FEATURE ARTICLE

1999 Was a Big Year for Spring Dead Spot

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Spring dead spot (SDS) is perhaps the most damaging disease of bermudagrass (*Cynodon* spp.) turf. This disease is caused by at least three root pathogens, including *Ophiospaerella korrae, O. herpotricha,* and *O. namari. Gaeumannomyces graminis* var. *graminis* is associated with both spring dead spot and bermudagrass decline in southern states. **The intensity of SDS varies greatly from year to year, and it seems impossible to predict those years when it will be severe.** Indeed, turf pathologists are baffled by the unpredictable nature of SDS outbreaks. The disease is generally more severe following mild and wet winters, but there seem to be many exceptions to this rule. For example, the SDS outbreak in the eastern United States in 1999 was extremely severe. The winter of 1998–1999 was initially cold and wet, but late winter was relatively mild. Conversely, the winter of 1997–1998 was mild and wet, yet the severity of SDS in the spring of 1998 was generally low. **Hence, severe outbreaks of SDS are due to imperfectly understood environmental and soil conditions, as well as the fact that three different species of *Ophiosphaerella* may be involved in the SDS complex in some regions.** Furthermore, soil fertility and pH, and some herbicides, also may potentially impact SDS severity.

As the name implies, SDS injury becomes apparent in the spring. **The actual infection probably begins in early autumn, but root injury by the pathogen becomes rapid just prior to spring green-up.** As bermudagrass breaks dormancy, circular patches of tan or brown sunken turf a few inches (5 cm) to three feet (0.9 m) or greater in diameter become conspicuous. Rhizomes and stolons from nearby healthy plants eventually spread into and cover the dead patches. This filling-in process is slow, a period that may last four to eight weeks or longer following spring green-up. The slowness of the filling-in process is believed to be due to toxic substances generated by the pathogen(s) in the thatch or soil below the dead patches. Weeds commonly invade the dead patches. These weeds should be eliminated to reduce competition with the bermudagrass, which helps to speed the turf recovery process.

Spring dead spot can be extremely destructive to bermudagrass under both low and high maintenance. Recovery, however, is very slow in turf maintained with low levels of nitrogen. The disease is most commonly associated with bermudagrass turf older than three years, but it may appear the spring following sprigging with stolons from sites previously affected with SDS. **Spring dead spot injury is most likely to occur where thick thatch layers exist and where high application rates of nitrogen fertilizers were applied during late summer or autumn.**

MANAGEMENT

Cultivars of bermudagrass with greater winter hardiness such as "Midiron," "Midfield," and "Vamont" tend to be less susceptible and generally recover more rapidly from SDS. "Tufcote" and most bermudagrass hybrids (*Cynodon dactylon* x *C. transvaalensis*) are very susceptible to this disease. It is important to eliminate weeds from diseased sites, as their presence will slow, and in some cases prevent, a complete recovery of the bermudagrass. **Ammonium sulfate or ammonium chloride (applied at 1.0 lb N/1000 ft; 50 kg N/ha) and potassium chloride (applied at 1.0 lb K/1000 ft; 50 kg N/ha) applied at monthly intervals from mid-May to mid-August speed the recovery of turf injured by SDS, and help to alleviate disease severity over time.** The suppression effect provided by the aforementioned acidifying fertilizer, however, may take three or more years to develop. Acidification alone, however, may not reduce the number of patches, but it does reduce their size. **It is important, however, to cease nitrogen application about six weeks prior to the anticipated dormancy of bermudagrass.** This is because the application of significant amounts of nitrogen in early autumn has been linked to an increase in SDS severity the following spring. **Nitrate forms of nitrogen, such as sodium nitrate, potassium nitrate, and calcium nitrate, should be avoided.** This is because nitrate forms of nitrogen tend to increase soil pH in the root zone, and have been shown to intensify SDS. According to Vincelli and Williams (1998), sulfur also reduces SDS. They suggested using ammonium-based fertilizers with a low rate of sulfur, such as 2.0 lb S/1000 ft^2 (100 kg S/ha) per year. Higher rates of sulfur in their study, however, caused slower spring green-up and thinning of the stand. Potassium can improve low-temperature stress hardiness, and research results suggest that potassium chloride may help to reduce SDS and improve bermudagrass quality. Irrigate frequently and maintain nitrogen applications during dry periods in the summer to encourage re-growth by stolons and rhizomes. **Higher-cut bermudagrass is not as severely damaged by SDS.** Hence, it is helpful to increase the mowing height as much as possible for the site (i.e., green, fairway, athletic field, etc.) about 30 days prior to dormancy. It also is beneficial to control thatch and to alleviate soil compaction by core cultivation and vertical cutting in the summer, when the bermudagrass is actively growing.

