PLANT MATERIALS TODAY

A Quarterly Newsletter of the Montana-Wyoming Plant Materials Program

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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.

Warm-Season Species Culture and Management

In the Northern Great Plains, there is interest in using warm-season grasses for their ability to extend the "green period" for mid- and late summer grazing, as well as for inclusion in CRP. The Bridger Plant Materials Center (PMC), in cooperation with the Bismarck PMC; Sidney, MT NRCS field office; and Mr. Wayne Berry, established a study to evaluate warm-season and cool-season forages in east-central Montana. The objectives of the trials were several-fold:

1. Determine if certain warm-season forage species would extend the "green period" into mid-and late summer.
2. Determine livestock preferences, performance, and utilization of the various warm-season species using an intensive grazing system.
3. Determine species/cultivar performance in and adaptation to eastern Montana of:
    - cool-season grasses
    - warm-season grasses
    - forbs/legumes

The warm-season trial includes 22 grass cultivars/accessions representing 7 species: sand, big and little bluestems; side-oats and blue grama; prairie sandreed; and switchgrass. Sainfoin, alfalfa, small burnet, fourwing saltbush, and cicer milkvetch were cross-seeded across so that the seven species of warm-season species were at one end of the trial.

Observations Over the Last Five Years--1994-1998

Culture Most warm-season species are best adapted to the eastern third of Montana and Wyoming, where there is some probability of summer precipitation, a longer growing season, warmer temperatures, and where warm-season plants have been a part of the historic plant community. All warm-season species were slow to establish, taking 2-3 years. All of the forb/legume species established more rapidly and were detrimental to establishment of all the warm-season grass entries. Therefore, including these forbs, legumes, or even cool-season grasses in a mixture of warm-season grasses will probably result in poor establishment of the warm-season grass component. When including warm-season species in CRP mixtures, the optimum success with warm-season establishment would be exclusively warm-season mixtures. If cool-season and warm-season species are mixed, they need to be established in separate, alternate rows. The ratio of warm-season to cool-season must be 1:1 or greater, in favor of the warm-season. Research at Colstrip has proven that the most successful installations of warm-season species is accomplished by establishing warm-season stands first and subsequently cross-seeding with cool-season species 1 year later.

Management Cool-season and warm-season grasses can be most easily used in grazing systems that consist of separate pastures of each grass type. Warm-and cool-season grasses have contrasting patterns of yield distribution. Warm-seasons produce more than 60% of their yield in mid-summer, while cool-seasons have their greatest production in spring and fall. Cool-season grasses can be grazed in the spring and fall, and warm-season grasses during mid-summer.

In the Berry replicated study, forage was harvested for the first time from the plots on August 16, 1995. Most of the cool-season species were headed out, whereas the warm-season grasses were still in the boot to early inflorescence stage. Observations in 1996 showed that the warm-season grasses suffered extensive damage from the severity of harvest (total biomass sampling) in August 1995. The plant vigor, growth, and production is still impacted after 4 years. In consulting with the Bismarck Plant Materials staff, it was recommended that biomass be harvested following a frost in mid- to late September to avoid damage to the warm-season plants. Furthermore, in discussing the grazing management timing of the warm-season plants in a pasture situation, grazing should begin in mid-July and quit by August 15 to allow sufficient time after grazing for regrowth prior to cooler temperatures. As a result of the 1995 plot harvesting impacts, the harvest date was changed to mid-September to avoid warm-season plant damage.

Recommendation Summary

- Warm-season grasses require a longer period to establish plants for utilization than cool-season grasses.
- Cool-season species should be maintained separately from warm-season
- When cool- and warm-season species are mixed, each type should be planted in separate rows, either alternately with a minimum of 12 inches between rows or in 12-inch cross-seeded rows.
- Legumes and other forbs may require interseeding into a 1-year-old, warm-season planting in order to create mixed species pastures.
- Grazing or haying of warm-season grasses should be done early enough in mid-summer to allow adequate regrowth prior to cool temperatures or first frost. Proper grazing management would leave a 6- to 8- inch leaf height following grazing.
- High intensity, low frequency grazing systems are recommended for proper management of mixed stands of cool- and warm-season grasses.
- Plant with a drill equipped with an agitator, picker wheels, depth bands, and packer wheels. If a "trashy seed" drill is not available, the use of a "carrier" is encouraged to assist with seed flow and provide a uniform field distribution.

