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GRASS VARIETIES in the UNITED STATES

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GRASS VARIETIES IN THE UNITED STATES

By A. A. Hanson, research agronomist, Crops Research Division, Agricultural Research Service

This handbook has been prepared as a reference for technical workers interested in the origin and current status of named and experimental grass varieties in the United States. Information on source material, previous names or experimental numbers, characteristics ascribed to varieties by originating stations, and seed supplies has not been previously available in a readily accessible form.

At least 90 grasses are used to some extent on most farms in the United States either for forage or for conservation and soil improvement. In addition, the forage grasses are utilized on some 400 million acres of open grazing land and woodland ranges that are not on farms. The grasses provide about 48 percent of the total livestock feed requirements as pasture and about 12 percent as hay. Grasses for turf in lawns, parks, playgrounds, airports, cemeteries, roadsides, golf courses, and other uses occupy more than 14 million acres and affect almost the entire population of the country.

Most of our major grasses have been introduced--a process that started with early pioneer settlements along the borders of what is now the continental United States. Chance introductions were followed in time by organized plant explorations sponsored by the United States Department of Agriculture (USDA), as well as by the direct exchange of seed and plant material between American and foreign research workers. It would be impracticable to attempt to list all the organizations and individuals who have participated in bringing promising new grasses and grass varieties to the United States. However, one would be remiss, indeed, if he failed to acknowledge the exploration work conducted by the former Division of Plant Exploration and Introduction, USDA. In addition, special mention should be made of the early and effective introduction programs conducted by several State agricultural experiment stations, particularly those in California, Florida, and Texas.

Certain individuals, because of their professional stature and personal contacts, did much to bring new grasses to the United States and to encourage their evaluation. Leaders in this field include C. V. Piper, H. N. Vinall, G. E. Ritchey, and H. L. Westover of the former Bureau of Plant Industry, and C. R. Enlow and F. J. Crider of the former Nursery Division of the Soil Conservation Service, USDA.

The amount of effort devoted to improving any one grass species is very limited in comparison with that applied to most cultivated crops. In addition, many early attempts to select superior grass varieties fell short of expectation, partly because of the lack of specific information on the species in question, including mode of reproduction, breeding behavior, physiological response under various systems of management, animal acceptance, nutritive value, and the relative significance of disease and insect attack. Applied grass-breeding work is advancing with the accumulated basic information in cytology, genetics, pathology, and physiology, but much remains to be done. Many of the grass-breeding procedures and techniques summarized by Hanson and Carnahan[1] cannot be properly evaluated on the basis of existing data. However, it is certain that the accumulation of basic information and additional introduction work will continue to be important considerations in providing American farmers, ranchers, and homeowners with new and better grass varieties.

An attempt has been made in this handbook to limit entries to those varieties and experimental strains that have been distributed rather widely for testing purposes. Exceptions have been included where a particular name or number might have appeared in the literature and questions could be raised as to origin or status; for example, Michigan B-2 smooth brome. In addition, brief descriptions have been included of several foreign varieties that have been distributed through the regional testing program of the Grass and Turf Section, USDA.

Since introductions are often grown at more than one experiment station, it is frequently difficult to assign credit to any one individual or group. Insofar as possible an attempt has been made to recognize those individuals and agencies that have taken the initiative in increasing and distributing specific strains.

No attempt has been made to appraise the relative merits of the grass varieties included in this handbook. Several of the varieties are obsolete, and others have failed to exhibit any particular promise in comparative tests.

Breeder seed has been defined by seed certification agencies and is a term used by plant breeders in various ways, but for the purpose of this handbook it serves only to indicate the source of stock seed.

Some varieties have not been included in seed certification programs, and where this is true an attempt has been made to indicate whether or not noncertified seed is being produced. The most effective system for maintaining the characteristics of a grass variety

[1] Hanson, A. A., and Carnahan, H. L. Breeding Perennial Forage Grasses. U. S. Dept. Agr. Tech. Bul. 1145, 116 pp. 1956.

in commercial seed production is seed certification. Many grass varieties should be certified on a limited generation basis. The practice of continuing varieties by recertifying certified seed indefinitely can lead to serious changes in type. The originating or sponsoring station and the certifying agency must assume the responsibility of developing production practices and adequate control measures for the maintenance of a given variety.

Grateful acknowledgment is made for the cooperation of the grass specialists associated with State agricultural experiment stations, the Agricultural Research Service (ARS), and the Soil Conservation Service (SCS) in submitting material for this handbook.

Agropyron cristatum (L.) Gaertn., crested wheatgrass (suggested common name, fairway wheatgrass)

A-1770

Increased at SCS Nursery, Albuquerque, N. Mex.--C. G. Marshall and J. A. Downs.

Source.--Collected on dry, gravelly soil near Ankara, Turkey, by Westover-Enlow expedition in 1934. Introduced as P. I. 109012.

Description.--Rhizomatous strain that might be regarded as another species. Plants and spikes smaller than those of typical fairway wheatgrass. Plants 20-40 cm. high, spikelets scarcely 0.5 mm. (approximately). Rhizomes freely developed, though plants appear densely tufted.

Released.--No. Included in regional testing program.

Breeder Seed.--Not available. (Old seed in storage.)

NEBRASKA 3576

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS and SCS cooperating--L. C. Newell.

Source.--Commercial lots and experiment station accessions of fairway wheatgrass collected in 1936-38.

Method of Breeding.--Selection of space-planted clones carried on through three successive generations. Seed from superior plants composited and increased.

Description.--Early-maturing cool-season grass. Very leafy and productive of both forage and seed. In comparative tests at Lincoln it produced forage yields equal to those of Nordan. No evaluation made as to its value as pasture. Sod production indicates its possible utilization for turf purposes.

Released.--No. Included in regional testing program.

Breeder Seed.--Nebraska Agricultural Experiment Station.

TURKISH

Increased at United States Southern Great Plains Field Station, ARS, Woodward, Okla., and Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan and W. R. Kneebone.

Source.--Four source selections (P. I. 172690, 172691, 172694, and 180794) collected in Turkey by J. R. Harlan in 1948.

Method of Breeding.--Seed collected from planting made in 1950 at Woodward, seeded in separate rows at El Reno, Okla., in fall of 1952. Although rows kept separate, considerable number of volunteer plants appear each year and original identity of several strains probably lost. Seed from these four sources bulked for further increase.

Description.--As a whole very leafy and looked good under irrigation. Dryland seedings to date disappointing in Oklahoma, and strain may not be adapted so far south.

Released.--No. Included in regional testing program as Turkish fairway wheatgrass, and tested under name "Cresturk."

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Agropyron dasystachyum (Hook.) Scribn., thickspike wheatgrass

P-1822

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Native vegetation east of The Dalles, Oreg.

Method of Breeding.--Selected by elimination of aberrant plants during several generations. Bulked selections increased under isolation.

Description.--Vigorous, blue, leafy, rapid-spreading, productive strain. Foliage and culms glaucous, with only partial pubescence on lemmas. Seed production fair to good, produces some sterile florets, shows some resistance to leaf and stem rust. Well adapted to conservation use on light-textured soils in wind-erosion areas. (2n = 28.)

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Agropyron desertorum (Fisch.) Schult., standard crested wheatgrass (suggested common name, crested wheatgrass)

MANDAN 2194B

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Two-clone synthetic. One clone selected from old nursery at Dickinson, N. Dak., other clone early large-seeded selection made by J. T. Sarvis.

Method of Breeding.--Each clone selected on basis of polycross progeny performance.

Description.--Uniform, tall, erect plants; compact heads with large awnless seed; high seed producer.

Released.--No. Included in regional testing program.

Breeder Seed.--United States Northern Great Plains Field Station.

MANDAN 2359

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Synthetic of three early clones selected by J. T. Sarvis.

Method of Breeding.--Parental clones selected on basis of polycross progeny tests.

Description.--Uniform, tall, erect plants; compact heads with large awnless seed; good seed producer.

Released.--No. Included in regional testing program.

Breeder Seed.--United States Northern Great Plains Field Station.

NEBRASKA 10

Increased at Nebraska Agricultural Experiment Station, Lincoln, SCS and ARS cooperating--E. C. Conard.

Source.--Accession obtained by SCS from unknown commercial source and assigned number Nebraska 1007.

Method of Breeding.--Repeated plantings of Nebraska 1007 proved this lot to have superior seedling vigor and stand establishment as compared with those of other seed lots. Seed later increased by SCS nurseries and Nebraska Agricultural Experiment Station as Nebraska 10.

Description.--Vigorous, productive, early-maturing strain of crested wheatgrass, exhibiting various spike types predominantly of standard type. In comparative tests of forage yield, strain widely adapted and compared favorably in yield with leading standard strains. Believed to be of considerable potential value for selection because of its diverse plant types.

Released.--No. Included in regional testing program.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Not available.

NORDAN

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Developed from selection made in old nursery at Dickinson, N. Dak., in 1937.

Method of Breeding.--Single plant selections made under open pollination for 2 generations--7 plants within open-pollinated progeny bulked for increase and tested as Mandan 571.

Description.--More uniform and erect than commercial, seed more awnless and larger in size, heads more dense and compressed, good seedling vigor and seed quality. Forage yield as good as or better than commercial.

Released.--1953, cooperatively by North Dakota Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Available in quantity.

SOUTH DAKOTA 15

Selected at South Dakota Agricultural Experiment Station, Brookings--James G. Ross.

Source.--Original selections from adapted materials collected from old fields in South Dakota.

Method of Breeding.--Sibbing within outstanding open-pollinated progeny carried out. From these progenies, individuals selected on basis of greenhouse root rot tests. From polycross progeny tests, selections on basis of forage and seed-production evaluations made. This strain produced from synthetic of three of these selected genotypes.

Description.--Upright and very leafy. Has awnless spikelets with longer rachis internodes than common A. desertorum.

Released.--No. Included in regional testing program.

Breeder Seed.--South Dakota Agricultural Experiment Station.

SUMMIT

Selected at Dominion Forage Crops Laboratory, Saskatoon, Saskatchewan, Canada--R. P. Knowles.

Source.--Introduction from Western Siberian Experiment Station, Omsk, U. S. S. R.; received in 1957.

Description.--Fairly similar to standard crested wheatgrass strains grown in United States. No attempt made to alter strain through selection, but one generation of increase was

by single plants to rogue out impurities, particularly fairway-type plants. Tested as S-131.

Released.--Canada Department of Agriculture.

Breeder Seed.--Forage Crops Laboratory, Saskatoon.

Certified Seed.--Available.

UTAH 42-1

Selected at Utah Agricultural Experiment Station, Logan, ARS cooperating--W. Keller.

Source and Method of Breeding.--Strain originated from 30 plants selected in 1948 from old field in hills between Cache and Box Elder Counties in northern Utah. These plants were tall, leafy, and dark green. After their transfer to Forage Experiment Farm, Logan, 9 plants discarded and remaining 21 cloned into 20 pieces and allowed to interpollinate to produce breeder seed of this strain.

Description.--Tall, erect, with considerable variation in respect to spike characteristics. Good forage yield but relatively low seed yield.

Released.--No. Included in regional testing program. Original clones discarded and no longer maintained. Limited amount of seed in storage.

Certified Seed.--Not available.

Agropyron elongatum (Host) Beauv., tall wheatgrass

A-1876

Increased at SCS Nursery, Albuquerque, N. Mex., as A-1876; and at Utah Agricultural Experiment Station, Logan, ARS cooperating, as P. I. 109452.

Source.--P. I. 109452. Collected by West-over-Enlow expedition at Bandirma, Turkey. Introduced as Agropyron intermedium (Host) Beauv.

Method of Breeding.--Bulk increase.

Description.--Tall perennial bunchgrass widely used in reclaiming saline soils. Good seed producer. Forage yields higher than those of any other accession tested at Albuquerque.

Released.--1937, cooperatively by New Mexico Agricultural Experiment Station and Nursery Division, SCS. Included in regional testing program as Utah 109452.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas.

Certified Seed.--Not available. (Probably certified as tall wheatgrass only.)

ALKAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Selection from P. I. 98526; introduced from U. S. S. R. in 1932.

Method of Breeding.--Mass selection from spaced plants of above introduction. Tested as P-2326.

Description.--Tall, very late maturing, stemmy, bunch-type wheatgrass. Coarse blue-green leaves, large seeded, good seedling vigor. Very tolerant to wet alkaline conditions and semiarid regions of West at 4,500- to 6,000-foot elevation. Fairly palatable and highly productive on subirrigated and irrigated saline and alkali land. Used to reclaim nonproductive saline and alkali lands.

Released.--1951, under accession P-2326 for certified seed production in Idaho, Washington, and Oregon. Named Alkar in 1958 and accepted for certification in these States and California.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available.

NEBRASKA 98526

Increased at SCS nurseries in cooperation with Nebraska Agricultural Experiment Station, Lincoln. Tested as Nebraska 1978.

Source.--P. I. 98526 originally grown at Colorado Agricultural Experiment Station, Fort Collins, and later distributed to nurseries in Dakotas and Nebraska (1936) by SCS. P. I. 98526 originally introduced into United States from U. S. S. R. in 1932. Seed presented by N. I. Vavilov.

Method of Breeding.--Direct increase of P. I. 98526 without selection.

Description.--Erect, tall, somewhat coarse bunchgrass, with deeply veined, bluish-green leaves and coarse stems. Particularly well adapted to low, wet, or alkaline soil conditions, where it produces good yields. Also does very well in dry, upland plantings, where it appears moderately drought resistant. P. I. 98526 relatively leafy type, somewhat less aggressive and coarse than Turkish introductions with which it has been compared.

Released.--First grown on Nebraska farms for seed production under field certification by Nebraska Crop Improvement Association on recommendation of Nebraska Agricultural Experiment Station, SCS, and ARS.

Certified Seed.--Available. Certified as Nebraska 98526.

Agropyron inerme (Scribn. and Smith) Rydb., beardless wheatgrass

WHITMAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Collected from native Palouse prairie grassland climax near Colton, Whitman County, Wash., by L. A. Mullen in area of 20 inches of annual precipitation at elevation of 2,800 feet on Palouse silt-loam soil.

Method of Breeding.--First observed as outstanding accession, P-3537, in observational tests among more than 500 beardless and bluebunch wheatgrass collections, which represented 6 ecotypes, from Pacific Northwest. Developed by selection from space-planted nursery.

Description.--Long-lived, native, perennial, drought-resistant bunchgrass. Intermediate type, with moderately abundant, erect to semi-erect, medium-coarse stems and abundant, soft, lax, flat basal and cauline leaves. Seeds awnless, but short-awned seeds occur occasionally. Seedling vigor good. Seed and forage production high. Good spring and fall recovery and retains feed value and palatability late into summer. (2n = 14.)

Released.--1946, by Washington, Idaho, and Oregon Agricultural Experiment Stations, and SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available.

Agropyron intermedium (Host) Beauv., intermediate wheatgrass

A-12496

Increased at SCS Nursery, Albuquerque, N. Mex.--C. G. Marshall and J. A. Downs; and at Utah Agricultural Experiment Station, Logan, ARS cooperating--W. Keller.

Source.--P. I. 98568, Maikop, U. S. S. R.--increased at Utah Agricultural Experiment Station.

Description.--Variable, but not so mixed as many introductions. Good vigor and development at Albuquerque and Logan. Produced in quantity at former SCS Nursery, Albuquerque.

Released.--No. Seed distributed to SCS cooperators. Included in regional testing program.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas.

Certified Seed.--Not available.

AMUR

Selected at SCS Nursery, Albuquerque, N. Mex.--J. A. Downs.

Source.--P. I. 131532, Manchuria, China. Received as Agropyron amurense Drob. from SCS Nursery, Pullman, Wash., P-9838. Identified by J. R. Swallen as A. intermedium. Tested as A-13046.

Method of Breeding.--Awned-type plants rogued from original material. Bulk increased.

Description.--Uniform gray green. Stronger seedling vigor than that of other intermediate wheatgrasses. Heavy seed producer and does not get sod bound or fall off in seed production as rapidly as commercial.

Released.--1952, cooperatively by New Mexico Agricultural Experiment Station and SCS Nursery, Albuquerque.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas, and Plant Materials Center, SCS, Pullman.

Certified Seed.--Available. (Certified in Colorado and Nebraska.)

GREENAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Developed from selection made in 1937 from P. I. 98568, which was introduced by Westover-Enlow expedition from U. S. S. R. in 1932.

Method of Breeding.--Open-pollinated selections made from planting one generation after introduction. Aberrant plants removed in following generation. Selections bulked and increased for field testing as P-2327.

Description.--Vigorous, mild sod-forming, late-maturing, leafy, dark-green, broad-leaved, high-producing wheatgrass. Plants variable, but over 90 percent green in color. Less than 5 percent of plants show trace of pubescence. Spring recovery early and abundant; fall recovery good; plants disease resistant, very productive, and aggressive. Widely adapted for conservation plantings on well-drained soils in dryland and irrigated areas. Suitable for both hay and pasture seedings made alone or with alfalfa.

Released.--1945, as P-2327, cooperatively by Washington, Idaho, and Oregon Agricultural Experiment Stations and SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman. Named Greenar in 1956.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

IDAHO 3

Selected at Idaho Agricultural Experiment Station, Moscow--C. L. Canode.

Source.--Selections from Greenar (P-2327).

Description.--Seven-clone synthetic comprised of plants that are predominately green.

Plants selected for less vigor of rhizome spread, increased seed yield, awnlessness, and freedom from pubescence on lemmas.

Released.--No. Included in regional testing program.

Breeder Seed.--Idaho Agricultural Experiment Station.

IDAHO 4

Selected at Idaho Agricultural Experiment Station, Moscow--C. L. Canode.

Source.--Selections from Greenar (P-2327).

Description.--Nine-clone synthetic. Plants selected for color, leafiness, mild sod-forming characteristic, and increased seed yield. Lemmas mostly free of pubescence and practically awnless.

Released.--No. Included in regional testing program.

Breeder Seed.--Idaho Agricultural Experiment Station.

IOWA M2-10820

Selected at SCS Nursery, Ames, Iowa--M. E. Heath and A. I. Alcott.

Source.--Original seed from SCS Nursery, Lincoln, Nebr., (Nebraska-2961) in 1941 and traces back to introduction P. I. 98568.

Method of Breeding.--Seed saved from several glaucous bluish-green plants in 1943, planted, and first increase harvested in 1945. Subsequently several additional generations of seed increase made by SCS Nurseries at Ames and Ankeny, Iowa, until 1953.

Description.--Consists mostly of glaucous bluish-green plants. Slightly earlier but otherwise similar in most respects to Nebraska 50, Ree, and other strains originating from P. I. 98568. Apparently has no distinctly superior forage or seed traits to recommend it.

Released.--No. Included in regional testing program.

Breeder Seed.--No longer available. Small increases made by SCS from 1945 to 1953.

MANDAN 1274

Increased at United States Northern Great Plains Field Station, ARS; and SCS Nursery, Mandan, N. Dak.

Source.--P. I. 98568 introduced from U. S. S. R. in 1932. This particular source traces to seed collected by Wayne Austin at Fort Collins, Colo., in 1937.

Method of Breeding.--No breeding background; traces to same parental material as Ree.

Description.--Types intergrading into pubescent wheatgrass, green and blue-green plants, highly variable.

Released.--No official release, but grown throughout northern Great Plains.

Breeder Seed.--None.

Certified Seed.--Available in quantity.

NEBRASKA 50

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS cooperating--L. C. Newell.

Source.--Selection from increase of P. I. 98568, originally grown at Colorado Agricultural Experiment Station, Fort Collins, and later distributed to nurseries in Dakotas and Nebraska. Original introduction from Maikop, U. S. S. R., in 1932.

Method of Breeding.--Selection of Nebraska 50 carried through three generations, 1941-46, directed toward glaucous blue-green type, with elimination of light-green plants and plants with pubescent lemmas. Seed of selected progenies with desired characteristics bulked in third generation.

Description.--Nebraska 50 maintains excellent seed quality and seedling vigor of common intermediate wheatgrass derived from P. I. 98586, combined with greater uniformity of glaucous blue-green plant type. This type appears better adapted in tests in southern range of adaptation of grass than do light-green selections. Forage and seed yields of Nebraska 50 compare favorably in most tests with those of other strains.

Released.--1950, cooperatively by Nebraska Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in quantity.

REE

Increased at South Dakota Agricultural Experiment Station, Brookings--C. J. Franzke.

Source.--Introduced as *Agropyron pungens* (Pers.) Roem. and Schult. by former Bureau of Plant Industry, USDA, from Leningrad, U. S. S. R., in April 1932. Originated in Maikop region of U. S. S. R. at elevation of 600 feet. Originally this introduction, P. I. 98568, distributed by USDA to Dickinson and Mandan, N. Dak., in 1932; and to Fort Collins, Colo., Pullman, Wash., Cheyenne, Wyo., and Bozeman, Mont., in 1935. Seed harvested from Fort Collins planting brought to South Dakota Agricultural Experiment Station in fall of 1937 by Wayne Austin of SCS as *A. pungens*. Planted in early fall of 1937 in observational plot at South Dakota Agricultural Experiment Station with several other known *Agropyron* species. Discovered that this strain exhibited certain outstanding plant differences from known strains of *A. pungens* and *A. intermedium*. Material of strain collected in July 1941 classified by J. R. Swallen as derived from cross of *A. intermedium* and *Agropyron trichophorum* (Link) Richt.

Method of Breeding.--Strain released without selection from original material grown at South Dakota Agricultural Experiment Station.

Description.--Plants vary from light green to dark green and many covered with whitish bloom. Erect, 30-48 inches tall. Stems, as compared with those of smooth brome, medium fine to large, coarse, and leafy. Produce abundant basal leaves. Leaf blades longer and broader than leaves of smooth brome. Seed head or spike erect to slightly nodding, lax, and 6-14 inches long. Lemmas of some plants have pronounced awns; those of others are awnless or practically so. Sometimes pubescent. Seedlings have characteristic reddish anthocyanin color, which disappears when they become 3 or 4 weeks old. Strong and large, resembling newly emerged winter rye seedlings. Yields of this grass in South Dakota better than or equal to those of best strains of smooth brome.

Released.--1945, by South Dakota Agricultural Experiment Station.

Breeder Seed.--South Dakota Agricultural Experiment Station.

Certified Seed.--Not available.

SOUTH DAKOTA 20

Selected at South Dakota Agricultural Experiment Station, Brookings--James G. Ross.

Source.--Selected from Russian introduction P. I. 98568 erroneously named *A. pungens* obtained from Fort Collins, Colo., in 1937. Identified by J. R. Swallen as being derived from cross of *A. intermedium* and *A. trichophorum* and released as Ree by South Dakota Agricultural Experiment Station in 1945.

Method of Breeding.--Out of nursery of self- and open-pollinated progenies, high seed-setting plants selected. On basis of diallel-crossing system best parents from standpoint of forage and seed yield selected. After 2 further polycross cycles, 4 genotypes selected to make synthetic South Dakota 20.

Description.--Considerably higher seed production than Ree wheatgrass and somewhat higher yielding. Uniform for blue-green plant color.

Released.--No. Included in regional testing program.

Breeder Seed.--South Dakota Agricultural Experiment Station.

Agropyron riparium Scribn. and Smith, streambank wheatgrass

SODAR

Selected at SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman, Wash.--R. H. Stark and J. L. Schwendiman.

Source.--Collected near Canyon City, Grant County, Oreg., by R. G. Johnson in area of 12-inch annual rainfall at elevation of 3,000 feet.

Method of Breeding.--Best of 11 accessions. Improved by mass selection and elimination of aberrants during several generations at Plant Materials Center, SCS, Aberdeen. Tested as P-2415.

Description.--Drought-resistant, rhizomatous grass, particularly adapted for erosion control. Excellent seedling vigor; narrow, tough leaves. Produces open sod highly competitive to weeds and other plants under dryland conditions and offers excellent protection against soil erosion. Used primarily on roadsides, airports, and irrigation canal banks.

Released.--1954, cooperatively by Idaho and Washington Agricultural Experiment Stations, and SCS Plant Materials Centers, Aberdeen and Pullman.

Breeder Seed.--Plant Materials Center, SCS, Aberdeen.

Certified Seed.--Available.

Agropyron sibiricum (Willd.) Beauv., Siberian wheatgrass

P-27

Selected at SCS Plant Materials Centers, Pullman, Wash., and Aberdeen, Idaho--J. L. Schwendiman and R. H. Stark.

Source.--Original collection in 1934 from Kasakstan, U. S. S. R.; obtained from Institute of Plant Industry, Leningrad, U. S. S. R., by Westover-Enlow expedition. P. I. 108434.

Method of Breeding.--Included in row nurseries and field-evaluation studies since 1935. Individual clones selected in 1949 by R. H. Stark are basis of present increase.

Description.--Similar to standard crested wheatgrass, *A. desertorum*, in adaptation and season of use, but differs in several important respects. Narrow, awnless heads; fine, leafy stems. Drought resistant, good seedling vigor, good seed yields. Well adapted to light, droughty soils.

Released.--1953, cooperatively by Idaho Agricultural Experiment Station and SCS Plant Materials Centers, Aberdeen and Pullman.

Breeder Seed.--Plant Materials Center, SCS, Aberdeen.

Certified Seed.--Available in quantity.

Agropyron smithii Rydb., western wheatgrass

MANDAN 456

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Field collection made at Mandan in 1939.

Method of Breeding.--Bulked seed of 13 clones originating within progeny of single selection from above source. Thirteen clones selected for density of growth, leafiness, softness of leaves, and rust resistance.

Description.--Vigorous, leafy, rust resistant.

Released.--No. Increased in 1941.

Breeder Seed.--United States Northern Great Plains Field Station.

SAND STRAIN

Increased at United States Southern Great Plains Field Station, ARS, Woodward, Okla.--D. A. Savage.

Source.--Clones collected by D. A. Savage from deep sands on Range Unit near Fort Supply, Okla., in 1940.

Released.--No. Distributed for testing under name "Sand Strain." Not impressive in most tests.

Breeder Seed.--Not available.

Agropyron spicatum (Pursh) Scribn. and Smith, bluebunch wheatgrass

P-739

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Collected in 1934 on Mallery Ridge at elevation of 3,175-4,792 feet, Umatilla National Forest, Asotin County, Wash.

Method of Breeding.--First observed as promising accession in Pullman nursery, which contained more than 500 Pacific Northwest beardless and bluebunch wheatgrass collections, representing 6 ecotypes. Developed by mass selection from spaced plantings.

Description.--Long-lived native perennial, drought resistant; spreads slowly from short rhizomes. Leaves abundant, erect to semi-erect, soft, lax, flat, and primarily basal. Stems moderately abundant, erect to semi-erect, and medium coarse. Seeds large, heavy, and awned; must be processed to permit satisfactory seeding. Best adapted at higher elevations where available moisture exceeds 8 inches, good spring and fall recovery, retains feed value and palatability late into summer and fall. ($2n = 28$.)

Released.--No. Included in regional testing program.

Breeder Seed.--Plant Materials Center, SCS, Aberdeen, Idaho.

Certified Seed.--Not available.

Agropyron trachycaulum (Link) Malte, slender wheatgrass

PRIMAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--A. L. Hafenrichter, J. L. Schwendiman, and A. G. Law.

Source.--Collected near Beebe, Mont., in 1933 by Forest Service, USDA.

Method of Breeding.--Selected from original collection, assigned accession number P-2535, and tested with 104 other accessions.

Description.--Vigorous, early-growing, semierect, long-lived, slender wheatgrass. Usually 10 days earlier in seed maturity and 5-10 inches taller than late commercial strains. Leaves and stems moderately coarse and glaucous gray green. Plants high in vegetative production; resistant to leaf rust, stem rust, and stripe rust; superior to common slender wheatgrass in resistance to head smut. Seed production moderately heavy; seeds relatively large when compared with those of ordinary strains. Adapted for use in sweet-clover-grass conservation mixtures for pasture, hay, and green manure. Alkali tolerant; adapted to short-lived dryland seedings in areas with minimum of 14 inches of rainfall.

Released.--1946, cooperatively by Washington, Idaho, and Oregon Agricultural Experiment Stations; Plant Materials Center, SCS, Pullman; and Crops Research Division, ARS.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

Agropyron trachycaulum X Hordeum jubatum L.

X AGROHORDEUM

Selected at Utah Agricultural Experiment Station, Logan--W. S. Boyle.

Source.--Hybrid between A. trachycaulum and H. jubatum.

Method of Breeding.--Colchicine-induced allopolyploid from sterile, tetraploid hybrid between A. trachycaulum and H. jubatum. Selected for increased fertility.

Description.--Tall, reasonably fertile hybrid. Information lacking on adaptation.

Released.--No. Included in regional testing program.

Breeder Seed.--Utah Agricultural Experiment Station.

Agropyron trichophorum (Link) Richt., pubescent wheatgrass

A-1488

Increased at SCS Nursery, Albuquerque, N. Mex.

Source.--P. I. 107328 introduced from Tashkent, Turkestan, U. S. S. R., by Westover-Enlow expedition in 1934.

Method of Breeding.--Bulk production of outstanding accession in comparison rows.

Description.--Fairly uniform gray-green type. Good seed and forage producer. Gives good production and ground cover when planted on appropriate sites. Used as standard strain in range reseeding plots near Albuquerque.

Released.--No. Included in regional testing program.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas.

MANDAN 759

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Increase of P. I. 116252 from U. S. S. R. in 1936. Seed presented by N. I. Vavilov.

Method of Breeding.--Progeny tests of original introduction.

Description.--Higher forage and seed yields and greater persistence than other varieties of pubescent wheatgrass in tests at Mandan. Rapid spreader under favorable conditions. Some plants intergrade taxonomically into A. intermedium, but variety as whole forms more open sod than intermediate wheatgrass.

