

**Sierra Cascade Intensive Forest Management Research Cooperative Proposal 08-02  
Incense Cedar Stock Type Trials**

Principal Investigator: Jason Warshawer

Title: Improving the Establishment and Growth of Incense Cedar on Dry Sites Through Stock Type Trials

Year Approved: 2008

**Executive Summary:**

To help address a lack of knowledge concerning growing cedar - in nurseries as well as after out-planting - as a component species in conifer plantations, a study was proposed in 2008 to determine the principal contributions of stock type to incense cedar (*Libocedrus decurrens*) and sugar pine (*Pinus lambertiana*) survival, early growth, and total above-ground biomass on dry sites in the interior Sierra Cascade region of northern California and southern Oregon under vegetation free conditions. The study will also provide information on effects of time of sowing on seedling performance. Sugar pine was dropped from the trials for the time being at the annual meeting of the Co-op in March, 2008.

Planting sites on lands managed by Co-op members Sierra Pacific Industries, Roseburg Resources and possibly Silver Butte Timber Co. were proposed for the initial installations of the study.

The study will include stock types Styro 5, 8, 10D, and 15; bare root 1-0 and 1-1; and plug-1. The styro stock types will have three periods of sowing: April, May, and June. This results in 15 treatments which

will have 4 replications at each site. Plot size is 72'x72' per replication with 60 plots per site. Planting spacing will be 8 feet x 8 feet resulting in 81 seedlings per plot. The center 25 seedlings will be measure trees with in-plot buffering of two rows of seedlings receiving the same treatment. Each site will require 7 – 8 acres for installation.

Caliper and height will be taken pre-planting and at the end of the fifth growing season. Survival will be monitored annually at the end of each growing season.

**2009:** The initial installation of the study will be on Roseburg Resources land. One thousand Stubby 4's were grown at Cal-Forest Nursery in Etna, California for the plug-1 stock type and will be transplanted in the spring of 2010 at IFA's nursery in Elkton, Oregon. Two thousand bare root seedlings were grown at the IFA nursery in Canby, Oregon for the 1-1 stock type and will be transplanted in the spring of 2010 at the IFA nursery in Elkton. The seedlings for the 1-0 stock type will be grown in Canby. Seed for the Styro 5, 8, 10D, and 15 stock types will be sown in April, May, and June

of 2010 at Cal-Forest Nursery for the 2011 spring plant.

**2010:** Because of the wet spring, some changes were made in the nurseries that were to receive seedlings for transplanting. Instead of going from Cal-Forest (Etna, CA) to IFA at Elkton, Oregon as originally planned, the Stubby 4's were sent to the IFA nursery at Canby, Oregon for transplanting. Planting date was 4/26/10. The 1-1 stock type transplants from Canby were planted in Elkton on 6/16/10. The 1-0 stock type were grown at Canby and all Styro stock types were grown at Cal-Forest as originally planned.

Plot layout was completed in November. The study site is located near Pondosa on Roseburg Resources land in a new clearcut. The clearcut has been doubled ripped. Planting spots will be marked in early 2011 with planting to follow. Representative measurements for caliper and height for each stock type will be taken prior to out-planting.

Due to the wet spring, late planting dates, and less than ideal nursery practices, the 1-1's are poor representatives of this stock type. The 1-0's are small, averaging about 2 inches in height. Plug-1's look good. All stock will be frozen for the trial.

**2011:** Representative samples of all stock types were measured for seedling height and caliper in mid-May (Figure 1). These data are available at the Co-op manager's office in Redding. Out-planting was accomplished

using contract crews during the week of May 23<sup>rd</sup>. The weather was ideal for planting with rain and snow showers occurring on all planting days. Planting spots were selected by Roseburg and Forest Service inspectors.

This study site was one of the stops on the Co-op field trip in June. At this time it was noted that all three bare-root stock types were having survival issues. The container stock types looked good regardless of time of sowing.

First year survival exams were done in late October/early November (Figure 2). Two of the bare-root stock types, 1-0 and plug-1, had survival rates of about 20 percent; the 1-1 seedlings had a survival rate of 7 percent. First year survival for the container stock ranged from 78 to 92 percent with no sowing date consistently producing bigger seedlings than the other dates.

**2012:** A walk-through examination in May revealed survival problems with the cedar seedlings. Mortality was uniformly high in all fifteen treatments. The mortality was so excessive that the viability of the study was in question. A decision was made to wait until the end of the 2012 growing season to evaluate the trial.

