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VARIABILITY, HERITABILITY AND GENETIC ADVANCE IN TORIA

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ABSTRACT

Variability, heritability and genetic advance were studied in eight varieties of toria (*Brassica compestris* var. toria). The genotypic coefficient of variation (GCV) was highest for 1000 seed weight and high for number of primary and secondary branches per plant. The highest phenotypic coefficient of Variation (PCV) was observed for number of secondary branches followed by number of capsules per plant, number of primary branches per plant, 1000 seed weight and number of seeds per capsule. The highest heritability was observed for 1000 seed weight followed by plant height, number of primary branches per plant, days to maturity and number of seeds per capsule. The genetic advance as % of mean was observed highest for 1000 seed weight and high for plant height and number of primary branches.

KEY WORDS : Toria, Variability, Heritiability, Genetic advance

Toria comes under rapeseed-mustard group of oilseed crops which is the second most important group after groundnut. In recent years the country witnessed a significant increase in production of rapeseed-mustard. The enhanced production attained is to be attributed to the development of high yielding varieties, agroproduction, protection technologies and their Widespread adoption by the farmers. The breeders select better genotype based on their phenotypic expression. The estimates of genotypic and phenotypic variance for various characters and their heritability are important components in choosing the best genotypes. The heritability is important due to defined role in expression of the desirable phenotype. The estimates of heritability and genetic advance are important for expression of yield, and these components are helpful in designing a successful breeding programme.

METERIALS AND METHODS

Eight diverse varieties of toria (*Brassica compestris* var. *toria*), (TS-33, TH-9002, BR-23, NDT-290, Bhawani, BAUTR-1, TW-871-1, JMT-6902) were used for the present study. The varieties were grown in a randomised block design in nine replications in three successive years. Each plot consisted of three rows of three m length with a spacing of 30 x 10 cm. The observation on nine characters were taken on selected 10 plants randomly per replication. The estimates of coefficient of genotypic and phenotypic variance, heritability, genetic advance and genetic advance as % of mean determined by using methods of Lush (1949), and Miller *et.al.* (1958).

RESULTS AND DISCUSSION

The varietal difference were highly significant (Table 1) for 1000 seed weight, number of seed per siliqua (pod), days to maturity and plant height. Similar result was reported earlier by Yadav (1973) in mustard and Thangavelu and Rajsekharan (1982), in sesamum. The coefficient of phenotypic variation (Table 2), which measure the total relative variation was highest for number of secondary branches and genotypic coefficient of variation was found highest for 1000 seed weight. Whereas lowest genotypic and phenotypic coefficient of

Table 1. Analysis of variance for various characters in toria

Source of variance	d.f.	Final plant stand	Days to maturity	Yield (g/plot)	No. of primary branches per plant	No. of secondary branches per plant	No. of pods per plant	No. of seeds per pod	1000 seed wt. (g)	Plant height (cm)
Treatment	7	56.02	26.35	1523.49	1.67	2.36	818.09	11.61	0.52	277.75
Replication	8	231.78	1533.06	9426.78	5.97	14.71	15106.48	13.55	1.43	721.67
Error	56	65.09	8.30	620.30	0.41	1.84	416.76	3.70	0.05	27.20
				11570.56	8.05	18.91	16341.33	28.86	2.00	1026.62

Table 2. Phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV), heritability, genetic advance and genetic advance as % of mean

Character	PCV	GCV	Heritability (Broad sense)	Genetic advance	Genetic advance as % of mean
Final plant stand	5.60	-.70	-1.57	-0.26	-0.18
Days to maturity	3.91	1.72	19.46	1.28	1.57
Yield (g/plot)	14.39	5.37	13.93	7.70	4.13
No.of secondary branches/plant	39.98	7.00	2.98	.08	2.49
No.of primary branches/plant	16.80	8.51	25.65	.39	8.88
No.of pods per plant	25.49	7.29	9.67	4.28	5.08
No.of seeds per pod	14.78	6.47	19.20	.85	5.85
1000 seeds weight (g)	15.79	11.32	51.41	.34	16.65
Plant height (cm)	8.78	6.24	50.57	7.73	9.15

variation was found in days to maturity. Low genotypic and phenotypic coefficient of variation was observed in plant height, yield per plot and number of seed per siliqua which is the bottle neck for further selection.

The wide range of variation was observed for 1000 seed weight followed by primary and secondary branches per plant, number of siliqua. This indicates that further selection may be carried out. High phenotypic and genotypic coefficient of variation were observed for 1000 seed weight, number of primary branches per plant and number of pods per plant which indicate that these characters are not influenced by environmental fluctuation. Burton (1951) suggested that the genotypic coefficient of variation and heritability estimates give the proper guideline for further selection. 1000 seed weight and plant height showed high heritability and number of primary branches per plant, days to maturity and number of siliqua per plant showed moderate heritability. These results are in general agreement with previous works (Labana, 1980; Paul, 1978). These results of present study were similar to findings of Satpathi *et al.* (1987) which gave high heritability and genetic advance as % of mean for 1000 seed weight, plant height, number of primary branches and number of seeds per siliqua indicating additive gene effects. High heritability used to be helpful in making selection of superior genotypes which ultimately gave to superior phenotype of matric characters.

This study clearly indicate that the parents which had high heritability and genetic advance may be selected and used in future breeding programme for development of elite varieties of toria.

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