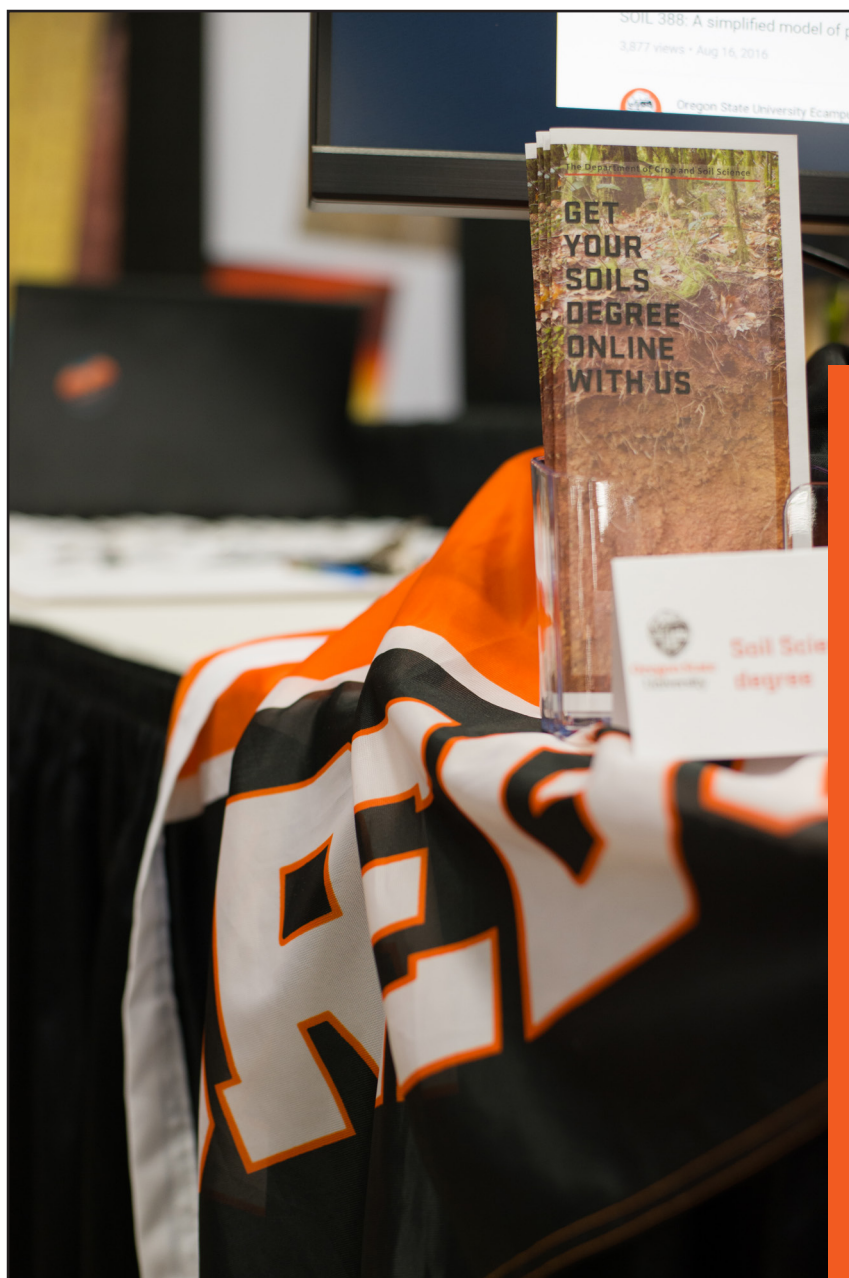


CROP AND SOIL SCIENCE

SOIL TO SEED

JANUARY 2020



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**Oregon State
University**

Study Crop and Soil Science Online

Written by Staff | December 2019

Driven by forward-thinking instructors using innovative technologies in order to teach traditionally field-based courses online, this past spring the department began offering a bachelor's degree in crop and soil science that students can earn via 100 percent online courses. As with the Corvallis campus-based degree program, students will have multiple degree options to choose from. Currently, the general soils major option is available for registration, with the agronomy and soils research options starting in the spring and fall terms of 2020, respectively.

The program is the only one of its kind in the nation and is already reaching an underserved audience of working professionals as well as place-bound students in rural areas who wish to earn a college degree, but have limited access to higher education opportunities. As of publication, the online degree program has 20 declared majors in 12 states. To showcase our online program to the larger community three faculty members, Adam Lindsley (Senior Instructor 1 & program director), Meg Mobley (Senior Instructor 1), and Burl Carpenter (Instructor) hosted an exhibit booth at the Tri-Societies 2019 annual meeting in San Antonio. The goal wasn't specifically to recruit students, but rather recruit faculty members at other universities whose own departments might be lacking coursework.

"The unfortunate truth is that nationwide, crop and soil science departments are shrinking, or being absorbed by other units. As a result, there may be no option for students to take classes that provided depth to their degree programs, like soil physics, or seed science," Lindsley said, continuing, "Our goal now is to tell faculty members at those schools: 'send your students to OSU for that class!' We have the classes, and the experience your students get will be identical to those taken on-campus." Delivered online by OSU Ecampus – the university's nationally ranked online education unit – the program provides students everywhere with real-world, field-based learning experiences that connect

students with their local natural and agricultural environments. Courses utilize custom lab kits, 3D printed soil samples, virtual reality, augmented reality and other advanced technologies.

"We're always on the lookout for new and improved ways to reach our distance students, regardless of where they reside - be that a big city with no access to soil like LA, or remote wilderness in Alaska. Our teaching techniques, materials, and technology allow us to share the wealth of Oregon cropping systems and diverse soils," said Lindsley.

Carpenter adds, "all of the program learning outcomes are enhanced by effective and immersive visualizations. We already have the ability to show remote students various processes and concepts; with the utilization of these technologies, students can discover them for themselves."

