Oregon Wheat Commission

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Annual Research Reports

2024-2025 Progress Reports

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Improving Weed Management in Oregon Wheat Production Systems (Year 3)

Commission Funding Amount: $ 57,939

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

The major change was from objective 3. Unfortunately, I was not successful to purchase a WeedChipper from the University of Western Australia (UWA). Attorneys from both universities (OSU and UWA) could not find an agreement due to liability issues that none of the insurance policies seemed to include. So instead of doing a comparison between the WeedChipper and WeedIT as I had proposed, I focused the research on having a better

Describe the outcomes of the research project. What was learned from the research work?

Objective 1. Identify best management practices to control weeds with Aggressor in CoAXium wheat.
A trial with different Aggressor AX rates, different adjuvants, and with the use or not of a preemergence herbicide was established in the fall and the spring treatments will be sprayed soon. The trial has ten different treatments. The other proposed trial was harvested on July 30, 2024. We wanted to stress the soft white CoAXium wheat to make sure Aggressor AX was safe even under those circumstances. The stressors were the lack of N fertilizer and the presence of downy brome. The important result from this trial is that we did not find crop

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

Not at this point. We will provide recommendations with the final report.

Appendix of the progress report FY 2024-2025

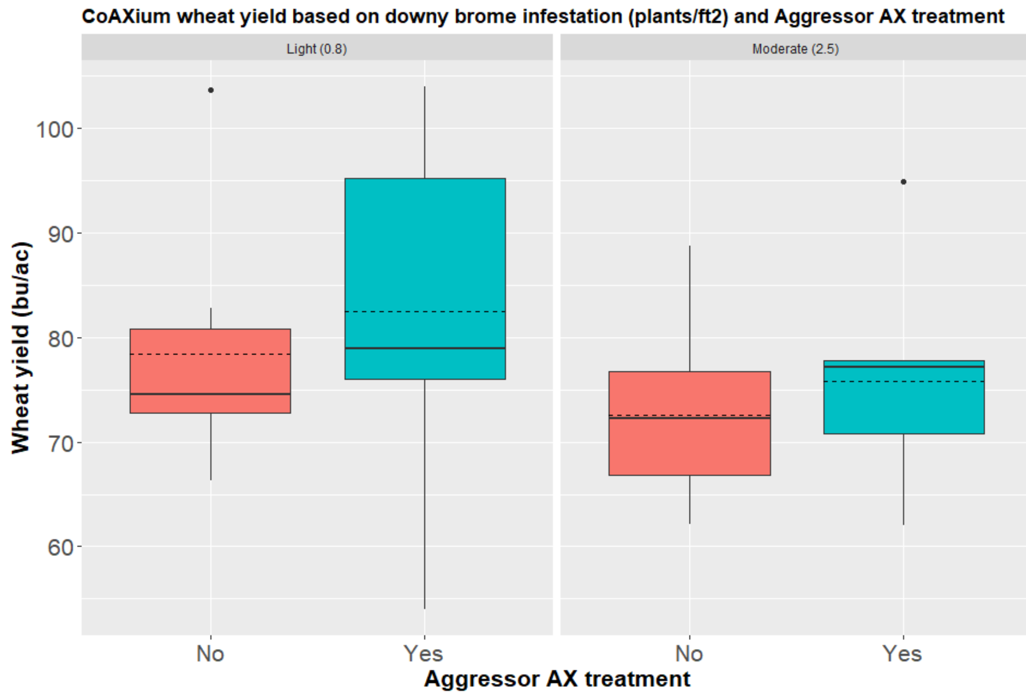

Figure 1. CoAXium wheat yields (bu/ac) from one of the trials in Objective 1, based on downy brome infestations (plants/ft^2) and Aggressor AX herbicide (yes or no) applied on April 2024 at 12 fl oz/ac. Note: The continuous black line in the boxes indicates the median and the dashed line the mean.

