2008 Progress Report to the 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 using chemigation application methods.
2. Evaluate reduced-risk herbicides for control of priority weed species in the PNW.

Results:

Evaluate reduced-risk chemicals applied through chemigation for control of fireworm

Methods: Two trials on first and second generation fireworm were conducted: 1st generation in Grayland WA, 7' x 6' plots, 4 replications; 2nd generation in Long Beach WA, 7' x 6' plots, 4 replications. The research assessed the efficacy of new insecticides when applied through simulated chemigation systems. An untreated control and Diazinon treatment were used as comparisons. Efficacy was measured based by assessing larvea in 10 sweeps per plot. Dates of application and assessment are provided in the tables.

Results:

Experiment 1: For first generation fireworm control, most chemistries provide excellent control (Table 1). There was no difference between insecticides for the first application. By the second application, fireworm counts were too low to make strong inferences. However, Esteem, Venom and Rimon appeared to be less effective than the other insecticides. Overall there was a slight difference in efficacy between the 3.25 and 6.5 oz/ac rate of Delegate.

Experiment 2: For second generation fireworm control, both rates of Delegate were as effective as Diazinon (Table 2). Intrepid was no better than the control.

Conclusion: Only two studies were conducted on fireworm and neither site had ideal conditions make strong conclusions. Delegate appears to be an excellent contender for replacing Diazinon for application through a chemigation system. Not enough data is available, however, to determine if the 3.5 oz/ac rate of Delegate is adequate for achieving consistent efficacy through chemigation. Altacor is another chemistry that looks very promising but more data will be required to determine if it is consistent.

Table 1. WSU Long Beach blackheaded fireworm insecticide screening # 1 2008

Treatment		First assessment on 1st generation blackheaded fireworm 5/19/2008								
		small larvea		medium larvea		large larvea		total		Total alive + dead
		alive	dead	alive	dead	alive	dead	alive	dead	
CONTROL		6.5	4.5	4.0	3.0	0.5	0.0	7.5	11.0	18.5
Delegate	3.25 oz wt/a	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0	0.5
Assail	8 oz/a	0.5	0.3	0.0	0.0	0.0	0.0	0.3	0.5	0.8
Avaunt	6 oz/a	0.0	1.3	0.0	0.0	0.0	0.0	1.3	0.0	1.3
Diazinon	2 qt/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Altacor	0.066 lb ai/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rimon	40 fl oz/a	0.3	0.5	0.0	0.0	0.0	0.0	0.5	0.3	0.8
Venom	3 oz/a	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0	0.5
Tesoro	6.4 oz/a	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.8
Calypso	6 oz/a	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Esteem	5 oz/a	0.3	0.3	0.3	0.0	0.0	0.0	0.3	0.5	0.8
Delegate	6.5 oz wt/a	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.3
LSD (P=.05)		2.30	1.16	2.39	1.18	0.42	0.00	1.98	4.98	6.62
Treatment Prob(F)		0.0001	0.0001	0.0723	0.0004	0.4671	1.0000	0.0001	0.0038	0.0001
Treatment		Second assessment on 1st generation blackheaded fireworm 6/12/2008								
		small larvea		medium larvea		large larvea		total		Total alive + dead
		alive	dead	alive	dead	alive	dead	alive	dead	
CONTROL		0.3	0.3	0.0	0.3	0.8	0.0	1.0	0.5	1.5
Delegate	3.25 oz wt/a	0.0	0.5	0.3	0.0	0.3	0.0	0.5	0.5	1.0
Assail	8 oz/a	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.5
Avaunt	6 oz/a	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.5
Diazinon	2 qt/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Altacor	0.066 lb ai/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rimon	40 fl oz/a	0.5	0.3	0.3	0.5	0.8	0.3	1.5	1.0	2.5
Venom	3 oz/a	0.0	0.0	0.0	0.8	0.5	1.0	0.5	1.8	2.3
Tesoro	6.4 oz/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calypso	6 oz/a	0.0	0.0	0.5	0.5	0.3	0.8	0.8	1.3	2.0
Esteem	5 oz/a	0.0	0.0	0.5	0.3	2.3	1.3	2.8	1.5	4.3
Delegate	6.5 oz wt/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSD (P=.05)		0.47	0.38	0.58	0.72	0.91	1.02	1.41	1.08	1.41
Treatment Prob(F)		0.5458	0.1784	0.4671	0.3356	0.0007	0.1408	0.0092	0.0111	0.0092

4 replications, 7' x 8' plots, in a heavily infested McFarlin bed in Grayland WA. Treatment applied to first generation 5/19/2008 and 6/4/2008 with 50 gpa spray volume followed by 620 gpa washoff. Data were collected from 10 sweeps per plot.

