PYTHIUM AND SAND TOPDRESSING

Increasing Evidence for Pythium Induced Root Dysfunction of Creeping Bentgrass Grown in High Sand Content Mixes

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The presentation made by me at the 1981 M.G.C.S.A. annual conference implicated Pythium in a root dysfunction of creeping bentgrass grown on reconstructed high sand content greens. The disease in question killed grass very rapidly and in a manner typical of Pythium "cottony blight." Examination of diseased plants, however, failed to yield Pythium or any other pathogen from above ground portions of the plant. Pythium was found throughout the root system of diseased plants. It is believed that when a green on an old golf course is rennovated to sand, Pythium may infest the sand from the collar and apron soil of the old green. The sand probably offers little microbiological competition for the Pythium and increased levels of irrigation and fertilization of sand greens may further promote the Pythium. There also is some evidence that more root mechanical damage may occur in sand than in soil; this could contribute to Pythium infection. This problem has not been observed in the roots of plants grown in traditional soil mixes.

To date, we have isolated four species of Pythium from the roots of creeping bentgrass associated with rapid death of infected plants. We are currently in the process of identifying the isolates to the species level and testing them for pathogenicity. It has been possible to infect roots in greenhouse studies and in some cases reduce the rate of growth of infected plants. We have not been able to kill inoculated plants. Our present observations suggest that the Pythium's in question may infect the roots and co-exist with the plant with minimal damage under mild growing conditions. It may necessitate some form of environmental or cultural stress before death occurs. There are two outstanding problems for the superintendent relative to this disease. These are diagnosis and control. The rapid death of infected plants appears to be due to a foliar pathogen. However, examination of dying leaves usually fails to yield any pathogens and often times even saprophytic organisms are not present. When the root systems are examined they usually appear normal in size and color. Because of this it is assumed that root pathogens are not present. These normal appearing roots can, however, be severely infected by Pythium. The Pythium's associated with this problem do not cause a rot and the degree of discoloration may not be detectible with the maked eye. We have found that when we properly incubate what appears to be a healthy root from these diseased plants, Pythium will grow from the root within six hours. We are suspicious that these Pythium's damage plants by interfering with water relations, not by rotting.

Control of this problem in the field remains elusive. Intense aerification followed by application of Pythium specific fungicides into the aerifier holes may slow the disease. There is some indication that wetting agents used in conjunction with the fungicides may be beneficial. It also appears that following renovation of a green the first time the disease strikes it is

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most severe; each subsequent year it becomes less severe.

Our primary research objectives for the next 2-3 years will be as follows: 1) Continue to collect and identify Pythium species associated with roots. 2) Determine pathogenicity of the Pythium species and the conditions necessary for injury or death to occur. 3) Determine the nature of the pathogenicity; i.e., in that the roots are not rotted, how are the plants ultimately killed. 4) Examine approaches to control.

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The award was presented at a special meeting in conjunction with the National Golf Course Superintendents' meeting recently held in Atlanta. The Gould department was noted for an exceptional ability at handling problems, even those of rare occurrence, and for contributing to product improvement by early recognition of a possible difficulty. The department distinguished itself equally in the matter of customer relationships.

Kirby Burmeister who has been with the Gould service division since 1973 has had a long standing reputation as one of our areas most knowledgeable and efficient equipment "doctors". It is pleasing to see that he and his colleagues in the service end of things at Gould's are receiving even national recognition.