Disease updates

Editor's note: Each year, reports of previously unknown diseases and sightings of known diseases in areas where they had not been seen before are published in the scientific literature. From time to time, GCM *will publish this information in its research section. In this issue, we are publishing reports that originally appeared in the journal* Plant Disease.

Report

First report of spring dead spot of zoysiagrass caused by *Ophiosphaerella korrae* in the U.S.

L.P. Tredway, Ph.D., and
E.L. Butler, Ph.D.

Since 2002, symptoms of an unknown disease have been observed in El Toro zoysiagrass (*Zoysia japonica* Steud.) in several locations across North Carolina. Symptoms become evident in the spring as the zoysiagrass comes out of winter dormancy. Circular or irregularly shaped patches, 3.9-11.8 inches (10-30 centimeters) in diameter, remain dormant as the surrounding turf resumes growth. These patches eventually collapse and die, leaving sunken depressions in the turf stand. After the initial appearance of symptoms, the zoysiagrass slowly recolonizes the patches by spreading inward from the perimeter. Microscopic observation revealed necrotic stolon and root tissue that was colonized by ectotrophic fungal hyphae, whereas leaf and sheath tissue was colonized by species of *Curvularia*, *Colletotrichum*, *Alternaria*, *Ascochyta*, *Drechslera* or *Fusarium*.

A total of 50 isolates were obtained from four locations in 2002 and 2003. A fungus resembling *Ophiosphaerella* species was consistently isolated and was confirmed to be *Ophiosphaerella korrae* by DNA testing. Pathogenicity tests were conducted in the field on El Toro zoysiagrass at the Lake Wheeler Turfgrass Field Laboratory in Raleigh, N.C.

Roots of El Toro zoysiagrass affected by spring dead spot.
Photos by L. Tredway

El Toro zoysiagrass in North Carolina shows symptoms of spring dead spot.

No symptoms were observed in the experimental area during 2005. In April 2006, five isolates incited spring dead spot symptoms in at least four of eight inoculated plots. The average diameter of patches induced by these isolates ranged from 3.1 to 4.5 inches (7.9-11.4 centimeters). In April 2007, three isolates incited symptoms in at least four plots, with average patch diameters ranging from 5.7 to 6.3 inches (14.5-16.0 centimeters). These inoculation success rates and patch diameters were similar to those resulting from *O. korrae* inoculation of bermudagrass conducted on the same date (L.P. Tredway, unpublished data). *Ophiosphaerella korrae* was consistently reisolated from symptomatic stolons and roots in May 2007.

To the best of our knowledge, this is the first report of spring dead spot of zoysiagrass caused by *O. korrae* in the United States. Previously, *O. herpotricha* was shown to induce spring dead spot symptoms on zoysiagrass in Kansas, and *O. korrae* was reported as a zoysiagrass pathogen in Japan. To date, we have only observed spring dead spot on the *Zoysia japonica* cultivar El Toro.

Source: Adapted from *Plant Disease*, December 2007, 91(12):1684 (DOI: 10.1094/PDIS-91-12-1684A).

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>>> *Report*

First report of *Waitea circinata* var. *circinata* causing brown ring patch on *Poa trivialis* in California

C.M. Chen; G.W. Douhan, Ph.D.; and F.P. Wong, Ph.D.

Rough bluegrass (*Poa trivialis* L.) is a cool-season turfgrass often used to overseed warm-season turf for fall through early-summer use on putting greens. In March 2007, at maximum daytime air temperatures of approximately 86 F-95 F (30 C-35 C), irregular, thin, yellow rings approximately 3.9-7.9 inches (10-20 centimeters) in diameter

In March 2007, symptoms of brown ring patch were reported on *Poa trivialis* greens on two golf courses in the Coachella Valley of Southern California. **Photo by B. Distel**

were reported on *P. trivialis* in putting greens from two golf courses in the Coachella Valley of Southern California. Affected plants had a blight of the leaves and stems and a rot of the crown, with initial symptoms being a yellowing of the tissue followed by the development of a dark, water-soaked appearance of the whole plant. Plants turned reddish brown as the water-soaked tissue desiccated.

A *Rhizoctonia*-like fungus was found colonizing the leaves, stems, and upper roots and thatch. Three isolates were obtained from the diseased turf samples. All were identified as *Waitea circinata* var. *circinata* based on colony morphology and DNA testing.

