Section V
Soil Arthopods

ASSESSMENT OF INSECTICIDE EFFICACY FOR ROOT WEEVIL CONTROL

R. L. Rosetta and S. E. Svenson
Department of Horticulture
Oregon State University, NWREC
Aurora, OR 97002-9543
(503) 678-1264
Robin.Rosetta@orst.edu
Sven.Svenson@orst.edu

The trial was conducted on *Rhododendron* 'Catawbiense Album' in 1-gallon containers. In May of 2000, adult stages of black vine root weevil (BVW), and rough strawberry root weevil (RSW), were established in the rhododendrons (seven BVW, three RSW applied to each container). On May 30 treatments were applied to the rhododendrons. Treatments were evaluated for percent adult mortality at 6 and 14 days after treatment (DAT), June 5 and June 12 respectively, for all treatments.

For black vine weevil (BVW) at 6 DAT, acephate (Orthene), bifenthrin (Talstar), low and high rates of lambda cyhalothrin (Scimitar), and the medium and high rates of foliar thiamethoxam (Flagship) had higher Effective Kill Ratios for BVW compared to the untreated control, bifenthrin treated discs and pots, deltamethrin (Delta Gard), acetamiprid, the low rate of foliar thiamethoxam and the soil applied thiamethoxam. At 13 DAT, both rates of lambda cyhalothrin treatments had highest Effective Kill Ratios (EKR) for BVW compared to all other treatments except acephate and bifenthrin

As with our trial in 1999, we are seeing differential effects of pesticides based on species. While acetamiprid appeared ineffective for BVW, it was effective for RSW. Similarly, soil applied thiamethoxam did not significantly kill BVW, but did have higher EKRs for RSW. In contrast, while the bifenthrin treated discs + pots were effective against BVW, this treatment was not different from untreated controls for RSW.

For the "re-challenge" study where untreated weevils were added to treated pots 20 DAT, and evaluated 23 DAT, the foliar thiamethoxam was still effective for BVW, but the lambda cyhalothrin was not. For BVW, the lambda cyhalothrin provides a more effective initial kill, but the thiamethoxam has better residual kill. In contrast, lambda cyhalothrin was still effective against RSW, along with the high rate of foliar thiamethoxam and soil applied thiamethoxam. Bifenthrin was not different from the untreated controls for RSW. The best Residual Kill was provided by the high rate of foliar applied thiamethoxam, killing 39% of the BVWs, and 66% of the RSWs.

Table 1. Influence of insecticides on mortality of black vine root weevil adults in *Rhododendron* 'Catawbiense Album' seven and fourteen days after insecticide application.

Insecticide	Application rate	Fraction Alive[2]		EKR[3]	
		6 DAT	13 DAT	6 DAT	13 DAT
untreated control	0.00 oz ai/100 gal	97 a[1]	92 a	0 d	0 e
acephate	12.0 oz prod/100 gal	10 d	16 e	89 a	83 ab
bifenthrin	20.0 oz prod./100 gal	21 cd	24 de	78 ab	74 ab
bifenthrin geotextile & pots	1.5% ai by wt	70 b	69 b	28 c	25 d
lambda cyhalothrin	5.0 oz prod/100 gal	20 cd	4 e	79 ab	95 a
lambda cyhalothrin	2.5 oz prod/100 gal	21 cd	13 e	78 ab	86 a
deltamethrin	4.0 oz prod/100 gal	79 ab	74 ab	18 cd	19 de
acetamiprid	1.7 oz prod/100 gal	82 ab	84 ab	15 cd	9 de
acetamiprid	3.4 oz prod/100 gal	83 ab	82 ab	14 cd	11 de
thiamethoxam foliar	2.0 oz prod/100 gal	69 b	69 b	31 c	25 d
thiamethoxam foliar	4.0 oz prod/100 gal	41 c	43 c	57 b	53 c
thiamethoxam foliar	8.5 oz prod/100 gal	30 cd	33 cd	70 ab	64 bc
thiamethoxam soil	6.3 oz prod/100 gal	90 ab	85 ab	7 cd	7 de
thiamethoxam soil	8.5 oz prod/100 gal	88 ab	84 ab	8 cd	8 de

[1] Means in columns for the same days after treatment and followed by the same letter are not significantly different; Mean separation using Duncan's New Multiple Range Test (5%); ANOVA PR>F was less than 0.0001 for all variables.

