ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 07, pp.35494-35496, July, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

CHARACTERIZATION AND ESTIMATION OF GENETIC DIVERSITY OF SNAKE GOURD (*TRICHOSANTHES ANGUINA* L.) GENOTYPES

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ARTICLE INFO

Article History:
Received 25th April, 2016
Received in revised form
19th May, 2016
Accepted 27th June, 2016
Published online 26th July, 2016

Key Words:
Genetic diversity,
Genotypes,
Fruit length and fruit yield.

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ABSTRACT

Snake gourd (*Trichosanthes anguina* L.) is an important Cucurbitaceous vegetable and has been traditionally grown due to its easy cultivation and short duration. An experiment was conducted by Randomized block design to characterize and assess the genetic diversity of 40 genotypes collected from different parts of South India which differ morphologically including one check variety MDU-1, at the Department of Horticulture, Annamalai University. Data were recorded for eleven characters. Variations have been observed in different characters like days to first male flowering, days to first female flower opening, Number of fruits per plant, Fruit length(cm), Fruit girth (cm), Flesh thickness (cm), Fruit weight (g), Fruit yield (kg/plant) and Number of seeds per fruit. The range observed for days to first male flower opening (18.38 to 46.50), days to first female flower opening (28.88 to 57.33), Number of fruits per plant (7.00 to 27.50), Fruit length (34.73 to 175.99), Fruit girth (10.20 to 30.36), Flesh thickness (0.40 to 1.17), Fruit weight (292.70 to 970.71), Fruit yield/plant (3.06 to 10.4g) and Number of seeds per fruit (22.18 to 90.75).

***Citation: Rajkumar, M., Karuppaiah, P., Sureshkumar, R. and Sendhilnathan, R.* 2016.** "Characterization and estimation of genetic diversity of snake gourd (*Trichosanthes anguina* L.) genotypes", *International Journal of Current Research*, 08, (07), 35494-35496.

INTRODUCTION

Snake gourd (*Trichosanthes anguina L.*) belonging to the family Cucurbitaceae having chromosome number 2n=22. (Chakrabarti, 1982), Sub-family Cucurbitaceae. It is originated inIndo-Malayan region. It is an annual, day neutral, herbaceous and climbing type of vegetables. It is important food items for solving nutritional problems in India. It contains considerable amount of protein (0.5%), fat (0.3 %), minerals (0.5%), fiber (0.5 %) and carbohydrates (33%) (Gopalan *et al.,* 1982). Ripe fruits are rich in vitamin A, there are number of cultivars with wide range of variability in size, shape and colour of fruits (Rashid 1993). Snake gourd is a monoecious crop and highly cross pollinated crop and the information pertaining to the morphological characteristics are not available, so much for delineating standardization. Therefore thestudy was under taken to delineate the characterization and evaluation of snake gourd genotype for selecting the best one.

MATERIALS AND METHODS

Forty genotypes of snake gourd including one check variety MDU-1 was collected from different parts of India. The experiment was laid in Randomized Block Design with three replication, seeds of the forty genotypes were first allowed to soak in water for 48 hours and then planted in the pits with the recommended package of practise, followed by Tamilnadu Agricultural University and observations were recorded on each plant such as days to first male flower opening, days to first female flower opening, number of fruits per plant, fruit length (cm), fruit girth (cm), flesh thickness (cm), fruit weight (g) and fruit yield (kg/plant). Number of days was counted from the date of germination to date of first male and female flower opened. Days to first harvest was counted from the time taken from first flowering to edible maturity of fruits. The number of fruits in each plant was harvested at edible stage and counted together. Weight of the harvested fruits from each plant was recorded and averaged. The length of ten fruit was recorded and averaged. The total weight of all the harvested fruit from each plant was recorded and fruit yield per plant was calculated. Collected data was subjected to statistical analysis and means were compared by DMRT (Duncan Multiple Test Range).

RESULTS AND DISCUSSION

Flowering characteristics: Significant variations were recorded among the 40 genotypes studied under present trial on flowering characteristics pertaining to days to first male flower opening and to first female flower opening. The genotype G24(IC-212484, NBPGR, Trichur, Kerala) registered earliest flowering in 18.38 days followed by G31 (Thiruvanandha-puram Farm, Kerala) (20.25 days). These results are similar to the findings of Uddin *et al.* (2007) in snake gourd. The days to first female flower opening ranged from 28.88 days to 57.33

