warmer conditions in this trial. Metribuzin applied postemergence at a rate of 0.5 lb. a.i./acre significantly increased smartweed control compared to a preemergence application of metribuzin at 0.75 lb. a.i./acre. Excellent control of bermudagrass was obtained with a postemergence application of fluazifop-butyl (0.25 lb. a.i./acre). All treatments receiving applications of the herbicide metolachlor had significantly improved yellow nutsedge control compared to the control treatment (no herbicide application) except when metolachlor was applied alone at the low rate (1 lb. a.i./acre).

Potato herbicide control programs need continued investigation as herbicide products available to the grower change. Also, control programs need to be tailored to the crop season, local conditions and growers cultural practices. In Dade County, for instance, frequent cultivation of the marl soil where potatoes are grown is required to counteract poor structure (4) and provide appropriate aeration. Most weed pests except nutsedge are controlled early in the crop season as growers cultivate and build beds. Future herbicide experimentation should address the affect of existing cultural practices and date of planting on the effectiveness of applied pre and postemergence herbicides.

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CONTROL OF LEPIDOPTEROUS PESTS OF SWEET CORN IN THE EVERGLADES

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Additional index words. Spodoptera frugiperda, Heliothis zea, fall armyworm, corn earworm, insecticides.

Abstract. **A field experiment was conducted to evaluate insecticides for control of lepidopterous pests of sweet corn. The infestation was primarily of fall armyworms (*Spodoptera frugiperda* J. E. Smith) and to a lesser extent corn earworms (*Heliothis zea* Boddie). The experimental compound PP 321 and the labelled materials thodicarb and sulprofos provided satisfactory ear protection. Granular methomyl provided excellent control until tasseling. Permethrin worked well early when the temperatures were relatively cool but declined in effectiveness during hot weather. Liquid methomyl and chlorpyrifos did not provide satisfactory control.**

Sweet corn is an important vegetable crop in the Everglades agricultural area of southern Florida. Several lepidopterous insect pests attack the crop, including the fall armyworm, *Spodoptera frugiperda*; the beet armyworm, *S. exigua; S. latisfascia* Walter; and the corn earworm, *Heliothis zea.* These pests, especially the fall armyworm, can occur in high densities and can cause severe damage to sweet corn. Consumer demands require that fresh-market sweet corn be virtually free of insect damage. As a result, sweet corn grown in south Florida receives numerous insecticide applications to control these pests. Taylor and Wilkowske (1) reported that an average of $221.25 per acre was spent on pesticides during the 1982-83 growing season. This figure represents over 21% of the total production costs for sweet corn. The purpose of this study was to compare the efficacy of 5 labelled and 4 unlabelled insecticides in controlling lepidopterous pests of sweet corn in the Everglades.

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Materials and Methods

The experiment was conducted at the Everglades Research and Education Center during Spring 1985. The sweet corn cultivar 'Summersweet 7800' was planted on 18 Mar. The plot was arranged in a randomized complete block design with 4 replications. Each subplot was 4 rows by 30 ft long with 2 row borders between plots and 5 ft bare alleyways between blocks. The 15 treatments are listed in Table 1.

All liquid treatments were applied with a backpack boom sprayer at 60 psi in 32 gal of water per acre. Methomyl granules were sprinkled over the row from a coffee can with holes punched in the lid. Treatments were made on 1, 8, 17, 22, and 29 Apr.; 7, 13, 15, 17, 20, 22, 24, and 28 May; and 3 and 7 June. No methomyl granules were applied on 17 Apr. Plots treated with methomyl granules prior to tasseling were treated with liquid methomyl at a rate of 2 pints/acre beginning 13 May.

On 24 Apr., 10 plants from each plot were dissected and live caterpillars present were counted. Caterpillars were considered small if less then 3/8-inch long and large if greater than 3/8-inch. On 24 Apr. and 9 May, 10 plants in each plot were rated for damage according to a 1-5 rating scale with 1 = no damage, 2 = slight damage, 3 = moderate damage, 4 = severe damage, and 5 = very severe damage and plants in jeopardy of not surviving or producing ear.

