The Root of **Plant Health**

Superintendents have the tough job of managing and modifying turfgrass physiology. Golf course turf often exists on the edge of viability because it has less leaf area than unmanaged turf — and faces additional stress from foot traffic, mower blades, heat, drought and humidity. Superintendents typically focus turfgrass management practices on the top half of the turf plant because that's what people see. But focusing on the root system may help improve aboveground performance.

To gain better insight into the role roots play in plant health, I spoke with Dr. Christina Wells, associate professor in the Department of Environmental Horticulture at Clemson University and a plant physiologist.

BY KATHIE KALMOWITZ, PH.D.

Root Functions and Size

"Turf roots are a thick, fibrous mass that can be very challenging to work with," said Dr. Wells.

Root system size is influenced by many factors, including the availability of water and nutrients. If water and nutrients are abundant in the soil, then roots won't branch out to find additional resources. There is little point in investing additional biomass and energy to get water and nutrients if they are readily available.

"Turfgrass roots are very efficient at finding water and nutrients," said Dr. Wells. "Think of roots like a factory. If you can get the job done with two or three machines, why would you invest in more? Roots are the same way. The plant invests in the amount of root mass its needs and no more."

Another factor affecting root system size is the removal of material from the top. Mowing turfgrass takes away above-ground biomass, and the plant responds by replacing lost shoot biomass rather than into growing more roots. Above-ground environmental stresses such as high temperature also impact root size: repairing stress-related damage uses carbon that might otherwise be used to help grow the root system.

Disease Control and Plant Health with Intrinsic Brand Fungicides

Research from BASF Professional Turf & Ornamentals shows that Intrinsic brand fungicides (active ingredient: pyraclostrobin) control a broad spectrum of diseases, as well as providing plant health benefits. Intrinsic brand fungicides control fungal diseases by affecting the ability of the fungi to grow and colonize turfgrass. In addition, they allow the plant to use photosynthetically fixed carbon more efficiently, reducing respiration and increasing growth, particularly under stress. Laboratory and field research from BASF has demonstrated pyraclostrobin-based fungicides improve plant nitrogen usage and improve photosynthetic efficiency.

"Last year at Clemson, we did a greenhouse trial where we applied Intrinsic brand fungicides to turf that was well-watered and turf that was drought stressed," said Dr. Wells. "When we applied these products on the stressed turf, we saw greater root growth and greener tops compared to untreated turf. With sufficient water, treated and untreated turf were similar."

Read part 2 of "The Root of Plant Health" in the next issue of *Golfdom* and learn more about Intrinsic brand fungicides at **www.IntrinsicPlantHealth.com** and other BASF Professional Turf & Ornamentals innovations at **www.betterturf.basf.us**. ■

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