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Genetic variability in chilli (*Capsicum annuum* L.) genotypes

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ABSTRACT

A field experiment was conducted with 37 chilli genotypes. The genotypic and phenotypic coefficients of variation were moderate on matured ripe chilli yield (33.95% and 34.18%). Low GCV and PCV were recorded for plant height (14.06% and 14.22%), crown size (10.65% and 14.25%), plant girth (16.18% and 16.61%), primary branches (8.63% and 11.73%), secondary branches (8.81% and 10.45%), days to 50 per cent flowering (7.34% and 9.18%), number of fruits per plant (18.62% and 19.47%) and dry chilli yield (26.56% and 26.85%), respectively. High heritability in association with low genetic advance over mean (GAM) was recorded for plant height (97.80% and 28.66%). High heritability coupled with moderate genetic advance as per cent over mean for plant girth (94.90% and 32.35%), number of fruits per plant (91.40% and 36.68%), matured ripe chilli yield (98.70% and 69.47%) and dry chili yield (97.80% and 54.11%). Low heritability coupled with low genetic advance as per cent over mean for per cent fruit set (33.40% and 6.72%).

Key words : Genotypic, Phenotypic, Heritability, Chilli.

Chilli is the most economic and additive to improve food acceptability. It is grown for spice and vegetable purpose. Before taking up breeding programme in any crop species a thorough knowledge regarding the amount of genetic variability existing in that particular crop for various characters is essential. Information on nature and magnitude of variability in existing plant material and association among the various characters is pre-requisite for improvement in the yield.

MATERIALS AND METHODS

A field experiment was conducted at Spices and Plantation Crops department of Kittur Rani Channamma College of Horticulture, Arabhavi in Belgaum district of Karnataka state during 2005-06 under irrigation with 37 chilli genotypes and three replications in a randomized block design. In the present investigation, 37 genotypes (collected from ARS, Devihosur) *viz*., DCA-101, DCA-102, DCA-103, DCA-104, DCA-105, DCA-106, DCA-107, DCA-108, DCA-109, DCA-110, DCA-111, DCA-112, DCA-113, DCA-114, DCA-115, DCA-116, DCA-117, DCA-118, DCA-119, DCA-120, DCA-121, DCA-122, DCA-123, DCA-124, DCA-125, DCA-126, DCA-127, DCA-128, DCA-129, DCA-130, DCA-131, DCA-132, DCA-133, DCA-134, DCA-135, DCA-136 and DCA-137 were used. Observations on growth, yield and quality characters were recorded on five randomly selected plants in each treatment. Genotypic and phenotypic coefficients of variations (GCV and PCV) heritability, genetic advance over mean were estimated by statistical analysis.

RESULTS AND DISCUSSION

The data presented in the Table 1 revealed that, low genotypic and phenotypic coefficient of variations were recorded for plant height (14.06% and 14.22%), crown size (10.65 and 14.25%), stem girth (16.18% and 16.61%), primary branches (8.63% and 11.73%) and secondary branches (8.81% and 10.45%). This low GCV and PCV indicated the limited variability in the genetic stalk studied. These results are in support of those of Arya and Saini (1976), Sahoo *et al.* (1989), Warade *et al.* (1996), Rani *et al.* (1996) and Nehru and Manjunath (1996). The low estimates of GCV and PCV for these traits indicated limited variability offering little scope for improvement of these traits. So, for all these growth parameters, the variability has to be generated for their further improvement.

Lower estimates of GCV and PCV were recorded for days to 50 per cent flowering (7.34% and 9.18%), number of fruits per plant (18.62% and 19.47%) and dry chilli yield (26.56% and 26.85%). These results are in conformity with the works of Arya and Saini (1976), Achal shah and Panth (1986), Sahoo *et al.* (1989), Rani *et al.* (1996), Warade *et al.* (1996) and Nandadevi (1999). Lower GCV and PCV for these traits provide evidence of low variability. Hence, the variability has to be generated through introduction and hybridizing diversified genotypes to generate transgressive segregations.

