

FIELD STUDIES OF BACTERIAL WILT OF TURFGRASSES

Dr. David L. Roberts
The Diagnostic Clinic - MSU

Bacterial wilt, caused by *Xanthomonas campestris* pv. *graminis*, is a devastating disease of turfgrasses. Bacterial wilt was discovered by electron microscopy studies (Figure 1) at Michigan State University as the solution to the "mystery" disease that destroyed the 'Toronto' putting greens at the Butler National Golf Course during the 1980 Western Open. During the 1970's, the disease was known as the C-15 Problem/C-15 Decline. The discovery of the bacterial pathogen represented a significant breakthrough in the unresolved C-15 problem. The discovery of bacterial wilt also signified the first known bacterial disease of turfgrasses in North America.

ORIGINS. Prior to the discovery of bacterial wilt on 'Toronto' creeping bentgrass, no bacterial-incited diseases of grasses were reported in North America. In Europe, however, bacterial wilt has become a serious disease on forage grasses since it was first reported in Switzerland in 1975. Since 1975, bacterial wilt has also been found in the British Isles, France, Belgium, Norway, the Netherlands, and New Zealand.

Research at Michigan State has now conclusively proven that the bacterium causing bacterial wilt of 'Toronto' creeping bentgrass is closely related to strains of bacteria found in Europe. We can therefore presume that the origin of bacterial wilt is undoubtedly the European region. The bacterial pathogen could easily have been transported between continents on grass seed or other plant material.

DIAGNOSIS. Diagnosis of bacterial wilt can be extremely difficult. Symptoms of the disease typically begin as a very rapid wilt of individual turfs. As the plants wilt, they usually appear blue-green, twisted, and shrivelled. Because the wilting of the turf plants is so rapid, the "blue-green stage" of the disease may not be observed by most turf managers and diagnosticians as wilting plants become brown and often begin decomposing within 48 hours.

Large areas of turfgrass may be destroyed within a couple of days. Whereas bacterial wilt may occur in small or large circular areas, the disease does not exhibit the well defined "patch" type pattern exhibited by such common diseases as brown patch, necrotic ring spot, and summer patch.

Further diagnosis can only be accurately achieved by qualified diagnosticians using electron microscopy and/or isolation procedures.

AFFECT OTHER GRASSES? Until 1983, bacterial wilt appeared to infect only 'Toronto' creeping bentgrass in North America. During the summer seasons of 1983 and 1984, bacterial wilt was found on 'Nimisilia' and 'Seaside' creeping bentgrasses and annual bluegrass. Although these turfgrasses may be of less importance than other varieties on golf course or lawn environments, it nevertheless illustrates the potential that other turfgrasses may not go unscathed.

WHAT CAN BE DONE? The current feelings and attitudes among turf managers and scientists is that bacterial wilt should be ignored. It is believed that since "only" 'Toronto' creeping bentgrass was affected, the replacement of 'Toronto' with other turfgrasses will completely solve the problem. Unfortunately, this will not be the case. Many other cultivars of turfgrasses may eventually succumb to the disease.

CURRENT RESEARCH: Plots of various turfgrasses have been established at the Hancock Turfgrass Research Center to study bacterial wilt. Temperature and moisture influences have not been adequately studied to determine what cultural conditions may inhibit epidemics of this disease. Furthermore, since oxytetracycline (Mycoshield - Pfizer Corp.) has proven to inhibit the disease, we are looking at timing, low vs. high rates and various methods of application to enhance this chemical control potential.