

CENTER FOR FORESTRY NURSERY AND SEEDLING RESEARCH 2005-2006

Edited by David L Wenny

Forest Nursery Research Update No 16

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RECENT AWARDS AND CONGRATULATIONS

Pitkin Scholarship

Jeremy Pinto will receive the Franklin H. Pitkin Scholarship from the fall 2006 semester through the spring 2007 semester while working on his PhD in Nursery Management.

Center for Forest Nursery and Seedling Research Managing Director Hired

Anthony Davis has accepted the Managing Director position at the Center for Forest Nursery and Seedling Research. His current official job title is "Assistant professor of plant production for forest, rangeland and riparian restoration and management, and manager of the University of Idaho - Frank Pitkin Forest Nursery". Congratulations, Anthony, we look forward to your arrival next summer.

RECENT NURSERY PUBLICATIONS

Container and physiological status comparisons of ponderosa pine seedlings

Jeremy R. Pinto, David L. Wenny, R. Kasten Dumroese, John D. Marshall, Robert L. Mahler

University of Idaho Master of Science Thesis: 2005

In an effort to minimize the physiological differences between seedlings in container comparison studies, ponderosa pine (*Pinus ponderosa* Laws. var. *ponderosa*) seedlings were grown in six different containers varying in density, volume, and depth in two locations with unique growing regimes to compare morphological and physiological characteristics. Morphological traits for both locations followed the pattern of increasing height, root collar diameter, and seedling dry weight for decreasing density and increasing container volume. Analysis done on all six containers by location found intrinsic water-use efficiency measurements and cold hardiness levels (CH) significantly different at both locations, despite rigorously controlled nitrogen (N) fertilizer and irrigation at one location versus a production facility cultural regime at the other. Foliar nitrogen concentrations were significantly different in the production facility, but not different in the controlled facility. Further analysis of seedlings grouped by container density showed that N, and CH were generally not significantly different. Although physiological and morphological differences were minor in this study, the importance of minimizing physiological differences should still be given adequate consideration for a thorough assessment of morphological advantages in future container comparison studies.

FUNDED NURSERY RESEARCH PROJECTS

Endophytes and the survival and growth of outplanted nursery trees

Investigators: Newcombe, G; Wenny, DL; Morrison, T

Project Term: 2005 - 2007

Funding Support from University of Idaho Seed Grants

Abstract - Nursery and greenhouse crops are the fastest growing segment of U.S. agriculture. Tree seedlings for landscaping and reforestation are shipped all over the country, but their symbionts are largely left behind. Some of these symbionts are endophytic fungi known to enhance nutrition and defence of their tree hosts. In their natural environment, tree seedlings become infected with endophytes that had infected previous generations of related trees. In greenhouses and nurseries, infection does not occur and outplanted trees may be more susceptible to various biotic and abiotic factors. We are proposing to inoculate UI Center for Forest Nursery and Seedling Research seedlings (ponderosa and western white pines, and Douglas-fir) with the full complement of endophytes from their source populations. Upon outplanting in the UI Experimental Forest, the growth, disease, insect resistance and survival of these seedlings will be monitored. Resistance and survival should be enhanced by endophytes. Although we are starting to publish our endophyte research in leading scientific journals, field trials are essential to demonstrate the need to modify industry practices. A proof of concept is needed, and collaboration among the UI Forest Pathology Lab, The Center for Forest Nursery and Seedling Research and the UI Experimental Forest will provide it.

Comparing growth and survival of western white pine and ponderosa pine containerized seedlings grown in copper and non-copper coated cavities then planted in the field

Investigators: Regan, D; Wenny, DL; Miller, D

Project Term: March 2004 – October 2007

Funding Support from Potlatch Corporation

Abstract - We plan to examine effects of copper coated container cavities on the growth and survival of western white pine (*Pinus monticola* Dougl.) and ponderosa pine (*Pinus ponderosa* Laws.) seedlings grown for one season in the greenhouse, then planted the following year in the field. In addition, the growth and survival of seedlings grown at two locations (University of Idaho Center for Forest Nursery and Seedling Research, and Potlatch Corporation Nursery) will be observed in the field.

