Answers to turf questions

by Fred V. Grau

Lime is a commonplace, ordinary material, quite devoid of glamour and often applied without visible results. The commonplace often is neglected for the spectacular. Perhaps many of us can use a "reminder" about the need for using lime.

Aglime is a term adopted to cover the unwieldy, "pulverized agricultural limestone." The National Limestone Institute, Inc., 702 H St., N.W., Washington, D.C. 20001, has published a summary of Aglime used in the U.S. (by states) compared with the tonnage *needed* according to soil surveys and tests. The results for 1966 show 30,461,488 tons used, 80,142,193 tons needed. We wonder how a similar survey might look if it were conducted on the turfgrass areas of the U.S.

So, when were the last samples submitted to your soil-testing laboratory? There is still time, and most labs have installed greatly improved equipment and techniques. Some have computerized the findings to reduce the human error. Now, who should use lime—and why?

Most grasses will benefit from the application of lime when the pH value of the soil drops below 6.0 (7.0 is neutral). Most authoritites acclaim pH 6.5 as a commendable goal. Some turf managers "run scared" when soil pH values rise above 7.0 or 7.5. Research has proved that turfgrasses that do well at pH 6.5 will continue to do well at pH 8.5 if nutrients are kept in balance.

Lime applied to turf can be expected to do several things:

a) Reduce soil acidity (H ions are replaced by Ca and Mg ions).
b) Supplies calcium and magnesium (see a), which are needed in building cell structure (stronger plants, more resistant to wear).
c) Counteracts the acidifying effect of nitrogen—(the more N used, the more lime is needed).
d) Release phosphorus and many other plant food elements that may be locked in the soil.
e) Minimizes aluminum and manganese toxicity.
f) Stimulates desirable microbial activity which helps to "mellow" soils, to reduce thatch accumulation and to minimize injurious effects of chemicals.
g) Reduces severity of many disease attacks. Undoubtedly there are other benefits that have not been included here.

What forms of lime are best for turf? For general use the Aglime is considered the most satisfactory. It is not caustic, it is inexpensive, it is slow to release and react and it is long lasting.

Burned lime (or burnt lime) is the product derived from heating limestone rock which drives off CO_2 ($CaCO_3 + \Delta \rightarrow CaO + CO_2$). This is *not* a good form to use on turf. It is highly reactive with water, it cakes on the surface and it will burn vegetation severely. Burned lime can be used effectively in seed beds when it can be incorporated at once.

Hydrated lime is the powder-fine product resulting from adding water to burned lime (much heat is released). It reacts quickly and is dangerous to use in connection with soluble N fertilizers (ammonia is produced). Hydrated lime on turf is most useful when applied as a spray at low rate (½ to 2 lbs./M) to revive "sick" grass and to relieve certain disease disorders. It is safe to use with ureaforms.

When is lime used to best advantage? Simply—when it is needed. As to seasonable use, apply it when the soil is most likely to absorb it. In fall, it will work its way into the soil with freeze-thaw cycles when the course has the least play.

When soil has been opened with cultivating tools, a high percentage of applied lime will be washed into the holes. Lime performs best when it is *mixed* with soil particles. Layers of lime can be harmful.

Impurities in Aglime can be plus values But, 65% $CaCO_3$ equivalent is the lowest acceptable grade in any state. Highest quality lime may run 109% $CaCO_3$ equivalent (magnesium in dolomitic types weighs more than Ca).

Color is not the deciding factor in Aglime. In one quarry, there were three predominant colors of limestone:

1) off-white—82% $CaCO_3$ equivalent.
2) grey—89.5% $CaCO_3$ equivalent.
3) red—95% $CaCO_3$ equivalent.

All were ground to the same fineness. Farmers would accept only white or grey; the red was refused (prejudice) even though it represented the best value. Prejudice and personal preference

Continued on page 14

GRAU *Continued from page 12*

should defer to neutralizing value ($CaCO_3$ equivalent.)

Particle size (fineness of grind) is a valid consideration. The finer the particles the sooner one obtains results. A good threshhold value for turfgrass use is 80—90% passing 100-mesh. Consult your supplier on what he can deliver.

Q. We plan to convert from sand greens in the near future. Can you suggest books or other publications that would help us in the conversion and would help our course caretaker to recognize green problems? (Missouri)

A. Converting from sand to grass is a major operation that merits even more consideration than building new greens from scratch. First, secure the services of a qualified golf course architect to design the greens and to develop specifications regarding irrigation, size of greens, drainage, contours, bunkering, soil mix, fertilization and selection and planting of the best grass.

The architect can guide you in selecting the proper maintenance equipment. Equipment firms have field representatives that instruct users in maintenance and operation of machines. They also represent chemical firms and will help select the best materials for pest and disease prevention. Some firms have excellent instructive literature.

Golf course superintendents skilled in turfgrass management can give valuable guidance. Some associations have committees organized for the purpose.

State Experiment Stations in your state and in surrounding states should be contacted for useful literature and helpful visitations. By attending turfgrass conferences and visiting other courses, your caretaker will learn a great deal about the management of grass greens. But be patient. He will make mistakes. Many golf course superintendents have gone to college to learn about grass. Your sand-green caretaker can't learn it overnight.

Q. I have run into a problem on my course and I need help. The

Continued on page 63

