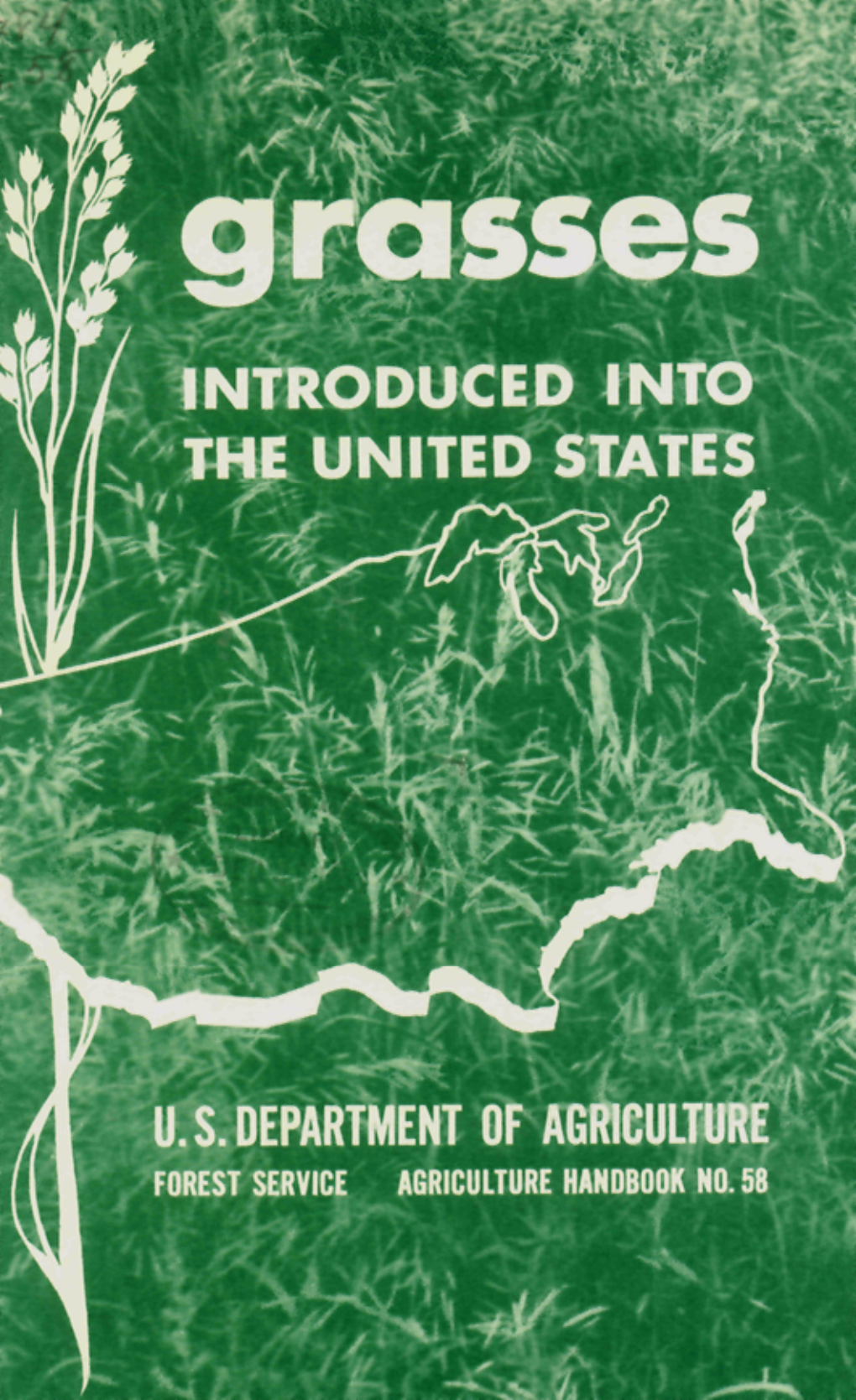
grasses

INTRODUCED INTO THE UNITED STATES



U. S. DEPARTMENT OF AGRICULTURE

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GRASSES INTRODUCED INTO THE UNITED STATES

(An annotated list with bibliography)

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Introduced grasses are becoming of ever-increasing importance in pasture, range, and associated soil-management practices. This publication attempts to list, in many cases with notes on origin, distribution, characteristics, and usage, all the species of demonstrated economic value as well as those now believed promising. In addition, a considerable number of species are included which are recorded merely as "on ballast" (accidental introductions) or which, at present, can be considered only as weeds.

Although many species that are confined to experimental grass nurseries are listed, no pretension is made to completeness on this score. Many ephemeral introductions have been omitted. On the other hand, some important selections and hybrids are included although not introduced in the strict sense. Only passing mention has been accorded the common cereals wheat, rye, oats, barley, corn, and rice.

Rather than prepare several lists according to type of usage, degree of importance, or habit of growth, it was thought preferable to have only one list in which entries are made alphabetically by scientific name. In setting up this list, an effort has been made to clarify nomenclatural confusion.

It is believed that the bibliography (p. 57) will prove helpful, since it includes articles dealing with characteristics and uses of most of the species listed here. No attempt has been made to evaluate the individual entries critically; recommendations given are those of the original authors.

AEGILOPS CYLINDRICA Host — jointed goatgrass

Annual. Europe. Widely distributed in United States. Found in wheatfields, pastures, and on abandoned farmland. Awns injurious to grazing animals. Joints contain 11.7 percent protein and, when maturing together with wheat, can be separated therefrom for stock feed.

[1] Grateful acknowledgment is made of the generous assistance given by the following persons in the compilation of this paper: William A. Dayton, A. C. Hull, Jr., Richard M. Hurd, and Elbert H. Reid of the Forest Service; Miss Frances J. Flick of the Department of Agriculture Library; Jason R. Swallen and Mrs. Agnes Chase of the Smithsonian Institution; Mason A. Hein and Mrs. Thelma H. Conway of the Bureau of Plant Industry, Soils, and Agricultural Engineering; A. L. Hafenrichter and James E. Smith, Jr., of the Soil Conservation Service.

AEGILOPS OVATA L. ———

Europe. Virginia and California. Obnoxious weed; awns injurious to animals.

AEGILOPS TRIUNCIALIS L. **barb goatgrass**

Annual. Europe. Pennsylvania, California. Troublesome weed in wheatfields and on foothill rangeland. Avoided by cattle; it is claimed by some that the awns are injurious while others report that cattle can eat the plant with no ill effects.

AELUROPUS LITTORALIS (Gouan) Parl. **Mediterranean saltgrass**

Mediterranean region. Introduced 1913; reintroduced 1924, 1930; more recently cultivated at Tucson, Ariz., and State College, N. Mex. Spreads rapidly by stolons and forms abundant seed; produces high-quality hay; more palatable than the native saltgrasses (*Distichlis* spp.). Promising for reseeding on alkaline adobe soils with a high water table and for forage, lawn grass, or erosion control.

AGROPYRON AMURENSE Drob. **Amur wheatgrass**

Russia. Two accessions, supposed to be *A. amurense*, have been introduced, Plant Introduction 131532, P. I. 135550. One of these was later identified as *A. semicostatum*. The other was tentatively identified as *A. intermedium*. Therefore, there is some question if there is any true *A. amurense* in the United States. Cultivated at experiment stations. Recommended for range reseeding in ponderosa pine and pinyon-juniper lands in Colorado, and on the better sagebrush-type land in Wyoming; poor growth on salt desert shrub-type land. Rated of secondary importance for soil conservation in Pacific Northwest.

AGROPYRON CANINUM (L.) Beauv. ———

Eurasia. Ballast near Portland, Oreg. Much confusion in name and identification of this species. Well adapted during average-rainfall years.

AGROPYRON CRISTATUM (L.) Gaertn. **crested wheatgrass**

Also called Fairway crested wheatgrass. Eastern Europe; western Asia; introduced from Siberia. To be distinguished from *A. desertorum* to which most so-called "crested wheatgrass," other than the Fairway strain, is properly assigned.

The Fairway strain, which is the commercial form of this species and the one commonly used in artificial reseeding, is characterized by bright green color and great uniformity; grows about 22 inches high. As compared to the Standard strain (*A. desertorum*) it is shorter, more leafy, smaller stemmed, smaller seeded, has more spreading spikelets and more pronounced awns. Cultivated for seed and hay in the Great Plains and western United States; hay highly palatable to sheep in Oregon. Said to reseed itself better under semiarid conditions; more resistant to root rot in the seedling stage than *A. desertorum*. Excellent results in reseeding trials in eastern Wyoming.

AGROPYRON DESERTORUM (Fisch.) Schult.

desert wheatgrass

Often called Standard crested wheatgrass to distinguish it from true crested wheatgrass (*A. cristatum*), with which it has been much confused. From a nomenclatural standpoint, most of the "crested wheatgrass" of seedsmen and agronomists belongs here. European Russia, Caucasus, western Siberia and central Asia. New York and North Dakota; widely cultivated in northern Great Plains. First introduced in 1898, but did not attract attention until reintroduction in 1915. As compared with the Fairway strain of crested wheatgrass (*A. cristatum*) it is much more variable as to size, leafiness, and head type, and is more extensively used in the United States. Now rated as one of the most successful of introduced grasses.

A variable bunchgrass with an extensive root system; thrives best with rainfall greater than 12 inches but does well on some sites with 8 inches or less of rainfall. Does not grow well on hard clays or coarse sands, is moderately tolerant of alkaline soil. Has long growing season but makes little growth during midsummer; resistant to drought, cold, and disease; competes better with cheatgrass (*Bromus tectorum*) when moisture supply is limited.

Reseeds itself well; seed easily harvested; germination high; seedlings develop slowly. Seedbed preparation necessary for successful stands, particularly where rainfall is less than 10 inches. Best cut for hay just prior to flowering. Used alone or in rotation with wheat for soil conservation and improvement; nutritious; palatable for sheep, especially in the spring. Properly utilized established stands have remained productive 10 to 15 years in the Pacific Northwest and much longer on the Great Plains.

Especially adapted to the northern Great Plains region and valleys and foothills of Rocky Mountains. More productive than any other perennial grass for dry grazing land in Montana. Valuable for regrassing abandoned croplands, depleted ranges, and burned-over land. Valuable for range reseeding and as a feed crop in drier areas of Wyoming; has been successfully grown in cooler parts of New Mexico, and the Texas Panhandle; does not withstand a succession of hot, dry seasons in the southern Great Plains. Tested for reseeding sagebrush, pine, and woodland ranges in northern New Mexico and Arizona, eastern Washington and Oregon, southern Idaho, Nevada, Utah, and Colorado, with promising results. Used occasionally for skid roads and logging landings in the Northwest. Well adapted to cheatgrass and weedy areas of Idaho, Utah, Nevada, and Montana and to saltgrass areas in Nevada and Utah. Most drought-resistant planted grass in Nevada, but needs irrigation in arid parts of the State.

Strains now being developed have larger, awnless seeds and are more uniform and vigorous. The observed variability of this grass is thought by some to be due to admixture of the commercially available seed with appreciable amounts of the Fairway strain and of Transbaikal wheatgrass (*A. michnoi*).

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rhizomatous crested wheatgrass

Taxonomic status uncertain. Believed by some to be derived from a single rhizomatous specimen of *A. desertorum* and by others to be

identical with *A. michnoi*. Rated as good in preliminary reseeding trials on both sagebrush and salt desert shrub types of land in Wyoming.

AGROPYRON DIVARICATUM Boiss. and Bal.
Turkish wheatgrass

Turkey. Cultivated at experiment stations. Drought-resistant and long-lived bunchgrass with poor seed habits; inferior to Standard crested wheatgrass (*A. desertorum*) and Russian wildrye (*Elymus junceus*).

AGROPYRON ELONGATUM (Host) Beauv. tall wheatgrass

Southern Europe and Asia Minor; introduced from Turkey; grows on saline meadows and seashores in its native habitat. Introduced in 1909; discarded as too aggressive at Utah in 1919; regarded favorably at Athens, Ga., in 1920, but largely ignored for a decade. A coarse, nonlodging, very late-maturing bunchgrass 2½ to 6 feet tall under cultivation. Cultivated for seed production in Intermountain and other regions; southern limit of adaptation unknown. Usually reported as resistant to cold and drought but killed in south-central Colorado at 7,600 to 10,000-foot elevations during the cold, dry winter of 1949–50. It makes excellent fall and spring recovery; remains green 3 to 6 weeks longer than most other grasses, including Standard crested wheatgrass (*A. desertorum*). Fairly palatable; useful as a forage plant because it gives green feed in dry summers. High yield of palatable hay for sheep in Oregon if cut before bloom.

Usually planted alone owing to its late summer growth. Four to five seasons required for full development; produces maximum crop for many years. Very salt-tolerant; high yields on subirrigated alkaline soils. Seed production excellent where growing season is long; does not mature seed at high elevations; seed large and easily threshed. Hybridizes with common and durum wheat and has been used in attempts to produce a perennial wheat.

Successfully used for conservation and erosion control; has been planted on abandoned, wind-eroded prairie in the Northwest where it provides supplementary summer pasturage. Recommended for range seedings on sagebrush and mountain lands in Idaho, Utah, Colorado, and Nevada. Has given poor to good results in seeding experiments in the ponderosa pine area in Colorado and northern New Mexico and Arizona, and has been suggested for trial on the sagebrush and cheatgrass (*Bromus tectorum*) ranges in northern Arizona and New Mexico; poor performance on dry sagebrush and salt desert shrub range in Wyoming.

AGROPYRON INTERMEDIUM (Host) Beauv.
intermediate wheatgrass

Central and southern Europe, Asia Minor, and the Caucasus to central Asia. Ballast at Camden, N. J. Introduced unsuccessfully in 1907 and 1920's; reintroduced in 1930's. Closely related to tall wheatgrass (*A. elongatum*) and pubescent wheatgrass (*A. trichophorum*). Three to four feet tall; resistant to lodging; moderately coarse; rhizomatous; sod-forming. Cultivated for seed production in the Intermountain and other regions, including higher elevations of the Southwest. Vigorous and easily established; spreads rapidly to give in

the first year a dense, leafy ground cover which is maintained during winter. Used for pasture, hay, and as a soil binder. Growth commences 4 to 5 weeks earlier than native grasses; late-maturing. Stays green longer in summer than Standard crested wheatgrass (*A. desertorum*); it is readily grazed when young; makes excellent hay when cut in early flowering.

Long-lived; resistant to disease and frost; drought resistance inferior to that of Standard crested wheatgrass but superior to that of smooth brome (*Bromus inermis*). Requires 15 inches average precipitation, good drainage, medium to high fertility. Good growth reported at elevations up to 10,000 feet in particular localities. Seed heavy, beardless, and easily threshed; production appears to vary widely with locality, but is generally high; seed commercially available; can be propagated by rhizomes. Hybridizes with common and durum wheat.

Suitable for erosion control on sand hills, waterways, and terrace channels; used with alfalfa for soil conservation in the Pacific Northwest where it is thought superior to smooth brome; promising for range reseeding; has been successful in Utah where summers are hot, dry, and windy and the soil bakes; has been suggested for seeding national forest areas in Montana, sagebrush, woodland, and mountain ranges of eastern Oregon and Washington, Wyoming, Colorado, Idaho and Utah, and northern Arizona and New Mexico. Heavy rust infestation reported in Texas.

AGROPYRON INTERMEDIUM × TRICHOPHORUM
Ree wheatgrass

Discovered and developed at South Dakota Agricultural Experiment Station. No superiority observed for this plant over either parent. Growth of established plants starts early in spring if moisture is favorable, continues during heat of summer, and is rapid during cool, moist weather of late summer. Drought- and frost-resistant; practically free from ergot; adaptable to wide range of soils; more alkali-tolerant than Standard crested wheatgrass (*A. desertorum*). Fairly readily established; rapid recovery after cutting; good seed production. Highly nutritious and palatable, being superior to smooth brome (*Bromus inermis*) in this respect. Best hay when harvested in early bloom stage.

AGROPYRON JUNCEUM (L.) Beauv. rushleaf wheatgrass

Europe. On ballast near Portland, Oreg., and on dunes, San Francisco, Calif. Has been tested for soil conservation use in the Pacific Northwest and found to be similar to pubescent wheatgrass (*A. trichophorum*) though not as drought-resistant.

AGROPYRON MICHNOI Roshev. Transbaikal wheatgrass

Mongolia and eastern Siberia. Grown at experiment stations and occasionally found mixed with *A. desertorum*. (See rhizomatous crested wheatgrass under *A. desertorum*.)

AGROPYRON MONGOLICUM Keng Mongolian wheatgrass

Asia. Related to Siberian wheatgrass (*A. sibiricum*); a plant of sturdy habit with very short awns. Cultivated at experiment stations.

AGROPYRON ORIENTALE (L.) Roem. & Schult.
Oriental wheatgrass

Annual. Asia Minor. Many introductions from 1903 to 1939. Cultivated at experiment stations; poor results at Pullman, Wash.; grew fairly well in Texas, but died out.

AGROPYRON PANORMITANUM Parl. ———

Mediterranean region; introduced from Turkey in 1937, grows in forested areas where native. Cultivated at Pullman, Wash. Coarse growth; 40 to 49 inches tall; moderately drought-resistant.

AGROPYRON POPOVII Drob. ———

Russia. Closely related taxonomically to pubescent wheatgrass (*A. trichophorum*), intermediate wheatgrass (*A. intermedium*), and tall wheatgrass (*A. elongatum*). Being tested at experiment stations. A late-maturing grass rated of secondary importance for soil conservation in Pacific Northwest.

AGROPYRON PUNGENS (Pers.) Roem. & Schult.
stiffleaf wheatgrass

Europe. Found in a few localities along Northeast and Northwest coasts. Most of the so-named material introduced for experimental purposes in 1924 is not identical with European material but is apparently a form of quackgrass (*A. repens*) although differing somewhat; only one introduction number (Plant Introduction 119604 from Turkey in 1937) grown at Logan, Utah, appears to be *A. pungens;* not established whether published reports on *A. pungens* refer to P. I. 119604 or not. More robust than quackgrass and maintains forage yields over a greater period of time; has stout rhizomes and is drought-resistant; forms a good ground cover; is a good soil binder and sod-former; easily established at some locations; does not lodge; has good seed habits; seeds do not shatter; is palatable and late-maturing. Promising on pinyon-juniper lands of western Colorado.

AGROPYRON RAMOSUM (Trin.) Richt. ———

Russia. Introduced unsuccessfully in 1906; reintroduced 1935. Cultivated at Pullman, Wash. Similar to quackgrass (*A. repens*); aggressive; rhizomatous; slender; 14 inches tall; late-maturing.

AGROPYRON REPENS (L.) Beauv. **quackgrass**

Eurasia. Common in northern States as a persistent weed in cultivated and abandoned fields, and often a serious pest. Propagated by seed or rhizomes; commences growth early; withstands severe summers and winters; generally requires a fairly good, moist soil; palatable and nutritious; a fair hay grass; large yields during first few years but becomes sod-bound and requires plowing. Eradication, though sometimes difficult, can usually be achieved by plowing in a dry season. Excellent for erosion control on railroad or other embankments. Used in parts of the Northeast and Midwest as lawn grass and in Michigan for golf courses on sandy ground. It should not be used in or near agricultural land.

AGROPYRON SEMICOSTATUM (Steud.) Nees
drooping wheatgrass

Asia; introduced from Manchuria. Under trial at many experiment stations. Reported as lacking vigor, partially winterkilling, and of no value in North Dakota. Said to be a vigorous grower and very promising in Kansas where it was drought-resistant and produced viable seed under adverse conditions. From the Northwest it is reported as remarkable for growth during hot, dry weather and for recovery after cutting; starts growth early in the spring. Several strains have set two crops of seed in one season; forage production and ground cover are maintained until freezing temperatures occur daily. Similar to the native slender wheatgrass (*A. trachycaulum*) in adaptation and use except that seed production is more difficult and the species may be shorter-lived.

AGROPYRON SIBIRICUM (Willd.) Beauv.
Siberian wheatgrass

European Russia, Caucasus, western Siberia, and central Asia. Introduced as early as 1906 but not successfully grown until 1920's. Similar to Fairway crested wheatgrass (*A. cristatum*) and Standard crested wheatgrass (*A. desertorum*) but smaller, more slender, and awnless. Less widely planted than the latter species. Drought-resistant; seed habits good; ground cover fair; good spring and fall recovery; will grow in sandy soils with an underlying hardpan, and is superior to its close relatives under dry-land conditions. Seed not at present available commercially. Adapted in the Northwest and in the Intermountain region; southern and eastern limits of adaptation undetermined, but promising on dry sites in Wyoming, Nevada, Colorado, Utah, and Idaho.

AGROPYRON TRICHOPHORUM (Link) Richt.
pubescent wheatgrass

Also called stiffhair wheatgrass. Eastern Europe to central Asia, Caucasus, and Asia Minor. A moderately coarse grass with short, thick rhizomes which may not be apparent until the second or third year; easily established; matures in late August; seed habits fair; seeds do not shatter but are difficult to thresh.

Able to survive dry, hot, and windy summers in areas where the soil bakes; suitable for pastures on burned-over land; not adapted to wet, poorly drained soils. Forage yields high, especially in early spring and late fall; only the new growth is grazed. Grouped taxonomically with intermediate wheatgrass (*A. intermedium*) and tall wheatgrass (*A. elongatum*); in comparison with the former it is better adapted to infertile and alkaline soils, and to areas of low rainfall; gives quicker ground cover and is more palatable as pasturage.

Cultivated for seed in Intermountain region, Washington, and at higher elevations of the Southwest. Can be used for range reseeding, pasture mixtures, or for conservation of eroded or wind-blown areas. It furnishes palatable grazing for sheep in Oregon during the summer. Has given excellent results in range reseeding experiments in ponderosa pine areas of Colorado, eastern Oregon and Washington, and

northern Arizona and New Mexico; in the sagebrush and woodland areas of Idaho, Nevada, Utah, Colorado, and Wyoming; and on foothill rangelands of northeastern Washington.

AGROPYRON TRITICEUM Gaertn. ———

Annual. Southeastern Europe to Asia Minor and Central Asia. Found sparingly as weed in Montana, Idaho, Wyoming, and Washington; probably accidentally introduced with other seed.

AGROSTIS ALBA L. **redtop**

Europe. Found throughout the cooler parts of United States, especially in the Northeast. Widely cultivated; also grows wild. Particularly adapted to wet lands, although drought-resistant when established and successful on sandy soils; both acid- and alkali-tolerant; a good sod-former; forms a good turf in a short time; seeds well; seed viable 2 years.

Though extensively employed for permanent pasturage it is less palatable than most cultivated grasses; matures about the same time as timothy and persists longer; should be cut in early flowering. Used for meadows and pastures in mixtures; withstands trampling; valuable as a wet-land hay crop or for pasture mixtures under humid conditions or on poor soil. Becomes stemmy and dies out under close cutting and hence not now recommended as a lawn grass although formerly used as such.

Suitable for erosion control, particularly on edges of running streams; planted together with alsike clover and a more rapidly developing grass for stabilization of gullies and waterways in the Pacific Northwest; has been used for reclamation of abandoned land in Pennsylvania; furnishes food for many birds. The most desirable of the 30 commercial and introduced strains are tall, have very broad leaves, and are slow-spreading.

AGROSTIS AVENACEA Gmel. ———
(*A. retrofracta* Willd.)

Asia. Sparingly introduced; California, Texas, and Ohio.

AGROSTIS CANINA L. **velvet bent**

Europe. Northeastern States; in meadows and open ground. Forms a close sod; is hardy, an early spring grower, and withstands heat better than Kentucky bluegrass (*Poa pratensis*). Adapted to both sun and shade; more aggressive than Colonial bent (*A. tenuis*). Used principally for lawn mixtures and putting greens.

AGROSTIS NEBULOSA Bois. & Reut. **cloudgrass**

Spain. Occasionally cultivated for ornament; used for dried bouquets.

AGROSTIS NIGRA With. **black bent**

Europe. Introduced in imported lawn seed.

