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Study of Correlation among Morphological Parameters in Different Varietites/accessions of *Brassica* Species

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Abstract: The research was carried out on ten varieties/accessions of *Brassica* species for the study of correlation in different yield contributing characters. Data were recorded on various quantitative charsters. Positive correlation was observed between primary branches and seed yield both at genotypic and phenotypic levels. Similarly seed yield showed positive correlation with siliqua per plant, number of secondary branches and siliqua length. While this relation was negative and highly significant in case of days to flower completion and plant height. Whereas seed yield was negatively and non-significantly correlated with seed per siliqua and 1000-seed weight.

Key words: *Brassica*, Rapeseed-Mustard, Correlation and Morphological Characters

Introduction

Among conventional oilseed crops rapeseed-mustard oil has remained an important source of edible oil in the country. Unfortunately desirable domestic varieties/types are not available. In fact the most probable reasons are both lack of proper research and developmental work and necessary measures to overcome the problems. For an effective breeding program, information concerning the extent and nature of genetic diversity within a crop species is essential. it is particularly useful for characterising individual accessions/cultivars and as a general guideline in the selection of parents by studying the correlation and genetic variability of crop germplasm including morphological traits (Gepts, 1993). The material under study showed considerable amount of genetic variation and correlation for different agronomic characters viz., number of secondary branches, siliqua per plant and siliqua length showed positive correlation with seed yield per plant (Wani and Zarger, 1995). This study on correlation can be utilised for the selection and development of better performing lines and varieties.

Materials and Methods

Ten *Brassica* varieties/accessions viz. Brown raya, Indian raya I, Indian raya II, Poorbi raya, RL-18, L-18, RLM-514, RLM-189, RS-300 and RNS were used for present investigations at Post Graduate Agricultural Research Station (PARS), Faisalabed. Randomised Complete Block Design wee used, with four replications. Row to row distance of 45 cm. and plant to plant distance of 25 cm. was maintained. Recommended doses of fertilizers and cultural practices were performed during the crop growth. Data were collected on 10 randomly selected plants from three middle rows, in each replication per accession. Data were recorded on number of primary and secondary branches, days to flower completion, siliqua per plant, siliqua length, plant height, days to maturity, 1000-grain weight and seed yield per plant.

Statistical Analysis: The data were analyzed statistically by using analysis of variance as given by Fisher (1958). Mean ($\bar{x}$) and standard deviation (SD) were calculated according to standard techniques (Steel and Torrie, 1980). Phenotypic and genotypic correlation coefficients were estimated by using the methods given. The sampling of genetic correlation was tested. And the phenotypic correlation were tested by the formula given by Steel and Torrie (1980).

Resutls and Discussion

Genotypic (rg) and phenotypic (rp) correlation coefficients among ten characters of *Brassica* species are given in the Table 1 which are discussed as follow.

Correlation between number of primary branches and other characters: Table 1 revealed that there was positive and non-significant correlation between primary branches and number of secondary branches, siliqua length, seeds per siliqua, 1000-seed weight and seed yield per plant both at genotypic and phenotypic levels. Results agree with the findings of Uddin *et al.* (1995) who also found positive and significant correlation between primary branches and seed yield while working on *Brassica juncea.* Whereas correlation with days to flower completion and plant height was negative and non-significant both at genotypic and phenotypic levels. Whilst relationship of number of primary branches was highly significant and negative with days to maturity but significant and positive with number of siliqua per plant, both at genotypic and phenotypic levels. Hussain (1990) and Guo *et al.* (1987) found similar trend while working on Indian mustard.

Correlation between number of secondary branches and other characters: Table 1 revealed that correlation between number of secondary branches and days to flower completion, day to maturity, siliqua length, seed per siliqua and 1000-seed weight was negative and non-significant both at genotypic and phenotypic levels. Results agree with the findings of Hussain (1990). Positive but non-significant correlation was observed between secondary branches and seed yield, while the relationship between secondary branches and siliqua per plant was positive and significant at genotypic and highly significant at phenotypic level. These results conform the findings found positive association between branches per plant and seed yield while working on *Brassica campastris* and *Brassica juncea* L.

Table 1: Genotypic (rg) and phenotypic (rp) correlation coefficient among 10 characters of *Brassica* species

