

Project Title: Effect of fungicide rate and time of application on stripe rust control in spring wheat – 2011.

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Objective: To evaluate the effect of Stratego rate and application timing for stripe rust control in spring wheat.

Materials and Methods:

The spring wheat variety “Hank” was seeded on May 19, 2011 at a rate of 80 lb/A to a depth of 1.5 inches on 8 inch row-spacings. The soil type was a Creston silt loam with 4.5% organic matter and a pH of 7.5. The field was fertilized with N-P-K-S at a rate of 150-30-120-24 lb/A. The factorial treatment design consisted of Stratego applied at six rates and three application timings. Stratego rates included 0.125, 0.25., 0.50, 0.75, and 1.0X of the labeled rate (10 oz/A) as well as a non-treated control. Application timings consisted of tillering, flag leaf, and tillering plus flag leaf. The tillering treatments were applied on June 28 and the flag leaf treatments were applied on July 7 when the crop was 12 and 20 inches in height, respectively. At the same time, stripe rust infection levels were 13 and 35 percent. Stratego was applied with a backpack sprayer in 20 GPA of water to individual plots which measured 10 by 15 feet. The experimental design was a randomized complete block with three replications. The treatments were assessed for percent stripe rust infection on July 29, and the study was harvested on September 14, 2011.

Results:

Stripe rust infection levels ranged from a high of 68% in the non-treated control to a low of 6% when the 1X rate was applied at tillering plus flag leaf growth stages. Stripe rust control improved as rates increased. However, control did not increase much at rates above 0.50X. Indeed, application timing was more important than use rate in terms of the level of control. The poorest control was obtained when Stratego was applied at tillering. There was no difference in control between applications made at flag leaf compared to the sequential applications made at tiller plus flag leaf. These results demonstrate that applications made at flag leaf were most critical in terms of controlling stripe rust. More to the point, applications made at the tillering stage were ineffective.

The tillering applications were ineffective due to rapid plant growth and the corresponding dilution effect on fungicide concentration. Crop heights increased from 12 to 20 inches within the nine day period that separated the tillering and flag leaf application stages, respectively. The newly formed, non-treated tissue was vulnerable to infection and the corresponding negative effects on plant growth and development. The effect of application timing also was evident for grain yield, protein, test weight, and thousand kernel weight. Stratego rate and timing had no effect on falling numbers.

Table 1. Effect of Stratego rate and timing on stripe rust control in spring wheat, 2011.

Application Timing	Rate oz/A	SR %	Yield bu/A	Protein %	TWT lb/bu	TKW g	FN sec
Control	0.00	68	36	15.63	52	30	325
Tiller	1.25	57	30	16.40	49	26	350
Flag	1.25	40	49	15.13	55	32	320
Tiller plus flag	1.25	27	44	15.80	52	29	331
Tiller	2.50	43	39	16.10	50	26	325
Flag	2.50	28	52	14.77	55	35	313
Tiller plus flag	2.50	7	60	15.60	54	32	295
Tiller	5.00	38	44	16.00	51	28	332
Flag	5.00	16	54	14.77	56	36	320
Tiller plus flag	5.00	9	56	15.60	54	34	331
Tiller	7.50	47	37	16.37	50	27	344
Flag	7.50	10	55	15.30	55	34	328
Tiller plus flag	7.50	7	64	15.67	56	36	311
Tiller	10.00	41	45	16.13	51	27	307
Flag	10.00	8	61	14.93	57	37	309
Tiller plus flag	10.00	6	65	15.37	56	36	296
	Mean	28.31	49.41	15.6	53.38	31.64	321.02
	CV	28.69	21.26	2.47	3.49	11.06	10.8
	LSD (P=.05)	13.544	17.52	0.642	3.1	5.836	57.823
	Pr>F	0.0001	0.0043	0.0001	0.0001	0.0006	0.8566

SR: stripe rust, TWT: test weight, TKW: thousand kernel weight, FN: falling number