

## 2011 IPM and Sustainable Ag Mini-Grant Proposal

### “Involving Local FFA Members in Monitoring, Collecting, and Distributing Biological Control Agents in Leafy Spurge”

**Project Leaders:** Clark Israelsen (USU Extension) Joel Merritt and Jake Forsgren (Cache County Weed Department) David Erickson and Andrea Clark (Vocational Agriculture Instructors, Cache County School District)

**Requested Budget: \$ 2,310**

**Situation:** Weeds have been a menace since the time man began cultivating fields and grazing livestock. Reduced yields, contaminated feeds, costly weed control efforts and frequent feelings of futility are all associated with persistent, troublesome weeds. Traditional methods of weed control include cultural, mechanical, and chemical means. Weed eradication is seldom possible, but weed control is a realistic goal.

Biological weed control is another method that continues to show promise. This self sustaining, environmentally friendly method consists of introducing and managing selected natural enemies into invasive weed patches. These host-specific, plant-feeding organisms, reduce the competitive advantage of the exotic weeds, thus allowing the more desirable plant species to thrive.

Biological control has many advantages. One of the greatest benefits is that BCAs are on duty 24 hours a day, 7 days a week. There is a reduced need for herbicides, and insects and pathogens don't argue about property boundaries. This long-term, self-perpetuating control method results in a lower cost per acre and allows agents to build up and disperse to the limits of the infestation.

Some of the disadvantages of biological control include the limited availability of agents for some plants. Biological control using insects is often slower than other methods of weed control. Additional challenges to biocontrol methods have to do with the time required to monitor and evaluate beneficial insect numbers, collection of excess populations, and the redistribution of biocontrol agents to new areas.

Cache county has experienced some success with BCAs on leafy spurge, purple loosestrife, diffuse knapweed and spotted knapweed. These weeds are often in less accessible areas of the county, making biological agents the logical method for weed control. USU Extension, County Weed Departments, US Forest Service, BLM, and APHIS have worked cooperatively to establish thriving BCA populations. Our problem, however, is our inability to properly monitor the effectiveness of BCAs, and then to collect and redistribute BCAs to new areas when needed. It seems we never have sufficient time or manpower.

We have found that BCAs are typically easy to catch and distribute by using a sweep net through specific noxious weed types. Captured insects are put into a tight fitting, but breathable, cardboard container with a little vegetation for food and cover. Insects are kept in a cooler with ice until ready for release. We are always more successful when involving land owners in the process of monitoring, collecting and distributing. Again, our difficulty has been a lack of time to actually accomplish this objective. We think we can have a significant improvement in our success by involving High School FFA students who are currently enrolled in Plant Science classes. Not only will they be helpful here and now, but they will carry the IPM/BCA concept into the next generation. In many cases, their parents or grandparents are the current landowners in areas where we want to work.

**Objectives:**

- 1) Involve High School FFA students who are currently enrolled in Plant Science classes in IPM/BCA activities.
- 2) With appropriate training from USU Extension and the Cache County Weed Department, FFA students will monitor BCA populations in areas when they have been introduced.
- 3) Under the direction of adult leaders, FFA students will collect and redistribute BCA's from areas of excess to areas that are deficient. Care will be taken to insure that proper protocols are followed so that success can be enhanced.
- 4) If funds permit, trained FFA students and their supervisors will introduce purchased BCAs to new areas where weed infestations are troublesome.
- 5) Our major objective is to convince the younger generation, future land owners, of the benefits of IPM/Sustainable Agriculture methods along with the proper use of BCAs.

**Procedures:** In late April or early May of 2011, USU Extension Agent, personnel from Cache County Weed Department, and FFA advisors will meet with FFA students who are enrolled in Plant Science classes at Mountain Crest and Sky View High Schools. Instruction will be provided on weed and insect identification, and the use of BCAs to control specific weeds. Biological control of leafy spurge will be our major focus, though we will consider the use of BCAs on other invasive weeds also.

Additional training and supervision will be given during the summer months, since FFA students are usually involved in summer Ag programs. Summer training will actually be in the field where sweep nets and PVC Transect Boxes will be used to monitor and redistribute BCAs according to population and need. Local media personnel will also be invited to be a part of the process so that they can help spread the word to communities.

Data will be collected relative to the percent damage to leafy spurge plots as compared to BCA populations. Assessments will also be made relative to the success of new introductions of BCAs and/or transplants into deficient areas. This study may require additional years of data before successes or failures can be adequately assessed and firmly documented.