<u>List of presentations from objective 5</u>:

1. Herbicide Resistance in Weeds. Hermiston Farm Fair, Eastern Oregon Trade and Event Center, Hermiston, OR. December 5, 2024 (≈90 attendees). Invited.
2. The Herbicide Resistance Problem and Corresponding Management Options. Pesticide Credit Class offered by OSU, Morrow County Extension Office, Heppner, OR. November 12, 2024 (10 attendees). Invited.
3. Herbicide Resistance in Weeds. Oregon Agriculture Chemicals & Fertilizer Association (OACFA) Safety and Stewardship Seminars, Convention Center, Pendleton, OR. November 5, 2024. (≈180 attendees). Invited.

<u>List of publications generated from objective 5</u>:

1. Lyon D.J., **Barroso J.**, and Campbell J. 2025. Update of Integrated Management of Feral Rye in Winter Wheat. Pacific Northwest Extension Bulletin (PNW) 660, 8 pages. (In-press). *Role: Responsible for updating the manuscript with most recent findings.*
2. Lyon D.J., **Barroso J**., Campbell J., Finkelnburg D., Burke I. 2025. Update of Best Management Practices for Managing Herbicide Resistance. PNW 754, 12 pages. (In-press). *Role: Responsible for updating the manuscript with most recent findings.*
3. Gourlie J.A. and **Barroso J.** Chemical control of panicle willowweed (*Epilobium brachycarpum*) in wheat cropping systems of the Pacific Northwest. Proceedings of WSWS Annual Meeting. Seattle, WA. March 11, 2025.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Improving Control of Wheat Stripe Rust

Commission Funding Amount: $ 12,000

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

There have been no any changes or adaptations to the project from the objectives and procedures described in the initial proposal. We have accomplished all studies scheduled for the 2024 growth season, we are on schedule for the studies during the 2025 growth season.

Describe the outcomes of the research project. What was learned from the research work?

1) During the 2024 growth season, we identified two races of the wheat stripe rust pathogen from 21 samples collected from Oregon and determined their frequencies.
2) We evaluated 196 breeding lines from Margaret Krause's wheat breeding program, 191 entries in the PNW winter and spring wheat variety trial nurseries, 73 entries in the west uniform regional winter and spring wheat nurseries, and hundreds of breeding lines from private companies in various field locations and in the greenhouse for resistance to stripe rust.
3) We made accurate forecasts for stripe rust, conducted field surveys and yield

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The results of stripe rust races in Oregon, the PNW, and the country are used by the breeding programs to select germplasms carrying effective genes for developing wheat varieties for resistance to stripe rust; and also used by our program to select predominant races and those representing different race and genetic groups for use in the greenhouse tests for screening breeding lines with effective resistance to stripe rust.

The results of screening wheat breeding lines for stripe rust resistance are used by the breeding programs to release new varieties with adeqaute resistance to stripe rust for growers to planting for reducing fungicide cost.

The stripe rust forecasts, updates, and recommendations made during the 2024 crop season helped growers to apply funcides on time in the fields grown with susceptible and moderately susceptible wheat varieties and also prevent unnecessary use of fungicides in fields planted with resistant varieties, saving growers millions of dollars. The data of screening wheat germplasm, testing fungicides for efficacy on control of stripe rust, and testing commercial varieties for yield loss and fungicide response are used to update Seed-Buying Guide for growers to select stripe rust resistant varieties to grow, which should reduce stripe rust damage and reduce cost of fungicide application.

In a recent study, we identified demethylation inhibitor (DMI) fungicde targeting gene

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Breeding High Quality Hard Red Spring Wheat for Oregon

Commission Funding Amount: $ 2,000

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No major changes have been made to the project.

Describe the outcomes of the research project. What was learned from the research work?

Two out of three trial locations have been planted, and the final location should be planted in the next month.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

No recommendations have been made based on this research.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Wheat and Barley Variety Testing for Oregon

Commission Funding Amount: $ 170,400

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No major changes have been made to the project.

Describe the outcomes of the research project. What was learned from the research work?

