Title: Durum variety evaluations with a special reference to insect infestations in the Western Triangle Area

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Objectives: The objective is to evaluate durum wheat varieties under the local conditions with respect to yield, test weight, plant height, and seed protein. Also, monitor the insect pest incidence on various durum wheat varieties so that it will help to develop insect control strategies. The research center strives to provide growers of the western triangle area unbiased information of various durum wheat varieties.

Methods: The durum wheat nursery consisted of 14 entries replicated three times, seeded with a four row plot seeder on one foot spacing. All plots were planted on no-till chemical fallow barley stubble. Plots were trimmed, measured for length, and then harvested with a Hege 140 plot combine. Durum wheat seed was cleaned prior to collecting data. The insect monitoring activity was initiated in all the entries. The plant samples were collected randomly and brought to the laboratory. The wheat stems were cut and noticed for the diapausing stages of the larvae of the wheat stem sawfly. Orange wheat blossom midge pheromone traps were also installed.

Results: Results are tabulated in Tables 1, with Table 2 being the six year averages for selected durum varieties. Soil test values are presented in Table 3.

Overall, the crop year was a little over 3 degrees cooler than the 28 year average at the research center with a little over an inch more moisture than the 28 year average. The winter, with the exception of January was cooler than usual. February was quite cold when compared to the 28 year average. The spring was quite cool with April being slightly cooler and wetter than the average.

Soil temperatures at the station under chemical fallow stubble stayed under 40 degrees at a depth of eight inches until mid April. May was cool and dry. Early in June we received 0.9 inches, then it warmed up and remained dry for about 10 days. At that time the winter wheat was running out of water as it was beginning to head. About that time we started getting significant rain for a five day span. The cool temps associated with the rain slowed the durum wheat growth.

Just as things were getting mature or close to mature the rain in August came at a very poor time. To further exacerbate the harvest situation we received snow on September 10th and 11th.

Top yielding varieties for 2014 were Strongfield, a Montana State University experimental line MT06584, and Alzada. Their yields were 87.9, 85.6, and 84.9 bu/ac. The overall plot mean for

yield was 81.2 almost 8 bu/ac more than the six year average. Test weight was 0.9 lbs/bu lighter than the long term average, whereas heading date was 3 days sooner than the average for 2014 (Tables 1 and 2).

No insect incidence (wheat stem sawfly or wireworms) was noticed in any of the spring wheat varieties. This is because of the high number of parasitoids of the wheat stem sawfly are present Devon area. None of the traps got any adults of orange wheat blossom midge at the off station locations.

Summary: The data from the off station plots is supported by the local producers and advisory committee as well as the seed industry. It is planned to continue the off station variety plots at the same locations as the environmental conditions at each location is unique to the western triangle area. No insect incidence or damage was noticed in any of the varieties.

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 probably 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 FY2016 Grant Submission Plans: A similar project will be proposed for FY 2016. The continuation of on and off-station variety trials help to elucidate researchers and farmers which varieties are better suited for that particular region in Montana.

Table 1. Durum Variety Trial located WTARC. Pondera County. Western Triangle Ag. Research Center. 2014.

Variety	Yield bu/a	Test Wt lb/bu	Height in.	Head Date
Strongfield	87.9	60.9	38.3	184.3
MT06584	85.6	60.0	26.3	184.0
Alzada	84.9	60.2	28.3	181.0
Grenora	84.2	60.1	35.0	182.3
Joppa	83.4	61.4	37.7	182.0
Carpio	82.2	60.8	39.0	184.7
Divide	81.3	59.8	37.3	181.7
Silver	80.5	60.2	26.3	180.0
MT101395	79.9	57.4	39.0	185.0
Tioga	79.8	60.8	40.0	183.0
Alkabo	78.3	60.0	36.0	182.0
MT101730	77.3	60.5	47.3	184.3
MT101427	76.9	59.0	26.7	182.0
Mountrail	74.1	59.7	39.3	184.0
Mean	81.2	60.1	35.5	182.9
LSD (.05)	14.2	1.4	3.0	1.3
C.V.	10.5	1.4	5.1	0.4
P-Value	0.8234	0.0019	<0.0001	<0.0001

Planted: 4/21/2014 on conventional fallow and harvested on 8/28/2014.
Fertilizer: actual pounds/ac. of N-P-K: 11-22-0 applied with seed and a 180-0-20 blend of urea and potash was broadcast at planting. Fertilizer rates are based on a yield goal of 60 bu/ac.
Herbicide: The plot area was pre-plant sprayed with 20 oz/ac RT3 on 4/24/2014. The plots were sprayed with Huskie at 11 oz/ac and Axial XL at 16.4 oz/ac on 5/30/2014.
Precipitation for growing season: 9.47 inches.

Table 2. Six-year means, dryland Durum varieties. Western Triangle Ag. Research Center Conrad, MT, Pondera County, 2009 – 2014.

Variety	Source	6 year mean Yield bu/a	Test weight	Height in.	Head date
Alkabo	N. Dak.	76.3	61.8	36.7	75.5
Grenora	N. Dak.	76.3	61.4	34.5	75.2
Alzada	WestBred	74.2	60.5	28.6	73.0
Silver (MT03012)	MSU	73.9	61.2	27.8	72.6
Mountrail	N. Dak.	70.3	60.2	37.4	77.0
Divide	N. Dak.	70.1	61.2	37.4	76.0
Nursery Mean		73.5	61.0	33.7	74.9

Table 3. Soil test values for off-station and on-station plots, WTARC, 2014.

Location	N (lbs/a)[1]	Olsen-P (ppm)	K (ppm)	pH	OM (%)	EC (mmhos/cm)
Cut Bank	54.6	18	394	7.9	2.4	0.44
Devon	11.9	18	408	6.6	1.0	0.18
Choteau	26.5	11	550	8.0	2.7	0.62
WTARC	17.6	18	346	7.5	2.7	0.38

[1]Nitrogen 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