

Cultural Control, Risk Assessment, and Environmentally Responsible Management of White Grubs and Cutworms

Dr. Daniel Potter

University of Kentucky

Goals:

- *Determine factors that affect the distribution and abundance of white grubs and cutworms on golf courses.*
- *Reduce the use of insecticides by identifying methods to reduce white grub and cutworm insects through modified cultural practices.*
- *Provide better information on the effects of pesticides on natural enemies of turf-grass pests and other beneficial species that live in golf course turf.*

Cooperators:

A.J. Powell

K.F. Haynes

B.A. Crutchfield

R.C. Williamson

Research on the biology of black cutworms revealed ways that this pest can be more effectively managed. Nearly all of the eggs laid on creeping bentgrass putting greens are glued to the tips of grass blades, where they are removed by daily mowing and disposal of clippings. Most eggs can survive passage through the mower blades and will later hatch. We therefore advise golf superintendents to dispose of clippings well away from greens and tees.

Cutworm moths also lay eggs on higher-mowed turf in fairways and roughs, but here, most eggs are laid lower down on grass plants, where they would not be removed by mowing. Thus, reservoir populations may develop in high grass surrounding greens and tees.

Night-time observations revealed that cutworms are most active on putting greens between midnight and 1 hour before sunrise. Thus, pesticide treatments are best applied toward evening. Young cutworms feed mainly by "grazing" on the putting surface, whereas larger ones feed mainly from aerification holes or self-made burrows. Contrary to expectation, cutworms were not attracted to aerified bentgrass, although they tend to occupy aerification holes when such holes are available. Sand topdressing seems to partially deter cutworms.

Mowing an hour or so before dawn may provide substantial control by shredding. Our work shows that cutworms may crawl as far as 70 feet in a single night, and that they often invade greens from peripheral areas. We therefore suggest that when treating for cutworms, a 30 ft buffer zone

around the putting green should also be treated.

Perennial ryegrass and tall fescue were found to be as suitable for cutworms as creeping bentgrass, but Kentucky bluegrass was highly unsuitable as food. Endophyte-infected cultivars did not provide significant resistance. Putting greens surrounded by creeping bentgrass, tall fescue, or perennial ryegrass may be at greatest risk from invasion from peripheral areas. None of the 14 cultivars of creeping bentgrass we tested was significantly resistant. Nevertheless, use of Kentucky bluegrass around greens and tees, coupled with daily mowing of greens and clipping removal should provide substantial cultural control.

In a previous research project, an unidentified sex pheromone was found in both adult and larval stages of masked chafers. The fraction containing the chemical sex pheromone of masked chafers

was pinpointed by gas chromatography and electro-antennogram/behavioral analysis. The active compound was characterized by mass spectroscopy. Identification and synthesis of this attractant will provide means for monitoring these pests on golf courses and home lawns.

Insecticides that are applied to golf courses can adversely affect beneficial invertebrates such as predators and earthworms. This can sometimes aggravate pest outbreaks or thatch buildup. In 1996, we began studying the side-effects of two important new insecticides, halofenozide (Mach 2) and imidacloprid (Merit) on the turfgrass environment. Golf course turf was treated in May, and impact on beneficial species was monitored bi-weekly until fall. Our results suggest that these new insecticides provide excellent control of white grubs with minimal impact on beneficial species.

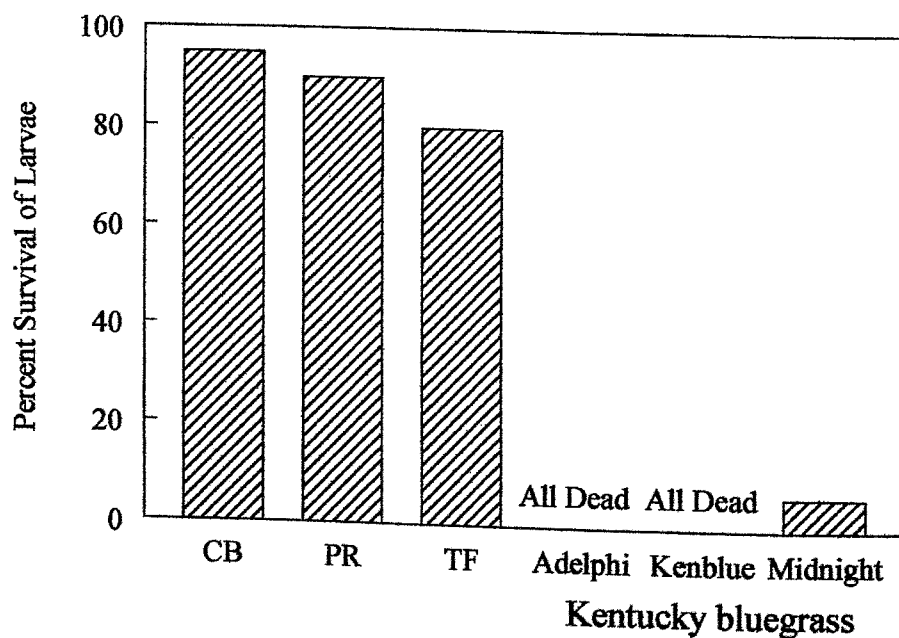


Figure 11. High survival of black cutworms reared on creeping bentgrass (CB), perennial ryegrass (PR) and tall fescue (TF), and lack of suitability of three diverse cultivars of Kentucky bluegrass.