

The Vegetative Method of Planting Creeping Bent¹

By LYMAN CARRIER.

It would seem that the vegetative method has been sufficiently discussed, so that it might go in a class with other common operations in the maintenance of golf greens which need but to be mentioned to be understood; but our correspondence reveals the fact that there are still a great many people who have a very hazy idea as to what it is all about. Such questions as, "How is the vegetable grass planted?" "How far apart do you make the rows on the green?" "Where can I buy the seed for planting vegetatively?" all show that those asking them are in the kindergarten, so to speak, in respect to the vegetative planting of creeping bent stolons. A recent letter had the request "Where can I buy stolon grass seed?" It is for the new recruits to the turf-growing fraternity that the following description of the grass and the method of planting is prepared.

First let it be clearly understood that there is no seed or seeding involved. As it was necessary to invent a term to distinguish this method of planting from seeding, the word "vegetative" was used, because the stem—a vegetative part of the grass—is planted. All grass stems are jointed like a bamboo fishing pole. The small, hard portions from which come the leaves are called nodes by botanists, and the spaces between these hard places internodes. We use the term joint to include both nodes and internodes. Each joint—or, to be more exact, each node—has one bud. No variation from this has ever been discovered in any species of grass. While a grass stem is growing at its tip a great many of these buds remain dormant and never start to grow; but if the tip is cut off or the stem becomes injured, some of these dormant buds shoot out into branches. It is a provision of nature to help perpetuate the species. In the case of some grasses these buds will not only develop into branches, but the nodes will also send out roots. The number of grasses which have the ability to root at the nodes is small compared with the great number which do not possess it. Bermuda grass, velvet bent, and the true creeping bent are the principal grasses with which the golfers are familiar, that have the ability to take root whenever the stems come in contact with moist ground. With each of these three grasses all that is needed to start a new plant is a node. To demonstrate this, I have cut away everything but the node and found that the bud would still give rise to a healthy shoot. One other thing needs to be understood. In planting these joints or nodes it is not necessary that they have roots on them. The roots will come when the conditions of moisture and temperature are favorable for their growth.

WHAT IS CREEPING BENT?—Creeping bent is a grass that spreads by long creeping stems above the surface of the ground. It belongs botanically in a group of grasses which contains redtop, Rhode Island bent, and velvet bent. The term carpet bent was once applied to creeping bent, because it had been customary in the seed trade to designate the bent seed received from Germany as "creeping bent," although there was never more than a mere trace of true creeping bent in it. Most of the leading seedsmen have very obligingly adopted a suggestion made some time ago by the Green Section and now advertise the German seed as "South German mixed bent." This does away with the necessity of having the term

¹ In this article Prof. Carrier presents in substance the address which he delivered before the Annual Meeting of the Green Section January 4, 1924.

“carpet bent,” which we would now recommend be dropped. This grass is certainly entitled to its true original name.

VARIETIES OF CREEPING BENT.—There are many varieties or strains of creeping bent. Just as all horses do not trot under 2.10 nor all golfers break 80, so all varieties of creeping bent do not produce turf of equal merit. This may be appreciated when it is known that, since we started systematic breeding work with this grass some seven or eight years ago at the Arlington Turf Garden, we have made over one hundred selections of different strains. Of these hundred or more selections all except a half-dozen have been discarded for one reason or another. Some were too coarse; some were susceptible to disease; some became unsightly during hot weather; and the turf of others was thin. We are still making selections whenever we find a variety that has any promise of superior value.



Nursery-grown sod of the Washington strain of creeping bent. This is the natural growth without being cut or rolled.

While the turf formed from any strain of creeping bent planted vegetatively is probably better for athletic fields of all kinds in the North than that produced from seed of any other grass, yet it is not advisable for a greenkeeper blindly to plant his putting greens with any creeping bent he may find growing about his course. There is an altogether too prevalent misconception that bent is bent and that equally satisfactory results can be obtained from stolons grown wild along ditch banks as from those produced in nurseries. It should be understood that the strains of creeping bent which are distributed by the United States Department of Agriculture have been carefully studied for two or more years before their release.

