2007 Progress Report
Cranberry Institute

Title: Reduced risk pesticide management strategies for blackheaded fireworm and perennial weeds.

Principal Investigator: Kim Patten, Washington State University, Long Beach Research and Extension Unit, 2907 Pioneer Rd., Long Beach WA 98631, 360-642-2031, pattenk@wsu.edu

Objectives:

1. Evaluate reduced-risk chemical controls of fireworm.
2. Evaluate reduced-risk chemical controls for several perennial weed species

Objective 1: Evaluate reduced-risk chemical controls of fireworm:

Fireworm: Trials on fireworm were conducted in growers' fields to assess the efficacy of flubendiamide, metaflumizone, and rynaxypyr on second generation fireworm larvae. An untreated control and Diazinon treatment were used as comparisons. Treatments will be applied in early July using simulated chemigation (450 gpa application volume followed by 225 gpa rinse) to 6 replicated plots (10' x 10') in abandoned grower beds with high adult moth activity. Efficacy data was based on sweeping beds for larvae, and the amount of feeding damage on foliage. All the new chemistries had reasonable efficacy when applied with high-volume broadcast methods, none have the level of control of Diazinon when applied via chemigation (Table 1). These results are discouraging since efficacy via chemigation is required for an insecticide to be considered a true replacement for an organophosphate. We replicate this study on several other farms, but fireworm populations were never adequate to make inferences. Research on chemigation efficacy will have to be done in subsequent years on additional chemistries. Other trials were conducted with just broadcast application assessing the efficacy of novaluron and Delegate on second generation fireworm (Table 2). Although population levels of fireworm were not high, several inferences can be made from the results. Both novaluron and Delegate appeared effective when applied at low spray volume. Neither product provided the level of control that Diazinon did. There did not seem to be a clear rate effect of novaluron. Both products need to be assessed using chemigation.

Table 1. Efficacy of various insecticides for first generation fireworm control at a farm in Long Beach Washington in 2007. *

Treatment	Rate		Application method	# live larvae from 15 sweeps: Small larvae 2 DAT	Medium larvae 2 DAT	Large larvae 2 DAT	Total live & dead larvae from 15 sweeps: 7 DAT	7 DAT	All dates
DPX-E2Y45	0.066	lb ai/a	CHEMIGATION	5	4	0	13	2	15
BAS320	18.3	fl oz/a	CHEMIGATION	2	5	3	11	13	24
NNI-480	4	oz/a	CHEMIGATION	6	4	0	15	6	22
DIAZINON AG600	2	qt/a	CHEMIGATION	2	1	0	3	3	5
DPX-E2Y45	0.066	lb ai/a	BROADCAST	2	2	0	6	5	12
BAS320	18.3	fl oz/a	BROADCAST	1	1	2	2	4	7
NNI-480	4	oz/a	BROADCAST	1	1	0	3	1	4
DIAZINON AG600	2	qt/a	BROADCAST	1	0	0	0	1	2
CONTROL				4	6	4	15	4	20
LSD (P=.05)				2.2	2.5	2.0	8.3	5.0	10.1
Treatment Prob (F)				0.0001	0.0002	0.002	0.0002	0.0013	0.0004

* Broadcast applied @ 280 gpa with no washoff, chemigation applied @ 280 gpa followed by 680 gpa washoff. Four replications of 10' by 12' plots. Treatments applied 5/9/07.

Table 2. Second generation Blackheaded Fireworm control with alternative insecticides on an abandon bed in Long Beach Washington in 2007.*

Treatment	Rate		Total BHFW larvae/ 5 sweeps: 7/30/2007	8/9/2007	Total both dates
NOVALURON	10	fl oz/a	0.6	0	0.6
NOVALURON	15	fl oz/a	1.3	0.3	1.5
NOVALURON	20	fl oz/a	0.6	0.3	0.9
NOVALURON	30	fl oz/a	0.6	0	0.6
DIAZINON	2	qt/a	0	0	0
DELEGATE	6	oz/a	0.4	0	0.4
untreated control			1.6	0.9	2.5
LSD (P=.05)			0.71	0.42	0.76
Treatment Prob(F)			0.0008	0.0009	0.0001

* Treatments were broadcast applied twice (7/24/07 & 8/3/07) @ 40 gpa on 8 replications of 12’ by 12’ plots on an abandon farm.

Objective 2: Evaluate effective management strategies for priority weed species using new herbicides:

New herbicide screening: Numerous herbicides were screened for efficacy and phytotoxicity. Yellow loosestrife was used as a target weed. Replicated trials across several sites were conducted at several grower sites. Summary data of efficacy and crop safety are provided in Table 3. Several herbicides caused severe crop damage and are not suitable for cranberries; other had no damage or efficacy. Four potential chemistries spring applied include KSU 12800, quinclorac, rimsulfuron and flumiclorac. In another study (Table 4), fall applied penoxsulam appeared to be very effect against arrowgrass, with only minor crop damage. Penoxsulam, therefore could also be a candidate herbicide if applied in the fall/winter.

Table 3. Summary of herbicide screening for control of yellow loosestrife and general crop phytotoxicity.

Treatment	Timing	% control	Crop damage
Flumioxazin	Pre	None	None
Isoxaflutole	Pre	None	None
Penoxsulam	Early post	100	Dead
Quinclorac	Early post, two application s	80 to 90	None
Quinclorac	Mid to late post, two application	None	None
Sulfosulfuron	Early post	100	Dead
Flumiclorac	Early post	50 to 80	None to slight
Topramezone	Early post	20	None
KSU 12800	Early post, one application	0 to 100, rate dependent	None to dead
Rimsulfuron	Early post, two applications	50 to 80	None
Mesotrione	Early post, two applications	10 to 20, slight reduction in height	None

Table 4. Effect of fall applied herbicide on arrowgrass (*Triglochin palustre)* control in a cranberry bed in Long Beach WA in 2007. *

Weed Code	% control		cranberry phytotoxicity rating
Rating Date			
Treatment	6/1/2007	8/19/2007	
CONTROL-WHITE	0	0	1=none, 5=dead
quinclorac 0.5 lb ai/ac	36	20	1
Penoxsulam 2.8 fl oz/ac	76	83	1.25
2-4D G 20 lb/a	49	16	1
LSD (P=.05)	25	40	0.347
Treatment Prob(F)	0.0009	0.0166	0.2564

*Treatments were applied 10/20/06 on 4 replicated 5'x5' plots