

PYTHIUM SPECIES

Associated with Golf Greens in the South

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Investments in golf courses and other installations involving turfgrasses total millions of dollars in the Southern United States. The prevention and control of turf diseases is essential in the long-term maintenance of lawns, golf greens, athletic fields, and other areas where utility and esthetic values depend upon the perfection of a grass cover. In recent years a great deal of effort has gone into the recognition of turf diseases and the identification of the associated organisms. Research has shown that effective control measures depend upon the nature of the causal organisms and their requirements for infection and spread.

Pythium diseases of turf have been recognized for many years as being prevalent on bentgrass, bluegrass, fescues and overseeded grasses such as ryegrass. The damage has been attributed primarily to *Pythium aphanidermatum*. As part of a larger study of the distribution of *Pythium* species in soils in the United States, 157 soil samples were collected from problem golf greens from Texas to Virginia and assayed for *Pythium* species. Data

from these assays included the number of infective units of *Pythium* per gram of soil and the identification of the species.

The turfgrasses were classified in four groupings (Table 1). Samples from Tifgreen bermudagrass turf were the most abundant and totaled 67. Forty-nine samples were from common bermudagrass with a few samples from Tifdwarf, Tiflawn and Tifway bermudagrasses. This group is labeled "Bermuda" in this article. The 28 samples from bentgrasses were largely from Penncross. Thirteen samples came from centipedegrass turf.

Over 20 species of *Pythium* were isolated from the golf green samples (Table 2). *Pythium irregulare* was the most common species. This fungus causes a root rot of diverse crops from peach trees to bermudagrass. The root rot disease results in slower growth, off color, and thinning out of grasses in a manner similar to damage caused by nematodes (Figure 1). This fungus probably is not associated with the *Pythium* cottony blight disease of turf (Figure 2).

Figure 1. Effect of Pythium irregulare and P. aphanidermatum on Tifdwarf bermudagrass. Grass in pots on each end is growing in soil infested with P. aphanidermatum. Grass in second pot from each end is growing in soil infested with P. irregulare. Grass in center pot is growing in sterile soil.





Figure 2. Cottony blight of ryegrass.

Pythium torulosum was the next most common species found, followed by *P. aphanidermatum*, *P. catenulatum* and *P. dissotocum*. These species usually cause the cottony blight type of disease.

Over 15 other species were found on a more limited basis. The nature of disease caused by these is unknown. Additional research is under way at the University of Georgia to define their effect on turf.

The occurrence of the nine most commonly isolated species of *Pythium* on bermuda, bent, and centipede turf is presented in Table 1. *Pythium irregulare* was most common on bermudagrasses other than Tifgreen, while *P. torulosum* was most common on Tifgreen.

TABLE 1. Occurrence of the nine most commonly isolated *Pythium* spp. from four groups of turf grass.

Pythium spp.	Bermuda	Tifgreen	Bent	Centipede
<i>afertile</i>	7	24	5	0
<i>aphanidermatum</i>	0	20	31	0
<i>catenulatum</i>	10	24	21	0
<i>dissotocum</i>	16	8	0	0
<i>irreg.-debar.</i>	76	39	31	40
<i>rostratum</i>	10	0	16	30
<i>torulosum</i>	10	51	62	0
<i>ultimum</i>	16	8	21	0
<i>vexans</i>	3	20	5	0
Total samples	30	28	19	10

*Samples from Tifway, Tiflawn, Tifdwarf, and common bermuda.

Bentgrass supported a high and diverse number of species of *Pythium*. These organisms have been observed causing root rot and dying of bentgrass in all seasons of the year. Some species are most active in warm seasons, while others kill and stunt bentgrass during the winter. It seems impossible to prevent *Pythium* disease of bentgrass on some greens.

The species of *Pythium* on centipede grass are among the group that causes root rot and slow decline, rather than cottony blight. Our sampling of centipede grass is very limited and would not warrant any conclusions.

Control of *Pythium* damage should begin with the architect. All new greens should have a fungicide such as Captan incorporated at the time the soil mix is prepared for the green. This should be followed by methyl bromide fumigation. Sprigged grasses should be purchased from nurserymen producing them in methyl bromide treated soil. Excellent water drainage is essential for preventing *Pythium* damage. Waterlogged soil favors these organisms, and the diseases they cause. A regular preventive maintenance program with fungicides such as Captan should be practiced. If the diseases occur despite this, individual trouble areas should be treated with fungicides such as Thiophanate, Koban or Dexon. To establish stands of overseeded grasses, use of seed treated with a fungicide is very helpful.

Golf course superintendents can have soil from their greens assayed to determine the amount of *Pythium* present. Those greens with high populations can be earmarked as potential trouble areas, to receive extra preventative sprays and to be watched more closely in rainy periods.

TABLE 2. Relative abundance of *Pythium* spp. in soil samples from turf problem areas from golf greens in South and Southeast.

Pythium species	Number of samples from which isolated ^a	Number of samples in which indicated species comprised the following percent of total Pythium population			
		10%	20-40%	50-70%	80-100%
<i>afertile</i>	9	6	3	0	0
<i>aphanidermatum</i> ^b	11	1	6	2	2
<i>artotrogus</i>	1	1	0	0	0
<i>catenulatum</i>	13	3	6	2	2
<i>dissotocum</i>	7	6	0	1	0
<i>intermedium</i>	3	1	0	0	2
<i>irreg.-debary.</i>	43	17	11	14	8
<i>middletoni</i>	1	0	1	0	0
<i>myriotylum</i>	2	1	1	0	0
<i>paroecandrum</i>	1	0	1	0	0
<i>pulchrum</i>	1	1	0	0	0
<i>prolatum</i>	1	0	0	1	0
<i>rostratum</i>	9	5	3	1	0
<i>salpingophorum</i>	1	1	0	0	0
<i>splendens</i>	1	1	0	0	0
<i>spinosum</i>	2	1	1	0	0
<i>sylvaticum</i>	4	2	1	1	0
<i>torulosum</i>	28	8	16	3	1
<i>ultimum</i>	11	7	4	0	0
<i>vexans</i>	6	5	1	0	0
<i>P. spp.</i>	31	14	15	0	2

^aTotal number of samples: 95.

^bBased on 10 colonies picked per soil sample. This table can be interpreted in the manner done below for *P. aphanidermatum*. *P. aphanidermatum* comprised 10% of the Pythium population in 1 sample, 20-40% in 6 samples, 50-70% in 2 samples and over 80% in 2 samples.

SUPER SAM by Paprocki

