



Pullman Plant Materials Center Progress Report of Activities

2014

Plant Materials Center Staff

Allen Casey
PMC Manager

Mark Stannard
PMC Manager (retired)

Pamela Pavek
Conservation Agronomist

Dallas Spellman
Farmer

Melissa Topping
Summer WAE

Ardina Boll
Summer WAE

Roylene Rides at the Door
Washington State Conservationist

Bonda Habets
Washington State Resource
Conservationist

Richard Fleenor
Plant Materials Specialist

Pullman Plant Materials Center
United States Department of
Agriculture
Natural Resources Conservation
Service
Johnson Hall, Room 107
Washington State University
Pullman, Washington 99164
Phone: 509-335-6892
Fax: 855-857-6405
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/wapmc/>



Cover crop plots at the WSU Othello Experiment Station, May 20, 2014.

Evaluation of Cover Crops and Planting Times in Irrigated Central Washington and Dryland Eastern Washington

The Pullman PMC conducted a large scale, preliminary study in 2014 to determine the best cover crops for the time periods of potential growth in central and eastern Washington, and the effect of planting date on above-ground biomass production. We compared 52 different species, cultivars and mixes planted at two dates in the fall and two dates in the spring/summer at the WSU Othello Experiment Station (irrigated) and the PMC (dryland). Andy McGuire, WSU Irrigated Cropping Systems Agronomist, collaborated with us on the Othello portion of the study.

Cover crop mixes planted in Othello in August produced more biomass than individual species, and were composed of 'Martigena' yellow mustard, oil seed radish, and 'White Huntsman' proso millet. Cover crops such as 'Trical102' winter triticale and 'Norwest553' winter wheat planted in September had better winter survival than when planted in August, and produced more biomass by the time of termination in the spring. The spring-planted cover crops that produced the most biomass included several of the mixes, spring barley, oil seed radish and spring wheat.

In Pullman, fall-planted cover crops produced more biomass and had better winter survival when planted in mid-September compared to late-September, however we had unusual amounts of fall precipitation in 2013, which resulted in excellent cover crop establishment. The mid-September-planted, non-cereal cover crops that produced the most biomass were forage turnip, 'Nemat' arugula, 'Kodiak' brown oriental mustard, hairy vetch and several Austrian winter pea varieties. Late spring/early summer-planted cover crops that produced the most biomass were warm season species such as sunflower, 'Longtail Delight' sorghum, 'MS9000' sorghum-sudangrass, 'White Huntsman' proso millet and safflower. More information about this study can be found in Washington Plant Materials Technical Notes 24 and 25.



Sunflower cover crop at the Pullman PMC August 26, 2014.

National Soil Health Study

2014 was the second year of our National Soil Health Study. In this study, we are evaluating three cover crop mixes (2, 4 and 6 species) planted at three seeding rates (20, 40 and 60 seeds/sq ft) and their effect on soil health properties. We planted the cover crops on October 6, 2013, terminated them on May 15, 2014 with a glyphosate application, and planted barley on May 20. Throughout the year, we assessed cover crop percent cover and height, cover crop biomass and nitrogen content; measured soil moisture, bulk density, and temperature; and collected soil samples for lab analysis of nutrient availability, pH, organic matter, and other properties.



Soil Health Study plot at the Pullman PMC, May 5, 2014.

The cover crops grew very little during the winter months and accrued most of their biomass during the first two weeks of May, when we had unusually high temperatures. Cover crop percent cover was lower and weed percent cover was higher in Year 2 than in Year 1. Biomass was lower in Year 2 in all plots except in the plots with 4 and 6 species, possibly because of re-seeding vetch plants. From Year 1 to Year 2 soil bulk density increased and soil carbon decreased, which may be a result of converting to no-till. These trends are similar to those experienced by growers in our region who have reduced their tillage. More second-year results can be found in our Soil Health Study Year 2 Progress Report, which will soon be available online.

Legume Conservation Cover in Orchards Study



David Granatstein, WSU, sampling alfalfa biomass in a young apple orchard near Prosser, WA, May 8, 2014.

In 2014, we collected the second-year data from a study to evaluate legume species for supplying an on-farm source of nitrogen in orchards. We have not analyzed the 2014 data yet, however it appears some of the alfalfa varieties, in particular ‘Perfect’, falcata and ‘FSG229CR’ (a creeping type), thrive in an orchard environment and produce large amounts of biomass. Alfalfa was historically used as a ground cover and source of nitrogen in Washington apple orchards, and this practice was reported by Hugh Hammond Bennett in 1947. Use of the practice declined with the introduction of commercial fertilizers, likely because orchardists could better regulate the timing and amount of nutrients, and there was concern about alfalfa attracting *Lygus* bugs. Currently, the cost of fertilizer, particularly organic fertilizer, and the negative effects the fertilizer has on soil and fruit quality are inspiring orchardists to again experiment with legume cover. David Granatstein, WSU Sustainable Agriculture Specialist, is collaborating with us on this study, and co-authored a review article with Pamela Pavek about the potential for legume cover crops in Washington apple orchards. It is available as Washington Plant Materials Technical Note 22.

Other Studies at the PMC

- Ventenata Seed Longevity – Latah County, ID
- No-Till Forb Establishment - Latah County, ID
- Forb Establishment Techniques - Douglas County, WA
- Assessment of Aboveground and Belowground Biomass Production of Fall-Planted Cover Crops and Their Effects on Soil Moisture, Nutrients and pH - PMC

Conservation Field Trials

- Planting Grasses as an Intermediary Step to Forb Establishment – WSU Othello Exp. Sta.
- Revegetation Techniques Following Ventenata Management – Asotin County, WA
- Assessing the Effect of Cover Crop Termination Date on Commodity Crop Yield – Whitman County, WA

2014 Technical Transfer

Publications

Pavek, P. WAPMC Soil Health Study Progress Report - Year 1

Pavek, P. Plant Materials Technical Note No. 22: The Potential for Legume Cover Crops in Washington Apple Orchards

Pavek, P. Plant Materials Technical Note 24: Evaluation of Cover Crops and Planting Dates for Irrigated Rotations in Central Washington

Pavek, P. Plant Materials Technical Note 25: Evaluation of Cover Crops and Planting Dates for Dryland Rotations in Eastern Washington

Pavek, P. Plant Materials Technical Note 18: Cover Crop Resources and Seed Vendors for Oregon and Washington

Pavek, P. Buckwheat Plant Guide

Presentations

Fleenor, R. Post Fire Collaboration - Oregon High Desert Basin and Deschutes Basin Teams

Fleenor, R. Range Plant ID - South Central Team and Conservation District

Fleenor, R. Threatened & Endangered Plants - Big Bend Team

Fleenor, R. Plant Materials Webinars I – VI

Pavek, P. Attracting Native Invertebrate Pollinators – Nez Perce County Extension Workshop

Pavek, P. National Soil Health Study and Cover Crop Biomass Study – Latah County NRCS Soil Health Workshop

Pavek, P. Identification and Biology of Native and Invasive Roses – Idaho Native Plant Society

Pavek, P. Othello Cover Crop Study Field Tour – Snake River and Big Bend Teams

Pavek, P. Pullman PMC Cover Crop Field Tour – WA, ID, and OR NRCS

Stannard, M. Overview of PMC and Plant Materials Program – Oregon John Day-Umatilla Basin and Snake River Basin