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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers University in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. It also allows these professionals to reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1996 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section represents performance of turfgrass cultivars and selections in New Jersey turf trials. The primary objective of these papers is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor
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DEVELOPMENT OF A RESEARCH AND EXTENSION PROGRAM IN TURFGRASS ENTOMOLOGY

Paula Shrewsbury[1]

To develop a sound research and extension program in turfgrass entomology, it is necessary to have a thorough understanding of Integrated Pest Management (IPM). There are several components to an IPM approach. These include 1) knowledge of the life cycles, host plants, and damage symptoms of key turfgrass pests; 2) monitoring or scouting; 3) decision-making; 4) management or control tactics; and 5) evaluation of the program. The justification for the implementation of IPM and the development of components that facilitate IPM programs is the economic importance of turfgrass in New Jersey and throughout the United States, environmental and societal concerns over the use of pesticides on golf courses, lawns, and in sod production, and the minimal practice of IPM by turfgrass professionals. In addition, several studies document dramatic reductions (average of 70%) in the quantities of pesticides used and the number of plants treated, without reduction in the aesthetic value of plants, following the implementation of IPM programs.

My extension program will involve educating turfgrass professionals on the underlying concepts of IPM, its components, and how to implement an IPM approach. This will include short courses and twilight meetings, newsletters, and the development and implementation of demonstration programs to assist turfgrass professionals in the practice of IPM.

My previous research identified ways to manipulate landscape habitats so they are more favorable to beneficial insects. By increasing the number of beneficial insects in a landscape you can reduce pest outbreaks. This management tactic is referred to as conservation biological control. My studies examined the interactions between habitat or vegetational diversity, natural enemies, and azalea lace bug abundance in landscapes. A common pattern found in landscapes is that azaleas growing in simple, exposed locations (landscapes with few plants) more frequently suffer from azalea lace bug outbreaks than azaleas growing in more diverse, shady locations (landscapes with many plants). After examining several possible explanations, I found that differences in natural enemies between simple and diverse habitats best explained the establishment of this pattern.

I determined that generalist predators, especially spiders, were much more abundant in the diverse landscape habitats than in the simple. This was because diverse habitats had more alternate prey (other insects besides azalea lace bug) than simple habitats. The greater abundance of alternate prey resulted in more generalist predators in these diverse habitats because they had a constant source of food. Whereas, in simple habitats, there were fewer alternate prey, thus predators left these habitats in search of food. Because there were more generalist predators, azalea lace bugs moving into these diverse habitats were eaten before their populations could become established. In simple habitats, however, fewer generalist predators were present, thus azalea lace bug survival was greater and their populations established and reached outbreak levels. By incorporating more plant material (trees, shrubs, flowers) into a landscape, you make it more favorable for natural enemies which results in fewer pest outbreaks.

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In developing my research program in turfgrass entomology, I will expand my studies in landscape ecology and conservation biological control to include the enhancement of turfgrass habitats to favor natural enemies. In addition, I will develop other alternative biological control tactics to suppress insect pest populations in turfgrass. These will include augmentative releases of predators to control turf pests and examination of many of the newer microbial products such as entomopathogenic fungi and nematodes, and *Bacillus thuringiensis*, a bacterial biological control agent.