

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

area may be overwatered insofar as the requirements of Merion are concerned.

Merion will do better with a constant, uniform supply of nitrogen as is supplied by an organic carrier. Don't drown Merion; do give it a steady food supply.

When management favors Merion it is a very vigorous grower, and tends to build up a surface thatch just as the aggressive creeping bentgrasses do. The right management for Merion tees includes close, frequent mowing ($\frac{1}{2}$ in. to $\frac{3}{4}$ in.) to prevent puffiness, and aerifying and vertical mowing as needed to control the surface thatch that harbors disease and insects.

Q—What are the symptoms of nematodes on bents? (Ky.)

A—The so-called "yellow tuft disease" of bentgrass long has been known. Usually this occurs in the early spring or in the fall and has not usually been considered too damaging because usually the grass recovers. Recent work has indicated this yellow-tuft condition is always associated with nematodes. The grass frequently takes on a rather chlorotic yellowish unthrifty appearance but positive determination of the presence of nematodes can be made only by a trained man and a microscope.

Q—Most of our greens have small amounts of the little white clover in them and a few have become quite infected. Is there any practical way to eliminate the clover without hurting the greens? (Ill.)

A—In the early days of golf when clover was much more prevalent on putting greens than it is now, much was discouraged by simply bruising with the back of a rake, then sprinkling with dry sulfate of ammonia crystals in the clover patches and allowing them to "cook" for an hour or two in the hot sun.

Following this, syringe with a hose to wash the crystals off the blades. This practice did two things—first, it severely damaged the clover because it has a broad leaf and it holds more of the sulfate than the narrow leaves of bent do, so it burned the leaves of the clover and drastically checked it.

Second, the sulfate of ammonia stimulated the growth of the grass and caused it to grow more rapidly and thus choked the clover by sheer competition. I think this is still a good method worthy of trying wherever the problem exists.

I would like to point out that a clover problem often is secondary to some other

factor in the management. Clover comes in because grass is weakened in some way. Disease, insects, mechanical injury, faulty irrigation practices, inadequate nitrogen, soil compaction—any one or more of these things may contribute to the problem.

Check every phase of management and try to overcome the things that are weakening the grass and allowing the clover invasion. I have seen greens that have been very heavily infested with clover become nearly pure bent greens in a year or two, simply by adhering to a sound program of management. Also, don't pass up the chance to crowd clover out by introducing the more vigorous, aggressive disease-resistant strains of bentgrasses. The use of 2,4-D and 2,4,5-T on greens must be approached cautiously.

Q—Our greens are almost, but not quite, solid Poa annua. The patches that aren't Poa are some badly matted foreign strain of bent. When we use the vertical mower, adjusted for the Poa annua, it tears up the matted bent. The members say that vertical mowing ruins the greens, though I don't quite agree because the patches of matted bent ruin the putting, anyway. What do you have to say about it? (Va.)

A—I think you are right that the patches of poor bent are detrimental to the putting surface. Vertical mowing has helped you to discover the trouble spots. They are like cancerous growths which you must discover and isolate before you can begin treatment.

I would suggest that you adjust the vertical mower so it will not dig too deeply into the bent. Gradually you will get the green uniform enough so that one setting of the vertical mower will be right for the entire area.

If you are dissatisfied with the quality of the bent, you could begin removing it by plugging it out and introducing plugs of an improved strain.

Bill Bengeyfield in Green Section New Western Office in L.A.

WILLIAM H. Bengeyfield, who succeeded Charles G. Wilson as Western Director of the USGA Green Section July 1 now is in the Green Section's offices at Los Angeles.

Through the cooperation of the Southern California Golf Assn., the Green Section's Western offices were moved from Davis, Calif. to the new location in the quarters of the Southern California Assn.,