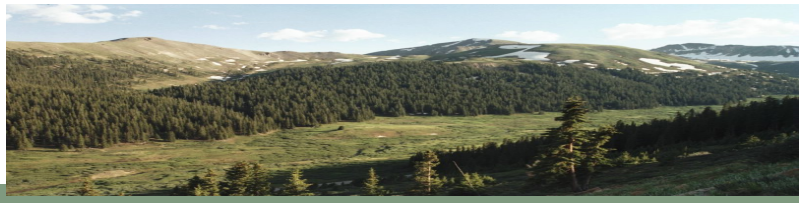
High Altitude Plant Materials



United States Department of Agriculture
Natural Resources Conservation Service

UPPER COLORADO ENVIRONMENTAL PLANT CENTER — MEEKER, COLORADO

Volume 1, Issue 1 — Summer 2008

Miller Creek Conservation Planting

Area below ditch before

Same area after

In 2002, the Miller Creek Ditch, a major irrigation ditch in the upper White River Valley, was partially destroyed from a landslide. Because of the early discovery and quick action by the local NRCS field office, NRCS area engineer, Farm Service Agency, and shareholders of the ditch company, the ditch was repaired and some irrigation benefit was realized before the end of the growing season. An emergency request for reseeding the repaired slopes above and below the ditch was received by UCEPC in June 2002. The success of the seeding was deemed critical to prevent further erosion and potential damage to the ditch banks. The location of the damaged area of the ditch is elevated approximately 200 feet above the White River. It was feared that any compromise to the structural integrity of the ditch could result in significant detrimental effects to the White River and the entire slope below the area of ditch repair.

The objectives of the critical area revegetation work were to (1) establish a vegetative cover over the bare slopes above and particularly below the Miller Creek Ditch; (2) select a species mix that would persist on a steep, north facing slope and one that would (3) reduce the likelihood of future site erosion.

After repairs were completed to the contour areas below the ditch, personnel from UCPEC, members of the ditch company and the local NRCS field office planted 250 PLS pounds of grass seed on 18 acres of disturbance. On September 5, 2002, a mixture of 14 cultivars with demonstrated performance was broadcast by hand and by the use of an ATV broadcast planter on slopes that were approximately 1.5 to 1. Seeding below the ditch was done largely with an ATV broadcast seeder. The site was too steep and had too poor of access to seed with conventional equipment. The perimeter of the repaired slope, areas too steep for the ATV and the critical area along the ditch were over seeded by hand held broadcast seeders. The area above the ditch was entirely hand broadcast.

A recent evaluation revealed excellent results from the seeding. The seeded area below the ditch had approximately 85 percent cover, 10 percent litter and 5 percent bare ground. A combination of western, intermediate, slender and thickspike wheatgrass, meadow and mountain brome, and sheep fescue was used for the mixture. Most of the wheatgrasses were identified and were well represented in the established stand. The seeded slope below the ditch appears to be stabilized, and further soil erosion on this slope should be minor.

High Priority Areas

Presently, there are many plant species and projects at the UCEPC which our Technical Advisory Committee has identified as providing substantial benefit for resource conservation. These projects fall into one of five identified High Priority Areas:

- Revegetation of high altitude and disturbed land
- Increased productivity of rangeland and pastures
- Improved water quality
- Wildlife habitat
- Use of native plants in xeriscape and horticulture

Inside this issue:

Repaired ditch prior to reseeding

Vegetated ditch bank

Establishment above the ditch is less dramatic. The site is steeper, 2:1, with less topsoil and is not as critical an area as the slope below the ditch. Nonetheless, there is some continuing erosion on this slope and a better stand of vegetation would be desirable. We were not able to cross the ditch to evaluate more closely, but from a distance of 25 feet it appeared that the cover was approaching 30 to 35 percent. Cottonwoods and especially willows along with redtop, orchardgrass, reed canary grass and some sedges were coming in nicely on their own along the ditch. There were even a few tamarisk plants that had established.

The results of a broadcast planting done in early September with a mixture of well know grass cultivars on a critical site were very impressive. Because of the importance of establishing a cover component, a broad array of cultivars was selected. If the prevention of erosion along the lower slope of the ditch could not be accomplished from seeding, a much more expensive and elaborate approach would have been necessary.

Thankfully, the seeding was successful. Important factors in the successful seeding include the seed mixture, the time of seeding, and the condition of the soil surface at the time of seeding.

Steve Parr and Rodney Dunham Below Miller Creek Ditch

Smooth Brome Grass

For many decades, thousands of acres of smooth brome grass have been seeded for irrigated pastures in the central Rocky Mountain region. More recently, smooth brome has been seeded into non-irrigated situations for hay production and as a vegetative cover on disturbed sites. Smooth brome consists of aggressive, sod forming southern types and mildly aggressive, northern types. Sod forming smooth bromes, especially when used in dryland applications for pastures, have a tendency to become "sod-bound". These sod bound sites produce substantially less than they are capable of. Other species, namely meadow brome, is now often used as a replacement for smooth brome in irrigated pastures because of comparable forage characteristics but with a less aggressive, sod forming nature.

