

Evaluation of insecticides for control of European asparagus aphid

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This season there was significant pressure from European asparagus aphid in San Joaquin County, with many fields being treated three times, which is more than usual. This high pest pressure, coupled with the recent loss of disulfoton (Di-Syston) and continued pressure from the Central Valley Regional Water Quality Control Board to reduce the use of chlorpyrifos (Lorsban) have given the hunt for new insecticides for asparagus added urgency. A replicated field trial was conducted in a young asparagus field located on Roberts Island (37° 53' 24" N 121° 23' 14" W). European asparagus aphid first appeared in the field in August and the field was sprayed with Lorsban at that time. Aphids began to reappear in mid-September, approximately one month after the first treatment. At that point, the trial plots were established. Plots measured 35 ft long by a single row and each insecticide treatment was replicated four times in a randomized complete block design.

Insecticides were applied on September 20<sup>th</sup> with a CO<sup>2</sup>-pressurized backpack sprayer and a hand-held boom operated at a pressure of 34 psi at the boom. A single nozzle was directed over the top of the fern and two nozzles were between the rows and directed horizontally; the rows of fern were sprayed on each side. Water volumes were equivalent to 44 gallons per acre. Each application included a non-ionic surfactant (Dyne-Amic) at a rate of 0.25% v/v. Treatments evaluated were:

entry #	Product	Product rate per acre	Active ingredient	Chemical class (mode of action; FRAC grouping)
1	<b>Lorsban Advanced</b>	2 pt	chlorpyrifos	organophosphate (acetylcholinesterase inhibitor; 1B)
2	<b>Fulfill</b>	2.75 oz	pymetrozine	(homopteran feeding blocker; 9B)
3	<b>Warrior II</b>	1.92 oz	lambda-cyhalothrin	pyrethroid (sodium channel modulator; 3A)
4	<b>Assail 70WP</b>	2.1 oz	acetamiprid	neonicotinoid (Nicotinic acetylcholine receptor agonist; 4A)
5	<b>Cyazypyr (HG W86 10SE)</b>	20.5 fl oz	cyantraniliprole	diamide (ryanodine receptor modulators; 28)
6	<b>Actara</b>	4 oz	thiamethoxam	neonicotinoid (Nicotinic acetylcholine receptor agonist; 4A)
7	<b>Beleaf</b>	2.8 oz	flonicamid	(homopteran feeding blocker; 9C)
8	<b>Nontreated control</b>			

Aphids were counted at various intervals after the insecticide application: 3 days post-treatment (dpt), 7 dpt, 14 dpt and 21 dpt. At each sampling time point, three spots within each plot were beat and aphids were caught on a beating sheet printed with a grid to assist in counting. Aphids were counted when feasible, or when populations were extremely high, the count was estimated by counting a portion of the grid and extrapolating the number out to the entire beating sheet.

## Results

Aphid populations prior to the application averaged about 430 aphids per beating. Although counts varied from fern to fern, in general the aphids were spread fairly evenly throughout blocks one and two, and were present at a lower but still uniform level in blocks three and four. After treatment, counts continued to be somewhat variable from fern to fern, but nonetheless some clear conclusions can still be drawn from the data. Lorsban and Warrior were the most effective and exhibited quick activity on the aphids, with almost complete control observed at only 4 days post-treatment. Actara was also very effective, but high levels of control were not observed until the 14 dpt rating. Fulfill and Beleaf, both feeding blockers, were somewhat slower; full control was not observed until 3 weeks post-treatment. Control exhibited by Assail was variable, with some ferns with high populations and other ferns with population under control. Cyazypyr was not effective against this particular aphid, though it is known to control other aphid pests.

		<b>Aphid counts at days post treatment (dpt)<sup>1</sup></b>					
<b>Product</b>	<b>active ingredient</b>	<b>4 dpt</b>	<b>8 dpt</b>	<b>14 dpt</b>		<b>21 dpt</b>	
<b>Cyazypyr</b>	cyantraniliprole	470.1	453.3	510.0	a	362.5	a
<b>Control</b>	---	454.0	386.9	481.7	ab	267.5	ab
<b>Assail</b>	acetamiprid	318.8	45.0	200.0	bc	110.8	ab
<b>Beleaf</b>	flonicamid	74.6	78.0	22.2	c	0.0	b
<b>Fulfill</b>	pymetrozine	252.9	431.4	10.4	c	4.3	b
<b>Actara</b>	thiamethoxam	91.4	20.3	0.0	c	0.2	b
<b>Lorsban</b>	chlorpyrifos	0.1	0.0	0.0	c	0.0	b
<b>Warrior</b>	lambda-cyhalothrin	0.2	0.0	0.0	c	0.0	b

<sup>1</sup>Numbers represent the mean of twelve observations. Means in the same column followed by the same letter are not significantly different according to Tukey-Kramer method ( $\alpha = 0.05$ )

Figure 2. Effect of insecticide applications on counts of European asparagus aphid at various days before or after treatment.

