e-planet **13** (2): 51-54 (July 2015)

Genetic variability studies in chench (*Corchorus aestuans* L.) genotypes collected from Chhattisgarh

***VIVEK KUMAR KURREY, PRAVIN SHARMA AND AMIT DIXIT**

Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012 Chhattisgarh, India.

**vivekkumar.kurrey@gmail.com*

ABSTRACT

Genetic variability for different yield contributing characters and important quality characters were studied in 25 genotypes of chench (*Corchorus aestuans* L.) during rabi 2014-15. The study indicated existence of considerable amount of genetic variability for all the characters studied. High magnitude of genotypic as well as phenotypic coefficient of variations were recorded for traits *viz*., dry weight of plant, fresh weight of plant, and leaf stem ratio. High heritability coupled with high genetic advance was observed for test weight, fibre content, plant height, duration of the crop, days to 50 % flowering, number of branches per plant, fresh weight of plant and dry weight of plant. These characters are therefore worth consideration in the improvement of this crop.

Key words: Chench (*Corchorus aestuans* L.), GCV, genetic advance, heritability, PCV, variability

INTRODUCTION

Chench (*Corchorus aestuans* L.) is one of the unexploited and underutilized leafy vegetable. In Chhattisgarh it is popularly known as *Chench Bhaji* and belongs to the family Tiliaceae consisting of 40 genus and 400 species (Heywood *et al.* 2007). Chench is rich source of vitamins, minerals such as potassium, calcium and sodium. High content of beta-carotene, fibre, folic acid, potassium and high volume of water makes it a heart healthy green vegetables as it helps in lowering blood cholesterol level, high blood pressure and other risk factors for heart diseases (Sharma, 2002). The exploration of genetic variability in the available germplasm is a pre-requisite in a breeding programme for effective selection for superior genotypes. The partitioning of total variability into heritable and non heritable components will enable the breeder to know whether the superiority of selection is inherited by the progenies. Identification of genotypes with high variability and heritability for the desirable characters is important in selection of varieties with high yielding potential., So there is an urgent need of information on the nature and magnitude of variation available in the material and part played by environment in expression of different characters. Keeping in view the above facts, the present investigation was undertaken to estimate the magnitude of heritable and non heritable component of variation and genetic parameters such as genotypic coefficient of variation, phenotypic coefficient of variation heritability and genetic advance in 25 diverse genotypes of chench.

MATERIALS AND METHODS

The local chench genotypes were collected from different areas of Chhattisgarh region and grown at the Research and Instructional Farm, Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh during the rabi season of the year 2014-2015. The 25 local chench genotypes were replicated thrice in randomized block design (RBD). The spacing adopted was 20cm in between two rows and 10 cm in between two plants within a row. Hundred plants were maintained in each plot of 2m x 2m. All recommended cultural practices were followed to ensure good crop growth. To record the biometric observations, sampling technique was used. Five plants from the net plot were selected randomly from each treatment per replication. Data were analyzed as per Panse and Sukhatme (1984) for analysis of variance. Phenotypic and genotypic coefficients of variation (PCV and GCV), heritability in broad-sense and genetic advance as percent of mean were calculated as per procedures given by Burton and De Vane (1953) and Johnson *et al* (1955).

