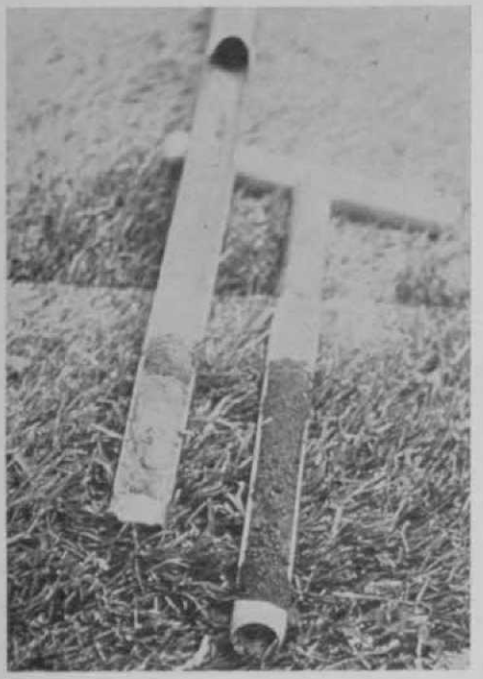

Soil cores removed from Aqua-Gro treated (right) and untreated areas on heavily matted aprons of Plainfield (N. J.) CC. Note dry spot in background and powder-dry soil (core at left). Moist core from treated area is 15-ins. long and was obtained from soil under same mat condition.

Tells How Wetting Agents Increase Water's Efficiency

Soils Treated with New Non-Ionic Substance Hold Moisture Longer as Result of Lab Findings

By ROBERT A. MOORE
Vp. Aquatrols Corp. of America

IF WE look back over the history of turfgrass management, we see constant development and improvement in fertilizers, new and special grasses, special soil mixtures, improved sprays, special equipment and the like. However, through all this development and in your daily work of producing better turf, we have been governed by the physical limitations of plain water.

Since plain water governs many of our maintenance procedures, Aquatrols Corp. has endeavored to change its physical properties so that water could be more efficiently used. Certainly plain water isn't sacred and after analysing results obtained in the laboratory and more important, in actual use, we knew we were approaching the problem from the right direction. The use of a wetting agent to make water wetter and more efficient definitely produced and maintained better turf.

New Agents Work

But first, let us start at the beginning with a brief definition of what wetting agents are and how they work. Wetting agents have two basic characteristics: First they are surface active; and, second, they are penetrating agents. In other words, soil wetting agents penetrate into the coil and attach themselves to the surfaces of soil particles. In this way they facilitate the wetting of these soil surfaces by subsequent waterings.

These materials are not to be confused with soil conditioners. The wetting agent is merely held in the soil and in no way changes soil texture. However, it does change the physical properties of water that come in contact with treated soil.

Lowers Surface Tension

In changing the physical properties of water, a wetting agent lowers the surface and inter-facial tensions, permitting a freer movement of the water. This yields a better soil-moisture distribution. Therefore, soil wetting agents have many beneficial applications where water is used in turf maintenance.

Actually, there are various kinds of wetting agents, and the general types are classified as ionic and non-ionic.

By way of definition, ionic materials form charged particles when in solution and are generally more chemically active.

Non-ionic materials do not form charged particles when in solution and are comparatively chemically inactive.

Comparing these physical differences between ionic and non-ionic wetting agents

* The above article is based on a paper by Moore which was read before the 1956 Pennsylvania Nurserymen's Assn.

to a field application on the basis of actual observations in turfgrass and landscape work, we find two evident facts:

(1) The ionic wetting agents are erratic in soil applications which is attributed to the higher chemical activity causing them to combine with certain soil matter so that they no longer act as wetting agents.

(2) The non-ionic wetting agents are consistently beneficial in soil use. Being chemically inert to soil matter, they do not combine to lose their identity as wetting agents.

