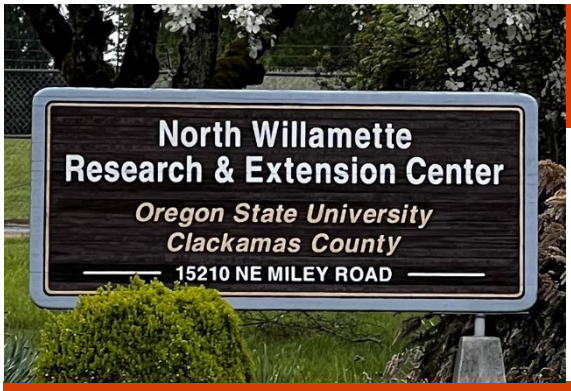

North Willamette Research and Extension Center
Oregon State University

NWREC News

December 2023

North Willamette Research and Extension Center
Oregon State University
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Visit us online at
https://extension.oregonstate.edu/nwrec
https://agsci.oregonstate.edu/nwrec
https://youtube.com/@NWREC

About us

The North Willamette Research and Extension Center (NWREC) is located in Aurora on a 160-acre facility. By serving Clackamas, Columbia, Marion, Multnomah, Polk, Washington, and Yamhill Counties NWREC plays an important role in the region where 65% of Oregonians live. Small fruits, Christmas trees, grass seed, hazelnuts, herbs, nursery crops, vegetables, and specialty seed crops are among the major commodities that NWREC research and extension faculty work on. Efforts from NWREC help both rural and urban communities in the Portland area for their food, health, and cultural needs through science-based real-world solutions.

NWREC News is a quarterly newsletter providing research and extension updates.

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Oregon State University
North Willamette Research and Extension Center

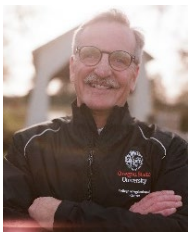
Celebrating the Vibrancy of Fall and Agricultural Success in Oregon

Fall is a spectacular time in Oregon. The season not only captivates us with its stunning colors but also unveils the diverse tapestry of agriculture in our state. For the College of Agricultural Sciences, this year has been nothing short of extraordinary. Our dedication to research excellence has propelled us to new heights of research funding for 2 years in a row with a remarkable milestone of $116 million. This significant doubling of research grants and contracts over just three years firmly establishes our college at the forefront of research metrics within the university.

Central to this achievement is the impassioned dedication of our faculty, who continually strive to unravel innovative solutions to complex challenges. Serving as the Associate Dean for Research in CAS and Associate Director of the Oregon Agricultural Experiment Station, I am honored, humbled, and invigorated daily by the privilege of collaborating with such a dynamic and creative group of individuals.

Our success also hinges on our adept integration of research and extension/outreach, effectively engaging stakeholders and bridging the gap between scientific discoveries and practical applications. This synergy is prominently showcased at the North Willamette Research and Extension Center (NWREC), a hub where nearly 40% of the total farmgate value of Oregon Agriculture is generated within a 50-mile radius. The groundbreaking work at NWREC is instrumental in developing solutions to fortify Oregon agriculture against climate challenges, water scarcity, and aligning with consumer preferences. Furthermore, it plays a pivotal role in our vision for the future, where clean energy converges with cropping systems through agrivoltaics and innovative approaches involving robotics, data sciences, and AI are embraced; themes described in the newly revealed 2024 OSU Strategic Plan – 'Prosperity Widely Shared'. CAS is integral to this plan and the research at NWREC is key to that future. We look forward to enabling partnerships that support the research and discoveries needed to continue to move us forward.

As fall gives way to winter in Oregon we are deeply grateful for the CAS community that surrounds, supports and energizes us. We look forward sustained support for faculty, students, and partners in the search for new discoveries and knowledge and ultimately 'making tomorrow better for everyone'.



