Title: Spring and winter wheat response to nitrogen and phosphorus fertilizer (4W2760).

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Objectives: To determine dryland winter wheat and irrigated spring wheat response to phosphorus and nitrogen fertilizer and relevant soil tests.

Results:

Site characteristics and soil test results are shown in Table 1. Grain yield, test weight, and protein results for dryland winter wheat and irrigated spring wheat are presented in Tables 1 and 2, respectively. Winter wheat responded to both N and P fertilizer, and grain yields were about 20 bu/acre higher than expected (range was 62 to 82 bu/acre). Thus grain protein levels were low, ranging from 9.8 to 10.8%. Spring wheat responded to N only. Grain yields were about 25 bu/acre more than expected and ranged from 103 to 127 bu/acre. In addition protein levels were much higher than expected, ranging from 13 to 14.1%.

Summary: Dryland winter wheat and irrigated spring wheat yields were exceptionally high, and both crops had large responses to N fertilization. The winter wheat trial averaged 75 bu/acre and 9.9% protein, and the spring wheat experiment averaged 116 bu/acre with 13.3 % protein

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

MWBC FY2011 Grant Submission Plans: A similar project will be proposed for FY 2011.

Table 1. Site characteristics and soil test results. Western Triangle Ag. Research Center. 2009.

Character	Dryland Winter Wheat	Irrigated Spring Wheat
Planting Date	9-18-2008	4-21-2009
Variety	Genou	Choteau
Previous Crop	Chemical fallow	Fallow
Blanket Fertilizer	0-0-25	0-0-25
Growing Season Precipitation(inches)	8.88	8.64 plus 3 irrigations totaling 5.05” of water
Harvest Date	8-18-2009	9-14-2009
Soil Series	Scobey Clay Loam	Scobey Clay Loam
Soil Test	**Dryland Winter Wheat**	**Irrigated Spring Wheat**
pH	7.5	8.0
O.M. (%)	2.8	2.8
P (ppm)	17	14
K (ppm)	320	311
EC (mmhos/cm)	0.73	0.47
NO_3-N (0-3’, lb/ac)	76	52

Table 2. Effect of nitrogen and phosphorus fertilizers on dryland winter wheat. Western Triangle Ag. Research Center, Conrad. 2009.

Treatment (lbs N/acre or P_2O_5/acre)		Grain Yield	Test Weight	Grain Protein
N Rate	**P Rate**	**bu/ac**	**lb/bu**	**%**
6	0	62.5	62.4	9.8
40	0	73.4	62.2	9.8
80	0	80.6	62.4	10.1
6	15	76.4	62.1	9.9
40	15	76.9	62.0	9.8
80	15	82.3	61.8	10.9
6	30	65.2	61.9	9.0
40	30	76.8	61.7	9.8
80	30	78.9	62.2	10.8
Nitrogen Summary				
6		67.7 a	62.2 a	9.6 a
40		75.4 b	61.9 a	9.7 a
80		80.6 b	62.2 a	10.4 b
Phosphorus Summary				
0		72.2 a	62.3 a	9.9 a
15		78.6 b	62.0 b	10.2 a
30		73.6 ab	62.0 b	9.7 a
Statistical Summary				
Mean		74.8	62.1	9.9
CV (%)		8.9	0.6	8.6
Interaction p-value		0.234	0.298	0.754

Means with the same letter are not significantly different accord to the LSD (p=0.05).

Table 3. Effect of nitrogen and phosphorus fertilizers on irrigated spring wheat. Western Triangle Ag. Research Center. Conrad. 2009.

Treatment (lbs N/acre or P_2O_5/acre)		Grain Yield	Test Weight	Grain Protein
N Rate	**P Rate**	**bu/ac**	**lb/bu**	**%**
6	0	103	64.0	13.0
125	0	122	64.0	13.1
250	0	123	63.2	13.8
6	15	102	64.2	12.1
125	15	123	63.8	13.2
250	15	125	63.5	13.9
6	30	103	64.2	12.7
125	30	120	63.8	13.4
250	30	127	63.3	14.1
Nitrogen Summary				
6		100 a	64.2 a	12.6 a
125		122 b	63.8 b	13.2 b
250		125 b	63.3 c	13.9 c
Phosphorus Summary				
0		116 a	63.7 a	13.3 a
15		116 a	63.8 a	13.1 a
30		117 a	63.8 a	13.4
Statistical Summary				
Mean		116	63.8	13.3
CV (%)		5.6	0.4	5.3
Interaction p-value		0.487	0.095	0.466

Means with the same letter are not significantly different accord to the LSD (p=0.05).