AGROSTIS PALUSTRIS Huds. **creeping bent**

Also known as seaside, Coos Bay, and Cocoos bents (propagated by seed) and Metropolitan and Washington bents (propagated by stolons and formerly called carpet bent). Eurasia. Northern, especially coastal, United States; found sparingly in the interior; fairly common

in mixtures in the Northeast and in purer stands in Washington and Oregon west of the Cascades. Good forage on summer ranges in Oregon. Sometimes confused with redtop (*A. alba*) and Colonial bent (*A. tenuis*). An excellent turf-forming species valuable for golf courses and lawns and, to a lesser extent, for pastures and hay, especially in moist soil in seaside meadows, as in Washington and Oregon. Gave poor results in reseeding trials in California at 1,000-foot altitude.

AGROSTIS SEMIVERTICILLATA (Forsk.) C. Christ **water bent**
(*A. verticillata* Vill.)

Subtropical Eurasia. Southwestern States; Washington and Oregon; moist ground at low altitudes, especially along irrigation ditches.

AGROSTIS TENUIS Sibth. **Colonial bent**

Also called Rhode Island bent. Europe. Northeastern States and northern Pacific coast. Common in pasture mixtures and escaped. Produces a fine turf; thrives on well-drained, acid soils; adversely affected by liming. Good grazing on summer ranges in Oregon. Used for golf courses and lawns.

AGROSTIS TENUIS Sibth. **Highland bent (strain)**

A named strain of Colonial bent produced in the Pacific Northwest.

AGROSTIS TRANSCASPIA Litw.

Asia Minor. Cultivated at Tucson, Ariz. Grows on heavy soil; suggested as promising for use in dry-site erosion control in the West.

AIRA CARYOPHYLLEA L. **silver hairgrass**

Annual, some forms native. Europe and South America. Eastern Coastal Plain and west coast on old cattle ranges. Dried plants (as of the native *A. elegans*) used for decoration.

AIRA PRAECOX L. **early hairgrass**

Annual. Europe. Northeast and northwest coast; sandy ground. Dried plants used for decoration.

ALOPECURUS ARUNDINACEUS Poir. **reed foxtail**
(*A. ventricosus* Pers.)

Also called creeping foxtail. Europe. North Dakota; adventive in hay meadows and cultivated to some extent in Northern States where it is best adapted. Similar to meadow foxtail (*A. pratensis*) in growth habits but with more vigorous rhizomes and blackish seeds; a long-lived grass with fair seed habits and high forage yield; weak in the seedling stage. Although the heads ripen rather early, 30 days before timothy (*Phleum pratense*), the forage remains green throughout the summer except under severe drought. Particularly well adapted to brackish conditions of tideland pasture and to river bottoms subject to overflow. Used as a wet-land pasture grass in the Pacific Northwest. Fourteen strains have a range of variation of 14 inches in height and 16 days in date of maturity.

ALOPECURUS CRETICUS Trin. **Cretan foxtail**

Annual. Europe. Ballast and waif at Philadelphia, Pa.

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ALOPECURUS MYOSUROIDES Huds. **slimspike foxtail**

Eurasia. Sparingly introduced; Maine to North Carolina, Texas, Washington, and Oregon.

ALOPECURUS PRATENSIS L. **meadow foxtail**

Eurasia. Introduced about 1850. Scattered distribution in Northern States and cultivated there; grown both near the coast and at high altitudes. Grows best in cool, moist climates but is tolerant of temperature, shade, and salt except for high concentrations; has weak rhizomes; seeds awned, predominately white. Produces large yield of palatable leaves of very high protein content. Seedlings weak and do not withstand weed competition or grazing; good results when planted with birdsfoot trefoil. Matures early, 1 month before timothy (*Phleum pratense*), but the forage remains green except under severe drought. The hay is good; best cut at full bloom. Has been utilized for silage in mixture.

Best suited for wet-land pasture for which it is grown in mixtures. Grows especially well in brackish tideland pasture or river bottoms subject to overflow under which conditions it excels ryegrass (*Lolium* spp.), orchardgrass (*Dactylis glomerata*), and clover. Good hay and pasture both of which are palatable to sheep in Oregon. Palatability occasionally reported as inferior in western Washington, presumably because of the local presence of better-liked species. Seed mostly imported; a small amount is produced in Oregon.

ALOPECURUS RENDLEI Eig. ———

Annual. Europe. Waif and ballast, Philadelphia, Pa.

AMMOPHILA ARENARIA (L.) Link **European beachgrass**

Also called Hollandgrass. Europe. San Francisco to Oregon; north Atlantic coast. Used for control of shifting dunes along the Pacific coast since 1896 and, on the northern part of that area, is still the principal grass used in initial plantings for that purpose. Makes excellent recovery when covered by large amounts of sand but tends to die out when the sand ceases to move and hence is unsuitable for permanent erosion control. Because of this fact it is inferior for this purpose to the native American beachgrass (*A. breviligulata*) and the native American dunegrass (*Elymus mollis*) which doubtless will be used more extensively as they become commercially available.

AMPELODESMOS MAURITANICUS (Poir.) Dur. & Schinz **Mauritania vinereed**

Mediterranean region. Grown for ornament in California; escaped in Napa County.

ANDROPOGON ANNULATUS Forsk. **Diaz bluestem**

Also called ringed beardgrass, Brahmangrass, Kleberg-grass. Northern Africa, China, India. Kleberg County, Tex., roadsides. This species has been confused with Angletongrass (*A. nodosus*). There are two recently introduced strains. Has produced viable seed in Texas and now limitedly used for range reseeding in the southern part of that State. The seed does not require a resting period. Limited seed supplies now available. It can be reproduced also by stolons (85 percent successful).

ANDROPOGON CARICOSUS L.

India. Cultivated. Said to be promising for reseeding of dry range country in the Southern and Southwestern States, but not thus far used in Texas.

ANDROPOGON CAUCASICUS Trin. Caucasian bluestem

Southern Russia. Cultivated in Southern States. Vigorous; easily established from seed, and high-yielding. Has finer stems and better texture than the native bluestems; is drought-resistant, offers good weed competition, and gives a good ground cover. Shatters easily but volunteers freely; seed small, hard to collect, and must be processed; careful planting required. Reported to do well when seeded alone on sorghum stubble. Tested in southern Great Plains area for dry-land grazing and for hay with good results.

ANDROPOGON FOVEOLATUS Delile Delhi bluestem

Also called todagrass. India. Has been grown at Gainesville, Fla. Grows vigorously but is unpalatable owing to production of oil that imparts a bitter taste to the feed.

ANDROPOGON INTERMEDIUS R. Br. Australian bluestem

India, China, Indo-Malay region. Introduced into United States from Australia. Culivated at experiment stations. Reported as well adapted at Angleton, Tex., and promising at Tucson, Ariz., and Stillwater, Okla. Promising for reseeding of dry range country in South and Southwestern States and for grazing in Florida. Stems tend to lodge; more satisfactorily for pasturage than hay.

ANDROPOGON ISCHAEMUM L. yellow bluestem

Also called Turkestan bluestem. Central and southern Eurasia. Cultivated at southern experiment stations; adventive in Kansas, Tennessee, and on wool waste, Yonkers, N. Y. Grown mostly in Texas and escaped there. Has given good results in reseeding experiments in southern Great Plains. It is vigorous, high-yielding, and volunteers readily. Two to four feet tall; finer stemmed and of better texture than the native bluestems; a fair seed producer. Usable for pasture, hay, and erosion control.

ANDROPOGON ISCHAEMUM L. Elkan bluestem (strain)

Found in Elk County, Kans., in 1937; now a certified variety in Kansas. More erect than King Ranch strain and has greatest cold-resistance of any Turkestan bluestem strain in use. Seed commercially available in limited quantity.

ANDROPOGON ISCHAEMUM L.
King Ranch bluestem (strain)

Discovered in a Rhodesgrass pasture at the King Ranch in Texas in 1937. An especially vigorous, leafy, and nutritious strain. A deep-rooted, semiprostrate, drought-resistant bunchgrass that tends to form a sod when closely grazed in heavy stands. Extensive root system; succeeds on eroded soils. Salt-tolerant but not to the degree of Angletongrass (*A. nodosus*) which has been observed with runners extending into salt water at high tide. A good forage producer; preferred by cattle to Rhodesgrass (*Chloris gayana*), giant panicum (*Panicum*

antidotale), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*). Two or three seed crops annually but collection difficult because of light weight of seed and sprawling habit of plant; seed commercially available.

ANDROPOGON ISCHAEMUM L. Turkestan bluestem (strain)

More erect and more cold-resistant than the King Ranch strain and recommended for use at higher elevations than the latter. Not yet commercially available.

ANDROPOGON NODOSUS (Willem.) Nash Angletongrass

Old World. Introduced from India about 1930; cultivated at southern experiment stations; spontaneous in southeastern Texas and formerly collected near Miami, Fla. This species has been frequently confused with Diaz bluestem (*A. annulatus* Forsk.), q. v. A very palatable pasture grass; has high water requirement but may survive drought; highly salt-tolerant; spreads rapidly by long runners which may be used conveniently for reproduction. Seeds are produced sparingly except in the deep South; commercially available in Texas.

ANDROPOGON PERTUSUS (L.) Willd. pitted bluestem

Also called hurricanegrass. India. State College, Miss., where it is a troublesome weed in lawns and pastures.

ANDROPOGON SERICEUS R. Br. silky bluestem

Australia. Cameron County, Tex., and Ga., spontaneous on roadside banks.

ANTHEPHORA HERMAPHRODITA (L.) Kuntze ————

Annual. Tropical Asia. Escaped from experiment station plots at Gainesville, Fla.

ANTHOXANTHUM ARISTATUM Boiss. annual vernalgrass

Annual. Europe. Scattered distribution in United States; found in waste places.

ANTHOXANTHUM GRACILE Bivon. Italian vernalgrass

Annual. Italy. Occasionally cultivated. Used for dry bouquets.

ANTHOXANTHUM ODORATUM L. sweet vernalgrass

Eurasia. Northeastern States and southward to the cotton belt. Starts growth early in the spring; grows on poor soils; turf-forming in suitable mixtures. An inferior fodder grass owing to bitter taste; improves the odor of hay but is undesirable in more than a very small amount. Seeds eaten by birds.

APERA INTERRUPTA (L.) Beauv. ————
(*Agrostis interrupta* L.)

Europe. Sparingly introduced; Missouri and Northwestern States. No economic importance.

APERA SPICA-VENTI (L.) Beauv. windgrass
(*Agrostis spica-venti* L.)

Europe. Sparingly introduced; Northeastern States, Missouri, Oregon.

ARISTIDA PENNATA Trin. ———

Persia. Cultivated at Tucson, Ariz. In Persia it is an excellent sand-binding grass that grows in very dry, sandy areas and withstands great extremes of temperature. Tested at Tucson as a soil binder.

ARRHENATHERUM ELATIUS (L.) Presl tall oatgrass

Europe. Widely distributed in the United States. Introduced about 1807. A long-lived, deep-rooted, hardy, perennial bunchgrass that has never attained great importance in any locality despite many desirable forage qualities. Seed collection difficult because of shattering immediately following maturity; seedlings vigorous and give ground good cover; older plants grow rapidly in fall and spring. Does not endure severe cold but will withstand considerable summer heat and drought after it becomes established.

Most successful on rich, well-drained soils but can be grown on sandy and gravelly soils in moist places; salt-tolerant; does well on saltgrass areas in Nevada and Utah; conflicting reports with regard to shade tolerance; good for seeding under aspen in Intermountain region. Gives an abundance of palatable hay that cures easily. Good for pasture; palatable to sheep in spring, summer and fall in Oregon; rapid recovery from moderate grazing; green from early spring to late fall. Widely used in mixture with legumes and other grasses for pasture or meadow; in Northeastern and Northwestern States for early spring grazing, in the Pacific Northwest as green manure, in Iowa for hay, and in the South for winter grazing and hay. One of the recommended grasses for planting at mid- and high elevations on mountainous ranges in the West. Good for logging roads in the Northwest.

ARRHENATHERUM ELATIUS (L.) Presl
Tualatin oatgrass (selection)

Developed in Oregon. Leafier and later than the species; seed shatters less readily and in threshing comes free from lemmas. Adapted to some areas of forested land in the West and said to be useful, in mixture with timothy (*Phleum pratense*) and orchardgrass (*Dactylis glomerata*), for reseeding of old logging trails; reported as not giving sustained yields on alkaline soil in Utah.

ARRHENATHERUM ELATIUS var. BULBOSUM (Willd.) Spenner tuber oatgrass

Europe. Eastern States. Occasionally introduced.

ARTHRAXON HISPIDUS (Thunb.) Makino ———

Annual. Orient. Maryland, Missouri, and Louisiana.

ARTHRAXON HISPIDUS var. CRYPTATHERUS (Hack.) Honda ———

Annual. Orient. Scattered; pastures, lawns, and open ground in a few localities; mostly Southeastern States.

ARUNDINARIA AMABILIS McClure Tonkin cane

China. Cultivated; recent introduction. Used for split bamboo fishing rods.

ARUNDINARIA SIMONI (Carr.) A. & C. Riviere ———

China via Europe. Cultivated. Used as an ornament and for handles on shuffleboard mallets.

ARUNDINELLA ECKLONII Nees ———

S. Africa. Cultivated. Tall, tough, and unpalatable.

ARUNDO DONAX L. **giant reed**

Tropical Old World and Mediterranean region. Arkansas and Texas to southern California; spontaneous along the Rio Grande River and in irrigation ditches where it sometimes becomes a serious pest. Grows very rapidly. This grass has also been rather extensively used in southern California for erosion control, being propagated solely by rhizome divisions; its chief use is in low windbreaks, as in South Carolina and Texas. It must, however, have some supplementary water under dry-land conditions. If properly handled it can also be used for feed. The stems have been used for building adobe huts, for laths, musical instruments, and woven work; cultivated as ornamental.

ARUNDO DONAX var. VERSICOLOR (Miller) Stokes ———

Tropical Old World. Cultivated for ornament. Has white-striped blades.

ASTREBLA ELYMOIDES Bailey & F. Muell. **hoop Mitchellgrass**

Australia. Cultivated at experiment stations. Regarded as an excellent range grass in Australia where grown on heavy soils. Found highly palatable but nonpersistent in tests at State College, N. Mex.; failed at Gainesville, Fla.; tends to winterkill in the United States; not sufficiently tested on heavy soil.

ASTREBLA LAPPACEA (Lindl.) Domin. **curly Mitchellgrass**

Australia. Cultivated at experiment stations. Reported from Australia as good on heavy soils. Highly palatable. Winterkills in Oklahoma; unsuccessful at Gainesville, Fla.; germination poor in Kansas, Texas, and elsewhere.

ASTREBLA PECTINATA (Lindl.) F. Muell. **Mitchellgrass**

Australia. Cultivated in grass gardens. Good growth in hot weather; killed by frost. Foliage abundant; 3 feet tall at Washington, D. C., 18 inches at Chillicothe, Tex.; yielded 2.2 tons forage per acre and seeded profusely in Texas; poor results in reseeding trials in California; failed at Gainesville, Fla.

AVENA BARBATA Brot. **slender oat**

Annual. Old World. West coast United States. First reported in California in 1885. A common weed, often associated with wild oat; has considerable forage value.

AVENA FATUA L. **wild oat**

Annual. Europe. Rare in eastern United States; a common weed on the Pacific coast, especially in California; used in some parts of

California for a hay crop; troublesome in wheatfields. Good forage when young; awns are dangerous to livestock when mature; dry forage is poor; new growth starts with fall rains. In the annual forage type range of California, absence of wild oat may be an indicator of improper management. Under proper use the species is one of the most important constituents of the annual forage crop. Seed habits good; useful as an erosion check because of its quick cover. Heavily fed on by birds.

AVENA SATIVA L. **oat**

Annual. Old World. Widely cultivated for grain. Grown in southern United States for forage.

AVENA STERILIS L. **animated oat**

Annual. Old World. Occasionally cultivated; sometimes spontaneous.

BAMBUSA MULTIPLEX (Lour.) Raeusch. **hedge bamboo**

China. Cultivated as an ornamental south of Savannah, Ga.

BACKMANNIA ERUCAEFORMIS (L.) Host
European sloughgrass

Europe. Grown in grass gardens. A wet-land grass that seeds abundantly and volunteers in low wet places but requires more moisture than is usually available on cultivated ground.

BRACHIARIA ERUCAEFORMIS (J. E. Smith) Griseb.
rocket signalgrass

Old World. Cultivated in grass gardens; occasionally escaped.

BRACHIARIA PLANTAGINEA (Link) Hitchc.
creeping signalgrass

Annual. Mexico and South America. Reported at Metcalf, Ga., and on ballast in eastern United States; grown at Gainesville, Fla. Palatable; remains green during late summer; does not withstand close grazing. Shatters badly; reseeds itself but is late starting in spring.

BRACHIARIA SUBQUADRIPARA (Trin.) Hitchc. ————

Asia. Occasionally planted in southern Florida. Thrives in dry weather; possibly suitable as a forage grass.

BRACHYPODIUM CAESPITOSUM (Host) Roem. & Schult.
Turkish falsebrome

Introduced at Tucson, Ariz., from Turkey.

BRACHYPODIUM DISTACHYON (L.) Beauv.
annual falsebrome

Annual. Europe. On ballast at Camden, N. J., and Portland, Oreg.; grown in grass gardens and escaped in Colorado and California.

BRACHYPODIUM MUCRONATUM Willk.
beardless falsebrome

Europe. Grown in grass gardens.

BRACHYPODIUM PINNATUM Beauv. Rumanian falsebrome

Mediterranean region; grown in grass gardens. Poor results in reseeding trials in California.

BRACHYPODIUM SYLVATICUM (Huds.) Beauv. woodland falsebrome

Mediterranean region. Grown in grass gardens and occasionally cultivated for ornament.

BRIZA MAXIMA L. big quaking-grass

Annual. Europe. Cultivated for ornament; escaped in California. Used as a bedding, border or background plant, and in dried bouquets.

BRIZA MEDIA L. perennial quaking-grass

Europe. Found sparingly in northeastern United States; escaped from cultivation. Grows on dry, thin soils.

BRIZA MINOR L. little quaking-grass

Annual. Europe. East and west coasts, especially California. Used as a bedding or border plant and in dried bouquets.

BROMUS ALOPECUROS Poir. ———

Annual. Mediterranean region. Michigan; adventive on waste ground.

BROMUS ARENARIUS Labill. Australian chess

Australia. Found in Oregon, California, Nevada, Arizona, and at Philadelphia, Pa.

BROMUS ARVENSIS L. ———

Annual. Europe. New York, Maryland, North Dakota, Nevada, Arizona, and California; in cultivated ground. Promising as winter cover crop for orchards and vineyards in Northeastern States.

BROMUS BRIZAEFORMIS Fisch. & Mey. rattlesnake chess

Annual. Europe. West coast, rarely eastward; escaped. Used as ornamental.

BROMUS CATHARTICUS Vahl rescuegrass

Annual. South America. Introduced prior to 1853; escaped cultivation and found sparingly throughout the Southern States where cultivated for winter forage; rarely found northward. Reported as valuable for special situations in southern Great Plains although winters in this region are usually too dry for satisfactory development. Growth starts in fall and continues through winter; plants mature in early summer; 2 to 3 feet high. Requires rich soil; subject to disease. Seed production abundant where not closely grazed.

BROMUS CATHARTICUS Vahl Prairie brome (strain)

A reputedly perennial strain introduced from New Zealand and reported as superior to native bromes of the Southwest. It is a strong winter grower but requires good soil or irrigation. Used for reseeding projects in California; suitable on coastal ranges.

BROMUS CATHARTICUS Vahl **Rescue 46 (selection)**

Also called Texas Rescue 46. A disease-resistant selection that is leafier and remains green longer.

BROMUS COMMUTATUS Schrad. **hairy chess**

Europe. Washington, California, Montana, and Northern States; a weed in fields of smooth brome (*B. inermis*) in the Southwest.

BROMUS COMMUTATUS var. APRICORUM Simonkai ———

Europe. Washington, Nevada, and California; rare.

BROMUS DANTHONIAE Trin. ———

Europe. Grown in grass gardens.

BROMUS ERECTUS Huds. **erect brome**

Also called meadow brome. Europe. Found in a few localities in Northern States where also cultivated; rare southwards. A rapidly developing, long-lived bunchgrass with pubescent foliage. It gives high root and seed yields but is susceptible to head smut; makes early recovery after cutting; valuable as a hay crop; not as palatable as smooth brome. Prefers dry, warm, exposed situations; can be grown on eroded or depleted soils; reported as very thrifty up to 10,000 feet; quite promising for use on marginal lands where excessive lime or low fertility prevents other growth; has been reported as excellent for clay hilltops and many eroded situations where there is low to moderate rainfall. Competes more successfully with cheatgrass (*B. tectorum*) than does Standard crested wheatgrass (*Agropyron desertorum*) in western Montana. Has given excellent results in reseeding tests at intermediate and high elevations in woodland and ponderosa pine areas in Colorado and has been suggested for range reseeding on and near the national forests in Montana. Low palatibility for sheep in Oregon. Seed will probably become commercially available; less pubescent strains are being developed.

BROMUS INERMIS Leyss. **smooth brome**

Russia and Hungary. Introduced in 1884. Extensively cultivated in northern Great Plains region and elsewhere under semihumid conditions. Strongly rhizomatous, has high seedling vigor, but is slow to establish. Produces abundant foliage and seed; tends to become sod-bound after a few years and should be plowed in order to retain its high yields; does best in mixture with clover; grows at a wide range of altitudes; withstands drought and cold when established; requires good soil and drainage; will tolerate alkaline conditions; good for seeding saltgrass areas in Utah and Nevada. Highly palatable and used extensively for pasture, hay, and winter forage as well as for reseeding in the western mountain ranges and for soil binding. High yield of palatable hay and pasture for sheep in Oregon.

Has been used with a legume for terrace outlets, seeded waterways, and ditch banks. Excellent for irrigated pastures throughout the Western States; does fairly well under irrigation in southern Great Plains, especially when mixed with alfalfa and other grasses. Has given encouraging results in range reseeding trials in various areas in the West and is one of the better grasses recommended for seeding

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the better sagebrush sites and mountain lands of Arizona, New Mexico, Colorado, Wyoming, Montana, Utah, Idaho, Nevada, Oregon, and Washington. Fairly shade-tolerant and produces good stands in open aspen, brushy, or timber areas. Seeds eaten by birds.

There are 34 strains of this species variable as to characteristics of maturity and growth. Southern types tend to be strongly rhizomatous. Northern strains generally unsuccessful in South.

BROMUS INERMIS Leyss. **Lincoln brome (strain)**

A southern strain selected for high seedling vigor and ease of establishment. An aggressive sod formation makes it valuable in erosion control as well as for pasture hay. Particularly well adapted to the central corn belt States.

BROMUS INERMIS Leyss. **Manchar brome (strain)**

A northern strain selected for leafiness and tendency to remain bunchy; has exceptionally strong seedling vigor; recovers quickly after cutting; does not rapidly become sod-bound; high disease resistance. Outstanding seed production; seeds dark purple, heavier than other strains, easily threshed. Has been reported as good for reseeding old logging trails in the Northwestern States.

BROMUS INERMIS Leyss. **Parkland brome (selection)**

A noncreeping selection developed in Canada. Compared to the common smooth brome it is claimed to be finer stemmed and more leafy, but has proved to be less vigorous and productive in North Dakota. Seed available commercially.

BROMUS JAPONICUS Thunb. **Japanese chess**

Annual. Asia. Widely distributed in the United States. A weed in waste places and in fields of smooth brome (*B. inermis*).

BROMUS LACINIATUS Beal ———

Mexico. Cultivated occasionally for ornament. Has long, drooping, purplish spikelets.

BROMUS MACROSTACHYS L. **Mediterranean brome**

Annual. Mediterranean region. Yonkers, N. Y., on wool waste. Occasionally cultivated for ornament in Texas.

BROMUS MOLLIFORMIS Lloyd ———

Europe. Southern California; Texas.

BROMUS MOLLIS L. **soft chess**

Annual. Europe. Scattered distribution; mostly Northeastern States; west coast and Rocky Mountain region; on abandoned farms in the Central States and southern Great Plains region; a weed in cultivated soils. A good seed producer; will reproduce under abuse. Useful as pasturage in early growth stages. This grass is considered the best of the annual bromes and is one of the major species in the annual forage foothill areas of California where it is especially abundant. It is uncommon in the other two Pacific States. Deemed a failure for reseeding arid rangeland in New Mexico. Seeds eaten by birds.

BROMUS OXYODON Schrenk ———

Asia. Grown at experiment stations.

