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EFFICACY OF MITICIDES AND INSECTICIDES AGAINST SPIDER MITES AND CORN BORERS IN CORN

by

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SUMMARY

In the spider mite efficacy trial, spider mite populations reached pretreatment counts of 635 to 1006 mites per plant. The Capture treatments gave up to 67% control that lasted for the 21 days. Capture combined with other miticides did not seem to improve efficacy. In the corn borer/spider mite efficacy trial, corn borer populations were very low and averaged only 1.5 SWCB per 10 plants in the untreated plots. SWCB larvae and percent plants infested were significantly reduced by all treatments. Spider mite populations reached pretreatment counts of 537 to 742 mites per plant. The Capture treatments significantly reduced spider mite numbers up to 21 days. Predator mite populations were not significantly affected by miticide treatments in either trial.

PROCEDURES

Field corn, 'Pioneer 3162IR', was planted 9 May with a John Deer MaxEmerge 6 row planter at a rate of 32,000 seeds/a in a furrow-irrigated field (Finnup #7) at the Southwest Research-Extension Center, Finney County, KS. Two tests, a spider mite test and a corn borer/spider mite test, were established. In each test treatments were arranged in a randomized complete block design with four replications. Plots were four rows (total of 10 ft) wide and 50 ft long with a 4-row (10 ft) border of untreated corn on each side and a 10-ft alley at each end. Treatments were applied on 7 and 9 August with a high clearance sprayer using a 10-ft boom with three nozzles directed at each row (one on each side of the row on 16-in. drop hoses directed at the ear zone and a third nozzle directed at the top of the plant). The sprayer was calibrated to deliver 20 gal/a at 2 mph and 40 psi.

SPIDER MITE EFFICACY TRIAL

In an effort to produce a more uniform spider mite infestation across the trial, spider mite infested corn leaves from another infested cornfield were added to 10 plants in the two center rows of each plot in the trial. Spider mite samples were made by collecting half the leaves from 4 plants from the two center rows in each plot. The leaves were placed in large plastic bags for transportation to the laboratory, where they were placed in large 76-liter Berlese funnels. A light bulb was used to dry the vegetation and drive arthropod specimens down into the collecting jar containing methanol. Spider mites and predator mites were counted on black filter paper using a binocular microscope. Sample specimens were mounted on microscope slides to determine species of spider mites. Spider mite samples were collected 7 August for pretreatment and again 5-, 13- and 21-days later for post-treatment samples. Spider mite counts were transformed with Taylor's power transformation for statistical analysis and converted to mites per plant for presentation. Grain yield was not taken because plant stands were not uniform.

CORN BORER EFFICACY TRIAL

Second generation SWCB infestations resulted from free flying feral moths and moths emerging from the manually infested plants in a nearby experiment. Second generation corn borer infestations were evaluated by dissecting 10 plants per plot on 18 September to record larvae and tunneling observations. Corn borer data was transformed with the square root mean + 1 before analysis. Also in this study, spider mites samples were collected 9 Aug. for pretreatment and again 6-, 12-, and 21 days later for post-treatment samples. Spider mite counts were transformed with Taylor's power transformation for statistical analysis and converted to mites per plant for presentation. Grain yield was not taken because plant stands were not uniform.

RESULTS AND DISCUSSION

SPIDER MITE EFFICACY TRIAL

Spider mite populations were slow developing in 2001, but then exploded just before the plots were

treated reaching pretreatment counts of 635 to 1006 mites per plant (Table 1). Capture treatments gave up to 67% control, which lasted for the 21 days post treatment. Capture in combination did not seem to improve efficacy. At pretreatment, the mites were 1.6% TSM. At 5-, 12- and 21-days post-treatment, the mites were 7.1, 29.4 and 46.6 % TSM, respectively. The percent TSM differed significantly among treatments. and presence of the TSM explains why the percent control did not exceed 67%, since TSM are not very susceptible to Capture. Predator mite populations were not significantly affected by the miticide treatments (Table 2).

