

PHYTOPATHOLOGICAL NOTES

**Pythium spp. Associated with Foliar Blighting of Creeping Bentgrass**

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ABSTRACT

*Pythium graminicola*, *Pythium torulosum*, and *Pythium vanterpoolii* were isolated from diseased 'Toronto' creeping bentgrass turf. *Pythium graminicola* and *P. vanterpoolii* appeared to be primary incitants of foliar blighting.

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*Additional key words:* foliar pathogens, bluegrass, fescue, ryegrass.

Creeping bentgrass (*Agrostis palustris* Huds. 'Toronto') turf was affected with a foliar blight on a golf course in Cincinnati, Ohio, in late summer, 1972. Infected areas first appeared water-soaked and blackened, later fading to a brown discoloration.

Frequently, the diseased areas coalesced to envelope larger sections of turf. Individual leaves were soft, water-soaked, and frequently covered with a cobwebby mycelium. The purpose of this study was to identify the incitant(s) and determine their capacities as foliar pathogens.

Numerous plant specimens were collected and isolations attempted from necrotic and adjacent, but apparently unaffected, tissues of crowns and leaves. Tissues were washed in running tapwater for 20 min before they were transferred to a modified V-8 juice medium (Schmitthenner, unpublished). Cultures were incubated at 21 C.

Platings of tissue from diseased plants yielded *Pythium* spp. which were identified as *P. graminicola* Subramaniam, *P. torulosum* Coker & Patterson, and *P. vanterpoolii* V. & H. Kouyeas. All three species produced inflated sporangia. Those of *P. vanterpoolii* were somewhat spherical, while the sporangia of *P. graminicola* were branched, forming irregular toruloid complexes. *Pythium torulosum* produced sporangia consisting of tuberous, branched swellings. Oospores of *P. vanterpoolii* were plerotic, thick-walled, and measured 17.2-19.5  $\mu$ m. Those of *P. graminicola* were also plerotic, smooth, and measured 24.1-28.7  $\mu$ m. *Pythium torulosum* had the smallest oospores of the three, measuring 11.5-17.2  $\mu$ m.

The pathogenicity of the *Pythium* spp. was tested on four bentgrasses (*Agrostis* spp.), six Kentucky

TABLE 1. Susceptibility of turfgrasses to attack by *Pythium* spp. at 27 C

Host type Botanical name Cultivar	<i>Pythium</i> spp. pathogens		
	<i>P. graminicola</i>	<i>P. torulosum</i>	<i>P. vanterpoolii</i>
<b>Bentgrasses:</b>			
<i>Agrostis tenuis</i> Sibth.			
'Astoria'	+++ <sup>a</sup>	+	++ <sup>b</sup>
'Highland'	+++	+ <sup>c</sup>	++
<i>Agrostis palustris</i> Huds.			
'Penncross'	+++	+	++
'Seaside'	+++	+	++
<b>Bluegrasses:</b>			
<i>Poa pratensis</i> L.			
'Delta'	+++	- <sup>d</sup>	-
'Flyking'	+++	-	-
'Kenblue'	+++	-	-
'Merion'	+++	-	-
'Newport'	+++	-	-
'Windsor'	+++	-	-
<b>Fescue:</b>			
<i>Festuca rubra</i> L.			
'Pennlawn'	+++	-	-
<b>Ryegrasses:</b>			
<i>Lolium perenne</i> L.			
'Linn'	+++	-	-
'Manhattan'	+++	-	-
'NK 200'	+++	-	-
'Pelo'	+++	-	-
'S 321'	+++	-	-

a +++ = very susceptible.

b ++ = moderately susceptible.

c + = susceptible.

d - = nonsusceptible.

bluegrasses (*Poa pratensis*), Pennlawn creeping red fescue (*Festuca rubra*), and five ryegrasses (*Lolium perenne*). Plants were grown in 12.7-cm diam plastic pots filled with silica sand. Before they were planted, the seeds were treated with Arasan 75 [75% thiram, bis(dimethylthiocarbamoyl)disulfide]. Pregermination irrigation was performed with deionized water, and a balanced Hoagland's solution (2) was used for postgermination watering.

Plants were inoculated when 8 wk old. The inocula were prepared by growing the organisms in 250-ml flasks on a medium containing 1.0 g sucrose, 0.2 g yeast extract, 10 mg cholesterol, 0.6 g CaCO<sub>3</sub> and 40 ml of V-8 juice per liter. V-8 juice (Campbell Soup Co., Camden, N.J.) was neutralized by steaming for 1 hr with CaCO<sub>3</sub> and filtered through Celite 545 (Johns-Manville Co., New York, N.Y.), before addition of other ingredients and autoclaving. Cultures were incubated at 21 C for 10 days, after which the mycelial masses were removed, washed in deionized water, and cut into small units in a Waring Blender. Inoculum from one 250-ml flask was poured over the foliage of one plant. The plants were then placed in a moisture-saturated atmosphere for 7 days at 27 C.

At the end of the incubation period, reisolations were made from diseased plants, and the reaction to *Pythium* spp. was recorded (Table 1). *Pythium graminicola* was capable of inciting severe foliar blighting on all grasses tested. The reaction of the bentgrasses to *P. vanterpoolii* was less severe, and *P. torulosum* was only weakly pathogenic. All plants not

susceptible to *P. torulosum* and *P. vanterpoolii* were reinoculated with the respective organisms and incubated at 12 C. Evaluations were again made after 7 days. The tests revealed that *P. vanterpoolii* and *P. torulosum* were capable of inciting a low order of foliar blighting under the lower temperature regime.

Because of the high degree of pathogenicity shown by the isolates of *P. graminicola* and *P. vanterpoolii*, it is concluded that they were the primary incitants of the disease under investigation. *Pythium graminicola* and *P. vanterpoolii* have not been previously reported as foliar pathogens of turfgrasses. So far, only *Pythium aphanidermatum* (Edson) Fritzpatrick and *Pythium ultimum* Trow have been recognized for their blighting capabilities on turf (1). Sprague (4) has listed redtop, meadow fescue, and Kentucky bluegrass as possible hosts of *P. graminicola*. Although *P. torulosum* was relatively avirulent, Luijk (3) recorded isolating *P. torulosum* from diseased bent and fescue grasses.

#### LITERATURE CITED

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