PROFESSIONAL SERIES

BP-125-W

Turfgrass Disease Profiles

PURDUE UNIVERSITY

Botany and Plant Pathology

Seasonal Activity of Turfgrass Pathogens

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The objective of this publication is to provide some background on the influence of weather on turfgrass diseases. The narrative below is intended to provide a few more details to the figure on page 3. More information on conditions that favor infection, symptom descriptions, and control recommendations are given in the Turfgrass Disease Profiles accessed through http://www.btny.purdue.edu/pubs.

Infectious disease can develop on turfgrass during every month of the year in the Midwest, but individual diseases are very seasonal, mostly occurring during months or weeks defined by certain temperature and moisture conditions. An understanding of the seasonal activity of turfgrass pathogens can help turf managers accurately identify diseases and schedule remedial or preventive treatments at the most appropriate times.

It is important to distinguish between pathogen activity and symptom expression, especially for root diseases. For example, take all patch infection will occur during cool wet conditions, but symptoms may be evident throughout the summer because of the damage sustained on roots. Scheduling fungicide treatments in April can be very effective. However, fungicides applied when symptoms occur in July will have no effect on the disease, because the pathogen is not active and will not be affected by the toxic ingredient in the fungicide.

Current information about the temperature and moisture conditions that favor pathogen activity is addressed below for individual diseases.

Gray snow mold

The gray snow mold fungi are active in a very narrow range of low temperatures (31˚F–36˚F). Also, like almost all pathogenic fungi, they require ample moisture. That explains why the most severe outbreaks of gray snow mold occur during prolonged periods of snow cover. A simple rule of thumb may be used to estimate the risk of snow mold damage. If snow cover exists for less than 45 days, then damage (symptom expression will be mild or negligible). If snow cover exists for 45–90 days, then moderate amounts of snow mold can be expected. If snow cover occurs for more than 90 days, then the risk of severe turf damage is high.

Pink snow mold / Microdochium patch

The same pathogen causes both of these diseases. Actually, they represent different phases of the same disease. In the pink snow mold phase, the pathogen spreads by radial expansion under snow cover. The symptoms resemble the circular patches associated with gray snow mold. In the Microdochium patch phase, snow cover is not necessary, and the pathogen produces patches in cool wet weather. The temperatures that favor infection and spread range from 32˚F–50˚F. This pathogen often is very active through mid-spring.

Red thread and pink patch

These are similar diseases caused by similar fungal pathogens that occur during the same environmental regimes. Infection occurs during mild wet weather and during times with long dew periods and temperatures (during the dew period) that range from 45˚F–60˚F. Symptoms are most often observed in mid-late spring, but outbreaks occasionally occur in the fall.

Yellow patch

This disease also is called "cool season brown patch" because it is caused by a species of Rhizoctonia that is very closely related to the fungus that causes the brown patch disease in mid-summer. Extended dew periods with low temperatures (40˚F– 55˚F) favor pathogen activity. Symptoms are most often observed in early to mid-spring but also occur in October and November.

Dollar spot

The dollar spot fungus is active during extended dew periods when temperatures range from 50˚F–70˚F. The dollar spot infection process occurs throughout the growing season, from early May through the end of October.

Necrotic ring spot

Necrotic ring spot is a root disease caused by a pathogen that is active in cool wet soils. Infection and colonization of roots normally occurs when soil temperatures range from 50˚F–60˚F. These rings, frogeyes, or arcs first become evident in mid-spring. Symptoms may persist through the summer, because a root system that is impaired by infection is less likely to support plant growth during periods of hot dry weather.

Take all patch

Take all patch is caused by another root infecting fungus that is active in cool wet soils (50˚F– 65˚F). In north-central Indiana, activity occurs mostly during the months of April and May, with some additional activity as soil temperatures cool in October. Like necrotic ring spot, symptoms may be expressed throughout the summer, especially during periods of drought stress.

Summer patch

Summer patch is another important disease that affects roots of bluegrass species. The summer patch fungus does not become active until soil temperatures (at the 3 inch depth) remain above 65˚F for several consecutive days. In north central Indiana, this usually occurs during the first two weeks of June. The fungus is active throughout the summer. Symptom expression seems to coincide with an extended period of hot, droughty weather, usually beginning in late July. By the time symptoms (patches of dead and wilted grass) are expressed, the disease has run its course and is too late for any remedial chemical treatment.

Brown patch

Brown patch is a disease of summer. Extended dew periods (12 hours or more) and warm temperatures (65˚F or greater), and episodes of heavy rains during hot weather favor infection and spread of the pathogen.

Pythium blight

Hot wet weather is ideal for outbreaks of Pythium blight. Long dew periods, warm evening temperatures (68˚F or greater), and heavy rains during the heat of the summer favor Pythium development.

Gray leaf spot

Outbreaks of gray leaf spot normally occur during mid to late summer. Pathogen activity is favored by long dew periods, warm evening temperatures and heavy rains (or frequent irrigation). In southern Indiana, disease development has been confirmed as early as the first week in July. In northern Indiana, outbreaks have occurred as early as mid-August. Disease activity into the first few weeks of autumn is not unusual.

Leaf rust

The leaf rust pathogen may be active over a broad range of temperatures. Disease development can occur from late summer through mid-autumn. Like many other fungal pathogens, long dew periods favor infection. Rust outbreaks normally occur on slow growing turf. Rust development during spring may be evident in heavily shaded areas.