There is little education in crop and soil science available online, and our department is considered at the forefront of what is available. As a result of the flexibility of ecampus courses, the program is expected to attract students from a larger variety of backgrounds than its on-campus equivalent, encompassing everyone from current industry and government employees to those who are unable (or choose not) to physically attend a university.

"It was great to see how completely flabbergasted many scientists and faculty were at the quality and detail of our visualizations and learning materials," Mobley said, addressing the fact that the idea of teaching these subjects online is so cutting edge that most conference attendees had never even considered it.

"I think we opened many minds to the reality that online education is quality education, that it is a powerful way to connect with people beyond the confines of a campus, to deliver practical training and content that is informed by current science, in an innovative and rigorous learning environment that emphasizes engagement and discovery."

Newsletter Editor

Shauna Gutierrez



Having taken some Ecampus classes when she was a student, instructor Alyssa DuVal knows the benefits of a more interactive learning environment for online students.

By Jenna Jarvis

May 9, 2018

Jenna Jarvis is a student marketing writer for Oregon State Ecampus.

ECampus Program: Get your hands dirty online

Oregon State Ecampus students are experts at adapting to their environment. They turn coffee shops into classrooms and living rooms into lecture halls. But for students taking crop science classes online, they needed a more lifelike way to learn about plants from a distance.

And now they're getting their hands "dirty" by digging into a variety of crops in a 3D virtual greenhouse.

Alyssa DuVal, an instructor in the Department of Crop and Soil Science, knows firsthand how important it is to find ways for online learners to better engage with course content. While pursuing her bachelor's degree on campus at Oregon State, she took some courses online.

Her experience in Ecampus classes allowed her to take note of the ways she could improve the learning experience when the time came for her to be an instructor. That time is now. In an effort to bring her students closer to nature, Alyssa worked with the Ecampus multimedia team to create the virtual greenhouse. The team designed it based on photos they took of the physical greenhouse students can visit on OSU's Corvallis campus. The exact layout of the plants and how they are spaced on the benches is essentially identical in both greenhouses.

"When I was trying to think of activities for the Ecampus students to participate in in this course, I wanted to figure out a way they could get the same experience they would have here on campus with going into the greenhouse, identifying plants and getting to feel all of these identifying characteristics," Alyssa says. The virtual greenhouse is a study tool that allows students to "walk inside" and explore a 3D environment. On the benches inside the greenhouse, they'll find different plants they can click on to learn more information and watch short videos of crop and soil science instructor Thomas Chastain discussing distinguishing factors that can be used to identify specific plants.

Ecampus students aren't the only ones who have seen a benefit from the virtual greenhouse. Alyssa has also received positive feedback from her on-campus students about the usefulness of the online environment.

"My students in the face-to-face class are able to utilize these references and activities we've created for the Ecampus version as a supplemental resource they can access outside of the normal lecture period," she says.

Alyssa's vision has not only opened the virtual door to the greenhouse, but also to a new way of learning.

"What I'd really like for individuals to take away from this message is to not limit themselves to a certain technology, to be able to think outside of the box and bring innovation into whatever you need in order to deliver for your course," she says.

Barley breeding advances on many fronts

This grain crop gets renewed attention for beer, but there's more going on than that.

Written by Willie Vogt | Published by FarmProgress.com Sep 30, 2019



Barley breeders are seeing renewed interest in the crop, with a new demand from craft brewers and new varieties suited to new uses.

Photo credit Pat Hayes

Barley is a crop that's been loved and loathed, depending on the market year. But these days, farmers with an eye toward special markets may find barley is a crop that belongs in their rotation. Breeders are looking at a range of factors as they work on new lines, from how well the crop goes through malting to new food and feed opportunities.

"You have to be optimistic in this business," says Patrick Hayes, barley breeder, Oregon State University. "There are grounds for optimism; I've been getting more calls about barley this fall planting season than I have for a long time."

Hayes' work at OSU has included developing new lines for

traditional malting use, and development of hull-less or "naked" barley that has a range of applications.

Barley is a versatile crop, with potential for use in malt where it is important to beer-making. With the rise of craft beers, that area has seen more attention. Yet those hull-less lines also have value — since barley is a good source of beta-glucans, a soluble fiber associated with heart and digestive health.

And that's the way of barley, an ancient grain that has found its way into many uses. The area getting a lot of attention these days is for malt, with the explosion of the craft beer business.

Hayes notes — as most barley growers know — that major malting companies work on contract, but there remains enthusiasm for the crop for craft brewers. And that has led to a rise in craft maltsters, which may be bringing new opportunities, too.

"The Rahr and Great Western maltsters [malting companies] of this world play an essential role," Hayes says. "They meet the malt needs for the mainstream and craft industry."

Yet, those craft maltsters offer an opportunity for local growers. "You have small facilities that may need a ton or a couple-ton batches, and they can potentially source local barley," Hayes says.

Barley, beer and flavor

And Hayes has done some interesting work on the potential new role of barley in beer-making beyond malt. He's done work on how barley can affect flavor in beer. "That's kind of the next wave, perhaps, in brewing," he says, noting that hops have a huge impact on flavor as well as yeasts. Yet in lighter beers, that are more malt-forward, barley varieties can have an effect on flavor.

"We've shown that there are statistically significant differences in beers brewed with different barleys," he says. "Those differences were determined using trained sensory panels, consumer panels — and we've incorporated metabolomics and proteomics, too. There's exciting work at Colorado State University, where they've mapped some of the genes driving flavor."

The work on barley impact on beer flavor is ongoing, and Hayes has worked with two varieties — Golden Promise and Full Pint — to explore this area.

Hayes is also working with a grad student whose thesis is to explore five winter barley types in an on-farm trial to explore differences in flavor. "This is something that enterprising brewers may pick up," he adds.

Malting in-house

Jamie Sherman, who heads up the barley breeding program at Montana State University, says her barley breeding program got a boost with the installation of the university's own malting setup in 2016. "When I started breeding barley in 2015 ... it seemed we had a hard time getting a high-quality line out; it was because we weren't able to look at as much quality data as needed."