Released.--No. Included in regional testing program.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Not available.

TOPAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman and Donald S. Douglas.

Source.--P. I. 107330 introduced from Tashkent, Turkestan, U. S. S. R., by Westover-Enlow expedition in 1934.

Method of Breeding.--Developed by selection from spaced planting. Selections bulked and increased under isolation. All testing prior to 1953 was as accession P-41.

Description.--Vigorous-growing, late-maturing, sod-forming, drought-resistant wheatgrass. Resembles and closely related to intermediate wheatgrass, but pubescent on leaves, stems, and lemmas. Forms sod more rapidly and adapted to lower fertility, higher elevations, and more alkaline sites than intermediate wheatgrass. Seedling vigor very good. Seed production moderate and seed does not shatter easily. Adapted to shallow soils and low fertility sites in 10- to 14-inch rainfall areas of West.

Released.--1953, cooperatively by Washington, Idaho, Oregon, and California Agricultural Experiment Stations and SCS Plant Materials Centers, Aberdeen, Idaho, Pleasanton, Calif., and Pullman.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

UTAH 109

Selected at Utah Agricultural Experiment Station, Logan, ARS cooperating--W. Keller.

Source.--Seed obtained from Intermountain Forest and Range Experiment Station and from old seed-increase nursery on Experimental Farm, Logan.

Description.--Increased on basis of performance in 6-year test. Replicated-plot test included 47 strains of wheatgrass and bromegrass. Highly variable in many characters; blue-green pubescent, green pubescent, and blue-green glabrous plants.

Released.--No. Included in regional testing program.

Breeder Seed.--Utah Agricultural Experiment Station.

Certified Seed.--Not available.

Agrostis canina L., velvet bentgrass

Several strains appeared from time to time, but to date none have been used very widely, owing in part perhaps to availability of planting stock or seed of other bentgrasses. Acme, Piper, Kernwood, and Raritan represent some varieties selected out of velvet bentgrass.

KERNWOOD

Selected at Kernwood Country Club, Salem, Mass.

Description.--Becomes green very early in season and continues green well into winter in rather mild climate of Rhode Island. Medium to dark green.

Released.--Not officially.

Breeder Seed.--Not available.

Certified Seed.--Not available. (No information on commercial sources.)

RARITAN

Selected at New Jersey Agricultural Experiment Station, Rutgers--Howard B. Sprague.

Source.--All commercial strains and named varieties available in 1930.

Method of Breeding.--Continuous selection in successive generations of what appeared to be outstanding individual plants. With each successive generation, outcrossing limited to families selected from previous generation. Relatively uniform and vigorous families combined to make synthetic variety.

Description.--Plants selected for seedling vigor, good seed yield, apparent freedom from disease, vigor of mature plants, and turf quality. Parallel testing of turf plots produced from seed of selected plants accompanied later stages of selection. Vigorous variety producing fine-quality turf. Displays excellent adaptation to climatic conditions prevailing in New Jersey.

Released.--1940, by New Jersey Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Not available. (At least one commercial seed field in existence.)

Agrostis palustris Huds., creeping bentgrass

Two types commercially available. One represents group of individual strains selected from established greens of South German mixed bentgrass; all these strains must be propagated vegetatively. Second type includes Penncross and Seaside strains grown from seed.

ARLINGTON

Selected at Arlington, Va., by United States Golf Association Green Section, ARS cooperating--John Monteith, Jr.

Source.--Collected in 1928 from practice green at Country Club of Atlantic City, Northfield, N. J.

Method of Breeding.--Increased vegetatively for testing as C-1.

Description.--Tough, sturdy, rather slow growing, bluish green. Responds to careful management. Requires high level of soil fertility, minimum irrigation, and close mowing to reduce swirl. Somewhat resistant to dollar spot and melting-out (Helminthosporium-Curvularia complex) and susceptible to brown patch. Grows well in hot weather. Not generally recommended for use in pure stands, but combines well with Congressional if not subjected to overwatering.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially.)

COHANSEY

Selected by E. R. Steiniger in 1935.

Source.--Fourth green at Pine Valley Golf Club, Clementon, N. J.

Method of Breeding.--Increased vegetatively for testing as C-7.

Description.--Vigorous, aggressive, yellowish green. Tolerates frequent watering and exhibits wide adaptation to climatic conditions. Performed very satisfactorily in warm areas. Exhibited some tolerance to brown patch and melting-out, but susceptible to dollar spot.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially.)

COLLINS

Selected at Arlington, Va., by United States Golf Association Green Section, ARS cooperating--John Monteith, Jr.

Source.--Collected in 1937 from eighth green at Washington Golf and Country Club, Rosslyn, Va.

Method of Breeding.--Increased vegetatively for testing as C-27.

Description.--Dark green, rather nonaggressive. Somewhat comparable to Seaside in susceptibility to disease, except possibly better rating for brown patch tolerance.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially in limited quantity.)

CONGRESSIONAL

Selected by R. P. Hines, Jr., in 1936.

Source.--Thirteenth green at Congressional Country Club, Rockville, Md.

Method of Breeding.--Increased vegetatively for testing as C-19.

Description.--Attractive dark green and good texture. Hardy variety; starts growth early in spring and retains color well into fall and winter. Susceptible to brown patch. Good variety either alone or in combination with Arlington (C-1) and/or Collins (C-27).

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially.)

DAHLGREN

Selected at Beltsville, Md., by United States Golf Association Green Section, ARS cooperating--Fred V. Grau.

Source.--Collected in 1946 at Naval Proving Grounds, Dahlgren, Va.

Method of Breeding.--Increased vegetatively for testing as C-115.

Description.--Coarse, disease resistant, not suited for putting-green turf. May be satisfactory for heavily used tee areas and park-lawn turf receiving low level of maintenance.

Released.--No.

Breeder Stock.--Not available.

Certified Stock.--Not available.

METROPOLITAN

Selected at Arlington Farms, Va., by United States Golf Association Green Section, ARS cooperating.

Source.--Material sent to USDA in 1917 for identification purposes by New York City seed firm.

Method of Breeding.--Increased vegetatively for testing as C-51.

Description.--Difficult to manage, turf tends to become fluffy and grainy. Very susceptible to melting-out.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Practically no Metropolitan bentgrass available commercially.)

NORBECK

Selected at Arlington, Va., by United States Golf Association Green Section, ARS cooperating--John Monteith, Jr.

Source.--Collected in 1937 from fourth green at Manor Club, Norbeck, Md.

Method of Breeding.--Increased vegetatively for testing as C-36.

Released.--Not officially. (Planting stock no longer available.)

OLD ORCHARD

Selected in spring of 1934.

Source.--Old Orchard Grass Nursery, Madison, Wis.

Method of Breeding.--Increased vegetatively as C-52.

Description.--Good color and texture. Some resistance to dollar spot. Some tendency to thin out during hot weather. Adapted to parts of Midwestern United States, where used rather widely.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially.)

PENNCROSS

Selected at Pennsylvania Agricultural Experiment Station, University Park--H. B. Musser.

Source.--Parent strains for seed production identified under station accession numbers 10(37)4 (Pennlu creeping bentgrass), 9(38)5, and 11(38)4.

Method of Breeding.--First-generation seed produced by random crossing of three vegetatively propagated clones of creeping bentgrass.

Description.--Turf-quality records obtained over 5-year period at Pennsylvania Agricultural Experiment Station show Penncross significantly better in density, tolerance to disease, and rate of recovery from attacks than other commercially available seeded types. Because of general vigor shows exceptional ability to produce better turf than other seeded bentgrasses under adverse conditions. Recommended for golf-course putting greens and similar intensive turfgrass areas.

Released.--1954, by Pennsylvania Agricultural Experiment Station.

Breeder Stock.--Parent clones maintained by Pennsylvania Agricultural Experiment Station.

Certified Seed.--Available.

PENNLU

Selected at Pennsylvania Agricultural Experiment Station, University Park--H. B. Musser.

Source.--First observed at LuLu Temple Golf Course, Philadelphia, Pa., by Edward Roberts and Walter Groff. Sent to Pennsylvania Agricultural Experiment Station for evaluation by C. K. Hallowell. Tested under accession number 10(37)4.

Description.--Consistently good performance, chiefly owing to high disease tolerance, good vigor, density, texture, and ability to withstand wide temperature range. Recommended for use on golf-course greens and similar specialized turf.

Released.--1954, by Pennsylvania Agricultural Experiment Station.

Breeder Stock.--Pennsylvania Agricultural Experiment Station.

Certified Stock.--Available.

SEASIDE

Description.--Established from seed. Quality poorer than that of most selected varieties of creeping bentgrass. Below average in disease resistance. Develops patches of individual strains that exhibit almost endless variation in texture, color, graininess, and disease susceptibility.

Released.--Not officially.

Breeder Seed.--Not available.

Certified Seed.--Available in quantity.

TORONTO

Source.--Toronto Golf Club, Long Branch, Ontario, Canada.

Method of Breeding.--Increased vegetatively for testing as C-15.

Description.--Vigorous, aggressive, requires careful management. Dark green; fine texture. Susceptible to dollar spot and brown patch. Well adapted in eastern Canada and Midwestern United States.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially in limited quantity.)

WASHINGTON

Selected at Arlington Farms, Va., by United States Golf Association Green Section, ARS cooperating.

Source.--Collected at Washington Golf and Country Club, Rosslyn, Va.

Method of Breeding.--Increased vegetatively for testing as C-50.

Description.--Washington and Metropolitan were first named strains of creeping bentgrass. Washington is heat resistant, exhibiting some tolerance to disease. Relatively short growing season; grows slowly in spring, growth stops in early fall, with cool weather assumes purple tinge. Light green; excellent texture.

Released.--Distributed in golf-turf industry.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially. Appears to be more than one strain being increased and used under name "Washington." Also known as Flossmoor bentgrass and Wakonda Washington.)

Agrostis tenuis Sibth., colonial bentgrass (other common names include Rhode Island, browntop, New Zealand, and Prince Edward Island)

ASTORIA

Source.--Collection made in northwestern Oregon by Engbretson and Hyslop in 1926.

Method of Breeding.--Comparative testing.

Description.--Weakly creeping; short stolons; semierect, slender culms. Short ligule, round to obtuse in shape, finely toothed, and often split. Panicle open with delicate form and somewhat larger than that of common colonial. In general, Astoria and common colonial cannot be readily distinguished on basis of growth habit or color. Astoria may be somewhat more robust but not under all conditions. Susceptible to brown patch. Used in lawn mixtures and on fairways.

Released.--Yes. Included in seed certification program in Oregon in 1926.

Breeder Seed.--Not available.

Certified Seed.--Available in quantity. Common colonial seed certified in Washington State. Most of production traces to seed collected originally from native stands found in southwest part of State, north of Columbia River to Olympia.

HIGHLAND

Source.--Collections made in southern Willamette Valley, Oreg., in about 1930.

Method of Breeding.--Comparative testing.

Description.--Astoria and common colonial bentgrass very similar in appearance; Highland has several distinctive characteristics. Bluish green, with erect, robust culms. Ligule longest of three types, about 1-3.5 mm., round to obtuse in shape, finely toothed, and often split. Panicles generally largest of three, pyramidal in form, with variations from Astoria to almost appearance of redtop. Culms tend to be coarser and taller. Culms and panicles dull, light red up to spikelets and remain so at ripening. Panicles semiclosed after blooming, making it readily noticeable in fields of common colonial, which turns brown at ripening and its panicles remain open. Highland stoloniferous, somewhat stronger creeper than other types. Susceptible to brown patch. Turf tends to become puffy when mowed at ordinary lawn height. Used in lawn mixtures and on fairways.

Released.--Yes. Included in seed certification program in Oregon in 1934.

Breeder Seed.--Not available.
Certified Seed.--Available in quantity.

Alopecurus arundinaceus Poir., creeping foxtail

GARRISON

Increased at SCS Nursery, Mandan, N. Dak.--Jesse L. McWilliams.

Source.--Field collection made near Max, McLean County, N. Dak., in 1950. Information obtained from local people there indicate grass brought into area from eastern Germany or western U. S. S. R. by immigrant in early days of homesteading. Escaped and growing around many pothole sloughs in area. In his Handbook of North Dakota Plants, O. A. Stevens stated, regarding this grass, "Specimens were received in 1935 from Gust Steinhaus of Max, McLean County, and were identified by J. R. Swallen, who commented that it was the first record for the United States."

Description.--Resembles common meadow foxtail (Alopecurus pratensis L.), but has more vigorous rhizomes and broader leaves. Seed black at maturity; spikelets fall away easily, making seed harvest somewhat difficult. Field tested in mountain meadow areas of Montana and Wyoming and in wetland areas of North and South Dakota. Well adapted to wetland sites; produces good yields of high-quality forage under these conditions. Tested as NDG-772.

Released.--No. In SCS field-evaluation tests.

Breeder Seed.--Plant Materials Center, SCS, Bismarck, N. Dak.

Certified Seed.--Not available.

P-14762

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--(P-111), P. I. 110067, botanic garden Alma-Ata, U. S. S. R., and (P-124), P. I. 110351, Institute of Plant Industry, Leningrad, U. S. S. R.; introduced by Westover-Enlow expedition in 1934.

Method of Breeding.--Selected plants from original planting cloned into spaced, isolated, polycross nursery in 1948. F_2 seed produced by open pollination under isolation from other strains. In 1955, 1.8-acre planting made and in 1956, F_3 seed harvested.

Description.--Leafy, long lived, sod forming. Foliage dark green; leaves flat and mostly basal. Stems erect, medium coarse, abundant. Plants start growth early in spring and mature seed early. Seed mostly black, short awned to awnless; seed habits fair; seed ripens more uniformly than most strains; shatters readily. Foliage stays green after seed matures and until heavy frost, or as long as moisture available. Best adapted to conservation plantings in wet or poorly drained areas.

Released.--No. Included in regional testing program.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Not available.

Andropogon annulatus Forsk., Diaz bluestem

PRETORIA 90

Increased at SCS Nursery, San Antonio, Tex.--James E. Smith, Jr. Called Pretoria to retain reference to general origin, and 90 (last two digits of accession number) to distinguish it from other South African accessions of A. annulatus.

Source.--Introduced from Transvaal, South Africa, as P. I. 188926, BN-6730; received in April 1951 from F. J. Crider as Dicanthium annulatum Stapf. Increased for testing as T-20090.

Description.--Selection made on basis of seedling vigor, rapid growth, and aggressive spread by self-seeding, good seed production, and good drought tolerance. Plants essentially bunchgrass, but stems will root to form loose turf in contact with moist soil. Stems leafy and leaves carry high along stems, which may reach 5 feet at seed maturity. Green forage relished by cattle. Best use indicated as tame hay, pasture, and ensilage grown on heavy soils from about Temple, Tex., south and eastward. Apparently cold tolerant at Fort Stockton, San Angelo, Dublin, and Palestine, Tex., but area of full adaptation not yet completely defined.

Released.--Informally by SCS in 1954 for tests on cooperators' farms in soil-conservation districts of southern and eastern Texas.

Breeder Seed.--Plant Materials Center, SCS, San Antonio.

Certified Seed.--Not available. (Limited commercial production.)

Andropogon caucasicus Trin., Caucasian bluestem

CAUCASIAN

Increased at SCS Nursery, Manhattan, Kans. --D. R. Cornelius and M. D. Atkins.

Source.--Introduced from Tiflis, U. S. S. R., in 1929 as P. I. 78758. Seed obtained in 1934 from A. E. Aldous, Kansas Agricultural Experiment Station, Manhattan. Increased for testing as KG-40.

Description.--Bunchgrass with good leafiness, fine stems, and forage production approximately equivalent to that of native little bluestem at Manhattan. Free from disease. Seed maturity indeterminate, very difficult to harvest, total yield poor to fair. Palatability lower than that of native bluestems, blue grama, and sideoats grama. Easily established and spreads well from seed. Good drought tolerance.

Released.--Informally by SCS in 1946 for field-evaluation plantings primarily in mixed prairie area of central Kansas and western Oklahoma. Came into rather extensive use in this area for warm-season tame grass pasture and for revegetating earth structures and other sacrifice areas.

Breeder Seed.--Foundation seed field being maintained at Plant Materials Center, SCS, Manhattan.

Certified Seed.--Not available. (Available commercially, but many growers dropped species because of difficulty of seed harvest.)

Andropogon gerardi Vitman, big bluestem

KAW

Selected at Kansas Agricultural Experiment Station, Manhattan.

Source.--Composite of lines selected after 4 or more generations from progeny of 200 accessions collected in 1935 in native Flint Hills grasslands south of Manhattan.

Description.--Tall and more uniformly leafy than field-run types; leafy, medium late in maturity, and somewhat resistant to rust. Forage yields greater in plot tests than those of field-run accessions with which it has been compared. Seed yields relatively high and seed set good.

Released.--1950, by Kansas Agricultural Experiment Station.

Breeder Seed.--Kansas Agricultural Experiment Station.

Certified Seed.--Plant Materials Center, SCS, Manhattan.

Andropogon hallii Hack., sand bluestem

WOODWARD

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan and W. R. Kneebone.

Source.--Traces to source nursery established by M. L. Peterson in 1942. Sources about equally divided between those in and near Woodward County, Okla., and those in general vicinity of Clovis, N. Mex.

Method of Breeding.--Plants selected for high seed set and placed in 6 isolation blocks by J. R. Harlan: Short-early, short-late, medium-early, medium-late, tall-early, and tall-late. Process repeated with separate populations established in 1946. Selected plants moved to 6 new isolation blocks. Seed from 2 medium blocks bulked and seeded for preliminary increase in 1949, refined somewhat by removal of excessively tall plants, and today serves as breeder seed block of Woodward sand bluestem.

Description.--Variable population, but with most plants similar in type. Superior to wild strains tested in (1) flower production, (2) seed set, (3) lack of excessively tall plants, and (4) leafiness. Forage yield comparable to that of better source strains. Woodward can be combined reasonably well, and seed quality superior to common sources.

Released.--1955, cooperatively by Oklahoma and Kansas Agricultural Experiment Stations and Crops Research Division, ARS.

Breeder Seed.--United States Southern Great Plains Field Station.

Certified Seed.--Available.

Andropogon ischaemum L., yellow bluestem

A-1407

Increased at SCS Nursery, Tucson, Ariz.--C. G. Marshall and L. P. Hamilton.

Source.--Introduced from U. S. S. R. as P. I. 107017 in 1934. Collected by Westover-Enlow expedition at Tajikistan, Turkestan.

Description.--Vigorous introduction that appears to be more erect and more cold hardy than King Ranch bluestem. Looked promising in central Arizona.

Released.--No.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

A-14207

Increased at SCS Nursery, Tucson, Ariz.--C. G. Marshall and L. P. Hamilton.

Source.--Origin cannot be established; seed obtained from Texas as little bluestem. Looked promising in some Arizona plantings. Collected and sent to Tucson by Fred Lavin.

Description.--Similar to A-1407, but appears to be superior in forage production. Panicle resembles that of Caucasian bluestem. Growth more erect than King Ranch bluestem.

Released.--No.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

EL KAN

Selected at SCS Nursery, Manhattan, Kans.--D. R. Cornelius.

Source.--Seed collection made in 1937 from adventitious plants growing in county road ditch and edge of adjoining rangeland west of Howard, Elk County, Kans. Exact origin unknown, but thought to have come in with cattle or hay from Texas.

Method of Breeding.--Selected in comparison with other introductions of this Asiatic bluestem. Tested as KG-495.

Description.--One of few strains of species fully hardy to winter conditions in Kansas. Bunchgrass of medium leafiness and forage production; more nearly equal to sideoats grama than to native bluestems in eastern Kansas. Only fair seed production. Comparatively free from disease. Low in palatability compared with native bluestems, blue grama, and sideoats grama. Easily established and spreads well from seed.

Released.--Informally by SCS for field-evaluation plantings in western Kansas and Oklahoma and eastern Colorado and New Mexico. Primarily for use as warm-season tame grass and for revegetating very difficult sites, earthen structures, and other sacrifice areas.

Breeder Seed.--Plant Materials Center, SCS, Manhattan.

Certified Seed.--Not available.

FORMOSA

Increased at Oklahoma Agricultural Experiment Station, Stillwater, ARS cooperating--J. R. Harlan.

Source.--Seed lot received in 1952 from Mr. Chu of Formosa. Two robust plants increased.

Description.--Songarica type of *Bothriochloa ischaemum* Keng; hexaploid. Differs from King Ranch bluestem in being extremely leafy and rather late in blooming. Susceptible to leaf rust, but not so much so as King Ranch bluestem. Overwintered at Stillwater, but injury suggests marginal adaptation in this respect. Strongly apomictic. Should be tested on good soils where high production and intensive management are anticipated.

Released.--No.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

KING RANCH (KR)

Selected at Kingsville, Tex., by N. R. Diaz; then grown at SCS Nursery, San Antonio, Tex.

Source.--Original seed collected in weakened rhodesgrass pasture on King Ranch, Tex., where escaped bluestem had gained dominance. Country of origin unknown, but thought by some to be China. Increased for testing as T-3487.

Origin of King Ranch bluestem in America described by J. R. Harlan in Oklahoma Forage Leaflet No. 11, 1952, as follows: Material now generally in use was first noticed by Nico Diaz on King Ranch in 1937 and increased for distribution by SCS under T-3487. Recent inquiry into history of Texas yellow beardgrass, which is apparently indistinguishable from King Ranch bluestem in all respects, leaves little doubt as to original entry of grass into United States. History is briefly as follows:

January 11, 1917--Received by P. B. Kennedy, California Agricultural Experiment Station, Berkeley, from Amoy, China. Presented by H. Hoyle Sink, American consul, Amoy. Given California number T. O. 144 and later S. P. I. number 44096.

1924--S. P. I. 44096 introduced to Angleton Experiment Station, Texas, by V. E. Hafner, Bureau of Plant Industry, Washington, D. C., and given Texas number T. S. 8413.

April 11, 1932--T. O. 144 received by Division of Forage Crops and Diseases, Bureau of Plant Industry, Washington, D. C., from Agronomy Department, University of California, Davis, and given F. C. number 21785.

April 11, 1935--F. C. 21785 sent to B. F. Kiltz, Oklahoma Agricultural Experiment Station, Stillwater, from Beltsville, Md.

1937--F. C. 21785 obtained by United States Southern Great Plains Field Station, Woodward, Okla., from Stillwater.

1937--F. C. 21785 obtained by Texas Agricultural Experiment Station, College Station, from Woodward.

1939--T. S. 8413 given name "yellow beardgrass" in Texas Agricultural Experiment Station Bulletin No. 570 and its performance at Angleton described.

1949--F. C. 21785 given name "Texas yellow beardgrass" and released for certification in Texas by Texas Agricultural

Experiment Station. All Andropogon ischaemum material furnished by Texas Agricultural Experiment Station to individuals or substations since 1941 originated from this source.

Since original Chinese material had been grown at Angleton Experiment Station as early as 1924, little reason to suppose that King Ranch strain is any other than Chinese accession that found its way from Angleton to King Ranch sometime during 1924-37.

Description.--Midtall, perennial, warm-season bunchgrass. Forms semiprostrate leafy clumps in early stages of growth. Very drought tolerant; able to withstand winter temperatures as far north as central Oklahoma. Produces seed indeterminately throughout season, volunteers aggressively, tends to eliminate other competition. Adapted best for range seeding on clay soils and rocky, limestone hills. Forage attractive to cattle and sheep; plants can withstand heavy use for relatively long periods. Leaf growth very susceptible to damage from leaf rust, especially in spring. Weakness did not show up as major factor until grass had been in widespread use for several years.

Released.--Informally by SCS in about 1941. Later certified and formally released by SCS and Texas Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Not available. (In commercial production.)

MARASH

Increased at Oklahoma Agricultural Experiment Station, Stillwater, ARS cooperating--J. R. Harlan.

Source.--Collected by J. R. Harlan in Maras, Turkey, in 1948 and introduced as P. I. 172720.

Description.--Belongs to common Eurasian type of Bothriochloa ischaemum, but is hexaploid rather than tetraploid; considerably more robust than other accessions of this type. Resembles El Kan in general ecological behavior and gross appearance; also apomictic. Larger, coarser, more robust, and bluish. Weedy; produces seed abundantly and continuously through growing season and should volunteer readily. Winter hardy in Oklahoma and resistant to leaf rust. Slow starter.

Released.--No.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Andropogon nodosus (Willem.) Nash, angletongrass

MEDIO

Increased at SCS Nursery, San Antonio, Tex.

Source.--Medio Creek, Bee County, Tex., near State Highway 202 bridge. Lines lower benches of Medio Creek from near Berclair to Copano Bay and evidently been in place for many years. All other except woody vegetation excluded by grass where it is established. Apparently first noticed by Dick Sentor of SCS in about 1940. His attempts to reproduce it then reported later as failures. In February 1951 Simon E. Wolff of San Antonio SCS Nursery with Roy Boethel and Alfred Taylor of Beeville SCS Work Unit collected 5 sod clumps, which were brought to San Antonio by Wolff, divided, set out in 2 rod rows, and given accession number T-20011. Country of origin unknown. Named Medio by James E. Smith, Jr.

Description.--Leafy, dark green, fine stemmed, perennial form of A. nodosus. Reproduces well by self-seeding; spreads rapidly by means of prostrate stems to form dense turf, with upright stems about 30 inches tall at seed maturity. Tolerant to alkali soils and low rainfall. Good seed producer; grows best in clay soils or sandy soils with shallow clay layer. Capable of very high forage production. Both green and cured forage taken by cattle in preference to most native and other introduced grasses. Area of best adaptation appears to be east of San Angelo, Tex., and south of Waco, Tex., for pasture and range seeding.

Released.--Informally by SCS in 1954.

Breeder Seed.--Plant Materials Center, SCS, San Antonio.

Certified Seed.--Not available. (In commercial production.)

Andropogon scoparius Michx., little bluestem

KG-1580

Selected at Kansas Agricultural Experiment Station, Manhattan--A. E. Aldous.

Source.--Accessions collected in 1935 from Flint Hills native grasslands south of Manhattan.

Method of Breeding.--Composite of progeny of these accessions made after several generations of selection.

Description.--Tall, leafy, vigorous, medium late in maturity, more uniform than field-run accessions. High producer of forage and, under favorable conditions, also of seed. Some resistance to rust.

Released.--No.

Breeder Seed.--Kansas Agricultural Experiment Station.

Certified Seed.--Not available.

Arrhenatherum elatius (L.) Presl, tall oatgrass

TUALATIN

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth.

Method of Breeding.--First selections made in 1930 in attempt to develop strain for non-shattering seed characteristics.

Description.--Leafier, finer stemmed, and about 10 days later in heading than common tall oatgrass; not quite so tall. Forage yields equal under comparable growing conditions; seed yields considerably higher because of resistance to shattering. Highly resistant to head smut, which readily attacks commercial type.

Released.--1940, cooperatively by Oregon Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oregon Agricultural Experiment Station.

Certified Seed.--Available in quantity.

Bouteloua curtipendula (Michx.) Torr., sideoats grama

BUTTE

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS and SCS cooperating--E. C. Conard and L. C. Newell.

Source.--Native collections from Holt and Platte Counties, Nebr.

Method of Breeding.--Repeated field plantings revealed superiority of seedling vigor and establishment by native collections from Holt and Platte Counties as compared with other sources. Collections eventually combined and increased for further testing as Nebraska 37. Seed distributed for testing in 1948.

Description.--Winter hardy, long lived, relatively early maturing. Makes best growth response under long days; best adapted to areas with relatively short growing seasons. Has large caryopses; exhibits excellent seedling vigor for establishment. In eastern Nebraska produces excellent seed crop, maturing in mid-August. Matures seed before frost in western Nebraska. In Nebraska recommended for upland plantings in north-central and western districts.

Released.--1958, cooperatively by Nebraska Agricultural Experiment Station; Crops Research Division, ARS; and Nursery Division, SCS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

CORONADO

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater-- J. R. Harlan.

Source.--Field collection made by J. R. Harlan in 1946. Collected in small, dry wash 1-1/2 miles west of "Encinoso," N. Mex.

Method of Breeding.--Increased at Woodward. Some plants died during first two winters, but no evidence since of winter injury; presumed nonhardy types have been eliminated. Seed distributed for testing under name "Encinoso."

Description.--Apomictic, rather robust, productive of both forage and seed, extremely uniform. Spikes tend to be straw colored at maturity; tips of inflorescences characteristically turn white as spikes ripen. Seed large; seed set under favorable conditions good; seedling vigor excellent. Two crops of seed per year may be expected, as in most apomictic varieties.

Released.--1955, cooperatively by Oklahoma Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Available.

EL RENO

Increased at SCS Nursery, Manhattan, Kans.--D. R. Cornelius.

Source.--Field-seed collection made near El Reno, Okla., in 1934.

Method of Breeding.--Bulk material compared with many other collections. Increased for testing as KG-482.

Description.--Outstanding in leafiness, forage production, and vigor. Ranked well in disease resistance, seed production, and winter hardiness. Produced about 500 pounds of seed per acre under irrigation.

Released.--1944, cooperatively by Kansas Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Foundation seed field maintained at Plant Materials Center, SCS, Manhattan.

Certified Seed.--Available. (Ample "affidavit" seed available. Most growers not certifying because of rigid certification standards.)

TRAILWAY

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS and SCS cooperating--L. C. Newell and E. C. Conard.

Source.--Hybrid population of sideoats grama found growing along abandoned roadway in northern Holt County, Nebr., by L. C. Newell in 1935.

Method of Selection.--Spaced plants of collection grown at Nebraska Agricultural Experiment Station. Selection made in hybrid population for late maturity and freedom from rust. Selection carried through three generations, resulting in harvest and increase of seed from several groupings of selected clones. Seed from several groups later composted for seed increase and testing as Nebraska 52.

