HYSLOP FARM FIELD DAY 2024

May 22, 2024
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Hyslop Farm Field Day Agenda 2024

8:30 – 9:00 AM: Welcome with Coffee and Donuts

9:00 – 11:30 AM: Grass and Legume Seed Production Field Tours

- Evaluating Insecticides for Symphylan Control and Their Compatibility with Carbon Seeding in Grass Seed Crops .............................................................. 1
- Intercropping Forage Legume Crops with Forage Type Tall Fescue ........ 2
- Innovation in Annual Ryegrass: A Brief Introduction to the USDA Grass Breeding Program ............................................................................................ 3
- Thinking Outside of the Box to Move the Yield Needle in Annual Ryegrass Seed Crops .................................................................................................. 4
- Evaluating Spot Spraying Herbicides between Tall Fescue Seed Crop using RTK Auto-Trac Steering and a Green on Brown Weed-IT Sensor ............ 5

11:30 AM – 12:15 PM: Interactive Exhibits

- Interactive Exhibits ..................................................................................... 6

12:15 – 1:30 PM: Lunch and Featured Speaker

- Lisa Charpilloz Hanson – Director of Oregon Department of Agriculture
- Dr. Margaret Krause – New OSU Wheat Variety Release

1:30 – 3:15 PM: Cereal Crop Field Tours

- Improving Resistance to Diseases in Wheat ............................................... 7
- The OSU Wheat Breeding Program: A New Variety and Breeder for the Willamette Valley .......................................................... 8
- Wheat Variety Testing in the Willamette Valley ........................................ 9
- The OSU Barley Breeding Program: New Faces, GN0, Disease Resistance, and More! .......................................................... 10
Evaluating Insecticides for Symphylan Control and Their Compatibility with Carbon Seeding in Grass Seed Crops

Navneet Kaur¹, Alison R. Willette¹, Pete A. Berry¹, Andy C. Branka¹, Seth J. Dorman¹,², Nicole P. Anderson¹

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Research Summary

Research efforts (2021-2023) have evaluated various insecticide products representing diverse modes of action for managing symphylans in both tall fescue [Schedonorus phoenix (Scop.) Holub] and perennial ryegrass (Lolium perenne L.) seed crops. The liquid fertilizer-ready formulation (LFR) of bifenthrin (Capture LFR) and various other bifenthrin formulations (Bifender LFC, Bifenture 2EC, and Brigade 2EC) emerged as promising candidates for symphylan management using pre-plant incorporation. The current project aims to establish efficacy data for promising pyrethroid products and/or additional new insecticidal chemistries for potential use with carbon seeding in the establishment of either spring- or fall-seeded grass seed crop plantings.

Spring 2024. On April 24, 2024, a trial was planted in a symphylan-infested site at the OSU Hyslop Research Laboratory, using tall fescue ‘Titanium GLS.’ The trial design included five insecticidal treatments (Table 1) and an untreated control arranged in a randomized complete block with four replications. Plots were 16.8 feet x 30 feet. Tall fescue (var. ‘Titanium GLS’) was planted at 11 lb/acre using a John Deere 5055 and Sunflower 9312 Drill Seeder at 20-inch row spacing. The seeding depth was approximately 0.35 inch. Activated carbon was applied in a 1-inch band at 16.67 lbs per acre at 20-inch row spacing (300 lbs per acre broadcast basis), and treatments were applied using the tractor-mounted sprayer calibrated to 50 GPA at 15 psi through Teejet 8008 VA nozzles. Using the potato bait method, mean symphylan abundance was determined by deploying three bait stations per plot 14 and 21 days after treatment (DAT) (Table 1).

