

Overview of the Turfgrass Science Program

The Turfgrass Science Program at Purdue University made tremendous progress in 2004 and underwent many changes. We'd like to take this opportunity to update you on the progress of the program during 2004.

Recognitions

- Jim Beard was awarded an Honorary Doctorate of Purdue University, the highest award presented by Purdue.
- The Turf Program was awarded the Dean's Team Award in Spring of 2004 for their outstanding teamwork in advancing turfgrass teaching, research, and extension.
- Lee Schmidt was awarded the Distinguished Agriculture Alumni Award.
- Ted Woerhle was awarded the Certificate of Distinction from the Purdue Ag Alumni Association.
- The Purdue University Turf Bowl team placed 2nd among over 60 teams in the GCSAA's Collegiate Turf Bowl at the International Golf Course Conference and Show in an Diego.

William. H. Daniel Turfgrass Research and Diagnostic Center

- The teaching laboratory was occupied 162 days for various classes, extension events, meetings, educational programs, and athletic department events with over 7900 attendees.

Personnel Changes

- Doug Richmond joined the turf program staff in the Department of Entomology, focusing primarily on basic research and lesser responsibilities in teaching and extension.
- Yiwei Jiang joined the turf program staff in the Department of Agronomy, focusing primarily on turfgrass physiology research.

Turfgrass Undergraduate Education

- Over 60 students were majoring in Turfgrass Science at Purdue University. This represents about 40% of the undergraduate enrollment in the Department of Agronomy.
- Nineteen students graduated in May or Dec 2004.
- Seven students majoring in Turfgrass Science earned scholarships administered by the Turf Program in 2004. Funds for these scholarships came from the turf industry.

Turfgrass Outreach/Extension

- Over 2500 turfgrass professionals attended on-going training programs presented by the Turfgrass Science Program in 2004. These programs included:
Midwest Turf Expo - Jan - Indianapolis
IN-IL Turfgrass Short Course - Feb - Willowbrook, IL
Midwest Regional Turf Field Day - July - West Lafayette
Turf and Ornamental Seminar - Nov - Lafayette
- A tremendous number of homeowners benefited from the turfgrass program in 2004, primarily by indirect contact with county extension educators and press releases in local newspapers, but also by direct contact through phone calls, email, Master Gardener training, and the World Wide Web pages.

Turfgrass Agronomic Research

- In ongoing studies in cooperation with the National Turfgrass Evaluation Program (NTEP), we evaluated the turf performance of Kentucky bluegrass, tall fescue, creeping bentgrass, fine fescue, perennial ryegrass, bermudagrass and zoysiagrass cultivars for use in Indiana. Based on the outcome of these trials, we will be able to make cultivar recommendations to professional turf managers and homeowners.
- Dan Weisenberger and Zac Reicher conducted several weed control experiments in 2004. These experiments included pre- and postemergence control of annual grasses, postemergence control of broadleaf weeds, fall control of ground ivy in lawns and selective control of *Poa trivialis* and creeping

bentgrass. Results of these experiments are used to make weed control recommendations for the turf industry.

- Dan Weisenberger and Zac Reicher maintained on-going research on Roundup Ready Creeping Bentgrass. Much of the earlier research evaluated cultivar performance, but we are now focused on management of this new technology.
- Cale Bigelow, Glenn Hardebeck and Kristie Walker (M.S. student) are conducting several studies focusing on nutrient management programs for home-lawns, golf course fairways and putting greens. Several studies related to plant growth regulators for golf course fairways are being conducted to improve fairway quality and for their effects on annual bluegrass reduction. Additionally, evaluation of cool-season turfgrass cultivars in co-operation with the National Turfgrass Evaluation Program are ongoing. These studies should help Purdue make better recommendations with regard to species, cultivar and cultural management strategies for fine turf areas throughout Indiana.