RESULTS AND DISCCUSION

The extent of variability present in the genotypes were measured in terms of ranges, phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV), heritability in broad sense and genetic advance as percentage of mean is presented in Table 1. The analysis of variance revealed highly significant differences for all the characters studied which indicates the genotypes differ significantly for all the characters. Wide range of variation was observed in all the characters except stem girth. The GCV which gives a picture of extent of genetic variability in the population range from 7.13% (stem girth) to 52.33 % (dry weight of plant). The relative magnitude of GCV and PCV when compared indicated that PCV values were greater than the GCV in respect of all the characters under observation and the differences between PCV and GCV were quite less, indicating there by the negligible influence of environments. High magnitude of genotypic as well as phenotypic coefficient of variations were recorded for traits *viz*., dry weight of plant (52.33 and 54.02 %), fresh weight of plant (41.61 and 42.44 %), leaf stem ratio (39.79 and 41.62 %), number of branches per plant (38.46 and 39.05 %), yield kg per plot (30.16 and 31.49 %), harvest index (29.43 and 31.41 %), internodal length (29.29 and 32.25 %), number of leaves per plant (25.65 and 32.29 %), dry matter % (23.45 and 35.75 %), root weight (21.06 and 26.34 5), leaf length (21.10 and 22.94 %) and fibre content (20.47 and 20.53 %). Moderate GCV and PCV were recorded for plant height (18.49 and 18.61 %), test weight (17.92 and 17.93 %) leaf width (17.91 and 19.92 %), Petiole length (15.12 and 17.99 %), root length (14.90 and15.50 %), duration of the crop (14.35 and 14.48 %) and days to 50 % flowering (10.46 and 10.59 %). Selection for these traits may also be given the importance for improvement programme. Similar findings were also reported earlier by Varalakshmi and Reddy (1994), Revanappa and Madalgeri (1998) and Anuja and Mohideen (2007).

The highest heritability was recorded for the characters test weight (99.9 %), fibre content (99.4 %), plant height (98.7 %), duration of the crop (98.3 %), days to 50 % flowering (97.6 %), number of branches per plant (97.0 %), fresh weight of plant (96.1 %), dry weight of plant (93.8 %), root length (92.4 %), yield kg per plot (91.7 %), leaf stem ratio (91.4 %), harvest index (87.8 %), internodal length (85.91 %), leaf length (84.66 %), leaf width (80.8 %) and petiole length (70.6 %). Similar results reported by Varalakshmi and Reddy (1994) for number of leaves, leaf weight, stem weight, leaf-stem ratio and yield of greens per plant, Rani and Veeraragavathatham (2003) for green yield per plant, stem weight per plant, leaf number per plant, leaf weight per plant, plant height, leaf length, leaf breadth and stem girth. Similar results were also reported by Shukla *et al*. (2006), Anuja and Mohideen (2007), Das and Kumar (2012). The moderate heritability was observed for root weight (63.9 %) and number of leaves per plant (63.1 %).

Low heritability was observed for dry matter % (43.03 %) and stem girth (22.2 %) similar result was also reported by Ahammed *et al.,* (2013).

Genetic advance as percentage of mean was observed high for dry weight of plant (98.80), fresh weight of plant (84.11 %), leaf stem ratio (78.78 %), number of branches per plant (78.10 %), yield kg per plot (59.76 %), harvest index (57.69 %), internodal length (57.09 %), fibre content (42.06%), number of leaves per plant (41.96 %), leaf length (40.00 %), plant height (37.84 %), test weight (36.72%), root weight (34.78 %), leaf width (33.43%), dry matter % (31.69 %), root length (29.51%), duration of the crop (29.32 %), petiole length (26.21%), and days to 50 % flowering (21.29%). Stem girth showed low genetic advance as percentage of mean. Therefore, selection based on phenotypic performance of these traits would be effective to select desirable plant type. Similar results were also reported Varalakshmi and Reddy (1994), Rani and Veeraragavathatham (2003), Shukla *et al*., (2005) and Anuja and Mohideen (2007). Rest of the traits showed moderate to low heritability estimates coupled with moderate to low genetic advance as percentage mean indicated the role of non additive genetic variance in their expression.

REFERANCES

Ahammed, A. U., Rahman, M. M. and Mian, M. A. K. 2013. Mutivariate analysis in stem amaranth (*Amaranthus tricolor*). *Bangladesh J. of Plant Breeding and Genetics.* **26**(1): 11 17.

Anuja, S., and Mohideen, M.K. 2007 Variability, heritability and genetic advance studies in amaranthus (*Amaranthus spp.). The Asian J. of Hort.* **2** (1): 63.

Burton, G.W. 1952. Quantitative inheritance of grasses. Proc. V1th International Grassland Congress. **1**: 287-83.

Burton, G.W. and Devane, E.H. 1953. Estimation of heritability in tall fescue from replicated clonal material., *Agron. J.* **45**: 478-87.

