

Title: Effect of nitrogen and phosphorus on yield and quality of spring wheat and durum.

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Objectives: To evaluate the effect nitrogen (N) and phosphorus (P) fertilizer on yield and quality of spring wheat and durum and to compare spring wheat and durum response to N and P.

Results: Grain yield, protein content, and test weight data are summarized in Table 1. Grain yield relative to N fertilization was similar for both crops again this year. McNeal had higher protein levels than Spectre with similar N fertility. As expected Spectre had higher test weight than McNeal, but test weight of both crops declined with increasing N. Neither crop responded to P fertilization because of the high P soil test of 37 ppm. High P rates did not reduce yield or protein content this year.

Summary: These data and similar data from 1997 indicate that spring wheat and durum have similar responses to N and P fertilization.

Table 1. The effect of N and P on spring wheat and durum yield and quality. The experiment was located at Western Triangle Ag. Research Center, Conrad, MT. 1998.

Entry	Fertilizer		Crop	Grain Yield (bu/a)	Test Weight (lbs/bu)	Protein (%)
	N	P <sub>2</sub> O <sub>5</sub>				
	----- (lbs/a) -----					
8	150	25	Spring Wt.	95.3	60.0	14.2
4	150	0	Spring Wt.	92.6	59.7	14.3
6	50	50	Spring Wt.	91.2	61.3	12.5
12	150	50	Spring Wt.	90.8	59.9	14.2
11	100	50	Spring Wt.	90.3	60.5	13.5
3	100	0	Spring Wt.	89.6	60.4	13.6
10	50	50	Spring Wt.	89.5	61.1	12.5
7	100	25	Spring Wt.	88.3	60.4	13.7
2	50	0	Spring Wt.	86.0	61.1	13.0
9	0	50	Spring Wt.	84.6	61.8	11.6
1	0	0	Spring Wt.	81.5	61.7	11.5
5	0	25	Spring Wt.	77.8	61.6	11.8
16	150	0	Durum	94.7	61.7	12.6
22	50	50	Durum	92.8	62.6	11.4
24	150	50	Durum	91.9	61.1	13.4
18	50	25	Durum	91.5	62.2	11.9
23	100	50	Durum	90.5	62.0	12.5
19	100	25	Durum	90.4	62.2	12.2
20	150	25	Durum	88.5	61.2	13.4
15	100	0	Durum	87.8	61.3	12.9
14	50	0	Durum	87.6	62.2	11.6
17	0	25	Durum	83.6	62.9	10.5
21	0	50	Durum	82.5	62.6	10.8
13	0	0	Durum	79.5	63.1	10.1

#### Summary Statistics

Experimental Means	88.3	61.4	12.5
Error Mean Square	27.6	0.179	0.191
P-value	0.0002	0.0000	0.0000
Standard Error of the Mean	2.63	0.211	0.218
C.V. 1: (s/mean)*100	6.0	0.7	3.5
LSD (0.05)	7.4	0.6	0.7

#### Variety Summary

Spring Wheat (McNeal)	88.1	60.8	13.0
Durum (Sceptre)	88.4	62.1	11.9
LSD (0.05)	NS	0.2	0.2

Table 1 Continued.

Nitrogen Summary

0	81.6	62.3	11.0
50	89.8	61.8	12.2
100	89.5	61.1	13.1
150	92.3	60.6	13.7
LSD (0.05)	3.0	0.2	0.3

Phosphorus Summary

0	87.4	61.4	12.4
25	88.3	61.5	12.5
50	89.1	61.4	12.5
LSD (0.05)	NS	NS	NS
Interaction P-value	0.541	0.318	0.066

Notes:

Varieties: Durum = Sceptre                      Spring Wheat = McNeal  
 Seeding Date: 4/28/98                      Harvest Date: 8/20/98  
 Growing Season ppt: 8.44"                      Planting Rate: 20 seeds/ft<sup>2</sup>  
 Previous Crop: Fallow  
 Fertilizer: N applied as urea (broadcast) and P applied with the seed. 30 lbs K/ac as KCl applied to all plots (broadcast).  
 Herbicide: Hoelon @ 2<sup>2</sup>/<sub>3</sub> pt./ac and Buctril @ 1<sup>1</sup>/<sub>2</sub> pt./ac applied on 5/28/98.

Soil Test Summary:

Depth	Cu	Fe	B	Mn	Zn	K	Olsen P	CaCO <sub>3</sub>	EC	OM	pH
	----- ppm -----							%		%	
0 - 6"	2.16	14.8	0.4	14.0	4.98	426	37.2	0.7	0.23	2.31	7.8
	Cu	Fe	B	Mn	Zn		Cl	NH <sub>4</sub> -N	NO <sub>3</sub> -N	SO <sub>4</sub> -S	
	----- ppm -----						----- lbs/ac -----				
0 - 1 ft.	1.85	12.2	0.43	11.8	1.19		10.4	16.1	45.9	234.8	
1 - 2 ft.	1.51	9.3	0.51	3.91	0.40		15.2	13.3	13.7	1439.5	
2 - 3 ft.	1.72	10.0	0.80	4.02	0.58		11.4	15.6	11.9	2701.8	
3 - 4 ft.	1.79	10.1	1.81	1.61	0.87		14.2	16.1	8.5	7858.1	