On 11 June, ears from 20 ft of row from each of the center 2 rows of each plot were hand harvested. All ears

Table 1. Insecticides, rates, and sources of treatments in sweet corn insecticide trial at Belle Glade EREC, Spring 1985.

Insecticide	Rate/Acre	Source
None	—	—
Methomyl L	1 pint	DuPont
Methomyl L	2 pints	DuPont
Methomyl (5G/L)	7 lb./2 pints	Asgrow/DuPont
Permethrin 2E	0.15 lb. ai	ICI Americas
Thiodicarb 3.2	0.75 lb. ai	Union Carbide
Thiodicarb 80DF	0.75 lb. ai	Union Carbide
Chlorpyrifos 50W	1.00 lb. ai	Dow
Sulprofos 6	1 pint	Mobay
PP 321 1EC	0.005 lb. ai	ICI Americas
PP 321 1EC	0.010 lb. ai	ICI Americas
PP 321 1EC	0.015 lb. ai	ICI Americas
PP 321 1EC	0.020 lb. ai	ICI Americas
PP 321 1EC	0.025 lb. ai	ICI Americas
Cyfluthrin 2EC	0.050 lb. ai	Mobay

Table 2. Mean number of small, large, and total fall armyworm larvae per 10 sweet corn plants in insecticide trial at Belle Glade EREC on 24 Apr. 1985.

Insecticide	Rate/acre	Small larvae[z]	Large larvae	Total larvae
PP 321	0.025 lb. ai	2.00 a	0.50 a	2.50 a
PP 321	0.020 lb. ai	3.00 a	0.75 a	3.75 a
Methomyl (5G/L)	7 lb./2 pts	5.75 ab	1.00 a	6.75
Permethrin	0.15 lb. ai	3.75 ab	3.75 ab	7.50 a
Cyfluthrin	0.050 lb. ai	5.75 ab	3.00 a	8.75 a
PP 321	0.010 lb. ai	5.25 ab	4.25 ab	9.50 a
PP 321	0.015 lb. ai	8.00 ab	2.50 ab	10.50 a
PP 321	0.005 lb. ai	8.00 ab	4.25 ab	12.25 ab
Sulprofos	1 pint	10.50 ab	3.25 ab	13.75 ab
Thiodicarb 3.2	0.75 lb. ai	10.25 ab	4.00 ab	14.25 ab
Methomyl L	2 pints	12.00 ab	3.00 a	15.00 ab
Thiodicarb 80DF	0.75 lb. ai	13.75 ab	2.75 a	16.50 ab
Chlorpyrifos	1.00 lb. ai	16.25 b	8.25 c	24.50 b
None	—	31.50 c	8.50 c	40.00 c
Methomyl L	1 pint	33.75 c	6.75 bc	40.50 c

[z]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 3. Mean caterpillar damage ratings (1-5 scale) for sweet corn on 24 Apr. and 9 May, 1985 in insecticide trial at Belle Glade EREC.

Insecticide	Rate/acre	Mean damage rating[z]	
		24 Apr.[y]	9 May
PP 321	0.025 lb. ai	1.38 a	1.43 a
PP 321	0.020 lb. ai	1.25 a	1.45 a
PP 321	0.015 lb. ai	1.78 abc	1.78 ab
Methomyl (5G/L)	7 lb.	2.63 ef	1.90 abc
Cyfluthrin	0.050 lb. ai	1.98 bcd	1.95 abc
Sulprofos	1 pint	2.10 bcde	1.95 abc
PP 321	0.010 lb. ai	1.70 ab	2.13 bcd
Thiodicarb 80DF	0.75 lb. ai	2.05 bcd	2.23 bcd
Thiodicarb 3.2	0.75 lb. ai	2.15 bcde	2.38 cd
Permethrin	0.15 lb. ai	1.68 ab	2.50 de
PP 321	0.005 lb. ai	1.98 bcd	2.53 de
Chlorpyrifos	1.00 lb. ai	2.33 cde	2.93 f
Methomyl L	2 pints	2.33 cde	3.30 f
Methomyl L	1 pint	2.35 de	4.25 g
None	—	2.93 f	4.53 g

[z]1-5 rating scale where 1 = no damage and 5 = very severe damage.
[y]Mean separation in columns by Duncan's multiple range test, 5% level.

were inspected for caterpillar damage. Ears were considered clean if they had no damage and were considered marketable if the damage were confined to the terminal inch of the ear. Plants in the harvested area and the total ears harvested were counted. Heights of 10 plants in the harvested area of each plot were also measured.

