



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. Direct inquiries to USDA NRCS, Plant Materials Center, RR2 Box1189, Bridger, MT 59014, Phone 406-662-3579, Fax 406-662-3428 or; Larry Holzworth, Plant Materials Specialist, USDA NRCS Montana State Office, Federal Bldg., Rm 443, 10 East Babcock Street, Bozeman, MT 59715-4704, Phone 406-587-6838, Fax 406-587-6761.

WOODY PLANT COLLECTORS EDITION II

Conservation Trees and Shrubs for Montana

There is a new publication that is available to the public featuring some of the conservation trees and shrubs that are adapted to the climate and conditions of the northern plains. It is a color ten-page brochure titled "Conservation Trees and Shrubs for Montana". This brochure was a cooperative effort between the Custer County Conservation District and the Natural Resources Conservation Service (NRCS). The Conservation District identified the need for a brochure of this sort to meet the need of the producers in their district. The district requested the assistance of the NRCS to provide the technical assistance in the development of this brochure.

The purpose of this brochure is to assist the producer in identifying and selecting the types of trees/shrubs they need based on their objectives. Inside the brochure there are color pictures of 36 species representing the major trees and shrubs used in conservation plantings such as windbreaks and shelterbelts in Montana. Next to each picture are some characteristics about that species such as growth rate, expected height, drought resistance, and wildlife values. For quick reference the first page is a summary of some of the characteristics and features of the listed species. This easy to read and concise format enables people to transport this brochure else where to carry on discussions with other decision-makers. This tool will assist them in the selection of trees and shrubs for their conservation plantings. This brochure can be a tool for planners, producers, seedling nurseries, extension service and others interested in conservation plantings.

This brochure will assist in the establishment of more conservation trees and shrubs for plantings in windbreaks and shelterbelts. These plantings will conserve and protect our soil resources from wind erosion and shelter our homes from the harsh winds thus conserving our energy resources.

Wind erosion and protection is a statewide concern. This brochure will assist in the establishment of more windbreaks/shelterbelts, thus affecting tens of thousands of acres and thousands of people each year.

Funding for this project came from the Montana Department of Natural Resources and Conservation (DNRC) in the form of a

grant to the Conservation District. Copies of this brochure can be obtained for free from any of the NRCS or Conservation District offices generally located in the county seats of each county.

This brochure is also available on a compact disc (CD) for those interested in large quantities. The cost of the CD is \$25. The cost of reproducing the brochure depends on the number of copies made, but figure on somewhere between \$030 - \$0.50 each. For questions or copies, contact Robert Logar at (406) 587-6836 or rlogar@mt.nrcs.usda.gov.

Bob Logar

Pending ponderosa pine release

The Bridger PMC is releasing a selected class germplasm of Rocky Mountain ponderosa pine *Pinus ponderosa* var. *scopulorum* for windbreaks and shelterbelts east of the Continental Divide in 2001. Although we usually wait until final release before promoting a selection, I thought this might be a good opportunity to give growers and planners a heads-up for the upcoming year. This selection is already in production at the Montana Conservation Seedling Nursery at Missoula and can be ordered directly through them by calling (406) 542-4244.

The ponderosa pine selection (currently unnamed) was originally a collaborative effort with the USFS to identify and select superior seed sources for windbreak and shelterbelt projects in the Great Plains. The study was installed at Bridger in 1989, and included 1491 test seedlings from 79 seed sources from Montana, Nebraska, and South Dakota. Nominations came from earlier seed source (provenance) research and Montana Interagency Tree and Shrub Improvement Study (MITOSIS) work. Selection occurred in 1995 when the trees were 10 years-of-age, with final selection based largely on rate of height growth and seedling survival. In 1996, selected trees were transplanted into a seed orchard designed to isolate related trees from one another in order to minimize in-breeding depression and facilitate efficient cross pollination. The 200-tree orchard produced its first seed crop (53.5 pounds of 60 percent TZ viable seed) in 1999.

This selection should perform substantially better than common stock ponderosa pine. Height growth at 10 years-of-age was ~2 feet per year under dryland conditions (11-in annual precipitation zone) and clean cultivation (no competing vegetation). As a comparison, we generally estimate a 20-year height for ponderosa pine in Montana of about 17 feet, with an average growth rate of approximately 1-foot per year between 10 and 20 years-of-age. This selection should reach 25- to 30-feet by 20 years-of-age, given clean cultivation and no competition between trees. Survival at the seed source level was greater than 78 percent, whereas, the overall population mean was 62 percent.

It is interesting to note the superior performance of the Nebraska seed sources in this study. Although Nebraska seed sources represented only ~25 percent of the tested accessions

and ~24 percent of the trees tested, they represented 42 and 51 percent of the selected accessions and trees, respectively. Provenances such as Springview, Ainsworth 720, Valentine 721, Kilgore, and Sparks were heavily represented in the final selection.

