

Evaluation of Insecticides for Spring Aphid Control in Carrots Grown for Hybrid Seed, 2012

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Abstract

The insecticides acephate (Orthene[®]), naled (Dibrom 8[®]), flonicamid (Beleaf[®]), pymetrozine (Fulfill), thiamethoxam (Actara[®]), and azadirachtin (Aza-Direct[®]) were evaluated for aphid control on seedling carrots grown for seed. Aphids were collected using a Schun Shaker, counted and identified. Flonicamid (Beleaf[®]), thiamethoxam (Actara[®]) and acephate (Orthene[®]) provided significantly greater control than the untreated check nineteen and twenty seven days after treatment.

Introduction

Aphid control in carrots is important to the hybrid carrot seed industry of central Oregon. Aphid populations can reach treatable levels in the fall following planting in August, as well as the following spring. The use of Agribon[®] paper to prevent winter damage and frost heaving, particularly to the weaker male rows, produces a micro climate favorable for aphids through much of the winter. Applying insecticides immediately after removal of the paper in spring can prevent aphid dispersal throughout the field. The objective of this research was to evaluate spring application of insecticides acephate (Orthene[®]), naled (Dibrom 8[®]), flonicamid (Beleaf[®]), pymetrozine (Fulfill[®]), thiamethoxam (Actara[®]), and azadirachtin (Aza-Direct[®]) for aphid control on seedling carrots grown for hybrid seed.

Methods and Materials

Plots consisting of male rows 5 ft x 20 ft were replicated three times in a randomized complete block design in a commercial hybrid seed carrot field near Madras, Oregon. Acephate (Orthene[®]) application to field surrounding plot area occurred on May 8, 2012. Aphid counts were taken on May 9, 2012 prior to insecticide application May 10. Insecticide treatments were made using a CO₂-pressurized, hand-held boom sprayer at 40 psi and 20 gal/acre water. Plots were evaluated May 15, May 22, May 29, and June 6. Foliage from 20 plants per plot was removed at the crown and placed on the screen in a Schun Shaker. Methyl ethyl ketone was applied to a gauze container in the lid to relax the aphids prior to shaking. The Schun Shaker was shaken 100 times to insure the aphids dislodged from the foliage for collection in a jar at the base of the funnel-shaped shaker. Aphids were then transferred into vials of ethanol for counting and identification.

Results and Discussion

Aphids collected were predominately green peach aphids (*Myzus persicae*) with approximately one fourth identified as willow or carrot aphid (*Cavariella aegopodii*). Due to variability in the aphid population across plots prior to treatment, aphid counts following treatment are reported as percent decrease based on the pre-treatment counts. Five and twelve days after treatment (DAT) none of the insecticide treatments were significantly different from the untreated check (Table 1).

Nineteen DAT, acephate (Orthene[®]), thiamethoxam (Actara[®]), and flonicamid (Beleaf[®]) provided significantly greater control than the untreated check. Twenty-seven DAT, all treatments but pymetrozine (Fulfill[®]) were significantly different from the untreated check. Although, thiamethoxam (Actara[®]) provided quality aphid control, use of neonicotinoids is discouraged due to the negative impact they have on honey bee colonies. The use of acephate (Orthene[®]) surrounding the plot area probably accounts for the decrease in check plots during the duration of the study. The likelihood of acephate (Orthene[®]) contamination in the plot area leads to some ambiguity about the overall efficacy of the products tested at 27 DAT. However at 19 DAT there are clear differences between treatments that are helpful in determining efficacy.

Table 1. Decrease in aphids collected from pre-treatment counts to 5, 12, 19, and 27 DAT.

Treatment	Rate	Decrease in Aphids Collected			
		5 DAT (%)	12 DAT (%)	19 DAT (%)	27 DAT (%)
Acephate (Orthene [®])	1.0 lb/A	36 ab	64 ab	91 a	99 a
Naled (Dibrom 8 [®])	1.5 pt/A	31 ab	64 ab	87 ab	97 a
Thiamethoxam (Actara [®])	4.0 oz/A	35 ab	72 a	92 a	100 a
Flonicamid (Beleaf [®])	2.8 oz/A	46 a	71 a	95 a	100 a
Pymetrozine (Fulfill [®])	2.75 oz/A	47 a	55 ab	56 c	96 ab
Azadirachtin (Aza-Direct [®])	2.0 pt/A	19 b	40 b	84 ab	99 a
Check	-	33 ab	61 ab	61 bc	93 b
<i>LSD</i>		23	27	27	4.8

