IOWA REPORTS ON RESEARCH WITH WETTING AGENTS

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It's a fact. High quality irrigation water is becoming harder to get for use on turf. Golf course superintendents as well as other turf managers are concerned with making best use of the water available. Where soils have become compacted and hard to wet or where thrtch layers slow down moisture penetration, wettin agents or surfactants have been used to increase rates of moisture infiltration. Many turf managers rely on these materials and include their regular use as a part of their maintenance programs. Others have found little value from use of wetting agents and have resorted to other methods (aerification, spiking and vertical thinning of turf) to help improve moisture penetration into the turf and soil.

Because of the importance of any and all information on watering and water use by turf, a research project was established at Iowa State University in 1962 to investigate the effect of surfactant use on growth of turfgrasses. Both field and greenhouse experiments have been conducted using Penncross and Seaside creping bentgrasses, Astoria Colonial bentgrass and Common Kentucky bluegrass. Bentgrass plots have been maintained as putting greens and bluegrass turf clipped at a 1½ inch height and maintained under lawn conditions. Soils have varied from very sandy to silty clay loams. Results of these studies are summarized briefly as follows:

Aqua-Gro, All-Wet, Pro-Green and Solar-25 wetting agents were applied at rates less than, equivalent to, and greater than manufacturer's recommendations. Treatments were made monthly throughout the growth season. No effect either beneficial or detrimental was noted on the production of high quality turf or on moisture relations under field plot conditions.

When the same 4 surfactants were added to a standard nutrient solution and the turf grown free from soil in a hydroponics system, increasing concentrations of surfactant caused production of yellow (Chlorotic) foliage and reduced growth of leaves. As surfactant level increased in the treatment, copper and zinc concentration increased in leaf tissue. These increases were found to be great enough to create toxic conditions within the turf. It was obvious that there was a striking difference between the lack of response obtained in soil and the iniury obtained in solution culture. Thus a third experiment was set up to determine what happens to the surfactant under soil conditions that prevents the type of injury noted in solution culture experiments.

Results of this study indicated that even where very high concentrations of wettin agen were applied to turf, over varying lengths of time, none could be leached out of the soil. Either these materials were decomposed very rapidly or they were attached to soil particles through polar attractions. Absorption in the soil system seems a most likely explanation for this immobility of the surfactant molecule. Thus, it appears that wetting agents, even though non-ionic, may through polar attractions be quickly tied up near the soil surface. In this way injury to turfgrass may be prevented. It is also likely

that the surface active or wetting properties of the soil water are in large measure erduced in this process.

It is important to note here that soils may be divided into 2 groups—those that wet easily and those that are difficult to wet. The surfactant is only of value on soils which are difficult to wet. It is not clear how frequently "difficult to wet" soils occur under turf conditions. In addition, the tie-up of the surfactant in these soils would indicate an accumulation in upper layers and the need for frequent light applications for any improvement in moisture penetration over a period of time.

In light of this information, it would seem desirable to carefully study and evaluate field results from use of surfactants. Injuury to turf appears unlikely except where soils are very sandy; under these conditions soils should not need a surfactant to improve wetting. Lack of response from the wetting agent may result from its rapid deactivition in the soil. Where response is satisfactory the surfactant is effectively getting to hard to wet soil particles. Evaluate your turf response and plan for next year accordingly.

THE NATIONAL GOLF FOUNDATION

ITS PURPOSE — ITS PROGRAMS

By Harry C. Eckhoff
Executive Director

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