

feet by 6 feet with 3 replications. Sustane, an organic fertilizer produced from turkey waste, gives a quicker response than Milorganite but the length of response was of shorter duration than Milorganite. IBDU responded slowly as expected but provided excellent longevity.

The study outlined in Table 6 was initiated on July 6. Turf quality ratings for the Kentucky bluegrass turf indicated considerable variability in the data caused reduced significance in the data taken July 19 and August 5. On August 15 and September 26 turf quality reflected the effect of nitrogen rate with few differences caused by carrier. Roots were washed from soil samples taken in September, then dried and weighed. Samples were also taken in September to determine the amount of thatch in each plot. Data are shown in Table 7. There was a tendency for lower root weights with higher rate of nitrogen application and with higher rate of potassium application but differences were not consistent. No differences occurred in the amount of thatch as a result of these treatments.

WETTING AGENT EVALUATIONS

Several wetting agent treatments were applied to a Penncross creeping bentgrass putting green at the Hancock Turfgrass Research Center to evaluate effects on localized dry spots, dew and frost formation and phototoxicity. Plot size was 4 feet by 6 feet. Plots were not irrigated to determine the potential for phytotoxicity. Data in Table 8 indicate Hydroflo L (liquid) and LescoWet were more phytotoxic than AquaGro liquid. While some minor injury was detected with the higher rate of Hydro Wet this proved the safest of the liquid materials evaluated. The Hydroflo and AquaGro granular materials resulted in no injury to the turf. LescoWet II was considerably less injurious than LescoWet. In terms of dew reduction the order of effectiveness was Hydroflo L > LescoWet > AquaGro > HydroWet = LescoWet II > AquaGro granular = Hydroflo G.

A second wetting agent study was begun October 6 to evaluate wetting agent effects on formation on dew and frost. Data are given in Tables 9 and 10 for dew and frost ratings, respectively. Generally, Hydroflo was most effective in reducing dew formations followed by LescoWet and AquaGro. Other materials reduced dew compared to the check on some dates. Granular wetting agents responded slowly and over the month of this study did not prove of longer effect than liquid applications. Effects of wetting agents on frost formation (Table 10) were less clearly defined although good differences occurred on the October 20 rating date.

One of the objectives of these studies was to evaluate the effect of wetting agents on preventative or curative effects on localized dry spots on putting greens on sandy soils. Although treatments were applied, no significant development of localized dry spot developed adequately to permit separation of treatment effects. A modest problem with localized dry spot began to develop in mid-July but rains promptly corrected the condition.

GREENS TOPDRESSING STUDIES

The long term sand topdressing study begun in 1982 was continued through 1988. Treatments shown in Table 11 give the quality ratings taken during the year. As observed in the past the higher nitrogen (6 pounds N per 1000 sq ft

Table 8. Phytotoxic and dew accumulation effects of wetting agents on a Penncross bentgrass green. Hancock Turfgrass Research Center. Wetting agents applied August 4, 1988. Averages for three replications.

Treatment	Rate (oz/1000)	Dew Rating (1=No Dew)	Phytotoxicity Rating (9=Severe Burn)		
			8/4	8/10	8/23
Hydraflo 15G	32	6.8a*	1.0f	1.0e	1.0d
Hydraflo 15G	48	6.5ab	1.2ef	1.0e	1.0d
Hydraflo 15g	64	6.3ab	1.0f	1.0e	1.0d
Hydraflo 15 g	112	6.5ab	1.0f	1.0e	1.0d
Hydraflo L	8	2.0h	2.8d	2.7d	1.7bcd
Hydraflo L	16	1.0i	5.0c	5.0b	2.0bc
Hydraflo L	32	1.0i	7.8a	7.3a	5.3a
LescoWet	8	2.8g	2.3def	1.7de	1.0d
LescoWet	16	1.2i	6.5b	5.7b	2.0bc
LescoWet II	8	4.7d	1.5def	1.2e	1.0d
LescoWet II	16	4.0ef	1.5def	2.5d	2.3b
HydroWet	8	4.3de	1.3def	1.3e	1.0d
HydroWet	16	4.3de	2.8d	2.0de	1.0d
AquaGro	8	3.7f	2.0def	1.7de	1.0d
AquaGro	16	2.0h	2.7de	3.7c	1.3cd
AquaGro g	32	5.7c	1.0f	1.0e	1.0d
AquaGro g	64	6.2bc	1.0f	1.0e	1.0d
Check	-	6.8a	1.0f	1.0e	1.0d

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

Table 9. 1988 wetting agent effects on dew accumulation on a Penncross creeping bentgrass green. Hancock Turfgrass Research Center. Treatments applied October 6, 1988. Averages for three replications.

