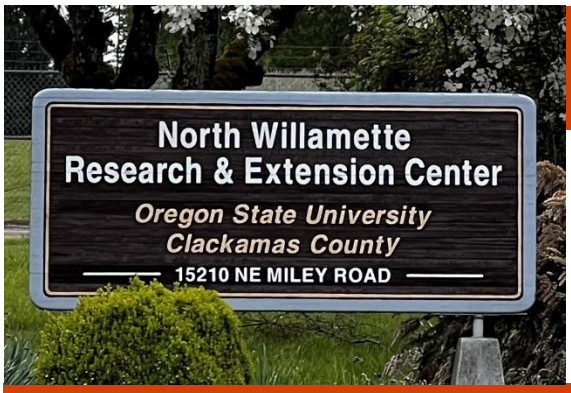

North Willamette Research and Extension Center
Oregon State University

NWREC News

September 2023

North Willamette Research and Extension Center
Oregon State University
15210 NE Miley Rd
Aurora, OR 97002
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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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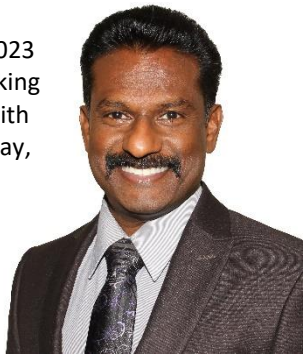
Oregon State University
North Willamette Research and Extension Center

Summer Research and Outreach

Summer is a busy time of the year for agricultural research. Our faculty has been occupied with various research projects and extension activities addressing issues important to our stakeholders and disseminating relevant information. Water, nutrient, pest, and disease management, evaluating new crops and varieties, supporting pesticide registration for specialty crops, developing climate-resilient cropping systems, and exploring new technologies in machine harvesting and pesticide application are among many areas resident and affiliated faculty at NWREC address. Our programs contribute to economic growth and community well-being through competitive and resilient agricultural systems and healthy environments. We are grateful to our stakeholders, donors, community partners, advisors, collaborators, and others for supporting our programs and contributing to the collective success of everyone in Oregon and beyond.

In addition to serving agricultural communities, we are also committed to serving the general public through various outreach activities and trainings related to agriculture or agricultural research. Each year, hundreds of people from Oregon, other states, or other countries visit NWREC to learn about our vibrant and diverse programs. Such public engagement opportunities in the recent months included tours for the Marion County Farm Bureau in May, for the 3rd graders from the Canby School District, middle schoolers from the West Linn-Wilsonville School District, members of the Wilsonville Garden Club, and food bloggers from around the US, and tractor training classes for youth and adults in June, NWREC Community Open House in July, and a training program for STEM teachers from Oregon and Washington organized by the Oregon Dairy and Nutrition Council and the American Farm Bureau Foundation for Agriculture in August along with several exclusive tours of the agrivoltaics program. Nearly 760 people visited NWREC through these tours and trainings in just four months in addition to a few hundred more that attended our workshops and field days. We are incredibly grateful for these opportunities that showcase our programs to the public, promote STEM education through field tours and internships for youth, and enhance the understanding of food production, sustainability, and other topics that are important to everyone.

I am also happy to share that arrangements for our 2023 Harvest Dinner are coming along well. We all are looking forward to celebrating the success of our programs with our stakeholders, supporters, and many more on Friday, September 22 evening at NWREC.



Surendra Dara
Professor and Director
North Willamette Research & Extension Center

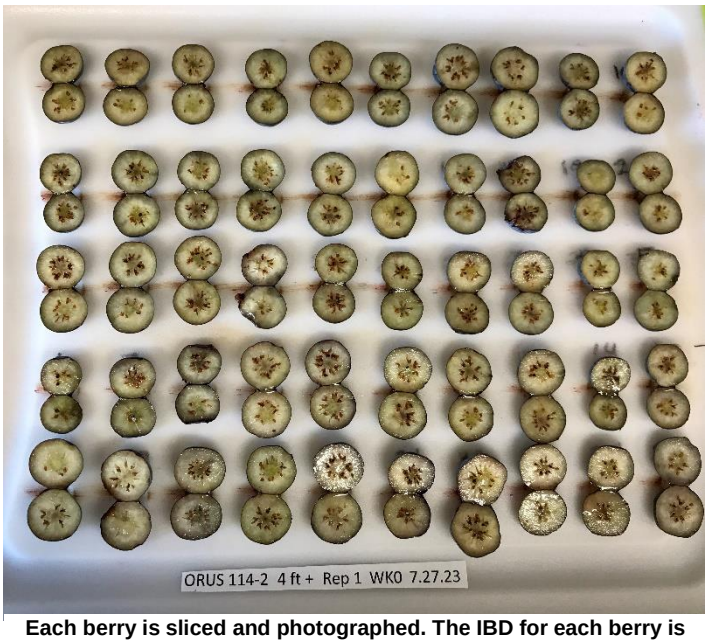
NWREC's Blueberry Extension Program Takes the Lead on Machine Harvesting