Description.--Winter hardy, long lived, late maturing, comparable in growth type to more southerly varieties as to origin. Somewhat indeterminate as to heading and flowering responses, exhibiting considerable variability in maturity. Requires most of growing season to mature seed in eastern Nebraska; may fail to produce seed crops in regions with shorter seasons. In Nebraska recommended for upland plantings in eastern and southern districts.

Released.--1958, cooperatively by Nebraska Agricultural Experiment Station; Crops Research Division, ARS; and Nursery Division, SCS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

TUCSON

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater.

Source.--Field collection made near Douglas, Ariz., by SCS. Reached Woodward by way of Lincoln, Nebr., in 1937.

Method of Breeding.--Considerable mortality and much winter injury observed in population for first several years. Selection of surviving types resulted in material adequately hardy for most of Oklahoma.

Description.--Consists of group of apomictic clones that resemble each other very closely. Outstanding in ability to grow under hot, dry conditions; remains green when most sexual types dry up. Two seed crops harvested each year, but inferior to Coronado in seed set, seed size, and seedling vigor. Became obsolete in Oklahoma with release of Coronado, but used elsewhere in Southwest.

Released.--Cooperatively by Crops Research Division, ARS; and Oklahoma Agricultural Experiment Station.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Available.

UVALDE

Increased at southwestern SCS nurseries--Gordon Mott.

Source.--Original seed collected from native stand along railroad right-of-way about 1-1/2 miles west of Knippa, Tex. Seed first planted at Stillwater, Okla., and later put in production at SCS Nursery, Tucson, Ariz. Quantity of seed sent from Tucson to San Antonio, Tex., in 1952, and commercial production started. Named Uvalde for county of origin. Increased for testing as T-20285 (Tex.) and A-2969 (Ariz.).

Description.--Dark green, erect, very leafy, heavy seed producer, superior to common forms of species in resistance to shattering at seed maturity. Represents first southern Texas variety to be produced commercially. Area of best adaptation probably within 100-150 miles of Uvalde, though plantings thriving as far away as Midland and Spur, Tex. Proved less desirable than local sources in Arizona and New Mexico because of winter-stand loss at higher elevations there.

Released.--1950, cooperatively by Arizona Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available. (In commercial production.)

VAUGHN

Increased at SCS Nursery, Albuquerque, N. Mex.

Source.--Collected from native stands near Vaughn, N. Mex., in 1935 and tested as A-3603.

Method of Breeding.--Bulk increase of native collection.

Description.--Population slightly variable, but all have erect leaf type. Good seedling vigor, easily established. More drought tolerant than El Reno, Uvalde, or Tucson for use in eastern Colorado and New Mexico.

Released.--1940, cooperatively by New Mexico Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas, and Plant Materials Center, Tucson, Ariz.

Certified Seed.--Available in limited quantity.

WOODWARD STRAINS

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater. Represent sources and experimental strains that have been distributed for testing purposes.

Hope

Apomictic. Collected 15 miles northwest of Hope, N. Mex., by J. R. Harlan in 1946. Medium height, fine stemmed, leafy, very uniform. In several tests has been highest yielding variety, but seeds small and subject to shattering. Seedling vigor less than that of Coronado.

Temple

Fifty plants selected after four cycles of mass selection from material originating near Temple, Tex. Leafy, robust, sexual type.

W1

Fifty selected plants from line advanced three generations by selection and isolation. Original source composite of many sources. Vigorous, leafy forage type; good seed producer. Light-colored inflorescences predominating. Fairly uniform as to type.

W2

Fifty plants selected from three lines (74-6545, 74-6546, 74-6547), each of which had been advanced three generations by selection and isolation and here combined. Leafy, robust types; somewhat less uniform as to type and more pigmented than W1.

W3

Fifty plants selected from four lines, each of which had been advanced two generations by selection and isolation. Original sources composited. Plants exceptionally tall and leaves coming well up stem.

W4

Fifty plants selected from same lines as W3. Vigorous, but shorter, medium leafy, and less erect than W3. W4 looked good in some tests; being increased for additional testing.

Bouteloua eriopoda (Torr.), black grama

FLAGSTAFF

Increased at SCS Nursery, Albuquerque, N. Mex.

Source.--Field collection along Flagstaff-Cameron Highway, 20 miles north of Flagstaff, Ariz.

Released.--No. Being tested as A-3730.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

Bouteloua gracilis (H. B. K.) Lag. ex Steud., blue grama

WOODWARD STRAINS

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater.

Blue grama types extensively distributed in small packet lots over last 10 years. No large-scale increases obtained because of difficulty of producing seed. Capitan, Synthetic 20, and Synthetic 40 being produced on small scale at El Reno, Okla. Marfa seed produced in limited quantity at Woodward. Most other varieties now obsolete.

Capitan

Collection 174 from property of Don Gregorio Herrera, 3 miles north of Capitan, N. Mex., to which selected plants added from collections 173, 175, and 176, all within 15 miles of collection 174. Extremely leafy, vigorous, pure green. Late flowering at Woodward; vegetatively most promising variant so far found. Original type apparently closely confined to one small watershed north of Capitan. Has looked outstanding at Central Plains Experimental Range in Colorado and under irrigation at El Reno.

Caprock

Collections 92 and 113 within 10 miles of Caprock, N. Mex., plus collection 135 near Kenna, N. Mex. Vigorous strain from edge of Mescalero ridge; somewhat finer than more southern sources.

Davis

Selected plants from Davis Mountain collections 28-41, except collection 34. Low growing, very leafy, late flowering, blue, typical of most Davis Mountain types. Vigorous southern type of considerable promise.

Dunlap

Collections 120 and 121 near Dunlap, N. Mex., representing high rocky plains west of upper Pecos River. Outstanding forage type.

Hueco

Collection 55, 15 miles east of Hueco station, Tex., on lower slopes of Hueco Hills, plus collection 57, 14 miles east of Salt Flats, Tex., on lower slopes of Guadalupe Mountains. Vigorous, medium leafy, bluish,

of some promise. High yielder in small plot tests at Woodward.

Marfa

Collection 34 from southern slopes of Davis Mountains, 2 miles north of Marfa, Tex., plus selected tall, early plants from Davis Mountain collections 28-41. Tall, leafy, vigorous, early flowering, representative of southern slopes of Davis Mountains. Has looked good under grazing at Woodward.

Pecos

Collection 107, 26 miles northeast of Carlsbad, N. Mex., plus selected plants from collections 106 and 108 within 10 miles of collection 107. Vigorous, southern type; apparently adapted to dry, sandy conditions of mid-Pecos River Valley. Tall, robust, bluish.

Roy

Collection 201 from Red River Canyon west of Roy, N. Mex., plus collection 192 near Santa Rosa, N. Mex. Represents most promising material found in northeastern New Mexico, which area generally provides mediocre material for Woodward conditions. Rather coarse, bluish.

Ruidoso

Collections 143 and 145 selected individuals from collection 144, all in Rio Ruidoso watershed between Hondo and Ruidoso, N. Mex. Montane type, but quite different from Capitan, which comes from same mountains. Ruidoso rather coarse, bluish, shorter leaved, and taller stemmed than Capitan.

Synthetic 20

One-hundred selected plants from sources known to have 2n = 20 chromosomes. These sources mostly from central New Mexico and western Texas. (See A Cytological Study of Bouteloua gracilis From Western Texas and Eastern New Mexico by L. A. Snyder and J. R. Harlan in Amer. Jour. Bot. 40: 702-707, 1953.)

Synthetic 40

One-hundred selected plants from sources known to have 2n = 40 chromosomes. Sources from central New Mexico at fairly high elevations. (See reference above.)

Van Horn

Collection 46 plus selected plants from collection 48, both within 10 miles of Van Horn, Tex. Vigorous, leafy, blue-green southern type. Promises to be good seed producer under good conditions.

W1

Fifty selected early plants from 1946 collection of blue grama. Wide range of vigorous early types; intercrossing to provide variable material for regional selection.

W2

Fifty selected late-flowering plants from 1946 blue grama collection. Wide range of vigorous late types; intercrossing to provide variable material for regional selection.

W3

Combining 25 plants of Betzen strain and 25 plants of Noble strain after advancing each three generations by selection and isolation. Betzen material originated on Betzen farm 8 miles south of Woodward. Noble strain came from Noble County, Okla. Strains similar, being vigorous, leafy, and very late in flowering.

W4

Fifty selected F_4 derivatives from crosses of Mexican Springs (New Mexico) X Fort Supply (Oklahoma) and reciprocal. Fairly uniform material intermediate between two original types. Finer, earlier, and greener than local Fort Supply material. Leafier, less spreading, and with better seeding habits than Mexican Springs.

Bromus carinatus Hook. and Arn., California brome

CUCAMONGA

Selected at SCS Plant Materials Centers, Pleasanton and San Fernando, Calif.--Paul B. Dickey, Paul E. Lemmon, and D. J. Vanderwal.

Source.--Collected from native stand near Cucamonga, Calif., September 15, 1939, by Cucamonga CCC camp agronomist, name unknown.

Method of Breeding.--Mass phenotypic selection made from small plot seeded at Pleasanton in 1941. Selection given accession number P-11117 and tested at San Fernando Nursery in comparison with other annual grasses.

Description.--Rapid-developing, early-maturing, self-perpetuating annual grass;

specifically developed to stabilize sand and control wind and water erosion in vineyards of southern California. Large seed; strong seedling vigor. Because of early maturity, does not rob moisture from dryland grapes. Subsurface tillage at this time insures good stand next year.

Released.--1949, cooperatively by California Agricultural Experiment Station and San Fernando Nursery, SCS.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Not available. (No commercial seed available at present.)

Bromus catharticus Vahl, rescuegrass

CHAPEL HILL

Increased at SCS Nursery, Chapel Hill, N. C.--F. J. LeClair, Paul Tabor, and L. R. Roof.

Source.--From commercial seed, Wyatt Seed Company, Raleigh, N. C.; originally from Nicholson Seed Company, Dallas, Tex.

Method of Breeding.--Natural selection for longevity and resistance to smut and mildew.

Description.--Vigorous strain with strong tendency to be perennial at northern border of Cotton Belt. Considerable resistance to smut and mildew in States east of Alabama and Tennessee.

Released.--Not formally. Distributed from SCS Nursery, Chapel Hill, in fall of 1947.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Seed in commercial trade channels often mixed. For pure seed, request names of growers from SCS.)

GEORGIA SELECTION

Selected at Georgia Agricultural Experiment Station, Experiment--J. M. Elrod.

Source.--Plants found growing in old nursery at Experiment in 1950.

Method of Breeding.--Individual plants increased vegetatively and used to establish space-planted nursery. Clones screened in greenhouse for resistance to mildew. Seed harvested from nursery used to increase strain. Found to be resistant to head smut in artificial inoculation tests.

Description.--Experimental strain characterized by resistance to mildew and smut. More uniform than common rescuegrass, having somewhat larger stems, wider and longer leaves, and longer, heavier panicles. Behaved as short-lived perennial under favorable conditions at Experiment.

Released.--No. Included in regional testing program.

Breeder Seed.--Georgia Agricultural Experiment Station.

LAMONT

Selected at Delta Branch Experiment Station, Stoneville, Miss., ARS cooperating--H. W. Johnson.

Source.--La Estanzuela 157/49. Seed of this strain obtained by O. S. Aamodt from Uruguay and introduced as P. I. 193144 in 1950.

Method of Breeding.--Mass selection. Seed harvested in May 1953 from 2-year-old plants in plot seeded at Stoneville in 1951.

Description.--Appears to consist largely of plants that are biennials or short-lived perennials. Consequently, provides longer grazing season during second and subsequent years of stand than during year of establishment or when grown as winter annual. Highly resistant to head smut. In tests at Stoneville proved immune to head smut collections from Auburn, Ala., College Station, Tex., Raymond and Stoneville, Miss., and Watkinsville, Ga. Proved moderately susceptible to Baton Rouge, La., collection, which appears to represent different race of head smut fungus.

Released.--1957, cooperatively by Mississippi Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Delta Branch Experiment Station.

Certified Seed.--Available.

PRAIRIE

Selected at Imperial Valley Experiment Station, El Centro, Calif.--L. G. Goar.

Source.--Introduced from New Zealand by Wayne Fisher.

Method of Breeding.--Mass selection at El Centro. Increased at Plant Materials Center, SCS, Pleasanton, Calif., for field-scale testing.

Description.--Rapid-developing, high-producing, short-lived perennial bunchgrass. High fertility-level requirement; very palatable to livestock. Tests showed it produced as much first-year feed in irrigated pasture mixtures as annual and perennial ryegrass and was less competitive to longer lived, slower developing perennial grasses in mixture. Under normal grazing practice disappears from mixture by end of second year.

Released.--1946, cooperatively by California Agricultural Experiment Station and Plant Materials Center, SCS, Pleasanton.

Breeder Seed.--California Crop Improvement Association and Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Available in quantity.

RESCUE 440

Selected at Tennessee Agricultural Experiment Station, Knoxville--J. K. Underwood.

Source.--Local naturalized colony.

Method of Breeding.--Selection of longer lived plants, high in seed and forage production.

Description.--Isolated in 1940 as short-lived perennial of excellent production and quality. Performed very satisfactorily at several locations in Southeast. Has been abandoned.

Released.--No. Distributed for testing.

Breeder Seed.--Not available.

TEXAS 46

Selected at Texas Agricultural Experiment Station, College Station--G. C. Warner, R. L. Hensel, and R. C. Potts.

Source.--Plant introduction from Australia; P. I. number unknown.

Method of Breeding.--Individual plants selected from Australian introduction and increased for testing.

Description.--Good seedling vigor, mildew resistance, early growth, good yield of forage and seed.

Released.--1946, by Texas Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Available.

Bromus coloratus Steud.

A-12445

Increased at SCS Nursery, Tucson, Ariz.--C. G. Marshall and L. P. Hamilton.

Source.--Introduced from Australia as P. I. 150144. Collected by William Hartley, Canberra, Australia, in 1942.

Description.--Similar to certified Prairie rescuegrass, but about 2 weeks earlier in maturity. Heavy seeder.

Released.--Cooperatively by Arizona Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

Bromus inermis Leyss., smooth brome

ACHENBACH

Source.--Old fields tracing to original planting made in 1895 by Achenbach brothers of Washington County, Kans.

Method of Breeding.--Some mass selection in early generations by Achenbach brothers.

Description.--Typical "southern" type of smooth brome. Leafy, vigorous, spreads rapidly by rhizomes to form dense, competitive sod. Heavy producer of both seed and forage. Far less susceptible to leaf diseases than "northern" types with which it has been compared in Kansas. Most smooth brome grown in Kansas is of this strain.

Released.--Named Achenbach in 1944 by Kansas Agricultural Experiment Station; old fields that could be traced to Achenbach brothers' plantings then declared eligible for certification. Have been source of all fields now grown for certification.

Breeder Seed.--Not available.

Certified Seed.--Available in quantity.

B. IN. 12

Selected at Utah Agricultural Experiment Station, Logan, ARS cooperating--W. Keller.

Source.--Northern types.

Method of Breeding.--Mass selection.

Description.--Includes 28 high-yielding, chiefly nonspreading or restricted-spreading clones. Performed well at higher elevations in some intermountain States and in northern Great Plains. Has been discontinued.

Released.--No. Included in regional testing program.

Breeder Seed.--Not available.

ELSBERRY

Increased at SCS Nursery, Elsberry, Mo.

Source.--Believed to be derived from old field located in either northwestern Missouri or southeastern Iowa.

Description.--Southern early-maturing strain of smooth brome. Best of several accessions tested at SCS Nursery, Elsberry.

Released.--Cooperatively by Missouri Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Missouri Agricultural Experiment Station, Columbia.

Certified Seed.--Not available. (Some commercial production.)

FISCHER

Increased at SCS Nursery, Ames, Iowa--M. E. Heath.

Source.--Original seed collected in 1939 from old field of smooth brome established in 1917 on E. A. Fischer farm near Shenandoah, Iowa.

Method of Breeding.--Original lot of seed planted at SCS Nursery, Ames, in 1940 for increase and subsequent testing by Iowa Agricultural Experiment Station, Ames, and SCS. Several generations of seed increase by SCS and Iowa Agricultural Experiment Station have followed.

Description.--Performance tests to date show Fischer to be aggressive, productive, hardy, and well adapted to better soils. In most respects similar to other "southern" strains--Lincoln and Achenbach.

Released.--1943, cooperatively by Iowa Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Iowa Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

HOMESTEADER

Developed at South Dakota Agricultural Experiment Station, Brookings--J. G. Ross, W. W. Worzella, and C. J. Franzke.

Source.--Seed collected from South Dakota farms on which original plantings had been made some time during 1905-15.

Method of Breeding.--Sixteen collections compared in variety tests. Five strains found superior for forage yield, seed production, and palatability. Seed of five superior strains bulked and composite increased for further testing.

Description.--Intermediate in type between northern and southern varieties. Approved for distribution on basis of good forage yield, palatability, and adaptation to South Dakota conditions.

Released.--1951, by South Dakota Agricultural Experiment Station.

Breeder Seed.--South Dakota Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

JEANERETTE

Source.--Old fields, southern Lyon County, Kans.; first grown in mid-1890's on Henry Jeanerette farm and later widely grown in that part of Kansas.

Description.--Typical "southern" type of smooth brome resembling Achenbach in growth habit and forage yield.

Released.--Not officially named, but widely grown in area south of Emporia, Kans., under local name "Jeanerette" after original grower in that area.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Some commercial production.)

KUHL

Selected at Prairie City, Oreg.

Source.--Field collection made on Phillip Kuhl farm near Prairie City in about 1936. (Probably an escape from observation nursery seeded on Kuhl farm in about 1930.)

Method of Breeding.--Increase of above field collection.

Description.--Low-growing type, deep rooted, dark leaves, dark heads, almost black seeds. Seems to be somewhat better adapted to drier lands than other varieties tested. Relatively low forage and seed yielder.

Released.--No. Entered in grass-testing program at few experiment stations in about 1938. After several years' testing was dropped and apparently now nonexistent.

Breeder Seed.--Not available.

LANCASTER

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS cooperating--L. C. Newell.

Source.--Clones collected from old fields in Nebraska.

Method of Breeding.--Produced in 1943 by field hybridization of clones from five unrelated sources. Selection of clones based on previous evaluation of their sibbed and open-pollinated progenies, studies beginning with selections from old fields in 1937.

Description.--Leading smooth brome variety in forage and seed yields in tests at Lincoln, 1947-52. Showed immediate promise among several experimental synthetic varieties in early comparative tests at Nebraska Agricultural Experiment Station. On fertile soils is leafy, vigorous, with fine stems and somewhat drooping panicles. Seed of advanced generation first distributed as Nebraska 44 for testing.

Released.--1950, cooperatively by Nebraska Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in quantity.

LINCOLN

Increased at Nebraska Agricultural Experiment Station, Lincoln, ARS cooperating--L. C. Newell and A. L. Frolik.

Source.--Old fields of smooth brome derived from early introductions of smooth brome prior to 1898; attributed to Hungarian origin (California introduction of 1884).

Method of Breeding.--Plot tests of farmer strains of smooth brome conducted in 1939-42; showed comparative superiority of locally grown southern strains as compared with strains of northern origin. Fields that showed superiority and that were traced to common origin first approved in 1941 for seed increase and later certified as Lincoln.

Description.--Cool-season grass; provides abundance of early-spring pasturage and fall regrowth under favorable conditions. Rhizomatous sod-forming type; well adapted for conservation purposes in central latitudes as compared with less aggressive northern types. Exhibits good seedling vigor and relative ease of establishment on critical planting sites.

Released.--1942, cooperatively by Nebraska Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in quantity.

LYON

Selected at Nebraska Agricultural Experiment Station, Lincoln, ARS cooperating--L. C. Newell.

Source.--Developed from selections made in farm strains of certified Lincoln smooth brome. Later progenies became outcrossed in selection nursery to broad source of germ plasm of southern type of smooth brome.

Method of Breeding.--Single clones of Lincoln smooth brome selected for seed quality and forage type and isolated; crossed seed composited and tested as B-9. Seed from progenies of these selections later outcrossed to large number of open-pollinated lines of southern type, bulked, and retested as Nebraska 36.

Description.--Maintains broad adaptation of Lincoln smooth brome parental stock combined with superior seed quality, seedling vigor, and more uniformly desirable plant type. Produced larger yields of forage and seed in Nebraska tests than Lincoln. As Nebraska 36, and later as Lyon, has been tested widely since 1947, showing promise over broad range of conditions. Named after Professor T. L. Lyon, who first worked with smooth brome at Nebraska Agricultural Experiment Station in 1897.

Released.--1950, cooperatively by Nebraska Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in quantity.

MANCHAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman, A. G. Law, A. L. Hafenrichter, and D. C. Tingey.

Source.--Original introduction in 1935 from Kungchuling Experiment Station of South Manchurian Railway, Manchuria, China, as P. I. 109812.

Method of Breeding.--Grown in nurseries at SCS Plant Materials Centers since 1935; subjected to mass selection and tested in uniform nurseries and strain tests since 1937 as P-177.

Description.--Intermediate between weakly spreading northern types and aggressive sod-forming southern types; maintains good balance with associated legumes; produces vigorous seedling; good yields of seed and forage; recovers rapidly after cutting. Its dark, purple-cast seeds thresh easily; seed generally heavier than that of common smooth brome.

Released.--1943, as P-177, cooperatively by Idaho and Washington Agricultural Experiment Stations, and SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman. Named Manchar in 1946.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

MANDAN 404

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--From local field collection of northern material.

Method of Breeding.--Developed by selection within single plant progeny after two generations of single plant selection under open pollination. Both inbred and open-pollination progeny tests made of each of eight clones going into variety.

Description.--Short, fine, very high in quality, light green. Not aggressive and not high yielder, but higher in protein at Mandan at all stages of growth than Lincoln. Tests at Mandan show Mandan 404 to be higher in palatability than Lincoln.

Released.--No. Included in regional testing program.

Breeder Seed.--United States Northern Great Plains Field Station.

MARTIN

Selected at Minnesota Agricultural Experiment Station, St. Paul.

Source.--Seed obtained from old fields of smooth brome in Martin County, Minn.

Method of Breeding.--Eighty-eight plants selected from space-planted nursery, which had been studied over 2-year period. Selections cloned and on basis of yield, leafiness, and freedom from leaf spot, 21 clones allowed to reproduce by natural cross-pollination.

Description.--Somewhat intermediate in growth between southern and northern strains. Generally classed as northern strain. Produced higher forage yields than Canadian common smooth brome in Minnesota.

Released.--Minnesota Agricultural Experiment Station.

Breeder Seed.--Not available. (Limited amount of old seed may be in storage.)

Certified Seed.--Not available. (Was recommended and certified in Minnesota for several years, but has been discontinued.)

MICHIGAN B-2

Accession number assigned by ARS to commercial lot of Canadian smooth brome; increased at Michigan Agricultural Experiment Station, East Lansing. Original seed planted at East Lansing in 1937. For few years seed from this source certified by Michigan Crop Improvement Association, but discontinued because of problem of quackgrass impurities.

MINNESOTA SYNTHETICS

Selected at Minnesota Agricultural Experiment Station, St. Paul--A. R. Schmid, H. K. Hayes, and H. L. Thomas.

Source.--Commercial strains and collection from Martin County, Minn.

Method of Breeding.--Individual plants and clones studied during 1936-45. In 1945, 50 best appearing selections included in polycross nursery. These clones and their polycross progeny studied for yield, vigor, resistance to leaf spot, and maturity.

Description.--Six experimental synthetics developed: (1) 4 most vigorous clones; (2) 8 clones low in leaf spot and most vigorous in low leaf spot group; (3) 8 clones selected for lateness and most vigorous in late group; (4) increase of clone 38; (5) increase of clone 17; (6) 8 clones selected for extreme lateness at expense of other characteristics.

Released.--No. Some synthetics included in regional testing program.

Breeder Seed.--Minnesota Agricultural Experiment Station. Further increase not planned at this time. Second-cycle material will be evaluated.

NEW YORK SYNTHETIC L

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy.

Source.--Wide collection of seed lots from plant breeders in United States. Parental clones: N. Y. 46-19, N. Y. 46-92, N. Y. 46-157, N. Y. 46-166, N. Y. 47-7, N. Y. 47-217, N. Y. 48E-1, N. Y. 48E-7, N. Y. 48E-11, N. Y. 48E-15, N. Y. 48E-22, N. Y. 48F-2, N. Y. 48-176, Pasture Laboratory N. Y. 47PL-23 (I-23), N. Y. 47PL-45(III-6), N. Y. 47PL-85 (III-46), N. Y. 47PL-92(IV-2), N. Y. 47PL-115 (IV-25).

Method of Breeding.--Synthetic variety developed from 18 selected, relatively self-incompatible clones. Five of clones originated at United States Regional Pasture Research Laboratory, ARS, University Park, Pa. First- and second-generation seed produced as for Saratoga.

Description.--Similar to Saratoga, but not quite so high in aftermath production.

Released.--No. To be continued under test.

OKLAHOMA (CHAPEL HILL)

Selected at SCS Nursery, Chapel Hill, N. C.--Paul Tabor and L. R. Roof.

Source.--Strains BN (Beltsville Nursery) 4415, 4416, 4417 (from Oklahoma), and SC 20-905 (collection made by Paul Tabor near Roanoke, Va.).

Method of Breeding.--Selection of most vigorous, disease-resistant plants from Oklahoma strains and transplanting these with Roanoke strain in isolated block.

Description.--Vigorous, more southern strain than other smooth brome varieties.

Released.--No. Seed distributed by SCS Nursery, Chapel Hill, in 1949.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Seed available in western Kentucky under name "Chapel Hill brome." Write Joe D. Little, Area Conservationist, SCS, Bowling Green, Ky., for sources.)

OKLAHOMA 1

Selected at Oklahoma Agricultural Experiment Station, Stillwater. (See Southland.)

Source.--Selection made in 1942 from old field of smooth brome (Kansas origin) established in 1936.

Method of Breeding.--Selection grown in smooth brome nurseries from 1942 to 1948, inclusive.

Description.--Tall, vigorous, late, leafy; medium-heavy seed producer. Moderately free of disease.

Released.--No. Included in regional testing program. Discontinued in favor of Southland.

Breeder Seed.--Not available.

PARKLAND

Selected at Dominion Forage Crops Laboratory, Saskatoon, Saskatchewan, Canada.

Source.--Increased progeny of third-generation inbred line descending from single plant selected in 1923 along roadway near Saskatoon.

Description.--Rhizomes present, but spread restricted to about 60 percent of that of Canadian common smooth brome. Considerably more sterile culms and lower seed yields (40-50 percent) than Canadian common smooth brome.

Released.--Canada Department of Agriculture.

Breeder Seed.--No longer available in original form. Forage Crops Laboratory, Saskatoon.

Certified Seed.--Not available.

SANDBURG

Selected in 1925-33 by Douglas Lytle, Montrose, Colo., from ordinary or Canadian common smooth brome.

Source.--Clarence Sandburg, Montrose, successor to Douglas Lytle.

Method of Breeding.--Selection of more robust plants, blending, and increasing in bulk.

Description.--Similar to Lincoln, but very slightly earlier.

Released.--Seed sold by Lytle & Sandburg and tested by Colorado Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Very little, if any, seed now available.

SARATOGA

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy and S. S. Atwood.

Source.--Wide collection of seed lots from plant breeders in United States. Parental clones: N. Y. 46-11, N. Y. 46-19, N. Y. 46-92, N. Y. 46-157, N. Y. 46-166.

Method of Breeding.--Synthetic variety developed from 5 selected, relatively self-incompatible clones. Breeder seed produced in isolated plot from randomly planted vegetative pieces of 5 clones in 100 or more replications. Equal amounts of seed from each parental clone mixed together for breeder seed. Foundation seed first advanced generation from breeder seed. Certified seed first advanced generation from foundation seed and not eligible for use as planting stock for production of any class of certified seed.

Description.--Vigorous, high seedling vigor, early spring growth, quick recovery and high aftermath production following cutting. Yielded 8 percent more in total season yield and 29 percent more in aftermath yield than Lincoln when grown alone. Yielded same as Lincoln when grown in mixture with alfalfa, but higher proportion of mixture has been grass. Has been similar to Lincoln in yield and quality of seed and in resistance to brown spot and scald, but superior to Canadian common smooth brome and Manchar.

Released.--1955, by New York Agricultural Experiment Station.

Breeder Seed.--New York Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

SOUTHLAND

Selected at Oklahoma Agricultural Experiment Station, Stillwater--W. B. Gernert, Hi W. Staten, M. D. Jones, W. C. Elder, and R. A. Chessmore.

Source.--Small field of smooth brome (seed of Kansas origin) seeded on Agronomy Farm in 1936. Selections made from this field, and other selections obtained from additional introductions. Original source of seed of selections rather obscure.

Method of Breeding.--Five open-pollinated lines selected as showing superior characteristics and performance bulked for testing as Oklahoma Synthetic.

Description.--Differences that generally separate southern from northern types of smooth brome accentuated in Southland. Rather coarse, broad leaved, heavy stemmed. Individual plants average somewhat taller and somewhat later in maturity than average of other southern types. Somewhat greater resistance to leaf diseases than most standard southern strains, but its chief advantage in significantly greater yielding capacity, greater seedling vigor, and generally better adaptation to southern conditions.

Released.--1953, by Oklahoma Agricultural Experiment Station.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Available in quantity.

WISCONSIN B-55

Selected at Wisconsin Agricultural Experiment Station, Madison, ARS cooperating--D.C. Smith and E. L. Nielsen.

Method of Breeding.--Synthetic made up of 88 plants, following one or more generations of inbreeding and selection. Parental clones vigorous, strongly creeping, dark green, moderately tall, of medium leafiness.

