AGRONOMY NEWS

Grasslands for Tomorrow

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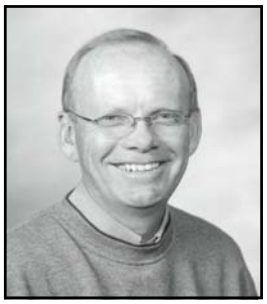

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Winter Wheat Response to Previous Crop and Foliar Fungicides
Larry Anderson - Cooperator, Ellendale, ND 2008

(Greg Endres, Eugene Elhard and Blake Vander Vorst)

The trial was conducted as a joint project between Ducks Unlimited and the NDSU Carrington Research Extension Center, with financial support from Syngenta. 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 15-inch rows with a 6- to 7-inch seed spread 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 19, 2007 on previous crop stubble including spring wheat, field pea, flax, and soybean. Soil pH, organic matter, nitrate-N (0- to 24-inch depth), and phosphorus (Olsen test) are listed respectively for each previous crop: spring wheat = 5.5, 4.2%, 193 lb/A, and 298 ppm; flax = 4.9, 4.2%, 390 lb/A, and 51 ppm; field pea = 5.4, 3.6%, 149 lb/A, and 48 ppm; soybean = 5.9, 3.4%, 72 lb/A, and 47 ppm. Starter fertilizer was deep-band applied as 28-0-0 plus 10-34-0 at 85 lb N and 50 lb P_2O_5/acre. On April 14, 2008, 28-0-0 was streambar applied at 80 lb N/A on soybean ground. On May 16, 10 gpa of 12-0-0-26 plus 10 gpa of water was applied using stream bars. Quilt at 7 fl oz/A was applied on May 15 to tillering wheat with a hand-boom plot sprayer equipped with 8001 flat fan nozzles delivering 10 gal/A at 30 psi. Tilt at 4 fl oz/A plus NIS at 0.125% v/v was applied on June 20 or 23 to wheat at early flowering with TJ60 8002EVS nozzles. Flag leaf disease (leaf rust; leaf spot = tan spot and Septoria) was visually evaluated on July 16. Fusarium head blight (scab) was not evaluated due to low incidence. The trial was harvested with a plot combine on August 1.

Grain yield was highest with spring wheat as the previous crop (Table 1). Reduced yield with pea and soybean residue likely was due to winter injury and resulting reduction of wheat stand in numerous plots. Test weight also was reduced with pea and soybean as the previous crops. Winter wheat seed protein was less with spring wheat compared to other previous crops, likely due to the higher yield. 'Jerry' had the highest seed yield, protein, and size while having the lowest protein compared to the other varieties. Leaf spot and rust severity were low but generally were reduced with fungicide use during the flowering stage compared to the untreated check or fungicide use during the tillering stage.

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There were numerous multi-factor interactions with statistically significant differences for winter wheat disease and agronomic performance. Seed yield and size differed among the factors of previous crop and winter wheat varieties (Table 2).

Winter wheat yield following the previous crop is reflective of the level of winter injury that was visually observed. Winter injury was least when planted following spring wheat followed by flax, pea and soybean, respectively, as previous crops. The yield of the three winter wheat varieties planted in the previous crop soybean is largely reflective of the difference in cold tolerance of the three varieties with Buteo and Jerry being similar in cold tolerance.

Standing and surface residue are both important to provide soil temperature modification to insulate the winter wheat crown. Standing residue was of particular importance because of its ability to hold snow. It was important to retain the small amount of measurable snow that was received.

Table 1. Winter wheat response to crop rotation and fungicides, Ellendale, 2008.

	Flag leaf disease		Seed			
	Leaf rust	Leaf spot	Yield	Test weight	Size	Protein
Treatment	(%)	(%)	(bu/A)	(lb/bu)	(seeds/lb)	(%)
Previous crop						
flax	2	11	79.2	60.6	14277	14.0
spring wheat	1	14	90.7	61.2	13997	13.4
field pea	5	12	62.3	59.4	14599	14.2
soy	5	12	41.2	59.0	14373	14.4
LSD 0.05	2	NS	16.6	1.2	NS	0.4
Variety						
Buteo	7	13	64.3	61.0	15329	14.0
Jerry	2	10	74.3	59.0	13653	14.4
Millennium	1	14	67.1	60.1	13952	13.6
LSD 0.05	2	NS	5.2	0.5	248	0.2
Fungicide						
UTC	5	12	69.8	59.9	14266	13.9
tiller	5	15	65.6	59.9	14439	14.0
flower	1	11	70.8	60.1	14330	14.0
tiller/flower	2	11	68.0	60.3	14211	14.1
LSD 0.05	2	3	NS	NS	NS	NS
mean	3	12	68.5	60.0	14311	14.0
C.V.%	111.4	60.4	18	1.4	3.7	2.0

