

**OREGON DEPARTMENT OF AGRICULTURE  
OAN NURSERY RESEARCH COMMITTEE**

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**Principal Investigator:**

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**Title:** Developing precision irrigation practices for container production of blueberry rootstock

**Collaborators:**

Sam Doane, Production Horticulturalist, J. Frank Schmidt and Sons

Lloyd Nackley, Oregon State University, North Willamette Res & Ext Center

**Background**

Blueberries are recognized as a “super food” that have been driving global demand. Using a monopodial blueberry tree can prevent fruit loss during machine harvesting with tight catch plate closure around the monopodial stem. The key technology to developing the blueberry tree is the rootstock (or understock) used to graft blueberry cultivars onto. Blueberry rootstock also offers other important advantages over a multi-stemmed blueberry bush with increased soil pH range (up to 6.3), less pruning cost, resistance to root rot disease (Yang, unpublished data), and potential drought tolerance. For gardeners, the blueberry tree offers them a plant that is easy to grow without modifying the soil and ease of care.

A blueberry rootstock (*Vaccinium arboreum* L.) has been selected from a previously SCRI-funded project and clonally propagated by working with private tissue culture labs in Oregon. For the rootstock to be adopted by the industry we must first learn how to rapidly produce them to production size for grafting. The proposed research will focus on developing nursery practices to grow *V. arboreum* from tissue-cultured plugs to a grafting ready size-class rootstock. Partnering with the Nackley Lab who have successfully established an Experimental Plant Irrigation Center (EPIC) at the North Willamette Research and Extension Center (NWREC). This innovative facility was created to address the challenges faced by the nursery industry in achieving consistent and efficient irrigation control. EPIC's gravimetric-based irrigation control system enhances the precision of irrigation by automating the process of weighing pots, providing an efficient and adaptable solution. This initiative aligns with the lab's commitment to advancing sensor-based irrigation control methods, with a particular focus on the suitability of gravimetric measures for container systems, especially those utilizing coarse media like Douglas-fir bark.

**Project Objectives**

To diversify the nursery's product line with the introduction of edible crops, aligning with the growing trend of homeowners seeking to create sustainable and productive landscapes. This initiative aims to broaden the customer base, meet consumer demand, enhance sustainability, and provide educational resources, ultimately increasing resilience and fostering community engagement while ensuring long-term market adaptation and success.

## Methods and Timeline

- Define and design several deficit irrigation treatments, each representing a specific level of water deficit compared to water holding capacity of the containers. For example, design treatments that irrigate at set thresholds 80%, 60%, and 40% of the calculated water holding capacity.
- Regularly record data on soil moisture, plant growth, fruit yield, and any signs of water stress.
- Document water applied in each treatment, including frequency and volume.
- Ensure that the irrigation system allows for precise control and measurement of water applied to each treatment.
- Analyze the collected data to evaluate the effects of different deficit irrigation levels on blueberry tree growth, fruit yield, and water use efficiency.
- Use statistical methods to identify optimal water use practices.
- Compile the results into a comprehensive report, highlighting the effects of deficit irrigation on blueberry rootstocks.
- Provide recommendations for optimizing irrigation practices to maximize water use efficiency while maintaining acceptable crop yields and quality.

## The Benefit to Nursery Industry

Incorporating edible crops into a nursery's product line not only broadens its appeal but also positions it as a resource for those interested in sustainable and productive gardening practices. This adaptation to evolving consumer trends can lead to increased sales and a stronger market presence for nurseries.

## Budget summary

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|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|                                                                                                                                            | <b>\$19,750</b> |
| • Two-month salary (\$3,750 per month plus 70% OPE) for faculty research assistant (FRA). The FRA will assist in all phases of experiment. | \$12,750        |
| • Materials and supplies:                                                                                                                  | \$3,000         |
| Fertigation supply: \$1,000                                                                                                                |                 |
| Pots and Potting mix: \$800                                                                                                                |                 |
| Sample storage bags: \$100                                                                                                                 |                 |
| fertilizer: \$300                                                                                                                          |                 |
| Facility fee: \$800                                                                                                                        |                 |
| • Outreach materials                                                                                                                       | \$1000          |
| • Sensors                                                                                                                                  | \$3000          |