Suppression of the C-15 Problem with Oxytetracycline

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In June 1980, bacteria were found in association with diseased Toronto (C-15) creeping bentgrass at the Butler National Golf Course in Oak Brook, Illinois. The bacteria were believed to be the cause of the poorly understood C-15 Problem which has destroyed Toronto putting greens for the past 10 to 15 years. Antibiotic treatments of tetracycline and streptomycin were initiated; 1) to determine if the disease could be suppressed by chemical means; and 2) to determine if a potential management procedure could be devised.

In the fall of 1980, 600 parts per million (ppm) was applied to plots at a location in Detroit in a 5 gal spray per 1000 ft^2. This rate of streptomycin and oxytetracycline was not effective in inhibiting the C-15 Problem. In the following spring (1981) heavy drench treatments of oxytetracycline, streptomycin and cupric hydroxide applied as solutions in 50 gal of water per 1000 ft^2 were made at a Detoit location (Edgewood) and two Chicago locations (Village Links and St. Charles Country Club). A 1000 ppm solution of oxytetracycline applied in 50 gal water per 1000 ft^2 provided absolute control of the C-15 Problem. A 1000 ppm-50 gal drench treatment is approximately equal to 2.5 lbs of formulated oxytetracycline (at 17% a.i.) per 1000 ft^2. Streptomycin and cupric hydroxide did not inhibit disease progression at any application rate.

In a side experiment, oxytetracycline and streptomycin were applied to adjacent halves of a golf green in a 1000 ppm-50 gal drench treatment per 1000 ft^2. Disease developed on the streptomycin-treated half six weeks later, when no disease was observed on the oxytetracycline treated portion. This may indicate some long lasting residual properties of the antibiotic.

With the involvement of Dr. Karen K. Baker of the Center for Electron Optics Laboratory, scanning electronmicroscopy was used to ascertain the presence of bacteria in antibiotic-treated C-15 plants. High populations of bactria were discovered in streptomycin-treated, cupric hydroxide-treated and control C-15 plants. No bacteria were observed in any plants treated with oxytetracycline.

Oxytetracycline has suppressed the C-15 Problem further implicating that a bacterium is the incitant of the disease. Further research is necessary before pesticide registration and feasible management schemes are possible.