Table1. Mean performance of 40 snake gourd genotypes for various characters

Genotype	Days to first male flower opening	Days to first female flower opening	Number of fruits per plant	Fruit length (cm)	Fruit girth (cm)	Flesh thickness (cm)	Fruit weight (g)	Fruit yield (kg per plant)	Number of seeds per fruit	Vitamin C content	Acidity content (per cent)
G1	38.00	45.00	15.50	75.00	16.50	0.68	465.00	7.97	40.00	11.20	**0..17**
G2	33.00	37.17	24.40	59.80	16.35	0.64	412.50	10.09	44.98	15.00	**0.16**
G3	32.50	39.50	20.35	57.60	19.00	0.87	475.00	8.79	37.00	18.00	**0.18**
G4	36.83	47.50	8.00	65.95	17.35	**0.40**	359.30	**3.06**	41.80	15.00	**0.18**
G5	31.50	37.67	**27.50**	65.20	15.65	0.77	428.00	9.83	55.00	18.50	**0.17**
G6	32.00	39.00	20.67	46.00	18.15	0.73	325.00	7.48	44.15	16.70	**0.19**
G7	36.00	45.50	16.00	113.50	16.10	0.70	633.33	7.33	37.00	17.80	**0.13**
G8	35.50	57.00	14.65	97.90	12.25	0.52	487.50	6.44	42.65	19.60	**0.14**
G9	36.50	46.50	16.83	60.75	15.04	0.62	**292.70**	4.75	35.90	**20.00**	**0.13**
G10	38.50	47.00	8.00	68.90	20.10	0.65	467.00	3.56	38.30	10.00	**0.18**
G11	35.00	43.50	17.50	63.50	20.50	0.60	405.00	7.34	46.25	12.00	**0.14**
G12	21.75	32.50	12.84	63.67	20.13	0.98	847.83	9.62	**90.75**	9.50	**0.16**
G13	25.75	46.69	16.32	52.49	19.37	0.87	519.05	8.48	61.02	11.20	**0.17**
G14	33.25	45.00	15.82	49.40	21.89	0.87	601.58	8.39	31.50	9.32	**0.18**
G15	35.50	46.00	8.00	75.95	21.66	0.55	611.37	5.13	52.70	18.00	**0.15**
G16	35.96	47.50	10.63	82.97	22.43	0.84	970.28	9.26	73.36	15.00	**0.13**
G17	38.50	46.50	10.50	74.85	23.07	0.54	407.50	4.55	49.90	16.77	**0.19**
G18	39.00	48.50	11.50	98.15	15.98	0.60	639.50	6.52	32.30	**8.93**	**0.12**
G19	35.50	47.50	10.00	93.75	14.55	0.60	458.70	4.60	53.10	9.13	**0.12**
G20	37.00	47.50	7.50	86.50	23.08	0.50	506.90	3.43	74.80	12.60	**0.14**
G21	38.67	51.00	9.50	86.02	15.23	0.50	406.80	4.73	47.60	11.50	**0.13**
G22	37.50	37.67	**7.00**	90.20	14.96	0.45	541.40	5.66	71.20	16.50	**0.17**
G23	22.20	29.12	16.51	38.94	15.10	0.76	300.42	4.26	62.16	11.30	**0.19**
G24	**18.38**	**28.88**	9.69	124.38	13.56	0.64	864.15	7.36	44.75	12.50	**0.13**
G25	34.75	55.25	9.76	81.83	21.39	**1.17**	**970.71**	9.42	88.25	14.10	**0.18**
G26	33.25	40.93	14.07	36.93	19.79	0.80	321.81	4.35	62.40	13.20	**0.15**
G27	33.00	45.58	10.19	84.60	23.27	1.05	887.44	**10.49**	**22.18**	11.67	**0.18**
G28	21.30	33.50	11.55	40.70	17.77	0.82	415.00	6.49	32.29	11.60	**0.17**
G29	30.25	51.00	11.63	59.16	24.65	1.01	929.79	10.05	42.00	12.40	**0.14**
G30	26.10	48.85	11.62	76.56	21.17	0.94	768.49	9.30	34.55	13.10	**0.15**
G31	20.25	36.95	12.19	67.54	22.19	1.01	801.35	9.14	74.84	10.05	**0.16**
G32	46.00	51.67	7.67	157.25	12.22	0.75	665.67	5.19	63.17	11.01	**0.11**
G33	45.17	**57.33**	11.50	36.99	25.43	0.95	552.50	6.30	70.83	9.23	**0.21**
G34	41.50	48.83	8.33	**175.99**	**10.20**	0.55	741.83	6.62	73.33	11.01	**0.13**
G35	36.17	41.33	16.17	**34.73**	25.89	1.02	392.67	6.38	61.00	9.23	**0.10**
G36	44.33	51.50	7.16	128.41	10.36	0.86	613.67	4.40	63.77	8.96	**0.12**
G37	**46.50**	53.83	12.50	36.29	**30.36**	0.97	478.86	5.88	43.00	12.50	**0.19**
G38	27.50	40.00	15.00	55.30	22.00	0.77	575.00	7.51	72.50	18.50	**0.18**
G39	39.00	44.00	13.00	63.50	19.25	0.70	630.00	7.62	45.00	17.00	**0.15**
G40	39.00	46.00	21.00	60.20	16.40	0.69	480.00	9.05	53.50	18.00	**0.14**
Range	18.38 -46.50	28.88 -57.33	7.00 -27.50	34.73 -175.79	10.20 -30.36	0.40 -1.17	292.70 - 970.7	3.06 -10.49	22.28 -90.75	8.93 -20.00	**0.10 - 0.21**
General mean	34.08	44.48	13.21	74.68	18.66	0.75	566.27	6.90	52.76	13.51	**0.16**
SE	1.08	1.06	0.52	1.28	0.35	0.03	7.68	0.60	1.27	0.40	**0.008**
CD (0.5%)	2.16	2.10	1.03	2.55	0.69	0.06	15.29	1.20	2.52	0.80	**0.02**
CD (1%)	**2.86**	**2.79**	**1.37**	**2.39**	**0.91**	**0.07**	**20.30**	**1.60**	**3.37**	**1.05**	**0.02**

