



# Anthracnose in Commercial Turfgrass

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## IMPORTANCE

Anthracnose is primarily a disease of intensely managed turfgrass, such as creeping bentgrass and annual bluegrass, on golf course putting greens. Outbreaks are generally induced by environmental conditions or cultural practices that result in stress to the turf. The anthracnose pathogen can incite a foliar blight phase or the more destructive basal rot phase.

## SYMPTOMS & SIGNS

Symptoms of this disease can vary in appearance. Overall, large diffuse areas of turf may appear generally unthrifty during midsummer (FIGURE 1). Timing of initial symptom occurrence varies depending on the species of turfgrass (TABLE 1).

### Foliar blight

Foliar blight occurs when leaf blades and sheaths become infected. Symptoms on older leaves of individual tillers appear to progress quickly from chlorotic (yellow) to necrotic (brown and dead). A variety of other stresses can cause similar symptoms, so an examination of leaf blades with a hand lens is often necessary to make a field diagnosis. Look for tiny fungal structures (acervuli) that are produced readily on infected leaf blades and sheaths. Acervuli appear as black, pad-like structures with protruding tufts of black spines (setae) (FIGURE 2).

### Basal rot

Root and lower stem (crown) infections result in a basal rot (FIGURE 3). This phase produces symptoms in discrete patches of yellowish-brown to reddish-brown turf that can be one foot to several feet in size. Crown tissues of individual plants appear dark and



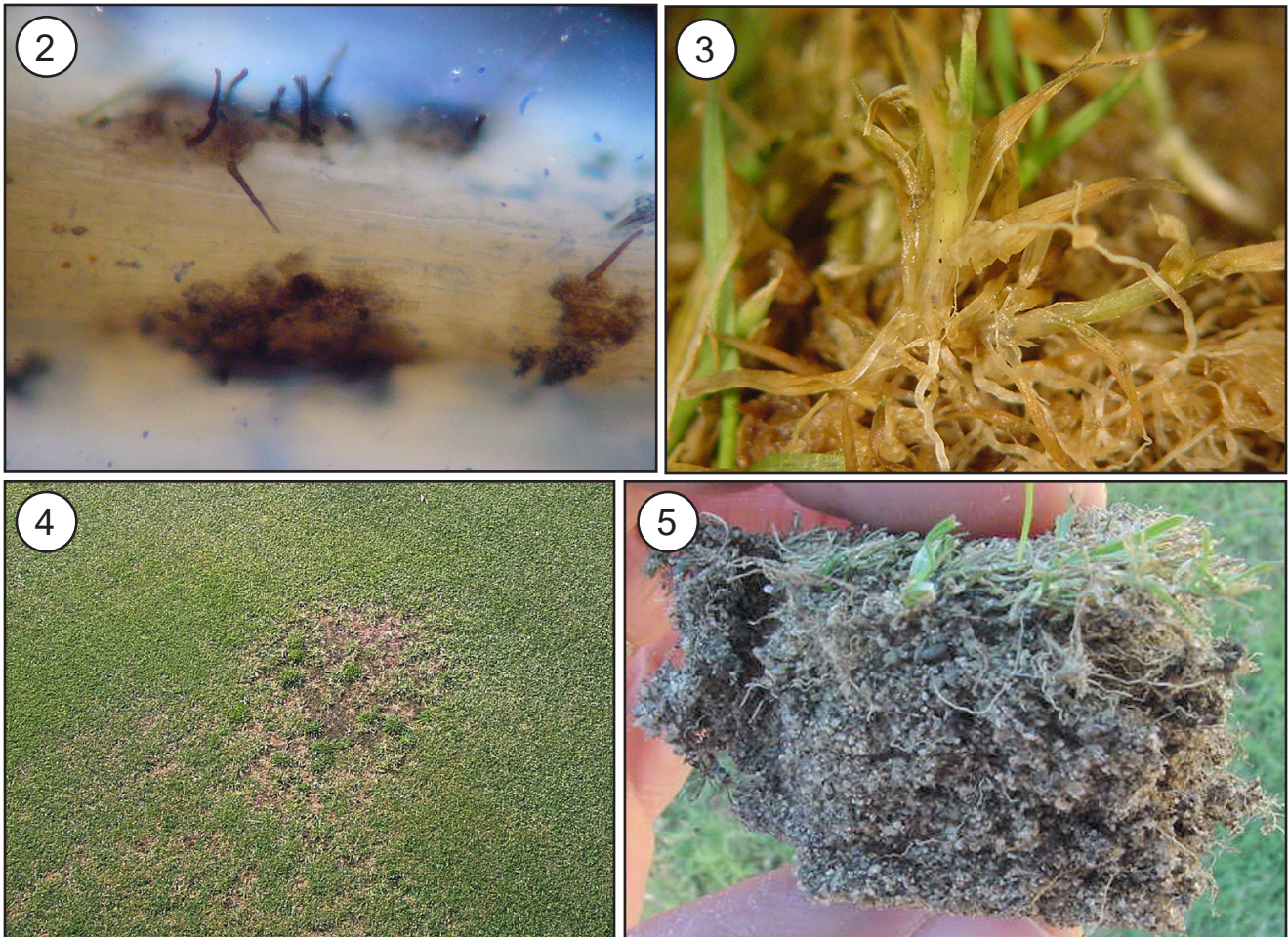
**FIGURE 1.** ANTHRACNOSE CAUSED DIFFUSE PATTERNS OF UNTHRIFTY TURF IN THIS CREEPING BENTGRASS GREEN.

