

When and How Spiking Improves Your Putting Greens

By KENNETH WELTON

THE PRACTICE of spiking putting greens is not a new one. It has been practiced off and on by greenkeepers in this country* for many years. It has usually been done as a purely mechanical means of softening putting green surfaces which have become hard and crusted. The theory is that the puncturing of many holes in the surface of the soil tends to fracture the solid mass, and that the combination of fractures and spoke holes allows the soil some slight movement under pressure which gives the green a softer or more resilient feel.

Spiking has also been used to break up crusts of soil which have formed on the surface due to faulty topdressing and other causes, which if not broken would smother the grass. The same is true of the leathery crust formed on the surface by the growth of algae. Many greenkeepers have spiked at certain seasons to aid in the more rapid absorption of moisture by the soil. Under certain conditions this practice has been very beneficial and has aided in the saving of many areas on greens which otherwise might have died from lack of moisture.

Some greenkeepers have spiked their greens with the idea of relieving a sour condition of the soil. In many cases the reasoning as to how this would be accomplished was rather vague and often entirely wrong, but the spiking usually gave beneficial results and hence appeared to substantiate whatever theory might have been held as to the trouble with the green and as to how the spiking would correct it. Spiking alone does not relieve acidity, which term is sometimes used as synonymous to sourness, but since the term "sour" is often applied to soil that is in poor condition for a variety of reasons, spiking often does give results which become noticeable in the improvement of the turf. A few spiking enthusiasts have claimed brownpatch control with spiking. In some cases an improvement in the soil condition due to the spiking has pro-

vided more healthy turf and hence the spiking can be said to have had a certain indirect control over the disease. However, unless the spiking is continued in such a manner that a definite permanent soil improvement is gained, any disease control by spiking is just about as specific and lasting as control from a change in the weather, or an application of lime, fertilizer, or topdressing might be.

Cultivation Benefits Soil

The real benefits derived from spiking in relief of sourness and disease, or improvement in growth of grass are mostly of a nature similar to the beneficial results obtained by the farmer by cultivating his soil. Even the most amateur of gardeners have an instinctive feeling that the soil should be loosened, turned over, exposed to the sunlight, and aerated in order to put it into good condition for the growth of plants, and the long list of proven benefits of soil cultivation need not be enumerated here. When one considers that many putting greens have been in turf for 10 to 20 years, during which time the soil has not been cultivated it does not seem strange that many people in charge of turf have attempted from time to time to give the soil, by spiking or discing, the cultivation they feel it needs; and that often their efforts have been rewarded.

When a putting green needs tile drainage or should be rebuilt to improve surface drainage, the sods should be removed from the green so that while the tile are being installed and while grading is being done, advantage may be taken of the opportunity to cultivate the topsoil and that whatever additions such as sand, organic matter, and fertilizing elements are necessary may be made before relaying the sod. There are also some greens that have such poor soil condition that, regardless of whether they should be regraded or tile-drained, the preparations and changes in the soil may best be made by removing the sod. But there are many putting

greens that are not so bad in any of the above points as to require the immediate lifting of the sod provided adequate spiking and other necessary treatments are made.

Golf clubs dislike having to put a putting green out of play during the playing season even if a good temporary green is provided. It is not always possible to do certain work when the course is not in play on account of weather conditions, so that any means of working an improvement on putting greens without the necessity of tearing up the greens is of considerable advantage to the club. Spiking can not cure fundamental difficulties due to the wrong strain or variety of grass, disease, poor drainage, and in some cases poor soil conditions, but it may have value in the above cases by its temporary effect and there are a number of problems for which spiking may prove of great permanent value.

Topdress with Spiking

The effect of spiking in softening putting surfaces so that greens will hold approach shots better will be more effective and more permanent in nature if adequate topdressing is done in connection with the spiking. Whatever the effect is of puncturing numerous holes in the turf the soil will soon settle and close the holes. However, the effect of the holes in aerating the soil and in the absorption of moisture will become lasting if some good sandy loam topdressing high in organic matter is worked down into the holes. By working such material into the holes any number of small or large channels of porous material may be projected into a hard-packed soil so that the surface soil is gradually improved under the surface as well as on the surface by the successive spiking and topdressing treatments. In this connection several instances come to mind where greens were in such a packed condition that it was thought necessary to remove the sod to improve the soil but where spiking and working-in of a good prepared soil was practiced as a temporary relief until this major operation could be carried out. In the cases in mind the other fundamental conditions in the greens were good enough that after a number of treatments of combined spiking and topdressing the hard condition on the greens was so relieved that it was not necessary to tear them up.