Barley varieties for malting must be approved for use by the American Malting Barley Association, which has a defined procedure for approval. The challenge for Sherman was getting enough information on malt performance on inbred lines early on. The solution was building an in-house malting setup, which she did with the help of several groups.

Sherman got support for building the facility from the Montana Wheat and Barley Committee, MSU and The Brewers Association. "And I had startup money as a new faculty member," she recalls. "We used those sources to get it going."

By having in-house malting capability, Sherman and her students could test barley lines much earlier in the breeding process to determine their suitability for commercial use. "We get malting information from USDA Agricultural Research Service, which provides that information for the whole nation, and we'll keep participating," she says. "Because we do our own malting, we can better understand the whole malt process, and we're learning new things about malt — and we're excited about what we're learning."

In fact, a new barley line called Buzz — named for Buzz Mattelin, a longtime advocate and supporter of barley in the state — provides the ability to shorten the malt process by a whole day. "We would not have learned that if we hadn't been malting our own barley," she says.



Oregon State University has a number of barley trials in the works, including hull-less varieties that offer improved properties for food and brewing use.

Photo credit Pat Hayes

That one-day savings can be significant in the cost of producing malt, but also in the concept of sustainability. A day less in the malting process reduces the energy needed to produce the malt. "And to him [Mattelin], sustainability is very important, and he wants this barley to succeed," Sherman adds.

Hayes and Sherman talk about the basics with barley breeding— that yield and disease resistance are musts. And that work continues; but in a changing barley market, where the buyers and sellers are connecting in new ways, barley may be playing a bigger role in the future in not only beer but also food. Continued next page...

Continued from page 5

Going naked with barley

Hayes likes to use creative names for barley lines he works on with researchers at OSU. And nowhere is that more evident than in the hull-less, or naked, barley lines developed in Barley World, the OSU barley breeding program.

Two lines coming up to speed for 2020 include Streaker and Buck. “We had some initial certified seed production snafus with Buck, but these are bringing a big step forward in grain yield,” he says.

Hayes notes that he’s looking at multiuse barley. The hull, which once had a role in malting, is less important these days. At one time the hull was used as a natural filtration system, but modern breweries are changing how they use barley with mash filters; and they’re using pulverized barley, where the hull is not useful.

The naked varieties could provide more gallons of beer per pound of malt. And a multiuse hull-less line would have food-use potential, too. “Humans don’t eat barley hulls either,” Hayes quips.

Food uses for hull-less lines may be rising as foodies turn to their attention to more “ancient” grains. Sherman at MSU is working on hull-less barley lines, and she notes the nutritional value of the crop.

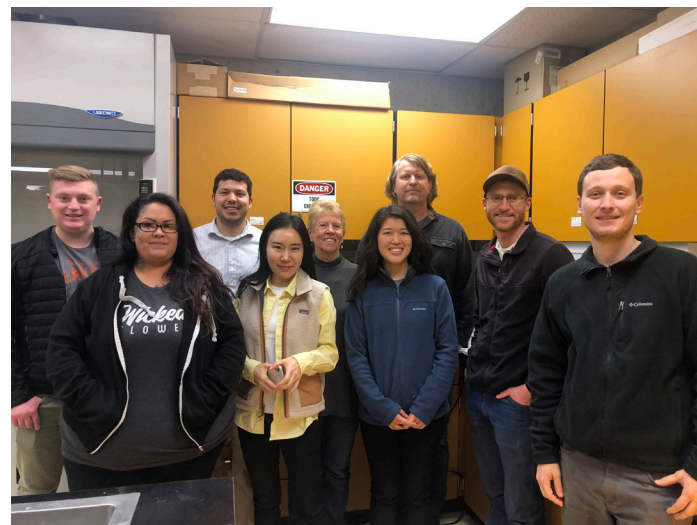
“Barley is very nutritious,” she says. “We have a hull-less line that can be cooked like rice for food.” She also notes the university is working on forage barley as well, which can be cut as hay for animal feed and may offer potential for the organic feed market.

Food, beer, forage — barley offers many uses, and that’s a source of optimism for Hayes, who has seen the market fortunes of the crop change. “Not many farmers raise barley for feed; but based on the calls we’re getting, they’re saying if they can’t sell it for malt, with the feed price for wheat now, there’s potential for barley. At the end of the day, it may make sense in some applications to be producing animal feed where needed, and not ship it a long distance.”

Research updates from the Weed Science Program

Authors: Andreia Kazumi Suzukawa,
Andrew Hulting, Caio Brunharo

The over-reliance on herbicides has caused a tremendous selection pressure on weeds and the survival and reproduction of those individuals was inevitable. What was once a single reported case of the weed Italian ryegrass (*Lolium perenne* ssp. *multiflorum*) resistant to a Group 1 herbicide in 1987, now there are 11 plant species reported as herbicide resistant in Oregon. Italian ryegrass is resistant to herbicide groups 1, 2, 3, 9, 15, and 22 in the Willamette Valley. As the majority of the annual ryegrass seed is shipped to other parts of the country and the world, there is potential for spread of herbicide-resistant weed populations elsewhere, jeopardizing the future of this industry in Oregon. With this issue of herbicide resistance at hand, the CRPS Weed Science Program, in collaboration with the OSU Seed Laboratory and funded by the USDA-FSCRU, hired Dr. Andreia Kazumi Suzukawa, a weed/seed scientist by training, as a postdoctoral scholar to find a quick test to identify resistant Italian ryegrass seed in annual ryegrass seed lots.



Pictured left to right: Nixxon Anders Montgomery, Adriana Perez, Caio Brunharo, Seji Jang, Carol Mallory-Smith, Andreia Kazumi Suzukawa, Andrew Hulting, Kyle Curtis Roerig, Lucas Riboldi

Research updates from the Weed Science Program continued...

