

Diseases

Many diseases occur on the different turfgrasses that are grown in North Carolina. In total, there are over 100 diseases that affect turfgrasses. Just like a human illness, each turfgrass disease has its own unique prescription that should be followed for its control. Accurate diagnosis of diseases is, therefore, a critical first step in their management. Fortunately, there are only about 26 diseases that develop in turfgrasses year after year. Learning how to diagnose and manage these most common diseases will prepare you to meet most problems that arise.



The [Disease Identification Decision Aid](#) on TurfFiles can help you to diagnose the most common diseases that occur in North Carolina. Diagnostic services are also available at NC State University, through the [Turf Diagnostics Lab](#).

Three factors are required for a disease to develop: a susceptible plant, a pathogen, and an environment that is favorable for pathogen growth. Disease will not develop unless all of these factors are present for at least several consecutive days. Because turfgrasses are perennial, the host plant is always present. The pathogens are always present as well, laying dormant in the thatch and soil when they are not causing disease. Therefore, it is the environment that triggers disease development. Weather conditions, management practices, and microclimate are the environmental variables that have the greatest impact on disease development.

Turfgrasses are most susceptible to disease when they are stressed or growing slowly. As a result, the most severe disease problems on cool-season grasses occur during the summer, and most diseases in warm-season grasses develop in the fall and spring. Selecting a turfgrass that is well adapted for the location and intended use will drastically minimize disease problems. Management practices also have a major impact on disease development. Grasses that are healthy and vigorously growing are far more resistant to disease than grass that is poorly managed, and they will also recover more quickly should disease develop.



The vast majority of turfgrass diseases are caused by fungi. Most fungi cause foliar diseases by attacking the leaves. Others specifically attack the crowns or roots of turfgrass plants, causing crown diseases or root diseases. Most fungi only grow within a specific temperature range and also require ample moisture. Foliar diseases typically develop at night, when the turfgrass leaves are wet from dew, and are, therefore, most strongly influenced by low night temperatures. For example, brown patch may develop when low night temperatures exceed 60°F for several consecutive days. Crown and root diseases are most strongly affected by conditions in the soil, such as soil temperature, pH, drainage, and compaction.

Fungicides can be used to control turfgrass diseases. Fungicide applications may be preventive, if made before symptoms of the disease appear, or curative, if made after symptoms appear. Preventive fungicide programs are recommended for diseases that occur annually, such as brown patch in tall fescue or large patch in the warm-season grasses. Curative fungicide applications are less effective and usually require increased application rates or shorter application intervals. Whenever possible, schedule preventive fungicide applications based on the weather conditions that favor disease development, not based on the calendar.

Fungicides can be grouped into two categories: contact and systemic. Contact fungicides remain on the leaf surface after application, forming a protective barrier to fungal infection on the leaf surface. Contact fungicides protect only the plant parts that are sprayed; therefore, uniform applications are necessary to ensure complete protection of the turf. Contact fungicides must also be re-applied frequently because they are removed from the leaf surface by mowing, precipitation, irrigation, traffic, etc. In contrast, systemic fungicides are absorbed by the plant and translocated. Most systemics are translocated only upward in the plant. Because systemic fungicides are absorbed into the plant, they are longer lasting and are more effective than contacts for curative applications. In general, systemic fungicides have a more limited control spectrum; therefore, a disease must be identified accurately in order to select the best fungicide for its control.

Over time, systemic fungicides may become less effective due to the development of fungicide resistance. Fungicide resistance occurs when fungicides from the same chemical class are applied repeatedly. Repeated applications allow strains of the pathogen that are naturally resistant to the fungicide to build up in the population. When resistant strains become dominant in the population, the fungicide no longer controls the disease, and significant damage may occur when conditions become favorable for disease development. Certain diseases, such as dollar spot and gray leaf spot, develop fungicide resistance very quickly, after as few as 5 consecutive applications of a fungicide. Other diseases, such as brown patch or summer patch, develop resistance much more slowly. To prevent the development of fungicide resistance, (1) use integrated management, including selection of appropriate species and variety, and good cultural management practices; (2) rotate to a different class of fungicides after every application; and (3) tank-mix systemic fungicides with a contact fungicide, which will suppress resistant strains and slow their emergence.

For fungicide recommendations for a specific disease, see publications such as *Selection and Application of Fungicides for Turfgrass Disease Control*, *Pest Control for Professional Turf Managers*, and the *North Carolina Agricultural Chemicals Manual*.

Note: Nematodes are microscopic, worm-like organisms that feed on the roots of all plants, including turfgrasses. They are usually grouped with turfgrass diseases because of their microscopic size and because symptoms can be mistaken for those caused by some fungal diseases. They are included under "Other Pests" in TurfFiles.

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