Students will learn about four specific species of flea beetles that have already proven to be effective in leafy spurge control in northern Utah. These relatively small beetles (5-6 mm long) have powerful jumping legs and can tolerate hot dry summers and sub-freezing winters. *A. czwalinae* and *A. lacertosa* are both black beetles that are difficult to tell apart. *A. czwalinae* prefers a habitat with warm temperatures with medium to high humidity, partial shade, loamy soils, and a low ant population. *A. lacertosa* prefers sunny and dry areas. *A. flava* is a slightly larger flea beetle with a bright gold color that prefers hot, dry areas with alkaline soils. *A. nigriscutis* is a brownish root boring beetle. It prefers sunny, dry areas with well drained soils. Adult flea beetles feed gregariously on the leaves and bracts of leafy spurge during the summer. Females lay their eggs at the base of the spurge plants with the subsequent larva feeding internally and externally on the primary and secondary roots. This causes considerable damage to the plants.

If appropriate funding is available, we will also work with *Oberea erythrocephala*. These beetles are a little over half an inch long, not including their antenna. Larvae attack the stems and root crown and the adults destroy stems and leaves. They prefer partially sunny, riparian type areas and can tolerate sub-freezing temperatures. Grazing can be detrimental to this agent because they utilize 3 to 4 inches of plant tips for egg laying and development during mid-summer. *Spurgia esulae* is another tiny fly that appears promising in Cache County.

### **Data Analysis and Presentation of Results:**

- 1) Project leaders will meet face-to-face with FFA students in their classes during the spring of 2011. Instruction will be provided regarding identification of weeds and insects. IPM/Sustainable Agriculture concepts will also be taught to the students.
- 2) Project leaders and students will work in the field during the summer monitoring weed infestations, BCA damage, BCA populations and success or failure of redistributing and/or introducing BCAs to deficient areas. Sweep nets and PVC Transect Boxes will be used to monitor and redistribute BCAs according to population and need
- 3) Local media personnel will be invited to be a part of the process so that they can help spread the word to communities. The media is always looking for educational stories, especially when it involves youth and proven sustainable activities.

- 4) Records will be kept relative to the percent damage to leafy spurge as compared to BCA populations. Assessments will also be made regarding the success of new introductions of BCAs and/or transplants into various areas.
- 5) This study may require additional years of data before successes or failures can be adequately assessed and documented.
- 6) A final report, directed by Clark Israelsen, will be written by all project leaders.
- 7) 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/html/ipm-grant>).
- 8) Results of the study may potentially be presented at the 2012 Utah weed Association annual meeting, USU Extension Agents Annual, Regional and National meetings. Additionally, results may be presented at annual county crop schools and grower meetings. Project leaders can also use the collected information to educate and train land owners in monitoring invasive weed populations (especially leafy spurge) on rangelands and cultivated lands, thus making effective management decisions that will enhance their net returns. This information can also be shared with local chemical dealers, and individuals via phone, email or walk-in conversations.
- 9) Results of this study will also appear in FFA contests and meetings as younger students become convinced of the value of IPM/Sustainable Agriculture and BCAs.
- 10) Pretests and posttests will be used to measure the impact of training on FFA student's ability to identify weeds, beneficial and harmful insects and BCAs.

#### **Educational Products/Outreach:**

- 1) Local media personnel will be invited to be a part of the process so that they can help educate the community of the benefits of IPM/SARE methods.
- 2) A peer-reviewed fact sheet will be created from the data collected. Records will be kept relative to the percent damage to leafy spurge plants as compared to BCA populations. Assessments will also be made relative to the success of new introductions of BCAs and/or transplants into various areas.
- 3) This study will likely require additional years of data before successes or failures can be adequately assessed and documented in a Journal Article.
- 4) All contributors will assist in producing and approving a final document that will detail the results of our study. 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>).

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**Budget Outline:**

Purchase of BCAs from Insectaries	\$1000
Training Materials for Students	\$ 150
12 Sweep Nets (Gemplers at \$25.75 each)	\$ 310
Materials for Transect Boxes (including tapes)	\$ 150
Travel for field visits – 400 miles @ .50/mile	\$ 200
Miscellaneous Costs not anticipated	\$ 200
Publication and Distribution Costs	<u>\$ 300</u>
<b>Total Expense</b>	<b>\$2,310</b>