Basal Rot Anthracnose

By MATT GIESE and CHRIS HOFF

If you had asked golf course superintendents about basal rot anthracnose seven or eight years ago, most would have thought you were speaking a foreign language. Ask the same question of superintendents today and you still may receive a similar facial expression, but related rather to feelings of anxiety entwined with attempting to control this disease. Basal rot anthracnose is not a new disease in terms of plant pathogens, but the incidence and distribution of the disease has certainly categorized it as a new hurdle in managing high maintenance turfgrass.

Basal rot anthracnose is a disease that can infect turfgrass year round due to its adaptability to different environmental conditions. During periods of wet and cool weather in spring and fall, anthracnose symptoms appear as crown or basal rotting with dark brown discoloration of the lower leaf sheaths and eventual blackening of the crown tissue. Under warm and moist conditions, symptoms appear over the foliage, especially on the older leaves and stem bases. If the plant remains under stress and is exposed to periods of extended leaf wetness, the pathogen can move down the leaf and infect the base or crown of the plant. These dying tissues have spore-bearing structures, called acervuli, and are observable under a 10x lens. The acervuli (resemble tiny pin cushions) are commonly found on old senescing leaves and stems, but their detection on newly emerged leaves indicates an advanced disease infection.

Anthracnose survives the mild winters as fungal mycelium in the plant tissue or as a saprophyte on plant debris. The fungus actively colonizes the thatch and leaf litter, which act as the sources of inoculum for leaf and crown tissue infections. Spore dissemination occurs mostly by rain splash, wind, and mechanical movement through mowing and vertical cutting.

A common misconception on courses that have low populations of Poa annua is that anthracnose will not affect them. Anthracnose is not limited to infecting Poa annua species, it has also been observed on creeping bentgrass, Kentucky bluegrass and perennial ryegrass. The common denominator is that anthracnose infects weakened plants, regardless of the species. Once the inoculum is present, mature turfgrass plants are infected when weakened by stress related factors. Such stresses may occur from many different sources, but all can predispose the plant to infection. Biological factors include root, crown, and leaf feeding insects, parasitic nematodes, or other pathogenic fungi. Abiotic factors also play a significant role in exerting stress on the plant. Soil compaction, anaerobic soil, high air and soil temperatures, soil moisture stress, cold injury, mechanical wounding, fertility level extremes, close mowing heights, traffic and wear, and pesticide misapplication can all stress the turfgrass plant and ultimately cause infections. The elevated level of distribution and incidence of this disease is invariably due to a combination of any or all of these plant stress factors.

The amount of research conducted on anthracnose over the years has been limited for mainly two reasons, 1) the recent newness of the disease, but more so is 2) the difficulty of working with the fungus in the field. Artificial inoculation of the pathogen does not consistently produce disease infection, or if it does, at levels too low to test fungicide products. Therefore turf pathologists must rely on naturally infected areas, which are generally more unreliable, to gather information.

However, in 2002, Dr. Bruce Clarke at Rutgers University conducted a trial on basal rot anthracnose on a naturally infected green in New Jersey yielding high disease infection (83% turfgrass area infected on non-fungicide treated turf). Dr. Clarke concluded, "In general, fungicides within the nitrile (Daconil Ultrex 82.5SDG at 3.2 oz/1000 sq. ft.) and the antibiotic polyoxin-D (Endorse 2.5W at 4.0 oz/1000 sq. ft.) chemical classes provided excellent control of anthracnose (96-100%), compared to non-fungicide treated turf. Of the DMI fungicides, only propiconazole (Banner MAXX 1.3MC at 1.0 fl oz/1000 sq. ft.) adequately controlled the disease (98-100% control), whereas myclobutanil (Eagle 40W 1.0 oz/1000 sq. ft.) provided moderate control (80-100% control) and triadimefon (Bayleton 50W at 1.0 oz/1000 sq. ft.) proved ineffective at the rate tested. The phosphonate fosetyl-Al (Chipco Signature 80WG at 4.0 oz /1000 sq. ft.), the dicarboximide iprodione (Chipco 26GT 2SC at 4.0 fl oz/1000 sq. ft.), and the phenylpyrrole fludioxonil (Medallion 50W at 0.25 oz/1000 sq. ft.) provided good to excellent suppression of this disease (78-100%). As a group, fungicides within the QoI chemical class including pyraclostrobin (Insignia 20WG at 0.5 oz/1000 sq. ft.), azoxystrobin (Heritage 50WG at 0.2 oz/1000 sq. ft.), and trifloxystrobin (Compass 50W at 0.25 oz/1000 sq. ft.) provided relatively poor control of anthracnose basal rot (3-46% control) at this site. The benzimidazole thiophanate-methyl (Cleary 3336 50W at 4.0 and 6.0 oz/1000 sq. ft.) did not significantly control this disease."