Of the trials originally proposed for the 2024-2025 growing season, most have been planted, and we expected that the remainder will be planted in the next month. All planted trials are growing well, with no issues that could have a major impact on the quality of results from these locations.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

No recommendations will be made until after harvest.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Utilizing Fungicides in the Absence of Foliar Disease for Potential Plant Health

Commission Funding Amount: 5k

Funding Year: 2023-2024

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No

Describe the outcomes of the research project. What was learned from the research work?

We applied fungicide groups 3, 7, and 11 to stripe rust tolerant winter wheat. After one year of reserch, our results indecate spraying in the absence of disease does not benefit yield, protein, or test weight (as industry often suggests).

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

We do not recomend Oregon producers apply fungicide in the absence of stripe rust infection. Year 1 of this study actually revealed a minor yield penatly of spraying fungicide compaired to the non-treated control. We look forward to the second year of this study to solidify our results and grower recomendations.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Seed Care Evaluation

Commission Funding Amount: 25k

Funding Year: 2023-2024

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

no

Describe the outcomes of the research project. What was learned from the research work?

We have recorded a significant yield benefit of seed care in comparison to non-treated controls. However, we have not recorded a significant yield benefit among any of the seed care treatments tested. This continues to be an intriguing project, particularly with low wheat prices - growers are asking more questions about how to save on input costs. We continue to recommend “basic” or generic seed care packages and typically recommend avoiding expensive seed care add-ons.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

We recomend basic seed care packages for Oregon Wheat producers. If soils are deficient in zinc, a zinc seed care addition could be profitable. When DTPA-extractable zinc levels in the soil's surface foot are 0.5 ppm, zinc may be profitable. The critical level (for wheat production) is 0.3 ppm.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Quality of varieties & pre-release lines: Genotype & Environment 'G&E' study

Commission Funding Amount: $ 38,418

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

None

Describe the outcomes of the research project. What was learned from the research work?

These samples from Variety Testing were fully processed and the data analyzed. The region's cereal specialists met in conjunction with the PNW-WQC in late January and reviewed new entries for the "2025 Preferred Wheat Varieties Based on End-Use Quality" brochure. Nine new entries were added to the published list this year, nearly all with very high quality.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The recommendation is that if growers know of two or three varieties that might do best on their farm based on agronomics, to please choose the variety higher up on the Preferred Variety brochure to ensure that we continue to maintain and improve the quality of PNW wheat for the export market. The export market has very high quality standards that we have met because growers, breeders, Commissions, seed dealers, scientists have prioritized high quality along with good agronomics. It is vital to the PNW wheat industry that we continue to emphasize that high quality.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: One-third the cost of the Miag pilot flour milling of PNW-WQC samples

Commission Funding Amount: $ 5,250

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

None

Describe the outcomes of the research project. What was learned from the research work?

The PNW-WQC samples were milled and analyzed by ~25 cooperators. The Council met in January and discussed the advantages and disadvantages of all samples based on quality labs, milling, and baking companies. New, up-and-coming lines were evaluated by end-users to get familiar with new releases and provide feedback to the breeder.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The recommendation is to use the comments from the Quality Council members for future breeding considerations. The line submitted by OSU had high quality and had positive feedback from the Council.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Advancing wheat grain quality in Oregon state

Commission Funding Amount: $ 23,000

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

None

Describe the outcomes of the research project. What was learned from the research work?

Samples from the 2024 harvest were received and organized into 41 nurseries. The samples totaled 1041. Most samples have been milled and have undergone preliminary flour testing, with some bake testing as well. So far the samples have good milling and flour properties.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The recommendation is to continue supporting the OSU Quality Lab and the WWQL to help Dr. Krause continue to make good selections for high quality varieties. OSU has a great reputation of releasing high quality varieties and with ongoing support of the quality labs and the breeding program, that will continue.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Oregon Barley Variety Development and Deployment

Commission Funding Amount: $ 35,000

Funding Year: 2024–2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

There have been no major changes or adaptations to the project. While Oregon Wheat Commission funding is not expected for the 2025–26 cycle, the program is still preparing to sow Beyond-tolerant spring barley trials in Corvallis, OR in April.

