K-STATE Research and Extension Plant Pathology EP147

Anthracnose of Bentgrass and Annual Bluegrass Putting Greens

Annual bluegrass and creeping bentgrass putting greens are susceptible to turfgrass anthracnose, a disease caused by the fungus *Colletotrichum cereale*. This fungus is also sometimes found on dying leaves of Kentucky bluegrass and tall fescue during periods of heat or moisture stress but is not considered a serious problem on these turfgrass species.

Symptoms

Anthracnose may occur throughout the growing season but is most common in the heat of summer during periods of turfgrass stress. Infected turf exhibits a yellow or brown color (Figure 1). The turf wilts rapidly during midday and requires frequent irrigation. The disease is worse on annual bluegrass than bentgrass.

The disease does not form distinct leaf spots. Instead, individual leaf blades fade from dark to light green and then yellow. The fungus produces black structures (called acervuli) with spiny hairs (called setae) on leaves and crowns that are easily visible with a 10x hand lens (figures 2 and 3). Visible acervuli on green tissue can indicate that anthracnose is the primary pathogen. Acervuli can be found on naturally senescing (dying, old) tissue, where *Colletotrichum* is a secondary pathogen.

Basal crown rot occurs when the anthracnose fungus infects the crown. Plants with basal crown rot are killed, resulting in a thinning of the turfgrass. Acervuli and small, black fungal resting structures are visible with a hand lens (Figure 4).

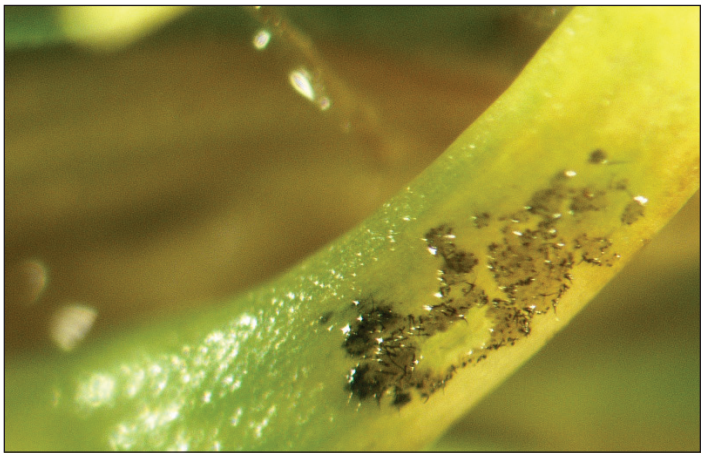

Figure 2. *Black spore-producing structures (acervuli) on green tissue. Photo by Megan Kennelly, Kansas State University.*

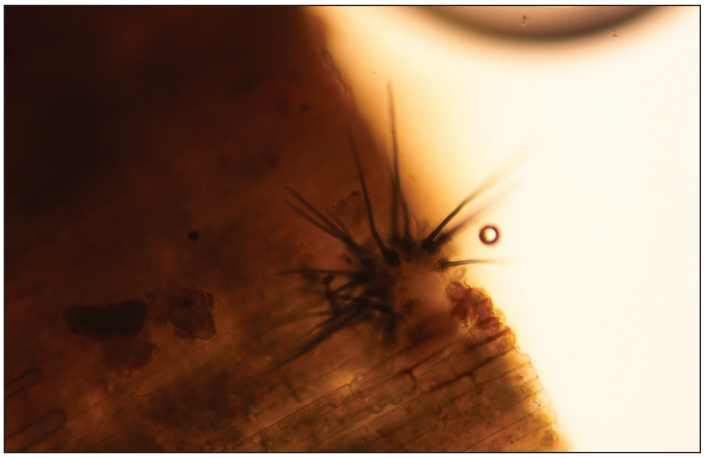

Figure 3. *Close-up view of spiny hairs (setae). Photo by Megan Kennelly, Kansas State University.*

Figure 1. *Anthracnose causes a yellow discoloration. Photo courtesy Jared Hoyle, Kansas State University.*

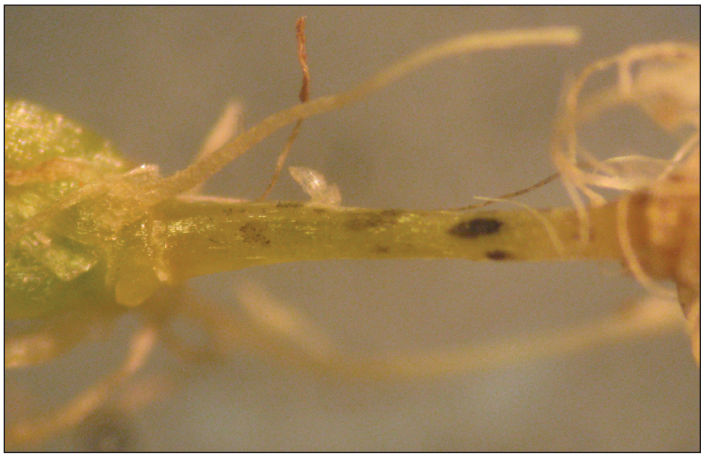

Figure 4. *Black fungal growth is visible on the crown in the basal rot phase of anthracnose. Photo by Megan Kennelly, Kansas State University.*

