

Perennial *Festuca* (Gramineae) of New Mexico ¹

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Wootton and Standley, in their landmark "Flora of New Mexico" of 1915, gave the first accounting on a state-wide basis of the *Festuca* in New Mexico. They reported a total of seven species of this genus, five of which were perennials (Table 1). Four taxa have been recognized consistently since that time: *arizonica*, *brachyphylla* (with a fine-tuning of the infraspecific status), *sororia*, and *thurberi*. Taxa corresponding to *idahoensis* and *saximontana* were added by Tidestrom & Kittell (1941), Allred (1993) brought the total to ten (including one ornamental), and this work culminates in a treatment of 14 perennial species found to grow in New Mexico.

The classification and identification of *Festuca* species has changed considerably during the last 25 years by the use of micro-morphological features such as leaf anatomy, chromosome number, and pubescence of the ovary apex, as well as the more recent use of molecular information (e.g., Aiken & Lefkovitch 1984; Aiken et al. 1997, 1998; Dube & Morrisett 1996; Fjellheim et al. 2001; Guldahl et al. 2001). Circumscription of taxa now largely depends on these newer features, though their recognition is assisted by the more easily observable characteristics of leaf, panicle, and spikelet.

The keys and descriptions that follow are based on New Mexico material, and may or may not correspond to plants from other regions. Chromosome data were taken from the CD-ROM of Aiken et al. (1997).

Key to the Species

1 Blades mostly wider than 3 mm, usually at least somewhat lax and flat when fresh

2 Spikelets 2- to 4-flowered, 8-11 mm long; auricles absent; panicle branches spreading, at least below *F. sororia*

2 Spikelets (4)5- to 9-flowered, 10-17 mm long; small auricles usually developed; panicle branches usually ascending

3 Auricles lacking cilia (10x or greater); two panicle branches borne at the lowermost node, together rarely bearing more than 6 spikelets; old sheaths brown, decaying to fibers; blades 3-6(7) mm wide *F. pratensis*

3 Auricles with minute cilia (10x or greater); two or three panicle branches borne at the lowermost node, together usually bearing 5-15(30) spikelets; old sheaths pale straw-colored, generally remaining intact; blades 3-12 mm wide *F. arundinacea*

1 Blades mostly less than 3 mm wide, usually rolled or folded and somewhat stiff

4 Ligules 2.5-5(9) mm long; lemma awns 0-0.3 mm long; nodes usually visible and conspicuous; plants generally more than 50 cm tall *F. thurberi*

4 Ligules less than 2 mm long; lemma awns usually more than 0.5 mm long, occasionally shorter; nodes often not visible nor conspicuous; plant height various

5 Anthers 2-4 mm long

6 Basal sheaths reddish and separating into thread-like fibers (the whitish veins) in age

7 Shoots loosely clustered, usually with short rhizomes; blades lax and usually flat or loosely folded, usually longer than 15 cm; sheath margins fused together to near the summit (most easily seen in young tiller shoots, the sheaths often ripped in older flowering shoots) *F. rubra*

7 Shoots densely clumped from a branched underground caudex, lacking rhizomes; blades stiff (though arcuate), usually rolled or folded tightly, 6-12 cm long; sheath margins fused only in the lower portions *F. calligera*

6 Basal sheaths usually not reddish nor separating into thread-like fibers

8 Blades, especially the older ones, strongly laterally compressed, thickened and stiff, 0.5-1 mm wide .. *F. trachyphylla*

¹ Supported by the New Mexico Agricultural Experiment Station, New Mexico State University

8 Blades, even the older ones, at least somewhat terete, not thickened, but thread-like, 0.2-0.4 mm wide

9 Peduncle and lower panicle branches densely scaberulous; old basal sheaths conspicuous at the base of the clump, generally 4-12 cm long (rarely shorter); body of larger lemmas 5-9 mm long, the awn 0.5-2.5 mm long; ovary apex pubescent *F. arizonica*

9 Peduncle and lower branches glabrous or nearly so; old basal sheaths conspicuous or not at the base of the clump, 1-3 cm long; body of larger lemmas 3-5.5 mm long, the awn 1-7 mm long; ovary and grain apex glabrous or with a few sparse hairs

10 Body of larger lemmas 3.5-5 mm long, the awn 1-2.5 mm long; lower glume 2.5-3.5 mm long; ovary apex with a few sparse hairs at maturity (glabrous when very young); grain 2-3 mm long *F. calligera*

10 Body of larger lemmas (4.5)5-5.5 mm long, the awn 2-7 mm long; lower glume 3.5-4.5 mm long; ovary apex glabrous at maturity and when very young; grain 4-5 mm long *F. idahoensis*

5 Anthers 0.4-1.7 mm long, rarely longer

11 Plants found only as ornamentals and border plants (in New Mexico), never in native habitats; foliage markedly bluish-glaucous in dense hemispheric tufts; ovary and grain apex densely pubescent *F. arvernensis*

11 Plants not growing as ornamental landscape plants, planted infrequently as a pasture grass, common in native mountain habitats; growth form various, but usually not in dense hemispheric tufts; foliage somewhat glaucous to green; ovary and grain apex glabrous or pubescent

12 Plants 3-10 cm tall

13 Lemma body 2-3 mm long, with an awn 0.5-1.5 mm long; spikelets with 2, occasionally 3, florets; panicle branches at lowest node usually 2-3; ovary and grain apex pubescent *F. minutiflora*

13 Lemma body 3-5.5 mm long, with an awn 2-3.6 mm long; spikelets with 3-4 florets, occasionally only 2; panicle branches at lowest node 1; ovary and grain apex glabrous *F. brachyphylla*

12 Plants over 10 cm tall, usually 15-50 cm tall

14 Basal sheaths reddish and splitting into thread-like fibers (the whitish veins) in age; ovary and grain apex pubescent *F. earlei*

14 Basal sheaths mostly straw-colored to brownish, not splitting into thread-like fibers in age (occasionally so in *F. brachyphylla*); ovary and grain apex glabrous

15 Blades soft, striate from the veins showing, somewhat wrinkled in drying, with little or no sclerenchyma tissue; spikelets and foliage greenish; culms usually less than twice the height of the leaves; anthers 0.5-1.3 mm long; rachilla internodes of middle florets 0.6-0.8 mm long *F. brachyphylla*

15 Blades stiff, terete or sulcate, not striate nor wrinkled, the veins generally not visible because of a build-up of sclerenchyma tissue; spikelets and foliage often glaucous; culms usually twice the height or more of the leaves; anthers 1-1.7 mm long (rarely longer); rachilla internodes of middle florets 0.9-1.1 mm long *F. saximontana*

***Festuca arizonica* Vasey ARIZONA FESCUE [of Arizona]**

Contrib. U.S. Natl. Herb. 1: 277. 1893

Festuca ovina Linnaeus var. *arizonica* (Vasey) Hackel ex Beal

Festuca vaseyana Hackel ex Beal

Plants 35-100 cm tall, densely tufted with yellowish green foliage, the bases generally not purplish. Nodes becoming exposed. Sheaths 3-12 cm long, open more than 1/2 their length, persistent, remaining whole and not splitting between the veins, conspicuous in large clumps. Ligules 0.5-2 mm long. Blades 15-40 cm long, 0.3-0.5 mm wide. Panicle 4-20 cm long, the peduncle markedly scabrous; primary branches 2.5-12 cm long. Spikelets 6-16 mm long, with 4-8 florets; first glume 3-5 mm long, 1-nerved; second glume 4.5-7 mm long, 3-nerved; body of lower lemma 5.5-9 mm long; awn of lower lemma 0.4-2.7 mm long. Anthers 3-3.8 mm long. Grain 3-3.5 mm long, the ovary apex pubescent. 2n=42. Native. Arizona, Colorado. New Mexico: ponderosa pine forests to subalpine slopes and meadows, often in open park lands with ponderosa pine; usually growing with *Festuca calligera*, *F. idahoensis*, and *F. thurberi*, from which it can be told by its

large clumps with conspicuous and persistent basal sheaths, short ligules, roughly scabrous peduncles and rachises, long spikelets, and short awns. This is the most conspicuous and perhaps the most common of the fescues in New Mexico, ranging throughout all our mountain regions at 7,000 to 11,400 ft elevations.

