

TURF CULTURE

Volume 1

APRIL, 1939

Number 2

NEW VARIETIES OF KENTUCKY BLUEGRASS

JOHN MONTEITH, JR.*

Kentucky bluegrass is the most widely used turf grass in this country. It is planted under a great variety of soil and climatic conditions to produce turf for various purposes. In some instances it is used merely to provide a ground cover while in others it is expected to develop a dense, lush mat of grass which may be classed as a thing of beauty. In other areas it is expected to provide a tough sod which will endure almost continuous trampling and be able to recover quickly from scars such as those caused by the clubs of golfers, the cleats of football players, or even the shoes of polo ponies.

In spite of all the special purposes for which this grass is planted and the great assortment of soils and environments to which it is subjected there are at present no commercial varieties especially suited to meet particular requirements. Kentucky bluegrass seed purchased for turf to be grown for a particular purpose under a specific set of conditions is taken from the same stock used elsewhere for entirely different turf needs. It also comes from the same stock which farmers plant to produce forage for live stock.

The absence of specialized varieties of this grass to meet particular requirements is not due to any lack of variability within

*Director of the United States Golf Association Green Section.

the species. It is merely because no improvement work on a commercial scale has been carried on with lawn grasses.

SELECTION IN GRASSES

In recent years attempts have been made to develop improved strains of grasses for pasture and hay. As a result of this work, notably in Norway and Sweden, seed of varieties of Kentucky



Variations in strains of Kentucky bluegrass. This strain and the two shown on the opposite page were all planted vegetatively in the same manner and at the same time. They were grown in similar flats of soil in the greenhouse. Note the different types of growth in these three strains. The strain shown here is early flowering and less dense than the others.

bluegrass is now available. In other countries, particularly at the Welsh Plant Breeding Station at Aberystwyth, special varieties of other grasses have been developed, including ryegrass,



A low-growing, upright, rapid-spreading type of Kentucky bluegrass which has many of the characteristics sought in turf grasses.



A vigorous leafy strain of Kentucky bluegrass growing under identical conditions as the two others shown on this and the opposite page.

orchard grass, timothy and fescue. These varieties have been developed for hay or forage. While they are generally unsuitable for turf they serve to indicate what may be expected from a program of grass improvement for special purposes.

For many years it has been recognized that selected varieties of creeping bent have had distinct advantages for turf purposes over the commercial stock. Strains or varieties of creeping and velvet bents for turf purposes have been selected and tested by the Green Section for about 20 years. This work has resulted in the development at the Arlington Turf Garden of such widely used strains as Washington and Metropolitan creeping bents.

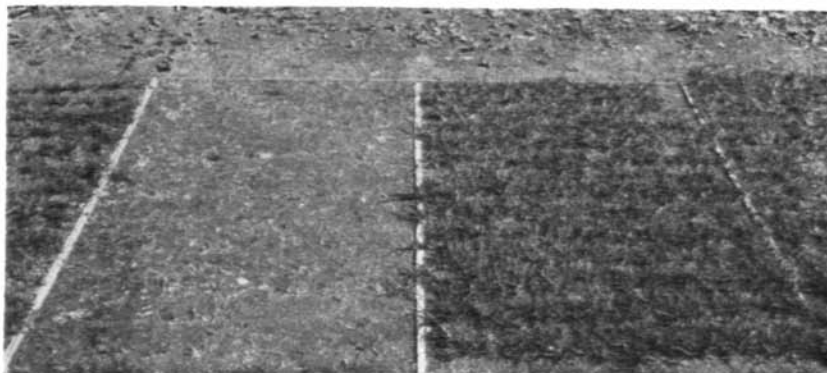
The encouraging results obtained from these selections of creeping bent have served to stimulate interest in the possibilities of developing superior strains of other turf grasses. Although not exhibiting the many striking variations that are common in such species as creeping bent, Kentucky bluegrass nevertheless is obviously variable and consequently offers possibilities for improvement as a turf grass.

Selection in Kentucky bluegrass for turf purposes is particularly directed toward securing strains notable for their ability to spread and to form a dense turf of a reasonably fine texture; for a low-growing habit; for durability under heavy trampling; for ability to withstand heat, drought and close mowing; for resistance to leafspot and other diseases; for vigorous, continuous growth to heal scars and to compete successfully with clover and other weeds; for ability to retain good color throughout the season; and for other characteristics of a good turf grass.

METHODS OF SELECTION

Selections are made in different parts of the country from old established turf which has been subjected for a long time to particularly trying conditions such as too close mowing, excessive wear, poor drainage, shade, drought or starvation. In any

such turf there are often individual plants which have successfully withstood these adverse conditions. These plants frequently are the sole survivors of thousands of plants that started together in the same area many years ago. By selecting promising individuals from such survivors full advantage is taken of severe competition and the resulting natural selection that has taken place over a period of years in turf subjected to abuse.



Varieties of Kentucky bluegrass growing in a low, partly shaded and poorly drained area unsuited to this grass. Planting was with the vegetative method in spring and all strains started evenly. Picture made in late summer shows the damage to one strain chiefly by leafspot disease, while the three other strains shown were highly resistant and continued to grow satisfactorily throughout the summer.