BROMUS PSEUDODANTHONIAE Drobov. ———

Turkestan. Cultivated at experiment stations.

BROMUS RACEMOSUS L. **bald brome**

Also called smooth bromegrass. Annual. Europe. Common in western United States. Makes good hay.

BROMUS RAMOSUS Huds. ———

Europe. Washington.

BROMUS SCOPARIUS L. ———

Europe. California, Virginia, and Michigan.

BROMUS SECALINUS L. **chess**

Annual. Europe. Throughout the United States in grainfields and on abandoned farmlands. Usually considered a weed; useful as forage where sufficiently abundant but yields vary widely from year to year; used locally and limitedly for hay in Washington and Oregon. Found as an impurity in meadow fescue (*Festuca elatior*) seed. Gave poor results in reseeding trials in California. Seeds eaten by birds.

BROMUS SECALINUS var. VELUTINUS (Schrad.) Koch ———

Annual. Europe. Oregon.

BROMUS SQUARROSUS L. ———

Europe. Michigan and North Dakota; waste places.

BROMUS STAMINEUS E. Desv. **Harlan brome**

Chile. Grown in California. Palatable and aggressive but short-lived. Good for reseeding burned brush areas in western California.

BROMUS TECTORUM L. **cheatgrass**

Also called downy chess, broncograss. Annual. Europe. Widely distributed in the United States; weedy, roadside annual in Eastern States; covers extensive areas in the West. An indicator of overgrazing. Prolific seeder; seed germinates rapidly with a high germination. A rapidly growing, short-lived grass that is very aggressive under moist conditions and may deter establishment of perennial species. Occurs in small amounts on native ranges in good condition. In southern Idaho it can be crowded out by bulbous bluegrass (*Poa bulbosa*) and by crested wheatgrass (*Agropyron cristatum*) when once established. Herbage production is high and it provides good forage when young, but fluctuates widely in yield from year to year. Awns, when mature, cause mechanical injury to stock; sometimes considered valuable as an erosion check because of its quick cover. A fire hazard when dry; 500 times more likely to burn than perennial grass range.

BROMUS TECTORUM var. GLABRATUS Spenner ———

Annual. Europe. Same ranges as species, less common. Same remarks apply as to the species.

BROMUS TOMENTELLUS Boiss. ———

Greece, Asia Minor, Persia. Grown in nurseries and on trial plots in the Pacific Northwest, and also in Utah and Colorado. A bunchgrass with a heavy growth of basal leaves that give good ground cover. Matures seed early but leaves remain green most of the summer. Usefulness limited by decline in seed production after the first season. Similar to smooth brome (*B. inermis*) in soil conservation uses.

BROMUS TRINII Desv. **Chilean chess**

Also called Chilean brome. Annual. Chile. West coast of United States; dry plains, rocky or wooded slopes.

BROMUS TRINII var. EXCELSUS Shear ———

Annual. Chile. Panamint Mountains, Calif., and Emory Canyon, Ariz.

CALAMAGROSTIS EPIGEIOS (L.) Roth **chee reedgrass**

Eurasia. Introduced in 1914. Found along northeastern coast in a few places. Very coarse; strongly rhizomatous; makes phenomenal growth on damp sandy or gravelly areas where it may be a serious weed. Not aggressive under dry conditions; no seed produced. Good for erosion control, especially of inland dunes, but inferior to Volga wildrye (*Elymus giganteus*).

CENCHRUS BIFLORUS Roxb. **India sandbur**
(*Cenchrus barbatus* Schum.)

Annual. India, North Africa. Ballast in Alabama and New York; said to be successful in Florida and along the Gulf coast; spreads naturally; cultivated at Gainesville, Fla. A bunchgrass 1 to 3 feet tall; propagated by bulblets; burs not coarse; eaten by cattle; good for grazing in sandy soil; may prove useful in ranges of the Southeastern States. Two strains reported.

CHLORIS ARGENTINA (Hack.) Lillo & Parodi
Argentine chloris

Argentina. Tifton, Ga.; roadsides, escaped from cultivation.

CHLORIS BERROI Arech. **Uruguay chloris**

Also called "giant fingergrass," a misnomer. South America. Introduced in 1931. Cultivated in grass gardens. In Florida does not stand the summer months but brightens up in cool weather; grows well in Oklahoma and Texas. Gave poor results in reseeding trials in California 1935–45.

CHLORIS CANTERAI Arech. **Paraguay chloris**

Paraguay. Bexar County, Tex.; spontaneous along roadsides and in uncultivated ground. Very poor growth at San Antonio, Tex.

CHLORIS CAPENSIS (Houtt.) Thell. ———

South Africa. Florida; probably escaped from cultivation.

CHLORIS DISTICHOPHYLLA Lag. **weeping chloris**

Also called umbrellagrass. South America. Texas and southern California; escaped from cultivation; grown at experiment station,

Gainesville, Fla. Palatable, but uprooted by grazing; seed production abundant but germination poor; fairly cold-resistant. Reported from Texas (1920) as not thrifty enough for pasture or hay.

CHLORIS GAYANA Kunth **Rhodesgrass**

Africa. Introduced in 1902. Cultivated and escaped in the extreme Southern States. A fine-stemmed, leafy grass about 3 feet high; requires good soil or fertilizer; prefers moist soil but will grow during drought; can be eradicated without difficulty. It is readily eaten; recovers quickly from trampling; easily cured, giving green hay; a good seed producer. Severe damage from Rhodesgrass scale under poor growing conditions or when overgrazed. Winterkills at 16° to 25° F. A cold-resistant strain has been used for erosion control on clay and loam soils of medium to high fertility in central and southern Texas. Furnishes high-quality hay and pasture in Florida and southern Texas; large hay yields obtained in Oklahoma. Salt-tolerant; reported promising as a pasture crop on alkaline soils of the lower valleys in Arizona. Rhodesgrass is also used in irrigated pasture mixtures in southern California, particularly where soil conditions are too saline or alkaline for Dallisgrass (*Paspalum dilatatum*). Reseeding trials in Madera County, Calif., gave poor results.

CHLORIS INFLATA Lind. **flatstem chloris**
(*C. paraguaiensis* Steud.)

Also called fingergrass, Mexican bluegrass. Throughout Tropics. Introduced in 1916. Cultivated in grass gardens. Reported as much lower-yielding and less winter hardy than Rhodesgrass (*C. gayana*) in Mississippi.

CHLORIS PRIEURII Kunth **Moroccan chloris**

Annual. West Africa. Ballast in North Carolina and Alabama.

CHLORIS RADIATA (L.) Swartz **annual chloris**

Annual. Tropical America. Introduced in 1920. Ballast near Portland, Oreg.; cultivated in grass gardens; yield poor; not winter hardy.

CHLORIS SUBMUTICA H. B. K. ———

Mexico. New Mexico; probably escaped from cultivation.

CHLORIS TRUNCATA R. Br. **creeping windmillgrass**

Also called stargrass. Australia. Occasionally cultivated as ornamental. The common name stargrass is better applied to the genus *Aletris* and to *Cynodon plectostachyum*.

CHLORIS VENTRICOSA R. Br. **Australian windmillgrass**

Australia. Occasionally cultivated in Virginia and Oklahoma.

CHRYSOPOGON MONTANUS Trin. ———

India. Cultivated in Florida. Makes heavy growth on light soil; appears early in spring; seed viability is very low.

COIX LACRYMA-JOBI L. **Jobs-tears**

Annual. Tropics everywhere. Cultivated for ornament and escaped in extreme Southern States.

COLEANTHUS SUBTILIS (Tratt.) Seidel **mudgrass**

Northern Eurasia. Washington and Oregon; mud flats along lower Columbia River.

CORIDOCHLOA CIMICINA (L.) Nees **bugseedgrass**

Annual. Southern Asia. Found sparingly in Florida.

CORTADERIA RUDIUSCULA Stapf **quila pampasgrass**

Argentina. Occasionally cultivated for ornament.

CORTADERIA SELLOANA (Schult.) Aschers. & Graebn. **pampasgrass**

South America. Cultivated in Southern States and especially in California where tested for erosion control and dry-land pasture. Used as an ornamental in spacious parks or in large home yards.

CORYNEPHORUS CANESCENS (L.) Beauv. **clubawngrass**

Annual. Europe. Ballast at several points in Northeastern States.

CRYPSIS NILIACA Fig. & DeNot. **pricklegrass**
[Erroneously referred to *C. aculeata* (L.) Ait.]

Annual. Egypt and southwestern Asia. California; inundated land.

CUTANDIA MEMPHITICA (Spreng.) Richt. **Memphisgrass**

Annual. Mediterranean region. San Bernardino Mountains, Calif.

CYMBOPOGON CITRATUS (DC.) Stapf **lemongrass**

Old World. Florida. Planted during World War II as a complementary oil crop in the Lake Okeechobee sugar-growing region.

CYNODON DACTYLON (L.) Pers. **Bermudagrass**

Also called Bahamagrass, wiregrass, devilgrass. Warm regions of both hemispheres; probably native to India. Introduced in America 1751 or earlier. Throughout Southern and Southwestern States and occasionally northward. Not hardy in central and northern parts of southern Great Plains. A long-lived perennial with a spreading habit; does best on moist heavy soils in warm or hot weather; salt-tolerant; killed by the first frost. The most important pasture grass in the Southern States. To maintain productive pasture it should be fertilized, grown with legumes, and shallowly plowed every 3 to 5 years.

In Texas it gives yearlong green forage when planted with rescuegrass (*Bromus catharticus*); sometimes grown for hay but should be cut before it becomes wiry. Used also for airstrips, lawns, as a soil binder, and for reseeding moist areas below 5,000 feet in the Southwest. Often propagated from stolons. Has been successfully established by sod plantings in saltgrass areas in New Mexico where, although useful, it has become a weed in irrigated, cultivated land. Seeds eaten by birds.

CYNODON DACTYLON (L.) Pers. Coastal bermuda (selection)

A selection from a cross between Tift bermuda—a strain found near Tifton, Ga.—and an introduction from South Africa. In com-

parison with common Bermudagrass it is leafier, has longer internodes, and larger stems, stolons, and rhizomes; leaves are longer, lighter in color, and form a more acute angle with the stem; more tolerant to cold, makes more fall growth, and stays green longer. Reports from Arkansas, Oklahoma, and Texas indicate it to be more drought-resistant. Resistant to leaf spot and immune to root-knot nematodes. Nearly seedless; propagated vegetatively; maintains a weed-free sod longer. Cattle prefer it to the finer-stemmed common types. Makes excellent hay. Once established can be expected to give several cuttings each season for many years. It is claimed to cure easier and quicker than any other hay crop adapted to the South.

CYNODON DACTYLON (L.) Pers. St. Luciegrass (selection)

Restricted to Florida. A small variety without rhizomes which spreads by stolons; has little cold resistance.

CYNODON DACTYLON (L.) Pers. Suwanee bermuda (strain)

Also called Tifton No. 99. A hybrid developed at Tifton, Ga. Differs from Coastal bermuda in darker green color, more erect leaves, greater production of viable seed, lesser tendency to sod over. Equal or superior for hay but inferior for grazing. Very well adapted to light, sandy soils on which it is more productive than Coastal bermuda, particularly if not fertilized.

CYNODON DACTYLON (L.) Pers. Tift bermuda (selection)

An increase by stolons of an unusual Bermudagrass plant found growing in an old cotton field near Tifton, Ga. Characterized by long, decumbent stems, few seedheads and an abundance of large stolons and rhizomes. Found to be superior to common Bermudagrass for both pasture and hay.

CYNODON PLECTOSTACHYUM (Schum.) Pilger giant dogtoothgrass

Also called stargrass, star bermudagrass, giant stargrass. Africa. Cultivated in grass gardens. Very coarse and unpalatable; susceptible to leaf spot; winterkilled in Georgia.

CYNODON TRANSVAALENSIS Burtt-Davy Transvaal dogtoothgrass

Also called African bermudagrass, fine-leaved bermudagrass. South Africa. Cultivated in grass gardens and occasionally in lawns; found as an escapee in Iowa and California. Used as a lawn grass at the Central Great Plains Experiment Station, Okla. A very fine-leaved grass that spreads rapidly and forms a dense sod.

CYNOSURUS CRISTATUS L. crested dogtail

Europe. Northern States; in waste places and cultivated in meadow mixtures, often from imported seed. Does well in shady places; of little value.

CYNOSURUS ECHINATUS L. hedgehog dogtail

Annual. Europe. West coast, Maryland, North Carolina, Arkansas, and Oklahoma.

DACTYLIS GLOMERATA L. **orchardgrass**

Also called cocksfoot. Eurasia. Introduced before 1760. Widely distributed in the United States; most common in humid sections of the East, especially Virginia and Kentucky. A coarse bunchgrass that never forms a dense sod. Bunchy character can be minimized by careful management and by seeding with a legume. It is persistent, drought-resistant when established, shade-tolerant, cold-resistant; grows until frost. One of the most successful introduced grasses for hay, silage, pasture, or erosion control.

Produces large quantities of forage with an abundance of basal leaves on rich soils and is valuable also on poor soils where establishing a cover is difficult. Reported as not well adapted on low-fertility or eroded soils of the Northwest and as not enduring flooding or alkaline conditions there. Palatable for sheep grazing in Oregon. The hay is inferior to timothy because of its woodiness, but this can be partially mitigated by growing in thick stands. In mixture with Ladino or red clover it gives large amounts of high-quality silage early in the season and abundant green pasturage after cutting.

Has been successfully used for reseeding logged-over lands and logging roads in Northwestern States and for irrigated pasture in Utah, Idaho, Colorado, and New Mexico; high forage yield as a cool-season grass in Texas. On rangelands it grows best under cool moist conditions and becomes dormant during drought. Recommended for reseeding the moister intermediate and high mountain areas of Oregon, Washington, Idaho, Utah, Nevada, Colorado, western Montana, Wyoming, Arizona, and New Mexico. Especially useful for seeding in shade, such as under aspen and brush stands. Seeds eaten by birds. There are more than 30 strains of this species of domestic and foreign origins, one of which is here described.

DACTYLIS GLOMERATA L. **Akaroa orchardgrass (strain)**

Introduced from New Zealand. A shorter, leafier, finer-stemmed, later-maturing strain; lacks winter hardiness; usable only west of the Cascades. Seed produced commercially in California.

DACTYLOCTENIUM AEGYPTIUM (L.) Beauv. **Durban crowfootgrass**

Annual. Tropical regions of the Old World. Found mostly along the Atlantic Coastal Plain. Sometimes cut for hay in the Southern States. Seeds eaten by birds.

DANTHONIA PILOSA R. Br. **hairy danthonia**

Also called hairy oatgrass. Australia. Introduced 1911; reintroduced about 1921. Cultivated at experiment stations and escaped in California. Has become a serious weed in Humboldt County, Calif., where it reduced the quality of forage. Might be useful as a ground cover on depleted land. Forms a dense sod; spreads rapidly; competes well; mature foliage fibrous and unpalatable. Produces a low, bunchy growth but lacks vigor and is not well-adapted in Texas and Kansas.

DANTHONIA PURPUREA (Thunb.) Beauv.
purple danthonia

Also called haaschare. South Africa. Cultivated in California. Grows 1 to 2 inches tall; said to be xerophytic, frost-resistant, slow-growing, and nutritious.

DANTHONIA SEMIANNULARIS (Labill.) R. Br.
Australian danthonia

Also called wallabygrass. Australia. Introduced in 1905 and subsequently. Cultivated in grass gardens; also escaped in California, and found on rangelands there. Reported as very leafy and eaten readily by stray cattle in Texas; readily established and high-yielding in Colorado; a vigorous summer grower but subject to winterkilling in Oklahoma.

DESMAZERIA SICULA (Jacq.) Dum. **desmazeria**

Annual. Europe. Cultivated for ornament as a bedding or border plant.

DIGITARIA DECUMBENS Stent **pangolagrass**

South Africa. Introduced in 1936. Cultivated in Georgia, Florida, and perhaps adapted to California. A rapid-growing, vigorous, leafy perennial; grows in sandy soil but requires fertilization; must be propagated vegetatively. It is drought-resistant but not frost-resistant; attacked by Rhodesgrass scale. Liked by cattle; withstands grazing; gives high yield of hay that cures rapidly.

DIGITARIA DIDACTYLA Willd. **blue fingergrass**

Also called blue couchgrass. Australia. Cultivated in Florida. Adapted to Southern States. A distinctly glaucous coloring gives it a blue appearance, and hence its name. A sod grass suitable for pasturage but regarded as inferior to Bermudagrass (*Cynodon dactylon*) which it resembles. Makes a fine, dense turf in sand and has been recommended for putting greens.

DIGITARIA ERIANTHA Steud. **woolly fingergrass**

Africa. Identity in question although reported from grass gardens in Florida, California, and Arizona. Growth and palatability are recorded as good in Florida; does not withstand grazing. Rated as poor in California reseeding trials.

DIGITARIA HORIZONTALIS Willd. **Jamaica crabgrass**

Tropical regions. On ballast in Alabama and in waste places in central and southern parts of Florida.

DIGITARIA ISCHAEMUM (Schreb.) Muhl. **smooth crabgrass**

Eurasia. Eastern States; weed in lawns. Seeds eaten by animals and birds.

DIGITARIA LONGIFLORA (Retz.) Pers. ——————

Asia. Southern Florida in ditches and on sandy ground.

262036°—53——4

DIGITARIA PENTZII Stent **Pentz fingergrass**

Africa. Reported as planted to limited extent in Florida, southern Georgia, and Louisiana. A strong growing perennial; must be planted by cuttings. Palatable but does not withstand grazing over long periods; poor recovery after frost. Unsatisfactory results in reseeding trials in California.

DIGITARIA SANGUINALIS (L.) Scop. **hairy crabgrass**

Annual. Europe. Throughout the United States. More common in Eastern and Southern States. A weed in cultivated ground and lawns. Used for forage and hay in California. Provides food for many birds and a few other animals.

DIGITARIA SWAZILANDENSIS Stent **Swaziland fingergrass**

South Africa. Cultivated at experiment stations in Georgia and Florida. A fine-leaved, sod-forming grass; recovers well after frost in Florida.

DIGITARIA VIOLASCENS Link **violet crabgrass**

Also called Dawsongrass. Tropics. Alabama, Georgia, Florida, Kentucky, Arkansas, Texas; open pineland.

ECHINOCHLOA COLONUM (L.) Link **junglerice**

Tropical regions. Ballast, New Jersey, Oregon, Pennsylvania, Southern States. Grows in moist places. Leaves tender; provides good fodder. Seeds eaten by birds.

ECHINOCHLOA CRUSGALLI (L.) Beauv. **barnyardgrass**

Eastern Hemisphere. Throughout United States in moist, open places; a troublesome weed in rice, cotton, and beanfields in California. Of considerable value as forage. Seeds eaten by birds.

ECHINOCHLOA CRUSGALLI var. FRUMENTACEA (Roxb.) Wight **Japanese millet**

India. Cooler regions of United States. A cultivated variety of barnyardgrass. More cold-tolerant than foxtail millet (*Setaria italica*). Can be used for green feed, silage, or hay.

EHRHARTA CALYCINA J. E. Smith **perennial veldtgrass**

South Africa. Cultivated in central and coastal areas of California. Palatable, drought-resistant, volunteers well; has been used in reseeding projects. Nonuniform ripening renders seed collection difficult; not as long-lived as smilograss (*Oryzopsis miliacea*).

EHRHARTA ERECTA Lam. ———

South Africa. Escaped and aggressive near Berkeley, Calif.

ELEUSINE CORACANA (L.) Gaertn. **ragimillet**

Also called African millet, Coracan millet, ginger millet, ragi. Annual. Africa. A cultivated form of *E. indica*. Occasionally grown in grass gardens and escapes. Reported from Florida as growing in large bunches 3½ feet tall; lodges at seeding time; well liked by cattle. Seed used for food among primitive peoples in Africa and southern Asia.

ELEUSINE INDICA (L.) Gaertn. **goosegrass**

Annual. Tropical regions. A common weed in the United States, particularly in East. Especially troublesome in lawns.

ELEUSINE TRISTACHYA Lam. **threespike goosegrass**

Annual. Tropical Africa. Ballast at several places in United States.

ELYMUS ANGUSTUS Trin. **Altai wildrye**

Russia. Cultivated. Resembles Chinese wildrye (*E. chinensis*) in growth habits; weedy. Owing to aggressiveness it should be excluded except in dry, eroded areas where other plants will not grow.

ELYMUS ARALENSIS Regel **Aral wildrye**

Russia. Cultivated. Resembles European dunegrass (*E. arenarius*) but has shorter rhizomes, more erect leaves, and poorer seed habits. May be useful for sand dune control.

ELYMUS ARENARIUS L. **European dunegrass**

Also called sea lymegrass. Europe. Cultivated in United States. Similar to the native common dune wildrye (*E. mollis*). Coarse, with bluish leaves; spreads by short rootstalks; a good seeder and easily established. A promising grass for control of coastal sand dunes although judged inferior to the beachgrasses (*Ammophila* spp.).

ELYMUS CAPUT-MEDUSAE L. **medusahead wildrye**

Annual. Europe. West coast of United States. A weed on California rangeland. Is crowding out cheatgrass (*Bromus tectorum*) and considered to be a serious pest in southern Idaho. Unpalatable at all stages.

ELYMUS CHINENSIS (Trin.) Keng **Chinese wildrye**
[*Agropyron pseudo-agropyron* (Griseb.) Franch.]

Also called false wheatgrass. China. Cultivated in United States. A vigorous, rhizomatous grass; very coarse; unpalatable; a poor seeder. The rhizomes may attain a length of 12 feet. Possibly useful in wind-eroded areas. Care must be exercised with this grass since it is very aggressive and could easily become a noxious weed.

ELYMUS DAHURICUS Griseb. **Dahurian wildrye**

Also called Asiatic wildrye. Siberia. Cultivated at experiment stations. Grows erect; foliage basal; ground cover good; yields well; short-lived. Inferior to native Canada wildrye (*E. canadensis*) and blue wildrye (*E. glaucus*) in the Northwest; poor results in reseeding trials in California.

ELYMUS DASYSTACHYS Trin. **thickspike wildrye**

Russia. Cultivated at experiment stations. Tested for soil conservation in the Pacific Northwest; said to be adapted to inland dunes but inferior to Volga wildrye (*E. giganteus*) for this purpose. Listed as a promising grass for forage at Mandan, N. Dak.

ELYMUS GIGANTEUS Vahl **mammoth wildrye**

Also called Siberian giant wildrye. Russia. Occasionally cultivated for ornament. A rhizomatous, drought-resistant grass; too coarse for forage. Especially useful for control of inland sand dunes; not adapted to coastal conditions.

ELYMUS GIGANTEUS Vahl **Volga wildrye (strain)**

Tall; coarse; creeping; unpalatable; long-lived on inland dunes. It not only stills the sands but unlike other strains it continues to grow and provide permanent cover on the dunes. Planted vegetatively; gives 15:1 increase in the first year.

ELYMUS JUNCEUS Fisch. **Russian wildrye**

Asia. Introduced about 1927. Cultivated at Mandan, N. Dak., and other experiment stations. Best adapted to north and central Great Plains area and Intermountain region. A widely variable, long-lived bunchgrass with abundant basal leaves. Vigorous and persistent when once established although the seedlings are weak and develop slowly. Roots may penetrate as deep as 8 to 10 feet and draw moisture for 4 to 5 feet horizontally. Drought-resistant; starts growth early and matures seed early; growth continues until late fall. Has been reported as a good grass to fill the gap between winter feeding and summer grazing in Colorado. Can withstand grazing if carefully managed to avoid injury.

It is not a dependable seed-producer, and this has retarded its more extensive use. Drop in yield of seed and forage in old stands may be due to lack of nitrogen. Seeds are difficult to collect because of lodging and shattering. Starts growth 3 days later and matures 20 days earlier than Standard crested wheatgrass (*Agropyron desertorum*) at Mandan, N. Dak. Reported in Montana to rival Standard crested wheatgrass in drought resistance and to remain green longer, although more difficult to establish; except during June and July it is less palatable than Standard crested wheatgrass or smooth brome (*Bromus inermis*), but its fall recovery and growth are better.

More useful for pasture than as hay, but produces good quality hay if grown in rows; most useful in mixtures; promising for erosion control and for range reseeding at low to intermediate elevations in southern Idaho, Colorado, Utah, Nevada, and Wyoming; less promising in foothills of northeastern Washington. Recommended for dry salty land with a deep water table in Utah. Improved strains are being selected at Mandan, N. Dak.

