



PLANT MATERIALS TODAY

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This is a quarterly field office newsletter to transfer plant materials technology, services, and needs. The plant materials personnel will be featuring short articles on project results, new cultivar releases and establishment techniques, seed collection, and field planting needs, etc. All offices are encouraged to submit articles about plant material-related activities relative to plant performance, adaptation, cultural and management techniques, etc.

COOPERATIVE EVALUATION OF INNER MONGOLIA, PRC, GRASSLAND GERMPASM IN THE WESTERN USA

Replicated dryland studies were established at three USDA, NRCS, Plant Materials Centers in the USA northern intermountain west by Chinese and American scientists. Forty-six Asian and 16 USA grasses, legumes, and shrubs were included. These plantings were evaluated for vigor, percent stand, and foliage height in 1994 and 1995, and for biomass production in 1995.

Bridger, NIT PMC 1994 Planting. Twelve grass accessions maintained a 60% or greater stand through 1995: 'Rosana' *Pascopyrum smithii* (73%); 'Bozoisky-Select' *Psathyrostachys juncea* (67%); 'Critana' *Elymus lanceolatus* ssp. *lanceolatus* (67%); 9057961 (62%), 9058216 (63%), and 9075989 (67%) *Hordeum brevisubulatum*; 'Pryor' *Elymus trachycaulus* ssp. *trachycaulus* (62%); 'Hycrest' *Agropyron cristatum* X *desertorum* (60%); 9058214 *Elymus ciliaris* (62%); 9057959 *Elymus tangutorum* (60%); 9075984 (63%) and 9057955 (60%) *Elymus dahuricus*; and 9058217 *Stipa grandis* (63%). Only one accession 9069980 *Leymus racemosa* failed to establish any plants, probably due to poor seed viability.

The highest forage-producing accessions in 1995 were Hycrest *Agropyron cristatum* X *desertorum*, 7821 kg ha⁻¹ (6976 lbs/a); Rosana *Pascopyrum smithii*, 7415 kg ha⁻¹ (6614 lbs/a); 'Bannock' *Elymus lanceolatus* ssp. *lanceolatus*, 7127 kg ha⁻¹ (6357 lbs/a); and 9058207 *Agropyron desertorum*, 6789 kg ha⁻¹ (6056 lb/a). The lowest yield was for 540441 *Elymus arenarius*, at 143 kg ha⁻¹ (128 lbs/a).

'Lutana' *Astragalus cicer*, 9057946 and 9075988 *Astragalus adsurgens*, and Spredor III *Medicago sativa* were the highest ranked legume species in 1995, with greater than 48% stand. These three accessions produced more than 4419 kg ha⁻¹ (3942 lbs/a) air-dry forage.

Aberdeen, ID PMC 1994 Plantings. Nine accessions of grasses had greater than 80% stands in 1995. They were 9058210 (93%) and 9075984 (85%) *Elymus dahuricus*; Rosana *Pascopyrum smithii* (88%); 9075989 *Hordeum brevisubulatum* (85%); 9075983 *Leymus chinensis* (83%); Critana (82%) and Bannock (81%) *Elymus lanceolatus* ssp. *lanceolatus*; 9058212 *Elymus nutans* (81%); 9057959 *Elymus tangutorum* (81%). The best forage-producing accessions were Hycrest *Agropyron cristatum* X *desertorum*, 9380 kg ha⁻¹ (8367 lbs/a); 9058211 *Elymus exelsus*, 8560 kg ha⁻¹ (7636 lbs/a); 9058210 *Elymus dahuricus*, 8350 kg ha⁻¹ (7448 lbs/a); and Rosana *Pascopyrum smithii*, 8190 kg ha⁻¹ (7305 lbs/a). The lowest-producing grass accession was 9058217 *Stipa grandis*, 1180 kg ha⁻¹ (1053 lbs/a).

Stand percentages for the legume species ranged from 100% for Spredor III *Medicago sativa* to 47% for 9075986 *Melissitus ruthenicus*. Forage production for the legume accessions were Spredor III *Medicago sativa*, 8760 kg ha⁻¹ (7814 lbs/a); Lutana *Astragalus cicer*, 8450 kg ha⁻¹ (7537 lbs/a); 9057988 and 9057946 *Astragalus adsurgens*, 6080 kg ha⁻¹ (5423 lbs/a) and 5650 kg ha⁻¹ (5040 lbs/a), respectively; and 9075986 *Melissitus ruthenicus*, 1720 kg ha⁻¹ (1534 lbs/a).

