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RECOVERY OF RECURRENT PARENT TRAITS WHEN BACKCROSSING IN COTTON

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Six family groups of upland cotton (*Gossypium hirsutum* L.), derived by backcrossing, were compared over multiple environments. Each group consisted of a different nonrecurrent parent (NRP), a cultivar from Africa with resistance to bacterial blight [caused by *Xanthomonas campestris* pv. *malvacearum* (Smith) Dye]; the same recurrent parent (RP), 'Westburn 70', susceptible to that disease; the F_4 of the cross between them; and the Bc_1F_4, Bc_2F_4, Bc_3F_4, and Bc_4F_4 generations. All entries were evaluated for lint yield, six fiber properties, and seven agronomic characters. Reactions to three diseases were also determined for the Bc_4F_4 and the RP in two environments per disease. The objectives of this study were to measure the degree and rate of recovery of RP traits through four backcross generations in upland cotton as well as to determine reactions to three diseases (including blight) in the Bc_4F_4 generation. Eighty-four sets of comparisons (six family groups by 14 traits) were possible in the portions of the study not involving diseases. The NRPs differed significantly from the RP in 69 of the 84. Among those 69 combinations, the number (and percentage) of significant differences from the RP in the F_4, Bc_1F_4, Bc_2F_4, Bc_3F_4, and Bc_4F_4 were 47 (68%), 35 (51%), 25 (36%), 25 (36%), and 14 (20%), respectively. No significant differences were detected in any family group between the Bc_4F_4 and the RP for lint yield, 2.5 and 50% span lengths, uniformity index, and pulled lint percentage. One or more such differences were found for micronaire, T_0 and T_1 fiber strengths, picked lint percentage, boll size, bur size, lint weight per boll, lint index, and seed index. Depending upon the trait, three, four, and often more backcrosses were required to recover the RP traits. Several instances of transgressive segregation were noted mainly in the earlier backcross generations. The observed rate of recovery of RP traits was 96% of the theoretical rate. The only intentional selection in these materials was for bacterial blight resistance. As expected, the level of blight resistance in the Bc_4F_4 reflected that of its NRP. Also as expected, the level of tolerance to Verticillium wilt (caused by *Verticillium dahliae* Kleb.) and of resistance to the Fusarium wilt [caused by *Fusarium oxysporum* Schlect. f. sp. *vasinfectum* (Atk.) Snyd. & Hans.]—root-knot nematode [*Meloidogyne incognita* (Kofoid & White) Chitwood] complex in the Bc_4F_4 reflected that of the RP with three possible exceptions.