ELYMUS SABULOSUS Bieb. **Russian dune wildrye**

Russia, Europe. Cultivated and tested at experiment stations. Reported as inferior to Volga wildrye (*E. giganteus*) in conservation work on inland dunes in the Pacific Northwest.

ELYMUS SIBIRICUS L. **Siberian wildrye**

Russia. Cultivated. Adapted to northern Great Plains and Intermountain region. A rapid-developing, short-lived grass that grows erect with long, lax, drooping heads. Grows in early spring and late fall; forage and seed yields are excellent. Has been reported from

the Northwest as inferior to native Canada wildrye (*E. canadensis*) and blue wildrye (*E. glaucus*) for conservation work; fair results in seeding tests in the ponderosa pine areas in Colorado.

ERAGROSTIS AMABILIS (L.) Wight & Arn. **feather lovegrass**

Annual. Old World. Georgia, Florida, and Texas; cultivated as bedding or border plant.

ERAGROSTIS BAHIENSIS Schrad. **Bahia lovegrass**

Brazil. Flordia, Alabama, and Louisiana in a few localities.

ERAGROSTIS BARRELIERI Daveau **Mediterranean lovegrass**

Annual. Southern Europe. Southeastern States in waste places.

ERAGROSTIS BRIZANTHA Nees **Kimberly lovegrass**

Africa. Tested at experiment stations. Produced good stands and maintained itself in New Mexico; forage production very small; winterkills in Oklahoma.

ERAGROSTIS CHARIIS (Schult.) Hitchc. **Thalia lovegrass**

Southeastern Asia. St. Petersburg, Fla., along roadsides.

ERAGROSTIS CHLOROMELAS Steud. **Boer lovegrass**

Also called blue lovegrass. Africa. Introduced in 1932. Cultivated in the Southwest. A rapidly growing, long-lived, perennial bunchgrass, similar to, but slightly smaller than weeping lovegrass (*E. curvula*); more palatable and drought-resistant than the latter. Starts stooling early; a continuous winter-grower in warm climates; not cold-resistant. Has been suggested for reseeding semidesert areas of Texas, Arizona, and New Mexico where temperatures seldom go below freezing.

ERAGROSTIS CILIANENSIS (All.) Link **stinkgrass**

Annual. Old World. Widespread in the United States; a weed.

ERAGROSTIS CURVULA (Schrad.) Nees **weeping lovegrass**

South Africa. Introduced in 1927 and again in 1934. Spontaneous in Florida, Texas, and Arizona; cultivated in the Southwest. A very rapid grower that starts early in spring and attains a height of 2 to 5 feet; deep-rooted; spreads by stooling; reseeds itself well. More drought-resistant than Bermudagrass (*Cynodon dactylon*) or buffalograss (*Buchloe dactyloides*); remains green in midsummer. Digestive proteins 50 percent higher than native grama grasses (*Bouteloua* spp.). Good forage when young; when kept grazed or mowed, the succulent base of the plant is readily eaten in midwinter; liked by horses. Used for winter pasturage on sandy land in Florida. Established rapidly in very poor soil in burned-over or eroded areas and has been used for erosion control in the Southwest. Well adapted to southern Great Plains although the less hardy strains are sometimes winterkilled in northern part; more cold resistant than Boer lovegrass (*E. chloromelas*). Replaced within a few years by native grasses when sown with them, although outstanding weed-competing ability reported at Manhattan, Kans.

Showed up well in extensive reseeding tests in California; has been suggested for reseeding work in New Mexico, Texas, and Oklahoma and also (together with native grasses) on semidesert grassland and semidesert shrub types on mesas and foothills in Arizona (3,000 to 4,500 feet). Reported as a "special place" grass for contour furrows, occasionally flooded sites, depressions on the range, and the like.

ERAGROSTIS CYPEROIDES (Thunb.) Beauv. **bristly lovegrass**

South Africa. On ballast, Oregon.

ERAGROSTIS LEHMANNIANA Nees **Lehmann lovegrass**

South Africa. Introduced in 1932. Tested at experiment stations. Smaller, less cold-resistant, and with shallower root system than either Boer lovegrass (*E. chloromelas*) or weeping lovegrass (*E. curvula*); more alkali-tolerant than the latter. New plants are produced by rooting of the commonly prostrate stems; readily reseeds itself. Requires a clean seedbed; cannot compete with Bermudagrass (*Cynodon dactylon*) or Johnsongrass (*Sorghum halepense*). Reported to be a good soil binder; moisture is retained by the profuse, layering growth. Has been suggested for seeding on semidesert grasslands and semidesert shrub mesas and foothills (3,000 to 4,500 feet) in New Mexico, Arizona, Oklahoma, and southwestern Texas where temperatures seldom go below freezing. Fair results in reseeding trials in California.

ERAGROSTIS MULTICAULIS Steud. **peregrine lovegrass**
(*E. peregrina* Wiegand)

Annual. Eurasia. Northeastern States and Oregon; waste places.

ERAGROSTIS OBTUSA Munro **flarescale lovegrass**

South Africa. Cultivated in grass gardens. Died out in summer in Florida; stemmy, of poor quality, and winterkilled in Oklahoma; poor stand and low forage yield in New Mexico.

ERAGROSTIS PILOSA (L.) Beauv. **India lovegrass**

Annual. Europe. Maine to Colorado, south to Florida and Texas; moist, open ground and waste places; a common weed in California rice fields; found on pastures and abandoned farmland in the southern Great Plains.

ERAGROSTIS POAEOIDES Beauv. **little lovegrass**

Annual. Europe. Northeastern and Southern States; sparingly introduced.

ERAGROSTIS STENOPHYLLA Hochst. **slimflower lovegrass**

India. Florida and Mississippi; probably escaped from grass gardens.

ERAGROSTIS SUPERBA Peyr. **Wilman lovegrass**

Also called qovane lovegrass. South Africa. Experiment stations. An erect, leafy perennial about 3 feet tall. Adapted to same areas as Lehmann lovegrass (*E. lehmanniana*). In comparison with weeping lovegrass (*E. curvula*) it begins growth later, competes less well with weeds, and seed does not ripen as uniformly. More palatable than either of these species but grows less in winter.

ERAGROSTIS TEF (Zuccagni) Trotter **teff**
[*E. abyssinica* (Jacq.) Link]

Africa. An important cereal in Africa. Grown at experiment stations in the Southwest; occasionally cultivated for ornament. Produced good stands but did not reseed itself; reported as unpalatable.

ERAGROSTIS TENELLA (L.) Beauv. **Japanese lovegrass**

Annual. Asia. Cultivated for bedding or border plant.

ERAGROSTIS UNIOLOIDES (Retz.) Nees **Chinese lovegrass**

Southern Asia. Georgia and Florida; waste ground.

ERAGROSTIS VIRESCENS Presl **Chilean lovegrass**

Annual. Chile. Ballast in Florida.

EREMOCHLOA OPHIUROIDES (Munro) Hack.
centipedegrass

Southeastern Asia. Introduced in 1919. South Carolina to Florida and the Gulf States. Forms a dense, weed-free sod; grows on poor, sandy soils; requires very little fertilization; is shade-tolerant and disease-resistant; turns brown with the first freeze. May be propagated by cuttings. Reported as excellent for lawns in the Southeastern States; may also be used as a fairway grass for golf courses in loose, sandy soil or for putting greens if it is kept well rolled. Unsuitable as a pasture grass; cattle often lose weight on pure stands. It is said to equal Bermudagrass (*Cynodon dactylon*) as a green cover for water channels if kept long.

ERIANTHUS RAVENNAE (L.) Beauv. **Ravennagrass**

Europe. Cultivated for ornament and established along irrigation ditches in Arizona. Said to be promising for erosion control.

ERIOCHLOA ARISTATA Vasey **bearded cupgrass**

Also called Mexican everlasting-grass. Annual. Mexico. Introduced in 1888. Arizona and California. Cultivated for hay only in extreme Southern States; produces two good crops annually; best crop obtained from second growth that is ready to cut in October. Reseeds itself well.

ERIOCHLOA POLYSTACHYA H. B. K. **Caribgrass**
[*Eriochloa subglabra* (Nash) Hitchc.]

Also called malojillagrass. West Indies. Introduced in 1914. Gulf Coast, from Florida to Texas. Prefers low, wet habitat; tolerates flooding; very rapidly established; will not withstand cold or drought; good for forage and hay. Excellent results in southern Mississippi and southern Florida where it is regarded as superior to Paragrass (*Panicum purpurascens*). Seeds eaten by birds.

ERIOCHLOA PROCERA (Retz.) Hubbard **tropical cupgrass**

Annual. Tropical Asia. Arizona.

ERIOCHLOA VILLOSA (Thunb.) Kunth **hairy cupgrass**

Annual. Asia. Ballast near Portland, Oreg.; adventive in Colorado; occasionally cultivated.

EUCHLAENA MEXICANA Schrad. **Mexican teosinte**

Annual. Mexico. Cultivated in Southern States for forage. Coarse; grows 6 to 12 feet high; does best on rich soil with ample moisture and a long, hot season; drought-resistant if deeply planted. On medium and poor soils it is inferior to sorghum (*Sorghum vulgare*) or Napiergrass (*Pennisetum purpureum*). Too unadaptable to be of much importance. May be cut like corn; gives four to five cuttings a year; seed matures only in the extreme South; can be used as green forage, silage, or fodder; the fodder, although good, is difficult to cure.

EUCHLAENA PERENNIS Hitchc. **perennial teosinte**

Mexico. Tested at Angleton, Tex., and in Arizona; also found at James Island, S. C.

FESTUCA AMETHYSTINA L. **amethyst fescue**

Europe. Sometimes cultivated for ornament.

FESTUCA ARUNDINACEA Schreb. **reed fescue**
[*F. elatior* var. *arundinacea* (Schreb.) Wimm.]

Also called tall fescue. Europe. Sparingly spontaneous; widely cultivated in Northern States and more recently in Southeastern States and Texas. Came into prominence in 1890. More rust-resistant and vigorous than meadow fescue (*F. elatior*). Adapted to semiwet conditions and survives prolonged winter flooding, but is also drought-resistant and aggressive; altitudinal limit is high; a long-lived species in the West; has strong seedlings and gives a good ground cover; growth commences early in spring and, with adequate moisture, continues until covered by snow.

Low palatability for sheep in Oregon and best grazed in summer and fall. Best in mixtures; used for forage although less palatable than smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), or timothy (*Phleum pratense*). Has been successfully employed for conservation in the Intermountain area and the Northwest on irrigated and wet alkaline land where the rainfall is 10 to 18 inches; good for seeding mountain ranges, with high forage yields reported in Oregon and Utah.

FESTUCA ARUNDINACEA Schreb. **Alta fescue (strain)**

Developed in 1923 by Oregon Agricultural Experiment Station and U. S. Department of Agriculture. Longer-lived, higher yielding, and more resistant to drought and disease than meadow fescue (*F. elatior*). Extremely tolerant of soil pH. Although coarse and tough, cattle will graze it when it is young or in mixture. High forage yields in Oregon where used also to reclaim saltgrass meadows; has shown up well in extensive reseeding tests in California.

FESTUCA ARUNDINACEA Schreb.
Alta 144 fescue (selection)

A selection from Alta fescue. Subject to winterkilling when young but very hardy the second winter.

FESTUCA ARUNDINACEA Schreb.
Kentucky 31 fescue (selection)

Also called Fescue 31. Discovered in Kentucky in 1931. Has a wider soil and temperature adaptability than the typical form of the species; considered by some to be identical with Alta fescue. Suited to the mid-Southeastern States and Texas where it remains green all year with occasional exception of midsummer months. Makes permanent pasture without reseeding; stand improves after first year; did not tolerate close or late-season grazing in Texas; not regarded as superior to ryegrass (*Lolium* spp.) in Georgia tests. Has been used for erosion control in Kentucky and Tennessee.

FESTUCA CAPILLATA Lam. **hair fescue**

Europe. Northeastern States; Minnesota and Oregon; occasionally cultivated. Blades more slender and longer than in sheep fescue (*F. ovina*).

FESTUCA DERTONENSIS (All.) Aschers. & Graebn.
brome fescue

Annual. Europe. Pacific coast; rare in Eastern States. No demonstrated value.

FESTUCA ELATIOR L. **meadow fescue**

Eurasia. Found in Northern States and cultivated there. A short-lived species that seems to be longer-lived in extreme northern parts of the Midwest. Requires good soil; not adapted to poor upland or sandy soils; nonpersistent in dry sites; fairly shade-tolerant; grows well in moist bottom lands; said to stand up well under a heavy flow of water. Growth commences early in spring and continues late; does not mature as early as timothy (*Phleum pratense*) but persists longer; can withstand considerable heat and dought; frost-resistant; subject to rust in wet years; excellent seed habits; best in mixture with timothy and clover.

Used both for pasture and hay. Not regarded as a hay plant in the Pacific States and has never become important there, as it has not remained in the stands. Growth poor under aspen in Utah. Said to do well on alkali-seepage land in Utah, Idaho, Nevada, and Colorado but sometimes winterkilled there. Recommended for reseeding moist mountain areas in Oregon, Nevada, Utah, Idaho, Colorado, and New Mexico. Reported as palatable for sheep in Oregon for summer and fall grazing. Seeds eaten by birds.

FESTUCA GENICULATA (L.) Cav. **Portuguese fescue**

Portugal. Sometimes cultivated for ornament.

FESTUCA GIGANTEA (L.) Vill. **giant fescue**

Europe. Adventive at Dobbs Ferry, N. Y.; cultivated and tested in the Pacific Northwest for conservation use. Regarded by some as an awned form of reed fescue (*F. arundinacea*) to which it is inferior in seed production.

FESTUCA MAIREI St. Yves **Maires fescue**

Africa. Tested in New Mexico.

262036°—53——5

FESTUCA MYUROS L. **rattail fescue**

Annual. Europe. Eastern States, Coastal Plain; Wisconsin, Ohio, and Washington to southern California. No demonstrated value.

FESTUCA OVINA L. **sheep fescue**

Some forms native. Eurasia. Northern half of the United States. Only locally abundant; often plentiful at higher altitudes in the West (7,000 to 11,000 feet). Usually found on dry, sandy, gravelly, or rocky soils; unable to compete successfully in other areas; slow to become established; cold-tolerant and drought-resistant. Becomes green early in spring and is most palatable then; relished by sheep; fairly resistant to trampling but dies out with excessive grazing. Useful in mixtures; good for range forage and, in mixture, for cultivated pasture; produces a durable turf on sandy soil.

Has been used successfully for conservation work in areas of low rainfall in the Northwest where it has been planted in alternate rows with wheatgrasses (*Agropyron* spp.); reported as suitable for bank stabilization along lined irrigation canals and for road cuts and fills. Has been suggested for reseeding intermediate high mountain ranges in Nevada, Idaho, Oregon, Colorado, and New Mexico, and for reseeding in and near the national forests in Montana and on logging roads in Oregon and Washington.

Several of the finer-stemmed, high-yielding strains are being increased. Birds eat the seeds.

FESTUCA OVINA var. DURIUSCULA (L.) Koch **hard fescue**

Europe. Northeastern States to Virginia and Iowa; cultivated as a pasture grass and for soil conservation in Northwestern States. An understory grass with a heavy root production; useful for improving soil structure. Less drought-resistant with smoother, longer, and tougher leaves than the typical form of the species; grows well on poor, eroded soils. A good seeder; requires shallow coverage. Relatively free from disease and easy to establish; seedlings are strong and grow rapidly. Used either alone or in mixture; best with alfalfa on eroded soils. Useful also for reseeding burned-over timberland and over-grazed grassland areas in the ponderosa pine belt on the mountainous slopes of the Northwest.

FESTUCA OVINA var. GLAUCA (Lam.) Koch **blue fescue**

Europe. Cultivated for borders.

FESTUCA RIGESCENS (Presl) Kunth ———

Peru. Arizona; known from a single specimen collected in 1887.

FESTUCA RUBRA L. **red fescue**

Also called creeping red fescue. Some forms are native. Europe. Northern States and southward in the mountains in fairly moist, cool regions. Found in old pastures in Northern States but not liked by cattle; moderately palatable for sheep in Oregon, best grazed in fall; used successfully for soil conservation and range reseeding in Pacific Northwest. Recommended for range seedings in the ponderosa pine areas of Colorado. Has been used for terrace outlets, ditches, road cuts, and fills; slow to become established but produces good turf

and is suitable for shady lawns. Soil-tolerant; produces a large amount of fine tough roots which are useful for erosion control on steep slopes, waterways, burned-over forest land, and sand dunes. The broad-leaved spreading type is the most satisfactory in conservation mixtures. There are several strains of this species, two of which are here described.

FESTUCA RUBRA L. Clatsop red fescue (strain)

A selection of red fescue found on the coastal dunes of Oregon and distinctive for its seedling vigor, long leaves, early spring recovery, growth during the warm summer and cool winter months, and lesser tendency to become sod-bound. Especially useful for permanent cover on sand dunes after erosion has been halted; reduces the fire hazard because it remains green all summer; is benefited by fertilizer application in the seedling stage.

FESTUCA RUBRA L. Illahee red fescue (strain)

Introduced from England in 1937. A turf variety that produces less forage than other varieties, more uniform, with finer stems and leaves; spreads slowly and is cold-tolerant.

FESTUCA RUBRA var. COMMUTATA Gaud. Chewings fescue

Europe. Occasionally cultivated. A form with more erect culms, producing a firmer sod than the species. Has been suggested, in mixtures, for reseeding at intermediate elevations in the Intermountain area, old logging trails, and dry sites in Northwestern States, and for waterways where the soil is poor; makes a good ground cover on steep slopes and burned-over forest land. Low palatability for sheep in Oregon.

FESTUCA RUBRA var. HETEROPHYLLA (Lam.) Mut. shade fescue

Europe. Occasionally used for lawns in shady places.

FESTUCA RUBRA var. LANUGINOSA Mert. & Koch hairyscale red fescue

Europe. Northwestern and Northeastern States. Lemmas pubescent.

GASTRIDIUM VENTRICOSUM (Gouan) Schinz & Thell. nitgrass

Europe. Pacific coast; Boston, Mass. A common weed on the Pacific coast. No economic value.

GYNERIUM SAGITTATUM (Aubl.) Beauv. uvagrass

Tropical America. Cultivated in greenhouses for ornament. Used as a soil binder in tropical America.

HACKELOCHLOA GRANULARIS (L.) Kuntze pitscalegrass

Tropics of the world. Southern States. Furnishes some forage in the Southwest.

HELEOCHLOA ALOPECUROIDES (Phil. & Mitterp.) Host

Europe. Ballast, Pennsylvania and Oregon.

HELEOCHLOA SCHOENOIDES (L.) Host **swamp-timothy**

Europe. Northeastern States; California.

HELICTOTRICHON PUBESCENS (Huds.) Pilger
***(Avena pubescens* Huds.)** **hairy false-oat**

Europe. Connecticut and Vermont; waste places.

HOLCUS LANATUS L. **velvetgrass**

Europe. Widely distributed in both eastern and western United States. Owing to low palatability this grass is regarded as a weed on the Pacific coast; difficulty of eradication has encouraged its use for hay; gives two cuttings a year under favorable conditions but with much shrinkage. Disliked by horses.

HOLCUS MOLLIS L. **German velvetgrass**

Europe. Washington to California; New York; ballast, Camden, N. J.

HORDEUM BREVISUBULATUM (Trin.) Link
short-awned barley

Russia. Cultivated. Does well on wet sites; withstands trampling; good seed yield. Undesirable because of weedy character and awned spikelets.

HORDEUM BULBOSUM L. **bulbous barley**

Russia. Cultivated on the Pacific coast. Resembles cultivated rye (*Secale cereale*); tall, sometimes exceeding 6 feet; stemmy and coarse. Grows well at low temperatures; very prolific spring development; matures early; seeds heavily; seed awned, and hard to collect and clean. Grown in almost pure clay soil; easily established on eroded and steep land; drought-resistant; forage yields are high during fall and winter; recommended for range reseeding at intermediate elevations in Nevada and Utah; reported as winterkilled in seeding experiments in a ponderosa pine area in Colorado.

HORDEUM HYSTRIX Roth. **Mediterranean barley**
(*H. gussoneanum* Parl.)

Europe. Scattered distribution in East and West; fields and waste places.

HORDEUM LEPORINUM Link. **hare barley**
(Referred to *H. murinum* L. by U. S. authors)

Europe. Common on the Pacific coast; found in a few localities in the East; fields and waste places. Reported as a troublesome weed in alfalfa meadows in Arizona and California. Makes high-quality pasture and hay if not allowed to mature before cutting; awns are injurious to stock unless treated by chopping with a hay cutter and then moistening for 12 to 24 hours. Seeds eaten by birds.

HORDEUM MARINUM Huds. **seaside barley**

Europe. Ballast at Camden, N. J.

HORDEUM STEBBINSII Covas **Stebbins barley**

Old World. Ballast, Alabama; adventive, Oklahoma, Idaho, Washington, New Mexico to California. Closely similar to hare barley (*H. leporinum*).

HORDEUM VULGARE L. **barley**

Annual. Old World. The commonly cultivated barley. Grain used for food.

HYPARRHENIA HIRTA (L.) Stapf ——————

Africa and South America. Cultivated at Florida Experiment Station. Adapted to extreme south or southwestern United States. Little forage value; promising for erosion control in southwestern Texas.

HYPARRHENIA RUFA (Nees) Stapf **jaragua**

Old World tropics. Sparingly cultivated in Florida; escaped on Gulf coast. Moderately good forage; will not withstand frost. Reported as poor in reseeding trials in California.

IMPERATA CYLINDRICA (L.) Beauv. **cogongrass**

Old World. Ballast at Portland, Oreg.; introduced recently in Florida and spreading in the west-central part. Grows 2 to 6 feet high; furnishes fairly good forage when young; because of the strong creeping rhizomes it spreads into cultivated ground and is very difficult to eradicate.

KOELERIA PHLEOIDES (Vill.) Pers. **annual koeleria**

Annual. Europe. Sparingly introduced in Southern States and Oregon. No economic value.

LAGURUS OVATUS L. **harestail**

Mediterranean region. Cultivated for ornament and sparingly escaped, New Jersey, North Carolina, and California. Used in dried bouquets.

LAMARCKIA AUREA (L.) Moench **goldentop**

Mediterranean region. Southwestern States, escaped in California. Sometimes cultivated for ornament; a pleasing grass for edgings. Shows promise as a valuable self-seeding ground cover in southern California. It can be used alone for a winter ground cover or as an understory to other grasses in soil conservation work.

LOLIUM MULTIFLORUM Lam. **Italian ryegrass**

Europe. Widely cultivated and naturalized in more humid regions of the United States. Prefers warm, moist growing conditions and rich, well-drained soils. Moderately salt-tolerant. A hardy short-lived, usually annual, rapidly growing grass; 2 to 4 feet tall. Forms a dense ground cover; crowds out weeds when mixed with clover. A heavy seeder, with many volunteers unless kept closely mowed or grazed. Less winter hardy than timothy (*Phleum pratense*) or orchardgrass (*Dactylis glomerata*). Tender and palatable; produces a large amount of forage; heavy pasturing keeps it in a succulent condition. Frequently grown in mixture with a slow perennial.

In the South it is used for temporary winter pastures and in the North as a nurse crop for permanent spring pastures or lawns. Where moisture and fertility are not limited it makes excellent hay and may be cut twice during the season; has been used for green manure and for temporary poultry range. The commercial seed of this species usually produces some plants, suspected to be hybrids,

which live into the second season. In the Northwest it is not regarded as superior to common ryegrass in any way. Seeds eaten by birds.

LOLIUM MULTIFLORUM × PERENNE **common ryegrass**

Also called domestic ryegrass, Oregon ryegrass, western ryegrass. The domestically grown ryegrass, usually a genetic mixture of Italian and perennial ryegrasses. Resembles Italian ryegrass (*L. multiflorum*) very closely although usually 2 to 3 feet shorter; leafy, tender, and very palatable. A heavy yielder which, when properly handled, gives a high grade of hay; often considerable pasturage is produced after the hay crop is removed. Suitable for lawns and putting greens in the Southern States. Ryegrass grown for seed production in the Pacific Northwest is often seeded with winter oats.

