Western Regional IPM Grants
Annual Progress Report Guidelines
Due October 15, 2008

INSTRUCTIONS: PLEASE PROVIDE ONLY THE ESSENTIAL COMPONENTS OF ACCOMPLISHMENT WHICH ARE:

1. A CLEAR IDENTIFICATION OF THE PROBLEM/ISSUE ADDRESSED BY THE RESEARCH/EXTENSION.
2. A CONCISE EXPLANATION OF HOW THE RESEARCH/EXTENSION ACHIEVEMENT CONTRIBUTED TO THE SOLUTION OF THE PROBLEM/ISSUE BEING RESEARCHED.
3. THE IDENTIFICATION OF OTHER BENEFITS RESULTING FROM THE RESEARCH/EXTENSION, EVEN IF UNPLANNED.
4. **PLEASE ATTACH A SUMMARY OF THE PAST YEARS PROGRESS, ONE PAGE MINIMUM.**

PROJECT NUMBER: NM-112816

PROJECT TITLE: Seasonal Phenology of the Beet Leafhopper in Relation to its >Weed Hosts and Beet Curly Top Virus Infection

---

LEAD PRINCIPAL INVESTIGATOR:_Rebecca Creamer

INSTITUTIONAL ADDRESS:
EPPWS, New Mexico State University, Las Cruces, NM 88003
TELEPHONE NUMBER AND EMAIL ADDRESS:
(575)-646-3225
CO-PIs or OTHER KEY PERSONNEL, and their INSTITUTIONS or AFFILIATIONS:
C. Scott Bundy, NMSU
Jill Schroeder, NMSU
Leigh Murray, Kansas State University

WHO MAY WE CONTACT FOR ADDITIONAL INFORMATION IF NOT THE LEAD PI?
NAME: C. Scott Bundy
TELEPHONE NUMBER AND EMAIL ADDRESS:
(575)-646-3171, cbundy@nmsu.edu

THE PROBLEM, ISSUE, OR REASON FOR PURSUING THIS RESEARCH/ EXTENSION PROJECT.

Curly top virus (BCTV), which is transmitted by the beet leafhopper, *Circulifer tenellus* (Baker) [Hemiptera: Cicadellidae], has caused significant problems to irrigated agriculture in the western US since 1899. In New Mexico, curly top disease causes substantial (over 50% in some years) losses to chiles. Since the crop is often grown with a small profit margin, growers are not able to grow chile profitably with that level of loss. Growers often attempt to control the problem by insecticide

application, but the vector can transmit the virus more rapidly than an insecticide can be effective. As such, insecticide use for control of curly top is not sustainable from an IPM, environmental, or economic perspective.

Little is known about the seasonal development of the beet leafhopper in New Mexico. A better understanding of the phenology of this insect (number of generations, timing of nymphal and adult development, etc.) and its interaction with weed hosts and chile are critical for proper timing and implementation of management strategies. Thus, a better understanding of how the beet leafhopper interacts with important weed hosts, such as London rocket, will allow commercial growers and gardeners in the general public not only the advance warning of likely high disease pressure, but also a necessary tool to implement effective disease management.

THE SINGLE MOST IMPORTANT ACCOMPLISHMENT OR BENEFIT RESULTING FROM THIS RESEARCH/EXTENSION PROJECT.

The results of this research, when completed, will provide New Mexico growers with critical information on the associations among the beet leafhopper, beet curly top virus, and key weed populations and the seasonal timing of these associations, providing management tools to better deal with this pest complex.

BRIEFLY DESCRIBE ADDITIONAL BENEFITS, SUCH AS:

SOCIAL BENEFITS -

ECONOMIC BENEFITS -

Better management strategies developed due to an increased understanding of the seasonal relationships of the beet leafhopper, weed hosts, and beet curly top virus should result in better yields and increased profits.

ENVIRONMENTAL BENEFITS -

Our data should offer the potential to reduce insecticide applications (and resulting environmental exposure) due to a better understanding of the timing of the seasonal development of the beet leafhopper.

OTHER -

Progress Report 2008

The seasonal phenology of the beet leafhopper was tested under field conditions to determine the number of generations and timing of the various stages of this insect through the year in southern New Mexico. Field collections at two primary sites began in January and continued weekly throughout the year on key weed species. London rocket, a cool season annual, was sampled for leafhoppers from January through May. Kochia, a warm season annual, was sampled from April until senescence. In addition to the previous weeds, other common weeds such as Russian thistle were sampled as well to get a better picture of host suitability. Each week adult and nymphal leafhopper populations were estimated using a sweep net and beat bucket, and eggs numbers were estimated using via leaf samples. All leafhoppers were taken to the laboratory to determine instar. Size and phenology of the weed species was documented weekly. Leaf samples also were taken from weed hosts and preserved for future virus extraction.

In a secondary project environmental conditions were evaluated to determine their potential impact on leafhopper abundance. Beet leafhoppers were sampled weekly on London rocket from February through May for beet leafhoppers at five locations in southern New Mexico using the same techniques listed above. Factors of interest included shading versus full sun, irrigation vs no irrigation, etc. Leaf samples for virus extraction also were taken from these sites.

Leaves from weed hosts in the field sites described above will be tested for curly top virus using PCR. The data will help us determine if leafhoppers are likely to overwinter on curly top infected weeds.

Once the seasonal phenology of the beet leafhopper has been elucidated for New Mexico, these data will be combined with plant development and seasonal temperatures to better predict curly top virus severity. We will revise the curly top management recommendations to include more precise weed management suggestions. While the research is specific to southern New Mexico, we believe

the information gathered, and the approach used will be helpful in furthering our understanding of this pest interaction that will benefit other areas of the western US.

PLEASE SUBMIT A HIGH RESOLUSION DIGITAL IMAGE REPRESENTATIVE OF YOUR RESEARCH/EXTENSION PROJECT THAT WE CAN USE IN WESTERN IPM CENTER PUBLICATIONS WHICH MENTION YOUR PROJECT.

When you have completed this form, return to

Frank Zalom

Department of Entomology
One Shields Avenue
University of California
Davis, CA 95616
fgzalom@ucdavis.edu

and

Rick Melnicoe
Western IPM Center
Department of Environmental Toxicology
One Shields Avenue
University of California
Davis, CA 95616
rsmelnicoe@ucdavis.edu

THIS FORM WAS COMPLETED BY:

C. Scott Bundy, Associate Professor

(Name and Title)