

## **EFFECTS OF MANGANESE APPLICATIONS ON TURFGRASS QUALITY**

The studies to evaluate the affect of foliar manganese applications on turf quality of a Penncross creeping bentgrass green at the Hancock Turfgrass Research center were continued in 1991. The first study utilized applications as shown in Table 14 on May 24, June 26, July 10 and July 30. Manganese sulfate did not provide a consistent improvement in turf quality although there was some increase in quality ratings from the first date of application. Thereafter, and in a second study (Table 15) established on September 3, there was no apparent benefit from manganese applications on this Penncross green on this loamy sand green. Ferrous sulfate did give generally improved quality ratings. However, some phytotoxicity can occur from foliar applications ferrous sulfate as was observed from the June 26 applications. Use care when making any soluble fertilizer application during high environmental stress conditions (high temperatures, wilting of turf, etc.).

## **EFFECTS OF USING ISOLITE IN TOPDRESSING PROGRAMS**

A study was established July 2 on a Penncross putting green turf at the Hancock Turfgrass Research Center to evaluate the effect of mixing Isolite with sand in a sand topdressing program. Treatments were: sand alone; 90% sand, 10% Isolite; and 80% sand, 20% Isolite. Parameters evaluated included turfgrass quality ratings, volumetric moisture content (Table 16); soil temperature (Table 17); and root weights and surface hardness measurements (Table 18). Topdressing treatments were applied at the rate of 3 cubic ft. per 1000 sq. ft. at 3 week intervals. There were no differences observed in any of the parameters measured during this relatively short-term study. To properly evaluate a soil amendment like this, longer term studies are necessary.

## **WETTING AGENT EFFECTS ON TURF AND SOIL MOISTURE**

The effects of wetting agents on turf and on soil moisture were evaluated in a series of studies on putting green turfs in 1991. The study was concentrated on the use of the Paragon wetting agent, which was compared to label rates of AquaGro and LescoWet, as well as an untreated check. One study involved treatments on July 30 and September 2 (Table 19). There were no meaningful differences in the moisture content of the soil.

Table 18

Isolite Topdressing Study, Root Weights and g-max readings Root samples taken 9/17/91 Initiated July 2, 1991				
Initial treatments were 18 cubic feet per 1000 sq. ft. of each topdressing material applied after double coring with .5 inch tines. 3 cubic feet of material per 1000 sq. ft. applied on three week intervals after initial treatment. Final season treatment was 18 cubic feet of each topdressing material per 1000 sq. ft. Treatment dates were initial July 2, 3 week treatments: 7/22, 8/13, 9/3, 9/24. Final treatment applied 10/15.				
Treatment	Root Weight kg m <sup>-1</sup> 0-3 inch	Root Weight kg m <sup>-1</sup> 3-6 inch	g-max July 30	g-max Nov. 13
80% Sand 20% Isolite	20.7	9.5	66.9	50.8
90% Sand 10% Isolite	7.7	10.5	68.6	50.8
100% Sand	13.6	2.6	70.0	48.4

Table 19

Precision Laboratories Paragon Wetting Agent Study Soil Moisture Measurements, HTRC Treatments Applied July 30, September 2, 1991						
Treatment	Rate OZ/M	8/1 VMC-7.5	8/23 VMC-7.5	8/23 VMC-15	9/20 VMC-7.5	9/20 GMC-7.5
Paragon	0.5	24.80	33.53	26.45	31.50AB*	12.60AB
Paragon	1.0	24.40	34.22	27.73	30.70 B	11.80 B
Paragon	2.0	23.40	33.72	26.70	31.40AB	12.48AB
Paragon	4.0	24.83	34.28	26.83	31.20AB	13.90A
Paragon	8.0	23.88	35.10	25.80	30.98AB	12.65AB
Paragon	16.0	25.80	34.85	28.30	32.90A	13.50AB
AquaGro	4.0	24.42	33.10	26.72	30.92AB	12.43AB
LescoWet	0.5	25.80	34.53	27.85	31.95AB	12.60AB
Check	--	23.85	33.33	27.42	31.60AB	12.65AB
* Means followed by the same letter are not significantly different at the 5% level using the LSD mean separation test.						

True localized dry spot conditions did not develop during the year on these plots so there was no measurable effect on correcting this condition. Wetting agents can cause significant phytotoxicity (Table 20), so applications should be applied when the turf is not under significant stress and should be watered in immediately. In these studies, applications were watered in shortly after application.

One interesting aspect of these studies is the effect of the wetting agents on evapotranspiration. A study was initiated on August 31 on Penncross creeping bentgrass green turf. Wetting agents were Paragon, AquaGro and LescoWet. While there is some variability in the data and there were no differences on some dates, there were several dates when wetting agent treatments significantly reduced evapotranspiration rates (Tables 21-24). Because there was some phytotoxicity from some treatments, it may be the reduced evapotranspiration occurred because of the injury to the turf leaves. However, differences were observed as long as 20 days after treatment on September 20 (Table 23). The significance of the reduction in evapotranspiration is still to be determined, so these studies should be continued.

