Updating Diseases — Problems in '85

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Each year carries with it some significant observations and experiences. This report will make no attempt to be all inclusive of what happened with turf diseases in 1985, but will focus on four diseases that have traditionally been of comparatively little importance, but whose pattern of activity have increased, or continued to increase recently, to the point that they deserve broader consideration. These four are Ascochyta foliage blight, Yellow Tuft, Red Thread, and Bacterial wilt.

We will also discuss one turf management problem that focuses upon a matter of increasing concern, that is, the matter of continued emergence of strains of pathogenic fungi that have become resistant to previously effective fungicides.

Ascochyta leaf blight. One of two general distribution patterns are encountered. The first is a general blighting of large areas, perhaps most of the lawn. Leaf tips turn white or yellow, assuming a rather bleached appearance. Often there are healthy blades of grass interspersed with diseased ones. This condition resembles general bleaching that can follow drying conditions right after mowing, frost damage, or other physical problems. Or, the spots may be much smaller, roughly circular in pattern, and ranging from a few inches to a few feet in diameter. These spots can resemble superficial fertilizer damage or some localized physical injury to the turf. Some leaves may show "hourglass"-shaped white or yellow lesions. The disease is confirmed by the presence of the tiny black pycnidial fruiting structures that are barely visible to the unaided eye in the dead tissue. These should be confirmed in the laboratory, at least initially, because many other organisms produce similar-appearing structures superficially.

There are several species of this fungus. It has been associated with cool wet seasons previously, although this relationship was not so evident in 1985. No turf was apparently permanently damaged by Ascochyta, but it was a major cause of questions for lawn care maintenance and other turf professionals in 1985.

Yellow tuft disease. Now properly called "downy mildew," and caused by the fungus **Sclerophthora macrospora**, this cool weather disease has increased in many areas of the country in recent years. Primarily a problem that causes blemishes and possible putting unevenness on golf greens, it has also been reported affecting bluegrass in low growing areas and St. Augustine grass in Texas. We have observed some increase in Wisconsin over the last several years, but it reached its greatest severity this past fall.

For many years the cause of this peculiar malady that is sometimes damaging—but more often is not—was undetermined. It is now known that a fungus which affects a very wide range of grass plants can invade the foliage and cause the damage during periods of wet weather. On tall grasses it can often be diagnosed by the dainty, downy growth of mold over the leaf surface. But this does not occur on closely mowed turf. Diagnosis depends upon examining individual plants occurring in these small yellow tufts for evidence of extensively tillered, yellow shoots with few roots. The diseased plants sometimes occur in drainage patterns on golf greens.

Diseased plants eventually disappear. Pythium-controlling fungicides may help control downy mildew, especially if applied before serious infestation, and with several applications. Single applications of Subdue, which is registered for this purpose, was ineffective when applied on Wisconsin golf greens this year.

Red thread is one of the oldest of turf diseases. Known since 1863, it has been of little consequence in most areas until recently. For some reason many states are reporting a substantial upsurge in its activity, prompting research on the disease. Formerly thought to be caused by the fungus **Corticium fuciforme**, it is now known to be caused by the fungus **Laetisaria fuciformis**, and a second, but closely resembling disease has been identified as **pink patch**, and caused by another fungus, **Limonomyces roseipellis**. To my knowledge, red thread is the only problem of the two in the midwest.

Control measures historically have emphasized increasing the fertility and watering the turf when concerns justified it, because the disease occurred primarily on red fescue lawns that were poorly maintained during dry summers. These treatments are still recommended, but the disease is occurring more frequently on perennial ryegrass, which is considered quite susceptible, as well as on more bluegrass lawns. The present disease shows no temperature restraints. It occurs in the fall or spring, and has even been reported as a snow mold in New York! New Jersey research has emphasized dormant fall fertilizer applications. In their studies, urea formaldehyde was superior to several other nitrogen sources. Two pounds of nitrogen also greatly improved the control they obtained with fungicide treatments.

