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.

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

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

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state. According to a recent report (5), powdery mildew caused by *Erysiphe cichoracearum* or *Sphaerotheca fuliginea*, is one of the more important problems facing Florida producers.

Fungicides have traditionally played an important role in squash powdery mildew control. However, in tests conducted in Dade County in the early 1980's several registered fungicides considered to be industry standards did not provide satisfactory control (6,8). Triadimefon (Bayleton, Mobay Chemicals) (8), a very effective mildicide, has recently been registered on cucurbits by the U. S. Environmental Protection Agency. This "site-specific" fungicide, sensu Samoucha and Cohen (7), may be expected to be more prone to development of resistance in pathogen populations than is the case with broad-spectrum, protectant fungicides.

We have noted what appear to be differences in the degree of powdery mildew severity among cultivars of summer squash grown in commercial fields in Dade County. Use of less-susceptible cultivars should enhance chemical control of this disease. Therefore, a series of field trials was established to evaluate summer squash cultivars for relative susceptibility to powdery mildew, with emphasis on cultivars already released for commercial use.

Materials and Methods

A total of 18 summer squash cultivars were tested for relative susceptibility to powdery mildew in 3 years of field trials at the IFAS, University of Florida, Tropical Research and Education Center (TREC), Homestead, beginning in 1983. Cultivars tested, seed company source, cultivar type, and year(s) tested are shown in Table 1.

The experimental design, cultural practices, pest management tactics, and powdery mildew evaluation methods were similar in all 3 experiments. Planting dates were 3 Mar. 1983, 25 Jan. 1984, and 3 Jan. 1985. Squash were direct-seeded into a Rockdale series soil, pH approximately 7.8. In each trial, 13 treatments (cultivars) were replicated 4 times in a randomized complete block design. Individual test plots consisted of 2 rows 4.6 m long on 0.91 m centers. A distance of 9.1 m was left between plots in all directions in order to minimize interplot interference.

Table 1. Summer squash cultivars evaluated for susceptibility to powdery mildew, TREC, Homestead, 1983-1985.

Cultivar	Seed company source	Cultivar type	Years tested
ACX-31	Abbott and Cobb	yellow crookneck	1984
Burpee Hybrid	Burpee	zucchini	1983,1984,1985
Castlehy 4022	Castle	zucchini	1983
Cracker	Peto	yellow crookneck	1983,1984,1985
Dixie	Asgrow	yellow crookneck	1983,1984,1985
Early Summer Gold	Northrup King	yellow crookneck	1985
Gold Rush	Peto	zucchini (gold skin)	1984,1985
Hyrific	Ferry Morse	yellow crookneck	1983,1984,1985
Lemondrop	Asgrow	yellow straightneck	1983,1984,1985
NVH 3653	Northrup King	yellow straightneck	1983
NVH 3658	Northrup King	yellow crookneck	1983
President	Peto	zucchini	1984,1985
Richgreen	Burpee	zucchini	1983
Senator	Asgrow	zucchini	1983,1984,1985
Seneca Butterbar	Robson	yellow straightneck	1983,1984,1985
Seneca Zucchini	Robson	zucchini	1983,1984,1985
Sundance	Peto	yellow crookneck	1984,1985
Sunrise	Northrup King	yellow crookneck	1984,1985

At planting the crop received 449 kg/ha of 8-7-13.3 fertilizer. A supplemental application of 449 kg/ha of the same analysis fertilizer was made 4 weeks after planting.

Weed control consisted of a pre-emergence application of chloramben at 3.37 kg a.i./ha and periodic mechanical cultivation and hand-weeding. Foliar diseases other than powdery mildew were controlled by weekly applications of mancozeb (1.35 kg a.i./ha), supplemented with occasional applications of a mixture of metalaxyl (0.17 kg a.i./ha) and mancozeb (0.81 kg a.i./ha) as needed for downy mildew control.

Weekly applications of methomyl (0.51 kg a.i./ha) or fenvalerate (0.11 kg a.i./ha) were made for lepidopterous pests. Methamidophos (1.12 kg a.i./ha) was applied as needed for management of leafminers (*Liriomyza spp*).

Once powdery mildew appeared, weekly evaluations were made of the amount of disease in each plot. Disease ratings were continued until either powdery mildew became uniformly damaging among all the treatments or plants became naturally senescent after a number of weeks of heavy fruiting. Evaluation periods typically lasted 3-4 weeks.

A number of methods for assessment of powdery mildew intensity were used. When individual foci of the powdery mildew fungus growth were discernable, foci on both the adaxial and abaxial surfaces of 6 leaves per plot were counted. In some cases Horsfall-Barratt (3) ratings of the amount of leaf surface covered by mildew were made on these same sample leaves. In the latter stages of some experiments, coalescence of foci made it difficult to assess actual foci numbers; in these cases, Horsfall-Barratt ratings only were used.

