Project Title: Spring Wheat Cultivar Response to Insecticide and Fungicide Applications -2013.

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Objective: To determine the response of commercial spring wheat varieties to fungicide and insecticide inputs.

Results:

Stripe rust and the orange wheat blossom midge (OWBM) are two troublesome pests in spring wheat. This study was conducted to determine the level of plant resistance present in common spring wheat varieties, and to determine the agronomic response of these materials when treated for the control of these two pests. Twenty four spring wheat varieties were grown and were either treated or not treated with appropriate pesticides. Headline was applied for the control of stripe rust, while lorsban was applied for the control of OWBM.

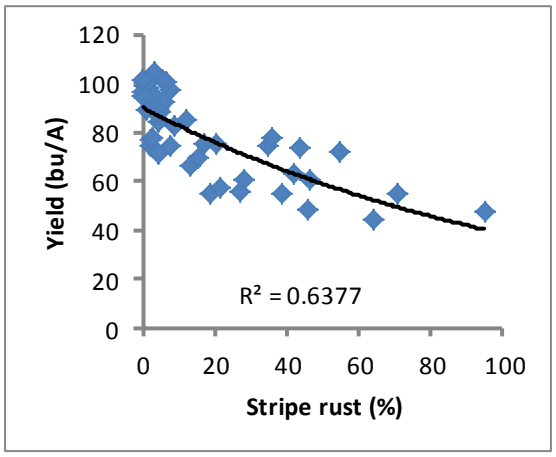
Stripe rust pressure was substantial and the effects of this disease had a negative impact on the growth and yield of most spring wheat varieties. Stripe rust infection averaged 31% in the check varieties, ranging from a low of 0% for Volt to a high of 95% for AP604CL (Table 2). Treatment with Headline reduced stripe rust infection to an average of 3.6%, with the highest levels of infection being observed for Hank and AP604CL, at 8.7 and 8%, respectively.

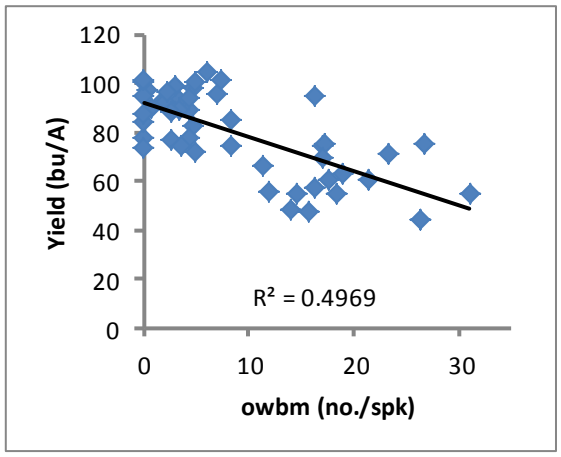
Stripe rust infection negatively affected spring wheat growth and development, resulting in a reduction in plant height. Check varieties averaged 36.3 inches, while treated plants averaged 37.5 inches in height. The taller plant height partially contributed to a higher incidence of lodging. The check varieties averaged 1.3% lodging, while treated plants averaged 10.4% lodging. The increased lodging also was partially attributed to heavier wheat spikes and greater yields. That is, there was a strong relationship between stripe rust infection and spring wheat yield (Figure 1).

Table 1. Materials and Methods - Spring wheat off station - 2013

Seeding Date:	5/6/13	Fertilizer:	150-40-110-20
Julian Date:	126	Herbicide:	5/31/13
Seeding Rate:	80 lb/A		Affinity TankMix 0.6 OZ/A, MCPE
Previous Crop:	Canola		0.5 PT/A, Axial 16.4 FL OZ/A
Tillage:	Conventional	Fungicide:	6/21/2013 Headline 9 FL OZ/A
Irrigation:	None	Insecticide:	7/2/2013 Lorsban 1 PT/A
Soil Type:	Creston Sil	Harvest Date:	9/6/13
Soil Test:	136-10-100	Julian Date:	249

Figure 1. Effect of stripe rust on wheat yield. Figure 2. Effect of OWBM on wheat yield.





