

Integrated Pest Management for Turfgrass

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*Excerpted from *2010 Pest Management Guidelines for Commercial Turfgrass*

3.4 Integrated Pest Management

Cornell's *Pest Management Guidelines for Commercial Turfgrass* provide turfgrass managers with information on the legal and appropriate use of pest management practices and products. The focus is primarily on pesticide options, the legality and availability of which change frequently. However, these guidelines should only be used in the context of a complete, site-specific, integrated pest management (IPM) program. Such a program cannot be detailed within the confines of this book, but an introductory IPM discussion is presented below. In addition, the online version of these guidelines at <http://IPMguidelines.org> offers more IPM information by linking to resources such as turfgrass cultural practices, species and cultivar selection, diagnostics, and biological pest management. The printed version is a handy, quick, field reference for managers, but readers are encouraged to also explore the additional resources presented online.

IPM is a decision-making process that strives to make best use of all available management tools, including cultural, biological, mechanical, environmental, and chemical methods. IPM is effective, economical, and minimizes risk to the environment and human health. IPM is also known as integrated turfgrass management, best management practices or plain old common sense. IPM is also the basis of a good organic program, even though synthetic chemical pesticides are not included in those programs.

Definitions of IPM are numerous, but most agree on the following goals.

Minimize: Losses to pests; costs; negative effects on human health and the environment; and pesticide resistance potential.

Maximize: Cultural, mechanical and biological pest controls; effectiveness of chemical pesticides (when they must be used); turfgrass quality; and populations of beneficial organisms.

Any decisions based on these criteria involve balance and potentially compromise, and depend on factors such as pest pressure, weather, quality demands and intended use of the area. Therefore, turfgrass managers select distinct IPM practices in various settings and circumstances. As practitioners, you know that IPM is diverse and cannot be applied according to "cookbook" recipes—it is a customized, proactive approach. The practice of IPM can be described in seven steps.

3.4.1 Plan

Successful businesses set goals and plan ahead. Likewise, good IPM requires good planning. Start with the big picture, such as "improve the environment with a quality turfgrass product", and then work into finer details. Ask how you can improve the environment on your golf course or your customers' properties, in the watershed, and in the community. Determine the current condition of the property. What grass and weed species are present? What are the soil conditions? What other pest problems are possible, and which are likely to occur? Consider the history from that property as well as from the local area.

A complete plan includes each of the six steps described below, and following it may require training a staff person on how to monitor and identify pests, attending educational sessions, or producing informative literature for customers. Plans should be flexible enough to incorporate new information and have contingencies for unexpected situations, such as invasion of a new or rare pest.

3.4.2 Monitor

Turfgrass areas should be monitored on a regular basis to assess health of the turfgrass planting, as well as signs and symptoms of pests, and other stress factors such as drought and nutritional deficiency. Proper identification of pests (including weeds, insects, diseases and vertebrates) and underlying cultural problems is essential. Know how to identify each pest species, the season when they occur, the conditions that favor them, and how they can be detected. Awareness of potential and probable pest problems is key to being able to prevent and monitor for them.

Pests must also be quantified to determine if populations are rising or declining, if thresholds have been reached, and whether previous control measures were successful. The pest stage (e.g. weed seedling, insect pupa) is also important for determining if and when intervention may be appropriate. Lawn care professionals can enhance their monitoring efforts by using lawns with known histories of problems as early indicators in individual neighborhoods. Likewise, managers of golf courses, institutional grounds and sod farms can follow specific indicator areas within the larger property.

Armed with knowledge of both pests and site, you should monitor or "scout" turfgrass areas on a regular basis. For low maintenance areas, that can be weekly or monthly, depending on the current pest pressure, pest biology, time of year, and expected use of the area. Higher maintenance areas need a minimum of weekly monitoring, with putting greens requiring daily examination. Disease and insect

problems can appear relatively quickly and frequent monitoring can provide an early warning of problems when conditions are conducive for that pest, especially in areas with a history of the problem. Weeds, on the other hand, invade and grow more slowly and can be monitored as infrequently as three times a year.

