The continued use of very high K rates could result in leaching of Mg. On sandy soils it is especially important to monitor soil Mg tests when using high K rates. Since many water sources come from limestone aquifers which contain some Mg, this may not present a problem where such water is used for irrigation. We have consistently observed increases in soil Mg tests on such sites. While increased use of potash is considered important because of improvement in wear and stress tolerance, turf managers should also be aware of potential problems with overuse of potash. Soil tests should be used more frequently when applying high rates of potash (5-6 lbs. per 1000 sq. ft. annually), especially on sands.

WETTING AGENT STUDIES

There are several new wetting agent products which have become commercially available in the past several years. We have received many questions about the efficacy of these newer products. In order to learn more about some of these newer products, we established wetting agent trials on 3 turf sites in 1990. For several years we have had studies in East Lansing to evaluate wetting agent materials, but had very limited success because we could not develop the hydrophobic conditions over a long enough period of time to evaluate the wetting agents. When the dry spot conditions began to appear, rains would rewet the soil such that no differences occurred among treatments. So in 1990 we selected 3 sites in different locations in the state, thinking surely one of these areas would experience dry enough weather that localized dry spots would develop on at least on of the sites. The studies were established on: 1)the putting green growing on a loamy sand soil at the Hancock Turfgrass Research Center; 2) on a fairway at the Crystal Downs Country Club near Frankfort; and 3) on a fairway at the Pines Golf Course near Mount Pleasant. Both fairways were growing on sandy soils. Wetting agents applied and the application schedules are given in Tables 16, 17 and 18, respectively, for the 3 sites. Five treatment dates were utilized on the plots in East Lansing and 3 treatment dates (on a monthly basis) at the other 2 locations. All treatments were watered in after application. There were 3 replications of each treatment.

In spite of our efforts to establish plots in 3 widely diverse locations in the state, 1990 was not the year to study localized dry spot problems. On a few occasions it appeared as if some differences were about to develop, then rains masked those differences very quickly. Unfortunately, this occurred at all 3 locations. As a result there were no visible differences among any of the treatments. Soil samples were obtained at all 3 locations to determine if there were any soil effects due to wetting agents. In previous studies we have observed that effective wetting agents permitted rewetting of the hydrophobic soil conditions. This resulted in higher soil moisture following irrigation than when the dry condition remained. In the 3 studies established in 1990, there were no consistent differences due to treatment. This again, was a result of the relatively wet summer.

Table 16 1990 Wetting Agent Study
Soil Moisture Measurements by depth, % moisture by weight
Treatments applied 7/10, 7/24, 8/13, 8/27, 9/7, 1990
Hancock Turfgrass Research Center

Treatment	Rate/M	0-5 cm Depth	5-10 cm Depth
LescoWet	2 oz	20.8a*	12.8ab
LescoWet	4 oz	18.0abcd	12.1abc
LescoWet	8 oz	18.7abcd	13.6ab
LescoWet Granular	2.5 lbs	16.7abcd	11.5abc
LescoWet Granular	5.0 lbs	17.6abcd	12.0abc
Aqua-Gro Liquid	2 oz	19.2ab	13.0ab
Aqua-Gro Liquid	4 oz	17.3abcd	11.3abc
Aqua-Gro Granular	3.5 lbs	18.6abcd	13.1ab
Aqua-Gro Granular	7.0 lbs	19.0abc	12.9ab
Hydraflo liquid	2 oz	13.3 d	9.3 c
Hydraflo liquid	4 oz	17.8abcd	11.8abc
Hydraflo granular	3.5 lbs	14.2 cd	10.5 bc
Hydraflo granular	7.0 lbs	18.7abcd	13.2ab
Hydrozyme	12 oz	15.0 bcd	10.4 bc
Naiad	4 oz	20.1ab	12.8ab
Surfside 19A	6 oz	19.5abc	12.4abc
Surfside 37	6 oz	15.9abcd	10.8abc
Check		20.1ab	13.9a

* - Means followed by the same letter are not significantly different at the 5% level using Duncan's Multiple Range Test.

Table 17 1990 Wetting Agent Study
Soil Moisture Measurements by depth, % moisture by weight
Initiated July 2, 1990, monthly treatments
Crystal Downs Country Club, Frankfort, Michigan

Treatment	Rate/M	0-5 cm Depth	5-10 cm Depth
Surfside 19a	6 oz	32.6ab*	19.2a
Surfside 37	6 oz	31.3ab	19.6a
Aqua-Gro Liquid	8 oz	36.2a	19.2a
Aqua-Gro Granular	3.5 lbs	31.1ab	20.3a
Hydroflo	2 oz	30.2 b	19.5a
LescoWet Liquid	4 oz	30.2 b	19.8a
LescoWet Liquid	8 oz	31.6ab	19.3a
LescoWet Granular	2.5 lbs	31.4ab	18.1a
LescoWet Granular	5.0 lbs	30.9ab	19.6a
Hydrozyme	12 oz	30.5a	20.4a
Naiad	4 oz	31.6ab	20.2a
Check		32.0ab	18.9a

* - Means followed by the same letter are not significantly different at the 5% level using Duncan's Multiple Range Test.