Many of the commercial growers of bent stolons at the present time, but not all, have obtained their foundation stock from the Arlington turf garden or from some one who had previously been given a start from that source. We like to encourage others to be on the lookout for improved strains of creeping bent, but, at the same time, we must caution clubs against the purchase from commercial growers of anything but carefully selected and tested nursery-grown stock. The man who believes he has a better variety than those now commonly grown is perfectly justified in trying it himself, but he should be sure of his ground before he goes into the production of it commercially or induces his friends to make extensive plantings of it. The Green Section will gladly arrange to have impartial tests made of any new selections that appear of promise.

SELECTING STRAINS.—Many persons have noticed spots of extra-fine turf on bent greens. The size of these spots may vary from a few inches up to 2 or 3 feet in diameter. It is usually noticeable that these spots are freer from weeds than is the surrounding turf. If a number of these areas are observed it will be seen that they vary much in texture and color. Each of these spots is the product of a single seed, depending in size on its age and the aggressiveness of the grass. It was the frequently repeated question "Why can I not get a whole green like that spot?" which led to the first selections being made of creeping bent and to the vegetative method of planting the grass.

Selections of creeping bent for the production of stolons to be planted vegetatively are best made on old bent putting greens. Before making a selection the particular spot of turf should be studied carefully to see if it meets all the requirements of desirable turf. There is no use to start with a mediocre strain. Growing grass in a nursery and then planting a green with the resulting stolons will not change the inherent quality of that particular strain of grass one iota. It would probably be a saving of time and trouble in the long run to keep the spot of turf from which the selection is to be made under observation throughout an entire season before taking it up to plant in the nursery; or, only part of the particular patch of grass may be transplanted and the remainder left to demonstrate its fitness for further use. The point we wish to make clear is that no one can tell from one observation of a strain of creeping bent whether it will make turf that will stand up under all conditions from one season to another. The only way to be sure is to try it out.

PLANTING A NURSERY.—Before planting a green it is necessary to grow a quantity of the runners or stolons. These are best propagated in rows 4 to 6 feet apart. The ground in the nursery is prepared before planting in the same manner as for most other crops,—that is, it should be plowed and then harrowed until it is firm beneath and mellow on top. If it can be fallowed a few weeks in the summer, to let some of the weed seeds sprout so they can be killed, all the better. The rows are laid off using a taut string as a guide. With a sharp-pointed stick or something similar, trenches not over 1 inch deep are made. The turf which is to be planted is next taken and torn apart. It will be found that in old bent sod and nursery-grown sod the stolons tend to run in one direction. In nursery-grown sod the long runners separate easily. The runners and any small pieces of sod are then scattered along in the trenches. Two or three runners side by side are enough. The planting in the row is made continuous. A creeping bent nursery is not planted as one would set out

cabbage plants. We have tried that method, and so have a lot of green-keepers, but for some reason the grass does not grow and spread as it does when the stolons are stretched out end to end in a continuous row. As soon as the grass is placed in the trenches it is covered not over one-half inch in depth, using the ordinary soil of the nursery. It is better to have some of the tips of the leaves showing than it is to have it all covered out of sight. The covering is well pressed around the stolons. This can be done by walking down the row, taking very short steps. The row is then watered, using a hose or sprinkling can. In our nursery we seldom give more than this initial watering, but of course there would be faster growth in dry times if it were watered regularly. We have frequently had a spread of 3 feet on each side of the original row in one year's growth from the time of planting. It depends, however, a great deal on the particular strain of bent, how rapidly it will spread. Rows of the Washington strain grow about half as wide as those of some other strains we have had.

One square foot of nursery sod, which will consist of a mass of stolons 2 or 3 inches thick, will plant 100 linear feet of row. If it is ordinary putting turf or old sod picked from about the course, it will take more than 1 square foot to plant this length of row. The subsequent care after the nursery is planted may be summed up in two words,—*clean cultivation*. All weeds should be pulled out of the rows, the spaces between the rows must be kept free from weeds and the soil on the surface loose and friable.