Description.--Approaches southern-adapted strains in general morphological characteristics, equals southern strains in yield in Wisconsin, and appears to possess greater disease resistance than other named strains.

Released.--No. Included in regional testing program.

Breeder Seed.--Wisconsin Agricultural Experiment Station.

WISCONSIN B-63

Selected at Wisconsin Agricultural Experiment Station, Madison, ARS cooperating--D.C. Smith and E. L. Nielsen.

Method of Breeding.--Synthetic based on 44 plants selected following one or more generations of inbreeding and selection. Selected plants tall, of medium earliness and texture. Leafiness and creeping habit intermediate; foliage medium to early in maturity.

Description.--Yielding capacity about same as that of other varieties in Wisconsin, but disease reaction somewhat better than that of commercially available strains.

Released.--No. Included in regional testing program.

Breeder Seed.--Wisconsin Agricultural Experiment Station.

Bromus marginatus Nees, mountain brome

BROMAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--A. L. Hafenrichter, A. G. Law, and J. L. Schwendiman.

Source.--Native collection made at Pullman in 1933 and assigned accession number WN-439. Selection P-3368 from this accession used in developing Bromar.

Method of Breeding.--Mass selection with screening for head smut resistance. Bromar was 1 of 4 ecotypes among 69 accessions of mountain brome tested.

Description.--Rapid-developing, late-maturing, perennial bunchgrass. Tall, erect, vigorous, with medium-coarse stems and abundant, broad, well-distributed leaves. When compared with commercial strain, Bromar is

taller, leafier, highly resistant to head smut, 2 weeks later in maturity; has more seeding vigor; is earlier in spring recovery. Heavy seed and forage producer, is compatible in rate of growth with sweetclover, and has seed that is readily deawned. Outstanding in performance in mixtures with sweetclover or red clover for pasture or green manure in short rotations.

Released.--1946, cooperatively by Washington, Idaho, and Oregon Agricultural Experiment Stations; Plant Materials Center, SCS, Pullman; and Crops Research Division, ARS. Seed distributed for testing in 1940 as P-3368.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

Bromus mollis L., soft chess

BLANDO

Selected at Plant Materials Center, SCS, Pleasanton, Calif.--H. W. Miller and O. K. Hoglund.

Source.--Collected on May 21, 1940, from winter-annual rangeland near San Ramon, Calif., by D. J. Vanderwal.

Method of Breeding.--Tested in comparison with 27 other collections of B. mollis by Pleasanton Plant Materials Center and San Fernando Nursery, SCS, Calif., since fall of 1940 as P-11657.

Description.--Winter-growing, heavy root-producing, self-seeding annual grass for range and brush-burn seeding and for conversion of abandoned grainland to range. Primary advantage over other strains is its consistent forage and seed production from year to year. During unfavorable years demonstrated its superiority by outperforming all other strains. Although well adapted to low fertility sites, responds exceptionally well to applications of fertilizer. In relation to other strains tested, is intermediate in time of maturity and suberect in growth habit.

Released.--Cooperatively by California Agricultural Experiment Station and Plant Materials Center, SCS, Pleasanton.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Available.

Bromus tomentellus Boiss.

P-2447

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--P. I. 111530, from Institute of Plant Industry, Leningrad, U. S. S. R., by Westover-Enlow expedition in 1934.

Method of Breeding.--Developed by mass selection through several generations.

Description.--Rapid-developing, early-maturing, short-lived, perennial bunch-type brome. Leaves dark green, lightly pubescent, abundant, mostly basal, and very low in lignin content. Seed culms few and seed production relatively low after first season. Seeds short awned. Outstanding spring recovery and rapid recovery after cutting. Seedling vigor strong; strong root system developed. Leaves remain green long after seed matures. Appears to be best adapted to conservation seedings on medium-textured soils at elevations above 2,000 feet where effective moisture is over 18 inches annually.

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Not available.

Buchloë dactyloides (Nutt.) Engelm., buffalograss

MESA

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan.

Source.--Female plant (1-2022) obtained from Wildorado, Tex., by M. L. Peterson in 1940. Male plant (2 X 2232-3) selected in 1944 from progeny of cross 35-17-c (from Hays, Kans.) X 0-1 (from Chillicothe, Tex.).

Method of Breeding.--Selection for superior combining ability.

Description.--F_1 progeny of cross between clones 1-2022 and 2 X 2232-3. Seed fields must be established from sod. F_1 variable, but as population is vigorous, spreads rapidly and has apparently high yield of forage. Female and male parents will be planted in seed-production fields at ratio of 4 to 1. Female parent vigorous and characterized by exceptional height of bur and outstanding shatter resistance.

Released.--No.

Breeder Stock.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Not available.

BAYSHORE (GENE TIFT)

Selected from Bayshore Golf Club, Miami Beach, Fla.

Source.--Selected vegetatively from Bayshore Golf Club, Miami Beach, by Roy A. Bair in 1945, and placed in evaluation nursery at Florida Everglades Experiment Station, Belle Glade, as Bayshore. At about same time name "Gene Tift" suggested for this grass in tribute to man of same name who propagated considerable quantities for distribution to golf courses in area. This synonomy continued among golf circles. This selection among group transferred to Florida Agricultural Experiment Station, Gainesville, when present turf research program initiated in 1952. Under new program established for further evaluation and classification as FB 3.

Method of Breeding.--Reported to be by natural crossing of native Florida turf-type bermudagrass selections with selections of Cynodon species from South Africa supplied by John Monteith, Jr., then director of United States Golf Association Green Section. Plots of various introductions planted vegetatively among native selections in test nursery at Bayshore Golf Club just prior to World War II by Fred Hurger, then superintendent of golf course. Golf course closed during war and grasses grew unattended. Golf course reopened after war and number of plant types visible. This particular selection one of several collected by Roy A. Bair for testing and evaluation. Selection maintained vegetatively, producing no appreciable quantity of viable seed. Records on African introductions not available, but it is believed to have been African bermudagrass (Cynodon transvaalensis Davy).

Description.--Light-green, fine-textured, putting-green type of bermudagrass; seems more adapted to southern than to northern Florida. More upright in growth, produces more clippings, yet inferior in turf quality to Everglades 1 in tests at Gainesville. Still marked improvement in putting-green quality over common bermudagrass. Shows distinct resistance to certain leaf spot diseases compared with common bermudagrass.

Released.--Not officially, although has been distributed in golf-turf industry.

Breeder Stock.--Not available.

COASTAL

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between Tift bermudagrass (discovered by J. L. Stephens in old cotton patch near Tifton in 1929) and tall-growing introduction from South Africa.

Method of Breeding.--Parents interplanted to allow for maximum natural crossing. Over 5,000 seedling plants carefully screened for many traits. Few of best clones subjected to numerous replicated tests giving measures of their palatability, efficiency, yield potential, management requirements, production under grazing, etc. Tested as selection 35.

Description.--When compared with common bermudagrass, Coastal has larger and longer stems, stolons, and rhizomes; grows much taller; is lighter green; has deeper and more efficient root system; is more resistant to foliage diseases, root knot nematode, frost, and drought; is much more efficient in nutrient and water use; is more palatable and produces nearly twice as much forage and animal products. This superiority holds throughout most of Bermudagrass Belt, demonstrating wide adaptation. Produces few seed heads that rarely contain viable seed; must be propagated vegetatively.

Released.--1943, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Stock.--Available in quantity.

EVERGLADES 1

Selected from Bayshore Golf Club, Miami Beach, Fla.

Source.--Selected vegetatively from Bayshore Golf Club, Miami Beach, by Roy A. Bair in 1945; placed in evaluation nursery at Florida Everglades Experiment Station, Belle Glade, as Everglades 1. Turf work at this station discontinued in 1950; plant material transferred to Florida Agricultural Experiment Station, Gainesville, in 1952. This selection entered in testing program as FB 4.

Method of Breeding.--Reported to be by natural crossing of native Florida turf-type bermudagrass selections with selections of Cynodon species from South Africa supplied by John Monteith, Jr., then director of United States Golf Association Green Section. Plots of various introductions planted vegetatively among native selections in test nursery at Bayshore Golf Club just prior to World War II by Fred Hurger, then superintendent of golf course. Golf course closed during war and grasses grew unattended. Golf course reopened after war and number of plant types visible. This particular selection one of several collected by Roy A. Bair for testing and evaluation. Selection maintained vegetatively, producing no appreciable quantity of viable seed. Records on African introductions not available, but believed to have been C. transvaalensis.

Description.--Dark-green, uniform, fine-textured, close-growing, vigorous, putting-

green type of bermudagrass of good quality; appears adapted throughout Florida. Much superior in turf quality to common bermudagrass and resistant to certain leaf spot diseases associated with common type.

Released.--Not officially, although has been distributed in golf-turf industry.

Breeder Stock.--Not available.

GREENFIELD

Selected at Oklahoma Agricultural Experiment Station, Stillwater.

Source.--Selected from among large number of common strains collected from all parts of Oklahoma. This particular selection found on Station farm.

Description.--Intermediate between coarse and very fine types of common bermudagrass. Exposed stolons purple; rhizomes short, crooked, numerous, forming dense mat. Winter hardy. Requires fertile soil especially high in nitrogen, but one of chief advantages is its ability to grow on less fertile soils. Propagated vegetatively.

Released.--1954, by Oklahoma Agricultural Experiment Station.

Breeder Stock.--Oklahoma Agricultural Experiment Station.

Certified Stock.--Available.

MIDLAND

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between cold-resistant common bermudagrass from Indiana, supplied by G. O. Mott, and Coastal bermudagrass.

Method of Breeding.--In 1942 enough seed of cross--Indiana bermudagrass X Coastal bermudagrass--made to give 66 F_1 hybrids evaluated for many characteristics beginning in 1943. Selection 13 most productive, more cold resistant than Coastal, surviving two winters at Lafayette, Ind., where Coastal bermudagrass winterkilled.

Description.--Taller, larger, leafier, more disease resistant, producing more open sod than common bermudagrass. Superior to common bermudagrass in most of good traits that characterize Coastal. Midland (selection 13) less productive than Coastal where latter does not suffer stand loss because of winter injury. Darker green, tends to produce more heads, starts growth earlier in spring than Coastal. Superiority over Coastal in tests at Stillwater, Okla., led to its release in that State. Recommended for northern part of Bermudagrass Belt.

Released.--1953, cooperatively by Oklahoma Agricultural Experiment Station; Georgia Coastal Plain Experiment Station; and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station. Foundation stock maintained at Oklahoma Agricultural Experiment Station, Stillwater.

Certified Stock.--Available in quantity.

NK-37

Selected at Phoenix, Ariz., by Northrup King and Company--Dale Grissom.

Source.--Seed harvested in about 1938 from giant strain observed growing on island in Colorado River near Yuma, Ariz. This seed collection increased and tested in Hawaii, where it performed very satisfactorily. Seed produced for several years, but production eventually discontinued.

Method of Breeding.--Superior plants selected from old, established production field were moved to clonal nursery at Phoenix. Plants selected on basis of superior growth habit, vigor, disease resistance, and seed productiveness. Bulk seed from selected plants identified as NK-37 bermudagrass.

Description.--Tall, giant strain; double size of common bermudagrass in Yuma area.

Released.--Seed distributed for testing in 1957 and 1958.

Breeder Seed.--Northrup King and Company.

Certified Seed.--Not available. (Limited amount of seed available commercially.)

ORMOND

Selected from Ellinor Village Country Club, Ormond Beach, Fla.

Source.--Selected vegetatively by Roy A. Bair in about 1946 from long-established fairway showing superior turf performance at Ellinor Village Country Club. When entered in testing nursery at Florida Everglades Experiment Station, Belle Glade, selection designated as Ormond. In 1952 when turf program transferred to main station at Gainesville, selection entered in comprehensive testing nursery as FB 25.

Method of Breeding.--As far as can be determined appears to have been natural selection. Quite possibly it developed from natural crossing of native and Arizona common bermudagrasses during World War II when golf course was inactive and unattended. As with most golf courses, maintenance records not complete enough to show practices that might shed further light on history of this selection.

Description.--Attractive blue green, vigorous, competitive, well adapted throughout Florida. Medium texture, making it suitable for golf tees and fairways as well as recreational areas. Grows uniformly, somewhat more prostrate in habit than Tiflawn, less tendency to produce thatch. Much superior to common bermudagrass in turf performance, resistant to certain leaf spot diseases associated with common bermudagrass, but marked susceptibility to dollar spot disease.

Released.--Not officially, although distributed in golf-turf industry.

Breeder Stock.--Not available.

SUNTURF

Increased at several experiment stations in Southeastern United States.

Source.--P. I. 184339, *Cynodon magennisii* Hurcombe. Stolons presented by Mildred Wilman, Kimberley, South Africa, in 1949.

Description.--Perennial, fine leaved, dark green. Low-growth habit, creeping stolons, spreads rapidly, drought resistant, not shade tolerant, produces few seed heads--so far no seed found. Sometimes has rust.

Released.--1956, cooperatively by Alabama, Arkansas, Oklahoma, and South Carolina Agricultural Experiment Stations.

Breeder Stock.--Alabama, Arkansas, Oklahoma, and South Carolina Agricultural Experiment Stations at Auburn, Fayetteville, Stillwater, and Clemson, respectively.

Certified Stock.--Available.

SUWANNEE

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between Tift bermudagrass (discovered by J. L. Stephens in old cotton patch near Tifton in 1929) and tall-growing introduction from South Africa.

Method of Breeding.--Parents interplanted to allow for maximum natural crossing. Over 5,000 seedling plants carefully screened for many traits. Few of best clones subjected to numerous replicated tests giving measures of their palatability, efficiency, yield potential, management requirements, production under grazing, etc. Tested as selection 99.

Description.--Similar to Coastal, except more erect, makes more open sod, less weed resistant, less tolerant of close grazing, but more drought resistant and definitely superior in productivity and efficiency of nutrient and water use on deep sands. Released for use on several million acres of these soils in South.

Released.--1953, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Stock.--Available in quantity.

TEXTURF 1F

Selected at Texas Agricultural Experiment Station, College Station--J. R. Watson and E. C. Holt.

Source.--Golf course in Dallas-Fort Worth, Tex., area. Tested as T-35A.

Method of Breeding.--Vegetative increase of original collection.

Description.--Fine-textured light-green grass. Produces dense ground cover that tends to be free of weeds. Relatively free of unsightly seed stems; makes good spring recovery. Susceptible to leaf diseases; for this reason plantings in gulf coast and eastern Texas areas not recommended. Does not have extensive root system, so more susceptible to drought than common bermudagrass.

Released.--1957, by Texas Agricultural Experiment Station.

Breeder Stock.--Texas Agricultural Experiment Station.

Certified Stock.--Available.

TEXTURF 10

Selected at Texas Agricultural Experiment Station, College Station--J. R. Watson and E. C. Holt.

Source.--Corsicana Country Club, Corsicana, Tex. Tested as T-47.

Method of Breeding.--Vegetative increase of original collection.

Description.--Medium textured, dark green. Produces dense turf. Relatively free of seed stems. Makes early spring recovery and tends toward closer and shorter growth than common bermudagrass. Better leaf-disease resistance, resulting in better color in autumn. Sensitive to chlorinated hydrocarbon insecticides, turning straw color following application of these materials. Recovers in 5 to 7 days with no permanent damage. Slower in producing cover than common bermudagrass.

Released.--1957, by Texas Agricultural Experiment Station.

Breeder Stock.--Texas Agricultural Experiment Station.

Certified Stock.--Available.

TIFFINE

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton and B. P. Robinson.

Source.--F_1 hybrid between *Cynodon dactylon* (L.) Pers. and *C. transvaalensis* from East Lakes Golf Course in Atlanta, Ga.

Method of Breeding.--Out of extensive crossing efforts involving Tiflawn bermudagrass ($2n = 36$) and African bermudagrass ($2n = 18$) came eight F_1 hybrids (triploids, $2n = 27$). Thoroughly screened under lawn and golf-green management and compared with superior selections of *C. dactylon* from golf courses. Distributed for testing as Tifton 127.

Description.--Lighter green, more disease resistance, and much finer texture than common bermudagrass. Superior for putting greens and fine lawns. Completely male sterile, sheds no pollen to annoy hay fever victims, and must be propagated vegetatively.

Released.--1953, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Stock.--Available in quantity.

TIFGREEN

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton, Jim Latham, and B. P. Robinson.

Source.--F_1 hybrid between superior clone from golf green at Charlotte Country Club, Charlotte, N. C., and *C. transvaalensis* from East Lakes Golf Course in Atlanta, Ga.

Method of Breeding.--Best of several F_1 hybrids (triploids, 2n = 27), involving Charlotte bermudagrass (*C. dactylon*) (2n = 36) and African bermudagrass (2n = 18). Thoroughly evaluated in comparison with number of bermudagrasses under golf-green management. Tested as Tifton 328.

Description.--Darker green and produces better putting surface than Tiffine. Similar in other respects and also being used for fine lawns.

Released.--1956, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Stock.--Available in quantity.

TIFLAWN

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between two selections of bermudagrass from pasture-breeding research at Georgia Coastal Plain Experiment Station.

Method of Breeding.--Several hundred F_1 hybrids between short, dense, dwarf selection and larger disease-resistant type subjected to thorough screening, which involved finally evaluating best under lawn and golf-green management. Tested as Tifton 57.

Description.--When compared with common bermudagrass, Tiflawn spreads faster, makes denser weed-free turf, more disease- and frost-resistant, requires less fertilization, and tolerates more wear. Particularly well suited for heavy-duty turf and used on many university football fields in South.

Released.--1952, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Stock.--Available in quantity.

U-3

Selected at Beltsville, Md., by United States Golf Association Green Section, ARS cooperating--Fred V. Grau.

Source.--Received from Savannah, Ga., by John Monteith, Jr.

Method of Breeding.--Vegetative increase of original collection followed by comparative testing.

Description.--Moderately fine leaved, cold hardy; adapted for use on lawns, fields, park areas, and golf-course tees and fairways. Rapid spreading; produces durable turf and has wide adaptation to soil and climatic conditions.

Released.--Distributed in 1946-47 by Crops Research Division, ARS; and United States Golf Association Green Section.

Breeder Stock.--ARS, Plant Industry Station, Beltsville, Md.

Certified Stock.--Available. (U-3 bermudagrass seed offered for sale, but produces variable turf as would be expected.)

UGANDA

Increased by Fred V. Grau, College Park, Md.; Plant Industry Station, ARS, Beltsville, Md.; and several State agricultural experiment stations.

Source.--P. I. 183551. Introduced through efforts of John Plant, Cairo, Egypt, and R. T. Jones, Atlanta, Ga., from Gezira Club in Cairo.

Description.--Fine-bladed, low-growing bermudagrass; suitable for putting greens and tennis courts. Very fine textured, relatively slow spreading; tends to assume reddish-purple cast after first cool nights in fall.

Released.--Not officially. (Distributed for testing.)

Breeder Stock.--Fred V. Grau, College Park.

Certified Stock.--Not available. (Available commercially.)

Dactylis glomerata L., orchardgrass

AKAROA

Increased at Plant Materials Center, SCS, Pleasanton, Calif.

Source.--Introduced from New Zealand.

Description.--Low growing, leafy, fine stemmed, late maturing. Excellent forage production. Seed-producing habit erratic. Lacks winter hardiness. Some seed lots tested in Eastern United States relatively early with respect to time of heading and flowering.

Released.--Cooperatively by California Agricultural Experiment Station and Plant Materials Center, SCS, Pleasanton.

Breeder Seed.--California Agricultural Experiment Station, Davis. Foundation seed maintained at Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Available.

AVON

Selected at Macdonald College, Quebec, Canada.

Source.--Obtained from Sweden through Swedish Farmers' Association in 1911.

Method of Breeding.--Mass selection for winter hardiness.

Description.--Early maturing; high level of winter hardiness. Performed well in areas having severe winters.

Released.--Macdonald College.

Breeder Seed.--Macdonald College.

Certified Seed.--Not available.

BRAGE

Developed by Swedish Seed Association, Svalov, Sweden.

Source.--Single plant selection in material from Germany.

Description.--Late, leafy strain; exhibits good winter hardiness and drought resistance in Sweden.

Released.--Swedish Seed Association. Included in regional testing program.

Certified Seed.--Not available in United States.

FINNISH LATE HAY

Selected at Massachusetts Agricultural Experiment Station, Amherst--W. C. Colby and Hrant M. Yegian.

Source.--Obtained from commercial seedsman in Turku, Finland, in 1939.

Method of Breeding.--Limited inbreeding of selected plants; selection based on polycross progeny performance.

Description.--Late maturing (week to 10 days later than common orchardgrass); upright growth habit; leafy (if adequately fertilized with nitrogen); winter hardy.

Released.--Distributed by Massachusetts Agricultural Experiment Station and Eastern States Farmers' Exchange (since 1955).

Breeder Seed.--Massachusetts Agricultural Experiment Station.

Certified Seed.--Not available. (In commercial production.)

HERCULES

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Parent material of Russian origin.

Method of Breeding.--Line breeding originating from single plant selection.

Description.--Erect, tall growing, somewhat later in maturity than common. Comparatively leafy, with marked uniformity in comparison with other types in same maturity class. Considered to be more winter hardy than most other named varieties. Where hardiness is problem, Hercules likely to be more productive than most other types. Where less hardy varieties survive, Hercules will not prove to be superior in forage production.

Released.--1938, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Available in limited quantity. (Some seed might be expected in 1959 from English sources.)

IOWA SYNTHETICS

Selected at Iowa Agricultural Experiment Station, Ames--R. R. Kalton and M. G. Weiss.

Source.--Parental clones selected from long-time stands in fields and roadways in central Iowa and south-central Minnesota in 1941 and 1943.

Method of Breeding.--Large collection of clonal selections evaluated in clonal, inbred, and outcross progeny tests for desirable agronomic traits and combining ability. Clones superior in forage and seed yield, hardiness, recovery, and leafiness selected for recombination.

Description.--Vigorous, productive, winter hardy. Midearly in maturity. Moderate disease resistance, good seedling vigor, somewhat drought hardy, good in stand establishment and seed yield.

Iowa 1.--Recombination of clones 58, 60, 64, 120, 123, 149, 158, and 160 from Iowa and 76, 83, and 91 from Minnesota. (See Source.)

Iowa 6.--Recombination of clones 64, 120, 121, 123, and 160 from Iowa. (See Source.)

Released.--No. Included in regional testing program.

Breeder Seed.--Iowa Agricultural Experiment Station.

KENTUCKY SELECT

Selected at Kentucky Agricultural Experiment Station, Lexington--E. N. Fergus.

Source.--Originated on farm of Fred Stutzenberger, Louisville, Ky. Had been grown on Stutzenberger's farm for several years.

Description.--Highest yielding naturalized strain in tests conducted at Kentucky Agricultural Experiment Station.

Released.--Recommended for use and certification by Kentucky Agricultural Experiment Station in 1931.

Certified Seed.--Available.

KENTUCKY SYNTHETIC

Selected at Kentucky Agricultural Experiment Station, Lexington--R. C. Buckner.

Source.--Kentucky naturalized strains.

Method of Breeding.--Plants selected in 1952 from surviving plants of seven naturalized strains that had been subjected to intensive clipping treatments for 3 years. Seven strains were highest yielding entries in tests, including

approximately 25 naturalized strains. About 400 plants removed from plots and isolated for seed increase. Progeny performance of these plants equal or superior to best of naturalized strains in yield and agronomic performance. Increased for testing as Ky. 79G23-297.

Released.--No. Included in regional testing program.

Breeder Seed.--Kentucky Agricultural Experiment Station.

LATAR

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman, R. J. Olson, and A. G. Law.

Source.--Original introduction from Institute of Plant Industry, Leningrad, U. S. S. R., as P. I. 111536, by Westover-Enlow expedition in 1934.

Method of Breeding.--Grown for three generations in nurseries at Plant Materials Center; mass selection jointly by SCS, ARS, and staff of Washington Agricultural Experiment Station, Pullman, from spaced plantings in fourth generation. Tested in uniform nurseries since 1951 as P-2453.

Description.--Late-maturing hay-type orchardgrass. Blooms and matures seed on average of 10 to 14 days later than commercial varieties. Abundant, broad, well-distributed, noticeably light-green leaves. Vigorous and high in vegetative production. Seed production good. Lowest among seven orchardgrass varieties in lignin content and significantly higher in digestibility.

Released.--1957, cooperatively by Washington and Idaho Agricultural Experiment Stations and SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available.

M2-11142

Selected at Iowa Agricultural Experiment Station, Ames, SCS cooperating--I. J. Johnson and M. E. Heath.

Source.--Parental clones selected from long-time stands in fields and roadways in central Iowa and south-central Minnesota in 1941.

Method of Breeding.--From collection of 100 clones, 10 superior in winter hardiness, disease resistance, clonal yield, and open-pollination progeny performance selected for recombination.

Description.--Moderately productive and winter hardy. Midearly in maturity. Fair disease resistance. Moderate seedling vigor, drought resistance, and seed yield. Recombination of clones 13, 45, 54, 58, 60, 64, 66, and 93 from Iowa and 82 and 91 from Minnesota. (See Source.)

Released.--No. Included in regional testing program.

Breeder Seed.--No longer available. Small amounts of seed produced by SCS Nurseries, Ames and Ankeny, Iowa, from 1945 to 1953.

Certified Seed.--Not available.

NEW YORK SYNTHETIC D

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy.

Source.--Selected from large group of clones originally selected at United States Regional Pasture Research Laboratory, ARS, University Park, Pa., from wide collection of seed lots. Parental clones: Pasture Laboratory N. Y. 49-108(XLI-17), N. Y. 49-119(MXII-6 XXXVIII-2), N. Y. 49-121(MXII-8 XXXVIII-25), and N. Y. 47-260(MIV-6).

Method of Breeding.--Developed from four selected clones.

Description.--Late maturing; selected for vigor, quick recovery, and resistance to foliar diseases.

Released.--No. To be continued under test.

Breeder Seed.--New York Agricultural Experiment Station.

NEW YORK SYNTHETIC E (AURORA)

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy.

Source.--Selected from large group of clones originally selected at United States Regional Pasture Research Laboratory, ARS, University Park, Pa., from wide collection of seed lots. Parental clones: Pasture Laboratory N. Y. 49-107(XLI-13), N. Y. 49-127(MXII-14 AIV-21), N. Y. 49-134(XLII-1), and N. Y. 49-135(XLII-4).

Method of Breeding.--Developed from four selected clones.

Description.--Very late maturing; selected for vigor, erect growth habit, and resistance to foliar diseases. Somewhat light green in spring and fall; starts growth later in spring and stops growth earlier in fall than earlier maturing varieties.

Released.--No. To be continued under test. (Consideration given to release of this variety under name "Aurora." However, because of low seed production, probably will not be released.)

Breeder Seed.--New York Agricultural Experiment Station.

OREGON 233

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth.

Source.--Increase of "selected grazing strain No. 233" obtained from Gartons, Ltd., Warrington, England, in 1936 as F. C. 22364.

Description.--Differs from common in being

finer and denser of leaf, higher in forage yield, and lower in seed yield.

Released.--No. Included in regional testing program for several years before it was discontinued.

Breeder Seed.--Not available.

PALESTINE

Increased at California Agricultural Experiment Station, Davis.

Source.--Accession number T. O. 1638 received from G. L. Stebbins in 1947. Seed received from Samaria, Palestine.

Description.--Under nonirrigated conditions in California, stronger winter grower than common. Drought resistant, but lacking in winter hardiness. Susceptible to rust, but not serious problem on range.

Released.--No. Included in regional testing program.

Breeder Seed.--California Agricultural Experiment Station.

PASTURE LABORATORY SYNTHETICS, 1 THROUGH 7

Selected at United States Regional Pasture Research Laboratory, ARS, University Park, Pa.--W. M. Myers.

Source.--

Synthetic 1.--Collections made in Virginia, Maryland, and Pennsylvania.

Synthetic 2.--Collections made in Pennsylvania and Maryland, and Canadian accession.

Synthetic 3.--Collections made in Vermont, and Canadian accession.

Synthetic 4.--Collections made in Pennsylvania, New York, and Maryland, also varieties Roskilde and Minerva.

Synthetic 5.--Tammisto, Tardus 2, and Skandia II.

Synthetic 6.--Tammisto, Tardus 2, and "Swedish Select grazing."

Synthetic 7.--Selected from O. P. progenies at SCS Nursery, Big Flats, N. Y. SCS accession numbers lost in fire.

Method of Breeding.--Selections evaluated in series of replicated polycross nurseries. Thirty-eight clones isolated on basis of clonal performance, and observational data obtained from polycross progenies.

Description.--Plants selected on basis of winter hardiness, disease resistance, plant type, recovery following mowing, and leafiness; arranged in seven synthetics according to maturity.

Synthetic 1.--Seven clones: MI-13, MI-14, MI-16, MI-17, MII-30, MII-34, MII-36. Average heading date May 31.

Synthetic 2.--Five clones: MI-19, MI-20, MII-18, MII-29, MII-56. Average heading date June 1.

Synthetic 3.--Four clones: MII-45, MII-46, MII-49, MII-50. Average heading date June 3.

Synthetic 4.--Six clones: MIII-8, MIII-18, MIII-20, MIII-21, MIII-22, MIII-24. Average heading date June 6.

Synthetic 5.--Five clones: MIV-5, MIV-6, MIV-11, MIV-14, and MIV-16.

Synthetic 6.--Three clones: MIV-14, MIV-17, MIV-18. Average heading date June 10.

Synthetic 7.--Eight clones: XLI-6, XLI-8, XLI-13, XLI-17, XLI-23, XLI-24, XLII-1, XLII-4. Average heading date June 12.