Table 1. Trade name, rate, active ingredient, IRAC group, and symphylan abundance in an insecticide efficacy trial conducted in a spring-planted tall fescue field at the Hyslop Research Laboratory, 2024

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Rate (fl. oz./acre)</th>
<th>Active ingredient</th>
<th>IRAC Group</th>
<th>Mean symphylan (14 DAT)</th>
<th>Mean symphylan (21 DAT)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.2</td>
<td>4.8</td>
<td>0.49 (ns)</td>
</tr>
<tr>
<td>Capture LFR®</td>
<td>8.5</td>
<td>bifenthrin</td>
<td>3A</td>
<td>0.5</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Elevest</td>
<td>9.6</td>
<td>bifenthrin + chlorantraniliprole</td>
<td>3A+28</td>
<td>0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Warrior II</td>
<td>1.9</td>
<td>lambda-cyhalothrin</td>
<td>3A+4A</td>
<td>1.2</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Endigo</td>
<td>4.5</td>
<td>lambda-cyhalothrin</td>
<td>3A+4A</td>
<td>0.7</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>F4092-3</td>
<td>8.5</td>
<td>bifenthrin and Bacillus spp</td>
<td>3A+unknown</td>
<td>0.49 (ns)</td>
<td>0.74 (ns)</td>
<td></td>
</tr>
</tbody>
</table>

Acknowledgments

We thank the OSU Agricultural Research Foundation, Oregon Grass Seed Commissions, and the Oregon Department of Agriculture Specialty Crop Block Grant Program for funding.
Intercropping Forage Legume Crops with Forage Type Tall Fescue

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Research Summary
A field trial consisting of nine legumes intercropped with forage type tall fescue was sown on 21 September 2023. The experiment quantifies if intercropping these legumes suppresses weeds while also providing a silage option on first year forage type tall fescue fields. In October 2023, mayweed chamomile (Anthemis cotula) risked overtaking the experiment; therefore, treatments were divided into 7 sub-plots to screen broadleaf herbicides. All herbicide treatments suppressed mayweed chamomile compared to plots without an herbicide, although bentazon outperformed other treatments, resulting in near complete suppression of mayweed chamomile six weeks after treatment (Table 1). In late December, a suspected outbreak of white mold (Sclerotinia sclerotiorum) affected some legumes, providing an opportunity to quantify differences in susceptibility (Table 2). Legumes that survived winter, while also showing promise for biomass production, included arrowleaf, crimson, and subterranean clovers. Subsamples of these plots were harvested and are being sorted to quantify the percentage of legume, tall fescue, and weeds.

Table 1. Means and Tukey’s HSD pairwise comparisons of the effects of 31 October 2023 herbicide treatments on the percentage of mayweed chamomile in Corvallis, Oregon.

<table>
<thead>
<tr>
<th>Active Ingredients</th>
<th>Rate</th>
<th>lbs. a.i. / acre</th>
<th>% Mayweed Chamomile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31-Oct-23</td>
<td>13-Dec-23</td>
<td></td>
</tr>
<tr>
<td>Flumetsulam + 0.25% NIS</td>
<td>0.66 wt. oz./acre</td>
<td>0.03</td>
<td>46% ns 56% b</td>
</tr>
<tr>
<td>Flumetsulam + 0.25% NIS</td>
<td>1.33 wt. oz./acre</td>
<td>0.07</td>
<td>45% ns 56% b</td>
</tr>
<tr>
<td>Bentazon+ 0.25% NIS</td>
<td>1.6 pint/acre</td>
<td>1.00</td>
<td>47% ns 1% d</td>
</tr>
<tr>
<td>MCP-Amine</td>
<td>0.5 pint/acre</td>
<td>0.25</td>
<td>48% ns 59% b</td>
</tr>
<tr>
<td>MCP-Amine</td>
<td>1.0 pint/acre</td>
<td>0.50</td>
<td>48% ns 54% b</td>
</tr>
<tr>
<td>MCP-Amine</td>
<td>1.0 pint/acre</td>
<td>0.50</td>
<td>43% ns 38% c</td>
</tr>
<tr>
<td>Flumetsulam + 0.25% NIS</td>
<td>1.33 wt. oz./acre</td>
<td>0.07</td>
<td>44% ns 68% a</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Seeding rates and average legume survival percentage on 23 February 2024.

