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# ASSOCIATION OF DIFFERENT CHARACTERS FOR IMPROVEMENT OF *BRASSICA* ACCESSIONS

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**ABSTRACT**

Thirteen accessions of *Brassica* including a standard one were sown in a randomized complete block design in four replications. Data on various quantitative characters were recorded for comparative performance. Primary branches, secondary branches, plant height, number of pods per plant, pod length, number of seeds per pod and thousand seed weight exhibited positive correlation with seed yield per plot, but secondary branches and oil percentage showed a negative correlation with seed yield per plot.

**Key words:** Quantitative, seed yield, correlation coefficients, genotypic, phenotypic.

## INTRODUCTION

Edible oil is an important constituent of human diet. In Pakistan the domestic edible oil production from all the sources do not match with the growing requirement of the population. The government imports edible oil by spending a large amount of the budget. The import bill of the edible oil was 788 million US $ (Anonymous, 2000). The circumstances show a remarkable shortage of edible oil and the escalation of prices will worsen the situation.

Rapeseed and mustard are the second main contributor in the production of local edible oil. It is estimated that from 698 thousand acres 67 thousand tons of edible oil was obtained from rapeseed and mustard (Anonymous, 2000). This condition shows very low yield per acre of the crop as compared to the advanced countries of the world. The problem of acute shortage cannot be overcome shortly but can be minimized through extensive research plan. The present studies were undertaken to estimate the correlation analysis of different *Brassica* accessions. The purpose was to evaluate the genetic potential of the desirable genotypes to increase the edible oilseed local production along with the non-traditional oil seed crops like soybean, sunflower, jojoba etc. Similar studies were carried out by Ismail and Khan (1996), Haq *et al.* (1998), Qamar *et al.* (1998) and Masood *et al.* (1999).

## MATERIAL AND METHODS

Thirteen *Brassica* accessions viz. PR-169/72, PR-48, PR-5, PR-133/72, PR-102/72, PR-143/72, P-53-482/4, PAK 85890, B. alba, ZEM-1, BM-1, PR-269 and DGL as a standard variety were laid out in randomized complete block design with four replications and studied in the Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad in 2000. Plant to plant and row to row distance was maintained as 30cm and 60cm, respectively. Ten guarded plants were selected from each replication and each genotype. The data on primary branches, secondary branches, plant height, number of pods per plant, pod length, number of seeds per pod, thousand seed weight, oil percentage, seed yield per plant and seed yield per plot were recorded on maturity of the crop. Analysis of variance was performed for each variable in randomized complete block design (RCBD) according to Steel and Torrie (1980). Correlation coefficients between all variables were calculated by using the formulae given by Kwon and Torrie (1964).

## RESULTS AND DISCUSSION

The data was recorded for various quantitative characters like primary branches, secondary branches, plant height (cm), number of pods per plant, pod length (cm), number of seeds per pod, thousand seed weight, oil percentage, seed yield per plant and seed yield per plot. These results are in accordance with Swain (1990). Analysis of variance (Table 1) indicated highly significant differences among the characters under study. The coefficient of variability revealed that there was a greater variation in the characters like number of primary branches, secondary branches, plant height, number of pods per plant, thousand seed weight, seed yield per plant. The phenotypic coefficients of variability were greater than the genotypic one's (Table 2). So it may be concluded that in the expression of the characters the environment played an important role.

Genotypic and phenotypic correlation analysis were made (Table 3). The number of primary branches exhibited a positive and significant correlation with the number of secondary branches, number of pods per plant along with seed yield per plant. Swain (1990) reported the positive correlation between these characters. The primary branches showed positive and highly significant correlation with the secondary branches. The secondary branches showed the positive and significant correlation with number of pods per plant and these had a positive and highly significant correlation with number of seeds per pod. Plant height exhibited positive and significant association with seed yield per plant, oil percentage and seed yield per plot. Ismail and Khan (1996) reported a positive association between the plant height and the seed yield per plant. The number of pods per plant showed a positive and significant correlation with seed yield per plant. Pod length resulted in positive and significant correlation with seeds per pod. Pod length showed positive and highly significant correlation with seed yield per plant. The number of seeds per pod exhibited a positive and the significant correlation with seed yield per plant, oil percentage and seed yield per plot. Haq *et al.* (1998) reported positive correlation between the number of seeds per pod and seed yield per plant. Thousand seed weight showed a positive and highly significant correlation with oil percentage. It also exhibited positive and significant correlation with seed yield per plant and seed yield per plot. Zhao *et al.* (1991) also reported the positive association between these characters. Oil percentage has a positive and significant correlation with seed yield per plot. Enggvist and Becker (1993) found similar results between these two characters. Seed yield per plant showed a positive and highly significant correlation with seed yield per plot.

