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# KENTUCKY BLUEGRASS VARIETY EVALUATIONS

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## INTRODUCTION

Many Kentucky bluegrass (*Poa pratensis* L.) varieties have been developed in the past several years. Some have become popular and are readily available, while others have never gained popularity and are not easily obtained. In some cases it is not clear whether the popularity of a variety is due to merit, availability, promotion, or a combination of factors.

To evaluate the merit of Kentucky bluegrass varieties then available, a variety trial was planted on the campus of the Ohio Agricultural Research and Development Center at Wooster in 1964.

## MATERIALS AND METHODS

In the fall of 1964, seed of all available varieties believed to have possibilities in Ohio were obtained for inclusion in a variety trial. Fourteen varieties were planted in a randomized complete block with four replications on a Wooster silt loam soil. The 14 varieties and their origins are shown in Table 1.

The entire area was fertilized uniformly with a 12-12-12 ($N$-$P_2O_5$-$K_2O$) analysis fertilizer each fall at a rate to supply 2 lb. of nitrogen per 1000 square feet. Ammonium nitrate was applied in the spring and summer at a rate to supply another 3 lb. of nitrogen per 1000 square feet. Thus, the annual application of nitrogen amounted to 5 lb. per 1000 square feet. These figures are approximate because some adjustments were made for varying conditions.

Irrigation was not planned but in 1967 the plots were thoroughly watered when it was obvious that the grass was suffering from lack of water during a prolonged drought.

Complete weed control was not attempted but 2,4-D or silvex were used as needed to control dandelion and chickweed. No data were obtained relative to invasion by these two weeds but it was observed that they were a problem, primarily in areas where grass growth was weak.

Fungicides or other disease control agents were not applied. Diseases were frequently observed on the plots but it was decided that the varieties could be evaluated best for use by homeowners if diseases were not chemically controlled.

Thatch removal was accomplished each fall after the second year with a mechanical dethatcher having both knife blades and steel "fingers".

Each plot was split into two halves, with one half mowed at a 2-inch height and the other half at a 1¼-inch height. Heights were determined by setting the mower at the appropriate height above a concrete surface.

All plots were mowed as needed to avoid cutting off more than 1 inch of leaf blade. This amounted to three mowings per week during the period of maximum growth. All mowing was done with a powered reel-type mower. Clippings were not removed.

Data were collected as visual estimates on a 1 to 9 scale for color, density, and leafspot infection. Weed invasion was recorded as an estimated percent cover and smut as an actual infected tiller count. An attempt was made to consider each characteristic separately but in some cases the characteristics overlapped. For example, some varieties had severe leafspot infection at the time color ratings were taken, making it difficult to estimate color independent of leafspot.

## RESULTS AND DISCUSSION

A summary of the data collected over the 4-year period ending in 1968 is presented in Table 2. For convenience, all 14 entries are called varieties, although two entries are designated "common". "Common"

**TABLE 1.—Origin of Kentucky Bluegrass Varieties Tested.**

| Variety | Origin |
|---|---|
| Merion | Selected in 1936 at the Merion Golf Club near Philadelphia, Pa. It was released in 1947. |
| Cougar | Developed by the Washington Agricultural Experiment Station in Pullman, Wash., and released in 1968. |
| A-20 | Developed and marketed by Warren's Turf Nursery, Palo Park, Ill. |
| Prato | Developed in the Netherlands and marketed by Northrup, King and Co. |
| Windsor | Developed and marketed by O. M. Scott and Sons Co., Marysville, O. |
| Pennstar | Developed by Pennsylvania State University and released in 1968. |
| Campus | Marketed by Rudy-Patrick Division of W. R. Grace and Co. |
| Park | Developed and released by the University of Minnesota. |
| Delta | Selected in Ontario and released by the Canada Department of Agriculture. |
| Newport | Developed and released by the Washington and Oregon Experiment Stations. |
| Nudwarf | Developed privately by Ross H. Rasmussen, Hooper, Nebraska. |
| Delft | Developed in the Netherlands. |
| Common (Kentucky grown) | Seed came from a naturally occurring field in Kentucky. |
| Common (Denmark grown) | Origin unknown except that seed was imported from Denmark. |

**TABLE 2.—Performance of 14 Bluegrass Varieties for Several Turf Quality Traits, 1965-1968.**

| Variety | Overall Rank | Color* | Density† | Percent Weeds‡ | | Leafspot** | Smut†† |
|---|---|---|---|---|---|---|---|
| | | | | 2-Inch Cut | 1¼-Inch Cut | | |
| A-20 | 1 | 3 | 1 | 2 | 2 | 1 | None |
| Pennstar | 2 | 2 | 2 | 4 | 6 | 2 | 15 |
| Windsor | 3 | 3 | 2 | 2 | 8 | 3 | 92 |
| Campus | 4 | 3 | 4 | 3 | 9 | 5 | 4 |
| Prato | 5 | 4 | 3 | 4 | 10 | 3 | 16 |
| Merion | 6 | 3 | 3 | 3 | 7 | 4 | 177 |
| Cougar | 7 | 4 | 3 | 3 | 22 | 5 | 7 |
| Delft | 8 | 3 | 4 | 5 | 13 | 5 | 25 |
| Common (Kentucky grown) | 9 | 4 | 4 | 5 | 14 | 6 | 4 |
| Newport | 10 | 4 | 4 | 6 | 11 | 5 | 52 |
| Delta | 11 | 4 | 5 | 12 | 37 | 7 | 16 |
| Common (Denmark grown) | 11 | 5 | 6 | 20 | 64 | 6 | None |
| Nudwarf | 12 | 4 | 5 | 6 | 32 | 7 | 40 |
| Park | 12 | 5 | 5 | 7 | 28 | 6 | 38 |