[2] Mean fraction of alive weevils based on all weevils found per treatment (DAT=days after treatment).

[3] Effective Kill Ratio (EKR) = [(fraction of live weevils in the control) - (fraction of live weevils per treatment)]/(fraction of live weevils in the control).

Table 2. Influence of insecticides on mortality of rough strawberry root weevil adults in *Rhododendron* 'Catawbiense Album' seven and fourteen days after insecticide application.

Insecticide	Application rate	Fraction Alive[2]		EKR[3]	
		6 DAT	13 DAT	6 DAT	13 DAT
untreated control	0.00 oz ai/100 gal	82 a[1]	62 a	0 c	0 f
acephate	12.0 oz prod/100 gal	27 bc	23 cdef	67 ab	62 abcd
bifenthrin	20.0 oz prod./100 gal	15 c	13 def	82 a	78 abc
bifenthrin geotextile & pots	1.5% ai by wt	53 ab	43 abc	35 bc	30 def
lambda cyhalothrin	5.0 oz prod/100 gal	17 c	5 f	80 a	91 a
lambda cyhalothrin	2.5 oz prod/100 gal	22 c	11 ef	73 a	82 ab
deltamethrin	4.0 oz prod/100 gal	57 ab	42 abcd	31 bc	33 cdef
acetamiprid	1.7 oz prod/100 gal	55 ab	52 ab	33 bc	16 ef
acetamiprid	3.4 oz prod/100 gal	27 bc	12 ef	67 ab	81 ab
thiamethoxam foliar	2.0 oz prod/100 gal	13 c	18 cdef	84 a	70 abcd
thiamethoxam foliar	4.0 oz prod/100 gal	30 bc	18 cdef	63 ab	70 abcd
thiamethoxam foliar	8.5 oz prod/100 gal	38 bc	37 abcde	53 ab	41 bcdef
thiamethoxam soil	6.3 oz prod/100 gal	35 bc	18 cdef	57 ab	70 abcd
thiamethoxam soil	8.5 oz prod/100 gal	33 bc	27 bcdef	59 ab	57 abcde

[1] Means in columns for the same days after treatment and followed by the same letter are not significantly different;

Mean separation using Duncan's New Multiple Range Test (5%); ANOVA PR>F was less than 0.0001 for all variables.

[2] Mean fraction of alive weevils based on all weevils found per treatment (DAT=days after treatment).

[3] Effective Kill Ratio (EKR) = [(fraction of live weevils in the control) – (fraction of live weevils per treatment)]/(fraction of live weevils in the control).

Table 3. Influence of insecticides on mortality of black vine root weevil (BVRW) and rough strawberry root weevil (RSRW) adults in *Rhododendron* 'Catawbiense Album' twenty-two days after insecticide application and two days after pots were infested with weevils.

Insecticide	Application rate	Fraction Alive[2]		EKR[3]	
		BVW	RSW	BVW	RSW
untreated control	0.00 oz ai/100 gal	95 a[1]	88 a	0 b	0 c
bifenthrin	20.0 oz prod./100 gal	-- --	69 ab	-- --	21 bc
bifenthrin geotextile & pots	1.5% ai by wt	-- --	68 ab	-- --	23 bc
lambda cyhalothrin	5.0 oz prod/100 gal	89 ab	45 bc	7 ab	49 ab
thiamethoxam foliar	4.0 oz prod/100 gal	-- --	88 a	-- --	0 c
thiamethoxam foliar	8.5 oz prod/100 gal	61 b	34 c	36 a	61 a
thiamethoxam soil	6.3 oz prod/100 gal	-- --	61 abc	-- --	30 ab
thiamethoxam soil	8.5 oz prod/100 gal	-- --	50 bc	-- --	43 ab

[1] Means in columns for the same root weevil species and followed by the same letter are not significantly different; Mean separation using Duncan's New Multiple Range Test (5%); ANOVA PR>F was 0.0608 for BVRW and
was 0.0003 for RSRW.

[2] Mean fraction of alive weevils based on all weevils found per treatment.

[3] Effective Kill Ratio (EKR) = [(fraction of live weevils in the control) - (fraction of live weevils per treatment)]/(fraction of live weevils in the control).