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greenhouse tests or reported in the literature. The female lines were genetic male-sterile stocks 30, 33, 46, 47 (Hocktt et al., 1968)[3], and the male-sterile diploid plants from the balanced tertiary trisomic 75a *msgl6*. Stocks 20 and and 33 contain the *msgl* 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 *Rphla, 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 *Reglaa, Ml-at, Reg2ac, Reg3ad, Reg4ae, Reg5af,* Jml_r^{81}, Jml_r^{74}, Jml_{nn}, and Jml_{nr} 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.

[1] Registered by Crop Sci. Soc. Am. Accepted 11 May 1979.

[2] Chairman and research geneticist, respectively, Plant Genetics and Germplasm Inst., Beltsville Agric. Res. Ctr., AR, SEA, USDA, Beltsville, MD 20705.

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REGISTRATION OF PEE DEE 695 AND PEE DEE 875 GERMPLASM LINES OF COTTON[1]

(Reg. No. GP42 and GP43)

T. W. Culp[2]

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[3,4]. 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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REGISTRATION OF FIVE GERMPLASM LINES OF COTTON[1]

(Reg. No. GP44 to GP48)

T. W. Culp and D. C. Harrell[2]

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[3]. 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

those of leading southeastern cultivars, but they have fibers that are 18% stronger. These two breeding lines differ significantly in fiber properties. Pee Dee 9232 is equivalent to 'Coker 201' in fiber length and micronaire, but Pee Dee 9223 is superior to them.

Pee Dee 9241 was developed from the cross of Coker 421 × PD 4398. Pee Dee 4398 was developed from the cross of FTA 263 × 'Atlas'. FTA 263 was developed from a complex series of crosses involving Triple Hybrid 108 and 171, AHA 6-1-4, Earlistaple, and Sealand 542 in the Pee Dee breeding program. Atlas was developed from related material in the Georgia Agricultural Experiment Station cotton breeding program. Pee Dee 9241 is from the increase of seed from a single F_3 plant selection.

Pee Dee 9241 possesses excellent fiber properties with unusually high fiber elongation. It combines well with other PD lines and gives excellent combinations of fiber quality and yield. Pee Dee 9241 is extremely susceptible to the fusarium-wilt (caused by *Fusarium oxysporium* F. spp. *vasinfectum*) rootknot-nematode complex (*Meloidogyne* spp.), and to verticillium wilt (caused by *Verticillium* spp.).

Pee Dee 9363 and Pee Dee 9364 were developed from a complex composite cross involving 'Carolina Queen', Triple Hybrids 108 and 171, AHA 6-1-4, Earlistaple, Sealand 542, and C 6-5. Each line is from a single F_3 plant selection.

Pee Dee 9363 and Pee Dee 9364 produce yields equivalent to Coker 201, but their fibers are 20% stronger. Other agronomic and fiber properties of Pee Dee 9363 are equivalent to Coker 201, but those of Pee Dee 9364 are superior.

These five breeding lines are derived from crosses with southeastern commercial cultivars, Coker 421, Atlas, and Carolina Queen. Although numerous crosses of this type have been made, this is the second series of crosses that have led to improved breeding lines. Studies indicate the success in breaking the genetic linkages that control the negative association between lint yield and fiber strength.[4]

Seed (25 g) of these breeding lines may be obtained from AR, SEA, USDA, Pee Dee Experiment Station, Florence, SC 29503.

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REGISTRATION OF PEE DEE 4461 COTTON GERMPLASM[1]

(Reg. No. GP49)

T. W. Culp and D. C. Harrell[2]

THE unique breeding stock of cotton (*Gossypium hirsutum* L.), Pee Dee 4461 (GP 49), was released to plant breeders and geneticists by AR, SEA, USDA, and the South Carolina Agricultural Experiment Station in 1974. This breeding stock possesses extra fiber quality, is an excellent combiner for yield and fiber strength, and carries unidentified factors for resistance to *Heliothis* spp.

Pee Dee 4461 was developed in a complex backcrossing and composite-crossing (CC) program to transfer the high lint percentage of a *G. barbadense* L. strain to upland cotton (1). Other parental material involved was 'Earlistaple', 'Auburn 56', and 'Coker 100 Wilt'. Pee Dee 4461 was an unusual CCF_3 selection with light green plant color essentially devoid of red pigment, compact plant type, and unusual prolificacy of small bolls. It was tested under the experimental label Q_1.

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Although Pee Dee 4461 produces low lint yields and has unusually small bolls and seed compared with these traits in southeastern cultivars, the breeding stock has high lint percentage and excellent fiber properties. It combines well with many commercial cultivars and breeding lines (1) giving heterosis for lint yield of 15 to 20% over the superior parent and transmitting a 15% increase in fiber strength from *G. barbadense* to its progenies.

Pee Dee 4461 was the common parent in several crosses that produced progenies resistant to *Heliothis* spp. (2, 3). This source of resistance to *Heliothis* spp. has not been isolated or identified, but Pee Dee 4461 must possess resistant factors. Preliminary studies suggest that cultivars with insect resistance require less insecticide or fewer applications for *Heliothis* spp. control, which can make cotton a more profitable crop and give a cleaner environment in which to live. Seed (25 g) of this breeding line may be obtained from AR, SEA, USDA, Pee Dee Experiment Station, Florence, SC 29503.

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REGISTRATION OF PEE DEE 6520 GERMPLASM LINE OF COTTON[1]

(Reg. No. GP50)

T. W. Culp and D. C. Harrell[2]

PEE DEE 6520 (GP 50), a very early maturing breeding stock of cotton (*Gossypium hirsutum* L.) with extra fiber strength, was released by AR, SEA, USDA and the South Carolina Agricultural Experiment Station in 1974. This breeding line represents a major improvement in lint yield and maintains a portion of the extra fiber strength of its parents.

Pee Dee 6520 was developed from a composite cross of two F_1 hybrids, (FTA 266 × 'Atlas') × (AC 235 × 'Dixie King'). FTA 266 was developed from a series of complex crosses involving Triple Hybrids 108 and 171, 'Earlistaple', 'Sealand 542', and AHA 6-1-4. AC 235 was derived from similar crosses that included C 6-5. Atlas, a commercial cultivar of Triple Hybrid origin, was developed at the Georgia Coastal Plain Experiment Station. Dixie King, a conventional southeastern commercial cultivar, was developed by the Bobshaw Pedigreed Seed Company, Stoneville, Miss. Pee Dee 6520 was derived from the increase of seed from a single F_3 plant selection.

Pee Dee 6520 produced yields comparable to 'Coker 201' at the Pee Dee Experiment Station and erratic yields in the 1968 and 1969 Regional High Quality Tests, primarily because its locks are too loose in the open bolls and fall out when harvest is delayed. This breeding stock is intermediate to Pee Dee 2165 and Coker 201 in fiber quality and yarn strength.

Pee Dee 6520 is early maturing and its compact plant type is advantageous when above-average plant populations are tested[3]. It also performs above average as an early season cotton in the Southeast.

Pee Dee 6520 has given above-average performances in tests where yields are influenced by injury from boll weevil (*Antho-*

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