Project Title: Orange Wheat Blossom Midge Insecticide Trials

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Objective: Evaluate insecticides for Orange Wheat Blossom Midge Control

Results:

Experiments were established at the Northwestern Agricultural Research Center (NWARC) and the Holst farm (Holst). Treatments included three registered insecticides (Lorsban 4E, Cobalt and Warrior), two experimental formulations of chlorpyrifos (3.33 CS and 3.75 EW), and an untreated check. Kelby spring wheat was planted at NWARC on May 1 (245 GDD) while Hank was planted at Holst on April 23 (147 GDD).

Treatments were applied on June 29 at NWARC (70% headed) and on June 27 at Holst (85% headed) in 20 GPA. Plots were 10 by 15 foot and treatments were replicated three times. A 10 foot wide boarder area was included adjacent to each plot to minimize vapor drift. Midge populations were assessed the evening prior to application. Midge densities averaged 4-5 midges per 10 spikes at NWARC and 1 midge per spike at Holst. A total of 45 spikes per treatment (15 spikes per plot) were randomly collected on July 16. The spikes were threshed and examined for midge larvae and wheat kernel damage. Wheat was harvested on August 3 at NWARC and August 23 at Holst using a plot combine.

Midge populations were relatively low at NWARC, yet significant treatment differences were observed. The check had an average infestation of 14 larvae per head, exhibited 15% kernel damage and yielded 46 bu/A. In contrast, insecticide treated plots yielded an average of 51.8 bu/A. All insecticides reduced midge populations and kernel damage relative to the check. However, yield differences did exist among the insecticides evaluated. All treatments containing chlopyrifos produced yields greater than the check. However, Warrior resulted in spring wheat yields that were similar to the check. This occurred in spite of the reduction in midge numbers and kernel damage. No differences occurred with respect to grain quality parameters, yet insecticides tended to increase falling numbers compared to the check.

Midge populations were higher at the Holst location. The check had an average infestation of 78 larvae/head, exhibited 52% kernel damage and yielded only 36 bu/A. In contrast, treated plots yielded an average of 54 bu/A. All insecticides reduced midge populations and kernel damage relative to the check, while simultaneously improving yields. However, differences in efficacy existed among the insecticides. Kernel damage was greater with Warrior compared to treatments containing chlopyrifos. Likewise, midge control was less with Warrior as compared to the 4E formulation of chlopyrifos. Nonetheless, yields did not differ among the insecticide treatments evaluated. Similarly, no differences occurred with respect to grain quality parameters. However check tended to have higher protein and lower falling numbers.

Table 1. The effect of insecticides on spring wheat crop injury, midge larvae numbers, and wheat kernel damage at NWARC in 2007.

Treatment	Conc	Type	Rate	Crop injury (%)				Midge	Spring wheat kernels		
			lb ai/ac	Chlorosis		Stunting		larvae	Total	Midge-damaged	
								No./ spike	No./spike	No./spike	%
				7/2/07	7/6/07	7/2/07	7/6/07	---------- 7/16/07 ----------			
Lorsban 4E	4.00	EC	0.500	0	0	0	0	1.4	34.4	0.5	1.3
Cobalt	2.55	EC	0.260	0	0	0	0	1.8	33.3	0.6	1.9
Chlorpyrifos	3.33	CS	0.494	0	0	0	0	4.6	35.3	1.3	4.0
Chlorpyrifos	3.75	EW	0.500	0	0	0	0	1.7	34.3	0.5	1.5
Warrior	1.00	EC	0.025	0	0	0	0	4.0	34.0	1.6	4.5
Untreated				0	0	0	0	14.0	33.3	5.0	15.0
LSD (P=0.05)				0	0	0	0	7.10	2.59	1.92	5.09
CV				0	0	0	0	84.66	4.17	66.72	59.70
Treatment F				0	0	0	0	4.53	0.87	8.28	10.38
Treatment Prob(F)				1	1	1	1	0.0203	0.5356	0.0025	0.001

Table 2. The effect of insecticides on spring wheat crop injury, midge larvae numbers, and wheat kernel damage at the Holst site in 2007.