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

In collaboration with the USDA, the NWREC's Blueberry Extension program has been conducting a series of drop tests to assess the feasibility of machine harvesting for the USDA's advanced blueberry selections. These drop tests emulate the real-world stresses that blueberries might encounter during mechanical harvesting for the fresh market sector. The experimental procedure involves subjecting hand-picked blueberries to controlled drops onto two surfaces, the rugged OXBO hard surface catch plates and the more modern and

Saksen Hathaway, summer intern and a University of Wisconsin senior, using the FirmTech II to determine berry firmness and size

gentler SOFTSurface® kit surface. These surfaces closely mimic the environments encountered by over-the-row harvest machines, simulating a drop from a height of 4 ft. An evaluation of the fruit's attributes such as firmness, size, sugar levels, acidity, and susceptibility to internal bruising damage (IBD) is carried out for all three scenarios: hard surface, soft surface, and no drop as a control. The quantification of fruit size and firmness relies on the utilization of the sophisticated FirmTech II (BioWorks Inc, Kansas City, KS) device. Each batch of harvested fruit samples undergoes meticulous processing, followed by a period in cold storage lasting 2 weeks. During this period, changes in fruit firmness, with a specific focus on the development of IBD throughout the cold storage phase, are meticulously determined and documented.



Each berry is sliced and photographed. The IBD for each berry is determined at a later date

IR-4 Specialty Crop Protection Program Update

Dani Lightle, Assistant Professor

I will be representing Oregon specialty crop growers at the annual IR-4 Food Use Workshop in September. The IR-4 Project helps specialty crop growers address pest concerns by developing data necessary for the registration of safe and effective pest management solutions with the U.S. Environmental Protection Agency. Held each year in the second week of September, the Food Use Workshop is attended by growers, researchers and pesticide registrants from across the country to determine the top priority specialty crop + pest control solutions to be researched the following growing season. Approximately 40 pesticide residue studies will be selected from a list of about 200 high priority submissions. This year, I will be advocating for studies in blueberry, clover seed, mint, hazelnut, hops, onions, and beets for the benefit of Oregon producers.

After a study is approved, IR-4 places trials across the country, depending on where the main production regions for that crop are located. Trials commonly placed in Oregon include blueberry, blackberry and raspberry, strawberry, hazelnut, hops, grass seed, clover seed, hemp, and a variety of vegetable crops. Most of the residue research is conducted at NWREC, with the remaining trials placed with grower cooperators who allow us access to their production fields for research purposes. IR-4 is a grower and needs-driven organization. There are many ways to become involved with IR-4, from providing information to me about your pest management needs, to attending the Food Use Workshop to advocate for your needs, to participating in IR-4 stakeholder groups. If you would like more information, reach out me at danielle.lightle@oregonstate.edu.

Summer in the NW Berry Program

Scott Lukas, Associate Professor

The NW Berry program at NWREC had a busy summer with all hands-on deck of the harvester. This summer we are nearing the final harvest of two multi-year studies. The first is evaluating the impacts of training, primocane suppression, and plant spacing on the trailing blackberry cultivar, Columbia Star. Amanda Davis (Senior Faculty Research Assistant II) has been actively focusing on this project, as well as sharing the findings at regional, national, and international conferences. Secondly, one of the longest-term organic blueberry research fields in the nation is yielding informative data on the impacts of naturally derived biostimulants on plant, soil, and fruit metrics. Since harvest season is still ongoing, stay tuned for more updates this winter for these trials. Focusing on breeding new cultivars for blueberry, red and black raspberry, blackberry, and strawberry is where Patrick Jones (Senior Faculty Research Assistant I) shines. Pat is managing multiple field trials working with the USDA Agricultural Research Service geneticists to breed small fruits that perform best in the Pacific Northwest and keep the producers supplied with new plant materials that are resilient to biotic and abiotic stresses and have great tasting berries. We have also hired a new Biological Research Technician, Kendrick Mitchell, to help ensure our multifaceted research and