Table 1. Variability for leaf yield and its component character in chench (*Corchorus aestuans* L.)

S.No.	Characters	Mean	Range		Coefficient of variation (%)		Heritability (h^2 %)	GA as percent of mean
			Min^m	Max^m	GCV	PCV		
01	Plant height(cm)	36.20	27.10	50.59	18.49	18.61	98.7	37.84
02	No. of leaves per plant	14.32	9.93	25.33	25.65	32.29	63.1	41.96
03	leaf length (cm)	5.76	2.48	8.78	21.10	22.94	84.66	40.00
04	leaf width (cm)	2.48	1.41	3.48	17.91	19.92	80.8	33.43
05	Petiole length (cm)	2.06	1.59	2.66	15.12	17.99	70.6	26.21
06	Stem thickness (mm)	3.90	3.26	4.86	7.13	15.15	22.2	6.92
07	No. of branches/plant	9.50	3.40	15.73	38.46	39.05	97.0	78.10
08	Root Weight (gm)	0.46	0.31	0.80	21.06	26.34	63.9	34.78
09	Root length (cm)	10.40	8.38	14.23	14.90	15.50	92.4	29.51
10	Fresh weight of plant (gm)	5.98	3.81	12.44	41.61	42.44	96.1	84.11
11	Dry weight of plant (gm)	0.84	0.24	2.18	52.33	54.02	93.8	98.80
12	Internodal length (cm)	1.49	1.13	2.91	29.89	32.25	85.91	57.09
13	Dry matter %	14.74	05.54	22.13	23.45	35.75	43.03	31.69
14	Days to 50 % Flowering	58.88	41.66	65.33	10.46	10.59	97.6	21.29
15	Yield Kg per plot	1.69	1.07	3.19	30.16	31.49	91.7	59.76
16	Harvest index (%)	0.52	0.31	0.82	29.43	31.41	87.8	57.69
17	leaf stem ratio	1.32	0.64	2.59	39.79	41.62	91.4	78.78
18	Fibre content (%)	10.65	03.93	15.12	20.47	20.53	99.4	42.06
19	Test weight (gm)	2.75	1.63	3.32	17.92	17.93	99.9	36.72
20	Duration of the crop	36.49	26.00	46.00	14.35	14.48	98.3	29.32

Das, A. and Kumar, D. 2012. Genetic evaluation and characterization of jute (*corchorus spp*. L.) genotypes using DUS parameters. *SAARC J. Agri.* **10**(2): 147-153.

Heywood, V.H., Brummit, R.K., Culham, A. and Seberg. O. 2007. Flowering plant families of the world. Royal Botanical garden Kew.

Sharma, J.P. 2002. Crop production technology for cold arid region. Kalyani Publisher, Ludhiana, New Delhi, pp 220-26.

Johnson, H.W, Robinson, H.F. and Comstock, R.E. 1955. Variability in soybean. *Agron. J.* **46**: 314-18.

Panse, V.G. and Sukhatme, P.V. 1967. Statistical Method of Agricultural Worker. ICAR, New Delhi.

Rani, A. R. and Veeraragavathatham, D. 2003. Genetic variability for green yield in amaranthus. *South Indian Hort.* **51**(1-6), 173-175.

Revanappa and Madalgeri, B.B. 1998. Genetic variability studies regarding quantitative and qualitative trait in amaranthus, *Karnataka J. of Agri. Sci.* **11**(1): 139-142.

Shukla, S., Bhargava, A., Chatterjee, A., Srivastava, A. and Singh, S. P. 2006. Estimates of genetic variability in vegetable amaranth (*A. tricolor*) over different cuttings. *Hort. Sci.* **32**(2): 60–67.

Shukla, S., Bhargava, A.,Chatterjee, A., Srivastava, A. and Singh S.P. 2005 b. Estimates of genetic variability in vegetable amaranth (*A. tricolor*) over different cuttings, *Hort. Sci. (Prague*). **32**(2): 60–67.

Varalakshmi B. and Pratap Reddy V.V. (1994) Variability, heritability and correlation studies in vegetable amaranth. *South Indian Hort.* **42**(6): 361-364.