, Stewart 1619; Hermanas, Marsh 2259; Monclova, Marsh 1721; 50 km. south of Monclova, Harvey 1126; Sierra Hechiceros, Cañon Indio Felipe, creek bank, Stewart 91; Sierra Cruces, Cañon Tinaja Blanca, arroyo bank,
erect, Stewart 1133; Torreon, 1898, Palmer 515; Jimulco Springs, May 13, 1885, Pringle 427. Chihuahua: Sierra Almagre, Ojo Almagre, about spring, becoming 6 ft. tall, Johnston & Muller 1201; near Chihuahua, by streams, Sept. 1885, Pringle 374; 5 km. west of Camargo, Harvey 1405a.

Louisiana and Texas south to southern Mexico.


Coahuila: Chojo Grande, 27 mi. southeast of Saltillo, about summit of waterfall in moist place, 1904, Palmer 338.


**Paspalum Hartwegianum** Fourn. Mex. Pl. 2: 12 (1886).

Coahuila: 24 km. east of Don Martin Dam, Harvey 949.

Texas south to southern Mexico.


Coahuila: Palm Canyon, Muzquiz area, Marsh 978.

Northeastern Mexico south to Hidalgo.

**Paspalum ciliatifolium** Michx. Fl. Bor. Am. 1: 44 (1803).


A very variable species of sandy soils, widely distributed in the eastern half of the United States; reported from the West Indies and Central America. The cited collection is an unusually glabrous plant and keys to *P. propinquum* in Chase's monograph. I am, however, perfectly content to refer it to typical *P. ciliatifolium*; cf. Rhodora 36: 21 (1934). Chase cites a collection of *P. stramineum* Nash from near Juarez, Chihuahua ("Paso del Norte, Pringle 1123"). This is presumably a form of the present species with puberulent foliage and somewhat hairy fruit, i.e. the var. *stramineum* (Nash) Fernald.


Coahuila: Rio Grande Valley near Piedras Negras, April 23, 1900, Pringle 8323.

Texas south into adjoining Coahuila. The present species probably should be united with *P. Reverchoni* Vasey (1889), an older species having practically the same geographical distribution.

**Panicum lanuginosum** Ell. var. Lindheimeri (Nash) Fernald, Rhodora 36: 77 (1934).

Coahuila: Muzquiz, Marsh 1171; Cañon Agua Grande, west of Las Delicias, by water, erect, Stewart 2800.

A phase of a variable species widely distributed in the eastern United States. Although ranging with the other variants of the species farther northward and eastward, the present glabrous form is the most common, if not the only, phase of the species in south central and trans-Pecos Texas.

**Panicum oligosanthes** Schultes, var. Scribnerianum (Nash) Fernald, Rhodora 36: 80 (1934).

Coahuila: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 519; Sierra Hechiceros, Cañon Indio Felipe, common on creek bank, Stewart 74.

Widely distributed in the United States; in Mexico known only from Coahuila.

Coahuila: Sierra Madera, Cañón Charretera, common in gravelly bed of arroyo in oak belt, Johnston 8919.

Central Texas and eastern Coahuila.

Panicum fasciculatum Sw. Prodr. Veg. Ind. Occ. 22 (1788).

Panicum fasciculatum var. reticulatum Beal, Grasses No. Am. 2: 117 (1896).

Chihuahua: Plains near Chihuahua, Sept. 2, 1885, Pringle 379, 380; 6 mi. west of Piloncillo, low place in grassland, Johnston 7863.

Florida; Texas to Arizona and south into South America.


Coahuila: San Antonio de los Alamos, summit of tuff cliffs, gravelly flat, two plants only, Johnston 8250. Chihuahua: 7½ mi. south of Pirámide, silty flat, flooded by storm-water, rare, Johnston 8100; 10 mi. southeast of Organos, fairly abundant on gentle grassy slope, Stewart & Johnston 2034; north of El Carmen, 1935, LeSueur 69; Chihuahua, Pringle 487 (US); Meoqui, 1935, LeSueur 37; 20 km. south of Camargo, Harvey 1391.

Trans-Pecos Texas to southern California and south in western Mexico to Oaxaca.

Panicum hirticaule Presl, Rel. Haenk. 1: 308 (1830).

Coahuila: Rancho Las Uvas, east side Valle Acatita, shale on slope, Stewart 2701. Chihuahua: Llano Chiquito, 7 mi. east of Chihuahua, gravelly flat, Johnston 7992; Chihuahua, 1935, LeSueur 12; Meoqui, 1935, LeSueur 32; 20 km. south of Camargo, Harvey 1378; 6 mi. west of Piloncillo, lava hillside, Johnston 7866.

