UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER

Beltsville, Maryland

1968 ANNUAL REPORT

CRIDER MEMORIAL GARDEN
OF CONSERVATION PLANTS

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER
AGRICULTURAL RESEARCH CENTER
BELTSVILLE, MARYLAND

ANNUAL REPORT
1968

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PERSONNEL

Robert B. Thornton..... Manager 1/

Frederick B. Gaffney..... Soil Conservationist

Gary V. Schultz..... Soil Conservationist

Robinson P. Abbott..... Biological Technician

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Richard Bradshaw, Jr..... Nursery Worker 2/

Helen M. Chamberlin..... Clerk-Stenographer

1/ Transferred to Washington Office December 2, 1968.
2/ Resigned December 6, 1968.

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This report prepared by Mr. Gaffney; distribution and reidentification data compiled by Mrs. Chamberlin.

United States Department of Agriculture
Soil Conservation Service
National Plant Materials Center
Beltsville, Maryland

INTRODUCTION

This report covers the operations of the National Plant Materials Center at Beltsville, Maryland for the calendar year 1968. One of the primary functions of this center is to serve as an assembly point for seeds and/or plants from world-wide sources for 19 other SCS plant materials centers located in various climatic regions of the United States. The National Plant Materials Center makes contacts and arrangements for receiving specific items or portions of collections made by plant explorers of the Crops Research Division, ARS.

Requesting collections of plant material which is endemic or naturalized to a specific region, and arranging for plant identification or verification of identity is frequently necessary.

To date, more than 19,000 accessions have been received at the National Plant Materials Center. During 1968 a total of 493 new items were received, the material coming from 19 different foreign sources. Special assemblies of various genera were made, including Agropyron for the northeastern United States, and Lolium, Paspalum, and Phalaris for the Hawaii center.

Distribution of seed and other plant material is made to the field SCS plant materials centers and specialists, other agencies of the Department of Agriculture, State Experiment Stations, as well as to plant scientists. A total of 1674 packets of seed were sent to SCS plant materials centers in 1968, while distribution to other agencies totaled 1142 packets. A total of 296 items was distributed to 33 foreign countries. Heaviest distribution was to Mexico (66 packets), Chile (31), Australia (27), Peru (23) and Czechoslovakia (22).

HIGHLIGHTS OF 1968

R. B. Thornton, Manager of the National Plant Materials Center, was invited to speak on "Woody Plant Seeding for Roadside Rengeneration" at the 27th Annual Convention of the Southeastern Association of State Highway Officials held in Richmond, Virginia in October. He also attended the Annual Meeting of the American Society of Agronomy in New Orleans, Louisiana in November, where he presented a paper on "Trial Plantings for Highway Erosion Control". In addition, Mr. Thornton was author of an article concerning new and better plants for land treatment for the Newsletter of the Associated Landscape Contractors of America, and was a participant in the Conference of Regional Plant Materials Specialists of the Soil Conservation Service held at Niagara Falls, New York in September.

F. B. Gaffney, Soil Conservationist, attended the Crownvetch Symposium held at Pennsylvania State University during February, and also attended the Maryland Tidal Bank Stabilization Tour held in September.

SPECIAL PROJECTS

Highway Project

A cooperative agreement between the State Roads Commission of Maryland and the Soil Conservation Service, USDA, was initiated in 1966. Many field trials have been made and evaluated, using primarily woody and suffrutescent species.

The three primary areas of concentration are: developing better techniques of handling the various species; selection of those species adaptable to various soil and climatic conditions; and establishing these plants on the roadside. When completed, all technical data will be released jointly by the State Roads Commission of Maryland and the Soil Conservation Service.

Ground Covers

The ground cover collection growing on sandy soil at the NPMC elicits many comments from visitors, many of whom want to know whether the material will perform equally well on a heavy soil. To help answer this question a duplicate planting of our ground cover collection is being made on a heavy plastic soil. Both sites are exposed to full sun. This will help us compare material performance on heavy and on light soil.

Dwarf Phalaris arundinacea

It has been observed that most dwarfed reed canarygrass plants do not produce viable seed. In August of 1968, further selections of 16 dwarf clones having good vigor and leaves less than two feet high were made. These selected clones were planted

in an isolated polycross block. The polycross block is in a moist field location. Continued observations on leaf height, vigor, and seed production will be made.

PLANT NOTES

The following is a resume of plant materials grown and observed at the NPMC. It includes both annuals and perennials. Perennials were observed for a minimum of two growing seasons unless the plants died earlier. Two broad categories have been used: (1) Grasses; (2) Legumes and Other, which may include ground covers, woody species, etc. More detailed information is available on these plants on request. In most cases, plants with the species undetermined are omitted.

The weather was favorable during most of the summer. Rainfall was adequate so no irrigation was used. Only one real hot spell occurred - in August, lasting for ten days. This helped point out a few plants which apparently will not tolerate high temperatures of this duration.

Grasses

Agropyron caninum (L.) Beauv.

Our five accessions from Russia were received as Agropyron sp., and identified as A. caninum. They are natives of North and Central Europe through to Asia, China and Japan. A cool hardy perennial, there is some question as to whether the species is a distinct bunchgrass or a slowly rhizomatous sod-former. Leaves are mostly basal; glumes are 3-nerved. All our accessions were highly susceptible to ergot and leaf spot. Uniformity of ripening was good, and shattering little. Accessions tested included PI-314612, 314615, 314616, 314628 and 314629. Chromosome number is 2N=28.

Agropyron cristatum (L.) Gaertn. fairway wheatgrass

None of the four accessions from the U.S.S.R. - PI-314186, 314596, 314597, 316120 - performed well. Two rod rows of PI-314186 died the first winter. The other three averaged 25" to 28" head height, and were rather scarce on leaves. All had a variable population. Some may perform better in the drier Western climates.

Agropyron desertorum (Fisch. ex Link) Schult. crested wheatgrass

Of the three accessions received (PI-314187, 314604 from the U.S.S.R., and 316121 from Sweden via Australia) only one, PI-314604, exceeded the A. cristatums in head height, being mostly 30" with a few to 35". Spring recovery was good and all accessions had matured seed by mid-July.

Agropyron gracillimum Nevski

This species is native to the stony hillsides of the Caucasus foothills and west Transcaucasus. One accession, PI-313960 from the U.S.S.R., was grown. It is a cool hardy perennial bunchgrass with few stems and few cauline leaves. Seed heads grew to 33", with leaves to 20". Performance was probably poor due to heavy soil conditions.

Agropyron intermedium (Host) Beauv. intermediate wheatgrass

Compared with other intermediate wheatgrasses grown here in previous years, PI-316122 from the U.S.S.R. via Australia appears to be a good accession, with leaves to 30". Early abundant spring recovery was followed by a mid-summer dormant period. Uniformity of ripening was good and the entire seed crop was collected by the first of August.

Agropyron pectiniforme Roem. & Schult.

This tufted perennial grass is native to Central Europe, Southern Russia and the cool high altitudes of Asia Minor, mostly on heavy soils. PI-312438 from Russia had heads similar to A. cristatum, but had 7-10 flowers per spikelet. This accession showed weak rhizomatous growth and rather poor performance in growth and seed set at this latitude. It needs higher and drier climates than we have at Beltsville. Chromosome number - 2N=14.

Agropyron pycnanthum (Godr.) Gren. & Godr.

A species closely resembling A. repens, it is rhizomatous with erect rigid stems, and has spikelets forming a dense erect spike. It occurs on dunes and stony places along the coast of the Mediterranean Sea. PI-316123 from France performed pretty well in its second year but lodged excessively, with stems to 36" when headed.

Alopecurus pratensis L. meadow foxtail

BN-15617 is a leafy, fairly productive accession under observation at the NPMC. This is a selected cross between BN-11114 and BN-11742.

Alopecurus pratensis L. - PI-314355 meadow foxtail
Alopecurus ventricosus (Gouan.) Huds. - PI-314356

Both the above are rhizomatous, cool hardy perennials. One had leaf spread to 20", and the other to 33". No difference in bloom date or maturity date was observed, and like all Alopecurus, these are subject to shattering. Both will have species verified next year if plants survive.