LOLIUM MULTIFLORUM var. RAMOSUM Guss. ————

Europe. Oregon; waif.

LOLIUM PERENNE L. **perennial ryegrass**

Europe. Widely cultivated and naturalized. Cultivated in meadows, pastures, and lawns. Prefers heavy soil in cool, moist regions with mild winters; unsuited to hot, dry weather or sandy soil. Valuable for forming a quick cover, but not popular in lawns because of toughness of the stems and difficulty in mowing, especially during dry weather. Seedlings are not as vigorous as common ryegrass (*L. multiflorum*×*perenne*). Very palatable and nutritious; withstands pasturing well; although short-lived it will produce a large amount of forage for 1 to 3 years; on marshy lands where the soil is good it may persist 5 to 7 years.

Hay good but inferior to timothy (*Phleum pratense*). Has been grown on well-drained saline soil in Utah and recommended for seeding saltgrass lands in Utah and Nevada. Used for soil conservation in the Pacific Northwest. Attacked by blind seed disease. Grown in western Washington and Oregon for seed.

LOLIUM PERENNE L. **Pacey's ryegrass (small-seeded state)**

A designation applied to the mechanically separated small seed of *L. perenne*. Has no demonstrated advantage in United States.

LOLIUM PERENNE L. **P–312 ryegrass (selection)**

A selection from Plant Introduction 107,071 which is cold-hardy and disease-resistant; used in the Northwest for soil conservation.

LOLIUM PERENNE var. CRISTATUM Pers. **crested ryegrass**

Europe. Wilmington, Del., and Washington, D. C.; ballast at Salem and Eola, Oreg. Spike ovate, and spikelets crowded, horizontally spreading; value unknown.

LOLIUM PERSICUM Boiss. & Hohen. **Persian ryegrass**
(*Lolium rigidum* Gaudin)

Russia. North Dakota; probably introduced in wheat seed; becoming a weed.

LOLIUM REMOTUM Schrank **hardy ryegrass**

Annual. Russia. North Dakota; a weed in flax fields. Gave erratic results in seeding tests in ponderosa pine area in Colorado.

LOLIUM STRICTUM Presl **Sicilian ryegrass**

Annual. Europe. Ballast, Oregon; introduced in California and Arizona. Resembles *L. subulatum* but spikelets not sunken in the rachis.

LOLIUM SUBULATUM Vis. **Dalmatian ryegrass**

Europe. Ballast and waste areas, Oregon and California. Good results in seeding trials in California.

LOLIUM TEMULENTUM L. **darnel ryegrass**

Annual. Europe. Occasional throughout Eastern States and rather common on the Pacific coast; grainfields and waste places. The grain is known to contain, at least frequently, a poisonous narcotic alkaloid and some authorities contend that this is due to fungus infestation.

LOLIUM TEMULENTUM var. LEPTOCHAETON A. Br. ———

Europe. Washington to California; occasional on the East coast, Maine to Texas. Lemmas awnless.

MANISURIS ALTISSIMA (Poir.) Hitchc. **African jointtail**

Warm temperate and tropical regions of both hemispheres. Southern Texas; ponds and ditches.

MELICA ALTISSIMA L. **Siberian melic**

Eurasia. Sometimes cultivated as an ornamental.

MELICA CILIATA L. **silkyspike melic**

Europe. Occasionally cultivated as an ornamental.

MELINIS MINUTIFLORA Beauv. **molassesgrass**

Native of Africa but described from Brazil whence introduced into United States in 1899. Southern Florida; a volunteer at Chillicothe, Tex. Can be grown only in frost-free localities. Highly nutritious, although sticky and ill-smelling; late maturing; volunteers well. Used for pasturage; cattle dislike it at first but later appear to relish it and thrive on it after becoming accustomed to the odor.

MIBORA MINIMA (L.) Desv. ———

Annual. Europe. Plymouth, Mass.

MICROSTEGIUM VIMINEUM (Trin.) A. Camus ———
[*Eulalia viminea* (Trin.) Kuntze]

Annual. Tropical Asia. Ohio, North Carolina, Virginia, Tennessee, Kentucky, Alabama; roadsides.

MICROSTEGIUM VIMINEUM var. IMBERBE (Nees) Honda ———

Annual. Asia. Berks County, Pa. An awned form.

MISCANTHUS NEPALENSIS (Trin.) Hack.
Himalaya fairygrass

Also called Nepal silvergrass. India. Occasionally cultivated for ornament.

MISCANTHUS SACCHARIFLORUS (Maxim.) Hack. **Amur silvergrass**

Asia. Clinton County, Iowa, escaped; sparingly cultivated.

MISCANTHUS SINENSIS Anderss. **Chinese silvergrass**

Also called eulalia. Eastern Asia. Cultivated for ornament and growing wild. The following varieties are distinguished: var. *variegatus* Beal, having white-striped blades; var. *zebrinus* Beal, with white-banded blades; var. *gracillimus* Hitchc., possessing very narrow blades. It would be better if the common name eulalia were restricted to the genus *Eulalia* Kunth.

MOLINIA CAERULEA (L.) Moench. **moorgrass**

Eurasia. Northeastern United States.

MONERMA CYLINDRICA (Willd.) Coss. & Dur. **thintail**
[*Lepturus cylindricus* (Willd.) Trin.]

Old World. Pacific coast; salt marshes.

NARDUS STRICTA L. **matgrass**

Europe. New Hampshire, New York, Michigan; sparingly found in dry, open ground.

NASSELLA CHILENSIS (Trin. & Rupr.) E. Desv.
[*N. major* (Trin. & Rupr.) E. Desv.] _____

Chile. Ballast, Portland, Oreg.

NEYRAUDIA REYNAUDIANA (Kunth) Keng **Burmareed**

Southern Asia. Cultivated and escaped in Florida.

OPLISMENUS HIRTELLUS (L.) Beauv. **basketgrass**

Tropical America. Cameron County, Tex.; shady places. Sometimes cultivated by florists as a basket plant and for edging under the name "*Panicum variegatum*." The blades are striped with white.

OPLISMENUS SETARIUS (Lam.) Roem. & Schult.

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Tropical America. North Carolina to Florida, Arkansas, and Texas; shady places along the coast.

ORYZA SATIVA L. **rice**

Old World. Adventive near the coast from Virginia to Florida and Texas. Cultivated in Louisiana, Texas, Arkansas, California, and Mississippi. An important food crop.

ORYZOPSIS COERULESCENS (Desf.) Hack. **blue ricegrass**

Europe. Grown at experiment stations. Reported as successful both on heavy and on sandy soils. Of little value for pasture. Grew well at Tucson, Ariz.; unsuccessful in New Mexico; inferior to Bloomers ricegrass (*O. bloomeri*) for sand-binding in the Pacific Northwest.

ORYZOPSIS MILIACEA (L.) Benth. & Hook. **smilograss**

Mediterranean region. California, introduced 1879; ballast, New Jersey and Pennsylvania. A hardy, drought-resistant, long-lived, perennial bunchgrass; requires a firm seedbed with little competition;

excellent seed production; volunteers well but establishes slowly. Palatable; provides good forage in southern California where it is persistent and remains green throughout the year; good results on burned brush areas in California; grows well at Tucson, Ariz.; winterkilled at Pullman, Wash.; inferior to Bloomers ricegrass (*O. bloomeri*) for sand-binding in Pacific Northwest; unsuccessful in New Mexico.

PANICUM ANTIDOTALE Retz. **giant panicum**

Also called blue panicum. India. Introduced in United States from Australia in 1912. Escaped in Cochise County, Ariz.; cultivated at experiment stations; grown in Texas. A coarse, vigorous perennial, 5 to 9 feet tall, with a heavy basal growth of thick, short, bulbous rhizomes; root system extensive; reproduction by tillering; seed production abundant. A heavy nitrogen feeder; requires fertile soil and good drainage.

Abundant moisture needed for germination; seedlings establish slowly and do not withstand competition; rapid growth commences 6 to 8 weeks after germination. When established, can recover from extensive heat and wind injury; needs frequent cultivation to prevent sod-binding. Good for grazing after shoots begin to grow rapidly; high protein content; very palatable if not too mature; provides earlier grazing than available annuals; production best under rotational grazing. Madrid sweet clover or a dry-land alfalfa have been suggested as suitable companion legumes.

Recommended for planting in washes and arroyos on flood plains and desilting areas and for stream-bank protection. Is being effectively used as a windbreak in the drier parts of the Rio Grande Valley, Tex. Adapted to warm areas, both dry and moist, but not promising in Southeastern States, possibly owing to low competitive ability in seedling stage; winterkills north of 35° latitude; inferior to Sudangrass (*Sorghum sudanense*) as a summer annual; a selected strain withstood below-zero cold at Woodward, Okla.

PANICUM BERGII Arech. **Berg panicum**

South America. Ballast in Alabama and southeastern Texas.

PANICUM COLORATUM L. ———

Africa. Tested at Tucson, Ariz., Woodward, Okla., and extensively at San Antonio, Tex. Prefers heavy soil; fairly leafy; makes good summer growth; winterkills in Oklahoma.

PANICUM MAXIMUM Jacq. **guineagrass**

Africa. Florida, Texas, California. A tall, vigorous, moderately coarse bunchgrass spreading slowly from creeping rootstocks. Requires a subtropical climate. Does best on heavy, rich soil; where well adapted it spreads rapidly and reseeds itself. Used for fodder and for pasturage when young; too coarse for forage when mature. May be cut once a month during growing season in Florida. Seed not commercially available.

PANICUM MILIACEUM L. **proso**

Also called broomcorn millet, hog millet. Asia. Important in Dakotas as early as 1875; cultivated from southern Canada to central Great Plains, especially in eastern Colorado; also escaped in waste

ground. A good, short-season, high-yielding grain crop; the hay is coarse and the forage yields low. Matures 2 weeks earlier than foxtail millet (*Setaria italica*) but gives smaller yields. The ground grain is readily eaten by livestock; used extensively in poultry feed and birdseed mixtures.

PANICUM PILCOMAYENSE Hack. ———

Paraguay. Matagorda County, Tex.

PANICUM PURPURASCENS Raddi **Paragrass**

Africa and tropical America. Florida, Texas, Gulf coast region. Found on damp, heavy soils; not injuried by overflows. Killed by temperatures below 18° F.; grows 4 to 5 feet high; propagated vegetatively. Can be used for pasture, hay, or as a soiling crop; provides good grazing and withstands trampling; quality and yield of hay is high; should be cut before it becomes woody. Sod-binding can be prevented by plowing under every few years in early summer.

PANICUM RAMOSUM L. **browntop millet**

Annual. Tropical Asia. Southeastern States; a minor forage crop in north central Georgia. A rapid-growing annual which gives good-quality hay or forage; growth limited to fertile soils with adequate moisture; not aggressive; season of growth is short and yields are moderate; disease-resistant. Sudangrass (*Sorghum sudanense*) usually preferred for fall grazing. Seeds abundantly and is cultivated for bird food.

PANICUM REPENS L. **torpedograss**

Tropical and subtropical coasts of both hemispheres. Florida to Texas, along the coast; collected at Mobile, Ala., as early as 1876. A good sand binder; thrives on coarse sands and in wet mucky areas; does not tolerate dense shade; may become a serious weed when allowed to become established in farm and grove land; can be used as a pasture grass although indiscriminate planting is not advisable. Productive and nutritious but inferior to pangolagrass (*Digitaria decumbens*) and other grasses except in certain unfavorable habitats, as on copper-deficient soils. Tends to become sod-bound and can be stimulated by heavy disking; fertilization required to maintain productive stand. Leaves easily killed by frost but dried grass has considerable feed value and may be used for winter pasturage or hay. Seeds eaten by birds.

PARAPHOLIS INCURVA (L.) C. E. Hubb. **sicklegrass**
[*Pholiurus incurvus* (L.) Schinz & Thell.]

Europe. New Jersey to Virginia; California; Portland, Oreg.; mud flats and salt marshes along the coast.

PASPALUM DILATATUM Poir. **Dallisgrass**

South America. Introduced about 1875. New Jersey to Tennessee and Florida, west to Texas and California. A tufted, deep-rooted grass that forms a loose sod under heavy grazing. Can be propagated vegetatively; seed germination poor; slow to establish but stands gradually improve. Palatable and highly nutritious; excellent forage in mixture with white clover which should not be seeded in until grass is established. Withstands continued grazing only when well estab-

lished. Close grazing or mowing is recommended to stimulate growth, avoid toughness, and prevent maturing of the ergot-infested seeds which are injurious to cattle. Thrives on heavy soils and is especially valuable on wet lands unsuitable for Bermudagrass (*Cynodon dactylon*); easily eradicated. Rated as fair for reseeding in California. Breeding program in Louisiana to overcome principal disadvantages of low purity, low germination, and ergot-infection of seed imported from Australia has resulted in the following improved strains.

PASPALUM DILATATUM Poir.
Dallisgrass (Strains B–230 and 430)

Developed at Louisiana Agricultural Experiment Station. Produce better seed (although not ergot-free) and yield more forage. Emerge in 1 to 2 weeks when sown in prepared seedbed; may be grazed 6 weeks after planting; regular mowing recommended. Seed commercially available.

PASPALUM INTERMEDIUM Munro ———

South America. Tifton, Ga.; escaped along roadsides.

PASPALUM MALACOPHYLLUM Trin. **ribbed paspalum**

South America. Cultivated in Carolinas and Florida; not common. Requires careful management to maintain stand; more erect and finer-stemmed than Dallisgrass (*P. dilatatum*); seed loses vitality quickly.

PASPALUM NICORAE Parodi ———

Uruguay. Cultivated; Georgia and Florida.

PASPALUM NOTATUM Flügge **Bahiagrass**

Tropical America. Introduced sparingly in New Jersey; North Carolina, Florida, Louisiana, and Texas; cultivated in Florida and the Gulf coast area. Not winter-hardy farther north. A leafy pasture grass with deep and extensive root system and short stolons; keeps out weeds once a sod is formed; grows well in sandy soils; produces abundant seed when properly managed. Capable of making a firm turf on loose sand.

PASPALUM NOTATUM var. SAURAE Parodi
Pensacola Bahiagrass
Paraguay Bahiagrass } **strains**
Wilmington Bahiagrass

Paraguay and Argentina. North Carolina, Florida, and Texas. Pensacola strain is taller and more winter-hardy than the species, with narrower leaves; produces abundant seed of good quality but shatters badly; lower fertilizer requirement than Dallisgrass (*P. dilatatum*). Shows promise of becoming important for forage and erosion control in the Southern States.

Paraguay strain is coarse and tough; as compared with the Pensacola strain, the leaves are shorter and more hairy and the seed stalks are taller. Inferior to zoysias (*Zoysia* spp.) or Bermudagrass (*Cynodon dactylon*) as a lawn grass. Has done well in Texas.

Wilmington strain similar to Paraguay strain but has exceptional resistance to lower temperatures.

PASPALUM RACEMOSUM Lam. **Peruvian paspalum**

Peru. Cultivated for ornament.

PASPALUM ROJASII Hack. ———

Brazil. Grown at Gainesville, Fla. A good forage grass in Brazil.

PASPALUM SCROBICULATUM L. **India paspalum**

Asia. Ballast, Camden, N. J., Abilene, Tex.

PASPALUM URVILLEI Steud. **Vaseygrass**

Argentina. North Carolina to Florida and Texas; southern California. Introduced accidentally near New Orleans before 1882. Seldom planted but utilized where found growing. Similar to Dallisgrass (*P. dilatatum*) but taller and less leafy at the base and more salt-tolerant. Can grow in wet land but will withstand severe drought; prefers heavy soils but grows also on moist, sandy land; can be used for pasture and hay in the South where it may continue growth throughout winter to provide late pasturage. Does not withstand continuous heavy grazing; hay rated as excellent. Seed not commercially available owing to excessive shattering and lack of suitable harvesting machinery; most of seed now planted is hand-stripped. It is unfortunate that the name Vaseygrass—insignificant for this species—was not applied to the grass genus *Vaseyochloa*, where it would be highly appropriate.

PENNISETUM ALOPECUROIDES (L.) Spreng.
Chinese pennisetum

China. Sparingly cultivated for ornament; escaped in Berks County, Pa.

PENNISETUM CILIARE (L.) Link. **buffelgrass**

South Africa. Grown in grass gardens in Southern States and now being extensively tested from Arizona to Florida, north to Oklahoma. Readily established; roots grow as much as an inch a day; high protein content. Provides a large amount of palatable forage on relatively poor soils but must be fertilized and managed properly to maintain highest production. Not adapted where winter temperatures are as low as minus 3 to 5° F. Seeding commences 60 days after emergence and continues profusely until frost; seeds are fuzzy and difficult to harvest. Good results in test on light, sandy, arid, nonproductive, blow-sand land in southern Texas. Adequate commercial seed supplies available.

PENNISETUM CLANDESTINUM Hochst. **kikuyugrass**

Africa. Introduced in middle 1920's in southern California; Arizona, Florida, and Texas; a weed in avocado and orange groves in San Diego County, Calif., where it was introduced to prevent soil erosion but has become a serious competitor to the trees. A low-growing species, with both underground and surface runners; spreads rapidly; drought-resistant; winterkills more quickly than Bermudagrass (*Cynodon dactylon*). Said to produce an abundance of palatable green feed. Propagated vegetatively; seed has been reported from Orange County, Calif., but is not produced in other localities. Attacked by leaf-spot disease in Florida and deemed un-

suited to the warm, damp climate there after many unsuccessful trials. Used for lawns and soil-erosion test plantings in southern California.

PENNISETUM COMPLANATUM (Nees) Hemsl. ——————

Southern Mexico to Panama. Tested in Florida where it was found to be very palatable but also very bunchy, slow to spread, and susceptible to frost injury.

PENNISETUM GLAUCUM (L.) R. Br. **pearl millet**

Annual. Eastern Hemisphere. Cultivated in Southern States; can be grown as far north as Maryland. Used in the South for grazing and silage; capable of producing very large amounts of green fodder; highly nutritive and palatable while leaves are tender; may be grazed throughout growing season. Requires fertile soil; moderately drought-resistant; exceptionally free of disease.

PENNISETUM GLAUCUM (L.) R. Br. Sanyo millet (hort. var.)

Nigeria, Africa. Cultivated in South. Is considerably more leafy than pearl millet and has a longer grazing season; yields are lower.

PENNISETUM GLAUCUM (L.) R. Br. Starr millet (strain)

Recently released in Georgia. Resembles Sanyo millet in leafiness; has possible advantage in somewhat earlier seed maturity.

PENNISETUM LATIFOLIUM Spreng. Uruguay pennisetum

South America. Occasionally cultivated for ornament.

PENNISETUM NERVOSUM (Nees) Trin.
bentspike pennisetum

South America. Southern Texas, along the Rio Grande.

PENNISETUM PURPUREUM Schumach. **Napiergrass**

Also called elephantgrass. Africa. Introduced in 1913. Florida, Gulf States, and irrigated areas of New Mexico, Arizona, and southern California. Can be grown as far north as Charleston, S. C., under favorable conditions of soil and moisture. Has been grown successfully in Arizona where it is deemed inferior to sorghum varieties. Grows 6 to 12 feet tall; prefers moist, fertile soil but is fairly successful on poor land and will withstand considerable drought; propagated readily from seed, root divisions, or cuttings of mature canes; expensive to establish. Old stands should be renewed to maintain productivity; successful grazing calls for rotational management.

Used for soiling, grazing, and silage; relished by cattle despite its coarseness; contains a relatively high percentage of protein; unexcelled in quantity of green feed produced; cuttings can be made every 3 to 4 weeks during the growing season until the plant becomes woody and unpalatable. Production during the last 15 years has been greatly increased by development of disease-resistant strains which are distributed from the Georgia and Florida Agricultural Experiment Stations.

PENNISETUM SETACEUM (Forsk.) Chiov. **fountaingrass**
(*P. ruppelii* Steud.)

Africa. Cultivated for ornament.

PENNISETUM VILLOSUM R. Br. **feathertop**

Africa. Cultivated for ornament; Michigan, Texas, and California; sparingly escaped in dry ground.

PHALARIS ARUNDINACEA L. **reed canarygrass**

Some forms native. Europe. Reported from Oregon about 1885. Northern half of United States in moist places; also cultivated in same area. A tall, coarse grass that spreads by rhizomes and tends to become sod-bound; does not lodge; prefers moist, cool regions but is not sensitive to heat or cold; especially suited to swampy or overflowed lands although successful on high, well-drained, good soils where there is ample moisture for spring and early summer growth; only moderately tolerant to alkaline soils. Matures from the top of the spike downward; seed shatters promptly upon ripening and is, therefore, relatively difficult to harvest, and scarce; some produced in Oregon.

Used for pasturage on wet lands, silage, hay, and erosion control along waterways; outstandingly successful in control of gullies. Commences growth early in the spring and will withstand pasturing if not grazed too closely; the hay is not very palatable and should be cut before heading. For waterway control it should be used only where there is a deep, well-defined channel; not suited to shallow waterways because it tends to collect silt and change the channel.

Regarded as useful for range reseeding on moist sites, usually on mountain lands, of Utah, Colorado, Oregon, Nevada, and Idaho. The 10 strains now being tested show a height variation of 16 inches and a 15-day range in maturity date; some strains make remarkable growth in dry areas. A nonshattering strain has been released by the Bureau of Plant Industry at Corvallis, Oreg.

PHALARIS ARUNDINACEA var. PICTA L. **ribbongrass**

Eurasia. Grown for ornament.

PHALARIS BRACHYSTACHYS Link **shortspike canarygrass**

Annual. Mediterranean region. Asherton, Tex.; Butte County, Calif.; ballast, near Portland, Oreg. A weed in rice fields in California.

PHALARIS CANARIENSIS L. **canarygrass**

Annual. Western Mediterranean region. Maine to Washington, south to Virginia and California; infrequent; waste places. An annual with upright growth and little stooling; can be seeded and harvested like wheat; sown in the spring in Northern States and in the fall in the South. Makes excellent hay; cultivated mostly for birdseed.

PHALARIS MINOR Retz. **littleseed canarygrass**

Annual. Mediterranean region. Maine to New Jersey, rare; Texas, Louisiana, Colorado; ballast at Portland, Oreg., and common in California in fields and waste places.

PHALARIS PARADOXA L. **hood canarygrass**

Annual. Mediterranean region. Arizona and California, a weed in grain and rice fields; waste places; ballast in a few localities. Seed eaten by wild birds.

PHALARIS PARADOXA var. PRAEMORSA (Lam.) Coss. & Dur. **cutscale canarygrass**

Annual. Mediterranean region. Ballast at Philadelphia, Pa.; Washington to California; fields and waste places.

PHALARIS TUBEROSA var. STENOPTERA (Hack.) Hitchc. **Hardinggrass**

South Africa; introduced from Australia. Spontaneous in Humboldt County, Calif. Cultivated in Oregon, North Carolina, Texas, California, and elsewhere. A pasture grass usable alone or in mixtures; withstands heavy grazing and recovers rapidly after cutting. Makes excellent first year growth in Northern States but is slowly established on dry land in South. When established can withstand drought and temperature extremes in Texas but winterkills in North. Reported of value in conservation reseeding experiments in California. Best suited to heavy soils although it produces well on sandy soils under irrigation; fertilization and cultivation are required on dry range. Seed shatters less badly than that of reed canarygrass (*P. arundinacea*).

PHLEUM ARENARIUM L. **sand timothy**

Annual. Coast of Europe and North Africa. Ballast near Portland, Oreg.

PHLEUM PANICULATUM Huds. **British timothy**

Annual. Mediterranean region. Ballast near Portland, Oreg.

PHLEUM PHLEOIDES (L.) Karst. **dryland timothy**
(*P. boehmeri* Wibel)

Europe. Grown in grass gardens. Tested in Pacific Northwest. A long-lived, tufted bunchgrass with long, branched heads and abundant basal leaves that provide good ground cover; height about 2 feet and very uniform; matures very early. Can be used in conservation work in arid, exposed areas if moisture is available for establishment. Forage yield is only moderate but exceeds ordinary timothy on dry sites.

