Innovative Management of Cutworms in Washington Vineyards

Doug Walsh, Extension Entomologist
Holly Ferguson, IPM Coordinator Specialist
Ron Wight, Field Research Director
Department of Entomology, WSU Prosser

Project Summary- 2003

In early-spring 2003 concentrated barrier delayed-dormant applications of the registered pyrethroid insecticide fenpropathrin (Danitol™) and the candidate pyrethroid insecticides *zeta*-cypermethrin, bifenthrin, and permethrin (Mustang Max™, Capture™, and Pounce™) were applied to the soil/vine/trellis interface to repeat studies that were conducted in 2002 with fenpropathrin that had demonstrated some promising results in repelling cutworms from climbing up insecticide-barrier treated vines. Additional barrier treatments included chlorpyriphos and cayenne pepper extract (Lorsban™ and Hot Pepper Wax™). All of the treatments have proven to be repellent to cutworms and have inhibited cutworms from climbing up (Table 2). Additional "foliar" treatments were applied about 10 days later at each trial site with the registered insecticides chlorpyriphos and fenpropathrin and the candidate insecticide indoxcarb (Avaunt ™). Three trial sites were selected. One was at Canoe Ridge (Paterson). The second was at Cold Creek, and the third was in a Concords vineyard on the Roza near Prosser.

Background:

Cutworms are inconspicuously marked, dull-colored caterpillars ranging from 0.6 to 2.0 inch (1.5 to 5 cm) in length. There are several species of cutworms that are pests of grapes grown on the Columbia Plateau/ Yakima Valley. These include the spotted cutworm, *Amanthes c-nigrunm* (L.) and possibly the red backed cutworm, *Euxoa ochrogaster* (Guenee). However, survey work conducted by David James Laboratory in 2002 has produced some evidence that what has historically been documented as red backed cutworm is an unidentified though closely related *Eoxoa* species. Positive identification is important as behavioral differences affect control actions among cutworm pests. James and his staff are continuing their survey efforts this growing season.

Fifth instar spotted cutworms are about 1.3 inch (3.5 cm) long and are a dull gray brown. *Euxoa* spp. cutworms are brownish or grayish with a yellow brown head. They can reach 1.5 inches long during their fifth instar of development. The back is usually reddish or reddish-brown bordered with dark bands. The spotted cutworm overwinters as 3rd instar larva whereas *Euxoa* likely overwinters in the soil as an egg. Both species pupate after feeding ceases in spring and the subsequent 2nd (and occasionally 3rd generation) are associated with other weed or crop hosts and are typically not damaging to grapes.

Chemical Management: The organophosphate insecticide Lorsban has been used for cutworm suppression in recent years. New insecticide products have recently been registered for use on grapes that have demonstrated good efficacy on cutworm populations on grapes in field trials conducted by Walsh in 2002 (see table below). These insecticides include the pyrethroid Danitol and the fermentation product spinosad (Success™) and the insect growth regulating insecticide (IGR) methoxyfenozide (Intrepid™).

In 2002 at 3 locations a barrier treatment with Danitol was the most effective at preventing subsequent feeding damage by cutworms (results below in Table 1, and 2 other trials- data not shown) in small 15 vine plots.

Table 1. Mean ±SE number of damaged buds per 3 vine visual sample of grapevines on cv. Merlot at Canoe Ridge on April 25, 2002

Treatment	ai/ acre	application	Mean±SE
Avaunt	0.11	foliar	0.25±0.25a
Danitol	0.2	foliar	0a
Danitol	0.4	foliar	0.75 ±0.47a
Danitol	0.2	barrier	0a
Intrepid	1.0	folier	2.75 ±1.80
Lorsban	2.0	folier	2.00 ± 0.58
Sevin	40# prod	bait	4.25 ±1.75
Success	0.156	folier	1.50 ±0.87b
Untreated			5.00 ±1.01

a/ population on treated vines is significantly lower ($p<0.01$) then the non treated control in pairwise t-tests (b/ =0.05)

2003-Targeted Pyrethroid Sprays. Concentrated applications of the pyrethroid insecticides Danitol, Capture, Mustang Max, and Pounce were applied in early April to the soil/vine/trellis interface in 3 locations. Sites selected were similar to the 2002 sites at Canoe Ridge, Cold Creek and Concords on the Roza. Additionally, Stimson Lane currently has used a "red-eye" spray device that is used for herbicide applications on large blocks to apply Danitol at several rates and several viticulturists have acknowledged that these treatments have shown some promise of reducing cutworm damage in these treated blocks.

Table 2. Mean ±SE number of damaged buds per vine by visual sample in mid-April on grapevines that were treated with barrier sprays during the last week of March.

