

Project No.: New

Title: Economic and environmental effects of cover crops compared to spring seed crops in northern Idaho dryland agriculture and the impacts of subsequent winter wheat production.

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Abstract: Cover crops have the potential to provide multiple benefits in a cropping system. They prevent erosion, improve soil's physical and biological properties, supply nutrients, suppress weeds, improve the availability of soil water, and break pest cycles along with various other benefits. The costs and soil changes of different spring planted cover crops compared to spring seed crops will be determined to determine the environmental and economic feasibility of cover crops in rotation with winter wheat in northern Idaho.

Justification: Cover crops were frequently used by US farmers in the first half of the twentieth century, but their popularity has declined dramatically since the 1950s, when agrochemicals and inorganic fertilizers were introduced on a large scale. Recently, many growers and researchers have taken a renewed interest in cover crops because of their potential role in reducing chemical inputs and improving soil quality. Cover crops are now recognized as an important component of "sustainable" production in many US regions.

Cover cropping can have both advantages and disadvantages. Potential benefits include: reduced soil erosion from water and wind; increased soil organic content; improved soil structure and water infiltration; addition or conservation of nitrogen; weed suppression; and insects benefits. However, potential disadvantages of cover crops are that they deplete soil moisture; decrease plant nutrients, especially nitrogen; increased weed problems; increased grower costs and reduce gross income.

However, cover crops have yet to be fully examined from economic, environmental and sustainability standpoints in the dryland regions of the northern Idaho.

Hypothesis and Objectives: We propose to examine the effect of growing spring-planted cover crops compared to spring seed crops and their impact on subsequent winter wheat profitability:

1. Determine the basic economics of growing a range of different cover crops compared to either spring canola, wheat, barley or pea.
2. Determine the environmental and rotation effects of cover crops compared to spring seeded seed crops by examining soil health parameters and the productivity of following winter wheat crops.

Procedures: This project involves replicated plot (10' x 40') field studies grown in northern Idaho (Moscow and Genesee). In spring of 2014 the cover crops; winter canola, tillage radish; triticale or winter wheat; Clearwater[®] mixture (buckwheat, radish, turnip, oat, Sudan grass,

Austrian winter peas, cereal rye, pearl millet, foxtail millet, triticale); Austrian winter peas; or summer fallow, were planted at two locations in northern Idaho. In addition, the following seed crops were included: spring canola; spring wheat; peas; and barley.

The seed and cover crops were grown side-by-side and managed according to local practices. Prior to planting, soil organic matter, soil fertility and soil moisture content were determined. The cover crops were monitored for plant biomass accumulation by destructive sampling and all cover crops were terminate and chopped at maximized biomass. Seed crops were grown to maturity and harvested, and yields were recorded. Mid-season and after harvest, soil moisture were determined along with soil nutrients. After harvest, soil water content and soil organic matter were determined from each cover crop and seed crop area.

In fall of 2014, the second cycle of the rotational study, the complete trial area was planted to a locally adapted soft white winter wheat cultivar ('Bruneau'). Soil moisture and available soil nutrients will be determined in the winter wheat plots according to the different previous crops and the winter wheat will be top-dressed to make up a uniform fertility over all plots. The winter wheat crop will be monitored for plant growth parameters, weed infestation and disease incidence. At harvest the winter wheat yield from each of the previous crop area will be recorded separately along with seed test weights.

The spring cover crop/seed crop trial will be repeated by planting the spring crops in spring 2015 followed by winter wheat in fall of 2015. Economic returns over two years of crop production will be combined to quantify and impact of the cover crop and spring seeded spring seed crops on productivity of wheat over a two year cycle.

Duration: Funding is requested for 2 years. Work has already began in spring of 2014 and will continue until harvest of winter wheat (year 2) in 2016. Annual results will be presented as data becomes available and the full results will be compiled and completed by December of 2016.

Cooperation: Kathrine Painter, Agricultural Economist, University of Idaho.

Anticipated benefits/Expected outcomes/Information transfer: Results from this study will provide Idaho wheat growers valuable information on the possible soil health and rotational benefits of including cover crops in rotation with winter wheat. In addition, the project will provide a two-year economic model that growers can use in decision making. Results from this study will be presented as a written report to the IWC. In addition results will be presented to growers via handouts, oral presentations at field days, and through our web site at <http://webpages.uidaho.edu/jbrown/brassica/>.

IDAHO WHEAT COMMISSION - BUDGET FORM

Allocated by Idaho Wheat Commission during FY 2014 \$ -

Allocated by Idaho Wheat Commission during FY 2015 \$ -

REQUESTED FY 2016 SUPPORT:

	Salary	Temporary Help	Fringe	Travel	OE	Grad Fees	TOTALS
Idaho Wheat Commission	\$ 9,578	\$ 5,460	\$ 806	\$ 700	\$ 2,285	\$ -	\$ 18,829

OTHER RESOURCES (not considered cost sharing or match):

TOTAL OTHER RESOURCES \$ -

TOTAL PROJECT ESTIMATE FOR FY 2016:	\$ 18,829 (Requested)	\$ - (Other)	\$ 18,829 (Total)
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BREAKDOWN FOR MULTIPLE SUB-BUDGETS:

	(PI name)	(PI name)	(PI name)	(PI name)
Salary	\$ -	\$ -	\$ -	\$ -
Temporary Help	\$ -	\$ -	\$ -	\$ -
Fringe Benefits	\$ -	\$ -	\$ -	\$ -
Travel	\$ -	\$ -	\$ -	\$ -
Operating Expenses	\$ -	\$ -	\$ -	\$ -
Graduate Student Fees	\$ -	\$ -	\$ -	\$ -
TOTALS	\$ -	\$ -	\$ -	\$ -

Total Sub-budgets \$ -

10.24.2014 - Version