

Final Report for VAC Project Number 731

Title: Strategies for infesting turf with white grubs for evaluating insecticides

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Statement of problem or issues to be addressed by this project:

Turfgrass is a valuable industry to Virginia. A survey conducted in 2014 confirmed that white grubs are by far the most important turfgrass pests in Virginia turf (Laub et al. 2016). Preventive or curative insecticide applications are the primary control strategies for these pests. Because EPA regulations on current insecticide products can change at any time, and because a pest population's susceptibility to insecticides also can change as resistance mechanisms develop, we must continually evaluate new insecticides for their efficacy. Unfortunately, insecticide efficacy evaluations on white grubs can be frustrating because of the patchiness and unpredictability of these subterranean pests. Too often, field trials are set up and pest densities end up not being high enough or uniform enough across the experiment, resulting in insufficient data. Strategies to infest turf plots with egg-laying beetles in order to increase pest densities of white grubs would help alleviate this problem while also enable researchers to conduct the experiments in locations that are most practical.

Descriptive summary of original proposed research plan/project:

Objectives

- 1: To assess the effectiveness of infesting turfgrass plots with egg-laying scarab beetles for evaluating insecticides for white grub control
- 2: To evaluate the efficacy of cyclaniliprole, a new insecticide chemistry for controlling white grubs and other soil pests in turfgrass.

What was done:

Objective. To evaluate the efficacy of springtime preventive insecticide treatments for control of Japanese beetle and masked chafer white grubs. The trial included cyclaniliprole, a new diamide insecticide that will likely be marketed by PBI/Gordon Corp. The product name is unknown at this time.

Experimental Design.

An experiment was conducted at the Virginia Tech Turfgrass Research Center in Blacksburg, VA. It was arranged in a Latin-Square Design with five replications of five treatments including:

- 1) Water control
- 2) Merit 75WP @ 1.6 oz/10,000 ft² (imidacloprid)
- 3) Acelepryn @ 3.67 fl oz/10,000 ft²
- 4) Cyclaniliprole 50SL @ 4.7 fl oz/10,000 ft²
- 5) Cyclaniliprole 50SL @ 12.6 fl oz/10,000 ft²

Individual plot size was 7 ft x 4 ft. All treatments were applied with a 2-gallon water pail drench on 14 May 2018, and irrigated afterward. On 27 June, masked chafer beetles were observed flying over turfgrass at dusk around Blacksburg, VA and >500 beetles were hand collected and placed in cages with vegetation. In mid-July, >500 Japanese beetle adults and masked chafer adults were also hand-collected from weeds and crops. In early July, each beetle species was caged over top of 1 ft diam sections of turf (Fig. 2). We placed about 10 beetles per cage and which allowed to deposit eggs for 2-3 weeks. On Aug 8, 2018, a sod cutter was used to cut 1 square foot width at the center of each plot at a depth of 1.5 inches.

The turfgrass was lifted up and the grubs below were counted. White grub densities were recorded and data were analyzed using ANOVA.



Fig. 2. PVC ring for caging scarab beetle adults on turfgrass to allow precision egg-laying in each plot for research.

Results. Pest densities of white grubs were not as high as we had hoped, particularly given the efforts to artificially infest plots with egg-laying beetles. However, all insecticide treatments provided effective control of white grubs compared with the water control. Cyclaniliprole may be another diamide insecticide option for turfgrass managers in the future as it appeared to provide similar control as the current standards Merit and Acelepryn.

Acknowledgements. I would like to thank John Dickerson and his crew at the Virginia Tech Turfgrass Research Center for assistance with the field plot and the Virginia Turfgrass Foundation/Virginia Agricultural Council for funding the research project.

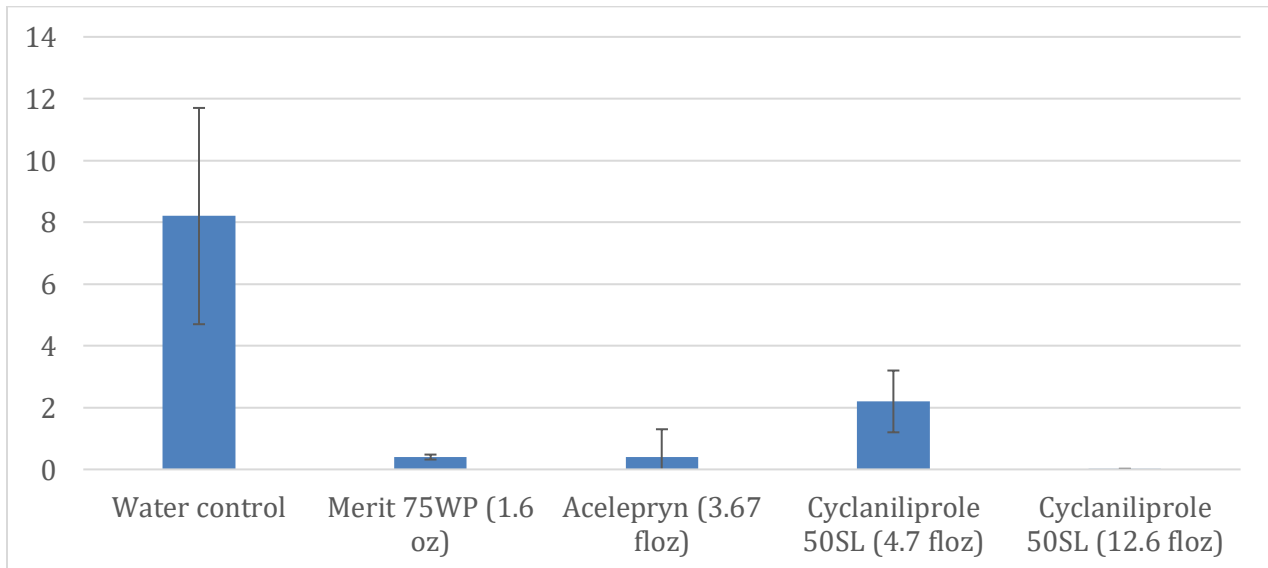


Fig. 3. White grubs/ft² sampled on 8 Aug (92 days following 14 May drench applications) in 2018.

Deliverables: The research trial for this project was established at the Virginia Tech Research Center in Blacksburg, VA, which enabled me to take part in annual turfgrass field day held at the facility in August 2018. The research will also provide useful insecticide efficacy data for other turfgrass training

workshops in winter 2019. Dr. Kuhar also submitted the results of this trial to the *Virginia Turfgrass Journal* for publication in the January/February 2019 issue.

Respectfully submitted:

A handwritten signature in black ink that reads "Thomas P. Kuhar". The signature is written in a cursive style with a long horizontal flourish at the end.