Anthephora pubescens Nees woolgrass

PI-299464 is a warm tender perennial bunchgrass from the limited rainfall areas of South Africa. It has been said that this species has a high prussic acid content in the wilted state (The Grasses and Pastures of South Africa, D. Meredith, Hon. Ed.). A. pubescens is found growing in association with Cenchrus ciliaris, Chloris gayana, Digitaria spp., Eragrostis superba, and Panicum coloratum. Our accession grew well, producing spikes to 55" tall which became white and fluffy from pubescence.

Arrhenatherum elatius (L.) Presl. tall oatgrass

Four accessions were grown and compared. Latest seed maturity was exhibited by PI-316159 out of Sweden via Australia. PI-316160, from Spain via Australia, and 316161 from Australia both produced two crops of seed, one on June 10th and the second by August 1. Excessive lodging was noted on PI-316161. PI-315370 from Russia was highly variable in leafiness.

Bothriochloa caucasica (Trin.) C.E. Hubbard Caucasian bluestem

Plants of PI-312442 from the U.S.S.R. looked good here, growing well the first year and setting an abundant seed crop. No winter damage was evident.

Brachiaria brizantha (Hochst.) Stapf signalgrass, or palisade grass

B. brizantha is a warm tender perennial with a wide soil adaptation, found mostly in humid tropical areas with at least 30" rainfall, although it is drought resistant. Productive, palatable and persistent, its poor seeding qualities will probably dictate vegetative planting. Chromosome number - 2N=54. PI-292180 from South Africa spread to 6 ft., with heading dates too late for this climate.

Brachiaria mutica (Forsk.) Stapf

PI-316447 from the Fiji Islands is a warm tender perennial grass, with stolons to $\frac{1}{2}$" in diameter and 30 ft. long. The plants spread like wildfire from July to September, forming a dense, well-tacked mat with leaves 40" high. It is considered a good general pasture grass in tropical regions of Africa, especially on erodable sites. The season was not long enough at Beltsville to produce heads. Part of our original seed went to the Florida PMC.

Brachypodium spp.

Reputedly of low palatability, this genus might possibly be worthy of goose grazing trials.

B. pinnatum (L.) Beauv., PI-316169 from France, having short rhizomes and being a cool hardy perennial, produced wider sod in two years than B. rupestre (Host) Roem. & Schult., PI-316170 from U.S.S.R. Part of the plant population of the latter species was lost in the first year.

Grasses - continued

Bromus inermis Leyss. smooth bromegrass

Of the 17 accessions of B. inermis, two accessions - PI-315374 and 315375 from the U.S.S.R. - are worthy of noting for good regrowth after cutting and little to no disease. Both had good spreading habit.

Bromus riparius Rehm. meadow brome

PI-314513, 314514, 314515 and 315397, all from the U.S.S.R., were grown, with the last three reidentified as B. riparius after being received as B. inermis. This is a highly variable group and would probably require space plantings to find those types suitable for any given locality.

Bromus unioloides HBK.

Three accessions were grown - PI-316174 from Lithuania, and PI-316176 and 316177 from Argentina, all received via Australia.

All lived over the second year, although the species has been described as a weak perennial to winter annual. Seed is much like rescuegrass, but smaller. The plants were heavy seed producers, but shattered excessively.

Bromus variegatus Bieb.

This species is endemic to the west, east and south Transcaucasus and foothills of the Caucasus, growing in alpine and subalpine meadows. Described as a perennial between 25-70 cm., it is considered one of the best forage crops in that area. It is much preferred by cattle over other available grasses, and has excellent regrowth after harvest.

Two accessions from the U.S.S.R. were grown here at the NPMC - PI-315395 and 315396. Both are cool hardy perennial bunchgrasses. The plants need cooler growing seasons to perform properly, but the leaves were basal and very soft, with a height of 10". Seed heads were produced 24"-30" and a small seed crop was collected.

Calamagrostis canescens (Weber) Roth

Species is native to the Mediterranean region, particularly northern Italy, and probably grows in sandy areas.

PI-316179 from Poland via Australia is a cool hardy perennial bunchgrass, with moderately abundant stems and few moderately coarse to soft leaves. Lodging and poor seed production were the major problems noted.

Calamagrostis epigeous (L.) Roth

C. epigeous is native to Europe, northern Scandinavia, Russia, Asia and Africa, growing in dry woods, especially on flat sandy places and sunny hills extending into mountains up to 1200 m.

PI-316180 from Poland via Australia is a rhizomatous cool hardy perennial grass which grew well in a wet, sandy location here at Beltsville.

Word of caution: Hitchcock reports this species as becoming a weed in sections of the United States.

Calamagrostis pseudophragmites (Hall f.) Koel.

This species normally occurs on the banks of mountain streams, in willow thickets and on river gravels, and is native to eastern Europe, Bulgaria, Russia, western Asia, Tibet, and Siberia. It closely resembles C. epigeous, but leaves are narrower and panicle larger.

Two accessions were grown - PI-316182 from Sweden and PI-316183 from the U.S.S.R., both received via Australia. Performance here was poor. All plants of PI-316183 died after transplanting and each of the three plants of PI-316182 remaining in the field is different.

Cenchrus ciliaris L. buffelgrass

After trying more than 40 accessions in 1965-66, we grew only two new ones in 1968. PI-319459 from Tunisia was a somewhat rhizomatous blue buffelgrass type, and like all blue buffels it failed to produce many heads. PI-323444 out of Pakistan was more of a bunchgrass, green, with good uniformity within the row.

Cenchrus prieurii (Kunth) Maire

This is an annual, native to northwest India and Africa north of the equator. It is an excellent fodder grass in semi-desert regions of India. The species is perfectly selfed.

PI-323445 from Pakistan rooted at lower nodes, had abundant fine, erect and sub-erect stems, with moderately abundant medium-soft leaves. Head height was 21", leaf height 17", with a spread of 28".

Chloris gayana Kunth rhodesgrass

Several rhodesgrass accessions were grown this past summer. The one with the most promising seed potential is PI-283215 from Sweden via Australia. PI-283220 out of Kenya via Australia showed promise as an erosion control and forage plant due to its very dense mat-growing habit, being stoloniferous to 96". Another accession, PI-284794 from South Africa via Australia is very early maturing, but limited in spreading habit.

Dactylis aschersoniana Graebn.

Only one new accession, PI-316209 from Bulgaria, was grown in 1968. Performance was similar to the two reported in our 1965-66 Annual Report as being good forage and seed producers.

Dactylis glomerata L. orchardgrass

We were looking for some late maturing accessions, but of the twelve grown, all bloomed within a week of each other.

Digitaria milanjiana ssp. eylesiana Henr.

PI-299729 is a warm tender perennial stoloniferous grass from South Africa. It performed well here at Beltsville, having abundant fine sub-erect stems and moderately abundant soft cauline leaves to 22". Puerto Rico has also tested and reported this accession.

Echinochloa crusgalli (L.) Beauv. barnyard grass

Of four accessions, PI-196291 from India was susceptible to corn borer. It had leaf blades $1\frac{1}{4}$" wide and also grew taller than the other three. Head height was 62" and leaf height 50".

Other accessions grown were PI-223254 from Afghanistan via the Mississippi PMC, PI-250096 from Egypt via the Mississippi PMC, and BN-14698, a commercial strain reproduced at the Florida PMC.

Echinochloa crusgalli var. frumentacea (Roxb.)W.F.Wight
Japanese millet

Performance of PI-217911 from India via the Georgia PMC was much the same as the accessions of E. crusgalli.

Echinochloa haploclada Stapf

This is a warm tender perennial bunchgrass which occurs on stream banks and in swamps from sea-level to about 6500 ft. altitudes in East Africa. Analyses indicate the species is high in crude protein.

PI-226065 from Kenya attained a head height of 42" and leaf height of 25". Stems were medium, coarse and erect; leaves abundant medium, cauline. Seed heads were reddish in color, with low production performance here.

Eleusine coracana (L.) Gaertn. Ragi millet

Of the three accessions grown here at the NPMC, only one matured before frost. It was PI-248881, a summer annual bunchgrass from India, with leaves two-ranked to 36". The species is cultivated in the tropics of the old country and used for porridge and an alcoholic beverage.