PLANTING FOR TURF.—The preparation of a putting green or turf bed for planting with stolons does not differ from that needed for seeding. But before the work of planting is started there must be provided within easy wheelbarrow-distance from the green a pile of top-dressing with which to cover the stolons. It will take about 15 cubic yards of material for a green of 6,000 square feet. While all of this will not be needed for the first covering, it will be necessary to make several top-dressings later; and so it is advisable to provide ample material at the beginning. This top-dressing for covering the stolons may be any good mellow soil which does not run together when wet and form a crust. If the soil contains a considerable amount of clay it will need to have sand mixed with it. A good rich sandy loam is ideal. It should be of such a texture that when a handful of the moist top-dressing is pressed into a ball it will readily crumble to pieces again.

PREPARING THE STOLONS FOR PLANTING.—The stolons should be cut into pieces from 1 to 2 inches in length and separated so they can be evenly broadcast. Now, the cutting and separating of these creeping bent stolons is a whole lot easier to write about than it is to do in actual practice. The methods of the past of cutting the sod into pieces by running it through a chopping-box or fodder-cutter and then picking the chunks apart by hand, are too slow for jobs where more than one or two greens are to be planted. If the nursery is home-grown—that is, easily accessible to the course where the planting is to be done—the method for chopping the stolons is simpler than where sod has to be shipped from a distance. In the former case no more stolons should be taken up in the nursery than will be planted that day. These should be cut off above the surface of the ground. Remember that the roots are not needed if the stolons are planted immediately. If there are no crowns of the grass with their intertwining roots to contend with, separating the pieces of stolons after the material has been run once or twice through a fodder-

cutter is not difficult. A different method from the above which was tried out at one club this last fall worked successfully. A lawn-mower with a grass-catcher attached was run up and down the nursery row. The clippings were in fine condition for planting. A rope was attached to the front of the mower, and two men pulled while a third man pushed and guided the machine. Where this method is followed it is not necessary to take up the rooted crowns, which will soon produce another crop of joints for further planting. Power machinery for cutting and shredding nursery sod has been successfully tried out. These machines do the work of a large number of laborers.

PLANTING THE STOLONS.—If the ground is dry, it is advisable to wet the green a few hours before planting. One of the chief troubles I have had in supervising the planting of some 200 putting greens by the vegetative method is to get some greenkeepers and laborers to realize that they are handling live grass which must not be allowed to become dry. Creeping bent stolons will stand a lot of rough treatment while they are moist. Chopping and shredding do not injure the vitality of the buds. But if you let them get thoroughly dried out you might as well bid the grass good-bye.



Scattering the pieces of stolons for sod. The top-dressing has been spread in the background, but not rolled.

The cut pieces of stolons are spread evenly over the surface of the green. There should be no large bare spots. A live joint to every square inch is desirable to give first-class turf, but it is necessary to spread somewhat more thickly than that in order to be sure of an even stand. One square foot of good thick nursery sod will plant 10 square feet of green. Much planting has been done at a thinner rate than this and good turf has resulted, but it takes longer and requires more labor in weeding and plug-

ging grass in the bare places than would be necessary if sufficient material were used at the outset.

As soon as the stolons are spread they are covered lightly with the top-dressing. Three-eighths of an inch of the top-dressing, if properly put on, is sufficient,—that is, if it is dropped directly on top of the pieces of grass and not thrown sidewise so as to roll underneath the stolons. I like to have portions of the pieces of grass showing above the dressing. Do not bury the stolons too deeply. Most of the young shoots are not strong enough to force their way through an inch of top-dressing. They will take root more quickly and grow faster on the surface of the ground without any covering than they will when top-dressed, provided they are kept continually moist. The covering serves the purpose of holding the cut stolons in place and in contact with moist soil.

PLANTING ORGANIZATION.—The equipment needed for planting the stolons after they have been cut up and shredded consists of a half-dozen galvanized iron 10-quart pails, 4 or 5 wheelbarrows, 4 or 5 shovels, a light roller, and enough 1-inch by 10-inch boards to reach from the pile of top-dressing to the farthest corner of the green.