Describe the outcomes of the research project. What was learned from the research work?

The first objective of the project was to make crosses to 'Successor' with the goal of creating a spring-sown, Beyond-tolerant barley variety with higher yield and quality and adaptation to Oregon's dryland environments. Successor was crossed to 'Oregon Promise', 'Woody-1', 'Woody-2', '14WAIM-3605.5', 14WAIM-3608.3', 14WAIM-3620.17', 'KWS Jessie', 'KWS Willis', 'Lenetah', and 'Tetonia' with a 92 percent success rate. F1 plants were grown in the greenhouse, and F2 seed was sent to Ryan Graebner for planting in Pendleton in spring 2024. F3 seed was harvested and grown in the greenhouse during the winter of 2024–25. F4 headrows will be planted in April for evaluation, although the future of this breeding effort is

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

Oregon wheat producers should consider testing the Beyond-tolerance variety Successor if spring barley is relevant for their rotation. Data on Successor's performance in Dr. Ryan Graebner's extension trials is available for locations in Athena, Ione, and Pendleton from 2024 (https://cropandsoil.oregonstate.edu/wheat/osu-wheat-variety-trials/2024-oregon-wheat-and-barley-yield-trial-data). Foundation seed is available from the Washington State Crop Improvement Association.

The Oregon State University program has produced a number of high performing winter malting barley varieties that may be of interest to Oregon producers if they are interested in and can secure a malting barley contract.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Developing Improved Winter Wheat Cultivars for Oregon

Commission Funding Amount: $ 245,913

Funding Year: 2024–2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

There have been no major changes or adaptations to the project. The original proposal did mention breeding activities for hard white winter (HWW) wheat. We evaluated HWW yield trials in the field during the 2024 season, but no HWW crosses were made during the 2024–2025 winter crossing cycle.

Describe the outcomes of the research project. What was learned from the research work?

The soft white winter (SWW) breeding project, which is the primary project of the breeding program, released OR2180377 and OR2190025 CL+. Plant Variety Protection (PVP) is pending for both releases. OR2180377 was released under the name 'Gale'. It is targeted for the Willamette Valley as a replacement for 'Rosalyn'. It is awnless/awnletted with an intermediate heading date. It has good stripe rust resistance and strawbreaker foot rot resistance. It has shown good/excellent yield potential, and the Pacific Northwest Wheat Quality Council rated it as "Most Desireable". Loren Behrman of Tualatin Valley Seeds harvested foundation seed of Gale. Two seed producers planted registered and certified seed

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

Oregon growers in the Willamette Valley should consider planting Gale in the fall of 2025. Registered and certified seed should be available from two sources this fall.

Seed producers looking to add a Clearfield option for low and intermediate rainfall environments should consider inquiring with the Washington State Crop Improvement Association regarding the available foundation seed of Mallory CL+.

Oregon growers should keep an eye on the 2025 OSU Cereal Extension Program trials for the performance of soil-borne wheat mosaic virus resistant SWW OR2180149 as well as CoAxium lines OR3230026 (SWW), OR3230010H (HRW), and OR3230008H (HRW).

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Gene introgression and trait prediction for developing new and improved

Commission Funding Amount: $ 65,517

Funding Year: 2024–2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

There have been no major changes or adaptations to the project. The original proposal did mention gene introgression activities for hard white winter (HWW) wheat. We evaluated HWW yield trials in the field during the 2024 season, but no HWW crosses were made during the 2024–2025 winter crossing cycle.

Describe the outcomes of the research project. What was learned from the research work?