Released.--No. Included in regional testing program. Since clones included in new synthetics developed at Pennsylvania Agricultural Experiment Station and New York Agricultural Experiment Station.

Breeder Seed.--Not available. Some clones available at New York Agricultural Experiment Station, Ithaca, and Pennsylvania Agricultural Experiment Station, University Park.

PENNLATE

Selected at Pennsylvania Agricultural Experiment Station; and United States Regional Pasture Research Laboratory, University Park, Pa., ARS cooperating--H. R. Fortmann and H. L. Carnahan.

Source.--Clone MIV-5 (Pasture Laboratory Synthetic 5), clone MIV-17 (Pasture Laboratory Synthetic 6), and clones XLI and XLII (Pasture Laboratory Synthetic 7).

Method of Breeding.--Four-clone synthetic; developed from tests including seven Pasture Laboratory experimental synthetics and polycross progenies of component clones. Restricted polycross progenies tested in New York and Pennsylvania. Strain included in testing programs as Pennsylvania Late Synthetic III.

Description.--Vigorous, persistent, late maturing. Produces higher yields and recovers better than other late maturing types.

Released.--1957, Pennsylvania Agricultural Experiment Station.

Breeder Seed.--Pennsylvania Agricultural Experiment Station.

Certified Seed.--Not available. (Available in limited quantity by 1960.)

PENNSYLVANIA SYNTHETICS

Selected at Pennsylvania Agricultural Experiment Station; and United States Regional Pasture Research Laboratory, University Park, Pa., ARS cooperating--H. R. Fortmann and H. L. Carnahan.

Source.--Early Synthetic I, clones MI-14, MII-34, and MII-36 from Pasture Laboratory Synthetic 1, and clone MII-56 from Pasture Laboratory Synthetic 2. Medium Synthetic II, clones MIII-8, MIII-18, MIII-20, and MIII-24 from Pasture Laboratory Synthetic 4.

Method of Breeding.--Four-clone synthetics, developed from tests including seven Pasture Laboratory experimental synthetics and polycross progenies of component clones. Restricted polycross progenies tested in New York and Pennsylvania.

Description.--Vigorous, persistent. Original selections made on basis of winter hardiness, disease resistance, plant type, recovery following mowing, and leafiness.

Released.--No. Included in regional testing program.

Breeder Seed.--Pennsylvania Agricultural Experiment Station.

POTOMAC

Selected at Plant Industry Station, ARS, Beltsville, Md.--R. E. Wagner, M. A. Hein, and P. R. Henson.

Source.--Plants collected in 1935 from old pastures in Maryland, Virginia, West Virginia, and Pennsylvania and from strain tests conducted at Plant Industry Station.

Method of Breeding.--Collections screened on basis of type, rust resistance, leafiness, persistence, and vigor; in 1940, 8 plants of predominately pasture type placed in one isolation block (Maryland pasture strain) and 6 plants representing erect hay types placed in another (Maryland hay strain). In 1945 plants selected from 3-year-old broadcast plots of these 2 strains and established in space-planted nursery together with equal number of seedlings from each of 2 strains. Nursery rogued and bulk seed collected for testing as Beltsville orchardgrass. Potomac represents third cycle of mass selection from 1945 nursery.

Description.--Dark green, leafy, erect, similar to commercial lots in height. Productive; superior persistence; rust resistance.

Released.--1955, by Crops Research Division, ARS, and cooperating experiment stations.

Breeder Seed.--Plant Industry Station.

Certified Seed.--Available in limited quantity.

S-37

Selected at Welsh Plant Breeding Station, Aberystwyth, Great Britain.

Source.--Initial plant material selected on basis of type rather than origin.

Description.--Hay type. Basic type plants relatively erect and well leaved up stems, giving more leafy hay than common Danish orchardgrass. Late maturing; performs very satisfactorily in association with legumes. Shown some evidence of lack of persistence in Eastern United States.

Released.--Welsh Plant Breeding Station. Included in regional testing program and recommended for use in certain States.

Certified Seed.--Available from Great Britain. Certified seed produced in Idaho and Washington.

S-143

Selected at Welsh Plant Breeding Station, Aberystwyth, Great Britain.

Source.--Based on indigenous plant of rather extreme type, which was designated "mop" cocksfoot owing to dense broad cushions produced by individual spaced plants.

Method of Breeding.--Reselected. New lots exhibit greater uniformity with respect to late maturity and prostrate growth habit.

Description.--Late-maturing pasture type; plants relatively spreading, with profusion of tillers and broad leaves.

Released.--Welsh Plant Breeding Station. Released in 1950, cooperatively by Idaho and Washington Agricultural Experiment Stations and SCS Plant Materials Centers, Pullman, Wash., and Aberdeen, Idaho.

Certified Seed.--Available from Great Britain. (Certified seed produced in several Western States.)

SANDIA

Selected at SCS Nursery, Albuquerque, N. Mex.

Source.--A-10655. Selected plants from "Brage" NY-NI-25969, SCS Nursery, Big Flats, N. Y.

Method of Breeding.--Selected more robust, disease-free plants from row planting. Plants dug and isolated for seed increase.

Description.--Large, robust; grows well with alfalfa. Good seed producer and apparently rust free.

Released.--1953, cooperatively by New Mexico Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas.

Certified Seed.--Available in limited quantity.

TROGDON

Selected at Missouri Agricultural Experiment Station, Columbia, ARS cooperating--E. Marion Brown.

Source.--Total of 344 plants selected in 1936 from sparse stand in 14-year-old field near Springfield, Mo. Also plants from bluegrass lawn in Columbia.

Method of Breeding.--Source material transplanted on 1-foot centers and mowed semimonthly to height of 1 inch through 1937 and 1938. Twenty-four plants selected on basis of recovery after each cutting and size and vigor at end of 2-year period of close defoliation. Selections transplanted to crossing blocks--seed composited and used to establish increase block.

Description.--Vigorous, persistent, not visibly distinguishable from commercial. Susceptible to leaf rust.

Released.--No. Included in regional testing program.

Breeder Seed.--Not available. Variety will be discontinued.

Certified Seed.--Not available.

UTAH SYNTHETIC

Selected at Utah Agricultural Experiment Station, Logan, ARS cooperating--W. Keller.

Source.--Developed from selections made in controlled competition studies at Forage Experiment Farm, Logan.

Method of Breeding.--Selection of 17 late-flowering plants from group of 50 chosen for high yield and good recovery from 1,400 plants grown under conditions of controlled competition. Number of clones later reduced to 14, which were planted in isolation in restricted polycross block to produce seed. Utah Synthetic-2 simply second synthetic generation of this same material.

Description.--Uniformly late, dark green, with rather narrow leaves. Forage yield under irrigated conditions compares favorably with strains of similar maturity.

Released.--No. Included in regional testing program.

Breeder Seed.--Utah Agricultural Experiment Station.

WASHINGTON 88

Selected at Western Washington Agricultural Experiment Station, Puyallup--M. S. Grunder.

Method of Breeding.--Sibs of single plant selected after three generations of self-pollination. These sibs planted under isolation, and seed produced from this mass seeding provided foundation stock for Washington 88. Strain lost during World War II; subsequently reestablished with selections from foundation field.

Description.--About 10 days later, less variation between individual plants, leafier than and almost as tall as common.

Released.--No. Included in regional testing program for several years before it was discontinued.

Breeder Seed.--Not available.

WASHINGTON H-2

Selected at Western Washington Agricultural Experiment Station, Puyallup--M. S. Grunder.

Method of Breeding.--Two relatively infertile parent plants increased vegetatively and interplanted under isolation to produce F_1 seed designated as hybrid 2. Two unrelated parent plants each had background of four generations of selfing.

Description.--Hybrid 2 slightly shorter when fully developed. About 20 days later than common; appears suitable for use in mixtures. Leafy and produces good yields of seed.

Released.--No. Included in regional testing program for several years before it was discontinued.

Breeder Seed.--Not available.

WISCONSIN 52

Selected at Wisconsin Agricultural Experiment Station, Madison, ARS cooperating--D. C. Smith and E. L. Nielsen.

Source.--Seed collections obtained in 1941 from 13 colonies throughout State from near Chicago, Ill., northward to Ashland, Wis.

Method of Breeding.--Spaced plants established from collections in spring of 1942. Progenies left in field for three winters and rogued of stemmy, nonleafy, and severely diseased plants. Remaining plants allowed to interpollinate; mass seeded rows established in 1945. Very winter hardy in Wisconsin; otherwise similar to common.

Released.--No. Included in regional testing program.

Breeder Seed.--Wisconsin Agricultural Experiment Station.

Certified Seed.--Not available.

Digitaria decumbens Stent, pangolagrass

Increased at Florida Agricultural Experiment Station, Gainesville, ARS cooperating--George Ritchey.

Source.--P. I. 111110 vegetative planting material received from South Africa in 1935.

Method of Breeding.--Comparative tests and pasture plots, 1941-42.

Description.--Similar to crabgrass (*Digitaria sanguinalis* (L.) Scop.), except perennial and vigorously stoloniferous. Strictly warm-weather grass for pastures, hay, or silage. Does not produce seed and is propagated vegetatively. Adapted to peninsular area of Florida. Susceptible to winterkilling in northern Florida.

Released.--1944, cooperatively by Florida Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Florida Agricultural Experiment Station.

Certified Stock.--Not available. (Available commercially.)

Ehrharta calycina Sm., perennial veldtgrass

Increased at California Agricultural Experiment Station, Davis.

Source.--California accession number T. O. 1359; received from Australia in 1929.

Description.--Highly palatable, drought-resistant bunchgrass; adapted to light soils. Does particularly well on sandy coastal soils in California. Seed production limited by shattering.

Released.--Yes. Certified by California Crop Improvement Association in 1947.

Breeder Seed.--California Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

NONSHEDDING

Selected at California Agricultural Experiment Station, Davis--R. M. Love.

Source.--Introduced by Agronomy Department from R. C. Rossiter, Perth, Western Australia. Given accession number T. O. 1883. (Seed lot further identified as P. I. 187309 - 1947 seed.)

Method of Breeding.--Original panicle selections now reduced to polycross consisting of 25 clones.

Description.--Experimental strain differing from typical E. calycina in having contracted panicles and retaining larger part of seed to maturity. Little shorter than typical perennial veldtgrass, but otherwise has same range of variation in flowering date, habit of growth, and fineness of foliage. Superior with respect to both seed yield and seed quality.

Released.--No. Distributed for testing.

Breeder Seed.--California Agricultural Experiment Station.

Elymus canadensis L., Canada wildrye

MANDAN

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Field collection made near Mandan in 1935.

Method of Breeding.--Mass selection within two single plant progenies and distributed as Mandan 419.

Description.--More and softer textured leaves, shorter culms, and longer lived than common Canada wildrye.

Released.--1946, cooperatively by North Dakota Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Not available.

M2-11108

Selected at Iowa Agricultural Experiment Station, Ames, SCS cooperating--I. J. Johnson and M. E. Heath.

Source.--Originated as seed increase under isolation of single plant selection made southwest of Des Moines, Iowa, in 1940.

Method of Breeding.--From about 100 plants selected from long-time stands in Iowa in 1940, one plant (clone 364) saved for increased purposes. All selections selfed and evaluated clonally. Clone 364 considered superior, and seed increase started in 1942. Several subsequent generations of seed increase made by SCS Nurseries at Ames and Ankeny, Iowa.

Description.--Uniform, leafy, vigorous; 10 days or more later in heading than Mandan wildrye. Disease resistant; good seedling vigor. Not thoroughly tested for agronomic merit.

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Elsberry, Mo.

Certified Seed.--Not available.

Elymus cinereus Scribn. and Merr.

P-5797

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--University of Saskatchewan, Saskatoon, Saskatchewan, Canada, in 1938.

Method of Breeding.--Selection of vigorous types during several generations.

Description.--Robust, vigorous, blue, tall growing, leafy. Broad, coarse leaves; large stems and seed heads; good seed production. Seed grows readily; good seedling vigor. Grows well on saline and high pH soils.

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Not available.

Elymus giganteus Vahl, giant wildrye

VOLGA

Selected at Plant Materials Center, SCS, Pullman, Wash.

Source.--P. I. 108491. Lower Volga region, U. S. S. R.; introduced by Westover-Enlow expedition in 1934. Propagated and tested as P-208.

Method of Breeding.--Selection of most vigorous plants from above introduction during several generations followed by vegetative reproduction of most desirable type.

Description.--Tall, coarse, green, creeping; nonpalatable to livestock. Long lived on inland sand dunes, where it will stop sand movement and provide permanent cover. Can be grown from seed or propagated vegetatively. Rate of increase from culms under proper cultural conditions 15 to 1 in first year. When established from seed, seedlings show excellent vigor.

Released.--Vegetative material distributed in 1949 for inland dune control by Plant Materials Center, SCS, Pullman. Seed not released.

Breeder Seed.--Vegetative material and seed from bulked selections, SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman.

Certified Seed.--Not available. (Material available for vegetative plantings.)

Elymus glaucus Buckl., blue wildrye

LOMAS

Selected at Plant Materials Center, SCS, Pleasanton, Calif.--Paul B. Dickey and O. K. Hoglund.

Source.--Collected from native stand in winter-annual rangeland near Sebastopol, Calif., in 1935.

Method of Breeding.--Green glabrous plants selected for field seeding and given SCS accession number P-10128. Selection outstanding among 129 collections of blue wildrye. Improved by mass selection for several generations and tentatively named Lomas.

Description.--Early-maturing, long-lived perennial bunchgrass, with low-fertility requirement. Bright green; forms open bunch; leaves of medium width. On rangeland sites to which it is adapted, has good seedling vigor, begins growth early in fall, develops rapidly during winter, and remains green 2-4 weeks after annuals dry up. Moderate grazing essential to maintenance of stands.

Released.--No. Included in tests on annual range area of California.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Not available.

Elymus junceus Fish., Russian wildrye

A-2514

Increased at SCS Nursery, Albuquerque, N. Mex.

Source.--Received in 1935 from United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.; given accession number A-2514.

Method of Breeding.--Bulk increase.

Description.--Variable population. Fair to good seed producer, but subject to unknown blight that attacks base of seedstalks, causing them to fall prior to seed set. Forage production as good as that of any other accession tested.

Released.--Distributed by SCS nurseries and Colorado Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Available in limited quantity.

MANDAN D-19

Increased at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Increase of P. I. 75737 received in 1927 from Western Siberian Experiment Station, Omsk, U. S. S. R. (Original recorded introduction received through H. N. Vinall.)

Method of Breeding.--Best among several introductions received up to 1940.

Description.--Typical of E. junceus introduced from U. S. S. R. Will probably be replaced by newer varieties.

Released.--Distributed to other experiment stations, and widely grown in United States.

Breeder Seed.--Not available.

Certified Seed.--Available in quantity. (Most often certified as commercial.)

MANDAN 2355

Selected at United States Northern Great Plains Field Station, Mandan, ARS, N. Dak.--George A. Rogler.

Source.--Five parental clones represent three separate introductions from U. S. S. R.

Method of Breeding.--Synthetic of 5 unrelated clones. At least 4 generations of selection on single plant basis in open-pollinated and inbred lines preceded choice of each parent. Progeny tests in yield plots and as

spaced plants used to measure effects of outcrossing with other 4 plants for each plant in synthetic. All 5 clones good seed producers and 3 of them produce exceptionally large seed.

Description.--Forage yields equal to those of commercial. Yielded 75 percent more seed than commercial in tests conducted over 5-year period. Weight per bushel of seed and weight of 200 seeds slightly higher than weight of commercial.

Released.--No. Will probably be released in cooperation with North Dakota Agricultural Experiment Station.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Not available. (Available in limited quantity by 1960.)

Eragrostis chloromelas Steud., Boer lovegrass

A-84

Increased at SCS Nursery, Tucson, Ariz.--C. G. Marshall and L. P. Hamilton.

Source.--Union of South Africa.

Released.--1950, cooperatively by Arizona Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Available in limited quantity.

A-12752

Selected at SCS Nurseries, Albuquerque, N. Mex., and Tucson, Ariz.--C. G. Marshall, T. F. Spaller, and L. P. Hamilton.

Source.--Received as Eragrostis curvula (Schrad.) Nees.

Method of Breeding.--Mass selection practiced for bluish type.

Description.--Vigorous strain of Boer lovegrass. Heads have more dense panicle branches than A-84; equally cold hardy.

Released.--No.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

OKLAHOMA 4880

Increased at Oklahoma Agricultural Experiment Station, Stillwater, ARS cooperating--J. R. Harlan.

Source.--A-12751 from SCS Nursery, Albuquerque, N. Mex. This lot probably same as one tested in western Oklahoma since 1948.

Description.--More cold tolerant than most accessions of this species; drought tolerance suggests it may be useful in parts of Southwest.

Released.--No. Increased for testing only.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Eragrostis lehmanniana Nees, Lehmann lovegrass

A-68

Increased at SCS Nursery, Tucson, Ariz.--C. G. Marshall.

Source.--Seed sent to F. J. Crider by M. Willman, Kimberley, Union of South Africa.

Description.--Seedlings volunteer and tolerate adverse conditions better than other lovegrasses. More drought tolerant but less cold tolerant than Boer or weeping lovegrass.

Released.--1950, cooperatively by Arizona Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

COLD HARDY

Increased at SCS Nurseries, Albuquerque, N. Mex., and Tucson, Ariz.--L. P. Hamilton and T. F. Spaller.

Source.--A-14108 represents mixed seed of P. I. 165734 and S. P. I. 092037 produced at United States Southern Great Plains Field Station, ARS, Woodward, Okla. A-14107 designated as first cold-hardy strain received from USDA. A-14108 and A-14107 bulked at Tucson.

Description.--Plants resemble A-68, but have denser basal leaf development. Panicle shorter and more densely branched. Less tendency for stolons. Seedlings develop less rapidly as in Boer lovegrass. Plants more cold hardy than A-68, being equal to Boer lovegrass. Seed fill good at Albuquerque and Snowflake, Ariz., but poor at Tucson.

Released.--No.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

HARDY

Increased at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan.

Source.--Unnumbered accession obtained in 1947; 19 plants set out in 1948, and seed of survivors increased. Seed sent to SCS Nursery, Albuquerque, N. Mex., where it overwintered in contrast to other strains of same species.

Description.--Hardier than most strains; proved remarkably drought resistant in western Oklahoma tests during great drought of 1950's.

Released.--No.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

KALAHARI

Increased at SCS Nursery, Tucson, Ariz.--L. P. Hamilton and Darwin Anderson.

Source.--From Kalahari Desert, South Africa; introduced as P. I. 198581. Included in testing program as A-14328.

Description.--More productive than A-68 when moisture available. Slightly taller, but no leafier when grown under moisture stress; strains similar in other respects.

Released.--No.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Not available.

Eragrostis trichodes (Nutt.) Wood, sand lovegrass

A-11527

Increased at SCS Nursery, Albuquerque, N. Mex.

Source.--Received originally from SCS Nursery, Woodward, Okla. Probably southern Kansas source.

Method of Breeding.--None. Bulk increase. In 1949 field selection of early-maturing plants made near Haxtun, Colo. This lot labeled A-11527; 2 weeks earlier in seed maturity than bulk increase. Forage production in first year superior to that of any northern strains tested.

Description.--Original bulk production is good southern strain adapted to eastern New Mexico, central and southeastern Colorado. Will not mature satisfactory seed crop in northeastern Colorado.

Released.--1940, cooperatively by New Mexico Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--SCS-New Mexico Cooperative Nursery, Los Lunas.

Certified Seed.--Available in limited quantity.

NEBRASKA 27

Increased at Nebraska Agricultural Experiment Station, Lincoln, ARS and SCS cooperating--L. C. Newell and E. C. Conard.

Source.--Collection from native meadow in northern Holt County, Nebr.

Method of Breeding.--Selections moved to Lincoln Nursery in 1935 by L. C. Newell and Elver Hodges. Seed from these plants later increased at North Platte and Waterloo Nurseries, Nebr., by E. C. Conard.

Description.--Winter-hardy, relatively long-lived strain of sand lovegrass. In Nebraska plantings, survived and maintained stands superior to plantings made with seed from more southern sources. Well adapted to range of soil types. Application of phosphorus fertilizers to sandy soils of low fertility will usually increase yields of forage and seed. Produces highly palatable nutritious forage. Best used in mixtures with other warm-season native grasses, such as gramas or bluestems.

Released.--1949, cooperatively by Nebraska Agricultural Experiment Station; Crops Research Division, ARS; and Nursery Division, SCS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available.

WOODWARD STRAINS

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan.

Five lines distributed over years. W2 and W5 taken to El Reno, Okla., for more extensive testing. W2 proved to be far inferior in both forage and seed to W5, which is being compared to common for seed production. Unless W5 turns out to be better seed producer than common, believe none of these strains an improvement. W5 available in considerable quantity; others dropped.

W1

Original field selection by Jack E. Engleman; later reselected. Tall, vigorous, large-seeded type; somewhat shatter resistant.

W2

Selection 45-5343. Short selection. On poor soil retains dark-green color when other strains show some chlorosis. Deeply pigmented panicles.

W3

Selection 45-5350. Leafy strain of medium height, open purple panicle, good seed producer.

W4

Selection 45-5344. Leafy, medium height, good seed producer.

W5

Recombines five plants from single plant selection family (85-5088-5092, incl.). Tall, vigorous, leafy, dark green.

Festuca arundinacea Schreb., tall fescue

ALTA

Selected at Oregon Agricultural Experiment Station, Corvallis, Oreg., ARS cooperating--H. A. Schoth.

Source.--In 1918 some of more promising lines of tall fescue from nursery at Pullman, Wash., established at Corvallis. Seed obtained from Max Heinricks, Pullman. Three lines used--P. I. 19728, P. I. 24838, and P. I. 25206. P. I. 19728 received on January 24, 1907, from A. LeCoq & Company, Darmstadt, Germany. P. I. 24838 from commercial lot of about 500 pounds of seed purchased from Peppard Seeds, Inc., Kansas City, Mo., on March 9, 1909. P. I. 25206 from lot of seed presented by George Bitter, director of Botanic Garden, Bremen, Germany. This lot received by Plant Introduction Section, USDA, on March 26, 1909.

Method of Breeding.--Evolved as ecotype selection. Material mentioned above planted in spring of 1918. Noted to have made exceptionally fine growth during first season. Received special mention in annual reports during 1919, 1920, 1921, and 1922. In winter of 1922-23 it suffered severe winterkilling. Surviving plants put together and became source seed of Selection 7. In 1927 designation of Selection 7 changed to FC 29366. Remained under this selection number until given name "Alta" in 1940. Recognized because of ability to remain green during dry summers in western Oregon and high yields of forage.

Released.--1940, cooperatively by Oregon Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oregon Agricultural Experiment Station.

Certified Seed.--Available in quantity.

ALTA 4-36

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth and H. H. Rampton.

Source.--Alta tall fescue.

Method of Breeding.--Fifty selections from Alta variety. Selections grown under isolation; outstanding individuals selected from resulting progenies.

Description.--More dense than Alta, with finer leaf. Approximately equal to Alta in forage yield and crude protein content, but lower in seed yield.

Released.--No. Included in regional testing program.

Breeder Seed.--Oregon Agricultural Experiment Station.

ALTA 144

Increased by Charles H. Lilly Seed Company, Seattle, Wash.

Source.--Origin obscure, but believed to trace to Alta tall fescue seed obtained from Corvallis, Oreg.

Certified Seed.--Not available. (No longer in commercial production.)

ASHEVILLE

Increased at SCS Nursery, Americus, Ga.--Paul Tabor and J. D. Powell.

Source.--Collection from naturalized stand 5 miles southwest of Asheville, N. C. Grown under experimental number SC 20-764.

Description.--Strain of tall fescue. More stable to adverse changes in environment than Kentucky 31 or Alta. Yield not greater than that of Kentucky 31 or Alta. Minimum cold required somewhat greater. Observed superior to other kinds on soils that become too wet in winter and on rich soils during cold of winter.

Released.--Seed distributed by SCS in 1952.

Breeder Seed.--SCS Nursery, Americus.

Certified Seed.--Not available.

GOAR

Selected at Imperial Valley Experiment Station, El Centro, Calif.--L. G. Goar.

Source.--Original material came from D. Dagen of Budapest, Hungary, to Professor Southworth of University of Manitoba, Winnipeg, Canada. Received by P. B. Kennedy of California Agricultural Experiment Station, Davis, in March 1925. Accession number T. O. 899.

Method of Breeding.--Planted at El Centro in 1941; tall fescue types selected. Seed of this type received from L. G. Goar by Plant Materials Center, SCS, Pleasanton, Calif., and assigned accession number P-13847. Tested there in cooperation with California Agricultural Experiment Station since 1946.

Description.--Early-maturing, vigorous, rather coarse bunchgrass, with high fertility level. Strong seedling vigor; well adapted to heavy-textured alkali soils. Grows better during periods of high summer temperature than do other strains of tall fescue.

Released.--Certified by California Crop Improvement Association in 1946.

Breeder Seed.--California Crop Improvement Association and Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Available.

KENTUCKY 31

Increased at Kentucky Agricultural Experiment Station, Lexington--E. N. Fergus.

Source.--William Suiter's farm in Menifee County, Ky. Collected by E. N. Fergus in 1931 for testing at Kentucky Agricultural Experiment Station. Apparently grown on Suiter's farm since 1887.

Description.--Wide adaptation to soil types and temperature extremes. Suited to upper South, where remains green all year with occasional exception of midsummer months. Very productive, but not too palatable. Excellent for erosion control.

Released.--Kentucky Agricultural Experiment Station.

Certified Seed.--Available in quantity.

KENTUCKY 59G1-32

Increased at Kentucky Agricultural Experiment Station, Lexington--E. N. Fergus and R. C. Buckner.

Source.--Naturalized variety from southeastern Kentucky.

Description.--Similar in appearance to Kentucky 31, but appears to develop sod that is somewhat more dense. Produced slightly higher yields than Kentucky 31, especially in older stands.

Released.--No. Included in regional testing program.

Breeder Seed.--Kentucky Agricultural Experiment Station.

Certified Seed.--Not available.

NCS-511

Increased at SCS nurseries in southeastern region.

Source.--Roadside collection, Haywood County, N. C., by W. H. Rankin in about 1940.

Description.--More prostrate and later by 7-10 days than either Kentucky 31 or Alta. Reported to be inferior south of North Carolina to other varieties of tall fescue.

Released.--Distributed by Plant Materials Centers, SCS, for testing purposes.

Breeder Seed.--Not available, except for few grams of seed at North Carolina Agricultural Experiment Station, Raleigh.

Certified Seed.--Not available.

NEW ZEALAND

Increased at Kansas Agricultural Experiment Station, Manhattan--Kling Anderson.

Source.--Seed collected from individual plants in New Zealand.

Description.--Very late, coarse type.

Released.--No. Included in regional testing program.

Breeder Seed.--Plant Industry Station, ARS, Beltsville, Md.

TENNESSEE STRAINS

Selected at Tennessee Agricultural Experiment Station, Knoxville--J. K. Underwood.

Source.--Kentucky 31 tall fescue.

Method of Breeding.--Inbred 2 years and strains having similar characteristics crossed by transplanting side by side and either caging or bagging.

Description.--(1) Fine leaved, leafy, productive; has not been submitted to palatability test. (2) Low silicon line (0.97 percent); leaves very long, broad, flagged; early heading; very productive. (3) High silicon line (1.28 percent); leaves narrower, stiff pointed, not flagged; 7-10 days later than (2) in heading and ripening of seed.

Released.--No. Seed not available at present for testing purposes.

Festuca elatior L., meadow fescue

ENSIGN

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Basic nursery established from seed lots obtained from various European sources.

Method of Breeding.--Synthetic variety built up by combining several desirable clones selected in selfed-line breeding program.

Description.--Tall, upright, with uniform type of growth; leafy basal growth. Considered equal to most other strains in forage production; outstanding in seed production.

Released.--1944, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Available in quantity.

Festuca idahoensis Elmer, Idaho fescue

P-6435

Selected at Plant Materials Center, SCS, Pullman, Wash.--R. J. Olson and J. L. Schwendiman.

Source.--Collected from native Ponderosa pine-grassland association near Winchester, Idaho, by Donald Hedrick in 1938.

Method of Breeding.--Accession outstanding among 61 collections. Improved by mass selection during several generations.

Description.--Vigorous, long-lived perennial; bunch-type fescue. Excellent seedling vigor, strong root system. Dark-green, basal, abundant leaves. Seed culms spreading, abundant, up to 36 inches in height. Large, awned

seeds. Seed production much better than that of any strain previously found.

Released.--No. Included in variety tests.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Not available.

Festuca ovina L., sheep fescue

P-274

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--P. I. 109497; south of Konya, Turkey; introduced by Westover-Enlow expedition in 1934.

Method of Breeding.--Selections from spaced plantings in which aberrant types eliminated.

Description.--Dwarf, blue green, densely tufted, erect growing, with abundant fine stems and dense, short, stiff, harsh, abundant basal leaves. Adapted to dry sites in 8- to 14-inch rainfall areas and at high altitudes.

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Not available.

Festuca ovina var. duriuscula (L.) Koch, hard fescue

P-2517

Selected at Plant Materials Center, SCS, Pullman Wash.--V. B. Hawk and J. L. Schwendiman.

Source.--Collected from old planting on Eastern Oregon Livestock Experiment Station, Union, Oreg., in 1934 by V. B. Hawk.

Method of Breeding.--Mass selection for several generations.

Description.--Tall, semierect growing, densely tufted perennial bunchgrass. Differs from sheep fescue in its smoother, wider, longer, firmer leaf blades. Large form of sheep fescue; closely related to chewings fescue, but more drought resistant and more densely tufted. Heavy root producer, shade tolerant. Basal, harsh foliage. Consistently high seed production. Primary use is for soil protection on roadsides, ditchbanks, and as soil-improvement understory grass in orchards. In mixtures with alfalfa for hay, it is very heavy root producer. Widely adapted to rainfall areas of 14-30 inches and to well-drained irrigated soil.

