Aphid Control in Cabbage Study

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Abstract

Aphistar provided the quickest reduction of the aphids after one application and continued residual control for up to 14 DAT-2. Following a second application and reduction of aphids, Pirimor, Provado, Fulfill, Actara, and Metasystox-R provided a varied degree of residual control of aphids between 5 and 14 DAT-2. A comparison of Fulfill rates indicated that the two rates were equally effective at 5 DAT-2 but the lower rate did not offer as long residual control compared to the higher rate. Endosulfan was moderately effective and did not provide acceptable control after 1 week.

Introduction

Aphid control in lettuce, cole crops, and leafy greens during the spring is a challenge when decisions require whether to use a soil-applied insecticide at planting time or to continually monitor a crop and use a foliar insecticide when aphids are detected. Using foliar insecticides poses challenges when a crop is approaching harvest and the pre-harvest interval after application might be variable for different products. The different products that are registered or nearing registration in the development process are variable in performance by offering rapid or slow reduction of aphids or longer versus short residual control. This field study was conducted in Chinese cabbage to compare efficacy of several insecticides that have or may eventually gain registration for use in vegetable crops.

Materials and Methods

A field test was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. Chinese cabbage, *Brassica rapa* var. *pekinensis*, was direct seeded on 19 January 1999 in two seedlines on a 40-inch shaped bed and sprinkler irrigated to establish a stand and then subsurface drip irrigated during the remainder of the growing season. The treatment plots were established in a randomized complete block design with three replicates. Individual plots consisted of two beds measuring 30 ft in length. Applications were made using a hand-held boom equipped with four hollowcone TX-10 nozzle tips spaced 20 inches apart. The sprays were applied in 20 gpa water with an adjuvant, Latron CS-7, added to all treatments at 0.25% v/v and pressurized to 30 psi with a CO_2 backpack sprayer. Insecticide treatment applications were initiated on 24 March and the second applications were made on 31 March. The weather conditions on 24 March were a clear day with no wind and air temperature at 75°F. Weather conditions on 31 March were not recorded. Aphid infestations, predominantly cabbage aphid (*Brevicoryne brassicae*) were detected when the cabbage was at stages ranging from rosette to heading. At intervals after the applications, ten whole plant samples were collected from each treatment replicate plot and placed in an air-tight steel drum where methylethyl ketone was used to asphyxiate the aphids on the plants and allowed to drop and collect at the bottom of the drum. The total number of cabbage aphids were counted per 10 plant sample.

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Results and Discussion

At 5 DAT-1, only three treatments, imidacloprid (Provado®), triazimate (Aphistar®), and thiamethoxam (Actara®), demonstrated a reduction of aphids relative to the untreated check (Table). The inconsistent level of control observed for the other treatments could have been due to variable size of the cabbage at the time of application. Following a second application, most of the treatments reduced the number of aphids compared to the previous observation date. Aphistar at 0.1 lb AI/A was the most consistently efficacious treatment that had the fewest aphids in the cabbage for up to 14 DAT-2. Pirimicarb (Pirimor®) similarly demonstrated consistent efficacy with few aphids detected at 14 DAT-2. Provado treated cabbage showed an increase in the number of aphids after 1 week but continued to suppress aphids at 14 DAT-2. Pymetrozine (Fulfill®) at 0.09 lb AI/A and oxydemeton-methyl (Metasystox-R®) similarly suppressed aphids for 9 and 14 DAT-2. Actara at 0.09 lb AI/A reduced the aphids for up to 9 DAT-2 and then the population increased. Endosulfan was moderately effective and did not provide acceptable control after 1 week.

A comparison of Fulfill rates indicated that the two rates were equally effective at 5 DAT-2 but the lower rate did not offer as long residual control compared to the higher rate. Actara treatments were difficult to discern since the lower rate appeared to have fewer aphids than the higher rate at 5 DAT-1. The lower rate did not appear offer good control after 5 DAT-2.

Aphistar provided the quickest reduction of the aphids after one application and continued residual control for up to 14 DAT-2. Following a second application and reduction of aphids, Pirimor, Provado, Fulfill, Actara, and Metasystox-R provided a varied degree of residual control of aphids between 5 and 14 DAT-2.

Table. Aphid Control in Cabbage Study

Treatment	Rate	Mean Number of Aphids/10 Plants				
	(lb AI/A)	23 Mar	29 Mar	05 Apr	09 Apr	14 Apr
Untreated check		40.7	45.3	33.0	81.0	138.3
Provado	0.047		41.3	20.7	63.0	57.3
Aphistar	0.10		16.3	12.7	22.0	11.7
Pirimor	0.25		65.0	20.0	33.0	36.0
Fulfill	0.045		65.7	31.3	60.7	83.0
Fulfill	0.09		89.0	34.7	55.0	54.5
Actara	0.067		39.7	52.0	125.7	120.7
Actara	0.09		76.3	34.7	42.3	98.7
Metasystox-R	0.50		47.7	23.5	69.7	79.0
Endosulfan	0.75		67.3	49.0	125.7	82.0
LSD (p=0.05)			80.54	40.7	83.69	86.43

Applications made on 24 and 31 March 1999.