

# PLANT SELECTION, HYBRIDIZATION PRODUCE NEW VARIETIES

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Starting with Merion, many leaf spot resistant cultivars have been developed. Almost all of the new bluegrass releases have good leaf spot resistance. The nature of the genetic resistance is not known. The resistant cultivars are generally low growing, broad leaved plants while the susceptible varieties are usually tall growing, fine leaved, stemmy types.

A number of fungicides can be used to control *Helminthosporium* leaf spot. Some of the better known broad spectrum fungicides commonly used are Actidione Thiram or TGF, Daconil 2787, Dyrene, Kromad and others. Unfortunately, fungicides are expensive and time consuming to apply. The best control is the planting of leaf spot resistant cultivars and there is a long list to choose from. However, under severe conditions, even the genetic resistance of the best cultivars can break down and fungicide application may be necessary.

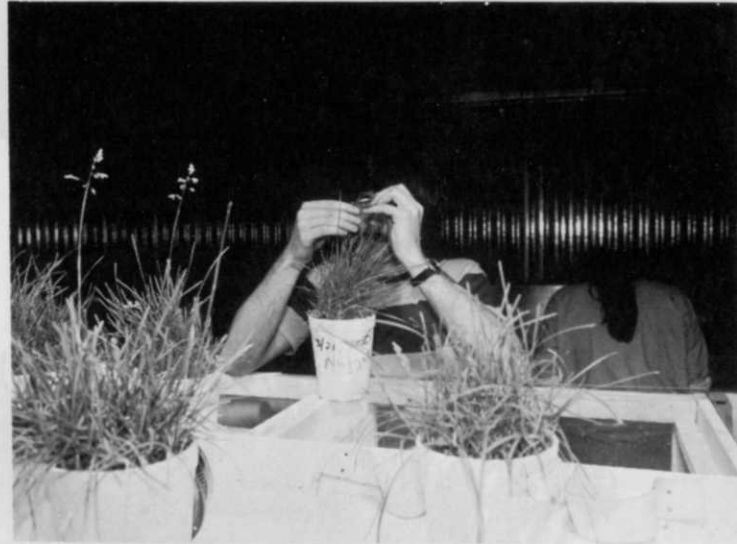
Plant breeders have been very successful in developing leaf spot resistant varieties. Two basic techniques have been used in bluegrass breeding: plant selection and hybridization.

Plant selection is the most basic breeding technique in existence. It simply involves the selection of superior plants that occur naturally, prosper and spread under close cut turf conditions. Often these plants can spread to enormous size; the plant selection that became Touchdown was over 50 feet in diameter. Some of the better known plant selections are Merion, Baron, Fylking, Glade, Windsor, Victa and Parade.

Bluegrass hybridization is a much more recent breeding technique. It has only been used for the past ten to 15 years but has resulted in the development of a number of improved leaf spot resistant varieties such as Adelphi, Bonnie-blue, Bristol and Majestic.

Hybridization is difficult in Kentucky bluegrass due to its unusual type of reproduction and seed formation. Kentucky bluegrass is facultatively apomictic, which means that most of the seed it produces bypasses the normal sexual reproduction cycle of grasses. This seed is an identical genetic copy of its mother plant. Only a small percentage of seed produced will be genetically different from the mother plant.

From a breeding standpoint, this unusual type of seed formation is both good and bad. It is good in that exact duplicates of superior plants can be produced year after year with no variation and no danger of losing a variety due to genetic shift. It is bad in that crossing is quite difficult because few hybrids are produced. Most of the seed derived from crossing will be identical to the mother plant and thus useless to a breeder. For every 1,000 plants derived from a cross perhaps only 20 to 50 hybrids might be produced. Since only one of a thousand hybrids might show commercial promise, huge numbers of plants have to be grown from seed produced by crossing two parent plants.



Seed research entails huge numbers new crosses to study for resistance.

Kentucky bluegrasses are usually crossed in the greenhouse during the spring. In the summer the crossed seed is germinated and individual spaced-plants are set out in the field. The next summer the mature plants are observed and the hybrids identified. Seed of the best appearing hybrids is harvested, cleaned, and used to plant a small turf plot of many standard varieties and the new hybrids are carefully compared with the check varieties. The resistance to various types of *Helminthosporium* leaf spot and melting-out of the hybrids is closely observed. It is essential that new hybrid variety intended for fine turf use has good leaf spot resistance.

The success rate among new bluegrass hybrids is very low. Perhaps only one in 500 or 1,000 hybrids will combine the characteristics of good turf quality, good disease resistance and good seed production necessary in new, improved varieties.

Despite the difficulties, several active bluegrass breeding programs are continuing in the U.S. and Europe. It is from these programs that a continuing source of new varieties will be forthcoming. The perfect variety will never be achieved, but hopefully breeders can keep developing varieties that get closer to that ideal.

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