Festuca arundinacea Schreber TALL FESCUE [reed-like]

Festuca elatior Linnaeus

Lolium arundinaceum (Schreber) S.J. Darbyshire

Schedonorus arundinaceus (Schreber) Dumort

Plant 30-150 cm or more tall, densely tufted, the bases not or only slightly purplish. Nodes becoming exposed. Sheaths open more than half their length, generally not splitting between the veins into thread-like segments but remaining intact and straw-colored. Ligules 0.4-1.2 mm long. Auricles present, claw-like, with noticeable (usually conspicuous at 10x) cilia. Blades flat or folded, 8-28 cm long, (3)4-12 mm wide. Panicle 10-35 cm long, with 2-3 panicle branches at the lowermost node, these together bearing 5-15(30) spikelets. Spikelets 7-12 mm long, with 4-8 florets; first glume 3-6 mm long; second glume 4-7 mm long; body of lower lemma 6-10 mm long; awn of lower lemma 0-2(4) mm long; rachilla scaberulous. Anthers 2.7-4 mm long. Grain 2-3 mm long, glabrous at the apex. $2n = 28, 42, 56, 63, 70$. Exotic. Widespread throughout much of North America. New Mexico: widely planted for improved pasture, erosion control, turf, and habitat restoration and found in a variety of habitats from 3,500 to 9,500 ft in elevation. As many as five subspecies have been recognized in populations native to the Old World, but these seem inapplicable to our New Mexico material. Over 100 cultivars have been developed for agronomic purposes. This and *Festuca pratensis* (q.v.) are closely related to *Lolium perenne* Linnaeus, are partially interfertile, and are sometimes merged with that genus, or treated in the segregate genus *Schedonorus*.

Festuca arvernensis Auquier, Kerguelen, & Markgraf-Dannenbergh BLUE FESCUE [of Auvergne, France]

Festuca glauca Lamarck, not Villars

Festuca ovina Linnaeus var. *glauca* (Lamarck) Koch

Plant 15-45 cm tall, densely tufted, forming round balls or mounds, the foliage usually conspicuously glaucous. Nodes usually concealed in the clump. Auricles absent. Sheaths open more than half their length. Ligules 0.1-0.3 mm long. Blades tightly rolled or folded, 8-20 cm long, less than 1 mm wide when rolled. Panicle 5-10 cm long, narrow and spike-like. Spikelets 4-9 mm long, with 3-6 florets; first glume 2-2.5 mm long; second glume 3-3.5 mm long; body of lower lemma 3-5 mm long, hyaline-margined; awn of lower lemma 2-4 mm long; rachilla scaberulous. Anthers 2-3 mm long. Grain 2-3 mm long, the apex densely pubescent. $2n = 28$. Widely planted as an ornamental border grass throughout cool-temperate North America, also used as a hanging house plant and in flower boxes and pots. Known

from only a few locales (not escaped) in New Mexico, and expected throughout the state in appropriate ornamental circumstances. This species is not known outside of cultivation in New Mexico, and is easily recognized by the rounded mounds of narrow blue foliage.

Festuca brachyphylla J.A. Schultes ex J.A. & J.H. Schultes subsp. *coloradensis* Frederiksen SHORT-LEAF FESCUE [short-leaved, of Colorado]

Festuca ovina Linnaeus var. *brevifolia* of New Mexico reports

Plants 3-12 cm tall, densely tufted, the bases purplish or not. Nodes hidden. Sheaths closed more than 1/2 their length, the bases usually persistent and remaining whole. Ligules shorter than 0.5 mm long. Blades 2-6 cm long, 0.3-1 mm wide, relatively soft and wrinkling upon drying, striate because of the veins showing. Panicle 1-2.5 cm long. Spikelets 3.5-5.5 mm long with 2-4 florets; first glume 1.8-3 mm long, 1-nerved; second glume 2.3-4.3 mm long, 3-nerved; body of lower lemma 3.3-4.5 mm long; awn of lower lemma 0.7-3.6 mm long; rachilla 0.6-0.7 mm long, scaberulous. Anthers 0.4-1.4 mm long. Grain 1.8-2.5 mm long, the ovary apex glabrous. $2n = 28$. Native. California, Montana, Wyoming, Utah, Colorado. New Mexico: subalpine to alpine slopes, ledges, grassy scree, and cliffs in the northern mountains, 10,500 to 12,500 ft in elevation. *Festuca brachyphylla* subsp. *coloradensis* can be confused with *Festuca saximontana*, and the two sometimes grow together, but the latter is usually at least somewhat glaucous rather than green, with comparatively stiffer blades and longer anthers, and also grows at lower elevations. Short-leaf fescue also grows with *F. minutiflora*, which is distinguished by having fewer florets, shorter spikelets, shorter awns, and a pubescent rather than glabrous ovary/grain apex.

Festuca calligera Piper SOUTHWESTERN FESCUE [beauty-bearing]

Plants 30-65 cm tall, densely tufted from a branched underground caudex, but not rhizomatous, the bases usually not purplish. Nodes mostly not exposed, except for a few. Sheaths open more than 1/2 their length, generally remaining whole but sometimes a few splitting into threads. Ligules 0.2-0.3 mm long. Blades 6-12 cm long, 0.4-0.6 mm wide. Panicle 5-15 cm long; primary branches 2-10 cm long. Spikelets 6-11 mm long, with 2-6 florets; first glume 2.5-3.5 mm long, 1-nerved; second glume 2.8-4 mm long, 3-nerved; body of lower lemma 3.5-5 mm long; awn of lower lemma 1-2.5 mm long. Anthers 2.2-3.3 mm long. Grain 2.5-3 mm long, the ovary apex glabrous when young but with a few sparse hairs at maturity. $2n = 28$. Native. Utah, Arizona, Colorado. New Mexico: subalpine to alpine, usually open grassland slopes, almost entirely in the south-central mountains, but with one collection from Hopewell Lake, Rio Arriba County. This species has been largely ignored in New Mexico botanical accounts and inventories. It is common in the Sacramento Mountains, and is easily

found with *Festuca arizonica* and *F. thurberi* near the Sierra Blanca ski area, from which it differs at first sight in having short involute leaves in a small basal clump. It occurs at 8,500 to 11,200 ft in elevation.

***Festuca earlei* Rydberg EARLE'S FESCUE** [honoring Franklin Sumner Earle, 1856-1929].

Plants 15-45 cm tall, densely tufted, the bases purplish or not. Nodes generally not exposed. Sheaths open more than half their length, not persistent, splitting into thread-like segments. Ligules 0.1-1 mm long. Blades 6-12 cm long, 0.5-0.9 mm wide (1-3 mm wide when flat). Panicle 3-8 cm long; primary branches 0.5-2 cm long. Spikelets 4-6 mm long, with 2-4 florets; first glume 2.2-3 mm long, 1- to 3-nerved; second glume 2.7-3.7 mm long, 3-nerved; body of lower lemma 3.2-4.5 mm long; awn of lower lemma 0.4-1.6 mm long; rachilla 0.9-1.1 mm long, scaberulous. Anthers 0.6-1.4 mm long. Grain 2.5-3 mm long, the ovary apex pubescent. $2n = ?$ Native. Arizona, Utah, Colorado. New Mexico: subalpine to alpine outcrops, rocky exposed slopes, talus slopes, and dry grasslands in spruce forests, at 9,500 to 12,500 ft. Like *Festuca rubra*, its sheaths split into thread-like segments, but that species produces rhizomes, and has longer anthers and a glabrous ovary apex.

***Festuca idahoensis* Elmer IDAHO FESCUE** [of Idaho]

Plants 30-70 cm tall, densely tufted, the bases purplish or not. Nodes becoming exposed. Sheaths open more than half their length, the bases persistent, not splitting into thread-like segments. Ligules 0.3-0.6 mm long. Blades flat or folded, 5-35 cm long, 0.4-0.6 mm wide. Panicle 5-20 cm long, the peduncle glabrous or nearly so, not densely scaberulous; primary branches 1.5-7 cm long. Spikelets 6-20 mm long, with 3-9 florets; first glume 3.5-4.5 mm long, 1- or 3-nerved; second glume 3-8 mm long, mostly 3-nerved; body of lower lemma 4.5-5.5 mm long; awn of lower lemma 2-7 mm long; rachilla usually easily visible and zig-zag, scaberulous. Anthers 2.5-4.5 mm long. Grain 4-5 mm long, the ovary apex glabrous. $2n = 28$. Native. Throughout much of mountainous western North America. New Mexico: open subalpine grasslands in the northern mountains, at 9,000 to 11,000 ft in elevation. This is not a common species in New Mexico, and at least one of the collections (Bobcat Pass, Taos County) may be from an artificial seeding.