Count data and Horsfall-Barratt ratings were subjected to analysis of variance and where F-tests indicated significant differences in arrays ($P \leqq 0.05$), means were separated by Waller-Duncan's method at $P \leqq 0.05$. In the 1984 and 1985 experiments, the count data (number of foci) were tested for homogeneity of variances (4),and appropriate transformations were used, if needed, before analysis of variance.

Results and Discussion

Cultivar differences in susceptibility to powdery mildew were evident in all 3 years of this study. In the 1983 trial, generally lower disease ratings were recorded for cultivars 'Senator', 'Richgreen', and 'Seneca zucchini' (all zucchini types) (Table 2). Higher disease ratings were most often found with cultivars 'Sundance', 'NVH 3658', 'Hyrific', and 'Dixie' (all yellow crookneck types).

In the 1984 trial, 'Dixie' and 'Sundance' again had some of the highest disease ratings over most of the evaluation period (Table 3). 'Goldrush' (a gold-skinned zucchini type) was noteworthy in this trial for its generally lower powdery mildew ratings. On 19 and 26 Mar., ratings on 'Goldrush' were statistically lower than those on the more susceptible cultivars (Table 3). Other cultivars with comparatively low disease ratings were 'President' (19 Mar.) and 'Burpee Hybrid' (26 Mar.)

Table 2. Powdery mildew severity ratings for 13 summer squash cultivars in 1983 in Homestead TREC, Dade county, Fla.

Cultivar	Date: 7 April No. of foci[z]	7 April Horsfall-Barratt rating	18 April No. of foci[z]	18 April Horsfall-Barratt rating	25 April Horsfall-Barratt rating
NVH 3658	60.2 N.S.	2.25 ab[y]	574.8 ab	4.75 N.S.	9.00 abcd
Cracker	39.5	2.50 a	501.8 ab	4.25	10.00 ab
Hyrific	33.5	2.00 ab	638.5 ab	4.75	8.75 abcd
Lemondrop	31.5	2.00 ab	527.2 ab	4.50	9.00 abcd
Dixie	26.2	1.75 ab	676.2 ab	4.25	10.50 a
Castlehy 4022	20.0	1.50 ab	409.5 ab	2.75	7.75 bcde
Burpee Hybrid	16.5	1.75 ab	358.8 ab	3.00	5.75 e
Richgreen	15.8	1.75 ab	240.0 b	3.00	7.00 de
Sundance	12.5	2.00 ab	859.0 a	4.75	10.00 ab
Seneca Butterbar	12.0	1.25 b	428.8 ab	3.75	9.50 abc
Seneca Zucchini	10.8	1.75 ab	351.2 ab	3.25	7.50 cde
NVH 3653	6.8	2.00 ab	396.0 ab	3.50	8.50 abcd
Senator	1.8	1.25 b	419.2 ab	2.75	7.50 cde

[z]Mean number of discrete areas of powdery mildew growth on both adaxial and abaxial leaf surfaces on 6 midcanopy leaves per plot.
[y]Means separation in columns according to Waller-Duncan's mean separation test, 5% level.

Table 3. Powdery mildew severity ratings for 13 summer squash cultivars in 1984 in, Homestead, Dade county, Fla.

Cultivar	Date: 12 March No. of foci[z]	19 March No. of foci[z]	26 March Horsfall-Barratt rating (abaxial)	2 April Horsfall-Barratt rating (adaxial)
Dixie	89 N.S.[w]	931 a[y]	10.2 a	5.2 bc
Sundance	88	620 ab	10.0 ab	4.0 cde
Lemondrop	70	509 bc	10.2 a	3.5 de
Seneca Butterbar	66	475 bc	9.8 ab	4.2 cd
ACX-31	22	446 bc	9.0 bcd	2.8 c
Seneca Zucchini	70	438 bc	9.5 abc	5.8 b
Burpee Hybrid	14	392 bc	6.8 e	4.5 bcd
Hyrific	15	355 bc	9.5 abc	4.2 cd
Sunrise	23	340 bc	8.5 cd	2.8 e
Cracker	56	334 bc	9.8 ab	4.2 cd
Senator	39	216 bc	9.5 abc	4.8 bcd
President	60	204 bc	8.0 d	4.8 bcd
Gold Rush	55	192 c	8.2 d	7.8 a

[z]Mean number of discrete areas of powdery mildew growth on both adaxial and abaxial leaf surfaces on 6 midcanopy leaves per plot.
[y]Mean separation in columns according to Waller-Duncan's mean separation test, 5% level.
[w]NS = not significantly different.

Table 4. Powdery mildew severity ratings for 13 summer squash cultivars in 1985 in Homestead TREC, Dade county, Fla.