Larry Holzworth

PLANT PROFILE: Echinacea

Our "Plant Profile" column is a new addition to the PMC newsletter featuring technical and practical information on plants with conservation applications. Initially we will feature plants that are currently under study at Bridger; however, we will be glad to cover any species or cultivar upon request.

This Plant Profile describes a valuable rangeland and medicinal species native to the prairies and plains of Montana and Wyoming: blacksamson echinacea, commonly called purple coneflower and black root - *Echinacea angustifolia* DC. Eastern purple coneflower, *Echinacea purpurea*, is not a native in Montana and Wyoming. Blacksamson echinacea is a herbaceous, taprooted perennial and a member of the Aster family. It takes its name from the Greek word *echinos*, meaning hedgehog or sea urchin, relating to the spiny-like rectangular bracts of the flower. It is very drought tolerant (annual precipitation zones of 10-14 and 14-18 inches) and tends to grow in dry, upland, grassland locations. It is found growing in the USDA Hardiness Zone 3, with average minimum temperatures of -30^0 to -40^0F. It grows on soils that are well-drained, mostly gravelly, coarse in texture, slightly alkaline (pH 6-8), and limey. The plant grows from a height of 4-20 inches (10-50 cm) tall, with a single, stout, bristly, hairy stem. Leaves are near the base of the plant (mostly basal) and are thick, rough, hairy, 3-8 inches (7-20 cm) in length, strongly three-nerved, lanceolate to linear in shape, and may or may not have toothed margins. Showy flowers are borne on the solitary stem, and the color of individual rays (petals) vary from whitish-rose to rose and purple. Depending on the seasonal climate and environmental position on the landscape, the plant flowers from late June to late August. Seed matures in early to mid-fall and there are approximately 128,000 seeds per pound. Successful propagation by seed includes a 12-week cold stratification treatment (oscillating temperatures to mimic winter conditions are best), or seed can be direct-seeded in late fall. Crown divisions of 2-7 buds and/or 4- to 5-inch (8-12 cm) root segments may also be transplanted in fall or spring.

Medicinal use of purple coneflower has been practiced by indigenous peoples across North America for centuries. Traditional remedies include antidote for snakebite and venomous stings, poultice for cellular abscesses, smoke treatment for headaches, roots chewed to relieve toothache pain, juice from stems applied to soothe burns, and tea decoctions were drunk for rheumatism and arthritis. Modern homeopathic practitioners tout the herb foremost as an immunostimulant. Recent studies have confirmed the effectiveness as a *preventative* that increases the body's ability to ward off the early stages of viral, bacterial, or fungal infections.

The use of echinacea as an herbal remedy has skyrocketed and plays a large role (reports indicate up to $80 million annually, or 12.5%) in the $4 billion a year herbal products industry. Widespread commercial wildcrafting of the root and aerial plant parts for sale and distribution to pharmaceutical companies has resulted in serious impacts on plant populations on tribal, state, federal, and private lands. Concerns have escalated over the potential disappearance of the vestiges of purple coneflower from the landscape. North Dakota recently passed a law that imposes a hefty fine (including confiscation of vehicles used during the caper) for trespass harvesting on private lands. The 1999 Montana legislature is currently voting on the implementation of a 3-year moratorium on the harvest of echinacea (and several other herbs) on state lands. The USDI Bureau of Land Management in Montana will institute a harvest restriction policy of no more than 40 plants per person per year. Use of products that certify active ingredients of cultivated origin may reduce the wildcrafted demand and preserve native populations.

Susan R. Winslow