Pest Monitoring: A Key to IPM for Turfgrass

BY JENNIFER GRANT AND GERARD FERRENTINO, NYS IPM PROGRAM, CORNELL UNIVERSITY, AND JOSEPH NEAL, DEPT. OF FLORICULTURE AND ORNAMENTAL HORTICULTURE, CORNELL UNIVERSITY

Integrated Pest Management (IPM) uses a combination of strategies to deal with turfgrass insects, weeds, and fugal diseases. Monitoring and proper identification are key steps to taking effective action.

Monitoring is the foundation of an authentic Integrated Pest Management (IPM) approach. The primary goal of monitoring (or scouting) is to identify, locate, and rank pest infestations and turfgrass abnormalities. Scouting on a regular basis will provide you with information on the changes in pest populations and turfgrass health. Pest management decisions, timing and control actions are based on data collected. Regular monitoring is the best method to check the success or failure of a control strategy.

In order to effectively implement pest monitoring, a person(s) must be assigned and trained to scout turf. Monitoring should be the preeminent job responsibility of the scout. Their responsibilities include, but not limited to, the following;

i. Monitoring the turfgrass or other landscape plants for insects, plant diseases, and weed infestation on a regular basis;
ii. Recording the findings on field data sheets;
iii. Diagnosing problems and rating the severity based on diagnosis, priority of the site, and turf value;
iv. Assessing the efficacy of pest management actions that have been taken;
v. Communicating the finding to decision makers.

Scouting

After identifying the person who will be responsible for scouting, but prior to scouting, a few other decisions need to be made. First, divide the turfgrass site into pest management units (PMU). These PMUs may correspond to treatment or use areas (i.e. scout athletic fields separately from walking areas). This enables you to follow pest infestations and make treatment decisions for specific areas.

Second, decide on the approach to scouting each PMU. The common turfgrass pests do not distribute themselves evenly, therefore, it is imperative that the entire turfgrass area is scouted in a consistent, uniform pattern. Walking in a serpentine pattern through each PMU is usually the most efficient way to scout.

Create a scouting kit and keep it on hand while out on the course for easy and quick analysis of potential outbreaks.

Third, scout the turf areas regularly throughout the season. Ideally, all turf should be scouted a minimum of once a week. However, more susceptible and high priority areas can be used as indicators to save time. Conversely, some areas may need to be scouted more than once a week if an active pest problem is being monitored.

Finally, documenting scouting information is crucial. Record pest identification and location, and the severity of the infestation. Rate infestation by using simple scales such as: pest absence or presence, light, medium or heavy infestations, and percentage of area damaged. If you encounter unknown problems when scouting, collect a sample and send it to a diagnostic laboratory.

Insect Sampling

Insect sampling techniques are useful IPM tools, complementing the visual monitoring of turf. Initiate sampling when you suspect the presence of insects—at the appropriate time in the insect's life cycle and the growing season; in historically infested areas; if damage is seen; or when a post-treatment analysis for efficacy of pesticides of other control measures is desired. Sampling for scarab grubs is one of the most important techniques for golf courses. Methods for detecting chinch bugs and Lepidopterans (cutworms, armyworms, and webworms) will also be discussed.

Grub Sampling

Sampling turf for scarab grubs determines grub populations densities, grub species, and grub developmental stages. High and low population areas can be delineated for possible spot treatments and damage thresholds used as guidelines in making treatment decisions. In addition, information on thatch thickness and soil type can be used to aid in the selection of the most appropriate insecticide.

It is difficult to get a grub to come to you, so you've got to dig down to their level. A standard golf course cup-cutter removes 4 1/4" (10cm) soil cores that can be quickly inspected for grubs and then replaced. Record on a data sheet or map the number of grubs found, and the predominate stage (instar) and species of the grubs. Checking soil samples in a grid pattern across any turf area will help you delineate areas with grub infestations. Minimum intervals of 20—30 meters between samples in large turf areas will be sufficient. Ultimately, the number of samples taken will depend on the labor time available.

Knowledge of grub/beetle life cycles will help you get the most out of your sampling effort. Target your sampling time to when grubs are small (1st and 2nd instar)--for Japanese beetles in upstate NY and southern Canada, this usually means early to mid August. Times vary by grub species, and regional and local weather patterns. Start sampling in just a few areas, several weeks before you expect grubs, to monitor the insect's life cycle on your own turf.

New York State (see Table 1). Use these as **guidelines** for treatment decisions. Generally speaking, healthy turf with strong roots, adequate moisture and low stress will tolerate grub infestations above the threshold level. Conversely, stressed turf will be susceptible to damage at threshold levels

Table 1 Common Grub Thresholds

Species	Mean per ft^2	Mean per sample
European Chafers	5 -7	0.5 – 0.7
Oriental Beetles	5 -7	0.5 - 0.7
Japanese Beetles	8 - 10	0.8 - 1
Black Turfgrass Ataenius	30 - 50	3 - 5

Flotation - A Method for Chinch Bug Detection

Unlike grubs, you can get chinch bugs to come to you! In areas where you suspect an infestation or want to check treatment efficacy, inset a metal cylinder (preferably 8 - 9" diameter) into the ground (1 - 2" depth). A coffee can with both ends removed is suitable. Fill the cylinder with water and watch for chinch bugs floating to the surface for 5 minutes. Water refills may be necessary. Consider 20 chinch bugs in a 9" diameter cylinder a damage threshold. Be careful not to count the beneficial big eyed bug as a chinch bug!

