

Section V  
Soil Arthropods

**CONTROL OF ROUGH STRAWBERRY ROOT WEEVIL IN STRAWBERRY**

L. K. Tanigoshi and J. R. Bergen  
Washington State University  
Vancouver Research and Extension Unit  
Vancouver, WA 98665-9752  
[tanigosh@wsu.edu](mailto:tanigosh@wsu.edu), [bergenj@coopext.cahe.wsu](mailto:bergenj@coopext.cahe.wsu)  
webpage: [vancouverreu@wsu.edu](mailto:vancouverreu@wsu.edu)

Lab bioassays were conducted with 3 neonicotinoids, Brigade (Brigade) and experimental Mustang Max (zeta-cypermethrin). The latter is another FMC pyrethroid they would like to label on red raspberry with the possibility of 5 application per season as the Brigade label is written for strawberry. Groups of five mature 'Totem' strawberry plants in 1 gallon pots were treated with the 5 compounds and allowed to dry for 2-3 hours. Then fifteen leaflet replicates per treatment were each placed in water vials and one unit was placed in a 6 inch Petri dish with 3 rough strawberry root weevil adults. Weevil mortality was then observed daily for 4 days and again at 8 days posttreatment. Brigade served as our standard treatment.

Six compounds known to possess root weevil toxicity were field tested in a 3 year-old 'Totem' field in Woodland, WA. Applications were applied the same day the field was mowed on 12 July with a 3 row application kit equipped with 9 D6 45 disc cone nozzles at 100 psi in 114 gpa. Treatments were replicated five times and plots measured 3 rows wide by 30 feet long. Sampling consisted of 3 randomly selected areas in each plot of about 1 ft<sup>2</sup> each. Population levels of primarily adult rough strawberry root weevil were ascertained with visual-hand searches in the soil-debris around plant crowns from the middle to the shoulder of a row, including runner foliage that escape mowing. We found congregations of the rough strawberry root weevil commonly in moistened microclimates beneath patches of green runner foliage. Renovation trials next season will include methods to cut runner foliage that extends into the strawberry rows.

Under the laboratory conditions of this bioassay, the 87% mortality observed for Brigade to adults of the rough strawberry root weevil was expected (Table 1). However, the poor performance of Mustang Max at 0.03 lb(AI)/acre should be re-evaluated at rates comparable to that of its companion pyrethroid, Brigade/Capture. We will follow-up with this in collaboration with FMC. The 3 neonicotinoids performed comparably at 4 and 8 days posttreatment. The known systemic mode of entry for the neonicotinoids may provide complimentary residual

persistence to the shorter-lived foliar residues of bifenthrin. We will test the relative efficacy of combinations of the neonicotinoids with the pyrethroids next season.

Hands and knee searches for populations of adult, rough strawberry root weevils were taken at 3, 7 and 14 days post-renovation. Malathion 8EC provided excellent activity compared with the untreated checks to 14 days posttreatment (Table 2). At 7 days after treatment, Brigade, Malathion and Clutch (clothianidin) had fewer adults found with our visual search method under foliage around the crown and within the soil as well. Given the random distribution and numerical variability of these root weevils, results in part at 14 days posttreatment were not significantly different from the untreated plots at the 5% level of significance. Adult weevil suppression with foliar application of neonicotinoids in the field require 5-7 days before they impact adult mortality compared with the generally fast acting OPs and pyrethroids.

Table 1. Rough strawberry weevil bioassay.

Treatment	lb(AI)/acre	Percent Mortality				
		1DAT	2DAT	3DAT	4DAT	8DAT
Actara 25W	0.06	22ab	27bc	56b	71a	93a
Clutch 50WDG	0.09	9ab	40b	60b	76a	91a
Brigade 10WP	0.10	22ab	87a	87a	87a	87ab
Provado 1.6F	0.04	31a	51b	62ab	69ab	91a
Mustang Max 0.8EC	0.03	2b	44b	44b	58b	67b
Untreated check		2b	2c	2c	2c	4c

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

Table 2. Rough strawberry root weevil trial.

Treatment	lb(AI)/acre	<u>Mean Weevils/ft<sup>2</sup></u>		
		3DAT	7DAT	14DAT
Actara 25WG	0.06	4.1bc	6.9bc	1.1b
Provado 1.6F	0.04	18.6a	19.7a	2.5b
Mustang Max	0.03	5.5bc	0.2c	0.1b
Brigade 10WP	0.10	8.5bc	1.6c	1.1b
Malathion 8EC	1.25	0.0c	0.5c	1.2b
Clutch 50WDG	0.09	7.0bc	0.3c	9.9a
Untreated Check		11.5ab	13.1ab	6.8ab

Means within columns followed by the same letter are not significantly different (Tukey HSD test,  $P < 0.05$ ). 12 July 04.