



SELECTION FOR EARLINESS, YIELD AND IT'S COMPONENTS IN FLAX

BY

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SUMMARY

The experiment was carried out at the Etay El-Baroud Experiment Station, El-Beheira Governorate, Egypt during the three successive seasons of 2014-2015, 2015-2016 and 2016-2017.

The present study aimed at measuring the efficiency of two methods of selection used in the flax breeding program namely; pedigree method (PM) and bulk method (BM) on three flax populations derived from previous work by the other (self) in 2014. F₂ seed from the previous work furnished the source material for subsequent generations. Three flax populations were Used in this study.

The results obtained can be summarized as follows:-

A- First cross:

A.1: F₃ generation:

- 1- Mean squares associated with f₃ families was found to be significant for eleven traits under study.
- 2- Low to moderate estimates of heritability in broad sense in the F₃ families were detected for all traits under study which ranged from 13.18 to 60.32.
- 3- Genetic gain as parent of means was rather lower for all traits under study, except No. of capsules/plant, No. of basal branches/ plant, and seed yield/plant which gave moderate values.
- 4- Moderate G.C.V% was detected for No. of capsules/Plant and seed yield/plant. On the other side, the other treats gave lower G.C.V%.

A.2: F₄ generation:

- 1- Mean squares due to F₄ selected families were found to be significant for all studied traits, indicating that the forty F₄ families showed somewhat differently from each to other.
- 2- Low to moderate estimates of heritability in broad sense was detected for all the studied traits.
- 3- Genetic gain% (ΔG %) was rather lower for all traits except seed yield/ plant and No. of capsules/plant where moderate estimates were detected. Also, the same trend was obtained for GCV%.

A.3: F₅ generation:

A.3.1: Breeding methods:

- 1- Mean squares due to breeding methods were significant for days to flowering, No. of capsule/plant, length of fruiting zone, No. of seeds/capsule, seed index, seed yield/plant, technical stem length, and oil percentage. The other traits showed insignificant. This result indicated the difference between breeding methods.
- 2- The pedigree methods gave the highest value for all traits.
- 3- The pedigree method proved to be more efficient than bulk method for selection based on these traits may be due to the two parents good combiner for most traits. Also, gave the earliness of days to flowering.

B- Second cross:

B.1: F₃ generation:

- 1- Mean squares associated with F₃ families were found to be highly significant for seven traits i.e. days to flowering, No. of capsules/plant, length of fruiting zone, seed index, seed yield/plant, Technical stem length and total fiber percentage.

- 2- High heritability value was detected for technical stem length, indicating the effectiveness of selection in this trait. For other traits low to moderate heritability values were detected, indicating low response of selection for these traits.
- 3- G.C.V% was low for all traits except seed yield/plant and technical stem length where, it moderate. Also, the genetic gain as parent of mean was rather lower for most traits under study.

B.2: F₄ generation:

- 1- Mean squares due to F₄ selected families were significant for days to flowering, No. of fruiting branches/plant, seed yield/plant and technical stem length.
- 2- Low to moderate estimates of heritability in broad sense was detected for all the studied traits.

B.3: F₅ generation:

B.3.1: Breeding methods:

- 1- Mean square due to breeding methods were significant for days to flowering, No. of capsules per plant , length of fruiting zone, seed index, seed yield/plant, technical stem length, total fiber percentage and oil percentage, indicating the difference between breeding methods.
- 2- Bulk method gave the highest value for, days to flowering, technical stem length and total fiber percentage. While, the pedigree method gave the highest value for, No. of basal branches/plant, length of fruiting zone, seed index, seed yield/plant, total length and oil percentage. This result indicated that pedigree method gave earliness plant. The bulk method and pedigree method showed the similar efficiency of these traits under study, this result may be due

to the first parent have good combiner and the second parent was poor combiner.

C- Third cross:

C.1: F₃ generation:

- 1- Mean squares associated with F₃ families were significant for stem diameter, number of seeds/capsules; seed yield/plant and total length.
- 2- Low heritability values were detected for the traits, indicating the lower response to selection for those traits. Also, G, G% and G.C.V, lower values were obtained, indicating impossible gain from selection on percent increase in the F₄ over the F₃ are selected.

C.2: F₄ generation:

- 1- Mean squares due to F₄ generation were significant for number of capsules/plant, No. Of seeds/capsule, seed yield/plant and total length, indicating that the forty selected families behaved somewhat differently from each to others for these traits.
- 2- Low heritability value, G, G% and G.C.V were detected for all traits, indicating that possible gain from selection on percent low increase in the F₅ over the F₄ are selected.

C.3: F₅ generation:

C.3.1: Breeding methods:

- 1- Mean square due to breeding methods were significant for days to flowering, No. of capsule/plant, No. of seeds/capsule, seed index, seed yield/plant, total length and oil percentage. The result indicated difference between breeding methods.
- 2- The pedigree method gave the highest value for mention traits. While, pedigree method gave earliness plant than bulk method.

3- The pedigree method produced consistently more superior lines compared the best parent or average mean for days to flowering, number of capsules/plant, number of seeds/capsule, seed yield/plant, total length and technical stem length was gave the high number of lines significant desirable for these traits.