

Proclaim® Insecticide Efficacy Against Cabbage Looper in Broccoli Experimental Use Permit Field Study

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Abstract

Proclaim® insecticide (emamectin benzoate, MK-244, Merck Research Laboratories) was applied two times during the broccoli growing season for lepidopterous insect control. The primary pest was cabbage looper (Trichoplusia ni, CL) and very few beet armyworm (Spodoptera exigua). After the second application at 1, 2, and 3 weeks after treatment (WAT), Proclaim reduced the number of CL in the broccoli relative to the untreated check. The number of large larvae observed in the Proclaim treated broccoli was one-half of that found in the untreated broccoli. Proclaim efficacy to reduce CL was comparable to the standard treatment of Larvin® (thiodicarb) plus Asana® (esfenvalerate). At harvest, the Proclaim treated broccoli had 20% infested crowns compared to 28% for the standard treatment and 44% in the untreated.

Introduction

Proclaim insecticide is a newly introduced product for future use in vegetable crop production insect pest management. It is a semi-synthetic avermectin insecticide derived from the fermentation product, abamectin (Agri-Mek®, Zephyr®). Research has demonstrated that Proclaim is effective specifically against a broadspectrum of lepidopterous insect pests at extremely low use rates. Activity against the insect is by ingestion as a stomach poison but also has contact activity. It is non-systemic in plants but has translaminar movement across the plant cuticle. Proclaim is not considered disruptive to beneficial arthropods. This study was conducted to evaluate Proclaim efficacy in a commercial broccoli field under an experimental use permit.

Materials and Methods

A field test was conducted within a commercially grown broccoli field near Scottsdale, AZ on the Salt River-Pima Indian Reservation. The treatment plots were sixteen conventional 40-inch beds wide by 415 ft in length. Untreated check areas of sixteen beds wide by 20 ft in length separated the treatments and delineated the end of the test area. Treatments were not replicated in the study except for the two untreated areas. Treatments were applied using a CO₂ pressurized bicycle sprayer equipped with a boom having eight TX-4 hollowcone nozzles covering four beds. Each nozzle was directly over one of two seedlines of broccoli cv. Signal on the beds. The treatments were applied in 20 gallons per acre of water at 30 psi pressure on 01 and 15 Oct 1996. Treatments included the adjuvant Activator 90 at 0.25% v/v. An exception was the standard treatment of Larvin plus Asana was first applied with commercial tractor sprayer on 02 Oct, a day after the initial Proclaim application. The commercial tractor sprayer broadcast treated eighteen beds in a single pass with five nozzles over every two beds. The #2 Delavan nozzle tips delivered 12 gallons per acre of water at 16 psi and no adjuvant was added to the spray mixture. The weather on 01 Oct was clear, air temperature at 96°F, and a slight breeze at less than 3 mph. The broccoli was at the 7- to 8-leaf growth stage. On 02 Oct, there were high scattered clouds, no wind,

and air temperature at 88°F. There was an average of 2.4 CL larvae per plant in the untreated check plots in a small test plot area immediately adjacent to this test to initiate the first application. On 15 Oct, the air temperature was 94°F, clear skies, and negligible wind. The broccoli had 12-leaves and initiating first buds. CL larval populations were monitored at weekly intervals and ten randomly selected plants per treatment were evaluated for small and medium/large size larvae. Five plants were monitored in each of the two untreated check areas. At harvest, twenty-five randomly selected plants per treatment were inspected for larval infestation.

Results and Discussion

On 10 Oct at 9 days after treatment (DAT) of the first Proclaim application, CL larval counts were not reduced relative to the untreated check. On 22 Oct at 1 WAT of the second application, Proclaim treated broccoli exhibited fewer CL larvae than the untreated check and was comparable to the standard of Larvin plus Asana. The same trend continued at 2 and 3 WAT of the second application demonstrating Proclaim efficacy to reduce CL larvae relative to the untreated check. Proclaim reduced the number of larger larvae 50% relative to the untreated check. At harvest, Proclaim treated broccoli had 20% infested crowns compared to 44% in the untreated check and 28% in the Larvin plus Asana treated broccoli.

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Table. Proclaim insecticide efficacy against cabbage looper in broccoli, EUP study (Umeda and Murrieta).

Treatment	Rate lb AI/A	Mean Cabbage Looper Larvae / Plant												Harvest 18 Nov % infested
		10 Oct		15 Oct		22 Oct		29 Oct		05 Nov		18 Nov		
		small	md/lg	small	md/lg	small	md/lg	small	md/lg	small	md/lg	small	md/lg	
Untreated check		1.3	1.6	1.8	6.0	0.6	1.9	0.0	2.2	0.0	2.6	0.0	2.6	
Proclaim	0.0075	3.3	2.2	2.4	7.1	0.3	1.0	0.6	1.1	0.0	1.3	0.0	1.3	
Larvin +	0.5 +	2.5	1.4	1.7	4.4	0.0	0.9	0.1	1.8	0.0	1.0	0.0	1.0	
Asana	0.04													

Treatments applied on 01-02 and 15 Oct 1996.

md/lg = medium and large larval instars of cabbage looper.