JB Comments

Turfgrass-Soil Diagnosis Procedure

James B Beard

It continues to amaze me as to how many individuals, both consultants and turfgrass professionals, involved in the diagnosis of turfgrass problems fail to look below ground. **In a majority of the cases, I can draw more conclusions concerning past and potential future turfgrass problems by examining the below-ground portion than can be accomplished by aboveground observations of the turf.** My preferred procedure for this diagnosis includes the following:

(1) **Use a 4-inch (10 cm) diameter cup cutter,** rather than the 3/4 inch (1.9 cm) diameter soil sample probes or the flat profile samplers that are available.

(2) Immediately after the 4-inch diameter core is removed from the cup cutter, assess the smell by traversing the length of the profile using **a close-up "nose" technique.** The question is **whether there is a sweet healthy smell, a neutral or absence of smell, or a serious "rotten egg" smell,** indicating an aerobic soil condition, which typically suggests serious problems, especially the blockage of downward water movement.

(3) Next is an examination along the length of the profile for **possible visual symptoms of soil layering or black layer.**

(4) An **examination for an objectionable depth of thatch and/or mat** also is accomplished. In the case of mat, use a knife or similar device to scrape along the top of the profile. This approach will more readily reveal any potential mat that may be present. A thatch accumulation in excess of 0.5 inch (13 mm) and a mat in excess of 0.3 inch (8.5 mm) indicate a proneness to problems.

(5) Next, gently shake the soil profile to allow the soil or root zone mix that is not held together by roots to fall from the lower profile. During this phase an examination is made for the presence of roots. **Typically there is a natural breaking point where a minimum amount of soil/root zone can be shaken loose, which represents the effective rooting depth wherein a majority of the roots are located.** This examination phase also will reveal the relative health of the roots—that is, whether they are white-healthy, medium-brown, or brown to black and non-functioning.

(6) Then **vertically break open the 4-inch diameter rooted soil plug into halves,** and again immediately conduct a "nose" smell assessment. Also, observe the relative health of the root system in terms of a white versus medium-brown versus brown to black. This phase also will allow **examination of the rhizomes** in terms of their relative health as indicated by their thickness and the potential presence of disease lesions or injury from feeding by insects or nematodes.

(7) Throughout the procedure **be alert for signs of pest problems** indicated by the presence of mycelia, fruiting bodies, larvae, and/or adult insects.

(8) Finally, while conducting this assessment it is important to conduct a detailed assessment of the aboveground turf canopy in terms of relative shoot density, leaf color, and presence of lesions or shoot injury to the leaves, crown, and/or stolons.