This evaluation was conducted on November 13<sup>th</sup>. Figure 3 shows survival percentages by treatment. When Figure 3 is compared to Figure 2, the extent of the second year mortality is apparent. Nine of the fifteen treatments had survival rates of

less than 10%. Five of the remaining treatments had less than 20% survival (this included all living seedlings in a treatment, not just measure trees). The Cedar Stock Trial is located very close to the Sunscald Study site. The extremely cold conditions recorded at the Sunscald site affected the

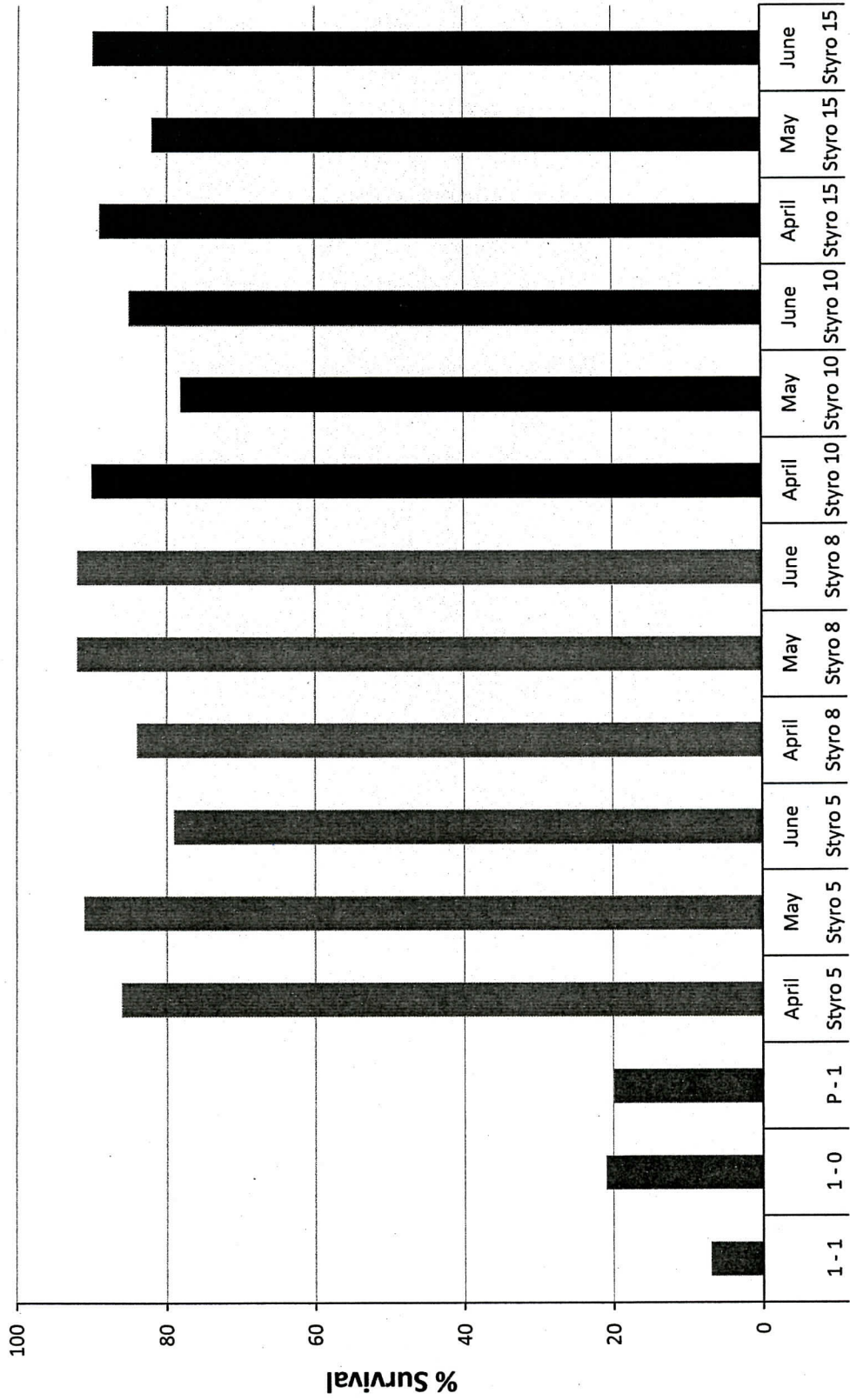
cedar site as well (see Sunscald Executive Summary in this Annual Report).

