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Performance of snake gourd (*Trichosanthes anguina* L.) genotypes for growth, yield and quality traits in coastal Andhra Pradesh

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Abstract

The present investigation was carried out to evaluate snake gourd (*Trichosanthes anguina* L.) genotypes for growth, yield and quality traits. The experiment was conducted at College of Horticulture, Venkataramannagudem during *late kharif* season of 2021-22 with two replications in Randomized Block Design. Total thirty-two snake gourd genotypes were evaluated for growth, yield and quality traits. Significant variation was observed among all the genotypes. Mean performance of genotypes for growth, yield and quality traits revealed that genotype IC-308557 recorded highest fruit yield per vine due to the highest average fruit weight and minimum days taken for opening of male and female flower. The same genotype also showed significant superiority in number of female flowers per vine, fruit set percentage, flesh thickness and number of seeds per fruit. Manusree showed significant superiority in days to first female flower opening and node to first female flower. Baby had highest number of female flowers per vine, maximum fruit girth, maximum number of fruits per vine and minimum sex ratio. The genotype IC-277390 recorded superior mean values in respect of node to first male flower and vitamin C content. Maximum fruit length was recorded in IC-333314. Highest acidity content was recorded by IC-202157 while high TSS was recorded by IC-212416.

Keywords: Snake gourd, mean performance, genotypes, growth, yield, quality, traits

Introduction

Snake gourd (*Trichosanthes anguina* (L.) 2n=2x=22) is an annual, day neutral, herbaceous and climbing type vegetable crop. It belongs to family Cucurbitaceae, sub-family Cucurbitaceae, tribe Trichosanthes. It is originated in Indo-Malayan region. The wild species of *Trichosanthes* is considered as the progenitor of *Trichosanthes anguina*. It is widely distributed in Asia, extending through Malaya to North Australia in one direction and through China and Japan in another. At present, snake gourd is also cultivated in Mauritius and in Central and East Java. In India, it is most commonly cultivated in South India and also grown in Punjab, Delhi, Uttar Pradesh, Bihar, Gujarat and other parts of the country.

It is a good source of minerals, fibre and nutrients to make the food wholesome and healthy (Ahmed *et al.* 2000) [1]. It contains considerable amount of protein (0.5%), fat (0.3%), minerals (0.5%), fibre (0.5%) and carbohydrates (3.3%). It possesses medicinal importance due to the abundance of flavonoids, carotenoids and phenolic acids *etc.* The predominant mineral elements are potassium (121.6 mg/100 g), phosphorus (135 mg/100 g), sodium, magnesium and zinc (Ojiako and Igwe, 2008) [4]. The plant has pharmacological and therapeutical properties such as anti-diabetic, hepatoprotective, cytotoxic and anti-inflammatory and it is also used in Ayurveda and Siddha medical practices.

Generally, snake gourd fetches more yield per unit area, but the average yield of the crop is low in India when compared to other neighboring countries and its production is also restricted to only to 3-4 months of the year. Despite of economic and medicinal importance of the crop due attention was not given towards a need based crop improvement programme and also no serious attempts have so far been made to upgrade the productivity and acceptability of this crop. The productivity of vegetable can be increased to a greater extent through varietal improvement. The improvement work should be focused on selection of genotype for better yield and superior quality. Snake gourd is a monoecious and highly cross-pollinated crop. There are number of cultivars with wide range of variability in size, shape and colour of fruits are available in India. Besides its nutritional value, it is having good demand in the market.

Considering the nutritional and medicinal importance of snake gourd, there is a prime need for its improvement. Identification of an improved variety with high yield and good quality characters with wider adaptability would be a great benefit to the farmers.