Regarding the introgression of new genes into Oregon State University (OSU) wheat breeding lines, crosses were made in the spring of 2020 to initiate two major stripe rust resistance genes (Yr5 and Yr15) into PNW adapted breeding lines. F5 generation plants have been identified that carry both resistance genes. Top and backcrossing continues to transfer disease resistance genes for barley yellow dwarf virus (BYDV), soil borne wheat mosaic virus (sbWMV) and Fusarium head blight into elite Oregon germplasm. Crossing continues to integrate a null gene for polyphenol oxidase (PPO) reaction into soft white winter and hard red winter cultivars and advanced breeding lines. Low test weight was also identified as a

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

Oregon wheat producers who have concerns about soil-borne wheat mosaic virus should consider attending an extension field day to observe OR2180149 in the OSU Cereal Extension Program trials and/or check the program's trial reports regarding the performance of OR2180149. OR2180149 is a SWW breeding line that contains the sbm1 gene for resistance to soil-borne wheat mosaic virus, and it has show preliminary resistance to the disease in the 2025 disease nursery in Irrigon, OR. It showed favorable agronomic performance in the 2024 Cereal Extension Program trials, and, if this trend repeats in the 2025 trials, it will be scaled up for release as a solution for Oregon producers working with ground affected by soil-borne wheat mosaic virus.

Oregon wheat producers who are interested in utilizing CoAxium wheat varieties are encouraged to attend the Pendleton field day on 10 June 2025. The breeding program will exhibit its CoAxium efficacy trial, in which growers will be able to observe and provide feedback to the breeding program on potential CoAxium variety releases.

Oregon wheat producers or anyone from the seed industry with concerns about whether or not a seed sample contains herbicide-resistance genes should contact the OSU wheat

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Wheat Microbiomes and Multiple Disease Resistance

Commission Funding Amount: $ 18,925

Funding Year: 2023-24

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No.

Describe the outcomes of the research project. What was learned from the research work?

We completed evaluating progeny of the Einstein x Tubbs and the Xerpha x Bobtail molecular mapping populations against take-all in the greenhouse. The take-all data will be used in quantitative trait loci (QTL) analyses to identify areas of the genome associated with take-all suppression. Since genotyping by sequencing (GBS) data for the Einstein x Tubbs population was derived several years ago, we had that population reevaluated at the USDA genotyping lab in Pullman to obtain a denser set of markers. After the QTL analyses are completed, we will test whether take-all suppression is due to specific components of the soil microbiome. This will be done by testing 10-20% of the most take-all suppressive progeny and 10-20% of

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

Discussion with some growers suggests that varieties such as Bobtail and Rosalyn suppresses take-all after the first year in continuous wheat cropping, and in two-year clover-wheat rotations where volunteer wheat results in take-all issues. As marker data become available, we will make this information available for use in wheat breeding programs.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Nitrogen Fixing Biofertilizers in Winter and Spring Wheat

Commission Funding Amount: $ 13,848

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

A spring wheat trial with MycoGold had been planned to be seeded at the Sherman Experiment Station in the spring of 2024, but was seeded at the Pendleton Experiment Station instead. The experimental design also changed for the spring wheat trial with two different rates of MycoGold tested under three different rates of starter fertilizer (16-20, ammonium phosphate). Drone imagery was also taken of all plots at soft dough stage to

Describe the outcomes of the research project. What was learned from the research work?

Utrisha N did not significantly increase yield, protein, or test weight, though fertilizer rate significantly increased grain yield and quality. The only soil variable that showed a significant response was potassium, which increased with fertilizer rate. The only nutrients in wheat tissue that showed a significant response was sulfur and calcium. Sulfur levels increased significantly with fertilizer rate and calcium was significantly lowered by utrisha.

MycoGold did not cause any significant response to grain yield and quality, though both were influenced by fertilizer rate in spring wheat. MycoGold did have a significant impact on soil

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

While some of the examined biological fertilizers increased yield by a few bushels under reduced nitrogen compared to controls at the same fertilizer rate, it was not consistent nor enough to be statistically significant due to yield variability and failed to provide a positive return on investment. Biofertilizers failed to significantly increase wheat tissue nutrients or significantly provide more nitrogen to wheat under reduced fertilizer rates. The results of this research aligns with other wheat research on these same products in Canada where most studies do not show a positive return on investment. Producers should not use biofertilizers and expect to see an economical return on investment. If producers are interested in using these products they should do test strips first before using on large areas as crop impacts will likely not be economical or may be highly variable.