necrotic, especially on annual bluegrass. As tillers die, turf thins and bare spots develop (FIGURE 4). Acervuli are not commonly observed on infected crowns or roots.

## CAUSE

Anthracnose is caused by the fungus *Colletotrichum cereale* (previously, *Colletotrichum graminicola*). This organism overwinters as dormant fungal structures (microsclerotia) and mycelia in crop debris. Spores produced in acervuli on infected tissues may be spread by splashing rain or mowing equipment.

The interaction between the foliar blight and basal rot phases is not yet understood. It is unclear if basal infections result from foliar infections that have progressed into crown tissues or if two different strains of the pathogen are causing two distinct diseases.



**FIGURE 2.** FUNGAL STRUCTURES WITH TINY BLACK SPINES, WHICH ARE VISIBLE WITH A HAND LENS, OCCUR IN ABUNDANCE ON TURF WITH ANTHRACNOSE FOLIAR BLIGHT. **FIGURE 3.** ANTHRACNOSE BASAL ROT OCCURS WHEN THE PATHOGEN INFECTS CROWNS AND ROOTS. **FIGURE 4.** ANTHRACNOSE BASAL ROT RESULTS IN DEATH AND THINNING OF PLANTS. **FIGURE 5.** REPEATED TOPDRESSING WITHOUT AERIFICATION CAN LEAD TO LAYERING, WHICH CAN IMPEDE DRAINAGE AND INCREASE DISEASE PRESSURE FROM ANTHRACNOSE.

## CONDITIONS FAVORING DISEASE DEVELOPMENT

### Annual bluegrass (*Poa annua*)

Basal anthracnose can develop under a wider range of temperatures in annual bluegrass than in creeping bentgrass, including occasionally under snow cover. There are four peak periods of anthracnose development on annual bluegrass:

- (1) Through winter (if conditions are mild and wet) into early spring;
- (2) During periods of extended overcast conditions in late spring;
- (3) Following peak periods of flowering in early summer; and
- (4) During periods of high temperature and humidity in summer.

Basal anthracnose on annual bluegrass appears to be favored by slow percolation of soil water, as

well as by excessively dry conditions. However, the combination of excessive soil wetness and heavy traffic can also be conducive to disease. A high-organic-matter content in the root zone of a sand-based green can hold excessive moisture and may favor infection.

### Creeping Bentgrass (*Agrostis stolonifera*)

Environmental stresses, which enhance plant susceptibility, favor infections. Common stresses include high temperatures, dry soil conditions, and low nitrogen-phosphorus-potassium (NPK) fertility. Although low soil moisture appears to predispose plants to infection, a period of leaf wetness is required for the spores to infect plant tissues. Disease severity will vary in high and low areas of the green, depending on these variables.