Texas to southern California and south to South America. An annual species, becoming large and coarse in the tropics. Our reduced northern form is 1–3 dm. tall.


Coahuila: El Berrendo, Harvey 1186.

Texas and eastern Coahuila.


Coahuila: Verda Spring, Marsh 288; Santa Anna Canyon, Marsh 427; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1278; 2 mi. northwest of Fronteras, road to Natadores, silty desert plain, Johnston 7170; near Rancho Santa Teresa, south of Cañon Castaños, Wynd & Mueller 174; mountains west of Saltillo, 1880, Palmier 1338; hills 20 mi. west of Saltillo, Shreve & Tinkham 9821; Sierra del Pino, La Noria, meadows and arroyo-bank, Johnston & Muller 467, 694, Stewart 1211; Sierra Madera, Cañon Charretera, ledges on sunny slope in oak belt, Johnston 9104; 14 mi. east of Paila, Shreve & Tinkham 9897; San Antonio de los Alamos, gravelly flat on top of tuff cliffs, Johnston 8250; Sierra Crues, 8 mi. north of Santa Elena, stony flat, Johnston & Muller 1017; 7 mi. south of Jaco, about mogote, Johnston & Muller 1111. Chihuahua: Rancho El Pino, southeast of Sierra Rica, rocky slope, Stewart 2395; Coahuilan boundary a mile east of Pozo de Villa, silty plain, Johnston 8175; Sierra Santa Eulalia, Aug. 1885, Pringle 376.

Texas to Arizona and south to Hidalgo and Durango.


Based upon Pringle 487, collected Sept. 22, 1885, by stream in rocky hills near (west of) Chihuahua, the type, and on material from Durango and the Federal District. I have not seen the type collection. The other
specimens originally cited, however, suggest that it may possibly be only a form of *P. Ghiesbreghtii* Fourn.


Trans-Pecos Texas to Arizona and south to Oaxaca.

**Panicum virgatum** L. Sp. PI. 59 (1753).


*Coahuila:* Sierra del Pino, head of Cañon Ybarra, dry hillside, *Stewart* 1248; Sierra del Pino, La Noria, arroyo banks, *Johnston & Muller* 405. **Chihuahua:** Pirámide, low ground, coarse clumps 2-4 ft. tall, *Johnston* 8140.

United States, except the Pacific States, south to Central America.


**Chihuahua:** Los Medanos, 1935, *LeSueur* 82.


**Panicum agrostoides** Spreng. Pl. Pugil. 2: 4 (1815).


Eastern United States and northeastern Mexico.


**Vernacular name:** Zacate Gramilla.


Missouri and Texas to Colorado and Arizona, and south to central Mexico. Growing in wet soil or low places where storm water frequently collects.

**Oplismenus hirtellus** (L.) Beauv. Ess. Agrost. 54, 168 (1812).


Northern Mexico to Argentina.

**Echinochloa colonum** (L.) Link, Hort. Berol. 2: 209 (1833).

*Coahuila:* Sierra del Carmen, Aug. 29, 1936, *Marsh* 699; Santa Anna Canyon,


Hitchcock, Contr. U. S. Nat. Herb. 17: 259 (1913), reports this species from “CHIHUAHUA: Chihuahua, Palmer in 1886.” The data on the specimen is possibly erroneous. Except for this specimen, the species is known only from central Mexico south into Central America.

Setaria lutescens (Wegr.) Hubbard, Rhodora 18: 232 (1916).

Setaria geniculata (Lam.) Beauv. Ess. Agrost. 51, 178 (1812).

Southeastern United States west to Texas and south to Argentina. The type of Chaetochloa gibbosa Scribn. & Merr., referred to C. macrostachya by Hitchcock, Contr. U. S. Nat. Herb. 22: 204 (1920), properly belongs in the synonymy of the present species.


A European weed, widely distributed in temperate North America.


Setaria lutescens (Wegr.) Hubbard, Rhodora 18: 232 (1916).

Setaria geniculata (Lam.) Beauv. Ess. Agrost. 51, 178 (1812).

Southeastern United States west to Texas and south to Argentina. The type of Chaetochloa gibbosa Scribn. & Merr., referred to C. macrostachya by Hitchcock, Contr. U. S. Nat. Herb. 22: 204 (1920), properly belongs in the synonymy of the present species.

A European weed.
Texas to Arizona and south to southern Mexico. A native annual, very suggestive of *S. verticillata* in general habit.


