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RESEARCH ARTICLE

GENETIC VARIABILITY AND CHARACTER ASSOCIATION IN SNAKE GOURD (*Trichosanthes Anguina* L.)

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ABSTRACT

An investigation entitled "Genetic Variability and Character association in snake gourd (*Trichosanthes Anguina L.*)" was carried out in the Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu, India. The characters observed were days to first male and female flower opening, number of fruits per plant, fruit length, fruit girth, flesh thickness, single fruit weight, fruit yield per plant, number of seeds per fruit, Vitamin C and acidity content of fruit. The results revealed that the genotype G27 followed by G2, G29, G5 and G12 expressed the maximum fruit yield per plant. High PCV, GCV and genetic advance as per cent of mean were observed among the genotypes for most of the traits studied except days to first male flower opening and acidity content of fruit. Based on the *per se* performance with specific trait and genetic divergence from different clusters, six genotypes namely P_1–Hessaraghatta local (Bangalore, Karnataka), P_2–Ottanchathiram local (Dindigul district, Tamil Nadu), P_3–IC-212484, NBPGR, Trichur, P_4–Michaelpalayam local (Dindigul district, Tamil Nadu), P_5–PKM–1 (mutant variety, HC&RI, TNAU, Periyakulam), P_6–Vellayani local (Kerala) were selected for crossing.

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INTRODUCTION

Snake gourd (*Trichosanthes anguina* L) commonly known as cucurbits or gourds, under the family Cucurbitaceae includes a large number of cultivated species of global or local economic importance. It is vinecrop growing mostly in tropical and sub-tropical regions. Snake gourd is important food items for solving nutritional problems. From nutritional point of view, snake gourd can be considered as nutrition rich fruit vegetable. It contains considerable amount of protein (0.5%), fat (0.3%), minerals (0.5%), fiber (0.5%) and carbohydrates (3.3%). Ripe fruits are rich in vitamin A. There are number of cultivars with wide range of variability in size, shape and color of fruits available in this country (Rashid 1993).The assessment of existing genetic variability in any crop species is essential for formulating effective breeding strategies as the existing variability can be used to enhance the yield level of the cultivars. For developing a superior variety, it is essential to improve the yield components; however, yield is a complex character and is associated with many other contributing traits which are simply inherited. Characters having a high genotypic coefficient of variation indicate high potential for effective selection. In the present investigation, Mahalonobis D^2 statistics analysis was adopted to find out the genetic divergence and genetic variability for fruit yield and their component characters among snake gourd germplasm.

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MATERIALS AND METHODS

Seeds of all 40 genotypes were sown separately with a spacing of 2 × 2 m. Experiment was laid in Randomized Block Design, replicated thrice. Twenty plants per genotype were maintained in each replication. Recommended agronomic practices and need based plant protection measures were given. Data on five randomly selected plants from each genotype from each replication were collected for fruit yield and its component traits. Pooled data were analysed by standard statistical methods. The phenotypic and genotypic coefficients of variation (PCV and GCV).

RESULTS AND DISCUSSION

Analysis of variance indicates that 40 genotypes of snakegourd differ significantly for all the characters under study. Genotypic coefficient of variation study reveals that there is an ample scope for the improvement of this crop. Estimates of variance components obtained for the eleven traits in the present study have shown that the high PCV and GCV (>20per cent) were observed for almost all the traits except the traits days to first female flower opening and acidity content of fruit. However these traits recorded moderate PCV and GCV. Snake gourd being a cross pollinated crop, there exists much variation and therefore the present observation is quite rational and reported earlier by Karuppaiah *et al*., (2005) in ridge gourd. The very low ECV observed for almost all the traits except the fruit yield per plant. Fruit yield per plant is the complex and

Genetic variability for eleven traits of snake gourd genotypes

Traits	PCV (%)	GCV (%)	ECV (%)	H^2 (BS)	GA	GA as % of mean
Days to first male flower opening	20.47	20.35	3.89	98.80	14.20	41.66
Days to first female flower opening	15.84	15.75	2.90	98.89	14.35	32.27
Number of fruits per plant	36.63	36.53	4.81	99.42	9.91	75.03
Fruit length (cm)	42.38	42.36	2.16	99.92	64.70	87.22
Fruit girth (cm)	23.82	23.78	2.28	99.70	9.13	48.93
Flesh thickness (cm)	25.05	24.91	4.60	98.88	0.38	51.03
Single fruit weight (g)	33.85	33.84	1.66	99.92	394.57	69.68
Fruit yield per plant	30.61	29.97	10.79	95.86	4.15	60.44
Number of seeds per fruit	31.26	31.21	2.93	99.71	33.88	64.20
Vitamin C Content (mg per 100 g)	25.35	25.27	3.63	99.32	7.01	51.87
Acidity content (per cent)	16.97	16.54	6.55	95.03	0.05	33.22

polygenic trait which was slightly influenced by the environment. Burton (1952) had suggested that high GCV with heritability would give the best picture on the amount of progress to be expected by selection. The estimates of heritability were very high for all the eleven traits. Genetic advance as per cent of mean was also high for almost all the traits except the traits days to first female flower opening and acidity content of fruit. A character can be improved only if it's highly heritable. The magnitude of heritability indicates the effectiveness with which the selection of genotypes can be made based on phenotypic performance (Johnson *et al*., 1955). In the present investigation, almost all the characters exhibited high heritability with high genetic gain. This indicates predominant of additive gene action in these traits and highly heritable suggesting the possibility of improvement through selection (Burton, 1952). Similar observations were made by Sheepujan Singh *et al*., (1996) in bitter gourd. The high heritability with low genetic gain indicates non-additive gene action in the traits such as days to first female flower opening and acidity content of fruit. The present investigation, indicates that number of fruits per plant, fruit set(%) and fruit retention (%) were the important yield attributing characters. But during selection of high yielding lines, the breeder must give more importance on number of fruits per plant, as this character had high GCV, high heritability, high genetic advance as well as high significant positive correlation with yield.

Summary: 40 snake gourd selections were assessed to estimate genetic variability and correlation for yield and its attributes. High GCV estimate was observed for the characters like node at which first female flower appears, length of vine, number of nodes per plant, and number of fruits per plant. The heritability estimate was high for all the characters. The same characters having high GCV, also exhibited high genetic advance. Yield per plant had a significant positive correlation with number of fruits per plant, fruit set (%) and fruit retention(%).

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