Elymus aralensis Regel

This species is native to the steppes near the Caspian Sea. It is a cool hardy perennial grass, which is weakly rhizomatous. PI-314663 from the U.S.S.R. was grown; the plants had few stems with moderately abundant leaves, both basal and cauline. Plants bloomed in June and July and matured in mid-July. No dormancy occurred during August heat, and very little to no leaf spot was noted.

Elymus arenarius L. Lymegrass, or European dune wildrye

PI-316233 from the U.S.S.R. was a vigorous, cool hardy rhizomatous perennial, with abundant basal, bluish leaves. Stems were coarse and leaves harsh. The species, closely related to E. mollis, is a beach and sand dune grass in its native habitat of central and northern Europe and Siberia.

Elymus canadensis L. Canada wildrye

PI-315864 had abundant, medium to fine, erect stems, with abundant, medium leaves. The accession was received from Czechoslovakia as E. philadelphicus, a synonym.

Elymus dahuricus Turcz. Dahurian wildrye

This native of northwest India and Siberia, found in foothills of the Himalayas at 5000 to 10000 ft. elevations, prefers dry areas.

PI-314674 and PI-314680, from the U.S.S.R., are cold hardy perennial bunchgrasses, with moderately abundant stems and moderately abundant to abundant leaves which are primarily basal. Seed heads grew to 38-44" and bloomed in June; seed was collected in July and August.

Elymus junceus Fisch. Russian wildrye

Of the three accessions tested, PI-314666 through PI-314668 from the U.S.S.R., PI-314666 was the most healthy, having little or no leaf spot, although it produced very few stems and leaves.

Elymus paboanus Claus

Native to Russia-Europe region, this cool hardy perennial appears to be a bunchgrass, but does have a few short rhizomes after two years of growth. PI-316234 from the U.S.S.R. via Australia had medium stems and abundant basal leaves which had a tinge of bluish color. Our plants bloomed in June and seed was collected in July. Seed heads grew to 30" and leaves to 12".

Eragrostis chloromelas Steud. Boer lovegrass

Of our 12 accessions of E. chloromelas, only three survived the winter. These were PI-208225, PI-209184 and PI-234206 all from South Africa. The species is highly variable and grades into E. curvula. (Grasses and Pastures of South Africa). It is a

native of South Africa, where it grows well on neutral to slightly acid soil and under semi-desert grassland ranges with 13" rainfall per annum.

Eragrostis curvula (Schrad.) Nees weeping lovegrass

PI-208385 from South Africa and PI-310403 from the U.S.S.R. were grown. PI-208385 (which was received as E. chloromelas and and reidentified as E. curvula) has a tremendous seed potential; it also reseeds and establishes itself rapidly.

Eragrostis tef (Zuccagni) Trotter

Selection of a superior Eragrostis tef should be possible, due to the variability observed in the six accessions grown here, PI-318899 through PI-318903, plus BN-18755, a selection. Original source of all accessions was Ethiopia. As this annual bunchgrass is 100% apomictic, a selection would be easy to maintain. Seed of the species may be red, white or tan. The Ethiopians cultivate it for grain, and in South Africa it is grown for hay.

Festuca arundinacea Schreb. tall fescue

Of the 13 accessions of tall fescue grown, two are large plant types, being strong and healthy. These are PI-289004, 'Brudzynska' strain from Hungary, and BN-18083 out of Kentucky via the Missouri Plant Materials Center. The latter was received at the NPMC as vegetative material. BN-18084, also received as vegetative material from the Missouri PMC, was essentially free of all leaf diseases and performed very well at Beltsville. It is slightly rhizomatous and very uniform.

Festuca djimilensis Boiss. et Bal.

PI-314084 from the U.S.S.R. is a cool hardy perennial bunchgrass, and had few stems and abundant basal leaves. Very poor performance here resulted in only a trace of seed. All our plants died in August--apparently this one is not heat-tolerant.

Festuca ovina L. sheep fescue

Previous confusion concerning PI-289656 from Spain (reported in the 1965-66 NPMC Annual Report as being a mixture) was cleared this past summer. The accession proved to be all F. ovina, according to Dr. E. E. Terrell, NCRB, after an inspection of spaced plants here at the NPMC. All plants were bluish, dense, and wiry tufts. A new number, PI-312225 has been assigned to the accession; F. rubra will retain PI-289656, even though seed of this accession does not exist.

Two other accessions, PI-314687 and PI-316249, both from the U.S.S.R., were also blue. All the F. ovinas grown last year were small, wiry, distinct bunches, and were perfectly winter hardy.

Festuca pratensis Huds. meadow fescue

With more than twenty accessions of Festuca pratensis (F. elatior, syn.), no one accession excelled greatly here. All were highly variable in vigor, leaves and stems.

Festuca rubra L. red fescue

PI-283322, 'Roskilde', a Danish cultivar, was rhizomatous and a good sod former, having abundant stems and leaves. It bloomed in June and seed was collected July 1.

Festuca rupicaprina (Hack.) Beck

PI-216251 from Sweden is a wiry, cool hardy perennial bunchgrass. The species occurs on alpine meadows, always on calcareous soils, in central Europe. This introduction had abundant fine erect stems to only 12", and abundant leaves to 3" tall.

Festuca sabulosa H. Lindberg

This is a species native to the most northern parts of north and middle Europe, limiting itself to the arctic area only. It is not cultivated there, but does occur on dunes. At Beltsville it is a cool hardy bunchgrass. Our plants had few stems, but abundant, wiry basal leaves. It was an early bloomer and matured by mid-June. Plants showed summer dormancy and had good fall recovery.

Festuca sclerophylla Boiss.

A native of northern Iran, the species occurs at 1600-2300 m. elevations. We grew one accession, PI-314086 from the U.S.S.R. This cool hardy perennial, which appears as a bunch, has a few short rhizomes after two years' growth. Basal leaves are 24" long, narrow, upright and pointed. A few seed heads at 40" were produced, but very poor fill was exhibited.

Festuca sulcata Hack.

This species, which resembles F. ovina, occurs in mountainous or alpine regions of Europe. It is used for early spring and late fall grazing.

PI-314375 is a cool hardy perennial from the U.S.S.R., with abundant leaves in a small wiry bunch.

Festuca varia Haenke

Species occurs in fields and gravelly slopes, on dry hot slopes and in rocky crevices on mountains and alpine regions up to 9000 ft. in central and southern Europe and the Caucasus.

Three accessions from the U.S.S.R. were tried here. PI-283325 was slightly rhizomatous and highly variable in leaf width. PI-312453 was a small wiry tuft, much like F. ovina, while PI-316252 was a tall, variable-leaved accession which made rapid regrowth after being cut. Herbariums of all three accessions will be taken in 1969.

Ixophorus unisetus (Presl.) Schlect. gordura (Spanish)

This is a coarse, tall, broadleaved warm tender perennial from Central America. It is adaptable to humid tropics and moist, fertile soil. Is claimed to be a succulent fodder when fed green to cattle and will give up to five cuttings a year. It will not persist under grazing.

Plants of PI-283478 from Central America via Australia were grown here in the greenhouse, and formed large clumps with abundant, coarse, erect and sub-erect stems, with swollen distinct nodes as sorghum. It will tack from the lower nodes. Leaves are abundant and harsh, due to a fine serrated edge. Seed heads were 78" high, and leaves to 60". Plants were attacked by grasshoppers and aphids, which were controlled by spraying.

Koeleria gracilis Pers.

Grows on virgin lands and old fallow lands in steppes and mountains of the U.S.S.R.

PI-314379 from the U.S.S.R. was the only one of five accessions tested that began regrowth from the base in August while the others were dormant.

Lolium perenne L. perennial ryegrass

One new accession of Lolium perenne, PI-311420 from Spain, was tested. It matured, set seed and died by July 16, so probably isn't L. perenne. The accession had abundant erect stems and few cauline leaves, with heads at 20" and leaves to 10". It is presently being grown for identification purposes.

Lolium remotum Schrank

This species is known principally as a weed in waste places, and is native to Europe - northern Scandinavia and northern and western areas of Spain, but rare in the Mediterranean areas. There are no common names in English in general use (A Taxonomic Revision of the Genus Lolium, E. E. Terrell), but the species may be called 'hardy ryegrass' according to Standardized Plant Names.

