

# UCEPC

## Progress Report of Activities



2004

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The Upper Colorado Environmental Plant Center (UCEPC) is one of 26 Plant Material Centers nationwide in which the primary purpose is to make available quality plant materials and associated technology to the general public. Products from the Plant Center include quality native grasses, forbs and shrubs.

In order to make available quality plant materials, our advisory committee has set five long range priority areas. They are as follows:

1. Revegetation of High Altitude and Disturbed Lands.
2. Increase Productivity of Rangeland and Pastures
3. Improve Water Quality
4. Wildlife Habitat Enhancement
5. Use of Native Plants in Xeriscape and Horticulture



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The UCEPC continues to cooperate with federal, state, and local land owners to ensure the availability of materials with the highest quality.



The UCEPC is located approximately six miles southeast of Meeker, Colorado at an elevation of 6,500 feet. It is owned and operated by the local Soil Conservation Districts in Rio Blanco County - Douglas Creek and White River. We serve the central Rocky Mountain Region which includes parts of Utah, Wyoming, New Mexico and Colorado.



# Native Plant Mats



Layout of plots as soil material is smoothed after broadcast seeding.



Plots with sprinkler irrigation as plants are emerging from mats. Weed barrier as base membrane in black.

The Upper Colorado Environmental Plant Center (UCEPC) has recently worked on two native plant mat projects, both funded by the National Park Service. One was a greenhouse project (1999-2000) and information from this project was incorporated into the larger field project (2002-2003). The objective was to try to develop a plant mat of native materials that could be used much like sods are now grown for lawns. The native plants could be grown in one location, dug and rolled in a small blanket, transported to another location, anchored to a site and would continue to grow there. The field project contained three treatments; two mat materials (excelsior and woven jute), two seeding rates (84 seeds/sq ft and 168 seeds/sq ft), and mulch or no mulch (applied at 3880 lb/ac or 1.9 tons/ac). Weed barrier was used as a base membrane under all 28 of the 8 ft by 8 ft plots. Four control plots were used that had no mat material. Eight species of native plant materials were used. Three grasses ('Arriba' western wheatgrass, 'San Luis' slender wheatgrass, and Garnet mountain brome) and five forbs ('Timp' Utah sweetvetch, 'Bandera' Rocky Mountain Penstemon, 'Summit' Louisiana sage, fringed sage, and yarrow. A premixed soil material was used to help reduce the weight of the mats when moving them. The soil material was applied to a depth of one and one-half inches and one third of this material was smoothed to cover the seed. Plots were irrigated as needed. At this time, the plant mats remain on the site and no attempt has been made to move them.

The following are some of the observations or conclusions from the field project.

1. Cover ranged from 90 to 50 percent and seeded species provided good cover in 13 of the 28 plots.
2. Three seeded grasses ('Arriba', 'San Luis', and Garnet) and three forbs ('Summit', yarrow, and fringed sage), were the most frequently found seeded species and were present in most of the 28 plots.
3. Uniform sprinkler irrigation was difficult to achieve during windy conditions.
4. One weed species (Mayweed) was found to be present in the soil material. Another weed (wheat) came with the weed free mulch (wheat straw).
5. Mat materials did not substantially influence the frequency of seeded species.
6. The lower seeding rate (84 seeds/sq ft) produced a somewhat better frequency of seeded species.
7. Weed free mulch (wheat straw), went from a potential beneficial treatment to producing an adverse influence due to the presence of wheat seed.

For more detailed information on the Native Plant Mat project, contact the UCEPC.

# Garnet Mountain Brome and Head Smut Disease



During the year 2000, the Upper Colorado Environmental Plant Center (UCEPC) released Garnet germplasm mountain brome as a tested class release. Garnet germplasm (the term “germplasm” denotes that the material is not a cultivar, but a pre-cultivar release recognized by the association of official seed certifying agencies), was selected for its head smut (*Ustilago bullata*) resistance, longevity and ease of establishment. Mountain brome is widely used for conservation and reclamation plantings in Colorado, Utah, and Wyoming. Unfortunately, seed producers in Colorado have reported more than 5% incidence of the disease smut in Garnet germplasm. This might imply that Garnet is not totally resistant to head smut or perhaps another strain of the disease has been developed. The disease is limiting production of Garnet and its use for conservation purposes. This fungal disease can reduce seed yields by 70 percent.

In order to sort out the many questions about head smut and to find a pathway to effectively control head smut, the UCEPC has been making inquiries with various scientists about head smut and its control. However, since mountain brome (*Bromus marginatus*) is a native grass, existing data is very limited and findings about the disease and its control are still not conclusive. In the summer of 2004, the plant center invited Dr. Howard Schwartz, Extension Plant Pathologist Specialist and professor, with Colorado State University to visit the UCEPC to discuss the disease and confirm the identity of head smut in one of our production fields. The disease was confirmed positive. In addition, since Dr. Schwartz’s visit, the UCEPC is working with Dr. Ned Tisserat, Extension Plant Pathologist Specialist, and professor, with Colorado State University to get a special local need registration for the chemical Enhance Vitavax-Captan 20-20 seed protectant, through Colorado Department of Agriculture. Enhance has been used in Oregon to control head smut in mountain brome and other native grasses, but is not cleared for use in Colorado. A field test will be planted in the spring of 2005 to learn more about the disease and its control.

