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Investigation of Lines Being Selected from Following Generations in Terms of Technological Properties in Cotton

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Abstract: This study was conducted in the University of Dicle, Faculty of Agriculture Department of Experimental field between the years of 1997-2003. In the study, the varieties Beliiizvor 432, Sayar 314 and F_5 , being obtained result of these parents' hybrid and the favoured lines, being selected from the back cross hybrid generations, were used for materials. In the study, fiber technological properties of favoured lines were determined and determining the changing limits of these properties formed groups. In terms of technological properties, it was determined that 0.96% of material had very thin fibre; 44.23% of it had very long fiber; 99.04% of it was strong in terms of fiber strength; of its value of fiber elasticity was high; 6.69% of its short fiber proportion was low. It was also determined that 22.12% of the material's value of fiber brightness was good, 74.04 of it's value of fiber yellowness was high.

Key words: Cotton, generation, breeding lines, technological properties

INTRODUCTION

The main goal of cotton breeding science is to develop new varieties having high fiber, fiber yield and quality. In the aim of reaching this goal, forming combination from different genotypes and collecting the desired characters in one population increase the selection's active and success in the breeding studies.

The cotton's fiber properties are limited with variety's genetic potential. The appearance of this potential depends on appropriate climate conditions and the raising method. Cotton's fiber quality's height is significant in accordance with protecting the competition power against other artificial fibers^[1].

In the studies related to the subject, Miller and Marani^[2] determined that there was high heterosis in fiber yield and quality in the F_1 , F_2 seed generation obtained in results of the hybrid studies. Gururajaro^[3] determined that they found much heterosis for fiber length and fiber strength. Wallejo *et al.*^[4] explained that they found positive but little heterosis in terms of length, fiber fineness and fiber strength in the generations obtained at the end of hybrid studies. Nasirci *et al.*^[5] studies made with using 79 germplasm, although genetic stocks had thicker and shorter fiber than control genotypes in general, they were more strong and better in point elasticity; with the aim of determination of fiber technological properties in the cotton line and varieties

end of the investigation of change limits in these properties. Stoilova^[6] determined that used genotypes differed considerably from the standard cultivars with respect to lint percentage and fiber length. Karadmir *et al.*^[7] determined that 63.5% of the material investigated in the study was thin fibered, 50% of it was long fibered and 60.8% of it was situated in the middle strong group in terms of fiber strength; 70.2% of its fiber elasticity value was good; 16.2% of its fiber elasticity value was better and 36.4% of its fiber brightness value was high.

In the study, the varieties Sayar 314, Beliiizvor 432 and F_5 , obtained with the result of these parents' hybrid and fiber technological properties of favoured lines being chosen from backcross hybrid generations were determined and by determining the changing limits of these properties, constituting of materials and data to the further quality cotton's production studies formed the studies goal.

MATERIALS AND METHODS

With making backcross hybrid and F_5 generations obtained with the results of hybrid programmes being conducted at the University of Agriculture, Department of Experiment in the years 1997-2002. Dependent on selection, the seeds obtained from 104 plants were planted to two rows on the 12 m parcel in 2002. After the last of

growing raising season, these lines by being harvested one by one their fiber properties were tested in the quality analysis laboratories. The change limits of the fiber technological properties were determined and were formed.

In the study, the parents Sayar 314, Beliizvor 432 and 104 favoured line being chosen from backcross (BcP₁ BcP₂) and F₃ generation were used for material.

Fertilization was made with 7 kg pure N and 7 kg pure P per decare in the planting and with the first irrigation 7 kg pure N per decare. In the experiment, totally 8 furrow irrigations were made, harvesting was made by hand in two different dates. The groups related to the technological properties being examined in the breeding lines figures were formed in the EXCEL program.

RESULTS AND DISCUSSION

Fiber fineness (mic): The fiber fineness limits have changed 3.9 and 5.7 mic (Fig. 1). It was determined that 0.96% of material's fiber fineness was situated in the thin fibered group (1 breeding cotton line) with the change between 3-3.9 mic.; 41.35% of it was situated in middle thin fiber group (43 breeding cotton lines) with the change between 4-4.9 mic.; 57.69% of it was situated in the rough fibered group (60 breeding cotton lines) with the change between 5-5.9 mic. Whereas Sayar 314 from the parents placed in the thinnest fibered group in terms of fiber fineness, Beliizvor 432, was placed in the middle thin fibered group present findings are agreed with the findings^[2,4,7].

Fiber length (mm): The fiber length of line and varieties being tested indicated value between 26.3 and 31.67 mm (Fig. 2). It was determined that 55.77% of the material was situated in the middle long group with showing the value between 25.5-28.5 mm (58 breeding cotton lines); 44.23% of it was situated in the long fibered group with showing the value between 28.6-34.9 mm. (46 breeding cotton lines).Whereas the parents Sayar 314 was situated in the middle long group in terms of fiber length, the parents Beliizvor 432 and nearly half of the material were determined to be situated in the long fibered group. Present findings were similar with the findings^[5,7] but they were different from findings^[3,4].