Shawn Donkin
Associate Dean of Research
College of Agriculture and Life Sciences

Evaluating Machine Harvest Effects on the New Popular 'Calypso' Blueberry for the Fresh Market

Sarah Doane, Faculty Research Asst. and Wei Yang, Professor

'Calypso' blueberry, known for its taste and vigorous growth, has gained popularity not only for its fruit quality but also for its adaptability to hot weather events. The upright growth habit and fruit clustering, along with the reduced drop height due to lower hanging fruit bunches, make them suitable for machine harvesting. This not only facilitates efficiency in harvesting but also minimizes internal bruising damage to the fruit, which is crucial for maintaining quality.

In 2023 we conducted a full study to determine the effects on fruit quality, simulating machine harvesting for both the hard surface typically found on over the row harvest machines and also the soft surface, found on modified machines. The comprehensive analysis of data, including fruit bruising data, will provide valuable insights into the adaptability of 'Calypso' blueberries to machine harvesting for fresh operations. The results of the cold storage component of this study highlight the fruit's resilience, which maintained good fruit firmness for up to 4 weeks after the simulated drop test.

The data collected during the 2023 growing season, including fruit bruising data, provides valuable insights into the adaptability of 'Calypso' blueberries to machine harvesting for fresh operations. Our goal is to provide science-based information to growers, enabling them to make the best decisions when it comes to machine harvesting 'Calypso' for the fresh market.

IR-4 / Specialty Crop Protection Program Update

Dani Lightle, Assistant Professor

We are excited to work on a new crop next summer. The IR-4 Project funded a research trial to determine the amount of residue of an herbicide, indaziflam, on common camas (*Camassia quamash*). This project was requested by the Confederated Tribes of the Umatilla Indian Reservation.

Source: USDA-NRCS PLANTS

Camas (from the Nez Perce word qém'es) is a native bulb which produces beautiful purple flowers. Several species and subspecies of this plant can be found across the state of Oregon, in coastal, valley, high desert and mountainous regions.

The bulb of the camas plant is an important First Food for indigenous tribes of Oregon. The bulb has been foraged for centuries, and tastes sweet when cooked. Camas cakes were provided by the Nez Perce to starving members of the Lewis and Clark expedition in 1804 – though, for unclear reasons, it evidently made the explorers quite ill.

Today, many of the native plant species in eastern Oregon are suppressed by invasive grasses, which out-compete native plants and also contribute to high fuel-load for wildfire. Indaziflam (trade name: Rejuvra) is an herbicide which controls invasive weeds and allows the native plants to thrive. Establishment of food tolerance through residue work on camas

will allow foraging for camas for food following treatment with indaziflam.

More information about camas can be found here: https://www.oregonencyclopedia.org/articles/camas/

Christmas Tree Program Update

Judy Kowalski, Christmas tree Research Technician

November and December are very busy months for Oregon Christmas tree producers. Harvest is the culmination of many years of hard work that goes into each and every tree. Stopping by our grower collaborators is always a highlight for us during this time. Many large producers have been harvesting for several weeks already. There is a flurry of activities, helicopters overhead moving piles of trees and lines of trucks being filled with beautiful Oregon Christmas trees headed for destinations throughout the country and beyond.

For the OSU Christmas tree program, field work has mainly finished for the season. Efforts are now focused on analysis of data, writing research results, and planning for 2024 program goals and projects. Maintenance work throughout our five seed orchards at NWREC is on-going. In early September, I harvested our first batch of cones from the Turkish fir orchard. Although it wasn't a large harvest, it's an encouraging sign of more to come in future years. Our three acres of orchards contain grafted trees with the world's most coveted traits— vibrant color, symmetrical form, rapid growth, disease resistance and superior needle retention. Seeds harvested from the cones produced in these orchards will be cultivated into seedlings and sold to growers to produce new generations of top-quality Christmas trees.

Large Turkish fir cones from the NWREC seed orchard.

Prior to Thanksgiving, I cut boughs from the orchards for the Wilsonville Garden Club. From these beautiful boughs, club members create centerpieces and swags for their annual fundraising event. Proceeds will benefit the Clackamas Community College Horticulture program and the gardening program at Coffee Creek Women's prison in Wilsonville.

Nackley Lab Nursery Production: Roots, Shoots, and Sky-High Science and Extension

Lloyd Nackley, Associate Professor

Our dedicated team has actively engaged in research and extension events this year that offer valuable insights into plant ecology and climate change adaptation.

