

VARIABILITY IN A SET OF CHILLI LINES

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Chilli is an indispensable spice cum vegetable grown throughout India. Originated in South America, the wider ecological adaptability of the crop facilitated its spread in different parts of the globe. India now ranks first in the world in the production of chilli. An attempt was made to determine the heritable and non-heritable components of phenotypic variation in a set of chilli lines maintained at the College of Horticulture, Vellanikkara, Trichur, Kerala.

Materials and Methods

Thirty eight chilli lines collected from different parts of India were grown in a randomised block design with three replications during July-November 1979 at the College of Horticulture, Vellanikkara. The 38 genotypes along with an additional eight new lines were grown again during May-September, 1980 in a randomised block design with three replications. There were ten plants/line/replication. The diverse chilli lines selected for the study included 'White Khandari' KAU Cluster, Pant C 1, Jwala NP 46 A, G4, K2 and a few local collections. The characters studied were plant height, main stem length, primary branches/plant, fruit length, fruit girth, fruit weight, fruits/plant, fruit yield/plant, days to flower and days to red chilli harvest.

The data were analysed and variability estimated as per Burton (1952). Heritability in broad sense was estimated as suggested by Burton and Devane (1953). The expected genetic advance at 5% intensity of selection was calculated as per Johnson *et al.* (1955).

Results and Discussion

The analysis of variance indicated significant differences among 38 chilli lines during the first season. The 46 genotypes also exhibited significant differences during the second season except for primary branches/plant. Such variation is quite expected in an often cross pollinated crop like chilli as reported earlier by Kshirsagar *et al.* (1983) and Nair *et al.* (1984).

Plant height ranged from 48.90 cm in Pant C 1 to 130.50 cm in CA 98 during the first season with a general mean of 74.97 cm (Table 1). During the second season, the range was from 50.30 to 133.60cm (Table 2). Jwala had a comparatively short stature (54.40 cm). CA 60-1, a selection from Jwala had the

Table 1

Mean, phenotypic and genotypic coefficients of variation (pcv and gcv), heritability and genetic advance during July-November, 1979

| Characters | Mean | pcv | gcv | Heritability | Genetic advance (%) |
|----------------------------|----------------|-------|-------|--------------|---------------------|
| Plant height (cm) | 74.97± 4.14 | 22.60 | 20.47 | 0.82 | 38.22 |
| Main stem length (cm) | 51.63± 3.60 | 46.42 | 44.61 | 0.93 | 88.92 |
| Primary branches/plant | 9.14± 1.32 | 31.94 | 19.91 | 0.38 | 24.95 |
| Fruit length (cm) | 4.60± 0.34 | 43.91 | 42.17 | 0.92 | 82.72 |
| Fruit girth (cm) | 0.79± 0.03 | 12.86 | 10.55 | 0.67 | 17.83 |
| Fruit weight (g); | 1.49± 0.13 | 33.51 | 29.79 | 0.79 | 54.55 |
| Fruits/plant | 136.50 ± 25.63 | 47.98 | 35.28 | 0.54 | 53.44 |
| Fruit yield/plant (g) | 179.86 ± 3031 | 43.54 | 32.31 | 0.55 | 49.40 |
| Days to flower | 49.86± 1.97 | 13.00 | 11.07 | 0.72 | 19.29 |
| Days to red chilli harvest | 88.58± 1.99 | 8.51 | 7.52 | 0.78 | 13.70 |

Table 2

Mean, phenotypic and genotypic coefficients of variation (pcv and gcv), heritability and genetic advance during May-September, 1980

| Characters | Mean | pcv | gcv | Heritability | Genetic advance (%) |
|----------------------------|----------------|-------|-------|--------------|---------------------|
| Plant height (cm) | 79.54± 5.64 | 28.97 | 26.24 | 0.82 | 48.92 |
| Main stem length (cm) | 56.38± 3.37 | 55.87 | 54.90 | 0.97 | 111.65 |
| Primary branches/plant | 9.82± 1.56 | 29.80 | 4.18 | 0.02 | 1.12 |
| Fruit length (cm) | 4.73± 0.32 | 59.21 | 57.94 | 0.96 | 117.15 |
| Fruit girth (cm) | 0.76± 0.03 | 22.85 | 21.81 | 0.92 | 43.31 |
| Fruit weight (g) | 1.21± 0.10 | 41.17 | 38.45 | 0.87 | 7378 |
| Fruits/plant | 211.65 ± 41.15 | 75.16 | 67.20 | 0.80 | 123.76 |
| Fruit yield/plant (g) | 172.92±22.15 | 46.44 | 40.88 | 0.77 | 73.67 |
| Days to flower | 47.91± 1.79 | 19.75 | 18.68 | 0.89 | 36.21 |
| Days to red chilli harvest | 84.45± 2.11 | 13.93 | 13.27 | 0.90 | 25.89 |

longest fruits (13.80 cm) followed closely by Jwala (13.20 cm) and NP 46A (1280cm). Fruit girth averaged 0.79 cm during the first season and 0.76 cm during the second season. Average fruit weight was maximum in K2 (2.74 g).

Fruit yield/plant and fruits/plant were maximum in White Kandhari (3.90 g and 330 respectively). White Kandhari took 65 days to flower compared to 38 days in the earliest accession CA 99. White Kandhari was ready for harvest 102 days after planting while CA 99 and Jwala were harvested within 75 days. Maximum number of fruits was recorded in CA 112 during the second season (703/plant).

Phenotypic coefficient of variation (pcv) was the highest for fruits/plant (75.16 during the second season and 47.98 during the first season). High estimates of pcv were reported for fruits/plant and fruit length by Kshirsagar *et al.* (1983). Moderate values of pcv were observed for fruit yield/plant (43.54 during the first season and 46.44 during the second season) and average fruit weight (33.51 during the first season and 41.17 during second season). The lowest pcv was recorded for maturity period measured by days to red chilli harvest (8.51 during the first season and 13.96 during the second season). This was in conformity with the report of Ramalingam (1979). In the present investigation, narrow range of variation was observed for fruit girth, primary branches/plant and plant height.

High heritability resulting from high gcv was observed for main stem length, fruit length, days to red chilli harvest, days to flower, plant height, fruit girth and average fruit weight. High gcv was observed for fruit length, main stem length, fruit weight, fruits/plant, and fruit yield/plant. Heritability along with estimates of expected genetic advance should be considered more than heritability *per se* while making selection. High heritability and high genetic advance for fruit length, main stem length and moderate value for fruits/plant indicated that these characters are governed by additive genes and could be improved through selection. Days to flower, days to red chilli harvest and fruit girth though having high heritability, the expected genetic advance was very low. This reveals the possible involvement of non-additive genes for the control of these characters. This was in accordance with the findings of Awasthi *et al.* (1976).

Summary

The study was aimed to estimate variability in the existing germplasm of chilli and to study components of variation. Significant differences were observed for many of the quantitative characters. Phenotypic coefficient of variation was maximum for fruits/plant (75.16) followed by fruit length (59.21) and main stem length (55.87). Fruit yield/plant recorded only moderate value of pcv (43.54). High heritability coupled with high genetic advance was observed for fruit length and main stem length. Fruits/plant had moderately high estimates of heritability and expected genetic advance. Days to flower, days to red chilli harvest and fruit girth having high heritability estimates had only low expected genetic advance. There is scope to evolve chilli line with long fruit and more fruits/plant through simple selection method.

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