not provide as much active ingredient in the turf at the time of the application, of course.

In the above study, the treatments were not watered in to determine the degree of phytotoxicity of each of the materials. Obviously this would not be a recommended practice, but this does provide some idea of the relative potential for phytotoxicity. The phytotoxicity data are given in Table 8. AquaGro and Lescowet caused the greatest phytotoxicity when not watered in. Our general recommendation is to apply wetting agents to turf which are not in a condition of moisture stress, then water in immediately. Unless absolutely necessary, it is best to never apply wetting agents when temperatures are going to be above 85, and it is best to treat in the evening. It may be necessary to irrigate the area lightly before treatment so the grass is not in a condition of wilt.

SOIL pH CONTROL

The plots treated with lime and sulfur in 1981 continue to show some changes with time. Of particular note is the increase in soil pH on the sulfur treated plots as well as on the check. Apparently the major factor is the hardness of the irrigation water applied to the turf. The pH data are in Table 9. Further, the loss in the bases, calcium and magnesium are dramatically increased from the high sulfur plots (Table 10). If the turf manager wants to achieve and keep a low pH, more frequent soil testing should be practiced to prevent a deficiency of magnesium. Also, the pH change occurs first in the surface layer and gradually moves downward. This surface acidification could lead to stress on the turf so the use of sulfur to acidify soils should be done cautiously.

PHOSPHORUS AND POTASSIUM SOIL TEST IN RESPONSE TO FERTILIZER APPLICATIONS

The effect of P_2O_5 and K_2O applications to several soils are summarized in Tables 11 and 12. As observed previously, the dune sand does not hold applied potassium (Table 11). Effective Potash application on sandy soils requires regular applications, a minimum 3 or 4 times a year. When some peat is mixed with the soil the potash holding capacity of the soil media is increased somewhat over the sand, but not as strongly as on the topsoil green (fine sandy loam).

Phosphorus is apparently leached from the dune sand as well (Table 12). After 2 years of application of P_2O_5 to this dune sand, the phosphorus soil tests are still moderately low. There was a very clear deficiency of P on the check plots throughout the year, while deficiency symptoms appeared on the 1 pound application rate per year late in the fall when soils became colder and the uptake of P was not as efficient. Soil tests on the sands should be taken more frequently than on other soils because of the low cation exchange capacity and the higher susceptibility to rapid chemical change and leaching.

Table 11. Potassium soil test[x] responses on Penncross creeping bentgrass greens growing on 3 soils. Hancock Turfgrass Research Center. Averages for 3 replications. Studies initiated September 30, 1983. Samples taken September, 1984.

K_2O Applied lbs/1000 sq. ft.	Dune Sand 0-3"	Sand/Peat 0-3"	Topsoil 0-3"
0	23 c	47 d	126 b
0.5	47 bc	94 c	132 b
1.0	67 b	161 b	189 ab
2.0	102 a	247 a	275 a

[x]Available Potassium (K) determined with neutral normal ammonium acetate.

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

Table 12. Phosphorus soil test responses on Penncross creeping bentgrass growing on dune sand. HTRC.

Treatment		P Soil test	Quality rating (9-best)		
lbs P_2O_5/M	time	lbs/A	Jul 8	Aug 14	Sep 19
0	---	11 c	1.7 c	1.2 d	1.3 d
1	spr	14 c	3.7 b	3.0 c	3.2 c
2	spr, fall	21 b	4.3 a	3.5 b	3.8 b
4	spr, fall	34 a	4.5 a	4.2 a	4.7 a

Spring treatments on April 20, fall on September 25. Study initiated July 1983.