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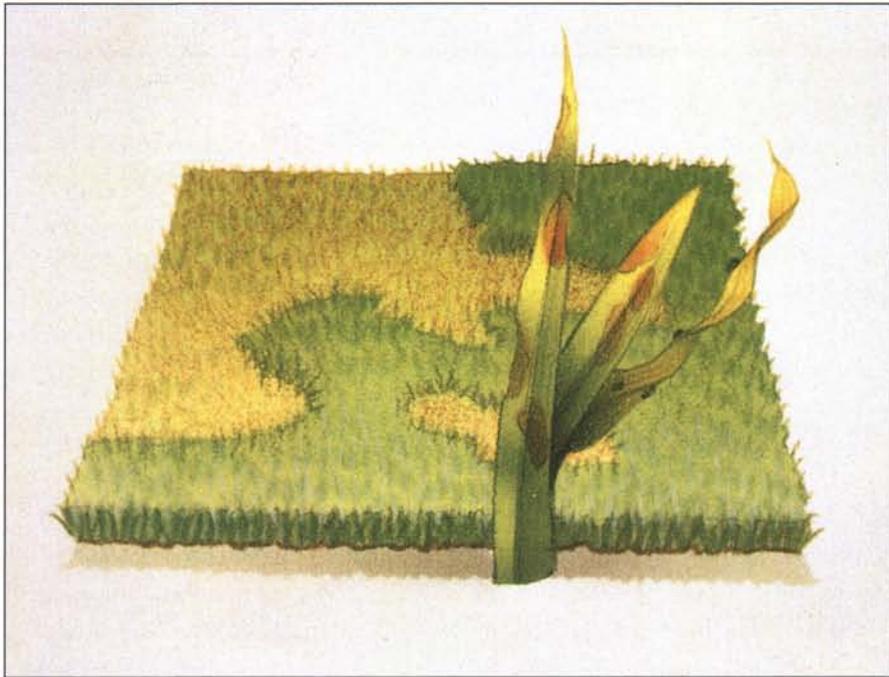
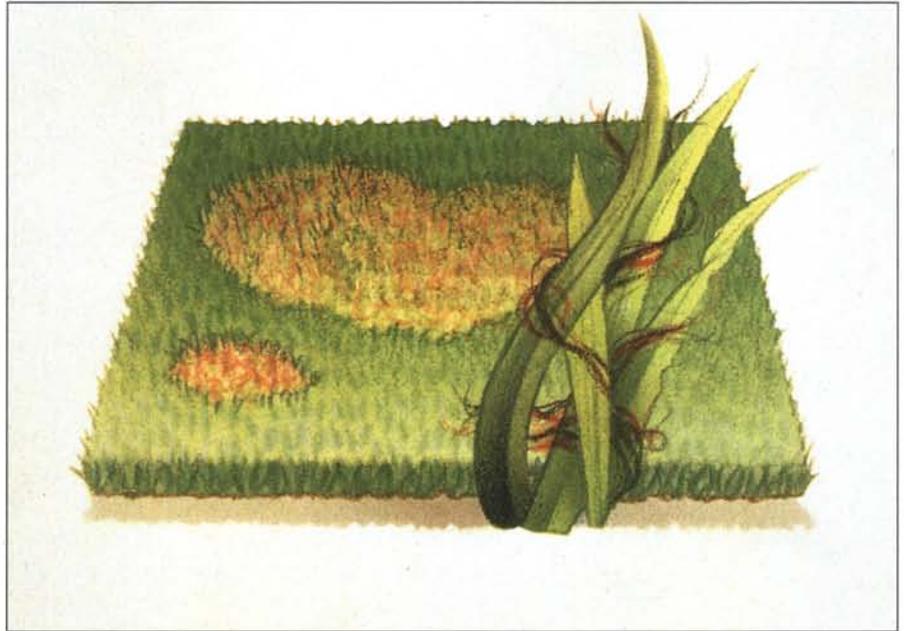
Disease Diagnosis - An IPM Approach

By Art Bruneau and David Bishop

Correct diagnosis of turf problems is essential to assure that effective, economical control measures are employed. Diagnosis can be defined as the investigation into the nature of a problem — the causes of which are many and varied. Rapid, correct diagnosis can mean the difference between success and failure.

A turf manager must be a good diagnostician. Besides common sense and good judgment, effective diagnostics requires:

- a basic knowledge of turfgrass species and their major pests;
- the ability to look, listen and ask pertinent questions;
- the use of all available resources — which come in the form of accurate and timely records, past experiences, peers and turf specialists, and available pub-



lications. Workshops, clinics, field trips and conferences are also excellent means of keeping abreast of the latest developments in the industry.

Basic Information

Regardless of the problem at hand,

certain basic information must be available to the turf manager in order to make a correct diagnosis. The following are five things each turf manager should consider. Addressing these considerations prior to the onset of field problems will prevent or substan-

A knowledge of the signs and the symptoms of diseases cannot be overemphasized. For instance, perennial ryegrass is a susceptible host to both anthracnose (left) and red thread (above), but a close examination of the symptoms can distinguish between the two pathogens. Photos courtesy: Dow Elanco.

tially reduce potential turf problems and allow for more correct diagnosis should a problem arise.

1. Study the *turfgrass* being maintained and become familiar with its strengths, weaknesses and requirements. Know what the turf should look like when healthy. This will make it easier to note problems and symptoms. Knowledge of the host plant will help the turf manager in keying on its major turf pests.

