OREGON DEPARTMENT OF AGRICULTURE: Research Proposal

Title: Advancing Field Production

Date: Sept 5, 2025

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Collaborators:
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Background

Oregon's nursery industry continues to lead the nation in production value, with field-grown trees and shrubs serving as the backbone of that success. To remain competitive, growers need reliable science-based data to optimize irrigation, reduce inputs, and ensure long-term plant performance.

Arborvitae (*Thuja occidentalis*) is one of the state's highest-value crops and among the most widely planted landscape trees in the U.S. Despite its economic importance, no shared scientific data exist on precise water requirements in field production. This gap has direct industry and regulatory consequences. For example, the City of Donald recently contacted the Nackley Lab for water-use estimates for arborvitae, underscoring how municipalities as well as growers are seeking defensible data on irrigation demand. Developing crop coefficients will not only improve irrigation efficiency and reduce costs for growers, but also provide a trusted resource for water planning discussions.

At the same time, growers continue to raise questions about the long-term performance of liners produced in different container systems. The Nackley Lab recently completed a two-year OAN-funded trial comparing red maple, Himalayan birch, and red oak grown in four liner container types: solid-walled #1200, Redi-Root air-pruning pots, Root Pouches, and Proptek Pioneer Pot. While results identified short-term differences in rooting and establishment, the industry's central question remains unanswered: **do container types influence tree growth and survival years down the line?** With field planting decisions representing major investments, nurseries need clear evidence to inform liner purchasing and production choices.

Together, these two research priorities: 1. water use in arborvitae and 2. long-term liner performance, this research will provide actionable data to help Oregon growers improve profitability and maintain leadership in the national nursery market.

Objectives

1. Develop crop coefficients for field-grown arborvitae. Establish a two-year study measuring growth and physiology of arborvitae under five irrigation levels to determine precise water needs.
2. Evaluate outplanting performance of shade tree liners. Track survival and growth of red maple, Himalayan birch, and red oak liners previously produced in four

container types to assess long-term performance in both field and large-container settings.

Methods and Timeline

Spring 2026

- Establish arborvitae field trial with five irrigation levels.
- Outplant shade tree liners into NWREC field plots and large containers.

Summer 2026

- Monitor arborvitae growth, soil moisture, and plant water status.
- Record shade tree growth, survival, and establishment metrics.

Autumn 2026

- Analyze first-year data.
- Share preliminary findings with growers through OAN channels and NWREC field days.

Impact to the Nursery Industry

- Provides the first scientifically validated crop coefficients for field-grown arborvitae, enabling growers to reduce water use and costs while supporting regulatory compliance.
- Answers long-standing grower questions about the durability and long-term performance of liner container types, guiding purchasing and production strategies.
- Continues Oregon's national leadership in nursery science by generating impartial, research that growers, municipalities, and industry partners can trust.

Budget (FY2026)

- **Part-time salary Faculty Research Assistant** – $26,000
- **Irrigation supplies** (sensors, lines, controllers) – $6,000
- **Regional Travel** (e.g. gas/fuel) – $500
- **Total – $32,500**