***Festuca minutiflora* Rydberg SMALL-FLOWERED FESCUE** [tiny-flowered]

Plants 3-10 cm tall, densely tufted, the bases generally not purplish. Nodes becoming exposed. Sheaths open about half their length, but this variable, the bases persistent, not splitting into thread-like segments. Ligules 0.1-0.3 mm long. Blades 1-5 cm long, 0.3-0.4 mm wide. Panicle 1-4 cm long; primary branches short, 0.3-1.5 cm long. Spikelets 2.5-4 mm long, with 2, sometimes 3 florets; first glume 1.3-2.4 mm long; second glume 2-3.4 mm long; body of lower lemma 2-3.3 mm long; awn of lower lemma 0.5-1.5 mm long; rachilla 0.7-0.8 mm long, scaberulous. Anthers 0.8-1.1 mm

long. Grain 2-2.5 mm long, the apex pubescent with a few hairs. $2n = 28$. Native. Alpine areas of much of western North America. New Mexico: alpine ledges, outcrops, grassy slopes, often on mountain peaks, in the northern mountains at 11,500 to 12,500 ft. This species is always very short, with short panicles, few spikelets, and few florets. It can be confused only with short specimens of *Festuca brachyphylla*, but that species has larger spikelet parts and a glabrous ovary apex.

***Festuca pratensis* Hudson MEADOW FESCUE** [of meadows]

Festuca elatior of many authors, not Linnaeus

Lolium pratense (Hudson) S.J. Darbyshire

Schedonorus pratensis (Hudson) P. Beauvois

Plants 30-125 cm tall, tufted but not densely so, the bases purplish or not. Nodes becoming exposed. Sheaths open more than half their length, not persistent but decaying to fibers. Auricles present, claw-like, glabrous. Ligules 0.2-0.5 mm long. Blades flat or folded, 10-20 cm long, 3-6(7) mm wide. Panicle 8-22 cm long, with 1-2 branches at the lowermost node, these together rarely bearing more than 6 spikelets. Spikelets 9-15 mm long; first glume 2.5-4.5 mm long; second glume 3-5 mm long; body of lower lemma 5-8 mm long; awn of lower lemma 0-2 mm long; rachilla glabrous or nearly so. Anthers 2.5-4 mm long. Grain 2-3 mm long, the apex glabrous. $2n = 28, 42, 56, 63, 70$. Exotic. Throughout most of cool-temperate North America. New Mexico: widely planted for improved pasture, erosion control, turf, and habitat restoration and found in a variety of habitats from 3,800 to 10,000 ft in elevation. Apparently, this is less common than tall fescue in the state, being documented in the central mountainous region, but this could simply be an artifact of incomplete collecting. This and *Festuca arundinacea* (q.v.) are closely related to *Lolium perenne*, and form fertile hybrids. The hybrid of *F. pratensis* \times *Lolium perenne* has been named ∞ *Festulolium loliaceum* (Hudson) P. Fournier (HYBRID FESCUE); it produces a panicle with the upper spikelets sessile and arranged in a spike and the lower spikelets stalked and on branches.

***Festuca rubra* Linnaeus RED FESCUE** [red]

Plants 20-80 cm tall, the culms loosely clustered from short rhizomes, these breaking through the basal sheaths (extravaginal). Nodes usually exposed. Sheaths closed to near the summit of the sheath, mostly splitting between the veins into thread-like segments. Ligules 0.2-0.5 mm long. Auricles absent or weakly developed. Blades flat or folded, 5-25 cm long, 1-4 mm wide. Panicle 5-20 cm long, with 1-4 branches at the lowermost node. Spikelets 5-12 mm long, with 4-9 florets; first glume 1.5-4 mm long; second glume 3-5 mm long; body of lower lemma 5-8 mm long; awn of lower lemma 0.3-4.5 mm long; rachilla scaberulous. Anthers 2.3-4.2 mm long. Grain 2.3-4.5 mm long, the apex glabrous. $2n = 14, 21, 28, 42, 49, 53, 56, 64, 70$. Native or introduced in some areas, widespread in North America. New Mexico: mountain meadows, high elevation slopes and outcrops,

7,200 – 11,700 ft. Young tillers of *Festuca rubra* have reddish sheaths fused to near the top of the sheath. The old sheaths of red fescue split between the veins into thread-like segments, a feature also found in *F. calligera* (sometimes), *F. earlei* (nearly always), and *F. pratensis* (indistinctly). CREEPING FESCUE (subsp. *rubra*, strongly rhizomatous in some races) and CHEWINGS FESCUE (subsp. *commutata* Gaudin, weakly rhizomatous, after George Chewings, who produced seed in New Zealand beginning in the late 1800s) are sometimes used in lawn and turf mixtures.

***Festuca saximontana* Rydberg ROCKY MOUNTAIN FESCUE [of rocky mountains]**

Festuca brachyphylla J.A. Schultes ex J.A. & J.H.

Schultes var. *rydbergii* (St.-Yves) Cronquist

Festuca brachyphylla J.A. Schultes ex J.A. & J.H.

Schultes subsp. *saximontana* (Rydberg) Hultén

Festuca ovina Linnaeus var. *rydbergii* St.-Yves

Festuca ovina Linnaeus subsp. *saximontana* (Rydberg) St.-Yves

Plants 20-50 cm tall, occasionally shorter, often glaucous but sometimes deep green, densely tufted. Nodes becoming exposed. Sheaths open more than half their length, persistent, not splitting into thread-like segments. Auricles poorly developed, glabrous. Ligules 0.2-0.5 mm long. Blades 5-20 cm long, 0.3-1 mm wide. Panicle 3-15 cm long, with 1-2 branches at the lower node. Spikelets 3.5-9 mm long; first glume 1.5-3.5 mm long; second glume 2.5-4.5 mm long; body of lower lemma 3-5.5 mm long; awn of lower lemma 0.5-2(2.5) mm long; rachilla internodes 0.9-1.1 mm long, scaberulous. Anthers 1-1.7 mm long. Grain 2.2-2.8 mm long, the apex glabrous. $2n = 42$. Native. Widespread in central and western North America. New Mexico: mountain grasslands and forest clearings, mostly in the northern mountains, 6,900 – 12,000 ft. *Festuca saximontana* is most easily confused with *F. brachyphylla*, told apart by the features in the key; it also may occur at much lower elevations and in drier habitats.

***Festuca sororia* Piper RAVINE FESCUE [referring to a sister (a related taxon)]**

F. subulata var. *sororia* (Piper) St.-Yves

Plants 50-130 cm tall, with leafy weak culms that are loosely clustered, the foliage deep green. Nodes becoming exposed. Sheaths open more than half their length, weakly splitting between the veins into thread-like segments, scaberulous. Auricles absent. Ligules 0.5-1.5 mm long, ciliate. Blades flat, lax, 10-25 cm long, 3-8 mm wide. Panicle 15-30 cm long, with mostly 2 branches at the lowermost node; primary branches spreading widely, 4-10 cm long, the tips drooping. Spikelets 8-11 mm long, with 2-4 florets; first glume 3-4 mm long, 1-veined, narrow; second glume 5-6 mm long, 3-veined, broader than the first; body of lower lemma 5.5-8.5 mm long; awn of lower lemma 0.2-2 mm long; rachilla scaberulous, easily visible and zig-zag. Anthers 1.8-2.2 mm long. Grain 4-6 mm long, pubescent at the apex. $2n = 28$. Native. California, Utah, Arizona, Colorado. New Mexico:

damp, shaded ravines and creek bottoms in the mountains, upper ponderosa zone to subalpine, 8000 – 11,200 ft. This grass is infrequently encountered, but there seems to be abundant material in herbaria and it is found in widely scattered locales in the mountains throughout the state. It is immediately recognized by the spreading panicle branches and few narrow spikelets.

***Festuca thurberi* Vasey THURBER'S FESCUE [honoring George Thurber, 1821-1890]**

Plants 45-150 cm tall, in tussocky dense clumps, the foliage green. Nodes becoming exposed. Sheaths open more than half their length, persistent, not splitting between the veins. Auricles absent. Ligules 2.5-5(9) mm long. Blades flat or more commonly folded, 25-45 cm long, 0.6-1.2 mm wide. Panicle 8-17 cm long, with 1(2) branches at the lowermost node. Spikelets 10-14 mm long; first glume 4-5 mm long, 1-veined; second glume 4.5-7 mm long, 1- or 3-veined; body of lower lemma 6.5-10 mm long; awn of lower lemma 0-0.3 mm long; rachilla scaberulous. Anthers 3-4.5 mm long. Grain 4-4.5 mm long, the apex pubescent. $2n = 28, 42$. Wyoming, Utah, Colorado. New Mexico: mid- to high elevation grasslands, meadows, grassy slopes, openings in coniferous forests, 8,000 – 12,000 ft. *Festuca thurberi* commonly grows with *F. arizonica*, completely intermingled within a community, but plants of the latter are easily recognized by their rolled glaucous leaves, short ligules, and short-awned (but the awns evident) florets.