PI-283611, a winter annual from Spain, was grown in the greenhouse; it had abundant fine erect stems to 35" and medium soft cauline and well distributed leaves to 25". Chromosome number - 2N=14.

Lolium rigidum Gaud.

This is a weedy species common in southern Europe and the Mediterranean region. It has no English common name, although "Wimmera ryegrass" has been used for L. rigidum var. rigidum; L. rigidum var. rottbollioides; or L. multiflorum X L. rigidum (A Taxonomic Revision of the Genus Lolium, by E. E. Terrell).

Four accessions from Spain, PI-311421 through PI-311424, were grown; all were winter annuals with heads 18" to 24" and leaves 11" to 12". All produced seed well, except PI-311422, which had severe winter damage.

Melica ciliata L.

A native of Europe, M. ciliata grows in sunny fields and stony places, often on limestone.

PI-315866 from Czechoslovakia had moderately abundant stems with few basal leaves. Although very short rhizomes exist, the grass appears as a cool hardy bunch. Head height was 13", with leaves to 6". During periods of high temperature the plants exhibited semi-dormancy.

Oryzopsis coerulescens (Desf.) Hack.

The species is a winter growing perennial from the Mediterranean region, occurring most frequently at higher altitudes than O. miliacea, as in parts of the high Atlas Mountains of southern Morocco.

Three accessions - PI-292447 and PI-306624 from Israel, and BN-15864 from Tunisia - were container grown in the greenhouse and placed outside in the spring. PI-306624 showed the best growth. Poor seed production was noted, although all accessions bloomed about the middle of May and seed was mature by June 20.

Oryzopsis holciformis (Bieb.) Hack.

This species is adapted to various mountain and sub-alpine climates in Iran. It is claimed to have excellent palatability, but is susceptible to over-grazing. Propagation from seed is difficult due to a hard seed coat which must be scarified.

PI-292448 and PI-306625, both from Israel, are perennial bunch-grasses. Mature heads were 36", and cauline leaves were 20-24" high.

Oryzopsis miliacea (L.) Benth & Hook. smilograss

PI-292449, PI-292453 and PI-292614, all from Israel, were tried here and one, PI-292453, did not survive the winter. PI-292614 was so weakened that it died by August. PI-292449 was transferred to the greenhouse to assure survival. Overall performance of this species was poor - it needs higher and drier climates. Chromosome number - 2X=24.

Panicum coloratum L. kleingrass

PI-207990 from South Africa, and PI-319485 from Tanzania were both tall and green but open accessions, due to lack of leaves. Where the lower nodes of PI-207990 made contact with the ground, they rooted.

Panicum maximum Jacq. guineagrass

PI-316460 from Brazil produced an abundance of green forage with leaves 84" high spreading to 80". Seed potential could not be evaluated as our growing season is too short; however, we did collect a small quantity of seed. We tried a total of ten new accessions of this species.

Panicum miliaceum L. proso millet

PI-250788 from Afghanistan via the Florida PMC grew to 14", set seed and died. Potential here at Beltsville is low, as 35 plants yielded only 2.7 grams of seed. No conservation value was displayed.

Panicum virgatum var. cubense Griseb.

BN-18582-66 originated by selection from open pollinated seed of BN-10997 and BN-10996. Seed of the selection was assigned BN-13645. BN-13645 was grown in isolation at the NPMC, and seed collected. The seed from the isolated planting was assigned BN-18582 and planted for seed production. The plants have abundant fine stems and moderately abundant leaves. Overall, the accession is very uniform and promising, and is being grown under isolation.

Paspalum notatum Fluegge bahiagrass

PI-297944 from Brazil produced a good dense mat of leaves 10"x 30". Seeding habits would probably be better farther south.

Paspalum pubiflorum var glabrum Vasey ex Scribn.

BN-17963 from Tennessee performed well at the NPMC, with stolons forming a dense carpet 8"x 38", with seed heads to 19". It survived the winter with no sign of damage. According to Hitchcock, it is normally found on moist, low, open ground.

Pennisetum macrourum Trin.

PI-300084 is a rhizomatous, warm tender perennial from South Africa which had abundant, coarse, erect stems to 70". Leaves were abundant, harsh and cauline, producing a dense cover 40" x 60". This accession was matured in the greenhouse.

Pennisetum typhoides (Burm.) Stapf & Hubbard pearl millet

PI-321087 is a summer annual from Kenya. It grew well, resembling corn insofar as stems, leaves and brace roots go. Inflorescense was a brown spike-like head about 12" long and 1" in diameter, yielding a small amount of small pearl-like seeds per head. Stems were coarse, to 1" in diameter, and erect to 134", with some blow-over from severe wind. Plants were susceptible to corn borer.

Phalaris aquatica L.

More than 15 accessions of this species were grown last year. Six of them PI-292456 through PI-292461 from Israel, were greenhouse grown. These were all received as Phleum subulatum, a synonym for Phalaris bulbosa, but all six were subsequently re-identified as Phalaris aquatica. All had short rhizomes.

The other accessions varied from 24" to 50", most of them ranging between 36" to 40" head height. A few were rhizomatous, but most were bunch to slow sod-forming types. Two accessions received via Australia as Phalaris hybrids, PI-316319 from South Africa and PI-316320 from Argentina were determined to be P. aquatica with a slight introgression from P. arundinacea. Accessions were variable as to winter hardiness, with PI-316319, PI-316320 and PI-316323 from Portugal via Australia, and PI-316326 from Iraq via Australia showing the most tolerance to freezing and thawing.

Phalaris aquatica X arundinacea (hybrid)

PI-316327 from Argentina via Australia was highly variable, some plants being very short. Plants which were more like P. arundinacea took two years to mature, while those more closely resembling P. aquatica set a limited number of seed heads the first year.

Phalaris arundinacea L. reed canarygrass

PI-337718 was a contaminant in an accession of Poa longifolia from the U.S.S.R. It was separated out of the original seed and grown here at the NPMC. It grew well, with seed heads to 50" and leaves to 30"; rhizomes were strong, and it had excellent winter recovery. Seed matured about 30 days earlier than other accessions of P. arundinacea.

PI-316330 from Portugal proved to be a very uniform accession and a rapid grower.

Phalaris tuberosa var. stenoptera (Hack.) Hitchc. hardinggrass

One accession from Spain, PI-316338, headed and matured by July 8th, and had very slow recovery after being cut. Winter recovery was good. Stems were medium, with abundant basal and cauline leaves.

Poa angustifolia L.

The species has widespread distribution in Europe and into Asia along the mountain ranges.

PI-314390 from the U.S.S.R. is a good sod former, but limited in rate of spread. Leaves are 10" high, seed heads to 34".

Poa longifolia Trin.

This species, in the lower economic forage bracket, is endemic to the western, eastern and southern Caucasus in alpine and sub-alpine meadows.

PI-314103 from the U.S.S.R. did not perform well here. Fifty percent of our transplants died soon after going to the field, and only a few of those that survived the first summer recovered from the first winter. Plants have long leaves with boat-shaped tips, and heads to 30" tall. The few plants we have left are bunches, and produced very few seeds. Apparently this species would prefer a cool and dry climate.

Poa pratensis L. Kentucky bluegrass

PI-314582 and PI-314733, both from the U.S.S.R., were sod-forming grasses, but PI-314733 formed a more dense sod and had higher seed potential.

Poa silvicola Guss.

This species is a native of wet meadows in the Mediterranean region.

PI-314174 from the U.S.S.R. is characterized by white segmented rhizomes which look like a string of pearls. The species goes completely dormant during the hot summer, dying back to ground level.

Poa sterilis Bieb.

The normal distribution of this densely tufted perennial is northwest India to the Caucasus, common to alpine pastures from 2000-3500 m., where it is an important fodder grass.

PI-314313 from the Soviet Union was received as Poa sp., and identification was made on the basis of a herbarium grown at the NPMC. It is a distinct small bunchgrass with moderately abundant, fine, erect stems; heads at 20", and few cauline leaves to 10". Chromosome number - 2N=28, 42.