<table>
<thead>
<tr>
<th>Legume interseeded with tall fescue</th>
<th>Target sowing rate (lbs./A)</th>
<th>Sowing rate adjusted for % germ (lbs./A)</th>
<th>Legume presence</th>
<th>First silage harvest date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berseem</td>
<td>10</td>
<td>10.9</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>Alsike</td>
<td>4</td>
<td>4.4</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Crimson</td>
<td>10</td>
<td>12.5</td>
<td>96%</td>
<td>15 April</td>
</tr>
<tr>
<td>Red</td>
<td>6</td>
<td>6.7</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2</td>
<td>3.2</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Persian</td>
<td>7.5</td>
<td>7.9</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Subterranean</td>
<td>15</td>
<td>15.8</td>
<td>99%</td>
<td>15 April</td>
</tr>
<tr>
<td>Arrowleaf</td>
<td>7.5</td>
<td>8.2</td>
<td>96%</td>
<td>02 April</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>10</td>
<td>11.5</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Only Tall Fescue</td>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Acknowledgments: The authors thank Ian Silvernail from the USDA-NRCS-PMC for technical assistance and Dr. Don Floyd with Smith Seed Services for donating seeds and inoculum.
Innovation in Annual Ryegrass: A Brief Introduction to the USDA Grass Breeding Program

Dustin Herb

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Research Summary
Genomic selection was first proposed as a method to capture complete additive genetic variance using genome-wide markers. Genomic selection is a form of MAS, which accounts for all marker effects across the entire genome to calculate genomic estimated breeding values (GEBVs), which are used to select individual plants for advancement. Genomic selection is ideal for complex traits with low to moderate heritability controlled by many QTLs with minor effects – such as yield and disease resistance - rather than by a few major QTLs. By utilizing genetic relatedness to predict plant performance, genomic selection targets populations and environments by associating the phenotypes and genotypes within a training population. Once genotyped, a training population is phenotyped for plant traits, and predictive models are built to estimate breeding values from marker data. The implementation of genomic selection for complex traits has been implemented for ryegrass and tall fescue and is a promising method to improve agronomically important traits in Lolium and Festuca crop species. The objective of this program is to adapt genomic selection to breeding strategies for improved seed yield and resistance to abiotic and biotic pressures in tetraploid and diploid annual ryegrass in the Willamette Valley.

Figure 1. Diagram of breeding pipeline and genomic selection (GS) program for Lolium spp. and Festuca spp.
Research Summary
Recent OSU studies have shown that the use of trinexapac-ethyl (TE) (Palisade EC) increases seed yield in Oregon’s annual ryegrass crops when applied at the 2-node stage (BBCH 32) (Figure 1). This seed yield increase is a result of increased seed number^2 (Figure 2), fertile tillers^2, and decreased spike length. In 2023, a year with an abnormally cold wet spring, we found that maximum seed yield potential was reached at a rate of 2 pts Palisade EC/acre. Rates exceeding 8 pts/acre did not result in a seed yield decrease, reinforcing the safety of TE usage in annual ryegrass seed crops. The current study aims to evaluate seed yield at multiple rates in the spring with more average air temperature and rainfall.

Previous studies have shown an interaction between mowing/grazing and PGRs in Oregon’s annual ryegrass seed crops. It is not uncommon for there to be an inadequate supply of sheep and/or fields to be too wet for mechanical mowing to occur during the early spring months. This is our first attempt to evaluate whether chemical “mowing” could be a viable alternative when sheep are not available or fields are too wet for machinery operations. Herbicide products including Gramoxone (8 oz/a), Rely (12 oz/a), Goal (1 oz/a), Metribuzin (2 oz/a), Sharpen (1 oz/a), and Chateau (4 oz/a) were applied at the 2-node stage (BBCH 32) and are compared to mechanical mowing and no-defoliation treatments.