2. Become familiar with the *environment* in which the turf is being grown and how the host plant and major pests will react in such an environment. Location of trees and shrubs (landscape design) influences the micro-environment. For example, powdery mildew is often associated with shade. Take note of specific

weather conditions, such as humidity, that may weaken turf and/or favor a certain pest. Turf injuries from severe weather such as hail, lightning or early or late frosts are often misdiagnosed as pest damage.

3. The soil situation should be frequently checked to ensure that the pH, nutrient content and soil structure are adequate to maintain healthy turf. This situation is often overlooked because soil problems may not be that apparent.

4. Keep records of the day-to-day maintenance that the turf receives and make sure that proper management practices are employed. Inform personnel to report any unscheduled changes in the management regime, such as the accidental misuse of pesticides.

5. Brush up on the major turf pests in the area and become familiar with the symptomatology, identification and

biology of each pest. Doing so may prevent extensive turf damage from these pests.

Steps in Diagnosis

There are many ways to approach a field problem; however, a logical sequence of events must be followed. The following is presented only as a guideline and should be modified to suit the particular situation being addressed.

Turf Inspection. Frequent, even daily, turf inspection by the manager is the first step to correct diagnosis. Early pest detection can minimize pest damage and result in savings of time, effort and money. Many pest symptoms are easiest to identify when the pest invasion is in its initial stages. This is especially true for disease incidence.

Signs and Symptoms. Familiarization of problem signs and symp-

Sending Turfgrass Disease Samples

By Jeff Lefton, Clark Throssell and Zachary Reicher

Periodically, various insect, weed, brown spot and other problem-area samples become a challenge to diagnose. Your first step is to develop a working relationship with your local county Extension agent, who has access to various technical publications and knowledge that can help you in your analytical process. The next possible step is to submit a sample directly to a technical specialist. For suspected occurrences of turf disease, a method for submitting samples is given below:

1. Send at least a 6-inch square section with at least 1 inch of soil attached. Collect the sample from the transition area of the healthy and affected turf; this should include portions of the diseased and healthy turf.

2. Wrap the sample in a slightly dampened newspaper. Enclose this in additional newspaper or a perforated plastic bag. Do not add excess moisture, as this will encourage rotting.

3. Enclose the sample in a strong box. Include as much information as possible on the nature of the problem (see list below). Photographs of the affected area are often helpful.

4. Besides your name, address and phone number, try to provide

the following relevant information:

- Specify type of grass (Kentucky bluegrass, ryegrass, etc.).
- How old is the turf stand? Seeded or sodded?
- Describe the situation (sports field, park, etc.).
- What is the damaged area (i.e., 20% of the turf stand, under trees only, in low-lying areas, near sidewalks, etc.)?
- Describe the size, shape and color of the affected area.
- When was the problem first noticed?
- Has the same problem occurred in the same area in previous years?
- How is the turfgrass cared for?
- Describe environmental conditions (rainfall, etc.).
- Describe soil type (subsoil, clay, sand, etc.).
- Are there signs of insect or animal activity (large number of birds; moths flying across lawn, etc.)?

5. Ship early in the week. Do not send a sample on Thursday or Friday. It could dry out in the post office.

Jeff Lefton, Clark Throssell and Zachary Reicher are turfgrass specialists at Purdue University. The above appears in "Turf Science Program" — <http://www.agry.purdue.edu/agronomy/turf/turf.htm> — a Web site sponsored by Purdue University's Department of Agronomy.

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toms cannot be overemphasized. *Symptoms* refer to plant reactions to pests (e.g. lesions, wilting or stunting) on individual turfgrass plants and on stands of turfgrass. *Signs* refer to the actual presence of the pest (e.g. fruiting bodies and mycelium).

Turf diseases result from the combination of a susceptible host, virulent pathogen, and environmental conditions favorable for disease development. Any practice that reduces grass susceptibility, controls disease organisms or alters the environment to disfavor disease development can help reduce infection.

Suspected disease activity is best confirmed by laboratory methods, although familiarization with the signs and symptoms will help identify the pathogen. Become familiar with the common diseases that are most likely to occur in your area and on the turfgrass species you maintain.

Symptoms that may suggest a presence of disease include the following: (1) irregular or round patches of dead grass; (2) powdery appearance on sur-

face of grass blades; (3) thin stands of turf; (4) mushrooms or puffballs; and (5) rings or arcs in the turf.

Symptoms of non-pest, man-made or environmental problems are too diverse to be discussed at any length. Adverse soil conditions, improper cultural practices, adverse weather and chemical injury are just a few of the possible causes. The ability to diagnose such problems correctly can only come from experience. The turf manager should keep in mind, however, that such problems are non-infectious and thus cannot be spread from plant to plant. Pesticides are not effective in controlling such problems.

Non-infectious problems can be easily confused with pathogen induced problems. Accurately distinguishing between the two is important. If you are confused or uncertain as to what is the exact cause of the problem at hand, then by all means obtain assistance from the sources mentioned earlier. One or more turf specialists, plant pathologists or entomologists may be required to determine the exact cause

of the problem.

Determine Prognosis. Once the cause has been determined, it is necessary for the turf manager to decide if control measures are justified based on economics and the severity of the problem.

Choose the safest and most effective control measure or measures available. Such measures include the use of adapted grasses, changes in the management regime and the use of chemicals.

If chemical control is necessary, select the proper pesticide and read and follow label directions. Become familiar with the proper use of the pesticide, and time your applications when the pesticide will be most effective.

Finally, take the necessary steps to ensure that the problem will not reoccur. □

Art Bruneau, North Carolina State University, and David Bishop are IPM turf specialists. The above information appears in "PENpages" — <http://www.penpages.psu.edu/> — a Web site sponsored by Penn State University's Department of Agronomy.

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