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Table 2. Winter wheat response to previous crop by variety, Ellendale, 2008.					
		Seed			
Treatments		Yield	Test weight	Size	Protein
Previous crop	Variety	(bu/A)	(lb/bu)	(seeds/lb)	(%)
flax	Buteo	73.1	61.5	14984	14.0
	Jerry	84.2	59.2	13867	14.4
	Millennium	80.3	60.9	13981	13.6
spring wheat	Buteo	84.9	62.0	15179	13.4
	Jerry	93.3	60.3	12896	13.6
	Millennium	93.8	61.3	13915	13.1
field pea	Buteo	56.5	60.2	15635	14.2
	Jerry	62.9	58.2	14106	14.8
	Millennium	67.6	59.8	14056	13.7
soybean	Buteo	42.5	60.4	15519	14.5
	Jerry	56.7	58.2	13743	14.7
	Millennium	22.9	58.4	13856	14.0
LSD 0.05		10.4	NS	495	NS
mean		68.5	60.0	14311	14.0
C.V.%		18	1.4	3.7	2.0

Table 3 indicates the impact the prior crops can have on winter wheat yield in an individual year. The 2008 crop had little snow cover during the winter months and the 2007 crop had snow cover most of the winter. The 2007 yields reflect the lack of residue in the pea and flax prior crop plots resulting in a soil water deficit during the grain fill period of the winter wheat. The 2008 data reflects the stand loss and winter injury in the three lower residue prior crops.

Table 3. Winter Wheat response to crop rotation 2007 and 2008, Ellendale. Average of three varieties. (Bu/Ac)

Previous Crop	2007	2008	2 Yr. Ave.
flax	51.9	79.2	65.6
HRSW	59.1	90.7	74.9
field pea	53.1	62.3	57.7
soybean	66.1	41.2	53.7

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Syngenta Crop Protection; Dickey County CIA; Cenex of Ellendale; Wheat Growers; Fullerton Agronomy Services; David Kinzler, Monango; WestBred LLC & Joe Breker; ND Game & Fish Dept.; SD Foundation Seed; UAP Northern Plains, Oakes; NK Seeds; Horsch Anderson; James River SCD; NDSU; Pulse USA; ND Foundation Seedstocks

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Early maturity Roundup Ready soybean variety trial, Lisbon ND

Dr. Hans Kandel, Dr. Joel Ransom, and Chad Deplazes
NDSU Plant sciences Department, Fargo, North Dakota

Ducks Unlimited (DU) is a sponsor of a North Dakota State University (NDSU) winter wheat and spring wheat variety trial on the Randy Mairs farm approximately seven miles south of Lisbon, ND on Highway 32. As a rotational crop soybean is used.

There was interest in adding an early maturity Roundup Ready soybean variety trial to the site with a fungicide application compared to a non-fungicide treatment, similar to the wheat variety trials. Many growers are reluctant to commit to two years of wheat (HRSW and then HRWW) to include winter wheat in their crop rotation. They would rather plant winter wheat following soybean because of the higher yield potential of winter wheat following a broadleaf crop. One practice that would make this feasible on a more consistent basis is seeding winter wheat earlier in the fall, following an early maturing soybean harvest, to allow a larger and healthier winter wheat crown to develop. This would enhance winter wheat survival. Several growers in the area are already experimenting with this concept.

The objectives of the soybean variety trail were:

- To evaluate the yield potential of 16 early maturing soybean varieties compared to a standard variety for the area (total of 17 varieties).
- To evaluate the physiological maturity dates.
- To evaluate the effect of fungicide on the soybean varieties.

The varieties entered in the trial needed to meet the following specifications:

The physiological maturity of at least one variety must be September 1 or earlier. The other varieties may meet the criteria outlined in specification 1 or their physiological maturity must be no later than September 12.

