

With either the dust gun or the wheelbarrow duster it is necessary, in order to do a satisfactory dusting, to have the powder absolutely dry. Freshly made Bordeaux dust is nearly white in color, and it will remain that color as long as it is free from moisture. But if it stands exposed to the air, especially in rainy weather, it will absorb moisture, which is evidenced by the white anhydrous copper sulfate taking on the characteristic color of blue-stone. It then becomes pasty and is likely to gum up the feeding apparatus. It has been found that the wheelbarrow duster works best when the hopper is full of the powder and the operator walks at a rapid pace, thus giving a decided jar to the machine.

Watering Putting Greens

A Discussion

Here's what some of the fellows believe about watering putting-greens. Most of them have had long experience.

My belief is that the best results are obtained by saturation, provided greens are properly drained. Twice a week is sufficient, and even three times in the driest weather would do no harm. Sprinkling keeps the roots so near the surface they are more likely to be affected by the heat of the sun. I favor watering very late in the day, but would prefer to have it done at night, if possible.

JAS. L. TAYLOR,

The Elkwanok Country Club, Manchester, Vt.

In regard to watering greens, we find that with good sprinklers and plenty of pressure we get very satisfactory results. We water always after sundown.

F. C. ARMITAGE,

Toronto Golf Club, Long Branch, Ontario.

In considering the question of sprinkling putting-greens, climatic conditions should, of course, be taken into consideration. Seaside golf courses enjoy conditions of moisture which do not prevail in the plains states west of the Mississippi river. As you are, of course, aware, we in this territory experience long and severe droughts during midsummer, and we have found by practical experience that in order to keep our greens soft and thoroughly saturated with moisture, it is necessary during periods of dry weather to sprinkle them every other night.

We employ a man who comes on duty at 5 p. m. and works until 1 o'clock the following morning. He is able properly to look after the sprinkling of nine greens each night. This enables us to sprinkle each green three times a week, no work being done Sunday night. The results obtained have been very satisfactory, the ground being thoroughly wet to a depth of two or three inches. This keeps the surface soft so that a ball pitched onto the green holds.

We have experimented with various types of sprinklers and have come to the conclusion that the only proper way to sprinkle the greens is by means of a rotary sprinkler with a standard 4 or 5 feet high with two revolving arms which distribute the water vertically upward in a very fine spray-like mist. Water so distributed comes as near a natural rain as any method that can be employed, and this certainly is the object to be attained. Any sprinkler delivering the water close to the ground or which has some of the outlets pointing horizontally or down, tends to wash the soil away from the roots of the grass, which of course is bad.

The temperature of the water is an important factor. Water from deeply driven wells or artesian wells is usually too cold. We take water from a large lake in front of the club house, and the water in the lake during the sprinkling season runs from 50 to 70 degrees. Some clubs, where they are obliged to use cold well water, first pump the water into an outside basin or artificial lake and then repump it, after it has become warm and aerated.

I am aware that the amount of sprinkling recommended above is considered excessive by a great many good greenkeepers, but I think those who hold this opinion enjoy better climatic conditions than we do in this drier climate.

WM. F. BROOKS,
Minikahda Club, Minneapolis, Minn.

The proper watering of the greens is a matter which I believe requires more latitude in the judgment of the greenkeeper than a good many other problems. I believe that greens should be watered before they dry out, starting even as early in this section as the first of May.

Our policy is to keep the grass a little bit softer on the greens on which we expect pitch shots to be made. It has been our practice to water the greens thoroughly whenever they are dry, and we have done this by a man using a hose, and also with different types of sprinklers. We have found that if the green is covered first with a preliminary wetting, the main application of water is much better absorbed than if poured on directly at first.

I believe that a properly-built and properly-fertilized green does not require as much watering as one which has not been properly kept up. During the driest time, in exceedingly hot weather, it may be necessary in this vicinity to water as often as every other day, if the greens are desired to be kept nice and green.

SHERRILL SHERMAN,
Yahmudasis Golf Club, Utica, N. Y.

In the writer's opinion, the watering of putting greens should be done only at night, and under normal weather conditions about three times a week. When this watering is done, the greens should be well saturated with a spray, as surface moisture is of very little use. The writer does not approve of daily watering; and while every day or two is sufficient, the moisture should be left with considerable depth instead of in a shallow surface.

FRANK B. BARRETT,
Hollywood Golf Club, Deal, N. J.

