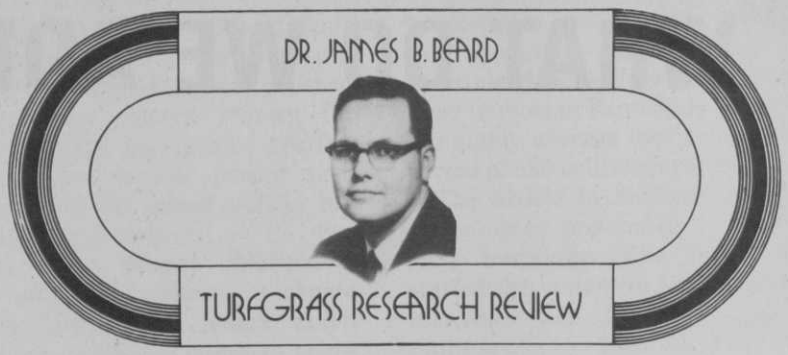

ACHIEVING PYTHIUM CONTROL

1972* Pythium *control results in South Florida. *R.E. McCoy. 1972. Florida Turf. 4(6):3. (from the Agricultural Research Center, University of Florida, Ft. Lauderdale, Fla. 33314).*

The objective of this investigation was to assess the comparative *Pythium* blight control achieved by four fungicides under southern Florida conditions. The experiment was conducted at the University of Florida Agricultural Research Center in Ft. Lauderdale. Weather conditions during the 1971 to 1972 winter season were warmer than normal, which accentuated *Pythium* blight development on the ryegrasses.

The plot size was five by 18 feet, with three replications arranged in a randomized block design. Italian ryegrass (*Lolium multiflorum*) was overseeded at a rate of 45 pounds per 1,000 square feet into a Tifgreen bermudagrass turf maintained at a 0.25 inch cutting height. The overseedings were accomplished on December 6, 1971, with seedling emergence occurring on December 10th. The first disease readings and spray applications were made on December 14th. The five fungicide treatments included in the experiment were: (a) Cleary 3336® at two and four ounces per 1,000 square feet, (b) dexon wettable powder at three ounces per 1,000 square feet, (c) koban at two and four ounces per 1,000 square feet, (d) chloroneb (Tersan-SP®) at four ounces per 1,000 square feet and (e) an untreated control plot. The application rates for Cleary 3336® and koban were increased from two to four ounces per 1,000 square feet at the time of the fourth application. Seven spray applications were made at five-day intervals throughout the experimental period using a backpack sprayer, which applied the equivalent of five gallons of water per 1,000 square feet. The dexon treated plots were irrigated with one-sixteenth inch of water immediately following application to wash the compound into the soil and prevent photochemical decomposition. Evaluations of the extent of disease development were taken at three-day intervals throughout the test period.

Extensive *Pythium* development occurred during the experimental period due to (a) the unseasonably warm temperatures averaging 70° F combined with (b) seven days in which measurable precipitation occurred during the 32-day experimental period. A summary of the results revealed that dexon at three ounces per 1,000 square feet, koban at four ounces per 1,000 square feet, and chloroneb at four ounces per 1,000 square feet gave good control of the *Pythium* blight. No significant differences in the degree of control occurred among these three fungicides. Koban did not give control during the initial four-week period when applied in a two ounce rate per 1,000 square feet. The fourth material evaluated, Cleary 3336®, gave no control of *Pythium* blight when applied at rates of two and four ounces per 1,000 square feet.

Comments: Pythium blight, sometimes called cottony blight, is a disease most commonly caused by either *Pythium ultimum* or *Pythium aphanidermatum*. This disease can be a serious problem on bermudagrass putting greens during the winter season when over-

continued on page 18

BEARD *from page 14*

seeded with cool season turfgrasses, particularly the ryegrasses. It is basically the same organism that caused such extensive damage to the bentgrass-annual bluegrass fairways in the warmer portions of the cool humid regions of the United States during the summer of 1972.

Disease development symptoms involve a water-soaked appearance on the leaf followed by the formation of light brown, somewhat circular spots that may coalesce into larger irregular patches of damaged turf. Conditions favoring development of this disease include hot, humid, wet weather and an excessive thatch accumulation.

The ubiquitous development of *Pythium* blight on winter overseeded bermudagrass greens in the southern United States usually necessitates the use of an appropriate fungicide for seedling disease control. It is important to maintain adequate moisture at the soil surface during seedling establishment in order to ensure proper seed-soil-moisture contact for rapid, uniform germination and establishment. This same practice also enhances disease causing organisms, particularly the *Pythium* fungi. Putting greens maintained at higher nitrogen levels and having an excessive thatch accumulation also provde a more favorable environment for *Pythium* disease development. Thus, under these conditions, it is usually necessary to make an appropriate fungicide application immediately after overseeding. Additional fungicide applications may be required, depending on the environmental conditions during the establishment period. This usually requires a regular day to day check for signs of impending disease development.

