



Pullman Plant Materials Center 2023 Progress Report Activities

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The mission of the USDA-NRCS Plant Materials Program is to develop, test and transfer plant science technologies to meet customer and natural resource concerns. The Pullman Plant Materials Center (WAPMC) achieves our mission using an integrated approach by partnering with NRCS staff, conservation districts, universities, landowners, and other agencies to develop plant products, provide technical information and trainings. The WAPMC serves a geographically diverse region, which includes Washington state, parts of Eastern Oregon and Northern Idaho. The region includes a variety of agricultural operations in irrigated and non-irrigated cropland, grassland, forest as well urban and peri-urban areas. The WAPMC activities focus on soil health, range and pasture productivity, forage production, agroforestry, and upland wildlife habitat to build resiliency and support producers in climate smart agriculture and forestry practices.

Research Activities

Interaction of planting dates on biomass production in fall planted cover crops.

We completed our second year of study investigating the interaction of planting dates and biomass production of fall planted cover crops in Eastern Washington. This study examines the key constraints of fall soil moisture

to initialize germination and enough growing days prior to a hard frost on cover crop adoption in the Inland Northwest (INW). Cover crop benefits such as reduced erosion, weed suppression and soil moisture conservation are limited if a cover crop is not established before frost/winter season. This study compares biomass production of several species and varieties of cool season cover crops at different planting dates to help identify best practices for cover crop standards in the INW. One regional barrier to cover crop adoption in wheat/ fallow systems is that growers need to terminate cover crops by June 1st. Our work is identifying species and varieties

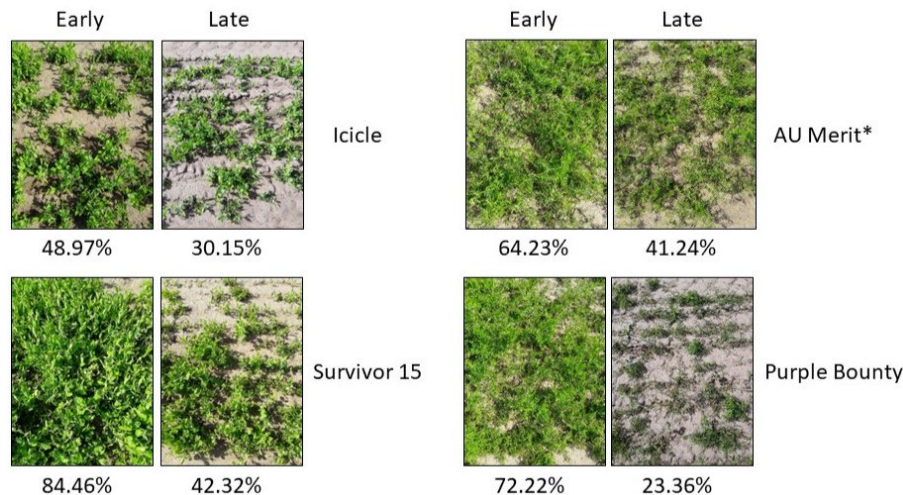


Figure 1. Shows four plots comparing ground cover percentages. Early planting dates were September 30th and late planting dates were October 14th. Pictures taken on May 27th.

capable of providing ground cover and benefits of cover crops within that window. Regional specific information relating planting dates with termination dates to optimize biomass production allows NRCS planners to make recommendations that address conservation needs of producers and maximize cover crop benefits.

Examining warm season cover crop species performance in MLRA 9 Palouse and Nez Perce Prairies

Several barriers such as planting and termination timing, species selection, and seed availability inhibit warm season cover crop adoption in the Inland Northwest. We initiated three variety trials across different MLRAs in Washington state to develop recommendations on selection and management of warm season cover crops. These trials will help develop additional study plans to identify appropriate planting dates, termination techniques, and seeding rates. Warm season species could be incorporated into crop rotations and provide a variety of functions including enhancing soil health by adding a diversity of plant functional groups, providing weed/pest suppression, enhancing habitat for pollinators and beneficial insects, providing good quality supplemental livestock feed, and filling short periods between commercial crops. There are many commercially available warm season species cover crops grown in other parts of the United States that are likely to be adapted to the climate of MLRA 8 and 9. Entries include several varieties of pearl millets, foxtail millets, proso millets, forage soybeans, sunflowers and brassicas. We are evaluating emergence, bloom dates, soil moisture levels and above ground biomass.



Figure 2. Shows year one of warm season cover crops plots planted on June 1st. Several key attributes we are examining include rapid and consistent emergence and stand development, ability to provide ground cover and growth under arid conditions. Plots were planted June 1st. Picture taken July 25th.

Partnerships

Collaboration with the University of Idaho on the Synergistic Response of Soil Function and Cover Crop Diversity



Figure 3. Picture on the left shows the overview of the University of Idaho “synergy” plots 3 weeks after planting. Picture on the right is a 6 species mix plot.