Material and Methods

The experiment was conducted at College of Horticulture, Dr. Y.S.R. Horticultural University, Venkataramannagudem, West Godavari District. It was conducted during late *kharif* season 2021-22 and laid out in Randomized Block design replicated twice. Total thirty-two snake gourd genotypes were evaluated for growth yield and quality traits. Genotypes were collected from NBPGR regional station Thrissur. The experimental site was well prepared, cultural practices include training, pruning, weeding, irrigation, fertilizer application and plant protection measures were followed for the healthy growth of crop. Observations on growth parameters were recorded upto 4 months of planting. Data on yield and yield attributes were collected at appropriate stages.

Results and Discussion

The mean of all the genotypes for different traits are presented in Table 1. The variation found in snake gourd genotypes for average fruit weight, number of fruits per vine and fruit yield per vine are presented in Figures 1, 2 and 3 respectively. Highest fruit set percentage was recorded in genotype IC-308557 (95.83), average fruit weight was maximum in IC-308557 (459.50 g), flesh thickness was maximum in IC-308557 (0.70), highest number of seeds per fruit in IC-308557 (78.25), fruit yield per vine was maximum in IC-308557

(13.11 kg) and days to first male flower opening was minimum in IC-308557 (28.43). In all these traits IC-308557 performed superior among the other genotypes. Baby had highest number of female flowers per vine (34.18), maximum fruit girth (17.15cm), maximum number of fruits per vine (32.65) and minimum sex ratio (12.38). Manusree showed significant superiority in days to first female flower opening (44.30 days) and node to first female flower (7.25). Flowering behavior may be due to change in length of photoperiod and inherent properties of genotypes. Variation in earliness might be due to genetic makeup and corresponding variation in its attributing characters. Rana and Pandit (2011)^[7], Rahman *et al.* (2002)^[5] and Deepa *et al.* (2013)^[2] also observed similar trend of results for earliness characters in snake gourd.

The genotype IC-277390 recorded superior mean values in respect of node to first male flower (3.00) and vitamin C content (4.89). Highest number of male flowers per vine was recorded in genotype IC-264713 (443.13). Maximum fruit length was recorded in IC-333314 (78.70). Highest acidity content was recorded by IC-202157, IC-308557, IC-212474 and Manusree (0.18) while high TSS was recorded by IC-212416 (4.15). Highest potassium content was recorded in the genotype IC-212474 (350.50) and fibre content was maximum in IC-284875 (0.75). The above genotypes are worthy for utilization in improvement of the respective characters mentioned. These results are in line with the findings of Rana and Pandit (2011)^[7], Deepa *et al.* (2013)^[2], Muralidhara *et al.* (2014)^[3] and Rajkumar *et al.* (2016) who observed significant variations among snake gourd genotypes for growth, yield and quality characters.

Table 1: Mean performance of snake gourd genotypes for growth, yield and quality characters

