

Germinating Whitebark Pine at Dorena Nursery

Lee E. Riley, Carmen M. Coumas, Judith F. Danielson,
and Richard A. Sniezko

Dorena Genetic Resource Center,
Umpqua National Forest, Cottage Grove, OR

Production of whitebark seedlings in nursery regimes, for both disease screening and reforestation, requires overcoming some inherent problems of regeneration in the species. Seed germination is generally poor and erratic. Only 10 to 15 percent germinate in the first year under natural conditions. The presumed reasons for this include predation and caching of seeds by animals before the embryos mature, lack of suitable substrate or climatic conditions, complex physiological requirements for release from dormancy, and extremely hard seed coats. All of these factors may be positively adaptive in a natural environment over the long term, providing a small supply of germinants over a period of 2 to 3 years given the proper conditions. But they present serious challenges in a nursery environment. The previous literature on attempts to successfully produce whitebark seedlings is varied but not extensive, and determining a routinely satisfactory protocol has been difficult. The most successful procedures to date are those developed by Coeur d'Alene Nursery (Burr and others 2001).

In 2001, Dorena Genetic Resource Center initiated a whitebark pine germination study. The objective of this study was to compare the protocols used by Coeur d'Alene Nursery (the "control") with a variety of pre-sowing and culturing treatments to determine best germination and growing procedures for this difficult species in a different growing environment, and with seed lots of various ages from different locations.

A total of 20 lots of whitebark pine, with storage times ranging from 0 to 7 years, were used in this study. Nineteen lots were individual tree collections from 5 forests in Washington and Oregon; 1 bulk seed lot was from the Shoshone National Forest in Wyoming.

Overall treatment germination percentages ranged from 31 to 74 percent. The overall germination in the control treatment was 69 percent. The overall germination in the chosen protocol for Dorena GRC was 74 percent. Full details of the study will be published in a forthcoming issue of the *Native Plant Journal*.

Key Findings

1) A longer stratification period (120 days) reduced the number of seed that required nicking of the seed coat prior to germination. Many seed split naturally during the extended time in cold stratification, greatly reducing seed handling and preparation time.

Continued on Page 8. . . .

Dorena Continued from Page 5

2) In contrast to previous literature, seed stored in excess of 4 years maintained viability. Under the chosen regime (as determined by this study), seed stored for 1 to 3 years ranged from 37 to 100 percent germination, while seed stored for 4 or more years ranged from 42 to 100 percent germination.

Literature Cited

Burr, K., Eramian A., Eggleston K. 2001. Growing whitebark pine seedlings for restoration. In: Tomback D., Arno S., Keane R., editors. Whitebark pine communities. Washington: Island Press. p 325-345. ■