

2008 IPM and Sustainable Ag Mini-Grant Proposal

“Examining Traditional Economic Thresholds for Alfalfa Weevil in Established Alfalfa”

Project Leaders: Clark Israelsen Michael Pace, Mark Nelson, and James Barnhill (USU Cooperative Extension County Agricultural Agents) in cooperation with Dr. Erin Hodgson (Extension Entomologist) and Dr. Dillon Feuz (Extension Economist).

Requested Budget: \$ 1,784

Situation: Many alfalfa producers in Utah have incorporated the practice of applying an insecticide as an early treatment for alfalfa weevil control. This preventative application is often made in combination with a herbicide, and before an alfalfa weevil infestation has been identified. Some growers sample for alfalfa weevil larvae and adults and make an insecticide application when they can justify the treatment.

In 2004, field research was conducted in Box Elder and Weber Counties, and showed that early applications of Furadan were effective in reducing weevil numbers. Post treatment counts resulted in an average of 5.7 larvae in Weber County and only 1 in Box Elder County. In comparison, untreated control fields in Weber County averaged 10.7 larvae per sweep and Box Elder County fields averaged 3.9 larvae per sweep. Although none of the sampled fields exceeded the traditional economic threshold for alfalfa weevil in established stands, (20 larva per 180 degree sweep with a 15 inch net) there was a substantial reduction in larvae per sweep.

Additional field trials were conducted in 2005, with alfalfa weevil counts collected from Weber, Box Elder, Beaver and Millard counties. Initial sweep counts during the first crop period averaged 3.4 larvae in the treated fields and 11.0 in the untreated control fields. The second sweep sample date occurred just prior to first crop harvest and resulted in 3.3 larvae per sweep in the treated fields and 35.2 larvae per sweep in the untreated controls. It appears the early Furadan treatments in 2005 were effective in reducing the alfalfa weevil larvae and adult populations. However, of the 26 untreated control field evaluations, only 8 exceeded the economic threshold. All 25 treated field evaluations had less than 20 larvae per sweep throughout the growing season. The spring of 2005 brought an unusual amount of precipitation and delayed first crop harvest, which may have produced non-typical results that year.

In 2006, alfalfa fields were sampled for alfalfa weevil in Cache, Box Elder and Beaver counties. Furadan treatments again reduced the larval and adult populations when compared to the untreated control fields. However, project leaders were not able to assess the economic benefit of early insecticide treatments in these fields. The percent reduction of alfalfa weevil larvae due to early treatment varied from 50 to 98 percent, with an average reduction of 85.6 percent. The average reduction in adult weevil was 74.3 percent. Of the 13 control field evaluations completed, none had twenty or more larvae per sweep, or a high enough population to warrant an insecticide application based on the

traditional economic threshold. The highest population of alfalfa weevil larvae (17.7 larvae per sweep) was detected just prior to the first cutting in Cache County.

Three years of Utah data show that weevil numbers collected per 180 degree sweep with a 15-inch net, is often below the generally accepted economic threshold used to justify an insecticide treatment. However, hay growers and crop consultants use anecdotal evidence suggesting that non-treated fields, especially after the harvest of first crop, are extremely slow to recover. As such, yields and net returns appear to be lower than what is observed in treated alfalfa fields.

As a result, project leaders suggest a need to re-assess the generally accepted economic threshold of 20 larvae per sweep. In general, economic thresholds for insects are not intended to be static, but are highly dependent on production costs, crop values, etc. Unfortunately, most growers ignore dynamic changes in the market and rely solely on one “number” to trigger all insecticidal treatments. For alfalfa, there are several points to consider when deciding a well timed insecticide application. The demand for quality alfalfa hay for dairy cows, horses and other specialty niches has been increasing regionally and worldwide. New insecticidal chemistries are expensive and frequently the only registered products available.

Developing a dynamic economic threshold for alfalfa weevil would be an invaluable asset to Utah growers because it will provide flexible management guidelines for variable growing conditions and market values. Without such knowledge, growers will likely continue to make unnecessary, preventative insecticidal treatments to control alfalfa weevil. On the other hand, understanding and properly using economic thresholds when dealing with alfalfa weevil can increase producer profits and safeguard environmental quality.