PHLEUM PRATENSE L. **timothy**

Eurasia. Introduced before 1747. Occurs throughout the United States. Cultivated throughout Northern States. A bunchgrass which prefers clay, loams, or heavy soils; alkaline tolerance poor; long-lived in cool, humid regions to which it is well adapted; cold- and shade-tolerant; requires ample moisture in growing season; grows rapidly from seed and becomes established before competition becomes severe; best sown in the fall. Leafy and highly palatable to all classes of stock; except with ample moisture or on very rich soils does not withstand close grazing and tends to die out; provides excellent pasturage while slower growing turf grasses are becoming established. Spreads rapidly by seed. The most important hay grass in the United States; commonly and advantageously grown with clovers; more nutritious when cut in early flowering.

Has been used in mixtures for reseeding in the West; recommended for range reseeding on the moister mountain areas of Utah, Idaho, Nevada, Wyoming, Oregon, Washington, Colorado, and New Mexico.

Suggested for logging roads in the Northwest. Grows well under partially open stands of aspen brush and timber. Has given excellent results in mountain-park type of land in the West. Most timothy grown in the United States is the unimproved type although numerous strains varying in height, time of flowering, and persistence have been developed.

PHLEUM SUBULATUM (Savi) Aschers. & Graebn. **Italian timothy**

Annual. Mediterannean region. Ballast, Philadelphia, Pa., and near Portland, Oreg.

PHYLLOSTACHYS AUREOSULCATUS McClure (*P. nevinii* Hance) **Nevin bamboo**

China. Cultivated as an ornamental. A relatively hardy bamboo; growing as far north as Washington, D. C. (*Phyllostachys* is a masculine noun but is treated as feminine in most of the literature.)

PHYLLOSTACHYS AUREUS A. & C. Riv. **golden bamboo**

China. Cultivated. A bamboo with shortened basal internodes; excellent for fishing poles.

PHYLLOSTACHYS BAMBUSOIDES Sieb. & Zucc. **Japanese timber bamboo**

Also called giant timber bamboo. Japan and China. Grown at Barbour-Lathrop Plant Introduction Garden and at Bakersfield, Calif. Used for paneling, poles, fences, shade houses, etc.

PHYLLOSTACHYS MEYERI McClure **Meyer bamboo**

China. Introduced in early 1900's; cultivated. Similar to golden bamboo (*P. aureus*), but without the shortened internodes.

POA ANNUA L. **annual bluegrass**

Annual. Europe. Throughout United States. Winter hardy in the Southern States; a weed in lawns further north.

POA BULBOSA L. **bulbous bluegrass**

Europe. Maryland to North Carolina and Missouri, westward to to Pacific coast, south to Oklahoma and California. A short-lived grass that prefers moderately fertile soils in a temperate climate with a cool, moist growing season; grows during spring and fall; produces bulblets ("seeds") that germinate quickly and develop rapidly. This grass holds a unique place in soil conservation because it can be established by broadcasting the bulblets on lands too steep or too rough to cultivate. "Seed" should be covered shallowly or not at all; furnishes a good ground cover when planted alone or with longer-lived grasses; particularly valuable in mixtures for providing an understory ground cover that controls erosion, retards the volunteering of cheatgrass (*Bromus tectorum*), and improves the character of the land.

This grass finds its best use in the foothill area of southwestern Idaho and parts of Oregon where it crowds out cheatgrass, Russian-thistle (*Salsola kali* var. *tenuifolia*), and other annuals. Used for early spring and late fall grazing on lower foothill ranges in the West

and Northwest; highly palatable and nutritious; forage yields medium to low. Has been used in the foothill zone in Utah; has been suggested for trial in California, Montana, Arizona, and New Mexico in areas where moisture is not limiting.

POA COMPRESSA L. **Canada bluegrass**

Europe. Found in most States; more common in the northern half of the United States, particularly the northeastern part. Adapted to open, rather poor, dry soils where it forms a strong turf; a good seed-producer; seed easily harvested. Useful as a pasture grass; nutritious but will not withstand close and continuous grazing. Shrinks very little on drying and furnishes good hay but seldom used for this purpose because of its low height. Can be used for lawns and golf links in situations too dry for Kentucky bluegrass (*P. pratensis*). In the Southwestern States it can be grown in mountain meadows about 7,000 feet where there is sufficient moisture. Found difficult to establish and not always persistent on foothills and lower mountain slopes in Montana.

POA NEMORALIS L. **wood bluegrass**

Europe. Scattered distribution in United States, mostly northeastern; occasional in meadows. Requires shade, moisture, and a cool climate. Not considered useful except for shady parks or lawns in northern or middle States.

POA PRATENSIS L. **Kentucky bluegrass**

Europe. Introduced by early settlers. Widely distributed in United States, except for arid regions. A hardy, long-lived perennial, spreading by rhizomes and making a dense sod on rich, moist soil; produces abundant seed; under optimal conditions it grows 3 feet tall and has outstanding ability to withstand abuse; often volunteers; never abundant on poor soil; not drought-resistant; grows early in spring and late in fall; dormant during hot, dry summer and turns brown when moisture is deficient; best sown in fall or early spring; becomes established slowly and does not form sod until second or third year.

Highly palatable and nutritious; relished by all classes of stock; has been called the most important introduced pasture grass; less satisfactory for hay; commonly cultivated for golf courses and famous for the beautiful lawns it makes. Because of its excellent sod-forming ability it has proved good for grass waterways on rich soil. Has been suggested, in mixture, for range reseeding moist mountain areas in Utah, Nevada, Colorado, New Mexico, and in or near the national forests in Montana. Not shade-tolerant on rangelands; not adapted to Georgia Coastal Plain. Seeds eaten by birds.

There is a moderate degree of variation in this species; desirable selections produce greater amounts of forage in early spring, after cutting, and during fall months and are slow spreading with a bunch tendency.

POA SUBFASTIGATA Trin. ———

Siberia. Cultivated at experiment stations. Tested in California for reseeding with poor results.

POA TRIVIALIS L. **rough bluegrass**

Europe. Northern States; ballast in Louisiana; probably introduced in mixed seed. Has a distinctive bright green color; prefers cool, moist soils in shady places; not adapted to sandy soil; becomes dormant in midsummer south of Michigan, Wisconsin, Minnesota, etc. Occurs in Washington and Oregon in meadows and pastures. Makes beautiful lawns; excellent for shady lawns in Northern States, but use is limited.

POGONARTHRIA FALCATA (Hack.) Rendle ———

Africa. Grown at State College, N. Mex. Gave fair to good results in reseeding trials. Foliage harsh and stiff when mature.

POLYPOGON AUSTRALIS Brongn. **Chilean polypogon**
(*P. crinitus* Trin.)

Chile and Argentina. Introduced in Washington.

POLYPOGON INTERRUPTUS H. B. K. **ditch polypogon**
[*P. lutosus* (Poir.) Hitchc.]

Europe. Western States in low, wet places.

POLYPOGON MARITIMUS Willd. **Mediterranean polypogon**

Annual. Mediterranean region. Georgia, Nebraska, and central California.

POLYPOGON MONSPELIENSIS (L.) Desf. **rabbitfoot-grass**

Annual. Europe. Most common in Western States; infrequent in East; a common weed at low altitudes; one of the species encountered on abandoned farmland in central Great Plains and southern Great Plains. Seeds eaten by birds.

PSEUDOSASA JAPONICA (Sieb. & Zucc.) Makino
(*Arundinaria japonica* Sieb. & Zucc.) **arrow bamboo**

Japan. Cultivated from Florida to New York City and corresponding climates westward; the commonest of the hardy bamboos in cultivation.

PUCCINELLIA DISTANS (L.) Parl. **weeping alkaligrass**

Eurasia. Mostly Northern States on moist, more or less alkaline soil.

RHYNCELYTRUM ROSEUM (Nees) Stapf & Hubb.
(*Tricholaena rosea* Nees) **Natalgrass**

South Africa. Introduced before 1866. Florida, Texas, and Arizona; also cultivated in Florida and along the Gulf Coast. Well adapted to poor, dry, sandy soils; especially valuable as pasture, hay, or cover crop on such soils in extreme Southeast, where few other grasses succeed. Yields two to four cuttings of highly nutritious hay in Florida; considerable shrinkage on drying. Contradictory reports on palatability as pasturage. Not frost-resistant; free from nematodes. Sometimes used as an ornamental.

ROTTBOELLIA EXALTATA L. f. **itchgrass**

Also called guineafowl-grass. Annual. Tropical Asia. Miami, Fla.

SACCHARUM BARBERI Jeswiet **Barber sweetcane**
Northern India. Grown at experiment stations.

SACCHARUM BENGALENSE Retz. **munj**
(*S. ciliare* Anderss.)
India. Cultivated for ornament.

SACCHARUM OFFICINARUM L. **sugarcane**
Asia. Cultivated for sugar and sirup in Louisiana and Florida; also used for forage; the leaves sometimes used for fodder.

SACCHARUM SINENSE Roxb. **Chinese sweetcane**
China. Cultivated for sirup.

SACCHARUM SPONTANEUM L. **wild sweetcane**
Asia. Grown at experiment stations.

SACCIOLEPIS INDICA (L.) Chase **India cupscale**
India. Introduced at Thomasville, Ga., in pecan orchard.

SCHISMUS ARABICUS Nees ———
Europe. Nevada, California, and southern Arizona. An excellent winter forage grass in Arizona.

SCHISMUS BARBATUS (L.) Chase **Mediterranean-grass**
Annual. Europe. Utah to California and southern Arizona; yards, roadsides, and dry river beds. Where locally dominant it makes an excellent winter forage grass. Winter moisture inadequate for growth in New Mexico.

SCLEROCHLOA DURA (L.) Beauv. **hardgrass**
Annual. Southern Europe. Western States, New York, Texas.

SCLEROCHLOA RIGIDA (L.) Griseb. ———
Annual. Europe. Sparingly and scatteringly introduced in waste places. No demonstrated value.

SCOLOCHLOA FESTUCACEA (Willd.) Link **rivergrass**
[*Fluminia festucacea* (Willd.) Hitchc.]
Northern Europe. Iowa, Nebraska, and Oregon.

SECALE CEREALE L. **rye**
Annual. Old World. Cultivated throughout United States; escaped in fields and waste places. Adapted to cool climates and regions of cold winters; hardier than wheat. Responds to good soils but will produce a good crop on poor soils; best on loams and sandy loams; will grow on foothills and mountain ranges; best adapted to dry farming sites; highly nutritious; grows rapidly; makes good fall and spring pasture; will furnish forage while perennial grasses are becoming established. Used in Southern States as a winter forage plant. Useful for early spring feed in the West. In New Mexico it is used either as a nurse crop or to produce mulch material for the following year. Seeds eaten by birds.

SECALE MONTANUM Guss. **mountain rye**

Mountains of southwestern Asia. A short-lived perennial cultivated and persisting along roadsides near Washington Agricultural Experiment Station at Pullman, Wash. Tested by the Soil Conservation Service in the Pacific Northwest and said to compare favorably with bulbous barley (*Hordeum bulbosum*). The seed is very difficult to harvest because of the disarticulating rachis. This grass has many desirable qualities, but the extremely bad seed habit makes cultivation almost impossible. Useful for range reseeding at intermediate elevations in the Intermountain region, the ponderosa pine area in Colorado, and foothill and valley areas in southern Idaho.

SEMIARUNDINARIA FASTUOSA (Mitford) Makino **Narihira cane**

Japan. Introduced around 1900. One of the most widely distributed and hardy of the introduced bamboos. Used as an ornamental.

SETARIA BARBATA (Lam.) Kunth **East Indies bristlegrass**

Annual. East Indies. Ballast in Florida.

SETARIA CARNEI Hitchc. **Carne bristlegrass**

Annual. Western Australia. Fresno County, Calif.; a rapidly spreading weed.

SETARIA FABERI Herrm. **Faber bristlegrass**

China. New York to Nebraska and Missouri, North Carolina, Kentucky, Tennessee; spreading rapidly and becoming a weed.

SETARIA ITALICA (L.) Beauv. **foxtail millet**

Annual. Eurasia. Introduced in 1849 or earlier. Cultivated throughout Great Plains; escaped throughout United States. Thrives in any region with high summer temperatures and moderate rainfall; has a shallow root system and a short growing season, 60 to 65 days; forms dense growth which suppresses weeds. Used as hay, pasture, and green fodder, although less extensively than formerly; largely displaced in southern Great Plains and central Great Plains by Sudangrass (*Sorghum sudanense*) which is superior in quality and yield; useful as a quick "catch crop" to supply extra feed when pastures fail or the hay crop is short; said to decrease the yield of a following crop; grain less palatable and nutritious than proso (*Panicum miliaceum*); seed deteriorates rapidly; used for birdseed but is injurious to horses. Among the most common strains are German, Hungarian, Siberian, Common, Kursk, and Dakota.

SETARIA LUTESCENS (Weigel) F. T. Hubb. **yellow bristlegrass**

Annual. Europe. Widely distributed in United States; a common weed on pastures and abandoned farmland in central Great Plains and southern Great Plains. Valuable food for wildlife.

SETARIA NIGRIROSTRIS (Nees) Dur. & Schinz. **black bristlegrass**

South Africa. Ballast near Portland, Oreg.

SETARIA PALMIFOLIA (Willd.) Stapf **palmgrass**

India. Cultivated for ornament, sometimes under the name "*Panicum plicatum.*"

SETARIA POIRETIANA (Schult.) Kunth **Poiret bristlegrass**

Tropical America. Cultivated for ornament, sometimes under the name "*Panicum sulcatum.*"

SETARIA RARIFLORA Mikan **Brazil bristlegrass**

South America. Mobile, Ala.

SETARIA SETOSA (Swartz) Beauv. **West Indies bristlegrass**

West Indies. Ballast at Camden, N. J., and Key West, Fla.

SETARIA VERTICILLATA (L.) Beauv. **hooked bristlegrass**

Also called bur bristlegrass. Annual. Europe. Massachusetts to North Dakota, south to Alabama, Louisiana, and Missouri, occasionally west to southern California; cultivated soil and waste places. Seeds eaten by birds.

SETARIA VERTICILLATA var. AMBIGUA (Guss.) Parl.
Sicilian hooked bristlegrass

Annual. Europe. Sparingly introduced in the United States; ballast and waste places.

SETARIA VIRIDIS (L.) Beauv. **green bristlegrass**

Annual. Europe. Found in all cooler parts of United States; a weed in cultivated soil; valuable as bird food.

SINOCALAMUS OLDHAMI (Munro) McClure ————
("*Dendrocalamus latiflorus*" of California gardens)

Formosa. A bamboo frequently cultivated as an ornamental in California and warmer parts of the Gulf States.

SORGHUM HALEPENSE (L.) Pers. **Johnsongrass**

Mediterranean region. Massachusetts to Iowa and Kansas, south to Florida and Texas. Introduced about 1830 in South Carolina. Prefers rich land where it volunteers well; nonpersistent on poor soils. Because of its aggressive character and heavy, extensive rhizomes this plant is often regarded as a pest in or near agricultural lands and eradication measures are frequently needed. This is usually accomplished by grazing it heavily and continuously (exhausting the rhizomes) or by frequent cutting and shallow plowing followed by several harrowings preferably in dry, hot weather. It is sometimes cultivated for hay and pasturage south of latitude 38° or as a summer crop in the North. Cultivation every other year improves its forage yield and ability to withstand drought. Two to four cuttings of good quality hay can be obtained annually; the hay is very moist and must be thoroughly cured.

Tolerates only light grazing and becomes unproductive under close and continued pasturing; should be cut before seed matures to avoid establishment as a weed. Used in mixture with a legume or following one. It has been reported as furnishing much forage on New

Mexico ranges and as a check against erosion but has become a seriously troublesome weed in the irrigated valleys of southern New Mexico.

SORGHUM SUDANENSE (Piper) Stapf **Sudangrass**
[*Sorghum vulgare* var. *sudanese* (Piper) Hitchc.]

Annual. Africa. Introduced in 1909. Cultivated mostly in the Southern and Central States and California; not grown in extreme Southeastern States because attacked by disease there; can be grown as far north as Michigan and the Dakotas in summertime; severely injured or killed by light frost. Very soil-tolerant but gives poor yields on alkaline soils; thrives in irrigated valleys and on well-drained, fertile uplands below 5,000 to 6,000 feet; fairly drought-resistant; grows rapidly from late seedings; requires dry, warm weather. Resembles Johnsongrass (*S. halepense*) in general appearance but is an annual, without rootstocks, and does not become a troublesome weed. Is one of the plants best suited to the Dust Bowl, germinates quickly, makes rapid growth, and assists soil-stabilization.

Best used as a "catch crop" for pasture, hay, or silage; yields several cuttings a season; has largely replaced the millets for this use because it roots more firmly, gives a longer pasture period, and is more palatable; the hay is of good quality but hard to cure. Should not be fed to animals after severe drought or frost because it may cause prussic acid poisoning, especially in cattle. Used also to check wind erosion; the stubble is widely used as a seedbed for perennial grasses where soil blowing is severe. Seeds eaten by birds.

SORGHUM SUDANENSE (Piper) Stapf **Sudan 23 (strain)**

A slightly later heading and more uniform strain developed at the California Experiment Station in 1936 by selection from common Sudangrass. Gives higher yields than common or Sweet Sudan, especially during late summer and autumn. Recovers quickly after grazing.

SORGHUM SUDANENSE (Piper) Stapf
Sweet Sudan (selection)

A recent selection developed at the Texas Agricultural Experiment Station by crossing Sudangrass with Leoti Red (a sweet sorghum) followed by a backcross to Sudan. Has a sweet juicy stalk and low prussic acid content. The reddish-tan color of the abundantly produced seeds readily distinguishes them from Sudangrass and Johnsongrass (*S. halepense*). Sweet Sudan is preferred by cattle but has the disadvantage of slow development both in the seedling stage and after cutting; yields no greater than Sudangrass. More resistant to foliage diseases in humid areas.

SORGHUM SUDANENSE (Piper) Stapf **Tift Sudan (strain)**

A variation of Sweet Sudan, developed at the Georgia Coastal Plain Experiment Station, which lacks the sweet, juicy stem characteristics. Advantageous primarily because of blight resistance; stems coarser and possibly less palatable than Sweet Sudan.

SORGHUM VIRGATUM (Hack.) Stapf **Tunisgrass**

Annual. Africa. Cultivated at experiment stations. Inferior to Sudangrass (*S. sudanense*) and therefore not used commercially.

SORGHUM VULGARE Pers. **sorghum**

Annual. Warmer regions of the Old World. Cultivated principally in the Southern States and, to some extent, farther northward as a summer crop. Grown for seed, sweet juice, forage (midsummer grazing), and silage. Sorghum silage has largely replaced corn silage in Kansas, Nebraska, Texas, and Oklahoma. Numerous varieties, including broomcorn, durra, feterita, kaoliang, kafir, shallu, and sorgo.

SORGHUM VULGARE var. DRUMMONDII (Nees) Hack. **chickencorn**

Annual. Africa. Mississippi and Louisiana, naturalized but apparently dying out here; Illinois, Alabama, California, rare.

SPOROBOLUS INDICUS (L.) R. Br. **West Indies smutgrass**

Tropical America. Florida; ballast in Alabama.

SPOROBOLUS POIRETII (Roem. & Schult.) Hitchc. **rattail smutgrass**

Tropical Asia. Southeastern States; ballast in New Jersey and Oregon. Poor pasturage. Seeds provide bird food.

STIPA BRACHYCHAETA Godr. **Araucanian needlegrass**

Argentina. Ballast near Portland, Oreg.

STIPA ELEGANTISSIMA Labill. **Australian feathergrass**

Australia. Sometimes cultivated for ornament.

STIPA NEESIANA Trin. & Rupr. **Uruguay needlegrass**

South America. Ballast at Mobile, Ala.

STIPA PAPPOSA Nees ——————

Uruguay. Tested in California for range reseeding with fair results.

STIPA PENNATA L. **European feathergrass**

Europe. Cultivated for ornament.

STIPA SIBIRICA (L.) Lam. **Siberian needlegrass**

Russia. Grown at experiment stations. Regarded as promising for forage at Mandan, N. Dak.

STIPA SPLENDENS Trin. **cheegrass**

Russian, Siberia. Cultivated in Northwestern States and California. Larger and later maturing than any of the native species. Recommended for abandoned lands with sandy soil; gave poor results in reseeding trials in California.

STIPA TENACISSIMA L. **esparto**

Mediterranean region. Cultivated for ornament. Used for papermaking and cordage in its native lands.

THEMEDA QUADRIVALVIS (L.) Kuntze **kangaroo-grass**

Annual. East Indies. Found near Opelousas, La., on bottom land.

THYSANOLAENA MAXIMA (Roxb.) Kuntze **tigergrass**

East Indies. Southern Florida and southern California; also grown in grass gardens and cultivated as an ornamental.

TRAGUS BERTERONIANUS Schult. **spike burgrass**

Warmer parts of the Old World. Texas to Arizona; ballast at Boston, Mass.

TRAGUS RACEMOSUS (L.) All. **stalked burgrass**

Old World. Ballast along the Atlantic coast; found also in Texas and Arizona.

TRISETUM AUREUM (Ten.) Ten. **golden trisetum**

Annual. Europe. Ballast at Camden, N. J.

TRISETUM FLAVESCENS (L.) Beauv. **yellow trisetum**

Europe. Scattered distribution; good soil along roadsides or on grassy mountain slopes; highly valued in Europe; not used in this country except in mixtures.

TRITICUM AESTIVUM L. **wheat**
(*T. vulgare* Vill. and *T. sativum* Lam.)

Annual. Old World. Cultivated widely in Northern States. Grown on more acreage than any other world crop and can be successfully produced through the world except in the tropics.

VETIVERIA ZIZANIOIDES (L.) Nash **vetiver**

Also called khuskhus. Old World. Several small plantings in Florida, Louisiana, and southern California; escaped in Louisiana. Grown for the vetiver oil that is used in making perfume; plants used also for making screens and mats.

ZEA MAYS L. **corn**

Also called Indian corn, maize. Annual. Mexico or Peru. Widely cultivated, especially in the Central States. Its principal use in this country is as stock feed and it has been called "the backbone of American agriculture."

ZOYSIA JAPONICA Steud. **Korean lawngrass**

Also called Japanese lawngrass. Asia. Cultivated in Southern States; has been grown as far north as Boston. Most winter-hardy of the zoysias; seed not presently commercially available; established vegetatively; once established it is very hardy and persistent; tough, harsh, and unpalatable. Used for lawn and turf; forms a more open sod than *Z. matrella* and can be grown in mixtures.

ZOYSIA MATRELLA (L.) Merr. **Manilagrass**
(*Z. pungens* Willd.)

Also called Japanese carpetgrass, zoysiagrass. Asia. Cultivated from the Gulf States to Long Island. The most important and widely used of the zoysias. A short, dark green, fine-leaved grass that produces a sod so dense that even crabgrass (*Digitaria* spp.) cannot compete; grows in sun or shade; fairly salt-tolerant but prefers heavy

soils; needs fertilization to maintain a good turf. Grows slowly, requiring 2 years to produce satisfactory cover; needs little mowing; remains green throughout summer heat but turns brown with first heavy frost. Propagated by cuttings as seed is not yet commercially available. Used as lawn grass in deep South.

ZOYSIA TENUIFOLIA Willd. **mascarenegrass**

Also called Korean velvetgrass. Asia. Florida and California. A shallow-rooted, fine-leaved grass seldom exceeding 2 inches in height.

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(80) CORNELIUS, DONALD R.
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Agropyron intermedium × trichophorum (Ree wheatgrass)

(91) FRANZKE, C. J.
1945. REE WHEATGRASS—ITS CULTURE AND USE. S. Dak. Agr. Expt. Sta. Cir. 58, 8 pp.

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A. panormitanum (———). See 6.

A. popovii (———). See 8.

A. pungens (stiffleaf wheatgrass). See 2, 6, 8, 9, and 70.

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Agropyron semicostatum (drooping wheatgrass). See 6, 8, 11, and 94.
A. sibiricum (Siberian wheatgrass). See 7–11, 15, 44, 45, 57, 59, 60, 70, and 73.
Agropyron trichophorum (pubescent wheatgrass). See 7–10, 29, 30, 36, 37, 45, 47, 54, 57, 59, 60, 69, 71–73, 75, 76, 83, 87, 90.
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A. canina (velvet bent). See 13, 15, 24, 94, and 107.
A. nebulosa (cloudgrass)
(109) MCKEE, ROLAND.
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Agrostis nigra (black bent). See 2.
A. palustris (creeping bent). See 2, 13, 15, 24, 29, 32, 56, 64, and 94.
A. semiverticillata (water bent). See 2.
A. tenuis (Colonial bent). See 2, 13, 15, 24, 29, and 102.
A. tenuis (Highland bent strain). See 15.