Waitea circinata var. *circinata* has been previously reported as the causal agent of brown ring patch on creeping bentgrass (*Agrostis palustris*) in Japan and as a pathogen of annual bluegrass (*P. annua*) in the United States. To our knowledge, this is the first report of *W. circinata* var. *circinata* infecting *P. trivialis* in California.

Source: Adapted from *Plant Disease*, December 2007, 91(12):1687 (DOI:10.1094/PDIS-91-12-1687A).

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Report

First report of summer patch of Kentucky bluegrass caused by *Magnaporthe poae* in Colorado

C.E. Swift, Ph.D.; A. Blessinger; N. Brandt; and N. Tisserat, Ph.D.

The ectotrophic, root-infecting fungus *Magnaporthe poae* is the cause of summer patch of Kentucky bluegrass (*Poa pratensis*). The disease is widely distributed in the mid-Atlantic region of the United States and west to central Nebraska and Kansas. It also has been found in certain locations in Washington and California but had not

In Grand Junction, Colo., tan patches and rings of dead turf indicated the presence of summer patch in Kentucky bluegrass. **Photos by A. Blessinger** been confirmed in the Rocky Mountain region.

In August 2005 and 2006, tan patches and rings of dead turf ranging from 3.9 to 11.8 inches (10-30 centimeters) in diameter were observed in Kentucky bluegrass swards in Grand Junction and Greeley, Colo., respectively. The sites, separated by approximately 224 miles (360 kilometers), are located west and east of the Continental Divide. A network of ectotrophic hyphae was observed on diseased root segments collected from both sites. A fungus morphologically similar to *M. poae* was consistently isolated from these segments. DNA extracted from mycelium of one isolate from each location indicated that the fungus was *M. poae*.

To our knowledge, this is the first report of summer patch in Colorado and indicates that *M. poae* may be widely distributed in the central Rocky Mountain region.

Source: Adapted from *Plant Disease*, November 2007, 91(11):1519 (DOI: 10.1094/PDIS-91-11-1519A).

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>>> *Report*

First report of the root-gall nematode infecting *Poa annua* greens in Washington state

N.A. Mitkowski, Ph.D.

In fall 2006, a golf course in Snoqualmie, Wash., renovated five putting greens with commercially produced *Poa annua* L. sod from British Columbia, Canada. Before the renovation, the greens had been planted with Providence creeping bentgrass (*Agrostis stolonifera* L.), which was removed during the renovation.

In February 2007, chlorotic patches were observed on the newly established *P. annua* greens. When the roots were examined, extensive galling was observed throughout plant roots. Galls were slender and twisted in appearance and less than 0.04 inch (1 millimeter) long. When washed galls were dissected, hundreds of eggs were exuded into the surrounding water droplet, and both mature male and female nematodes were observed. Further morphometric examination of males, females and juvenile nematodes demonstrated that they were *Subanguina radicicola* (Greef 1872) Paramanov 1967. Genetic testing confirmed that the nematodes were *S. radicicola*.

Each *P. annua* plant had an average of six galls (with a range of 1 to 8), primarily located within the top (2 centimeters) of the soil. All five new *P. annua* putting greens at the golf course were infested with the nematode. In addition, *P. annua* from two Providence creeping bentgrass greens that had not been renovated was infected, suggesting that the population occurred on site and was not imported from the Canadian sod.

Poa annua roots infected with the root-gall nematode exhibiting galling symptoms. **Photo by N. Mitkowski**

Subanguina radicicola has been identified as the cause of severe damage on *P. annua* greens in New Brunswick, Canada, and in wild *P. annua* in the northwestern U.S., but to our knowledge, this is the first report of the nematode affecting *P. annua* on a golf course in the U.S.

Source: Adapted from *Plant Disease*, July 2007, 91(7):905 (DOI:10.1094/PDIS-91-7-0905C).

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Report

First report of Pythium root dysfunction of creeping bentgrass caused by *Pythium volutum* in North Carolina

J.P. Kerns and L.P. Tredway, Ph.D.