The status of this study will be discussed at the 2013 annual meeting and a decision made as how to proceed with the study.

# Cedar Stock Type Trial Stock Types At Time Of Planting May 2011

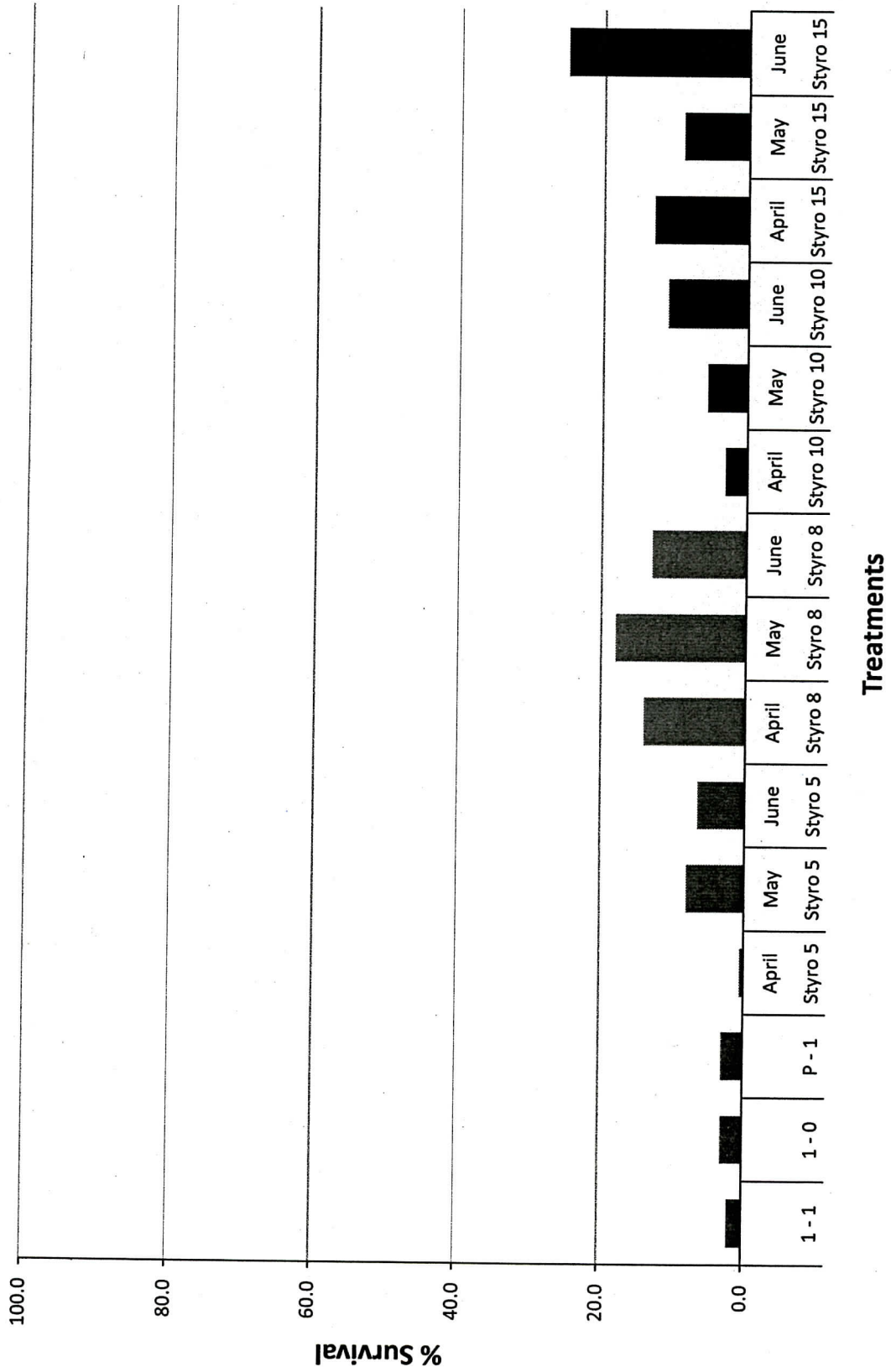


# Cedar Stock Type Trial 1<sup>st</sup> Growing Season Survival 2011



Treatments

## Cedar Stock Type Trial 2<sup>nd</sup> Growing Season Survival 2012



Treatments