

Section V  
Soil Arthropods

**EFFICACY OF SOIL APPLIED INSECTICIDES TO CONTROL IMMATURE ROOT  
WEEVILS**

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Four soil insecticides were incorporated in a small cement mixer with 50% peat and 50% pumice soil mix, placed into 6 inch pots and planted with a mature 'Totem' strawberry plant on 25 April. The granular formulations selected are registered for weevil control in ornamental plants. Granular formulations of these insecticides are not available for agriculture. In part, we are looking at efficacy of these granular formulations for root weevil control during blueberry's non-bearing growth phase in the nursery and field. Black vine weevil larvae were field collected from a strawberry field in Vancouver, WA and 10 each per treatment were introduced to each pot on 2 May. Treatments were replicated 10 times. The larvae were placed into individual 2-3 inch deep holes made with a wooden dowel around the plant and covered over with soil. These units were periodically watered, as needed, to activate the soil insecticides. After one week, the foliage of the strawberry plants was cut down to the crown and each unit covered with a 1 ft<sup>2</sup> particle board to contain emerging adult root weevils. These units were checked 3 times a week to detect adult weevil emergence.

All of the granular formulated treatments and respective rates tested for their soil incorporation into potting media provided significant black vine weevil control for 5th instar larvae compared with the untreated check at the 5% level (Table 1). Systemic Marathon (imidacloprid), Talstar (bifenthrin) and the high rate of Choice (fipronil) provided better than 90% mortality of larvae as measured by adult emergence between 20 May and 20 June. The new polymer encapsulated formulation of Precise (acephate) performed intermediate to the other granular pesticides. This unique product will require further evaluation as a potential root weevil product.

Four soil insecticides and the entomopathogenic nematode, *Steinernema kraussei* were applied as drench treatments into 6 inch pots filled with our standard potting mix and planted with a mature 'Totem' strawberry plant on 7 May. Each treatment was replicated 10 times and 10 mature black vine weevil were individually placed into 2-3 inch deep holes made with a wooden dowel around the plant and covered with soil. All treatments were applied in a 350 ml stock solution and

plants were watered when needed. Evaluation and posttreatments methods were similar to the soil-incorporated test above.

Compared with the untreated check, both rates of Talstar and the neonicotinoid Platinum (thiamethoxam) provided nearly complete larval/adult mortality based on observed adult emergence from 23 May to 20 June (Table 2). Based on our bioassay method, adult emergence in the untreated check was nearly identical with the granular bioassay conducted with late instar, black vine weevil larvae. The experimental nematode, *S. kraussei*, from Europe provided outstanding control. Currently, regulatory agencies will not permit further importation of this biological control because it is not native and because of current issues regarding invasive species. Systemic Merit (imidacloprid) and AzaDirect (azadirachtin) provided intermediate larval suppression compared with the untreated check. Field trials will be conducted with both granular and drench applications of Talstar, Marathon/Merit and Platinum around the base of non-bearing and early bearing blueberry plants in the field. Each replicate will be artificially infested with known numbers of black vine weevil larvae.

**Table 1. Soil Incorporated Trial**

Treatment	oz/pot	Mean numbers
		emerged
Choice 0.1WG	0.006	3.3b
Choice 0.1WG	0.012	1.0c
Marathon G	0.16	0.9c
Marathon G	0.33	0.5c
Precise 4G	0.05	3.7b
Precise 4G	0.11	3.6b
Talstar 2G	0.27	0.6c
Talstar 2G	0.44	0.4c
Untreated check		8.1a

Means within columns followed by the same letter are not significantly different (Tukey HSD test,  $P < 0.05$ ).

Drench with 350ml solution for 6 inch pot.

**Table 2. Drench Trial**

Treatment	ml/pot	Mean numbers emerged
	0.66	2.4b
Merit 75WP	0.26g	2.3b
Platinum 2SC	0.14	0.4c
Platinum 2SC	0.22	0.1c
Talstar F	1.1	0.0c
Talstar F	2.2	0.0c
<i>Steinernema kraussei</i>	68	0.1c
Untreated Check		8.3a

Means within columns followed by the same letter are not significantly different (Tukey HSD test,  $P < 0.05$ ).

Drench with 350ml solution for 6 inch pot.