The soil on many putting greens be-

comes so packed around the edges and on the high areas of the greens that it will not absorb moisture and even though the greens are apparently well watered these areas show signs of lack of moisture. The trouble is that the soil is too packed to absorb the moisture applied by hand or sprinkler quickly enough to get to any depth. Most of the water applied to these areas runs to the low areas where the surplus of water often causes more trouble. Spiking of these hard elevated areas is of great help in this problem and if the spiking is repeatedly and well done these high packed areas can be put into such a condition that they will absorb moisture. When spiking for this purpose it is also well to work an improved porous soil down into the spike holes in order to keep the holes open with absorbent material and to gradually effect a permanent improvement in the soil texture.

When deep spiking has been done and the holes filled with improved soil it has been frequently observed that the roots have grown down the channels of improved soil far below the surrounding roots. This is to be expected as roots find difficulty in forcing their way through hard packed soils. Certain minerals such as phosphorus, potash and calcium are also beneficial in improving the root growth but these minerals with the exception of potash are insoluble and do not readily enter hard packed soil and hence it may take considerable time, if at all, before they come in contact with the roots where most needed. Spiking is of great value in getting these minerals down to the roots, as these minerals may be mixed in topdressing, which in turn may be rubbed and watered into the spike holes. Lead arsenate is freely used on putting greens for grub- and worm-control and for this purpose it does not become effective until it enters the soil. The lead arsenate also is very insoluble so that on hard firm soil it will be much more effective to apply it in the manner recommended for certain minerals mentioned above.

Last but not least, there are many greens, especially creeping bent greens planted with stolons, that have developed a thick surface mat of partially decayed roots and stolons. This mat is often found to be more than two inches thick and is responsible for much turf trouble. This condition may be avoided by correct maintenance practices, but once developed it is

difficult to overcome. When a green gets in this condition it should first be checked for acidity. The soil bacteria will more quickly break down this accumulated organic surface mat if the soil is close to neutral or on the alkaline side. The bacterial action which is necessary to break down the organic mat will also be greatly stimulated by aeration of the soil, so that spiking, or discing, can be of considerable value not only in letting oxygen into the soil but in allowing the lime to enter in case it is found necessary.

I KEEP POA ANNUA

Fertilizing Practice that Keeps Poa Annua Greens During Summer

By JOHN MacGREGOR
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POA ANNUA has caused greenkeepers more worry and sleepless nights than any other putting green grass because it dies out during the summer months—June, July, and August—the months in which there is the heaviest play. During the spring and autumn months, when play is light, *Poa Annua* greens usually are perfect.

What is the reason for this variability? Many have given their opinions on the subject, but none seems to be able to supply the remedy. *Poa Annua* is an annual as the name implies. It belongs to the bluegrass family, and bluegrass develops best in neutral or alkaline soil. It is very seldom one sees greens which are 100 per cent *Poa Annua*, as there usually is a fair percentage of either seeded or vegetative bent in those greens. Now I believe that the average greenkeeper does not cater to the wants of *Poa Annua*, but leans to the development of his bent, hoping that it will take possession of the green and in this way eradicate the *Poa Annua*.

I never have known this to happen, because *Poa Annua* is a prolific multiplier. It drops its seed at least three times a year, so no matter if the old plants die out, the seed will germinate and there will be more of the plants than there were before. Now why not cater to the needs of *Poa Annua* and develop a really excellent putting-green turf? It is agreed by all

good golf players that *Poa Annua* makes a perfect putting green.

The proper method to pursue in developing this turf is first to have the soil analyzed to determine the acidity, alkalinity, available nitrogen, phosphorus, and potash. I am willing to gamble that in soils which show an acidity value of pH 5 to 6.5, *Poa Annua* dies out during the summer months—I am now citing my own experience. My last experience with *Poa Annua* dying out was June, 1933. I had the soil in the greens analyzed and found the acidity to be pH 5.6, and also a great deficiency in phosphorus. During the hottest week of that year I applied 25 pounds of hydrated lime per 1,000 sq. ft. A week later I applied 15 pounds of 20 per cent superphosphate per 1,000 sq. ft. Of course I watered the separate applications thoroughly. By the middle of August the greens were in beautiful condition. By the end of September I found the roots of the *Poa Annua* had penetrated to a depth of two inches. The roots continued to develop during the growing season. Before going into the winter the roots had penetrated to a depth of two and one-half inches. During May, 1934 I applied a complete fertilizer at the rate of 15 pounds per 1,000 sq. ft. Although the spring season was extremely dry, I did not apply water to my greens until the first week in June. My reason for doing this was to encourage the roots to go deeper.

I applied light applications of ammonium sulphate only three times during the entire season. When I say light, I mean three pounds per 1,000 sq. ft. This is the first time in six years that my greens have come through without the *Poa Annua* dying out. I should like also to draw your attention to the fact that I have not top-dressed my greens at all this year. The turf has been so dense that I don't know how I could have worked any compost in to the grass.

The sooner this program is begun and carried through, the better. Do it now!

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