Puccinellia capillaris (Liljebl.) Jansen

The species is native to Sweden, found on sands and salt flats.

PI-316340 from Turkey via Australia is a perennial sod-former, with abundant stems to 18" tall, leaves to 9". Grown in the greenhouse, plants had slow to medium regrowth after cutting. Only a small amount of seed was produced.

Secale montanum Guss. mountain rye

This species was described in our 1965-66 Annual Report as a short-lived perennial from mild climatic regions, or a cool hardy perennial if from cold regions of Europe.

PI-283977 through PI-283981, all from Hungary, and PI-284841 from Germany died during our summer heat.

Setaria queenslandica Domin.

Species is found growing in association with Eucalyptus in northern woods near the Walch River area of Australia.

Believe PI-316342 from Australia to be a perennial bunchgrass that might have possibilities as an ornamental, due to its reddish-green foliage. Our plants did not have sufficient growing time in the field, and were moved into the greenhouse, resulting in a few heads being produced, but very poor fill was obtained.

Setaria sphacelata (Schum.) Stapf & Hubb.

Seven accessions received from Rhodesia were grown. They were warm tender perennial bunchgrasses, with long spikes varying from 5" to 14". Seed had to be collected slightly green, as it shattered excessively.

The species is an important grass in South Africa, being used for hay and pasture. Song birds and doves enjoyed the seed from the plants in our fields at the NPMC.

Grasses - continued

Sorghastrum nutans (L.) Nash Indiangrass

One accession, BN-14670, was grown from seed reproduced at the Mississippi PMC (MS-145, origin North Carolina). It had few stems and leaves, bloomed in September and matured October 25th.

Sorghum verticilliflorum (Steud.) Stapf wild sorghum

Grows in wet places from Natal, Orange Free State and the Transvaal to South West Africa. Chromosome number - 2N=20

PI-208190 from South Africa grew well, with seed heads to 85", and leaves to 60" high, leaf blades 1¼" wide. Plants resemble johnsongrass (S. halepense), but this accession is a bunchgrass with no rhizomes.

Stipa tenacissima Jusl.

In his "Manual of the Grasses of the United States" Hitchcock states that this species is used in Spain and Algeria for making paper and cordage. It is also found growing in Portugal and Morocco.

PI-315875 received from Czechoslovakia is a cool hardy perennial bunchgrass. It had few stems and few to moderately abundant basal leaves. During the early spring of 1968 plants showed good vigor. They bloomed in August and seed was collected in September.

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Legumes and Other

Biserrula pelecinus L.

B. pelecinus is a winter annual which prefers neutral to slightly acid soils. Plants are said to inhabit areas from very arid to almost damp sites, but it presents incompatabilities in high mountains, preferring altitudes between 300 to 600 m. In Spain, arid regions are usually fall seeded and once the species is established, it will self-sow.

Seven accessions were evaluated at the NPMC, and all are worthy of expanded trials. They produced a dense mat of ground cover varying from 3" to 5", except for PI-292392 which went to 14" tall. Width was generally 36" to 45". All accessions produced abundant seed, but only two did not shatter excessively - PI-276650 and PI-292392.

Clitoria rubiginosa Guss. ex Pers.

PI-298605 from Taiwan was reported in the NPMC Annual Report for 1965-66. It wasn't until December of 1967 that the accession began to bloom and set pods prolifically, at which time the vines were 12 ft. long. As the pods matured, the seed, which was extremely viscid, was thrown several feet. Nodulation was poor and roots were susceptible to either root borer or nematodes.

Desmodium angustifolium (HBK.) DC.

This species is a woody perennial with a solitary stem about $\frac{1}{4}$" in diameter. When grown in a small pot, mature height was 65", and side branching to 50". PI-316210 from Brazil via Australia was self-fertile and set a good crop of seed in September and October. Blooming was indeterminate, but temperature and day length appear important for seed set. The viscid fluid from broken stems caused a rash on my arms, much like poison ivy, which lasted about one hour.

Desmodium cinerascens Gray

PI-282691 from Mexico is a woody perennial with solitary stems $\frac{1}{2}$" in diameter, height of 85" and side branches to 72". The plants bloomed from April to July in the greenhouse and set a few seeds in June only. In November through February plants bloomed again and all flowers blasted, probably due to chilling or changes in temperature near the glass in the greenhouse. Cuttings from side branches rooted well, using a 1:500 IBA/Talc powder mix.

Desmodium intortum (Aubl.) Macbride

This is a perennial forage legume which grows wild in Central America, and is used for cattle and goats as well as for hay meal for poultry. It is claimed that it will reduce worm infestations in goats.

PI-188559 from Guatemala is a perennial legume with triangular stems which would probably be sub-erect to prostrate in wild conditions. Under greenhouse conditions stems extended to 150", with side branching, bearing slightly rugose leaves. Flowers apparently must be tripped to set seed.

Desmodium intortum (Mill.) Urb.

This decumbent perennial is native to tropical America.

PI-271671 from Kenya is an excellent prostrate vine which roots readily when crushed or covered with soil. Vines extended to 156", and leaves were water-marked with purple discolorations. Seeding characteristics in the greenhouse caused problems of seed set. The plants bloomed from November to February, but set only a few seed after hand tripping and spraying with a blossom set hormone.

Hedysarum argenteum Murr.

In "The Flora of Russia" this species is described as a perennial, 25-40 cm. tall, endemic to the foothills of the Caucasus and lower Don River area.

PI-314088 from the U.S.S.R. did not perform well at Beltsville. Four plants were put in the field in April and only two bloomed and matured seed by August. Grown in the proper location, this plant may have value as a beautification species. Overall size was 9" high with a 10" spread.

Hedysarum coronarium L. sulla

This drought-resistant perennial herb prefers a sandy textured soil of neutral to high pH. It is native to the semi-arid, warm dry Mediterranean sub-regions at altitudes less than 100 meters, and shows absolute incompatibility with other regions in Spain. Its climatic and coastline character is further emphasized by the fact that it has a high tolerance to salts.

Seeding time is usually November to February, depending upon the climate. Seeding rates of 70-130 lbs of unhulled or 18-36 lbs. of hulled seed per acre are used in Spain. The species grows slowly during the winter but developes quickly in the spring. It will persist for two to three years.

PI-283347 formed a beautiful plant 3" tall with a spread of 33", had moderately abundant prostrate stems and abundant leathery-textured leaves. It produced seed in June.

Hosackia subpinnata G.Don.

PI-283470 through PI-283473, all from South America (probably Chile), are fine-stemmed winter annuals differing from Lotus by having one leaf-like stipule. The species has a wide range of soils and is found in rainfall areas from 4" to 40".

The four accessions performed well, with one, PI-283472, maturing 30 days later than the rest. All plants exhibited characteristic shattering of seed and were 3" to 4" tall with a spread of 24" to 30".

Lathyrus pratensis L.

This species is native to Europe, Asia Minor and the U.S.S.R., occurring in meadows of the forested areas. It is claimed to be eaten by all types of livestock, with highest palatability when cut for hay.

PI-308028 from Czechoslovakia bloomed in July, but failed to set seed. The late August heat killed all plants. Plants were rhizomatous and had vines to 36".

Lathyrus sativus L. grass pea

This species has been used in the U.S.S.R. as a cover crop after sugar beets.

BN-18762 was a selection of brown seeds out of PI-183816 from Ethiopia, which proved to be much more vigorous and more productive than the other seed, which was mostly green in color. The plants had abundant stems and leaves; flowers had a blue banner, blue wings with pink trim, and an almost all-white keel. Plants grown from the green seeds had medium to few stems and leaves and a mostly all-white flower. Seed from the brown-seeded plants was all-brown to dark mottled.

Lathyrus sylvestris L. flat pea

This species is a rhizomatous cool hardy perennial herb, with short prostrate stems and toxic seeds. It is native to Europe and the Caucasus where it is sometimes cultivated for forage. It has been recommended for erosion control on cut-over or burned over areas in the United States.

PI-297357 from Norway has been growing for three years and still refuses to set seed. I suspect it requires a cooler climate. It has produced excellent cover, 12" x 40", having a short vine with many leaves and many rhizomes.