3.4.3 Manage

Sound horticultural practices are fundamental to growing and maintaining healthy turfgrass, and healthy grass is more resilient to pests. Maintain the turfgrass areas with the best cultural management strategies that are feasible for the site, including optimal grass species and variety selection, watering and mowing practices, and fertility inputs based on soil or tissue testing. Minimizing turfgrass stress, selecting pest-resistant grasses and proper maintenance of equipment have the greatest impact on reducing pest problems.

3.4.4 Analyze

IPM is a knowledge-based decision-making process, and the use of action or treatment thresholds is one of its hallmarks. Thresholds are flexible guidelines, usually defined in terms of the level of pest abundance or damage that can be tolerated before taking action, and are based on numerous aspects of the biology of both pest and plant. IPM managers apply thresholds to plan short and long term pest management actions and strategies for each turfgrass area, after considering monitoring data, current and predicted weather conditions, turf value and customer expectations. This analysis is an ongoing process that allows managers to make timely and appropriate decisions for individual areas throughout each growing season. The determination that a pest problem warrants intervention, such as the use of a pesticide, is part of a thorough analytical process.

3.4.5 Intervene

At times the monitoring and critical analysis process will reveal a problem that needs remediation. At this point, the professional intervenes with a cultural, physical, biological, or chemical control tactic. The cultural practices discussed elsewhere in these guidelines are mainly preventive, but can sometimes be used to minimize the effects of a pest outbreak. Midnight mowing is an example of a physical tactic that has effectively reduced cutworm populations on putting greens, and may also be useful on higher cut turf. Biological controls have received a great deal of attention in the past 20 years, partly due to the decline in chemical options. Several products are now available and legally registered as pest control products, and are listed in the appropriate pest tables. Remember that biologicals tend to be more pest and climate specific than traditional chemical pesticides, and therefore must be appraised on a case-by-case basis. Examples include *Trichoderma harzianum* and *Bacillus licheniformis* for

disease management, and entomopathogenic nematodes and *Bacillus thuringiensis* for insect control.

Application of chemical pesticides, a common intervention for many managers, is the last option for an IPM practitioner. Close attention to the monitoring and analysis of individual areas often allows for spot treatments rather than whole area treatments and the use of lower toxicity treatments, before pests reach high levels. An IPM practitioner will consider all approaches and select the least disruptive option that will be effective.

3.4.6 Keep Records

Many benefits of IPM are lost if information is not recorded. All considerations from the analysis process should be documented, as well as the cultural practices and intervention tactics employed. Professionals should keep good records of cultural practices; turfgrass health; pest incidence, identity, and severity; and all intervention tactics, especially the use of pesticides. These records are critical for in-season decision-making as well as historical documentation of pest problems and efficacy of actions taken. From this base, personalized thresholds can be developed and the effectiveness of treatment decisions evaluated. Whether you spent \$500 or \$50,000 on pest control last year, you should know if it was worthwhile and necessary.

The use of *Trac Software for Turfgrass* can improve the ease and accuracy of your record keeping. There are specialized files for golf, lawn care, grounds management and sod farms. Each file contains a listing of approximately 100 pesticides registered in New York State for that turfgrass setting. Visit <http://nysipm.cornell.edu/trac/> to learn more about the software and how to obtain it.

3.4.7 Communicate

Good communication with staff, customers, and community members is an essential aspect of IPM. Regardless of who is designated to monitor, all staff should be aware of pest problems and management activities. All employees should be encouraged to report potential problems, and IPM training should be provided to as many staff as possible. The IPM approach also needs to be conveyed to customers, whether they are homeowners, golfers, or neighbors. The turfgrass professional should articulate to customers how his/her expertise along with information gleaned from monitoring and a scientific knowledge base combine to create a customized, site-specific IPM program. Describe IPM in promotional literature and on your website. IPM efforts pay off many times over when communicated among staff, to customers, and the community.