This year we continued our partnership with researchers at the University of Idaho examining the interactions of different management treatments such as cover crop diversity, intercropping, compost addition, and simulated grazing on various soil health functions. The University of Idaho has been collecting soil samples to analyze them for carbon and nitrogen cycling, below ground microbial community composition, diversity, and function. Biomass and cash crop yield data have been collected. This collaboration will help provide valuable information about the potential synergies between multiple agronomic management practices, biogeochemical cycles, and below ground biodiversity.

Legume Cover Crop Advanced Line Trial Study

For the last 6 years we have participated in a national Plant Materials Program collaboration with USDA-ARS and several universities in the multi-year legume cover crop advanced line trials. The objective of the project is to improve cover crop performance through germplasm screening and selection. As part of a nationwide study, the WAPMC is evaluating two legume species: hairy vetch and Austrian winter pea. Using standard varieties of each species as checks, we provide information for efficient selection of breeding lines and identify regionally adapted varieties. Identifying new varieties of legume cover crops best suited to local conditions provides growers more options to improve soil health.

Vetch



Winter Peas



Figure 4. Plantings rows of the legume cover crop advanced line study.

Evaluating Sainfoin as an alternative forage and crop for Inland Northwest with the Land Institute



This year we initiated a collaboration with Drs. Evan Craine and Brandon Schlautman of The Land Institute to evaluate sainfoin cultivars and breeding material for alternative hay and forage crops in the Inland Northwest. Objectives are to evaluate seeding methods on stand establishment, plant growth/vigor and development of production systems to enhance usage of sainfoin in Eastern WA. Data from these plantings will be leveraged to develop high-throughput phenotyping methodologies to accelerate germplasm evaluation.

Figure 5. Three-week-old field of Sainfoin and wheat planted in different treatments such as inter seeded or alternative row seeding with different seeding rates of wheat and sainfoin.

Trainings and Events

Trainings for NRCS Field Staff:

- *Seeding across disciplines: Conservation cover, Forage and Biomass Planting and Range Planting*, Training for OR NRCS Filed Staff, Pendleton, OR-November 2022
- *Seeding across disciplines: Conservation cover, Forage and Biomass Planting and Range Planting*, Training for OR NRCS Field Staff, Redmond, OR-April 2023
- *Soil Health and Sustainability*, Training for Washington Field Staff, Pullman PMC-May 2023.
- *Warm Season Cover Crop Establishment and Management*, Training to ID NRCS Field staff, Pullman PMC-August 2023



Figure 6. Nick Sirovatka from the Soil Health Division teaching participants of the Soil Health and Sustainability training how to conduct in the field soil health assessments.

Presentations:

- *Pullman Plant Materials Center: Plant Science Technologies to meet resource needs, Presentation to Conservation districts of Whitman County, Colfax, WA-Feb 2023*
- *Historical development of conservation species and understanding the certification of seed types*, Presentation to Benton County Conservation District-April 2023
- *Pullman Plant Materials Center research updates on current trials and projects*, Ecological Sciences monthly seminar to WA NRCS Planners-May 2023

Field Days:



Figure 7. PMC agronomist Jessica Wayment conducting our spring field day in the fall planted cover crop trials.

We conducted two cover crop field days this year, one in early June and the other in August. In June we presented work on our Fall planted timing trial. At the August field day, we presented the warm season cover crop species trial. Both of our trials demonstrate pure stands of different varieties of species commonly used in cover crop mixes. Our field days were well attended by landowners, producers, conservation district employees and field staff.

Products and Technology Transfer:

Updated release brochures:

'Latar' orchardgrass <https://www.nrcs.usda.gov/plantmaterials/wapmcrb13959.pdf>

'Whitmar' bluebunch wheatgrass <https://www.nrcs.usda.gov/plantmaterials/wapmcrb13995.pdf>

'Canbar' Canby's bluegrass <https://www.nrcs.usda.gov/plantmaterials/wapmcrb13960.pdf>

'Bromar' mountain brome grass <https://www.nrcs.usda.gov/plantmaterials/wapmcrb13961.pdf>

Plant Guides:

Potenilla gracilis Plant Guide <https://www.nrcs.usda.gov/plantmaterials/wapmcpq14016.pdf>

WAPMC maintains seed production fields and produces high quality Breeder seed for 11 conservation releases including 'Alkar' tall wheatgrass, 'Bromar' mountain brome, 'Covar' sheep fescue, 'Durar' hard fescue, 'Secar' Snake River wheatgrass, Union Flat Germplasm blue wildrye, White Pass Germplasm blue wildrye, and 'Whitmar' bluebunch wheatgrass. These plant materials are available through the Washington Crop Improvement Association for production of Foundation seed fields.

Pullman Plant Materials Center Staff

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Farmer, Dallas Spellman

Bio Science Technician Aides, Izie Janecek and Shane Avery



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