

## PLANT MATERIALS TECHNICAL NOTE

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### PONDEROSA PINE *Pinus ponderosa*

#### A Native Conservation Tree for Use in the Northern Great Plains and Rocky Mountains

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Figure 1. Hunter Germplasm ponderosa pine

#### General Description

Ponderosa pine is a native, perennial, evergreen tree found over broad expanses of Montana and Wyoming. It is a long-lived, deep-rooted; drought-tolerant species with an average mature height of 35 to 45 feet, although it can attain heights near 200 feet on ideal sites. It has long dark green needles varying in length from 4 to 7 inches and borne in fascicles (bundles) of 2 or 3 needles per fascicle. Two naturally occurring races of ponderosa pine exist in Montana, one native to locations east of the Continental Divide, and the other native to locations west of the Divide. Ideally, each respective race should be planted where it naturally occurs.

#### Adaptation/Range

**Locations:** Grows well under proper cultivation in most of northwest and west-central Montana; central, south-central, and southeastern Montana, north-central and northeastern Wyoming. It grows best in Montana and Wyoming at elevations below 5,500 feet given other favorable site conditions. It is currently not recommended for the western-half of

MLRA 52 (Montana Plant Adaptation Zone e) based on the poor survival of the species in this area, possibly due to Chinook winds or winter desiccation.

**Soils:** Ponderosa pine grows on a variety of soil types including igneous, metamorphic, and sedimentary. It does best on coarse-textured soils when available soil moisture is limited. Ponderosa pine is seldom found growing naturally on heavy-textured soils with a high clay and/or silt content. The soil pH where ponderosa pine occurs naturally ranges from 4.9 to 9.1 depending on location and soil horizon, but the surface horizon usually ranges from 6.0 to 7.0. It is recommended in Montana for Conservation Tree and Shrub Suitability Groups 1, 3, 4, 5, 6, 7, and 8. Soil salinity tolerance is unclear but is generally reported to be better on coarse well-drained soils (possibly tolerant to 4 to 6 mmhos/cm), but performing very poorly on heavy soils with salinity levels as low as 2 to 3 mmhos/cm.

**Hardiness:** Ponderosa pine grows well in USDA Winter Hardiness Zone 3b, [-34 to -37°C (-30 to -35°F)] and may tolerate Zone 3a [-37 to -40°C (-35 to -40°F)].

### Conservation Uses

Ponderosa pine is an excellent choice as a tall tree component in windbreaks and shelterbelts, offering year-round protection and relatively rapid growth. It can be used in field borders, living snowfences, wildlife applications (food, nesting, loafing, cover), riparian restoration projects, mine-land reclamation, carbon sequestration, logging road revegetation, native landscaping, and for timber production.



Figure 2. Ponderosa pine first year (left) and second year (right) seed cones

### Establishment

Ponderosa pine establishes well given proper site conditions and preparation. Control of rhizomatous grasses and forbs 1 to 2 years prior to planting is highly recommended, as is the use of high quality woven weed fabric. Supplemental water at planting time increases soil:root contact, prevents root desiccation, and increases seedling survival. Preferred stock type includes various sizes of 1- and 2-year-old container plants, although 1-0 and 2-0 bareroot stock works well given proper handling and storage. Dormant spring planting is recommended.

### Limitations

Loss of established plants occurs from shading, rabbits, hares, squirrels, pocket gophers, porcupine, deer, and domestic livestock (primarily cattle and sheep). Ponderosa pine is the host of numerous insect and disease pathogens. Browsing on fresh needles may cause abortion in cattle, and possibly other classes of livestock. In areas of limited summer rainfall, such as southwestern

Montana and western Wyoming, lack of available moisture may prevent seedling establishment unless supplemental irrigation is provided. Soil moisture stress resulting from grass and shrub competition also limits seedling survival and growth. Ponderosa pine is shade intolerant, and should be planted in full sun for best performance. It is not recommended for excessively wet, compacted or poorly-drained sites, heavily saline or sodic soils, or soils classified as “unsuitable” for tree and shrub planting.

## Releases

Hunter Germplasm ponderosa pine was released in 2002 by the Bridger Plant Materials Center in cooperation with the agricultural experiment stations of Montana State University and the University of Wyoming. It was selected for superior height growth, seedling survival, and vigor rating, primarily for use in windbreaks and shelterbelts from among 71 seed sources and 1,491 trees. Hunter Germplasm ponderosa pine is a composite from 38 parent trees<sup>1</sup> (accessions) from Nebraska, Montana, and South Dakota. The germplasm is named in honor of Hal Hunter, State Staff Forester Emeritus, for his contributions to the woody plant program at Bridger. Heights of 30 to 35 feet can be expected with this selection at 20 years-of-age given clean cultivation and a minimum of 10 to 12 inches of annual precipitation on a well-drained site.

<sup>1</sup> A parent tree is the mother plant from which seed was collected and used to produce test seedlings.

## Additional Information

*Windbreaks for Montana – a landowner’s guide*. 1986. Cooperative Extension Service, Montana University, Bozeman, MT. Bulletin 366.

*Creating Native Landscapes in the Northern Great Plains and Rocky Mountains*. USDA NRCS Montana State Office, Bozeman. Available at <http://www.mt.nrcs.usda.gov/technical/ecs/plants/xeriscp/index.html>.

Plant Fact Sheet for ponderosa pine *Pinus ponderosa*, electronic availability at <http://plants.usda.gov>.

Plant Guide for ponderosa pine, *Pinus ponderosa*, electronic availability at <http://plants.usda.gov>.

For proper seed source selection, see Montana Plant Materials Technical Note, MT-67, *Seed Source Selection, Use of Certified Seed, and Appropriate Seed Release Class Improve Conservation Planting Success* on the Montana NRCS or national Plant Materials web sites.

For proper seedling storage and handling, see Montana Plant Materials Technical Note MT-51, *Temporary Storage and Handling of Container, Bareroot, and Cutting Stock* on the Montana NRCS or national Plant Materials web sites.

For proper bareroot and container seedling planting, see *Hand-Planting Guidelines for Bareroot Trees and Shrubs* and *Planting Guidelines for Containerized and Balled and Burlapped Stock* on the Montana NRCS web site.