Typically, annual ryegrass seed crops do not have problems with stem rust or other major grass seed diseases commonly found in Oregon. However, industry representatives have questioned whether there may be a potential benefit to using fungicides in this crop. In this work, we aim to evaluate whether fungicides have any effect on seed yield or seed weight in annual ryegrass seed crops. On April 24, the following fungicide treatments were applied: untreated control, Tilt (8 oz/a), Monsoon (8 oz/a), Quilt Xcel (14 oz/a), Trivapro (18 oz/a), and Prosaro (8 oz/a).
Evaluating Spot Spraying Herbicides between Tall Fescue Seed Crop using RTK Auto-Trac Steering and a Green on Brown Weed-IT Sensor

Pete A. Berry¹, Andy C. Branka¹, Jamie Burroughs¹
¹Department of Crop and Soil Science, Oregon State University
pete.berry@oregonstate.edu

Research Summary
GIS (Geographic Information System) technology enhances agriculture by improving precision and efficiency in field management practices. RTK (Real-Time Kinematic) autosteer harnesses satellite positioning to deliver highly accurate steering, enabling tractors and other equipment to follow predetermined paths with centimeter-level precision. Spot spraying between lines, enabled by GIS data, allows for targeted application of herbicides. This technique relies on sensors to identify weeds specifically between crop rows, reducing post-emergent applications, expanding application windows, and providing the potential to use non-selective herbicides. A spot sprayer designed for grass seed row spacing, featuring a dual boom system with nozzles spaced at 5 and 10 inches, was built for spot spray studies. The objective of the trial is to evaluate the effectiveness of spot-spraying weeds between rows of tall fescue using RTK planting lines and autosteer. This involves measuring herbicide efficacy, the area covered when the nozzles are activated, and analyzing crop damage that may occur when weeds close to the crop are spot-sprayed.

Methodology
In the fall of 2023, tall fescue ‘Titanium GLS’ was planted at Oregon State University’s Hyslop Research farm using a John Deere 5055E tractor and Sunflower 9321 Drill Seeder on 20-inch row spacing. Tall fescue was planted at a depth of 0.25 inches at 10 lbs/acre. The tractor was enabled with the John Deere Autotrac system and real time kinematics (RTK) linked with a JD generation 4 monitor via a 6000 series globe. During the spring of 2024, a Rometron 4th generation Weed-IT spot sprayer connected to the John Deere RTK through the ISOBUS was utilized in spot spraying weeds between tall fescue rows. Mesotrione (Callisto) at 3 fl oz/acre rate was spot sprayed on weeds placed between the crop rows to assess narrow nozzle spacing and the spray area. Spray cards were placed below weeds to quantify the total area sprayed when the nozzles were activated. Weeds were placed away from and near crop rows to assess crop phytotoxicity visually to determine the potential for off target spray when weeds close to the crop activate the spot sprayer. Preliminary data will be reported during the field day.

Acknowledgments
The authors wish to thank the Grass Seed Commissions and the Agricultural Research Foundation for their contributions and support.
Interactive Exhibits

Field Crops Entomology Program
Dr. Navneet Kaur will showcase major insect pests in grass and clover seed crops and a poster on symphylans management in grass seed crops. Copies of the Pest Pocket Guide will be available.

Cereal Quality Demonstrations
Dr. Andrew Ross will have demonstrations of elements of wheat and food-barley quality, either or both example tests or products (bites) to eat.

Developments at OSU Seed Certification Laboratory
Dr. Sabry Elias will discuss the development of a quantitative PCR test to distinguish between annual and perennial ryegrass.

USDA-ARS Molecular Biology and Genetics Research for Grass Seed Production
Dr. Joseph Gallagher will highlight research including genomic diversity of annual ryegrass, plant biotechnology, molecular sources of herbicide resistance, and genetics of seed yield traits.

Organic Agriculture Extension Program
Serves farmers and other professionals interested in sustainable, regenerative and Organic farming. We will have data summaries, demos, and information about transitioning to organic!

Sensing Devices for Grass Seed Crops
Dr. Jing Zhou will display a developed Hyperrail imaging platform and a handheld seed moisture-sensing device developed to take instant moisture measurements of grass seed samples.

