African Journal of Agricultural Research Vol. 7(49), pp. 6550-6552, 27 December , 2012
Available online at http://www.academicjournals.org/AJAR
DOI: 10.5897/AJAR12.1624
ISSN 1991-637X ©2012 Academic Journals

Short Communication

Study of genetic variability, heritability and genetic advance for fruit quality characters in Teasle gourd (*Momordica subangulata* blume. subsp. *renigera*)

Abhishek Naik*, Shirin Akhtar, Arup Chattopadhyay and Pranab Hazra

Department of Vegetable Crops, Faculty of Horticulture, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur- 741252, Nadia, West Bengal, India.

Accepted 10 December, 2012

Five female clones of Teasle gourd were evaluated to estimate the variability, heritability and genetic advance in randomized complete block design with four replications. Higher phenotypic coefficients of variation were observed for all the characters except fruit length at marketable stage. Total sugar in mesocarp, total sugar in exocarp, reducing sugar in mesocarp, ascorbic acid in exocarp, ascorbic acid in mesocarp, total soluble solids (TSS) in exocarp, b-carotene in exocarp, acidity in mesocarp, b-carotene in mesocarp, TSS in mesocarp, acidity in exocarp showed high heritability coupled with high genetic advance indicating that these traits were under the additive gene control and simple selection can be used for further improvement in these traits Teasle gourd.

Key words: Teasle gourd, clones, variability, heritability, genetic advance.

INTRODUCTION

Teasle gourd (*Momordica subangulata* Blume. subsp. *renigera*) is one of the most important members of the cucurbitaceae, which is diecious in nature and contains good flavor aroma and essential oil and is used in almost all the vegetarian and non vegetarian communities of the world (Bhuiya et al., 1977). The young leaves of Teasle gourd are also consumed as a leafy vegetable. Teasle gourd seeds contain oil which is used as an illuminant. The fruits are regarded as highly nutritious. The unripe fruits act as appetizer and astringent. Since Teasle gourd is a commercial crop and is multiplied through root propagated, thus, it was thought imperative to evaluate different germplasm of Teasle gourd. Estimates of various parameters for assessment of genetic variability *viz.,* mean range of variation, heritability, genetic advance and coefficients of variation help the plant breeders in devising suitable plant type by bringing improvement in quantitatively inherited traits. Systematic breeding efforts on this crop have so far been neglected. For starting any improvement work, information about the genetic variability in the population is a prerequisite. Presence of high variability in this crop offers much scope for its improvement. Hence, an attempt was made to estimate genetic variability, heritability and genetic advance in the available germplasm of Teasle gourd.

*Corresponding author. E-mail: abhishek.hort@gmail.com.

MATERIALS AND METHODS

The experimental materials consisted of five female clones of Teasle gourd grown in Randomized Complete Block Design with four replications during 2007 to 2008 were carried out at the research field of All India Coordinated Project on Vegetable Crops situated at C Block farm, Bidhan Chandra Krishi Viswavidyalaya, Nadia. Recommended package of practices were followed to raise healthy crop. Five competitive plants of each genotype were selected randomly in each replications for recording observations on exocarp, acidity in mesocarp, b-carotene in exocarp, reducing sugar in mesocarp, ascorbic acid in excoarp,b-carotene in mesocarp, ascorbic acid in mesocarp, TSS in exocarp, reducing

Table 1. Genetic variability parameters for different fruit quality characters of Teasle gourd.

Components of variation	Mean	Coefficient of variation(C.V.)	Phenotypic coefficient of variation (PCV)	Genotypic coefficient of variation (GCV)	Heritability % (H)	Genetic advance (GA)	Genetic advance (GA) % of mean
Characters							
Fruit weight at marketable stage (g)	57.58	2.70	12.33	12.04	95.2	13.93	24.19
Ovary diamater (mm)	7.60	6.12	18.21	17.15	88.7	2.53	33.29
Fruit length at marketable stage (cm)	6.36	2.60	8.18	7.76	89.9	0.96	15.09
Fruit breadth at marketable stage (cm)	4.96	21.09	22.83	8.74	14.6	0.34	6.86
Pericarp thickness at marketable stage (mm)	4.05	14.04	15.35	6.21	16.4	0.21	5.19
TSS in exocarp (°Brix)	4.02	3.14	26.86	26.68	98.6	2.19	54.48
TSS in mesocarp (°Brix)	6.66	1.58	21.65	21.59	99.0	2.96	44.44
Acidity in exocarp (%)	0.19	9.40	23.13	21.13	83.5	0.08	42.11
Acidity in mesocarp (%)	0.21	19.89	37.79	32.13	72.3	0.12	57.14
Ascorbic acid in exocarp (mg/100 g)	190.59	3.26	33.10	32.93	99.0	128.68	67.52
Ascorbic acid in mesocarp (mg/100 g)	20.77	2.28	30.31	30.22	99.4	12.90	62.11
Total sugar in exocarp (%)	1.56	6.31	37.85	37.32	97.2	1.18	75.64
Total sugar in mesocarp (%)	2.42	7.70	67.43	66.98	98.7	3.32	137.19
Reducing sugar in exocarp (%)	1.13	3.91	24.31	23.99	97.4	0.55	48.67
Reducing sugar in mesocarp (%)	1.26	7.54	36.18	35.39	95.7	0.90	71.43
ß-carotene in exocarp (mg/100 g)	2.01	12.42	37.77	35.67	89.2	1.40	69.65
ß-carotene in mesocarp (mg/100 g)	0.83	17.40	32.64	27.61	71.6	0.40	48.19

sugar in excoarp, acidity in exocarp, fruit breadth at marketable stage, TSS in mesocarp, ovary diameter, pericarp thickness at marketable stage, fruit weight at marketable stage.