Control

Anthracnose is difficult to control after symptoms appear. The best strategy is to prevent anthracnose by alleviating the underlying stresses that trigger disease development. Rutgers University recently developed a set of best management practices for anthracnose prevention in annual bluegrass putting greens, and the principles should apply to bentgrass. Steps to prevent anthracnose include the following practices:

Fertility program: Provide adequate nitrogen to maintain turfgrass growth. Low nitrogen can increase anthracnose severity. Applications of soluble nitrogen at 0.20 to 0.25 pounds of nitrogen per 1,000 square feet every 2 weeks is beneficial. Apply adequate potassium.

Mowing and rolling: Low mowing heights can raise the risk of anthracnose development. Slight increases in mowing height can reduce disease pressure. Consider raising the mowing height to 3.6 mm (0.14 inches). Rolling on alternate days increases ball roll and slightly reduces anthracnose severity.

Irrigation and drainage: Anthracnose can be more severe with either too much or too little water. Irrigate to supply 60 to 80 percent of evapotranspiration. Avoid wilt stress. Hand water when practical. Do not overwater putting greens, since waterlogged conditions damage roots and make plants more susceptible. Aerify in the fall to improve drainage and airflow.

Topdressing: Light, frequent topdressing reduces the overall risk of anthracnose.

Plant growth regulators: Normal use of trinexapac-ethyl and ethephon reduced anthracnose in trials. Mefluidide had little effect in most cases.

Cultivation: Shallow verticutting (0.13 inch) had mixed results, leading to slight increases in disease in some studies and no effect in others. If anthracnose is active, use fungicides before any cultivation.

Fungicides

Numerous fungicides (see Table 1) are labeled for anthracnose control. Preventative applications are more effective than curative. Some strains of the anthracnose pathogen may be resistant to certain fungicides (see table). Follow label instructions about resistance management. Rotate to different mode of action groups, and consider tank mixes with a contact fungicide.

Anthracnose is usually associated with an underlying environmental or management-based stress. The most rapid improvement from anthracnose damage occurs following significant (cooler) weather changes and less stressful management practices.

Table 1. *Fungicides labeled for anthracnose.*

Active ingredient	Fungicide group	Efficacy** and notes	Typical application interval (days)	Examples of products
azoxystrobin*	QoI (strobilurin)	3, at risk for fungicide resistance	14-28	Heritage
Bacillus licheniformis	Biological control	L	3-14	EcoGuard
Bacillus subtilis, strain SQT 713	Biological control	L	7-10	Rhapsody
chlorothalonil	chloronitrile	3	7-14	Daconil Ultrex, Manicure, Concorde SST, Chlorostar, Echo, Pegasus L
fenarimol	DMI	2, possible resistance risk	30	Rubigan
fluazinam	Oxidative phosphorylation uncoupler	L	14	Secure
fludioxonil	Phenylpyrolle	2.5	14	Medallion
fluoxastrobin	QoI (strobilurin)	3, at risk for resistance	14-28	Disarm
hydrogen dioxide	Oxidizing agent	L	7	Zerotol
metconazole	DMI	3	14-21	Tourney
mineral oil	Not classified	3	7-21	Civitas
myclobutanil	DMI	2, possible resistance risk	14-21	Eagle
penthiopyrad	SDHI	3.5***	14	Velista
phosphite salts (salts of phosphorus acid)	phosphonate	2-3****	14	Alude
polyoxin D	Polyoxin	3	7-14	Affirm
propiconazole	DMI	2, possible resistance risk	14-28	Banner, Spectator
pyraclostrobin	QoI (strobilurin)	3, at risk for fungicide resistance	14-28	Insignia
tebuconazole	DMI	3, at risk for resistance	28	Torque
thiophanate-methyl	Benzimidazole	2, at risk for resistance	10-14	Cleary's 3336, Fungo, Systec 1998, Cavalier, T-Storm
triadimefon	DMI	1.5, possible resistance risk	14-45	Bayleton, Proturf Fungicide VII
trifloxystrobin	QoI (strobilurin)	3.5, at risk for resistance	14-21	Compass
triticonazole	DMI	3, possible resistance risk	14-28	Trinity

* Resistance to QoI and thiophanate methyl has been reported in several states, as well as reduced sensitivity to DMI fungicides. Follow labeled instructions for resistance management for all fungicides.

** 4=consistently good to excellent control in published experiments; 3=good to excellent control in most experiments; 2=fair to good control in most experiments; 1=control is inconsistent between experiments but performs well in some instances; N=no efficacy; L=limited published data available.

*** More effective preventatively compared to curatively.

**** More effective on annual bluegrass than creeping bentgrass.

Table modified with permission from *Chemical Control of Turfgrass Diseases 2015* by Paul Vincelli and Gregg Munshaw, University of Kentucky.

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