The purpose of this study was to compare two commonly used smooth brome grass varieties, Lincoln and Manchar, to Liso, an experimental collection, under non-irrigated conditions. Forage production, forage quality and vegetative comparisons were done at Upper Colorado Environmental Plant Center, six miles southeast of Meeker, Colorado.

The results of evaluations showed a trend for production by accession to favor those products that spread laterally more favorably than the 'Liso' material which was noted to remain more centered along the planted row (northern type of smooth brome). Visual assessments were made on the percent spread from the center line of the seeded rows.

Results are listed in Figure 1 for percent spread by plot and product.

Figure 1

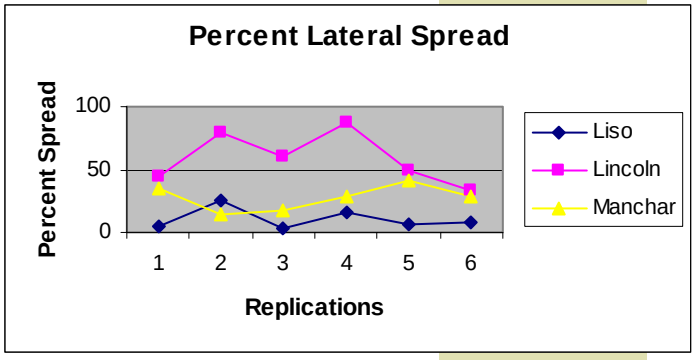
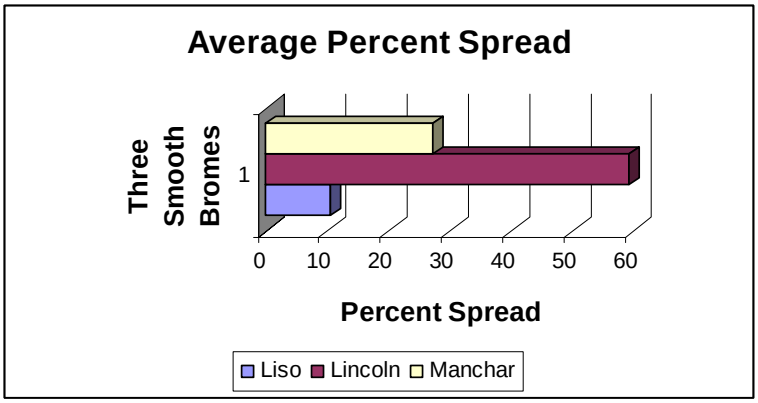


Figure 2

Lateral Spread of Three Smooth Bromes in Six Replications

The six replications for each of the three smooth brome entries are averaged for percent spread over seven years as a dryland plot. This information is provided in Figure 2. Significant differences in the amount of lateral spread were noted between Liso, Manchar and Lincoln seven years after planting.



Average Percent Spread of Three Smooth Bromes

'Lincoln' smooth brome is a very aggressive, rhizomatous sod-forming product. Because there was "more material to clip" in the 'Manchar' and 'Lincoln' plots from lateral movement of those materials relative to the lack of a spreading tendency exhibited by 'Liso', they produced more forage biomass than Liso.

Table 1 Average Dryland Performances of Three Smooth Brome Varieties - Production

Variety	Total Weight (g)	Production (Tons/Acre)
'Lincoln'	3063	1.36
'Liso'	2063	0.92
'Manchar'	2152	0.96

Table 2 Average Dryland Performances of Three Smooth Brome Varieties – Forage Quality

Variety	Percent Protein	Percent Invitro Digestibility
'Lincoln'	5.48	52.11
'Liso'	6.06	52.09
'Manchar'	6.04	51.04

After three years of results on forage production, 'Lincoln' is the most productive smooth brome for this area in a dryland setting. Liso is comparable in production to 'Manchar'. Forage quality data is not conclusive. In areas where 'Manchar' is used as the predominant smooth brome variety, 'Liso' may compare favorably and should be tested there. From quality analysis over two years, 'Liso' has slightly higher protein than either 'Manchar' or 'Lincoln' and slightly better digestibility than 'Manchar'. The digestibility of 'Liso' is slightly less than that of 'Lincoln'. In addition, Liso may have, on average, smaller basal stem diameters. The smaller stems may increase the palatability of 'Liso' over 'Manchar' or other smooth brome varieties.

'LINCOLN' IS THE MOST PRODUCTIVE SMOOTH BROME FOR THIS AREA IN A DRYLAND SETTING.

A less aggressive, spreading type of smooth brome may be more productive through time than a vigorous spreading type, and may be more conducive to plant as a mixture with other grasses or legumes. In addition, smooth brome has come under some scrutiny as being an aggressive, non-native that has the ability to out compete native vegetation and spread beyond planted locations. Environmental considerations may strongly favor 'Liso' over more aggressive, spreading selections.