2023 NWREC Berry research team

extension activities are managed with care. And of course, we cannot thank our hard-working summer staff enough for the long hours spent harvesting, managing fields, and sorting fruit. On the Extension side of our program, we are happy to report that the strawberry (June 7th), caneberry (June 21st), and blueberry (July 26th) field days had great attendance. Our mission is to be able to share information generated at NWREC and throughout the PNW with stakeholders, colleagues, and our community to support our robust berry industries. Join us next year for these events (similar times to this summer) to hear about research projects, taste berries, and have great conversations.

We hope that you are enjoying the wonderful berries that Oregon has to offer this summer. Feel free to email Scott Lukas at scott.lukas@oregonstate.edu for more information. Thank you to our berry team and for all of your support!

2023 Harvest Dinner

Oregon State University
North Willamette Research and Extension Center

Harvest Dinner

Celebrating the Success of Service

NWREC will host the annual Harvest Dinner on September 22 from 5:00-8:30 pm. Please register by September 9 at http://tinyurl.com/2023HDregistration. Contact Jan Egli (jan.egli@oregonstate.edu) if you have any questions.

Vegetable and Specialty Seed Program Update

Kristie Buckland, Associate Professor

The Vegetable and Specialty Seed program hosted stakeholders from the medicinal herb industry at NWREC on Wednesday, August 16th. The group toured the ¼ acre demonstration garden which hosts 20 species of herb crops suited for production in our region. Preliminary work on herb crops for the region resulted in a list of potential crops, as well as challenges, detailed in an Extension publication titled "Medicinal Herb Production in the Pacific Northwest" which can be seen at https://catalog.extension.oregonstate.edu/em9349.

Red sage (*Salvia miltiorrhiza*) growing in the herb demo garden at NWREC. The demo garden hosts 20 species of medicinal herbs that have high potential for farming in our region. Photo credit: Rachel Cross

We also presented early results of research trials and planned future research and extension events, based on industry feedback. Look for updates from the field day at https://pnwherbs.org. In cooperation with the Nackley Lab, we will also host a field day and demonstration of unmanned aerial systems with pesticide application technology on Sept 14th at NWREC. Join us for talks on using drones on farms, aerial

applications, and see equipment in action! An additional demonstration event is in the works for early October as well. Read more about how we use our aerial imagining in research such as plant disease detection or assessing crop establishment and learn more about upcoming events at the Fly Your Farm blog here: https://blogs.oregonstate.edu/flyyourfarm.

Christmas Tree Program Update

Judy Kowalski, Research Technician

Historically, Oregon Christmas tree producers do not typically irrigate their fields of trees. There are many varied reasons for this, but primarily there has not been a great need to until more recently. Summers in our region have become increasingly hotter and drier making it very challenging to keep noble fir seedlings alive. The Christmas tree program has conducted several trials over the last decade to find practical solutions to decrease mortality of noble fir seedlings.

This year, as a part of a larger trial, we are evaluating the effect of supplemental water to spring planted noble fir seedlings. We are working with a grower that uses a basic drip poly irrigation line, attached to a large water tank with a pump. This is a portable set-up that he moves throughout his fields as needed.

Drip line irrigation on noble fir seedlings with sawdust mulch. July, 2023

This method has shown some promising results for the grower, so we are doing a preliminary evaluation to measure water penetration and moisture retention in the soil around the seedlings. I have installed Watermark sensors at 6" and 10" depths on seedlings, with and without mulch, applied around the base. In mid-July, each seedling received 32 oz. of water, which is equivalent to what the grower is applying to all of his seedlings. I have been monitoring these seedlings weekly to record how long the soil is retaining the added moisture.

We are also working with OSU Extension Communications to produce an instructional video about this drip line irrigation method to share with growers. The video and our trial results should be complete by fall. Thank you to the grower cooperators assisting us and to the Real Christmas Tree Board for funding this research trial and their continuous support of our program.