It has been our experience that the less water used on Bermuda-grass greens, the better they are. Special care must also be taken in the use of artesian water, as it causes deterioration of the putting-green surface. Top-dressing gives us much better results than watering.

C. B. BUXTON,
Dallas Country Club, Dallas, Tex.

In designing the system at Glen Echo it was first necessary to determine what we wanted in the way of water on the greens; and so far as I have been able to find out, no data have been compiled on the subject. We studied this question thoroughly and adopted a unit requirement of 20 gallons per minute as being sufficient to run three sprinklers of fairly large capacity. This would give on a green 100 feet square a volume of water equivalent to one inch of rain. This we estimated would be about equal to a good, heavy summer shower. For this climate we decided we should be able to put this amount of water onto the greens every other day, necessitating sprinkling nine greens each day or requiring a supply of 180 gallons per minute into our mains.

We were very much surprised at the size of pipes required to give this result, and believe our failure in the past to get sufficient water onto the greens has been due to our ignorance as to the capacity of the ordinary sprinklers and the size of pipe required to operate those sprinklers economically. Of course, these results would vary for each club, and possibly for different greens in the same club. It might require ten hours for a green to absorb an inch of water if the soil had become hard and dry, while on other greens that amount of water might be absorbed in from two to four hours. We hired a hydraulic engineer to design the system for us, and believe that other clubs would experience much less difficulty in getting water onto their greens if they had their sizes of pipe looked into.

W. C. FERGUSON,
Glen Echo Country Club, Normandy, Mo.

At Ortega we use all the water we can get during dry times. Our supply is limited and we can not use as much as we would wish. We use sprays, and run them all night. Our course is sandy, and during dry weather no amount of water is too much.

L. C. MENAGER,
Florida Country Club, Ortega, Fla.

My thought is that when greens are watered they should be watered thoroughly so that you will get penetration of at least three inches, and I would much rather water comparatively seldom in this way than to water frequently for only a short time with almost no penetration. In the former method you teach the roots of your grass to go deep for their moisture, and that is where you want them to be, while in the latter method of frequent and light waterings you teach the grass roots to come to the surface, which results first in a thinner turf and second in a turf that is more liable to burn out.

Most people realize the necessity for watering after the spring and fall reseeding of greens and before the seeds have germinated. While this is important, I feel that it is even more important to see that the greens get an adequate supply of water for at least six weeks after the new grass has germinated, for it is just in this stage of its existence, when it has very small and shallow roots, that it is sure to die unless it receives plenty of moisture.

ALAN D. WILSON,
Merion Cricket Club, Haverford, Pa.

Weather and physical conditions will naturally have a strong bearing on any policy that may be established in connection with watering putting-greens. For the excessively hot weather that normally comes in July and August, in this latitude, I believe in the practice of giving putting-greens a good, thorough soaking once every two or three days, as circumstances demand.

Our observation shows much more beneficial results from this method than the old system of light watering at more frequent intervals, say, once every twenty-four hours.

A. J. HOOD,
Detroit Golf Club, Detroit, Mich.

The question of how often a putting-green should be watered is a difficult one to answer, as conditions of weather, soil, and many other things enter into the problem. My offhand answer would be, to sprinkle them when they need it. Sometimes they need flooding, sometimes sprinkling lightly. The only hard and fast rule that I can think of is not to water them in the hot sun but in the evening after 4 o'clock. A good greenkeeper will know when and how to water his greens, just as a mother will know when her baby needs milk.

W. A. ALEXANDER
Old Elm Club, Fort Sheridan, Ill.

Our practice at Morris County is to give the greens a thorough soaking two or three times a week. We can see no objection to watering in the day time except the possible loss of water by evaporation in a very hot sun. Personally, I think it is preferable to have the blades of grass dry at night rather than to allow them to enter the night freshly watered, as I think the latter tends to encourage the brown-patch fungus.

We always start watering our greens before the grass shows the slightest sign of becoming brown or scorched. I think a number of greenkeepers wait too long before they start with their watering. It is much more difficult to bring back turf than to keep it in a good condition.

We give our greens light top-dressing very frequently during the summer, and water this into the greens. This tends to keep the grass strong and vigorous during the periods when it is most apt to get brown and lose vitality owing to the excessive heat.

We have tried a number of kinds of sprinklers and have no particular make to recommend. The main point is to get plenty of water on and let it soak in thoroughly.

WYNANT D. VANDERPOOL,
Morris County Golf Club, Convent Station, N. J.



Composting pine needles and forest litter with stable manure. A common practice in Eastern Virginia