

## THE NEW THREAT: BACTERIAL WILT OF TORONTO CREEPING BENTGRASS

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The outbreak of disease two weeks prior to the 1980 PGA Western Open at the Butler National Golf Course in Oak Brook, Illinois, prompted a full scale investigation of the unresolved "C-15 problem-decline" on Toronto creeping bentgrass (Agrostis palustris Huds. cv. Toronto). Using an electron microscope, bacteria were found in association with diseased Toronto creeping bentgrass. The limitation of numerous bacteria to the xylem (water transporting) vessels of the plant in the early stages of disease provided a reasonable explanation for the wilt symptoms. As the disease progressed, plants wilted from the leaf to the crown and eventually became brown and decomposed. With the aid of electron microscopy, bacteria were associated with diseased Toronto from more than 25 locations in Indiana, Illinois, Michigan, Ohio and Wisconsin.

Oxytetracycline (Mycoshield - Pfizer Corp., New York) suppressed disease symptoms in Michigan and Illinois turfgrass plots affected with the disease. Oxytetracycline, an antibiotic used in human medicine was applied as 2.5 lbs formulated ingredient in 50 gallons water per 1000 ft<sup>2</sup> and was effective for at least 3-4 weeks.

Using scientific procedures developed at Michigan State, but not commonly employed in turfgrass pathology, a particular bacterium was finally isolated into pure culture in the laboratory. Under specific environmental conditions infection of 'Toronto' plants in the laboratory produced identical wilt symptoms to those observed in the field. This laboratory evidence proved that the bacterium was the cause of the previously unresolved C-15 problem decline. Based on wilt symptoms and the infective bacterium the disease has now been named "bacterial wilt of Toronto creeping bentgrass". This is the first reported turfgrass disease caused by a bacterium in North America.

Identification by morphological, biochemical (nutritional) and serological (immunology) tests suggest that the 'Toronto' bacterium is a member of the genus Xanthomonas. Serology, a very specific test for identifying bacteria, has shown the 'Toronto' bacterium to be unlike any other found in North America. However, the 'Toronto' bacterium was very similar to bacteria which cause bacterial wilts of grasses throughout Europe. This research strongly implies that the 'Toronto' bacterium was introduced from Europe where bacterial wilts are extremely devastating to many genera of grasses. The introduction of this bacterium is quite possible since it could be transported on seed which is frequently exchanged between North America and Europe.

Even though the 'Toronto' bacterium does not apparently infect other grasses in North America, the potential for it or other introduced bacteria to attack other grasses is very high. Prior to bacterial wilt of Toronto creeping bentgrass no known bacterial diseases of grasses were known in North America. Hence, little research has been devoted to the study of the unpredictable and devastating disease. Bacterial wilt of grasses in Europe are regarded so potentially dangerous that many universities now study the disease, and resistance is incorporated into most breeding programs. It is strongly recommended that research of bacterial wilt also be initiated in the United States before the bacterium attacks other common grasses such as the bluegrasses, bentgrasses, ryegrasses, fescues, and bermudagrasses.