Treatments	Rate (oz/M)	Date of Rating (1988)y				
		10/7	10/11	10/17	10/19	11/4
Hydraflo 15G	32	5.0DEF*	5.3DEFG	5.7DEF	5.3EFG	6.0DEF
Hydraflo 15G	64	5.7CDE	6.0BCDE	6.3CDE	7.3BCD	7.3BCD
Hydraflo 15G	128	6.0CDE	7.3B	8.0AB	9.0A	8.0AB
Hydraflo L	4	8.7A	7.0BC	7.0BC	8.0AB	6.7BCDEF
Hydraflo L	8	9.0A	8.7A	8.7A	9.0A	7.7ABC
Hydraflo L	12	9.0A	9.0A	9.0A	9.0A	9.0A
LescoWet	4	7.7AB	5.7CDEF	6.3CDE	6.7BCDEF	6.0DEF
LescoWet	8	8.7A	7.3B	7.3BC	7.7ABC	7.2BCDE
LescoWet II	4	6.0CDE	4.3FG	4.7F	5.7DEF	6.0DEF
LescoWet II	8	5.7CDE	5.7CDEF	5.7DEF	6.0DEF	5.7EF
AquaGro	8	8.3A	6.7BCD	6.7CD	7.0BCDE	6.7BCDEF
HydroWet	8	6.3BCD	5.0EFG	5.7DEF	5.2FG	5.7DEF
AquaGro D	64	5.0DEF	5.7CDEF	5.0F	5.7DEF	6.3CDEF
Naiad	2	4.7EF	4.7EFG	4.3F	4.0GH	5.3F
SurfSide 19A	8	5.3CDEF	4.7EFG	4.7F	5.3EFG	6.0DEF
SurfSide 37	16	6.7BC	5.0EFG	5.7DEF	5.8DEF	5.8DEF
SurfSide 9	64	5.0DEF	5.3DEFG	5.3EF	6.3CDEF	6.5BCDEF
Check	0	4.0F	4.0G	3.0G	3.0H	5.3F

* - Means followed by the same letter are not significantly different at the 1% level, using Duncan's multiple range test.
y - 9 = least dew, 1 = heavy dew

Table 10. 1988 Wetting agent effects on frost formation on a penncross creeping bentgrass green. Hancock Turfgrass Research Center. Treatments applied October 6, 1988. Averages for three replications.

Treatments	Rate (oz/M)	Date of Rating (1988)y		
		10/12	10/20	11/3
Hydraflo 15G	32	6.8 ABC*	4.3 EFG	4.0 A
Hydraflo 15G	64	6.0 ABC	5.5 CDE	3.0 C
Hydraflo 15G	128	7.3 A	6.3 ABC	2.0 D
Hydraflo L	4	4.8 C	5.8 BCD	4.0 A
Hydraflo L	8	6.0 ABC	6.7 AB	4.0 A
Hydraflo L	12	5.2 BC	7.0 A	3.7 B
LescoWet	4	6.3 ABC	4.8 DEF	4.0 A
LescoWet	8	5.3 A	5.3 CDEF	4.0 A
LescoWet II	4	6.8 ABC	4.5 EFG	4.0 A
LescoWet II	8	5.5 ABC	4.5 EFG	3.7 B
AquaGro	8	6.0 ABC	4.5 EFG	4.0 A
HydroWet	8	5.3 ABC	4.2 FG	4.0 A
AquaGro D	64	5.7 ABC	3.3 GH	4.0 A
Naiad	2	6.2 ABC	3.3 GH	4.0 A
SurfSide 19A	8	5.3 ABC	3.3 GH	4.0 A
SurfSide 37	16	6.3 ABC	4.2 FG	4.0 A
SurfSide 9	64	6.7 ABC	4.5 EFG	4.0 A
Check	0	7.2 AB	2.3 H	4.0 A

* - Means followed by the same letter are not significantly different at the 10% level, using duncan's multiple range test.

y - 9 = no frost 1 = heavy frost