The infestation was fairly light early in the growing season and became very heavy later. The infestation was almost exclusively fall armyworms until ears began to form, but at harvest corn earworms constituted about 10% of the caterpillars observed.

Results and Discussion

Data in Table 2 show the mean number of larvae per 10 plants in 24 Apr. Chloropyrifos, the 1 pint per acre rate of liquid methomyl, and the untreated sweet corn had significantly higher numbers of small larvae than other treatments. The higher rates of PP 321 and methomyl granules were very effective at controlling both small and large larvae. Permethrin seemed to have controlled the small larvae better than the large larvae. Thiodicarb had fairly high numbers of small larvae and low numbers of large larvae, which may indicate that it is a rather slow acting material.

The damage ratings on 24 Apr. (Table 3) agree fairly closely with the caterpillar counts except for granular methomyl. Two factors may have led to this discrepancy; skipping the treatment on 17 Apr. and difficulty in getting enough of the granules down in the whorl when the plants were very small. Again, PP 321 and permethrin performed very well and a middle group consisted of the 2 formulations of thiodicarb, cyfluthrin, and sulprofos. The damage in the untreated was only moderate (2.93).

By 9 May, the caterpillar damage was quite severe, with an average rating of 4.53 in the untreated. The 3 higher rates of PP 321, granular methomyl, cyfluthrin, and sulprofos provided the best control. PP 321 at 0.010 lb. ai/acre and the thiodicarb formulations performed well. Permethrin appeared to be losing its effectiveness, possibly because of the hot weather. Liquid methomyl and chloropyrifos did not adequately control the caterpillars.

At harvest there were no significant differences between treatments in plant stand. The only difference in the number of ears was that the untreated had fewer than the other treatments. Table 4 summarizes the harvest weights and plant height measurements. The higher rates of PP 321, 2 formulations of thiodicarb, permethrin, cyfluthrin, and granular methomyl produced acceptable yields. There was a strong linear correlation between mean plant height and mean yields ($R^2=0.73$). The 3 higher rates of PP 321, thiodicarb, cyfluthrin, and sulprofos resulted in the highest percentages of clean ears (Table 5). No undamaged ears were found in the untreated. Thiodicarb, PP 321 at the 3 higher rates, and sulprofos gave good control with regard to percentage of marketable ears. Chloropyrifos, liquid methomyl at 1 pint per acre, and the untreated provided unsatisfactory control and the others were intermediate.

Whenever a single material is evaluated at several rates, the relationship between rate and efficacy should be examined. The relationship between rates of PP 321 and 4 measures of its performance is described by the following equations:

Table 4. Mean sweet corn harvest weights (per 40 ft), and plant heights in insecticide trial at Belle Glade EREC, spring 1985.

Insecticide	Rate/acre	Weight (lb.)[z]	Height (ft)
PP 321	0.025 lb. ai	31.9 a	6.19 ab
Thiodicarb 3.2	0.75 lb. ai	31.3 ab	5.73 cd
Permethrin	0.15 lb. ai	31.1 ab	5.87 abc
PP 321	0.020 lb. ai	30.3 abc	6.22 a
Cyfluthrin	0.050 lb. ai	29.8 abc	6.07 abc
PP 321	0.010 lb. ai	29.6 abc	5.74 cd
PP 321	0.015 lb. ai	29.4 abc	5.87 abc
Thiodicarb 80DF	0.75 lb. ai	28.6 abc	5.80 bcd
Methomyl (5G/L)	7 lb.	28.3 abc	5.71 cd
PP 321	0.005 lb. ai	27.3 bc	5.67 cd
Sulprofos	1 pint	27.3 bc	5.82 abcd
Methomyl L	2 pints	26.8 c	5.28 e
Chlorpyrifos	1.00 lb. ai	26.4 c	5.44 de
Methomyl L	1 pint	22.0 d	4.80 f
None	—	9.4 e	4.67 f

[z]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 5. Mean percentages clean and marketable sweet corn ears harvested in insecticide trial at Belle Glade EREC, Spring 1985.

