Developing monitoring techniques for control of Pear Slug

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Abstract

Introduction:

Codling moth mating disruption is being implemented on approximately 95% of the pear acreage. Despite the efficacy of mating disruption, supplemental CM control with insecticides is often necessary. Thus, pear pest management now relies on mating disruption for CM control, supplemented with an organophosphate insecticide (OP) (Guthion or Imidan), pyrethroid (Danitol) or reduced risk insecticide (Confirm, Intrepid or Success). The reduced usage of OP insecticides has caused a substantial decrease in pear psylla and two-spotted spider mite pest pressure, permitting a reduction in the use of pesticides targeting these secondary pests. However, the reduced usage of OP insecticides has also caused a substantial increase in damage from a number of other secondary pests such as true bug (lygus, stink and boxelder bug), oblique-banded leafroller and occasionally pear slug. Since pear slugs had seldom been seen in sprayed orchards, monitoring methods have not been developed and we do not know the best timing to control this pest.

Objectives:

1) To develop monitoring tools to determine the best timing for control of pear slug.
2) To evaluate efficacious pest control for pear slug.

Plans and Procedures:

Monitor: To determine the best timing for control, we monitored pear slug in an orchard under codling moth mating disruption in Hopland. We monitored eggs beginning at tree bloom and continuing through larval development of the second generation. Ten leaves from each of 50 trees were collected weekly and examined for eggs and larvae.

Trial: We conducted two trials in Mendocino County: 1) in an orchard under mating disruption for CM control in Hopland and 2) in an organic orchard in Potter Valley

Hopland

Eight treatments were tested in Hopland. The treatments were: 1) Confirm (20 oz/100 G water), 2) Assail at full rate (3.4 oz/100 G water), 3) Assail at 1/2 rate (1.7 oz/100 G water), 4) Success at full rate (8 fl oz/100 G), 5) Success at 1/2 rate (4 fl oz/100 G water), 6) Ever Green EC 60-6 at full rate (24 oz/100G water), 7) Ever Green EC 60-6 at 1/2 rate (12 oz/100 G water) and 8) an untreated control. All treatments were replicated four times in a randomized complete block design. Treatments were applied to three trees per replicated plot The foliar sprays were applied with a hand-held orchard sprayer. Applications were placed at peak egg laying for the first generation on June 6

based on monitoring data. We took a pre-treatment sample on May 22 that consisted of 5 terminals taken from the top and the bottom of each of 10 trees. The trial was evaluated for pear slug population one, three and five weeks after insecticide application by collecting 10 leaves per plot from the tree at the center of the plot. We recorded dead, live and emerged eggs, and dead and live larvae. We also did an evaluation of feeding damage before the larvae died as a measure of how much they fed before the chemical took effect. This was measured on a scale of from 1 to 5 where a value of 1 was given where there was no feeding; a 2 when there was 1 to 4 bites; a 3 was more than 4 individual bites; a 4 was when the individual bites coalesced to form a larger surface area eaten than from a single bite; and 5 when 50% of the leaf was skeletonized.

PotterValley

The trial conducted in Potter Valley consisted of 4 treatments replicated 3 times. The applications were done with a speed sprayer and each replicate was approximately 1 acre. The four treatments were 1) Codling moth mating disruption (CM MD) only as the control, 2) CM MD + 415 Oil at 2.5 G/acre, 3) CM MD + Entrust at 2 oz/acre, 4) CM MD + CM granulosis virus Cyd-X at 3 oz/acre + NuFilm 17 at 16 oz/acre. Treatments were applied on July 12, July 24 and August 4. On July 12 Entrust at 1 oz/acre was included in each treatment due to high populations of pear slug. Codling moth pheromone was applied with Isomate t at 36 ties per acre and puffers in the surrounding area at 1.5 canisters per acre.

Results:

Hopland

On the pre-count conducted on May 22 the average number of pear slug eggs per terminal was 0.6 at the bottom of the tree and 1.5 at the top of the tree. Population at the top of the canopy was consistently double that of the bottom of the tree. This is considered a high population and I expected good results given that we had a good population in which to test the different insecticides. Results from the evaluation conducted 5 weeks after treatment (Table 1) show there were no difference between treatments. Evaluations done at 1 and 3 weeks show exactly the same results, thus we report only the results taken at week 5. There is no difference even in comparison to the control where larvae mortality was almost 100%. In trying to reconstruct what happened, we speculate that the pre-bloom application of Actara applied for psylla control was affecting the results causing mortality even in the control treatment. Actara is a Neonicotinoid insecticide with systemic action.

Potter Valley

In the trial conducted in Potter Valley, Entrust applied three times at 2 oz/acre controlled a high pear slug population. Entrust is the organic formulation of Spinosad the same active ingredient of Success. We also saw a reduction on pear slug population with the granulosis virus Cyd-X applied for codling moth control. We cannot explain this reduction of pear slug population with Cyd-X.

Table 1. – Average number of eggs and larvae alive and dead per leaf in eight treatments for pear slug control evaluated 5 weeks after treatment.

	Eggs/leaf			Larvae/leaf		Feeding/leaf
Treatment	Alive	Dead	Emerged	Alive	Dead	(scale 1-5)
Assail Full rate	0.3	0.9	1.2	0.0	0.2	2.9
Assail 1/2 rate	0.4	0.5	1.2	0.0	0.3	2.4
Confirm	0.2	0.4	1.9	0.0	0.4	2.9
Success Full rate	0.3	0.4	1.8	0.0	0.4	2.2
Success 1/2 rate	0.3	0.6	1.5	0.0	0.2	2.6
Evergreen Full rate	0.1	0.6	1.5	0.0	0.6	2.8
Evergreen 1/2 rate	0.3	0.6	1.6	0.0	0.6	2.9
Control	0.2	1.1	2.2	0.0	0.6	3.0

Fig. 1. Percent leaves with Pear Slug in four treatments, Potter Valley, Mendocino County