Dr. Lucas Baiochi Riboldi recently joined the CRPS Weed Science Program as a postdoctoral scholar to work on several projects related to herbicide resistance. He is a biochemist/plant physiologist by training, and will focus his efforts on trying to understand the biochemical, molecular, and physiological modifications in weeds that confer them the resistance phenotype. Dr. Seth Bernard Abugho will also be joining our group in November after successfully concluding his PhD program at Texas A&M University. He will focus on ecological weed management practices that reduce weed interference in perennial ryegrass and tall fescue, and will be funded by the Oregon Department of Agriculture/USDA-SCBGP.

These are very challenging times in agriculture as the expansion of areas affected by herbicide resistant weeds are seen around the world. The CRPS Weed Science program will continue to work hard to address the weed management issues in Oregon to maintain the sustainability and profitability of our cropping systems.

Small farms conference offers classes, networking

By GEORGE PLAVEN Capital Press
Feb 25, 2019



Assistant Professor & Associate Director, Center for Small Farms & Community Food Systems, Lauren Gwin. Photo by Stephen Ward

CORVALLIS, Ore. — For Elliott and Rae VanZandt, getting into their first farmers’ market last year proved to be a learning experience.

The couple, from Klamath Falls, Ore., tends a small garden with squash, zucchini, garlic and other produce, as well as an assortment of wildflowers. While Elliott said they enjoy growing their own food, he never before considered selling at the local market.

He and Rae came Feb. 23 to the Oregon Small Farms Conference at Oregon State University in Corvallis, looking for ways to improve their farm stand heading into year two. One lesson in hindsight, Elliott said, was they probably focused too much on crop diversity, and not enough on quantity.

“We weren’t predictable for our customers,” he said. “We just want to refine, and get better.”

As the farm manager for Dragonfly Transitions — a therapeutic training and mentoring group for young adults in Southern Oregon — Rae is no stranger to running a successful farm, though she said she gained a lot at the conference by hearing from other farmers about their past experiences and mistakes.

“It was really experiential, which I think farming totally is,” she said.

More than 900 people from across the state gathered at OSU for the annual Small Farms Conference, featuring a full day of educational talks on topics ranging from growing techniques to markets to bills under consideration at the Oregon Legislature. A trade show was also split between two buildings, the LaSells Stewart Center and CH2M Alumni Center, on campus. Continued next page...

Continued from page 7...

Lauren Gwin, associate director for the OSU Center for Small Farms and Community Food Systems, said small farms are a not only a key part of the state's agricultural economy, but also environmental sustainability. Of approximately 35,000 total farms in Oregon, about 32,000 are classified as small farms under the USDA's definition, meaning they make less than \$350,000 in annual income.

"They are a huge part of our state," Gwin said. "These farmers contribute to our dinner tables, they contribute to clean water and clean air, and they contribute to the vibrancy of our communities."

In many cases, Gwin said small farmers serve as the face of local agriculture at farmers' markets in larger cities, creating a link across the urban-rural divide. Continued next page...

The Center for Small Farms, through OSU Extension Service, offers a variety of classes and networking opportunities for small farmers to find their niche and connect to markets. Gwin said the conference also gives farmers a sense of community, and a shot of excitement for the season to come.

"I just look around and people's faces are lit up," she said. "They're going to take what they learn here, they're going to take all this energy, and they're going to go back to their own farms."

Megan Corvus has been coming to the conference for five years, and said she enjoys seeing her friends and hearing what everyone has to say during the sessions. Corvus and her partner, Talina, started Blackbroom Farm in the Willamette Valley six years ago, raising chickens for eggs and a small herd of meat animals, including lambs and goats.

"After winter, coming to the conference is a great way to get ready for the season," Corvus said.

It may be "mud season" now, but Corvus said small farmers should be thinking about what they are going to do next season, and how they are going to get it done. The conference, with its educational sessions and experiential mentality, is a great way to get those creative juices flowing, she said.

"It's a good jolt (of energy)," she said. "Half of the value is just hearing what other people have to say at the sessions."

Updates from the Lybrand Lab



Erin Rooney was awarded the OSU-PNNL Distinguished Graduate Fellowship, the 2019 Arctic Institute of North America Grant-in-Aid, and a 2019 Geological Society of America Graduate Research award, and attended the University Centre of Svalbard course Permafrost and Periglacial Environments in Longyearbyen, Svalbard, Norway.

Also, Lybrand Landscape Pedology partnered with the Forest Soils Lab for a 2019 Learning Innovation Grant and HJ Andrews LTER funded project. We are currently working with ROOTS to build a 3D printed HJ Andrews watershed that functions as an interactive landslide model. Project collaborators: Rebecca Lybrand, Erin Rooney, Adrian Gallo, and Rachel Villarreal.

New grad student Julia Fleiner will be working on a coastal rainforest project in Alaska.

The focus of the field research in Juneau, Alaska this summer was to survey, collect and process samples in the Tongass National Forest near Juneau for Jennifer's research. Jennifer and the research team described and sampled pedons for lab analyses per the USDA Forest Service and National Resources Conservation Service (NRCS). These highly productive forests along the southeast Alaskan coast can sequester carbon at great depths within in the soil profile. Jennifer's research will quantify carbon and other nutrients in the mineral soil horizons of these upland coastal rainforests.



Photo credit: Dr Brendan O'Neill



Photo credits:
Erin Rooney



Photo credit: Molly Tankersley

Jennifer also traveled to British Columbia to help her advisor, Dr. Rebecca Lybrand, conduct research on mineral weathering by fungi along a climate gradient in the Pacific Northwest. The research group deployed mesh bags of different rock types on a granitic lithology in two sites on Calvert and Hecate Islands where the Hakai Institute is based. The team scouted several sites for deployment and buried bags to be dug up in one, two- and three-year intervals with analyses run later utilizing a SEM and HIM coupled technique to look at the extent of mineral weathering by fungi.