Table 2. WSU Long Beach blackheaded fireworm insecticide screening # 2 2008

Treatment		Second generation blackheaded fireworm assessed 4 days after treatment 7/24/08								
		small larvea		medium larvea		large larvea		total alive	total dead	total larvae
		alive	dead	alive	dead	alive	dead			
CONTROL		0.8	0.0	1.3	1.3	1.8	0.0	3.8	1.3	5.0
Delegate	3.25 oz wt/a	0.0	0.8	0.0	0.3	0.0	0.0	0.0	1.0	1.0
Delegate	6.5 oz wt/a	0.0	0.8	0.0	0.5	0.3	0.0	0.3	1.3	1.5
Diazinon	2 qt/a	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	2.0
Intrepid	16 fl oz/a	0.5	0.5	1.3	1.5	0.3	0.0	2.0	2.0	4.0
LSD (P=.05)		1.29	1.74	0.98	2.46	0.58	0.00	0.58	0.00	3.47
Treatment Prob(F)		0.5980	0.7700	0.0176	0.5388	0.0001	1.0000	0.0188	0.9199	0.1153

4 replications, 7' x 8' plots, in a heavily infested Stevens bed in Long Beach WA. Treatment applied to second generation fireworm on 7/21/08 with 50 gpa spray volume followed by 620 gpa washoff. Data were collected from 10 sweeps per plot on 7/24/08.

Evaluate reduced-risk herbicides for control of priority weed species in the PNW

Methods: Numerous replicated trials were conducted on several farms to assess herbicide efficacy on yellow loosestrife, lotus, arrowgrass, false lily-of-the valley, brambles and silverleaf. The following herbicides were screened singularly: rimsulfuron, quinclorac, penoxsulam, KSU 1280, liquid Casoron, carfentrazone-ethyl, dormant timing of trichlorpyr, dormant timing of 2,4D Amine, and chemigation of Callisto. The following herbicide combinations were screened: simazine + mesotrione, rimsulfuron + mesotrione, quinclorac + mesotrione, and pH buffering (acid and base) with mesotrione.

Results: A summary of findings is as follows:

- Rimsulfuron: continues to provide good efficacy of loosestrife with no phytotoxicity noted.
- Quinclorac: good control of loosestrife with no phytotoxicity noted, minor suppression of other target weeds. Timing very critical for efficacy, too late and efficacy greatly impaired.
- Penoxsulam: some control of arrowgrass, but too much phytotoxicity noted.
- KSU 1280: excellent control of most weed species, but too much phytotoxicity noted.
- Liquid Casoron; good control of the same species controlled by granular Casoron, no problems with phytotoxicity noted. Efficacy in general slightly less than granular product, but ease of application for spot treatments is advantageous.
- Carfentrazone-ethyl: controlled moss, but some phytotoxicity noted.
- Dormant timing of trichlorpyr: inconsistent control of brambles, no phytotoxicity noted.
- Dormant timing of 2,4D Amine: good control of Arrowgrass with no real phytotoxicity noted. Several applications were required to achieve efficacy.
- Chemigation of Callisto: For some weed species, especially if timing was early enough, good post-emergent efficacy was achieved and no phytotoxicity noted. There was some pre-emergent efficacy noted.
- Simazine + mesotrione: no synergistic effect for efficacy on all the weeds tested.
- Rimsulfuron + mesotrione: improved control for loosestrife over either product alone, no phytotoxicity noted. Worth additional screening to assess timing effects.
- Quinclorac + mesotrione: improved control for loosestrife and false lily of the valley over either product alone, no phytotoxicity noted. Seems a particularly effective mixture for lily control. Worth additional screening to assess timing effects.
- pH buffering (acid and base) with mesotrione. There was no noticeable effect of modifying tank mix solution pH from 2 to 12 on efficacy.

Conclusion: Most herbicide trials were unimpressive. There was either no efficacy or there was a combination of efficacy and crop phytotoxicity. There were several products, however, worth noting. Liquid Casoron formulation showed promise. Data has been sent to the registrant to help support a 2EE label change for cranberries. Rimsulfuron showed great potential on many weed species. Dupont refused to support an IR4 project until Classic receives a registration, after which they will consider it. Quinclorac results look good and will be used to support IR4 data and future registration. Particularly impressive were combinations of quinclorac with mesotrione. Additional research on this combination is planned. There is some potential for a registration of 2,4-D amine and/or trichlorpyr for a dormant timing. Efficacy is consistent enough at this time to warrant it. Research from other states would be needed to support this.