*Average rating of 1 to 9, with 1 as best. Includes 4 years of fall ratings and 2 years of spring and summer ratings.
†Two-year average ratings of 1 to 9, with 1 as most dense, 1967 and 1968 on 2-inch cut.
‡Estimated percentage of ground covered by grass weeds, 1967 and 1968.
**Three-year average ratings of 1 to 9, with 1 as least disease.
††Average number of infected tillers per square foot, 1967 and 1968.

is defined as any Kentucky bluegrass not sold under variety name. Therefore, the two common seed lots used in this study certainly do not represent all of the common Kentucky bluegrass being sold.

The spring and summer color ratings were made in 1967 and 1968 and the fall ratings were made during all 4 years of the test. All color ratings were made on a whole plot basis, ignoring possible effects of mowing height. It was assumed that dark green is preferable to light or yellow green. In the absence of disease, all varieties had attractive color and, although there were differences, these differences were not considered important.

Density ratings were made in 1967 and 1968 on the area of the plot cut at a 2-inch height. An attempt was made to base the rating of a plot on weed-free areas of the plot. Poor density appeared to be associated with disease infection. Density can also be affected by insects, fertility, soil pH, weather, and other factors, as well as by the genetic potential the variety possesses for the trait. Density is therefore one of the most important traits measured in this test.

Since there was some control of broadleafed weeds, the data on weed percentage refer primarily to grass weeds. These data were collected in 1967 and 1968 since there were few weeds during the first 2 years. The predominant grass weeds were crabgrass (*Digitaria sanguinalis* (L.) Scop.) and annual bluegrass (*Poa annua* L.) It is important to note that more than three times as much area was covered by weeds in the 1¼-inch cut area as in the 2-inch cut area. However, there were some varieties which withstood the 1¼-inch cut with little weed invasion. A-20 was most weed-free of all varieties and responded to both cutting heights about equally. Several varieties were relatively weed-free at the 2-inch cutting height but had relatively large areas covered by weeds when cut at 1¼ inches.

The leafspot ratings were taken in 1966, 1967, and 1968. The organism causing the disease was primarily *Helminthosporium vagans* Drechs. This is probably the most important disease of Kentucky bluegrass in Ohio and no doubt influenced color and weed invasion, as well as density. These data indicate that resistance is available. A-20 and Pennstar were virutally immune to the disease, as shown by their extremely low ratings. Several other varieties showed good resistance, including Windsor, Prato, and Merion. The two "commons" were extremely susceptible.

Stripe and flag smut (*Ustilago striiformis* (West.) Niessl and *Urocystis agropyri* (Preuss) Shroet.) were observed on the plots first in 1966 and data were collected in 1967 and 1968. Merion proved to be by far

the most susceptible variety. Windsor was moderately susceptible, while the two "commons" were very resistant.

Leafspot and smut are very destructive diseases and it is highly desirable that a variety have resistance to both. Leafspot can be controlled or prevented with chemical treatment but the cost and time needed for the spray program make such control impractical for most homeowners. Smut cannot be controlled with chemicals now available, although certain experimental products show promise.

For purposes of comparison, an overall rank column is included in Table 2. The overall rank was derived by ranking the varieties from 1 through 14 for all traits. These rankings were averaged and the varieties were listed numerically according to their average rank.

Such a system assumes equal value for all traits and may not be valid for that reason. However, it is the consensus of those familiar with the test that the overall rank is a good index of the relative merits of the varieties as they performed in this test.

The choice of the most desirable variety is difficult at best and the results of this test do not provide all of the answers needed. A-20 was clearly a superior performer in this test. However, it is sold as sod only and seed is not available. Pennstar, also superior, is a recent release and seed is available in limited quantities. Windsor and Merion are both readily available. Windsor rates high in the overall ranking. Merion, however, is extremely susceptible to smut and this means it probably should not be grown alone until a practical method of smut control is developed. Windsor is also susceptible to smut but to a much lesser extent than Merion.

The Kentucky grown "common" did not perform well in this test. However, wide experience indicates that under certain management levels it performs satisfactorily. These management levels are those used by many homeowners who give very minimal attention to their lawns. Superior varieties usually require good management and perform no better than "common" under poor management.

It is probable that with different management systems, different varieties would excel. This is apparent from the differing susceptibility of certain varieties in this test to weed invasion under different mowing heights. Other changes in management such as varying fertilizer rates would probably produce similar results.

This test is being continued and further data will be collected to evaluate the effects of time on the varieties. Several varieties have been developed since this test was planted. They will be included in future variety trials but a period of at least 3 years is required for preliminary varietal comparisons.

# The State Is the Campus for Agricultural Research and Development


Ohio's major soil types and climatic conditions are represented at the Research Center's 11 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 13 departments on more than 6200 acres at Center headquarters in Wooster, nine branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County: 344 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Western Branch, South Charleston, Clark County: 428 acres