Vegetative Planting of Bent Grasses: An Historical Sketch

R. A. OAKLEY

At this time, when a very general interest is manifested in the vegetative planting of the bent grasses, it seems worth while to tell the story of how the method came to be used for the making of putting greens. It has been told before, but not fully in THE BULLETIN; therefore, it will be recorded here for the interest it may have for the readers of today and for its historical value for the future.

Let it be clearly understood at the outset that the propagation of grasses by their vegetative parts is an agricultural and horticultural practice of very long standing. The most common example of this method is found in the propagation of Bermuda grass in our southern states. Bermuda grass is propagated very extensively by runners or pieces of sod. This is done by the farmers as a field practice without the refinements that attend the making and rooting of cuttings, as done by the horticulturists. Such field methods can only be used in connection with plants that are quite aggressive. That is why Bermuda grass lends itself so well to planting by runners and sod.

Grass may be propagated vegetatively by pieces of the crown or clump, botanically known as *clones,* by rootstocks (which are underground creeping stems), or by stolons or runners (which are above-ground creeping stems), though not all grasses possess these last two vegetative organs. In their work with the fine turf grasses, Mr. J. B. Olcott, of Manchester, Connnecticut, and Mr. Fred W. Taylor, of Philadelphia, both propagated plots of turf by setting out small pieces of sod at close intervals. In practice this is essentially the setting out of pieces of the crowns or clumps of the grass. While these men appreciated many of the advantages of growing fine turf by vegetative propagation, neither of them thought of propagating the bent grasses by runners as they are propagated today. There is a very great difference between this method and the setting out of small pieces of sod or turf, albeit from a botanical standpoint they are very much alike.

It may be worth while to digress here sufficiently to explain briefly how it is possible to propagate grasses by their vegetative parts. No matter what vegetative part of the grass plant is used for propagation, the important organ is the joint, technically known as the *node.* The stems of all grasses, whether they be underground stems or above-ground stems, possess joints. They are usually observed as small swellings on the stems. Sometimes they are several inches apart. Other times, as in the case of young plants, they are very close together. The piece of stem between the joints or nodes is called the *internode.* Each joint is capable of producing a bud, just one, no more, and this bud is capable of producing a new plant. In thick, closely clipped turf of the bents or the fescues, the joints can be found only by tearing the small individual plants apart and carefully stripping back the leaves. When this is done the joints will be found very close together at the base of the small plant. During the growing season

new shoots are continuously developing from the buds at these almost invisible joints. When the plants grow in the open, that is, when they have a chance to spread, the stems and joints become plainly visible. In the case of some of the bents, the stems may become very long. Those who are not familiar with the turf-forming habits of the grasses will find the subject an interesting field for study. A general understanding of these habits will give one a much greater appreciation of what good turf and its maintenance really means.

Getting back to the story, the propagation of the bent grasses by runners may be said to owe its start, primarily, to a small matter of curiosity. For many years the United States Department of Agriculture has conducted investigations with fine turf grasses. In the course of these investigations Dr. C. V. Piper and his assistants, including Prof. Lyman Carrier and the writer, became much interested in the patches of uniform and excellent turf that are found on all putting greens sown with seed of German mixed bent. Everyone who has carefully observed putting greens in the northeastern quarter of the United States knows what these patches are like. They range from a few inches to several feet in diameter, and are very distinct in outline. In color they range from pale apple-green, to dark blue-green. Curiosity on the part of the aforementioned group of investigators to know what grasses made these distinct areas of superb turf, led to the starting of a systematic study in the summer of 1916 to solve the mystery.

A bit of ancient history in the vegetative method of making bent grass putting greens. This is the way creeping bent runners were chopped for the first greens planted at East Potomac Park in October, 1916.

Almost at the outset of these investigations it became evident that the patches in each case resulted from the spreading of a single bent plant. The problem then, for the time being, resolved itself into the discovery of how many species of bent grass were involved and to the acquiring of an intimate knowledge of their vegetative and seed habits. The first step in the investigation was to get small plugs from as many differently appearing patches as could well be studied. The grounds of the Department of Agriculture and the greens of many golf courses, including those of the Columbia Country Club, the Merion Cricket Club, the Washington Golf and Country Club, and the Ekwanok Club, contributed a large amount of valuable material for study. The plugs, some no more than two inches in diameter, and some cut to fit the ordinary cigar box or golf ball box, the usual shipping containers, were pulled apart and the pieces planted 4 inches apart in rows 3½ feet wide.