Fiber strength (g tex⁻¹): Fiber strength in the whole material have changed between 29.7 and 42.3 g tex⁻¹ (Fig. 3). It was determined that 99.04% of material's fiber strength was between 30-42.3 g tex⁻¹ (104 breeding cotton lines) and was placed in the very strong group, 0.96% of it was between 26-29.9 (1 breeding cotton line) and was

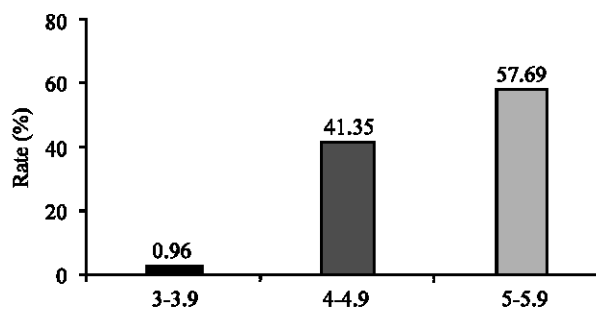


Fig. 1: Fiber fineness

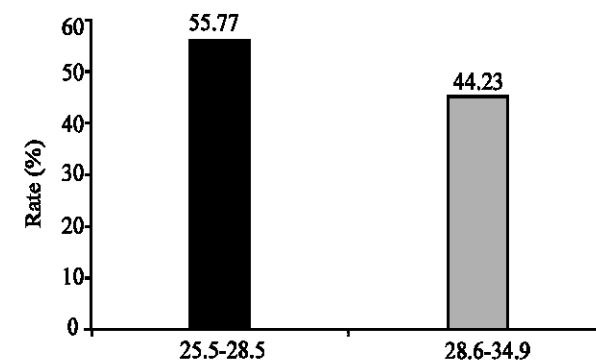


Fig. 2: Fiber length

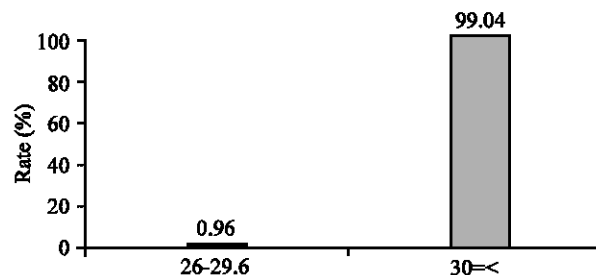


Fig. 3: Fiber strength

situated in the strong group. Both of the parents and almost the whole material were determined to be very strong fibered. Present findings were different from the findings of Grurajoro's^[3] and Karademir *et al.*^[7].

Fiber uniformity (%): It was painted that the value of fiber uniformity indicated change between 82.4 and 88% in whole material (Fig. 4). It was also determined that 37.5% of material's fiber uniformity value was between 85.1-88% (39 breeding cotton lines) and was situated in the best group; 59.62% of it was between 83-85% (62 breeding cotton lines) and was placed in good group; 2.8% of it showed value between 80-82.9% (3 breeding cotton lines) and placed in middle group. It was pointed that the parent Beliizvor 432 and the majority of the

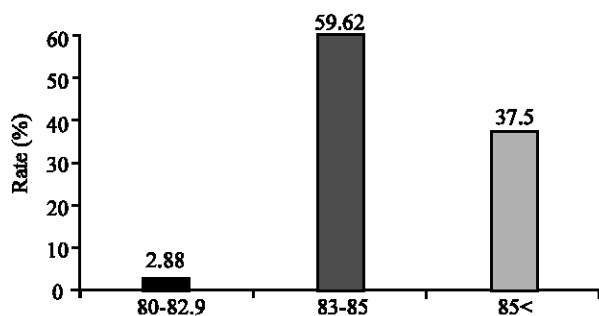


Fig. 4: Fiber uniformity

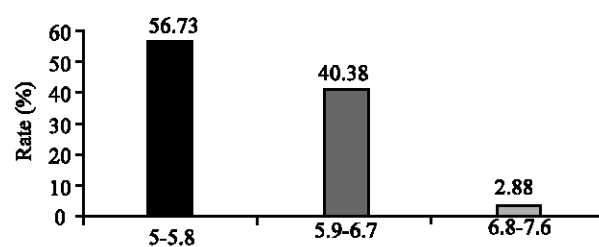


Fig. 5: Fiber elasticity

material were superior in point of fiber uniformity and parent Sayar 314 showed performance in the middle level. Present findings were in harmony with findings of Karademir *et al.*^[7].