Oregon IPM Center
Aims to reduce the environmental, economic, and health impacts of pests and pesticides through the increased adoption of Integrated Pest Management (IPM) practices in the Pacific Northwest.

Current and Future GIS Technology in Precision Weed Management
Dr. Pete Berry will showcase FarmDroid® fully autonomous planting/weeding system assessed for multiple crops in Oregon, a Weed-it spot sprayer, and a drone utilized for weed identification.

Barley Breeding and Genetics
Hot steeps will be available to taste and learn about the sensory analysis process! We will also showcase doubled haploid plants grown from tissue culture in magenta boxes.

Wheat Breeding and Genetics
Dr. Margaret Krause will highlight the new release of OR2180377 and provide an overview of new research, including GPS planting, genomic selection, and UAV phenotyping.

Green Horizons: Enhancing Potato Quality & Advancing Skills in Organic Agriculture
Student posters on essential oils to control late blight and post-harvest potato sprout, phenolic acids for organic control of root-knot nematodes, and Online Graduate Certificate in Organic Ag.

Soil C and Soil Health in Willamette Valley Grass Seed Production Systems
Dr. Jennifer Moore will discuss the importance of soil carbon and soil health in supporting productive and resilient grass seed systems, including soil sampling, soil health, and soil carbon sequestration potential.

Exhibitions: Soils, Sensing Devices, Molecular Research, GIS technology, Entomology, Cereal Breeding, and more!
Improving Resistance to Diseases in Wheat

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Research Summary
A major goal of the collaboration between the OSU Cereal Pathology and Cereal Breeding programs is to develop wheat varieties with resistance to diseases of importance in the Willamette Valley. Two aspects of this collaboration will be discussed at the 2024 Hyslop Field Day. The first is the pending release of the elite line OR2180377 (‘Gale’), which has recently been approved by the OSU Cereal Variety Advisory Committee. Gale resulted from a cross between ‘Rosalyn’ and an advanced line from the OSU program. Gale is targeted as a replacement for Rosalyn, with improved yield and disease resistance. Relative to Rosalyn, Gale shows improved stripe rust resistance, is slightly more resistant to Septoria, and shares with Rosalyn excellent resistance to sharp eyespot and strawbreaker foot rot (Table 1). The second topic is a collaboration begun several years ago to increase levels of Septoria resistance in lines that also have high stripe rust resistance and yield. Disease performance of one of the most promising lines from that collaboration, OR2220557, is shown in Table 2. History of this project will be described, Septoria field plots will be shown, and other 2024 disease updates will be presented.

Table 1. Disease levels of a potential new wheat release and currently grown varieties.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Stripe rust severity (%)</th>
<th>Septoria severity (%)</th>
<th>Sharp eyespot 1-5</th>
<th>Strawbreaker foot rot (% lodging)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trial 1</td>
<td>Trial 2</td>
<td>Trial 1</td>
<td>Trial 2</td>
</tr>
<tr>
<td>Rosalyn</td>
<td>12.5</td>
<td>18.8</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>OR2180377 (Gale)</td>
<td>6.5</td>
<td>6.8</td>
<td>26</td>
<td>30</td>
</tr>
<tr>
<td>LCS Shine</td>
<td>2.2</td>
<td>2.8</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Bobtail</td>
<td>1.5</td>
<td>3.8</td>
<td>27</td>
<td>34</td>
</tr>
<tr>
<td>Stephens</td>
<td>2.5</td>
<td>6.0</td>
<td>50</td>
<td>71</td>
</tr>
</tbody>
</table>

Table 2. Disease reaction of an advanced wheat line with improved Septoria resistance.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Stripe rust severity (%)</th>
<th>Septoria severity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trial 1</td>
<td>Trial 2</td>
</tr>
<tr>
<td>Stephens</td>
<td>8.3</td>
<td>46.7</td>
</tr>
<tr>
<td>Madsen</td>
<td>2.5</td>
<td>28.3</td>
</tr>
<tr>
<td>Bobtail</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>OR2220557</td>
<td>0.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Acknowledgments
Supported by the Oregon Wheat Commission and the Oregon Agricultural Experiment Station.
The OSU Wheat Breeding Program: A New Variety and Breeder for the Willamette Valley