*Coahuila*: Torreon, 1898, *Palmer* 505. **Chihuahua**: Ojo Almagre, Sierra Almagre, about spring, 6 ft. tall, *Johnston & Muller* 1202.

Texas and northeastern Mexico. **Setaria villosissima** (Scribn. & Merr.) *Schum.* is probably a synonym of this species.


**Vernacular name**: Chancaquilla.

COAHUILA: On desert 25 mi. southwest of Sabinas, Wynd & Mueller 218; Rancho Agua Dulce, valley floor, Wynd & Mueller 404; 20 mi. northwest of Hac. La Babia, valley floor, Wynd & Mueller 444; Verda Spring, 1936, Marsh 287; Hac. Encantada, abundant on flats, 1941, Stewart 1733; Monclova, 1939, Marsh 1823; near Esmeralda, fairly common along arroyo, Stewart 2179; Cañon Agua Grande, west of Las Delicias, on flats, common, Stewart 2825.

Chihuahua: 1935, LeSueur 7; 20 km. south of Camargo, 1939, Harvey 1393.

Chase, Contr. U. S. Nat. Herb. 22: 71 (1920), reports the species from Saltillo. This species is probably indigenous to Mexico and Texas and was formerly much less generally distributed than at present. It has become a widely distributed and obnoxious weed along roads and about towns in waste ground. Chase refers the common, apparently indigenous *Cenchrus* of central United States to *C. pauciflorus*, but that seems doubtfully correct, for the broader darker green leaves and the shape and armature of the burs of that plant are more suggestive of *C. echinatus*.


Collected in the bottoms of the Rio Grande on the Texan side of the river between El Paso and old Fort Quitman, and almost certainly to be found on the Chihuahuan side also.

*Andropogon hirtiflorus* (Nees) Kunth, Rév. Gram. 1: Suppl. xxxix (1830).


Trans-Pecos Texas to Arizona and south into tropical America. Our plants represent the Mexican var. *jeensis* (Fourn.) Hitchc. The plant closely resembles *A. scoparius* and *A. cirratus*, from which it differs chiefly in the scabrid strigose hairy glumes.


CHIHUAHUA: Rocky hills northeast of Chihuahua, Oct. 17, 1885, Pringle 382.

Southeastern Arizona to Trans-Pecos Texas (east to the Davis Mts.) and south into Chihuahua and eastern Sonora. Closely related to *A. scoparius* and probably only a well-marked geographical variety, differing in having the hairs on the spikelet and pedicels scanty or nearly absent.


COAHUILA: Sierra del Carmen, Aug. 26, 1936, Marsh 607; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1272; Hillcoat Mesa, lying west of Encantada Ranch, July 25, 1938, Marsh 1433; Sierra del Pino, La Noria, along arroyo bottom and on rocky flats among scrub-oaks, Johnston & Muller 449, 661; tableland north of Cañon Cuervo Chico, rocky slopes of low rounded limestone hills, Johnston 8558.


COAHUILA: Cañon Agua Grande, west of Las Delicias, near water, erect, 3 m. tall, scarce, Stewart 2818.
Wet ground from southeastern United States to California and south into tropical America.

**Andropogon ternarius** Michx. Fl. Bor. Am. 1: 57 (1803).

**Coahuila:** Sierra de los Guajes, Cañion Madera, fairly abundant on hillsides, Stewart 1504; Sierra Madera, Cañion Charretera, rocky bed of open arroyo in oak belt, common, becoming 4 ft. tall, Johnston 9074.

Delaware to Missouri and south to Florida and central Texas, entering Mexico only in northern Coahuila.


**Chihuahua:** Los Medanos, 1935, LeSueur 61.

Sandy places from North Dakota to Utah, and south to Arizona and trans-Pecos Texas and northern Chihuahua.

**Andropogon Gerardi** Vitman, Summa Pl. 6: 16 (1792).


**Coahuila:** Sierra del Pino, meadows in the pine forests north of La Noria, common and conspicuous, Johnston & Muller 542, Stewart 1226.

Widely distributed in eastern and central United States. Known in Mexico only in Coahuila.

