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Determination of Variation Limits of Lines Selected from Following Generations (*Gossypium hirsutum* L.) in Terms of Some Agronomic Properties on Cotton

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Abstract: This study was conducted in the University of Dicle, Experimental Field of Agricultural Faculty in 1997-2002. In the study, the varieties Beliizvor 432, Sayar 314 and F_5, being obtained result of hybridization of these parents and the favoured lines, being selected from the back cross as hybrid generations, were used as materials. In the study, some agronomic and earliness properties of favoured lines were determined the change limits of these properties. In the result of the study, it was determined that 18.10% of examined material have longer plant height, 36.10% of examined material situated in earliness group and first node number of sympodial branch was low 12.38% of examined material number of sympodial branch and 11.43% of examined material's number of boll was high. It was also determined that 12.8% of material first hand seed yield cotton was high and situated in earliness group and 16.19% of material was the generous group in terms of cotton seed yield.

Key words: Cotton, generation, breeding lines yield, yield components

INTRODUCTION

Cotton is one of the necessity material having an important position in human life. People have been together with cotton cloth since the life existence. Cotton having important position in human life, is also an important raw material of other industry branches like oil, soap and animal feed alongside of textile industry (Anonymous, 2001).

The ability to provide properties like farmer's high yield, durable against damaging of disease and insect and industrialist's high fiber quality, cotton gin production and high oil rate in seed should constitute combination from different genotypes and to be farmer desired characters in one population. Especially know about degree of quantitative character's heritage and relevant statistics parameter will increase the selection's activity and success in improvement study.

In similar studies, White and Kohel (1966) had informed influences of dominant gene in generations in terms of fiber yield and the number of boll on plant in the result of hybrids. Mehla *et al.* (1988), informed determined positive heterosis in terms of the number of first sympodial branch, they had got in the result of made backcross; Ghulam *et al.* (1989), determined the highest heterosis rate in fiber yield and constituted superior seeds from parents in constituted generation that they had made in the result of diallel hybrid; Kaynak (1996), fixed heterosis merits were positive and important in terms of properties like cotton seed yield and boll weight, in terms of properties like number of boll. Plant height were positive, but unimportant in generations he had got in the result of hybrid; Yılmaz (1997), heterosis was positive and in high level in terms of number of sympodial branch, first harvest rate, number of boll on plant and cotton seed yield, in terms of plant height, number of sympodial branch, it was positive, but in lower level in made hybird; Meredith and Brown (1998), investigated heterosis rates in properties like total cotton seed yield, ginning percentage production, number and weight of boll and informed the necessity of benefit from heterosis improvement for high in quality and production in cotton; Nasırcı and Smith (1999), genetic stocks in general were more back than control genotypes and none genetic stock couldn't pass the parents in terms of element of boll fiber yield by using 79 germplasm in the studies they had made; Unay *et al.*, (2001) 6 lines pass the controls in the observation they had made with 17 lines in terms of cotton seed yield in F_4 generation and the transferring of this lines to the F_5 level and in F_5 level the differences between genotypes were important in terms of plant height, weight of boll cotton seed yield and ginning percentage; Unay *et al.* (2001) got heterosis which was positive and high level in terms of node number of first sympodial branch and the rate of first hand cotton seed yield.

In this study, Sayar 314 and Beliizvor 432 varieties and F_5 and backcross generations being got from the

result of this parents hybrid whose favoured lines were determined agronomic properties for the studies of high in quality cotton's production would be made further by determining this properties change limits had constituted the aim of this study.

MATERIALS AND METHODS

With making backcross hybrid and F_5 generations obtained with the results of hybrid programmes being conducted at the Dicle University Faculty of Agricultural, Department of Field Crops experimental area in 1997-2002. Dependent on selection, the seeds obtained from 105 plants were planted to two rows on the 12 m parcel. After the growing season, these lines by being harvested one by one their yield properties were tested. The change limits of the yield and yield components were determined.

In the study, the parents Sayar 314, Beliizvor 432 and these rest seed generations (BcP_1, BcP_2) and 105 favoured lines being chosen from F_5 generation were used as research materials.

Fertilization was made with 70 kg pure N and 70 kg pure P per hectare in the planting and with the first irrigation 70 kg pure N per hectare. 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

Plant height (cm): The length of plant height was determined between 62.20 and 97.40 cm in all materials (Fig. 1). It was determined that 18.10% material's plant height was between 89.52-97.40 cm (19 breeding lines); 26.67% of material was between 81.64-89.52 cm (28 breeding lines) 41.9% material was between 73.75-81.64 cm (44 breeding lines) and also 13.33% of material was between 73.4-67.2 cm. While parents Beliizvor 432 located in long height group, the parents Sayar 314 located in the middle length group. Findings show that majority of materials have middle height. The present findings were similar with the findings of Yılmaz 1997 and Unay *et al.* (2001), but showed differences with the findings of White and Kohel (1966).