***Festuca trachyphylla* (Hackel) Krajina HARD FESCUE [rough-leaved]**

Festuca brevipila Tracy

Festuca ovina Linnaeus subvar. *trachyphylla* Hackel

Festuca ovina L. var. *duriuscula* of many authors, non Linnaeus

Festuca trachyphylla Hackel ex Druce, nomen nudum (Darbyshire & Pavlick 1997)

Plants 25-65 cm tall, the foliage yellowish green, gray-green, to glaucous, the bases somewhat purplish. Nodes becoming exposed. Sheaths open more than half their length, persistent and conspicuous at the base of the clump, not splitting between the veins. Auricles weakly developed as swellings. Ligules 0.1-0.3 mm long. Blades 8-25 cm long, folded, stiff when mature, 0.5-1.2 mm wide. Panicle 3-12 cm long, with a single branch at the lowermost node. Spikelets 5.5-10 mm long; first glume 2-4 mm long; second glume 3-5.5 mm long; body of lower lemma 4-5.5 mm long, glabrous to scaberulous; awn of lower lemma 0.5-2.5; rachilla scaberulous. Anthers 2-3.4 mm long. Grain 2.5-3.5 mm long, the apex glabrous. $2n = 42$. Exotic. Widespread in scattered locales throughout much of cool-temperate North America. New Mexico: introduced for range restoration, erosion control, mine reclamation, and similar agronomic purposes in the northern mountains, but to be looked for elsewhere in a variety of (often disturbed) habitats, 5,200 – 11,500 ft. When mature, the stiff widely-folded blades are



F. arizonica x3



F. arundinacea x3



F. brachyphylla
subsp. *coloradensis* x3



F. idahoensis x2.5



F. minutiflora x4



F. pratensis x3



F. rubra x2.5



F. saximontana x3



F. sororia x3



F. thurberi x2.5



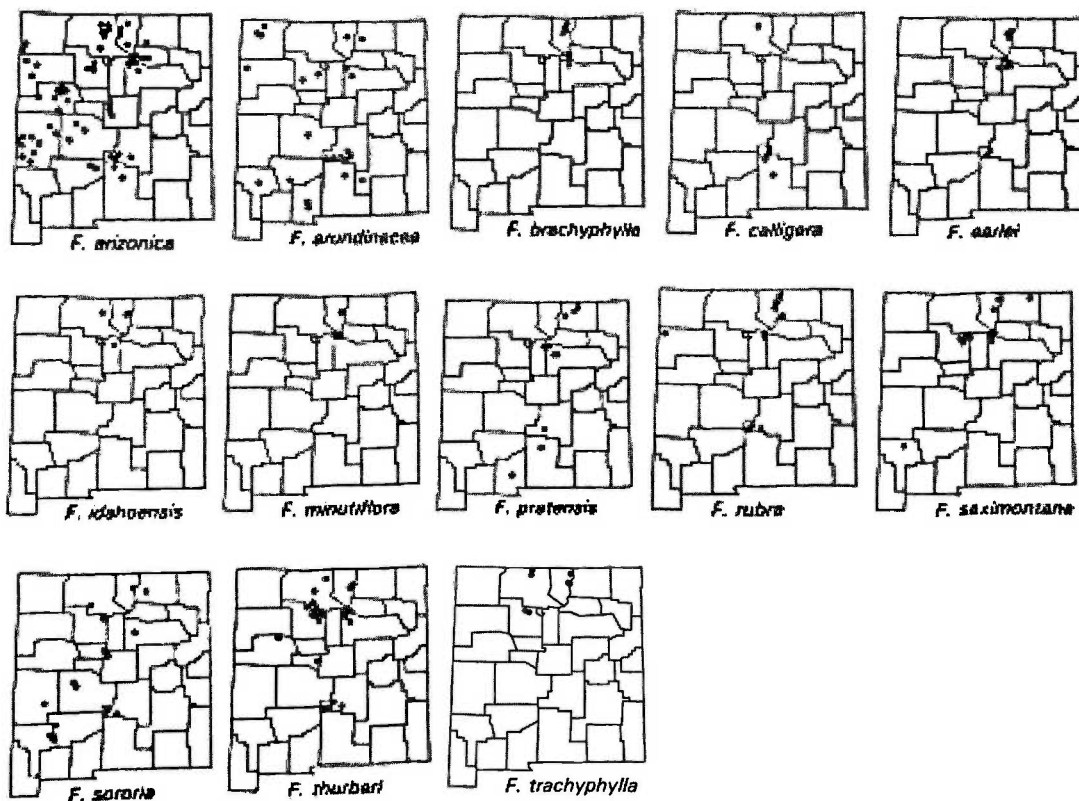
F. trachyphylla x3

Figure 1. Spikelets of perennial *Festuca* species in New Mexico.

Table 1. Previous taxonomic disposition of the perennial species of New Mexico *Festuca*

This work	Wooton & Standley, 1915	Tidestrom & Kittell, 1941	Martin & Hutchins, 1980	Allred, 1993
<i>arizonica</i>	<i>arizonica</i>	<i>Arizonica</i>	<i>arizonica</i>	<i>arizonica</i>
<i>arundinacea</i>	<i>elator</i>	-	-	<i>arundinacea</i>
(<i>arvernensis</i> ¹)	-	-	-	<i>ovina</i> var. <i>glauca</i>
<i>brachyphylla</i> var. <i>coloradensis</i>	<i>brachyphylla</i>	<i>ovina</i> var. <i>brachyphylla</i>	<i>ovina</i> var. <i>brachyphylla</i>	<i>brachyphylla</i>
<i>calligera</i>	-	-	-	-
<i>earlei</i>	-	-	-	-
<i>idahoensis</i>	-	<i>idahoensis</i>	<i>idahoensis</i>	<i>idahoensis</i>
<i>minutiflora</i>	-	-	-	-
<i>pratensis</i>	-	listed for AZ, but not for NM	<i>elator</i>	<i>pratensis</i>
<i>rubra</i>	-	listed for AZ, but not for NM	<i>rubra</i>	<i>rubra</i>
<i>saximontana</i>	-	<i>ovina</i> ?	<i>ovina</i> ?	<i>saximontana</i>
<i>sororia</i>	<i>sororia</i>	<i>sororia</i>	<i>sororia</i>	<i>sororia</i>
<i>thurberi</i>	<i>thurberi</i>	<i>thurberi</i>	<i>thurberi</i>	<i>thurberi</i>
<i>trachyphylla</i>	-	-	-	-

¹ included as an ornamental by Allred (1993)



quite distinctive, but other diagnostic features include long anthers, short awns, and glabrous ovary apices. Old sheaths remain at the base of the tuft in a characteristic grayish clump.