Fiber elasticity (%): It was determined that the whole material showed change between 5-7% in terms of fiber elasticity (Fig. 5). It was pointed that 2.88% of material's fiber elasticity value changed between 6.8-7.6 (3 breeding cotton lines) and belonged to good group 40.38% of it changed between 5.9- 6.7 (43 breeding cotton lines) and belong to middle elasticity group in terms of fiber elasticity; Sayar 314 was situated in the middle group. It was determined that 2.8% of material was in good group in point of fiber elasticity. Present findings were similar with findings of Nasirci *et al.*^[3] but were different from findings of Karademir *et al.*^[7].

Short fiber proportion (%): It was pointed that short fiber proportion limit's change value in all lines were between 5.8- 15.6% (Fig. 6). It was determined that 0.96% of material's short fiber proportion's value was lower than 6 (1 breeding cotton line) and was situated in good group by showing the value between 6-6.9 (22 breeding cotton lines); 74.04% of it was situated in middle group by showing the value between 9.1-13.9 (77 breeding cotton lines) and 3.85% of it was placed in bad group by showing the value between 14-15.6 (4 breeding cotton lines). Although the parent Beliiivor 432 was placed in good

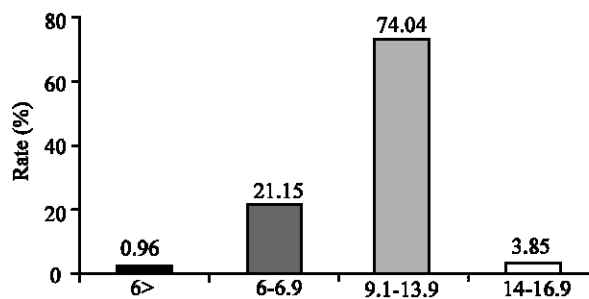


Fig. 6: Short fiber proportion

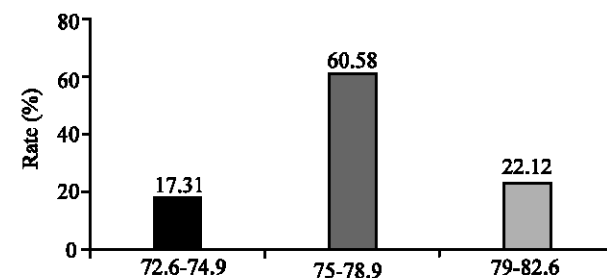


Fig. 7: Fiber brightness

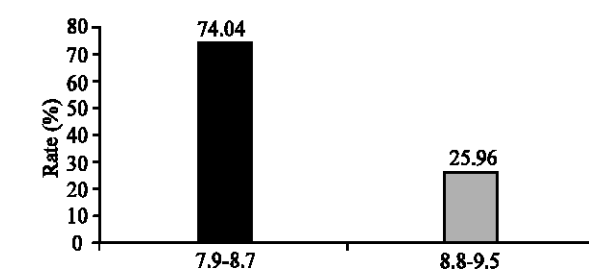


Fig. 8: Fiber yellowness

group in terms of short fiber proportion, Sayar 314 was situated in the middle group. The great majority of the material was situated in the middle group in point of short fiber proportion.

Fiber brightness (%): It was determined fiber brightness value changed between 72.6 and 82.6% in all lines. (Fig. 7) It was pointed that 17.31% of material was between 72.6-74.9 (18 breeding cotton lines); 60.58% of it was between 75-78.9 (63 breeding cotton lines); 22.12% of it was between 79-82.6 (23 breeding cotton lines) in terms of brightness.

While the parent Sayar 314 showed superior performance in terms of fiber brightness, parent Beliiivor 432, was situated in middle level group. It was determined that fiber brightness's value was not low in the whole material. Present findings were different from the finding of Karademir *et al.*^[7].

Fiber yellowness (%): It was pointed the fiber yellowness value changed between 7.9 and 9.5% in all material. (Fig. 8). It was determined 74.04% at material changed between 7.9-8.7 and (77 breeding cotton lines); 25.96% of it changed between 8.8-9.5 and belonged to middle group (27 breeding cotton lines) In terms of fiber yellowness Sayar 314 showed superior performance, but Beliiizvor 432 showed middle level performance. It was also determined fiber yellowness values in material generally was well.

In this study, the change limits of the varieties Sayar 314 and Beliiizvor 432, obtained in the result of these parents hybrid and favoured lines being chosen from backcross hybrid and F₃ generations were formed in groups by being determined in points of technological properties. It was determined that in terms of technological properties 0.96% of the material was very thin fibered; 44.23% of it was long fibered; 99.04% of it was very strong fibered; 37.05% of it had very high value of fiber uniformity; 2.88% it had high value of fiber elasticity, 6.69% of it had low value short fiber proportion; 22.12% of it had high value of fiber brightness; and 74.04% of it had good value of fiber yellowness. In this manner, positive results were got in this study in terms of constituting of material and data to next breeding study.

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