Fungicide responses have varied among regions. For instance, they reported good control with sterol inhibitors, and some with dicarboximides, and none with Daconil. Wisconsin results have been poor with all of these chemicals, especially Daconil, but we have had good success with Actidione (cycloheximide), which incidentally, is not registered. Results vary among state reports. Like many other diseases, control may have to be tailored to meet local conditions.

Bacterial wilt. Prior to 1981, no

turf disease of any consequence was known to be caused by a bacterium! That changed when Michigan researchers demonstrated the cause of 'C-15' or 'Toronto' decline in the greater Chicago area to be caused by a bacterium, now called **Xanthomonas campestris** pv **graminis**. The turf world remained relatively unconcerned, with the belief that the bacterium was confined to that vegetatively-propagated turf variety. That story is changing. Nimisilia and Seaside bentgrass from Ohio, and annual bluegrass from both Michigan and Ohio have been affected recently, as well as bermuda grass from Hawaii. Several crops are known to be susceptible with a different strain in Europe. Apparently, the bacterium contains several strains that are quite specific to given hosts. This may help reduce its propensity for rapid spread, but the fact that new problems with the bacterium are surfacing is disturbing. Control is difficult.

Fungicide Resistance. Most turf managers are aware of the fact that a number of turf pathogens formerly controllable by the use of certain fungicides are no longer sensitive to these products. Fungicide resistance, as it is frequently called, has rendered a number of previously valuable chemicals useless for most turf purposes. Unfortunately, this pattern is continuing, and with the introduction of the "site-specific" systemic fungicides, particularly, some action should be taken to safeguard their future use.

Some examples where fungicide resistance has been reported include the following:

Dollar spot—cadmium, Dyrene, benzimicazoles, iprodione (Chipco 26019)

Powdery mildew—benzimidazoles (Cleary's 3336, Fungo 50, Tersan 1991, etc.)

Fusarium (pink) patch—iprodione

Pythium—metalaxyl (Subdue)

Ergosterol biosynthesis inhibitors, commonly called "sterol inhibitors," and including Bayleton, Rubigan, and a number of highly potential candidate fungicides, have only been subjected to laboratory situations of fungicide resistance, until recently, when resistance to the apple scab fungus has been found in an orchard that was sprayed for three years with the product. That's a signal that turf people should listen to—it's probably only a matter of time that turf diseases will be responding similarly.

The report in Pennsylvania that Pythium is no longer controlled on a golf course that used the product for three years is also alarming. In experimental work, Pennsylvania researchers have shown recently that a population initially containing only 0.1% of Subdue-resistant fungal propagules could completely overwhelm the Subdue-sensitive population within just five generation cyclings! Rotations with mancozeb (such as Fore) nor propamocarb (Banol) did little to prevent loss of Subdue effectiveness. However, one-half rate mixtures of Subdue with either mancozeb or Banol effectively protected the effectiveness of Subdue. Whether rotating chemicals in a treatment program or blending compatible products is the most effective way of protecting fungicide efficacy will continue to be argued, but these data speak in favor of blends!

But will this work with sterol inhibitors? And if so, what combinations should be used? Here are some points to ponder as we enter into this important question:

1. Fungicide compatibility. In addition to traditional concerns of compatibility, the two products should have the same length of effectiveness to protect against "resistant fungus leakage."
2. Economics. Sterol inhibitors have provided long residuals in many instances. What combinations—and rates—can be found to effectively utilize this long residual?
3. Compatible modes of chemical action. Chemicals that behave similarly in the way they stop fungus development cannot be used together satisfactorily for this purpose.
4. Their use as growth regulators. These products have growth regulator effects in many instances, and are being variously considered and used for such purposes as Poa suppression (Rubigan and Cutlass). Will the choice on each golf course ultimately have to be made regarding their management purpose?
5. Other factors. There are many. What diseases should they be used for, eg, should they be "reserved," say, for dollar spot control at the expense of their use during other seasons, for snow mold or leaf spot control, for example?

No experienced turf manager expects disease problems to remain static, nor for control measures to become simple and guaranteed. The 1985 season certainly proved the principle. But then, if it weren't for challenges, there wouldn't be any call for turf professionals to manage our golf courses, would there?!