**Andropogon saccharoides** Sw. Prodr. 26 (1788).


**Andropogon perforatus** Trin. ex Fourn. Mex. Pl. 2: 59 (1886).

**Vernacular name:** Zacate aceite.

**Coahuila:** Sierra del Carmen, July 29, 1936, Marsh 638; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1513; Hillcoat Mesa, lying west of Encantada Ranch, July 25, 1938, Marsh 1435; Hermosas, Marsh 1628 and 2254; Monclova, 1880, Palmer 1347; Monclova, Marsh 1092; desert near Rancho Santa Teresa, Wynd & Mueller 207; 2 mi. west of Saltillo, Harvey 1066; Saltillo, 1898, Palmer 4, 261, 810; Sierra del Pino, La Noria, Stewart 1212, Johnston & Muller 667; Sierra Madera, Cañion Charretera, bed of arroyo, Johnston 9075; 10 km. southwest of El Oro, on bajillo, Stewart 3028; Sierra Jimulco, 5 km. northeast of Jimulco, Stanfield et al. 132. **Chihuahua:** Vicinity of Rancho El Pino, 10 km. southeast of Sierra Rica, rocky slopes, Stewart 2410; near Juarez, May 30, 1888, Pringle 1994; Agua Caliente, 1935, LeSueur 51; Chihuahua, 1935, LeSueur 2; arroyo 20 km. south of Camargo, Harvey 1382, 1389; 6 mi. west of Piloncillo, grassland, Johnston 7879. **Zacatecas:** Concepcion del Oro, 1904, Palmer 262.

Alabama and Missouri west to southern California and south to Argentina. A variable widely spread species which I am here accepting in the broad sense used by Hackel in his monumental treatment of the genus. Attempts to segregate out certain forms, such as *A. barbinodis*, by stressing length of peduncle, hairiness of the nodes, shape of panicle, size of spikelets, etc., have been singularly unsuccessful but persistent. The characters used show little tendency to vary together and some of them are probably associated with the vigor and rapidity of growth. Significantly, these segregates and the restricted species have practically the same geographical distribution in Mexico and the United States and commonly may be detected in the same locality. Some plants of *A. saccharoides* have a conspicuous pore developed on the glumes and have been distinguished as *A. perforatus*. The distribution of the form is sporadic and may occur in
plants referred either to *A. saccharoides* or to *A. barbinodis*. Pitted glumes are known in other species of *Andropogon*. I see no reason why the development should be given specific recognition in the present case.


A Mediterranean grass, now widely introduced into the warmer parts of America. A serious weed in irrigated lands, particularly in the Laguna District.

**Sorghastrum nutans** (L.) Nash in Small, Fl. S. E. U. S. 66 (1903).


Eastern United States and south into Mexico.

**Heteropogon contortus** (L.) Beauv. ex R. & S. Syst. Veg. 2: 836 (1817).


Florida to Arizona and southward; widely distributed in the warmer parts of the world. Although growing on limestone, this species is more abundant on igneous rocks, particularly basalt. Usually growing on rocky slopes and at times dominating large areas.


*Chihuahua:* Rocky flat just east of Organos, locally common on ledges, *Stewart & Johnston* 2059; Chihuahua, *LeSueur* 15.

Southern and eastern Texas; Arizona; Mexico to Argentina.

**Elyonurus barbiculmis** Hack, in DC. Monogr. Phan. 6: 339 (1889).


Trans-Pecos Texas to Arizona and south to Durango.


Wet places in the warmer parts of the world; introduced into America. The species has been collected repeatedly on the Texan bank of the river in the Big Bend of the Rio Grande.

Chihuahua: Open canyon in igneous hills 20 km. north of Chihuahua, sprawling in moist gravel, rare, Stewart & Johnston 2128; hills near Chihuahua, Pringle 1057 (US).

Arizona south through Chihuahua to Central America. A weedy grass widely distributed in the warmer parts of the world. Said to be introduced in our area, but, if so, introduced at a very early date, for it was collected at unfrequented places in southeastern Arizona by Charles Wright as early as 1851.


A species of the Old World tropics, widely cultivated in America for its bead-like fruits and frequently spontaneous.

Tripsacum dactyloides L. Syst. Nat. ed. 10, 1261 (1759).


Coahuila: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 536; Sierra Encantada, 7 km. west of Buena Vista, fairly common in wet canyon, Stewart 1450; Santa Anna Canyon, Marsh 438; Palm Canyon, near Muzquiz, Marsh 982.

Connecticut to Iowa and south to Florida and through Texas and northeastern Mexico to San Luis Potosi. Hitchcock, and recently Cutler & Anderson, have placed the Tripsacum of northeastern Mexico in T. lanceolatum Rupr. I am, however, unable to separate Texan specimens from those collected in Coahuila, Nuevo Leon, Tamaulipas, and eastern San Luis Potosi. Characters in the size, shape, and surface of the segments of the female inflorescence readily separate these specimens from the more southerly and westerly T. lanceolatum.

Arnold Arboretum,
Harvard University.

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