This selection is recommended for most of Montana and Wyoming below 6,000 feet, given other favorable climatic conditions. It should perform well in central, south-central, and southeastern Montana, north-central and northeastern Wyoming, northwestern and north-central Nebraska, and south-central and southwestern South Dakota. Look for details on the performance of ponderosa pine in a future Plant Profile in PLANT MATERIALS TODAY.

It is hoped that final release will occur in late summer or fall of 2001. Foundation seed will be available on a limited basis through the Montana State University Seed Stocks Program as soon as release is secured. Contact Larry Holzworth, Montana Plant Materials Specialist or Dr. Bill Grey, Foundation Seed Program, MSU-Bozeman for seed availability.

Joe Scianna

Saline tolerant tree and shrub study

The Bridger PMC has been working cooperatively with other PMCs and states in the west to develop a draft project plan for a tree and shrub soil salinity tolerance study. The goal of the study is to identify saline tolerant species and the salinity level at which growth and survival are impaired, and to determine maximum salinity tolerance by species.

Although there are numerous references available on this subject, much of the information is based on anecdotal or hearsay sources. The limited scientific research is often laboratory-based or involves species that are poorly adapted to the northern Plains. In addition, tolerance is often reported in terms of absolute survival (i.e., it died or it survived), without measuring the effects of increasing salinity on growth and performance. The result is that an inexperienced planner may recommend a plant that is known to survive at a given soil salinity level, but will not grow and function properly (not good public relations).

Various sources estimate the salinity tolerance of woody plants with different yardsticks. A conservative rule of thumb is that "saline tolerant" woody plants can handle about half the salinity that saline tolerant grasses can withstand. Numerous grass species can withstand 10 mmhos/cm of electrical conductivity (EC) without productivity being effected, and many can survive >20 mmhos/cm [see MT/WY PM Tech Note 26 (revised)]. In contrast, most trees and shrubs are effected at salinity levels between 4 and 6 mmhos/cm, and few desirable trees survive past 10 mmhos/cm. It's important to note that the salinity of the soil profile often varies with depth. If the surface is "hot" and the subsurface salinity is acceptable for plant growth, it may be possible to plant large stock grown in deep containers to avoid the salty surface layer. Containerized material has the added benefit of supplying its own rooting environment, a temporary benefit that may be sufficient for plant establishment on an otherwise

inhospitable site. If the subsurface salinity is too high, it may be possible to leach salts from the root zone.

An associated, but often overlooked, problem on saline and non-saline sites is the salt content of the irrigation water. Even moderate salt levels in irrigation water can elevate soil salinity over time, if water does not percolate through the root zone. As a ball park figure, potentially serious salt toxicity occurs when the EC of the irrigation water reaches about 3 mmhos/cm [2,000 mg/l or ppm total dissolved salts (TDS)]. Actual damage varies with several factors, including the amount and type of salt, the plant being grown, the texture of the soil, the stage of growth of the crop, the method of irrigation, and other factors. Fortunately, there are management practices that may help alleviate some of these problems. The concentration of dissolved salts in surface water is usually low right after peak spring runoff, so that's a good time to saturate the soil profile. If the permeability of the site allows, it's also a good time to leach salts from the root zone with heavy irrigations. The amount of leaching required to maintain an acceptable level of root zone soil salinity varies with the salt content of the irrigation water, the salt tolerance of the crop, and the texture and salinity of the soil. It is easier to meet this "leaching requirement" on light-textured soils than on heavy-textured soils. (see the Montana Irrigation Guide for calculation of the leaching requirement). Be aware that other problems may also develop as a result of salt accumulation, including reduced soil permeability, specific ion toxicity, and clogging of drip system emitters.

The BPMC hopes to publish a Tech Note this year that summarizes current woody plant salinity research. Upon completion of the salinity tolerance study (which will take several years), the Tech Note will be revised to reflect study results. For now, use personal experience to "adjust" current recommendations to fit your local conditions. Keep in mind that survival alone may not justify the use of a species if its growth and performance are not adequate for the intended conservation use. For additional information on saline tolerant woody plants, see the following references:

Windbreaks for Montana – a landowner's guide, Cooperative Extension Service – Bulletin 366, Montana State University, Bozeman, MT, July 1986. (call Coop. Ext. at 406-994-3273 for copies)

Tolerances of Trees and Shrubs to Salinity. Technical Guide Notice ND-93. 1997. (contact the Bridger PMC for copies)

North Dakota Tree Handbook (hard copies were available through North Dakota State University Extension Service and the North Dakota State Soil Conservation Committee). This reference can be accessed electronically at the following website: www.ag.ndsu.nodak.edu/aginfo/trees/handbook.htm

Salt Tolerance of Various Temperate Zone Ornamental Plants. www.colostate.edu/Depts/CoopExt/TRA/PLANTS/stable.html

Joe Scianna

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