days. The genotype G24(IC-212484, NBPGR, Trichur, Kerala) was found to be earliest in flowering in (28.88 days) followed by G23(IC-212483, NBPGR, Trichur, Kerala) (29.12 days). Fifteen genotypes flowered significantly earliest than general mean of 44.48 days. Similar findings of variations in flowering in various cucurbits like Ridge gourd, Bitter gourd, bottle gourd were also reported by Rahman *et al.* (1990).

Fruit characteristics: Number of fruits per plant, fruit length (cm), fruit girth (cm), flesh thickness (cm), single fruit weight (g) and fruit yield per plant showed significant variation among the genotypes (Table-1). Wide range of variability was found in case of number of fruits per plant. The mean performance of fruit ranged from 7 to 27.50. The genotype G22(IC-212475, NBPGR, Trichur, Kerala) had the minimum number of fruits (7) and the genotype G5 (Trichy Local, Tamil Nadu) showed the maximum number of fruits per plant (27.50) followed by G2(Hessaraghatta Local, Karnataka) (24.40). Sixteen genotypes excelled the general mean of 13.21 for this trait, the bottle gourd (Rahman *et al.,* 1991) and Muskmelon (Swamy *et al.,* 1984). Yield of snake gourd significantly varied among the snake gourd lines (Table1). The maximum fruit yield per plant was obtained from the genotype G27 (Michaelpalayam Local, Tamil Nadu) (10.49kg) which was statistically differed from the other genotypes and the minimum fruit yield per plant was recorded in G4(Nagerkovil Local, Tamil Nadu) (3.06 kg).

The mean performance for fruit length ranged from 34.73 to 175.79 cm. The longest fruit length was obtained in genotype G34 (PKM-1, Tamil Nadu) (175.79 cm) and the shortest fruit length was observed in G35 (Vellayani Local, Kerala) (34.73 cm). These results are in accordance with the findings of Varghese (1991). The weight of the fruit varied significantly among the genotypes and the genotypes G25 (IC-212504, NBPGR, Trichur, Kerala) (970.71g) registered the highest fruit weight followed by the G16 (Vedasandur Local, Tamil Nadu) (970.28g). Seventeen genotypes registered significantly higher values than the general mean of 566.27g. A variation for fruit yield per plant was also observed in water melon (Cheziyan, 1984). The fruit girth ranged from 10.20 cm to 30.36cm. The fruit girth was maximum in G37 (Tittagudi Local, Tamil Nadu) (30.36cm) followed by G35 (Vellayani Local, Kerala) (25.89cm). Twenty genotypes had superior mean value than the general mean of 18.66cm. Similar findings were observed by Rana (1986) in Pumpkin. The flesh thickness was highest in the genotype G27 (Michaelpalayam Local, Tamil Nadu) (1.05cm) and on par with G35 (Vellayani Local, Kerala) (1.02cm). The lowest flesh thickness was registered in genotype G4 (Nagerkovil Local, Tamil Nadu) (0.40 cm).Number of seeds per fruit ranges from 22.18 to 90.15. The genotype G27 (Michaelpalayam Local, Tamil Nadu) recorded the minimum number of seeds and the maximum number of seeds were found in the genotype G2 (Hessaraghatta Local, Karnataka) (10.09 kg) and followed by genotype G29 (Nadupatti Local, Tamil Nadu) (10.05 kg). This was in line with the findings of Uddin et al. (2008). The genotypes G5 (Trichy Local, Tamil Nadu), G35 (Vellayani Local, Kerala), G37 (Tittakudi Local, Tamil Nadu), G25 (IC-212504, NBPGR, Trichur, Kerala), G27 (Michaelpalayam Local, Tamilnadu) showed better performance in respect of number of fruits per plant, fruit length (cm), fruit girth (cm), single fruit weight and fruit yield per plant (kg).

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