

## Grafted Seedless Watermelon Trial in Southwest Indiana (2006)

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### Objectives

The objectives of the study were to investigate the managing tactics for insect and disease and the yield potential of grafted seedless watermelon in southwest Indiana.

### Materials and Methods

*Experimental Design.* A field study was conducted at Steve Nowaskie's Farm near Vincennes, Indiana during 2006. Watermelons, *Citrullus lanatus* (Thunb.) Matsum. & Nakai, were grafted by using Shintoza squash (*Cucurbita maxima* x *Cucurbita moschata*) as the rootstock (Cox Farms, Inc., Gaston, IN). Two varieties of Grafted seedless watermelons (Coopterstown triploid and Shintoza and PX8033-5335 and Shintoza) and one variety of non-grafted seeded watermelon (Royal Sweet) were conducted in this trial.

The experimental design was a split-plot arrangement with calendar based insecticide schedule and IPM insecticide schedule as the main plot and varieties as the subplots. Four replications were conducted in the trial. For calendar based schedule, insecticides were applied every 7-day, whereas for IPM schedule insecticide were applied when insect density reached an average of one cucumber beetle per plant or 30% of plants infected by aphids. Plants were spaced 4 ft within rows and 8 ft between rows. Each row was 32 ft long and mulched with 4-ft-wide black plastic. In each row, there were seven watermelon transplants and pollinator (Companion pollinator and Shintoza) were transplanted in the same hole of plant numbers 2 and 6. All varieties of watermelons were transplanted on May 26, including the pollinator. In each replication, four rows were planted for each variety of watermelon.

*Insect Populations.* Insect populations in the study were sampled once a week after the watermelon was transplanted in the field to the week before harvest. Ten plants were selected randomly for counts of cucumber beetles and aphids in each treatment. The numbers of cucumber beetles observed in the sampling unit (10 plants) were recorded; however, the numbers of plants infected by aphids in the sampling unit were reported.

*Disease.* Disease incidence was checked and recorded once a week after the watermelon was transplanted in the field to the week before harvest.

*Yield.* The watermelons from each treatment were harvested from July 26 through August 17. Only marketable fruits from each treatment were harvested and number and weight were recorded.

*Data Analyses.* The numbers of insects on 10 selected plants in each treatment on each sampling date were calculated. The total number and weight of watermelons in each treatment were summarized. Analyses of variance and Tukey's multiple comparison (SAS Institute 1999) were used to compare the difference in insect densities and watermelon yield among treatments.

## Results and Discussion

*Insect Populations.* The pest populations were relatively low in the plots of the trial. The major insect species observed in the study were: Striped, *Acalymma vittatum* (F.), and spotted, *Diabrotica undecimpunctata howardi* Barber, cucumber beetles (Coleoptera Chrysomelidae) and aphids, including melon aphid, *Aphis gossypii* Glover, and green peach aphid, *Myzus persicae* (Sulzer), (Homoptera: Aphididae). On the split-plot of calendar based schedule, Pounce EC (6 fl oz/A) was applied on May 19, June 23, June 30, and July 7 and Thiodan EC (64 fl oz/ A) was applied on May 26, June 2, June 9, July 14, and 21. On the IPM schedule split-plot, Thiodan EC (64 fl oz/ A) was applied once on June 2.

Results of the analyses on cucumber beetle numbers on plants and number of plants infected by aphids in each treatment are listed in Table 1. There were no significant differences in striped ( $F = 2.18$ ,  $df = 5$ ,  $P = 0.06$ ) and spotted ( $F = 0.99$ ,  $df = 5$ ,  $P = 0.42$ ) cucumber beetles and aphids ( $F = 1.53$ ,  $df = 5$ ,  $P = 0.18$ ) among treatments.

*Disease.* No disease incidence was observed in the plots during the study.