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- Festuca arizonica*: **Canon County**: Datil Mts, 8500 ft (2591 m), 15 Jun 1976. Fletcher, R. 405 (UNM); Datil Mts, 9100 ft (2774 m), 19 Jul 1976. Fletcher, R. 663 (UNM); Datil Mts, 8400 ft (2560 m), 31 Jul 1976. Fletcher, R. 889 (UNM); Datil Mts, 7600 ft (2316 m), 28 Aug 1963. Goodrow, K.K. s.n. (UNM); Elk Mt. on Rt.78, 10 Aug 1952. Roller, J.W. 2810 (UNM); Gila National Forest, Luna District, Forest Rd 19, about 2 mi north of Luna, ft (m), 11 Sep 1982. Allred, Kelly W. 2331 (NMCR); Gila National Forest, 0.8 miles north of Gilita Creek Campground, 8300 ft (2530 m), 3 Aug 1993. Allred, Kelly W. 5943 (NMCR); 1 mi nw El Caso Ranch, 25 Oct 1960. Bilbrey, D. 30 (UNM); 6 mi north of Datil, 7000 ft (2134 m), Sep 1939. Easley, G. 1738 (NMCR); Datil Mts, 8500 ft (2591 m), 10 Jul 1976. Fletcher, R. 570 (UNM); Mogollon Mts. in the vicinity of Mogollon & Whitewater Baldy, 10200 ft (3109 m), 22 Aug 1968. Hess, W. 2260 (NMC); Apache National Forest, 18 Aug 1960. Laney, V.F. 8 (UNM); 47 mi E of Mogollon, 7 Sep 1936. Parker, K.W. 890 (NMCR); Elk Mt., 21 Jun 1952. Roller, J.W. 2824 (UNM); 7 miles west of Datil, 7550 ft (2301 m), 27 Jun 1986. Spellenberg, R. 8513 (NMC); 14 miles east of Mogollon, 8800 ft (2682 m), 22 Jul 1986. Spellenberg, R. 8567 (NMC); 30 meters inside New Mexico/Arizona boarder along U.S. Hwy. 180, 8600 ft (2621 m), 23 Jul 1986. Spellenberg, R. 8576 (NMC); between Luna and the state line on hwy US 180, 14 Aug 1973, Spellenberg, R. & M. 3479 (NMC); 12 Jul 1906. Wooton, E.O. s.n. (NMC). **Cibola County**: Mt. Taylor, 8800 ft (2682 m), 9 Jul 1932. Castetter, E.F. 2816, 2817, 1820 (UNM); west of Mt. Taylor, 22 Aug 1965. Barnett, L. 19 (UNM); Elkins Ranch, Mt. Taylor, 27 Jul 1952. Castetter, E.F. 8012 (NMC); La Mosca Peak, Mt. Taylor, 27 Jul 1952. Castetter, E.F. 8035 (NMC); 7050 ft (2149 m), 20 Jun 1986. DeBruin, E. 296 (UNM); Big Water Canyon, Cibola National Forest, 8500 ft (2591 m), 13 Jul 1981, McCallum, A. 1162 (UNM); Zuni Mts., Agua Fria, 16 miles west of Grants, 8000 ft (2438 m), 22 Aug 1963. Goodrow, K.K. 762, 825 (UNM); Water Canyon, Mt. Taylor, 26 Jun 1960. Osborn, N. 169 (UNM); Lobo Canyon, Mt. Taylor, 8100 ft (2469 m), 15 Jul 1960. Osborn, N. 235, 251 (UNM); south face of La Mosca Peak, Mt. Taylor, 10800 ft (3292 m), 22 Jul 1967. Osborn, N. 419 (UNM); summit of Mt. Taylor, 11389 ft (3500 m), 23 Jul 1960. Osborn, N. 432 (UNM); upper Lobo Canyon, Mt. Taylor, 8500 ft (2591 m), 24 Aug 1960. Osborn, N. 571 (UNM); Zuni Mts., Mount Sedgwick, 9000 ft (2743.2 m), 19 Jul 1968. Riffle, N.L. (UNM); La Mosca Peak, Mt. Taylor, 27 Jul 1952. Roller, J.W. 2812, 2821, 2823 (UNM). **Colfax County**: York Canyon, 7611 ft (2320 m), 18 Jun 1979, Alfonso 122 (UNM). **Grant County**: Hwy 180, mile marker 145, 25 Jul 1984. Miera, J.P. 8 (NMCR). **Lincoln County**: Sierra Blanca ski area, 1 Sep 1980. Allred, Kelly W. 1816 (NMCR); Lincoln National Forest, 2 Sep 1983. Allred, Kelly W. 2566 (NMCR); Sierra Blanca ski area, trail to Buck Mt, 10,000 ft (3048 m), 2 Aug 1985. Allred, Kelly W. 2973 (NMCR); Lincoln National Forest, Loma Grande, Sep 1925. Castetter, E.F. 2815 (UNM); Monjeau Lookout, Sierra Blanca, 17 Aug 1952. Castetter, E.F. 8226, 8227 (NMC); White Mts, 11,000 ft (3353 m), 19 Aug 1959. Harrington s.n. (UNM); picnic area 1 mile south of Monjeau Lookout, 9000 ft (2743 m), 25 Jul 1970. Hutchins, B. 3160 (UNM); Sierra Blanca ski lodge, 9680 ft (2950 m), 18 Jul 1971. Hutchins, B. 3501 (UNM); Monjeau Campground, 10 Sep 1983. Phillips, J.C. 39 (NMCR); Sierra Blanca, north of ski area, 10,000 ft (3048 m), 22 Aug 1976. Spellenberg, R. 4459 (NMC); Capitan Mt near summit, 9844 ft (3000 m), 1 Aug 1976. Wagner, W.L. 2231, 2232 (UNM); White Mt Peak, 6 Jul 1895. Wooton, E.O. s.n. (NMC); White Mt Peak, 10,000 ft (3048 m), 16 Jul 1897. Wooton, E.O. 354 (NMC); White Mts, 7400 ft (2256 m), 25 Aug 1907. Wooton, E.O. 3567 (NMC). **McKinley County**: Whiskey Lake, Chuska Range, 8600 ft (2621 m), 21 Jul 1935. Carter, C.B. 8205 (NMC); McGaffey, 3 Jul 1953. Castetter, E.F. 8657 (NMC, UNM); Crazy Woman Canyon east of Gallup, 7200 ft (2195 m), 12 Jun 1994. Hevron, B. 2189 (UNM); Tohatchi farm, 8100 ft (2469 m), 27 Feb 1935. Love, L.D. 1 (NMC). **Mora County**: Pecos Wilderness, Sangre de Cristo Mts, north end of Hamilton Mesa, 10,000 ft (3048 m), 29 Jul 1997. Allred, Kelly W. 6820, 6821, 6822, 6823, 6824, 6825, 6826 (NMCR); Pecos Wilderness, Sangre de Cristo Mts, east slopes of Round Mountain, 10,000 ft (3048 m), 31 Jul 1997. Allred, Kelly W. 6964, 6965, 6966, 6967 (NMCR); 100 meters from Pecos River, 9460 ft (2883 m), Jul 1982. Andrews, T. 219 (UNM); Coyote Creek, 10 miles from Rainsville, 7700 ft (2347 m), 2 Sep 1941. Bridges, J.O. 2285 (NMCR); Beattys Cabin, 9000 ft (2743 m), 8 Aug 1908. Standley, P.C. 4857 (NMC). La Cueva Ranch, near Rainsville, 29 Sep 1954. Williams, E. s.n. (UNM). **Otero County**: White Mts, Mescalero Indian Reservation along hwy 70, 7500 ft (2286 m), 18 Sep 1993. Allred, Kelly W. 6070 (NMCR). **Rio Arriba County**: Hopewell Lake, Carson National Forest, 9200 ft (2804 m), 10 Aug 1983. Allred, Kelly W. 2504 (NMCR); Carson National Forest, Laguna Larga, 9000 ft (2743 m), 11 Aug 1983. Allred, Kelly W. 2522 (NMCR); near Chino Lake, 8900 ft (2713 m), 7 Aug 1986. Allred, Kelly W. 4084 (NMCR); near Hopewell Lake, 9185 ft (2800 m), 17 Aug 1987. Anderson, David Lee 4343 (NMCR); Carson Forest, Sep, Baum, D.N. 11-26 (UNM); Carson National Forest, upper Conjilon Creek, 22 Aug 1940. Bridges, J.O. 2142 (NMCR); Carson National Forest, upper El Rito Creek, 8500 ft (2591 m), 22 Aug 1940. Bridges, J.O. 2145 (NMCR); Cano Canyon, 10.5 miles northeast of Canjilon, 9200 ft (2804 m), 7 Aug 1963. Goodrow, K.K. 458 (UNM); 7 miles west of Tres Piedras, 9200 ft (2804 m), 12 Jul 1963. Goodrow, K.K. 490 (UNM); between Canjilon & Placitas, 7500 ft (2286

