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## SUMMARY

The field trials of this study were conducted at Sids Agricultural Research Station, Beni-Suef Governorate, ARC, Egypt, during the winter seasons of 2004/05 and 2005/06. Twenty of faba bean genotypes (17 genotypes derived from nine  $F_6$  crosses along with three check cultivars Giza 429, Giza 843 and Misr 1), were used in this study, A randomized complete block design with four replications was used. Each plot was consists of five ridges, three meters length, 60 cm apart and 20 cm between hills, with two seeds per hill (plot size 5.2 m<sup>2</sup>). Seeded was done in the 10 November each season and all cultural practices were made as recommended. The following data were recorded on 10 individual guarded plants selected at random from each plot, except seed yield, time to 50% flowering, time to 95% maturity, which estimated on plot basis: 1- Time to 50% flowering, 2- Time to 95% maturity, 3- Seed yield/plant, 4- Seed yield (kg/plot), 5- Harvest index, 6- Plant height, 7- Number of branches/plant, 8- Number of pods/plant, 9- Number of seeds/plant, 10- 100-seed weight, 11- Seed protein content, 12- Hydration coefficient of seeds before cooking , 13- Cotyledons percentage, 14- Hull percentage, 15- Total Soluble Solids (TSS) and 16- Seed cookability (stewing percentage). Data of each season were subjected to the analysis of variance of RCBD. The phenotypic and genotypic variance of each season is calculated. The genotypic and phenotypic coefficient of heritability and broad sense heritability were calculated.

Results could be summarized as follows

1- Highly significant differences among tested faba bean genotypes were detected for number of days from sowing to 50% flowering, 95% maturity, plant height, number of branches/plant, harvest index, number of pods/plant, number of seeds/plant, seed yield/plant, 100-seed weight, seed yield/plot, protein %, hull %, Cotyledons %, hydration %, T.S.S. and stewing % in 2004/05 and 2005/06 seasons. (These indicated that the tested faba bean genotypes were selected from highly diverse resources and the selection after crossing could be useful way to improve these characters).

2- Wide variation among tested genotypes was detected in both seasons. The range of days to 50% flowering and 95% maturity, plant height, number of branches and harvest index were 48.00 to 55.63 days, 145.0 to 154.6 days, 119.8 to 137.9cm, 2.24 to 3.13 and 29.82 to 35.94%, respectively. Three genotypes namely 1586/553/2002, 1581/546/2002 and 1592/559/2002 were the earliest in maturity. They matured at 145.0, 145.3 and 145.6 days, respectively, comparing with 147.5 days for the best control variety Giza 843.

3- The variation among tested genotypes in both seasons showed narrow ranges of plant height (119.8 to 137.9 cm) and number of branches / plant (2.24 to 3.13).

4- Significant differences among genotypes for harvest index were detected, and genotypes 1573 / 517 /2002 1586/553/2002 and 1561/489/2002 recorded the highest percentage of harvest index,

which recorded (35.94, 34.56 and 33.46%, respectively), comparing with (30.67, 30.04 and 31.54%) for the three check varieties Giza 429, Giza 843 and Misr 1, respectively.

5- Significant differences among genotypes for seed yield were obtained. The most promising genotypes in seed yield were 1573/517/2002, 1563/506/2002 and 1562/517/2002, which recorded (3.38, 3.37 and 3.27 kg/plot, respectively). These three genotypes gave increases in seed yield exceeded the mean of the three check cultivars Giza 429, Giza 843 and Misr1 by 22.5, 22.1 and 18.4%, respectively. These genotypes being promising and would be exploited in breeding program.

6- Among the tested genotypes, three genotypes namely 1573/517/2002, 1563/506/2002 and 1562/517/2002 produced the highest number of pods/plant, which recorded 15.31, 14.23 and 12.91, respectively. Also, these genotypes produced the highest number of seeds/plant, which recorded 45.25, 41.16 and 39.08, respectively.

7- Results revealed significantly differences among the genotypes for seed yield/plant (g). Three genotypes exhibited the highest seed yield/plant (1581/546/2002, 1573/517/2002 and 1562/517/2002) which recorded 34.44, 33.65, and 33.41 g, respectively. These genotypes gave increases in seed yield exceeded the mean of the three check cultivars Giza 429, Giza 843 and Misr1, by 42.6, 39.3 and 38.3%, respectively.

8- The genotypes were varied significantly in their seed protein content with a range of 24.38% for genotype 1573/527/2002 to 29.32% for genotype 1561/478/2002. Genotypes 1561/478/2002, 1582/550/2002, 1563/506/2002, 1561/429/2002 and 1562/521/2002, possessed the highest values of protein content, which recorded 29.32, 29.22, 28.28, 28.19 and 28.16%, respectively, comparing with (26.00, 24.70 and 26.43%, for check varieties Giza 429, Giza 843 and Misr 1, respectively).

9- The ranges of hull, Cotyledons, hydration, stewing, TSS percentages characters were (10.58-11.86%), (82.52-77.58%), (199.40-171.65), (100-80.05%) and (18.25-11.75%), respectively. The genotype 1563/506/2002 posed the highest level of seed protein content and cook ability. This genotype being promising and would be useful genotypic stock.

10- Estimates of genotypic coefficient variance were high for seed yield components (pods, seeds and seed yield/plant) but their heritability estimates were moderate (76, 73 and 77, 74 and 72, 74 in both seasons, respectively) in which environment effects were high for these characters. Whereas, the high heritability were found in flowering (96 and 85), maturing (95 and 86), 100 seed weight (99 and 93) seed yield/plot (93 and 88), Cotyledons (92 and 98), hydration (96 and 88) and TSS (96 and 92%). These indicated that the genetic variance has a great role in the existence of variability in these characters. Therefore, these characters could be exploited as selection criterion in breeding program.

11- The expected genetic advance (GA%) exhibited considerable range (7.39 to 30.18%) . Number of seeds / plant followed by number of pods / plant and seed weight / plant (g) expressed the highest estimates of genetic advance and recorded 30.18 - 25.248 and 24.35, in the same order.

It could be concluded that :-

Great variation was observed among the tested genotypes.

Some of these genotypes might be used as a source of desirable characters.

Further research ought to be done on the promising line under different locations.

Three genotypes namely 1573/517/2002, 1563/506/2002 and 1562/517/2002, were the most promising in seed yield. These genotypes gave increases in seed yield exceeded the mean of the three check cultivars. Giza 429, Giza 843 and Misr 1 by 22.5, 22.1 and 18.4%, respectively. The genotypes would be exploited in faba bean breeding program.

One genotype namely 1563/506/2002, possessed the highest level of seed protein content, stoving% and high seed yield and therefore, it would be exploited in breeding program.