

Potential for Long-Term Seed Storage for *Ex Situ* Genetic Conservation of High Elevation White Pine Species – Whitebark Pine and Foxtail Pine Case Study¹

R.A. Sniezko² and A.J. Kegley²

Whitebark pine (*Pinus albicaulis*) and foxtail pine (*P. balfouriana*) are conifers native to western North America. Due to several threats, including a non-native pathogen (*Cronartium ribicola*) and a changing climate, whitebark pine and foxtail pine are classified on the IUCN Red List as ‘endangered’ and ‘near threatened,’ respectively. Whitebark pine has been proposed for listing under the Endangered Species Act (ESA) in the United States and is now listed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). *Ex situ* genetic conservation activities are underway, including long-term seed storage for both species (Sniezko et al. 2011). However, little is known about how long seeds of these species can be stored in freezers and retain their viability. The study reported here and in more detail in a subsequent paper (Sniezko et al. 2017), examines germination of the oldest known foxtail pine seedlots from California (its native range), as well as the oldest known seedlots from different parts of the range of whitebark pine (collected and stored by different groups in the Pacific Southwest, Pacific Northwest, and Interior West United States and in British Columbia and Alberta). Results indicate that at least some seedlots of whitebark pine and foxtail pine can be stored for several decades and show very high germination (50 to >90 percent) in subsequent tests (Sniezko et al. 2017). The germination trial was conducted in Oregon at Dorena Genetic Resource Center, but more recent refinements in germination protocols for whitebark pine developed in Canada indicate that even higher levels of germination are possible. A subsequent sowing of some of the ‘old’ foxtail pine seedlots showed that they retained capacity for high germination several years beyond this trial. In this subsequent sowing, the foxtail pine seedlots also showed similar seedling vigor (height growth and survival) compared with more recent seedlots, when grown for disease resistance testing. We conclude that mature whitebark pine and foxtail pine seeds collected and stored under suitable conditions can retain viability for at least several decades (Sniezko et al. 2017).

Literature Cited

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² USDA Forest Service, Dorena Genetic Resource Center, Cottage Grove, OR 97424.
Corresponding author: rsniezko@fs.fed.us.