Insecticide	Rate/acre	Clean ears[z]	Marketable ears[y]
PP 321	0.025 lb. ai	91.2 a	93.8 a
PP 321	0.020 lb. ai	81.4 ab	92.4 a
PP 321	0.015 lb. ai	75.2 b	86.5 ab
Thiodicarb 3.2	0.75 lb. ai	68.5 bc	95.0 a
Thiodicarb 80DF	0.75 lb. ai	61.0 cd	95.4 a
Cyfluthrin	0.050 lb. ai	60.6 cd	77.0 abc
Sulprofos	1 pint	55.3 cd	90.8 ab
Permethrin	0.15 lb. ai	50.6 de	71.8 abc
PP 321	0.010 lb. ai	50.4 de	73.0 abc
PP 321	0.005 lb. ai	47.1 de	71.5 abc
Methomyl L	2 pints	38.9 ef	79.3 abc
Chlorpyrifos	1.00 lb. ai	31.0 fg	61.8 bc
Methomyl (5G/L)	7 lb	19.6 gh	80.1 abc
Methomyl L	1 pint	9.1 hi	52.4 cd
None	—	0.0 i	33.4 d

[z]Mean separation in columns by by Duncan's multiple range test, 5% level.
[y]Ears considered marketable if damage confined to terminal 1 inch of ear.

$$\text{Height} = 5.48 + 30.4\text{Rate} \quad (R^2=0.89) \qquad [1]$$
$$\text{Weight} = 26.7 + 200\text{Rate} \quad (R^2=0.90) \qquad [2]$$
$$\text{PCTCL} = 33.3 + 2381\text{Rate} \quad (R^2=0.94) \qquad [3]$$
$$\text{PCTMKT} = 64.2 + 1280\text{Rate} \quad (R^2=0.91) \qquad [4]$$

where Height = mean plant height in ft
Rate = rate of PP 321 in lb. ai/acre
Weight = weight (lbs) of harvested ears/40 ft
PCTCL = percentage clean ears
PCTMKT = percentage marketable ears

In conclusion, it appears from this study that the labelled insecticides thiodicarb and sulprofos will provide good control of lepidopterous pests of sweet corn throughout the season. Granular methomyl will provide good control until tasseling. Permethrin appears to lose some of its effectiveness in hot weather, but gives good control during most of the season. The experimental material PP 321 appears to have great potential as a sweet corn insecticide for the future, probably at a rate of about 0.020 lb. ai/acre.

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EVALUATION OF SUMMER SQUASH CULTIVARS FOR SUSCEPTIBILITY TO POWDERY MILDEW

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Abstract. **The susceptibility of summer squash (*Curcurbita pepo* L.) cultivars to powdery mildew (*Erysiphe cichoracearum* DC, *Sphaerotheca fuliginea* (Schlect.) Pollacci was evaluated on 3 seasons at the Tropical Research and Education Center, Homestead. Cultivar differences in susceptibility were evident. Generally, yellow crookneck types were more susceptible than zucchini types. Among the currently popular commercial cultivars, 'Sundance' and 'Dixie' were most susceptible and 'Cracker' least susceptible to powdery mildew. 'Sunrise' also was rated highly susceptible to this disease. The zucchini types 'President', 'Richgreen', and 'Burpee Hybrid' tended to have lower disease ratings. In the 1985 test, 'Early Summer Gold', a yellow crookneck type, was rated substantially less susceptible to powdery mildew than any cultivar previously tested. The occurrence of the more difficult-to-control *S. fuliginea* in Dade County suggests that integration of cultivar choice with chemical sprays will become even more important for management of cucurbit powdery mildew.**

Summer squash, *Cucurbita pepo*, is grown extensively in Florida. All three types of summer squash, yellow crookneck, yellow straightneck, and green zucchini are important in one or more of the squash-producing areas of the