

What We Know About Yellow Tuft

Peter H. Dernoeden

Yellow tuft disease is caused by the downy mildew fungus *Sclerophthora macrospora*. *Sclerophthora macrospora* attacks virtually all turfgrasses as well as several major grass crops, including rice, sorghum, and corn. Kentucky bluegrass (*Poa pratensis*) sod can be rendered temporarily unsalable, and a severe infection mars the appearance and the playability of creeping bentgrass (*Agrostis stolonifera*) and/or annual bluegrass (*Poa annua* var. *annua*) putting greens. Infected plants generally are not killed by this obligate parasite, and the disease is primarily a problem on putting greens.

Symptoms. On bentgrass greens and tees, the disease appears as yellow spots of 0.25 to 0.5 in. (6.4–12.7 mm) in diameter. In Kentucky bluegrass, and other wider-bladed grasses, the yellow spots are 1 to 3 in. (25–75 mm) in diameter. Each spot consists of one or two plants that have 20 to 30 or more tillers, giving plants a tufted appearance. **The tufting, or abnormal tiller production, is induced by *S. macrospora*, which causes a shift in the production of a hormone (possibly indoleacetic acid) that regulates tillering.** Roots of infected plants are short and bunched, and the tufts are easily detached from the turf. **During cool and moist periods in late spring and autumn, plants develop a yellow color, at which time the infected plants are “yellow tufted.”** The yellowing is the indirect result of heavy spore production by the fungus. These spores swim (zoospores), which accounts for the fact that the disease is more severe in low-lying areas that puddle. Zoospores are produced in lemon-shaped structures called sporangia. Sporangia develop on leaf surfaces from sub-stomatal cavities below the leaf epidermis. During early morning hours, when leaves are wet, the pearly white sporangia can be seen with a hand lens on the upper and to a lesser extent the lower leaf surfaces of infected plants. During most summer months infected plants appear green and amazingly healthy.

In St. Augustinegrass (*Stenotaphrum secundatum*), the disease is called downy mildew instead of yellow tuft, and the symptoms are different. The disease appears as white, linear streaks that run parallel to the leaf veins. Leaves turn yellow and there may be some browning of leaf tips. Excessive tillering does not occur. The disease is disfiguring and St. Augustinegrass growth may be stunted.

Nature of Disease. Plants infected with *S. macrospora* can persist in excess of two years. The pathogen is a very sophisticated obligate parasite. Obligate parasites only can grow and reproduce in living tissues. As a result, most obligate parasites have evolved to the point where they gener-

ally do not directly kill plants. Instead, they debilitate or weaken plants, predisposing them to possible injury or death from other stress factors. *Sclerophthora macrospora* gains entry through meristematic tissue (i.e., stems, buds, or the mesocotyl region of germinating seeds), and except for roots, it spreads systemically throughout the plant. Once infected, the mycelium grows upward between cells (i.e., intercellular spaces) from the buds or stem bases into leaf sheaths and then leaf blades. If plants are allowed to produce seedheads, the fungus can grow upward into the culm, invade the inflorescence, and eventually infect the seed. Hence, yellow tuft can be a seedborne disease. When leaves die, the mycelium may differentiate into large, sexual spores called oospores. The oospores are thick-walled survival structures, which can persist indefinitely in dead leaf tissue. They germinate in low numbers in the presence of water and suitable temperature to produce either a germ tube or an oosporangium. Each oosporangium may contain 50 or more zoospores, and they have the same shape and appearance of asexual sporangia and zoospores. While oospores help to disperse the pathogen, the production of zoospores by asexual sporangia is the primary mechanism by which large numbers of plants become infected. Crabgrass (*Digitaria* spp) is very susceptible to *S. macrospora*, and this weed serves as a major harborage site for the production of zoospores and oospores.

Over time, new shoots escape systemic invasion by the fungus and eventually *S. macrospora*-free tillers replace the original plants. Escape of tillers explains the ephemeral nature of yellow tuft symptoms in older stands. Seedlings are most susceptible to infection by *S. macrospora*, which accounts for the fact that the disease is most commonly observed in the spring following autumn seeding. The disease can recur in older turfs during years marked by excessively wet weather.

Culture. Improving drainage may help to alleviate yellow tuft since the disease is most severe in low-lying areas where water collects. As noted previously, it is in wet environments that the swimming zoospores are able to move easily to uninfected plants.

Yellow tuft can be controlled chemically with either fosetyl aluminum (Aliette Signature®) or metalaxyl (Subdue MAXX®). For unknown reasons, **these fungicides generally perform better when tank mixed with Daconil® (chlorothalonil).** Generally, two or three fungicide applications are required to eradicate the fungus in infected plants. After the application(s) of a fungicide, however, plants can retain their tufted appearance for several weeks. It is only until new tillers replace the older infected shoots that plants resume their normal appearance and growth habit.