Node number of first sympodial branch (Number/plant): It was determined first sympodial branch node number changed between 1.2 and 4.8 number/plant (Fig. 2). It was determined 36.19% of material's node number of first

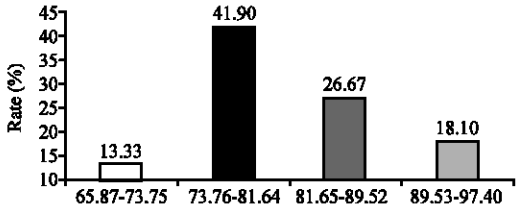

Fig. 1: Groups of breeding lines for plant height

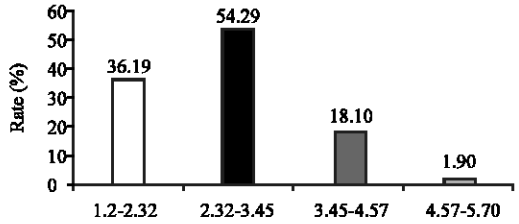

Fig. 2: Groups of breeding line for node number of first sympodial branch

sympodial branch was between 1.2-2.3 number/plant (38 breeding lines); 54.29% of material was between 2.4-3.4 number/plant (57 breeding lines); 18.10% of material was between 3.5-4.5 number/plant (8 breeding lines); 1.9% of material was also between 4.6-4.8 number/plant. The male parent Beliizvor 432 and female parent Sayar 314 showed high performance in terms of node number of first sympodial branch. Findings were found similar with findings of Kaynak (1996), Yılmaz (1997), Mehla *et al.* (1998) and Basbag and Gençer (2000).

Number of monopodial branch (Number/plant): It was determined that number of monopodial branch changed between 0.4 and 2.6 number/plant in all material (Fig. 3). It was determined that number of monopodial branch of 52.38% of material was between 0.4-1 number/plant (55 breeding lines); 39.05% of material was between 1.2-1.8 number/plant (41breeding lines) 7.62% of material was between 2-2.28 number/plant (8 breeding lines); 0.95% of material was also between 2-2.8 number/plant. While the male parent Beliizvor 432 (0.6 number/plant) located in the group being least number of monopodial in terms of number of monopodial as an earliness criteria, the female parent Sayar 314, located in the middle group. It was found that more than half of the material's number of monopodial branch was low. This result shows that roughly one third of materials have early maturity. The present findings were found similar with the findings of Yılmaz (1997).

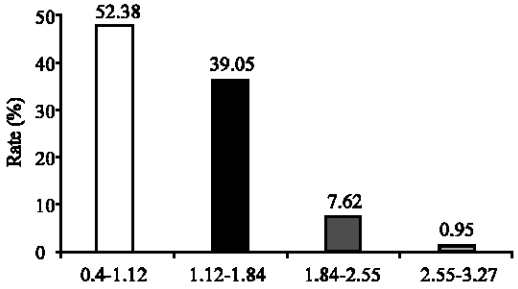

Fig. 3: Groups of breeding lines for number of monopodial branch

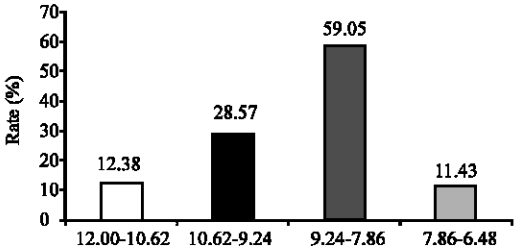

Fig. 4: Groups of breeding line for number of sympodial branch

Number of sympodial branch (Number/plant): It was determined that the value of number of sympodial branch changed between 7 and 12 number/plant in all materials (Fig. 4). It was determined that in terms of number of sympodial branch 12.38% of material changed between 10.8-12 number/plant (13 breeding lines); 28.57% of material changed between 9.4-10.6 number/plant (30 breeding lines); 59.05% of material changed between 8-9.2 number/plant (50 breeding lines) 11.43% of material changed between 7.4-7.8 number/plant Beliizvor 432 (12 number/plant) located in good group in terms of number of sympodial branch.

The parent Sayar 314 (9.26 number/plant) also located in the middle group. Our findings are similar with the findings of Yılmaz (1997).