# Irrigation System Conversion



The 2004 growing season represented a milestone for the Upper Colorado Environmental Plant Center (UCEPC). Twelve years after the initiation of an entire renovation of an antiquated irrigation system, the final phase was completed and was fully operational in 2004. In all, 156.7 acres that previously were flood irrigated from earthen contour furrow ditches are now irrigated from overhead sprinklers. This conversion will enable the expansion of plant material testing and development on ground that previously was used only for hay production. **Phase I** of the project was completed with the installation of a headgate control structure, a measuring structure and 600 feet of pipeline. Phase I replaced an eroded irrigation delivery ditch that was on an excessive erosive grade and provided a means to accurately measure and regulate irrigation water flow. Phase I was financed through UCEPC's budget and cost share money from ASCS.

**Phase II**, completed in 1997, reorganized the irrigation system on three fields containing 57.4 acres. Three thousand one hundred feet of pipeline and 48 risers with automatic valves were installed to provide water via a portable sprinkler system. This improved system replaced the flood irrigation system which was prone to erosion and excessive waste water. **Phase III**, the final portion of the irrigation system replacement, was completed in fiscal year 2004. This newly completed section was utilized for the entire growing season. This segment consisted of the installation of a state of the art irrigation system for plant material production and testing. Because the drops can be controlled individually, the system allows irrigation of a variety of crops with different stages of growth, simultaneously. The project included burying over 2800 feet of pipeline, installing two risers and a pump station, and purchasing a Zimmatic Linear Move irrigation system. A linear move system operates much the same way as a center pivot, but the entire unit moves.

This year, the system was set to deposit 1.5 inches of water per hour for 120 hours, or 5 days of continuous run, over an 80 acre field with approximately 2 hours of labor. This field will be converted from hay production to plant materials production over the next 5-10 years. The funding for Phase III was acquired entirely through grants and was designed and engineered by NRCS. The total cost for the complete irrigation system conversion, including in kind contributions, was just over \$173,000. This upgraded system will greatly enhance the capabilities of UCEPC to develop quality plant materials for future conservation needs.



# Results of a Field Evaluation Planting

Seven years after planting, the final evaluations were conducted by the Upper Colorado Environmental Plant Center in 2004 on a Field Evaluation Planting in central Utah. This planting is a continuing effort to determine plant material establishment, adaptability and production potential for use in the western portions of the upper Colorado River Basin.

In October of 1997, the planting was established on a site between Starvation and Strawberry Reservoirs in east-central Utah. The site is a typical pinon/juniper - Wyoming big sage (PJ) site characterized by 12 inches of annual precipitation and 120 days of frost free growing. The planting, Coyote Draw, was an effort to determine products that had positive attributes for recommended application in areas of eastern and southeastern Utah and western Colorado on comparable sites. The seeded area had been cleared of sagebrush in 1988, nine years before planting, and periodic efforts were made to keep the cleared area weed free prior to planting.

As is the case with much western rangelands, invasive species are displacing a great portion of the native vegetation. Add disturbance to an area and leave it unseeded for nine years, and conditions for site invasion by annual weeds at the very least are very good. As a preparation for the planting, a herbicide mixture of Banvel and 2-4-D was applied for Russian thistle control during the summer. In September, the area was again cleared of all remaining vegetation in preparation for seeding. Sixty nine accessions, including 54 grasses, 8 forbs, and 7 shrubs, were planted in three replications on October 20 and 21, 1997. During evaluations on June 9, 1998, it was very apparent that cheatgrass, *Bromus tectorum*, had invaded a considerable portion of the site, and that seedlings were having a difficult time competing. At that time, a decision was made to use a pre-emergent herbicide as a split plot application to reduce cheatgrass competition the following year.

In June, 1999 it was noted during evaluations that the pre-emergent effectively removed all vegetation, including the seedlings. As a result, only the untreated half of each of the plots were utilized for evaluations. Cheatgrass remained a major detriment to the integrity of the study's purpose. Five years later, however, very valuable information has been obtained as a result of the Coyote Draw planting. No native forb or shrub entry competed well with cheatgrass. Of 31 native accessions representing 17 species, only one species of native grass, Indian ricegrass, competed well. However, four species represented by nine accessions of non-native materials not only competed well through time, but effectively controlled cheatgrass infestation into those plots. Siberian wheatgrass, Russian wildrye, crested wheatgrass and Hycrest all performed well. On similar sites where cheatgrass invasion is a concern, this study has a great deal of merit in making recommendations on appropriate materials with capabilities of suppressing cheatgrass infestation.