The mean data were subjected to statistical analysis of variance (Panse, 1957), coefficient of variation and heritability (Burton and Devane, 1953) and genetic advance in percent of mean (Johnson et al., 1955), respectively.

RESULTS AND DISCUSSION

The analysis of variance revealed significant differences among the genotypes for all the seventeen characters, thus paving way for further analysis. The mean values and estimates of different quality parameters for various traits are given in Table 1. Wide range for all the traits indicates the existence of variation among the genotypes. The phenotypic coefficient of variation (PCV) was high for total sugar in mesocarp, followed by total sugar in exocarp, acidity in mesocarp, b-carotene in exocarp, reducing sugar in mesocarp, ascorbic acid in excoarp, b-carotene in mesocarp, ascorbic acid in mesocarp, total soluble solids (TSS) in exocarp, reducing sugar in excoarp, acidity in exocarp, fruit breadth at marketable stage, TSS in mesocarp, ovary diameter, pericarp thickness at marketable stage, fruit weight at marketable stage.

The similar trend was observed for genotypic coefficient of variation (GCV). Although GCV is an indicative of the presence of high degree of genetic variation, the amount of heritable variation, can only be determined with the herita-bility estimates and genetic gain. Broad sense heritability estimates was moderate for pericarp thickness at marketable stage and fruit length at marketable stage and high ranging for other characters. The results are in partial agreement with those reported by Burton (1952) and Hayes et al. (1955). Though high heritability indicates the effectiveness of selection on the basis of phenotypic performance, it does not show any indication the amount of genetic progress for selecting the best individuals.

The genetic advance (%) was moderate for all the characters except fruit length at marketable stage, fruit breadth at marketable stage and pericarp thickness at marketable stage. Total sugar in mesocarp, total sugar in exocarp, reducing sugar in mesocarp, ascorbic acid in excoarp, ascorbic acid in mesocarp, TSS in exocarp, b-carotene in exocarp, acidity in

mesocarp,b-carotene in mesocarp, TSS in mesocarp, acidity in exocarp showed high heritability coupled with high genetic advance indicating that these traits were under the additive gene control and simple selection can be used for further improvement in these traits in Teasle gourd. These results are in accordance with findings of Maharana et al. (1995), Rasul et al. (2004) Bharathi et al. (2005a, b, 2006) and Sanwal et al. (2007).

REFERENCES

Bharathi LK, Naik G, Dora DK (2005a). Genetic divergence in spine gourd. Veg. Sci. 32(2):179-181.

Bharathi LK, Naik G, Singh HS, Dora DK (2005b). Correlation and Path analysis in spine gourd (*Momordica diooca* Roxb.). Orissa. J. Hort. 33(2):105-108.

Bharathi LK, Naik G, Dora DK (2006). Studies on genetic variability in spine gourd. Indian J. Hortic. 63(1):96-97.

Burton GW, Devane EN (1953). Estimating heritability in fall fescus from replicated clonal material. Agron. J. 45:478-481.

Burton GW (1952). Quantitative inheritance in grasses. Proc. 6th Int. Grasita Cong. 1:273-283.

Bhuiya MRH, Habib AKMA, Rashid MM (1977). Content of loss of Vitamin C in vegetables during storage and cooking. Bangladesh Hortic. 5:1-16.

Hayes HK, Immer FR, Smith DC (1955). Methods of Plant Breeding. McGraw Hill Book Co., New York. p. 551.

Johnson HW, Robinson HW, Comstock RE (1955) Estimates of genetic and environmental variability in soyabean. Agron. J. 47:314-18.

Maharana UKP. Tripathy and Maharana T (1995). Genetic variability and heritability studies in spine gourd. Current Research University of Agric. Sci. Bangalore. 24(7):122-124.

Panse VG (1957). Genetics of quantitative characters in relation to plant breeding. Indian J. Genet. 28:225-29.

Rasul MG; Hiramatsu M, Okubo H (2004). Morphological and physiological variation in kakrol (*Momordica dioica* Roxb.). J. Fac. Agric. Kyushu Univ. 49(1):1-11.

Sanwal SK, Yadav PK, Rai N, Yadav DS, Singh PK (2007). Genetic diversity and interrelation analysis in sweet gourd (*Momordica cochinchiensis*), Genotypes of Northeast India. Veg. Sci. 34(1):64-66.