

Project Title: Initiation of Trapping and Monitoring Techniques to Identify and Determine the Pest Status of Billbugs in Arizona Turfgrass

Project Leader: Kai Umeda

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Location: Maricopa and Yavapai Counties

Critical Issue / Situation to be addressed: Not all insect species that occur as turfgrass pests in Arizona have been specifically identified nor have adults or immature growth stages been quantified. Threshold levels for damage to turf by insects have not been established. Tolerance levels or action thresholds to execute pest management strategies for turf pests have not been determined or established. Economic damage thresholds that weigh costs versus benefits of control options for varying populations of pests in turf have not been calculated. Turf managers and golf course superintendents use insecticides for billbug control in turfgrass but the species causing visual damage has not been fully determined. Adult billbugs representing possibly four different species are commonly suspected.

Golf course superintendents and pest control operators acknowledge using chemical control measures for a variety of turfgrass insect pests such as white grubs [masked chafers (*Cyclocephala* spp.), May/June beetles (*Phyllophaga* spp.), blackturfgrass atenioid (*Ataenius spretulus*, BTA)], cutworms (*Agrotis ipsilon*), sod webworms (Family Pyralidae), armyworms (Family Noctuidae), pearl scale (*Margarodes miridonalis*), mole crickets (*Gryllotalpa* spp.), and rove beetles (Family Staphylinidae). The exact insect pest species occurrence and population biology and phenology are largely unknown in the desert environment. Mis-identification and/or improper diagnosis are common and often lead to inappropriate use of insecticides. The biology and life histories of most arthropod pests in Arizona turfgrass are not certain. Pests that normally have single generations per year in other regions of the U.S. may have multiple generations per year in Arizona where the winters are mild and less harsh. Four species of billbugs (*Sphenophorus* spp. Bluegrass, Hunting, Phoenician, and Denver) are suspected of infesting the same turf in Arizona and both adults and larvae are present during many times of the year.

Our survey network initiated in 2004 showed variable masked chafer populations around the perimeter of the Phoenix area with as many as three peaks in mating activity during the season. Some golf course superintendents are alerted to grub infestations on desert golf courses when javelinas dig and destroy the turf on greens, tees, and fairways or when birds fly onto golf courses and begin feeding for extensive periods of time. These observations were the basis for chemical treatments of grubs. With resource assistance from the Arizona IPM Center, nearly 10% of golf course superintendents in the Phoenix area were trained and have adopted trapping and monitoring techniques to optimally time insecticide applications for grubs.

The overall objective of this project will be to enhance decision-making abilities of professional turf managers in Arizona by improving site-based IPM practices through adoption of trapping

and monitoring techniques for billbugs in turf. The success of this proposed project will empower Arizona turf managers to proficiently monitor billbug populations through the use of traps and collect locally-based information about billbug identification, biology and seasonal occurrences. A billbug monitoring network will concurrently develop the locally obtained information for billbug species identification, determine threshold levels, and control options.

Outcomes:

1. Trapping billbugs on golf courses' turf will enable identification and determination of exact species.
2. Baseline information will be collected for the biology, lifecycles, and turf damage threshold levels of each of the billbug complex pests that occur in Arizona.
3. Establishment and maintenance of a billbug survey network will enable golf course superintendents to understand billbug populations in the Prescott and Phoenix areas.
4. Appropriate IPM strategies for the billbug complex will be enhanced by the development and implementation of monitoring. All alternatives for pest management would include cultural and biological control strategies in concert with chemical control options.
5. Critical decisions will be based on information that is developed for billbugs specific to the desert southwest region.

Plan for Evaluation: Evaluate the baseline knowledge level of superintendents and turf managers at educational workshops that are devoted to transferring information about billbugs. Evaluate the rate of anticipated and actual adoption of trapping techniques through surveys at workshops and seminars. Survey turf managers to determine current insect control practices and compare with practices implemented over time at annual seminars to evaluate IPM adoption.

Outputs:

Elements of the project are to achieve the goal of developing the IPM strategy by establishing fundamental knowledge for detecting, identifying, and quantifying billbug pests.

1. Establish a billbug survey network on select golf courses at Prescott Lakes Golf Course and other sites in the Phoenix area.
2. Identify the billbug species that cause the greatest concern for desert area turf managers. Correlate the biology and lifecycles of the billbug complex with environmental/climatic conditions to enable developing action threshold levels.
3. Transmit pertinent and timely data to golf course superintendents and turf managers via internet listserv.
4. Develop appropriate IPM strategies for managing populations of the key billbug pest(s).
 - a. Construct a matrix for integrating cultural turfgrass management practices with available chemical control options.
 - b. Local knowledge of billbugs will support insecticide manufacturer label references to Cooperative Extension recommendations
5. Produce and disseminate bulletins or appropriate publications about billbugs and their management to golf course superintendents and professional turf managers.
 - a. Fact sheets to describe billbugs' biology, phenology, and identification features to distinguish and differentiate pest species.
 - b. Publications will be posted to the internet website for broader regional access.
6. Extend and transfer technology to golf course superintendents and professional turf managers to enable individual trapping and monitoring for billbugs.
 - a. Provide information to build pitfall traps and to properly establish sites to effectively trap and monitor seasonal billbug populations.

7. Conduct seminars and workshops for golf course superintendents, sports turf managers, parks and recreational facility turf managers, and landscape professionals to:
 - a. Identify billbug pest species, understand billbug pest biology and lifecycles, understand population dynamics and seasonal occurrences
 - b. Annual Summer Short Course, Turf Field Day, or Turf Management Seminars are established annual meetings to facilitate future insect pest workshops
8. Provide support for technology transfer and ensure that golf course superintendents and professional turf managers become competent in billbug pest identification and quantification so that decisions are based on sound IPM practices.

Inputs – Budget:

Partial Salary – Research Specialist (Gabriel Towers) ERE included	\$4,000.00
Total	\$4,000.00