Lower estimates of GCV and PCV were recorded for fruit length (18.19% and 18.67%), pedicel length (13.69% and 14.76%), matured ripe fruit weight (20.05% and 22.80%), dry fruit weight (15.06% and 16.51%),

Table 1: Estimate of mean, range, components of variance, heritability and genetic advance for different characters in chilli

Sr. No.	Characters	Mean ± S.E.	Range	GV	PV	GCV (%)	PCV (%)	h^2 (%)	GA	GAM (%)
1.	Plant height (cm)	61.08 ± 2.86	44.25-75.48	74.17	75.85	14.06	14.22	97.80	17.53	28.66
2.	Crown size (cm)	47.79 ± 1.79	38.29-56.88	25.35	45.43	10.65	14.25	55.80	7.75	16.39
3.	Stem diameter (cm)	1.02 ± 0.02	0.76-1.40	0.03	0.03	16.18	16.61	94.90	0.33	32.35
4.	Number of primary branches	4.10 ± 0.18	3.60-5.26	0.13	0.23	8.63	11.73	54.20	0.54	13.17
5.	Number of secondary branches	8.07 ± 0.26	7.40-+11.33	0.51	0.72	8.81	10.45	71.20	1.23	15.26
6.	Days to 50% flowering	45.42 ± 2.09	37.78-55.83	11.21	17.52	7.34	9.18	63.90	5.51	12.08
7.	Per cent fruit set	45.42 ± 2.09	38.20-55.02	6.61	19.72	5.64	9.77	33.40	3.05	6.72
8.	Number of fruits per plant	49.14 ± 1.61	32.11-66.00	83.66	91.50	18.62	19.47	91.40	18.02	36.68
9.	Matured ripe chilli yield (g/pl.)	156.9 ± 3.59	82.57-288.16	2840.75	2879.43	33.95	34.18	98.70	109.06	69.47
10.	Matured ripe chilli yield (q/ha)	46.79 ± 2.77	24.29-85.34	237.90	260.96	32.97	34.53	91.20	30.34	64.86
11.	Dry chili yield (g/plant)	83.42 ± 1.90	46.69-129.99	490.66	501.52	26.56	26.85	97.80	45.14	54.11
12.	Dry chilli yield (q/ha)	24.09 ± 1.65	12.44-43.59	40.55	48.74	27.09	27.14	99.60	13.42	55.73
13.	Fruit length (cm)	9.28 ± 0.20	5.43-13.60	2.85	2.98	18.19	18.67	94.92	3.38	36.46
14.	Fruit breadth (cm)	1.37 ± 0.08	0.93-2.48	0.13	0.15	26.17	28.31	85.50	0.68	49.64
15.	Pedicel length (cm)	2.70 ± 0.08	1.93-3.79	0.14	0.16	13.69	14.76	86.10	0.71	26.30
16.	Matured ripe fruit weight (g)	3.26 ± 0.18	2.03-4.83	0.43	0.53	20.05	22.80	81.00	1.21	37.23
17.	Dry fruit weight (g)	1.69 ± 0.06	1.29-2.63	0.07	0.08	15.06	16.51	83.20	0.48	28.40
18.	Number of seeds per fruit	98.14 ± 5.43	62.68-158.34	783.73	838.25	26.04	30.20	74.40	44.84	45.69
19.	Ascorbic acid (mg/100 g)	103.40 ± 6.13	78.81-134.61	160.41	273.39	12.25	15.99	55.87	19.98	19.32

GV – Genotypic variance
PV – Phenotypic variance
GCV – Genotypic coefficient of variation
PCV – Phenotypic coefficient of variation.
h^2 – Heritability
GA – Genetic advance
GAM – Genetic advance over mean.

number of seeds per fruit (26.04% and 30.20%) and ascorbic acid content (12.25% and 15.99%), respectively, which provides evidence for low variability. Hence, the variability has to be generated through introduction and hybridizing diversified genotypes to generate transgressive segregations. These results are in accodance with findings of earlier workers, *viz*., Awasthi *et al.* (1970), Arya and Saini (1976), Achalshah and Panth (1986), Sahoo *et al.* (1989) and Amarchandra *et al.* (1990).

