SARE Project ANE95-26

Arthropod Management Tests: 1997

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REPORT

INDEXES

CORN (SWEET): *Zea mays* L. 'Chief Ouray'
Banks grass mite (BGM): *Oligonychus pratensis* (Banks)

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(43E)

CONTROL OF BANKS GRASS MITE IN SWEET CORN, 1996: Insecticides were applied with a hand held CO_2 sprayer calibrated to deliver 18 gpa spray material at 25 psi through four LF4 nozzles at 18 inch spacing mounted on a 4.5 foot boom. Treatments were applied on 3 Jul 1996, when the first silks were appearing on sweet corn that was approximately five feet in height. Plots were 7.5 feet by 30 feet, arranged in a RCB design replicated four times. Only the middle row of the three row plots was used for evaluation purposes. Mites were sampled prior to spraying, and again on 10 Jul (7 DAT). Sampling involved collecting five random ear leaves per plot, brushing the leaves with a Leedon Engineering Mite Brushing Machine, and counting a subsample of the extracted mites. Damage evaluations were made on 29 Jul, when sweet corn was harvest ready, by rating each plot on a 0–5 damage scale: 0 = no damage, 1 = 1–20% ears damaged by mites, 2 = 21–40% damaged ears, 3 = 41-60% damaged ears, 4 = 61–80% damaged ears and 5 = 81–100% damaged ears. Data were $(X + 0.5)^{1/2}$ transformed before analysis of variance. Actual means are presented.

There were no differences in BGM numbers between treatments 7 DAT ($F = 2.13$; df = 6,17; $P = 0.999$). Significant differences in damage ratings were observed at harvest, with Warrior and Warrior + MSR treatments not differing from the untreated check, and all other treatments having significantly lower damage ratings.

Treatment	Rate lb (AI)/acre	Mean no. BGM/5 leaves (7 DAT)	Damage rating (0–5 scale)
MetaSystox-R (MSR)	0.125	59.75	1.5a
MetaSystox-R	0.250	45.0	1.25a
Comite II	1.5	87.0	2.0ab
Capture	0.1	121.75	2.5abc
Warrior	0.03	109.0	3.25cd
Warrior + MSR	0.03 + 0.125	125.75	3.5cd
Untreated		104.5	4.0d

Means in a column followed by the same letter are not significantly different ($P = 0.05$) by SNK.

CORN (SWEET): *Zea mays* L. 'Rise and Shine'
European Corn Borer (ECB): *Ostrinia nubilalis* (Hübner)
Corn Earworm (CEW): *Helicoverpa zea* (Boddie)

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FOLIAR SPRAYS OF *BACILLUS THURINGIENSIS* IN EARLY CORN, 1996: Sweet corn was planted 2 May in blocks of 4 rows by 25 feet. Each treatment was repeated 4 times in a RCB design. Blocks were separated by 15 feet. Insecticides were applied on 5, 11, and 18 Jul, beginning before tassels emerged. Biweekly treatments were also sprayed on 9, 16, and 22 Jul. ECB flights were monitored with two nylon Heliothis traps baited with a Trece' pheromone lure (New York or Iowa strain). The CEW flight was monitored with a Heliothis trap with a Hercon *Helicoverpa zea* lure. Sprays were applied at 75 psi with a four row drop nozzle sprayer pulled (5 nozzles per row) behind a tractor. A hand held applicator delivered 0.5 ml per ear of a 1:20 mixture of Dipel ES and food-grade corn oil directly to the silks on 16 Jul. Plots were harvested on 29 Jul. Fifty ears per plot were rated for damage, and for presence of CEW and ECB. Two ratings are reported: Undamaged ears = no feeding on ear; undamaged kernels = no feeding on filled kernels, may have feeding on unfilled tip.

ECB flight peaked 10 Jun and ended 1 Jul. CEW flight began 16 Jul. CEW larvae caused more damage than ECG. All treatments reduced ear damage, and all treatments except Dipel without sticker, suppressed CEW, compared with untreated checks. The best control of CEW and ECB was achieved with weekly Dipel ES and Surfix sprays combined with oil/Bt. direct silk treatment. A two-way ANOVA showed no difference between the two Bt products. Addition of a sticker or 2nd spray per week did not improve control, except in the % undamaged kernels, achieved with Dipel ES.

