in 1992 there was a small population of annual bluegrass in the plots. Our hypothesis was that with compaction there would be an increase in the annual bluegrass population. Data from Fall, 1993 showed a trend for an increase in annual bluegrass, but the differences were not significant. Surface hardness as measured with Clegg meter were higher on the compacted plots as would be expected. Soil cores were sampled in late Fall, 1993 and taken into the laboratory to measure the effect of compaction on water holding capacity. Data in Table 7 points out that compaction consistently decreased the water holding capacity over the range of 20 cm moisture tension (high moisture content) to 1 bar (medium moisture content). These moisture tension levels are in the range of soil moisture which is most available to the turf that occurs in the larger soil pores. This result is not surprising because compaction causes the loss of the largest soil pores through which drainage and aeration take place. These plots will be subjected to moisture stress dry down periods in 1995 to determine if there is any difference in susceptibility to wilt.

WETTING AGENT EFFECTS ON SOIL WETTABILITY

A study of an experimental wetting agent from the AquaTrols Corporation was conducted in 1993 and repeated in 1994. Treatments were applied to a Penncross creeping bentgrass green growing on a loamy sand soil. Treatments shown in Table 7 were applied on July 13, August 15 and September 17, 1994. AquaGro-L is the present liquid formulation of wetting agent which has been used in the industry for many years. The ACA 864 is an experimental wetting agent. All treatments were watered in immediately after application. Plot size was 4 ft. by 10 ft. with 4 replications. Because of regular rainfall in 1994 there were few differences in turf quality observed among treatments. In September there was a 2 week period during which there was no rain, permitting visual differences among treatments. All treated plots had less localized dry spot apparent on Sept 7 and 14. Color and quality ratings gave similar results.

Soil core samples were collected about one month after each treatment to determine if there was any effect of wettability of the soil at different depths. This measurement entails drying the soil cores for 1 month, then placing a water droplet on the soil at selected depths. The time for the water droplet to disappear is a measure of how wettable the soil is. The longer the time for the drop to penetrate the soil, the more hydrophobic is the soil. Data in Table 8 indicate that the experimental wetting agent applied at the rates of 4 or 6 oz. per 1000 sq. ft. on July 13 resulted in a decreased time for a water droplet to disappear when placed on the soil surface. Below the surface there was no influence of treatment as all shallow depths (1-3 cm) had relatively hydrophobic conditions.

For the second application date in August (Table 9) the highest rate gave faster water penetration at the 1 and 3 cm depths while no other treatment showed any benefit at those depths. It is interesting to note that all treatments had greater wettability than the check at the 5 cm depth. No treatment had a significant effect on wettability of the surface layer, although there was a trend for reduced times with the higher rates of the experimental material. Interestingly, there was a trend for reduced times deeper in the profile. Apparently, within one month the effect of the wetting agent on the surface layer had dissipated.

For the third application the two highest rates of the experimental resulted in greater wettability at the 1 and 2 cm depths of soil (Table 10). The experimental wetting agent appears to be an effective material for improving wettability of soil and reducing localized dry spot incidence. On several dates after application dew ratings were taken. AquaGro is much more effective than ACA864 in reducing dew. The experimental had some dew reduction effect for about 4 days while the effect of AquaGro lasted 5 to 8 days.

GREENS ROLLING STUDY

A study to evaluate the effects of rolling and mowing height on ball roll and turf quality was initiated during the summer of 1993 and continued in the summer of 1994. Plot size was 15 ft. by 5 ft. 4 in. with 4 replications. The treatments shown in Table 11 included rolling with an Olathe roller 3 times per week; a Jacobsen roller at 3 or 5 times a week; an unrolled check plot; and a treatment which received double mowing. All these treatments were mowed 6 times a week at 5/32 inch. One additional plot was mowed at 3/16 inch and rolled with the Jacobsen roller 3 times per week.

On three dates ball roll was measured the same day as treatments were applied utilizing the Stimpmeter. Rolling 3 times per week with the Olathe roller gave the highest ball roll numbers on the 3 dates analyzed as shown in Table 11. Over a period of months double mowing with no rolling was nearly equal to the Olathe treatment. Rolling 5 times per week with the Jacobsen roller outperformed 3 times per week on only 1 of the 3 dates analyzed. When rolled with the Jacobsen roller and mowed at 5/32 inch the Stimpmeter reading was better than when rolled and mowed at 3/16 on only one date (Aug. 1).

The seasonal average for all dates evaluated for these treatments was 9 ft., 10.5 in. for the Olathe, rolled 3 times per week; 9 ft., 7 in. for the Jacobsen, rolled 5 times; 9 ft., 4 in. for the Jacobsen, rolled 3 times; 8 ft., 9 in. for the check; and 8 ft., 7 in. for the treatment rolled with the Jacobsen 3 times and mowed at 3/16 in. To date these data substantiate

Table 8. Effects of Wetting Agent Treatment on Water Droplet Infiltration at various depths, Time In Seconds
Wetting agents applied July 13, 1994
Cores taken August 12, 1994

Treatments	Surface	1 cm depth	2 cm depth	3 cm depth	4 cm depth	5 cm depth
Check	569 ab	509 a	433 a	374 a	160 a	103 a
AquaGro L @ 8oz./M²	594 a	595 a	439 a	497 a	258 a	104 a
ACA 864 @ 6oz./M²	180 d	358 a	382 a	302 a	145 a	58 a
ACA 864 @ 4oz./M²	292 cd	413 a	436 a	318 a	156 a	69 a
ACA 864 @ 2oz./M²	403 bc	496 a	431 a	315 a	107 a	49 a
Probability	.0009	.2846	.9862	.3749	.3457	.2314

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

Table 9. Effects of Wetting Agent Treatment on Water Droplet Infiltration at Various depths, Time In Seconds
Wetting agents applied August 15, 1994
Cores taken September 15, 1994

Treatments	Surface	1 cm depth	2 cm depth	3 cm depth	4 cm depth	5 cm depth
Check	502 a	465 a	323 a	319 a	279 a	270 a
AquaGro L @ 8oz./M²	545 a	456 a	338 a	256 ab	209 a	80 b
ACA 864 @ 6oz./M²	382 a	146 b	112 a	93 b	96 a	64 b
ACA 864 @ 4oz./M²	423 a	233 ab	178 a	139 ab	94 a	60 b
ACA 864 @ 2oz./M²	489 a	391 ab	222 a	178 ab	124 a	36 b
Probability	.2189	.0571	.2050	.1463	.3354	.0713

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

Table 10. Effects of Wetting Agent Treatment on Water Droplet
Infiltration at Various depths Time In Seconds
Wetting agents applied September 17, 1994
Cores taken October 17, 1994

Treatments	Surface	1 cm depth	2 cm depth	3 cm depth	4 cm depth	5 cm depth
Check	600 a	487 ab	351 ab	330 a	121 a	93 a
AquaGro L @ 8oz./M²	600 a	554 a	472 a	335 a	285 a	95 a
ACA 864 @ 6oz./M²	503 a	65 c	182 b	275 a	226 a	97 a
ACA 864 @ 4oz./M²	421 a	71 c	140 b	230 a	133 a	65 a
ACA 864 @ 2oz./M²	590 a	259 bc	328 ab	159 a	151 a	75 a
Probability	.1305	.0015	.0903	.5828	.1500	.7299

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