

BREEDING HISTORY OF DELTAPINE 16 AND DELTAPINE 50

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Abstract

Deltapine 16

Deltapine 16 was derived from a 1959 cross of Deltapine Smooth Leaf and a selection from Fox 4. The Fox 4 selection, Fox 4-4205, was later released as Deltapine 45. The cross for Deltapine 16 was an example of trying to combine the best material from within a breeding program. Deltapine Smooth Leaf had been released in 1957 and was a direct selection from the widely grown variety Deltapine 15. In the late 1950's, mechanical harvest was increasing rapidly and the smooth leaf characteristic improved grades of mechanically harvested cotton. Deltapine Smooth Leaf was best adapted to central and southern Mid-South areas. Fox 4-4205 was from the program series that provided greater earliness and resistance to Fusarium wilt. The Fox series was better adapted to the northern half of the Mid-South. Company seed sales at that time were about 15% for the Fox series and 85% for the Deltapine Series.

Deltapine 16 was developed by the pedigree breeding method. The F₁ generation was grown in the winter of 1959-60 at Iguala, Mexico. Plant selections were made from a 1960 F₂ block and from 1961 and 1962 F₃ and F₄ progeny rows. In plant selection, only plants with smooth leaves were selected, resulting in all F₅ progeny rows possessing the smooth leaf characteristic.

In 1963, there were about 200 F₅ lines planted with three 66-foot single row replicates of each line. The cross was of great interest because it had shown resistance to Verticillium Wilt, which had become a serious problem in the Mid-South in the early 1960's. About 70 F₅ lines were harvested from the 5916 cross. These 70 lines were tested in strain tests at Scott and Barnacres, Mississippi, in 1964.

Six of the 70 F₅ 5916 lines were superior for yield and fiber in the F₅ and were also the leaders in the 1964 new strain tests. These six lines were all derived from F₂ plant 022. The six 022 lines were bulked to form Deltapine 16. Line 5916-022-11-21 was also increased separately for release as Deltapine 16A. This release was never made.

Testing of Deltapine 16 was expanded to all company main variety tests in 1965 and also was tested beltwide in state variety tests. During the four year (1964-1967) variety test period, maximum increases of Deltapine 16 were made. These increases resulted in a larger than usual volume of

seed being available for the 1968 first major sales of Deltapine 16 to farmers. Prior to the Plant Variety Protection Act, the volume of the first sales of a cotton variety was very important in recovery of research costs as other than company sources of the variety were soon available.

Deltapine 16 had a number of advantages over the program's leading variety, Deltapine Smooth Leaf. Deltapine 16 had good resistance to both Verticillium and Fusarium Wilt while Deltapine Smooth Leaf was very susceptible to both diseases. In addition, Deltapine 16 fiber was about 1/32 longer and also slightly stronger than the fiber of Deltapine Smooth Leaf. Also, Deltapine 16 was earlier than Deltapine Smooth Leaf, higher yielding and more widely adapted in the Mid-South Region.

Deltapine 16's gain in popularity was quite remarkable. It was planted on 8% of the U.S. acreage in its initial major sales year, 1968, and became the most popular variety in 1969 with 23% of the acreage. Deltapine 16 remained the most popular U.S. variety for 5 years. In 1972 it was planted on 28% of the U.S. cotton acreage. This percentage planted figure has not been exceeded by any variety since 1972 and probably only by the variety Deltapine 15 prior to 1972. Deltapine 16 also became an important variety worldwide, especially in Mexico, Columbia, and Australia. Deltapine 16 remained a competitive variety for about eleven years, dropping from the varietal scene in the early 1980's.

Deltapine 16 was used in numerous crosses within the Deltapine program and in competing programs. Deltapine 16 also saw additional life in Deltapine 61, a direct selection, and Deltapine NSL, a backcross derivative. Deltapine 16 was also strongly reflected in two direct selections from Deltapine 61 (Deltapine 62 and Deltapine 69).

Deltapine 50

Deltapine 50 was derived from a 1975 cross of an advanced strain, 6942-051 x DES 56. Strain 6942-051 was derived from a cross of Deltapine 16 x a strain selected from a 1963 repeat cross of the parents of Deltapine 16 (Deltapine Smooth Leaf and Deltapine 45). One might think of the cross as (Deltapine Smooth Leaf x Deltapine 45) squared x DES 56.

The cross for Deltapine 50 was an example of combining good material from your program with the best available from a competing program. DES 56 was an excellent source of genes for earliness and yield. Also, the cross for Deltapine 50 was an example of the spirit of sharing genetic material among cotton breeders as the cross with DES 56 was made three years before the varietal release of DES 56.

Similar to Deltapine 16, the breeding method for Deltapine 50 was the pedigree breeding method. The F₁ generation was grown at Iguala, Mexico, in the winter of 1975-76. During F₂, F₃, and F₄ plant selections in 1976, 77, and 78, no attempt was made to select smooth leaf plants and, consequently, Deltapine 50 was a smooth leaf variety only by chance. Deltapine 50 and also its sister variety Deltapine 20 first showed great promise in F₄ progeny rows grown in the wet spring and hot dry summer of 1978. After the harvest of selected plants, the F₄ progeny rows of Deltapine 50 were bulk harvested.

From cross 7537, which started with 300 F₂ plant selections, only 9 F₅ selections were made in 1979. Three of the nine selections were plant 6150-71 lines, which were bulked with seed from the 6150-71 F₄ progeny rows to form Deltapine 50. Because of an extra year of increase, the seed from the F₄ progeny rows constituted a higher percentage of the bulk than that from the three F₅ lines.

Variety testing of seed from the F₄ progeny rows of Deltapine 50 started in 1979 at Scott and testing of the bulk expanded to beltwide company and public testing during the 1980-82 time period. During the test period, Deltapine 50 was competing with Deltapine 20 for release. It was thought within the company that only one strain should be released. If only one had been released, it probably would have been Deltapine 20. Deltapine 20 was earlier and had a higher lint percentage than Deltapine 50. However,

fortunately, it was decided in 1983 to release both and limited sales of Deltapine 50 were made in 1984.

Deltapine 50 had several distinct advantages in the Mid-South over the program's leading variety Deltapine 61. Deltapine 50 was significantly earlier than Deltapine 61 and usually outyielded Deltapine 61. The earliness of Deltapine 50 made it well adapted to the northern half of the Mid-South where Deltapine 61 had performed inconsistently.

Starting with less than 1% of the U.S. market in 1984, Deltapine 50 grew to a 13% market share and the leading variety by 1988. Deltapine 50 remained the leading variety for 6 years reaching the 17% level in 1990 and 1991. Since this peak, Deltapine 50 has trended down and was planted only on 4% of the 1997 cotton acreage.

Similar to Deltapine 16, Deltapine 50 was used in numerous crosses within the Deltapine program and in competing programs. Among varieties with Deltapine 50 as a parent are DP 5409 and DP 5415. Also, similar to Deltapine 16, Deltapine 50 has seen prolonged life in its direct selection, Deltapine 51, and its transgenic versions, DP 50^B and DP 50^R. Including transgenic and conventional genotypes, about 26% of the 1997 cotton acreage was related to Deltapine 50.

Cotton breeders fade into the sunset. Cotton varieties live on in the genotypes of tomorrow.