Margaret Krause¹, Mark Larson¹, Adam Heesacker¹, Nathalia Moretti¹, Hilary Gunn¹
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Research Summary
The OSU wheat breeding program aims to meet the needs of Oregon wheat producers through the development of new varieties with improved agronomic performance, disease resistance, and end-use quality. This is accomplished through collaborations with cereal scientists Drs. Andrew Ross and Teepakorn Kongraksawech, cereal pathologist Dr. Chris Mundt, and OSU extensionists across the state. The program now focuses on three market classes: soft white winter, hard red winter, and winter club wheat.

New variety release for the Willamette Valley
The OSU wheat team is excited to announce the release of ‘Gale,’ a soft white winter wheat variety developed for the Willamette Valley. Experimental line OR2130377 was given the name ‘Gale’ in recognition of the late Gale Gingrich, area Extension Agronomist for Oregon State University. Gale is intended as a replacement for ‘Rosalyn’ soft white winter wheat, based on its yield potential (Table 1), level of stripe rust resistance, and end-use quality. Gale is an awn-tipped semi-dwarf variety derived from the cross Rosalyn/Einstein/Rosalyn. Gale has shown favorable end-use quality testing results that are comparable to Norwest Duet and superior to Rosalyn and Norwest Tandem. Tualatin Valley Seed is producing registered seed this season.

Table 1 Yield in bu/ac from the 2021, 2022, and 2023 Soft White Elite Yield Trials at the North Valley (producer fields near Banks and Cornelius) and South Valley (Corvallis) testing sites.

<table>
<thead>
<tr>
<th>Variety</th>
<th>North Valley</th>
<th>South Valley</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 2022 2023</td>
<td>2021 2022 2023</td>
<td></td>
</tr>
<tr>
<td>Gale</td>
<td>112.2 138.9 102.6</td>
<td>136.0 104.9 97.6</td>
<td>115.4</td>
</tr>
<tr>
<td>Rosalyn</td>
<td>100.9 125.4 108.0</td>
<td>117.4 97.8 83.7</td>
<td>105.5</td>
</tr>
<tr>
<td>Stephens</td>
<td>107.6 90.1 97.8</td>
<td>92.6 83.8 81.6</td>
<td>92.3</td>
</tr>
<tr>
<td>Norwest Tandem</td>
<td>105.4 118.0 110.5</td>
<td>116.7 85.2 91.8</td>
<td>104.6</td>
</tr>
<tr>
<td>LCS Shine</td>
<td>117.5 115.0 102.1</td>
<td>119.8 95.5 104.9</td>
<td>109.1</td>
</tr>
</tbody>
</table>

New breeder joins the OSU wheat team
In November of 2023, Dr. Margaret Krause joined the Department of Crop and Soil Science as an assistant professor and OSU’s new wheat breeder following Dr. Robert Zemetra’s retirement. Dr. Krause was previously an assistant professor and wheat and barley breeder at Utah State University. A native of Minnesota, Dr. Krause completed her degrees at the University of Minnesota and Cornell University, conducting some of her research in Mexico at the International Maize and Wheat Improvement Center. She is excited to join OSU’s highly experienced wheat team and build relationships with Oregon growers to learn more about outstanding needs. For her research, Dr. Krause is interested in evaluating genomics and proximal/remote sensing technologies for breeding with the goal of providing improved varieties to Oregon growers on a shorter timeline.

Acknowledgments
The OSU wheat breeding program thanks the Oregon Wheat Commission for supporting this work, as well as the growers who have hosted variety trials on their farms.
Wheat Variety Testing in the Willamette Valley
Ryan Graebner, Daisy Rudometkin, Matthew Hunt
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ryan.graebner@oregonstate.edu | 541.359.7151

Research Summary
The OSU Cereal Variety Trials provide growers with performance information on commonly
grown and newly released wheat and barley varieties from public and private breeding programs.
These varieties are grown in seventeen winter wheat testing locations and eight spring cereal
testing locations, spanning the major growing regions in Oregon.