Characters		Number of Secondary Branches	Days to completion	Plant flower (cm)	Days to height	Pod per maturity	Pod plant (cm)	Seeds length pod	1000-seed per weight (g)	Seed Yield per plant (g)
Number of	rg	0.062^{NS}	-0.433^{NS}	-0.118^{NS}	-0.767†	-0.813	0.120^{NS}	0.232^{NS}	0.143^{NS}	0.297^{NS}
Primary Branches	rp	0.295^{Ns}	-0.275^{NS}	-0.001^{NS}	-0.854*	0.465*	0.011^{NS}	0.188^{NS}	0.120^{NS}	0.197^{NS}
Number of	rg		-0.135^{NS}	-0.876$^{=}$	-0.484^{NS}	0.932$^{=}$	-0.212^{NS}	-0.277^{NS}	-0.044^{NS}	0.218^{NS}
Secondary Branches	rp		-0.113	-0.581**	-0.363^{NS}	0.928**	-0.158^{NS}	0.215^{NS}	-0.147^{NS}	0.036^{NS}
Days to	rg			-0.459^{NS}	0.009^{NS}	-0.423^{NS}	-0.494^{NS}	-0.325^{NS}	-0.272^{NS}	-0.819†
Flower completion	rp			-0.435*	-0.016^{NS}	-0.365^{NS}	-0.405*	-0.272^{NS}	-0.154^{NS}	-0.647**
Plant	rg				-0.159^{NS}	-0.813$^{=}$	-0.051^{NS}	-0.038^{NS}	0.079^{NS}	-0.824$^{=}$
Height (cm)	rp				-0.122^{NS}	-0.571**	-0.017^{NS}	0.022^{NS}	-0.001^{NS}	-0.649**
Days to	rg					-0.784$^{=}$	-0.309^{NS}	-0.513^{NS}	0.048^{NS}	-0.100^{NS}
Maturity	rp					-0.541**	-0.192^{NS}	-0.339^{NS}	-0.003^{NS}	-0.079^{NS}
Pods per	rg						0.073^{NS}	0.042^{NS}	0.071^{NS}	0.438^{NS}
Plant	rp						0.070^{NS}	0.032^{NS}	-0.079^{NS}	0.229^{NS}
Pod	rg							1.000$^{=}$	-0.562^{NS}	0.321^{NS}
Length (cm)	rp							0.854**	-0.379^{NS}	0.311^{NS}
Seed per	rg								0.555^{NS}	-0.429^{NS}
Pod	rp								0.362^{NS}	-0.423*
1000-seed	rg									-0.372^{NS}
Weight (g)	rp									-0.333^{NS}

† = Significant tested against S.E., * = Significant at 0.05, ** = Significant at 0.01 and NS = Non-significant

respectively. The correlation was negative and significant between secondary branches and plant height both at genotypic and phenotypic levels.

Correlation between days to flower completion and other characters: Negative and non-significant correlation was observed between days to flower completion and plant height, number of siliqua per plant, seed per siliqua and 1000-seed weight. While relation between days to flower completion and days to maturity was positive and non-significant at genotypic level but negative and non-significant at phenotypic level. Relationship was negative and significant with seed yield both at genotypic and phenotypic levels. Sandhu and Gupta (1996) also reported negative correlation between days to flower completion and seed yield while working on *Brassies* species.

Correlation between plant height and other characters: Correlation was negative and non-significant with days to maturity, pod length, both at genotypic and phenotypic levels. Results agree with the findings of Khan (1992) and Hussain (1990) relationship with seeds per pod was negative and non-significant both at genotypic and phenotypic levels whereas negative on genotypic level but positive on phenotypic level in case of 1000 seed weight. The correlation between plant height and pod per plant and seed yield per plant was negative and highly significant both *at* genotypic and phenotypic levels. These results are in agreement with the findings of Uddin *et al.* (1995) and Sandhu and Gupta (1996) who reported positive correlation between plant height and seed yield per plant.

Correlation between Pods per plant and other characters: Correlation between pods per plant and pod length, seeds per pods, 1000-seed weight and seed yield per plant was positive non-significant both at genotypic and phenotypic levels, except 1000 seed weight where this correlation was positive and non-significant at genotypic and negative at phenotypic level. Same findings were reported by Wani and Zargar (1995) who found siliquae per plant a promising character for seed yield per plant.

Correlation between pod length and other characters: The association between pod length and seeds per pod was positive and highly significant both at genotypic and phenotypic levels. The correlation with 1000-seed weight was negative and non-significant both at genotypic and phenotypic levels where as the relationship of pod length with seed yield was positive and non-significant both at genotypic and phenotypic levels.

Correlation between seeds per pod and 1000-seed weight and seed yield per plant: The relationship of seeds per pod with 1000-seed weight was positive and non-significant both at genotypic and phenotypic levels. While the correlation with seed yield per plant was negative both at genotypic and phenotypic levels but non-significant at genotypic level while significant at phenotypic level. These results do not agree with the findings of Uddin *et al.* (1995) and Andrahennadi *et al.* (1991) who reported that the siliqua had greatest direct and positive effect on seed yield.

Correlation of 1000-seed weight with seed yield per plant: 1000-seed weight was non-significant and negatively correlated with seed yield per plant both at genotypic and phenotypic levels. Results partly agree with the findings of Hussain (1990) who found negative correlation both at genotypic and phenotypic levels during his studies on different mustard vvarieties. While results do not agree with Uddin *et al.* (1995).

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