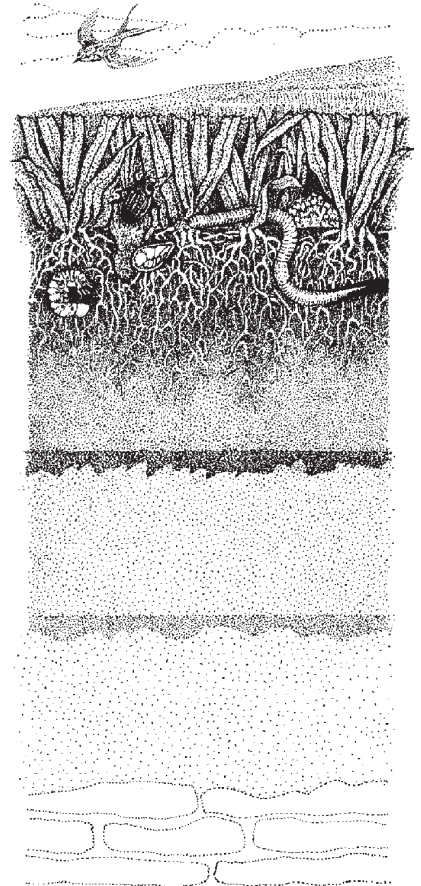


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Pest Monitoring: A Key to Integrated Pest Management for Golf Course Turfgrass

This is the fourth article published in CUTT focusing on Integrated Pest Management (IPM). Prior articles discussed the fundamental principles of IPM (Vol. 1, #3) and the steps required to start an IPM program (Vol. 2, #2). This article will explore pest monitoring by discussing scouting techniques specific to insects, diseases and weeds.

Monitoring is the foundation of an authentic 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 provides you with information on 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 the golf course. Monitoring should be the preeminent job responsibility of the scout. Their responsibilities include, but are not limited to, the following:

- 1) Monitoring the turfgrass or other landscape plants for insects, plant diseases, and weed infestations on a regular basis;
- 2) Recording the findings on field data sheets;
- 3) Diagnosing problems and rating the severity based on diagnosis, priority of the site, and turf value;
- 4) Assessing the efficacy of pest management actions that have been taken; and
- 5) Communicating the findings 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). The simplest method of dividing a golf course into PMU's is by holes. Pest data is then collected for each hole. Subdividing each hole by tee, fairway, rough, approach, and green enables you to follow pest infestations in specific areas.

Second, decide on the approach to scouting each PMU. The common turfgrass pests do not distribute themselves evenly throughout the turf, therefore, it is imperative that the entire turfgrass area is scouted in a consistent, uniform pattern. Follow a serpentine pattern covering the PMU.

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Gerard W. Ferrentino and Jennifer Grant, IPM Program, and Joseph C. Neal, Dept. of Floriculture and Ornamental Horticulture

2. Short Cutts

3. Scanning the Journals

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Michael G. Villani, Dept. of Entomology, Geneva

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IPM Corner

Keeping good records enables you to ascertain important pest and control trends.

Pest Monitoring

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Third, scout the course regularly throughout the season, at least once a week. However, at certain times of the season, it may be better to scout two, three or even four times per week.

Finally, scouting information is worthless unless you record your observations. Record pest identification and location, and the severity of the infestation. Rate infestations 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 or 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 population 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" 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 predominant 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. On the golf course, 4 samples across the fairway at 30 yard intervals is recommended. Plan on 36 labor hours to check an 18 hole course; a four person team can do a whole course in a day. On other turf areas, sample in as tight a grid as time allows.

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 up-state NY, 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.

Damage thresholds have been established for the major grub pests in 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.

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, insert 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 5-15 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 square yard area of turf. Irritated insects such as webworms, cutworms, armyworms, and beetles; as well as earthworms will come to the surface within five minutes. A threshold of 1-5 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 scouting. Look for irregularities and differences in the color of the turf. 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 finds. Pay special attention to areas with a history of disease problems. Use these locations as indicator sites. Send a sample to the diagnostic lab if you are unable to identify the problem.

Table 1. Common Grub Thresholds

Grub Species	Grub Counts	
	per square foot	per 4" cup-cut
European Chafers	5-7	any
Oriental Beetles	5-7	any
Japanese Beetles	8-10	any
Ataenius	30-50	3-5



Combine the disease scouting information with past and future weather information to determine when and if control action is required.

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 thin spots in the turf. This is the best time of year to repair thin turf, control perennial 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 information records.

Field Data Sheets: Field data sheets vary from a sheet of paper with maps drawn of the holes, 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, date, 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 what 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.

Control Information: Recording information pertaining to control methods and their results are as vital 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:

- 1) Date of spray application;
- 2) Name, classification, and amount of active ingredient;
- 3) Amount of material and water mixed for the application;
- 5) How much of the pesticide was actually applied;
- 6) Where the pesticide was applied;
- 7) Size of the area;
- 8) Type of application method (wet spray, fog, etc.);
- 9) Applicator's name; and
- 10) Labor hours.

Keeping good records enables you to ascertain important pest and control trends. For example, have there been reductions in total amounts sprayed, 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. For information on how to get started with an IPM program contact your local Cornell Cooperative Extension agent.

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HORTICULTURE

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