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USGA Update
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There Is No Fun in Pythium Root Dysfunction

This month's update provides important information prepared by Dr. Lane Tredway of North Carolina State University. His summary is full of good tips for not only managing Pythium root dysfunction, but on promoting healthier bentgrass putting greens. This disease is stress induced and cultural practices will have a real effect on a superintendent's ability to successfully manage the disease. Finally, Dr. Tredway introduces a new fungicide that may not be familiar to most readers. Best wishes for a successful summer and if the opportunity arises, be sure to thank Dr. Tredway and the pathology department at North Carolina State for their efforts. Outlined below are comments prepared by Dr. Tredway:

"Pythium root dysfunction, caused by Pythium volutum, continues to be a problem for golf course superintendents managing bentgrass in the southeastern states. Pythium volutum is most active in the fall and spring when soil temperatures are between 50 and 75 degrees F. Infection of roots during the fall and spring prevents formation of root hairs and causes death of root tips, therefore reducing the plant's ability to absorb water and nutrients. Symptoms of the disease typically appear during the summer when heat or drought stress causes a decline of the affected plants. However, symptoms may also appear during the fall and spring if warm and dry weather occurs.

Symptoms of Pythium root dysfunction typically appear in distinct circular patches, ranging from a few inches up to 3 feet in diameter. The patches initially wilt or turn yellow to orange in color, and the turf eventually becomes thin and collapses to the ground. In very wet or shady areas, the disease tends to appear in more irregular patterns rather than in distinct circles. Significant turf loss may occur within a period of 2 to 3 weeks if the disease is left unmanaged.

Based on our observations, cultural management practices have a major impact on the development and severity of this disease. Any source of stress, including nitrogen and other nutrient deficiencies, drought stress, and close mowing, appear to encourage the disease. Maintenance of adequate nutrition, water, and oxygen in the soil profile is critical for management. Regular solid-tine aeration, hollow-tine aerification, and topdressing are needed to maintain adequate oxygen levels in the root zone. In fact, when symptoms of this disease appear, the most recent aerification holes often remain completely healthy. Affected areas require frequent hand watering and syringing during the summer to compensate for the damaged root system and to prevent heat and drought stress. Regular tissue testing for nutrient content can also be helpful to detect nutrient deficiencies or imbalances that may contribute to symptom expression.

Considerable progress has been made in the development of effective fungicide programs for control of this suspected Pythium disease. Unfortunately, the standard Pythium fungicides, such as mefanoxam (Subdue Maxx), propamocarb

(Banol), and fosetyl-Al (Signature) have provided poor to moderate control when applied alone. The most effective fungicides in our experience have been pyraclostrobin (Insignia 20WG) and cyazofamid (Segway). Applications that are watered in with 1/8" of irrigation immediately have been slightly more effective than standard foliar applications. The same result may also be obtained by making the applications in larger volumes of water (4 to 6 gallons per 1000 ft2) to drive the fungicide deeper into the canopy. Tank-mixtures of Signature + Banol (4 + 2 oz/1000 ft2) or Signature + Subdue Maxx (4 + 1 oz/1000 ft2) have also provided good suppression of the disease. These tank-mixes are most effective when applied to the foliage in 2 gallons of water per 1000 ft2.

Fungicides may be used on either a curative or preventative basis for Pythium root dysfunction control. Both strategies employ the same fungicide rotation:

1. Insignia (0.9 oz/1000 ft2, watered-in with 1/8" of irrigation)
2. Segway (0.9 fl oz/1000ft2, watered-in with 1/8" of irrigation)
3. Signature + Banol (4 + 2 oz/1000 ft2) or Signature + Subdue Maxx (4 + 1 oz/1000 ft2) applied in 2 gal/1000 ft2 and left on the foliage

For preventative control, one of these treatments should be applied every 21 to 28 days in the fall and spring when average daily soil temperatures are between 50F and 75F.
Curative applications should be made every 14 to 28 days based on the appearance of symptoms. Effective curative control also requires increased mowing heights and nitrogen inputs to relieve stress and allow the affected plants to heal.

Because Insignia and Segway are prone to fungicide resistance, it is very important to follow the fungicide rotation outlined above. Superintendents who apply one fungicide repeatedly are likely to experience control failure as the fungal population becomes resistant.

Segway (cyazofamid) is a new Pythium fungicide from FMC that belongs to a new class of chemistry (QiI). This product has received federal registration and is awaiting approval by the individual states."