The efficiency of a planting crew depends a great deal on whether it is properly directed or not. Any lost motion—one man idling while another is in his way—adds decidedly to the cost. A well-organized crew may plant twice as much ground in a day, and without greater effort, than one which is out of balance.

I try to get the following arrangement where possible: 3 men with pails to scatter the stolons; 4 men with wheelbarrows to spread the top-dressing; 1 man with roller to direct the work and roll the green as fast as the top-dressing is applied. Starting at one corner of the green, each of the men spreading stolons should start planting a strip about $2\frac{1}{2}$ feet wide, walking backward as he scatters the pieces. Each man should walk directly backward, like a crawfish, and not sidewise, like a fiddler-crab. The man supervising the work should see that the stolons are scattered evenly and that there are no vacant places between the strips. It takes some training before three men will learn to spread the pieces at the same rate and work together as a team.

The top-dressing is applied immediately, working from the side of the green for the first trip. I have the spreading done by hand directly from the wheelbarrows. The workers soon learn to let the soil sift through their fingers directly on top of the stolons. They should never try to cover more than they can easily reach. As soon as a strip is covered, it should be rolled lightly, and then the boards may be laid on it for wheeling on the top-dressing for the next strip. If the three men spreading stolons get more than 10 minutes ahead of the men applying the top-dressing on a dry day, one of them is changed to help spread the top-dressing. A crew this size should easily plant 12,000 to 15,000 square feet of greens in a day. Some planting crews this past fall did much more than that, while others did not do so well. Be sure to have the top-dressers working back of and not in front of the men spreading stolons.

WATERING.—As soon as the chopped stolons are spread, top-dressed, and rolled, the green should be watered. It is advisable to set the most trustworthy men you have at the watering, for the final success of the whole procedure depends a great deal on the watering the greens receive during the first two or three weeks after planting. The surface

of the green should be kept moist all of the time. You can not make up by extra watering one day for neglect the day before.

The watering is best done by hand, with the hose equipped with a rose nozzle. On large greens it is advisable to have an extra hand to carry the hose on and off the green. One man trying to do the watering and at the same time drag the hose around is sure to draw a lot of the stolons out of place. Do not be afraid to water during the day. The old fear that watering on bright sunshiny days will kill grass has proved to be groundless.

SUBSEQUENT CARE.—The grass should begin to come up in about a week after planting, if the temperature is warm. When the nights are cold it may take longer for it to show. In three or four weeks there is usually enough growth to make it advisable to mow it. After it has been cut, the next thing to do is to top-dress lightly. One cubic yard to an average green is about right. The top-dressing should be worked down around the roots of the grass and into the depressions. When the planting is done in the fall, one or two top-dressings are usually all that are advisable before cold weather comes. Just as soon as growth starts in the spring this same treatment should be repeated—that is, cut, top-dress, and smooth up the surface. A month of good growing weather in the spring is usually all that it takes to make the grass grow together into a turf. If there are any bare spots of 5 inches or more in diameter, they should have small plugs of the bent planted in them. These plugs can usually be taken from thrifty tufts of the grass near the spots, or they may be taken from around the margin of the green. Bare spots no larger than a man's hand will be quickly covered when the bent gets to growing vigorously. The treatment in the spring should be aimed toward making a true putting surface.

The first two or three times the green is cut, it is customary to let the clippings fall on the ground and to cover them with top-dressing. The young tips of the stems will take root and grow even though no joints are visible on them. Of course, if the growth is heavy and there is danger of the clippings smothering the grass beneath, the clippings should be removed. There are some excellent pieces of turf which were produced by planting the clippings from creeping bent greens. In most cases it is not advisable to let the grass on a putting green grow sufficiently long to permit of the use of the clippings in this manner, but a turf bed might well be kept for such a purpose. During good growing weather the turf bed might be clipped every ten days or two weeks and the clippings used for planting. The tender tip is the most active part of a stolon and will make a faster growth when planted than will the older joints.

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