Photo credits: Jennifer Fedenko

2019 Scholarship Recipients

Katie Akers

Leo L Anderson, Jr Memorial
Donald D Hill

Tessa Barker

Dorothy & Henry Rampton
Larry C Burrill Memorial

Jennifer Fedenko

Dr Ishwar P Muraka

Tarisha Goosmann

McGuire Scholarship

Tristan Graham

Timothy Scott Wirth Memorial

Liberty Greenlund

Donald D Hill

Margaret Halstead

Outstanding Senior

Colton Haskins

Wilbur Powers Memorial

Shengwei Hu

J Ritchie Cowan Memorial

Jordan Kersey

John F & Jean Krautscheid

Sam Kuschnick

Oregon Seed League

Matt Liszewski

John Flanagan Memorial

Oregon Seed Association

Oregon Seed Cleaning

Adams Family

Kevin Madrigal

M Dale Chipman

John Flanagan Memorial

Chandra Maki

Willson H Foote Memorial

Pedro Martinez

J Ritchie Cowan Memorial

Elizabeth McCarty

Oregon Seed League

Kacie Melville

M Dale Chipman

Grayson Namdar

Robert Warrens Memorial

Lucas Norton-Guerra

Willson H Foote Memorial

McGuire Scholarship

William Ortiz

Western Seed Association Outstanding Senior

Laura Love Rathbun

William & Heidi Geschwill

Brad Remsey

Arthur King Memorial

John F & Jean Krautscheid

Otilla Schreuder

Sheldon L Ladd Memorial

Raymond Seal

Oregon Seed League

John Flanagan Memorial

Travis Tubbs

William Kent Wiley, Jr Memorial

Yan Yan

Dorothy & Henry Rampton

Cody Zellmer

CSS Entering Student

Ruben Aleman
MS in Soil Science

Fares Alzahrani
MS in Crop Science

Alexander Baasch
BS in Crop and Soil Science

Tessa Barker
BS in Crop and Soil Science

Pete Berry
PhD in Crop Science

Kali Brandt
PhD in Crop Science

Qianqian Fan
MS in Crop Science

Gabriel Flick
PhD in Crop Science

Mason Mckinney
BS in Crop and Soil Science

Elizabeth McCarty
BS in Crop and Soil Science

Bruce Moffatt
MS in Soil Science

Patrick Morales
BS in Crop and Soil Science

Juan Munguia
BS in Crop and Soil Science

Joshua Neuman
MS in Soil Science

Chad Niegel
BS in Crop and Soil Science

Trang Nguyen
PhD in Soil Science

Congratulations to our 2019 Graduating Class

Brooke Getty
MS in Crop Science

Ester Gordon
MS in Soil Science

Javier Hernandez Vasquez
PhD in Crop Science

Brian Hill
MS in Soil Science

Tara Hudgins
MS in Crop Science

Lucas Kopecky Bobadilla
MS in Crop Science

Samuel Kuschnick
BS in Crop and Soil Science

Kelsey Martin
MS in Soil Science

William Ortiz
BS in Crop and Soil Science

Mark Rondina
BS in Crop and Soil Science

Eduardo Salas Rodriguez
BS in Crop and Soil Science

Cristal Torres
BS in Crop and Soil Science

Ian Trenkel
BS in Crop and Soil Science

Susanne Trittinger
PhD in Crop Science

Lisa Windom
MS in Soil Science

Be a Part of the Success of the Department of Crop & Soil Science



For more information on ways to support OSU and the Department of Crop and Soil Science through your estate planning, please contact:

Todd Bastian, Senior Director of Development
todd.bastian@oregonstate.edu
Office (541) 737-8724 or Cell (541) 231-6346

or
Jack Holpuch, Associate Director of Development
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Office (541) 737-9636 or Cell (541) 760-6054

To make a donation via credit card, go to the OSU Foundation website and click on the "how to give" link at the top of the page.
www.OSUfoundation.org

New Potato Varieties Might Breed Savings

Written by Kym Pokorny and Published by Oregon Agricultural Progress November 2018

Two new potatoes could save growers in Oregon, Idaho, and Washington millions of dollars by curtailing several serious diseases and improving processing quality.

The potatoes — Echo Russet and Castle Russet — are in the hands of growers for trials thanks to the breeding efforts of Oregon State University and partners in the Tri-State Potato Breeding Program.

In Hermiston, where potato fields reach far and wide, Sagar Sathuvalli, an assistant professor of potato breeding and genetics in OSU's College of Agriculture, works to develop potatoes resistant to diseases for an industry that was Oregon's sixth highest producing agricultural commodity in 2016 at \$187 million.

Sathuvalli says Castle Russet was bred mainly for disease resistance, while breeding work on Echo Russet focused on high-yield, good agronomic performance, and good processing qualities. Most of the Oregon crop heads to processors to be turned into French fries and other potato products.

Both Castle Russet and Echo Russet show tolerance to diseases that include potato mop-top virus, which is spread by the problematic powdery scab fungus, according to Sathuvalli. They also are tolerant to soft rot and somewhat to verticillium wilt.

Echo Russet is noted for requiring less fertilizer, reducing the need for it by 30 to 40 percent — only 250 parts of nitrogen per acre instead of 400.

The Castle Russet variety is also resistant to all strains of potato virus Y and to corky ring spot, which is caused by tobacco rattle virus and vectored by stubby root nematodes, according to

Sathuvalli. Resistance to diseases allows growers to use less fumigant, an important consideration as farmers deal with increasing restrictions.

Castle Russet also has the ability to cleanse a field infested with stubby root nematodes carrying tobacco rattle virus.

"That means you have a good crop to sell, and it cleanses the field to grow other crops," he says.

Getting to the point of releasing a new potato is a long process, Sathuvalli says. From the time breeding begins to when the potatoes are approved for release, it usually takes 12 to 15 years of exacting field trials.



Vidyasagar (Sagar) Sathuvalli, OSU potato breeder, works to develop disease-resistant varieties in a test plot at HAREC. Photo by Lynn Ketchum



Oregon seed crop dodges damage from rain

By Mateusz Perkowski Capital Press Jul 10, 2019

A short spell of unseasonable rain in early July isn't expected to diminish yields for Oregon seed farmers during this summer's harvest — unless it persists.

While growers can typically count on dry weather this time of year, steady showers on July 9 and overcast skies on July 10 probably won't cause problems as long as the sun soon comes back, said Tom Chastain, seed crop physiology professor at Oregon State University.

