

HE NEEDS TO USE MORE WATER TO 'SOFTEN' THEM."

More good grass has been ruined by too much water poured onto putting greens in a vain attempt to keep them soft enough to hold a poorly-played shot and to mollify a small segment of high-handicap golfers.

Many balls that hit on a hard approach or collar bound high in the air but the green gets the blame. This is another good reason to keep banks, collars and approaches well-watered.

Mechanical conditioning of putting green soils will do more good than water to hold a shot to the green.

It is hoped that a better understanding of the needs for, and the functions of, water can be brought about between the player and the superintendent.

Quite often the demands for a green turf can be met better and more economically by aerifying and fertilizing than by the addition of more water. Water is necessary for life but so is air. We can go for many hours without a drink of water but how long can we stay under water without air?

A balance of water and air, then, greatly is to be desired.

Q—Every time a green is analyzed in our area, the report comes back 'very high phosphorous'. I understand that the same report is more or less national. What effect does a high phosphorous condition have on the greens and what are the symptoms, if any? I also understand that much of the phosphorous is locked up and is not active. (Wis.)

A—Yes, this condition of high phosphorous in greens is more or less a national problem. This is the result of years and years of applying fertilizer high in phosphorous.

Phosphorous is not a soluble material and it remains in the soil with very little leaching. Nitrogen and potash both are soluble and not only do they leach but they are more quickly taken up by the plants and removed in clippings. This situation probably would not exist had we been able to make recommendations more nearly in accord with the needs of the plants.

A high phosphorous content in the soil in a putting green does not necessarily do any harm. If the nitrogen and potash levels are too low in relation to the phosphate level then there is a tendency for more seeds and more coarse stems to be

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produced which affects the putting condition.

Also, a high phosphorous content tends to react with lead arsenate rendering the lead arsenate ineffective against controlling *Poa annua*, chickweed and other weeds in putting greens.

A high phosphorous content may cause chlorosis because it would tend to tie up certain other basic elements which help to maintain green color in grasses. This would be particularly true if the pH of the soil were rather high. This, in effect answers your question about symptoms, if any. Actually, it is rather hard to detect symptoms of high phosphorous content in soils unless there is a striking example of comparison.

It is true that much of the phosphorous is locked up and is not active, because phosphorous tends to associate itself with calcium in the soil and where there is an adequate supply of lime, then the phosphorous is associated with the calcium in various forms.

A tissue test is a good way to keep check on the balance of N, P and K in the leaves of the plants. Many of the elements in the soil are not taken up by the plants in the same proportion in which they exist in the soil. Therefore, a test of the elements that are being absorbed by the leaves of the plant gives a more accurate picture of the situation. Tissue tests in conjunction with soil tests is the best method for evaluating the situation. Tissue test kits are available commercially. Also, the agricultural colleges can assist you with tissue tests.

From the practical standpoint, where the phosphorous content of the soil is extremely high, the best advice is to use nitrogen and potash fertilizers for at least a year without additional phosphorous and then continue your soil and tissue tests to see what changes have been brought about.

Q—Is it possible to use too much water even on bentgrass? I have noticed that on one of our greens where the grass is weak, the grass at the outer edges of the green, scarcely reached by the sprinkler, is much better than the grass that is getting most of the water. (N. Y.)

A—Yes, it is possible to overwater bent. If so much water is applied that the soil is saturated, then there is no room for oxygen, which is vital if the roots are to develop and take up food normally. You can check on the situation by taking a soil sample from the heavily watered

area. If roots are shallow and discolored, it is an indication that overwatering is a factor in causing the poor turf.

You will find it much easier to maintain the right moisture relations in the greens themselves, if you will give more careful attention to watering the collars and banks. These areas should be aerified thoroughly and frequently—about every three weeks. Keeping the area around the greens open and receptive to water will help to prevent excessive drying out of the green even though less water is applied directly to the green. Healthier growing conditions will result, and playing conditions will be better, too, if the putting surface is not so soggy.

Q—We have a fairway with coarse, gravelly soil. Every grass we have tried burns out in summer. What do you suggest? (Conn.)

A—Have you tried Kentucky 31 fescue? Very coarse soils do not retain moisture, but the fescues most often can survive drought conditions. Kentucky 31 must be seeded heavily or it may give a ragged, bunchy effect. It should be cut at about 1 in. to give a well-knit turf. Although Kentucky 31 can survive a low level of maintenance, you will find that it responds to feeding. It may not produce a turf comparable to bluegrass or bent but it offers a better chance to grow some grass.

Q—How can we apply two pounds of hydrated lime to 1,000 sq. ft.? (Mo.)

A—By mixing the small amount of hydrated lime with a bucketful of screened topdressing or with a granular organic fertilizer such as Milorganite or similar, or with most any other diluent which will give greater bulk and permit spreading of the dry material.

Q—We seeded Merion bluegrass into our tees. It has been well-watered and fertilized with an inorganic nitrogen. However, we can't find the Merion because *Poa annua* is so prevalent. I know that you and lots of others have recommended Merion for tees, but how do you make it grow? (Mich.)

A—I have always recommended solid sodding of Merion on tees as the best planting method. However, I don't think the Merion would be vigorous under the management you have described, regardless of how it was planted. The fact that *Poa annua* predominates suggests that the