Accession number	DFMO	DFFO	NFMF	NFFF	NMFV	NFFV	SR	FS	FL	FG
IC 410142	34.17	67.90	5.75	9.70	423.90	25.90	16.17	71.90	44.30	13.51
IC 284753	30.83	51.18	4.84	8.88	425.50	24.60	16.77	55.00	43.87	13.54
IC 347377	40.63	69.28	5.00	8.38	436.15	26.67	16.32	56.67	41.79	13.47
IC 212517	46.63	74.25	5.84	10.00	431.95	26.00	16.75	78.00	34.25	12.50
IC 212513	28.58	47.12	4.34	7.38	427.23	28.67	13.50	91.00	47.40	13.05
IC 202157	44.84	77.63	5.25	11.17	427.00	25.29	17.19	82.17	54.25	12.17
IC 418496	37.67	73.50	6.17	8.50	429.13	26.42	16.54	71.25	38.00	15.04
IC 212416	46.17	57.25	4.33	8.84	439.00	26.34	16.67	74.67	39.96	13.44
IC 426984	41.33	47.13	4.17	8.63	437.00	25.50	16.50	88.25	26.40	14.57
IC 202155	38.13	48.38	5.67	14.13	431.50	25.84	17.24	76.87	29.80	14.70
IC 264713	43.42	46.46	5.17	13.75	443.13	25.84	18.41	79.67	56.42	11.00
IC 212527	38.50	74.50	5.17	13.88	435.13	24.94	16.92	70.50	44.95	12.37
IC 410160	37.16	48.75	5.00	13.88	428.25	27.63	15.49	86.25	29.10	14.65
IC 202158	46.45	51.38	5.67	13.84	425.75	26.67	15.87	75.17	44.00	12.96
IC 546082	41.42	64.50	5.17	9.00	432.25	26.50	16.53	51.50	45.84	14.54
IC 308557	28.43	46.46	4.33	7.38	434.03	33.13	13.32	95.83	56.50	13.83
IC 277390	43.13	53.83	3.00	14.00	433.90	25.10	19.10	87.50	39.80	14.25
IC 212465	36.62	55.50	3.84	13.75	431.50	24.75	17.64	67.88	39.71	10.93
IC 212474	31.50	75.13	7.00	14.25	432.25	24.90	18.07	73.63	28.00	12.48
IC 212475	39.63	57.09	5.84	14.67	433.73	27.54	15.72	79.13	39.40	14.05
IC 212483	32.96	64.00	5.38	14.00	432.88	24.28	17.90	74.10	29.25	15.41
IC 333314	33.60	55.75	5.75	14.00	432.00	24.00	19.00	56.17	78.70	12.33
IC 284875	37.38	63.63	5.63	10.50	434.00	25.00	16.77	62.96	42.30	13.95
IC 539812	42.50	65.63	5.04	10.00	433.50	25.63	15.93	67.63	54.67	12.67
Baby	42.30	53.30	3.60	11.00	430.90	34.18	12.39	95.55	27.80	17.15
Manusree	28.44	44.30	6.13	7.25	427.73	31.38	13.45	93.79	37.80	14.65
Kaumudhi	35.90	60.85	3.75	8.88	426.63	25.70	16.44	61.00	36.20	14.10
CO-2	41.40	62.40	3.90	10.00	431.90	27.20	15.61	80.67	27.20	16.15
PKM-1	42.80	75.75	4.55	8.00	428.00	26.38	17.59	76.67	40.75	13.77
Madiki Local	43.50	61.88	3.85	8.00	434.25	25.75	16.08	73.50	31.34	15.37
Gudem Local	40.04	67.50	3.90	7.63	433.23	25.63	16.97	58.84	44.00	11.91

Guntur Local	34.40	63.80	4.30	8.20	434.25	28.10	16.30	63.50	37.29	11.65
Grand mean	38.44	60.19	4.91	10.67	431.80	26.61	16.41	74.29	40.97	13.62
SEM	1.11	1.94	0.59	1.21	1.76	1.08	1.00	4.05	2.82	0.77
C.D. (0.05)	3.22	5.60	1.70	3.51	5.09	3.12	2.89	11.69	8.14	2.23

DFMO: Days to first male flower opening
 DFFO: Days to first female flower opening
 NFMF: Node to first male flower
 NFFF: Node to first female flower

NMFV: Number of male flowers per vine
 NFFV: Number of female flowers per vine
 SR: Sex ratio (%)
 FS: Fruit set (%)

FL: Fruit length (cm)
 FG: Fruit girth (cm)

Table 1: cont.