Table 1. Mean squares from analysis of variance of different characters of thirteen Brassica accessions.

| S.O.V | df | Primary Branches | Secondary Branches | Plant Height (cm) | No. of Pods Per plant | Pod Length (cm) | No. of seeds per pod | 1000 SW | Oil Percentage | Seed Yield per Plant | Seed Yield Per plot |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Replications** | 3 | 1.26 | 3.51 | 38.69 | 597.81 | 0.19 | 2.56 | 0.03 | 3.62 | 1.28 | 2322.28 |
| **Genotypes** | 12 | 2.90* | 18.67* | 256.32** | 31284.24** | 2.01** | 31.61** | 0.84** | 27.41** | 30.35** | 80533.58 ** |
| **Error** | 36 | 1.13 | 8.65 | 44.01 | 1754.79 | 0.06 | 3.61 | 0.08 | 3.23 | 3539.05 | 3539.05 |

Where * Significant @ 5%; ** Highly Significant @ 1%

Table 2. Genotypic and phenotypic coefficients of variability in variables of different *Brassica* accessions.

| Sr. No. | Characters | Coefficient of variation | |
|---|---|---|---|
| | | GCV% | PCV% |
| 1. | Primary branches | 9.9 | 18.7 |
| 2. | Secondary branches | 6.38 | 13.49 |
| 3. | Plant height | 4.78 | 6.48 |
| 4. | Pods per plant | 22.25 | 24.75 |
| 5. | Pod length | 15.49 | 16.43 |
| 6. | Seeds per pod | 14.82 | 18.24 |
| 7. | 1000-grain weight | 17.29 | 20.62 |
| 8. | Oil %age | 6.29 | 7.79 |
| 9. | Seed yield per plant | 12.39 | 19.94 |
| 10. | Seed yield per plot | 1.54 | 1.67 |

Where GCV%=Genotypic Coefficient of Variation Percentage; PCV%= Phenotypic Coefficient of Variation Percentage

Table 3. Genotypic (G) and Phenotypic (P) correlation coefficients among ten traits of thirteen Brassica accessions.

| Characters | | Secondary Branches | Plant Height | No. of Pods per plant | Pod Length | No. of Seeds Per pod | 1000-seed Weight | Oil % age | Seed Yield Per plant | Seed Yield Per plot |
|---|---|---|---|---|---|---|---|---|---|---|
| **Primary Branches** | **G** | 0.62 | -0.51 | 0.28* | -0.11 | -0.40 | 0.24 | -0.1 | 0.31* | 0.005 |
| | **P** | 0.042 | -0.31** | 0.22 | 0.02 | -0.28** | 0.13 | -0.08 | 0.17 | -0.02 |
| **Secondary Branches** | **G** | | -1.03 | 0.66 | -0.14 | -0.58 | -0.23 | -0.17 | -0.31 | -0.11 |
| | **P** | | -0.67 | 0.53** | -0.08 | -0.43** | -0.1 | -0.15 | -0.21 | -0.10 |
| **Plant Height (cm)** | **G** | | | -0.29 | -0.41 | -0.05 | 0.14 | 0.17** | 0.39* | 0.23 |
| | **P** | | | -0.28** | -0.04 | -0.05 | 0.14 | 0.11 | 0.33** | 0.19 |
| **No. Pods per plant** | **G** | | | | -0.022 | 0.44 | -0.02 | -0.21 | 0.05* | 0.10* |
| | **P** | | | | -0.014 | -0.40** | -0.04 | -0.19 | 0.04 | 0.09 |
| **Pod length** | **G** | | | | | 0.28* | 0.23 | 0.14 | 0.52* | 0.82* |
| | **P** | | | | | 0.25 | 0.21 | 0.26 | 0.46** | 0.78** |
| **No. of seeds Per pod** | **G** | | | | | | 0.005 | 0.54* | 0.11 | 0.26* |
| | **P** | | | | | | 0.008 | 0.48 | 0.09 | 0.23 |
| **100 Seed Weight** | **G** | | | | | | | 0.32* | 0.66* | 0.31* |
| | **P** | | | | | | | 0.28** | 0.62** | 0.29** |
| **Oil % age** | **G** | | | | | | | | -0.08 | 0.26* |
| | **P** | | | | | | | | -0.07 | 0.25 |
| **Seed Yield per Plant** | **G** | | | | | | | | | 0.57* |
| | **P** | | | | | | | | | 0.54** |
| **Seed Yield per plot** | **G** | | | | | | | | | 1.00 |
| | **P** | | | | | | | | | 1.00 |

* Significant @ 5%; ** Highly Significant @ 1%

## CONCLUSIONS

It may be concluded that the primary branches, secondary branches, plant height, number of pods per plant, pod length, number of seeds per pod and thousand seed weight are those quantitative characters which enhance the seed yield per plot. It may also be concluded if the accessions PR-48, PR-143/72, PAK 85890, ZEM-1, PR-269 and DGL are grown on large scale these may increase the total production of edible oil and as a result we can overcome the acute shortage of this commodity.

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