

Behavior of Named Bents Under Playing Use*

By W. H. GLOVER

Greenkeeping Supt., Fairfax (Va.) Country club

When the behavior of any grass is considered, all the factors which have a bearing on the life processes of the plants must be taken into account along with the grass being considered. It would be an unfounded statement to say that one of the selections which I have been dealing with is superior to another species under just any condition. I would have no observation or scientific data to support such a statement. So, in order to put some meaning into any observations made, it is quite necessary to establish some sort of a base to work from. With this in mind it is in order to give some of the fundamental facts regarding the construction and maintenance of greens at Fairfax CC. I propose to show that the observations which have been made on the selections of bent grasses with which we have been dealing are grounded on what might be termed a fairly well controlled experiment with very few variable factors.

The first nine holes were built during 1940 and were put in play during May, 1941. An attempt was made to build every green with perfect surface and subsurface drainage. All greens are tile drained with a herring-bone system with the laterals being spaced closer together in the areas where the surface water is taken off. The architect left two greens with pockets in them which hold enough water to produce trouble. These two mistakes have since been corrected.

The soil is very nearly the same mixture on each green. It is a made soil and was mixed on the green site. The mixture consists of 6 to 8 inches of 50 percent of clay-loam soil, 50 percent of very coarse sand, and 25 percent of humus added. All measurements were by volume. These ingredients were mixed during the summer with tractor and disc harrow until the middle of August when 50 pounds of 16 percent super-phosphate was added for each 1000 square feet of area along with 100 pounds of ground limestone. After this was harrowed in well, 15 pounds of lead arsenate was applied plus 35 pounds of 10-6-4, 50 percent organic, fertilizer to each 1000 square feet of area. All of this mixture was then rototilled in four direc-

tions and levelled and compacted until the surfaces were ready to plant.

Maintenance practices have been held as nearly constant for all greens as possible except where geographical locations have made it advisable to vary them. Insofar as cutting, aerifying, feeding, mowing, pest control, raking and topdressing were concerned all greens were treated alike. Water management has been the greatest varying factor.

Bent Planting Program

C-1, C-19, C-27, C-50, C-52, and C-15 were planted as individual strains on six greens and then a combination of C-(1-19-27), C-(1-19), and C-(1-27) was planted on each of the remaining three greens in the order mentioned.

These were the selections which had been rated superior in the Arlington Turf Garden plots previous to 1940. Many observations had been made on the plots and some in the field but, to my best knowledge, this was the first large scale use of these selections on nine greens of a golf course where they were going to be placed under actual playing conditions.

Mixed plantings were put down because it was thought to be desirable to try and incorporate the rugged qualities of C-1 in a combination with some of the finer bladed grasses. It has been observed that Arlington bent had shown unusual ability to withstand heavy traffic, to develop a deep root system, and to better withstand the excessive heat and humidity of the Washington area. It had also been recognized that this grass by itself did not produce quite as desirable a putting surface as some of the finer bladed grasses like C-19 or C-15 which have a closer incidence of nodding and finer leaf structure. Both C-1 and C-19 are very close in color to C-1.

The unknown quantity and the very important question was: would these grasses separate into a green resembling the mixed German Bent greens with differentials in texture on the same green or would they be compatible in growth habits and blend into an even-textured putting surface?

* (NGSA convention paper)

All of these greens were rated quite regularly by the personnel of the USGA Green Section and by many of the green-keeping superintendents in the area and by golfers who play the course. At the end of five years and just previous to the decision to build nine more holes, all of the rating data were gone over and a list was compiled ranking each planting as to its desirability in a descending order. The list showed the plantings to be in the following order:

- C-(1-19-27) which is Arlington, Congressional and Collins bent
- C-(1-19) which is Arlington and Congressional
- C-19 Congressional
- C-15 Toronto
- C-52 Old Orchard
- C-1 Arlington
- C-27-1 Collins and Arlington
- C-27 Collins

Combination Proved Superior

It was observed quite strikingly that the combination of C-(1-19-27) had been outstanding in its general demeanor and was superior to all other plantings. There was little difference between any of the plantings during the spring and fall growing seasons. Outbreaks of attacks from fungi came less often, damage was less severe and recovery more rapid.

By the end of 1943 it became very noticeable that this combination had a better ability to withstand the abrasive effects of extremely heavy play and to recover rapidly from the extreme foot traffic which is concentrated in the cupping areas.

It was also noticed that between feedings, as we approached the time when more fertilizer was needed, the plantings with C-1 in them showed the need for nitrogen sooner than the others. We began to adjust our feeding program to include more nitrogen so it would fit the combination plantings and the green which had been planted to C-1 alone.