Although stripe rust negatively affected wheat yields, OWBM damage also contributed to a reduction in yields (Figure 2). OWBM pressures were moderate, averaging 15 larvae per spike (Table 3). The highest numbers were recorded for Hank at 31 larvae per spike, while several of the CAP lines had no larvae. Lorsban effectively control OWBM, reducing densities to an average of 3 larvae per spike.

The combine effect of both pests negatively affected yields. The check varieties averaged 66 bu/A while the treated varieties averaged 92 bu/A. Pesticide treatments improved the yield of every variety evaluated, but the magnitude of the yield response varied depending on the susceptible of each variety to the pest complex present. In general, the more susceptible the variety, the greater the yield benefit. Choteau, AP 604CL, and Oneal benefited the most from the treatments, with percent yield increases of 117,102 and 69 percent. In contrast, yields for Volt, Reeder, and CAP 400-1 increased by 7, 11, and 13 percent, respectively.

Regardless of being treated or not, Volt, CAP 197-3 and MT 1142 consistently ranked as high yielding varieties. Likewise, Hank, and Oneal consistently ranked as low yielding varieties. Treated varieties generally had lower protein, as well as higher test weights and falling numbers. Nevertheless, CAP 400-1 had some of the highest protein contents and highest falling number values.

Summary:

The relative ranking of spring wheat varieties changed depending on whether or not they had been treated for stripe rust and the orange wheat blossom midge. However, several varieties consistently yielded well, irrespective of treatment.

Table 2. Agronomic response of spring wheat varieties to fungicide and insecticide inputs. Kalispell, 2013.

	Heading (Julian)			Height (in)			Lodging (%)			Stripe rust (%)		
Cultivar	check	treated	avg	check	treated	avg	check	treated	avg	check	treated	avg
AP604CL	180	180	180	37.7	40.0	38.9	0.0	1.0	0.5	95.3	8.0	51.7
Brennan	181	181	181	30.2	32.3	31.3	0.0	0.0	0.0	34.7	5.7	20.2
BuckPronto	180	180	180	35.8	37.4	36.6	0.0	0.0	0.0	13.3	4.3	8.8
CAP 197-3	183	184	184	38.1	39.1	38.6	6.7	26.7	16.7	36.0	6.7	21.3
CAP 34-1	182	182	182	33.6	35.4	34.5	0.0	0.7	0.3	54.7	4.0	29.3
CAP 400-1	184	184	184	39.2	38.7	39.0	0.0	0.0	0.0	4.7	0.0	2.3
CAP 219-3	181	181	181	36.3	38.3	37.3	0.0	10.0	5.0	44.0	5.7	24.8
Choteau	183	182	183	35.0	37.3	36.2	0.0	0.0	0.0	46.0	3.3	24.7
Corbin	181	181	181	35.5	35.9	35.7	1.7	58.3	30.0	28.3	4.3	16.3
Duclair	181	182	181	37.3	37.1	37.2	0.3	15.7	8.0	27.3	4.0	15.7
Fortuna	183	182	183	46.7	46.1	46.4	22.7	48.3	35.5	18.7	2.3	10.5
Hank	180	180	180	31.9	32.8	32.4	0.0	0.0	0.0	71.0	8.7	39.8
Jefferson	181	182	182	37.4	36.7	37.1	0.0	0.0	0.0	20.3	1.7	11.0
Kelby	180	180	180	30.8	31.0	30.9	0.0	0.0	0.0	39.0	6.0	22.5
McNeal	184	185	184	38.3	38.9	38.6	0.0	0.0	0.0	21.7	2.7	12.2
MT 1053	183	183	183	35.3	36.3	35.8	0.0	0.0	0.0	42.3	2.7	22.5
MT 1142	182	183	182	39.8	41.6	40.7	0.0	30.0	15.0	17.3	0.7	9.0
MT 1172	183	183	183	37.2	38.5	37.8	0.0	34.0	17.0	2.3	0.0	1.2
Oneal	184	184	184	36.3	37.9	37.1	0.0	0.0	0.0	64.3	7.7	36.0
Reeder	182	182	182	39.5	41.2	40.4	0.0	24.0	12.0	12.3	0.7	6.5
Solano	183	184	183	29.0	31.0	30.0	0.0	0.0	0.0	4.7	1.7	3.2
Vida	184	183	183	37.9	40.9	39.4	0.0	1.3	0.7	15.3	1.3	8.3
Volt	188	188	188	37.3	37.7	37.5	0.0	0.0	0.0	0.0	0.0	0.0
WB9879CLP	182	183	183	36.1	38.1	37.1	0.0	0.0	0.0	46.7	5.0	25.8
Mean	182	182	182	36.3	**37.5**	36.9	1.3	**10.4**	5.9	31.7	**3.6**	17.7
LSD	NS		0.85	NS		1.76	17.77		12.57	8.21		5.81
Pr>F	0.6809		0.0001	0.8560		0.0001	0.0002		0.0001	0.0001		0.0001

