

S-1812 Lepidopterous Insect Pest Control in Broccoli Study

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Abstract

A single application of S-1812 (Valent) at 0.15 and 0.20 lb AI/A effectively reduced Plutella xylostella (diamondback moth, DBM) in broccoli compared to the untreated check. S-1812 at 0.15 lb AI/A performed similar to thiodicarb (Larvin) at 1.0 lb AI/A. S-1812 significantly reduced the DBM at 5 days after treatment (DAT) and control was effective for up to 14 DAT. S-1812 was less effective against Trichoplusia ni (cabbage looper, CL) compared to DBM control efficacy or Larvin. S-1812 reduced the development of small CL to larger sized larvae.

Introduction

A new insecticide, S-1812, has been introduced by Valent for testing and development against lepidopterous insect pests. Vegetable crops including cole crops, lettuce, and other leafy greens are typically infested by economically injurious levels of several lepidopterous insect pests. During the fall planting season, *Trichoplusia ni* (cabbage looper, CL) and *Spodoptera exigua* (beet armyworm) are key pests in Central Arizona. In recent years, during the spring growing season, *Plutella xylostella* (diamondback moth, DBM) has been observed more frequently in the cole crops. Several new selective insecticides have been introduced in recent years and the addition of S-1812 will provide in the future a greater diversity of effective products for vegetable growers to integrate into an effective pest management program.

Materials and Methods

A small plot field test was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, Arizona. The test was established in a randomized complete block design with three replicates. The individual treatment replicate plots were established with two conventional 40-inch beds measuring 25 ft in length. Broccoli was direct-seeded in two seedlines on each bed on 22 January 1998. The crop was established and maintained with furrow irrigation through the growing season. The single insecticide treatment application was made on 03 April. The broadcast sprays were made using a CO₂ backpack sprayer equipped with a hand-held boom. The boom was outfitted with four hollowcone TX-10 nozzle tips spaced 20 inches apart with two nozzles positioned over each bed. The sprayer was pressurized to 40 psi and delivered 22 gpa water. The weather conditions at the time of application was clear skies with air temperature at 70°F and a slight breeze. The test was initiated with pest populations of total DBM at 9.7 larvae per 10 plants and CL at 2.7 larvae per 10 plants in the untreated check plots. At three intervals after the application, evaluations were made in the broccoli by harvesting ten plants per treatment replicate and counting the small (1st instar) and larger-sized (>2nd instar) larvae on the entire plant.

Results and Discussion

A single application of all treatments significantly reduced the DBM larval counts at 5, 10, and 14 days after treatment (DAT) (Table 1). Broccoli treated by S-1812 at 0.15 lb AI/A at 5 DAT had slightly more DBM larvae compared to the S-1812 at 0.2 lb AI/A. S-1812 at 0.15 lb AI/A was comparable to Larvin at 1.0 lb AI/A with similar counts for small-sized and total DBM larvae. At 10 and 14 DAT, S-1812 and Larvin treatments were equally effective in maintaining low levels of DBM relative to the untreated broccoli.

S-1812 treatments were less effective against CL compared to Larvin (Table 2). Larvin treated broccoli exhibited no CL at 5 and 10 DAT of the single application. Small-sized CL larvae were detected in most of the S-1812 treated broccoli and accounted for most of the total observed larvae. Few larger-sized CL larvae were counted in the S-1812 treated broccoli indicating that egg hatches occurred and that small CL larvae did not progress to later stage instars.

Further refinement of rates for efficacy against different pest species is warranted. Future development of S-1812 should evaluate integration into IPM strategies.

Table 1. S-1812 Lepidopterous Insect Pest Control in Broccoli Study. (Umeda and Strickland)

Treatment	Rate (lb AI/A)	<u>Mean Number of Larvae / 10 Plants</u>							
		<u>DBM</u>							
		<u>03 Apr</u>		<u>08 Apr</u>		<u>13 Apr</u>		<u>17 Apr</u>	
		small	total	small	total	small	total	small	total
Untreated Check		9.0	9.7	9.7	13.0	3.3	9.7	3.3	6.0
S-1812	0.15			1.7	2.3	0.3	0.7	0.3	0.7
S-1812	0.2			0.7	1.0	0.7	0.7	0.7	1.0
Larvin	1.0			1.3	2.0	0.7	0.7	0.7	1.3
LSD (p=0.05)				8.0	8.1	1.9	3.2	2.3	4.3

Treatments applied on 03 April 1998.

Latron CS-7 added to all treatments at 0.25% v/v.

DBM = diamondback moth, *Plutella xylostella*

Small = 1st instar larvae, total = small + larger-sized larvae.

Table. S-1812 Lepidopterous Insect Pest Control in Broccoli Study. (Umeda and Strickland)

Treatment	Rate (lb AI/A)	<u>Mean Number of Larvae / 10 Plants</u>							
		<u>CL</u>							
		<u>03 Apr</u>		<u>08 Apr</u>		<u>13 Apr</u>		<u>17 Apr</u>	
		small	total	small	total	small	total	small	total
Untreated Check		2.0	2.7	1.3	2.7	2.0	3.7	3.0	4.7
S-1812	0.15			1.0	1.0	0.0	0.7	1.3	2.0
S-1812	0.2			3.0	3.3	2.0	2.7	1.7	2.0
Larvin	1.0			0.0	0.0	0.0	0.0	0.3	0.3
LSD (p=0.05)				2.1	1.8	2.8	3.9	2.2	2.0

Treatments applied on 03 April 1998.

Latron CS-7 added to all treatments at 0.25% v/v.

CL = cabbage looper, *Trichoplusia ni*

Small = 1st instar larvae, total = small + larger-sized larvae.