Small Farms Update: Small Farms Climate Adaptive Field Demonstrations

Heidi Noordijk, Outreach Program Coordinator

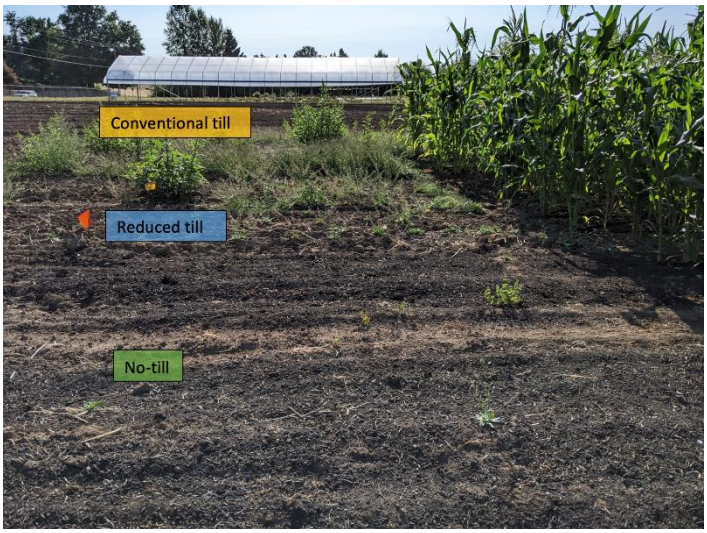
Participants reading soil moisture levels during the irrigation scheduling workshop

For the next three years (2023-2025) the Metro Small Farms program will demonstrate climate adaptive strategies at the NWREC Learning Farm. These experiential demonstrations will focus on drought-resilient and climate-adaptive production strategies and will include techniques such as dry farming, low and no-tillage, tarping, and irrigation scheduling. These techniques have been identified as crucial needs by our farmer networks in light of Western drought and wildfire conditions.

Irrigation Scheduling Workshop (July 18): Farmers and conservation educators attended an irrigation scheduling workshop at NWREC. Demonstrations on how to use soil moisture meters and weather station data to inform irrigation scheduling for tomatoes and turnips. Maria Zamora-Re, OSU's Irrigation Engineering Extension specialist, shared information on how soil and water interact and the small farms program demonstrated soil moisture probe installation and reading.

Reduced Tillage Workshop (August 23): Sweet corn and peppers were planted in three different tillage treatments including no-till, reduced, and rototilled. The small farms program hosted a

reduced tillage workshop featuring field walks, equipment showcase, and soil health demonstrations.



End of beds showing weed pressure of three tillage treatments

Dry Farm Field Day (September 6): Melons, tomatoes, and winter squash dry farm trials feature production without irrigation. These trials are being grown in the agrivoltaics plots and an adjacent open field. The field day will feature field walks, trial results, tastings, and discussions.

Snow leopard melons in the dry farmed plots

Follow the project blog for updates and workshop information: https://extension.oregonstate.edu/smallfarms/metro/climate-adaptive-demonstrations.

Nursery Program Update

Lloyd Nackley, Associate Professor

Nursery team at pot-in-pot zone heat stress mitigation experiment in maples

The NWREC is bustling with activity during this abundant season. We've be advancing our work with mini-lysimeters designed to regulate irrigation in shade trees. These compact scales assess the weight of potted plants and utilize weight fluctuations as they dry to ascertain optimal watering times. The Willamette Valley has experienced consecutive hot summers, although the current season has been relatively milder. Despite this, our commitment to heat mitigation solutions remains unwavering. One approach involves cultivating ornamentals under drought conditions to identify those best suited to the changing climate. This endeavor aims to pinpoint the most "climate-ready" plants capable of meeting evolving requirements. We created opportunity for public participation at our Field Day on August 17. Sticking with the climate change theme, we are assessing diverse strategies to counteract heat and the resulting heightened evapotranspiration rates (essentially methods to minimize plant moisture loss).

Black and white pots on nursery run-off pad looking at temperature release rates of fertilizer

These measures encompass misting young plants, applying kaolin to shield tissues, introducing potentially beneficial fungicides for water loss management, adopting white pots in

lieu of the conventional black, and even exploring growth inhibitors. Lastly, we have started growing marigolds to donate for festivities such as Dia de los Muertos. This colorful project has notably added vibrancy to NWREC's Nursery Zone. Furthermore, we are advancing by exploring passive methods for drying these flowers. This approach not only conserves energy and resources but also safeguards the captivating summer hues, contributing to a sustainable process.