The single strain greens were left to adjust themselves to the increased nitrogen feeding. We included more organic nitrogen in the feedings but kept the interval the same. This treatment kept the color at a more even level but did not produce a soft turf; nor could we see that it increased the incidence of fungus attacks.

From observations made so far, I cannot say that C-1 is immune from attacks of large brown patch; but I do sincerely say that C-1 and the combination grasses including it are not damaged so severely as other selections observed and does definitely recover more rapidly from the

damage caused by attacks than any putting green turf I have ever handled. I attribute its resistance to damage and its recovery to its general vigor and its coarser, harder stolon. It is not immune to attack from pythium but does recover rapidly.

Many of the same things can be said for the combination C-(1-19) as has been said for the three-way combination. In fact, there is not too much difference between the two greens which were observed. The factor which made the three-way combination rate first was that, the green on which it was located happened to be near the clubhouse where it was subjected to more traffic and it still stood out over the others in spite of its added burden of traffic.

It should be said that the combination greens and the single planting of C-1 were found to require more raking to make them produce their best putting surface. By raking I do not mean casual brushing. I mean actually getting down into the nap with something like a Del Monte rake, preferably on a power driven machine, which makes it possible to really bear down and break up stolon structure. We accomplish this by placing the rake on the back drawbar of an OverGreen tractor. After a severe raking it is not uncommon to take 20 to 30 boxes of clippings from an average-sized green. If the turf is vigorous this practice does not disturb the putting surface, even temporarily. This raking practice is carried out from two to four times per season with regular brushing in between.

C-19, C-15, and C-52 will be grouped together because they have been rated very close together. They are better-than-average grasses. Under optimum conditions they have performed admirably and even during the difficult part of the season can not be criticized too severely. There has been a higher incidence of disease on these single strain plantings than on the combinations. C-15 is more susceptible to invasion by dollarspot than the other two but does not take pythium nor copper spot as readily as the other two. Since the advent of the cadmium base fungicides we have experienced very little difficulty in controlling any of the three diseases mentioned, with the exception of pythium which no one seems to be able to control.

The single planting of C-1 which we have is on one of the worst locations geographically of any green on the golf course. It is a par three hole and only three and one-half feet above the level of a water hazard which surrounds it half way. Even though the tree area is not close enough to shade the green it is so

(Continued on page 101)

should not be used on the golf course itself, except at the tees. It is also important to not use too many varieties of trees, but to have those that are very hardy and are native to the region in which the club is located.

The outstanding course will be completely streamlined as far as the designs of the tees, fairway sandtraps, putting greens and fairways are concerned and will be easy to maintain with power equipment. This will result in an economical, functional and more beautiful layout.

BEHAVIOR OF BENTS

(Continued from page 70)

located as to cause a serious air drainage problem. Yet the turf has stood up remarkably well. Even during the last season an attack of pythium was the most serious trouble which developed and the recovery was complete in less than a week. There has been less dollarspot on this C-1 green than on any other pure strain green in spite of its location.

The planting of C-1 and C-27 combined has not been an outstanding piece of turf.

It has been satisfactory and can be compared favorably with C-1 alone. The addition of the C-27 helps the putting surface but I feel confident that if it were to be placed on the green just mentioned above that it would eventually go completely to C-1. The C-27 probably would not stand the location and adverse conditions encountered where the C-1 is now located.

C-27 by itself has been only an average green. It does not grow as vigorously as C-1 or C-19 and has to be watched a little more closely. I cannot condemn it because the green on which it is planted is one of the two where I lost out to the architect on surface drainage.

C-50 has proved to be the weakest of any of the selections used. In some manner a small amount of C-52 stolons were mixed in the original planting. It is now a motley green of mostly C-52 and is not pretty to look at. This planting has proved that these two grasses are not compatible because they separate into definite areas of each grass and do not produce a combination in which you can not detect one grass from the other. I could not recommend either grass be placed in combination with other grasses.

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At the time in early 1946 when it was decided to build the last nine holes, our records showed that we would be wise to plant all of the new greens to the combination of C-(1-19-27). By this time we knew about how much traffic to expect and were quite sure that we were selecting the proper grass combination. Experience had taught us that we needed even more positive drainage both on the surface and in the sub-surface area. Larger putting areas were needed and were constructed to give an average green size of 6500 square feet as against 5000 square feet on the first nine holes.

The selection of the three way combination has proven to be a wise choice. The best located greens represent the best putting areas I have had the pleasure of maintaining under extremely heavy play and the poorer located greens pose less of a problem in maintenance than one would ordinarily expect from modified sunlight and poorer air drainage.