At the Arlington Experimental Farm a veritable bontanical circus resulted when the grasses, given a real chance to grow uncrowded, began to show what they could do. Some selections produced an abundance of rapidly growing runners which rooted at the joints; some grew more nearly upright and spread slowly. Among the former were such coarse-growing strains that no one without having seen them under turf conditions would ever suspect them of being capable of making fine turf. In general, the more rapidly spreading strains were darker in color and somewhat coarser than the more slowly spreading strains. To the first group the descriptive name *carpet bent* was applied; later these grasses were found to be true creeping bent, which name is now regarded as preferable. To the second group, that is, to the fine, light-colored, slow-spreading strains, the name *velvet bent* was given.

Botanists from the time of Linnaeus, who started our present system of botanical naming, known as the binomial or two-name system, which gave us the name of *Poa annua* and the like, have tried to classify the various bents according to their relationships. For one reason or another they failed to do so satisfactorily. The growing of the selections at Arlington made it possible to clear up the botanical names of the common bents. The botanical name *Agrostis stolonifera* was given to the strains called creeping bent, and *Agrostis canina* to those called velvet bent.

It should be mentioned here that pieces of the sod that make up the bent turf on greens between the distinct patches of creeping bent and velvet bent were planted in rows and studied in the same way as were plugs of these bents. A study of the vegetative and seed habits of these pieces of turf showed them to be of one kind of bent, which a later study by Dr. Piper proved conclusively to be the same as the Rhode Island bent of New England. To this species was assigned the botanical name *Agrostis vulgaris*. Formerly botanists had used the name *Agrostis canina* for Rhode Island bent, but careful study of the characters of true Rhode Island bent disclosed the error in applying the botanical name of *Agrostis canina* to it. Just about this time Mr. F. H. Hillman, of the Seed Laboratory of the

Bureau of Plant Industry, discovered how to identify seeds of each of the various species of bent and redtop. This helped immensely not only in clearing up the botanical tangle, but in enabling the investigators to determine from examination of a sample of German bent seed (commercially known as creeping bent seed) just what species it contains. In brief, it was found that the German bent seed on a redtop-seed, chaff, and weed-seed-free basis, is composed of approximately 85 per cent of seed of *Agrostis vulgaris,* which is commonly known as Rhode Island bent, approximately 15 per cent of seed of *Agrostis canina,* to which the name velvet bent has been given, and a mere trace of seed of *Agrostis stolonifera,* or true creeping bent. Rhode Island bent does not produce runners and spread in the manner of creeping bent or velvet bent and, therefore, does not lend itself well to vegetation propagation as do these species. However, it makes an excellent putting green turf from seed, as those who have tried it are well aware. Seed now on the market under the name of *Colonial bent* is that of *Agrostis vulgaris,* or Rhode Island bent, but produced in New Zealand.

It was not enough to grow rows of the various strains of bents that make excellent turf and to study their turf-forming and specific botanical characters, but an effort was called for to make practical use of the best of the strains for putting greens. The possibilities of producing seed of them on anything like a sufficient scale to be useful were quite remote. The only other means of utilizing them was by vegetative propagation. In addition to making row plantings at Arlington in the fall of 1916, plugs of turf were set out in plots approximately four inches apart each way to see how long it would take to get close, continuous turf by this method. The grass spread from the plugs and ultimately covered the ground completely, but the turf was uneven, owing to the high, hard spots caused by the original plantings. While this experience was quite discouraging, the long rooting runners of the more spreading strains brought to mind Bermuda grass and how it is commonly propagated in the South. It will be remembered that about this time the supply of bent seed had been reduced to practically nothing because of war conditions. This was likewise an incentive to propagate the bents vegetatively.

In September, 1917, plots 8x8 feet in the grass garden at Arlington were prepared as for seeding, and runners of some of the best strains of both creeping bent and velvet bent were spread thinly but uniformly over the beds. They were then covered with about one-half inch of good compost, composed largely of top soil, and rolled and watered carefully. The runners thus planted rooted quickly and sent up new plants from the joints. While the whole runners were used for the first plot plantings, the idea of cutting them in three-inch lengths suggested itself in the interest of economy of material and ease of its distribution. In a few weeks the experiment gave sufficient promise to justify the planting of long rows in a nursery to furnish runners for more extensive tests in 1918. These nursery rows were planted in October, 1917. They were 8 rods long and approximately 6 feet apart. By September, 1918, the most rapidly spreading strains of creep-

ing bent had covered a width of 4 to 6 feet; therefore, abundance of planting material was available for continuing the turf experiments started the fall previously.