Released.--1949, cooperatively by Washington, Idaho, and Oregon Agricultural Experiment Stations and Plant Materials Center, SCS, Pullman.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

Festuca rubra L., red fescue

CLATSOP

Selected at Astoria Nursery Unit, SCS, Warrenton, Oreg., in cooperation with Oregon Agricultural Experiment Station, Corvallis--Robert L. Brown.

Source.--Maritime race collected from sandy plain at Florence, Oreg., in 1939.

Method of Breeding.--Seed collected from single plant in space-planted nursery. Increased under isolation as P-7153.

Description.--Narrow leaved, dark green, moderately tall, moderately rhizomatous. High forage and seed yield. Remains green throughout summer, hence fire resistant. No evidence of susceptibility to common diseases; cold tolerant.

Released.--No. Used in comparative strain tests in Western States. Used for permanent grass cover on stabilized coastal dunes in Oregon.

Breeder Seed.--Plant Materials Center, SCS, Corvallis.

DURATURF

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Scandinavian material.

Method of Breeding.--Mass selection.

Description.--Comparatively uniform, with dense bottom growth. Outstanding attribute is seed-producing ability. Because of uniformity, somewhat easier to harvest than more variable strains.

Released.--1943, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Not available. (Some of commercial creeping red fescue seed produced in Canada derives from this variety. Unlikely to stay in production as pedigree strain.)

ILLAHEE

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth.

Source.--Seed lot imported in 1937 from England by Oscar Loe, Silverton, Oreg.

Method of Breeding.--Comparative tests at Corvallis and Beltsville, Md.

Description.--Turf variety, with fine stems and leaves, slow rate of spread. Produces dense, uniform, fine-textured turf. At Beltsville established more rapidly from fall seeding and more cold tolerant than five varieties of red fescue, including Oregon-grown commercial with which it was compared.

Released.--1950, cooperatively by Oregon Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oregon Agricultural Experiment Station.

Certified Seed.--Available in quantity.

OLDS

Selected at School of Agriculture, Olds, Alberta, Canada.

Description.--Growth habit erect to spreading; perennial with short rootstalks. Few fertile shoots 35 to 60 cm. tall; relatively numerous long-leaved sterile shoots. Hardy to temperatures common throughout western Canada. Moderately drought tolerant; not subject to disease in Alberta. Recommended for use in lawns, fairways, pastures, and for soil conservation.

Released.--School of Agriculture, Olds.

Certified Seed.--Available. (Certified in Canada and Pacific Northwest.)

PENNLAWN

Selected at Pennsylvania Agricultural Experiment Station, University Park--H. B. Musser.

Source.--Individual plants selected from university golf-course fairways. This turf seeded approximately 30 years previously with seed of European origin.

Method of Breeding.--Screening tests of source material received from England, Hungary, Canada, and United States. Sod plugs collected from established turf and included in tests. Turf-quality tests of approximately 50 strains established at University Park and Beltsville, Md. Three superior strains (on basis of data from two locations) isolated for increase. Strains identified as F-55(38), F-74(38), and F-78(38).

Description.--Synthetic variety; produces better turf than any of original parents. Not immune to leaf spot diseases, but decidely tolerant of them; not attacked severely and recovers rapidly. Good foliage density, rapid spread, ability to withstand close clipping.

Released.--1954, by Pennsylvania Agricultural Experiment Station.

Breeder Seed.--Pennsylvania Agricultural Experiment Station.

Certified Seed.--Available.

RAINIER

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth.

Source.--Accession received in 1938.

Description.--High seed yielder, stiff stems, good turf developer, long lived, uniform dark green, rapid grower; resistant to common leaf, stem, and head diseases in Pacific Northwest.

Released.--1944, cooperatively by Oregon Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oregon Agricultural Experiment Station.

Certified Seed.--Available.

Lolium multiflorum Lam., Italian ryegrass (Also *L. multiflorum* X *L. perenne* and *L. multiflorum* X *L. rigidum*)

FLORIDA RUST RESISTANT

Selected at North Florida Branch Experiment Station, Quincy--T. E. Webb.

Source.--Selections from domestic ryegrass and introductions.

Method of Breeding.--Mass selection.

Description.--Rapid developing; rust resistant. Appears to be in same early-maturity class as La Estanzuela; equals or surpasses it in rust resistance.

Released.--No. Included in regional testing program.

Breeder Seed.--North Florida Experiment Station, Quincy.

GULF

Increased at Rice-Pasture Experiment Station, Beaumont, Tex., ARS cooperating--R. M. Weihing.

Source.--P. I. 193145, introduction of La Estanzuela 284 received from Uruguay.

Method of Breeding.--Comparative tests.

Description.--See La Estanzuela 284. Introductions varied in percentage of rust-resistant plants and in earliness. P. I. 193145 performed very well at Beaumont; relatively uniform as to maturity; relatively high percentage of rust-resistant plants.

Released.--1958, cooperatively by Texas Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Rice-Pasture Experiment Station.

Certified Seed.--Available in limited quantity.

H-1

Selected at Plant Research Bureau, Grasslands Division, Palmerston North, New Zealand.

Source.--Selection from artificial hybrid between L. multiflorum X L. perenne.

Description.--Combines high productive capacity and palatability of Italian ryegrass with some of permanence of perennial ryegrass. "Short-rotation" ryegrass; exhibits ability for winter production under New Zealand conditions superior to that of either parent. Requires good soil fertility.

Released.--In New Zealand. Included in regional testing program.

Certified Seed.--Not generally available in United States.

LA ESTANZUELA 284

Selected at La Estanzuela Experiment Station, Colonia, Uruguay.

Description.--Annual; exhibits appreciable amount of rust resistance. Relatively early; more susceptible to cold injury than domestic ryegrass.

Released.--In commercial production in Uruguay. Several accessions played important role in ryegrass-breeding programs in United States. These include T. O. 1882, obtained by R. M. Love, California Agricultural Experiment Station, Davis; P. I. 193145, obtained by O. S. Aamodt, Crops Research Division, ARS, Beltsville, Md.; and P. I. 201980, presented by Albert Boerger, La Estanzuela, Colonia.

Certified Seed.--Not available in United States.

RYE GRASS 12

Selected at Plant Research Bureau, Grasslands Division, Palmerston North, New Zealand. Increased at California Agricultural Experiment Station, Davis, in 1943.

Source.--Selections from artificial hybrid between L. multiflorum X L. perenne.

Description.--Morphologically intermediate between parents. Variable; starts growth early and described as remaining green longer than annual ryegrass.

Released.--In New Zealand. Included in regional testing program.

Certified Seed.--Not generally available in United States.

STONEVILLE RUST-RESISTANT STRAINS

Selected at Delta Branch Experiment Station, Stoneville, Miss., ARS cooperating--H. W. Johnson, H. W. Bennett, and C. L. Blount.

Source.--P. I. 194395 introduced from Uruguay (contained 35-percent rust-resistant plants when random population of seedlings inoculated in greenhouse). P. I. 201980, introduction of La Estanzuela 284, obtained from Uruguay (contained 51-percent rust-resistant plants).

Method of Breeding.--

Strain 1.--Synthetic consisting of five open-pollinated lines selected from P. I. 194395. When grown in progeny row nursery at McNeill, Miss., in 1953-54, these lines remained practically free of crown rust. In greenhouse tests at Stoneville five lines had following percentages of rust-resistant plants: 100, 95, 90, 86, and 83.

Strain 2.--Synthetic consisting of two S-2 lines derived from individual selfed plant of P. I. 194395. In greenhouse tests these lines contained 92- and 96-percent resistant plants.

Strain 3.--Synthetic consisting of three S-3 lines from one S-2 plant of P. I. 201980. In greenhouse tests these lines contained 96-, 91-, and 88-percent resistant plants.

Description.--Strains 1, 2, and 3 appear as productive as domestic ryegrass in tests conducted at Stoneville. Superior to La Estanzuela 284 in rust resistance.

Released.--No. Included in regional testing program.

Breeder Seed.--Delta Branch Experiment Station.

TIFTON 1

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Homer Wells.

Source.--Westerwold's ryegrass.

Method of Breeding.--Five plants that appeared to be immune to rust selected from artificial inoculation tests. Progenies screened for rust in artificial tests; selections made to repeat cycle. Field selection being practiced for resistance to leaf spot diseases.

Released.--No. Included in regional testing program.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

WIMMERA

Increased by Western Australian Department of Agriculture.

Source.--Naturalized in Wimmera-Mallee areas of Victoria, Australia. Possibly hybrid between L. rigidum and L. multiflorum. Seed

obtained from F. H. Brunning, Ldt., Melbourne, Australia. Increased at Plant Materials Center, SCS, Pleasanton, Calif., and San Fernando Nursery, SCS, San Fernando, Calif., as P-11419--D. J. Vanderwal and Paul E. Lemmon.

Description.--Variable in type, ranging from L. rigidum to L. multiflorum. Dominant type assumes upright growth, with rigid geniculate stems, but plants with sprawling growth and branched stems and seed heads also occur. Capable of good growth under adverse conditions, and will complete its life cycle in very short growing seasons. P-11419 maintained at Pleasanton selected for greater uniformity in type.

Released.--Department of Agriculture, Victoria. Used in soil-conservation districts in southern California in short-rotation dryland seedings and for quick, but short-lived, cover on burns.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Not available. (In commercial production.)

Lolium perenne L., perennial ryegrass

NORLEA

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Worldwide collection of seed lots.

Method of Breeding.--Repeated selection and progeny evaluation through 6 generations. In final synthesis 12 proven clones involved.

Description.--Sufficient hardiness to survive and to be productive in areas where heretofore species was of little or no value. Leafy, somewhat later in maturity than short-ley ryegrass strains. Susceptible to leaf rust in some areas, but susceptibility does not appear to affect yield, since it consistently outyielded other varieties in forage and seed production.

Released.--1958, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Not available. (Some seed should be available in 1960.)

P-312

Increased at Plant Materials Center, SCS, Pullman, Wash.

Source.--P. I. 107071 from Turkestan, U. S. S. R.; introduced by Westover-Enlow expedition in 1934. Labeled "Lolium rigidium"; reidentified in 1938 as L. remotum Schrank; subsequently classed as L. perenne.

Method of Breeding.--Mass selection for several generations.

Description.--Consistently more winter hardy, more productive, and longer lived than other strains of perennial ryegrass at Pullman. Uniform; free from annual and short-lived plants. Erect growing, leafy, completely awnless.

Released.--No. Included in regional testing program.

Breeder Seed.--Plant Materials Center, SCS, and Washington Agricultural Experiment Station, Pullman.

Certified Seed.--Not available.

S-23

Selected at Welsh Plant Breeding Station, Aberystwyth, Great Britain.

Source.--Material obtained from old grazed pastures (Midlands, Kent, Lincolnshire, England; Wales; Holland).

Description.--Spreading growth, late flowering, high tillering, dense, leafy. Very persistent under grazing.

Released.--Welsh Plant Breeding Station. Included in regional testing program.

Certified Seed.--Available from Great Britain.

S-24

Selected at Welsh Plant Breeding Station, Aberystwyth, Great Britain.

Source.--Based primarily on two wild plants, but not from old grazed pasture. These plants interbred and further "native" basic plant material added. Also some plants from produce of Hawke's Bay, New Zealand, seed selected and incorporated in strain.

Description.--In Great Britain more persistent and leafier than most ordinary strains. Capable of producing heavy crops and good aftermath. Starts growth earlier than most ordinary strains.

Released.--Welsh Plant Breeding Station. Included in regional testing program.

Certified Seed.--Available from Great Britain.

S-101

Selected at Welsh Plant Breeding Station, Aberystwyth, Great Britain.

Source.--Based entirely on plants derived from very old pastures of Midlands and Kent, England.

Description.--Flowers only slightly earlier than those of S-23; plants less spreading, leaf blades longer and often broader. Leafy dual-purpose strain approaching hay type.

Released.--Welsh Plant Breeding Station. Included in regional testing program.

Certified Seed.--Available from Great Britain.

Oryzopsis hymenoides (Roem. and Schult.) Ricker, Indian ricegrass

P-2575

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Native collection made in 1935, 5 miles south of White Bird, Idaho.

Method of Breeding.--Selected from among 152 accessions for its good vegetative characteristics and low hard-seed content. Selection repeated through several generations before initial increase.

Description.--Large, erect plant type; robust stems; broad, flat, abundant leaves. Medium small, dark, almost naked, elongate seeds. Excellent seedling vigor, averaging less than 50 percent of hard seeds.

Released.--No. Distributed for testing purposes.

Breeder Seed.--SCS Plant Materials Centers, Aberdeen, Idaho, and Pullman.

Certified Seed.--Not available.

Oryzopsis miliacea (L.) Benth. and Hook., smilograss

Increased at California Agricultural Experiment Station, Davis.

Source.--Introduced from Mediterranean region; first tested at California Agricultural Experiment Station in 1879.

Description.--Drought resistant, perennial bunchgrass, with about same climatic adaptation as hardinggrass, but does better on lighter soils. Difficult to obtain stands except in ash of brush burns or on very light soils. Less palatable than veldtgrass or hardinggrass.

Released.--Yes. Certified by California Crop Improvement Association in 1947.

Breeder Seed.--California Agricultural Experiment Station and Plant Materials Center, SCS, Pleasanton, Calif.

Certified Seed.--Available in quantity.

Panicum antidotale Retz., blue panicgrass

A-130

Increased at SCS Nursery, Tucson, Ariz.

Source.--Australia.

Description.--Original increase of blue panicgrass widely used in Texas and in Southwestern United States.

Released.--1950, cooperatively by Arizona Agricultural Experiment Station and SCS Nursery, Tucson.

Breeder Seed.--Arizona Plant Materials Center, Tucson.

Certified Seed.--Available.

ALGERIAN

Increased at Oklahoma Agricultural Experiment Station, Stillwater, ARS cooperating--J. R. Harlan.

Source.--Seed lot received in 1953 from Algeria, North Africa, under number St 453. This lot bears accession number 3997.

Description.--Increased in hope it might be more winter hardy than common material. Begins growth some 10 days to 2 weeks earlier in spring than other sources, but by midsummer is indistinguishable from other varieties.

Released.--No. Distributed for testing purposes.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

T-15327

Selected by personnel of SCS Nursery, Woodward, Okla., OK-N-2--James E. Smith, Jr., and Gordon L. Powers.

Source.--Bulk common strain of blue panicgrass derived from commercial increase of SCS Nursery, Tucson, Ariz., accession A-130. Increased for testing as T-15327.

Method of Breeding.--One-year-old seedlings that survived -18° F. in dryland field planting increased clonally; extremes in height, plant texture, and dates of flowering discarded; remaining plants bulked. Parent plants of these seedlings survived -11° F. in 2 successive years prior to field planting using seed harvested from them.

Description.--Relatively uniform, leafy, medium-fine stems, heavy seed producer; considered to be more cold tolerant than common strain available.

Released.--Informally by SCS nurseries in 1949.

Breeder Seed.--Not available.

Certified Seed.--Not available. (In commercial production.)

Panicum coloratum L., kleingrass

SELECTION 75

Selected at SCS Nursery, San Antonio, Tex., TX-N-1--James E. Smith, Jr. Name "Klein (buffels) gras (Panicum coloratum)" taken from page 66 of Common Names of Grasses in South Africa. Last two digits of accession number added to distinguish strain from others of similar origin.

Source.--Introduced from Kimberley, South Africa, as P. I. 166400, BN-5225. Increased for testing as T-20275.

Description.--Very productive, leafy, fine stemmed; plants mostly erect, good seed producer, drought tolerant. Warm-season perennial; tends to remain green at San Antonio, where produces fresh green growth at all times during winter, except when temperature falls below 25° F. Trailing stems root at nodes to form fairly dense sod when in contact with moist soil. This accession is best that has been observed at San Antonio. Plant makeup rather variable; improvement selection for greater uniformity should be possible. Well adapted to heavy soils, though complete soil and climatic adaptation not yet fully known. Probably not suited to areas where winter temperatures normally fall below 0° F.

Released.--Informally by SCS. Small amounts of seed sent to selected soil-conservation district cooperators in 1954 for testing.

Breeder Seed.--Plant Materials Center, SCS, San Antonio.

Certified Seed.--Not available.

SYNTHETIC 1

Selected at SCS Nursery, San Antonio, Tex.--James E. Smith, Jr.

Source.--South African introductions. Single plant selected from T-4453, P. I. 142284, BN-2731. Open-pollinated accession--Albuquerque SCS Nursery A-14156, P.I. 190327, BN-6876.

Method of Breeding.--Equal amounts of selfed seed from single outstanding plant and open-pollinated seed from another accession similar in plant characters mixed to form synthetic strain.

Description.--Tall, very leafy plants; leaves carried high along stems, more erect than those of most accessions of species seen at San Antonio; heavy head production. Single plant exceptionally good seed producer when open pollinated. Clonal increase of this plant revealed it to be largely self-sterile. Stands from open-pollinated seed of single plant resulted in population predominantly similar to that of single plant.

Released.--No. Included in observational tests.

Breeder Seed.--Plant Materials Center, SCS, San Antonio.

Certified Seed.--Not available.

Panicum virgatum L., switchgrass

BLACKWELL

Selected at SCS Nursery, Manhattan, Kans.--D. R. Cornelius.

Source.--Seed harvested in 1934 from single plant growing in native prairie near Blackwell, Okla.

Method of Breeding.--Single plant selected in comparison with many other collections at Manhattan nursery. Tested as KG-208.

Description.--Ranked high in leafiness, total forage produced, and resistance to rust and other diseases. Ranked well in seed production and seedling vigor. Upland-type switchgrass of medium height, with rather large stems. Consistently produces 400 pounds of seed per acre under irrigation.

Released.--1944, cooperatively by Kansas Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Plant Materials Center, SCS, Manhattan.

Certified Seed.--Available in quantity.

CADDO

Selected at Oklahoma Agricultural Experiment Station, Stillwater, ARS cooperating--Hi W. Staten, W. C. Elder, R. A. Chessmore, and J. R. Harlan.

Source.--Field collections from southern Great Plains, especially central Oklahoma.

Method of Breeding.--Mass selection in space-planted nurseries, with elimination of undesirable types. Process repeated, using most promising lines; seed from selected plants used to establish rows. Five rows selected for uniformity and superior production; seed bulked to form experimental strain 4200.

Description.--Tall, robust upland switchgrass generally characteristic of central Oklahoma. Leafy, productive, considerable rust resistance, rather uniform when seeded in rows for seed production; gives heavy yield of seed under favorable conditions. Forage yield under irrigation outstanding for native grass; recovers well after mowing. No special features distinguish it positively from other varieties, but tends to be greener and contains less red pigment in stems and heads than many other varieties.

Released.--1955, cooperatively by Oklahoma Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Available.

NEBRASKA 28

Developed at Nebraska Agricultural Experiment Station, Lincoln, ARS and SCS cooperating--L. C. Newell.

Source.--Native stand of switchgrass collected in Holt County, Nebr., in 1935.

Method of Breeding.--Spaced plants grown at this experiment station from original collection selected for type and allowed to

cross-pollinate in isolation. Resulting seed bulked and increased.

Description.--Relatively early-maturing strain of switchgrass, representative of Nebraska sandhill types. Average plants semi-decumbent, with fine stems of moderate height, bluish green, and leafy; but considerable variation in plant type exists. Well adapted to diverse soils and used successfully for pasturage and soil-conservation purposes, such as seeded waterways in pure stands or mixtures. Matures seed in mid-August to early September. In areas with longer growing seasons is susceptible to rust, which is likely to be serious factor in production.

Released.--1949, cooperatively by Nebraska Agricultural Experiment Station; Crops Research Division, ARS; and Nursery Division, SCS.

Breeder Seed.--Nebraska Agricultural Experiment Station.

Certified Seed.--Available in quantity.

WOODWARD STRAINS

Selected at United States Southern Great Plains Field Station, ARS, Woodward, Okla., in cooperation with Oklahoma Agricultural Experiment Station, Stillwater--J. R. Harlan.

Source.--Local populations plus some collections from Texas and New Mexico.

Description.--

W1.--Short, leafy, blue type, with good seeding habits; only 80 percent fixed for short type. This strain discarded.

W2.--Short, leafy type, finer than W1; contains both green and blue types. Apparently somewhat better forage quality than W1; seed production about same.

Released.--No. Seed of W2 increased for testing only. In all probability will not be given further consideration in Oklahoma following release of Caddo.

Breeder Seed.--United States Southern Great Plains Field Station.

Paspalum dilatatum Poir., dallisgrass

B-230

Selected at Louisiana Agricultural Experiment Station, Baton Rouge--C. R. Owen.

Source.--Lot B of seven lots of seed collected from natural stands in lower Red River bottom. Selection made in 1941.

Method of Breeding.--Plant selection followed by progeny testing for seed quality and forage vigor evaluation. Tested in new strain-evaluation experiments where seed yields, seed quality, and forage compared.

Description.--Not distinguishable from common dallisgrass. Produces better quality seed than common dallisgrass by about 30 percent. Remains green later in fall and begins growth earlier in spring.

Released.--1951, cooperatively by Louisiana Agricultural Experiment Station and Louisiana Crop Improvement Association.

Breeder Seed.--Louisiana Agricultural Experiment Station.

Certified Seed.--Not available.

B-430

Selected at Louisiana Agricultural Experiment Station, Baton Rouge--C. R. Owen.

Source.--Nursery from which selection taken planted from seed collected in same area. Selection made in 1943 in space-planted nursery at Hamburg, La.

Method of Breeding.--Plant selection for normal forage type, which excelled in viable seed produced. Tested in progeny row and extended to new strain test where both seed and forage production compared.

Description.--No definite distinguishing characteristics for identification. Exceeded average of strains included by 32 percent for pure seed content. Ergot-infected florets amounted to 28 percent less than average.

Released.--1951, cooperatively by Louisiana Agricultural Experiment Station and Louisiana Crop Improvement Association.

Breeder Seed.--Louisiana Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

PROSTRATE

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Came from material obtained from Ben Smith, North Carolina Agricultural Experiment Station, Raleigh, who received it from Bernardo Rosengurt of Montevideo, Uruguay.

Method of Breeding.--Seeds from several progenies that appeared to be similar in type and 100-percent apomictic were blended and increased to furnish seed released in regional tests.

Description.--More prostrate, more resistant to foliage diseases, more persistent, maintaining good stands much longer than common dallisgrass. Outyielded common dallisgrass in clipping tests at Tifton. Very susceptible to ergot, very irregular in meiosis, poor in seed production.

Released.--No. Included in regional testing program.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Paspalum nicorae Parodi, brunswickgrass

Increased at SCS Nursery, Americus, Ga.--Paul Tabor.

Source.--Sprigs dug March 1, 1945, at Brunswick, Ga. Grown under experimental number SC 20-672.

Description.--Rhizomatous species generally similar to bahiagrass. More than two-seed racemes per stem. Some plants glaucous, others light green. Dense sod produced.

Released.--No.

Breeder Seed.--Plant Materials Center, SCS, Americus.

Certified Seed.--Not available.

Paspalum notatum Flügge, bahiagrass

ARGENTINE

Selected at Florida Agricultural Experiment Station, Gainesville, ARS cooperating--George Ritchey.

Source.--P. I. 148996 from Argentina; seed presented by Lorenzo R. Parodi.

Method of Breeding.--Selected as one of two distinct types from this introduction in 1945. Plots and pastures planted in 1945-46.

Description.--Wider leaves than those of Pensacola, but narrower than those of common. Preferred by cattle. Medium cold resistance, making most growth during midsummer. Very susceptible to ergot. Adapted throughout Florida and coastal areas of other Southern States.

Released.--1949-50, cooperatively by Florida Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Available commercially.)

PARAGUAY

Source.--Origin obscure. Presumably traces to early introductions that became established along Gulf of Mexico.

Description.--Coarse, tough. Leaves shorter and hairier than those of Pensacola. Used to some extent as general-purpose turfgrass.

Released.--No.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Some commercial production in Texas.)

PARAGUAY 22

Increased at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--J. L. Stephens.

Source.--P. I. 158822 collected by J. L. Stephens in Paraguay in 1947.

Method of Breeding.--Selection of one plant in source nursery. Progeny tests indicated that selection was true breeding and probably 100-percent apomictic.

Released.--No. Included in regional testing program as Tifton bahiagrass.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Not available. (Some commercial production.)

PENSACOLA

Found by county agent, Ed Finlayson, Pensacola, Fla. Sprigs from vacant lot on Government Street, Pensacola, taken to SCS Nursery, Americus, Ga., in May 1940 by Paul Tabor.

Source.--Plants growing along docks and railroad tracks at Pensacola. Thought to have arrived by fruit boat from Central or South America.

Method of Breeding.--Comparative tests conducted at several experiment stations. Experimental pastures and plots for forage yield and chemical composition planted at Gainesville, Fla., in 1942.

Description.--Similar to common bahiagrass, except more cold hardy, narrower blades, smaller seed, and more responsive to fertilization. Seed germination excellent, with full stands and ground cover in 8-12 weeks. Adapted throughout southeastern Coastal Plain area and to all Florida.

Released.--Approved as superior forage by Florida Agricultural Experiment Station in 1944. Seed distributed by Americus Nursery in 1942, with first large-scale distribution in 1944.

Breeder Seed.--Plant Materials Center, SCS, Americus.

Certified Seed.--Available.

PENSACOLA X COMMON

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between selected plants from Pensacola bahiagrass and common broad-leaved bahiagrass.

Method of Breeding.--Triploid from cross--Pensacola (diploid) X common (tetraploid). Sterile in isolation, but seeds well when interplanted with pollinator, such as Pensacola bahiagrass. Seeds produced give rise to uniform progeny exactly like female parent, indicating reproduction by apomixis.

Description.--Broader, more tender leaves, more palatable than Pensacola bahiagrass. Outyielded common parent twofold and Pensacola parent by 10 to 15 percent in replicated clipping tests.

Released.--No. Included in regional testing program.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Not available.

TIFHI 1

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Developed from selected clones coming from commercial Pensacola bahiagrass.

Method of Breeding.--Selected clones of Pensacola tested for general combining ability in polycross tests. Best of these tested for specific combining ability in single crosses. Two of best that were self-sterile and cross fertile and gave good single cross carry test numbers 14 and 108. Interplanted vegetatively in strips up to 30 feet wide to establish seed-production fields, where hybrid seed may be produced simply by combining all seed produced. Distributed for testing as Pensacola hybrid 14 X 108.

Description.--Slightly leafier than commercial Pensacola. One of parents (selection 108) more shatter resistant, facilitating seed production. Hybrid carries considerable heterosis, yielding up to 25 percent more forage than that of commercial check. In 4-year grazing test in replicated pastures produced 69 pounds more beef per acre per year than commercial Pensacola--statistically significant difference.

Released.--1957, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Stock.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Available in limited quantity.

WILMINGTON

Increased at SCS Nursery, Rock Hill, S. C.

Source.--Collected in 1940 from naturalized stand near Wilmington, N. C., by Paul Tabor. Tested under SC 20-338.

Description.--Narrow-leaf, cold-hardy bahiagrass; makes dense sod; plants of medium size. Only bahiagrass not injured by cold at Chapel Hill, N. C., between 1941 and 1953.

Released.--No formal release. Seed distributed from SCS Nursery, Rock Hill, in 1943.

Breeder Seed.--Not available.

Certified Seed.--Not available. (Limited commercial supply.)

Pennisetum ciliare (L.) Link, buffelgrass

BLUE

Increased at SCS Nursery, San Antonio, Tex.--James E. Smith, Jr.

Source.--Pretoria, South Africa. P. I. 133898. Received in March 1940; increased for testing as T-3782.

Description.--Selected over other similar accessions because of early-spring growth recovery (about 3 weeks ahead of T-4464 buffelgrass), vigorous summer growth, high forage production, rapid spread by means of short rhizomes, drought tolerance, resistance to injury by leafhoppers and aphids, and tolerance to light frost (active growth continues in fall about 3 weeks longer than for T-4464 buffelgrass). Best adapted to clay soils in Texas from Sonora eastward and Waco southward. Relatively low seed producer; limited in use within its area of adaptation by chronic shortage of commercial seed supplies. Both green and cured forage readily eaten by cattle. Plants perennial.

Released.--Informally by SCS nurseries in 1952.

Breeder Seed.--Not available.

Certified Seed.--Not available. (In commercial production.)

P. I. 155084

Increased at SCS Nursery, Brooksville, Fla.

Source.--Obtained from Van Rensburg, Pretoria, South Africa, in 1947 as P. I. 155084. This accession represents Equator strain originally from British East Africa.

Description.--Light-bluish foliage. Makes only few seed heads as compared with *P. ciliare* sold commercially. Viable seed. Tillers and spreads by rather stout, sharp-pointed, round, smooth rhizomes. Culms grow to be about 4 feet tall under moderate fertilization. Leaves longer and stiffer than those of commercial buffelgrass. Stems become woody upon maturity. Foliage palatable and nutritious. Grass has odor of molasses similar to that emitted by molassesgrass (*Melinis minutiflora* Beauv.).

Released.--No. Increased for testing.

Breeder Seed.--Plant Materials Center, SCS, Arcadia, Fla.

Certified Seed.--Not available.

T-4464

Increased at SCS Nursery, San Antonio, Tex.--D. H. Foster.

Source.--Pretoria, South Africa. P. I. 153671, BN-4112. Received in April 1946; increased for testing as T-4464. Called buffelgrass in belief that common name had significant reference to species in South Africa. Later learned that buffelgrass is name applied indiscriminately to many other species and genera in that country.

