

Diagnosing leaf and root diseases

by Christopher Sann

ANY DISCUSSION of the diagnostic differences between foliage and root damaging diseases of turfgrass must begin with a simple truism: Forget any of the skills that you, the turfgrass manager, have developed for diagnosing foliar diseases of turf from any distance further than three inches." When it comes to diagnosing root diseases, at best, these skills will be useless and, at worst, they will give you incorrect diagnoses more times than not.

When dealing with most foliar diseases, there are often a group of highly "diagnostic visual symptoms." They range from species specific leaf lesions to whole site patterns of disease activity. A skilled diagnostician can literally diagnose some foliar diseases while driving by at forty miles per hour. Unfortunately, that kind of visual detecting will not work with root diseases. In fact, it often leads to mis-diagnosis, inappropriate applications of control chemicals, and the extra expense of additional control materials and the cost of labor and machinery to reapply.

The days of "seat of the pants" field diagnosis are numbered. If the cost and aggravation of mis-diagnosing turf grass diseases doesn't make us want to change our approach, then the regulators will. One way or the other, we are entering a new age where we have to qualify, quantify and justify why we make every pesticide application. We might as well get used to the idea.

"Diagnostic" symptoms

The problem with trying to transfer the visual skills of pattern recognition and lesion identification—the tell tale signs of foliar turfgrass diseases—to the diagnosis of root diseases is that there are few, if any, truly diagnostic, unique visual symptoms that consistently occur in root disease symptomology.

To be sure, the symptoms of root damaging diseases are often very different from most of the more familiar, "diagnostic" symptoms of foliar diseases, but these different symptoms are so common within this group—and for that matter in the advanced stages of many of the foliar diseases—that they could be caused by any of a dozen pathogens. Historically, with the use of the broad spectrum heavy metal-based fungicides, the fine distinctions between the various pathogens was a moot point. But in today's highly charged regulatory atmosphere, with the increasingly narrow focus of newer fungicides, this distinction has become crucial.

How to look for root disease symptoms

Vision is still the best tool for making correct diagnoses in the field, but, in the case of root diseases, your



vision should be augmented with a 8 - 10 X hand lens, a soil probe, a sample cutter (like a sturdy pen knife or a putting green hole cutter), and a major revision of attitude.

We need to reverse the historic approach of starting at the top of the turfgrass plant and working down to the crown and maybe the roots. Root damaging diseases kill roots. Often the infected plant has sustained massive root loss before any symptoms can be seen on the foliage. Additionally, the more opportunistic foliar diseases will colonize turf that is under attack from root pathogens, and simply identifying the "diagnostic symptoms" of these foliar infections will give you a false impression about what is happening and in what order.

This common mistake can be avoided if you start at the bottom and work your way up. Start by taking a sample from the margins of the damaged area, pry it apart, and examine the roots with your hand lens. If the roots look healthy (i.e., white with abundant root hairs), then examine the crown. If the crown also appears healthy, then finally examine the foliage.

If, after using this bottom up approach, you cannot find enough visual clues to come to a conclusion, then either further examine the sample under a good microscope, using a good reference book like "The Compendium of Turfgrass Diseases," or send a sample to a good diagnostic lab. Most major state universities either have diagnostic labs or can recommend one. ■

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Worker exposure study

K.A. HURTO AND R.A. YEARY of Trugreen/Chemlawn measured how pesticide exposure to workers varied by equipment and formulations and how much of the applied pesticide was recoverable over time. Compared to worker exposure from using granular application drop spreaders

- FINE DROPLET SIZED LIQUID application equipment exposed workers to 15 times more pesticide.
- LARGE DROPLET SIZED LIQUID application equipment—10 times more.
- LIQUID BACKPACK SPRAYERS—four times more
- GRANULAR ROTARY SPREADERS—two times more.

The thigh and lower legs received 99% of the exposure during liquid applications, while areas above the waist only received 1% of the exposure.

The residues that could be recovered from turf following a liquid application were 25% of the total amount applied, one hour after the application. This amount decreased, after two hours, to 7%; after 1 day to 6%; after 7 days to 2%; and after 14 days to <1%. When treated area was irrigated two hours after the application, the amount of pesticide was reduced by an average of 45% for each testing day.

When a liquid application was compared to a granular formulation of the same material, the recoverable residues of the liquid were 20 times that of the granular formulation. ■