

# Insecticides for Whitefly Control in Cantaloupes

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## Abstract

Several experimental insecticide treatments alone or in combinations were evaluated and demonstrated efficacy against *Bemisia argentifolii* [silverleaf whitefly (WF) also known as sweet potato WF, *B. tabaci*]. At each rating date following each of four applications, the number of adult and immature WF were reduced relative to the untreated check. CGA-215944 (Ciba) treatment combinations were similar at each rating date and significant differences could not be distinguished between the addition of fenoxycarb (Ciba) or CGA-59205 (Ciba). Combinations of insecticides or alternating with insect growth regulators (IGR's) also significantly reduced numbers of WF adults and immatures similar to the standard treatment of bifenthrin (Capture®) plus endosulfan. A single application of pyriproxyfen (Valent) was followed by different treatments [endosulfan followed by fenpropathrin (Danitol®) plus methamidaphos (Monitor®) followed by endosulfan] at each application date. Buprofezin (Applaud®) was combined or alternated with endosulfan at each application and similar reduction of WF was observed. Pyridaben (BASF) did not adequately reduce WF adults and immatures relative to the standard treatment in this test. The Ciba compounds and single or multiple applications of the IGR's, pyriproxyfen and Applaud were highly effective in substantially reducing WF immatures and adults in this test.

## Introduction

Whiteflies [*Bemisia argentifolii*, silverleaf whitefly (WF) also known as sweet potato WF, *B. tabaci*] is a primary insect pest of melons grown in the desert in the spring and fall seasons. Foliar applied insecticides are very limited by the number of products available and minimal efficacy offered. Imidacloprid (Admire®) provides substantial protection when applied in the soil at planting or early during the cropping season. Reliance on the few available products will eventually diminish their efficacy in the long term. Additional products representative of novel chemistries and mode of action against the WF will enhance and sustain melon production in the desert. New insect growth regulators (IGR's) have been developed for use against WF in cotton and offer potential for use in vegetable crops. Several new products were evaluated in this test for efficacy when applied singly, alternated, or in combinations with other products for potential use against WF.

## Materials and Methods

A small plot field study was conducted at the University of Arizona Maricopa Agricultural Center. Cantaloupe cv. Mission was planted on 16 Apr 1996 on 40-inch beds spaced 10 ft apart to buffer and minimize WF movement between plots and the single row plots measured 35 ft long. The test was established as a randomized complete block design with four replicates. All insecticide treatments were applied using a hand-held boom configured with four TX-10 hollow cone nozzle tips spaced 20-inches apart and delivered in 45 gallons per acre of water pressurized with a CO<sub>2</sub> backpack

sprayer at 50 psi. Treatment applications were made at 7 to 8 day intervals on 04, 12, 19, and 27 Jun. All applications were made during the morning hours when temperatures ranged from 94 to 108 degF with mostly clear skies and almost no wind. The sky was overcast on 12 Jun during the application. All insecticide treatments included spreader-sticker Kinetic at 0.125% v/v. Sampling for WF was done at 6, 7, or 8 days after treatment (DAT) of every application for adults and immatures. A 13 and 18 DAT sampling was done after the last application. Adults were evaluated by turning the 3<sup>rd</sup> to 5<sup>th</sup> fully expanded terminal leaf of a vine on ten randomly selected plants per replicate of each treatment. Immatures were counted on the underside on the midrib of five similar fully expanded leaves in a 0.5-inch by 0.5-inch square area under a microscope. The data was analyzed using ANOVA and LSD.

## **Results and Discussion**

At 1 WAT of each of the applications, CGA-215944 treatments, pyriproxyfen and alternating treatments, Applaud treatments, and the standard Capture plus endosulfan treatment significantly reduced WF adults and immature counts relative to the untreated check. Immature counts for these treatments remained very low for up to 2 WAT of the last application and then increased at 3 WAT of the last application. All CGA-215944 treatments with either fenoxycarb or CGA-59205 exhibited similar reduction of WF adults and immatures. No difference could be discerned between fenoxycarb or the two rates of CGA-59205. Pyriproxyfen was applied one time then followed by endosulfan then Danitol plus Monitor then endosulfan again for the fourth and last application. This alternation of chemistries was to determine efficacy of a pest management program without reliance on consecutive applications of insecticides. These alternating materials demonstrated efficacy equivalent to the standard treatment of Capture plus endosulfan that was applied consecutively four times. Similarly, Applaud was applied alternating with endosulfan or consecutively with endosulfan at each application. Alternate applications showed that two applications of Applaud sufficiently reduced WF comparable to the standard treatment. An additional two consecutive applications of Applaud plus endosulfan did not exhibit any advantage to provide any added WF control. Pyridaben at the two rates evaluated exhibited a reduction of WF adults and immatures relative to the untreated check but was not effective relative to the standard treatment. Both adult and immature counts increased when applications were initiated. The new chemistry, CGA-215944, and IGR's pyriproxyfen and Applaud demonstrated potential to offer highly effective WF control in melon production pest management systems.

Table. Insecticides for whitefly control in cantaloupes at U of A MAC (Umeda).

Treatment	Rate lb A/I/A	Mean Whitefly Adults / Leaf						Mean Whitefly Immatures / Leaf Area**						
		04 Jun	12 Jun	19 Jun	27 Jun	03 Jul	10 Jul	15 Jul	12 Jun	19 Jun	27 Jun	03 Jul	10 Jul	15 Jul
Untreated check		2.9	4.4	22.2	23.5	29.4	61.3	55.1	0.1	2.2	12.1	28	40.2	105.1
CGA-215944 + Fenoxycarb	0.094 0.062	2.3	3.2	6.1	14.3	9.3	31.7	48.6	0.5	0.2	1.6	5.3	5.9	44.9
CGA-215944 + CGA-59205	0.094 0.062	1.7	4.0	8.0	12.9	10.0	30.3	45.5	0.5	0.8	0.8	3.2	6.5	51.9
CGA-215944 + CGA-59205	0.094 0.094	2.4	3.2	7.6	9.8	10.8	33.4	46.8	0.1	0.1	0.7	2.4	2.9	40.4
Pyriproxyfen* or Endosulfan or Danitol + Monitor or Endosulfan	0.05 0.75 0.2 0.5 0.75	2.3	2.3	4.4	13.5	8.6	23.9	28.3	0.3	0.6	0.2	6.2	8.0	46.7
Applaud* or Endosulfan	0.25 0.75	1.8	3.7	5.2	17.1	7.4	19.4	42.7	0.9	0.3	0.1	4.3	3.3	32.8
Applaud + Endosulfan	0.25 0.75	2.2	2.6	5.1	10.4	8.3	17.2	21.9	0.1	0.0	0.5	3.3	7.2	22.4
Pyridaben	0.15	2.4	3.9	18.9	18.9	24.2	40.7	49.3	0.1	1.6	2.3	23.6	36.4	75.6
Pyridaben	0.3	2.4	5.8	24.1	17.5	23.2	36.6	30.1	0.3	2.4	32.3	18.4	35.6	102.1
Capture + Endosulfan	0.08 0.75	2.3	3.3	6.2	9.5	7.8	26.4	43.1	0.3	0.5	1.1	7.2	12.1	41.2
LSD (P=0.05)		1.3	1.2	6.5	6.6	7.4	13.5	15.7	0.9	2.3	25.9	11.9	15.7	51.5

Applications made on 04, 12, 19, 27 Jun 1996.

Spreader-sticker Kinetic at 0.125% v/v added to all treatments.

\*Treatments alternated each application date.

\*\*Leaf area = 0.5" x 0.5" square area of underside of 5 leaves/treatment-replicate.