In July and August of 2002 and 2003, a disease of unknown etiology was observed in Charlotte, N.C., on A-1 creeping bentgrass (*Agrostis stolonifera* L.) putting greens that were constructed in 2000. Symptoms appeared as irregular patches ranging from 5.9 to 11.8 inches (15-30 centimeters) in diameter. Grass in the affected areas was initially wilted and chlorotic, but later exhibited a yellow-to-orange foliar decline. Similar symptoms were observed in Durham, N.C., in July and August 2003 on creeping bentgrass greens established in 2001 with a 1:1 blend of A-1 and A-4.

Wilt symptoms are observed early in the disease cycle of Pythium root dysfunction.
Photos by L. Tredway

The disease was initially diagnosed as take-all patch, but attempts to isolate *Gaeumannomyces graminis* var. *avenae* and other ectotrophic root pathogens were unsuccessful. Symptoms of the disease reappeared during periods of warm, dry weather in the fall of 2003 and spring of 2004. At that time, examination of affected root tissue revealed bulbous root tips, loose cortical structure, absence of root hairs and abundant *Pythium* oospores and hyphae. These signs and symptoms are typical of Pythium root dysfunction.

Eleven *Pythium* isolates were obtained from Charlotte, and 10 were obtained from Durham. All isolates produced lobate sporangia, large oospores and three to nine diclinous antheridia typical of *Pythium volutum*.

Cone-Tainers containing sand meeting USGA specifications were seeded with A-1 creeping bentgrass and grown for six weeks in the greenhouse. Each Cone-Tainer was inoculated by cutting the root system at a depth of 2 inches (5 centimeters), placing five to seven infested grass blades onto the surface of fresh sand, and then replacing the turf. Cone-Tainers inoculated with one of three *P. volutum* isolates and an uninoculated control were placed in a growth chamber at 75 F/61 F day/night (24 C/16 C) for four weeks to allow pathogen infection and disease development. After four weeks, the chamber temperature was raised to 90 F/79 F (32 C/26 C) to induce symptom development. Two weeks after raising the temperature, all *P. volutum* isolates caused significant foliar chlorosis and dieback (70% to 100% disease)

In its later stages, Pythium root dysfunction causes foliar decline of the turf, which turns yellow to orange in color.

and reduced root depth and mass by 25% to 65% compared with the uninoculated control. Roots of inoculated plants were colonized with *Pythium* hyphae, contained numerous oospores and consistently yielded *P. volutum* in isolations.

To our knowledge, this is the first reported occurrence of Pythium root dysfunction in North Carolina and provides further support for the importance of *P. volutum* as a pathogen of creeping bentgrass. On the basis of our observations, the majority of pathogen activity and disease development occurs in the fall and spring, with foliar symptoms being induced by heat or other stresses.

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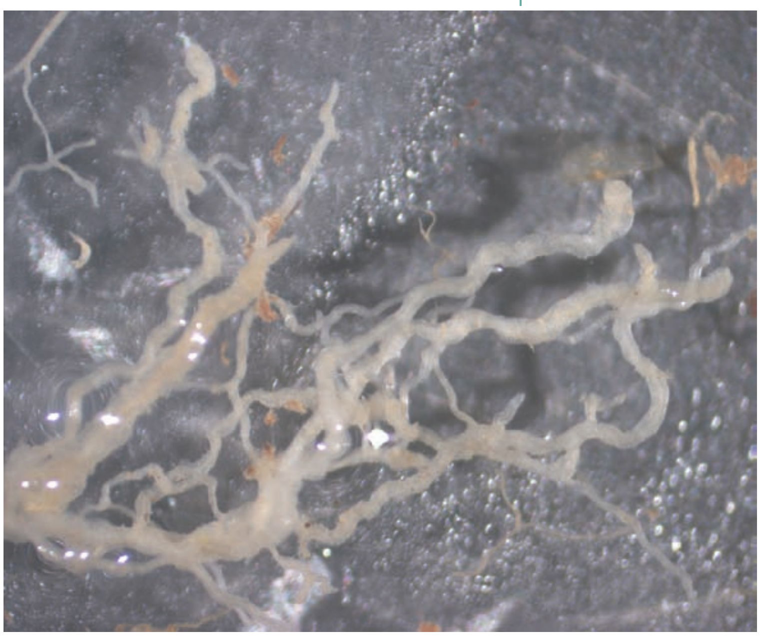

Infected roots of creeping bentgrass suffering from Pythium root dysfunction.

Source: Adapted from *Plant Disease,* May 2007, 91(5):632 (DOI: 10.1094/PDIS-91-5-0632C).

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