Winter wheat response to previous crop and foliar fungicides, Ellendale, 2009.
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The field trial was conducted as a joint project between Ducks Unlimited and the NDSU Carrington Research Extension Center, with Larry Anderson as the farm cooperator. Experimental design was a randomized complete block with a split-split plot arrangement and three replications. Main factor was previous crop, split factor was variety, and split-split factor was fungicide. The trial was direct seeded in 7-inch rows at a soil depth of 1- to 1.5 inches at 1.2 million pure live seeds/acre (treated with Dividend Extreme + Cruiser at 2 + 1 oz/100 lb seed) on Sep 15, 2008 on previous crop stubble including spring wheat, field pea, flax, and soybean. Soil pH = 6.3 and organic matter = 3.5%. Winter injury was visually evaluated on May 6. Best management practices were used for plant nutrition and weed management. Quilt at 7 fl oz/A was applied on May 22 to 5-leaf wheat with a hand-boom plot sprayer equipped with 8001 flat fan nozzles delivering 10 gal/A at 35 psi. Tilt at 4 fl oz/A plus NIS (Induce) at 0.125% v/v was applied on June 23 with TJ60 8002EVS nozzles at the early-flowering stage. Flag leaf disease (leaf rust; leaf spot = tan spot and Septoria) was visually evaluated on July 15 with wheat in the soft-dough stage. Fusarium head blight (scab) was not evaluated due to very low incidence. The trial was harvested with a plot combine on August 6.

Winter wheat injury was lowest, and grain yield and test weight were highest with flax and spring wheat as the previous crop (Table 1). Flag leaf disease was similar among previous crops. Jerry had the least winter injury, and highest yield and seed size among varieties tested, while CDC Buteo had the highest test weight. Seed protein of Jerry and Millennium were greater than CDC Buteo. Leaf rust severity was very low in the trial. Leaf spot disease was reduced with fungicides, and lowest with application at the early-flower and tiller/early-flower wheat stages. Due to the relatively low overall disease presence, yield did not differ among fungicide treatments.

Table 1. Winter wheat response to crop rotation and fungicides, Ellendale, 2009.

		Flag leaf disease		Seed			
	Winter injury	Leaf rust	Leaf spot	Yield	Test weight	Size	Protein
Treatment	(0=best; 9=worst)	(%)	(%)	(bu/A)	(lb/bu)	(seeds/lb)	(%)
Previous crop							
flax	4	0.4	15	96.4	61.3	12191	12.4
spring wheat	4	0.5	12	95.0	60.6	12208	12.5
field pea	7	0.5	16	77.4	58.4	12096	12.5
soy	7	0.4	16	71.7	57.3	12217	12.5
LSD 0.05	1	NS	NS	11.0	1.3	NS	NS
Variety							
CDC Buteo	6	0.9	15	85.3	60.2	13021	12.1
Jerry	5	0.3	12	99.3	59.8	10871	12.7
Millennium	6	0.1	18	71.2	58.2	12614	12.7
LSD 0.05	1	0	NS	3.3	0.6	305	NS
Fungicide							
UTC	X	0.6	24	84.6	59.8	12390	12.4
tiller	X	0.7	17	84.3	59.4	12275	12.5
flower	X	0.3	10	86.3	59.4	12088	12.5
tiller/flower	X	0.2	9	85.6	59.0	11964	12.5
LSD 0.05	NS	0.4	4	NS	0.5	247	NS

Seed yield, test weight, and protein differed among the factors of previous crop and winter wheat varieties (Table 2). Each variety had highest yield with flax and spring wheat as the previous crop. CDC Buteo had the highest test weight on flax ground. Test weight of Jerry on flax ground was higher versus field pea

and soybean. Millennium test weight was greater on flax and spring wheat compared to field pea and soybean as previous crops. Protein of Jerry was higher than Millennium on flax ground while protein with Millennium was higher than Jerry on soybean ground.

Table 2. Winter wheat response to previous crop by variety, Ellendale, 2009.

			Seed			
Treatments		Winter injury	Yield	Test weight	Size	Protein
Previous crop	Variety	(0=best;9=worst)	(bu/A)	(lb/bu)	(seeds/lb)	(%)
flax	CDC Buteo	5	94.9	62.2	13177	12.1
	Jerry	4	105.2	60.8	10807	12.7
	Millennium	4	89.1	60.8	12588	12.4
spring wheat	CDC Buteo	4	92.4	60.8	13261	12.0
	Jerry	3	100.7	60.4	11082	12.8
	Millennium	5	92.0	60.7	12281	12.6
field pea	CDC Buteo	7	81.1	59.6	12824	12.1
	Jerry	5	99.8	59.6	10852	12.7
	Millennium	8	51.1	55.8	12611	12.9
soybean	CDC Buteo	7	72.9	58.4	12821	12.2
	Jerry	6	90.9	58.2	10732	12.5
	Millennium	8	52.8	55.3	12974	12.9
LSD 0.05		NS	6.7	1.2	NS	0.3
mean		6	85.2	59.4	12178	12.5
C.V.%		19.7	9.3	1.8	4.3	1.9