**TABLE 1.** CONDITIONS ASSOCIATED WITH ANTHRACNOSE IN TWO GRASS SPECIES.

| Type of Turfgrass  | Symptom Occurrence | Weather Conditions Favoring Infection |                  |
|--------------------|--------------------|---------------------------------------|------------------|
|                    |                    | Foliar Blight                         | Basal Rot        |
| Creeping bentgrass | June to September  | cool, cloudy                          | hot temperatures |
| Annual Bluegrass   | April to September | hot temperatures                      | cool, cloudy     |

## DISEASE MANAGEMENT

The following disease management practices are suggested for controlling anthracnose on high maintenance turf. For additional advice, including specific fungicide recommendations, refer to the most recent edition of *Chemical Control of Turfgrass Diseases* (PPA-1) or contact a local county Extension office.

### Reduce stress

Stress reduction is the first line of defense against anthracnose. This is easier said than done, however, since a putting green mowed at 5/32 inch or less with the foot traffic of several hundred golfers on a summer day in Kentucky is obviously under stress. Nevertheless, for both annual bluegrass and creeping bentgrass, cultural practices that reduce stress may help significantly in diminishing disease severity. For additional suggestions, refer to the “Reducing Summertime Stress on Putting Greens” section of *Chemical Control of Turfgrass Diseases* (PPA-1).

- Maintain conditions of moderate fertility using a complete fertilizer. Provide sufficient soluble nitrogen (N) to maintain a moderate growth rate through summer.
- Although the physical abrasion of light topdressing with sand may temporarily increase disease pressure, light, frequent topdressing through summer has been associated with an overall improvement in anthracnose control in mid- to late summer when compared to non-topdressed plots. Aerification is critical; repeated applications of topdressing without aerification impedes drainage, which favors disease development (FIGURE 5).
- On greens with the basal rot phase, use walk-behind mowers, and raise the height of cut. Reduce mowing frequency if the green is growing slowly.
- Minimize mowing when the turf is soggy since the equipment will sink into the turf, potentially scalping plants.

- Rolling greens with lightweight rollers (vibratory or sidewinder) three times per week, coupled with regular topdressing, can reduce anthracnose pressure. For best results, a rolling program should be initiated by May 1 to give the turfgrass time to adapt to the treatment before the heat of summer.
- Irrigate greens as needed, particularly between midday and late afternoon, to avoid drought stress. Avoid irrigation in late afternoon or evening hours. Hand-water whenever possible.
- Avoid overwatering.
- Improve drainage through aerification and topdressing.

### Fungicide applications

Typically, preventative spray programs have been much more effective against anthracnose than curative programs. In addition, fungicide mixtures have provided better results than a single fungicide product used alone. A good guideline is to begin a preventative program approximately one month before the typical onset of symptoms at the site.

#### *Annual bluegrass*

If temperatures are above normal in December through February, begin a preventative program in early to mid-March, especially if conditions in early spring are wet.

#### *Creeping bentgrass*

On sites with a history of the disease, begin fungicide applications before Memorial Day, continuing until the end of August. If conditions warrant, it may be necessary to begin fungicide applications by mid-April and continue applications into mid-October. Under severe disease pressure, research shows that biweekly applications may be needed from early April through mid-November.

## Resistant cultivars

If sowing new greens, consider adapted creeping bentgrass cultivars with moderate resistance to anthracnose (refer to the National Turfgrass Evaluation Process Web site) Avoid the most susceptible cultivars, such as Providence, Pennlinks II, Penncross, Seaside II, and Brighton,

## ADDITIONAL RESOURCES

- Chemical Control of Turfgrass Diseases (PPA-1)  
<http://www.ca.uky.edu/agc/pubs/ppa/ppa1/ppa1.pdf>
- National Turfgrass Evaluation Process (NTEP and USDA)  
<http://www.ntep.org>
- Reducing the Risk of Resistance to Fungicides Used to Control Diseases of Turfgrasses (PPFS-OR-T-02)  
<https://plantpathology.ca.uky.edu/files/ppfs-or-t-02.pdf>

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