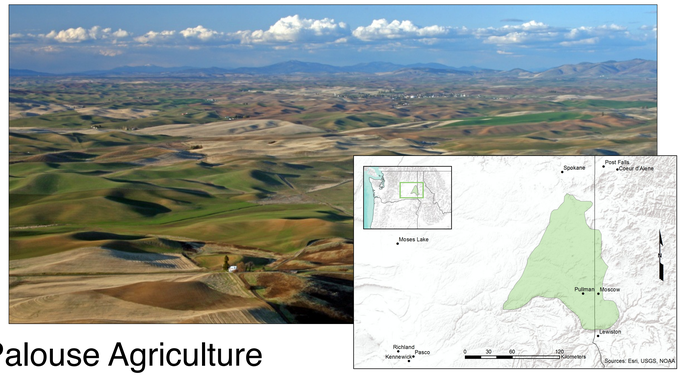
Optimizing the use of cover crops in the Palouse Region

Brita Olson[1], Pamela Pavek[2], and Jodi Johnson-Maynard[1]

[1]Department of Plant, Soil and Entomological Sciences Department, University of Idaho

[2]Pullman Plant Materials Center, USDA-Natural Resources Conservation Service

Background



Palouse Agriculture

The Palouse is an area of productive dryland agriculture in eastern Washington and north central Idaho. The dominant rotation is winter wheat – spring grain – legume. While this is currently deemed as the least risky and most profitable of possible rotations, the long-term sustainability of this system is threatened by:

- Declines in soil health
- Soil erosion
- Increasing costs of chemical inputs
- Climate change



Cover crops

The addition of cover crops to Palouse cropping systems has the potential to improve the resiliency of agriculture in the region by reducing erosion, increasing nutrient availability, reducing weed competition, and enhancing infiltration and soil water storage. One option is to plant cover crops in late August/early September after commodity crop harvest, allowing them to over-winter, and then terminating in the spring before a spring crop is planted.

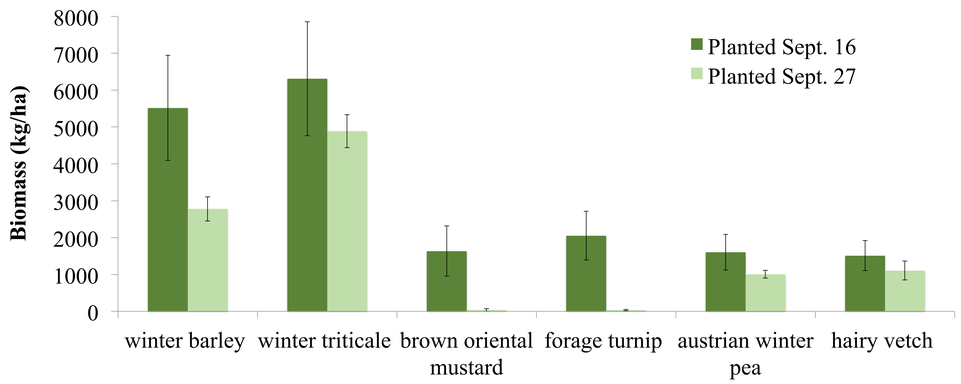
The ideal cover crop will:

- Accumulate biomass quickly
- Prevent soil erosion
- Fix atmospheric nitrogen or reduce nitrate leaching
- Reduce weed competition
- Maintain or improve grain yields following the cover crop

Experimental Design

Preliminary trial

An initial trial of 37 potential cover crop species was planted in September 2013. The aboveground biomass of each crop was sampled in May 2014. The best grasses, broadleafs and legumes from this trial (see below) were chosen for more extensive study.



Cover crops planted in 2014

Group	Treatment
Control	No cover crop
Single species	Winter barley Winter triticale Brown oriental mustard Forage Turnip Austrian winter pea Hairy vetch
Mixes	All species All non-grass species Triticale and vetch

Current experiment

In August 2014, a control, six single species cover crops, three cover crop mixes (see left) were planted in a randomized complete block design with four replicates. Crops will be allowed to overwinter and then will be terminated by May 1. Spring wheat, a commodity crop, will be planted by May 15. Multiple assessments of cover crop performance will be made throughout this experiment (see right).

Sampling schedule for 2014-2015 experiment

Timeline	Data collected/measured
Pre-planting, Fall	Plant Available Nitrogen Total CN pH
After planting, Fall	Establishment Percent cover Soil moisture Aboveground biomass Weed competition
Pre-termination, Spring	Percent cover Soil moisture Aboveground biomass Weed competition Belowground biomass
Post-termination, Spring	Plant Available Nitrogen Total CN pH
Post-termination, Fall	Commodity crop yield

Impact

This study will help inform the development of new cropping systems that could increase the sustainability of Palouse agriculture. We will select promising crops to be grown in field trials to more completely demonstrate their potential as an addition to the region's cropping systems. Growers on the Palouse are already experimenting with cover crops as a way to diversify their cropping systems and increase soil health, but must consider the economic feasibility of deviations from time-tested rotations. This study will help reduce uncertainty and economic risk associated with crop diversification.

Acknowledgments

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Further information

Contact: Brita Olson

olso2054@vandals.uidaho.edu

PSES Dept, 875 Perimeter Drive MS 2339

Moscow, ID 83844-2339