



Short communication

Variability, heritability and genetic advance in chilli (*Capsicum annuum* L.)

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Abstract

Thirty-five chilli (*Capsicum annuum* L.) genotypes were evaluated in a field study to assess genetic variability, heritability and genetic advance. Higher phenotypic and genotypic coefficients of variation were observed for leaf area, fruits per plant, fruit weight, fruit length, fruit girth and yield per plant. High heritability coupled with high genetic advance observed for these characters imply the potential for crop improvement through selection.

Key words: genotypic coefficient of variation, crop improvement, phenotypic variance

Chilli (*Capsicum annuum* L.) is one of the most important vegetable-cum-spice crops valued for its aroma, taste, flavour and pungency. A wide range of variability reportedly exists in this crop (Nandi, 1992; Munshi and Behera, 2000). Cultivation in smallholdings by individual farmers under diverse environmental conditions is thought to have contributed to this vast variability. This also implies the potential for utilizing such variability in crop improvement programmes. Although an estimate of genetic variability is often considered a pre-requisite for initiating appropriate breeding procedures, no previous reports on locally adapted landraces of chilli are available from south Kerala. Therefore, the current study was undertaken with the aim of estimating genetic variability, heritability and genetic advance in the under-exploited landraces of vegetable chilli (*C. annuum* L.) in southern Kerala.

Thirty-five genotypes of vegetable chilli collected from different sources were evaluated at Vellayani during 1997-98. The genotypes were raised in randomised block design with two replications, having 10 plants per plot, under irrigated conditions, per local management recommendations (KAU, 1996). Five plants were selected randomly from each genotype and observations on

height, internodal length, stem girth, leaf area, petiole length, days to first flower, node on which first flower appears, height of node to first flower, fruits per plant, fruit length, fruit girth, fruit weight, yield per plant and incidence of mite (*Polyphagotarsonemus latus*) were recorded. Of these, plant height, internodal length (length between two nodes just below the first branch), stem girth (girth of main stem at 15 cm above the soil) and incidence of mite were recorded at 120 days after planting (DAP). For leaf area and petiole length measurements, five mature leaves from the top of the main branches were selected and observations recorded at 35 DAP. Height and number of nodes to first flower were also recorded on that date. Ten fruits were selected at random at first harvest (70 DAP) for recording observations on fruit characters such as fruit length, fruit girth and fruit weight. Analysis of variance was performed to test variations among genotypes (Panse and Sukhatme, 1978). Variability for different quantitative characters and expected genetic advance at 5% intensity of selection were calculated as per Burton (1952) and Johnson et al. (1955) respectively.

Data presented in Table 1 reveal significant variations for all characters studied. High values of genotypic

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Table 1. Variability parameters for biometrical characters in chilli

Characters	Range	Mean \pm SE	Genotypic variance	Phenotypic variance	GCV (%)	PCV (%)	Heritability (%)	Genetic advance (%)
Plant height (cm)	27.42 - 67.18	43.08 \pm 1.20	93.40	96.30	22.44	22.78	96.98	45.52
Internodal length (cm)	2.25 - 2.75	2.52 \pm 0.06	0.01	0.02	4.09	5.60	53.30	6.35
Stem girth (cm)	2.80 - 4.80	3.91 \pm 0.15	0.15	0.19	9.95	11.25	78.26	18.16
Leaf area (cm ²)	6.30 - 19.38	12.76 \pm 0.70	13.24	14.21	28.51	29.54	93.19	56.73
Petiole length (cm)	2.05 - 5.10	3.46 \pm 0.06	0.60	0.61	22.49	22.66	98.55	45.66
Height of node to first flower (cm)	15.00 - 30.63	20.69 \pm 0.83	15.70	17.09	19.15	19.98	91.86	37.80
Node to first flower	9.25 - 20.88	13.19 \pm 0.39	8.62	8.93	21.83	22.22	96.51	45.03
Days to first flower	20.13 - 35.68	27.74 \pm 0.51	12.08	12.59	12.53	12.80	95.91	25.27
Fruits per plant	16.10 - 125.00	48.05 \pm 1.65	936.80	942.29	63.70	63.88	99.42	130.84
Fruit length (cm)	2.45 - 15.85	6.68 \pm 0.10	6.62	6.64	38.50	38.56	99.68	79.19
Fruit girth (cm)	3.10 - 10.35	5.25 \pm 0.11	3.85	3.82	37.38	37.51	99.41	76.76
Fruit weight (g)	2.55 - 16.40	6.02 \pm 0.17	9.39	9.45	50.89	51.04	98.86	104.48
Yield per plant (g)	73.75 - 382.88	213.23 \pm 6.32	6912.90	6992.68	38.99	39.21	94.45	79.87
Incidence of mite attack	0.00 - 2.17	1.16 \pm 0.06	0.13	0.14	31.26	32.17	90.21	62.93

(6912) and phenotypic (6992) variance were recorded for yield per plant. In addition, high phenotypic and genotypic coefficients of variation were observed for leaf area, fruits per plant, fruit weight, fruit length, fruit girth and yield per plant. High values of genotypic coefficients of variation (GCV) have been previously reported for both fruit size (Sarma and Roy, 1995) and fruit length (Nandi, 1992). Conversely, internodal length had low phenotypic and genotypic coefficients of variation.

High heritability were observed for most of the characters studied and, in particular, for leaf area, fruits per plant, fruit length, fruit girth, fruit weight and yield per plant. This is consistent with the reports of Gopalakrishnan et al. (1984), Jabeen et al. (1998) and Munshi and Behra (2000), who observed high values of heritability for fruit weight, fruit size and yield per plant respectively. The expected genetic advance was high for leaf area, fruits per plant, fruit weight, fruit length, fruit girth and yield per plant. Jabeen et al. (1998) also reported similar findings earlier. High heritability coupled with high genetic advance observed in the present study for leaf area, fruits per plant, fruit weight, fruit length, fruit girth and yield per plant can be considered as favourable attributes for crop impro-

vement through selection. Likewise, the high heritability combined with high genetic advance could be regarded as an indication of additive gene action and the consequent high-expected genetic gain from selection for these characters.

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