Combined Proceedings IPPS 68:232-233. 2018.

Selecting and Grafting Wild *Pinus monophylla* on Containerized *Pinus edulis* Rootstocks

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Keywords: Grafting, pine grafting, pinyon pines, single-leaf pinyon pine.

Abstract

Single-leaf pinyon pine (*Pinus monophylla*) is a source of wild-collected, edible, soft-shelled pine nuts that are in great demand. This project identified high yielding, wild trees and evaluated two means of grafting the selections to *Pinus edulis* rootstocks to establish a stock block.

Trees were selected and sampled from productive wild stands near Hamlin Valley (February 23, 2018), Eureka (March 5, 2018), and the Raft River Mountains (February 12, 2018), UT and Austin, NV (February 2, 2018). These stands were identified by pine nut collectors and represent a broad sample from the Great Basin. From each stand, six trees were selected based on visual observations of the number of cones in the tree and on the ground.

Cone production was quantified by collecting six upper-canopy shoots from the top half of each tree at six compass points (N, NE, SE, S, SW, NW) and counting abscission scars from the past 10 years. Analysis of the cone scar data showed that some trees were more productive than others both within and between stands. The three most productive trees with the highest quality scion wood in each stand were selected for use in grafting. Scion wood was collected concurrent with shoots for cone scar analysis and from the same branches.

Second year seedlings of *P. edulis* (Pitkin Forest Nursery, University of Idaho) were used as rootstocks. Seedlings were delivered in November 2017, potted into 4-inch × 4-inch × 12-inch pots with a bark-based mix (Metro-Mix 900) and kept above freezing temperatures in a cold frame to prevent dormancy. Scion wood was stored for one week after collection at 4°C before grafting. A total of 24 scions from each mother tree were grafted, with 12 side-wedge grafts and 12 side-veneer grafts with one graft per rootstock.

Side-wedge grafts consisted of scion wood cut in a V-shape and inserted into a corresponding cut extending into the stem about one-third of the stem diameter. Side-veneer grafts consisted of scion wood cut shallowly along one side and notched at the bottom. A

corresponding shallow cut was made into the rootstock and the scion set into the rootstock with cut sides facing each other. Both grafting styles were tied with 3/8-inch × 5-inch grafting rubber bands. After grafting, the seedling trees were covered with 1 to 2 mm of plastic and row cover material in a cold frame for 6 weeks. The covers were removed once every week to ventilate the trees and to monitor the health of the grafts. After six weeks, the plastic was removed, followed by the row cover after one more week. These treatments were applied to each group of collected scion accessions sequentially based on collection date.

The trees were moved to a shaded greenhouse for 3 weeks before being moved to a full sun greenhouse on May 2, 2018, at which point all treatments were applied uniformly to the entire group. On June 4, 2018 (12 weeks from the last grafting) ,97% of the grafts were healthy and growing, with side-wedge grafts being more developed than side-veneer grafts. On July 2, 2018 (16 weeks after the last grafting), 92% of the grafts were alive, 77% of the grafts had produced significant needle growth, and the tops of the rootstocks were removed at 1 cm above the graft. An analysis of the grafts indicated side-wedge grafts were more successful than side-veneer grafts (95% and 89%, respectively), had longer average candle lengths (3.6 cm and 3.3 cm, respectively) and longer needles (4 cm and 3.3 cm, respectively).

Scions from Hamlin had the lowest survival rate (80.5%), scions from Austin had the longest average candle lengths (4 cm), and scions from Raft River had the longest needle lengths (5.4 cm). These results, excluding the average candle lengths, were statistically significant, indicating that side-wedge grafts are more successful than side-veneer grafts for grafting pinyon pine seedlings. Considering that these scions were collected from wild grown trees rather than cultivated trees, the results are very promising for the establishment of stock blocks.