

Project Title: Winter Cereal forage cultivar evaluations for the Western Golden Triangle area of Montana

Principle Investigator: Gadi V.P. Reddy, Professor of Entomology/Insect Ecology, John H. Miller, Research Scientist, MAES, Western Triangle Ag Research Center, Conrad, MT.

Personnel: Julie Prewett, Research Assistant, MAES, WTARC, Conrad, MT, and Pat Carr and Simon Fordyce, MSU/MAES, Central Ag. Research Center, Moccasin, MT.

Objectives: The objective is to evaluate winter wheat varieties under the local conditions with respect to yield, test weight, plant height, and seed protein. The research center strives to provide growers of the western triangle area unbiased information of various winter cereal forage varieties.

Methods: Plots were seeded with a four row plot seeder on one foot spacing and planted on no-till chemical fallow barley stubble. Plots were trimmed, measured for length, and then harvested with a Wintersteiger Classic plot combine. Forage samples were harvested and wet weight and dry weight were recorded. Winter wheat seed was cleaned prior to collecting data.

Results: A winter cereal forage trial was seeded the fall of 2016. The forage data was collected when the plants were in the early milk stage. The top three dry matter yielding varieties were WCF1060, WCF1440, and T1310-221 with 7.3, 7.2, and 6.9 ton/ac (Table 1). In addition to forage data, grain harvest data are also presented in Table 1. Grain yields ranged from 33.4 bu/ac for Willow Creek to 71.4 bu/ac for the Montana experimental line MTF1559.

Overall, the crop year temperatures were much warmer than 31 year average at the research center, July was 4.9 degrees warmer than the average. But the overall average temperature for the year from September to August was 1 degree cooler than the 31 year average. The winter temperature was well below average, with the exception of November being about 7 degrees warmer than usual. December and January were 10 and 6 degrees colder than the 31 year average while May thru August were warmer than the 31 year average. While we had the colder than normal temperatures in December and January, there was snow cover on the winter wheat. July was 5 degrees warmer than the normal. Precipitation was generally above the average from September to April, then below normal from May to August. Overall, precipitation was average for the year.

The chemical fallowed soils generally had good moisture while seeding winter cereal forage varieties during the fall of 2016. Overall, considering the lack of moisture and heat this past summer, the winter cereal forage plots did quite well.

Summary: The data for the winter cereal forage plots are supported by the local producers and advisory committee as well as the seed industry. It is planned to continue the winter cereal variety plots at WTARC.

These data should be used for comparative purposes rather than using absolute numbers. Statistics are used to indicate that treatment or variety differences are really different and are not



different due to chance or error. The Least Significant Difference (LSD) and Coefficient of Variability (CV) values are useful in comparing treatment or variety differences. The LSD value represents the smallest difference between two treatments at a given probability level. The LSD at $p=0.05$ or 5 % probability level is usually the statistic reported, and it means that the odds are 19 to 1 that treatment differences by the amount of the LSD are truly different. The CV value measures the variability of the experiment or variety trial, and a CV greater than 15 % indicates a high degree of variability and less accuracy.

Funding Summary: Office of Special Projects will provide expenditure information. No other grants support this project.

MWBC FY2018 Grant Submission Plans: A similar project will be proposed for FY 2018. The continuation of on and off-station variety trials help elucidate researchers and farmers which varieties are better suited for that particular region in Montana.



Table 1. 2017 Winter Cereal Forage, Western Triangle Ag Research Center, Conrad, MT.

Treatment	Head Date Cal.	Head Date (Julian)	Plant Height (in)	Dry Yield (ton/ac)	Forage Moisture (%)	Test Wt (lb/bu)	Grain Yield (bu/ac)
WCF1060	6/8	158.7	53.7	7.3	54.4	49.9	48.7
WCF1440	6/7	157.7	52.3	7.2	51.2	53.6	54.1
T1310-221	6/7	158.3	50.0	6.9	51.3	54.4	50.0
T1310-218	6/6	156.7	48.7	6.7	52.8	57.3	57.8
Trical 102	6/7	158.0	49.0	6.7	53.5	52.1	59.0
Flex 719	6/6	156.7	44.7	6.3	50.8	52.4	54.1
MTF1631	6/11	160.3	39.3	6.1	54.7	61.7	63.3
WCF0013	6/6	157.0	49.7	5.7	51.6	54.9	40.1
MTF1786	6/11	161.7	42.3	5.6	55.8	62.4	57.1
MTF1559	6/7	169.3	40.3	5.5	64.5	58.4	71.4
MTF1432	6/11	162.0	36.0	5.4	52.2	59.4	62.6
MTF1435	6/9	160.0	34.7	5.1	53.5	58.5	48.1
Willow Creek	6/12	163.0	45.0	4.9	60.3	60.5	33.4
MTF1775	6/7	157.7	28.0	4.2	52.5	62.5	56.5
Mean	6/9	159.8	43.8	6.0	54.2	57	54.0
CV%	-	1.4	11.2	20.1	6.4	2.6	18
LSD(0.05)	-	3.6	8.2	NS	5.8	2.8	977.9
P-Value	-	<0.0000	<0.0000	0.1070	0.0024	5.17	0.0088

Planted: 9/27/2016 on chemical fallow and forage harvested on 6/26/2017 and 6/27/2017. Grain harvested 7/31/2017.

Fertilizer: actual pounds/ac of N-P-K: 11-22.5-0 applied with seed and 30-0-20 broadcast at planting. 140 lbs N/ac as urea was broadcast on 3/24/2017. For fertilizer rates a yield goal of 70 bu/ac was used.

Herbicide: pre-plant sprayed with 20 oz RT3/ac and 0.6 oz Olympus/ac. Huskie at 11.0 oz/ac and Axial XL at 16.4 oz/ac applied on 5/16/2017.



Table 14. Soil test values for off-station and on-station plots, 2017.

Location	N (lb/ac) ¹	Olsen-P (ppm)	K (ppm)	pH	OM (%)	EC (mmhos/cm)
Cut Bank	39.6	17	385	7.5	2.7	0.39
Devon	12.0	14	221	7.2	0.8	0.15
Knees	21.1	28	482	6.9	2.4	0.55
Choteau	44.5	7	412	8.1	2.3	0.82
WTARC Fall	15.5	20	318	7.8	2.6	0.56
WTARC Spring	15.9	30	528	7.4	2.6	0.36
Sweetgrass Hills	3.5	27	336	6.7	2.5	0.23

¹Nitrogen soil samples were to a depth of four feet in one foot increments. All other soil tests were for zero to six inches in depth.

WTARC- Western Triangle Ag. Research Center