Nitrogen fertilizer across all trials provided a significant increase in yield and positive return on investment. These trials indicate that in Moro about 2 lbs of total available nitrogen (from fertilizer and residual soil nitrogen) were required per bushel of wheat yield. Additional nitrogen beyond this amount did not generate a positive return on investment.

Drone imagery captured over these trials found that there is a correlation between NDVI and

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: Additive Effects of Foliar Nitrogen with Fungicides in Winter Wheat

Commission Funding Amount: $ 1,680

Funding Year: 2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No

Describe the outcomes of the research project. What was learned from the research work?

This study failed to find any additive effects of applying foliar nitrogen with a fungicide. Yield was not significantly impacted by applying a nitrogen source (Rally) or fungicide (Nexicor) or both together. The untreated control had the greatest average yield, while treated plots averaged slightly lower. There was no positive return on investment in this trial. Protein and test weight also were not influenced by using these products. Nutrients in wheat tissue were not significantly influenced by nitrogen or fungicide application.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The use of fungicides for plant health is not as common in wheat as it is in other crops in Oregon. In this trial fungicide and a nitrogen source were applied at flowering in winter wheat. Weather conditions quickly turned hot and dry after the application was made, which may have decreased the observed response. This trial suggests that producers in north central Oregon should not spend the money to apply a fungicide late in the growing season for only plant health benefits. This trial did not find any significant responses to plant health from using a fungicide like Nexicor. Similarly, making a foliar application of nitrogen (Rally) did not significantly change anything with grain yield or quality or wheat tissue nutrients. The combination of both products also did not provide any added benefits. While many producers use a late applied application of Nexicor with Rally, this trial suggests that it may not be an economical practice every year. In addition, this trial applied these products with a ground rig, while producers usually fly it on with a plane. Control plots in this trial were also driven with a ground rig as to not cause an unfair advantage to treated plots that were driven through late in the crop year causing yield impacts. Using a ground rig may have caused some differences that future trials will better mitigate through using larger plots and possibly having a drone apply products to more closely match how producers are applying these products.

Oregon Wheat Commission Project Report

Add additional pages as needed

Project Overview

Title of Project: How significant is the cereal leaf beetle at present?

Commission Funding Amount: $ 3,052

Funding Year: FY2024-2025

Final Report or Progress Report Progress

Research Results

Were there any major changes or adaptations to the project from what was described in the initial proposal? (describe if so)

No changes.

Describe the outcomes of the research project. What was learned from the research work?

• Although there was significant beetle damage, populations did not exceed currently established economic thresholds.
• Insecticides reduced beetle populations and damage compared with the untreated controls.
• Warrior II (lambda-cyhalothrin) was the best overall insecticide in terms of reducing beetle populations and damage, and in increasing yields.
• Yields were significantly greater with the insecticide treatments.
• When applied at the pre-boot stage, yields were 29% - 45% greater with insecticide treatments compared with the untreated control.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission as a result of this research project? (describe if so)

The insecticides were more effective when applied at the pre-boot stage than later at the boot stage, indicating the importance of timing applications appropriately.

Although beetle populations did not exceed the current economic thresholds, insecticide treatments significantly reduced damage and increased yields. Therefore, research that reexamines the economic thresholds may be warranted.

Oregon Wheat Commission Project Report

Title of Project: OSU Cereal Quality Laboratory

Commission Funding Amount: $80,000

Funding Year: 2024

Progress Report

Research Results

1) Were there any major changes or adaptations to the project from what was described in the initial proposal?

No

2) Describe the outcomes of the research project and what was learned from the research work?

Two soft white (SW) varieties ‘Gale’ and ‘Mallory CL+’ were released.

Gale entered the quality-based preferred variety list in 2024 in the Most Desirable (MD) category. In the preferred list calculations Gale is rated equal in quality to Nixon and Nimbus.

