**Title:** Evaluation of winter wheat grain yield response to prior year cover crop.

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**Objectives:** To evaluate the performance of winter wheat following a partial season cover crop. Cover crops are thought to improve soil health.

**Methods:**
Mid late spring 2014 six spring dicot crop species and a composite of the six dicot species were seeded no-till into 2013 barley stubble. The check treatment was chemical fallow check. A fertilizer blend of 10-15-10-05 was placed with the seed. The dicot crops were harvested as forage crops on July 07, 2014. The stubble was sprayed with glyphosate a week after harvest and again late summer and post winter wheat seeding. The dicot crops were yellow blossom sweet clover (VNS), Neche Flax, Rubis Red spineless safflower, Pennant yellow mustard, Sodbuster radish, and Purple top turnip. For the six species mix, each seed of each species was added at one six of the seeding rate.

**Results:**
The 2014 May-July precipitation was 1.70 inches below average. The much above average precipitation, in the August September period, offset any soil moisture depletion by the cover crops from the shallow Judith Soils. The chemical fallow check was similar (0.05) in yield to the highest and lowest yielding cover crop treatments. The safflower and turnip treatments had the lowest yields which were significantly lower, (.05) than the highest yielding yellow sweet clover and the crop mix treatments (Table 1). While there were statistically significant differences in test weight, there was no readily apparent explanation as to why one treatment would induce these response. The chemical fallow check had the lowest test weight and radish had the highest. There was no statistical differences in protein content.

**Summary:**
While there were statistically significant yield and test weight differences, there are no readily apparent inferences to be made from these results. It should be remembered that the CARC has a long history of utilizing a diversity of crop species in its crop systems. It is expected that because of this diverse cropping history that responses to the use of cover crop strategies will be less striking that would occur on land that has decades old history of cereal grains only.

**Funding Summary:**
Expenditure information to be provided by OSP
No other grant support for this project

**MWBC FY2011 Grant Submission Plans:**
It is planned to submit this project for funding consideration in the next fiscal year.

Table 1 2015 Winter wheat yield and protein response to 2014 cover crops species.
Exp 153844 Central Agricultural Research Center. Moccasin, Montana.

| | | | | 2014 | | | | 2015 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | July 7 Harvest | | | | | | |
| Cultivar | 2014 crop | Trt code | Seed Rate | Height | Matter | foliage | <3" ht | Grain Yield | Test Weight | Grain Protein |
| | | | lbs/a | " | % | t/a | t/a | bu/a | lbs/bu | % |
| VNS | Yellow blossom sweet clover | 14CC01 | 6 | 34 | 22.4 | 0.49 | 1.07 | 52.4 | 55.1 | 14.7 |
| Neche | Neche annual flax | 14CC03 | 20 | 58 | 26.8 | 0.64 | 0.75 | 44.3 | 56.0 | 14.8 |
| Rubis Red | Rubis Red spineless safflower | 14CC02 | 22 | 70 | 17.8 | 0.72 | 0.63 | 43.4 | 55.8 | 15.1 |
| Pennant | Pennant yellow mustard | 14CC04 | 10 | 75 | 28.6 | 1.01 | 0.49 | 49.7 | 56.4 | 14.2 |
| No-till | fallow (some weeds) | 14CC05 | 0 | 27 | 18.3 | 0.13 | 0.96 | 46.4 | 55.0 | 14.9 |
| Six sp. Mix | safflower,ybs clover, flax, turnip, radish, Y.mustard, | 14CC06 | 0.2X | 53 | 20.4 | 0.46 | 1.23 | 51.9 | 56.6 | 14.4 |
| Sodbuster | radish | 14CC07 | 6 | 80 | 17.8 | 0.67 | 0.45 | 50.0 | 56.7 | 14.3 |
| Purple Top | turnip | 14CC08 | 6 | 14 | 23.98 | 0.22 | 1.68 | 43.3 | 55.8 | 14.8 |
| mean | | | | 51.3 | 22 | 0.542 | 0.91 | 47.64 | 55.91 | 14.63 |
| P value | | | | 0.00 | 0.00 | 0.00 | | 0.10 | 0.24 | 0.42 |
| CV1 | | | | 9.4 | 4.4 | 21.5 | | 11.3 | 1.9 | 4.4 |
| LSD(0.05 by t) | | | | 7.05 | 14.31 | .1709 | | 7.92 | 1.56 | ns |

Seed Date: 2014 cover crops: 2-May-14 2014-2015 Winter wheat: 16-Oct-14
Fertilizer: W/seed: 10-10-10-05 NPKS W/seed: 10-15-10-05 Brdcst: 90N
Comment: The field has been in continuous crop. The cover crop was proceded with a crop of hayed barley.
Record setting 6.72" of precipitation was received in August 2014 followed by above average, 2.34", in September.
The target fertilizer rate was to be 60 lbs/a N rate. An application error resulted in 90 lbs N rate.