"I don't think we're looking at a disaster, it's just going to be a delay for people," Chastain said.

Roughly a half-inch of rain fell July 9 on the central Willamette Valley, where much of the state's grass seed is produced — the equivalent of the entire month's average rainfall all in one day, he said.

The downpour was likely too gentle to knock seeds loose to the ground, thereby reducing yields, which can occur during violent storms, he said. "I'm not expecting a lot of shattering, at least for the crop that's not cut yet."

Sustained moisture can induce seeds in windrows to germinate, hurting quality, but forecasts call for a return to sunny weather that would dry out the crop before that occurs, Chastain said.

"I don't think it got wet enough for long enough for us to have problems with sprout," he said, noting that pest and fungus pressure can also result from prolonged moisture.

Different types of grass seed are harvested in stages in Oregon's Willamette Valley, with annual ryegrass and forage-type tall fescue being cut into windrows and then run through a combine to collect seed earlier than perennial ryegrass and turf-type tall fescue. Likewise, red and white clover are harvested after crimson varieties.

Crops that have already been windrowed face other issues from rain aside from seed shatter and germination: grass blades can grow into the windrows, interfering with the combine's harvesting mechanism, Chastain said. That possibility can also be averted if sunshine soon dries out the windrows.



In recent memory, the area saw 0.63 inches of rain in July 2011 and 1.12 inches in July 2014 without causing serious disruptions to seed farmers, he said. "Things were OK those years, we didn't have a lot of yield problems."

However, the 3 inches of rain that fell in July 1983 did cause sprouting that cut yields because the seed was rendered unusable, Chastain said.

If weather forecasts are correct and conditions return to normal, the recent rain will probably just result in a more compressed harvest schedule for growers, he said. "They've got to pick up the backlog of fields they haven't harvested plus the new ones coming online."

OSU launches Global Hemp Innovation Center

As a friend of the College of Agricultural Sciences at Oregon State University I want you to be one of the first to learn that today we are proud to launch the nation's largest research center devoted to the study of hemp. The Global Hemp Innovation Center is a virtual hub that connects more than 40 OSU faculty across 19 academic disciplines, in our college and others.

The College of Agricultural Sciences has been conducting hemp research for more than four years and in that time has cultivated a global reputation as one of the leading resources for hemp research, with faculty regularly asked to speak at conferences and symposiums around the world. With hemp research already underway at 10 OSU experiment stations across the state and with partners in four countries, Oregon State is already the largest comprehensive center for hemp research. That research includes such things as exploring optimal growth conditions, including the best light, soil, and nutrient conditions to grow the healthiest and highest yield hemp crops. Work that is critically needed in an emerging agricultural opportunity.

Hemp has the potential to become a major agricultural commodity in the United States and abroad with hemp plant fiber being used in manufactured products, including clothing, construction materials and packaging. Meanwhile, hemp seed oil is being investigated for use in pharmaceuticals, cosmetics, foods and nutraceuticals. For example, hemp has a long tradition of use in treating ailments by eastern medicine. According to some hemp industry economic reports, the hemp-derived CBD market alone is expected to grow from \$618 million in 2018 to \$22 billion by 2022.



The Global Hemp Innovation Center will be led by Jay Noller, one of the world's most recognized hemp researchers.

Please join me in celebrating the launch of this vital new research center that has tremendous promise for the future of Oregon State University, for Oregon's economy and for the state's agricultural community. I encourage you to read the press release distributed today, and visit the center's new website where you can watch a short video that details even more about the exciting opportunities that lie ahead.

Dr. Alan Sams
Reub Long Dean, College of Agricultural Sciences
Director, Oregon Agricultural Experiment Station

Entomological Society of America Names Winners of 2019 Professional and Student Awards Award for Excellence in Integrated Pest Management



Silvia Rondon
Oregon State University
<https://www.entsoc.org/esa-names-winners-2019-professional-and-student-awards>

This award, which is sponsored by Syngenta Crop Protection, recognizes outstanding contributions that have a direct relation to integrated pest management (IPM).

Dr. Silvia Rondon is a professor and extension entomology specialist at Oregon State University affiliated to the Hermiston Agricultural Research and Extension Center and the Department of Crop and Soil Sciences. In 2005, Dr. Rondon joined Oregon State University. Her areas of expertise are pest management, insect distribution, population dynamics, insects-plant interactions, biological control, and chemical control. Her work involves various cropping systems including potatoes, onions, sweet corn, small fruits, and other high-value vegetables. Dr. Rondon is currently working toward improving management of Lygus bugs, leafhoppers, and other pests affecting irrigated crops.

THE JAMES G. BOCKHEIM DISTINGUISHED LECTURE IN SOIL SCIENCE

Incipient Weathering in the Critical Zone:
Assessing the Bioweathering of Minerals at the Microscale



Dr. Rebecca Lybrand was invited to give this year's James Bockheim Distinguished Lecture in Soil Science at the University of Wisconsin-Madison on October 16, 2019.

Oregon Seed Certification Service

Adding Value to Oregon Seed Since 1916

Written by Mary Beuthin Nov 5, 2019

What's in a Name?

