

greenhouse tests or reported in the literature. The female lines were genetic male-sterile stocks 30, 33, 46, 47 (Hockett et al., 1968)<sup>3</sup>, and the male-sterile diploid plants from the balanced tertiary trisomic 75a *msg16*. Stocks 20 and 33 contain the *msg1* gene. Stocks 46 and 47 contain the *msg2* gene. Each male line was crossed to at least two lines having two of the three different male-sterile genes. The crosses were made at Beltsville, Md., from 1973 to 1977. The  $F_1$ 's were grown as individual plants at Aberdeen, Idaho in space-planted nurseries from 1973 to 1977. In 1978,  $F_2$  seed was bulked so that the progeny of each male line was equally represented in the population. The bulks were grown at Aberdeen in 1978 and became Composite Cross XXXV and subpopulations XXXV-A, -B, and -C, described as follows.

CC XXXV (GP 37): Is an equal mixture of  $F_2$  seed that went into CC XXXV-A, XXXV-B, and XXXV-C and should contain all of the genes present in those populations.

CC XXXV-A (GP 28): This mixture of 25 sources of leaf rust resistance has known genes *Rph1a*, *Pa2*, *Rph3c*, *Rph4d*, *Rph5e*, *Pa6*, and *Pa7* and additional unnamed genes.

CC XXX-B (GP 29): Is a mixture of 52 sources of powdery mildew resistance having genes at or near loci *Reg1aa*, *Ml-at*, *Reg2ac*, *Reg3ad*, *Reg4ae*, *Reg5af*, *Jml<sup>st</sup>*, *Jml<sup>ra</sup>*, *Jml<sup>nn</sup>*, and *Jml<sup>ne</sup>* and additional unnamed genes.

CC XXXV-C (GP 30): Is a mixture of 17 sources of scald resistance and has known genes *Rh2*, *Rh3*, *Rh4*, *Rh5*, *rh6*, *rh7*, and *Rh9* and additional unnamed genes.

These composite cross populations will segregate for a wide range of characters. They contain a broad spectrum of disease resistance genes and should be a useful source of germplasm for barley breeders who need additional sources of resistance. In areas where multiple disease resistance is needed, Composite Cross XXXV should be used. In areas where specific disease resistance is needed, the appropriate subpopulation, Composite Cross XXXV-A, -B, or -C, should be used. Genetic male sterility was incorporated into the populations to facilitate recombination of resistance genes and the use of recurrent selection methods.

A list of male parents used in the development of each subpopulation and seed in 500-g quantities can be obtained from the authors and from Dr. J. C. Craddock, World Collection of Small Grains, AR, SEA, USDA, Beltsville Agricultural Research Center, Beltsville, MD 20705.

<sup>1</sup> Registered by Crop Sci. Soc. Am. Accepted 11 May 1979.

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<sup>3</sup> Hockett, E. A., R. F. Eslick, D. A. Reid, and G. A. Wiebe. 1968. Genetic male sterility in barley. II. Available spring and winter stocks. Crop Sci. 8:754-755.

## REGISTRATION OF PEE DEE 695 AND PEE DEE 875 GERmplASM LINES OF COTTON<sup>1</sup>

(Reg. No. GP42 and GP43)

T. W. Culp<sup>2</sup>

TWO breeding lines of cotton (*Gossypium hirsutum* L.), Pee Dee 695 (GP 42) and Pee Dee 875 (GP 43), were released by AR, SEA, USDA and the South Carolina Agricultural Experiment Station in 1978. Both breeding lines possess resistance to the bollworm (*Heliothis zea* Boddie) and the tobacco budworm (*H. virescens* Fab.). Pee Dee 695, a frego bract line, is also resistant to the boll weevil (*Anthonomus grandis grandis* Boheman).

Pee Dee 695 was developed from the backcross of (PD 8562 × La. Frego 2) × PD 8562. PD 8562 was selected from the cross of Pee Dee 4461 × PD 3307. Pee Dee 4461 or  $Q_1$ , the common parent from which resistance factors for *Heliothis* spp. must have come, was developed from backcrosses and composite crosses involving a *G. barbadense* L. strain with high lint percentage, 'Earlistaple', 'Coker 100 Wilt', and 'Auburn 56'. PD 3307 was selected from the intercross of two AC.NA breeding lines from crosses involving Triple Hybrid 171, 'Sealand 7', and 'Earlistaple'. La. Frego 2 was developed from the fifth backcross of ('Stoneville 7A' × 'Stoneville Frego') × Stoneville 7A at the Louisiana Agricultural Experiment Station. Pee Dee 695 is from the progeny of a single frego-bract plant selected in the  $BC_1F_2$  generation.

