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John E. Watkins

University of Nebraska-Lincoln, jwatkins1@unl.edu

Roch E. Gaussoin

University of Nebraska-Lincoln, rgaussoin1@unl.edu

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Rust Diseases of Turfgrass

This NebGuide describes the various rust diseases common to Nebraska and offers suggestions for maintaining a vigorous and disease-resistant lawn.

John E. Watkins, Extension Plant Pathologist
Roch Gaussion, Extension Turfgrass Specialist

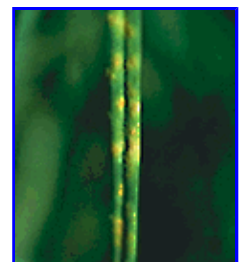
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Rust diseases occur on all turfgrasses; however, most rust problems occur on Kentucky bluegrass, perennial ryegrass, tall fescue and zoysia. In the cool-temperate regions of North America, cool season turfgrasses may suffer severe injury late in summer by attack from one of the rust pathogens. In addition, rust-weakened plants are much more susceptible to injury from environmental stresses and to attack by other turfgrass pathogens.

There are nearly 5,000 different species of rusts of which about 10 may be important pathogens on turfgrass. Rust fungi attack only live grass plants, and two or more rusts may attack the same grass plant at the same time. Different races of the species of rust fungi occur; they differ in their ability to attack cultivars (varieties) within a grass genus or species. This is one of the reasons that some grass cultivars "lose" their rust resistance after being grown for a period of years.

Figure 1. Orange pustules covering an infected leaf blade.

Stem rust, caused by *Puccinia graminis*, became a recognized problem on turfgrass with the release and widespread use of the Kentucky bluegrass cultivar Merion in 1950. Although superior in performance and quality to common Kentucky bluegrasses, Merion's extreme susceptibility to stem rust eventually limited its usefulness as a turf in some areas.



The principal rust diseases found on turfgrasses in Nebraska are stem rust on Kentucky bluegrass and crown rust on tall fescue and perennial ryegrass. Crown rust gets its name from the crown-like structure on the top cell of one of its spore stages. Although the two rusts differ in appearance and in life cycles, there are enough similarities between the two that they can be difficult to distinguish in the field.

Symptoms

The appearance of small light green to yellow flecks on leaves and leaf sheaths is early evidence of rust attacks on grasses. A few days later, orange to reddish brown uredinial rust pustules break through the host epidermis (*Figure 1*). Initially, these pustules may extend in a longitudinal direction in rows parallel with the leaf veins. Contained within each uredinial pustule are thousands of microscopic urediniospores. Exposed urediniospores may be yellow, orange, brownish yellow, chestnut brown or brick red; and they appear powdery in mass.



Figure 2. Yellow appearance of turf due to heavy rust infestation.

Those of stem rust are chestnut-brown to brick red, whereas urediniospores of crown rust are orange. In severe attacks the entire turf may be a yellow to orange to brownish orange color (*Figure 2*). The powdery urediniospores are easily dislodged from the pustule. Shoes, clothing, hands or implements disturbing the turf can become coated with spores. Homeowners have complained about clouds of orange dust when they mow the lawn in September.

Plants within heavily rusted turf become chlorotic and weakened, and the stand can be thinned due to the loss of leaves and stems.

Disease Cycle

In describing the rust disease cycle, many plant pathologists start by noting where the pathogen overwinters. Both stem rust and crown rust of turf overwinter either as teliospores or as urediniospores and mycelium on infected grass hosts in the southern states. When weather is conducive to disease development, new uredinial pustules are produced. The urediniospores are carried long distances by wind and move north in stages during the growing season. Rust usually makes its appearance in Nebraska sometime in mid-summer and remains active until early October. Urediniospores are transported locally within a turf by air currents, water, shoes, turf equipment and infected sod, plugs or sprigs.

Each urediniospore must come in contact with a water droplet on the leaf or stem surface to germinate and infect the plant. Within two weeks after infection, new urediniospores are produced in abundance and are released from the rust pustules. A single pustule may contain 50,000 or more urediniospores, each capable of producing a new pustule. This cycle is repeated about every two weeks under conditions favorable for rust development.

Most rust fungi produce another spore type, the teliospore, as the leaves and stems become dormant in fall. Telia are dark brown and are sometimes confused with one of the leaf spot diseases.

Conditions Favoring Rust

Rust epidemics are favored by either warm late summer days with cool nights that produce heavy dew formation or by frequent rain showers that keep the turf wet for several hours. These conditions are common in Nebraska in late August and throughout September and coincide with the time of greatest rust development in our turfs. Turf with a reduced growth rate due to a lack of nitrogen, insufficient watering, soil compaction or other growth-limiting factor will be more heavily rusted than actively growing turf. Also, infrequent mowing can result in a build-up of rust on leaves and stems. Athletic fields are often prime targets of rust attack because of lower maintenance and compaction.

Prescription for Healthy Turf

Rusts do less damage when vigorous growth is promoted by adequate, but not excessive, nitrogen fertilizer and irrigation. Prevention of drought stress appears as important in the control of turf rusts as assuring an

adequate state of soil fertility. Rust injury to turfgrass can sometimes be lessened by improving mid-season fertility and irrigation management.

Preventive rust management really begins with initial establishment of a turf. Improved cultivars that are well adapted to Nebraska's climate and that show a reasonable level of resistance to the major diseases are available. Kentucky bluegrass cultivars with moderate to good resistance to one or more rusts include A-34 (Bensun), Adelphi, Admiral, America, Apart, Aguila, Argyle, Aspen, Banff, Bayside, Bonnieblue, Bono, Brunswick, Challenger, Charlotte, Classic, Columbia, Enoble, Escort, Georgetown, Geronimo, Glade, Haga, Harmony, Holiday, Majestic, Merit, Midnight, Mona, Monopoly, Nassau, Nugget, Parade, Piedmont, Plush, Ram I, Rugby, Sydsport, Trenton, Wabash and Welcome.

Acclaim, All*Star, Birdie II, Blazer, Blazer II, Cigil, Citation, Crown, Delray, Elka, Gator, Loretta, Manhattan II, Omega II, Ovation, Palmer, Pennant, Pippin, Prelude, Premier, Ranger, Repell, Tara and Yorktown II are some rust resistant perennial ryegrasses. Tall fescue cultivars with improved crown rust resistance include Adventure, Apache, Falcon, Jaguar, Mustang and Olympic.

Blends containing two or more of these cultivars should provide adequate protection against rust injury. The use of blends does not impart total rust resistance since a cultivar may be resistant in one location, but be susceptible in another turfgrass area. Also, the turf manager or homeowner who fails to manage the turf properly, allowing it to become stressed, may be confronted with a serious rust problem no matter what cultivar is planted.

Mow on a regular schedule and do not irrigate in the evening. Mowing the turf too short can sometimes stress the plants and increase their susceptibility to rust attack.

In certain years and on certain turfs, rust often becomes severe enough to justify the application of fungicides. Two or three applications at 7 to 21 day intervals beginning in late July, or when rust is first detected, should provide adequate protection. Some of the products that will control rust on turfgrass include chlorothalonil (Daconil 2787), maneb, mancozeb, propiconazole (Banner) and triadimefon (Bayleton). Since product registrations can change, always read the label before purchasing a fungicide to make certain that turf is listed. Read and follow all label directions and precautions carefully before application.

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