As you can readily see, there are wide variations possible in the performance of wetting agents in soil use. It is interesting to note that these agents can actually vary in behavior from "water-wetters" to "water-repellents." Of course, we here are interested in "water-wetters."

From the work that has been done, the ionic wetting agents have been shown to be:

(1) Specific in use

(2) More toxic to plant material and micro-organisms than the non-ionic types, and

(3) Erratic in soil applications

Non-ionic wetting agents have been shown to be:

(1) Broader in application

(2) Less toxic to plant material and micro-organisms than the ionics.

(3) Promoters of micro-organism activity

(4) Consistently beneficial in soil use

(5) More effective

It was at the conclusion of many lab and university tests that we selected non-ionic "water-wetters" that gave the best performance. This selected blend of non-ionic wetting agents was then applied to various field problems under actual operating conditions by golf courses, nurseries, landscapers, greenhouses, cemeteries, parks, etc. These tests confirmed that there are many economically practical applications for a soil-wetting agent.

Having briefly described wetting agents and some of their behavior patterns, I am now going to discuss their application in solving many of the watering problems found in turf maintenance work.

Localized Dry Spots

Under localized dry spots there are several known causes such as thatch, pimples or contours and hard-spots. (Compacted areas will be discussed separately). These areas are hard to water — puddling in some areas, running-off in others — but in all cases, it is difficult for water to penetrate and wet the soil. Treating these areas with a wetting agent permits water to wet through thatch, to soak-in quickly on pimpled areas rather than running-off; and to penetrate hard-spots. In each case, water is distributed evenly and deeply in the soil where the wetting agent is used. This makes waterings more effective, encourages deeper root systems and leads to less frequent watering.

Robert A. Moore, who wrote this article, inspects fifth green at Whitemarsh Valley CC in Philadelphia, which showed great improvement after it was treated with Aqua-Gro.

Random illustrations from the field where controlled demonstrations were possible are as follows: Under thatch, Warren Lafkin in White Plains reports taking an area know to be badly thatched. The soil was dry enough to show signs of wilt. Half the thatched area was treated with the wetting agent and after a period of identical watering, the areas were inspected by taking soil cores. Water had uniformly penetrated 6 to 8 ins. in the treated areas as compared to less than 2 ins. in the untreated areas. There was a definite improvement in the grass in less than 24 hours.

Plainfield (N. J.) CC observed similar results in the case of heavily matted aprons.

Reports from Texas show a marked improvement in watering St. Augustine grass, which, as we all know, produces a very heavy mat or thatch. Watering treated areas was so much improved that the watering schedule could be cut in half.

The second item under localized dry spots is pimples or contours that cause poor distribution of water in soil. This poor distribution causes the upper or face areas of these knolls, terraces, etc., to dry out faster producing dry-spots or areas of special water management.

Richlawn in Fort Worth, Tex., set out treated and untreated areas to demonstrate the benefits that could be obtained by the use of a wetting agent under these conditions. The areas that were terraced showed the following:

Untreated: (1) Level above terrace required watering every 4 — 6 days.

(2) Face of terrace required watering every 1 — 2 days.

(3) Level below terrace required watering every 6 — 8 days.

In the treated section all areas were watered on a 10 — 15 day schedule. Note the more uniform distribution of water as well as the reduced watering schedule.

Galloping Hills and Somerset CC in New Jersey reported that the use of wetting agents eliminated the problem of watering pimpled or mounded areas on greens.

The third item under localized dry spots are hard-spots. These areas of the green are dense, hard to water, but are not the compacted areas in the normal traffic zone.

Cures Hard-Spots

At Hercules CC, Wilmington, Del., several greens with histories of hard-spots were cured by treatment. Denver CC reported that the 18th green with a history of localized dry spots, showed no signs of drying until August after being treated with a non-ionic wetting agent in April. The spots were retreated with Aqua-Gro which "immediately restored the soil's ability to absorb moisture."