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...Drought Stress...
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The relative drought resistance of 24 turfgrasses*, when grown in their respective regions of adaptation.

Relative Ranking	Turfgrass
superior	dactylon bermudagrass†
	hybrid bermudagrass†
	seashore paspalum
excellent	kikuyugrass
	zoysiagrasses
	American buffalograss
	bahiagrass
good	crested wheatgrass
	St. Augustinegrass†
	centipedegrass
	common carpetgrass
	tropical carpetgrass
medium	tall fescue
	perennial ryegrass
	Kentucky bluegrass
fair	creeping bentgrass
	hard fescue
	Chewings fescue
	red fescues
poor	colonial bentgrass
	creeping bluegrass
	annual bluegrass
very poor	annual ryegrass
	rough bluegrass

*Based on the most widely used cultivars of each species.
†Significant variability occurs among cultivars within the species.

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Azoxystrobin (Heritage®), fenarimol (Rubigan®), myclobutanil (Eagle®), propiconazole (Banner MAXX®), and triadimefon (Bayleton®) have been shown to suppress SDS. **A fungicide should be applied once or twice in mid to late September or about 30 days prior to anticipated winter dormancy.** Fungicides, however, do not provide complete SDS control, and one application usually provides nearly as good SDS suppression as multiple applications. **Control is typically erratic with any fungicide in any given year, with levels of SDS suppression often ranging from 0 to 75%.** As noted previously, complete control with fungicides is seldom, if ever, achieved. **There is no benefit to be gained by applying a fungicide at spring green-up, because most of the root and stolon damage occurs prior to green-up.** Fungicides should be applied in at least 100 and preferably 200 gallons of water per acre. High water dilutions help move the fungicide down to stolons or between leaf sheaths to make contact with vital growing points. Currently, there are no data to support the premise that watering-in of a fungicide to the root zone will improve SDS control. Indeed, bermudagrass generally loses most of its existing root system at spring green-up. Hence, it would appear that protecting stolons and stems, which can live for one or more years, is the correct target for a fungicide. Therefore, until field research demonstrates otherwise, these fungicides probably should not be watered-in.

REFERENCES

Dernoeden, P.H., J.N. Crahay, and D.B. Davis. 1991. Spring dead spot and bermudagrass quality as influenced by nitrogen source and potassium. *Crop Sci.*, 31:1674–1680.

Vincelli, P. and D. Williams. 1998. Managing spring dead spot of bermudagrass. *Golf Course Management,* 66(5):49–53.

Rust Problems Increase in Midwest

In a recent conversation with Dr. Joe Vargas of Michigan State University, he indicated that **increased turf damage has been observed on numerous Kentucky bluegrass (*Poa pratensis*) lawns in Michigan and the contiguous midwestern states that is being caused by rust (*Puccinia* spp.).** These general field observations indicate that the injury is occurring on a broad range of cultivars of Kentucky bluegrass, although there is a need for detailed studies in this regard, as well as a need to address the specific causal pathogen or pathogens involved.

The rust-causing pathogens are obligate-parasitic fungi, which have a distinct sexual cycle, as contrasted to the imperfect fungi, which have an asexual cycle only. The existence of the sexual cycle allows the heterogeneous *Puccinia* pathogens to develop new races of the fungus to which the existing turfgrass cultivars may not be resistant. The development of new races of *Puccinia* is a well-known, periodic occurrence in certain small grains. Specific investigations are needed to confirm whether this in fact is occurring. **If this is the case, there will be a need to develop new Kentucky bluegrass cultivars that have resistance to the newly emerging races of the *Puccinia* fungus.**