Land's End Field Evaluation Planting-Grass

A 2002 survey conducted by the Colorado Department of Agriculture showed Colorado with more than 118,341 infested acres of Russian knapweed, *Acroptilon repens*. Russian knapweed is a creeping perennial that reproduces from seed and vegetative root buds. Russian knapweed requires an aggressive continual stress with herbicide and mechanical means in order to control it. After the weed is controlled, sowing with desirable plant species is necessary. Re-invasion of the weed has been prevented in some cases with some sod-forming grasses like thickspike or smooth brome. This field evaluation planting was set up to determine the competitive capability of 49 different grasses in preventing re-invasion of Russian knapweed after herbicide and mechanical control.

Forty nine grass species were seeded October 27-28, 2004, into four replications. The site is located about ten miles southeast of Grand Junction, Colorado. The planting location is on Divide Road east of Land's End Road, at the Kannah Creek-Lands End exit off Colorado Highway 50. The average precipitation in this area is 5-10 inches annually with an elevation of about 5000 ft. The site was not irrigated.

Preliminary establishment in 2005 looked very promising for the planting. However, just before evaluations were conducted in 2005, severe grazing by rabbits on the plots made the results in 2005 and subsequent years less about what materials might be suited for the site and more about what products resisted rabbit use and persisted. Based on data collected on 2006, out of the 49 grasses planted, October 27-28 of 2004, seven species had no germination at all, four species had plant stands greater than 50 percent, four species had plant stands between 40-50 percent, eight species had plant stands between 30-39 percent, and 26 species had plant stands less than 30 percent (see Table 1 Pg. 5).

Land's End Fields

Land's End Plot

RYE GRASSES COULD HAVE THE MOST POTENTIAL TO PREVENT RE-INVASION OF RUSSIAN KNAPWEED

Overall the rye grass species did the best in establishment, followed by the wheatgrasses. Judging from plant establishment and three years of data collection, the rye grasses could have the most potential to prevent re-invasion of Russian Knapweed at this site.

Working With Native Plants Since 1975!

UPPER COLORADO ENVIRONMENTAL PLANT CENTER — **MEEKER, COLORADO**

5538 RBC # 4
Meeker, CO 81641

Phone: 970-878-5003
Fax: 970-878-5004
E-mail: Steve.Parr@co.nacdnet.net

Visit us on the Web!
http://plant-materials.nrcs.usda.gov/copmc/

Upper Colorado Environmental Plant Center (UCEPC) is a non-profit facility owned and operated by two soil conservation districts in northwest Colorado. The 269 acre center is located at an elevation of 6,500 feet with 16 inches of annual precipitation and a 90 day frost free growing season. Our service area includes mountains, deserts, and plateaus of the Rocky Mountain west.

Our Goal

UCEPC works to ensure an improved quality of life for people and those affected by human activities. We provide quality plant materials and associated technology to those engaged in natural resource management. Each of us understands the importance of plants in our lives. From a golf course fairway to a forested mountain; a houseplant to an alpine meadow. Plants and their successful management, affect our quality of life. It is our mission to conserve or improve environmental conditions through the wise use of plants.

Land's End (Cont.)

Table 1. Plant Establishment for 49 Perennial Grass Species Seeded at Land's End, Colorado

>50% Plant stand	40-50% Plant stand	30-39% Plant stand	>0-29% Plant stand		No Establishment
L-46 – Basin Wildrye	Douglas - Crested Wheatgrass	Columbia bunch - Blue bunch Wheatgrass	Manska - Intermediate Wheatgrass	Tusas - Bottlebrush Squirreltail	Alma - Blue Grama
Trailhead – Basin Wildrye	Nordan – Crested Wheatgrass	Magnar - Basin Wildrye	Rosana - Western Wheatgrass	Niner - Sideoats Grama	Bad River - Little Bluestem
Vavilov - Siberian wheatgrass	Expedition - Snake River Wheatgrass	P-7 - Blue bunch Wheatgrass	TH-2 - Intermediate Wheatgrass	Wapiti - Bottlebrush Squirreltail	Covar - Sheep Fescue
L-45 - Basin Wildrye Cross	Secar – Snake River Wheatgrass	Critana - Thickspike Wheatgrass	Arriba - Western Wheatgrass	Pueblo - Bottlebrush Squirreltail	Badlands - Blue Grama
		Bannock - Thickspike Wheatgrass	Whitmar - Beardless Wheatgrass	Rimrock - Indian Ricegrass	Volga - Mammoth Wildrye
		Anatone - Bluebunch Wheatgrass	San Luis - Slender Wheatgrass	High Plains - Bluegrass	Vaughn - Sideoats Grama
		Sodar - Streambank Wheatgrass	Pryor - Slender Wheatgrass	Salado - Alkali Sacaton	Viva - Galleta Grass
		Bozoisky - Russian Wildrye	Hycrest-Crested Wheatgrass	9092261-Northwest Junegrass	
			Newhy - Hybrid Wheatgrass	Lodorm - Green Needlegrass	
			Goldar - Bluebunch Wheatgrass	Paloma - Indian Ricegrass	
			Ephraim - Crested Wheatgrass	Mankota - Russian Wildrye	
			White River - Indian Ricegrass	Salina - Wildrye	
				Schwendimar - Thickspike Wheatgrass	
				Rush- Intermediate Wheatgrass	