In the Willamette Valley, we test soft white winter wheat varieties in two trials: one near
Corvallis (either at the Hyslop Field Lab or a nearby on-farm site) and one at an on-farm site
near Forest Grove. Hard and soft spring wheat varieties are tested at an additional on-farm site
near Forest Grove. We work to ensure that each of these locations reflects local growing
conditions and apply fungicides as needed to control stripe rust and septoria tritici blotch
infection in the plots. This work is complemented by disease evaluations from Dr. Chris Mundt,
who rates each variety for stripe rust, septoria tritici blotch, and a range of other pathogens.

After harvest, samples from our trials are sent to the OSU Cereal Quality Laboratory in Corvallis
and the Western Wheat Quality Laboratory in Pullman for a comprehensive evaluation of end-
use quality. These evaluations help to ensure that the Pacific Northwest maintains its reputation
for high-quality wheat on the global market.

Technical reports for these trials can be found on our website
(https://cropandsoil.oregonstate.edu/wheat/osu-wheat-variety-trials). Alternatively, we are
always happy to talk about wheat variety performance in different growing conditions and can be
reached on the phone, by e-mail, or by text.

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trials.
The OSU Barley Breeding Program: New Faces, GN0, Disease Resistance, and More!

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Research Summary
The OSU barley breeding program is currently focused on the development and release of improved 2-row facultative/winter malting barley varieties adapted to Oregon and the greater Pacific Northwest region.

New Faces
The past year has seen some major personnel changes within the program. OSU professor and barley breeder Dr. Patrick Hayes retired at the end of 2023, at which point new OSU wheat breeder Dr. Margaret Krause took up barley breeding with the help of Faculty Research Assistant (FRA) Scott Fisk. While Dr. Krause provides administrative and research leadership to the program, Scott has stepped into the role of assistant breeder to oversee day-to-day breeding operations. Following the retirement of FRA Tanya Filichkin at the end of 2023, Travis Nickols, a graduate of Cal Poly Humboldt, joined the program to take over the doubled haploid lab. FRA Laura Helgerson is continuing in her role managing greenhouse production. Former postdoc Christopher Massman recently moved on to a breeding role in private industry, and the OSU barley breeding program looks forward to welcoming a new postdoctoral researcher this summer.

GN0
Glycosidic nitriles (GN) are organic compounds that are produced by some barley varieties during the malting process. If this malt is then used for distilling, the GNs can produce significant amounts of ethyl carbamates, which are carcinogenic. Consequently, the distilling industry is increasingly demanding low- or non-GN (i.e., GN0) malting barley varieties. The OSU barley breeding program is excited to announce the release of ‘Top Shelf’ and ‘GN0-Vivar’, the first GN0 two-row winter malting barley varieties in North America. Both were derived from the cross DH130939/Calypso and have shown favorable results for extract and Predicted Spirit Yield. Foundation seed will be available in July of this year from the Washington State Crop Improvement Association.

Disease Resistance
This season, the OSU barley breeding program is evaluating the third year of a field experiment to identify resistance genes for barley yellow dwarf virus (BYDV). Aphids transmit BYDV, and infected plants may show yellowing leaves, stunting, and other symptoms that can result in yield losses as high as 50%. During the 2022 and 2023 seasons, the OSU barley breeding program evaluated a genetic mapping population for resistance to BYDV at the Hyslop Farm. Genetic analyses of the resulting data suggested that a region on barley’s second chromosome may be involved in conferring resistance. This season, a different population is under evaluation at Hyslop to validate the results of the mapping study. If these results are consistent, the OSU barley breeding program, as well as breeding programs nationwide, can incorporate this genomic region into new barley varieties to improve resistance to BYDV.

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