Turfgrass research review

by Dr. James B. Beard

Reports on Soil Problems

The Effects of Urea on Soil pH and Calcium Levels.
R.L. Goss. 1967. Northwest Turfgrass Topics. 9(3):1-4. (from the Western Washington Experiment Station, Puyallup, Washington).

The effect of nitrogen, phosphorus and potassium fertilization on the soil pH and calcium level were investigated on a Highland bentgrass putting green turf at Puyallup, Washington. Included were three nitrogen levels (6, 12 and 20 pounds per 1,000 square feet per season), two levels of phosphorus (0 and 4 pounds of P205) and three levels of potassium (0, 4, and 8 pounds of K20) which were applied in all possible combinations.

After eight years, substantial changes in the soil pH and calcium levels were noted. A significant reduction in soil pH occurred when the higher nitrogen rates were applied in the form of urea. Also, plots where no phosphorus was applied had depressed soil calcium levels. The author suggests that the low pH (4.2 to 4.3) of these plots caused a reduction in phosphorus availability. The lack of phosphorus resulted in increased calcium uptake by the bentgrass plants with the calcium being removed in the clippings. The low calcium level was noted in terms of a loss of turfgrass color.

Control of Thatch in Tifgreen Bermudagrass.
W. R. Thompson, Jr. 1967. Proceedings of the Florida Turfgrass Management Conference. 15:53-55. (Department of Agronomy, Mississippi State University, State College, Mississippi, 39762).

The study involved the effectiveness of selected management practices in reducing thatch accumulation on a 3-year old Tifgreen bermudagrass sod. The experimental area was mowed daily at 3/16 inch. The treatments included: three frequencies of soil topdressing (none, monthly, and bimonthly, with 6 to 7 cubic feet of soil used per 1,000 square feet per application); three frequencies of aerification (none, 2 and 3 times per season); and four frequencies of vertical mowing (none, every 2, 4, and 6 weeks).

Results showed that topdressing on a monthly basis was the most effective treatment in reducing thatch accumulation of bermudagrass greens. Vertical mowing reduced the thatch accumulation but the reduction was substantially less than from topdressing. The turfgrass appearance and quality was highest if the vertical mowing was practiced on a regular basis of every two weeks. Less frequent vertical mowing removed excessive amounts of leaves which damaged the turf and slowed recovery. When the aerification operation included core removal, no effect on thatch accumulation was observed. However, when the aerification involved utilization of the cores as topdressing material, the rate of thatch accumulation was reduced and turfgrass quality and greenness was increased.

Comments: The recent advent of power topdressing equipment has greatly facilitated the topdressing operation. It is important to remember that the soil selected for topdressing should be similar to the underlying soil of the turf to be topdressed. The application of a soil of significantly different particle size results in layering. This is to be avoided because layering impairs water and air movement which, in turn, restricts rooting.

Some Effects of Supraoptimal Temperatures upon Creeping Bentgrass *(Agrostis Palustris Huds).*
D.T. Duff. 1967. Ph.D. Thesis. Michigan State University. pp. 1-61. (Department of Crop Science, Michigan State University, East Lansing, Michigan, 48823)

The effects of supraoptimal temperatures on Toronto creeping bentgrass were investigated. Sod pieces of the grass were grown at successive light-dark temperature regimes of 68-50, 77-59, 86-68, 95-77, and 104-86° F. utilizing a 16-8 hour cycle. Leaf clipping harvests were made once per week at a 0.5 inch cutting height for a four-week period under each temperature regime.

As the temperature was increased the (a) dry weight yield of clippings, (b) leaf length, (c) leaf width and (d) succulence were decreased. Clipping yield varied inversely with the water soluble carbohydrate content of the leaves. Leaf sheath, stem and stolon tissue contained as much carbohydrate of the leaf tissue. Thus, accumulation of carbohydrates in the leaves at high temperature levels could not be attributed to the disruption of translocation to lower portions of the plant. Also, the decrease in leaf dry matter production was not attributed to depletion of reserve carbohydrates within the leaf tissue. Bentgrass plants which had ceased leaf growth and had become chlorotic contained a carbohydrate level similar to plants which remained green and still produced

Continued on next page

Beard

Continued from preceding page

new leaves. Thus, the reduction of turfgrass density at the highest temperature treatment could not be attributed to carbohydrate depletion.

Measurements of the photosynthetic rate of bentgrass leaves showed that leaves produced at 104-86° F. have a greater photosythetic rate per unit area than leaves grown at 68r 50° F. when they were tested at 68, 86 and 104° F. Thus, adaptive mechanisms occur in the photosynthetic system of plants grown at high temperatures.

Comments: The above data questions the frequently stated hypothesis that high temperature growth stoppage of turfgrasses is due to carbohydrate depletion. Further studies are needed to clarify the specific causes of high temperature growth reduction of cool season turfgrasses. The above study is typical of a long term basic research project whose ultimate objective is to provide an efficient means of developing cool season turfgrasses which are more tolerant of high temperature stress.

Sod Webworm Control Trials.
H.T. Streu and L.M. Vasvary. 1966. Report on Turfgrass Research at Rutgers University. New Jersey Agricultural Experiment Station Bulletin 816. pp. 83-84. (Department of Entomology and Economic Zoology, Rutgers, the State University, New Brunswick, New Jersey).

Five insecticides were evaluated for sod webworm control on a Kentucky bluegrass-red fescue turf. The insecticides were formulated as emulsible concentrates and were applied as drenches with about three gallons of water per 100 square feet. Before and immediately after application of the insecticide treatments, about one half inch of water was applied. Evaluations of insecticide performance were made counting live sod webworm larvae per square foot.

The organophosphate materials diazinon, ethion, and Trithion gave satisfactory sod webworm control under New Jersey conditions while chlordane gave somewhat less control. The carbamate, Zectran, was not satisfactory. In terms of residual effectiveness and rate of application, diazinon was the most satisfactory insecticide of the five materials evaluated.

Effect of time of Thatch Removal on Survival and Earliness of Growth of Three Turf-type Bermudagrasses.
W.W. Huffine. 1968. Turfgrass Production and Management Research Progress Report, 1967. Oklahoma Agricultural Experiment Station Processed Series P-580. pp. 19. (Department of Agronomy, Oklahoma State University, Stillwater, Oklahoma, 74075).

The proper time of thatch removal for early spring green up was investigated using three bermudagrasses: Sunturf, Tifgreen, and U-3. The thatch removal dates were: (a) February 15, 1967, (b) March 2, 1967, (c) March 18, 1967, and (d) April 5, 1967. The effect on survival and earliness of growth was rated in terms of percentage greenness on April 5 and 20, 1967.

Among the thatch removal dates tested under Oklahoma conditions, the data indicates that the earlier the thatch is removed the quicker Sunturf and Tifgreen bermudagrasses will green up in the spring. There appeared to be some differential in response between varieties. U-3 bermudagrass showed slightly more growth when the thatch was removed around mid-March when compared to the earlier dates.

Other References of Interest:

1. Fungi as agents of turfgrass disease. N. Jackson and F.L. Howard. Journal of the Sports Turf Research Institute. 42:9-16. 1966. (Department of Plant Pathology and Entomology, University of Rhode Island, Kingston, R.I.).

2. Control of summer blight in common bermuda. A.M. Boyle and A.D. Davison. Arizona Turfgrass Research Report 240. pp. 13-14. 1966. (Department of Plant Pathology, University of Arizona, Tucson, Arizona, 85721). □