Lespedeza cuneata (Dumont) G.Don sericea lespedeza

PI-304132 from Okinawa failed to bloom the first summer - and then did not survive the winter. This probably was due to heavy soil conditions causing water to puddle around the plants.

Lotus caucasicus Kuprian

The species is a cool hardy perennial native to the alpine and subalpine meadows of European Russia and the Caucasus Mountains.

PI-314535 from the U.S.S.R. had abundant sub-erect to prostrate stems, with moderately abundant, soft, well-distributed leaves. It grew to 8" tall and had a 32" spread, bloomed in May and was cut in July. It made excellent regrowth and bloomed again by the middle of August.

Lotus corniculatus L. birdsfoot trefoil

Birdsfoot trefoil is native to temperate Europe and Asia. The genus is generally short-lived in this area (Beltsville) due to root rot.

Of nine accessions, PI-314704 from the U.S.S.R. failed to recover last spring. PI-315451, also from the U.S.S.R., had good spring growth (10" x 40"), but suffered severe disease or heat damage resulting in loss of many leaves and browning of stems during August. PI-316268 from Uruguay had fast recovery after being cut.

Lotus frondosus Freyn.

L. frondosus is native to the Caucasus, western Siberia and central Asia.

Three accessions of this species were grown, and apparently all suffered from crown or root-rot or other disease, as they were short-lived perennials, almost biennials. The best accession as to ground cover was PI-316272 from the Soviet Union, with a height of 3" and spread of 32". I would imagine cooler and drier climate would help this species.

Lotus pedunculatus Cav. big trefoil

PI-316273 from Portugal produced abundant stems and leaves, forming a mat 12" x 40". Seed potential looks good, both for seed quantity and recovery after cutting. PI-316274 from New Zealand via Australia was disappointing as it formed a dense carpet 10" x 50" but had very poor seeding habits.

Lotus tenuis Waldst. & Kit. narrowleaf trefoil

Three accessions of this species were grown, two of which were received as other Lotus species and reidentified. PI-316275 from Czechoslovakia via Australia had abundant stems and moderately abundant leaves, but was a slow grower the first year.

Medicago arabica (L.) All. spotted burclover

This species has a widespread distribution, including the U.S.S.R., much of Europe, Iran, Asia Minor and North Africa. Habitat is preferably moist sands and soft deposits along streams, but it does grow in clearings and occasionally in pastures and gardens. It can be used for fodder or green manure, and is of interest for winter culture in Soviet sub-tropical regions.

PI-227031 is a winter annual from Iran which had abundant, fine, prostrate stems with moderately abundant but very small fine leaves. The plants, which matured at a size of 3" tall by a 52" spread produced double flowers from January to April, matured by May. Verification of the species is being done. Chromosome number - 2N=16.

Medicago sativa L. alfalfa

Seed of M. sativa, PI-314368, was received as Medicago sp. from the U.S.S.R. Plants in the field have grown fairly well in spite of the fact that deer and rabbits kept the tops grazed off during the summer. The accession had good spring recovery and attained a height of 15", which reflects the deer grazing.

Medicago turbinata Willd.

The species is a winter annual legume preferring soils ranging from slightly basic to slightly acetic. It is a native of the eastern Mediterranean and is found most frequently in altitudes up to 600 meters. Plants are glandular and pubescent with open decumbent stems offering poor soil protection, but are early maturing and appear to make good winter growth.

PI-308064 from Czechoslovakia had abundant stems and leaves, bloomed in February and March and matured April through June in the greenhouse. It attained a size of 3" x 55".

Melilotus indicus All. Indian sweetclover

As described in the NPMC 1964 Annual Report, M. indicus is associated with the seaboard countries of the Mediterranean. PI-287894, an annual from Spain, was a quick-maturing, poor-performing legume here, with few stems and few leaves. It bloomed at the end of June, matured seed and died in mid-July.

Melilotus officinalis (L.) Lam. yellow sweetclover

This species has a widespread distribution from Central Asia and the European area of the Soviet Union to the Caucasus and Alps at elevations from 2000 to 2200m. above sealevel. Native stands are usually single plants, rarely in thickets. Plants are highly variable, from erect to prostrate.

Of the three introductions from the U.S.S.R. planted here, all were biennials, but we experienced high winter mortality on two accessions. PI-314465 bloomed two weeks earlier than PI-314284 and PI-314285.

Melilotus tauricus (Bieb.) Seringe Crimean sweetclover

This species has a very limited habitat, being confined to the southern seaboard of the Crimea, growing on coastal rocks, on mounds, among shrubs, and on gravelly soils.

Both our accessions, PI-308069 from Czechoslovakia and PI-314094 from the U.S.S.R. had 50% loss in plant numbers over the first winter. The plants remaining had a sub-erect growth with PI-314094 attaining a size of 26" tall by 35" spread. Both accessions had main stems with diameters of $\frac{1}{4}$". They bloomed in June and matured in July of the second summer.

Ononis arvensis L.

The species is common over Europe and Asia and is supposed to spread rapidly by rhizomes, but our plants of PI-315086 from the U.S.S.R. have remained almost solitary, with branching from the crown. The accession is a perennial and a very poor performer in the greenhouse here, with few stems and leaves and poor seed set - only 12 seeds in 1968. Plants are all very viscid. It leaves much to be desired.

Ornithopus isthmocarpus Coss.

This species is native to the Mostaganem Plateau of Morroco, growing in sandy areas with trees and brush.

PI-284133 from Morocco via Australia was grown in the greenhouse in No. 10 cans. The plants produced abundant prostrate stems and abundant, well-distributed soft leaves, forming a solid ground cover with an overall size of 8" tall and 84" wide. Seed pods have 5 to 6 segments and have a large 3/4" hook on the end of the pods. Seed collecting on a large scale would be hampered due to excessive shattering. O. isthmocarpus might make an excellent winter cover crop in some areas of the south.

Ornithopus sativus Brot. serradella

This species is a native of the Mediterranean region.

Eight accessions were grown in the greenhouse at the NPMC. All performed similarly, having abundant sub-erect to prostrate stems and abundant leaves. Mature size varied from 10" to 16" tall and 54" to 90" wide. PI-284135 from Portugal via Australia had the greatest total volume, being 16" x 90". All accessions looked very promising for cover cropping. Inoculation of seed is very important.

Poterium polygamum Waldst. & Kit.

The species is found in Spain growing from sea level to 1500 meters but prefers an altitude between 300 and 800 meters. It apparently is not compatible to arid and humid extremes of summer nor to high mountain climates. Preferring medium textured deep soils, it has a long range of pH tolerance from acid and neutral to basic.

PI-297947 and PI-297948 from the U.S.S.R. via Australia were tried here. Both are cool hardy perennials with erect to sub-erect stems and primarily basal leaves. PI-297947 was the better number for growth and survival, as well as in forming new rosettes of leaves by mid-October.

Sanguisorba minor Scop. burnet

S. minor is a deep rooted perennial, native to Europe, and first cultivated in England about 1760 as a pasture plant. It has adapted itself to New England areas in the United States, especially on lime-rich soils.

PI-314325 from the U.S.S.R. acted much like a biennial, attaining maturity during the second growing season and then dying. PI-314550, also from Russia, died during the second year after yielding seed but not until after a severe hot spell in August. Seed head heights were 22" and 18" respectively.

Sanguisorba officinalis L.

A native of Europe existing in damp places in grassland up to 1500 ft., it ranges from Iceland and Spain to temperate Asia and Japan.

Compared to other Sanguisorba and Poterium species grown in 1968, PI-312470 from the U.S.S.R. outperformed them all by producing abundant stems and abundant leaves to 24" high on the stems. Seed head height was 34". This species had high mortality during the first two years as did S. minor, probably due to root rot.

Herbariums of all Poterium polygamum and Sanguisorba officinalis accessions were submitted for identity verification.

Stylosanthes gracilis HBK. tropical lucerne or stylo

This species is a native of tropical South America where it is a perennial to 3 ft. tall. Plants will root at the nodes and become woody if not grazed or cut. Species has a wide range of adaptability from dry to very wet areas, but does not tolerate boggy or swampy conditions; it will tolerate acidity.

PI-283994 from Brazil via Australia was grown unsuccessfully in our greenhouse. It grew to 9" tall with sub-erect growth spreading to 24", but failed to produce seed and eventually died.