*Yield.* The means of marketable watermelons in number and weight from each treatment are presented in Table 2. Significantly higher in numbers were observed on the two grafted seedless watermelons than the non-grafted seeded watermelon ( $F = 12.89$ ,  $df = 5$ ,  $P < 0.01$ ). However, no significantly different in total weight per treatment were observed among the varieties ( $F = 1.12$ ,  $df = 5$ ,  $P = 0.39$ ). The average weight per melon was observed significantly higher in the non-grafted seeded watermelon than those grafted seedless watermelons ( $F = 73.59$ ,  $df = 5$ ,  $P < 0.01$ ). Furthermore, between the grafted seedless watermelons the average weight per melon was significantly higher in the Cooperstown triploid and Shintoza than the PX8033-5335 and Shintoza.

**Table 1. Mean numbers of striped and spotted cucumber beetles and numbers of plants infected by aphids in 10 selected plants of watermelon (2006)**

Variety	Insecticide	Cucumber beetles <sup>abc</sup>		Aphids <sup>abd</sup>
		Striped	Spotted	
Cooperstown triploid and Shintoza (stock)	Calendar based schedule <sup>e</sup>	0.08 ± 0.05	0.14 ± 0.09	0.39 ± 0.11
PX8033-5335 and Shintoza (stock)	Calendar based schedule <sup>e</sup>	0.08 ± 0.06	0.06 ± 0.04	0.36 ± 0.12
Royal Sweet	Calendar based schedule <sup>e</sup>	0.11 ± 0.05	0.08 ± 0.05	0.72 ± 0.24
Cooperstown triploid and Shintoza (stock)	IPM schedule <sup>f</sup>	0.22 ± 0.12	0.17 ± 0.07	0.58 ± 0.12
PX8033-5335 and Shintoza (stock)	IPM schedule <sup>f</sup>	0.39 ± 0.12	0.28 ± 0.14	0.5 ± 0.12
Royal Sweet	IPM schedule <sup>f</sup>	0.33 ± 0.11	0.22 ± 0.08	0.89 ± 0.21
LSD		0.37	0.34	0.67
Dates (n)		9	9	9
P > F		0.06	0.42	0.18

<sup>a</sup> Mean ± SEM of four replications on nine sampling dates.

<sup>b</sup> Mean within a column followed by the same letter are not significantly different at the  $P = 0.05$  level (LSD).

<sup>c</sup> Numbers of insects per 10 selected plants.

<sup>d</sup> Number of plants infected in the 10 selected plants.

<sup>e</sup> Spray insecticide every 7-day.

<sup>f</sup> Spray insecticide when cucumber beetles  $\geq 1$  per plant or plants infected by aphids  $\geq 3$ .

**Table 2. Mean yield in number and weight of watermelon (2006)**

Variety	Insecticide	Number <sup>ab</sup>	Weight (lb) <sup>ab</sup>	
			Per treatment	Per melon
Cooperstown triploid and Shintoza (stock)	Calendar based schedule <sup>c</sup>	31.0 ± 1.87 a	487.55 ± 19.0	15.79 ± 0.34 b
PX8033-5335 and Shintoza (stock)	Calendar based schedule <sup>c</sup>	35.0 ± 1.78 a	479.21 ± 22.54	13.71 ± 0.26 c
Royal Sweet	Calendar based schedule <sup>c</sup>	20.5 ± 1.55 b	425.69 ± 32.27	20.78 ± 0.43 a
Cooperstown triploid and Shintoza (stock)	IPM schedule <sup>d</sup>	30.0 ± 0.41 a	474.97 ± 4.5	15.84 ± 0.12 b
PX8033-5335 and Shintoza (stock)	IPM schedule <sup>d</sup>	33.75 ± 2.84 a	446.96 ± 29.74	13.32 ± 0.44 c
Royal Sweet	IPM schedule <sup>d</sup>	21.0 ± 1.08 b	441.49 ± 21.03	21.07 ± 0.6 a
LSD		7.89	104.73	1.78
P > F		< 0.01	0.39	< 0.01

<sup>a</sup> Mean ± SEM of four replications.

<sup>b</sup> Mean within a column followed by the same letter are not significantly different at the  $P = 0.05$  level (LSD).

<sup>c</sup> Spray insecticide every 7-day.

<sup>d</sup> Spray insecticide when cucumber beetles  $\geq 1$  per plant or plants infected by aphids  $\geq 3$ .