SHORT COMMUNICATION

Variability, Heritability and Genetic Advance in late-sown Indian Mustard (*Brassica juncea* L. Czern and Coss)

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The experiment was carried out using 98 diverse genotypes of Indian mustard (*Brassica juncea* L. Czern and Coss) during *Rabi* 2001-2002 at Crop Research Centre, GBPUAT, Pantnagar. The crop was sown on 27th April 2001. The study of genetic variability was carried out for 13 agro-morphological characters. The number of secondary branches/plant recorded the highest values for PCV and GCV followed by number of primary branches/plant, siliqua on main shoot and seed yield/plant. Moderate values for PCV and GCV were shown by plant height, main shoot length, and 1000-seed weight. Days to maturity exhibited the lowest value for PCV while oil content showed the least value for GCV. Plant height, number of primary branches/plant and seed yield/plant revealed high heritability. Plant height also showed high genetic advance while high heritability coupled with low genetic advance was recorded for number of primary branches/plant. Oil content showed low values of heritability and genetic advance. The present study revealed the presence of substantial amount of variability in the material and the important yield components were number of primary and secondary branches/plant, plant height, main shoot length and 1000-seed weight. Therefore, greater emphasis should be given on these characters while selecting for higher yield and related characters.

Key Words: Genetic Advance, Heritability, Indian Mustard, Variability

The *Brassica* group of oilseed crops, commonly known as rapeseed-mustard are the second largest oilseed crop next to groundnut in terms of area and production in India. Indian mustard is the predominant crop among the *Brassica* oilseeds occupying nearly 90% of the total area among these crops. The low productivity can be substantially increased by the use of high yielding varieties/hybrids which in turn serve as potential donors for various qualitative and quantitative traits. In view of the above evaluation of variability present in the germplasm and its exploitation is a pre-requisite. Similarly, heritability of complex traits such as yield and its component characters is also useful in determining the selection criteria for improving the genotypes. Considering the above facts, the present study was conducted to assess the variability in Indian mustard germplasm under late sown conditions and have an idea of the heritability and genetic advance of yield and its component traits.

The experimental material consisting of 98 diverse genotypes of Indian mustard (*Brassica juncea* L. Czern and Coss), were grown during *rabi* 2001-2002 at Crop Research Centre, GBPUAT, Pantnagar. These genotypes, along with two checks Kranti and Varuna were sown in 10 x 10 simple lattice design with two replications under late-sown conditions (27th November, 2001). Each plot consisted of a single row of 3 m length with row to row distance of 30 cm and plant to plant distance of 10 to 15 cm was maintained by thinning. The crop was grown at a fertility level of 80:40:40 NPK/ha, respectively. Observations were recorded on five randomly selected plants from each plot for 13 quantitative characters *viz.* days to flower initiation, days to 50% flowering, days to maturity, plant height, number of primary branches per plant, number of secondary branches/plant, length of main shoot, siliqua length, siliqua on main shoot, seeds/siliqua, 1000-seed weight, oil content and seed yield/plant. The estimates of phenotypic coefficient of variations (PCV), genotypic coefficient of variation (GCV), heritability and genetic advance were computed using standard statistical procedures.

The analysis of variance under late sown conditions exhibited highly significant differences among genotypes for all the characters studied. The range, mean and standard error of mean, genotypic and phenotypic coefficient of variability, heritability and genetic advance are presented in Table 1. The range of variability indicated the existence of variability for all the characters.