CORN BORER EFFICACY TRIAL

Corn borer populations were very low and averaged only 1.5 SWCB in 10 plants. SWCB and percent plants infested were significantly reduced by all treatments (Table 3). Spider mite populations were slightly lower in the corn borer trial than in the spider mite trial, reaching pretreatment counts of 537 to 742 mites per plant (Table 4). Capture treatments gave up to 89% control at 12 days post treatment, and control was still up to 78% at 21 days. At pretreatment, the mites were 11.4% TSM. At 6-, 12-, and 21-days post-treatment, the mites were 18.9, 29.2, and 42.7 % TSM, respectively. The percent TSM did differ significantly among treatments. Predator mite populations were not significantly affected by the miticide treatments (Table 2).

Splitting corn stalks to measure corn borer tunneling and to find corn borer larvae.

Corn borer cannibalism.

Table 1. Efficacy of insecticide and miticide treatments made 7 August on spider mite, SWREC Garden City, KS.

Treatment	Rate fl.oz/a (lb ai/a)	Spider Mites/plant Pre-treat.	Spider Mites /plant 5 days Post-treat. (% Control)	Spider Mites /plant 13 days Post-treat. (% Control)	Spider Mites /plant 21 days Post-treat. % Control)
Check Untreated	—	1006	403 ab	296	345
Capture 2EC	5.1 (0.08)	897	337 ab (6%)	88 (67%)	102 (67%)
Capture 2EC	6.4 (0.1)	635	162 ab (36%)	123 (34%)	187 (14%)
Capture 2EC & Dimethoate 2EC	5.1 (0.08) 32 (0.5)	617	206 ab (17%)	114 (37%)	135 (36%)
Capture 2EC & Dimethoate 2EC	6.4 (0.1) 32 (0.5)	936	163 ab (57%)	145 (47%)	191 (40%)
Capture 2EC & Furadan 4F	6.4 (0.1) 32 (1.0)	795	130 b (59%)	134 (43%)	187 (53%)
F-test P		0.4386	0.1547	0.3911	0.3024
CV		14.0%	18.0%	14.1%	13.8%

Means followed by the same letter are not significantly different (P < 0.05, LSD)
[a] Percent Control calculated using the method of Henderson (1955).

Table 2. Efficacy of insecticide and miticide treatments made 7 August on predator mites, SWREC Garden City, KS.

Treatment	Rate fl.oz/a (lb ai/a)	Predator Mites /plant Pre-treat.	Predator Mites /plant 5 days Post-treat.	Predator Mites /plant 13 days Post-treat.	Predator Mites /plant 21 days Post-treat.
Check Untreated	—	1.2	0.4	0.9	3.5
Capture 2EC	5.1 (0.08)	0.8	2.8	2.5	3.0
Capture 2EC	6.4 (0.1)	1.4	0.1	0.8	4.4
Capture 2EC & Dimethoate 2EC	5.1 (0.08) 32 (0.5)	0.4	0.1	0.5	2.3
Capture 2EC & Dimethoate 2EC	6.4 (0.1) 32 (0.5)	0.3	0.5	1.1	3.0
Capture 2EC & Furadan 4F	6.4 (0.1) 32 (1.0)	0.8	0.3	1.1	3.3
F-test P		0.717	0.505	0.226	0.238
CV		143%	284%	119%	86%

Means followed by the same letter are not significantly different (P < 0.05, LSD)

Table 3. Efficacy of insecticide and miticide treatments made 9 August on corn borers and spider mites, SWREC Garden City, KS.