Description.--Leafy perennial bunchgrass, especially well adapted to deep sandy soils in

section of Texas where winter temperatures seldom fall as low as 0° F. Heavy seed producer, with yields of 300 to 600 pounds per acre not uncommon under irrigation. Plants characteristically light green, with good seedling vigor, good drought tolerance, and ability to grow rapidly from early spring through hot summer months. Stems may reach 48 inches in height at seed maturity.

Released.--Informally by SCS nurseries in 1949.

Breeder Seed.--Not available.

Certified Seed.--Not available. (In commercial production.)

Pennisetum glaucum (L.) R. Br., pearl millet

GAHI 1

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Commercial F_1 hybrid developed from four inbred lines selected from many lines isolated from common pearl millet, several introductions from Africa and India, and hybrids between them.

Method of Breeding.--Inbred lines isolated, stabilized, and tested for general and specific combining ability. Four of them, carrying numbers 13, 18, 23, and 26, chosen because they give good, high-yielding single crosses in all combinations; used to produce hybrid seed. F_1 seed produced by harvesting all open-pollinated seed from isolated field planted to mixture of equal numbers of live seeds of inbreds 13, 18, 23, and 26. This seed containing 65-75 percent of hybrids and 25-35 percent of selfs or sibs will perform as well as 100-percent hybrid seed when planted at rate of 10 pounds per acre in 30- to 36-inch rows. Increased for testing as Georgia Hybrid 1.

Description.--Leafier, later maturing, and more productive than common pearl millet. At Tifton yielded 50 percent more forage from May through September and over three times more after August 1 than common check. Recovery after grazing also much faster.

Released.--1958, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Available in 1960.

HYBRID SJ

Selected by J. R. McNeill Seed Company, Spur, Tex.--J. R. McNeill and associates.

Source.--Single plant, dimunitive, very sweet and juicy. At time this plant was found, unable to find any reference to sweetness in P. glaucum in literature. This plant occurred in material supplied by Texas Agricultural Experiment Station, Lubbock, and was from Bureau of Plant Introduction (USDA) material, probably from India.

Method of Breeding.--This plant progeny crossed with numerous lines of common pearl millet, showing range of maturity, leafiness, yield potential, disease resistance, and drought tolerance. Selection 7 not used because of dominance for dry nonsweet character. Eighty promising selections planted at Summerfield, Tex., under supervision of George C. Warner in 1954, and 20 further tested at Spur in 1955. That planting afforded opportunity for observation of chinch bug susceptibility, and three lines dropped. Further selections for freedom from leaf diseases made. Present seven inbred lines result of continuing selection, with production of two generations per year.

Description.--Mildly sweet in grazing and ensiling stage and juicy. Seed larger than common, not so large as Selection 7; seedling vigor good. Heads smaller than Selection 7; stalks not quite so tall, leafy, and free tillering.

Released.--Hybrid SJ made available to various research organizations in 1955. About 50,000 pounds of seed distributed commercially in 1957 from California to Florida and as far north as Iowa.

Breeder Seed.--J. R. McNeill Seed Company.

Certified Seed.--Not available. (In commercial production.)

SELECTION 7

Selected by J. R. McNeill Seed Company, Spur, Tex.--J. R. McNeill and associates.

Source.--Production field of common pearl millet; plant selection made by Elmer Edwards in 1948.

Method of Breeding.--Selected plants selfed in nursery. Next generations duplicated on dry land and land under supplemental irrigation.

Description.--Originally sold as Cattail Millet 7 and often listed as Texas 7. Tall, midleafy, midearly; large, compact heads. Seed larger than average lots of common observed; germination and seedling vigor good. Well-developed heads have angled tip, character seen frequently in species.

Released.--No formal release made. Included in regional testing program. Variety produced and widely distributed since. No attempt made to get homozygous line because of high incidence of crossing and importance of hybrid vigor in open-pollinated P. glaucum.

Breeder Seed.--J. R. McNeill Seed Company.

Certified Seed.--Not available. (In commercial production.)

STARR

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Developed as synthetic from material selected from common pearl millet and introductions carrying P. I. numbers 115055 and 115059. These introductions received from U. S. S. R. in 1936. P. I. 115055 originally from Tunisia, North Africa, and P. I. 115059 from India.

Method of Breeding.--Broad-leaved, highly palatable inbred line of common pearl millet crossed with broad-leaved, short internode, leafy dwarf line in 1944. Selected F_2 plants carrying desired combination of characters tested and reselected in advanced selfed generations. Finally, best recombined in synthetic bearing name "Starr" in honor of Silas Starr, first director of Georgia Coastal Plain Experiment Station.

Description.--Broader leaves, shorter internodes and stems, and more leaves per stem than common pearl millet; matures 4-6 weeks later. In clipping tests produced about as much total dry matter as common, but produced much higher yields of leaves. Easier to manage under grazing, lasts longer, and produced more beef and milk under grazing than common type.

Released.--1951, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Available in quantity.

Pennisetum purpureum Schumach., napiergrass

MERKERON

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--F_1 hybrid between two selections carrying numbers 1 and 208.

Method of Breeding.--From 1936 to 1941 selection within open-pollinated seedling progenies of local types and introductions practiced. In fall of 1941 several of these selections hybridized to combine desirable characteristics, including resistance to *Helminthosporium* eyespot. One of these crosses involving selection 1, vigorous common type, and selection 208, plant with very short internodes and many tillers, gave plants yielding 35 percent more than checks and best common napiergrass hybrids. In 1944 several of best of these hybrids sent to Río Piedras, Puerto Rico, for testing. Best of these--cross between selections 1 and 208--released under name "Merkeron" in 1955 by Velez Fortuno, head of plant breeding at Experiment Station, Río Piedras.

Description.--Leafy, many-tillered, late-maturing F_1 hybrid resistant to *Helminthosporium* eyespot.

Released.--1955, by Experiment Station, Río Piedras.

Breeder Stock.--Experiment Station, Río Piedras.

Certified Stock.--Not available. (Available commercially.)

Phalaris arundinacea L., reed canarygrass

IOREED

Selected at Iowa Agricultural Experiment Station, Ames, SCS cooperating--H. D. Hughes and C. P. Wilsie.

Source.--Parental clones selected from German Steenacker 1; German Rodowbrooker 18; Oregon commercial; Minnesota J18, J15C, J15A, J20B; United States Department of Agriculture 55009 and 55018; and old Iowa strain, 503.

Method of Breeding.--Ten clones from above sources selected on basis of forage, seed-yielding ability, and forage quality; saved and recombined. Iowa clone represented about one-third and other nine sources about 7 percent each of seed recombined to form Ioreed. Synthetic 1 seed first obtained in 1945.

Description.--Hardy, vigorous, moderately productive, with good leaf-disease resistance. Midearly in maturity, fair in seed production, rather susceptible to seed shattering. Appears similar to commercial types from long-time stands in Iowa and Minnesota.

Released.--1946, cooperatively by Iowa Agricultural Experiment Station and Nursery Division, SCS.

Breeder Seed.--Iowa Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

MANDAN 315

Increased at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Field collection made near Waterloo, Mont., in 1936.

Method of Breeding.--Increase of above field collection. Planted in observational rows under dryland conditions at Mandan in 1937; most vigorous and most persistent of 10 reed canarygrass accessions grown in nursery until

1948. Vegetative material from original rows moved to new location in 1949 still persists. Seed from latter planting increased in 1956.

Description.--Vigorous, tall, free of leaf spot diseases at Mandan.

Released.--No. Included in regional testing program.

Breeder Seed.--United States Northern Great Plains Field Station.

SUPERIOR

Selected at Oregon Agricultural Experiment Station, Corvallis, ARS cooperating--H. A. Schoth.

Source.--Material growing on Oregon Agricultural Experiment Station farm.

Method of Breeding.--Single plant selection made in 1926.

Description.--Comparatively nonshattering, large seeds; leafy, late maturing. Adapted to highland and fairly wet areas, but not resistant to long periods of inundation.

Released.--Cooperatively by Oregon Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Not available.

Certified Seed.--Not available. Looked promising in some tests. Strain used in grazing tests at Alabama Agricultural Experiment Station, Auburn, apparently traces to Superior.

Phalaris coerulescens Desf., sunolgrass

Increased at SCS Nursery, Pleasanton, Calif.

Source.--Increase of P. coerulescens, P. I. 111994; received from Australia.

Method of Breeding.--Tested at Pleasanton Nursery since 1936 and under range conditions at Sunol, Calif., since 1944.

Description.--Rapid developing, long-lived bunchgrass for supplemental range reseeding in winter annual range areas, receiving 16 inches or more of rainfall. Resembles hardinggrass in general appearance, but has three or more round, bulblike enlargements at bottom on each stem, rather than typical elongated bulb of hardinggrass.

Released.--No. Included in regional testing program.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton.

Certified Seed.--Not available.

Phalaris tuberosa var. hirtiglumis Batt. and Trab., koleagrass

Increased at California Agricultural Experiment Station, Davis--R. M. Love.

Source.--Introduction received from Agricultural Experiment Station, Rabat, Morocco, in 1955. California accession number T. O. 2143.

Description.--Coarse bunchgrass. Resembles hardinggrass in general appearance, but has round, bulblike enlargements at base of culm--somewhat similar to P. coerulescens. Some indication it requires higher rainfall than hardinggrass.

Released.--No. Included in regional testing program.

Breeder Seed.--California Agricultural Experiment Station.

Phalaris tuberosa var. stenoptera (Hack.) Hitchc., hardinggrass

Increased at California Agricultural Experiment Station, Davis.

Source.--Introduced from Toowoomba Botanical Gardens, Australia, in 1914 by P. B. Kennedy, California Agricultural Experiment Station. Seed collected from old hardinggrass field at Hopland, Lake County, Calif., in 1940 by D. J. Vanderwal. This seed lot given accession number P-11740 and increased at Plant Materials Center, SCS, Pleasanton, Calif.

Description.--Long-lived, persistent, dryland perennial bunchgrass, with intermediate winter growth. Short, stout rhizomes originating from base of low-lying crown; semibroad, blue-green leaves. High forage yields. Most widely adapted range grass used in California. Survives on rather infertile, stony soils, but yields best on heavy soils. Adapted to zones of less than 15 inches of rainfall if clay layer in soil profile.

Released.--Certified by California Crop Improvement Association in 1946.

Breeder Seed.--Plant Materials Center, SCS, Pleasanton. Foundation seed available from California Crop Improvement Association.

Certified Seed.--Available in quantity.

Phleum pratense L., timothy

CLAIR

Increased at Kentucky Agricultural Experiment Station, Lexington--R. C. Buckner.

Source.--Naturalized strain growing on farm of Clair Andrew, Vevay, Ind.

Method of Breeding.--Comparative tests. Strain designated as Vevay in regional testing program.

Description.--Very early maturing strain, relatively coarse, vigorous, with good aftermath production.

Released.--1958, Kentucky Agricultural Experiment Station.

Breeder Seed.--Kentucky Agricultural Experiment Station.

Certified Seed.--Not available. (Limited supplies in 1959.)

CLIMAX

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Wide collection of seed lots.

Method of Breeding.--Synthetic variety developed by combining several progeny tested clones.

Description.--Tall, fine stemmed; characterized by marked leafiness. Leaves carried high on stems. Under conditions of good fertility, aftermath growth excellent. Highly resistant to rust. Seven to ten days later in maturity than common.

Released.--1947, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Available. (Seed produced in Canada and United States.)

CORNELL 1777

Selected at New York Agricultural Experiment Station, Ithaca.

Description.--Developed in 1908. More resistant to rust than Cornell 4059 or common timothy. Medium height, medium early, leafy, medium-fine stem. Retains green color when mature. High yields of forage and seed.

Released.--1922, by New York Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Not available. (At one time increased for commercial production in Pacific Northwest.)

CORNELL 4059

Selected at New York Agricultural Experiment Station, Ithaca.

Description.--One week later in maturity than common timothy. Tall, erect, coarse; appeared to be adapted to coastal area of New England.

Released.--1922, by New York Agricultural Experiment Station.

Breeder Seed.--Not available.

Certified Seed.--Not available.

DRUMMOND

Selected at Macdonald College, Quebec, Canada--J. N. Bird.

Source. Strain from northern Europe, S-48 and S-51 from Wales, and F. C. 15150 from ARS and Ohio Agricultural Experiment Station, Wooster, all introduced during 1930-33.

Method of Breeding.--Maternal line selection, with space-planted progeny tests.

Description.--Reaches flowering and seed stage about 10-14 days later than common timothy at Macdonald College. Winter hardy, with appreciable amount of rust resistance.

Released.--Department of Agronomy, Macdonald College.

Breeder Seed.--Department of Agronomy, Macdonald College. Foundation seed maintained at Plant Materials Center, SCS, Pullman, Wash.

Certified Seed.--Available in limited quantity. (Some increase in Pacific Northwest.)

DURAL

Selected at University of Manitoba, Winnipeg, Canada.

Source.--Parent material obtained from New York Agricultural Experiment Station, Ithaca, and from Ontario College of Agriculture, Guelph, Ontario, Canada.

Description.--Selected for yield, leafiness, and resistance to rust. Winter hardy; well adapted to more humid areas of Manitoba. Medium in maturity.

Released.--University of Manitoba.

Breeder Seed.--University of Manitoba.

Certified Seed.--Available in limited quantity.

ESSEX

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy and S. S. Atwood.

Source.--Wide collection of seed lots from plant breeders in United States. Parental clones: N. Y. 48-30, N. Y. 48-140, N. Y. 48-154, and N. Y. 48-215.

Method of Breeding.--Synthetic variety developed from four selected clones. Breeder seed produced in isolated plot from randomly planted vegetative pieces of 4 clones in 100 or more replications. Equal amounts of seed from each parental clone mixed together for breeder seed. Certified seed first advanced generation from foundation seed; not eligible for use as planting stock for production of any class of certified seed.

Description.--Very late maturing, leafy. Yielded 97 percent as much as common and Climax when tested alone, 94 percent when tested with alfalfa, and 93 percent when tested with Empire birdsfoot trefoil. Approximately 2 weeks later in maturity than common and 10 days later than Climax. Forage at first harvest nearly always leafier and freer of foliar diseases than common, Climax, and other earlier maturing types. In limited tests for seed production similar to common and lower than Climax in yield.

Released.--1955, by New York Agricultural Experiment Station.

Breeder Seed.--New York Agricultural Experiment Station.

Certified Seed.--Available.

HOPKINS

Selected at Ohio Agricultural Experiment Station, Wooster, ARS cooperating--M. W. Evans.

Source.--Collections from old meadows and roadsides.

Method of Breeding.--(See Marietta.) Composed of selections F. C. 28119 and F. C. 28152.

Description.--In northern Ohio approximately 14 to 15 days later than common timothy.

Released.--1946, cooperatively by Ohio Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Clones maintained at Indiana Agricultural Experiment Station, Lafayette.

Certified Seed.--Not available.

HURON

Selected at North Ridgeville, Ohio; and Ohio Agricultural Experiment Station, Wooster, ARS cooperating--M. W. Evans.

Source.--Plant selected along roadside about 4-1/2 miles west of Wakeman, Huron County, Ohio, in 1911.

Method of Breeding.--(See Marietta.) Evaluated as F. C. 3937.

Description.--Late variety; about 6 days later blooming and maturing seed than common timothy.

Released.--Cooperatively by Ohio Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Not available.

Certified Seed.--Not available.

ITASCA

Selected at Minnesota Agricultural Experiment Station, St. Paul.

Source.--See Method of Breeding.

Method of Breeding.--Composed of seven inbred lines from following sources: One from Minnesota commercial seed, one from T7, two from Cornell 1620, and three from Cornell 1777. Synthetic tested as Minnesota 1630.

Description.--Rank growing; well adapted to conditions in Minnesota. Similar to commercial timothy in maturity, but superior in growth character and habit.

Released.--Minnesota Agricultural Experiment Station.

Breeder Seed.--Minnesota Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

LORAIN

Selected at Ohio Agricultural Experiment Station, Wooster, ARS cooperating--M. W. Evans.

Source.--Collections from old meadows and roadsides.

Method of Breeding.--(See Marietta.) Composed of selections F. C. 15167 and F. C. 28147.

Description.--In northern Ohio approximately 10-12 days later than common timothy. Leaves remain green for about 8-10 days longer than those of common. Adapted for hay production in northern Ohio.

Released.--1939, cooperatively by Ohio Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Clones maintained at Indiana Agricultural Experiment Station, Lafayette.

Certified Seed.--Not available.

MARIETTA

Selected at Ohio Agricultural Experiment Station, Wooster, ARS cooperating--M. W. Evans.

Source.--Collections from meadows and roadsides.

Method of Breeding.--Selection practiced in space-planted nurseries. Plots arranged in blocks of selections having same time of heading, blooming, and maturity. Progeny tested in space-planted row plots in successive generations. Composed of selections F. C. 11901, 12468, and 15220. In 1946 selections changed to F. C. 11901, F. C. 28096, and F. C. 28185. Leaves of last two selections remain green longer than those of F. C. 12468 and F. C. 15220.

Description.--Blooms and matures in northern Ohio approximately 5 days earlier than common timothy. Leaves tend to remain green nearly as late as those of common timothy. Well adapted to southern Ohio.

Released.--1937, cooperatively by Ohio Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Clones maintained at Indiana Agricultural Experiment Station, Lafayette.

Certified Seed.--Not available.

MEDON

Selected at Ontario College of Agriculture, Guelph, Ontario, Canada--O. M. McConkey.

Source.--Local collections and introductions from Scandinavia, U. S. S. R., central Europe, Great Britain, and United States.

Description.--Leafy, winter hardy, well adapted in Ontario.

Released.--Ontario College of Agriculture.

Breeder Seed.--Ontario College of Agriculture.

Certified Seed.--Available in limited quantity.

MILTON

Selected at Macdonald College, Quebec, Canada--J. N. Bird.

Source.--Strains obtained from New York Agricultural Experiment Station, Ithaca, and Minnesota Agricultural Experiment Station, St. Paul, Svalov Experiment Station, Sweden, and commercial seed from Dickinson Seed Company, Chicago, Ill., in 1911.

Method of Breeding.--Fairly rust resistant in comparisons made with inoculated plants at Macdonald College, whereas ordinary commercial strains susceptible to timothy rust. Winter hardy, early maturing, vigorous.

Released.--Macdonald College.

Breeder Seed.--Macdonald College.

Certified Seed.--Available in limited quantity.

NEW YORK SYNTHETIC B

Selected at New York Agricultural Experiment Station, Ithaca--R. P. Murphy and S. S. Atwood.

Source.--Wide collection of seed lots from plant breeders in United States. Parental clones: N. Y. 48-11, N. Y. 48-56, N. Y. 48-102, N. Y. 48-103, and N. Y. 48-110.

Method of Breeding.--Synthetic variety developed from five selected clones. First- and second-generation seed produced as for Essex.

Description.--Medium to late maturing; leafy. Similar to Climax in performance, except it has wider leaves and approximately 3 days later in maturity.

Released.--No. To be continued under test.

Breeder Seed.--New York Agricultural Experiment Station.

SHELBY

Early-maturing farmer's strain grown and used in southern Indiana.

Certified Seed.--Not available.

SWALLOW

Selected at University of Alberta, Edmonton, Canada.

Source.--Late Swedish stock Svalov 523 introduced into Alberta in 1918.

Description.--Hay type; similar to common timothy in appearance, but with good stem, rust resistance (Edmonton), and winter hardiness.

Released.--University of Alberta.

Breeder Seed.--University of Alberta.

Certified Seed.--Available in limited quantity.

Poa ampla Merr., big bluegrass

SHERMAN

Selected at Plant Materials Center, SCS, Pullman, Wash.--V. B. Hawk, J. L. Schwendiman, and A. L. Hafenrichter.

Source.--Collected from native vegetation near Moro, Sherman County, Oreg., by D. E. Stephens, superintendent of Sherman Branch Experiment Station, Moro, in 1932. Recollected by SCS in 1935; tested as P-2716 against 177 other accessions.

Method of Breeding.--Mass selection for several generations.

Description.--Starts growth very early in spring. Productive, early maturing, 35-38 inches tall, erect growing, fine stemmed. Long-lived perennial bunchgrass; high in seed, forage, and root production. Distinct blue, moderately abundant leaves; large, compact seed head. Plants apomictic. (2n = 63.) Adapted to conservation seedings alone or with alfalfa in dryland areas in wheat-fallow farmland on light-textured soils. Successfully used for reseeding burned-over forest lands in pine zones of Western States.

Released.--1945, cooperatively by Washington, Idaho, and Oregon Agricultural Experiment Stations and Plant Materials Center, SCS, Pullman. Distributed for field tests in 1938.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in quantity.

Poa arida Vasey, plains bluegrass

RENO

Increased at Plant Materials Center, SCS, Manhattan, Kans.--M. D. Atkins.

Source.--From field-seed collection made in 1951 on poorly drained, high water table, saline grassland near Hutchinson, Reno County, Kans. Increased for testing as KG-2188.

Description.--Leafy, vigorous ecotype for use in grass mixtures for establishing permanent vegetation on high water table, saline and alkaline sites in central and western Kansas. Medium seed production.

Released.--Informally by SCS in 1956 for field-evaluation plantings.

Breeder Seed.--Plant Materials Center, SCS, Manhattan.

Certified Seed.--Not available.

Poa bulbosa L., bulbous bluegrass

P-4874

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman.

Source.--Pullman, east on Highway 3 near Idaho State line. Collected in 1937 by J. L. Schwendiman from naturalized stand.

Method of Breeding.--Bulk selections from open-pollinated planting of original collection. Tested against commercial and other naturalized strains.

Description.--Vigorous, robust, leafy, tall growing, productive, late maturing. Heavy forage and seed producer. Short-lived perennial. Reseeds readily. Seed high in germination. Adapted for use as understory grass in range seedings of crested wheatgrass or other dryland grasses at elevations of less than 4,000 feet, where it provides good ground cover.

Released.--1956, cooperatively by Idaho Agricultural Experiment Station and Plant Materials Center, SCS, Pullman.

Breeder Seed.--Plant Materials Center, SCS, Pullman.

Certified Seed.--Available in limited quantity.

Poa pratensis L., Kentucky bluegrass

ARBORETUM

Selected at Missouri Botanical Garden, St. Louis--W. L. Brown.

Source.--Collections of plants from old pastures and lawns in Missouri and neighboring States.

Released.--Informally. Included in several turf tests; not outstanding in most tests.

Certified Seed.--Not available. (Limited commercial increase in Pacific Northwest.)

DELTA

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Native material.

Method of Breeding.--Single plant selection.

Description.--Vigorous, erect, fine stemmed, relatively early, apomictic. Adapted to cooler sections of Kentucky bluegrass region, where leaf spot infestations to which it is susceptible are less frequent. Marked resistance to mildew.

Released.--1938, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Available. (Some production in Pacific Northwest.)

KB-143(223)

Selected at United States Regional Pasture Research Laboratory, ARS, University Park, Pa.--W. M. Myers.

Source.--Commercial seed lot received from Kansas City, Mo.

Method of Breeding.--Space-planted progeny tests and evaluation in sod plots.

Description.--Very vigorous; consistently outyielded common lots in yield tests.

Released.--No. Distributed for testing.

Breeder Seed.--Limited amount of seed in storage at United States Regional Pasture Research Laboratory.

KB-176(22)

Selected at United States Regional Pasture Research Laboratory, ARS, University Park, Pa.--W. M. Myers.

Source.--O. A. C. 2 strain supplied by Dr. Muntzing.

Method of Breeding.--Space-planted progeny tests and evaluation in sod plots.

Description.--Low-growing "lawn type."

Released.--No. Distributed for testing.

MERION

Selected at Plant Industry Station, ARS, Beltsville, Md., by United States Golf Association Green Section, ARS cooperating--Fred V. Grau.

Source.--Single plant selection made by Joseph Valentine of Merion Golf Club, Ardmore, Pa., in 1936 and increased by John Monteith, Jr., former director, United States Golf Association Green Section.

Method of Breeding.--Plant selection and apomictic seed progenies obtained through succeeding generations tested in cooperative turf research program of Crops Research Division, ARS, and United States Golf Association Green Section. Tested as B-27.

Description.--Low growing, short leaves, good color; high degree of resistance to *Helminthosporium* leaf spot. More tolerant to close mowing than common Kentucky bluegrass. Susceptible to rust.

Released.--1947, cooperatively by Crops Research Division, ARS, and United States Golf Association Green Section.

Breeder Seed.--Pennsylvania Agricultural Experiment Station, University Park.

Certified Seed.--Available in quantity.

NEWPORT

Selected at Plant Materials Center, SCS, Pullman, Wash.--Jens Clausen, Carnegie Institution of Washington, Stanford University, Stanford, Calif., and Plant Materials Center staff.

Source.--Maritime race collected from coastal bluffs at Newport, Lincoln County, Oreg., by W. E. Lawrence. Propagated under Carnegie Institution of Washington, accession CIW 4466-1 and accession P-13821.

Method of Breeding.--Seed of original collection used to establish spaced planting in 1949. Strain found apomictic (2n = 81); bulked seed used for increase in 1953. This strain used in Carnegie Institution of Washington hybrid bluegrass studies.

Description.--Vigorous, highly productive coastal race of broad climatic tolerance. Wide dark-green leaves, low growing, fair to good in seed production, medium late in seed maturity, rapid sod forming. Appears to be fairly resistant to rust and Helminthosporium leaf spot.

Released.--1958, informally by Washington and Oregon Agricultural Experiment Stations.

Breeder Seed.--Plant Materials Center, SCS, and Washington Agricultural Experiment Station, Pullman.

Certified Seed.--Available in limited quantity.

P-4358

Selected at Plant Materials Center, SCS, Pullman, Wash.--J. L. Schwendiman and I. R. Adlard.

Source.--From Professor Frandsen, Denmark, as F. C. 22190 in 1934.

Method of Breeding.--Propagated through 4 generations to eliminate aberrant plants. Space planted in 1952; 14 single plant selections made in 1953. Seed from 4 outstanding plant selections space planted. Aberrant plants removed; bulked seed of each selection used for further testing in turf tests of Agronomy Department of Washington Agricultural Experiment Station, Pullman.

Description.--Dwarf, low growing; short, dark-green leaves. Similar to Merion, but 10-14 days later in seed maturity. Produces very few aberrant plants; resistant to powdery mildew and leaf and stem rusts.

Released.--No. Increased for testing.

Breeder Seed.--Plant Materials Center, SCS, Pullman, and Washington Agricultural Experiment Station.

PARK

Selected at Minnesota Agricultural Experiment Station, St. Paul--H. L. Thomas, Herman Shultz, A. R. Schmid, and H. K. Hayes.

Source.--Vegetative material collected from 60 old pastures and waste places throughout Minnesota in 1937.

Method of Breeding.--Collections separated into 281 vigorous individual plants; carried through extensive selection and testing program until 1947. Eighteen strains selected for further testing; in 1953 mixture of 15 best apomictic strains increased for testing as Minnesota 95.

Description.--In Minnesota described as being superior to Merion in seedling and plant vigor, resistance to rust, and sod formation.

Released.--1957, by Minnesota Agricultural Experiment Station.

Breeder Seed.--Minnesota Agricultural Experiment Station.

Certified Seed.--Available.

TROY

Selected at Montana Agricultural Experiment Station, Bozeman, ARS cooperating--R. E. Stitt.

Source.--Increase of P. I. 119684. Introduced from Turkey by Westover-Wellman expedition in 1936.

Description.--Vigorous pasture strain; released for use in irrigated pastures in Montana. Tall, erect-growth habit, good recovery, open sod; not outstanding with respect to disease resistance. Adapted to cooler parts of Kentucky bluegrass region. Early maturing, ready to graze at Bozeman 10-14 days before other strains.

Released.--1955, cooperatively by Montana Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Montana Agricultural Experiment Station.

Certified Seed.--Available in limited quantity.

Setaria italica (L.) Beauv., foxtail millet

EMPIRE

Selected at Forage Crops Division, Experimental Farms Service, Ottawa, Canada--R. M. MacVicar.

Source.--Manchurian material.

Method of Breeding.--Synthetic variety developed by combining selected lines of similar type.

Description.--Tall, leafy, high yielding, late maturity. Seeds golden, tending toward roundness. May be identified readily by high percentage of bifurcate inflorescences. This bifurcate character dominant, but degree of expression depends to considerable extent on environmental conditions. In Canada outyielded most, if not all, commercial millets in same maturity group.

Released.--1937, Canada Department of Agriculture.

Breeder Seed.--Forage Crops Division, Central Experimental Farm, Ottawa.

Certified Seed.--Not available. (Some commercial production in Ontario.)

GERMAN 8

Selected by Asgrow Texas Company, San Antonio, Tex.

Method of Breeding.--Head-to-row selection for uniformity.

Description.--Uniform for leafiness and lobed heads (lobed head character accentuated in thin stands).

Released.--1952, Asgrow Texas Company.

Certified Seed.--Available.

GERMAN 8A

Selected by Asgrow Texas Company, San Antonio, Tex.

Method of Breeding.--Single plant selection.

Description.--Superior seedling vigor, broad leaves, few days earlier than German 8.

Released.--Asgrow Texas Company.

Certified Seed.--Available.

GERMAN R

Selected by J. R. McNeill Seed Company, Spur, Tex.--J. R. McNeill. McNeill made original selections. Increase and evaluations made jointly with A. M. Stoy; first increase of foundation (registered) seed made by George C. Warner.

Source.--Production field of certified German millet near Kress, Tex.

Method of Breeding.--Fifty selections planted head to row in 1948. Seven strains designated R showed leafiness, fine stems, seedling vigor, large seed size, with maturity considered typical of older German millet composite. Strain fairly homozygous from first planting, but close rogued in several generations before release.