Samples of these selections are transplanted to flats in the greenhouse or to the turf nursery. There they are isolated in soil free from other grass and are permitted to grow until the resulting clump is sufficiently large to divide vegetatively. In the meantime care is taken to prevent the grass from producing seed which might fall to the ground and contaminate the parent stock.

When the individual plants are large enough they are divided and planted in duplicate 8- by 4-foot plots, or in other series in plots 4 feet square. These plots are on soil in which turf

grasses have not recently been growing, and care is taken to prevent seed from falling onto the plots. This is to prevent the introduction of another grass plant into an otherwise pure planting from one individual plant.

METHOD OF RATING

The development of the grass on these duplicate small plots is followed carefully, observations being made on the rapidity with which the stand is established, as compared with that on check plots planted vegetatively at the same time with random samples of bluegrass taken from an old lawn. The plots also are rated systematically at intervals throughout the growing season for such characteristics as color, density and texture. These ratings are made numerically, 10 in each case representing the ideal for Kentucky bluegrass.

At the end of the season the several ratings made throughout the year are added and the percentage of a perfect score on the scale used, is calculated. These figures represent the scores for the season and make it possible readily to compare the performance of the several strains under test.

These varieties must be compared over a period of several years and under different soil and climatic conditions before their relative values can be determined. The results thus far seem to show striking differences in the turf-producing qualities of the several strains.

In the accompanying table are given the ratings for density and texture of a few of the highest and the lowest ranking strains in one of the series. This particular series of plots was planted in May, 1937, and there was a uniform stand in all

plots in the early summer of 1937. The ratings in the table were recorded during the growing season of 1938

KENTUCKY BLUEGRASS RATINGS FOR 1938

| <i>Strain Number</i> | <i>Density</i> | <i>Texture</i> |
|----------------------|----------------|----------------|
| 12..... | 95 | 70 |
| 30..... | 91.25 | 61.25 |
| 5..... | 90 | 53.75 |
| 1..... | 90 | 66.25 |
| 27..... | 83.75 | 50.13 |
| 35..... | 68.75 | 68.75 |
| 36..... | 67.50 | 62.50 |
| 18..... | 63.75 | 56.25 |
| Check..... | 60 | 56.25 |

In a few cases diseases (chiefly leafspot caused by *Helminthosporium vagans* Drechsl.) had so damaged the grass during the summer of 1937 that bare areas were left the following spring. Most of the plots however were well covered in the spring, so the density ratings largely indicate the behavior of the grass in 1938.

The rating of strain number 12 shows that a dense cover of turf was maintained throughout the season on practically the entire area in the duplicate plots. It will be noted that four strains had ratings of 90 percent or better, in contrast with four strains having ratings lower than 70 percent. The check in this case was planted vegetatively in the same manner as other plots using planting material obtained from a collection of small samples dug up at random on the old lawn of Arlington farm. This random stock therefore represented better than average bluegrass stock, as it came from plants that had survived many years of competition under turf conditions.

In studying this table it should be borne in mind that these strains were not selected with a view to showing extreme variability of the species but because they all demonstrated ability to produce good turf under adverse conditions. Even among these strains some are far superior to others under the conditions at the turf garden.

The term "texture" designates primarily the fineness of the individual leaves. The highest rating represents the finest leaves. The texture ratings are naturally affected by density, for when turf becomes thin the plants spread out and the leaves are coarser, and conversely, where turf is crowded the leaves are more upright and narrow.

The strains are rated also for color, and records are kept on their response to diseases and other characteristics, for these must also be considered in any final evaluation of turf grasses. For the present report, however, the ratings of density are of most interest and importance. Since density is influenced by the general vigor of the grass, disease attacks, ability to withstand mowing or unfavorable weather, clover invasion, and other factors, this rating is of greatest practical significance.

PROPAGATION OF BLUEGRASS STRAINS BY SEED

Both self-pollinated and open-pollinated seed has been obtained from some of the selected strains growing in nursery rows. The plants obtained from this seed resemble to a remarkable degree the parent plant. It appears likely that there is asexual production of seed in the case of some of these strains. Such production of seed without fertilization in Kentucky bluegrass has been reported in Sweden and the work has been

reviewed in this issue in the section, "What Others Write on Turf."

These results illustrate the possibilities which the bluegrasses offer to the plant breeders and those interested in better turf. Selection work among the bluegrasses combined with breeding programs to improve these selections will undoubtedly lead to new and vastly improved commercial strains available for the many different needs for which these grasses are to be used.

A DRY-LAND TURF GRASS

L. E. KIRK *

There has long been a demand for a suitable turf grass for semi-arid and sub-humid districts. Such a grass is required for lawns on farms and in small towns where a water supply is not available. The same is true for golf course fairways, school playgrounds, ball parks and other places that are used for sports.

In most of Saskatchewan and southern Alberta there has never been available until recently a species of turf grass which could be recommended with any degree of confidence. This statement probably applies as well to western North and South Dakota, Montana, eastern Washington and parts of Nebraska. This need, however, is now being met in a satisfactory manner with crested wheatgrass, *Agropyron cristatum* (L.) Beauv., and its use is steadily increasing.

Crested wheatgrass is noted for its great drought resistance and also for its winter-hardiness. It grows best during the cool

* Dean of the Faculty of Agriculture, University of Saskatchewan, Saskatoon, Saskatchewan.