Marigolds grown for cultural connections

Interest continues to grow in Agrivoltaics at NWREC

Allan Branscomb, Faculty Research Assistant

Between early June and mid-August there were seven tours of the Oregon Agrivoltaic Research Facility, (OARF) by visitors including the Farm Bureau, Future Farmers of America, an architectural firm and collaborators, grade school children, a local farmer, a professional photographer, a local television reporter, the American Farmland Trust, and two developers of utility scale solar energy projects. All told, there have been 14scheduled tours since late April until mid-August. In addition, visitors arrived for the second Tuesday OARF open house in April through July.

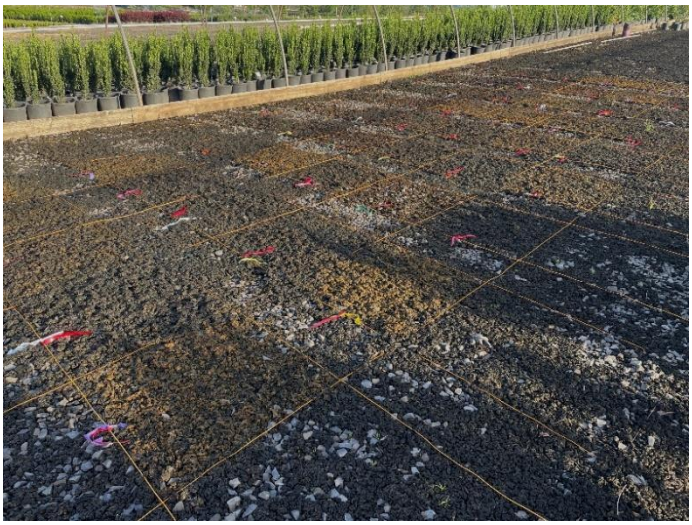
Seeking Solutions for Nostoc, a Nuisance in Nurseries

Luisa Santamaria, Professor, and Sarah Doane, Research Asst.

Green mats covering gravel around containers, between hoop houses, and in heavily irrigated locations present a concern for some nurseries, particularly in the summer. These mats are aggregates of microscopic photosynthetic bacteria, better known as cyanobacteria. Nostoc, the green growth on the gravel that nursery growers refer to, is one of several cyanobacteria species present in this biofilm. Although this growth doesn't harm the plants, it is an annoyance in the production areas, and its slippery characteristics pose a risk to workers. Finding effective control methods is crucial for ensuring worker security and managing the spread across the nursery. Excessive overhead irrigation, sanitation practices, and fertilizer runoff are conducive conditions for Nostoc growth. Some research studies have been conducted to determine the most effective management strategies, but none have offered a long-term answer.

The Nursery Plant Pathology program at NWREC has been studying different aspects of the biology of cyanobacteria for the last three years. This year, we are implementing the IR-4 Environmental Horticulture Program's protocol for Nostoc because it was identified as one of the top concerns for the nursery industry. New and existing products were tested this summer.

By the end of the year, we plan to offer recommendations for managing Nostoc in nursery settings based on data gathered from prior years and current research. Stay tuned!



Current research taking place in the Willamette Valley to determine the best treatment practices for Nostoc control

Field Day for School Children

About 260 3rd graders from the Canby School District, along with their teachers and parents, participated in a Field Day on June 1, 2023. In addition to learning about various research programs at NWREC, they enjoyed interacting with Benny Beaver. This event was organized by Marc Anderson in collaboration with OSU Clackamas Extension.