Powdery mildew

Powdery mildew infection occurs during mild weather (temperatures ranging from 50˚F–70˚F) in areas with heavy to moderate shade. Frequent rains or extended dew periods are not essential for infection.

Anthracnose

There remains some uncertainty regarding the environmental conditions that favor anthracnose infection and development. The disease has two phases, a basal rot phase and a foliar phase. The foliar phase is evident on plants suffering from a variety of summer stresses. According to some studies, infection will occur during hot humid conditions. The basal rot phase has been identified during the cool wet conditions of spring in Indiana. It is likely that basal rot infection occurs during extended periods of cool wet weather, and that these infections provide the source of inoculum for foliar infections on stressed turf during summer.

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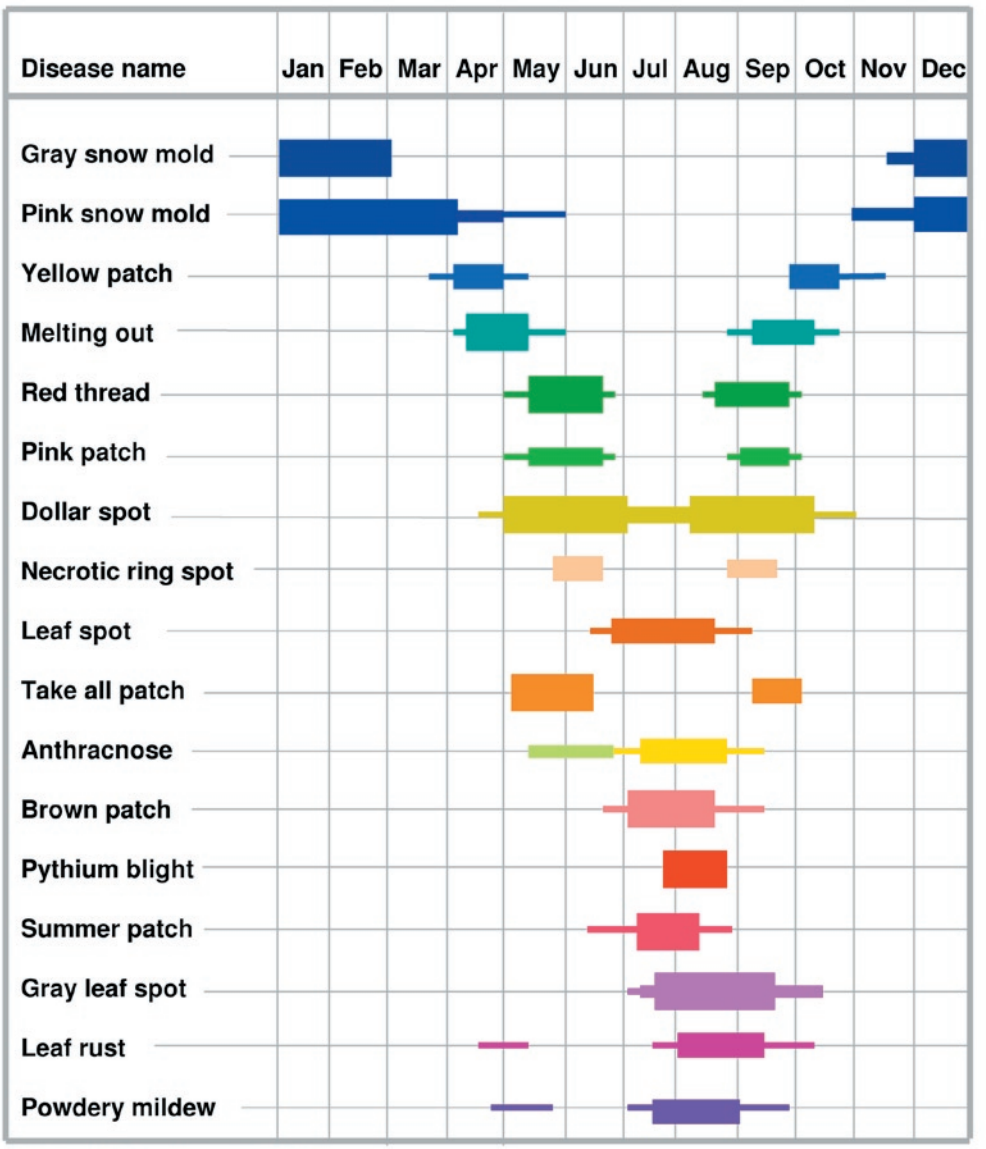
Leaf spot / Melting out

These diseases are caused by closely related fungal pathogens. Symptoms are very similar, but the environmental conditions that favor infection seem to differ. Wet conditions, marked by frequent rainfall are required for the establishment and spread of both diseases. The melting out disease is caused by a pathogen that is active during cool wet spring conditions. The leaf spot pathogen is active during the heat of summer. Because the pathogens and the symptoms are so similar, these diseases were once referred to as a single disease, "Helminthosporium leaf spot."

Seasonal activity of turfgrass pathogens in Indiana

This figure is intended to provide a graphic description of periods of pathogen activity. The thickness of the colored bars estimates the relative risk of outbreaks based on monthly environmental conditions. Thicker bars indicate high risk; narrower bars indicate low risk.



R. Latin / Purdue University / 2003

Rev 1/04