Chloride uptake by various turfgrass species and cultivars. *W.E. Cordukes and E.V. Parups. 1971. Canadian Journal of Plant Science. 51:485-490. (from the Plant Research Institute, Canada Department of Agriculture, Ottawa, Ont., Can.).*

The objective of this investigation was to evaluate the relative tolerance of 12 turfgrass cultivars to various chloride concentrations when grown under relatively constant plant nutrient levels. The turfgrasses included in the experiment were (a) Kentucky bluegrass, cultivars Fylking, Merion and Windsor; (b) red fescue, cultivar Pennlawn; (c) colonial bentgrass, cultivar Highland; (d) timothy, cultivar Climax; (e) Italian ryegrass; (f) perennial ryegrass, cultivar Norlea, and (g) tall fescue, cultivar Kentucky 31.

The 12 turfgrasses were seeded into six-inch diameter plastic pots containing a growing medium of 50 per cent by volume vermiculite and 50 per cent No. 6 silica sand. The pots were established into a greenhouse having a day-night temperature regime of 68° and 60° F, respectively. The grasses received a daily application of nutrient solution throughout the 35-day establishment period. The pots were flushed weekly with water to avoid salt accumulations. At the end of 35 days, six differential nutrient solutions containing constant cation levels and variable amounts of chloride, sulphate and carbonate

continued on page 21

BEARD *from page 18*

ions were established and maintained for a 140-day period. All solutions containing chlorides had comparable milliequivalents of anions. The treatments were replicated four times.

The turfs were cut weekly at a height of 1.6 inches. Clippings were collected at six intervals during the experimental period and were oven dried for total shoot growth determinations and chloride analysis. Visual estimates of the effects on turfgrass growth were also taken.

The visual ratings and shoot yields indicated that the turfgrasses included in this experiment tolerated relatively high chloride levels for considerable lengths of time. Chloride levels above 0.3 per cent were required to cause death. Chloride uptake by the plants increased with time and also with increasing chloride content in the nutrient solutions. Chloride uptake was less from alkaline than from acidic solutions.

Comparisons among the turfgrasses included in this experiment showed Norlea perennial ryegrass and Kentucky 31 tall fescue to be the most tolerant to chlorides. Kentucky bluegrass and Pennlawn red fescue ranked intermediate whereas Highland colonial bentgrass, Italian ryegrass and timothy were the least tolerant to chloride toxicity. The initial symptom noted on the turfgrasses was a bleached or chlorotic appearance on the leaves.

Comments: Salts containing chloride are commonly applied during the winter period to melt ice and snow from walks and roadways. This practice is of concern because of injury to turfs growing adjacent to these surfaces. The effects of chloride involve two aspects (a) direct physiological drought, or foliar burn, caused by the presence of the salt in direct contact with the leaf tissue and (b) toxic buildups of salt in the soil.

Foliar toxicity or desiccation results in immediate death of the affected tissue. It may or may not cause serious thinning of the turf. The washing of salts from the leaf surfaces will minimize the probability of foliar burn, if it can be done when the salt first comes in contact

continued on page 23

BEARD *from page 21*

with the leaf.

The second aspect involves phototoxic salt accumulations in the soil root zone. We are quite fortunate in this regard because the turfgrasses are fairly tolerant of soil salinity. However, injurious effects can result if the soil levels become high enough. The potential for this to occur is greatest in regions of low rainfall or where drainage has been restricted due to poor soil permeability to water. Fortunately, this soil salinity problem is only temporary in areas of relatively high rainfall and on soils having adequate internal water movement. The salt level is readily dissipated by the leaching action of spring and early summer rains.

The selection and use of a more salt tolerant turfgrass species should also be considered. Norlea perennial ryegrass and Kentucky 31 tall fescue proved to be quite salt tolerant. Earlier studies by Youngner in California also revealed that Kentucky 31 tall fescue was quite salt tolerant along with Seaside creeping bentgrass. Seaside also had superior recuperative potential from the effects of salinity.

A higher soluble salt level occurring in soils adjacent to walks and roadways may not result in direct damage to the turf. However, there may be some indirect effects that will become noticeable during the subsequent growing season. More specifically, the high salt concentration in the soil solution will impair the absorption of water and essential nutrients by the turfgrass root system. Thus, proneness to wilt and desiccation will be increased.

Visual symptoms of salinity include wilting and a grayish-green appearance that gradually develops into an irregular stunting of growth. Tip burn may also appear. A distinct thinning of the shoots may develop under higher salt levels. Should salt effects associated with the application of de-icing materials during the winter be suspected of causing these symptoms, an intensive program of leaching should be initiated to move the salts from the turfgrass root zone. Soil cultivation in the form of coring or slicing will also help achieve this end. □