

A Comparison of Cone Collecting Techniques for Whitebark Pine

Murray, Michael P.

USDI National Park Service, Crater Lake National Park, Crater Lake OR 97604

Abstract

This study's objective was to test and compare the utility of the most popular and emerging methods for collecting cones from whitebark pine: climbing, orchard ladder, ground-based, and tree-tong. A total of 101 cages were installed and retrieved at Crater Lake National Park during 2005. Strengths and weaknesses of each technique are summarized. Brief recommendations are offered.

Introduction

With blister rust well-established in most of whitebark pine's (*Pinus albicaulis*) natural range, tempering the tree's decline requires a long-term commitment. A variety of management techniques are being applied to slow mortality including pruning infected branches, removing fungus-bearing shrubs, and applying fungicides. In order to reverse declines, restoration protocols rely on finding rare naturally occurring disease-resistant trees (Mahalovich and Dickerson 2004). By using these trees as seed sources, breeding programs can regenerate large numbers of trees which can survive the blister rust plague. This protocol essentially accelerates the process of natural selection – thus mitigating the impending bottleneck of whitebark pine numbers. This approach has been successfully applied to western white pine (*P. monticola*) and may be 'the last hope' for whitebark pine (McDonald and Hoff 2001).

The first critical step for developing disease resistance hinges on the ability to identify candidate trees and collect cones. Whitebark pine occurs at some of the most rugged and remote locations in western North America. Most populations are miles from the nearest road, exposed to harsh climate, and upon treacherous terrain. Long rescue times present additional risk. A further challenge is preventing the harvest of cones by marauding birds. These impediments demand careful planning which incorporates the safest and most efficient techniques for collecting cones.

There is very little information available addressing the challenges of whitebark pine cone collection. This study's objective was to test and compare the utility of four popular methods for collecting cones from whitebark pine along with a new technique, a tree-tong, to guide fieldworkers in safe and effective practices.

Methods

During the summer of 2005, twenty-nine whitebark pine trees were chosen for disease-resistance testing at Crater Lake National Park, Oregon. Collecting options were: climbing with rope, free climbing, ground-based, orchard ladder, and tree-tong (fig. 1). Climbing with

rope involved the prusik system with a climbing harness (Davis 2005). Free climbing involved the same safety gear, harness, and lanyard except no rope was used to assist the climber. Ground-based collection was simply performed where cones were within reach of a person standing on the ground. The orchard ladder we used was a commonly available aluminum tripod model (14-ft tall). The tree-tong was developed specifically at Crater Lake National Park for collecting whitebark pine cones in 2005. It consists of an 18-ft long telescoping aluminum pole with a pre-fabricated tong screwed on the end which is opened and closed from a dangling rope. A single two-person crew did all collecting.



Fig 1—Collecting techniques tested include, from left to right, tree-tong, orchard ladder, climbing with rope, and free climbing. (Photos by Michael Murray, except Molly Allen (left.))

Because Clark’s nutcracker (*Nucifraga columbiana*) and rodents are ubiquitous collectors of whitebark pine seeds, we enclosed cones in protective mesh cages in early summer. During return visits in September-October we retrieved each cage and the enclosed ripened cones. Usually, the same collection method was used on the second visit.

Results and Discussion

A total of 101 cages were installed and retrieved. I found strengths and weaknesses of each collection technique (Table 1). Climbing was a relatively slow process and caused damage to the thin tree bark despite our best efforts to the contrary. The tree-tong was the workers’

favorite for its portability and quickness. However, we were unable to adequately close the cage bottom to firmly grasp the branches. As a result, nearly half of these cages blew off before cones were ready for retrieval. In 2006, modifications to the system resulted in improved cage closure ability (Davies and Murray, in press).

Table 1—Comparative summary of cone collection techniques used at Crater Lake National Park, summer 2005.

Technique	Strengths	Weaknesses
Climbing with Rope	<ul style="list-style-type: none"> • Tallest trees can be accessed 	<ul style="list-style-type: none"> • Technical training required • Hazardous • Slow • Costly Equipment • Tree damage unavoidable
Free Climbing	<ul style="list-style-type: none"> • Tallest trees can be accessed • Moderately fast 	<ul style="list-style-type: none"> • Technical training required • Hazardous • Moderately Costly Equipment • Tree damage unavoidable
Ground-based	<ul style="list-style-type: none"> • Fastest • Least Expensive • Safest 	<ul style="list-style-type: none"> • Restricted to cones reachable from ground (can be rare)
Orchard Ladder	<ul style="list-style-type: none"> • Fast 	<ul style="list-style-type: none"> • Ladder can be cumbersome to carry
Tree-tong	<ul style="list-style-type: none"> • Very Portable • Inexpensive • Safe 	<ul style="list-style-type: none"> • Less effective in closing bottom of cage around branch^a

^aImprovements in cage closing ability have been made since 2005 (Davies and Murray, in press).

The most appropriate time to choose a collecting technique is during the initial tree survey. This decision should factor cone height in the tree canopy, the availability of branches for climbing, the distance from a road to the tree, and the exposure of the canopy to strong winds (Murray, in press). Once a technique is selected, corresponding field gear can be prepared for a return trip to install cages. In remote locations requiring long travel, the initial survey can be combined with cage installation, necessitating the transport of all cages and installation equipment. In these instances, a tree-tong plus climbing gear with ropes is recommended.

Acknowledgement

Molly Allen, Biological Technician, Crater Lake National Park, provided significant fieldwork assistance.

Literature Cited

- Davies, M.A.; Murray, M. [In press]. Tree tong: a new tool for whitebark pine cone collection. Tech Tip 0624–2354–MTDC. Missoula, MT: U.S. Department of Agriculture Forest Service, Missoula Technology and Development Center. 8 p. <http://www.fs.fed.us/t-d/pubs/pdfpubs/pdf06242354/pdf06242354dpi300.pdf>. (27 December).
- Davis, D. 2005. National tree climbing guide: 2005 edition. Tech. Rep. 0567-2819 MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 88 p.
- Mahalovich, M.F., and G.A. Dickerson. 2004. Whitebark pine genetic restoration program for the Intermountain West (United States). In: Snieszko, R. A.; Samman, S.; Schlarbaum, S.E.; Kriebel, H.B., eds. Breeding and genetic resources of five-needle pines: growth, adaptability, and pest resistance: Proceedings RMRS-P-32. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 181-187.
- McDonald, G.I. and R.J. Hoff. 2001. Blister rust: an introduced plague. In: Tomback, D.F.; Arno, S.F.; Keane, R.E., eds. Whitebark pine communities: ecology and restoration. Island Press, Washington, D.C. 193-220.
- Murray, M.P. [In press]. Cone collecting techniques for whitebark pine. *Western Journal of Applied Forestry*.