Inheritance of some quantitative characters in faba bean (Vicia faba L.)

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5-SUMMARYThis study was carried out during the period of 1999/2000, 2000/2001, 2001/2002 and 2002/2003 growing seasons at Etay El- Baroud Agricultural Research Station, Behaira Governorate, Egypt. The objective of this study was to estimate the response to different methods of plant breeding i.e., pedigree, bulk and single pod descent. Also, direct and indirect selection criteria for increase seed yield were carried out. A selection intensity of 5% was used with direct selection (selection for yield itself) and with indirect selection using the three criteria, i.e., no. of pods /plant, 100-seed weight, no. of seeds/pod. The genetic parameters were estimated in F3, F4 and F5 generations.Three F2 populations derived from the crosses (Line 103 x ILB 938), (Line 103 x Tripe White) and (Line 18 x Rina Blanca) .The obtained results could be summarized as follow: A. First cross (Line 103 x ILB938):1.Mean squares associated with F3 and F4 families were found to be significant for the four traits under study in the first cross.2.Genetic gain was rather moderate for all studied traits except no. of seeds/pod. The same trend was obtained for G.C.V.% for these traits in the F3- families.3.Most selected families surpassed significantly the better parent for seed yield /plant in the F4 families. Also, genetic gain was rather moderate for no. of pods /plant andrelatively high for seed yield /plant. However low for 100-seed weight. The same trend was found for G.C.V% for the mentioned traits.4. F5 generation:a) Breeding methods:Mean squares due to breeding meth ds were significant for 100-seed weight only. Either pedigree breedingmethod or bulk breeding method produced consistently more superior lines compared the best parent in the first ross. The best line was no.1 (99.19 gm) of SPD method and line no.8(97.96 gm) of bulk method and line no.2 (95. 3gm), 6 (94.29gm) of pedigree method.b) Selection criteria:Mean squares due to selection criteria were s gnificant for no.of pods per plant, 100-seed weight and high s ed yield per plant. However nonsignificant for no. of seeds/poThe selection of high seed yield/plant gave th highest values for no.of pods/plant, 100-seed weight d seedyield/plant. Then the selection of high seed index sh wed the same trend.The comparison showed that the efficiency of election for high seed yield/plant, followed by heavier seed ndex inimproving mean yield of F5-lines and extracting higher number of high yielding lines.B. Second cross: (Line 103 x Triple White).1.Significant mean squares were detected for all studied traits for F3. Regarding to seed yield/plant, only seven families surpassed significantly higher than the heaviest parent. A significant high and moderate heritability in broad-sense were detected for yield and its components.2.Significant mean squares due to F4-selected families were detected for all studied traits except no.of seeds/pod. As for seed yield /plant all selected families except no. 6, 7 and 10 surpassed significant the better parent. The range of selected families varied from (120.85gm) family no.40 to (44.69gm) family no.6.3.Genetic gain was rather low for no. of pods/plant and 100-seed weight. However moderate for seed yield/plant.4.F5 generation: a) Breeding method:Mean squares due to breeding methods were significant for all traits under study. The bulk method record the highest values for both of no.of pods/plant, 100-seed weight and seed yield/plant. However, SPD method record the highest value of seeds/pod. It could be concluded that bulk method considered the best method for seed yield /plant, no.of pods/plant and 100-seed weight than those pedigree and SPD ones.The pedigree method produced consistently more superior lines compared the best parent. While, line no.6 in bulk method was the heaviest one being (102.82gm) followed by line no.10 in pedigree method being (

96.4gm).b) Selection criteria:Mean squares due to selection criteria i.e., no.of pods per plant, 100-seed weight, no. of seeds per p d (indirectselection) and seed • yield per plant (direct sele tion) were significant.Concerning seed yield/plant, the selectio based on high seed yield/plant led to heaviest seed yield/p1 t followed by selection based on high no. of pods/plant. H wever, theselection plants with high no.of seeds/pod record the lowest one.The selection of high seed yield per plan , gave the highest seed yield per plant and the higher no.o seeds perpod. While, selection plants with high no.of seeds/ od, record the higher no.of pods/ plant and heaviest seed indeC. Third cross: (Line 18x Rina Blanca).1. Mean squares due to F3 families were highly significant for all studied traits. Concerning seed yiel • plant sixfamilies surpassed significant higher than the m est parent (R.B).2.Significant mean squares due to F4 families we found to be significant for all studied traits. With rega d to seed yield/plant 44 selected families surpassed signi cantly the best parent. The range of selected families v ied from (53.48 gm) family no. 5 to (169.37 gm) family n 19.3.Heritability in broad-sense values were high for i oth seedindex and seed yield/plant and moderate for no.o pods per plant and for no. of seeds/pod.4.Genetic gain was rather moderate for no.of pods/plant, • 100-seed weigh; low for no.of seeds/pod, and somewhathigh for seed yield/ plant. While, G.C.V.% was moderatefor all traits.5.F5- generation: a) Breeding method.:Mean squares due to breeding methods were significant for all studied traits except no.of seeds/pod. The pedigree method gave the highest values for no.of pods/plant, 100-seed weight and seed yield/plant. It could be concluded that pedigree method considered the best breeding method for this traits.Both of pedigree and bulk breeding methods gave consistently more superior lines compared the best parent with 10 and 8 lines, respectively. The best lines were no.2, 4 in pedigree and in bulk in the same order.b) Selection criteria:Mean squares due to four selection criteria i.e., no.of pods/plant (indirect selection) and high seed yield/plant (direct selection) were found to be significant.With regard seed yield/plant, the selection based on higher no.of seeds/pod gave the significant heavier seed yield/plant, followed by selection based on high no.of pods/plant.The selection of high no.of pods/plant, gave the highest seed yield/plant and higher no. of pods/plant.The present study expressed the selection for yield via no.of pods/plant and no. of seeds/pod as indirect selection were more efficiency in faba bean. The results indicated that selection for no.of pods/plant and seed yield/plant were more efficient in breeding forward superior yielding F5 lines.Finally, it could be concluded that indirect selection for yield via no.of seeds/pod, no. of pods/plant and selection for yield itself were effective.