Accession number	AFW	FT	NSPF	NFPV	FYPV	VC	AC	K	TSS	FC
IC 410142	264.20	0.44	39.75	18.61	4.91	3.74	0.13	120.50	3.32	0.50
IC 284753	326.50	0.56	55.00	13.53	4.42	4.05	0.17	137.00	2.85	0.40
IC 347377	431.00	0.43	28.00	15.07	6.44	3.58	0.14	155.00	2.93	0.35
IC 212517	141.25	0.45	31.00	20.32	2.86	4.40	0.14	146.00	3.68	0.50
IC 212513	411.00	0.62	64.75	23.87	9.79	4.34	0.13	165.50	3.47	0.35
IC 202157	254.25	0.45	31.50	20.78	5.28	4.58	0.18	174.00	2.80	0.65
IC 418496	322.25	0.50	14.00	18.83	6.07	4.58	0.17	193.00	2.58	0.35
IC 212416	331.13	0.39	39.50	19.66	6.51	4.46	0.11	184.00	4.15	0.50
IC 426984	190.10	0.40	60.00	22.49	4.28	4.49	0.14	223.00	3.50	0.25
IC 202155	184.70	0.43	24.50	19.87	3.69	4.84	0.13	203.50	3.18	0.45
IC 264713	263.30	0.30	24.50	20.58	5.42	4.10	0.17	214.50	3.53	0.65
IC 212527	253.20	0.38	24.25	17.58	4.46	3.35	0.17	254.50	3.43	0.45
IC 410160	182.70	0.48	30.75	22.06	4.03	3.39	0.14	245.50	3.83	0.25
IC 202158	229.34	0.35	23.75	20.10	4.61	3.50	0.15	284.50	3.45	0.15
IC 546082	313.75	0.50	60.00	13.58	4.27	4.42	0.16	317.50	3.40	0.50
IC 308557	459.50	0.70	78.25	28.54	13.11	4.00	0.18	275.00	3.78	0.50
IC 277390	198.20	0.41	24.00	22.01	4.21	4.89	0.13	182.50	3.64	0.35
IC 212465	271.70	0.35	45.75	16.80	4.56	3.38	0.12	344.00	3.33	0.30
IC 212474	152.50	0.55	63.00	18.42	2.82	4.53	0.18	350.50	3.23	0.35
IC 212475	259.20	0.52	24.50	21.71	5.60	3.79	0.13	261.00	3.18	0.35
IC 212483	283.50	0.48	39.00	17.98	5.08	4.43	0.15	192.50	3.53	0.55
IC 333314	325.20	0.42	52.25	13.48	4.40	3.68	0.17	235.50	3.02	0.45
IC 284875	225.20	0.46	63.00	19.92	4.48	4.72	0.13	145.50	3.77	0.75
IC 539812	331.75	0.40	20.75	17.32	5.75	3.40	0.13	247.00	3.53	0.65
Baby	201.40	0.50	32.00	32.65	6.58	3.42	0.12	316.00	3.55	0.70
Manusree	424.40	0.66	75.25	24.53	10.41	4.18	0.18	188.50	3.70	0.45
Kaumudhi	248.60	0.54	48.50	15.58	3.87	4.76	0.17	158.50	3.76	0.45
CO-2	199.50	0.49	19.75	21.95	4.40	3.95	0.16	275.50	3.25	0.25
PKM-1	376.50	0.36	29.25	20.22	7.58	4.28	0.13	256.50	4.05	0.45
Madiki Local	188.30	0.39	41.25	18.93	3.56	3.85	0.14	231.00	2.80	0.25
Gudem Local	363.75	0.35	30.50	14.92	5.41	3.68	0.12	307.00	3.38	0.35
Guntur Local	164.13	0.35	45.75	17.82	2.93	4.28	0.16	190.50	2.63	0.55
Grand Mean	274.12	0.46	40.13	19.68	5.37	4.09	0.16	224.22	3.38	0.44
SEM	18.61	0.04	1.65	1.21	0.45	0.20	0.10	2.74	0.16	0.07
C.D. (0.05)	53.69	0.12	4.76	3.50	1.29	0.57	0.03	7.91	0.46	0.20

AFW: Average fruit weight (g)
 FT: Flesh thickness (cm)
 NSPF: Number of seeds per fruit
 NFPV: Number of fruits per vine

FYPV: Fruit yield per vine (kg)
 VC: Vitamin C content (mg/100 g)
 AC: Acidity content (per cent)
 K: Potassium (mg/100 g)

TSS: TSS (°Brix)