Number of boll (Number/plant): It was determined that the value of number of boll changed between 11-30.2 number/plant in all materials (Fig. 5). It was indicated number of boll of 11.43% of material was between 24.8-30.2 number/plant (12 breeding lines); 28.52% of material was between 18.4-23.6 number/plant (31 breeding lines); 56.19% of material was between 12.4-12.2 number/plant (59 number); 2.86% of material was between 11.0-12.2 number/plant (3 breeding lines) It was fixed that the parent Beliizvor 432 (29.2 number/plant) showed high performance in terms of number of boll and the parent Sayar 314 (23.4 number/plant) also located in lower group. Present findings were found different with the findings of

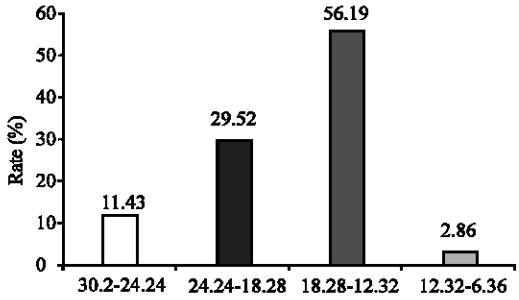

Fig. 5: Groups of breeding lines for number of boll

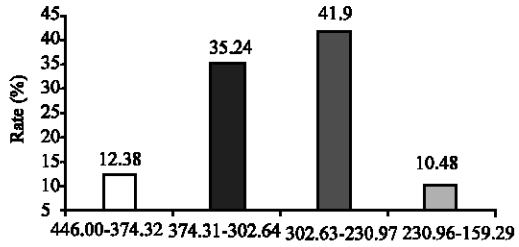

Fig. 6: Groups of breeding lines for first hand cotton seed yield

Yılmaz (1997), Meredith and Brown (1998) and White and Kohel (1966).

First hand cotton seed yield (kg da^{-1}): It was determined that first hand cotton seed yield changed between 193.71 and 446.00 kg da^{-1} in all materials (Fig. 6). It was determined that first hand cotton seed yield 12.38% of material was between 375.71-446.00 kg da^{-1} (13 breeding lines) 35.24% of material was between 303.14-374.28 kg da^{-1} (37 breeding lines) 41.9% of material was between 334.57-308.50 kg ha^{-1} (44 breeding lines) 10.48% of material was between 193.71-228.00 kg ha^{-1} (11 breeding lines) The parent Beliizvor 432 (404.00 kg da^{-1}) showed high performance in terms of first hand cotton seed yield and the parent Sayar 314 (275.00 kg da^{-1} located in the middle earliness group, was indicated. Present findings are similar with the findings of Yılmaz (1997), Meredith and Brown (1998) Basbag and Gencer (2000).

Cotton seed yield (kg da^{-1}): It was determined that cotton seed yield changed between 221.71 and 605.71 kg da^{-1} in all materials (Fig. 7) It was determined that cotton seed yield 16.19% of material was between 498.42-605.71 kg da^{-1} (17 cotton lines) 23.81% of material was between 380.00- 491.14 kg da^{-1} (25 breeding lines); 51.43% of material was between 273.71-379.42 kg da^{-1} (59 cotton breedings lines); 8.57% of material was between 221.71- 261.42 kg da^{-1} (9 cotton breeding lines) It was determined that the parents Beliizvor 432 and Sayar 314

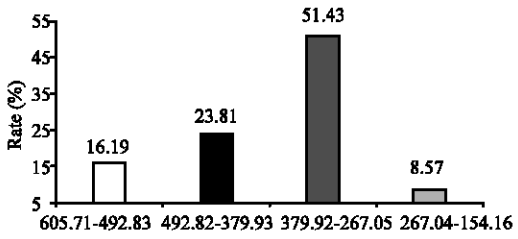

Fig. 7: Groups of breeding lines for cotton seed yield

located in second good group in terms of cotton seed yield. The present findings were similar Ghulam *et al.* (1989), Kaynak (1996), Yılmaz (1997), Nasırcı and Smith (1999) and Unay *et al.* (2001).

In this study, It was grouped by determining change limits in terms of Sayar 314 and Beliizvor 432 varieties and F_5 being got from the result of hybridising of those parents and in agronomic properties in favoured lines selected from hybrid generations to back. In the result of the study, it was determined that 18.10% of examined material was long and more yield, 36.19% of examined material first node number of sympodial branch was low and located in earliness group, 52.38% of examined material number of sympodial branch low very much, 12.38% examined material number of boll was high. It was determined that 12.8% material first hand of seed cotton yield was high and located in earliness group, 16.19% of material also located in high yielded group in terms of cotton seed yield. So that in this study, positive results were got in terms of constituting datum and material for improvement studies would be made further.

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