Pullman, WA PMC 1994 Planting. Fifteen grass accessions had greater than 70% stands in 1995: Hycrest *Agropyron cristatum* X *desertorum* (92%); 'Schwendimar' *Elymus lanceolatus* ssp. *lanceolatus* (88%); 9058211 (80%), 9057956 (70%), and 9057957 (77%) *Elymus exelsus*; 9058212 *Elymus nutans* (85%); 9058207 *Agropyron desertorum* (85%); 9058214 *Elymus ciliaris* (77%); 9058209 *Agropyron sibiricum* (87%); Pryor *Elymus trachycaulus* ssp. *trachycaulus* (87%); Rosana *Pascopyrum smithii* (90%); Bannock *Elymus lanceolatus* ssp. *lanceolatus* (78%); P-27 *Agropyron fragile* ssp. *sibiricum* (73%);

9075984 *Elymus dahuricus* (72%); and 540441 *Elymus arenarius* (73%).

Hycrest Agropyron cristatum X desertorum had the highest forage production at 15,993 kg ha⁻¹ (14,266 lbs/a). An additional four accessions produced more than 9000 kg ha⁻¹ of air-dry forage. They were Schwendimar *Elymus lanceolatus ssp. lanceolatus* 13,270 kg ha⁻¹ (11,837 lbs/a); 9058211 *Elymus excelsus*, 11,848 kg ha⁻¹ (10,568 lbs/a); 9058212 *Elymus nutans*, 10,879 kg ha⁻¹ (9704 lbs/a); and 9058207 *Agropyron desertorum*, 9250 kg ha⁻¹ (8251 lbs/a).

Percent stand for the legume accessions ranged from 93% for Lutana *Astragalus cicer* to 62% for Spredor III *Medicago sativa*. Forage production varied from 8459 kg ha⁻¹ (7545 lbs/a) for Spredor III to 4900 kg ha⁻¹ (4371 lbs/a) for 9057946 *Astragalus adsurgens*.

Conclusion

Preliminary results of the Chinese accessions planted at the three USA locations show several Asian species have potential for pasture improvement, reclamation, and sustainable cropping systems in the USA intermountain west. Generally, USA grasses outperformed Asian grasses, while Inner Mongolian legumes show the highest potential for use in the intermountain west. Species which completed much of their active growing period in the spring were able to escape summer drought. Summer drought is characteristic of the intermountain west and could limit long term adaptation of those introduced species exhibiting summer active growth.

John Scheetz and Susan Winslow

OUTER MONGOLIA EVALUATION PLANTING

In August 1992, Scott Peterson, National PMC, and Theresa Flessner, Oregon PMC, visited Outer Mongolia and made seed collections. The seed was sent to the Bridger PMC for planting and evaluation. The purpose of the cooperative work between the Mongolian Ministry of Agriculture, Research Institute of Animal Husbandry, Department of Forage, and the NRCS is to: Cooperatively evaluate plant materials for use in restoring or improving grasslands in the arid and semi-arid zones of Mongolia and the United States.

Seeds of 15 accessions were assembled and planted into 10 cubic inch Cone-tainers™ in the greenhouse

at the Center on May 12, 1993. The plants overwintered in a plastic-covered hoop house and were transplanted into Field 11 on July 25, 1994. Due to differences in the number of plants per species, field row spacing and row length were adjusted accordingly. The plots were sprinkler irrigated twice in 1994 and 1995 at approximately 40 mm (1.5") per treatment and weeds were removed mechanically and by hand-rogueing. Plots were evaluated for survival, vigor, and height on September 29, 1994 and on July 26, 1995. Seed harvest occurred at various times in 1995.

Results

The advanced transplanting date in 1994 proved less than optimum and the plants had not fully recovered from transplant shock at the time of evaluation. Overall survival in the establishment year, however, was 95.7 percent for the grasses, 97.8 percent for the forbs, and 86.5 percent for the shrub species. The average grass and forb vigor was "fair", while shrub vigor was "good". Plant height for the grasses ranged from 5 to 13 centimeters, average forb height was 3.3 centimeters, and shrub height was 8 centimeters.

In 1995, grass survival declined to 78.2 percent (*Leymus racemosa* 9069980 completely died-out), forbs to 68.8 percent (herbicide overspray on the *Astragalus* contributed to a portion of the decrease), while shrub survival was reduced to 43.8 percent. Grass vigor improved to "good", forbs remained "fair" (despite the herbicide damage), and shrub vigor, however, declined to "poor". The height of the grasses improved considerably and ranged from 15 to 80 centimeters, the forbs were 15 to 70 centimeters tall, and the shrub measured 27 centimeters.

In anticipation of future advanced evaluation plantings, seed was collected from eight grass species. Seed production in late summer 1995 ranged from 1,146 grams for slender wheatgrass (*Elymus trachycaulus*), less than one hundred grams each for wheatgrass (*Agropyron spp.*), foxtail (*Alopecurus brachystachus*), Colorado false needlegrass (*Ptilagrostis mongholica*), and trace amounts for needlegrass (*Achnatheum splendens*), *Cleisfogones squarrosa*, Altai wildrye (*Leymus angustus*), and *Leymus secalinus*. Seed will continue to be collected over the life of the planting.

Susan Winslow

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