Dr. Clarke also looked at the effect of nitrogen on disease incidence as well as tank mixtures and concluded this, "Although date and fungicide dependent, nitrogen (urea) significantly reduced disease severity. On non-fungicide treated turf, the addition of 0.125 lb N/1000 sq. ft. every two weeks reduced the severity of symptoms 18-36%. Tank mixtures and rotational programs (i.e., applying products from different chemical classes every two weeks) provided excellent disease control that was equivalent to or better than single product entries." All treatments in this study

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144 Attend Phosphorus Seminar

One-Hundred and forty-four MGCSA members attended the March Mini-Seminar on Phosphorus at Midland Hills Country Club on March 18. Host Scott Austin, CGCS, made sure everything was in order for this informative session.

MGCSA President Rick Fredericksen, CGCS, Woodhill Country Club, welcomed attendees. Jim Nicol, CGCS, Hazeltine National Golf Club, followed with a review of last year's PGA Championship as host superintendent.

A brief review of the current phosphorus law was next up on the agenda. Peter Beirman, University of Minnesota, gave a talk on basic soil science and soil testing.

Dr. Brian Horgan, University of Minnesota, spoke on Phosphorus Chemistry and later in the day about fertilizer management.

Jim Turner, Simplot Partners concluded the day with a session on dry soils and wetting agents.

Attendees received a certificate of completion.

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were applied on 14-day intervals beginning mid-May through mid-August in 2 gallons of water/1000 sq. ft. The entire study received a total of 1.5 lb N/1000 sq. ft. in periodic increments during the season. The nitrogen treatments applied were over and above this amount.

In closing, there is debate among pathologists that there may be several strains of anthracnose, each reacting differently to different fungicides. This study certainly indicates control differences by chemical class at this single location. Additional research will be required from multiple locations and years for a more complete understanding of this disease complex. However, several solid conclusions can be drawn:

Utilizing the nitrile class (Daconil) provides "excellent disease control" in a preventive fungicide rotational program.

A balanced nutritional program including nitrogen, phosphorus, and potassium are required for vigorous healthy plants that can fend off disease and/or have a speedy recovery post infection.

Correcting underlying problems that place stress on the plant will assist in reducing the severity of outbreak.

Although not thoroughly tested, late fall fungicide applications, in conjunction with snow mold applications, have been observed to reduce disease severity for the following spring season. Whether inhibiting late season infections, reducing over-wintering populations, and/or increasing plant health, the effect to the plant is relatively unknown. However it is known that early preventative applications coupled with good fertility and reducing plant stress, can reduce the economic loss associated with anthracnose. Fortunately, these types of studies give golf course superintendents short-term solutions until a longer-term solution is determined.

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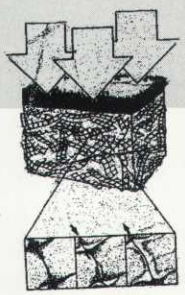

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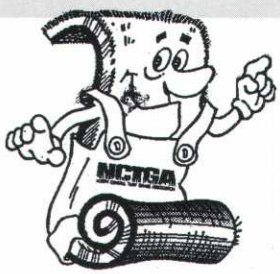

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