

THE DEVELOPMENT OF NEW BEAN VARIETIES FOR FLORIDA

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The breeding of new varieties of beans at the Everglades Station originated with an effort to learn whether any known varieties were resistant to bean rust. Bean fields in south Florida were ravaged by the rust disease in the 1936-37 season, and again the following year. Although it was found that sulphur fungicides would control this disease and powdery mildew, it was considered desirable to determine whether any existing varieties were resistant to bean rust.

During the 1936-37 and 1937-38 seasons tests of a considerable number of varieties of beans were conducted in the greenhouse by inoculating young potted plants with the spores from rusted vines. Bountiful, Black Valentine, Tendergreen and Kentucky Wonder beans proved to be very susceptible. On the other hand a number of new stocks from the Ferry Morse Seed Company were more or less resistant. One stock, 6651, of the Kentucky Wonder type, was practically immune in all the tests conducted in the two years. This bean was only slightly affected by rust in plantings made at six other locations by cooperating pathologists from Florida to Maine. It also was resistant to infection by the powdery mildew fungus when grown in the greenhouse with such very susceptible varieties as Bountiful and Black Valentine.

A cross of the rust and mildew resistant 6651 with the susceptible Bountiful variety was made at the Department of Plant Breeding at Cornell University in 1938. The progeny of this cross were tested and selected through seven or eight generations and a number of very resistant lines of bush snap beans

were developed. None of these however had sufficient quality to be introduced as new varieties, but they have indirectly contributed to the development of one of our new beans as I shall indicate later.

In 1940, we received 47 lots of hybrid bean seed from Dr. B. L. Wade of the U.S.D.A. Vegetable Breeding Laboratory at Charleston, South Carolina. These beans were segregating stocks in the third and fourth generations from several crosses. Single plant selections were made from seven lines in the spring of 1940 when rust and drouth had severely crippled most beans. The next fall five more lines were dropped and only two were carried on by single plant selection. Beginning in 1941 these two lines were increased until it was possible to release stocks to seedsmen in 1943. These new selections were named the Florida Belle and the Florida White Wax. Both were much more resistant to rust than the Bountiful bean. The Florida Belle has been planted extensively in the last two years and has earned a place as a standard variety for the Everglades area, and in north Florida. On the sandy soils in eastern Palm Beach and Broward Counties, the Florida Belle has not always shown the quality of which it is capable under more favorable conditions. The Florida White Wax has not won recognition in this State. We have had reports that it looked good as a canning bean in California.

The Florida Belle was derived from a cross between Stringless Black Valentine and U. S. No. 5 Refugee. Resistance to rust and powdery mildew was obtained by selection in the first and second Florida generations. Tolerance of drouth conditions had been noted in the breeding material before it was released by the Vegetable Breeding Laboratory, and the first selection in Florida was made under drouth conditions. Resistance to common bean mosaic

is inherited from the U. S. No. 5 Refugee bean, one of the parental types.

Florida Belle beans produce large bushes with very strong stems, and a luxuriant foliage. The plants stand erectly, and are moderately branched. The pods are borne well up in the plant and do not become blemished by contact with the soil. The pods are about 7 inches long and narrow and are slightly oval in cross section. It is classed by the trade as a flat bean. The pod color is lighter than Bountiful and Plentiful and does not become shiny or greasy with age. Canneries have expressed a liking for Florida Belle because the pods are not too broad for their clippers and are long and straight. On the fresh market the Florida Belle competes favorably with the Black Valentine. Many growers have found the Florida Belle a more productive bean than other common varieties. Yields of more than 200 hampers per acre at the first picking have been obtained.

While the Florida Belle bean was being developed the trial plantings were in close proximity to the other hybrid lines which we were developing. The segregation of a few seeds with colors not typical of Florida Belle was noted in the fall of 1942 in the sixth generation in Florida. This could only mean that a new cross had occurred naturally, presumably in the fall of 1941. It was assumed that a cross had occurred between Florida Belle and one or more of the disease resistant lines established by crossing Bountiful with Kentucky Wonder 6651. Seed coat colors and plant characters which developed in the progeny of the new hybrids indicated this to be true.

Single plant selections were made from several of the new hybrid lines in 1943, and in each succeeding year until now there are over 100 selections which have been derived from the new hybrid material. These are closely related lines and in the main differ only slightly with respect to plant habit, pod type and

color, flower color and seed color. Several of these lines should be carried on for the purpose of making further selections, particularly with the object of developing resistance to the root rotting fungi prevalent in the east coast sandy soils.

One of the new lines developed from a single plant selection in 1944 has been sufficiently fixed and the seed stock has been increased enough so that it has been released to seedsmen this spring. This new variety has been named the Dixie Belle.

The Dixie Belle is a round podded green bush bean. Its relationship to Florida Belle is indicated by the inclusion of the word Belle in the name. This relationship is clearly seen also in the erect habit of the plant, the very stout stem, and the method of branching at about a 45 degree angle. The pods are about 6 inches long, round, fleshy and stringless. In color they are lighter than Tendergreen. Most of the pods are straight to slightly curved. They are smooth while young, but may show a few creases as in Kentucky Wonder when fully mature. The Dixie Belle plants are large, vigorous, and resistant to several diseases, including rust, mildew, mosaic and root rot; although the term resistance should not be interpreted to mean immunity. In the field plots at Belle Glade this spring these beans have been grown successfully without the use of fungicides. The Dixie Belle promises to be a very productive bean as it blooms profusely and sets a heavy crop of pods.

Specimens of the Florida Belle and Dixie Belle beans have been passed among the audience. It is our opinion that these varieties will shortly dominate all other bean varieties in Florida because of their quality, productivity and resistance to several of the diseases affecting beans in Florida. The development of these varieties stands as testimony to the value of breeding and selecting beans adapted to the conditions and requirements of Florida. The work should be continued not only with beans but with all vegetable crops.