Cultivar	Date: 20 Feb. No. of foci[z]	27 Feb. No.of foci[z]	6 March No.of foci[z]	13 March No. of foci	13 March Horsfall-Barratt rating
Sundance	26.2 a[y]	33.0 ab	135 a	446 a	3.25 ab
Sunrise	19.8 a	50.1 a	99 ab	375 ab	2.50 abc
Dixie	15.0 a	10.5 bc	60 abc	272 abc	3.50 a
Hyrific	5.2 a	6.6 bc	25 bcd	190 bcd	2.25 bc
Lemondrop	12.9 a	10.4 c	13 d	172 abcde	2.25 bc
Goldrush	9.5 a	9.6 c	22 cd	149 abcde	2.00 c
Seneca Zucchini	8.7 a	10.3 c	20 cd	139 bcde	2.25 bc
Seneca Butterbar	6.1 a	10.1 c	27 bcd	112 bcde	2.00 c
Burpee Hybrid	28.7 a	11.1 bc	15 cd	101 cde	2.00 c
President	6.4 a	6.0 c	7 d	85 cde	2.00 c
Senator	11.3 a	41.1 a	97 ab	80 cde	2.00 c
Cracker	4.4 a	9.8 c	29 bcd	62 de	2.00 c
Early Summer Gold	0.49 b	5.7 c	9 d	57 e	2.00 c

[z]Mean number of discrete areas of powdery mildew growth on both adaxial and abaxial leaf surfaces on 6 midcanopy leaves per plot.
[y]Mean separation in columns according to Waller-Duncan's mean separation test, 5% level.

In the 1985 trial, powdery mildew on 'Early Summer Gold' was markedly less severe than on most of the other cultivars tested (Table 4). For example, on 20 Feb. and 6 Mar., the average number of mildew foci per 6 midcanopy leaves of 'Early Summer Gold' was only 2% and 7%, respectively, of that found on 'Sundance', the most heavily diseased cultivar on each date. 'President' and 'Cracker' also had generally lower disease ratings.

Mildew ratings were consistently higher on the yellow crookneck cultivars 'Sundance', 'Sunrise', and 'Dixie' (Table 4).

It is evident from these 3 years of replicated field trials that differences in susceptibility to powdery mildew exist among several of the common commercial cultivars of summer squash. The zucchini type squash were, on a whole, less susceptible to powdery mildew than the yellow squashes. In almost all cases, the cultivars noted as less susceptible to powdery mildew have been zucchini types. 'Richgreen', and 'Burpee Hybrid' were among the least diseased zucchini cultivars.

The yellow crookneck types 'Sundance' and 'Dixie' (currently popular in commercial plantings in Dade County) and 'Sunrise' were among the most susceptible varieties tested. Frequent applications of fungicide are made to summer squash in Dade County to contain powdery mildew below damaging levels. The recent registration of triadimefon has helped growers control this disease where inconsistent results have been seen with older materials (6,8). Use of highly susceptible cultivars certainly suggests increased dependence on a one-dimensional control program.

Recently, at least one case of reduced performance of triadimefon has been noted in Dade County. Spilker and Noegel (9) have warned that triadimefon is less effective against *S. fuliginea* than against *E. cichoracearum*. Using differences in conidial characteristics between the 2 genera (9), we did, indeed, find a large portion of the powdery mildew foci in this field to be *S. fuliginea*. This observation supports the thesis that extensive use of systemic, "site-specific" (7) fungicides can lead to rapid reduction in fungicide performance in commercial fields.

Development of tolerance to highly effective, albeit narrow spectrum, fungicides could conceivably be mitigated by the use of an integrated approach to control of powdery mildew. 'Cracker' has compared favorably in horticultural characteristics with other yellow squash cultivars in other parts of the state (1,2). It may be a candidate for more extensive planting in Dade County.

The excellent performance of 'Early Summer Gold' in our tests suggests that it also be considered for increased commercial use. However, this cultivar is an open pollinated variety, with lower yield potential than the hybrids currently used in commercial production. The greatest potential for 'Early Summer Gold' can be as a source of germplasm for the development of improved cultivars with lower susceptibility to powdery mildew, good yields, and favorable quality traits.

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EVALUATION OF MUSKMELON CULTIVARS FOR SOUTHWEST FLORIDA: SPRING AND FALL 1984

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Abstract. **Muskmelon (*Cucumis melo* L. var. *reticulatus* Ser.) cultivars and advanced breeding lines were evaluated in replicated trials during Spring and Fall 1984 at the Gulf Coast Research and Education Center in Bradenton, Fla. Nineteen entries in the spring and 20 in the fall were examined for marketable yield, earliness of production, and fruit characteristics such as length, diameter, weight, cavity size, flesh width, and soluble solids. In the spring, yields ranged from 100 to 286 hundredweight/acre. There were no significant differences among 'Ambrosia', 'Florida 93-8', 'Edisto 47', 'Planter's Jumbo', 'Magnum .45', 'Summet', and 'Dixie Jumbo' with respect to high yield. Three cultivars produced fruit with soluble solids above 12% ('Galia', 'Florida 93-8', and 'Florida 93-71'). Only 'Saticoy' was below U.S. No. 1 grade of 9% soluble solids. In the fall, yields ranged from 164 to 378 hundredweight/acre. Greatest yields came from 'Planter's Jumbo'**

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