A. transcaspia (———). See 7.
Aira caryophyllea (silver hairgrass). See 2.
A. praecox (early hairgrass). See 2.
Alopecurus arundinaceus (reed foxtail). See 2, 8, and 11.
A. creticus (Cretan foxtail). See 2.
A. myosuroides (slimspike foxtail). See 2.
A. pratensis (meadow foxtail)
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(111) MCLAUGHLIN, WILLARD T., AND BROWN, ROBERT L.
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Andropogon annulatus (Diaz bluestem)
(112) SWALLEN, JASON R.
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Andropogon foveolatus (Delhi bluestem)
(118) THOMPSON, J. B.
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A. ischaemum (yellow bluestem)
(119) CLINTON, D. D.
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Andropogon ischaemum (King Ranch strain)
(123) JENKINS, T. A.
1947. K. R. IS A BETTER GRASS: MORE PALATABLE, PRODUCTIVE AND EROSION-PROOF STRAIN OF YELLOW BLUESTEM FOUND IN THE SOUTHWEST. South. Seedsman 10 (6): 18.
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Andropogon ischaemum (Turkestan strain). See 83.
A. nodosus (Angletongrass). See 2, 112, 119, 122, 124, and 126.
A. pertusus (pitted bluestem). See 2 and 112.
A. sericeus (silky bluestem). See 2 and 112.
Anthephora hermaphrodita (———). See 2.
Anthoxanthum aristatum (annual vernalgrass). See 2.
A. gracile (Italian vernalgrass). See 2.
A. odoratum (sweet vernalgrass). See 56, 94, and 99.
Apera interrupta (———). See 2.
A. spica-venti (windgrass). See 2.
Aristida pennata (———). See 5 and 7.
Arrhenatherum elatius (tall oatgrass)

(128) LOVE, R. M., AND JONES, BURLE J.
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(129) PLUMMER, A. P., AND STEWART, GEORGE.
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(130) SPRINGFIELD, H. W., AND REYNOLDS, H. G.
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(131) STEWART, GEORGE.
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Arrhenatherum elatius (Tualatin oatgrass selection.) See 8 and 75.
A. elatius var. **bulbosum** (tuber oatgrass). See 2.
Arthraxon hispidus (———). See 2.
A. hispidus var. **cryptatherus** (———). See 2.
Arundinaria amabilis (Tonkin cane)

(132) MCCLURE, F. A.
1948. BAMBOOS FOR FARM AND HOME. U. S. Dept. Agr. Yearbook 1948: 735–740.

Arundinaria simoni (———). See 132.
Arundinella ecklonii (———)

(133) RITCHEY, GEORGE E.
1936. USE OF RABBITS IN DETERMINING THE PALATABILITY OR TOXICITY OF FORAGE. Amer. Soc. Agron. Jour. 28 (6): 484–486.

Arundo donax (giant reed). See 3 and 94.
A. donax var. **versicolor** (———). See 2.
Astrebla elymoides (hoop Mitchellgrass)

(133a) CONWAY, THELMA H., AND RITCHEY, GEORGE E.
1951. A REPORT ON PLANT SPECIES UNDER TEST AT GAINESVILLE, FLORIDA 1914–49. 645 pp. [Unpublished manuscript on file at U. S. Dept. Agr., BPISAE, Beltsville, Md.]

A. lappacea (curly Mitchellgrass). See 5 and 133a.
A. pectinata (Mitchellgrass). See 6, 32, 94, and 133a.
Avena barbata (slender oat). See 2 and 3.
A. fatua (wild oat). See 2, 94, 95, and 99.
A. sativa (oat). See 2 and 94.
A. sterilis (animated oats). See 2.
Bambusa multiplex (hedge bamboo). See 132.
Beckmannia erucaeformis (European sloughgrass). See 8.
Brachiaria erucaeformis (rocket signalgrass). See 2.
B. plantaginea (creeping signalgrass)

(134) TABOR, PAUL.
1950. OBSERVATIONS OF GRASSES, LEGUMES, WEEDS, SEED PROCESSING, WEEDICIDES FOR SOIL CONSERVATION. U. S. Dept. Agr. Soil Conserv. Serv. Nurseries, Spartanburg, S. C. 67 pp. [Processed.]
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Brachiaria subquadripara (———). See 2.
Brachypodium caespitosum (Turkish falsebrome). See 2.
B. distachyon (annual falsebrome). See 2.
B. mucronatum (beardless falsebrome). See 5.
B. pinnatum (Rumanian falsebrome). See 32.
B. sylvaticum (woodland falsebrome). See 2.
Briza maxima (big quaking-grass). See 2 and 109.
B. media (perennial quaking-grass). See 2 and 94.
B. minor (little quaking-grass). See 2 and 109.
Bromus alopecuros (———). See 2.
B. arenarius (Australian chess). See 2.
B. arvensis (———). See 2 and 15.
B. brizaeformis (rattlesnake chess). See 2.
B. catharticus (rescuegrass). See 2, 4, 13, 15, 21, 24, 56, 63, 64, and 94.
B. catharticus (prairie brome strain)
(135) LOVE, R. M.
1948. FORAGE PLANTS—NEW GRASSES AND GRAZING PRACTICES DESIGNED TO AID THE LIVESTOCK INDUSTRY. West. Dairy Jour. 4 (5): 64–66.
See also 32 and 128.
Bromus catharticus (rescue 46 selection)
(136) WHITE, LEE.
1948. NEW GRASSES PROMISE AID FOR PASTURES. Southwest. Crop & Stock 2 (1): 11.
See also 24, 83, and 85.
Bromus commutatus (hairy chess). See 2 and 15.
B. commutatus var. **apricorum** (———). See 2.
B. danthoniae (———). See 5.
B. erectus (erect brome). See 8–11, 17, 29, 30, 37, 41, 72, and 73.
B. inermis (smooth brome)
(137) GARDNER, HARRY H., AND FREYBURGER, EDWIN.
1949. GRASS WATERWAYS. U. S. Dept. Agr. Leaflet 257, 8 pp.
(138) KEFFER, CHAS. A.
1899. GRASSES AND FORAGE CROPS. N. Mex. Agr. Expt. Sta. Bul. 32, 34 pp.
See also 4, 5, 8–11, 13–17, 19, 22, 24, 25, 28–30, 32–34, 37, 38, 40–51, 53–60, 62–65, 67, 71–73, 76, 77, 84, 87, 94, 97, 98, 101, 106, 108, 115, 129, and 130.
Bromus inermis (Lincoln strain)
(139) ANDERSON, K. L.
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(140) STARK, R. H., AND KLAGES, K. H.
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Bromus inermis (Parkland selection). See 15 and 27.
B. japonicus (Japanese chess). See 4 and 15.
B. laciniatus (———). See 2.
B. macrostachys (Mediterranean brome). See 2.
B. molliformis (———). See 2.
B. mollis (soft chess)
(140a) HUTCHISON, C. B., AND KOTOK, E. I.
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B. pseudodanthoniae (———). See 5.
B. racemosus (bald brome). See 2 and 94.

B. ramosus (———). See 2.
B. scoparius (———). See 2.
B. secalinus (chess). See 4, 32, 94, and 99.
B. secalinus var. **velutinus** (———). See 2.
B. squarrosus (———). See 2.
B. stamineus (Harlan brome). See 128 and 135.
B. tectorum (cheatgrass)
(141) COSTELLO, DAVID.
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B. tomentellus (———). See 8.
B. trinii (Chilean chess). See 2.
B. trinii var. **excelsus** (———). See 2.
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(144) VINALL, H. N.
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Chloris argentina (Argentine chloris). See 2.
C. berroi (Uruguay chloris). See 5, 32, and 70.
C. canterai (Paraguay chloris). See 2 and 6.
C. capensis (———). See 2.
C. distichophylla (weeping chloris). See 2, 6, and 133a.
C. gayana (Rhodesgrass)
(145) POTTS, R. C., AND HENSEL, R. L.
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(146) ROLFS, P. H.
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Chloris inflata (flatstem chloris). See 5 and 6.
C. prieurii (Moroccan chloris). See 2.
C. radiata (annual chloris). See 2 and 6.
C. submutica (———). See 2.
C. truncata (creeping windmillgrass). See 2.
C. ventricosa (Australian windmillgrass). See 2.
Chrysopogon montanus (———). See 118.
Coix lacryma-jobi (Jobs-tears). See 2 and 94.
Coleanthus subtilis (mudgrass). See 2.
Coridochloa cimicina (bugseedgrass). See 2.
Cortaderia rudiuscula (quila pampasgrass). See 2.
C. selloana (pampasgrass)
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Corynephorus canescens (clubawngrass). See 2.
Crypsis niliaca (pricklegrass). See 2.
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Cymbopogon citratus (lemongrass)
(148) SWALLEN, JASON R.
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Cynodon dactylon (Coastal bermuda selection)

(151) BURTON, GLENN W.
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(152) KING, G. H.
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C. dactylon (Suwanee bermuda strain). See 15 and 24.

C. dactylon (Tift bermuda selection). See 24.

C. plectostachyum (giant dogtoothgrass). See 6 and 15.

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(153) STURKIE, D. G.
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Cynosurus cristatus (crested dogtail). See 2 and 94.

C. echinatus (hedgehog dogtail). See 2.

Dactylis glomerata (orchardgrass)

(154) BLOUNT, A. E.
1892. CEREALS, FORAGE PLANTS, GRASSES, CLOVERS, TEXTILE PLANTS, SORGHUM. N. Mex. Agr. Expt. Sta. Bul. 6, 19 pp.
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Dactylis glomerata (Akaroa orchardgrass strain)

(157) Hafenrichter, A. L.
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Dactyloctenium aegyptium (Durban crowfootgrass). See 94 and 99.

Danthonia pilosa (hairy danthonia)

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D. semiannularis (Australian danthonia). See 2, 5, and 6.

Desmazeria sicula (desmazeria). See 2 and 109.

Digitaria decumbens (pangolagrass)

(159) CLARK, H. E.
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(160) GWYNNE, W. P.
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Digitaria didactyla (blue fingergrass)

(161) PIPER, C. V.
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Digitaria eriantha (woolly fingergrass). See 32, 133, and 133a.

D. horizontalis (Jamaica crabgrass). See 2.

D. ischaemum (smooth crabgrass). See 2 and 99.

D. longiflora (———). See 2.

D. pentzii (Pentz fingergrass). See 2, 32, and 133a.

D. sanguinalis (hairy crabgrass). See 2, 3, 4, 99, 103, and 105.

D. swazilandensis (Swaziland fingergrass). See 2 and 133a.

D. violascens (violet crabgrass). See 2.

Echinochloa colonum (junglerice). See 2, 94, and 99.

E. crusgalli (barnyardgrass). See 2–4, 94, 98, and 99.

E. crusgalli var. **frumentacea** (Japanese millet). See 2, 15, 24, and 102.
Ehrharta calycina (perennial veldtgrass). See 2, 5, 32, 54, 128, and 135.
E. erecta (———). See 2, 5, 32, 54, 128, and 135.
Eleusine coracana (ragimillet). See 2 and 94.
E. indica (goosegrass). See 2 and 94.
E. tristachya (threespike goosegrass). See 2.
Elymus angustus (Altai wildrye). See 8 and 11.
E. aralensis (Aral wildrye). See 11.
E. arenarius (European dunegrass). See 7, 11, and 94.
E. caput-medusae (Medusahead wildrye). See 2 and 3.
E. chinensis (Chinese wildrye). See 7, 8, and 11.
E. dahuricus (Dahurian wildrye). See 7, 8, 11, 32, and 70.
E. dasystachys (thickspike wildrye). See 7 and 8.
E. giganteus (mammoth wildrye). See 7, 8, and 11.
E. giganteus (Volga strain). See 8.
E. junceus (Russian wildrye)
(162) ROGLER, GEORGE A.
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E. sabulosus (Russian dune wildrye). See 5 and 8.
E. sibiricus (Siberian wildrye). See 7, 8, 11, 54, and 70.
Eragrostis amabilis (feather lovegrass). See 2 and 109.
E. bahiensis (Bahia lovegrass). See 2.
E. barrelieri (Mediterranean lovegrass). See 2 and 4.
E. brizantha (Kimberly lovegrass). See 5 and 6.
E. chariis (Thalia lovegrass). See 2.
E. chloromelas (Boer lovegrass)
(163) CRIDER, F. J.
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(164) NIXON, W. M.
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E. curvula (weeping lovegrass)
(165) CASSADY, JOHN T., AND GLENDENING, GEORGE E.
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(167) SASSER, H. R.
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Eragrostis cyperoides (bristly lovegrass). See 2.
E. lehmanniana (Lehmann lovegrass). See 5, 30, 32, 34, 38, 53, 54, 59, 70, 71, 76, 83, 117, 124, and 163–165.
E. multicaulis (peregrine lovegrass). See 2.
E. obtusa (flarescale lovegrass). See 5 and 6.
E. pilosa (India lovegrass). See 2–4.
E. poaeoides (little lovegrass). See 2.
E. stenophylla (slimflower lovegrass). See 2.
E. superba (Wilman lovegrass)
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Eragrostis tef (teff). See 5, 6, 30, 94, and 154.
E. tenella (Japanese lovegrass). See 2 and 109.
E. unioloides (Chinese lovegrass). See 2.
E. virescens (Chilean lovegrass). See 2.
Eremochloa ophiuroides (centipedegrass)

(169) ANONYMOUS.
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Erianthus ravennae (Ravennagrass). See 2, 7, and 94.
Eriochloa aristata (bearded cupgrass). See 2 and 94.
E. polystachya (Caribgrass)
(170) BAIR, R. A.
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Eriochloa procera (tropical cupgrass). See 2.
E. villosa (hairy cupgrass). See 2.
Euchlaena mexicana (Mexican teosinte). See 2, 56, 94, and 154.
E. perennis (perennial teosinte). See 2.
Festuca amethystina (amethyst fescue). See 2.
F. arundinacea (reed fescue)
(171) BAILEY, R. Y., AND SCOTT, L. B.
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(172) INSKEEP, J. J.
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(173) VINALL, H. N.
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Festuca arundinacea (Alta fescue strain)
(174) LANCASTER, R. R.
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(174a) RAMPTON, H. H.
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Festuca arundinacea (Alta 144 fescue selection)
(175) DUDLEY, D. I.
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(176) COPE, C.
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(177) GALVIN, P. J.
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Festuca capillata (hair fescue). See 2.
F. dertonensis (brome fescue). See 2.
F. elatior (meadow fescue). See 10, 11, 13, 15, 19, 24, 29, 32–34, 39, 42, 45, 46, 48, 55, 57, 60, 64, 73, 77, 94, 97–99, 101, 102, 107, 129, 137, 138, 154, and 173.
F. geniculata (Portuguese fescue). See 2.
F. gigantea (giant fescue). See 2 and 8.
F. mairei (Maires fescue). See 5.
F. myuros (rattail fescue). See 2.
F. ovina (sheep fescue). See 9–13, 15, 19, 24, 32–34, 39, 41, 45, 55, 64, 73, 90, 94, 99, 102, and 108.
F. ovina var. **duriuscula** (hard fescue). See 2 and 8.
F. ovina var. **glauca** (blue fescue). See 2.
F. rigescens (———). See 2.
F. rubra (red fescue). See 10, 11, 13, 15, 24, 29, 32, 37, 48, 55, 64, 71, 73, 94, 99, 102, and 108.
F. rubra (Clatsop red fescue selection). See 8.
F. rubra (Illahee red fescue strain)
(177a) MYERS, W. M.
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F. rubra var. **commutata** (Chewings fescue). See 2, 8, 11, 12, 15, 29, 55, 59, and 137.
F. rubra var. **heterophylla** (shade fescue). See 2 and 94.
F. rubra var. **lanuginosa** (hairyscale red fescue). See 2.
Gastridium ventricosum (nitgrass). See 2.
Gynerium sagittatum (uvagrass). See 2 and 109.

Hackelochloa granularis (pitscalegrass). See 2.
Heleochloa alopecuroides (———). See 2.
H. schoenoides (swamp-timothy). See 2.
Helictotrichon pubescens (hairy false-oat). See 2.
Holcus lanatus (velvetgrass). See 2, 32, 56, 94, and 99.
H. mollis (German velvetgrass). See 2 and 94.
Hordeum brevisubulatum (short-awned barley). See 8 and 11.
H. bulbosum (bulbous barley). See 5, 7, 8, 11, 57, 60, and 70.
H. hystrix (Mediterranean barley). See 2.
H. leporinum (hare barley)
(178) McClatchie, A. J.
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Hordeum marinum (seaside barley). See 2.
H. stebbinsii (Stebbins barley). See 2.
H. vulgare (barley). See 2 and 99.
Hyparrhenia hirta (———). See 2, 5, 7, and 70.
H. rufa (jaragua). See 2 and 32.
Imperata cylindrica (cogongrass). See 2, 15, and 94.
Koeleria phleoides (annual koeleria). See 2.
Lagurus ovatus (harestail). See 2 and 109.
Lamarckia aurea (goldentop). See 2 and 94.
Lolium multiflorum (Italian ryegrass)
(179) Schoth, H. A., and Hein, M. A.
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Lolium multiflorum × perenne (common ryegrass). See 8 and 179.
L. multiflorum var. **ramosum** (———). See 2.
L. perenne (perennial ryegrass). See 8, 13, 15, 19, 24, 32, 33, 46, 57, 60, 62, 64, 94, 98, 102, 106, 107, 132, 138, and 179.
L. perenne (Pacey's ryegrass, small-seeded state). See 179.
L. perenne (P–312 selection). See 8.
L. perenne var. **cristatum** (crested ryegrass). See 2.
L. persicum (Persian ryegrass). See 2.
L. remotum (hardy ryegrass). See 2.
L. strictum (Sicilian ryegrass). See 2.
L. subulatum (Dalmatian ryegrass). See 3 and 32.
L. temulentum (darnel ryegrass). See 2 and 94.
L. temulentum var. **leptochaeton** (———). See 2.
Manisuris altissima (African jointtail). See 2 and 94.
Melica altissima (Siberian melic). See 2.
M. ciliata (silkyspike melic). See 2.
Melinis minutiflora (molassesgrass). See 5, 56, 64, and 94.
Mibora minima (———). See 2.
Microstegium vimineum (———). See 2.
M. vimineum var. **imberbe** (———). See 2.
Miscanthus nepalensis (Himalaya fairygrass). See 2.
M. sacchariflorus (Amur silvergrass). See 2.
M. sinensis (Chinese silvergrass). See 2 and 109.
Molinia caerulea (moorgrass). See 2.
Monerma cylindrica (thintail). See 2.
Nardus stricta (matgrass). See 2.
Nassella chilensis (———). See 2.
Neyraudia reynaudiana (Burmareed). See 2.
Oplismenus hirtellus (basketgrass). See 2.
O. setarius (———). See 2.
Oryza sativa (rice). See 2.
Oryzopsis coerulescens (blue ricegrass). See 5, 7, 8, and 11.
O. miliacea (smilograss)
(180) Laude, H. M.
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Panicum antidotale (giant panicum)
(183) AINSWORTH, J. C., JR.
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(184) NIXON, W. M.
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Panicum bergii (Berg panicum). See 2.
P. coloratum (———). See 6 and 7.
P. maximum (Guineagrass). See 2, 56, 64, 94, and 126.
P. miliaceum (proso)
(185) ALLRED, B. W., NIXON, W. M., and BELL, H. M.
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Panicum pilcomayense (———). See 2.
P. purpurascens (Paragrass)
(186) THOMPSON, J. B.
1919. PARA GRASS. Fla. Agr. Expt. Sta. Press Bul. 308, 2 pp.
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Panicum ramosum (browntop millet)
(187) TABOR, P.
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Panicum repens (torpedograss)
(188) HODGES, ELVER M., AND JONES, DAVID W.
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Parapholis incurva (sicklegrass). See 2.
Paspalum dilatatum (Dallisgrass)
(189) GEORGE, L. V.
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(190) NIXON, W. M.
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(192) TURNER, W. F.
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(193) WASSON, R. A., AND MONROE, W. E.
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P. malacophyllum (ribbed paspalum). See 2, 5, 13, and 121.
P. nicorae (———). See 2.
P. notatum (Bahiagrass). See 2, 5, 15, 24, 64, 84, and 161.
P. notatum var. **saurae** (Pensacola strain)
(194) BAILEY, R. Y., SCOTT, L. B., AND LEFFELMAN, L. J.
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Paspalum notatum var. **saurae** (Paraguay strain). See 15, 86, and 121.
P. notatum var. **saurae** (Wilmington strain). See 15 and 24.
P. racemosum (Peruvian paspalum). See 2.
P. scrobiculatum (India paspalum). See 2.
P. urvillei (Vaseygrass). See 13, 15, 24, 56, and 64.

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P. ciliare (buffelgrass)
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P. complanatum (———). See 133 and 133a.
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P. latifolium (Uruguay pennisetum). See 2 and 94.
P. nervosum (bentspike pennisetum). See 2.
P. purpureum (Napiergrass)
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Pennisetum setaceum (fountaingrass)
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See also 13.
Pennisetum villosum (feathertop). See 2, 94, and 109.
Phalaris arundinacea (reed canarygrass)
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Phalaris arundinacea var. **picta** (ribbongrass). See 2.
P. brachystachys (shortspike canarygrass). See 2 and 3.
P. canariensis (canarygrass). See 2, 13, 56, 94, and 99.
P. minor (littleseed canarygrass). See 2 and 3.
P. paradoxa (hood canarygrass). See 2, 3, and 99.
P. paradoxa var. **praemorsa** (cutscale canarygrass). See 2.
P. tuberosa var. **stenoptera** (Hardinggrass)
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Phleum arenarium (sand timothy). See 2.
P. paniculatum (British timothy). See 2.
P. phleoides (dryland timothy). See 8 and 11.
P. pratense (timothy)
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Phleum subulatum (Italian timothy). See 2.
Phyllostachys aureosulcatus (Nevin bamboo). See 132.
P. aureus (golden bamboo). See 132.
P. bambusoides (Japanese timber bamboo). See 132.
P. meyeri (Meyer bamboo). See 132.
Poa annua (annual bluegrass). See 2, 13, and 94.
P. bulbosa (bulbous bluegrass)
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Poa compressa (Canada bluegrass). See 2, 13, 15, 17, 19, 24, 34, 39, 53, 64, 94, 102, and 104.
P. nemoralis (wood bluegrass). See 2 and 94.
P. pratensis (Kentucky bluegrass). See 2, 8, 11, 13, 15, 19, 27, 32–34, 39, 41, 48, 53, 57, 59, 64, 77, 94, 95–97, 99, 102–104, 106–108, 129, 130, 137, 150.
P. subfastigiata (———). See 32.
P. trivialis (rough bluegrass). See 2, 13, 24, 56, and 94.
Pogonarthria falcata (———). See 2 and 5.
Polypogon australis (Chilean polypogon). See 2.
P. interruptus (ditch polypogon). See 2.
P. maritimus (Mediterranean polypogon). See 2 and 3.
P. monspeliensis (rabbitfoot-grass). See 2, 4, and 99.
Pseudosasa japonica (arrow bamboo). See 132.
Puccinellia distans (weeping alkaligrass). See 2.
Rhyncelytrum roseum (Natalgrass)
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See also 2, 15, 56, 64, and 94.
Rottboellia exaltata (itchgrass). See 2.
Saccharum barberi (Barber sweetcane). See 2.
S. bengalense (munj). See 2.
S. officinarum (sugarcane). See 2 and 94.
S. sinense (Chinese sweetcane). See 2.
S. spontaneum (wild sweetcane). See 2.
Sacciolepis indica (India cupscale). See 2.
Schismus arabicus (———). See 2.
S. barbatus (Mediterranean-grass). See 2 and 5.
Sclerochloa dura (hardgrass). See 2.
S. rigida (———). See 2.
Scolochloa festucacea (rivergrass). See 2.
Secale cereale (rye). See 2, 5, 19, 57, 60, 77, 94, and 99.
S. montanum (mountain rye). See 2, 8, 45, and 59.
Semiarundinaria fastuosa (Narihira cane). See 132.
Setaria barbata (East Indies bristlegrass). See 2.
S. carnei (Carne bristlegrass). See 2.
S. faberi (Faber bristlegrass). See 2.
S. italica (foxtail millet)
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See also 2, 5, 13, 15, 24, 94, 102, 154, and 185.
Setaria lutescens (yellow bristlegrass). See 4, 94, and 99.
S. nigrirostris (black bristlegrass). See 2.
S. palmifolia (palmgrass). See 2.
S. poiretiana (Poiret bristlegrass). See 2.
S. rariflora (Brazil bristlegrass). See 2.
S. setosa (West Indies bristlegrass). See 2.
S. verticillata (hooked bristlegrass). See 4 and 94.
S. verticillata var. **ambigua** (Sicilian hooked bristlegrass). See 2 and 4.
S. viridis (green bristlegrass). See 2, 4, 94, 99, and 102.
Sinocalamus oldhami (———). See 132.
Sorghum halepense (Johnsongrass)

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Sorghum sudanense (Sudangrass)
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Sorghum sudanense (Sudan 23 strain)
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See also 24 and 213.
Sorghum sudanense (Sweet Sudan selection). See 24, 185, 213, and 215.
Sorghum sudanense (Tift Sudan selection)
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See also 24 and 213.
Sorghum virgatum (Tunisgrass). See 2.
S. vulgare (sorghum).
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S. vulgare var. **drummondii** (chickencorn). See 2.
Sporobolus indicus (West Indies smutgrass). See 2 and 94.
S. poiretii (rattail smutgrass). See 2 and 99.
Stipa brachychaeta (Araucanian needlegrass). See 2.
S. elegantissima (Australian feathergrass). See 2 and 94.
S. neesiana (Uruguay needlegrass). See 2.
S. papposa (———). See 32.
S. pennata (European feathergrass). See 2.
S. sibirica (Siberian needlegrass). See 7.
S. splendens (cheegrass). See 2, 11, and 32.
S. tenacissima (esparto). See 2.
Themeda quadrivalvis (kangaroo-grass). See 2.
Thysanolaena maxima (tigergrass). See 2.
Tragus berteronianus (spike burgrass). See 2.
T. racemosus (stalked burgrass). See 2.
Trisetum aureum (golden trisetum). See 2.
T. flavescens (yellow trisetum). See 2 and 94.
Triticum aestivum (wheat). See 2, 199, and 217.
Vetiveria zizanioides (vetiver). See 2, 94, and 148.
Zea mays (corn). See 2, 199, and 217.
Zoysia japonica (Korean lawngrass)
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See also 2, 13, 24, and 161.
Zoysia matrella (Manilagrass). See 2, 5, 13, 24, 86, 94, 153, and 218.
Z. tenuifolia (mascarenegrass). See 2, 13, and 24.