### **MULCHING OF TREE LEAVES INTO KENTUCKY BLUEGRASS TURF**

Regulations will soon prevent the disposal of yard wastes in landfills. One of the significant sources of yard wastes is tree leaves in the fall. Effects of using a mower to grind the leaves and return them to the turf has not been reported to our knowledge. With this in mind, a cooperative study with Bruce Branham was initiated in October, 1990 to evaluate this practice. Treatments included 2 rates of tree leaves: High (470 grams dry leaf material per 1000 sq. ft.), Low (235 grams), and No leaves. Four nitrogen treatments were included: 2 lbs. N per 1000 sq. ft. with 2/3 applied in the spring or fall; and 4 lbs. N at similar times. Quality rating data in Table 25 suggest there was no negative effect of tree leaf treatments on turf from the first year of treatments. There were small responses to the N treatments (Table 26). This study will be continued to determine the long term effects on turf quality, soil tests and thatch accumulation.

Table 20 Precision Laboratories Paragon Wetting Agent Study  
 Phytotoxicity Ratings, 9=Dead, 1=No Damage, HTRC  
 Treatments Applied July 30, September 2, 1991

Treatment	Rate OZ/M	July 31	August 9	September 3	September 5
Paragon	0.5	1.25 C*	1.5 BC	1.0 F	1.0 E
Paragon	1.0	1.75 C	1.0 C	1.75 DEF	2.0 CDE
Paragon	2.0	1.5 C	1.5 BC	2.25 DE	1.75 CDE
Paragon	4.0	1.75 C	1.5 BC	3.25 C	2.75 C
Paragon	8.0	3.0 B	2.25 B	5.0 B	6.5 B
Paragon	16.0	4.25 A	3.25 A	7.0 A	9.0 A
AquaGro	4.0	4.25 A	3.25 A	2.5 CD	2.5 CD
LescoWet	0.5	2.0 B	1.5 BC	1.5 EF	1.25 DE
Check	---	1.25 C	1.25 C	1.0 F	1.0 E

\* Means followed by the same letter are not significantly different at the 5% level using the LSD mean separation test.

Table 21 Precision Laboratories Paragon Wetting Agent ET Study Initiated August 31, 1991, HTRC Evapotranspiration expressed in mm day <sup>-1</sup>								
Treatment	Rate OZ/M	9/1	9/2	9/3	9/4	9/5	9/6	9/7
Paragon	4.0	3.68	4.12AB*	4.04AB	3.84	3.09	3.70	4.38
Paragon	8.0	3.95	3.93 C	3.75 C	3.71	2.59	3.55	3.97
AquaGro	4.0	3.70	4.12AB	4.02AB	3.84	2.79	3.76	4.18
LescoWet	0.5	3.83	3.91 BC	3.98 B	3.64	2.70	3.56	3.74
Check	---	3.34	4.25A	4.18A	3.88	2.76	3.86	4.38
* Means followed by the same letter are not significantly different at the 10% level using the LSD mean separation test.								

Table 22 Precision Laboratories Paragon Wetting Agent ET Study Initiated August 31, 1991, HTRC Evapotranspiration expressed in mm day <sup>-1</sup>								
Treatment	Rate OZ/M	9/8	9/9	9/10	9/11	9/12	9/13	9/15
Paragon	4.0	1.95	2.82A*	0.95 C	2.09A	2.13	1.48	0.46 B
Paragon	8.0	1.76	2.22 C	1.02 BC	1.93 B	1.99	1.45	0.46 B
AquaGro	4.0	1.86	2.58AB	0.97 BC	2.04AB	2.05	1.47	0.42 B
LescoWet	0.5	1.82	2.41 BC	1.05AB	1.93 B	2.05	1.53	0.46AB
Check	---	1.91	2.77A	1.14A	2.11A	2.21	1.52	0.51A
* Means followed by the same letter are not significantly different at the 10% level using the LSD mean separation test.								

Table 23 Precision Laboratories Paragon Wetting Agent ET Study Initiated August 31, 1991, HTRC Evapotranspiration expressed in mm day <sup>-1</sup>								
Treatment	Rate OZ/M	9/16	9/17	9/18	9/19	9/20	9/21	9/22
Paragon	4.0	1.27	1.53	1.97 B*	1.72 BC	1.84AB	1.86	2.33
Paragon	8.0	0.90	1.90	1.84 B	1.71 BC	1.71 B	1.73	1.23
AquaGro	4.0	1.26	1.51	1.84 B	1.61 C	1.65 B	1.74	2.65
LescoWet	0.5	1.26	1.54	1.93 B	1.85AB	1.85AB	1.82	2.09
Check	---	1.32	1.68	2.16A	2.02A	2.03A	1.97	2.28

\* Means followed by the same letter are not significantly different at the 10% level using the LSD mean separation test.

Table 24 Precision Laboratories Paragon Wetting Agent ET Study Initiated August 31, 1991, HTRC Evapotranspiration expressed in mm day <sup>-1</sup>								
Treatment	Rate OZ/M	9/23	9/24	9/25	10/8	10/9	10/10	10/11
Paragon	4.0	1.37	0.55	0.98	3.93	3.38	2.05	1.06
Paragon	8.0	1.19	0.43	0.92	4.95	2.80	1.74	0.94
AquaGro	4.0	1.65	0.50	0.99	4.13	3.35	2.01	1.00
LescoWet	0.5	1.27	0.44	0.93	4.36	2.91	1.78	1.00
Check	---	1.3	0.74	0.94	4.07	2.81	1.81	1.05