Secondary branches ranged from 3.2 to 18.9 with a mean value of 7.98 $\pm$ 1.58 and exhibited the maximum

Table 1. Range, mean, phenotypic, genotypic and environment coefficient of variation, heritability and genetic advance as per cent of mean of various characters

	Days to Flower Initiation (no.)	Days to 50% flowering (no.)	Days to maturity (no.)	Plant height (cm)	Number of primary branches	Number of secondary branches (cm)	Length of main shoot	Siliqua length (cm)	Siliqua on main shoot (cm)	Seeds/ siliqua (no.) (g)	1000-seed weight	Oil content (%) (g)	Seed yield/ plant
Range	47.3-71.3	52.5-83.5	117.8-133.9	101.8-176.8	3.2-11.4	3.2-18.9	20.6-53.1	2.7-5.5	15.7-36.7	6.8-16.1	2.1-4.9	35.7-42.8	1.5-6.9
Mean± SEM	55.82±2.48	61.97±2.34	128.61±2.74	132.7±7.80	4.82±0.66	7.98±1.58	40.73±5.05	4.33±0.42	23.99±2.63	12.16±1.10	3.63±0.27	37.87±1.31	3.75±0.32
PCV	9.65	6.70	3.56	13.65	31.22	41.52	18.53	16.37	23.92	15.44	15.33	4.79	21.38
GCV	7.32	4.04	1.89	10.83	24.44	30.64	5.94	8.77	18.24	8.65	11.21	1.39	17.67
ECV	6.28	5.35	3.01	8.30	18.43	28.01	17.55	13.82	15.47	12.80	10.46	4.99	12.03
h^2	0.58	0.36	0.28	0.63	0.61	0.54	0.70	0.29	0.58	0.31	0.53	0.08	0.68
GA	6.38	3.11	2.68	23.49	1.89	3.71	1.59	0.42	6.87	1.21	0.61	0.31	1.13

values for PCV (41.52) and GCV (13.64). Oil content and days to maturity showed the lowest values for PCV (4.79 and 3.56, respectively) and GCV (1.39 and 1.89, respectively). Similar results have been reported by Chauhan *et al.*, (1999).

Plant height varied from 101.8 cm to 176.8 cm with a mean value of 132.7 ± 7.80 cm. The corresponding PCV and GCV values were 13.65 and 10.83, respectively. The number of primary branches/plant also showed high PCV (31.22) and GCV (24.44) values, the range being 3.2 to 11.4 with a mean value of 4.82 ± 0.66.

Main shoot length varied from 20.6cm to 53.1cm with a mean value of 40.73 ± 5.05. The PCV and GCV values were 18.53 and 5.94, respectively. The siliqua length showed moderate values for PCV (16.37) and GCV (8.77) and ranged from 2.7 cm to 5.5 cm with a mean value of 4.33 ± 0.42.

The 1000-seed weight varied from 2.07 g to 4.87 g with a mean value of 3.63 ± 0.27. The character recorded moderate values for PCV (15.33) and GCV (11.21).

Seed yield/plant showed moderately high values for PCV (21.38) and GCV (17.67) and ranged from 1.47 g to 6.91 g with a mean value of 3.75 ± 0.32.

Plant height (0.63), number of primary branches/ plant (0.61) and seed yield/plant (0.68) showed high estimates of heritability. This indicated that these characters are less influenced by environment. Similar results have been reported by Bagrecha *et al.*, (1972), Ghosh and Gulati (2001). Moderate heritability (0.40 to 0.60) was recorded for number of secondary branches/plant (0.54), siliqua on main shoot (0.58) and 1000-seed weight (0.53). Oil content (0.08) showed the least heritability. This is supported by the findings of Sharma (1987).

High heritability coupled with high genetic advance (23.49) was recorded for plant height. Number of primary branches/plant (1.89) and seed yield/plant (1.13) showed low genetic advance but high heritability. Similar results have been reported by Bagrecha *et al.* (1972), Das *et al.*, (1998). Oil content showed low heritability with low genetic advance (0.31) supported by the findings of Sharma (1987).

The present study indicated the presence of wide range of variability for number of secondary branches/ plant, number of primary branches/plant, plant height, main shoot length, siliqua on main shoot, 1000-seed weight and seed yield/plant. Therefore, selection should be based on these characters in order to achieve greater productivity in this crop.

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