

BETTER TURFGRASSES CAN BE PRODUCED BY BREEDING

By GLENN W. BURTON

Principal Geneticist, Field Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture and Georgia Coastal Plain Experiment Station, Tifton, Ga.

THE SCIENCE of plant breeding that has worked wonders with most of our crop and garden plants can also work wonders with turfgrasses. The expensive disease-control program so essential for good turf can be forgotten when grasses resistant to disease have been developed. New herbicides like 2,4-D are very effective in controlling many turf weeds, but superior strains of grass developed by the plant breeder can solve many of the weed problems at a fraction of the cost of herbicides. The plant breeder can develop turfgrasses with better root systems that will grow on soils where the common type will not grow. Given time, the plant breeder can help solve most of the turf problems generally found on the golf course.

Perhaps you would like to know how the plant breeder undertakes to develop superior turfgrasses. To begin with he must first know the grass with which he is working. Some grasses are extremely variable and every seed that grows gives rise to a plant that is different from every other one. Most of these differences are very slight, but are so great that anyone can see them. Bermudagrass, bentgrass and Zoysia grass are examples of this type of grasses.

Very often much progress can be made with these grasses just by discovering individual plants that are well suited for turf. Most of the good bentgrass strains in use today are natural variations that were found doing very well on a green, on somebody's golf course. U-3, Gene Tift and some of the other improved turf Bermudas had their origin in this way. Usually grasses arising in this way have faults that need to be corrected. Continued search through thousands of plants might bring the desired individual. Generally, however, the process can be greatly

hastened by applying the science of plant breeding. Our work with Bermudagrass will illustrate some phases of this procedure.

Susceptible To Disease

In 1938 we found a very unusual plant of Bermudagrass growing in some 5,000 spaced plants. It produced no seed heads, had very short leaves and made an unusually dense growth. It looked like the answer to a home-owner's prayer—a lawn grass that would need no mowing. When planted in lawns, however, this grass, called No. 12, was found to be quite susceptible to disease. Weeds and the more aggressive common Bermuda crowded it out. Obviously it needed disease resistance and more vigor.

Our pasture breeding program had developed Bermuda selections that had both disease resistance and greater vigor. The science of plant breeding indicated the quickest way to improve No. 12 was to cross it with the more vigorous, disease resistance selections. Finally, in 1942, No. 12 produced seed heads and 100 hybrids were made. These were spaced 8 feet apart in each direction in the spring of 1943. By the fall of 1946 it was apparent that a number of these plants were better than No. 12. In the spring of 1947, twelve of these hybrids and thirty others from the pasture breeding program were planted in the turf plots along with common Bermuda and 50 Bermudas sent in by golf course superintendents from some of the best putting greens in the Southeast.

For a four-year period these Bermudas were fertilized and managed exactly alike. During this time they were rated on 38 different occasions on such things as disease resistance, density, weed resistance, rate of recovery after the transition period, playing quality, and aggressive-

ness. When all these ratings were totaled, Tifton 57 had the best score of any Bermuda in the test. Some of the Bermudas that looked very good the first season made a poor showing a year or two later. Several selections from golf courses were equal or superior to Tifton 57 at favorable seasons of the year, but during periods of adversity Tifton 57 was consistently better than these selections.

The logical way to improve the putting qualities of Tifton 57 is to cross it with a grass that makes a better putting surface. Perhaps you are wondering why it couldn't be crossed with bentgrass? I wish we could, but nature has set up certain barriers that no one has been able to pass. In general, things must be rather closely related if they are to be crossed. The horse and the donkey can be crossed, but the horse and the cow cannot be crossed. Even though they look very much alike, bentgrass and Bermudagrass are very different, and would be more difficult to hybridize than cows and horses.

Eighty-nine Hybrids Obtained

A number of years ago a very fine Bermudagrass that has excellent putting qualities was introduced from Africa. A number of people tried this African Bermuda on golf greens and found it made an excellent putting surface in the spring and late fall, but that it dies back very badly in the summer. Disease caused a part of this dying back. Five years ago we undertook to combine the excellent putting qualities of African Bermuda with the other good qualities of our best common Bermuda grass selections. Eighty-nine hybrids were obtained, which were finer than common, but not as fine as African Bermuda. Tifton 127 (Tiffine) was a product of this breeding program. Although great improvements over common Bermuda have been made for putting greens, Bermudagrass breeding and selection work is being continued at Tifton, Ga., Gainesville, Fla., Texas A. & M. and Arizona in the hope that even better Bermudas may be found.

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Dr. Ian Forbes and Dr. Fred V. Grau and his associates, working with the Zoysias at Beltsville, Md., and Tifton, Ga., made progress in developing superior strains of these desirable turfgrasses. At Penn State, Prof. H. Burton Musser and his co-workers have been isolating superior strains of bent, fescue, and bluegrass. If the plant breeders can develop strains of bentgrass that are resistant to disease, all of the South may be able to enjoy year-around putting greens. There is room for improvement, by the breeding of every grass now used for turf in the United States. Well supported turfgrass breeding programs are bound to pay dividends. Better turf by breeding can be guaranteed.