COOPERATIVE EVALUATION OF WESTERN HEMISPHERE GRASSLAND GERMPLASM IN INNER MONGOLIA , PRC

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ABSTRACT

Replicated studies were established jointly by Chinese and American scientists in central Inner Mongolia. Both Asian and North American plant materials were included. Results of the Chinese plots show USA saline-tolerant species have potential to assist the Chinese with saline soil reclamation. On saline sites, USA cultivars rated the best stands and had the highest yields. Generally, Chinese desert steppe species outperformed USA upland entries with the Chinese legumes establishing the best stands and producing the most biomass.

KEYWORDS

Inner Mongolia, desert steppe, germplasm, evaluation, saline

INTRODUCTION

The semi-arid and arid grasslands of Inner Mongolia and the western United States are ecologically similar in structure and function (Dewey, 1983). A cooperative project was initiated between the Grassland Research Institute, Inner Mongolia, People's Republic of China and the USDA Natural Resources Conservation Service, Bridger Plant Materials Center (PMC), Bridger, Montana, USA in 1988. The major objective of the cooperative program was to evaluate and select plant materials to restore steppe, shrub-steppe, saline bottomlands, and open woodland sites in the arid and semi-arid zones of the two countries.

METHODS AND MATERIALS

Seven hundred five plots were planted with a single-row hand planter at four locations within the desert steppe ecosystem of Inner Mongolia in June 1991 and 1992. Each of the 85 Chinese and USA accessions and cultivars were planted in four rows, six meters long, and were replicated three times. Row-spacing widths were 30 cm for grasses, 60 cm for legumes, and 120 cm (47.2 in) for shrubs. All plantings were planted into dryland cultivated plots and relied on the natural environmental conditions for establishment and survival. The planting sites' environments range from sandy- to clayey-textured soils, from saline to non-saline, from 135 mm to 400 mm mean annual precipitation and 1039 m to 1375 m in elevation at 40°-42°N latitudes.

All the plant entries have been evaluated for vigor, percent stand, and foliage height since planting. Forage yield has been sampled beginning the year after establishment.

RESULTS AND DISCUSSION

Plant performance results are based on the mean of three replications evaluated during 1991-1995. Only the top ranked plant entries at each location will be discussed.

Huhehot. Due to below-average 1991 growing-season precipitation, a severe weed infestation within the plots, and rodent grazing, most of the 85 plant entries did not establish good stands. *Melissitus ruthenicus* (L.) I.Y. Latsashvili, *Agropyron mongolicum* Keng, *Agropyron desertorum* (Fisch. ex Link) J.A. Schultes, and *Agropyron sibiricum* (Willd.) Beauv. were the highest ranked species in 1995, with greater than 30% stands, and producing more than 359 kg ha^{-1}. Air-dry forage. *Astragalus adsurgens* Pallas from Chiefeng produced 483 kg ha^{-1}. *Agropyron mongolicum* Keng had the best yield at 747 kg ha^{-1}.

The replant in 1992 established a high percentage of the 85 plant entries. *Astragalus adsurgens* Pallas, *Agropyron mongolicum* Keng, *Achnatherum splendens* (Trin.) Nevsid, and *Melissitus ruthenicus* (L.) I.Y. Latsashvili accessions had the highest yields, more than 975 kg ha^{-1}, with *Astragalus adsurgens* Pallas yielding the most at 2960 kg ha^{-1}. *Astragalus adsurgens* Pallas, *Caragana microphylla* Lam., *Lespedeza davurica* (Laxm.) Schindler, and *Melissitus ruthenicus (L.)* I.Y. Latsashvili all rated 50% or greater stands.

Dalad Qi. Twenty of twenty-eight plant entries established plants on this saline site in 1991. *Achnatherum splendens* (Trin.) Nevski has maintained the best stand rating through 1995.

Linhe. 'Tyrell', 'Jose', and 'Alkar' *Thinopyrum ponticum* (Podp.) Barkworth and Dewey and 'Arriba' *Pascopyrum smithii* (Rydb.) A. Love established the best stands on this saline site. 'Largo', Tyrell, Jose, and Alkar *Thinopyrum ponticum* Podp.) Barkworth and Dewey and *Hordeum brevisubulatum* had the highest yields, with Jose yielding 3005 kg ha^{-1}.

Zhaohe. *Caragana microphylla* Lam, *Astragalus adsurgens* Pallas, *Melissitus ruthenicus* (L.) I.Y. Latsashvili, *Lespedeza potaninii* Vassillev, and *Lespedeza davurica* (Laxm.) Schindler had greater than 50% stand ratings on this dryland site. *Agropyron mongolicum* Keng had the best yield of 244 kg ha^{-1}.

Overall, the Chinese grasses and legumes outperformed the USA plant materials in Inner Mongolia. However, early results indicate USA species/cultivars have the potential to assist the Chinese with saline soil reclamation.

These studies in Inner Mongolia are scheduled for evaluation through

1998. The summarization of study results at that time will validate plant performance, and seed production will begin for additional large-scale plantings in both countries.

REFERENCES

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