Field Research: Graduate student Scout Dahms-May led extensive research into how ornamental shrubs respond to drought conditions. Her dedication shone through as she ventured into the field for pre-dawn plant water potential assessments, sharing the experience with hot air balloonists and the local coyotes. Our excellent undergraduate students, along with the new graduate student, Josh Perrault, played a pivotal role in the research by meticulously measuring the leaf area of over 100 plants. Their hard work serves as a testament to the commitment of students pursuing cutting-edge agricultural research.

Predawn balloonists, photo by Scout Dahms-May

Extension: Standout events this season included an impressive demonstration of sprayer drones. Visitors had the opportunity to witness these cutting-edge technologies in action, gaining insights into how they can be used in modern agriculture and horticulture. Another highlight was a grand field day that showcased the spirit of collaboration at NWREC, involving students, staff like Brent Warneke, Dalyn McCauley, and Clint Taylor from the Nackley Lab, as well as guest appearances by experts, including Dr. Rebelo, a visiting scholar from South Africa, and Dr. Wiman, Orchards Program Leader, and Dr. Yang, a Blueberry Extension Specialist. This summer, NWREC demonstrated its position as a hub of research, learning, and community engagement, driven by our shared commitment to advancing the field of plant science.

Nackley Nursery Team

FFA Soil Judging Competition

Marc Anderson, NWREC Farm and Facilities Manager

On October 5th, NWREC hosted more than 186 students for the Future Farmers of America (FFA) soil judging competition. The students represented 12 high schools from the Mt Hood and Capital districts. Soil science is one of the first competitions that FFA members compete in at the beginning of the school year and is a very intensive competition.

Soil science shows importance in every aspect of life- food, sports, construction etc. This is a great opportunity for students to understand the dynamics of what goes into evaluating soil and what you are looking for to be successful in these different areas. Paige Orelski, Canby FFA advisor, said "For our class, we focus on plant needs and the ideal soil in order to have effective growth and yield."

During the competition the students start with evaluating the soil profile. This includes determining soil horizons, texturing, color and the type of structure it is. Contestants then determine if water is present by checking for mottles and if there are any special features that would cause compaction. After their initial observations, they continue to determine effective depth for root growth, erosion concerns and irrigation sustainability. They finish by identifying the parent material and calculating the slope of the area. This was a great event and NWREC was proud to support the next generation of Ag professionals.

Olea Project Updates

Heather Stoven, Extension Horticulturist for Yamhill County

NWREC has hosted the Olea olive research project since 2017. This project brings together research and educational opportunities to assist western Oregon's olive producers. As the Willamette Valley is further north than the traditional olive-growing regions, winter cold damage to woody tissues is currently the largest issue that olive producers face.

In order to address the issue of olive cold hardiness, the Olea Project planted a variety evaluation in 2021. The trial has a diverse group of 420 olive trees collected as cuttings from the National Clonal Germplasm Repository in Davis, California. The one-acre plot holds 118 different olive cultivars, in most cases, each replicated four times. The plant diversity within the trial has been apparent as we collect data on cold damage, plant size, flowering, as well as yield and fruit size. Olive harvest season is typically at the end of October or early November in western Oregon.

Producers aim to allow olives to ripen as much as possible before the first freeze, which can damage fruit. On November 7th, we were able to harvest our olive crop at NWREC with the help of 7 volunteers from the local olive industry.

The trees are still young and not yet near full production, however we collected fruit from the trees that were producing, which was about a quarter of the trees in the plot.

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were producing, which was about a quarter of the trees in the plot. The fruit from each tree was bagged then weighed so that we will be able to compare fruit production for each of the cultivars. In the future we hope to have enough fruit to mill it into oil in order to determine oil quality of some of the better suited cultivars for our region.

Managed Aquifer Recharge (MAR) Innovation Field Research

Salini Sasidharan, Assistant Professor

Groundbreaking Research in Groundwater Sustainability
This innovative project spearheads the future of groundwater management. Focused on Managed Aquifer Recharge (MAR) technology, it aims to revolutionize both groundwater and surface water management through sustainable practices.

