

# New Chemistry and Pyrethroid Combinations for Lepidopterous Pest Control in Broccoli

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## **Abstract**

*Success, Proclaim, and Avaunt were efficacious when applied alone or in combination with the pyrethroids, Warrior or Mustang. Warrior and Mustang alone also provided excellent control of the cabbage looper (*Trichoplusia ni*, CL) and diamondback moth (*Plutella xylostella*, DBM) at all rating dates for 3 weeks after a single application. Low infestation levels of the pests were attributed to the effectiveness of the insecticides.*

## **Introduction**

The introduction of new insecticides for use against lepidopterous insect pests in vegetable crops presents new opportunities to explore pest management strategies. Spinosad (Success®), emamectin-benzoate (Proclaim®), and indoxacarb (Avaunt®) are highly specific against lepidopteran pests. Initial research and commercialization of these insecticides focused on the singular use of these products. In most of the desert vegetables, a multitude of pests occur at any given time and applications of pesticides are made to manage a spectrum of pests. These applications often include combinations of products that are designed to control a broad-spectrum complex. No longer are single generalist broad-spectrum insecticides being used in regular short interval applications to control multiple insects. The new insecticides were combined with pyrethroids, lambda-cyhalothrin (Warrior®) or zeta-cypermethrin (Mustang®) to evaluate efficacy against lepidopterous pests in broccoli.

## **Materials and Methods**

A small plot field test was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. Broccoli was planted on 12 October 1999 on conventional 40-in shaped beds with two seedlines per bed. Each treatment replicate consisted of two beds measuring 24 ft long. The test was established in a randomized complete block design with four replicates. At the time of initial applications, broccoli was at the 4 to 6 leaf stage of growth. All treatments were applied using a backpack CO<sub>2</sub> sprayer equipped with a hand-held boom with four hollowcone TX-10 nozzle tips spaced 20 inches apart. The treatments were applied in 20 gpa water pressurized to 30 psi. All of the sprays included an adjuvant, Latron CS-7 at 0.25% v/v. The applications were made on 30 November with the air temperature at 80F. Weekly evaluations were made by harvesting ten plants per treatment replicate and counting small, medium, and large instar larval stages of cabbage looper (CL, *Trichoplusia ni*) and diamondback moth (DBM, *Plutella xylostella*).

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## Results and Discussion

Following the application of the treatments, CL populations remained relatively low at most of the evaluation dates with 0.5 to 1.6 total larvae per 10 plants being counted in the untreated check (Table). Most of the treatments appeared to demonstrate good efficacy with CL numbers less than the untreated check. The population of DBM was relatively high at 4.3 total larvae per 10 plants in the untreated check at 6 days after the application (DAT). All of the treatments exhibited excellent control with less than 0.8 total larvae/10 plants. The good control was observed for the duration of the test at 20 DAT.

Due to the relatively low populations of the CL and DBM in the broccoli, Success, Proclaim, and Avaunt were efficacious when applied alone or in combination with the pyrethroids, Warrior or Mustang. Warrior and Mustang alone also provided excellent control of the CL and DBM at all rating dates.

Table. New chemistry and pyrethroid combinations for lepidopterous pest control in broccoli. K. Umeda, D. MacNeil, N. Lund

Treatment	Rate (lb AI/A)	Total CL /10 plants				Total DBM / 10 plants			
		06 Dec	10 Dec	13 Dec	20 Dec	06 Dec	10 Dec	13 Dec	20 Dec
Untreated check		0.5	1.1	1.6	1.3	4.3	0.6	0.6	2.4
Success	0.09	0.5	0.0	0.3	0.0	0.8	0.5	0.8	1.6
Proclaim	0.01	0.8	1.0	0.3	1.8	0.8	0.3	0.5	1.0
Avaunt	0.065	0.5	0.0	0.3	0.5	0.5	0.8	0.6	1.0
Warrior	0.03	0.8	0.3	0.0	0.5	0.0	0.0	0.0	0.8
Mustang	0.05	0.3	1.0	1.0	1.3	0.3	0.3	0.0	1.3
Success + Warrior	0.09 + 0.03	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.0
Success + Mustang	0.09 + 0.05	0.5	0.3	0.0	0.0	0.0	0.0	0.5	0.0
Proclaim + Warrior	0.01 + 0.03	0.0	0.0	0.3	0.3	0.0	0.0	0.3	0.0
Proclaim + Mustang	0.01 + 0.05	0.3	0.0	0.3	0.3	0.3	0.0	0.3	0.8
Avaunt + Warrior	0.065 + 0.03	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.5
Avaunt + Mustang	0.065 + 0.05	1.0	0.3	0.0	0.5	0.8	0.3	0.3	0.6

Treatments applied on 30 Nov 1999