Treatment/ Formulation	Rate (form) /acre	Interval	Mean no. CEW/50 ears	Mean no. ECG/50 ears	% Undamaged ears	% Undamaged kernels
MVP	2.5 pt	weekly	8.8cd	0.8bc	82ab	89b
MVP + Surfix	2.5 pt 0.7 oz	weekly	12.0c	1.0bc	76bc	90ab
MVP + Surfix	2.5 pt 0.7 oz	2X/week	13.0bc	2.5ab	73bc	91ab
Dipel ES	2.5 pt	weekly	20.5ab	1.5bc	65c	81c
Dipel ES+ Surfix	2.5 pt 0.7 oz	weekly	12.3c	2.5ab	68bc	88b
Dipel ES + Surfix	2.5 pt 0.7 oz	2X/week	11.3c	1.0bc	76bc	93ab
Dipel ES + Surfix (foliar)	2.5 pt 0.7oz	weekly	2.5d	0.5c	91a	96a
Corn Oil + Dipel ES (0.5 ml/silk)	11.6 pt 1.1 pt.	once				
Untreated Check	none	none	21.5a	4.0a	51d	73d

Means in each column followed by the same letter are not significantly different (LSD, $P = 0.05$)

CORN (SWEET): *Zea mays* L. 'Rugosa NK-199' (45E)
Corn earworm (CEW): *Helicoverpa zea* (Boddie)
European corn borer (ECB): *Ostrinia nubilalis* (Hübner)
Dusky sap beetle (SB): *Carpophilus lugubris* Murray
Fall armyworm (FAW): *Spodoptera frugiperda* (J. E. Smith)

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FOLIAR SPRAYS TO CONTROL EAR INVADING INSECTS IN SWEET CORN, 1996: 'NK-199' sweet corn was planted in 4-row plots 100 ft in length on 31 May '96. Distance between rows was 3 ft. Distance between plants within the row was 8 inches. Plots consisted of 4 treatment rows with the center 2 rows serving as record rows. Plots were replicated 4 times in a RCB design. Sprays were applied with an International Harvester 770 Hi-Clear sprayer. The spray boom was adjusted to spray the silk area with each row being covered by 4 nozzles. The sprayer was equipped to treat 4 rows. All treatments were mixed in 10 gallons of water and applied at the rate of 25 gpa with 50 psi. Spray treatments were applied at 30% silk 20, 24 and 28 Jul. At harvest on 5 Aug, 50 ears from the center 2 rows of each plot were husked and evaluated for insect damage as fresh-market ears (clean, no damage evident), processing ears (evidence of tip feeding but less than 3.6 cm tip damage), and culls (tip damage beyond 3.6 cm to the side and/or bottom). All insects found within the husk or ear were identified.

Although insect pressure was only moderately heavy, damage in the untreated plots was well above threshold for both fresh market and processing sweet corn. Fresh market sweet corn should be at least 90% free of injury. Consequently, the high rate of Baythroid and Warrior were the only acceptable fresh market treatments. All treatments, except the low rate of Capture, gave acceptable control for processing sweet corn.

		Ear rating		Mean no. insect damaged ears/50 samples					
Treatment	Rate lb (AI)/acre	Mean no. fresh market ears/50 samples (clean)	Mean no. processing ears/50 samples (<3.6 cm damage)	Culls	CEW	FAW	SB	ECB	Combined Insects
Untreated Check	—	8.50d	28.75a	12.75a	24.25a	0.50 NS	0.50 NS	9.00a	7.25a
Baythroid 2 EC	0.025	43.00abc	4.75b	2.25b	3.50b	0.00	1.00	2.25b	0.25b
Baythroid 2 EC	0.044	46.75a	2.50b	0.75b	2.25b	0.00	0.25	0.75b	0.00b
Warrior 1 EC	0.025	45.50ab	2.75b	1.75b	2.75b	0.50	0.00	1.25b	0.00b
Pounce 3.2 EC	0.2	44.00abc	4.75b	1.25b	4.00b	0.00	0.25	1.75b	0.00b
Mustang 1.5 EC	0.038	45.00abc	4.75b	0.25b	3.75b	0.00	0.25	1.00b	0.00b
Capture 2 EC	0.25	40.75c	6.50b	2.75b	4.75b	0.25	1.00	2.50b	0.75b
Capture 2 EC	0.25	42.25bc	4.00b	3.75b	4.75b	0.25	0.75	2.00b	0.00b
TD-2344-02 .8 EC	0.035	44.00abc	4.75b	1.25b	3.50b	0.00	1.00	0.50b	1.00b

Means in a column followed by the same letter do not significantly differ at 5% level based on DMRT.