These dates were selected in anticipation that harvest maturity or moisture will be from 8 to 10 days following physiological maturity. This would then allow winter wheat seeding to commence from September 10-20. Many of the NDSU trials have the maturity dates listed in their trial results. The target planting date before the trial was May 5-10. Soybean was planted into wheat stubble.

The soybean variety was replicated 6 times and three of the reps were sprayed with Headline fungicide. On July 14, 2008 the plots were in the R2 (flowering) growth stage and 6 fluid ounces of the fungicide Headline was applied in the late afternoon under sunny conditions.

Conclusion: There were significant differences among the varieties for all measured observations. Some of the varieties matured early and this would allow for earlier seeding of winter wheat. Some of the early maturing varieties yielded as well as the later maturing entries. There were no significant differences between any measured observations where Headline fungicide was used compared with no application of the fungicide, except Palmitic acid content was significantly higher when the fungicide was applied.

This research has been support by BASF, Asgrow DeKalb, Integra Seed, Mycogen Seeds, NuTech Seed, LLC, Peterson Farms Seed, and Pioneer Hi-Bred International, Inc.

2008 Lisbon Early Maturing Soybean Variety Trial

Company	Variety	Company Maturity Rating	Phsio-logical Maturity	Yield	Test Weight	Average[1] seasonal Plot score	Mature height 9/24	Lodg-ing[2] 9/24	Protein	Oil	Fiber	Ash	Palmitic Acid	Stearic Acid	Oleic Acid	Lino-leic Acid	Lino-lenic Acid
			(date)	(bu/a)	(lb/bu)	(1-9)	(inch)	(1-9)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
DeKalb	AG 0604	0.6	9/22	39.7	57.6	4.6	30.5	1.7	33.3	20.0	6.8	5.3	12.9	3.3	12.4	65.0	8.5
DeKalb	AG 0401	0.4	9/22	38.6	56.7	4.2	29.5	2.2	34.3	19.9	6.8	5.3	13.8	3.4	12.4	64.4	8.2
DeKalb	AG 1002	1.0	9/24	41.6	58.8	5.3	28.3	1.5	33.0	20.0	6.4	5.1	13.2	3.5	12.2	64.3	8.7
Integra	97004R	00.4	9/4	41.1	57.6	4.6	23.2	1.0	33.9	20.4	6.8	5.3	14.2	3.7	11.5	63.9	7.6
Integra	97009R	00.9	9/20	38.0	57.8	3.4	28.7	1.8	33.4	20.3	6.8	5.2	13.8	3.7	12.9	62.8	8.2
Integra	79031R	0.3	9/23	36.5	56.9	3.2	28.3	2.0	33.6	20.5	7.0	5.3	13.6	3.3	11.5	63.9	8.9
Integra	97014R	0.1	9/9	39.5	57.5	6.0	28.5	1.0	35.7	20.4	6.3	5.3	14.0	3.7	17.1	61.3	6.8
Mycogen	5A009RR	00.9	9/10	37.8	57.5	4.9	27.7	1.0	35.3	20.4	6.4	5.3	13.7	3.6	17.1	61.9	7.0
Mycogen	5B004RR	00.4	9/6	37.2	58.0	4.9	26.7	1.8	34.8	20.1	6.7	5.3	13.8	3.5	11.4	64.7	8.3
NuTech	NT-6006	00.6	9/19	40.5	56.7	3.7	26.7	2.0	33.9	20.7	6.1	5.2	13.2	3.6	15.1	62.5	6.9
NuTech	NT-0525RR	0.4	9/20	39.0	57.2	3.8	32.2	1.7	33.9	20.0	6.2	5.2	13.0	3.4	13.0	64.6	7.7
NuTech	NT-6042RR	0.4	9/19	38.0	58.2	3.9	26.5	1.9	35.1	19.1	6.1	5.2	13.2	3.6	14.5	63.6	7.8
NuTech	NT-6022RR	0.2	9/7	40.5	57.2	5.4	29.7	1.2	32.8	20.9	6.6	5.1	13.5	3.7	14.7	63.2	6.5
Peterson	0702RR	0.2	9/21	43.5	57.8	5.3	27.2	1.7	33.2	20.8	6.2	5.1	12.9	3.6	15.1	64.2	6.7
Peterson	0901RR	0.1	9/20	41.4	58.1	4.4	27.0	1.3	33.9	19.5	6.8	5.3	13.3	3.2	10.3	67.1	8.7
Pioneer	90M60	0.6	9/21	39.2	57.3	4.7	28.0	1.4	34.1	20.0	6.4	5.1	13.1	3.7	14.4	64.0	6.8
Pioneer	90Y20	0.2	9/20	40.9	57.4	3.8	25.7	1.6	34.0	19.9	6.7	5.4	13.3	3.3	11.4	65.7	7.7
	Mean			39.6	57.5	4.5	27.9	1.6	33.9	20.1	6.5	5.2	13.4	3.5	13.2	64.0	7.9
	LSD 0.05			4.1	1	0.9	2.5	0.6	1.2	0.9	0.4	0.1	0.7	0.2	1.9	1.8	1.5
	CV %			9.0	1.5	16.8	7.8	31.8	3.1	3.7	5.3	1.6	4.6	4.3	18.7	2.5	16.7
	Without Fungicide			40.6	57.8	4.7	28.5	1.7	33.8	20.2	6.5	5.2	13.3	3.5	13.5	64.3	7.5
	With Fungicide			39.1	57.7	4.5	27.4	1.5	33.9	20.1	6.6	5.2	13.5	3.5	12.8	63.7	8.2
	LSD 0.05			NS	NS	NS	NS	NS	NS	NS	NS	NS	0.2	NS	NS	NS	NS