Turfgrass Pathology

- A bioassay method was used to measure the duration of effective concentrations of fungicides for control of dollar spot on creeping bentgrass fairways. In each of three identical experiments, fungicide treatments were applied once to turf in replicated field plots, then sampled periodically over three weeks by removing turf plugs from the field. The sampled plugs were placed in incubation containers and inoculated with sections from a 4-day-old colony of *Sclerotinia homoeocarpa* growing on potato dextrose agar. After a 96 h incubation period, the extent of pathogen growth on the turf plugs was measured. Results describe a precipitous decline in effective concentration for all fungicide treatments beginning 7 to 10 days after application. The fungicides were only marginally effective at 14 days after application, and none provided any disease suppression at 21 days after application. The efficacy half-life (EHL) associated with four of the fungicides (chlorothalonil, iprodione, propiconazole, and thiophanate methyl) was estimated after fitting the data to a negative exponential model. EHL estimates ranged from 6.1 days to 9.5 days depending on the fungicide. This research contributes to our knowledge of the duration of effective fungicide concentrations on creeping bentgrass and can provide insight for scheduling fungicide sprays for golf course fairways.
- Research was initiated on the interaction between trinexapac-ethyl and fungicides used for dollar spot control on creeping bentgrass. Preliminary experiments were conducted on 'Penncross' creeping bentgrass at both fairway and greens height at the Daniel Turfgrass Research and Diagnostic Center in West Lafayette, IN. Two fungicides, chlorothalonil and propiconazole, were selected for this investigation because they represent most commonly used contact and acropetal penetrant active ingredients. All treatments were applied to replicated field plots using a custom boom sprayer that delivered a spray volume of 2 gallons per 1000 sq ft through three Tee-Jet 8004 flat fan nozzles. Fungicides were applied once (at label rates) at the beginning of each experiment, while trinexapac-ethyl was applied at a rate of 0.125 fl oz per 1000 sq ft at 14-day intervals. First year data showed that post-outbreak (curative) treatments with trinexapac-ethyl and propiconazole resulted in significantly less turf recovery (and poorer turf quality) when compared to propiconazole alone. In the experiments where treatments were applied prior to the dollar spot outbreak (preventive) the trinexapac-ethyl had no effect on disease progress. Research will be repeated in spring and summer of 2005.

Turfgrass Entomology

- Writing of the distance education course on technical implementation of integrated pest management in schools (IPMIS) was completed during 2004. One module of this course focuses on providing training that will assist the professional lawn and landscape industry to actively partner in this educational/extension program. This model lawn care program for public schools, was developed in cooperation with members of the MRTF. We believe that being proactive on this politically charged issue will continue to be critical for the turfgrass industry in the next few years. Publication of this course is expected during 2005.

- Work regarding the behavior of adult Japanese beetles continued during 2004. This work is providing clues as to the behavior of Japanese beetle flight and dispersal and will continue during 2005.
- Use of remote sensing to detect and map Japanese beetle grub populations prior to irreversible turfgrass damage was initiated several years ago. Research was completed and plans are to have this work published during 2005. Such technology may pave the way for application equipment with global positioning systems (GPS) capability to apply pesticides precisely where needed, reducing costs, human exposure to pesticides and potential negative effects on the environment.
- Chemical efficacy tests, financed by the chemical industry to evaluate and compare the effectiveness of new and existing insecticides for turfgrass insect pest control, were continued in 2004. 2005 plans are to expand these studies to include newer and as yet non labeled products. Plans for 2005 also include an evaluation of mole control technologies.
- Developing an integrated management approach for lawns. In this study we are incorporating two separate, but equally important lines of research. The first line employs a set of experimental lawns in which a wide range of management approaches will be implemented early in the turfgrass establishment process. These lawns will be used to evaluate biological, economic and aesthetic aspects of divergent lawn management approaches and provide a broad basis for comparing the relative strengths and weaknesses of each. The second line of research will be performed on a set of 50-100 home lawns managed using a wide range of methodologies. Data generated from this “biological lawn survey” will strengthen and regionalize ongoing efforts to identify key predictors associated with various turfgrass insect, weed and disease pests. Work will be initiated during the summer of 2005.
- Integrating soil fertility, host-plant resistance and biological control for management of insect pests of turfgrass. The overall goal of this research is to develop alternative pest management programs for the key arthropod pest associated with turfgrass in Indiana by integrating fertility management, endophyte-mediated resistance and biological/biorational controls in a way that optimizes turfgrass pest management. This work will continue during 2005.
- Cultural factors and persistence of entomopathogenic nematodes. In this study, we are exploring how cultural practices such as cutting height, turfgrass species selection, and fertility management influence the persistence of entomopathogenic nematodes- key natural enemies of insect pests. This work will also allow us to identify mechanisms responsible for increasing the persistence of these biological controls in the turfgrass environment. This work was initiated during 2004 and will continue in 2005.
- How important are insects in the weed invasion process? Current studies indicate that insects may be important facilitators of weed invasion into turfgrass. In this study we are exploring how cultural factors such as turfgrass species, endophyte infection, fertility and irrigation interact with insect pests to promote weed invasion. Our goal is to determine which factors have the largest influence on weed invasion and explore how the importance of these factors might change across a range of environmental conditions. This work was initiated in 2004 and will continue in 2005.