Moderate estimates of GCV and PCV were observed for the character matured ripe chilli yield (33.95% and 34.18%). From these result, it can be confirmed that traits are more sensitive to environment and their expression depends more on the non-genetical factors. Therefore, these characers are less docile to selection and selection for such character is not rewarding.

High heritability in association with low GAM was recorded for plant height (97.80% and 28.66%) showing non-additive gene effect. These traits are also highly influenced by environment and as such offering little scope to improve these characters through selection. These results corroborate with the findings of earlier workers (Awasthi *et al.*, 1970; Amarchandra *et al*, 1990; Rani *et al.*, 1996; Warade *et al.*, 1996 and Nandadevi, 1999).

High heritability coupled with moderate genetic advance as per cent over mean for stem girth (94.90% and 32.35%), number of fruits per plant (91.40% and 36.68%), matured ripe chilli yield (98.70% and 69.47%) and dry chilli yield (97.80% and 54.11%) indicating that these character are governed by additive gene effects and applying selection pressure on these traits would be remunerative. These results are in conformity with those obtained by Sahoo *et al.* (1989), Amarchandra *et al.* (1990), Nehru and Manjunath (1996) and Nandadevi (1999).

Moderate heritability coupled with low genetic advance as per cent over mean for crown size (55.80% and 16.39%), days to 50 per cent flowering (63.90% and 12.08%) suggesting the role of non-additivity. This indicated the character had low response to selection. These results are supported by kashinath (2003).

Moderate heritability in association with low GAM was recorded for primary branches (54.20% and 13.17%) and secondary branches (71.20% and 15.26%) suggesting the role of non-additivity. This indicated that the characters had low response to selection. These results are supported by Rani *et al.* (1996).

Low heritability coupled with low genetic advance

as per cent over mean was observed for per cent fruit set (33.40% and 6.72%). This trait is highly influenced by environment and as such, offering little scope to improve this character through selection.

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REFERENCES

Achalshah Lal, S.D. and Panth, C.C. (1986). Variability studies in chilli. *Prog. Hort.*, **18** (3-4) : 270-272.

Amarchandra, P., Sharma, H. and Gupa, V.P. (1990). Genetic variability studies in chilli. *Veg. Sci*., **23** (2) : 23-28.

Arya, P.S. and Saini, S.S. (1976). Capsaicin content of chilli varieties. *Indian Areca. Spices and Cocoa J.,* **1** (1) : 7-10.

Awasthi, D.N., Joshi, S. and Ghildiyal, P.C. (1970). Studies on genetic variability, heritability and genetic advance in chilli (*Capsicum annuum* L.). *South Indian Hort*., **30** : 37-40.

Kashinath (2003). Evaluation and genetic variability studies in chilli genotypes (*Capsicum annum* L.). M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.

Nandadevi (1999). Genetics studies in chilli (*Capsicum annum* L.). M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.

Nehru, S.D. and Manjunath, A. (1996). Genetic variability and path coefficient for some characters in chilli (*Capsicum annuum* L.). *Prog. Hort.,* **28** (3-4) : 73-78.

Rani, K., Natarajan, S. and Thamburaj, S. (1996). Genetic variability in chilli (*Capsicum annuum* L.). *South Indian Hort*., **44** (3-4) : 68-70.

Sahoo, S.C., Mishra, S.N. and Mishra, R.S. (1989). Variability in F2 generation in a diallel cross of chilli. *South Indian Hort*., **37** (8) : 348-349.

Warade, S.D., Dhumal, M.M. and Shinde, K.G. (1996). Studies on genetic variability and heritability in chilli. *J. Maharashtra Agril. Univ*., **21** (2) : 219-220.

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