Trifolium alexandrinum L. berseem clover

This winter annual species is probably a native of Asia Minor, and has spread rapidly around the Mediterranean area. Egypt grows large acreages of berseem clover, mostly for green fodder and hay.

Of the three new accessions grown (PI-283995 from Israel; PI-283996 from Morocco; and PI-283997 from Italy, all received via Australia), PI-283995 'Fahli', a tall, dryland type, proved to be perfectly non-shattering. It grew to 55" tall, had abundant hollow stems and moderately abundant soft leaves. PI-283997 had coarse stems to $\frac{1}{2}$" in diameter. The species is weakly self-pollinated.

Trifolium alpestre L. owl-headed clover

Native to mountain woods and pastures in the Mediterranean region at altitudes between 1900 and 2300 meters.

PI-308075 from Czechoslovakia was a poor performer here at Beltsville. It is a cool hardy perennial having very short rhizomes which looks like a small bunchy plant. Our plants bloomed in June and matured in July, with a very poor seed yield. Only two very weak plants remained alive in September 1968.

Trifolium ambiguum Bieb. kura clover

Originally from the lower mountains of the Caucasus and Armenia, this species is a cool hardy perennial with creeping rhizomes which will tolerate inundation, high water table, trampling and grazing.

Three accessions - PI-284000 from the U.S.S.R., PI-284002 from Turkey and PI-284005 also from Turkey - were grown for three years, and we were still unable to obtain seed, except for a trace from PI-284005 in 1967. All accessions had poor survival, with PI-284002 completely winterkilling. Growth on the few plants of the other accessions remaining alive is poor.

Trifolium apertum Bobr.

This annual species is found among shrubs and in edges of forests and meadows in Asia Minor. It is grown for fodder in southern U.S.S.R.

PI-314117 from Russia formed small clumps 9" tall by 6" wide, with few stems and leaves. The plants bloomed in July and seed matured by early August, after which the plants died.

Trifolium burchellianum Ser.

This species is described in the 1965 NPMC Annual Report as being found in moist forest edges of Kenya at altitudes of 1800 to 4000 meters.

One new accession, PI-300148 from South Africa, was stoloniferous with few stems and moderately abundant leaves. Mature size was 5" tall with spread of 15". Flowers were purple and very little seed was set. Being a warm perennial, it did not survive the winter.

Trifolium fragiferum L. strawberry clover

This native of Europe, Asia Minor and North Africa is found on wet pastures and meadows with heavy soils, usually alkaline in nature. Chromosome number is 2N=16. The species is usually found in association with Cynodon dactylon, also with Lolium perenne, Phleum nodosum, Poa annua, Trifolium pratense and Tetragonolobus siliquosus in fields heavily trampled and grazed.

Of the three accessions grown, PI-314755 and PI-314938 from Russia and PI-316347 from Afghanistan via Australia, the latter is the most promising. It had no injury from winter or summer, formed a solid mat 6" tall by 25" wide, and had abundant stems and leaves. It also set an excellent seed crop.

Trifolium hirtum All. rose clover

A native of the Mediterranean region and Asia Minor, this annual species prefers slightly acid to neutral soil over the basic ones, and its growth is restricted to elevations less than 800 meters. Frequent associations are with Trifolium campestre, Anthyllis cornicina, Trifolium cherleri, Anthyllis lotoides, Dactylis glomerata, Ornithopus compressus and Scorpiurus subvillosa.

PI-284269 through PI-284272 from Cyprus, Bulgaria and Morocco respectively (all received via Australia) were greenhouse grown. Of these, PI-284270 had very little to no shattering of mature seed; PI-284271 was a dwarfed, early-maturing accession. All had abundant stems and leaves and set seed easily, being self-fertile. Size varied considerably from a 6" x 18" for PI-284271 to 10" x 45" for PI-284270.

Trifolium hybridum L. alsike clover

The species is a native of Europe, Transcaucasia and part of Asia Minor.

Three accessions - PI-308081 from Czechoslovakia, PI-316348 from Turkey, and PI-316349 from Argentina via Australia were grown. PI-308081 had the most vegetative growth, 9" x 22", while PI-316348 and PI-308081 were about equal in seed production. All accessions died - probably from root rot.

Trifolium incarnatum L. crimson clover

PI-292825 from Sweden was grown as a summer annual here at the NPMC. It had moderately abundant stems and leaves and attained a size of 10" tall and spread of 10". The plants bloomed in June and seed was collected primarily in July. By mid-August, all plants were dead.

Trifolium pratense L. red clover

PI-310459, PI-310460 and PI-310465 from Switzerland and PI-314936 from the U.S.S.R. performed about the same, and acted much like annuals or biennials for us. Growth habit of stems and leaves was greatly altered due to continuous grazing by deer.

Trifolium repens L. white clover

PI-314762 and PI-314764 from the U.S.S.R. were grown, and both produced nice mats of vegetation 16" and 22" wide respectively. PI-314762 winter-killed after setting a good crop of seed, and PI-314764 had severe loss and considerable weakening of vigor.

Another accession, PI-340658 (a contaminant from a packet of seed of T. pratense from the U.S.S.R.) was grown. Performance was similar to the above accessions.

Trifolium resupinatum L. Persian clover

Persian clover is a native of southern Europe, North Africa and eastward to Transcaucasia and Iran. This annual to biennial species grows in damp places, generally from sea level to 800 meters. Soil preference is a slightly acid, medium-textured sandy soil. It is found frequently growing with Agrostis castellana and Lotus pedunculatus.

Six accessions were grown in greenhouse culture, including PI-305517 through PI-305522 which are all varieties from Iran. All plants were 60" to 80" tall and all except PI-305522 had soft, hollow stems up to ½" diameter. Seed production was excellent, as the bumble bees were attracted and did their part.

Vicia cracca L. birdvetch

This cool hardy perennial is a native of northern Europe and Asia to Japan, Iceland and Greenland. It grows on slightly acid soils, mostly in altitudes between 600 to 1500 meters.

Seed of PI-314350 was received as Vicia sp. from the U.S.S.R. The plants grown here were rhizomatous and attained a size of 72" tall and spread to 100". The dense, climbing vine was very leafy and succulent and never became woody at the base. The species looks very promising for future conservation use in cool areas. Pollination habit is selfed, but seed will not be set during high temperatures. Chromosome number - 2N=14, 28.

Vicia tenuifolia Roth bramble vetch

Native to elevated areas of the southern range in Cyprus, this accession, PI-314349 from the U.S.S.R., was received as Vicia sp. The plants were very rhizomatous with vines to 4 feet. With few stems and moderately abundant leaves, this accession never attained great leaf or cover density. The species is self-pollinated, but is a very poor seed setter under greenhouse conditions.

Vicia venosissima Nakai

Native habitat of this species is probably restricted to the Far East, although information is lacking as to exact native habitat, soil and climatic conditions preferred and other plants usually associated with the species.

PI-317310 was grown for Dr. C. R. Gunn, NCRB, from seed collected in Korea. The plants had only a few short, viny stems to 36", and very few leathery leaves which remained chlorotic until after a small seed crop was collected. All flowers had to be tripped. They were light orange to white and produced on a raceme. Only 34 seeds were collected. The species showed very little conservation value.

