

ZUCCHINI: *Cucurbita pepo* L. ‘Tigress’

Squash Bug and Striped Cucumber Beetle Control with Insecticides Allowed for Organic Production, 2014*

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Gourd (pumpkin, squash) | *Cucurbita* spp.

squash bug | *Anasa tristis*

striped cucumber beetle | *Acalymma vittatum*

(1*S*)-2-methyl-4-oxo-3-(2*Z*)-2,4-pentadien-1-yl-2-cyclopenten-1-yl (1*R*,3*R*)-2,2-dimethyl-3-(2-methyl-1-propen-1-yl) cyclopropa-necarboxylate; dimethyl(2*aR*,3*S*,4*S*,4*aR*,5*S*,7*aS*,8*S*,10*R*,10*aS*,10*bR*)-10-(acetyloxy)octahydro-3,5-dihydroxy-4-methyl-8-[[[(2*E*)-2-methyl-1-oxo-2-butenyl]oxy]-4-[[[1*aR*,2*S*,3*aS*,6*aS*,7*S*,7*aS*]-3*a*,6*a*,7,7*a*-tetrahydro-6*a*-hydroxy-7*a*-methyl-2,7-methanofuro[2,3-*b*]oxireno[*e*]oxepin-1*a*(2*H*)-yl]-1*H*,7*H*-naphtho[1,8-*bc*:4,4*a-c'*]difuran-5,10*a*(8*H*)-dicarboxylate; oils; anhydrous aluminum silicate; Veratridine; Cevadine

This trial was conducted to evaluate insecticides allowed for use in organic production. The trial was conducted on a field at Cornell’s New York State Experiment Station in Geneva, NY managed using practices allowed for organic production since 2008. Zucchini “Tigress” was seeded in the greenhouse 29 May and transplanted on 16 Jun into raised beds with 1.25 mil black polyethylene and drip irrigation tape. A solution of 0.5 oz/gal Fertrell fish oil emulsion was applied to all plants at transplanting. Annual ryegrass was seeded between the rows for weed control and mowed periodically as needed. Six treatments and an untreated check were arranged in a RCB design with four replications. Each plot consisted of six plants spaced 18 inch apart with 7 ft between rows and 3 ft between treatments. Sprays (with the exception of Surround) were applied with a CO₂ pressurized backpack sprayer at 40 psi delivering 40 gpa through two TeeJet 8002VS flat fan nozzles spaced 19 inch apart. Surround was applied to thoroughly cover the foliage, using a hand pump pressurized sprayer with a single nozzle. Treatments included: Azera (1.4% pyrethrum plus 1.2% azadirachtin) at 3.5 pt/acre, Grandevo (*Chromobacterium substugae* strain PRAA4-1 and spent fermentation media) at 2 lb/acre, Venerate (heat-killed *Burkholderia* spp. strain A396 cells and spent fermentation media), Veratran (Sabadilla alkaloids) at 15 lb/acre, Surround (kaolin clay) at 0.5 lb/gal, and an untreated check. The first spray was applied 10 Jul, the day after plots were infested with striped cucumber beetles (adults)

collected from a nearby location. Approximately 20 beetles were released onto each plot. Four more sprays were applied on 16 and 24 Jul, and 1 and 8 Aug. On 22 July, striped cucumber beetles were counted on each plant. On 8 Aug, squash bugs were counted on five randomly chosen leaves on each plant. Because of lack of fit to a normal distribution despite transformation, data were analyzed using the Kruskal–Wallis non-parametric test. Steel–Dwass All Pairs tests were conducted to separate treatment means. Average maximum temperatures for 16–30 Jun, all Jul, and 1–7 Aug were 80, 78, and 77°F, respectively; average minimum temperatures were 59, 59, and 60°F. Rainfall amounts (inch) were 2.1, 7.8, and 1.1 for 16–30 Jun, all Jul, and 1–7 Aug, respectively.

Striped cucumber beetle numbers were low (0.38 per plant) in the untreated check and there were no significant differences among the treatments and the untreated check (Table 1). The lowest number of beetles was in the Surround treatment, which is the current standard treatment for organic farmers in the Northeast. Therefore, further tests under higher population pressure are warranted.

Squash bug numbers were moderate with 7.2 insects per 5 leaves in the untreated check (Table 2). Only Azera and Grandevo provided significantly better control compared to the untreated check and all other treatments were not significantly different from the Azera and Grandevo treatments.

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Table 1

Treatment/formulation	Rate-amt/acre	Average no. beetles per plant
Venerate	4 qt	0.50a
Veratran D	15 lb	0.42a
Grandevo	2 lb	0.42a
Untreated check		0.38a
Azera	3.5 pt	0.20a
Ecotec	4 pt	0.20a
Surround	0.5 lb/100 gal	0.04a

Means followed by the same lower case letters within a column are not significantly different (Steel–Dwass All Pairs, $P > 0.05$).

Table 2

Treatment/formulation	Rate-amt/acre	Mean no. squash bugs per five leaves
Ecotec	4 pt	9.8ab
Untreated check		7.2a
Veratran D	15 lb	5.1ab
Venerate	4 qt	4.7ab
Surround	0.5 lb/gal	2.7ab
Grandevo	2 lb	2.5b
Azera	2 lb	1.9b

Means followed by the same lower case letters within a column are not significantly different (Steel–Dwass All Pairs, $P > 0.05$).