

Cooperative Extension IPM Program Grant Proposal - 2005

Project Title: Encouraging Adoption of Trapping and Monitoring Techniques as a Component of IPM Practices for Managing Desert Turfgrass Insect Pests

Project Leader: Kai Umeda

Project Team Members: Gabriel Towers, David Kopec, Jeff Schalaus, Rick Gibson, Jack Kelly, David Langston, Al Fournier

Location: Maricopa, Yavapai, Pinal, Pima Counties

Critical Issue / Situation to be Addressed: Insect species that occur on turfgrass in Arizona have not been specifically identified nor have adults or immature growth stages been quantified at any time or over any span of time. 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 white grub control in turfgrass but the species causing visual damage has not been fully determined. Adult beetles representing different species are commonly suspected and are often mis-identified.

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. For example, superintendents and turf management consultants have often observed and treated what they believed to be BTA; however, more precise identification showed that it was an *Aphodius* spp. beetle. 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. Two species of billbugs (*Sphenophorus* spp.) can infest the same turf in Arizona and Southern California and both adults and larvae are present during many times of the year. (3). Our survey network initiated in 2004 showed variable masked chafer populations around the perimeter of the Phoenix area with as many as three peak populations during the season. Currently, 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. One golf course suffered extreme damages from "Japanese beetles" such that an entire green had to be replaced. Japanese beetle (*Popillia japonica*) has not been officially detected or recorded as a pest in Arizona by USDA-APHIS. These examples of mis-identification, improper diagnosis, lack of knowledge of pest life cycles, and impacts of wildlife demonstrate that adequately developed economic damage threshold levels to initiate pest control measures is severely lacking for the desert region. Pearl scale is often responsible for causing large necrotic patches in bermudagrass turf in the early summer which is after the susceptible crawler stage

should have been treated. A high school football field in the Phoenix area was completely resodded after pearl scale allegedly caused damage to the turf. Another less severe situation on a professional baseball field showed “witch’s broom” effects on a hybrid bermudagrass that was thought to be a fertility problem but instead was a small mite infestation. Rove beetles, typically known to be beneficial predators, appear on golf course greens and push up small mounds of soil that interfere with putting and thus necessitate chemical treatment in some cases. Pearl scale, mites, billbugs, rove beetles, and *Aphodius* spp. are routinely alleged to be pests, however, misidentification, improper diagnosis, lack of knowledge of biology and lifecycles, or understanding of economic damage threshold levels to initiate pest control measures is severely lacking for the desert region.

The overall objective of the project will be to enhance decision-making abilities of professional turf managers in the Arizona by improving site-based IPM practices through adoption of trapping and monitoring techniques for turf insect pest(s). This is the most cost effective way to fill the existing aforementioned gaps in the practical knowledge base of turf insects and at the same time develop threshold levels and develop much needed control management options. The success of this proposed project will empower Arizona turf managers to proficiently monitor insect traps and use locally-based information about specific insect pests’ identification, biology and seasonal occurrences. An insect pest monitoring network will concurrently develop locally obtained information for insect pest species identification, determine threshold levels, and control options.

Outcomes:

1. Turf managers will become proficient in properly identifying insect pest species by:
 - a. knowing how to utilize blacklight traps and monitor insect pests.
 - b. knowing when to initiate seasonal trapping and evaluate populations to determine economic threshold levels for grub complex pests.
 - c. relying upon University of Arizona Cooperative Extension to assist in identification of insect pest species that occur in turfgrass.
2. Establishment and maintenance of an insect pest survey network will enable turfgrass managers to confirm trends of pest insect populations with personal data that is being collected.
3. Reliable baseline information will be established for the biology, lifecycles, and economic threshold levels of each of the white grub complex pests that occur in the southwest region.
4. Appropriate IPM strategies for key white grub complex pests will be enhanced by the development and implementation of personalized monitoring for a specific site. 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 ground-truthed data supported by information that is developed for insect pest(s) specific to the desert southwest region.

Plan for Evaluation: Evaluate the rate of 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 to achieve the goal of developing the IPM competence of turf managers will be to demonstrate a practical and applied approach to detecting, identifying, and quantifying insect pests.

1. Maintain an insect pest survey network for turfgrass sites on select golf courses, sports turf fields, and other commercial turf facilities in the desert region for multiple seasons.
2. Identify the key white grub complex pest(s) species that cause the greatest concern for desert area turf managers. Correlate the biology and lifecycles of the key white grub complex pest(s) with environmental/climatic conditions to enable developing action threshold levels.
3. Identify other insect pest species that occur in desert turfgrasses.
4. Transmit pertinent and timely data to turf managers via internet listserve.
5. Develop appropriate IPM strategies for managing populations of the key white grub complex pest(s).
 - a. Construct a matrix for integrating cultural turfgrass management practices with available chemical control options.
 - b. Local knowledge of insect pest(s) will support insecticide manufacturer label references to Cooperative Extension recommendations
6. Produce and disseminate bulletins or appropriate publications about key insect pest(s) and their management to professional turf managers.
 - a. Fact sheets to describe insect pest(s) biology, phenology, and identification features to distinguish and differentiate pest species.
 - b. Publications will be posted to the internet website for broader regional access.
7. Extend and transfer technology to professional turf managers to enable individual trapping and monitoring for turf insect pest(s).
 - a. Provide information to obtain blacklight traps and to properly establish sites to effectively trap and monitor seasonal insect populations.
8. Conduct seminars and workshops for golf course superintendents, sports turf managers, parks and recreational facility turf managers, and landscape professionals to:
 - a. Identify insect pest species, understand insect 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 workshops
9. Provide support for technology transfer and ensure that professional turf managers become competent in insect pest identification and quantification so that decisions are based on sound IPM practices.

Inputs – Budget:

Partial Salary – research specialist (Gabriel Towers)	\$7,400.00
Travel	\$2,500.00
Consumable supplies	\$100.00
Total	\$10,000.00