Disclosing Solution - A Method for Lepidopteran Detection

One final technique to be discussed is the use of a "disclosing" or "irritant" solution. Mix 1 - 2 tablespoons of liquid soap in a gallon of water, and pour it over a 1 m^2 area of turf. Irritated insects such as webworms, armyworms, and beetles; as well as earthworms will come to the surface within five minutes. A threshold of 15 caterpillars per square yard can be used for webworms. The disclosing solution can be used on both close and high cut turf.

Disease Sampling

Follow general scouting procedures for disease monitoring. Look for irregularities and differences in the color of the turf and examine these areas for signs and symptoms of diseases. Search for lesions on turfgrass leaves, and the presence of mycelia and other fungal growth. Record the type, location and severity of the disease problems. Use these location as indicator sites. Send a sample to a diagnostic lab if you are unable to identify the problem. Combine the disease scouting information with past and future weather information to determine when and if control action is required.

Properly identifying the type of infestation (insect, weed, or fungus), will allow for proper treatment of the problem and save you money.

Weed Sampling

Scout for weeds in the spring (late April or early May), early summer (mid - to late June), and again in late summer or fall (mid - August to late September). Record the species, where they occur, the intensity of the infestation, and if there are patterns of occurrence (spotty, throughout, etc.).

In the spring look for perennial broadleaf weeds or winter annuals not controlled in the fall. Decide if a May herbicide application will be necessary. Also, evaluate turf density. Are there thin areas where summer annual weeds will be a problem? If so, repair these areas or plan for pre or postemergent summer annual weed control.

In early summer scout for summer annual weeds such as crabgrass, goosegrass, oxalis, spurge, and prostrate knotweed. Make postemergent applications for these weeds while they are still young and more easily controlled.

In late-summer or early fall look for summer annuals which escaped control, perennial dicot weeds, seedling winter annual weeds, and winter annual broadleaf weeds, and to assess the overall effectiveness of your weed management program.

Monitoring Records

Write it down! Legible, regular records are crucial to the success of your IPM program. Documentation is an important tool during and after the season. Set up a clear, concise way of recording all pest information to ease the task of record-keeping. At Cornell we examined all types of record-keeping methods and found it necessary to keep three types of records: a field data sheet, weekly summaries, and control.

Field Data Sheets

Field data sheets vary from a sheet of paper with maps drawn of turf areas (by PMU) to the use of a sophisticated hand held computer. The field data sheet serves as the tool to record what, where, and how many pests are present during scouting. Remember to record basic information such as location scouted, data, scout's name, and time in and time out. Additional information can be recorded on the field data sheet, for example, environmental conditions and observations of turfgrass growth and health.

Weekly Summaries

When a Scout has finished the week's monitoring activities the results should be compiled on a summary sheet. The information is itemized for each PMU, recording the pest incidence and population, and if any unusual circumstances were found. Weekly summary sheets inform the pest manager in an organized fashion about that is happening at each PMU during each week. Based on this information the turfgrass pest manager can identify priority areas and then decide on control strategies.

Good record keeping should be a part of every golf course's standard management practices. Much like the Old Farmer's Almanac, kept records hold insight into the property and can be used by future superintendents.

Control Information

Recording information pertaining to control methods and their results are as vita to a successful IPM program as are the scout's records. The combined pest and control information forms the basis for judging efficacy and cost as well as making future plans. Pesticide use records must be complete, up-to-date and as detailed as possible. Preferably, the pest manager should record:

i. Date of pesticide application;
ii. Name, classification, and amount of active ingredient;
iii. Amount of material and water mixed for the application;
iv. How much of the pesticide was actually applied;
v. Where the pesticide was applied;
vi. Size of the area;
vii. Type of application method (spray, granular, etc.);
viii. Applicator's name; and
ix. Labor hours.

Keeping good records enables you to ascertain important pest and control trends. For example, have there been reductions in total amounts applied, or has there been a shift to pesticides of a higher or lower toxicity? Comparing annual information points out recurrence and trends of pests.

Conclusion

Too often people are unwilling to change, secure in the methods they follow for pest control. They believe new techniques to be risky, time consuming, and potentially jeopardizing their employment. When you start an IPM program you will find out that IPM is neither risky nor time consuming. Practitioners say IPM is only common sense and really not that difficult. Start small and develop a pilot monitoring program. Keep an open mind and give it a chance. When you make monitoring a normal turfgrass management practice, you will be pleasantly surprised with the results. Remember, the primary goal of IPM is improved turfgrass quality.

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Jennifer Grant, Ph.D.
NYS IPM Program, NYSAES, Cornell University
www.nysipm.cornell.edu

Gerard Ferrentino
Ferrentino & Co., Inc.
Trumansburg NY, 14886

Joseph C. Neal, Ph.D.
Dept. of Horticultural Science
NC State University

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