Treatment	ai/ acre	Canoe Ridge	Cold Creek	Roza (Concords)
Capture	0.1 #	0.1 ± 0.1^{a}	0.4 ± 0.4^{a}	0.5 ± 0.4^{ns}
Danitol	0.1 #	0.2 ± 0.1^{a}	0.2 ± 0.1^{a}	0.4 ± 0.3^{ns}
Danitol	0.2 #	0^{a}	0^{a}	0.3 ± 0.3^{ns}
Danitol	0.4 #	0^{a}	0.1 ± 0.1^{a}	0.2 ± 0.2^{ns}
Hot Pepper Wax	3 gal prod	0.6 ± 0.2^{b}		
Lorsban	1 #	0^{a}	0.3 ± 0.2^{a}	0^{ns}
Mustang Max	.0025 #	0.1 ± 0.1^{a}	0.3 ± 0.2^{a}	1.1 ± 0.8^{ns}
Pounce	0.5#	0^{a}	0.2 ± 0.1^{a}	0.1 ± 0.1^{ns}
Untreated Control		2.1±1.2	4.0 ± 0.7^{a}	2.0 ± 1.1^{ns}

a/ population on treated vines is significantly lower ($p<0.01$) then the non treated control in pairwise t-tests (b/ $p<0.05$).

Table 3. Mean ±SE number of damaged buds per vine by visual sample on 4/28 (Canoe Ridge) and on 4/29 (Roza Concords) on grapevines that were treated with barrier sprays during the last week of March and with foliar sprays about 10 days later.

Treatment	ai/ acre	Treatment	Canoe Ridge	Roza (Concords)	Cold Creek
Avaunt	0.047 #	Foliar	1.53±0.50[a]	0.60±0.24[ns]	1.15±0.10[a]
Avaunt	0.067 #	Foliar	1.15±0.31[a]	0.10±0.10[ns]	1.00±0.16[a]
Avaunt	0.112 #	Foliar	0.57±0.31[a]	0.05±0.05[ns]	1.23±0.22[a]
Capture	0.1 #	Barrier	1.48±0.73[a]	0.40±0.23[ns]	0.70±0.58[a]
Danitol	0.1 #	Barrier	0.43±0.18[a]	0.70±0.70[ns]	0.55±0.14[a]
Danitol	0.2 #	Barrier	0.20±0.07[a]	0.15±0.15[ns]	0.43±0.04[a]
Danitol	0.2 #	Foliar	1.18±0.33[a]	0.55±0.34[ns]	1.18±0.10[a]
Danitol	0.4 #	Barrier	0.10±0.08[a]	0.05±0.05[ns]	0.45±0.22[a]
Hot Pepper Wax	3 gal prod	Barrier	2.10±1.11[ns]		2.28±0.17 [ns]
Hot Pepper Wax	3 gal prod	Foliar		0.45±0.28[ns]	
Lorsban	1 #	Barrier	0.25±0.17[a]	0.30±0.24[ns]	0.47±0.14[a]
Lorsban	1#	Foliar	1.22±0.19[a]	0.10±0.10[ns]	2.70±0.22 [ns]
Mustang Max	.0025 #	Barrier	1.10±0.44[a]	0.50±0.30[ns]	0.71±0.14[a]
Pounce	0.5#	Barrier	0.13±0.08[a]	0.05±0.05[ns]	0.53±0.19[a]
Untreated Control			3.20±0.49	1.30±0.62	2.95±0.65[a]

a/ population on treated vines is significantly lower ($p<0.01$) then the non treated control in pairwise t-tests (b/ =0.05)

Conclusions: The targeted pyrethroid insecticide barrier sprays are proving to be effective at reducing cutworm feeding injury. A switch away from the foliar application of Lorsban will provide additional benefits by conserving natural enemies e.g. predatory mites that aid biocontrol of other secondary pests. **It is our firm opinion that none of the pyrethroid insecticides should be used as a foliar treatment for general pest management. They should only be applied in dire emergencies as rescue insecticides.** Pyrethroid insecticides are broad-spectrum in their activity and will disrupt populations of almost all of the beneficial natural enemies that are present in vineyards. Additionally, the pyrethroid insecticides will repel most beneficial arthropods that fly into vineyards.

Summer Research Plans for 2003. An attract and kill trap has been developed by Dr. Pete Landolt a Research Entomologist at the USDA Wapato Entomology Research Facility. Landolt's trap uses indole acetic acid as a feeding attractant lure. This lure is placed in the base of a modified badminton birdie. Moth mortality occurs after the moth makes contact with the insecticide permethrin mixed in teflon™ grease that is smeared onto the sides of the badminton birdie. Landolt's target pest in the tree fruit system has been the lacanobia fruit worm. However, Landolt has observed substantial numbers of other moth species including the spotted cutworm are attracted to and killed by these traps. An advantage this trap offers over traditional pheromone-based traps is that both males and females are killed as opposed to pheromone-based that traps that typically only attract males. We have received funding from the Wine Advisory Committee and the Washington State Commission on Pesticide Registration to test if it is possible to reduce the spring 2004 cutworm population in vineyards by reducing the reproductive moth population in the summer and fall of 2003.