INDEX OF COMMON NAMES

Page

alkaligrass, weeping (**Puccinellia distans**) 50
Angletongrass (**Andropogon nodosus**) 12
Bahamagrass. See Bermudagrass.
Bahiagrass (**Paspalum notatum**) 43
  Paraguay (strain of var. **saurae**) 43
  Pensacola (strain of var. **saurae**) 43
  Wilmington (strain of var. **saurae**) 43
bamboo (Gramineae family, Bambuseae tribe, species of).
  arrow (**Pseudosasa japonica**) 50
  giant timber. See bamboo, Japanese timber.
  golden (**Phyllostachys aureus**) 48
  hedge (**Bambusa multiplex**) 15
  Japanese timber (**Phyllostachys bambusoides**) 48
  Meyer (**P. meyeri**) 48
  Nevin (**P. aureosulcatus**) 48
barley (**Hordeum vulgare**) 37
  bulbous (**H. bulbosum**) 36
  hare (**H. leporinum**) 36
  Mediterranean (**H. hystrix**) 36
  seaside (**H. marinum**) 36
  short-awned (**H. brevisubulatum**) 36
  Stebbins (**H. stebbinsii**) 36
barnyardgrass (**Echinochloa crus-galli**) 26
basketgrass (**Oplismenus hirtellus**) 40
beachgrass, European (**Ammophila arenaria**) 10
beardgrass, ringed. See bluestem, Diaz.
bent (**Agrostis**).
  black (**A. nigra**) 8
  Cocoos. See bent, creeping.
  Colonial (**A. tenuis**) 9
  Highland bent (strain) 9
  Coos Bay. See bent, creeping.
  creeping (**A. palustris**) 8
  Metropolitan. See bent, creeping.
  Rhode Island. *See* bent, Colonial.
  seaside. See bent, creeping.
  velvet (**A. canina**) 8
  Washington. See bent, creeping.
  water (**A. semiverticillata**) 9

Page

Bermudagrass (**Cynodon dactylon**) 22
  African. See dogtoothgrass, Transvaal.
  Coastal bermuda (selection) 22
  fine-leaved. See dogtoothgrass, Transvaal.
  St. Luciegrass (selection) 23
  Star. See dogtoothgrass, giant.
  Suwanee bermuda (strain) 23
  Tift bermuda (selection) 23
  Tifton bermuda No. 99. See Suwanee bermuda.
bluegrass (**Poa**).
  annual (**P. annua**) 48
  bulbous (**P. bulbosa**) 48
  Canada (**P. compressa**) 49
  Kentucky (**P. pratensis**) 49
  rough (**P. trivialis**) 49
  wood (**P. nemoralis**) 49
bluegrass, Mexican. See chloris, flatstem.
bluestem (**Andropogon**).
  Australian (**A. intermedius**) 11
  Caucasian (**A. caucasicus**) 11
  Delhi (**A. foveolatus**) 11
  Diaz (**A. annulatus**) 10
  pitted (**A. pertusus**) 12
  silky (**A. sericeus**) 12
  Turkestan. See bluestem, yellow.
  yellow (**A. ischaemum**) 11
    Elkan (strain) 11
    King Ranch (strain) 11
    Turkestan (strain) 12
Brahmangrass. See bluestem, Diaz.
bristlegrass (**Setaria**).
  black (**S. nigrirostris**) 52
  Brazil (**S. rariflora**) 53
  bur. See bristlegrass, hooked.
  Carne (**S. carnei**) 52
  East Indies (**S. barbata**) 52
  Faber (**S. faberi**) 52
  green (**S. viridis**) 53
  hooked (**S. verticillata**) 53
  Poiret (**S. poiretiana**) 53
  Sicilian hooked (**S. verticillata** var. **ambigua**) 53
  West Indies (**S. setosa**) 53
  yellow (**S. lutescens**) 52
brome (**Bromus**).
  bald (**B. racemosus**) 19
  Chilean. See chess, Chilean.
  erect (**B. erectus**) 17

Page

brome—continued
false. *See* falsebrome.
Harlan (**B. stamineus**) 19
meadow. *See* brome, erect.
Mediterranean (**B. macrostachys**) 18
Prairie (strain of rescuegrass) 16
smooth (**B. inermis**) 17
Lincoln (strain) 18
Manchar (strain) 18
Parkland (selection) 18
bromegrass, smooth. *See* brome, bald.
broncograss. *See* cheatgrass.
buffelgrass (**Pennisetum ciliare**) 44
bugseedgrass (**Coridochloa cimicina**) 22
burgrass (**Tragus**).
spike (**T. berteronianus**) 56
stalked (**T. racemosus**) 56
Burmareed (**Neyraudia reynaudiana**) 40
canarygrass (**Phalaris canariensis**) 46
cutscale (**P. paradoxa** var. **praemorsa**) 47
hood (**P. paradoxa**) 46
littleseed (**P. minor**) 46
reed (**P. arundinacea**) 46
shortspike (**P. brachystachys**) 46
cane.
Chinese. *See* sweetcane, Chinese. Narihira (**Semiarundinaria fastuosa**) 52
Tonkin (**Arundinaria amabilis**) 13
Caribgrass (**Eriochloa polystachya**) 31
carpetgrass, Japanese. *See* Manilagrass.
centipedegrass (**Eremochloa ophiuroides**) 31
cheatgrass (**Bromus tectorum**) 19
cheegrass (**Stipa splendens**) 55
chess (**Bromus**, certain annual exotic species).
Australian (**B. arenarius**) 16
chess (**B. secalinus**) 19
Chilean (**B. trinii**) 20
downy. *See* cheatgrass.
hairy (**B. commutatus**) 17
Japanese (**B. japonicus**) 18
rattlesnake (**B. brizaeformis**) 16
soft (**B. mollis**) 18
chickencorn (**Sorghum vulgare** var. **drummondii**) 55
chloris (**Chloris**).
annual (**C. radiata**) 21
Argentine (**C. argentina**) 20
flatstem (**C. inflata**) 21
Moroccan (**C. prieurii**) 21
Paraguay (**C. canterai**) 20
Uruguay (**C. berroi**) 20
weeping (**C. distichophylla**) 20
cloudgrass (**Agrostis nebulosa**) 8
clubawngrass (**Corynephorus canescens**) 22

Page

cocksfoot. *See* orchardgrass.
cogongrass (**Imperata cylindrica**) 37
corn (**Zea mays**) 56
corn, Indian. *See* corn.
couchgrass, blue. *See* fingergrass, blue.
crabgrass (**Digitaria**).
hairy (**D. sanguinalis**) 26
Jamaica (**D. horizontalis**) 25
smooth (**D. ischaemum**) 25
violet (**D. violascens**) 26
crowfootgrass, Durban (**Dactyloctenium aegyptium**) 24
cupgrass (**Eriochloa**).
bearded (**E. aristata**) 31
hairy (**E. villosa**) 31
tropical (**E. procera**) 31
cupscale, India (**Sacciolepis indica**) 51
Dallisgrass (**Paspalum dilatatum**) 42
Strains B–230 and 430 43
danthonia (**Danthonia**).
Australian (**D. semiannularis**) 25
hairy (**D. pilosa**) 24
purple (**D. purpurea**) 25
Dawsongrass. *See* crabgrass, violet.
desmazeria (**Desmazeria sicula**) 25
devilgrass. *See* Bermudagrass.
dogtail (**Cynosurus**).
crested (**C. cristatus**) 23
hedgehog (**C. echinatus**) 23
dogtoothgrass (**Cynodon**).
giant (**C. plectostachyum**) 23
Transvaal (**C. transvaalensis**) 23
dunegrass, European (**Elymus arenarius**) 27
elephantgrass. *See* Napiergrass.
esparto (**Stipa tenacissima**) 55
eulalia. *See* silvergrass, Chinese.
everlasting-grass, Mexican. *See* cupgrass, bearded.
fairygrass, Himalaya (**Miscanthus nepalensis**) 39
falsebrome (**Brachypodium**).
annual (**B. distachyon**) 15
beardless (**B. mucronatum**) 15
Rumanian (**B. pinnatum**) 16
Turkish (**B. caespitosum**) 15
woodland (**B. sylvaticum**) 16
false-oat, hairy (**Helictotrichon pubescens**) 36
feathergrass (**Stipa**, plumose-awned spp.).
Australian (**S. elegantissima**) 55
European (**S. pennata**) 55
feathertop (**Pennisetum villosum**) 46
fescue (**Festuca**).
amethyst (**F. amethystina**) 32
blue (**F. ovina** var. **glauca**) 34
brome (**F. dertonensis**) 33
Chewings (**F. rubra** var. **commutata**) 35
creeping red. *See* fescue, red.

Page

fescue—continued
giant (**F. gigantea**) 33
hair (**F. capillata**) 33
hard (**F. ovina** var. **duriuscula**) 34
Maires (**F. mairei**) 33
meadow (**F. elatior**) 33
Portuguese (**F. geniculata**) 33
rattail (**F. myuros**) 34
red (**F. rubra**) 34
Clatsop (strain) 35
Illahee (strain) 35
hairyscale (**F. rubra** var. **lanuginosa**) 35
reed (**F. arundinacea**) 32
Alta (strain) 32
Alta 144 (selection) 32
Fescue 31 (selection). *See* Kentucky 31 (selection).
Kentucky 31 (selection) 33
shade (**F. rubra** var. **heterophylla**) 35
sheep (**F. ovina**) 34
tall. *See* fescue, reed.
fingergrass (**Digitaria**).
blue (**D. didactyla**) 25
Pentz (**D. pentzii**) 26
Swaziland (**D. swazilandensis**) 26
woolly (**D. eriantha**) 25
fingergrass. *See* chloris, flatstem.
giant. *See* chloris, Uruguay.
fountaingrass (**Pennisetum setaceum**) 45
foxtail (**Alopecurus**).
creeping. *See* foxtail, reed.
Cretan (**A. creticus**) 9
meadow (**A. pratensis**) 10
reed (**A. arundinaceus**) 9
slimspike (**A. myosuroides**) 10
goatgrass (**Aegilops**).
barb (**A. triuncialis**) 2
jointed (**A. cylindrica**) 1
goldentop (**Lamarckia aurea**) 37
goosegrass (**Eleusine indica**) 27
threespike (**E. tristachya**) 27
guineafowl-grass. *See* itchgrass.
Guineagrass (**Panicum maximum**) 41
haaschare. *See* danthonia, purple.
hairgrass (**Aira**).
early (**A. praecox**) 9
silver (**A. caryophyllea**) 9
hardgrass (**Sclerochloa dura**) 51
Hardinggrass (**Phalaris tuberosa** var. **stenoptera**) 47
harestail (**Lagurus ovatus**) 37
Hollandgrass. *See* beachgrass, European.
hurricanegrass. *See* bluestem, pitted.
itchgrass (**Rottboellia exaltata**) 50
jaragua (**Hyparrhenia rufa**) 37
Jobs-tears (**Coix lachryma-jobi**) 21

Page

Johnsongrass (**Sorghum halepense**) 53
jointtail, African (**Manisuris altissima**) 39
junglerice (**Echinochloa colonum**) 26
kangaroo-grass (**Themeda quadrivalvis**) 55
khuskhus. *See* vetiver.
kikuyugrass (**Pennisetum clandestinum**) 44
Kleberg-grass. *See* bluestem, Diaz.
koeleria, annual (**Koeleria phleoides**) 37
lawngrass, Japanese. *See* lawngrass, Korean.
lawngrass, Korean (**Zoysia japonica**) 56
lemongrass (**Cymbopogon citratus**) 22
lovegrass (**Eragrostis**).
Bahia (**E. bahiensis**) 29
blue. *See* lovegrass, Boer.
Boer (**E. chloromelas**) 29
bristly (**E. cyperoides**) 30
Chilean (**E. virescens**) 31
Chinese (**E. unioloides**) 31
feather (**E. amabilis**) 29
flarescale (**E. obtusa**) 30
India (**E. pilosa**) 30
Japanese (**E. tenella**) 31
Kimberly (**E. brizantha**) 29
Lehmann (**E. lehmanniana**) 30
little (**E. poaeoides**) 30
Mediterranean (**E. barrelieri**) 29
peregrine (**E. multicaulis**) 30
qovane. *See* lovegrass, Wilman.
slimflower (**E. stenophylla**) 30
Thalia (**E. chariis**) 29
weeping (**E. curvula**) 29
Wilman (**E. superba**) 30
lymegrass. *See* wildrye.
sea. *See* dunegrass, European.
maize. *See* corn.
malojilla-grass. *See* Caribgrass.
Manilagrass (**Zoysia matrella**) 56
mascarenegrass (**Zoysia tenuifolia**) 57
matgrass (**Nardus stricta**) 40
Mediterranean-grass (**Schismus barbatus**) 51
melic (**Melica**).
Siberian (**M. altissima**) 39
silkyspike (**M. ciliata**) 39
Memphisgrass (**Cutandia memphitica**) 22
millet.
African. *See* ragimillet.
broomcorn. *See* proso.
browntop (**Panicum ramosum**) 42
Coracan. *See* ragimillet.
foxtail (**Setaria italica**) 52
ginger. *See* ragimillet.

Page

millet—continued
hog. *See* proso.
Japanese (**Echinochloa crus-galli** var. **frumentacea**) 26
pearl (**Pennisetum glaucum**) 45
Sanyo (hort. var.) 45
Starr (strain) 45
Mitchellgrass (**Astrebla pectinata**) 14
curly (**A. lappacea**) 14
hoop (**A. elymoides**) 14
molassesgrass (**Melinis minutiflora**) 39
moorgrass (**Molinia caerulea**) 40
mudgrass (**Coleanthus subtilis**) 22
munj (**Saccharum bengalense**) 51
Napiergrass (**Pennisetum purpureum**) 45
Natalgrass (**Rhyncelytrum roseum**) 50
needlegrass (**Stipa**).
Araucanian (**S. brachychaeta**) 55
Siberian (**S. sibirica**) 55
Uruguay (**S. neesiana**) 55
nitgrass (**Gastridium ventricosum**) 35
oat (**Avena sativa**) 15
animated (**A. sterilis**) 15
slender (**A. barbata**) 14
wild (**A. fatua**) 14
oatgrass (**Arrhenatherum**).
tall (**A. elatius**) 13
Tualatin (selection) 13
tuber (**A. elatius** var. **bulbosum**) 13
oatgrass, hairy. *See* danthonia, hairy.
orchardgrass (**Dactylis glomerata**) 24
Akaroa (strain) 24
palmgrass (**Setaria palmifolia**) 53
pampasgrass (**Cortaderia selloana**) 22
quila (**C. rudiuscula**) 22
pangolagrass (**Digitaria decumbens**) 25
panicum (**Panicum**).
Berg (**P. bergii**) 41
blue. *See* panicum, giant.
giant (**P. antidotale**) 41
Paragrass (**Panicum purpurascens**) 42
paspalum (**Paspalum**).
India (**P. scrobiculatum**) 44
Peruvian (**P. racemosum**) 44
ribbed (**P. malacophyllum**) 43
pennisetum (**Pennisetum**).
bentspike (**P. nervosum**) 45
Chinese (**P. alopecuroides**) 44
Uruguay (**P. latifolium**) 45
pitscalegrass (**Hackelochloa granularis**) 35
polypogon (**Polypogon**).
Chilean (**P. australis**) 50
ditch (**P. interruptus**) 50
Mediterranean (**P. maritimus**) 50

Page

pricklegrass (**Crypsis niliaca**) 22
proso (**Panicum miliaceum**) 41
quackgrass (**Agropyron repens**) 6
quaking-grass (**Briza**).
big (**B. maxima**) 16
little (**B. minor**) 16
perennial (**B. media**) 16
rabbitfoot-grass (**Polypogon monspeliensis**) 50
ragi. *See* ragimillet.
ragimillet (**Eleusine coracana**) 26
Ravennagrass (**Erianthus ravennae**) 31
redtop (**Agrostis alba**) 8
reed, giant (**Arundo donax**) 14
reedgrass, chee (**Calamagrostis epigeios**) 20
rescuegrass (**Bromus catharticus**) 16
Prairie Brome (strain) 16
Rescue 46 (selection) 17
Texas Rescue 46 (selection). *See* Rescue 46 (selection).
Rhodesgrass (**Chloris gayana**) 21
ribbongrass (**Phalaris arundinacea** var. **picta**) 46
rice (**Oryza sativa**) 40
ricegrass, blue (**Oryzopsis coerulescens**) 40
rivergrass (**Scolochloa festucacea**) 51
rye (**Secale cereale**) 51
mountain (**S. montanum**) 52
ryegrass (**Lolium**).
common (**L. multiflorum** × **perenne**) 38
crested (**L. perenne** var. **cristatum**) 38
Dalmatian (**L. subulatum**) 39
darnel (**L. temulentum**) 39
domestic. *See* ryegrass, common.
hardy (**L. remotum**) 38
Italian (**L. multiflorum**) 37
Oregon. *See* ryegrass, common.
perennial (**L. perenne**) 38
Pacey's (small-seeded state) 38
P–312 (selection) 38
Persian (**L. persicum**) 38
Sicilian (**L. strictum**) 39
western. *See* ryegrass, common.
St. Luciegrass (**Cynodon dactylon** var.) 23
saltgrass, Mediterranean (**Aeluropus littoralis**) 2
sandbur, India (**Cenchrus biflorus**) 20
sicklegrass (**Parapholis incurva**) 42
signalgrass (**Brachiaria**).
creeping (**B. plantaginea**) 15
rocket (**B. erucaeformis**) 15
silvergrass (**Miscanthus**).
Amur (**M. sacchariflorus**) 40
Chinese (**M. sinensis**) 40

Page

silvergrass—continued
Nepal. See fairygrass, Himalaya.
sloughgrass, European (**Beckmannia erucaeformis**) 15
smilograss (**Oryzopsis miliacea**) 40
smutgrass (**Sporobolus**).
rattail (**S. poiretii**) 55
West Indies (**S. indicus**) 55
sorghum (**Sorghum vulgare**) 55
stargrass. See windmillgrass, creeping; dogtoothgrass, giant.
giant. See dogtoothgrass, giant.
stinkgrass (**Eragrostis cilianensis**) 29
Sudangrass (**Sorghum sudanense**) 54
Sudan 23 (strain) 54
Sweet Sudan (selection) 54
Tift Sudan (strain) 54
sugarcane (**Saccharum officinarum**) 51
swamp-timothy (**Heleochloa schoenoides** 36
sweetcane (**Saccharum**).
Barber (**S. barberi**) 51
Chinese (**S. sinense**) 51
wild (**S. spontaneum**) 51
teff (**Eragrostis tef**) 31
teosinte (**Euchlaena**).
Mexican (**E. mexicana**) 32
perennial (**E. perennis**) 32
thintail (**Monerma cylindrica**) 40
tigergrass (**Thysanolaena maxima**) 56
timothy (**Phleum pratense**) 47
British (**P. paniculatum**) 47
dryland (**P. phleoides**) 47
Italian (**P. subulatum**) 48
sand (**P. arenarium**) 47
todagrass. See bluestem, Delhi.
torpedograss (**Panicum repens**) 42
trisetum (**Trisetum**).
golden (**T. aureum**) 56
yellow (**T. flavescens**) 56
Tunisgrass (**Sorghum virgatum**) 54
umbrellagrass. See chloris, weeping.
uvagrass (**Gynerium sagittatum**) 35
Vaseygrass (**Paspalum urvillei**) 44
veldtgrass, perennial (**Ehrharta calycina**) 26
velvetgrass (**Holcus lanatus**) 36
German (**H. mollis**) 36
Korean. See mascarenegrass.
vernalgrass (**Anthoxanthum**).
annual (**A. aristatum**) 12

Page

vernalgrass—continued
Italian (**A. gracile**) 12
sweet (**A. odoratum**) 12
vetiver (**Vetiveria zizanioides**) 56
vinereed, Mauritania (**Ampelodesmos mauritanicus**) 10
wallabygrass. See danthonia, Australian.
wheat (**Triticum aestivum**) 56
wheatgrass (**Agropyron**).
Amur (**A. amurense**) 2
crested (**A. cristatum**) 2
desert (**A. desertorum**) 3
drooping (**A. semicostatum**) 7
Fairway crested. See wheatgrass, crested.
false. See wildrye, Chinese.
intermediate (**A. intermedium**) 4
Mongolian (**A. mongolicum**) 5
Oriental (**A. orientale**) 6
pubescent (**A. trichophorum**) 7
Ree (**A. intermedium × trichophorum**) 5
rhizomatous crested (**A. michnoi? A. desertorum** var.?) 3
rushleaf (**A. junceum**) 5
Siberian (**A. sibiricum**) 7
Standard crested. See wheatgrass, desert (Standard strain).
stiffhair. See wheatgrass, pubescent.
stiffleaf (**A. pungens**) 6
tall (**A. elongatum**) 4
Transbaikal (**A. michnoi**) 5
Turkish (**A. divaricatum**) 4
wildrye (**Elymus**).
Altai (**E. angustus**) 27
Aral (**E. aralensis**) 27
Asiatic. See wildrye, Dahurian.
Chinese (**E. chinensis**) 27
Dahurian (**E. dahuricus**) 27
mammoth (**E. giganteus**) 28
Volga (strain) 28
medusahead (**E. caput-medusae**) 27
Russian (**E. junceus**) 28
Russian dune (**E. sabulosus**) 28
Siberian (**E. sibiricus**) 28
Siberian giant. See wildrye, mammoth.
thickspike (**E. dasystachys**) 27
windgrass (**Apera spica-venti**) 12
windmillgrass (**Chloris**).
Australian (**C. ventricosa**) 21
creeping (**C. truncata**) 21
wiregrass. See Bermudagrass.
zoysiagrass. See Manilagrass.

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