Project Title: Stripe rust response to winter wheat varieties and fungicides

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Objectives: To evaluate fungicide efficacy when applied to winter wheat varieties differing in susceptibility to stripe rust.

Materials and Methods:

The factorial treatment arrangement consisted of three fungicide treatments and seven winter wheat varieties that varied in susceptibility to stripe rust (*Puccinia striiformis tritici*). The fungicide treatments included Priaxor, Prosaro,Twinline plus a non-treated control. The winter wheat varieties consisted on Decade, Eddy, Jagalene, Paladin, Tucson, Whetstone, and Yellowstone.

The study site was a conventionally tilled field that had been planted to peas during the previous year. The soil was a Creston silt loam (25-50-25/S-Si-C) with an organic matter content of 4%, a C.E.C of 20, and a pH of 7.5. A preplant application of 30-30-60 was applied on September 22, 2010 , and the wheat varieties were planted 1.5 inches deep on September 28, 2010 at a rate of 80 lb/A. Individual plots consisted of seven, 6-inch rows, 15 feet in length, with each variety-fungicide combination replicated 3 times in a split plot design. Fungicide treatments were the whole plot effect and the varieties were the sub-plot factor.

A topdress application of nitrogen and sulfur (110-0-0-11) was applied on May 13, 2011. Priaxor, Prosaro and Twinline were applied at 4.0, 6.5, and 9.0 oz/A, respectively on June 6 when the plants were in the flag leaf stage and ranged from 22 to 25 inches in height. Treatments were applied with a non-ionic surfactant at 0.125% v/vi n 20 GPA of water using a backpack sprayer equipped with Tee Jet 11002 nozzles. The study was harvested on August 23. Yield, quality, and economic variables were then determined.

Results:

Wheat varieties varied greatly in susceptibility to the disease. On July 1, the most resistant variety was Whetstone, which had an overall infection level of 8 % (Table 1). In contrast, Decade was the most susceptible and had an average infection level of 53 percent. The effect of the disease was so severe that infection level impacted plant height. On average, plant height was reduced by three inches in the presence of the disease.

All three fungicides reduced the incidence of stripe rust, regardless of the level of resistance expressed by the individual cultivar. However, priaxor was the least efficacious. While fungicide reduced the incidence of stripe rust, it did not change the relative ranking of the wheat cultivars. These results demonstrate that stripe rust management requires the use of resistant varieties as well as fungicide applications.

Table 1. Winter wheat response to the main effects of fungicide and variety for stripe rust control, Kalispell, MT 2011

	SR June 7	SR June 17	SR July 1	SR Aug 5	Heading Julian	Height inch	Lodging %	Yield bu/A	Protein %	TWT lb/bu	TKW g	FN sec	Moist %
Fungicide													
Control	25	45	60	95	174	33	0	65	12.34	58	34	401	10
Priaxor	18	28	30	86	173	36	3	98	12.02	59	36	375	11
Prosaro	21	25	14	85	173	35	4	104	12.15	59	37	381	11
Twinline	20	26	14	86	173	35	5	107	12.26	59	37	389	11
LSD	2.78	8.58	11.89	6.29	NS	0.80	NS	3.90	NS	0.50	1.73	NS	NS
Variety													
Decade	16	35	53	96	174	35	1	50	13.47	50	25	420	9
Eddy	12	28	25	92	172	32	0	90	11.63	58	36	362	10
Jagalene	34	47	22	94	172	34	11	91	12.28	60	38	371	10
Paladin	25	31	31	75	175	33	0	91	12.17	61	38	384	12
Tucson	37	44	43	92	174	36	1	96	11.61	61	40	407	10
Whetstone	14	19	8	83	171	33	1	113	12.61	60	36	405	10
Yellowstone	11	15	24	85	176	38	7	124	11.58	61	40	356	13
LSD	5.86	4.38	6.12	4.34	1.03	1.40	4.56	5.10	0.31	0.60	0.97	20.14	0.53

SR: stripe rust, TWT: test weight, TKW: thousand kernel weight, FN: falling number, Moist: grain moisture.

Table 2. Winter wheat response to the interactive effects of fungicide and variety on stripe rust control, Kalispell, MT 2011

	SR June 7	SR June 17	SR July 1	SR Aug 5	Heading Julian	Height inch	Lodging %	Yield bu/A	Protein %	TWT lb/bu	TKW g	FN sec	Moist %
							Control						
Decade	20	58	96	100	176	31	0	13	14.60	50	24	459	10
Eddy	13	43	72	100	172	30	0	47	11.60	56	30	388	10
Jagalene	40	55	43	100	173	32	2	67	12.23	59	36	387	10
Paladin	28	48	63	88	175	31	0	60	12.27	59	36	399	11
Tucson	42	57	70	98	174	33	0	69	11.67	61	37	407	10
Whetstone	18	32	23	87	172	33	0	96	12.60	60	34	409	10
Yellowstone	12	23	50	95	178	37	2	105	11.43	61	38	353	12
							Priaxor						
Decade	10	27	70	92	173	36	0	50	13.27	49	23	395	9
Eddy	7	27	13	88	172	34	0	95	11.53	59	36	352	10
Jagalene	32	50	27	94	172	34	17	92	12.03	60	38	358	10
Paladin	20	22	35	75	176	34	0	93	12.03	61	39	369	13
Tucson	35	43	45	88	174	37	0	103	11.43	61	41	408	11
Whetstone	15	15	4	80	171	34	0	120	12.47	61	36	391	10
Yellowstone	10	13	15	82	175	39	1	134	11.37	62	41	353	13
							Prosaro						
Decade	13	28	20	97	174	35	5	72	12.77	52	27	410	9
Eddy	20	22	10	89	171	33	0	106	11.53	59	38	350	10
Jagalene	27	38	9	91	172	35	7	100	12.37	61	41	360	10
Paladin	30	27	13	68	174	34	0	105	12.03	61	39	374	12
Tucson	35	35	25	87	175	35	0	107	11.80	61	41	402	11
Whetstone	12	17	4	78	171	33	3	118	12.60	60	36	415	10
Yellowstone	13	12	18	83	176	39	14	121	11.93	61	39	354	13
							Twinline						
Decade	20	27	25	94	173	36	0	67	13.23	50	26	414	9
Eddy	7	18	6	89	172	33	0	111	11.87	60	38	358	10
Jagalene	38	43	8	91	172	35	21	105	12.50	60	39	380	10
Paladin	22	27	13	71	175	34	0	105	12.33	61	39	393	13
Tucson	35	40	33	92	174	37	3	106	11.53	61	41	410	10
Whetstone	10	13	3	85	171	33	2	117	12.77	60	36	406	10
Yellowstone	10	12	13	81	176	39	10	136	11.60	62	41	365	14
LSD	NS	8.77	12.25	NS	NS	NS	9.12	10.30	0.62	1.10	1.94	NS	1.05

SR: stripe rust, TWT: test weight, TKW: thousand kernel weight, FN: falling number, Moist: grain moisture.