m). 14 Aug 1963. Goodrow, K.K. 630 (UNM); Jiarita Mesa. 8500 ft (2591 m). 8 Feb 1963. Goodrow, K.K. 428, 432, 444 (UNM); trail to Canones Creek. 26 Jul 1964. Tatschl, A. s.n. (UNM); 9 Sep 1960. Valdez, J.B. 2-10 (UNM). **San Juan County:** Whiskey Lake. Chuska Mts. 23 Jul 1935. Carter, C.B. s.n. (NMC). **San Miguel County:** Elk Mt. 1963. Ellis, A. 13 (UNM); 8100 ft (2469 m). 11 Sep 1960. Garner, A.J. 16 (UNM); Winsor's Ranch. 8400 ft (2560 m). 3 Jul 1908. Standley, P.C. 4143 (NMC). **Sandoval County:** Jemez Mts. about 3 miles west of Berlandier National Monument boundary. 11 Aug 1983. Allred, Kelly W. 2541 (NMCR); Baca Ranch. Redondo Peak. 8800 ft (2682 m). 7 Sep 1963. Osborn, N. 1389 (UNM); Bandelier National Monument. 10 Aug 1983. Salazar, R.A. 55 (NMCR). **Sierra County:** San Andres. Salinas Peak. 8950 ft (2700 m). Aug 1997. Anderson, David Lee 7136 (NMCR); along Fisherman's Canyon trail. 8400 ft (2560 m). 16 Jun 1994. Roalson, E.H. 884 (NMCR). **Socorro County:** top of Mt. Withington. 11 Jul 1952. Castetter, E.F. 2822 (NMC.UNM); La Mosca Peak. Mt Taylor. 27 Jul 1952. Castetter, E.F. 8021, 8036, 8038, 8043, 8046, 8355 (NMC); Elk Mt. 10 Aug 1952. Castetter, E.F. 8232 (NMC); South Baldy Peak. Magdalena Mts. 10,000 ft (3048 m). 25 Jul 1982. McIntosh 1048 (UNM); Mogollon Mts. on or near the west fork of the Gila River. 10,500 ft (3200 m). 15 Aug 1903. Metcalfe, O.B. 521 (NMC); Magdalena Mts. South Baldy. 10,500 ft (3200 m). 23 Jul 1976. Willson, J.M. 4257 (NMC); vicinity of Water Canyon. Magdalena Mts. 9200 ft (2804 m). 27 Jul 1973. Hutchins, B. 4540, 4744 (UNM); Magdalena Mts. 9000 ft (2700 m). 20 Jul 1997. Worthington, Richard D. 26903 (NMCR.UTEP). **Taos County:** about 3 mi s of Tres Piedras. 11 Aug 1983. Allred, Kelly W. 2528 (NMCR); 1.5 mi north of Red River. 9320 ft (2841 m). 4 Jul 1979. Baker, W.L. 1206 (NMC); 0.5 mi south of Angostura. 9040 ft (2755 m). 10 Aug 1979. Baker, W.L. 1209 (NMC); Costilla Canyon. Sangre de Cristo Range. 18 Jul 1953. Castetter, E.F. 8769, 8771 (NMC); 15 miles northwest of Mora. 20 Jul 1966. Robinson 34 (UNM); Valle Vidal Basin. 9470 ft (2886 m). 23 Jul 1983. Williams, J. 14 (UNM). **Torrance County:** Manzano Mts. along road to Capilla Peak. 8500 ft (2591 m). 21 Aug 1995. Allred, Kelly W. 6296 (NMCR); Manzano Mts. along crest near Manzano Peak. 9900 ft (3018 m). 18 Aug 1962. Bedker, E.J. 688, 702, 707 (UNM); Manzano Mts. along crest at head of Trigo Canyon. 8800 ft (2682 m). 2 Sep 1963. Bedker, E.J. 1526 (UNM).

Festuca arundinacea: **Chaves County:** wetland along Penasco River. 5 May 1994. Roalson, E.H. s.n. (NMCR). **Colfax County:** Salyer's Canyon. 15 Jun 1981. [no collector] 603 (UNM). **Dona Ana County:** New Mexico State University. north end of Corbett Center. 4000 ft (1200 m). 22 Apr 1979. Garcia, J. 21 (NMCR); cultivated on College Farm. 23 May 1893. Wooton, E.O. 1031 (NMC). **Grant County:** Lake Roberts. 1 Jun 1987. Allred, Kelly W. 4419 (NMCR). **Lincoln County:** Sierra Blanca. 24 Jun 1973. Higgins, L.C. 7444 (NMC); south fork of Eagle Creek. 7480 ft (2280 m). 29 Jun 1960. Hutchins, B. 2078, 2080 (UNM); Fort Stanton. 31 Aug 1980. Lebgue 367 (NMCR); Circle Bar West Ranch. 5300 ft (1615 m). 12 Aug 1994. McClenahan, Dianne 157 (NMCR); Fort Stanton. next to Bonito Creek. 3 Oct 1981. Rundell, L. 33 (NMCR); along Rio Ruidoso. vicinity of Fox cave. 5905 ft (1800 m). 7 Jun 1977. Wagner, W.L. 3106 (UNM). **McKinley County:** McKinley Coal Mine. introduced in depressed area where rain water collects.. 7000 ft (2133.6 m). 15 Jun 1974. Wagner, W. 154 (UNM); McKinley Coal Mine. mine spoils. 7000 ft (2100 m). 8 Mar 1974. Wagner, W. 275 (UNM). **Otero County:** between Mayhill and Weed. 6900 ft (2103 m). 29 Jun 1952. Dunn, D.B. 8210 (UNM). **San Juan County:** Farmington. in lawn. 4 Jun 1990. Allred, Kelly W. 5057 (NMCR); 4 miles north of La Plata 6000 ft (1829 m). 11 Aug 1981. Spellenberg, R. 6148 (NMC); 6.6 miles south of Waterflow on the Navajo Mine. 5 Jun 1985. Spellenberg, R. 8223 (NMC). **San Miguel County:** along Winsor Creek. Cowles. 8500 ft (2591 m). 8 Sep 1954. Castetter, E.F. 9423 (UNM); Pecos National Historic Park. 6800 ft (2073 m). 27 Jun 1993. Sivinski, R. 2302 (UNM). **Sandoval County:** about 4 miles north of San Ysidro along Rio Guadalupe. 28 Apr 1989. Allred, Kelly W. 4928 (NMCR); Bandelier National Monument. Frijoles Falls trail. at edge of Frijoles Creek. 8 Jun 1983. Salazar, R.A. 15 (NMCR). **Sierra County:** Percha Creek. 5000 ft (1524 m). 3 Jun 1993. McIntosh, L. 2733 (NMC). **Socorro County:** Bosque del Apache Wildlife Refuge. 30 Jun 1958. Fleetwood, R.J. 855 (UNM). **Taos County:** Arroyo Hondo. irrigated improved pasture. 7000 ft (2134 m). Jul 79. Warren, A. s.n. (NMCR).

Festuca arvernensis: **Dona Ana County:** New Mexico State University. 4000 ft (1200 m). 30 Apr 1998. Allred, Kelly W. 7082 (NMCR); New Mexico State University. 3890 ft (1200 m). 19 Mar 1998. Forbes, Adam C. 236 (NMCR). **Santa Fe County:** Santa Fe. landscape plant on the Capitol grounds [observed by Allred].

Festuca brachyphylla subsp. **coloradensis:** **Mora County:** Sangre de Cristo Mts. Pecos Wilderness. Pecos Baldy Lake. 11,500 ft (3505 m). 30 Jul 1997. Allred, Kelly W. 6871 (NMCR); Sangre de Cristo Mts. Pecos Wilderness Trailriders Wall. 12,000 ft (3658 m). 30 Jul 1997. Allred, Kelly W. 6899, 6902 (NMCR); saddle near Barbara Peak. 12382 ft (3800 m). Jul 1982. Andrews, T. 242 (UNM). **Rio Arriba County:** northwest side of Santa Barbara Peak. 12440 ft (3800 m). 8 Jun 1985. Fletcher, R. 8388 (UNM). **San Miguel County:** Pecos Wilderness. between Terrero Mine and summit of Elk Mt. 19 Aug 1984. Hill, S.R. 15346 (NMCR); Summit of Elk Mt. 11500 ft (3500 m). 29 Jun 2000. Allred, K.W. 7830 (NMCR). **Sandoval County:** Baca Land & Cattle Co., San Luis Creek. 11,175 ft (3400 m). 1 Jul 1975. Ludwig, J. 1360 (NMC). **Taos County:** Goose Lake. below Gold Hill. 11,500 ft (3500 m). 13 Aug 1955. Castetter, E.F. 9894 (UNM); Carson National Forest. Sep 1960. Engstrom 15 (UNM); Latir Mesa. 12,200 ft (3700 m). 1 Aug 1979. Fletcher, R. 4006 (UNM); Gold Hill. 12,300 ft (3700 m). 1 Sep 1954. Hoff & Everett 9758 (UNM); Wheeler Peak. 12,500 ft (3800 m). 7 Aug 1967. Mackay, H. 333 (UNM); Pot Creek and Wheeler Peak collection. Osborn, N. 831 (UNM); Sangre de Cristo Mts. Carson National Forest. Bull of the Woods trail. July 1989. Warren, A. s.n. (NMCR); Carson National Forest. Lobo Peak area above and south of Goose Lake. 12,500 ft. July 1990. Warren, A. s.n. (NMCR).