Comparing growth of Douglas-fir and western larch containerized seedlings fertilized with enhanced levels of potassium and nitrate

Investigators: Regan, D; Wenny, DL; Cameron, K

Project Term: March 2006 - October 2008

Funding Support from Plum Creek Timberlands

Abstract - Root growth occurring rapidly after outplanting may improve seedling survival. This experiment will examine new root growth on seedlings one month after outplanting. Douglas-fir (*Pseudotsuga menziesii* Glauca) and western larch (*Larix Occidentalis*) were greenhouse grown in styro 6 (112-105) containers at the University of Idaho Center for Forest Nursery and Seedling Research for one season. One treatment group of seedlings received enhanced levels of potassium and nitrate in their fertilization regime. The seedlings will be outplanted on two sites. Measurements of height, caliper and one month's new root growth will be taken.

Examining growth and survival of outplanted Douglas-fir, western larch and western white pine seedlings

Investigators: Regan, D; Wenny, DL; Miller, D

Project Term: March 2006 - October 2008

Funding support from Potlatch Corporation

Abstract - Foresters are requesting larger plug sizes for outplanting. Growing the same number of seedlings in a larger plug size requires an increase in nursery bench space. To justify the added bench space, this experiment will try to determine if larger plug sizes significantly increase the growth and survival of outplanted seedlings. Douglas-fir (*Pseudotsuga menziesii* Glauca), western larch (*Larix Occidentalis*) and western white pine (*Pinus monticola* Dougl.) seedlings were greenhouse grown for one season at the University of Idaho Center for Forest Nursery and Seedling Research. The seedlings (styro 4's, 5's, 6's, 8's, 10's and 20's) will be outplanted on two

sites. Measurements of survival, height and caliper from each species, treatment and replication will be taken after the first and second growing season in the field.

RESEARCH NOTES PRESENTED TO THE INTERMOUNTAIN CONTAINER SEEDLING GROWERS' ASSOCIATION

Using probability tables to compare greenhouse seed germination with seed germination tests – Moscow Meeting, 2005

Investigators: Regan, D; Wenny, DL

Project Term: January 2005 – April 2005

Seed germination tests conducted under optimum laboratory temperatures can differ when compared with seed germinated under greenhouse conditions. We conducted seed germination tests under greenhouse conditions to ensure that accurate amounts of seed can be prepared for sowing. Probability tables were examined to compare seed germinated in plastic trays at greenhouse temperatures to seed sown and germinated in the greenhouses. The results showed no significant difference in seed germination between the two treatments.

Improving seed germination of black hawthorn – Moscow Meeting, 2005

Investigators: Regan, D; Wenny, DL

Project Term: December 2004 – July 2005

We are conducting further experiments on black hawthorn (*Crataegus douglassii*) seed to determine treatments that will increase germination. Applied treatments consist of acid scarification and/or warm and cold stratification periods. These treatments are replicated on multiple seed lots to compare their response. The results showed significantly greater germination when black hawthorn seed had five month cold stratification versus a four month cold stratification.

Examining growth of Douglas-fir containerized seedlings in Premier Horticulture growing media - Salem Meeting, 2006

Investigators: Regan, D; Wenny, DL

Project Term: March 2006 - October 2006

Douglas-fir (*Pseudotsuga menziesii* Glauca) containerized seedlings were grown at the Center for Forestry Nursery and Seedling Research in either Pro Mix BX with Biofungicide general purpose growing media or Pro Mix BX general purpose growing media. At the end of one greenhouse growing season, measurements of seedling height, caliper and biomass will be taken to evaluate the seedlings response to the growing media.

Evaluating growth of containerized seedlings in Premier Horticulture Pro Mix BX with Biofungicide - Salem Meeting, 2006

Investigators: Regan, D; Wenny, DL; Dawes, D; Hutton, K; Schaefer, J; Schwartz, M

Project Term: March 2006 - October 2006

Containerized seedlings were grown at five locations (Center for Forestry Nursery and Seedling Research, Wildlife Habitat Nursery, Plants of the Wild, Western Forest Systems and Northwoods Nursery). Each location grew seedlings in the Premier Horticulture Pro Mix BX with Biofungicide and the growing media they used on an operational basis for growing seedlings. Measurements of seedling height, caliper and biomass will be taken after one growing season at each location to determine if there are growth differences between the two treatments.