Objectives:

- 1) Assess the validity of the generally accepted economic threshold of 20 alfalfa weevil larvae per 180 degree sweep with a 15 inch net.
- 2) Monitor production levels in established treated and untreated control alfalfa fields with the use of Rising Plate Meter's fitted with electronic accumulator counters.
- 3) Develop a response curve for alfalfa forage DM production as a function of insect populations in order to apply some economic projections and potentially establish a dynamic economic threshold.

Procedures: Trials during 2008 will be established in Box Elder, Beaver, Weber and Cache counties. Each agent will select fields for sampling and monitoring that have an alfalfa stand that has been established for a minimum of two years and a maximum of five years. Portions of each field will receive an insecticidal application to control alfalfa

weevil (i.e., Treated). The remaining portion of the field will not receive an insecticidal treatment regardless of alfalfa weevil populations (i.e., Untreated Control). Replications will be repeated four times.

Participating agents will sample the alfalfa fields for weevil at least twice before the first cutting and twice again before the second cutting. The first crop sampling will take place approximately 3 weeks before anticipated harvest and again just days before the hay is actually swathed. Second crop sampling will be done approximately 7-10 days after the first crop was harvested and again just days before the hay is swathed for second crop. Each monitoring session will consist of counting alfalfa weevil adults and weevil larvae found in three sub-samples from each field replication. The sub-samples will be collected by taking ten 180° sweeps with a 15 inch sweep net through the top of the foliage (like the data collected from 2004-2006).

In addition to sweep net counts, each field will be assessed for dry matter tonnage per acre using Electronic Rising Plate Meters (www.jenquip.co.nz/pasturem.htm). Dry matter will be estimated by taking 20 random readings per field. The Electronic Rising Plate Meters, generally used to measure forage in grazed pastures, will be calibrated for accuracy. Early in the season alfalfa clippings will be collected from quadrants and tonnage will be compared to results from the Rising Plate Meters.

Anticipated Results from this Proposal:

- 1) Project leaders will meet face-to-face at the 2008 Annual Extension Conference in March to finalize sampling protocols, field locations and other details.
- 2) A final report, directed by Clark Israelsen, will be written by all project leaders. All contributors will assist in producing and approving the final document. The final report will be placed on the USU Extension webpage and also be made available on the IPM/SARE website (<http://utahpests.usu.edu/ipm/htm/ipm-grant>).
- 3) Results of the study may potentially be presented at the 2009 Utah Hay and Forage Symposium for hay producers (2007 symposium had 125 participants), Ag Agent Annual and Regional Meetings (75 agents) along with county crop schools and grower meetings (500 plus participants). Project leaders can use the collected information to educate and train growers in sampling for alfalfa weevil and making effective management decisions, and the potential use of the rising plate meters to monitor tonnage in their respective fields. This information can also be shared with local chemical dealers, and individuals via phone, email or walk-in conversations.
- 4) Project leaders will develop a Utah Pests factsheet, coordinated by Erin Hodgson, on pertinent alfalfa weevil life cycle, biology information in Utah. This publication will include up-to-date treatment recommendations and be available online (<http://utahpests.usu.edu/insects/htm/factsheets>).

Detailed Budget Outline for 2008:

Electronic Rising Plate Meter Extensions - 4 @ \$45 each	\$ 180
Insecticides for treated areas – Lorsban – 5 gallon	\$ 190
Solo Backpack Sprayers with fold-away handle, pressure gauge, padded straps, boomless brass broadcast nozzle – 4 @ \$135 each	\$ 540
Clippers and Quadrants – 4 sets @ \$45 per pair	\$ 180
Travel for field visits – 400 miles @ .485/mile	\$ 194
Miscellaneous Costs not anticipated	\$ 100
Publication and Distribution Costs	<u>\$ 400</u>
Total Expense	\$1,784