Festuca calligera: **Lincoln County:** White Mountains. north of Sierra Blanca Ski Lodge. 9 Oct 1987. Allred, Kelly W. 4666, 4669 (NMCR); Sierra Blanca. 9500 ft (2900 m). 8 Jul 1997. Allred, Kelly W. 6725 (NMCR); north slope of White Mt. 20 Aug 1930. USDA Forest Service 10 (NMCR). **Otero County:** Sacramento Mountains. Boy Scout Camp Wehinahpay. about 8 air miles west of Sacramento. 8500 ft (2600 m). 8 Jun 1995. Allred, Kelly W. 7102 (NMCR). **Rio Arriba County:** Hopewell Lake. 6 Jul 1981. Fisher, L. 7 (NMCR).

Festuca earlei: **Lincoln County:** Sierra Blanca ski area. 10,000 ft (3000 m). 6 Feb 1977. Haggren, W. & P. Knight 50 (UNM); White Mts. 11,200 ft (3400 m). 19 Aug 1969. Hutchins, R. 2506 (UNM). **Mora County:** Barbara Peak. July 1982. Andrews, T. 177, 242 (UNM); Pecos Baldy Lake. 12,000 ft (3700 m). 8 Sep 1954. Castetter, E.F. 9427 (UNM); Pecos Baldy Lake. 12,000 ft (3700 m). 9 Aug 1954. Castetter, E.F. 9703, 9704, 9705 (UNM). **Rio Arriba County:** Truchas Peak. 12500 ft (3800 m). 8 Aug 1908. Standley, P.C. 4833 (NMC). **Sandoval County:** Valles Caldera Preserve. R.L. Hartman 71296 (NMCR). **San Miguel County:** top of Las Vegas Range. 11,000 ft (3400 m). Cockerell, T.D.A. s.n. (NMC); Elk Mt. 1963. Ellis, A. 27 (UNM); west Penuelo Ranger Station. 29 Aug 1937. Hare, O.A. 1234 (NMCR); Santa Fe National Forest. 14 Sep 1960. Hill, A. 10 (UNM); between Terrero Mine and summit of Elk Mt. 19 Aug 1984. Hill, S.R. 15297, 15300 (NMCR); upper Pecos River. 3 Aug 1898. Maltby & Cahill 137 (NMC); Glorieta Mesa. Perry, J.L. 14 (UNM). **Taos County:** Goose Lake. below Gold Hill. 11,500 ft (3500 m). 13 Aug 1955. Castetter, E.F. 9849, 9898, 9903 (UNM); Twining Canyon. south of Wheeler Peak. 9950 ft (3000 m). 8 Jul 1949. Gordon, S. & K. Norris 293 (UNM); Frazier Mt. 12100 ft (3700 m). 7 Sep 1966. Robinson, J.L. 3 (UNM); Rita de la Olla. 10,000 ft (3000 m). 19 Jul 1979. Soreng, R. 349 (NMC); Lobo Peak area above and south of Goose Lake. 12,500 ft (3800 m). July 1990. Warren, A. s.n. (NMCR).

Festuca idahoensis: **Rio Arriba County:** Placer Creek. 10,100 ft (3078.48 m). 28 Jul 1967. Gierisch, Ralph K. 3148 (UNM). **Santa Fe County:** Big Tesuque campground off Hyde Park. 15 Aug 1978. Soreng, Rob 15 (NMC). **Taos County:** Bobcat Pass. along hwy 38 at Colfax County line. 9500 ft (2896 m). 20 Jun 1989. Allred, Kelly W. 4980, 4982 (NMCR); Valle Vidal. Jul 1983. Williams, J. 33, 35, 43, 52 (UNM); **Festuca minutiflora:** **Mora County:** Pecos Wilderness. Sangre de Cristo Mts. Trailriders Wall. 12,000 ft (3658 m). 30 Jul 1997. Allred, Kelly W. 6903 (NMCR). **Rio Arriba County:** North Truchas Peak. 12,000 ft. 4 Jul 1986. Argus, G.W. 12404 (CAN: as reported in Argus & Aiken 1987). **Santa Fe County:** Pecos Baldy Lake. Jul 1938. Bridges, J.O. 1413

(NMCR); Pecos Wilderness, Lake Katherine, 11700 ft (3566 m), 20 Jul 1988, McSweeney, A.M. 45 (NMCR). **Taos County:** Wheeler Peak, 12,500 ft (3800 m), 7 Aug 1967, Mackay, H. 331 (UNM).

Festuca pratensis: **Colfax County:** about 8 mi e of Eagles Nest, 7900 ft (2408 m), 20 Jun 1989, Allred, Kelly W. 4973 (NMCR); along hwy 72 10 miles east of Yankee. 2 Jul 1973, Higgins, L.C. 7491 (NMC); north of Raton City Park, 6900 ft (2103 m), 29 Jul 1979, Soreng, R. 378 (NMC). **Dona Ana County:** Mesilla Valley, 3850 ft (1173 m), 25 Jul 1907, Wootton, E.O. 3303 (NMC). **Lincoln County:** Lincoln National Forest, 2 Sep 1983, Allred, Kelly W. 2551 (NMCR). **Otero County:** 4 mi e of Cloudcroft, 9000 ft (2743 m), 25 Sep 1938. [no collector] (NMCR). **San Miguel County:** Hermits Peak near Las Vegas, 27 Jun 1936, Nisbet, G. s.n. (UNM); Las Vegas, 12 Jul 1936, Nisbet, G. 8232 (UNM); Harvey's upper ranch, Pecos River National Forest, 9600 ft (3000 m), 1 Aug 1908, Standley, P.C. 4639 (NMC). **Santa Fe County:** Santa Fe Ski Basin near parking area, 10,300 ft (3139 m), 15 Aug 1978, Soreng, R. 18 (NMC).

Festuca rubra: **Colfax County:** Black Lake, [fide R. Soreng]. **Dona Ana County:** plant brought in by County Agent, in lawn mixture, Oct 1990 (NMCR). **Lincoln County:** Sierra Blanca, Lookout Peak, 3450 m, 29 Jul 1923, Eggleston, W.W. 18797 (US). **McKinley County:** Mexican Springs, 26 Jun 1935, Babcock, E.B. 14325 (TAES). **Otero County:** meadow north of White Mt peak, 11,1000 ft, 1 Jul 1969, Hutchins, C. 2179 (UNM); north side of Sierra Blanca, glacial cirque, 11,000 ft, 1 Jul 1969, Worthington 6349 (UTEP). **Santa Fe County:** Big Tesuque campground, 10,000 ft (3000 m), 15 Aug 1978, Soreng, R. 43 (NMC). **San Miguel County:** Pecos National Historic Park, Glorieta Creek, 7250 ft (2200 m), 14 Jul 1993, Sivinski, R. 2388 (UNM). **Taos County:** Costilla Canyon, 18 Jul 1953, Castetter, E.F. 2808 (UNM); Costilla Valley, Bartlett's Ranch, 10,000 ft, 6 Sep 1913, Wootton, E.O. 7159 (US).

Festuca saximontana: **Colfax County:** canyon north of Raton City Park, 6900 ft (2100 m), 21 Jul 1979, Soreng, R. 381 (NMC). **Grant County:** Gila National Forest, 7000 ft (2134 m), 16 Jul 1992, Boucher, P. 991 (For. Serv. Herbarium). **Los Alamos County:** 7500 ft (2300 m), 21 Jun 1979, Tierney & Foxx 576 (UNM). **Mora County:** Sangre de Cristo Mts, Pecos Baldy Lake, 11,500 ft (3505 m), 30 Jul 1997, Allred, Kelly W. 6870, 6872, 6873 (NMCR); Sangre de Cristo Mts, Pecos Wilderness, Trailriders Wall, 12,000 ft (3658 m), 30 Jul 1997, Allred, Kelly W. 6897, 6906 (NMCR), near Pecos River, 9380 ft (2900 m), Jul 1982, Andrews, T. 242 (UNM). **San Miguel County:** Winsor's Ranch, 8400 ft (2600 m), 2 Jul 1908, Standley, P.C. 4119 (NMC); Harvey's upper ranch, 9600 ft (2900 m), 1 Aug 1908, Standley, P.C. 4736 (NMC); Elk Mt, summit, 11500 ft (3500 m), 29 Jun 2000, Allred, K.W. 7823 (NMCR). **Sandoval County:** Redondo Peak, 9 Oct 1963, Osborn, N. 1835 (UNM); Valle Grande, 8500 ft (2600 m), 1978, Wall, H. s.n. (UNM). **Taos County:** Sangre de Cristo Mts, Greenie Peak, 10 Aug 1983, Allred, Kelly W. 2482, 2493 (NMCR); Sangre de Cristo Mts, Costilla Creek, 8500 ft (2600 m), 15 Aug 1973, Holmgren, N.H. 7182 (UNM). **Bernalillo County:** Sandia Crest, Sandia Mts., 10,000 ft (3048 m), 3 Aug 1952, Castetter, E.F. 2807 (UNM); Kiwanis Meadow, Sandia Mts., 10400 ft (3170 m), 23 Sep 1982, Dunbar, T. 278 (UNM); Sandia Mts, Tree Springs, 8900 ft (2700 m), 14 Aug 1978, Soreng, R. 7 (NMC); Sandia Mts, on road to crest, 9800 ft (3000 m), 25 Jul 1984, Spellenberg, R. 7816 (NMC).