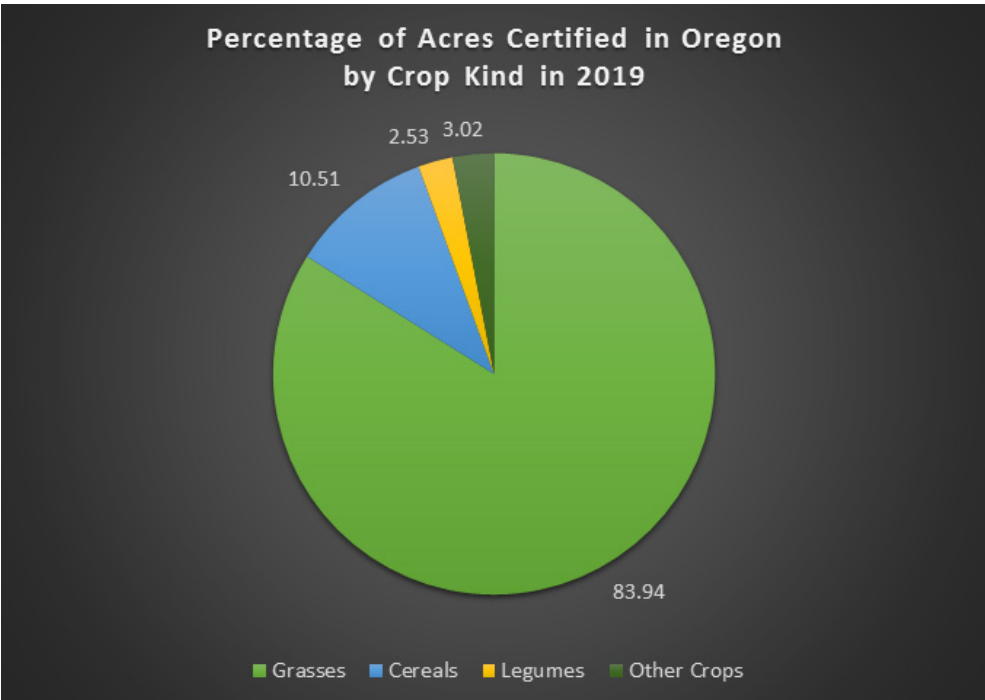
Oregon Seed Certification Service (OSCS) provides independent third-party oversight of the production and labeling of named varieties of seed in Oregon. Many of the states that produce seed crops have formed organizations to fulfill this need; by state law, the Oregon Seed Certification Service is the agency tasked with providing this service to producers and consumers of Oregon-grown seed. You might imagine how purchasing a sack of Emerald perennial ryegrass that turned out to be a mix of grass species would be pretty upsetting. A certification tag offers a high level of confidence and reassurance that the product was produced in a way that minimizes cross pollination, has been proven to be highly pure, and is free of prohibited weeds and diseases, adding value for the buyer.

A variety is defined as “distinct, uniform, and stable” (DUS) with regard to heritable traits. When a plant breeder develops a new variety, the traits and breeding methods are documented and specifically described. Some variety owners will register a USDA Plant Variety Protection contract, which can provide them with legal protections for their variety. There is an option for Title V protection, which specifically requires certification in order to market and sell the product. Seed can be legally sold as “variety not stated” (VNS) in which certification is not required. Actually, certification is not required for many crops and is a voluntary service to the public.

The Certification Process: Paperwork, Inspections, Testing, Tagging

Seed certification is a multi-step process. OSCS receives and reviews variety and field applications, performs inspections, issues reports, coordinates sampling and testing of seed lots, synthesizes all of this data in a custom database and when all is said and done, issues the final certification in the form of tags (and sometimes certificates). At each step, standards are applied to determine eligibility. In the field, inspectors look for other crop plants, volunteer plants of the same species, and weeds. They also report adjacent sources of pollen contamination. There are allowances for every species, outlined in the OSCS Certification Handbook and the individual crop standards found online at seedcert.oregonstate.edu.

In addition to looking for contaminants, inspectors assess the crop plants' performance. Variety traits should be identical from plant to plant including color, height, and habit; any “off-types” could affect the integrity of the intended seed product. This is increasingly important for crops of similar species that can cross-pollinate



or be difficult to differentiate and separate following harvest, like annual and perennial ryegrasses. In some crops, like potatoes and mint, we also look for seed-borne diseases that can affect quality and performance of successive plantings.



Photo credit: Andrew Altishin

Seed testing is another tool used to increase confidence in seed purity and viability. The OSU Seed Lab is the only certification-accredited lab in Oregon and completes all Oregon certified seed testing prior to tagging. All species are tested for purity from weeds or other crop seeds, and germination. Some species have additional special testing requirements to determine potential contamination by another closely-related species. Once all paperwork, inspections, and testing have been completed and a crop is found to meet standards, tags can be issued for lots harvested from a certified field.

Standards Approved by the People

Housed at Oregon State University in Corvallis, the Oregon Seed Certification Service operates as a separate business entity; fully-funded by grower fees and independent of tax dollars. Oregon certified seed standards must meet the national minimum set by the Association of Official Seed Certifying Agencies (AOSCA) and may be more stringent. Many don't realize that Oregon's standards are maintained by committees made up of OSU Extension Specialists, seed growers, and seed trade representatives and report to the Seed Certification, Foundation Seed & Plant Materials Board. Each of the following 6 committees meet annually to discuss industry topics and any proposed updates to their respective crop standards: Grass & Legume, Seed Conditioners, Small Grains, Mint, Potato, and the newly-formed Hemp Advisory Committee. Changes are brought forward, sometimes via appeal, through the committee to the Board for discussion and review. These meetings are public and minutes of the proceedings are available on the OSCS website.

Meeting Demand in a Growth Industry

The majority of certified acres and inspections are grass seed fields in the Willamette Valley (see chart), many of which multiple inspections are required. During the seed crop inspections, an average of 190,000 acres are inspected by helicopter between Memorial Day and the Fourth of July. Continued next page...



Photo credit: Terry Burr

Continued from page 17

Inspectors are able to see large areas of the field to accurately identify and record problems quickly and navigate from one field to the next relatively seamlessly. A recent estimate determined that it would take 30 people to complete the same amount of work on foot as 2 people can do from the helicopter in the same time frame. Helicopters provide the opportunity to make more efficient field assessments and allows the inspectors to identify problem fields for further assessment on foot.



Photo credit: Dennis Lundeen

Detailed mapping systems are key to enable efficient navigation from field to field. Over the last decade, the mapping process has morphed from strictly hand-drawn field boundaries on permanent laminated maps, to identifying field borders on a digital map image on the computer and printing pre-labeled temporary maps. A planning process that used to take weeks to prepare now only takes a couple of days.