The most notable plantings of the fall of 1918 were made on the greens of the East Potomac Park Public Golf Course; in all, five greens were planted on this course between the dates of October 2 and 12. These were the first putting greens to be planted with bent runners and gave added evidence of the feasibility and advantages of the vegetative method. Plots of many different strains of both creeping bent and velvet bent were planted at Arlington, so that a good opportunity was afforded for studying the possibilities of the new way of getting putting green turf.

Additional nursery rows were planted at Arlington in September, 1918, and Dr. Walter S. Harban started a nursery at the Columbia Country Club later that fall. This was the first bent grass nursery to be established on a golf course. From this nursery the 9th green of the Columbia course was planted in the fall of 1919. This green attracted so much attention that it virtually "sold" the vegetative method to the golfing fraternity.

At first clubs were somewhat slow to take up the new method of making greens, largely because of lack of available material for planting. Last fall (1922) for the first time bent runners were available from commercial sources, and as the result upward of 125 greens were planted. With commercial concerns establishing large bent nurseries, and golf clubs starting small ones, it is practically certain that bent runners will be plentiful in the future. Those who have seen a good vegetatively planted bent green, such as No. 9 at Columbia, are not happy until they get greens of this character on their home course. In no other way is it possible to get fine bent turf, uniform in color and texture.

In New England and doubtless other parts of the North, it will be easily possible to make excellent greens by planting velvet bent runners. Velvet bent is the putting green turf par excellence where it can be maintained with reasonable care; however, the best strains of creeping bent, although a trifle coarser, are likewise most excellent. They will spread faster and will withstand the wear and tear under most conditions better than the velvet bents, and for this reason they are generally more satisfactory.

Vegetatively planted bent greens are by no means an extravagance. The cost of making them is not excessive, in fact it is relatively low; and the cost of maintaining them, considering the state of perfection it is possible to attain, is lower than the average cost of maintaining the much less desirable greens produced from sowing seed.

In reading an article written in December, 1918, by Piper and Oakley, the writer came across the following statement with regard to the making of bent putting greens by the vegetative method:

"But there are two things that may make trouble. First, there may be some difficulty resulting from the surface runners that develop after planting and which really are responsible for the closeness of the turf.

They are more prominent in the carpet bents than in the velvet bents, but in all probability the planting of properly prepared material and the liberal application of good humus top-dressing will entirely correct this difficulty. The second trouble to be feared is the susceptibility of the carpet and velvet bents to the brown-patch disease, a fungous disease which is very prevalent and destructive to putting greens in moist, hot times in the spring and summer."

The first difficulty mentioned (that is, the one from surface runners) has not materialized; the proper use of top-dressing obviates it completely. Brown-patch, however, has proved to be a very serious turf disease; but a careful study of its effects upon vegetatively planted greens and upon greens seeded with bents or fescues, shows little difference in the resistance of one over the other. Furthermore, by systematic and careful use of Bordeaux, either the liquid or the powder, the brown-patch disease can be reasonably well controlled.

The greens planted on the East Potomac Park Public Golf Course in 1918, were the victims of a combination of unfortunate conditions which resulted in their undoing. Those now responsible for the course, however, give assurance that the combination will never occur again, but with all the factors that operated against them, of which brown-patch was one, the greens would be in condition today, if only they had been left alone. As it is, No. 9-A, the first green planted, promises to stage a comeback that will surprise some who thought it successfully dead and buried. It is scarcely an exaggeration to say that the success of No. 9 green at the Columbia Country Club is known wherever golf is played, and it is safe to say that there is not a finer piece of putting turf anywhere in the world. It is now entering into its fourth year in better condition, if such is possible, than at any time in its history.

It is needless to make predictions for the future of the vegetative planting of the bent grasses. The future is so near at hand that it will very soon speak for itself.

Vegetative Planting of Putting Greens

WALTER S. HARBAN

The success we have had at Columbia with the vegetative propagation of the bent grasses has brought forth requests that I give the readers of THE BULLETIN some suggestions descriptive of the steps involved in making putting greens, such for example as our No. 9. I shall endeavor, therefore, to describe in simple terms the various steps in the method from the growing of the stolons for the planting of the green to the treatment of the resulting turf.