Table 3. Agronomic response of spring wheat varieties to fungicide and insecticide inputs. Kalispell, 2013.

	owbm (no/spk)			Yield (bu/A)			PRO (%)			TWT (lb/bu)		
Cultivar	check	treated	avg	check	treated	avg	check	treated	avg	check	treated	avg
AP604CL	15.7	0.3	8.0	47.9	97.0	72.5	14.1	14.9	14.5	60.6	62.7	61.7
Brennan	17.0	1.7	9.3	74.4	92.6	83.5	15.6	14.9	15.3	60.7	62.4	61.5
BuckPronto	11.3	0.7	6.0	66.5	89.9	78.2	16.6	15.1	15.9	60.3	60.5	60.4
CAP 197-3	0.0	0.0	0.0	78.0	100.7	89.4	13.7	13.5	13.6	59.9	60.7	60.3
CAP 34-1	5.0	0.0	2.5	72.2	87.6	79.9	13.8	13.9	13.9	60.6	61.3	61.0
CAP 400-1	0.0	0.0	0.0	84.4	95.3	89.9	16.3	16.1	16.2	61.1	61.6	61.3
CAP 219-3	0.0	0.0	0.0	73.7	101.5	87.6	14.1	14.3	14.2	60.3	60.9	60.6
Choteau	14.0	6.0	10.0	48.3	105.1	76.7	15.6	15.0	15.3	59.0	60.8	59.9
Corbin	21.3	4.3	12.8	60.8	89.0	74.9	15.7	14.4	15.1	60.7	62.0	61.3
Duclair	12.0	3.3	7.7	55.3	93.0	74.2	16.2	14.2	15.2	58.4	60.4	59.4
Fortuna	14.7	2.7	8.7	55.1	77.3	66.2	15.7	15.4	15.6	59.3	61.5	60.4
Hank	31.0	4.7	17.8	54.5	82.5	68.5	14.9	13.8	14.4	57.0	58.7	57.9
Jefferson	26.7	4.7	15.7	75.6	97.8	86.7	15.2	14.3	14.8	61.6	61.2	61.4
Kelby	18.3	2.0	10.2	54.6	92.1	73.4	16.0	15.4	15.7	59.7	61.7	60.7
McNeal	16.3	4.3	10.3	57.7	78.1	67.9	15.6	14.7	15.2	59.5	61.1	60.3
MT 1053	19.0	7.0	13.0	62.8	95.8	79.3	15.0	13.7	14.4	59.0	61.3	60.2
MT 1142	17.3	3.0	10.2	75.3	98.7	87.0	16.1	15.1	15.6	61.5	62.1	61.8
MT 1172	8.3	2.3	5.3	74.6	96.3	85.5	16.2	15.1	15.7	57.8	59.4	58.6
Oneal	26.3	3.7	15.0	44.0	74.3	59.2	15.2	14.4	14.8	57.8	60.0	58.9
Reeder	8.3	4.3	6.3	84.9	94.4	89.7	15.1	15.1	15.1	61.4	61.4	61.4
Solano	23.3	5.0	14.2	71.6	100.6	86.1	16.3	14.9	15.6	59.7	61.5	60.6
Vida	17.0	3.3	10.2	69.6	89.5	79.6	15.9	14.6	15.3	59.5	60.8	60.1
Volt	16.3	7.3	11.8	94.6	101.4	98.0	14.3	14.2	14.3	62.2	62.5	62.3
WB9879CLP	17.7	2.7	10.2	60.5	88.5	74.5	15.8	14.7	15.3	58.0	61.0	59.5
Mean	14.9	**3.1**	9.0	66.5	**92.5**	79.5	15.4	**14.7**	15.0	59.8	**61.1**	60.5
LSD	9.53		6.74	15.4		10.9	0.63		0.45	1.02		0.72
Pr>F	0.0049		0.0001	0.0046		0.0001	0.0001		0.0001	0.0003		0.0001