Description.--Fine stemmed, leafy, with compact heads smaller than those of other current varieties or strains of German millet. Spines red to purple in immature head stage; R in name refers to this character. Stems slender and recurve under weight of heads. Seed larger than that of other German millets observed; typical tubercle character confined to base of seed. This seed character affords means of identifying variety from seed, whereas purple spines afford means of identifying variety in field.

Released.--J. R. McNeill Seed Company.

Breeder Seed.--J. R. McNeill Seed Company.

Certified Seed.--Available in quantity.

Sorghastrum nutans (L.) Nash, yellow indiangrass (suggested common name, indiangrass)

CHEYENNE

Bulk strain collected October 1942 by SCS Nursery, Woodward, Okla., OK-N-2. Original collection 214 pounds recleaned seed. Strain increased on dry land at Cheyenne, Okla., land utilization project until 1951; then placed in irrigated increase by OK-N-2 near Texline, Tex. First seed crop from this location harvested in fall 1953 and distributed to soil-conservation districts in spring 1954.

Source.--Native range stand near Supply, Okla.

Description.--Heterogeneous plant makeup. May have acquired some uniformity in flowering and date of maturity through successive increase plantings of combine-harvested seed material. Good forage type, good seed producer. Should be fully adapted for range and pasture seeding in western Oklahoma and most of Texas Panhandle.

Released.--Informally by SCS in 1945. No commercial stands known to exist from seed distributions made between 1945 and 1954, when field established by Max Bower, Morton, Tex.

Breeder Seed.--Not available.

Certified Seed.--Not available. (In commercial production.)

KANSAS EXPERIMENTAL

Selected at Kansas Agricultural Experiment Station, Manhattan.

Source.--Collections made in Oklahoma and southern Kansas in 1953.

Method of Breeding.--Selected in 1955 from accessions space planted in 1954. Fifty plants selected after two seasons of observation (1954 and 1955) in evaluation nursery of several thousand individuals. Major criteria for selection--leafiness, vigor (large size), freedom from rust, and, since species tends to mature late, earliness of maturity. Propagated clonally in 5-replication randomized crossing block in 1956. Seed produced by this block in 1956 planted in 36-inch rows in 1957 for further increase. Planned that this may serve temporarily as variety until plant breeders can make further improvement.

Description.--Tall, leafy, vigorous, mostly free of rust, medium to late maturity.

Released.--No. Distributed for testing.

Breeder Seed.--Kansas Agricultural Experiment Station.

Certified Seed.--Not available.

M2-10302

Selected at SCS Nursery, Ames, Iowa--M. E. Heath and A. I. Alcott.

Source.--Bulk collection of seed made along railroad right-of-way south of Ames in 1939.

Method of Breeding.--Seed collected in 1939 increased under isolation for several generations at SCS Nursery, Ames and Ankeny, Iowa.

Description.--Representative ecotype of central Iowa. Uniform, vigorous, with high seed yields.

Released.--No. Tested in observational plantings by SCS from 1941 to 1949.

Breeder Seed.--Small quantity maintained by Plant Materials Center, SCS, Elsberry, Mo.

Certified Seed.--Not available.

Sorghum halepense (L.) Pers., johnsongrass

MISSISSIPPI FINE STEM

Selected at Mississippi Agricultural Experiment Station, State College, ARS cooperating--H. W. Bennett.

Source.--Large number of field collections.

Method of Breeding.--Selection made on number of culms produced from seed first season (above 60); further selection made on degree of clipping and palatability.

Description.--Produces 130-180 culms per plant, 2-4 feet tall, 1/32-1/8 inch in diameter. Largest culm never gets as large as minimum allowed in grade 1 hay. Very leafy. Relatively low seed production. Has been used as source material in breeding program.

Released.--No. Included in regional testing program.

Breeder Seed.--Mississippi Agricultural Experiment Station.

MISSISSIPPI PERSISTENT

Selected at Mississippi Agricultural Experiment Station, State College, ARS cooperating--H. W. Bennett.

Source.--Large number of field collections.

Method of Breeding.--Selection made on number of culms produced from seed first season (above 60); further selection made on degree of clipping and palatability.

Description.--Produces 80-120 culms per plant, up to 5 feet tall, 1/8-1/4 inch in diameter. Rather compact base with very slowly spreading rhizomes. Persistent under mowing; withstood 6 clippings for 2 years. Only self-fertile plant in large number handled.

Released.--No. Included in regional testing program.

Breeder Seed.--Mississippi Agricultural Experiment Station.

Sorghum halepense X S. vulgare (including S. halepense X S. sudanense and S. almum Parodi), sorgrass

MISSISSIPPI ISJ

Selected at Mississippi Agricultural Experiment Station, State College, ARS cooperating--H. W. Bennett.

Source.--Collections of Hodo sorgo and johnsongrass.

Method of Breeding.--Cross made by pollinating hot-water emasculated (42° C. for 10 minutes) Hodo sorgo florets with red-stigma johnsongrass. Selfing started in F_1 and has been continued. Spaced F_2 plants left where set for growth-habit studies. Perennial (75 percent) plants grazed by cattle. Cattle consistently grazed types containing juice regardless of stem size. Five percent of selectively grazed population selfed; progeny selected for juiciness by hand twisting and for nonspreading rhizomes.

Description.--Selection from F_6 made on basis of plant size intermediate between sorgo and johnsongrass. Produces 20-40 culms per plant, 9-12 feet tall, 1/3-1/2 inch in diameter. Arise from very slowly spreading rhizomes. Produces two cuttings per year. Total carbohydrate content of 10-14 percent. Seed set approximately 50 percent. Produces extremely well under irrigation and fertilization.

Released.--No. Included in regional testing program.

Breeder Seed.--Mississippi Agricultural Experiment Station.

MISSISSIPPI SJ-1

Selected at Mississippi Agricultural Experiment Station, State College, ARS cooperating--H. W. Bennett.

Source.--Collection of Hodo sorgo and johnsongrass.

Method of Breeding.--Cross made by pollinating hot-water emasculated (42° C. for 10 minutes) Hodo sorgo florets with red-stigma johnsongrass. Selfing started in F_1 and has been continued. Spaced F_2 plants left where set for growth-habit studies. Perennial (75 percent) plants grazed by cattle. Cattle consistently grazed types containing juice regardless of stem size. Five percent of selectively grazed population selfed; progeny selected for juiciness by hand twisting culm 180 degrees. Later juicy progeny further selected for nonspreading rhizomes.

Description.--F_6 segregate. Selection made on basis of large leaves and sweet stems. Produces 25-65 culms per plant, 3-1/2-7 feet tall, 3/16-7/16 inch in diameter. Too large and juicy for hay, but makes good grazing and leafy silage. Seed production extremely low. May be cut at least twice per season.

Released.--No. Included in regional testing program. Dropped because of low seed production. Used in new hybrids and backcrosses.

Breeder Seed.--Clones maintained at Mississippi Agricultural Experiment Station.

MISSISSIPPI SJ-2

Selected at Mississippi Agricultural Experiment Station, State College, ARS cooperating--H. W. Bennett.

Source.--Collection of Hodo sorgo and johnsongrass.

Method of Breeding.--Cross made by pollinating hot-water emasculated (42° C. for 10 minutes) Hodo sorgo florets with red-stigma johnsongrass. Selfing started in F_1 and has been continued. Spaced F_2 plants left where set for growth-habit studies. Perennial (75 percent) plants grazed by cattle. Cattle consistently grazed types containing juice regardless of stem size. Five percent of selectively grazed population selfed and progeny selected for juiciness by hand twisting and for nonspreading rhizomes.

Description.--Selection from F_6 made on basis of grass-type habit and carbohydrate content. Very leafy; 14-percent total carbohydrate content in 50-percent dry-matter plant. Produces 40-90 culms per plant, 3-5 feet tall, 1/16-5/16 inch in diameter. Self-fertile and good seed producer. May be cut at least twice per season.

Released.--No. Included in regional testing program.

Breeder Seed.--Mississippi Agricultural Experiment Station.

PERENNIAL SWEET

Selected at Texas Agricultural Experiment Station (Substation 8), Lubbock, Tex.--R. E. Karper.

Source.--In 1941 L. F. Randolph, New York Agricultural Experiment Station, Ithaca, doubled chromosome number of common sudangrass with colchicine and crossed this tetraploid with johnsongrass. Seed of this hybrid sent to Texas Agricultural Experiment Station for further study.

Method of Breeding.--Progeny selections grown for several years, but appeared too early and unproductive. Few selections retained their seed well; these persistent types grown in 1945 surrounded by sweet sudangrass. Three natural outcrosses with sweet sudangrass recovered in 1946. Selection continued for sweet juicy stalks, good fertility, seed yield, and perennial rooting habit intermediate between johnsongrass and sudangrass.

Description.--Synthetic tetraploid (4N) that would be expected to cross freely with johnsongrass, but not likely to cross with other sorghums. Rootstalks short and thick, more weakly perennial, not so difficult to eradicate as johnsongrass. More likely to be profitable when handled as annual. As palatable as sweet sudangrass. Seed similar to that of sweet sudangrass; glumes predominantly chocolate or mahogany in color. Plant mostly tan. Seeds persistent.

Released.--1957, by Texas Agricultural Experiment Station.

Breeder Seed.--Texas Agricultural Experiment Station (Substation 8).

Certified Seed.--Available in 1959.

SORGHUM ALMUM

Introduced into United States from Argentina, South Africa, Australia, and New Zealand. Grown at Chillicothe and Lubbock Experiment Stations, Texas, since mid-40's, and collection from Argentina received by Georgia Agricultural Experiment Station, Athens, in 1949. Major source of seed in United States traces to seed lots obtained from Australia and New Zealand in 1952. Commonly referred to as columbusgrass in South Africa.

Source.--First described by Lorenzo R. Parodi in 1943. He received seed in 1936 from A. Ragonese, agronomist, Province of Santa Fe, Argentina. Parodi concluded grass must have originated under cultivation as hybrid between johnsongrass and some other introduced sorghum (*S. vulgare*). Records indicate material grown in South Africa, Australia, and United States traces to seed lots that had origin in Argentina. (2n = 40.)

Description.--Tall, robust, rather closely resembling johnsongrass in many ways. Coarser, larger stems, often wider leaves, and generally grows taller than johnsongrass. Heads longer, lax, more spreading, with more branches at whorl. Rhizomes stout, short, and turn up close to crown. No difficulty experienced in killing it out by plowing. Seed shatters very readily. Although seed somewhat larger than that of johnsongrass, difficult to identify it in intermediate range. Some crossing could be expected to occur with johnsongrass. Sorghum Almum accessions exhibit wide range in plant type; some lots more uniform than others. Prussic acid potential equivalent, for most part, to that of johnsongrass.

Certified Seed.--Not available. (Ample supplies of commercial seed.)

Sorghum sudanense (Piper) Stapf, sudangrass

BELTSVILLE SYNTHETIC 4

Selected at Plant Industry Station, ARS, Beltsville, Md.--J. P. Trimble.

Source.--Disease-resistant lines isolated by C. L. Lefebvre.

Method of Breeding.--First-generation hybrid produced by planting mixture containing equal amounts of live seed of four inbred lines.

Description.--Coarse, vigorous, high yielding; good level of disease tolerance. Hydrocyanic acid content high.

Released.--No. Included in regional testing program for 3 years.

Breeder Seed.--Not available. Lines used in several breeding programs.

CALIFORNIA 23

Selected at Imperial Valley Experiment Station, El Centro, Calif.--L. G. Goar.

Source.--Common sudangrass.

Method of Breeding.--Selected from common sudangrass in early 1930's; reselected at Davis, Calif., to eliminate black seed and other offtypes.

Description.--Little later in heading and more uniform than common sudangrass. Shown somewhat taller and more vigorous growth; yielded 10-20 percent more than common or Sweet sudangrass at California Agricultural Experiment Station, Davis. Susceptible to leaf diseases when grown under humid conditions.

Released.--1938, by California Agricultural Experiment Station.

Breeder Seed.--California Agricultural Experiment Station.

Certified Seed.--Available.

COMMON (GARAWI)

Introduced into United States in 1909.

Source.--Probably native of upper Egypt; cultivated near Khartoum under name "garawi," but it may have originated farther south in Africa.

Description.--Several strains of sudangrass developed from early introductions; similar in type, being extremely early and susceptible to disease.

Released.--Informally by USDA and State agricultural experiment stations in early 1900's.

Certified Seed.--Some local strains certified. (Ample commercial supplies.)

GEORGIA 337

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Developed from intercrossing and selection of material tracing its parentage to Tift sudangrass, McLean sorghum, and low HCN lines from Wisconsin Agricultural Experiment Station, Madison.

Method of Breeding.--Disease resistance of Tift and low HCN of Wisconsin material combined by hybridization and screening F_2 populations. This material crossed with McLean sorghum for broad leaves, disease resistance, juiciness, and sweet stalk. Selected F_2's recombined several times to bring together desired characteristics. Usually 1,000 or more F_2's tested in F_3 generation in single row plots between rows of common and Tift. Finally, F_2 plant breeding true for desired traits in F_3 increased in isolation.

Description.--Excellent disease resistance, sweet juicy stalks, wide leaves, low HCN. Uniform straw-colored seedcoat. Late maturing; often outyields other varieties during long growing seasons. Shown great yield potential under irrigation. Its disease resistance gives it dependability and quality lacking in some varieties during heavy disease epidemics.

Released.--No. Included in regional testing program.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

GREENLEAF

Selected at Kansas Agricultural Experiment Station, Manhattan--R. C. Pickett.

Source.--Advance generation backcross of common sudangrass X Leoti Red sorghum received in 1940 from Texas Agricultural Experiment Station, Chillicothe. After several generations of selection, composite group of selected lines bulked for increase in 1951.

Method of Breeding.--Selection for several generations in cross of sudangrass X sweet sorghum.

Description.--Juicy stalk; tall, fairly coarse, vigorous, leafy, freely tillering, late maturing; tan glume (from Leoti parent). High degree of resistance to leaf diseases; high forage yields.

Released.--1953, by Kansas Agricultural Experiment Station.

Breeder Seed.--Kansas Agricultural Experiment Station.

Certified Seed.--Available in quantity.

LAHOMA

Selected at Oklahoma Agricultural Experiment Station, Stillwater--W. C. Elder.

Source.--Breeding materials received from Texas Agricultural Experiment Station, Chillicothe, in 1948.

Method of Breeding.--Selected from progeny row that remained in vigorous growing condition after other entries had succumbed to drought and severe chinch bug infestation. Distributed for testing as Oklahoma 130.

Description.--Wide leaved, late maturing, drought enduring. Very uniform in growth habit, tillers well. Distinctive yellow-green leaf. Good seed producer. Seed ranges in color from apricot to sienna. Leaf diseases may be troublesome when moisture excessive. No more prussic acid than other sweet types.

Released.--1954, by Oklahoma Agricultural Experiment Station.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

Certified Seed.--Available.

OKLAHOMA 8

Selected at Oklahoma Agricultural Experiment Station, Stillwater--C. E. Denman.

Source.--F_2 population of Piper X Lahoma.

Description.--Common type; rather juicy and intermediate between two parents in leafiness, maturity, and tillering. Disease reaction similar to that of Lahoma. Seed color sienna; leaves as wide as those of Lahoma.

Released.--No. Included in regional testing program.

Breeder Seed.--Oklahoma Agricultural Experiment Station.

PIPER

Selected at Wisconsin Agricultural Experiment Station, Madison--D. C. Smith.

Source.--Tift and lines obtained from Texas Agricultural Experiment Station, Chillicothe, and Kansas Agricultural Experiment Station, Manhattan.

Method of Breeding.--Resulted from series of crosses among lines low in hydrocyanic acid, Tift, and Texas selection, followed by repeated testing and selection. Last cross made in 1942.

Description.--Low in prussic acid potential, vigorous, resistant to leaf blight and anthracnose at northern locations. Mixed as to seed color, with both light- and dark-colored seeds. Early variety. Most of stalks dry.

Released.--1950, by Wisconsin Agricultural Experiment Station.

Breeder Seed.--Wisconsin Agricultural Experiment Station.

Certified Seed.--Available in quantity.

STONEVILLE SELECTION

Selected at Delta Branch Experiment Station, Stoneville, Miss., ARS cooperating--H. W. Johnson and P. G. Hogg.

Source.--Sudangrass X sorghum selection resistant to Helminthosporium turcicum (seed obtained in 1947 from C. L. Lefebvre, Beltsville, Md.) and sorgo introduction from Africa (Mn 1054) resistant to zonate leaf spot and rust (seed obtained in 1950 from O. H. Coleman, Meridian, Miss.).

Method of Breeding.--Cross made in greenhouse in winter of 1951 and F_1 grown in field that year. Selfing started in F_2 generation and has been continued since.

Description.--Increase of open-pollinated seed of F_4 line from above cross. Seed of this selection produced in isolated block at Stoneville in 1956. Selection remains green in field plantings until late summer, when it may become spotted with gray leaf spot. Plant size intermediate between sudangrass and sorgo. High yield potential. Juice sweet.

Released.--No. Included in regional testing program.

Breeder Seed.--Delta Branch Experiment Station.

STONEVILLE SYNTHETIC 1

Selected at Delta Branch Experiment Station, Stoneville, Miss., ARS cooperating--H. W. Johnson and P. G. Hogg.

Source.--Sudangrass X sorghum selection resistant to Helminthosporium turcicum (seed obtained in 1947 from C. L. Lefebvre, Beltsville, Md.) and sorgo introduction from Africa (Mn 1054) resistant to zonate leaf spot and rust (seed obtained in 1950 from O. H. Coleman, Meridian, Miss.).

Method of Breeding.--Cross made in greenhouse in winter of 1951; F_1 grown in field that year. Selfing started in F_2 generation and has been continued since.

Description.--Increase of mixed, open-pollinated seed of two F_4 lines from above cross. Seed of this synthetic produced in isolated block at Stoneville in 1956. Synthetic remains green in field plantings until late summer, when it may become spotted with gray leaf spot. Plant size intermediate between sudangrass and sorgo. High yield potential. Juice sweet.

Released.--No. Included in regional testing program.

Breeder Seed.--Delta Branch Experiment Station.

SWEET 372

Selected at Texas Agricultural Experiment Station (Substation 12), Chillicothe, ARS cooperating--J. R. Quinby, R. E. Karper, and J. C. Stephens.

Method of Breeding.--Mixture of strains selected from intercrosses between strains selected from cross between sudangrass and Leoti sorghum. Selected strains all unusually palatable to cattle.

Description.--Similar to common sudangrass, except stems juicy and sweet and glumes sienna in color. Plants grow 3-8 feet tall and tiller freely. Stems less than 1/2 inch in diameter; leaves long and narrow. Forage yield slightly above that of common sudangrass, but increase in weight due to higher seed production.

Released.--1943, cooperatively by Texas Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Texas Agricultural Experiment Station (Substation 12).

Certified Seed.--Available in quantity.

SWEET 372(S1)

Selected by J. R. McNeill Seed Company, Spur, Tex.--J. R. McNeill.

Source.--Single plant selection from field of registered Sweet 372 sudangrass.

Method of Breeding.--Seed of this and other selections planted in isolated blocks on dry land having good underground moisture. Only

two of these seemed superior; only that designated S1 (selection 1) increased.

Description.--Single strain selection from Sweet 372; synthetic composed of multiple strains. Plants fine stemmed, free tillering, with peduncles that recurve under weight of heads. Seed covered by dense sienna glumes; glabrous and glossy. Seedling vigor good. Maturity 3-5 days earlier than average of Sweet 372 sudangrass in high plains area of Texas.

Released.--Distributed by J. R. McNeill Seed Company.

Breeder Seed.--J. R. McNeill Seed Company.

Certified Seed.--Available in quantity.

TIFT

Selected at Georgia Coastal Plain Experiment Station, Tifton, ARS cooperating--Glenn W. Burton.

Source.--Developed from hybridization program involving common sudangrass and Leoti sorghum.

Method of Breeding.--Disease-resistant plants in some 35,000 F_2's of cross between common sudangrass and Leoti sorghum backcrossed to sudangrass. Thirty thousand F_2's from these backcrosses gave superior individual that bred true for disease resistance and uniform enough in other characteristics to permit its increase in isolation and its release as Tift.

Description.--Mixture of chocolate and tan-colored seeds, basic tan plant color, fine stemmed and leafy. Resistant to *Colletotrichum graminicolum*, *Helminthosporium turcicum*, bacterial stripe, and bacterial streak. Somewhat later maturing than other sudangrass varieties. During heavy disease epidemics produces more forage of higher quality for longer period of time than disease-susceptible varieties.

Released.--1943, cooperatively by Georgia Coastal Plain Experiment Station and Crops Research Division, ARS.

Breeder Seed.--Georgia Coastal Plain Experiment Station.

Certified Seed.--Available in quantity.

WHEELER

Selected by Carl Wheeler, Bridgeport, Kans.

Source.--Seed received from USDA in about 1911.

Description.--Early strain of common sudangrass. In general, taller and higher yielding than most common strains. Not very leafy. Susceptible to disease. Hydrocyanic acid potential comparable to that of common types.

Released.--1915, by Carl Wheeler.

Breeder Seed.--Not available.

Certified Seed.--Available in quantity.

WILD SUDAN

Source.--Seed collected by Paul Tabor in 1945 from naturalized stand at Clewiston, Fla. Tested as SC 20-833. *Sorghum* sp.

Description.--Annual; similar to sudangrass in appearance. Seed shatter soon after maturity, remains sound for some time, volunteers freely. Extensively naturalized in Everglades area just south of Lake Okeechobee in Florida. Susceptible to leaf and stem diseases; resistant to drought.

Released.--Distributed by SCS Nursery, Thorsby, Ala., in 1950.

Breeder Seed.--Plant Materials Center, SCS, Americus, Ga.

Certified Seed.--Not available.

Sorghum vulgare var. *drummondii* (Nees) Hack. ex Chiov., chicken corn

Source.--Seed collected near Epes, Ala., by W. C. Young in August 1939 from naturalized stand. This species introduced apparently by accident in Black Belt of Alabama about 1860; became widespread few years later. Practically disappeared as naturalized plant. Tested as SC 26-104.

Description.--Wild sweet sorghum of medium size. Bears seed that shatters soon after maturity, remains sound over winter, germinates following spring and summer. Used in wildlife plantings.

Released.--Distributed by SCS Nursery, Thorsby, Ala., in 1950.

Breeder Seed.--Plant Materials Center, SCS, Americus, Ga.

Certified Seed.--Not available. (Limited commercial supplies.)

Stenotaphrum secundatum (Walt.) Kuntze, St. Augustine grass

BITTER BLUE

Selected originally from Florida lower east coast.

Source.--Improved variety of St. Augustine grass originally selected by tradesman of grasses from lower east coast of Florida. Stories conflicting as to just who selected variety and as to original source. Variety known and widely used in commerce in Florida for over 25 years. Brisk demands for St. Augustine grass sod brought about widespread misuse of name and misidentity of improved variety with common and pasture-type St. Augustine grass. Selections from several sources under test at Florida Agricultural Experiment Station, Gainesville.

Method of Breeding.--Not known, but surmised to be natural selection.

Description.--Improved St. Augustine grass variety with closer internodes, shorter, more narrow leaves, greater leaf density, and closer growing habit than common type. Attractive blue green, good shade tolerance, frost resistance. Does not tolerate continuous wear; hence best adapted for ornamental turf.

Released.--Never officially.

Breeder Stock.--Not available.

Certified Stock.--Not available. (Available commercially.)

Stipa hyalina Nees

T-20258

Increased at SCS Nursery, San Antonio, Tex.--James E. Smith, Jr.

Source.--Introduced from Pergamino, Argentina, as P. I. 197867, BN-7440. Tested as T-20258.

Method of Breeding.--Observational tests.

Description.--Leafy perennial bunchgrass, with light-green foliage. Heavy seed producer. Stems about 30 inches tall under dryland cultivation; often 5-6 feet tall under irrigation and at seed maturity. Plants continue active growth longer in spring than native *S. leucotricha* Trin. and Rupr. Seed small, about 3/16 inch long; blunt callus; very slender awn about 1-1/4 inches long. Volunteers aggressively against such competition as irrigated blue buffelgrass and johnsongrass.

Released.--No. Included in observational plantings.

Breeder Seed.--Plant Materials Center, SCS, San Antonio.

Certified Seed.--Not available.

Stipa viridula Trin., green needlegrass

GREEN STIPA

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Collection made near Mandan in 1935.

Method of Breeding.--Single plant selection from above source; progeny tested, increased, and distributed as Mandan 397.

Description.--Superior to common green needlegrass in forage and seed yields, improved seedling, and regrowth characteristics.

Released.--1946, cooperatively by North Dakota Agricultural Experiment Station and Crops Research Division, ARS.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Available in quantity.

Stipa viridula X *Oryzopsis hymenoides*

MANDAN RICE GRASS

Selected at United States Northern Great Plains Field Station, ARS, Mandan, N. Dak.--George A. Rogler.

Source.--Amphidiploid of natural cross of *S. viridula* and *O. hymenoides*. F_1 hybrid occurred in nursery at Mandan in 1941; fertile F_2 plant found in 1945.

Method of Breeding.--Natural intergeneric hybridization followed by spontaneous chromosome doubling.

Description.--Morphologically intermediate between two parent species, with growth habit more closely approaching that of *O. hymenoides*.

Released.--No. Distributed for testing.

Breeder Seed.--United States Northern Great Plains Field Station.

Certified Seed.--Not available.

Zoysia japonica Steud., Japanese lawngrass

MEYER

Selected at Arlington Farms, Va., and Plant Industry Station, ARS, Beltsville, Md., in cooperation with United States Golf Association Green Section--Ian Forbes, Marvin H. Ferguson, and Fred V. Grau.

Source.--Japanese lawngrass (*Z. japonica* Steud.) seed introduced in 1930 from northern Korea. *Z. japonica* known to have been in United States in 1895.

Method of Breeding.--Promising individual plant selected at Arlington Farms in 1940. Vegetative material moved to Beltsville in 1941; increased for testing in 1947-48 as Z-52.

Description.--Develops tough wear-resistant turf. Leaf width intermediate between that of *Z. matrella* (L.) Merr. and *Z. japonica*. Drought resistant, but will turn brown during long dry periods. Grows and persists on relatively poor soils. Rate of spread and color improved by applications of fertilizer and

irrigation. Competes very satisfactorily with weeds and other grasses in areas where adapted. Competition from other species increases time required to attain complete coverage. Winter hardy, but in general only recommended in areas with long, warm growing season. Warm-season grass; becomes dormant and brown with first frost in fall.

Released.--1951, cooperatively by Crops Research Division, ARS, and United States Golf Association Green Section. Name "Meyer" honors memory of Frank N. Meyer, USDA plant explorer.

Breeder Stock.--Plant Industry Station, ARS, Beltsville.

Certified Stock.--Available. (Ample commercial stock.)

Z-73

Selected at Plant Industry Station, ARS, Beltsville, Md., in cooperation with United States Golf Association Green Section--Fred V. Grau.

Source.--Meyer zoysia.

Method of Breeding.--Single plant selection made from plants grown from seed produced on Meyer zoysia.

Description.--Vigorous, relatively fast spreading. Leaf width intermediate between Meyer and common Z. japonica. Winter hardy. Produces good seed yields. Seed heads golden tan. Appears to be less competitive to Kentucky bluegrass than Meyer. Suggested for use in erosion control and on large lawns and highways. Proposed name, "Sunburst."

Released.--No. (Seed from Z-73 distributed in 1952.)

Breeder Stock.--National Plant Materials Center, SCS, Beltsville.

Zoysia japonica X Z. tenuifolia Willd. ex Trin.

EMERALD

Selected at Plant Industry Station, ARS, Beltsville, Md.--Ian Forbes.

Source.--Selected from several F_1 hybrids between Z. matrella varieties japonica and tenuifolia. Z. japonica parent introduced from Korea and Z. tenuifolia parent from Agricultural Experiment Station at Guam.

Method of Breeding.--Hybrids made in all possible combinations between varieties japonica, matrella, and tenuifolia. Selection in F_1 based on turf quality (leaf width, density, color, growth habit) and winter hardiness. Tested as experimental 34-35.

Description.--Vegetatively propagated F_1 hybrid (Z. matrella var. japonica X Z. matrella var. tenuifolia). In comparison with varieties japonica, matrella, tenuifolia, and Meyer zoysia at Beltsville and at Tifton, Ga., Emerald had best total turf-quality score at both locations for 3 years. Combined to varying degrees greater winter hardiness, nonfluffy growth habit, and faster rate of spread of its japonica parent with finer leaves, denser turf, and dark-green color of its tenuifolia parent. Exhibited hybrid vigor in rate of spread, browning, and density ratings. Considerably more shade and frost tolerant than bermudagrass.

Released.--1953, cooperatively by Georgia Agricultural Experiment Station; Crops Research Division, ARS; and United States Golf Association Green Section.

Breeder Stock.--Georgia Coastal Plain Experiment Station, Tifton.

Certified Stock.--Available in quantity.

Zoysia matrella (L.) Merr., manilagrass

F. C. 13521

Increased at Alabama Agricultural Experiment Station, Auburn.

Source.--Received from H. N. Vinall in 1927. F. C. 13521 obtained originally from J. B. Norton, Hartsville, S. C.; probably selection from S. P. I. 48574.

Description.--Fine, dark green. Leaf blades usually 3-5 inches long when not mowed. Grows very dense. Produces creeping stolons that root profusely; ends of stolons cling to ground and thus grow under competing plants. Stands considerable shade; produces seed heads and some seed in spring; has been rather free from diseases and insects. Susceptible to drought, but will recover rapidly when moisture becomes available.

Released.--Alabama Agricultural Experiment Station.

Breeder Stock.--Alabama Agricultural Experiment Station.

Certified Stock.--Available.

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