Pee Dee 875 was developed from the backcross of (Pee Dee 8619 × (DSR-1 × 6-56) × Pee Dee 8619. Pee Dee 8619 was selected from the cross of Pee Dee 4461 × 'MO-DEL'. MO-DEL is a commercial cultivar with improved fiber strength developed from a series of complex crosses at the Missouri Agricultural Experiment Station. DSR-1 × 6-56 was selected from the intercross of two dwarf storm-resistant lines at the Texas Agricultural Experiment Station. Pee Dee 875 is from the progeny of a single, normal bract plant selected in the  $BC_1F_2$  generation.

Pee Dee 695 and Pee Dee 875 possess an unidentified source of resistance to *Heliothis* spp. and produced 405 and 500 kg/ha of lint, respectively, as compared with 132 kg/ha for 'Coker 310' at one-half the recommended rate of insecticide (toxaphene + methyl parathion + chlordimeform, 1.12 + 0.56 + 0.14 kg AI/ha) applied at 5- to 7-day intervals in 1975. Under heavier infestations in 1976, Pee Dee 695 produced 261 kg/ha of lint compared with 26 and 67 kg/ha for 'Stoneville 213' and 'Deltapine 16', respectively. In 1977, under a low rate (0.056 kg AI/ha) of synthetic pyrethroid, Pee Dee 695 produced 1,727 kg/ha of seed cotton compared with 550 and 809 kg/ha for the respective checks, Stoneville 213 and Deltapine 16. Similar yields were also produced with a high rate (0.168 kg AI/ha) of synthetic pyrethroid, suggesting a savings of \$74.00/ha with Pee Dee 695.

With seven applications of synthetic pyrethroid at 0.168 kg AI/ha for minimum control of *Heliothis* spp. on tolerant cultivars, Pee Dee 695 produced 1,392 kg/ha of seed cotton compared with 412 and 550 kg/ha for the respective checks. Poor seed production made it impossible to obtain similar data on Pee Dee 875; however, square injury and live larvae per 100 squares on Pee Dee 695 and Pee Dee 875 were about one-half that on the commercial checks<sup>3,4</sup>. Under adequate insect control, Pee Dee 695 and Pee Dee 875 produced lint yields of 945 and 977 kg/ha while Stoneville 213, Coker 310, and Deltapine 16 produced 736, 802, and 907 kg/ha, respectively. Pee Dee 875 appears to possess similar resistance to *Heliothis* spp. as Pee Dee 695 and should be the preferred breeding stock in areas where other insects are more destructive to frego-bract types. Seed (25g) of these breeding lines may be obtained from AR, SEA, USDA, Pee Dee Experiment Station Florence, SC 29503.

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<sup>3</sup> Culp, T. W., H. M. Taft, and A. R. Hopkins. 1977. Reaction of several cultivars to cotton insects in South Carolina. Beltwide Cotton Prod. Res. Conf. Proc. p. 97. (Abstr.).

<sup>4</sup> Culp, T. W., H. M. Taft, and A. R. Hopkins. 1978. Response of cotton cultivars tolerant to *Heliothis* spp. under three insecticide regimes. Beltwide Cotton Prod. Res. Conf. Proc. p. 84. (Abstr.).

## REGISTRATION OF FIVE GERmplASM LINES OF COTTON<sup>1</sup>

(Reg. No. GP44 to GP48)

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FIVE breeding lines of cotton (*Gossypium hirsutum* L.), Pee Dee 9223 (GP 44), Pee Dee 9232 (GP 45), Pee Dee 9241 (GP 46), Pee Dee 9363 (GP 47), and Pee Dee 9364 (GP 48), with extra fiber strength were released by AR, SEA, USDA, and the South Carolina Agricultural Experiment Station in 1974<sup>3</sup>. These breeding lines represent a significant step in overcoming the adverse association between yield and fiber quality, particularly extra fiber strength.

Pee Dee 9223 and Pee Dee 9232 were developed from the cross of 'Coker 421' × PD 2164. Coker 421 was selected from 'Coker 413'. Coker 413 was derived from a single glabrous plant selected from an advanced progeny row of the cross, 'Coker 100 Wilt' × 'Coker Wilds'. PD 2164 was developed from the cross of AC 239 × FJA 348. AC 239 and FJA 348 were developed from a complex series of crosses involving Triple Hybrid 108 and 171, AHA 6-1-4, 'Earlistaple', 'Sealand 542', and C 6-5. Each line is from the increase of seed from a single  $F_3$  plant selection.

Pee Dee 9223 and Pee Dee 9232 produce yields equivalent to