Table 4. Effect of fungicide and insecticide inputs on grain quality. Kalispell, 2013.

	TKW (g)			FN (sec.)			MC (%)		
Cultivar	check	treated	avg	check	treated	avg	check	treated	avg
AP604CL	31.2	34.7	32.9	330.0	353.5	341.8	16.5	16.2	16.4
Brennan	35.4	35.1	35.3	248.2	397.1	322.7	15.8	15.6	15.7
BuckPronto	42.6	40.9	41.7	325.2	389.7	357.4	15.6	15.7	15.7
CAP 197-3	32.4	33.7	33.0	343.4	351.1	347.2	16.0	16.3	16.2
CAP 34-1	33.6	33.0	33.3	362.9	391.3	377.1	16.6	16.7	16.6
CAP 400-1	33.8	34.0	33.9	446.6	479.4	463.0	15.5	15.4	15.5
CAP 219-3	32.7	34.5	33.6	354.2	375.1	364.6	16.2	16.1	16.1
Choteau	35.4	34.7	35.1	368.7	419.4	394.0	16.2	16.1	16.2
Corbin	42.5	41.6	42.1	344.7	388.1	366.4	15.8	16.2	16.0
Duclair	38.7	37.0	37.9	294.9	378.7	336.8	16.3	16.1	16.2
Fortuna	39.8	42.7	41.3	302.6	321.9	312.3	16.6	16.0	16.3
Hank	38.5	39.9	39.2	237.2	352.5	294.8	15.7	15.7	15.7
Jefferson	41.1	37.3	39.2	334.1	384.4	359.2	15.5	15.3	15.4
Kelby	33.2	35.4	34.4	203.0	361.3	282.1	15.7	15.5	15.6
McNeal	35.4	35.7	35.6	453.4	506.9	480.2	15.5	15.1	15.3
MT 1053	38.6	40.0	39.3	262.1	346.6	304.4	16.6	16.7	16.6
MT 1142	37.6	39.6	38.6	358.4	363.6	361.0	16.3	15.8	16.1
MT 1172	39.6	38.9	39.3	303.4	357.8	330.6	15.9	16.0	16.0
Oneal	31.6	31.1	31.3	388.5	439.4	413.9	16.1	15.7	15.9
Reeder	37.2	37.8	37.5	388.9	429.8	409.3	15.6	15.7	15.6
Solano	40.8	38.9	39.9	315.4	383.5	349.4	15.4	15.5	15.5
Vida	37.2	38.0	37.6	278.4	320.5	299.5	15.9	16.2	16.1
Volt	36.2	31.8	34.0	393.0	425.0	409.0	16.3	16.6	16.4
WB9879CLP	33.9	32.9	33.4	377.5	427.1	402.3	16.0	16.2	16.1
Mean	36.6	36.6	36.6	334.0	**389.3**	361.6	16.0	15.9	16.0
	NS		2.3	39.96		28.25	NS		0.39
	0.1752		0.0001	0.0001		0.0001	0.6426		0.0001