

Title: Effect of spring wheat resistance and insecticide application timing on the control of Orange Wheat Blossom Midge.

Objective: To identify the optimum application timing of insecticides for control of OWBM in susceptible and resistant spring wheat varieties.

Results:

Susceptible and resistant spring wheats incur feeding damage from the OWBM, and so both may benefit from insecticide applications. This study was conducted to determine the optimum insecticide application timing required to minimize damage from the wheat midge. The factorial treatment arrangement consisted of 2 spring wheat varieties, 3 insecticide treatments, and 4 application timings. The treatments were arranged as a split plot randomized complete block design where spring wheat varieties represented the main plot effect and insecticide-application timing combinations represented the sub plot effect. McNeal and Egan spring wheat were used to represent susceptible and resistant varieties, respectively. The three insecticides evaluated were a non-treated check, Warrior II, and Lorsban Advanced. The insecticides were applied at 30 heading, 70% heading, 30% anthesis, and 70% anthesis.

Overall midge pressure was considerably lower than previous years and no significant differences were observed for the main effects of insecticide and application timing, or the corresponding interaction (Tables 3-5).

Despite low OWBM larvae numbers, significant varietal differences were observed for all response variables except heading (Table 2). Egan was 0.8 inches taller, experienced 4.3% more lodging and had a 1.5% greater protein content than McNeal. McNeal produced higher yields and test weights than Egan.

Table 1. Materials and Methods - Effect of genetic resistance and insecticide application timing on the control of Orange Wheat Blossom Midge - 2014

Seeding Date: 5/1/2014	Harvest Date: 9/2/2014
Julian Date: 121	Julian Date: 245
Seeding Rate: 80 lb/A	Soil Type: Creston Sil
Previous Crop: Fallow	Soil Test: 431-40-258
Tillage: Conventional-Till	Fertilizer: 200-30-100
Irrigation: N/A	Herbicide: Huskie 11 floz/A and Axial XL 16.4 floz/A
	Fungicide: Headline 9 floz/A

Table 2. Main effect of genetic resistance with cultivars on the control of orange wheat blossom midge - 2014.

	HD	HT	LOD	OWBM	YLD	PRO	TWT
Cultivar	Julian	in	%	no/spk	bu/A	%	lb/bu
Egan	183	39.7	11.6	0.1	108.2	16.9	60.1
McNeal	183	38.9	7.3	1.6	113.7	15.4	60.8
LSD	ns	0.7	3.4	1.1	2.5	0.1	0.2
Pr>F	0.1313	0.0150	0.0158	0.0059	0.0001	0.0001	0.0001

Table 3. Main effect of insecticide variety on wheat resistance to orange wheat blossom midge - 2014.

	HD	HT	LOD	OWBM	YLD	PRO	TWT
Insecticide	Julian	in	%	no/spk	bu/A	%	lb/bu
Check	183	39.7	10.3	0.8	107.3	16.2	60.2
Warrior II	183	38.9	9.3	0.8	114.0	16.0	60.8
Lorsban Advanced	183	39.3	8.8	1.0	111.4	16.1	60.4
LSD	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.2844	0.4870	0.7322	0.9475	0.4748	0.6751	0.2230

Table 4. Main effect of insecticide application timing on wheat for control of orange wheat blossom midge - 2014.

	HD	HT	LOD	OWBM	YLD	PRO	TWT
Timing	Julian	in	%	no/spk	bu/A	%	lb/bu
30% heading	183	39.6	8.6	1.4	113.1	16.2	60.5
70% heading	183	39.2	8.7	0.8	110	16.1	60.3
30% anthesis	183	39.2	10.2	0.3	110.5	16.1	60.5
70% anthesis	183	39.2	10.3	0.9	110.1	16.2	60.6
LSD	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.5654	0.8085	0.7620	0.4232	0.5844	0.7289	0.7490

HD: heading, HT: height, LOD: lodging, OWBM: orange wheat blossom midge, YLD: yield, PRO: protein, TWT: test weight, ns: nonsignificant.

Table 5. Effect of genetic resistance , insecticide, and insecticide application timing on wheat resistance to orange wheat blossom midge - 2014.

	Heading (Julian)		Height (in)		Lodging (%)		OWBM (no/spk)		Yield (bu/A)		Protein (%)		TWT (lb/bu)	
	Egan	McNeal	Egan	McNeal	Egan	McNeal	Egan	McNeal	Egan	McNeal	Egan	McNeal	Egan	McNeal
	Check													
30% heading	183	183	40.0	40.0	16.7	1.3	0.0	1.2	108.4	117.8	16.9	15.4	59.9	60.8
70% heading	183	183	39.7	40.0	9.0	1.7	0.0	1.9	105.7	107.9	17.0	15.5	59.8	60.4
30% anthesis	183	183	39.0	39.7	11.0	12.3	0.0	0.6	101.5	108.0	16.8	15.5	59.7	60.3
70% anthesis	183	182	40.7	38.3	16.7	14.0	0.0	3.1	104.2	104.9	17.0	15.7	59.8	60.6
	Lorsban Advanced													
30% heading	182	182	39.7	39.0	4.0	5.7	0.0	4.0	106.6	114.5	16.8	15.6	60.2	60.4
70% heading	183	182	39.0	39.3	11.7	11.7	0.0	1.9	102.1	112.9	17.1	15.6	59.7	60.4
30% anthesis	183	183	40.3	38.3	10.0	13.3	0.0	0.9	115.6	113.5	16.9	15.5	60.3	60.9
70% anthesis	183	183	39.7	39.0	11.7	2.3	0.0	1.1	106.5	119.4	16.7	15.1	60.2	61.1
	Warrior II													
30% heading	183	183	40.0	39.0	13.3	10.7	1.1	2.2	113.2	118.2	17.0	15.3	60.5	61.2
70% heading	183	182	39.7	37.3	14.3	3.7	0.0	1.1	112.5	118.7	16.6	14.8	60.2	61.4
30% anthesis	183	183	39.0	38.7	7.3	7.3	0.0	0.6	110.2	114.4	16.5	15.1	60.5	61.0
70% anthesis	183	183	39.7	37.7	13.3	4.0	0.0	1.2	111.7	113.6	17.0	15.5	60.5	61.2
LSD	ns		ns		ns		ns		ns		ns		ns	
Pr>F	0.9621		0.3873		0.4550		0.9114		0.2136		0.4800		0.4503	

OWBM: orange wheat blossom midge, TWT: test weight, ns: nonsignificant.