Large Patch Disease of Zoysiagrass
Rhizoctonia solani

Large Patch

Host Plants: Zoysia sp.

Description: Zoysiagrass may be damaged by cold temperatures, excessive wear during dormancy, insects, and thatch accumulation. Although zoysiagrass is also subject to injury by numerous plant diseases -- including nematode feeding, dollar spot and rust -- it is generally assumed to have fewer debilitating diseases than other turfgrass species. Nevertheless, turfgrass managers have noted an increase in a large, patch-type disease of zoysiagrass in the past decade, particularly along the extreme northern range of its adaptation and use in North America.

In Arkansas, large patch symptoms on zoysiagrass may occur throughout the growing season during relatively cool, wet conditions. Patches are most common in early spring and late fall as the turfgrass is entering or breaking winter dormancy, but they occasionally develop in shaded, moist areas in mid-summer. Some patches are seasonal while others are perennial; i.e., they develop at the same location in both spring and fall for several years. Patch diameters may vary from less than 2 feet to more than 20 feet, making them among the largest in turf.

Fall patch symptoms initially develop as roughly circular, slightly matted areas of bright orange, discolored turfgrass. Individual shoots within the patch develop pinpoint, reddish-brown to black lesions on basal leaf sheaths embedded in thatch. In order to see the lesions, you must dig up the plant and look at the crown area near its attachment to the stolon. Lesions or spots do not normally develop on plant tissue above the thatch layer; therefore, it is unlikely you will see any rotting or lesions on the leaves themselves. The progressive enlargement of the sheath lesion eventually girdles the crown. The nutrient- and water-starved leaves turn yellow-orange before the shoot is killed. During favorable weather, the disease progressively kills more shoots, resulting in large, blighted patches of turfgrass with bright orange margins. Depending on disease severity, unaffected, living shoots may be scattered throughout the patch. Interestingly, stolons and roots within the patch are not killed by the disease. Stolons may eventually form new shoots after disease development is suppressed. Symptoms are most severe on turfgrass mowed at a height of less than 1 inch. Higher mowing heights tend to mask or suppress damage by the pathogen.

Disease symptoms frequently reappear in early spring in the same location as the fall patches, although new satellite infections may also develop. Spring patches initially appear as light brown, sunken areas that are slower to recover from dormancy than surrounding, healthy turfgrass. Leaf sheath lesions typically are not observed in early spring, but sheath rotting may resume in April

and May as soil and air temperatures increase. This can result in patch expansion and symptoms similar to those described for fall infection. Patch activity may continue through May but is suppressed by high summer temperatures. Zoysiagrass slowly refills the damaged areas during the summer.

Large patch disease of zoysiagrass is caused by a soilborne fungus called *Rhizoctonia solani*. Although this fungus is very similar to the one that causes brown patch disease of cool-season turfgrasses in mid-summer, it has some important differences. The *Rhizoctonia* fungus that attacks zoysiagrass belongs to a different subgroup (anastomosing group 2-2) and has lower temperature range (50 to 86 F) for infection than the *Rhizoctonia* (anastomosing group 1) that normally attacks cool-season turfgrasses. Therefore, in Kansas, the anastomosing group 2-2 *Rhizoctonia* is almost always associated with damage to zoysiagrass during relatively cool weather in spring and fall, whereas the anastomosing group 1 *Rhizoctonia* is normally a problem on cool-season turfgrasses and not zoysiagrass during hot, humid periods in mid-summer.

The large patch fungus oversummers in the thatch or as resting structures called sclerotia on living stolons. The fungus does not produce spores. Fungal infection of zoysiagrass generally starts in mid- to late September and may continue through fall dormancy into December as long as thatch temperatures are above 50° F and moisture is adequate. Fungal infection may resume in early spring but is suppressed by thatch temperatures exceeding 86° F.

Recommendations: Since the large patch fungus does not attack stolons or roots, it rarely is responsible for completely killing large areas of zoysiagrass. Nevertheless, the fungus does damage a large percentage of shoots within a diseased patch. Recovery of the turf by formation of new shoots may require several months. Therefore, damage from this disease may be unacceptable in high-traffic areas. Large patch may be suppressed by a combination of cultural and chemical control practices.

Large patch development is favored by high thatch and soil moisture. Avoid overwatering the turfgrass, especially in the fall or early spring. Poorly-drained areas are very susceptible to injury from large patch and should be reconstructed (draining tiles, etc) to avoid soil saturation. Avoid mowing the turfgrass in early morning when the thatch is spongy or wet. The fungus may be distributed in grass clippings during mowing.

Core aeration and/or vertislicing in June or July helps reduce thatch accumulation and invigorate the turfgrass. A reduction in the thatch layer should also help suppress large patch development. Do not core aerate or slice in early spring or at other times when patch symptoms are active! The fungus may be spread on infected turf cores removed during aeration. Furthermore, early spring aeration weakens the turf.

Some managers lightly fertilize zoysiagrass with nitrogen in early spring to 'boost' the turfgrass out of winter dormancy. Don't do this! Early spring fertilization increases the possibility of a large patch epidemic. Begin fertilization only after large patch activity has stopped. This is usually sometime in mid- to late May. Research in Manhattan suggests that routine applications of slow-release forms of nitrogen in the summer (urea formaldehyde, turkey compost litter, Milorganite) may slightly suppress severity of large patch in the fall. Avoid using more than 2 lb/1000 sq. ft. of active nitrogen during the growing season. If large patch is severe in the spring, application of a fast-release form of nitrogen, such as urea, in late May or early June may help speed turfgrass recovery during the early summer months. Avoid using fast-release nitrogen forms in late summer.

For those areas with a history of large patch, make a single preventive fungicide application in late September to early October. Don't delay the fungicide application! A preventive fungicide applications not only inhibits fall infection, but it also suppresses or delays disease development in the spring. Several fungicides including iprodione (Chipco 26019), triadimefon (Bayleton), flutolanil (Prostar), propiconazole (Banner), PCNB, cyproconazole (Sentinel, golf course only), myclobutanil (Eagle), and azoxystrobin (Heritage) are effective in reducing the incidence and severity of large patch if they are applied at the right time and at high rates. The trick is to get them on before you see damage! This disease can continue to damage shoots even after the zoysia has entered fall dormancy provided that air temperatures remain relatively warm. This is very common in our area. Therefore, you are not out of the woods if you don't notice any symptoms before the turf goes dormant. The damage caused by the fungus after turf dormancy will be apparent next spring during green-up and by that time it is too late to do anything about it.

Curative treatments are much less effective in controlling large patch. Many zoysia shoots are damaged by the time fungicides are applied. Because of cool temperatures in fall and spring, the turfgrass cannot quickly recover from the injury. Nevertheless, curative treatments of iprodione, chlorothalonil and possibly flutolanil may prevent patches from further expanding during favorable weather.