Table 18 1990 Wetting Agent Study
Soil Moisture Measurements by depth, % moisture by weight
Initiated July 2, 1990, monthly treatments
The Pines Golf Course, Mount Pleasant, Michigan

Treatment	Rate/M	0-5 cm Depth	5-10 cm Depth
Surfside 19a	6 oz	22.6ab*	16.6a
Surfside 37	6 oz	22.8ab	17.3a
Aqua-Gro Liquid	8 oz	22.3ab	17.5a
Aqua-Gro Granular	3.5 lbs	22.1ab	16.9a
Hydroflo	2 oz	23.0ab	17.1a
LescoWet Liquid	4 oz	22.2ab	16.9a
LescoWet Liquid	8 oz	23.4ab	17.8a
LescoWet Granular	2.5 lbs	25.3a	17.4a
LescoWet Granular	5.0 lbs	20.6b	16.8a
Hydrozyme	12 oz	22.4ab	16.1a
Naiad	4 oz	24.2ab	16.2a
Check		25.5a	16.3a

* - Means followed by the same letter are not significantly different at the 5% level using Duncan's Multiple Range Test.

Table 19

1990 Wetting Agent Study
Dew Ratings, 9 = no dew, 1 = heavy dew
Treatments applied 7/10, 7/24, 8/13, 8/27, 9/7, 1990
Hancock Turfgrass Research Center

Treatment	Rate/M	Rating Dates, 1990									
		7/16	7/25	7/27	8/8	8/14	8/17	8/24	8/29	9/12	9/26
LescoWet	2 oz	2.7egf*	7.0ab	5.7ab	1.3a	8.0a	2.3def	1.0b	3.3ab	1.3ef	1.0c
LescoWet	4 oz	3.3cdef	8.3a	6.0a	1.7a	9.0a	1.7ef	1.0b	5.0ab	3.0cde	1.0c
LescoWet	8 oz	4.3bcd	8.7a	6.0a	1.3a	9.0a	4.0bcd	1.0b	4.7ab	1.7ef	1.0c
LescoWet Granular	2.5 lbs	2.7efg	1.0d	1.3d	1.3a	6.0e	2.0def	1.0b	1.0b	1.3ef	1.0c
LescoWet Granular	5.0 lbs	1.7gh	1.0d	1.3d	1.3a	6.3de	1.0f	1.0b	2.3b	1.3ef	1.0c
Aqua-Gro Liquid	2 oz	3.0defg	6.0bc	6.0a	1.7a	8.7ab	2.7cdef	1.0b	4.0ab	1.3ef	1.0c
Aqua-Gro Liquid	4 oz	4.0bcde	8.0a	5.7ab	1.3a	9.0a	4.7abc	1.0b	5.0ab	3.0cde	1.0c
Aqua-Gro Granular	3.5 lbs	2.7efg	1.3d	1.3d	1.0a	7.3bcde	3.0bcdef	1.0b	3.0ab	2.3def	1.0c
Aqua-Gro Granular	7.0 lbs	4.7bc	2.3d	2.7cd	1.3a	8.0abc	5.0ab	1.0b	1.0b	3.7cd	1.3bc
Hydraflo liquid	2 oz	4.0bcde	8.7a	6.7a	1.7a	9.0a	3.7bcde	1.3b	4.7ab	2.7cdef	1.0c
Hydraflo liquid	4 oz	5.0b	8.0a	6.7a	2.0a	9.0a	4.7abc	1.0b	7.0a	4.3bc	1.0c
Hydraflo granular	3.5 lbs	5.0b	1.3d	2.7cd	1.3a	7.0cde	3.7bcde	1.0b	2.3b	5.7ab	1.7b
Hydraflo granular	7.0 lbs	6.7a	1.3d	2.3cd	1.3a	8.0abc	6.7a	3.0a	3.0ab	7.3a	2.7a
Hydrozyme	12 oz	2.0fgh	1.3d	2.0d	1.7a	7.7abcd	2.3def	1.0b	1.0b	2.7cdef	1.0c
Naiad	4 oz	2.7efg	4.7c	4.0d	1.0a	9.0a	3.0bcdef	1.3b	3.7ab	1.3ef	1.0c
Surfside 19A	6 oz	2.3fgh	1.7d	1.3d	1.0a	7.7abcd	3.0bcdef	1.0b	1.0a	1.3ef	1.0c
Surfside 37	6 oz	2.7efg	1.0d	1.0d	1.3a	7.7abcd	2.3def	1.0b	1.3b	1.3ef	1.0c
Check		1.0h	1.0d	1.7d	1.7a	6.0e	2.7cdef	1.0b	1.0ab	1.0f	1.0c

* - Means followed by the same letter are not significantly different at the 5% level using Duncan's Multiple Range Test.

The only observable differences due to treatment in East Lansing were in the effect of wetting agent on dew (or guttation fluid) which occurred. Dew ratings for these plots are given in Table 19. Among liquid materials Lescowet, Aqua-Gro and Hydraflo tended to be the most effective in reducing dew rating. Granular formulations were much slower to affect dew formation and were generally less effective.

EARLY SPRING MOWING STUDY

As reported last year mowing a Kentucky bluegrass turf early in the spring before growth initiation resulted in improved turf ratings on several dates during the growing season. This study was repeated in 1990. The Kentucky bluegrass sod was mowed on March 16 at heights of 0.5, 1.0, 1.5 and 2.0 inches with a rotary mower. All material was removed from the plot area. Turf quality ratings were taken at several times during the growing season as shown in Table 20. Early in the growing season (April) the shortest mowing height gave the best turf ratings. After that time few differences occurred. This was consistent with data taken in 1989. We are still of the opinion that removing the dead leaf tissue early in the spring permits quicker warming of the soil and crown tissue, resulting in earlier growth initiation. While this practice has limited application, it may be feasible on sites where early spring greenup is desired beyond that achieved by fertilization.