Festuca sororia: **Catron County:** 15 miles east of Mogollon, 7 Sep 1936, Parker, K.W. 902 (NMCR). **Grant County:** Hillsboro Peak, 10,000 ft (3000 m), 28 Aug 1904, Metcalfe, O.B. 1236 (NMC); near Mimbres Lake, 9600 ft (2900 m), 13 Aug 1978, Moir, W.H. 17 (NMC). **Lincoln County:** Sierra Blanca Ski Area, 1 Sep 1980, Allred, Kelly W. 1821 (NMCR); Sierra Blanca Ski Area, 2 Aug 1985, Allred, Kelly W. 2974 (NMCR); north of Sierra Blanca Ski Lodge, 10,400 ft (3000 m), 9 Oct 1987, Allred, Kelly W. 4665 (NMCR); Sierra Blanca, north of ski area, 10,000 ft (3000 m), 22 Aug 1976, Spellenberg, R.S. 4460 (NMC). **Los Alamos County:** Pajarito Mt., 8000 ft (2438 m), 21 Aug 1979, Hitchcock, M. 644 (UNM). **Rio Arriba County:** Vega Redondo Trail east of Vega Redondo, 21 Aug 1965, Fleck, A. s.n. (UNM); San Pedro Mts, Rito de las Palomas, 9300 ft (2800 m), 8 May 1973, Moir, W.H. 175 (NMC). **San Miguel County:** Upper Gallinas Canyon, near Las Vegas, 9 Aug 1936, Nisbet, G. 8202 (UNM). **Sierra County:** along stream about 1 air

mile north of Diamond Peak, 8800 ft (2682 m), 23 Jul 1994, Roalson, E.H. 958 (NMCR). **Socorro County:** Magdalena Mts, 9400 ft (2900 m), 10 Aug 1988, Peterson, Roger S. 88-127 (NMCR); San Meteo Mts, Bear Trap Canyon, 9000 ft (2743 m), 30 Aug 1975, Wagner, W. 1324 (UNM). **Taos County:** north side of Wheeler Peak, about 1.5 mi south of Red River, 9900 ft (3000 m), 20 Jul 1979, Soreng, R. 372 (NMC).

Festuca thurberi: **Bernalillo County:** Kiwanis Meadow, Sandia Mts, 10,400 ft (3170 m), 2 Aug 1982, Dunbar, T. 170 (UNM). **Cibola County:** La Mosca Peak, Mt. Taylor, 27 Jul 1952, Castetter, E.F. 2812 (UNM); summit of Mt. Taylor, 18 Jul 1959, Martin, C.W. 3385 (UNM); Water Creek, Mt. Taylor, 16 Jun 1960, Osborn, N. 48 (UNM); Mt. Taylor, Osborn, N. 169, 175, 399, 401, 404, 432, 437, 441, 589 (UNM); La Mosca lookout, Mt. Taylor, 10,500 ft (3200 m), 27 Jul 1952, Roller, J.W. 2826 (UNM). **Colfax County:** Valle Vidal, 10600 ft (3231 m), 28 Jul 1982, Fletcher, R. 6330 (UNM). **Lincoln County:** Sierra Blanca Ski Area, 10,000 ft (3048 m), Allred, Kelly W. 2972, 4671, 6726 (NMCR); Sierra Blanca Ski Area, 9800 ft (2987 m), 1 Oct 1977, Haggren, W. 503 (UNM); White Mts., 10,000 ft (3048 m), 28 Jun 1970, Hutchins, B. 3060 (UNM); in the White Mts., 11400 ft (3475 m), 26 Jul 1970, Hutchins, B. 3177 (UNM); Sierra Blanca Ski Area, 10,000 ft (3048 m), 8 Jul 1977, Knight, P. 192 (UNM); Sierra Blanca Ski Area, 10,700 ft (3261 m), 10 Jul 1977, Manthey, T. 676 (UNM); north of Ski Area, 10,000 ft (3048 m), 22 Aug 1976, Spellenberg, R. 4457 (UNM). **Los Alamos County:** Pararito Mtn, 21 Aug 1979, [no collector] 641 (UNM); upper Frijoles Meadow, 9600 ft (2926 m), 7 Jul 1982, Dunbar, T. 62, 70 (UNM). **Mora County:** Jemez Range, 11,200 ft (3414 m), 9 Aug 1931, [no collector] 2827 (UNM); Pecos Baldy Lake, 12,000 ft (3700 m), 9 Aug 1954, Castetter, E.F. 9702 (UNM); Pecos Wilderness, Beatty's Cabin, 9000 ft (2700 m), 8 Aug 1908, Standley, P.C. 4858 (NMC); Pecos Wilderness Area, 10,000 ft (3048 m), 20 Oct 1960, Weinl, s.n. (UNM). **Rio Arriba County:** Carson Forest, 4 Aug 1960, Eby, J.W. 29 (UNM); San Pedro Mts, 10 Jul 1965, Fleck, A. s.n. (UNM); west of American Peak, 27 Jun 1965, Fleck, A. s.n. (UNM); small meadow on Paleo Creek, San Pedro Mts, 18 Jul 1964, Fleck, A. s.n. (UNM); Vega Redondo, San Pedro Parks Wild Area, 9900 ft (3018 m), 25 Jul 1964, Fleck, A. s.n. (UNM); Cano Canyon, 10.5 mi ne of Canjilon, 9200 ft (2800 m), 8 Jul 1963, Goodrow, K.K. 462 (UNM). **San Miguel County:** 5 miles north of Cowles, Jul 1939, Bridges, J.O. 1364, 1378 (NMCR); Pecos Baldy Lake, 1938, Bridges, J.O. 1384, 1408 (NMCR); Santa Fe National Forest, 14 Aug 1960, Hill, A. 12 (UNM); Pecos Wilderness, between Terrero Mine and summit of Elk Mt, 10,900 ft (3322 m), 19 Aug 1984, Hill, S.R. 15247, 15283 (NMCR); Elk Mt, 11,000 ft (3353 m), 23 Sep 1960, Richards, M.E. 35 (UNM). **Sandoval County:** Jemez Mts, about 3 mi w of Berlandier National Monument boundary, 11 Aug 1983, Allred, Kelly W. 2540, 2545 (NMCR); Baca Land & Cattle Co. San Antonio Mt, 9700 ft (3000 m), 1 Jul 1975, Ludwig, J. 1261 (UNM); slopes of Redondo Peak, 10,000 ft (3048 m), Jun-Jul 1963, Osborn, N. 1314, 1427, 1498, 1637, 2328 (UNM); Johnson Mesa, 22 Sep 1960, Prichard, L.A. 19 (UNM). **Taos County:** Frazer Mt, 11,800 ft (3597 m), 4 Aug 1980, Fletcher, R. 4605 (UNM); near Bernadine Lake, 9 Jul 1961, Potter, L.D. 540 (UNM).

Festuca trachyphylla: **Rio Arriba County:** New Mexico/Colorado state line along hwy 17 about 8 miles north of Chama, 9200 ft (2804.16 m), 21 Jun 1989, Allred, Kelly W. 4983, 4987, 4990 (NMCR); about 6 miles north of Chama, 8900 ft (2700 m), 21 Jun 1989, Allred, Kelly W. 4994 (NMCR). **Sandoval County:** Jemez Mts, 8700 ft (2700 m), 17 May 1989, Allred, Kelly W. 4945 (NMCR); about 3 miles west of La Cueva, 8500 ft (2590.8 m), 29 May 1997, Allred, Kelly W. 6518 (NMCR). **San Miguel County:** Elk Mt, about 2 miles down from the summit, 11000 ft (3400 m), 29 Jun 2000, Allred, K.W. 7846 (NMCR). **Taos County:** Bobcat Pass, 9500 ft (2895.6 m), 20 Jun 1989, Allred, Kelly W. 4979, 4981 (NMCR); Costilla Canyon, 18 Jul 1953, Castetter, E.F. 8766 (NMCR).