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SUMMARY OF REIDENTIFICATIONS - 1968

BN- or Other No.	PI No.	Original Identification	Reidentified as:
PM-WY-276	-	Undetermined grass sp.	Agropyron riparium Scribn. & Smith
P-15594	-	Elymus sp.	Elymus triticoides Buckl.
HA-179	-	Cenchrus sp. 'Pango'	Cenchrus ciliaris L.
-	106663	Digitaria sp.	Digitaria pentzii Stent
Cor-7-65	-	Phalaris sp.	Phalaris aquatica X P. arundinacea
T-1051	-	Indigofera sp.	Indigofera leptosepala Nutt.
6877	190328	Panicum sp.	Panicum coloratum L.
8346	221955	Puccinellia sp.	Puccinellia distans (L.) Parl.
8636	237128	Axonopus compressus	A. compressus var. australis G.A.Black
10450	257681	Briza sp.	Briza maxima L.
10763	131901	Liriope planiscarpus var. leucanthus	Liriope graminifolia (L.) Bak.
10764	254924	Liriope spicata	Liriope graminifolia (L.) Bak.
10777	316321	Phalaris hybrid	Phalaris aquatica X P. arundinacea
10997	315726	Panicum virgatum var. cubense	*Panicum dichotomiflorum Michx.
11059	315715	Lathyrus venosus var. meridionalis	Tephrosia virginiana (L.) Pers.
11519	269891	Agropyron sp.	Agropyron striatum Nees ex Steud.
12037	276033	Eragrostis atherstonei	Eragrostis horizontalis Peter
13881	289643	Poa pratensis	Poa silvicola Guss.
14426 thru 14431	292456 thru 292461	Phleum subulatum	Phalaris aquatica L.
15480	299044	Setaria phanerococca	Setaria sphacelata (Schum.) Stapf & Hubb.
15689	253191	Deschampsia sp.	Deschampsia flexuosa (L.) Trin.
15870	-	Undetermined grass sp.	Ampelodesmos mauritanicus (Poir.) Dur.& Schinz
15871	340774	Agropyron desertorum	Bromus japonicus Thunb.
15886	302947	Phalaris aquatica	Phalaris minor Retz.
16511	309929	Andropogon condensatus	Andropogon microstachyus Desv. ex Hamilt.
16512	309930	Andropogon condensatus	Andropogon microstachyus Desv. ex Hamilt.
16514	309932	Andropogon lateralis	Andropogon microstachyus Desv. ex Hamilt.
16515	309933	Andropogon paniculatus	Andropogon microstachyus Desv. ex Hamilt.
16516	309935	Andropogon virgatus	Andropogon condensatus HBK.
16575	310008	Eragrostis sp.	Eragrostis lugens Nees

*Determination based on herbarium submitted by W-6, Pullman, Washington

SUMMARY OF REIDENTIFICATIONS - 1968

BN- or Other No.	PI No.	Original Identification	Reidentified as:
16577	310010	Eragrostis sp.	Eragrostis expansa Link
16580	310013	Eragrostis sp.	Eragrostis lugens Nees
16581	310014	Eragrostis sp.	Eragrostis lugens Nees
16598	310031	Panicum sp.	Panicum bergii Arech.
16600	310033	Panicum sp.	Panicum bergii Arech.
16602	310035	Panicum sp.	Panicum bergii Arech.
16604	310037	Panicum sp.	Panicum bergii Arech.
16609	310042	Panicum sp.	Panicum milioides Nees & Trin.
16610	310043	Panicum sp.	Panicum milioides Nees & Trin.
16613	310046	Paspalum boscianum	Paspalum cf. quadrifarium Lam.
16689	310122	Paspalum mondiocanum	Paspalum pumilum Nees
16817	310250	Paspalum pumilum	Paspalum mondiocanum Trin.
16858	310291	Paspalum sp.	Paspalum plicatulum Michx.
17397	314174	Poa sp.	Poa silvicola Guss.
17408	314202	Agropyron sp.	Agropyron cf. leptourum (Nevski) Grossh.
17409	314203	Agropyron sp.	Agropyron drobovii Nevski
17446	314313	Poa sp.	Poa sterilis Bieb.
17449	314349	Vicia sp.	Vicia tenuifolia Roth
17490	314938	Trifolium sp.	Trifolium fragiferum L.
17534	314614	Agropyron sp.	Agropyron ugamicum Drob.
17543	314646	Bromus sp.	Bromus benekenii (Lange) Trimen
17545	314648	Bromus sp.	Bromus benekenii (Lange) Trimen
17553	314672	Elymus sp.	Elymus angustus Trin.
17556	314675	Elymus sp.	Elymus junceus Fisch.
17560	314680	Elymus sp.	Elymus dahuricus Turcz.
17574	314724	Oryzopsis sp.	Lasiagrostis caragana Trin. & Rupr.
17628	315397	Bromus sp.	Bromus riparius Rehm.
17739	316174	Bromus marginatus	Bromus unioloides HBK.
17808	316271	Lotus corniculatus ssp. presslii	Lotus tenuis Kit.
17861	316331	Phalaris arundinacea	Phalaris aquatica L.
18211	321087	Pennisetum sp.	Pennisetum typhoides (Burm.) Stapf & Hubbard

National Plant Materials Center

Domestic Distribution of Seed in 1968

Genera	Number of Packets Distributed to:			
	North-east	Mid-west	South-east	West
Acacia			1	1
Adesmia			1	2
Agropyron	36	6	2	41
Agrostis	5	2		
Alopecurus	6	3	2	7
Andropogon	12			
Arachis				1
Arrhenatherum	5	1		
Astragalus	7	4		1
Bothriochloa	14	1	1	3
Bouteloua	4			
Brachiaria			2	1
Brachypodium			2	6
Bromus	40	57	10	31
Cajanus			1	
Calamagrostis	2	2		2
Canavalia			3	
Cenchrus			13	
Chloris			12	12
Clitoria				1
Coronilla	8	2	3	4
Cotoneaster	3	3	2	
Crotalaria			4	
Dactylis	10	7		3
Dactyloctenium	1		3	
Desmodium			6	5
Digitaria			2	17
Dorycnopsis			1	
Echinochloa			21	
Elaeagnus			1	
Eleusine	1			
Elymus	9		2	11
Eragrostis	33		50	55
Festuca	47	30	6	23
Fingerhuthia				7
Glycine			6	8
Hordeum			1	1
Hyparrhenia			4	5
Indigofera			2	2
Lathyrus	15		2	1

National Plant Materials Center

Domestic Distribution of Seed in 1968

Genera	Number of Packets Distributed to:			
	North-east	Mid-west	South-east	West
Lespedeza	26		5	
Leucaena			1	
Lolium	21	53	8	51
Lotus	41	20	1	35
Lycium	2			
Medicago	1		3	4
Melilotus	4	1		3
Melinus			1	1
Miscanthus			1	
Myrica			1	1
Ornithopus	2		2	1
Oryzopsis				6
Osteospermum			1	1
Pachyrhizus			2	
Panicum	82	3	57	39
Paspalum	1		1	36
Pennisetum			5	4
Phalaris	12	4	4	27
Phaseolus			1	1
Phleum	5	2		
Poa	19	15		8
Poncirus	1			
Pueraria			2	
Sanguisorba	17			14
Setaria	7		9	2
Sorghastrum	1			
Sporobolus			3	1
Stylosanthes			11	12
Tetrachne			3	3
Tetragonolobus	3	3	3	2
Thuarea			2	
Trifolium	17	13	13	21
Tripsacum	1			
Vicia	11		24	54
Zoysia			2	
TOTALS	532	232	332	578

TOTAL GENERA: 75

TOTAL PACKETS: 1674

National Plant Materials Center

Bulk Seed Shipments

1968

BN No.	Species	Amount (Lbs.)
9026	Ammophila breviligulata	6
9344	Bromus arvensis 'Svalof'	22
8299	Castanea mollissima	15
5201	Coronilla varia 'Emerald'	1
8094	Coronilla varia 'Penngift'	1
----	Eragrostis curvula	20
8009	Erianthus ravennae	2
10774	Indigofera pseudotinctoria	2
8379	Lespedeza bicolor 'Natob'	6
8569	Lespedeza cuneata	0.5
9249	Lespedeza cuneata	1.5
10849	Lespedeza cuneata	0.5
11400	Lespedeza cuneata	1.5
12112	Lespedeza cuneata	0.5
14651	Lespedeza cuneata	3
9250	Lespedeza X intermixta	3
3542	Lespedeza japonica intermedia	5
15034	Lespedeza serpens	1
2258	Panicum amarulum	1.5
8360	Panicum amarulum	140
8354	Panicum virgatum	19
8574	Panicum virgatum	35
8624	Panicum virgatum	11.5
9195	Panicum virgatum var. cubense	1.5
13654	Panicum virgatum var. cubense	.75
18582	Panicum virgatum var. cubense	1.5
3490	Quercus acutissima	42
18947	Quercus acutissima	15
17970	Zoysia japonica	1

Other Shipments

Foreign..... 296 packets

Interagency & Other..... 1142 packets