

Early Foliar Application of Tilt Fungicide on Hard Red Spring Wheat in Southwest North Dakota

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Summary

Tilt (Propiconazole) fungicide was applied at the 2 Fl oz/acre rate to hard red spring wheat at the four- to six-leaf growth stage in three fields in southwest North Dakota. In a field where continuous wheat was grown near Huff, ND, significant differences in yield and test weight were detected. A significant difference in test weight was detected in a continuous wheat field near Regent. No significant difference was detected in yield or test weight where wheat was grown in rotation with non-host crops.

Introduction

Hard red spring wheat was grown on approximately 1,580,100 acres in 1999 in southwest and south central North Dakota (Beard and Waldhaus 2000). Rotation to non-host crops provides time for wheat pathogens to degrade. However during some years spores of foliar diseases can move into adjacent fields. Some long-lived residual herbicides that producers have used may prevent rotation to non-host crops, or producers have limited themselves to continuous wheat or wheat-fallow rotations. Foliar diseases such as tan spot (*Pyrenophora tritici-repentis* Died.) and septoria leaf blotch (*Septoria nodorum*) are more prevalent in continuous wheat fields than in fields where crop rotation is practiced (Wiese, 1987). In western North Dakota, of the known previous crops reported in a 1997 study, 75% of the wheat grown had been in fields where wheat or barley was grown the previous year (McMullen, 1998).

Western North Dakota is often thought to be too dry to support economically damaging levels of foliar diseases in most years. The objective of this demonstration/study is to determine if low rates of a foliar fungicide applied at the four- to six-leaf growth stage is beneficial when disease pressure is expected to be high.

Materials and Methods

Three locations with known cropping histories ([Table 1](#)) were selected for this demonstration. Precipitation for the Beach location was recorded at the North Dakota Agricultural Weather Network site ([Table 2](#)). This site is approximately 2 miles south of this field location.

The closest precipitation for Huff was recorded at the Mandan Experiment Station site for the National Oceanic and Atmospheric Administration. This site is located about 17 miles north of the Huff field location. A self-tipping bucket and event logger on site recorded precipitation at the Regent site.

A randomized complete block design with four replications was used at all locations. Each plot was 6 feet by 20 feet in size. Leaf spotting from disease was visually rated and recorded prior to applying the fungicide. Incidence was determined by the number of plants that exhibited foliar disease and severity was determined by the percent of the last full developed leaf covered with lesions. Tilt fungicide was applied at the rate of 2 Fl oz in 20 gallons of water per acre to the crop when the crop was in the four- to six-leaf stage.

After the crop matured and ripened, yield samples were harvested from each plot by hand from an area four rows wide by 8 ft (2.4 meters) long. These were bagged, hung up to dry, threshed, and yield and test weight measured.

All data was statistically analyzed using SAS Statistical software version 6.12 (SAS Institute Inc., 1996).

Results and Discussion

The Tilt treated plots at Huff and Regent yielded 6.9 and 4.5 bushels more grain respectively than the untreated plots. Grain yield for the Tilt plots at Huff were significantly higher than the untreated plots. Grain test weight from the Tilt treated plots was significantly higher than the untreated plots with a 2 and a 2.6 pound per bushel difference at Huff and Regent respectively. At Beach, no significant differences were detected in either yield or test weight.

Wheat was grown continuously at the Huff and Regent fields. At Beach the previous crop was sunflower, a non-host crop for tan spot and septoria leaf blotch. Crop rotation is known to reduce inoculum levels (Murray, Parry, and Cattlin 1998, Wiese 1987). Wet conditions at Huff made environmental conditions more favorable for foliar diseases as well as yield potential was greater than Regent during this growing season. The Tilt application protected a significant portion of the yield produced at Huff.

Implications of Demonstrations

Tilt applications at a low rate with herbicides may be beneficial in controlling foliar fungus problems in fields that have a cropping history of continuous wheat. Early season, low rate Tilt fungicide applications may be applied at the same time that producers apply herbicides to the growing crop. This may present growers with an economical means to apply fungicides when intensive wheat rotations warrant their application.

Cooperating Producers

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Literature Cited

Beard L. and E. Waldhaus. 2000. North Dakota Agricultural Statistics 2000. North Dakota Agricultural Statistics Service, North Dakota State University, Fargo, ND.

McMullen, M.P. 1998. Effect of previous crop on tan spot and Fusarium head blight in wheat 1997. *In* Phytopathology 88:S116.

Murray, T.D., D.W. Parry, and N.D. Cattlin. 1998. A Color Handbook of Diseases of Small Grain Cereal Crops. Iowa State University Press, Ames, IA.

SAS Institute, 1996. Release 6.12ed SAS Institute, Inc., Cray, NC.

Wiese, M.V. (ed.) 1987. Compendium of Wheat Diseases, 2nd ed. APS Press, St Paul, MN.

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Table 1. Cropping history, wheat variety, crop stage, and disease rating at fungicide application, 2000.

Location	Cropping history	Hard red spring wheat variety - 2000	Fungicide application date	Crop stage fungicide application	Disease rating at application ¹
				Haun	%
Beach	1999 sunflower 1998 wheat 1997 mustard	Ernest	5/10/00	4.0 - 5.0	Incidence 10 Severity < 1
Huff	1999 wheat 1998 wheat 1997 barley	Oxen	5/26/00	4.0 - 5.0	Incidence 70 Severity 15

Regent	1999 wheat 1998 wheat 1997 wheat	2398	5/19/00	4.5 - 5.2	Incidence 60 Severity 10
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¹ This is a combined rating for tan spot (*Pyrenophora tritici-repentis*) and septoria leaf blotch (*Septoria nodorum*) at the four- to six-leaf stage.

Table 2. Precipitation received at Beach, Regent, and Mandan for the months of May through August, 2000.

Month	Beach ¹	Mandan ²	Regent ³
	----- inches -----		
May	1.39	2.73	1.74
June	1.08	5.69	2.25
July	4.58	5.80	2.10
August	0.58	1.30	0.37
Total May - August	7.63	15.52	6.46

¹ North Dakota Agricultural Weather Network site near Beach.

² National Oceanic and Atmospheric Administration site at the Mandan Experiment Station.

³ Rainwise self tipping bucket and Hobo event logger on site.

Table 3. Yield and test weight of hard red spring wheat treated with Tilt in the four to six leaf stage at Beach, Huff, and Regent, ND, 2000.

Treatment	----Beach ----		---- Huff ----		---- Regent ----	
	Yield	Test weight	Yield	Test weight	Yield	Test weight
	bu/acre	lb/bu	bu/acre	lb/bu	bu/acre	lb/bu
Tilt	45.3	63.6	61.2	61.5	40.8	62.5
Check	45.2	63.6	54.3	59.5	36.3	59.9
Mean	45.2	63.6	57.8	60.5	38.5	61.2
CV%	3.6	--	3.0	1.2	5.8	1.1

LSD .05	NS	NS	3.9	1.6	NS	1.6
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