[1]Average seasonal plot score 1= poor 9=excellent. [2]Lodging 1=erect 9=flat on the ground

Planted 5/14/2008 Headline Application 7/14/2008 Harvested 10/3/2008

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Grasslands for Tomorrow

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NITROGEN LOSSES FROM UREA FERTILIZER APPLICATIONS

South Dakota State University
AgBio Communications Unit

BROOKINGS, S.D. — South Dakota State University research provides some guidelines that can help determine when nitrogen loss, or volatilization, is likely to occur with surface-applied urea.

Plant science professor Ron Gelderman said the urgency of the question increases if rainfall is limited for a week or two after spring applications. "Urea is the most common N fertilizer source in South Dakota. It is susceptible to loss when the urea is converted to ammonia by the urease enzyme found in all soils and on all residues," Gelderman said. *"Since this is a enzymatic conversion, warmer temperatures and moisture tend to increase the conversion process."*

The soil will trap ammonia if the urea is incorporated into the soil. However, for no-till conditions, producers don't often have that option, and typically urea is broadcast on the soil surface.

"If we receive one-fourth to one-half inch or more of rainfall, losses are small because the urea is dissolved and moved into the soil. However, a small rain or even heavy dew can produce more N losses by increasing urease activity with limited N movement into soil," Gelderman noted.

Heavy residue, warmer temperatures and high soil pH (a pH greater than 7.0) also can increase N losses, he added. But less residue, cooler temperatures and lower pH tend to reduce losses.

Generally, for surface broadcast applications of urea, the recommendations are to apply with cooler temperatures and when rainfall chances are higher, Gelderman said. This usually covers the period of late February to mid May, assuming non-frozen soils with no snow cover.

"If applying broadcast urea in late September when temperatures are usually high and chance of rainfall low, we only have about a week before we need rainfall of one-fourth to one-half inch or more to limit nitrogen losses," Gelderman said. "However, if we wait until late fall, we have seven to ten weeks; in winter, five to ten weeks; in early spring, one to two weeks; and in late spring, less than a week. If we receive a significant rainfall before this time, the chance of N loss is small."

Those time periods are based on average air temperatures. If temperatures are unusually cool, however, the safe period is longer.

The work also showed that fertilizer nitrogen placed beneath the soil surface performed as well as or better than other placements. This result was due to less potential N that was volatilized and less potential N "tie up" with residue. (Editor's note: It is not recommended to apply urea on top of snow.)

Volatilization Potential for Surface applied to Urea to No-Till

Time N Applied	Safe	Possible N Loss
	**** Weeks****	
Mid September	1	2
Nov - Dec	7	10
Jan - Feb	5	10
Late Feb - March	2	4
Early May	1.5	2
Late May	0.5	--
Early June	1.0	--