

Chemical Control/New Products

Evaluation of neonicotinoid insecticides for control of mountain leafhopper in sweet cherry—2002

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Abstract: A trial was conducted in Stockton, CA, to evaluate the efficacy of three neonicotinoid insecticides (Provado, Actara and V-10112) for the control of mountain leafhopper (ML). ML were caged on cherry foliage at 0, 3, 7, 14 and 21 days after treatment (DAT), and mortality was assessed at 1/2, 1 and 2 days of exposure (DOE). At 1/2 DOE, Asana, the grower standard, provided significantly greater ML mortality compared to all other treatments through 21 DAT except Actara at 21 DAT. At 1 DOE Asana provided significantly greater ML mortality compared to all other treatments through 21 DAT except Actara at 0 and 21 DAT. Asana provided superior ML mortality compared to all of the neonicotinoid insecticides, while Actara provided consistently greater ML mortality than Provado or V-10112. Based on this and past years' research, Actara would be the most effective neonicotinoid replacement for Asana, Sevin, Diazinon or Guthion.

Materials and Methods

A trial was conducted on mature 'Bing' cherry trees in a commercial orchard near Linden, CA. Four experimental insecticides and an untreated control were replicated four times in a RCB design. Each replicate consisted of an individual tree with buffer trees in each direction. Treatments were applied between 8:00-10:00 a.m. on 24 June with a hand-held orchard sprayer operating at 200 psi and delivering 300 gpa of finished spray (2.76 gal/tree). Control was evaluated at 0, 3, 7, 14 and 21 days after treatment (DAT) by caging 20 laboratory-cultured adult ML on cherry foliage in 60 cm x 35 cm mesh bags. ML were caged on the branches at about 6:00 p.m. The branches were removed the following morning at 6:00 a.m. The branches were placed in 1000 ml Erlenmeyer flasks filled with water and held in the laboratory at about 75°F. Mortality was determined at 1/2, 1, 2 and 3 days of exposure (DOE).

Results and Discussion

This trial should be considered a rigorous test of the experimental materials. Any movement by ML, however small, resulted in scoring the leafhopper as alive. However, live ML on treated branches were lethargic and incapable of feeding. At 1/2 DOE, Asana provided significantly greater ML mortality compared to all other treatments through 21 DAT except

Actara at 21 DAT (Table 1). Actara and V-10112 provided significantly greater ML mortality compared to the untreated control through 3 DAT, while Actara continued to provide significantly greater ML mortality through 21 DAT. Provado did not provide significantly greater ML mortality compared to the untreated control. At 1 DOE, Asana provided significantly greater ML mortality compared to all other treatments through 21 DAT except Actara at 0 and 21 DAT (Table 2). Actara and V-10112 provided significantly greater ML mortality compared to the untreated control though 3 DAT while Actara continued to provide significantly greater ML mortality through 21 DAT. Provado did not provide significantly greater ML mortality compared to the untreated control. At 2 DOE, the untreated control mortality exceeded 44% and the data are difficult to interpret and should be viewed with caution (Table 3). Asana provided superior ML mortality compared to all of the neonicotinoid insecticides, while Actara provided consistently greater ML mortality than Provado or V-10112. Based on this and past years' research, Actara would be the most effective replacement for Asana, Sevin, Diazinon or Guthion.

Table 1. Mean percent mortality of mountain leafhoppers caged on foliage for 1/2 day of exposure at Lodi, CA - 2002

Treatment/ formulation	Rate lb(AI)/acre	Percent mortality at DAT with 1/2 DOE				
		0	3	7	14	21
Asana XL	0.0722	87.5 a	76.7 a	60.3 a	28.9 a	32.8 a
Provado 1.6F	0.1000	16.1 c	13.6 cd	19.8 bc	5.8 b	7.8 b
Actara 25 WDG	0.0625	61.2 b	32.1 b	37.9 b	9.8 b	28.7 a
V-10112 20SG	0.0660	48.4 b	24.5 bc	15.2 c	12.7 b	9.2 b
Untreated	—	8.8 c	2.0 d	10.8 c	13.3 b	7.6 b

Means followed by the same letter within a column are not significantly different (Fisher's protected LSD, P<0.05).

Table 2. Mean percent mortality of mountain leafhoppers caged on foliage for 1 day of exposure at Lodi, CA - 2002

Treatment/ formulation	Rate lb(AI)/acre	Percent mortality at DAT with 1 DOE				
		0	3	7	14	21
Asana XL	0.0722	94.0 a	81.0 a	79.6 a	41.2 a	44.1 a
Provado 1.6F	0.1000	34.5 c	19.0 cd	27.4 c	14.5 c	15.5 b
Actara 25 WDG	0.0625	91.8 a	50.0 b	49.3 b	29.0 b	43.8 a
V-10112 20SG	0.0660	60.3 b	27.9 c	27.6 c	26.1 bc	16.3 b
Untreated	—	19.3 c	3.9 d	13.9 c	19.2 bc	15.4 b

Means followed by the same letter within a column are not significantly different (Fisher's protected LSD, P<0.05).

Table 3. Mean percent mortality of mountain leafhoppers caged on foliage for 2 days of exposure at Lodi, CA - 2002

Treatment/ formulation	Rate lb(AI)/acre	Percent mortality at DAT with 2 DOE				
		0	3	7	14	21
Asana XL	0.0722	100.0 a	91.9 a	95.4 a	90.9 a	73.2 ab
Provado 1.6F	0.1000	34.5 b	64.8 c	68.4 bc	56.5 cd	49.2 c
Actara 25 WDG	0.0625	96.6 a	96.6 b	87.2 ab	78.5 ab	81.2 a
V-10112 20SG	0.0660	92.1 a	92.1 b	73.8 abc	62.3 bc	55.5 bc
Untreated	——	58.3 b	58.3 c	49.6 c	44.3 d	53.7 bc

Means followed by the same letter within a column are not significantly different (Fisher's protected LSD, $P < 0.05$).