Mallory CL+ (ORI2190025 CL+) was also released. Mallory CL+ also entered the quality-based preferred variety list in 2024 in the Desirable category and is equal in quality to ‘Appelby CL+’. Mallory CL+ also has a yield advantage over Appelby CL+.

We have recommended that Dr. Krause submits SW line OR2180149 to the 2025-harvest Pacific Northwest Wheat Quality Council (PNW WQC). Dr. Krause is excited about this line’s agronomics. Its quality is currently tracking for MD in the preferred list.

We assert that our intense functionality screening at early generations allows the breeder more latitude for finding lines, like OR2180149 and Gale, that combine good field performance with market class appropriate or better processing functionality and end-product quality.

The lab has been also working to support work of other researchers from OSU and the University of Idaho. We have continued to work with USDA and WSU Pullman on issues related to preharvest sprouting (PHS) and late-maturity amylase (LMA) and have found a biochemical marker that appears to distinguish PHS from LMA. Validation work continues.

More recently we have begun collaborating with Pullman-based scientists, Drs. Amber Hauvermale and Alison Thompson, on anomalously low Falling Numbers (FNs) from wheat in the *absence* of increased amylase enzymatic activity. We have identified a flour functionality marker that distinguishes the non-enzymatically from enzymatically driven low FNs. This last initiative may be key to understanding occasional, but probably too frequent, anomalous low FN events. These low FN wheats without increased amylase activity suffered a hard freeze at the soft dough stage of grain filling.

Our work with the Wheat Marketing Center (WMC) and US Wheat Assoc. (USW) on Japanese sponge cake quality has resulted in two publications and is moving into the validation phase. Cake quality research with WMC and USW is also transitioning to chiffon cakes as result of changing market dynamics that were reported to us by USW.

Under the methods development objective, Dr. TK has been collaborating with the PNW WQC cooperators and with technical experts within OSU to develop automated scoring using machine-learning (AI). This is firstly for cookie top grain score, secondly for bread crumb grain score, and thirdly for assessing loaf volumes. This work is at the beginning stage.

Publications
-Mense, A.L., Ross, A.S. and Bock, J.E., 2025. Predicting Hand Folded Japanese Sponge Cake Quality using Rapid Visco Analyzer Flour Pasting Properties. *Cereal Chemistry.* http://doi.org/10.1002/cche.10870
-Mense, A.L., Ross, A.S. and Bock, J.E., 2024. Predicting wheat flour quality for making Japanese sponge cake using flour pasting properties as measured by the Rapid Visco Analyzer. *Cereal Chemistry*, *101*(5), pp.954-967.
-Curtis B. Adams, Teepakorn Kongraksawech, Andrew Ross, Ryan Graebner, Clark Neely, Juliet Marshall, Catherine Reardon, Dan Long, Xi Liang. 2024. As grain mineral densities have declined over time, have densities converged across wheat classes? Insights from the U.S. Pacific Northwest and worldwide benchmarks" *Crop Science*, *65*(1), p.e21409.
Reports
-Ross A.S. 2024. Selecting for Quality 2024: Collaborations, Cakes, and Calculations… Oregon Wheat. October 2024:
Presentations
-Ross A.S., 2024. *Flour milling and cookie quality demonstrations.* Pendleton Field Day. June 2024.
-Ross A.S., 2024. *Cookie quality (release of "Gale" soft white wheat).* Hyslop Farm Field Day. May 2024.
-Ross A.S., 2024. What does Materials Science have to do with bread and cookies? OSU College of Engineering, Materials Science Seminar Series. May 2024.

Are there any recommendations for Oregon Wheat producers/ the Oregon Wheat Commission because of this research project?

We continue to recommend, as the Preferred Variety Lists assert, "*When making decisions between varieties with similar agronomic characteristics and grain yield potential, choose the variety with the higher quality ranking. This will help to increase the overall quality and desirability of Pacific Northwest (PNW) wheat*".