Section V
Soil Arthropods

MANAGING SLUGS AND SOD WEBWORMS IN GRASSES GROWN FOR SEED

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Grass seed fields in the Willamette Valley with *minimum tillage seeding system, reduced field burning, improved field drainage*, and *increased organic matter* are developing a persistent group of pests causing increasingly greater economic losses in grass seed and rotational crop production. Slugs, sod webworms, craneflies, symphylans, cutworms, wireworms as well as stem and leaf feeders like frit fly, meadow spittle bug, plant bugs, are a few of these pests observed in greater numbers over the past few years. We will focus our talk on 2 of the pests including slugs (*Deroceras reticulatum* and *Arion* spp.) and sod webworms (*Chrysoteuchia topiaria*).

First, we will discuss how the seasonal growth and development of SLUGS dictates the windows of opportunity for control; and compare efficacy studies conducted at different seasonal periods and how weather influences the effectiveness of treatments. We will discuss only products, rates and use patterns that are registered for use on grasses grown for seed.

We will emphasize how knowledge of a slug's life history, behavior and dispersal are used in structuring management strategies; and compare slug numbers using various field monitoring techniques (e.g. 19x19 inch slug blankets, 10.5 defined area traps, 10.5 cold water extraction from grass cores, bait stations) for quantifying population densities to help determine the need for treatment.

In addition to slugs, sod webworms severely damaged many Willamette Valley fescue and perennial rye grass seed fields in 2007 and 2008. Up to 15 larvae per crown were collected in some fields. Dead and dying crowns became obvious in SEPT. To control larvae, irrigation or a timely rainfall is very important. Pre-irrigate dry soil and either (as label states) chemigate or immediately incorporate a broadcast sprayed insecticide into the crowns where the larvae feed. Direct control of sod webworm larvae continues to be difficult. This is due to: the lack of sufficient and timely rainfall, large amounts of post harvest residues that accumulate on the crowns of grasses and the inherent low solubility of insecticides coupled with their tendency to permanently adsorb to vegetation, soil and organic matter in the field. Spray should be applied when larvae are small, before plant damage occurs. This timing occurs from mid-AUG to early SEPT depending on field, location and year.

To control sod webworm moths, an insecticide application timed to the approximate peak flight of this pest in a grass seed field appears to reduce subsequent economic infestations of the larvae that can occur from late summer through early fall. The principal is to kill or repel them with an insecticide as they emerge in the field or immigrate to it. This is done early to mid-way through the flight period (usually JUNE 15-20), a little before peak flight. Pheromone traps should be used to monitor moth flight and determine need for spray (moth counts exceed 75 moths/trap for

any 5 day period (late June). On MAY 31, commercial pheromone traps were placed in fields (2 for every 40 to 60 acres). Total moths trapped were recorded over 5 day periods: MAY 31-JUNE 5, JUNE 6 – 10, JUNE 10 – 15, JUNE 15 – 20, JUNE 20 – 25, etc. through JULY 20. It is important to move the traps once or twice to different field locations during each 5 day period to account for field variation in the flight. If and when traps in a field average 75 or more moths per trap over a 5 day period there is potential for larval damage. Effective residues for pyrethroid products in grass seed production should kill or repel SWW adults for 2 to 2 ½ weeks. A second moth spray may be indicated if moth pressure is great, swathing date or harvest dates fit with the product(s) used and label restrictions are met. We believe that both Baythroid XL and Lorsban 4E insecticides that were applied for larval control would have performed better on low residue PRG/TF plantings than they did in this high residue tall fescue field. Moribund (sick from insecticide poisoning and eventually dying) and dead larvae were recorded along with live larvae. Mortality and sickness were not noticed in the experimental plots until 10 DAT. We feel this could be attributed to, 1) cold soil temperatures, 2) larvae going into pre-pupal diapause and therefore not actively feeding, 3) it possibly took that long for the small amount of insecticide that is not adsorbed to straw/soil to reach and kill larvae.

Table 1. Mean number of SWW larvae/pre-pupae per tall fescue crown at 0, 3 and 10 days after treatment. Additional percent reduction reported from 3 DAT larval/pre-pupae collection brought to lab. October, 2007

Treatment	0 DAT pre- *10/15/07*	3 DAT *10/19/07*	10 DAT *10/26/07*	3 day lab observation[2] **% SWW Reduction[3]**
	-------Mean number of SWW larvae per crown[1]------			
UTC	8.00 ± 0.54	1.06 ± 0.07	0.66 ± 0.18	11
Baythroid XL (4 oz/a)		1.60 ± 0.64	0.13 ± 0.08	30
Lorsban 4E (2 qt/a)		1.87 ± 0.33	0.27 ± 0.07	22

[1] No differences in numbers of larvae were seen between treatments.
[2] Larvae and pre-pupae were transported back from 3 DAT evaluation and observed for 3 days.
[3] Fungal and bacterial pathogens and unknown causes killed some larvae as seen in the untreated control from laboratory observation. No parasites emerged from SWW.

Table 2. Pheromone trap catches and subsequent larval SWW infestations in three locations in each of three fields treated to kill sod webworm moths with Baythroid XL. July, 2008

	No. of SWW Moths per Pheromone Trap per Date			Mean No. SWW Larvae per 6"crown[1]	
PRG FIELD #	6/18/08	6/23/08	6/30/08	9/3/08 60 DAT	9/17/08 74 DAT
25	8	16	35		
SE-UTC *Unsprayed*				1.4	No data
NW				1.9	"
NE-Mid				1.7	"
27	2	10	44		
SW-UTC *Unsprayed*				3.4	0.83
NW				1.4	1.67
NE-Mid				0.7	0.5
26	2	45	67		
S-UTC *Unsprayed*				4.2	5.8
NW				0.4	0.67[2]
NW-Mid				0	1.5

[1] Sample based on 6 or 7, 6-inch grass cores.

[2] One SWW larva was parasitized; small cocoon present.

Table 2. Control of sod webworm infesting tall fescue.

	Mean no. of live SWW larvae per crown		Percent reduction within treatment	Percent reduction compared to UTC
Treatment	Pretreatment	6 DAT		
	Sept 26, 2008	Oct 2, 2008		
Baythroid XL	5.63	2.50	58%	50%
Lorsban 4E	6.06	3.42	41%	25%
UTC	5.56	4.75	14%	--

[1] Eight, 6-inch grass cores were taken for pre-treatment counts; six, 8-inch cores were taken for post-treatment counts. No statistical differences in SWW numbers were seen between treatments.