

Ontario Turfgrass Symposium, Thursday, January 4, 2001, 2:30-3:00

**Anthracnose basal rot of creeping bentgrass
by Tom Hsiang, Guelph Turfgrass Institute, University of Guelph
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Introduction. Anthracnose foliar blight and basal rot are diseases found on many plants including the turfgrasses, annual bluegrass (*Poa annua*) and creeping bentgrass (*Agrostis palustris*). On grasses, these two diseases are caused by the same fungus, *Colletotrichum graminicola*. This pathogen has long been known as the cause of anthracnose foliar blight on annual bluegrass, but has been found to cause basal rot on creeping bentgrass. Reports of creeping bentgrass basal rot appear to be increasing in temperate North America.

Symptoms. Anthracnose basal rot differs from anthracnose foliar blight in that it causes damage near the crown of the plant. Because the damage is done to the crown, the plant often dies. This compounded by the fact that basal rot symptoms are usually not observed until well after infection has occurred, and efforts to control the disease by that time may be unsuccessful because the damage is already done. The infected tissue usually darkens as the fungus spreads in the plant, and the diseased area can extend into the roots and stolons and affect the base of leaf blades particularly lower ones. Infected turf acquires a yellow cast in a diffuse pattern, and then dead reddish or bronze-colored irregular patches of bentgrass appear as the turf thins. These symptoms can expand to cover several square meters as the fungus continues to grow. Small black fungal masses called acervuli can form on infected tissues, often well after infection has occurred and the tissue is dead. The presence of acervuli on dead tissue is not always a good indicator of the presence of the disease since this organism can survive on dead organic matter. However, if acervuli are found on dead or dying tissues bordering on live areas, then this is a good indication that the symptoms are caused by anthracnose.

Life Cycle. The fungus overwinters as mycelium or spores in infected tissues. Basal rot is favored by cool (15-20EC) moist weather during the late spring and early summer, whereas foliar anthracnose is favored by high humidity and much warmer temperatures, and is usually observed in mid to late summer. Anthracnose spores are readily spread by rain and splashing water, but the fungus can also spread by growth through infected tissues.

Conditions Favoring Disease. Anthracnose basal rot is frequently linked with poor soil conditions and restricted root growth. It can be favored by over compaction, poor drainage and nutrient deficiency in turf. Reducing compaction by aerifying and improving soil fertility can reduce the amount of disease. However wounds in crowns created during aeration and topdressing can also possibly increase the amount of basal rot. Fungicides are often ineffective in controlling basal rot, especially when the plants have been weakened, for example, by poor soil conditions.

Survey. Anthracnose basal rot is increasing in prevalence across Ontario. Five years ago, it was virtually unknown, but in the past two to three years, turf managers have been confronted with increasing incidences of a dieback due to a basal rot that has been very difficult to manage. Despite intensive use of fungicides, the grass often does not recover properly or recovers slowly. In the U.S.A., there has been very limited research conducted on this disease. Many recommendations made for its control come from our experience with anthracnose foliar blight which seems to have major differences in development from anthracnose basal rot.

Because basal anthracnose has been observed more frequently in Canada in the recent past, and because of very limited research on this disease in the U.S.A., we began a survey on the incidence of anthracnose basal rot in Ontario in 1999, and to examine the relationship between anthracnose isolates which cause basal rot to those which cause foliar blight. By studying the differences between the fungal isolates in terms of their genetic relatedness and modes of infection, we hoped to gain insights into how to better manage the disease.

Results. In 1999, we received samples from 15 locations. There were multiple samples from some locations resulting in 42 samples altogether. Out of these 42 samples, 27 had anthracnose (from 6 locations only). Of these 25 samples, 9 were from creeping bentgrass greens, 3 from Kentucky bluegrass fairways and 15 from annual bluegrass fairways. In 2000, we received or collected 88 samples from 17 locations. Of these 88 samples, 73 had anthracnose. Most were from creeping bentgrass (both greens and fairways), but 12 were from annual bluegrass.

Conclusions (from survey)

- ! Anthracnose basal rot can be seen on both greens or fairways (but usually not on both at the same location) of creeping bentgrass. The fungus also can cause basal rot symptoms on annual bluegrass and Kentucky bluegrass.
- ! In Ontario, the onset of the first symptoms of basal rot is often in June but can be anywhere from late May to early July. The symptoms are more severe with a cool wet spring and usually become more visible (more pronounced) with a drying period.
- ! Other factors were associated or preceding symptom expression included topdressing, verticutting, aeration, often one to two weeks before symptom expression.
- ! These observations are in line with what is known about anthracnose basal rot of creeping bentgrass, that a wet period is needed for infection, and that stress conditions (such as drought or heat or mechanical injury) are needed for symptom expression.

Management

- ! Stress reduction (moderate fertility, adequate soil moisture)
- ! Moisture management (good drainage, reduce leaf wetness periods)
- ! Chemical control: fungicides containing chlorothalonil, propiconazole, myclobutanil, benomyl, thiophanate-methyl, azoxystrobin have been seen to work well preventively. An important factor is that the fungicide needs to be drenched into the soil so that they reach the site of action and are also taken up by the roots to be moved into the crowns and leaves. (Except for chlorothalonil which is a contact fungicide, the other ones listed are xylem-mobile systemic fungicides which means that they can be taken into the plant and will move upwards, but not downwards in the plant).

Future Research

- ! test effects of specific plant stresses (light, temperature, moisture, fertility, injury)
- ! test susceptibility of different creeping bentgrass cultivars
- ! examine more isolates to see if the strains from annual bluegrass and creeping bentgrass are really different
- ! test sensitivity of strains to different fungicides