

1999 RUTGERS Turfgrass Proceedings



THE NEW JERSEY TURFGRASS ASSOCIATION

In Cooperation With

RUTGERS COOPERATIVE EXTENSION
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

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1999 RUTGERS TURFGRASS PROCEEDINGS

of the

**New Jersey Turfgrass Expo
December 7-9, 1999
Trump Taj Mahal
Atlantic City, New Jersey**

**Volume 31
Published July, 2000**

The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers University in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1999 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available

source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section includes research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of this section is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turf Research Program at Cook College - Rutgers, The State University of New Jersey.

Dr. Ann B. Gould, Editor
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A NEW FUNGAL DISEASE OF CREEPING BENTGRASS INCITED BY *OPHIOSPHAERELLA AGROSTIS*

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In late summer of 1998, a new fungal disease of relatively young creeping bentgrass (*Agrostis palustris*) putting greens in Maryland, Virginia, Pennsylvania, and Ohio was discovered. The causal agent was reported to be an undescribed species of *Ophiosphaerella* (Dernoeden et al., 1999). An isolate obtained from a bentgrass nursery with similar disease symptoms was obtained from Dr. Randy Kane of the University of Illinois. The Illinois isolate also was confirmed to be the same undescribed species of *Ophiosphaerella*. The disease has since been found in Massachusetts, Missouri, New Jersey, North Carolina, and Texas. Hence, the disease has been found in ten states and has probably been misdiagnosed in many other areas of the country.

The first, or "type," species of this genus was *O. graminicola*. In 1909, Spegazzini described *O. graminicola* as a pathogen of sprangletop (*Leptochloa virgata*) in Argentina. Sprangletop is a warm-season, perennial grass found on open ground in southern areas of Florida and Texas and in tropical regions of South America (Hitchcock and Chase, 1950). There are about seven other known species of *Ophiosphaerella*, and three have been reported to be turfgrass pathogens. *Ophiosphaerella herpotricha*, *O. korrae* (syn. *Leptosphaeria korrae*), and *O. narmari* (syn. *Leptosphaeria narmari*) are casual agents of spring dead spot of bermudagrass (*Cynodon* spp.) (Crahay et al., 1988; Endo et al., 1985; Smith, 1965; Tisserat et al., 1989; Walker and Smith, 1972; and Wetzal et al., 1999). *Ophiosphaerella herpotricha* also causes

spring dead spot of buffalograss (*Buchloe dactyloides*), whereas *O. korrae* is the casual agent of necrotic ring spot in creeping red fescue (*Festuca rubra* var. *rubra*) and in Kentucky (*Poa pratensis*) and annual (*Poa annua*) bluegrasses (Dernoeden et al., 1995; Landschoot, 1996; Tisserat et al., 1999; and Worf et al., 1986).

Except for *O. graminicola*, all of the aforementioned *Ophiosphaerella* species are turfgrass root pathogens. A unifying characteristic of these turfgrass pathogens is that they produce darkly pigmented hyphae on roots. None of these pathogens, however, has been associated with creeping bentgrass (Clarke and Gould, 1993; Wetzal et al., 1996). A study of colony characteristics, spores, and fruiting bodies was made from a collection of isolates from eight of the affected turf sites. When compared to descriptions published by Walker (1980), this morphological information indicated that the new pathogen may be an unknown species of *Ophiosphaerella*. Through DNA testing, the fungus was shown to be an undescribed species of *Ophiosphaerella*. The pathogen was named *O. agrostis* and the disease will be known as bentgrass dead spot.

This new disease of creeping bentgrass first appeared between August and September of 1998 on putting greens in Maryland, Virginia, Pennsylvania, and Ohio. According to Dr. Randy Kane, however, the disease was first noted at the Skokie Country Club in Glencoe, Illinois in the fall of 1997. In 1999, the first known outbreak of bentgrass dead spot was observed in

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June at Trenton Country Club in New Jersey. The disease is less common on tees and collars and thus far has not been found on fairways. Disease symptoms appear initially as small, reddish-brown spots in turf that are 0.5 to 1.0 inch (1.0 to 2.0 cm) in diameter. Spots enlarge to only about 3.0 inches (8.0 cm) in diameter, and have tan tissues in the center and reddish-brown leaves on the outer periphery of larger, active patches. At times, the symptoms have been similar to those associated with copper spot (caused by *Gloeocercospora sorghi*), dollar spot (*Sclerotinia homoeocarpa*), Microdochium patch (*Microdochium nivale*), black cutworm (*Agrotis ipsilon*) damage, and ball mark injury. Although foliar mycelium has not been observed on turf in the field, foliar mycelium will develop in a laboratory humidity chamber. The foliar mycelium is pale-pinkish-white and may take from 3 to 5 days to develop on diseased plants maintained under high humidity.

Bentgrass dead spot appears during warm to hot and dry weather from June to October. The disease may remain active, however, until hard frosts occur in November. Unlike dollar spot, the spots or patches caused by *O. agrostis* rarely coalesce. Sometimes depressed spots or "crater pits" develop. Darkly pigmented hyphae, typical of the other *Ophiosphaerella* species that attack turf, are not found on roots. The pathogen has been isolated, however, from leaves, stems, and roots of diseased plants. It is unknown where infection first occurs, but observations suggest that the pathogen may attack leaves first. The fungus then appears to move from leaves into stem bases and eventually stolons. Numerous black, flask-shaped fruiting bodies called pseudothecia may be found embedded in necrotic leaf and sheath tissues. The fruiting bodies contain large numbers of needle-shaped spores (i.e., ascospores). When mature, ascospores exude through a pore in the top of the neck of the pseudothecium. These spores can be found in large numbers on diseased and nearby healthy leaves. The fruiting bodies often are produced in abundance, and can be found embedded in dead tissues throughout the winter months.

According to anecdotal information provided by several golf course superintendents dealing with the disease, the symptoms were arrested by Daconil, Chipco 26GT, Clearys 3336, and Fore, but little or no suppression was provided by Banner, Rubigan, or Heritage. Control lasted for about 7 to 10 days, after which active symptoms would recur. Water soluble nitrogen fertilizers were applied to stimulate growth of surrounding, healthy creeping bentgrass plants. Stolon growth into the dead spots or patches appeared restrained or inhibited. Some recovery occurred as a result of tillering of adjacent healthy plants, but most dead spots did not fully recover prior to winter. During winter, inactive spots or patches were whitish-tan. Diseased spots often were void of living tissue, and the underlying bare, sandy soil was evident in the center of dead areas during the winter and following spring.

Virtually nothing is known regarding the disease or biology of the pathogen. The disease does not appear to be specific to any single cultivar. On the affected golf courses surveyed, numerous cultivars and blends were used including G-2, L-93, Crenshaw, Pennlinks, Penncross, Providence, Southshore, and SR 1119. All greens mixes involved were of high sand content, and the mixes were obtained from different regions and/or distributors. Most clubs affected by the disease are 1 to 3 years old, but greens as old as 6 years have developed the disease. To date, most injury is associated with greens in open or exposed locations, rather than shaded sites.

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