However, since the advent of the cadmium-bases fungicides to control dollar spot and copper spot my regard for C-15 has risen appreciably and I would be inclined to replace the C-27 in the three way mixture of C-(1-19-27) with C-15. There is another selection which looks promising as a fourth member of a four-

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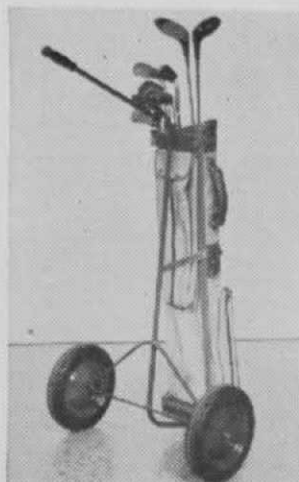
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way combination and it is C-115. Or, better than that, and because of its yellow-green color, a combination of C-115 and C-7, which has been named Cohanse, might prove to be a superior combination. I have had no direct experience with C-7 but have observed it many times and am sure that it would rate with the top three. Neither of these two grasses has proven itself compatible with other grasses or with each other.

Withstand Invasions

Probably the greatest single strong point in favor of the top ranking combinations and selections mentioned is their ability to withstand the invasion of poa annua and crabgrass. On the first nine holes constructed and after nine years under actual play there has been less than 100 square feet of poa annua in the 45,000 square feet of putting green turf. This small amount has been almost entirely eliminated by the raising of two low areas in two greens where small pockets existed. There has never been any other thin or bare areas into which poa annua could get a start. This speaks well for any putting green grass grown in the Washington area where poa annua is considered a pest.

Much the same story is true regarding the invasion of crabgrass. It has always



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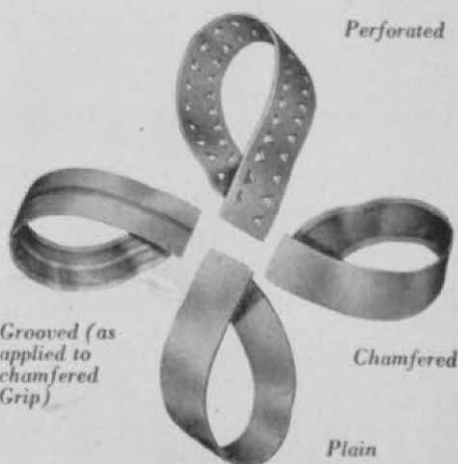
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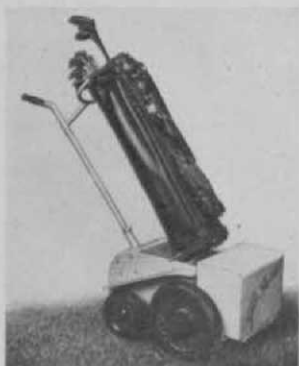
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been controlled by picking and is now so sparse that it is controlled by the men who change the cups as they go over the greens repairing ball pocks.

Let us sum up our experiences with the grasses we have used by reminding that:

1. The combination of C-(1-19-27) has been superior.
2. It needs more severe raking than is customarily looked upon as necessary.
3. Uses to advantage more fertilizer; nitrogen in particular.
4. Is not hurt so severely by fungi and recovers fungus damage more rapidly.
5. Seems to do better with lighter and less frequent applications of water.
6. Stands up well under extremely heavy play and recovers very rapidly from abrasion damage.
7. Resists invasion by poa annua and crabgrass.
8. Can be made to produce an excellent putting surface throughout the season.
9. The same experiences hold true for the rest of the grasses used but in decreasing values as they are listed previously in this discussion, with C-50 rated as the least desirable in all respects.

I would suggest strongly that, as selections are made and looked upon favorably

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A total of 79 individuals registered for the Rutgers One-Week Course in Turf Management held Jan. 30 through Feb. 3.

Among the variety of lecture topics, two subjects were given extra emphasis. First, water management on turf occupied an entire morning session. Dr. James R. Watson took time before his move from the Pennsylvania State College to Texas A & M to talk on "The Influence of Compaction and Watering on Turf". He presented data showing an increase in disease and crabgrass with the excessive use of water. Dr. Fred V. Grau followed with comments on "The Proper Watering of Turf". He stressed the fact that water is too often used in excess on turf. Also, he suggested that mechanical treatments such as aeration be used to open compact soils to better penetration of water.

The second major topic was fairway renovation. Dr. M. A. Sprague of the Farm

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