Several greens at the Olympic CC in San Francisco were so hard in spots that they couldn't be aerated, and consequently wouldn't wet more than ¼ in. One full treatment gave 6 ins. of water penetration in subsequent watering. The hardness in these spots also disappeared.

Another interesting application was made at the Scioto CC in Columbus, Ohio. The 8th green never had any sun, being built low and in the wood. The green was hard and required frequent watering to keep it soft. This practice always caused trouble because of the lack of a drying sun. After one full treatment with the non-ionic wetting agent it was possible to maintain the green with an infrequent watering schedule.

Fairview CC in Indiana and La Jolla CC in California both report improvement in watering dry-spots.

Compacted Areas

Compacted areas are a major problem to the supt. on tees and greens and often on approach areas. Compacted soils are resistant to watering and lead to dry-spots unless special water maintenance is practiced. Compacted tees and greens also bring complaints from the golfers. When a non-ionic wetting agent is used on these areas, the water penetrates deeply into the soil with a uniform distribution. This even distribution of water in the soil causes a measurable increase in the softness of the soil.

One course that was treated had a tee that was so compacted that aerification was ineffective — no impression was made in the surface of the tee. Waterings were ineffective, wetting only 1 in. or less of soil. This same area was treated with the wetting agent and then watered. Twenty-four hours later soil sample cores showed excellent distribution of water 6 to 8 ins. deep. Three days later, aerification was completely effective. This application points up a good hand-in-hand application for very severe areas using the wetting agent first, watering, and then aerating.

Improved Turf

Of course the use of non-ionic wetting agents is not limited only to curing problem areas as just discussed, but has many applications in the development of better plants.

For instance, we have numerous reports on the increased density of turf where wetting agents have been used.

At Plainfield CC there was a very definite increase in the boxes of grass removed from treated greens as compared to untreated — as high as 8-½ to 4-½.

C. Arthur Righter, a landscaper in suburban Philadelphia, set out demonstration plots in several areas. Some of the turf plots were under Silver and Norway maples. He reported a much denser turf in the treated area with an increased rate of growth. He also spoke of a better color.

Richlawn of Fort Worth, substantiates these findings. The grass in the treated sections grew approximately 1 in. taller in a two weeks period. Somerset Hills Country Club reports that the turf on the treated greens was noticeably denser

(*Continued on page 92*)

Wetting Agents Increase Water's Efficiency

(*Continued from page* 80)

after treatment with the wetting agent.

Similarly, in the nursery and greenhouse fields we have reports on a greater growth of rooted cutting in treated soil, and a denser growth on balled and burlapped azaleas that were treated in mulched frames.

Next, we have information from Prof. de Werth of Texas A & M on the encouragement of deeper roots for seedlings. These tests were made in the greenhouse and were conducted in flats. Seeds were germinated in a ¼-in. layer of sphagnum moss over a layer of soil. Where the wetting agent was used the moss could not be separated from the soil showing good deep root development into the soil layer. Without the wetting agent, the moss separated from the soil showing poor root development.

(1) There are vast differences in results that can be obtained with ionic and non-ionic types of wetting agents.

(2) Non-ionic wetting agents accomplish one vital thing in water management — namely, they make water more effective.

(3) The potential uses of wetting agents are as unlimited as your use of water in daily turf maintenance.

(4) The use of wetting agents not only eliminates many problems in turf-water management, but also produces a better turf.

(5) The use of non-ionic wetting agents insures against over-wetness so often caused by trying to water a hard-to-wet area, and thereby overwatering an adjacent area.

Obitz Honored By UVS

At the national convention of the United Voluntary Services (Swing Clubs) held in Chicago, Harry Obitz, pro at Fred Waring's Shawnee (Pa.) CC, was awarded a plaque for distinguished service in extension of golf activities at veterans' hospitals and military installations.

Obitz is chmn. of the PGA committee working with the UVS Swing Club women. Mrs. Helen Lengfeld, UVS pres., made the award.