

# Evaluation of Economic Thresholds for Alfalfa Weevil Control 2007

## IPM Mini-Grant Proposal

### Project Title: Examining Traditional Economic Thresholds for the Control of Alfalfa Weevil in Established Alfalfa Stands

#### **Project Leaders:**

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#### **Situation:**

Many alfalfa producers have incorporated the practice of applying an insecticide such as 'Furadan' (*carbofuran*) as a preventative alfalfa weevil control. This application is often made early in the season before an alfalfa weevil infestation has been identified. Others apply an insecticide when scouting for weevil populations seem to justify treatment.

Research data in 2004, with trials conducted in fields in Box Elder and Weber Counties, showed that early applications of Furadan were effective in reducing weevil numbers. However, control fields in Weber County averaged 10.7 larvae per sweep while Box Elder County fields averaged only 3.9 larvae per sweep. The treated fields averaged 5.7 larvae in Weber County and only 1 in Box Elder County. According to generally recognized economic thresholds, 20 larva per 180 degree sweep with a 15 inch net, weevil populations never did reach levels high enough to warrant the use of insecticides.

In 2005, agents monitored individual alfalfa fields located in Weber, Box Elder, Beaver and Millard counties. Initial sweeps during the first crop period averaged 3.4 larva in the treated fields and 11.0 in the control fields. The second sweep, just prior to first crop harvest, netted 3.3 larva per sweep in the treated fields and 35.2 larva per sweep in the controls.

It appears the early Furadan treatments in 2005 were effective in reducing the alfalfa weevil larvae and adult populations. However, of the twenty six control field evaluations, only eight had twenty or more larvae per sweep ---- the generally accepted economic threshold level to warrant spraying. All of the twenty five 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.

Agents from Cache, Box Elder and Beaver Counties again monitored alfalfa weevil populations in 2006. Furadan treatments again reduced the larvae and adult populations

when compared to the controls in every field for which we collected data. However, the question of just how effective that treatment was is mixed.

The percent reduction of alfalfa 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 thirteen control field evaluations completed, none of the fields had twenty or more larvae per sweep---enough to warrant an insecticide application. In fact, the highest level recorded was 17.7 larvae per sweep just prior to first crop harvest in Cache County.

Three years of Utah data shows 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 are observing that non-treated fields, especially after the harvest of first crop, are extremely slow to recover. As such, yields appear to be lower than what is observed in treated alfalfa fields.

As a result, we suggest a need to re-assess the generally accepted economic threshold of 20 larvae per sweep. The increasing value of quality alfalfa hay, ever changing costs of insecticide treatments, and potential impacts of insecticides applications on beneficial insect populations calls for an analysis of a defensible economic threshold. In addition to monitoring weevil populations, researchers must also collect yield data before an economic analysis can be made.

### **Objectives:**

- 1) Assess the validity of the generally accepted economic threshold of 20 alfalfa weevil larva per 180 degree sweep with a 15 inch net.
- 2) Monitor production levels in established alfalfa fields, treated and control, by 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 in order to establish a threshold.

### **Procedures:**

Trials during 2007 will be established in Box Elder, Millard, Beaver 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. Four fields, greater than 5 acres, will be monitored in each county with close proximity to each other. Half of the fields (Treated) will have received an insecticide application to control alfalfa weevil (either initially for prevention or later as a result of scouting for populations) the other half will not be treated (Control).

\* Sampling

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 harvested.

Second crop sampling will be done approximately 10-14 days after the first crop was harvested and again just days before the hay is cut for second crop.

Each monitoring session will consist of counting the adult weevil and weevil larvae found in five sub-samples from each field replication (see Diagram #1). The sub-samples will be collected by taking ten 180° sweeps with a 15 inch sweep net thru the top of the foliage (like the previous years procedures).

In addition to the use of sweep nets to count weevil infestations, participating Extension Agents will also take 30 readings in each field, each time, using the Electronic Rising Plate Meters ([www.jenquip.co.nz/pasturem.htm](http://www.jenquip.co.nz/pasturem.htm)) included in the budget of this proposal. Data from the Rising Plate Meters will be used to determine tonnage of dry matter per acre in the respective fields.

Agents and Specialists will meet face-to-face at the Annual Extension Conference in March to make certain each agent will be following proper protocols collecting the samples and to answer any specific questions. We will also need to do some alfalfa clippings to confirm the validity of equations when using the Rising Plate Meters.

### **Training and Educational Materials to be Produced**

Clark will take the lead in writing the final report in cooperation with the other participating agents. All contributing agents will assist in producing the final document and in getting the information distributed to our clientele. The final report will be placed on the USU Extension webpage and also be made available on the IPM website.

Results of the study may potentially be presented at Utah Hay and Forage Symposium for hay producers (125 participants), Ag Agent Annual and Regional Meetings (75 agents) along with county crop schools and grower meetings (500 plus participants). Agents can use the collected information to educate and train growers in sampling for economic threshold levels for alfalfa weevil and in the proper use of the rising plate meters to monitor tonnage in their respective fields. This information can also be shared with local chemical dealers.

**Budget for 2007:**

Electronic Rising Plate Meters – 4 @ \$660 each	\$2640
Clippers and Quadrants – 4 sets @ \$38 each	\$ 152
Stipends for Agents – 4 @ \$200 each (including mileage)	\$ 800
Publication and Distribution Costs	<u>    \$ 200</u>
<b>Total Expense</b>	<b>\$3,792</b>

**Diagram #1**