Treatment	Rate fl.oz/a (lb ai/a)	SWCB Per 10 plts (% Control)	Tunnels Per 10 plts (% Control)	Tunneling Cm Per 10 plts (% Control)	% Infested Plants
Check Untreated	—	1.5 a	2.8	26.3	25.0 a
Tracer 4SC	1 (0.031)	0.8 ab (50%)	1.3 (54%)	8.0 (70%)	12.5 ab
Tracer 4SC	2 (0.067)	0.8 ab (50%)	1.0 (64)	4.8 (83%)	10.0 ab
Tracer 4SC	3 (0.094)	0.3 ab (83%)	0.8 (71%)	10.0 (62%)	7.5 b
Warrior 1EC	3.8 (0.02)	0.0 b (100%)	0.0 (100%)	0.0 (100%)	0.0 b
Capture 2EC	6.4 (0.1)	0.3 b (83%)	1.3 (54%)	6.0 (77%)	10.0 ab
Capture 2EC & Avid 1.15 EC	6.4 (0.1) 16 (0.019)	0.0 b (100%)	0.8 (71%)	3.5 (87%)	2.5 b
Capture 2EC & Kelthane MF 4EC	6.4 (0.1) 48 (1.5)	0.3b (83%)	0.5 (82%)	3.3 (87%)	2.5 b
F-test P		0.0467	0.2844	0.0934	0.0342
CV		20.5	31.3	65.5	58.8

Means followed by the same letter are not significantly different (P<0.05, LSD)
[a] Percent Control calculated as reduction from the check.

Table 4. Efficacy of insecticide and miticide treatments made 9 August on corn borers and spider mites, SWREC Garden City, KS.

Treatment	Rate fl.oz/a (lb ai/a)	Spider Mites/ plant Pre-treat.	Spider Mites/ plant 6 days Post-treat. (% Control)[a]	Spider Mites/ plant 12 days Post-treat. (% Control) [a]	Spider Mites / plant 21 days Post-treat. (% Control) [a]
Check Untreated	—	646	389 a	362 a	530 a
Tracer 4SC	1 (0.031)	742	554 a (-24%)	234 ab (44%)	505 ab (17%)
Tracer 4SC	2 (0.067)	642	254 ab (34%)	248 ab (31%)	350 ab (34%)
Tracer 4SC	3 (0.094)	565	314 a (8%)	205 abc (35%)	248 b (46%)
Warrior 1EC	3.8 (0.02)	760	241 ab (47%)	135 bc (68%)	340 ab (45%)
Capture 2EC	6.4 (0.1)	676	53 b (87%)	79 cd (79%)	229 bc (59%)
Capture 2EC & Avid 1.15 EC	6.4 (0.1) 16 (0.019)	669	61 b (85%)	42 d (89%)	121 cd (78%)
Capture 2EC & Kelthane MF 4EC	6.4 (0.1) 48 (1.5)	537	48 b (85%)	35 d (88%)	127 d (71%)
F-test P		0.9191	0.0094	>0.0001	0.0012
CV		13.4%	22.2%	14.2%	11.1%

Means followed by the same letter are not significantly different (P<0.05, LSD)
[a]Percent control calculated using the method of Henderson (1955).

Table 5. Efficacy of insecticide and miticide treatments made 9 August on corn borers and predator mites, SWREC Garden City, KS.

Treatment	Rate fl.oz/a (lb ai/a)	Predator Mites /plant Post-treat.	Predator Mites /plant 6 days Pre-treat.	Predator Mites /plant 12 days Post-treat.	Predator Mites /plant 21 days Post-treat.
Check Untreated	—	1.1	0.1	1.4	3.0
Tracer 4SC	1 (0.031)	0.1	1.0	5.4	12.1
Tracer 4SC	2 (0.067)	0.0	0.4	1.6	4.1
Tracer 4SC	3 (0.094)	0.0	0.6	1.9	4.6
Warrior 1EC	3.8 (0.02)	0.1	0.3	1.0	4.0
Capture 2EC	6.4 (0.1)	0.1	0.4	0.0	3.6
Capture 2EC & Avid 1.15 EC	6.4 (0.1) 16 (0.019)	0.1	0.8	0.4	4.8
Capture 2EC & Kalthane MF 4EC	6.4 (0.1) 48 (1.5)	0.4	0.4	1.8	4.8
F-test P		0.320	0.416	0.824	0.315
CV		182%	86%	41%	24%

Means followed by the same letter are not significantly different (P < 0.05, LSD).

SWCB girdled corn plant.

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