Advancing MAR for Groundwater Replenishment
Central to our initiative lies in developing novel subsurface characterization methods, cutting-edge vadose zone injection well designs, and advanced pretreatment techniques. These key advancements are instrumental in augmenting groundwater recharge processes, securing long-term groundwater sustainability, and effectively addressing the pressing issue of water scarcity.

Initial Milestones: A Strong Foundation for Future Success
We have successfully completed the initial construction of a drywell and a customized pretreatment chamber at our research site. The completion of a geophysical survey for the Managed Aquifer Recharge (MAR) site is also a noteworthy achievement. The installation of a sensor testing facility with continuous monitoring capabilities marks a strategic advancement, enabling real-time data collection and analysis that enhances the observation and response in deep vadose zone. These developments are vital for our ongoing experiments and studies, providing a robust foundation for our innovative approaches to groundwater management.

Commitment to a Water-Secure Future
Our research is not just about technology; it's about securing a sustainable future for our water resources. By focusing on both groundwater and surface water, we are taking a holistic approach to ensure the availability and quality of water for future generations.

Stay Updated and Get Involved
We invite you to stay engaged with our progress and explore ways to contribute to this vital research
https://bee.oregonstate.edu/users/salini-sasidharan

Dry Farming Melons in NWREC's Agrivoltaic Plots: Small Farms Update

Heidi Noordijk, Ag Small Farms Coordinator

The Small Farms Program established a dry-farmed melon demonstration at NWREC to meet a crucial need identified by our farmers: to provide drought-resilient and climate-adaptive farming techniques. In early June, ten varieties of melons, known to thrive in dry-farmed conditions, were planted in both the agrivoltaic plots and in a nearby open field. A range of practices to conserve soil moisture for crop growth, including the addition of compost and low tillage, were utilized in the plantings. Each melon plant received one gallon of water at planting, constituting the only supplemental irrigation they received.

Throughout the season, Victoria Taylor, an OSU undergraduate intern, collected data on soil moisture, plant health, yield, and led tastings for the field day. In early September, 35 participants attended the dry-farmed field day to learn about techniques, walk through the plots, share their experiences, receive dry-farmed marketing materials, and taste the melons.

While yields are often lower in dry farming, this practice is believed to result in more flavorful, nutrient-dense crops and produce. According to the tastings, the melons were very flavorful. Lower yields were found in Agrivoltaic plantings, likely due to increased shading and reduced photosynthesis. One hypothesis was that the shading provided by the solar panels would cool the soil and reduce evapotranspiration or water loss from the plants compared to open field plantings.

Our findings indicate that melons are not an ideal crop for planting in agrivoltaics. Potential crops better adapted to the integration of agriculture, food/forage crops, and solar panels include lettuce, forage crops, and dry-farmed tomatoes. Smaller plantings of dry farmed winter squash and tomatoes were also planted at NWREC.

Dry farming is often defined as crop production without irrigation during a dry season, typically in a region receiving at least 20 inches (50 cm) of annual rainfall. It involves utilizing the moisture stored in the soil from the rainy season. characteristics, and NWREC's Willamette silt loam soils are ideal for this method.

According to OSU's Dry Farming Collaborative, a dry-farmed crop is irrigated once or not at all. Successful dry farming necessitates deep soil with good water-holding characteristics, and NWREC's Willamette silt loam soils are ideal for this method.

The Oregon Agrivoltaics Research Facility has its first harvest

Allan Branscomb, Faculty Research Assistant

The inspiration that energizes the Agrisolar dual use of land for crops and solar energy is that excess solar energy is a marketable farm product. In September, the Agrisolar Clearinghouse, a program of the National Center For Appropriate Technology, brought together over forty people for a tour of the AVS array, a luncheon which included crops harvested by Heidi Noordijk's Small Farms program, and a meeting that featured both planned presentations as well as an open floor discussion. While the panels harvested power, the participants consumed fresh vegetables from the farm.

Since then, interest in agrivoltaics has grown steeply with growers, developers of utility scale arrays, public officials, designers, and others making contact and scheduling tours. Tours are now being scheduled into 2024 with the Oregon China Council, state agency personnel, and local, state and US elected officials. In the arrays, cover crops have been seeded, forage trials have begun, and the soil health study is underway.