Oregon Seed Certification strives to remain relevant and efficient in the evolving business world, making certification information access

more user-friendly for clients. All applications and field maps are created via online forms on the secure eCertification website, and users can receive mobile notifications when inspection or testing reports are completed. All of this advancement is to facilitate the rapid tagging, selling and moving of seed lots once they have met all the requirements. Seed lots need to be tagged and shipped quickly in the fall after harvest and OSCS has utilized the advancements in online business to assist Oregon's producers to remain competitive in the world markets.

In 2016, OSCS collaborated with the OSU Unmanned Aircraft Systems group on a special project to determine whether field inspections could be completed using drone technology. Between battery demands, data storage and review, additional pilot licensing requirements, cost, and the logistical problems due to the large size and scope of the program, OSCS determined that drones are not feasible for replacing the helicopter inspections yet. Specialized use of drones in some of the minority crops for disease and prohibited weed detection may be possible in the near future.

Oregon's Certification tag represents a level of scrutiny and confidence to the consumer that a product will perform as advertised, and for many seed producers the added value is worth the extra time and effort required to certify a seed crop. Thanks to a diverse group of outstanding seed growers and a solid industry in support of strong seed standards, OSCS has been considered one of the premier certification agencies in the world for over 100 years.

More information about Oregon Seed Certification Service programs and requirements can be found at seedcert.oregonstate.edu.

New Faces

- Katie Bewley - Administrative Program Assistant
- Kali Brandt - Research Associate (Post Doc)
- Caio Brunharo - Assistant Professor
- Jolene Bunce - Office Manager
- Jessica Johnson - Seed Analyst
- Navneet Kaur - Assistant Professor
- Alicia Leytem - Instructor
- Mason Mckinney - Office Specialist 2
- Kylie Meyer - Faculty Research Assistant
- Leon Nguyen - Instructor
- Brenda Peters - Bio Science Research Tech 1
- Stefan Seiter - Senior Instructor II & Advisor
- Lok Yung Sliker - Seed Analyst 1
- Erika Smith - Advisor
- Mary Voorhees - Seed Analyst 2

2019 Diamond Pioneer Recipients

The Diamond Pioneer Registry was established in March 1983 when the College Of Agricultural Sciences observed its 75th anniversary. With the Registry, the College recognizes the significant contributions of many of our friends and colleagues who have served agriculture and related areas throughout a portion of their careers.

- Neil Christensen, Corvallis
- Herb Huddleston, Corvallis
- Gary Jolliff, Corvallis
- Ken Rykbost, Houlton, MA
- Clinton Shock, Ontario
- Paul Rasmussen, Pendleton
- Ronald Rickman, Pendleton
- W. Bryan Wolfe, Hermiston
- Jerry Zahl, College Place, WA

In Memoriam

Moyle Harward
May 1, 1922 — May 4, 2019



Moyle Harward was born May 1, 1922, in Aurora, Utah, to Orson Alfred Harward and Iva Peterson. He was the third child of nine siblings. The family moved from Aurora to Provo, Utah when Moyle was about five. He assisted his father in the dairy industry through his growing up years.

After his enlistment in the National Guard as a Technician at the beginning of World War II, Moyle eventually became a 1st Lt. in the U.S. Army. Moyle was the last known survivor of his Medical Corp at the age of 97.

He married his high school sweetheart, Ada Taylor, on November 6, 1943, in Clovis, New Mexico. After the war, Moyle began his college education at BYU under the GI Bill. He then continued on for his Master's Degree at the University of Massachusetts in Agrostology before heading to North Carolina State for his PhD in Soil Chemistry.

After accepting a position as Assistant Professor in the Agronomy Department at NC State, Moyle and his family, which now included four girls and his wife, moved to Oregon where he accepted a position as a Professor of Soil Science specializing in Clay Mineralogy at Oregon State University in 1955. Over the next few years, two more daughters were added to the family bringing the total to six girls, whom he fondly referred to as "My Girls."

Before his retirement from OSU, Moyle and his family moved to "the Farm" south of Philomath, where he began raising Christmas trees. After his retirement in 1982, he devoted his time to raising Christmas trees as his second career. After the death of his first wife in 1992, Moyle met E. Maxine Kropf. They were married on April 24, 1993, in Corvallis and had just celebrated their 26th wedding anniversary. Moyle passed away peacefully, surrounded by those who loved him on May 4, 2019 in Corvallis.



Oregon State University

Crop and Soil Sciences
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Oregon State University
Corvallis, OR 97331

Be a Part of the Success of the Department of Crop & Soil Science

Please complete this form and send it with your check to:

The Oregon State University Foundation

4238 SW Research Way

Corvallis, OR 97333

Make checks payable to the OSU Foundation

I am making a gift of (circle one) \$50 \$100 \$250 \$500 \$1,000 \$_____ (other) to Crop and Soil Science and
would like it directed to the following:

- ☐ Where need is greatest
- ☐ Forage/Livestock Research and Extension Endowment Fund
- ☐ Oregon Potato Research/Extension Professorship Endowment
- ☐ Weeds Research and Extension Fund
- ☐ Arnold P. Appleby Weed Science Education Endowment
- ☐ Paul C. Berger Professorship Endowment Fund – New and alternate crop graduate student support
- ☐ George R. Hyslop Professorship Endowment Fund – Seed crop research, extension and teaching
- ☐ Warren E. Kronstad Wheat Research Chair Endowment Fund – Wheat research
- ☐ Paul R. Pugh Grass Seed Endowment Fund – Seed crop research, extension and teaching
- ☐ Thomas L. Jackson Student Support Endowment in Agronomy – Student research/professional development support
- ☐ Henry H. & Dorothea Rampton Memorial Scholarship Endowment Fund
- ☐ McGuire Crop Science Scholarship Fund
- ☐ Verhoeven Student Engagement Endowment Fund
- ☐ Moyle Harward Issues in Ag Lectureship Fund
- ☐ Benno Warkentin Endowment Fund – Soils Teaching
- ☐ William C. Young III Endowment Fund – Seed Crop Research by Extension Faculty

THANK YOU FOR YOUR SUPPORT!