Treatment	Conc	Type	Rate lb ai/ac	Crop injury (%)				Midge larvae	Spring wheat kernels		
				Chlorosis		Stunting			Total	Midge-damaged	
								No./ spike	No./spike	No./spike	%
				6/30/07	7/5/07	6/30/07	7/5/07	---------- 7/16/07 ----------			
Lorsban 4E	4.00	EC	0.500	0	0	0	0	10.2	42.0	2.5	6.1
Cobalt	2.55	EC	0.260	0	0	0	0	15.2	43.6	5.3	12.3
Chlorpyrifos	3.33	CS	0.494	0	0	0	0	19.4	41.0	4.8	11.8
Chlorpyrifos	3.75	EW	0.500	0	0	0	0	12.9	43.2	4.7	11.2
Warrior	1.00	EC	0.025	0	0	0	0	23.9	42.3	9.6	22.7
Untreated				0	0	0	0	78.4	43.4	22.6	51.9
LSD (P=0.05)				0	0	0	0	11.43	3.54	3.45	6.92
CV				0	0	0	0	23.54	4.56	23.02	19.67
Treatment F				0	0	0	0	50.68	0.77	45.43	59.02
Treatment Prob(F)				1	1	1	1	0.0001	0.5907	0.0001	0.0001

Table 3. The effect of insecticides on spring wheat yield and grain quality parameters at NWARC in 2007.

Treatment	Conc	Type	Rate lb ai/ac	Yield	Test weight	Grain moisture	TKW	Protein	Falling number
				bu/ac	lb/bu	%	g	%	s
				8/3/07					
Lorsban 4E	4.00	EC	0.500	51.3	57.9	10.4	24.10	16.6	428
Cobalt	2.55	EC	0.260	54.0	60.0	10.9	26.53	15.0	454
Chlorpyrifos	3.33	CS	0.494	51.4	58.7	10.9	24.94	15.8	428
Chlorpyrifos	3.75	EW	0.500	53.3	59.0	10.5	25.31	15.6	416
Warrior	1.00	EC	0.025	49.1	59.3	10.8	25.38	15.3	448
Untreated				46.3	58.7	11.6	25.24	15.8	392
LSD (P=0.05)				3.93	1.43	0.86	1.88	1.09	
CV				4.25	1.34	4.38	4.10	3.83	
Treatment F				5.16	2.42	2.68	1.72	2.41	
Treatment Prob(F)				0.0134	0.1094	0.0865	0.2182	0.1112	

Table 4. The effect of insecticides on spring wheat yield and grain quality parameters at the Holst site in 2007.

Treatment	Conc	Type	Rate lb ai/ac	Yield	Test weight	Grain moisture	TKW	Protein	Falling number
				bu/ac	lb/bu	%	g	%	s
				8/23/07					
Lorsban 4E	4.00	EC	0.500	54.5	54.5	11.3	34.04	16.4	406
Cobalt	2.55	EC	0.260	56.5	54.1	11.2	32.28	16.7	423
Chlorpyrifos	3.33	CS	0.494	52.3	53.8	11.3	33.13	16.7	379
Chlorpyrifos	3.75	EW	0.500	52.6	52.4	11.1	31.09	17.5	384
Warrior	1.00	EC	0.025	56.3	53.4	11.2	31.18	17.3	393
Untreated				35.8	51.6	10.9	28.80	18.5	332
LSD (P=0.05)				13.77	3.14	0.42	5.65	1.44	
CV				14.74	3.24	2.04	9.78	4.59	
Treatment F				3.20	1.26	1.35	1.05	2.75	
Treatment Prob(F)				0.0555	0.35	0.32	0.44	0.08	