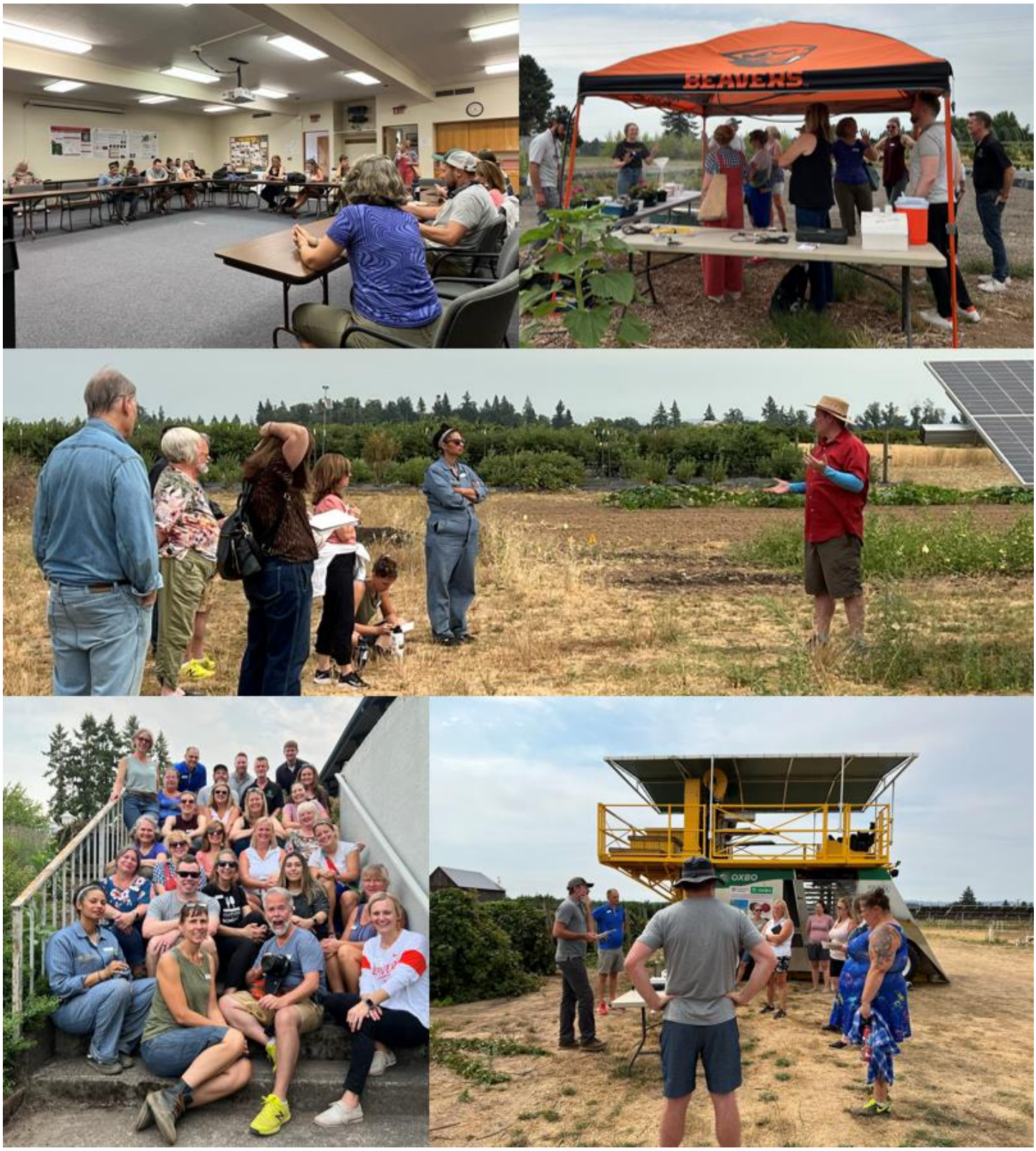
Wilsonville Garden Club Visits NWREC

Members of the Wilsonville Garden Club toured NWREC on June 1, 2023. They were fascinated by the kind of research we do and its impact on farming as well as local communities.

2023 Annual Community Open House

Nearly 140 people visited NWREC on July 19, 2023 for our annual Community Open House event organized in collaboration with OSU Extension Clackamas County. It was a very warm day but many enthusiastic visitors visited the exhibits, interacted with our faculty, tasted berries, and enjoyed the hay wagon rides. Thanks to Fir Point Farm for loaning their hay wagon and Montecucco Farms and Aurora Farms for providing fresh vegetables for our visitors. Watch the highlights of this event at https://www.youtube.com/watch?v=0c_Mof65Hco.

STEM Teachers Get Immersive Ag Research Training



On August 17, 2023, NWREC hosted a group of middle and high school teachers from Oregon and Washington as a part of their professional development training organized by the Oregon Dairy and Nutrition Council in collaboration with the American Farm Bureau Foundation for Agriculture. Teachers appreciated the opportunity to learn about the berry, nursery, and agrivoltaics programs and interpreting and verifying scientific data.