Disease resistance may be a major factor responsible for the apparent wide range in adaptability of Pee Dee 0109, Pee Dee 0111, and Pee Dee 0113.

Seed (25 g) of these germplasm lines may be obtained from AR-SEA-USDA, Pee Dee Exp. Stn., Florence, SC 29503.

REFERENCES

REGISTRATION OF FERTILITY RESTORER DEMETER II COTTON GERMPLASM
(Reg. No. GP 144)
James B. Weaver, Jr.

DEMETER II cotton (Gossypium hirsutum L.) germplasm was developed by the College Experiment Station, Univ. of Georgia and released to scientists in March 1979.

Development of this germplasm was begun in 1973 when a single plant of DES HAF 277 was crossed as the female parent with ‘Pima S-4’ (G. barbadense L.). DES HAF 277 had the genome of G. hirsutum in G. harknessii Brandegee cytoplast and carried a restorer gene Rf. The Rf gene behaves as an incomplete dominant gene in crosses of cytoplasmic male sterile upland × upland strains that have the restorer gene. However, it behaves as a complete dominant gene in crosses of cytoplasmic male sterile upland × G. barbadense with the restorer gene. Sheets and Weaver found that Pima has a dominant gene, E, that enhances pollen fertility but is not a restorer per se.

F₂ seed of the DES HAF 277 × Pima S-4 were grown at Iguana, Mexico, where the most fertile segregates were selected and backcrossed (BC) as females to upland non-restorer strains. The most fertile plants in the BC₁ generation were again backcrossed to non-restorer upland strains (BC₂). A third backcross was made in the same manner and the most fertile BC₃ plants were self pollinated. Individual plants in the BC₃ F₂ generation were crossed onto several cytoplasmic male sterile upland strains in 1977. The BC₃ test cross generation was grown in 1978 and scored for weak fertile and strong fertile hybrid plants. Demeter II is the open pollinated seed from BC₃ progeny rows which has both the Rf gene and the “enhancer factor” E. Approximately 1/16 of the plants in the BC₃ F₂ generation should be of the genotype Rf Rf E E and all plants should have acceptable agronomic properties.

Our research indicates that the fertility enhancer gene E must be present in order to obtain adequate fertility in cytoplasmic male-sterile upland × restorer upland crosses. Pure lines of the F₂ generation were crossed to non-restorer upland strains (BC₄). A third backcross (BC₅) was made in the same manner and the most fertile BC₅ plants were then self pollinated. Individual plants in the BC₅ F₂ generation were crossed onto several cytoplasmic male sterile upland strains in 1977. The BC₅ test cross generation was grown in 1978 and scored for weak fertile and strong fertile hybrid plants.

REGISTRATION OF MEDIUM STAPLE COTTON GERMPLASM
(Reg. No. GP 145 to GP 149)

T. W. Culp and D. C. Harrell

The adverse relationship between extra fiber strength and low lint percentage has been a persistent problem in cotton (Gossypium hirsutum L.) improvement. Our research shows that this percentage was overcome in the PD breeders’ introduction of the California breeding lines AC 239 (GP 145) and AC 241 (GP 146), a cross of Hybrid 313 or Line A X C 241. This increase in lint yield over that in previously developed PD lines. These lines have genes for extra-large bolls, seeds and bolls about 8% smaller than that of AC 239, and it has been used profusely in crosses to increase lint percentage in PD material. Hybrid 313 (GP 145) is from a complex series of crosses involving Tripal 484A, Sealand 7, and Earlstalk.

These AC lines have been combined with medium staple PD lines FJA and FTA (3) to produce new lines of medium staple PD lines (GP 147, GP 148, GP 149). The FJA and FTA lines each have a unique combination series of crosses involving Tripal 484A, Sealand 7, Earlstalk.

PD 2164 is from the increase of the PD F₂ of a single F₂ plant selection from the cross of AC 100 W. This strain produces 25 to 40% more lint than other AC strains, which probably reduce its range of adaptability. AC 239 has an extra-large boll and a lint percentage of 39, which is an increase of 10.5% over the base strain, AC 241 has extra-large bolls and seeds, and it has been used profusely in crosses to increase lint percentage in PD material. Hybrid 313 from a complex series of crosses involving Tripal 484A, Sealand 7, and Earlstalk.

These breeding lines were released by AR-SEA-USDA and the South Carolina Agric. Exp. Stn. in 1979.

Seed (25 g) of each breeding stock may be obtained from AR-SEA-USDA, Pee Dee Exp. Stn., Florence, SC 29503.

REFERENCES