FC: Fibre content (g/100 g)

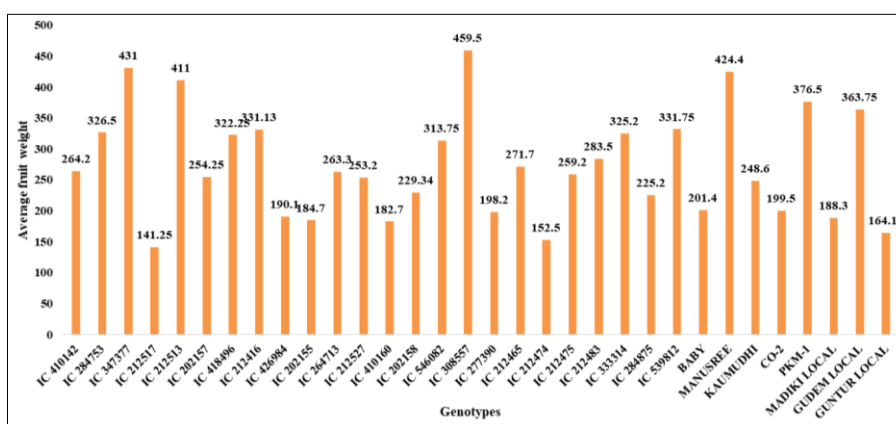


Fig 1: Average fruit weight in different snake gourd genotypes

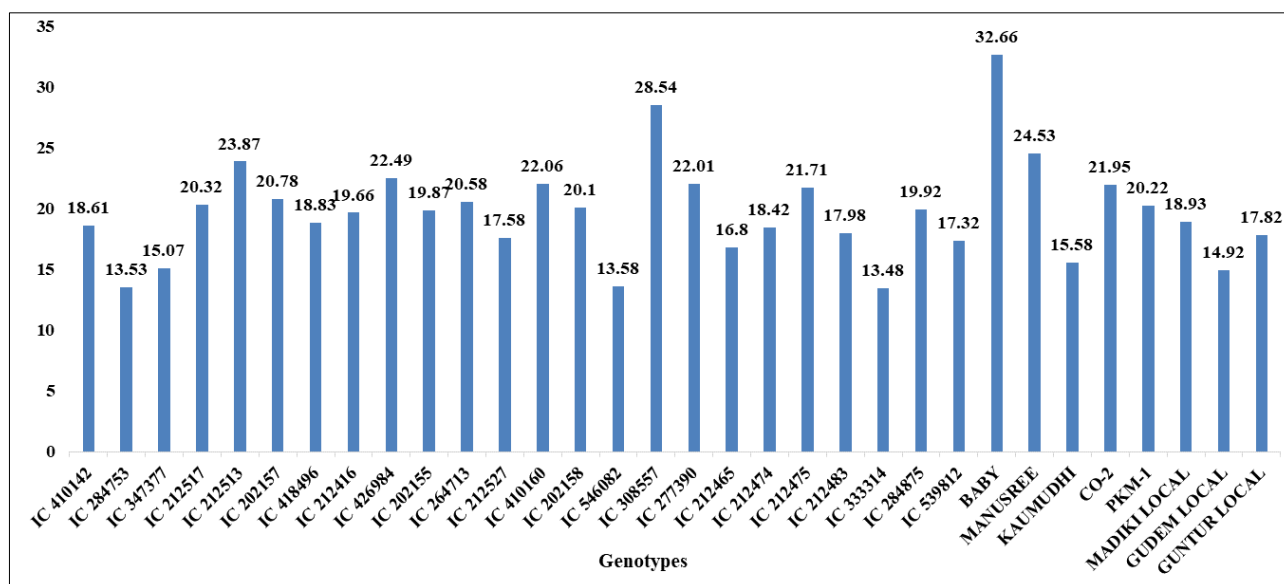


Fig 2: Number of fruits per vine in different snake gourd genotypes

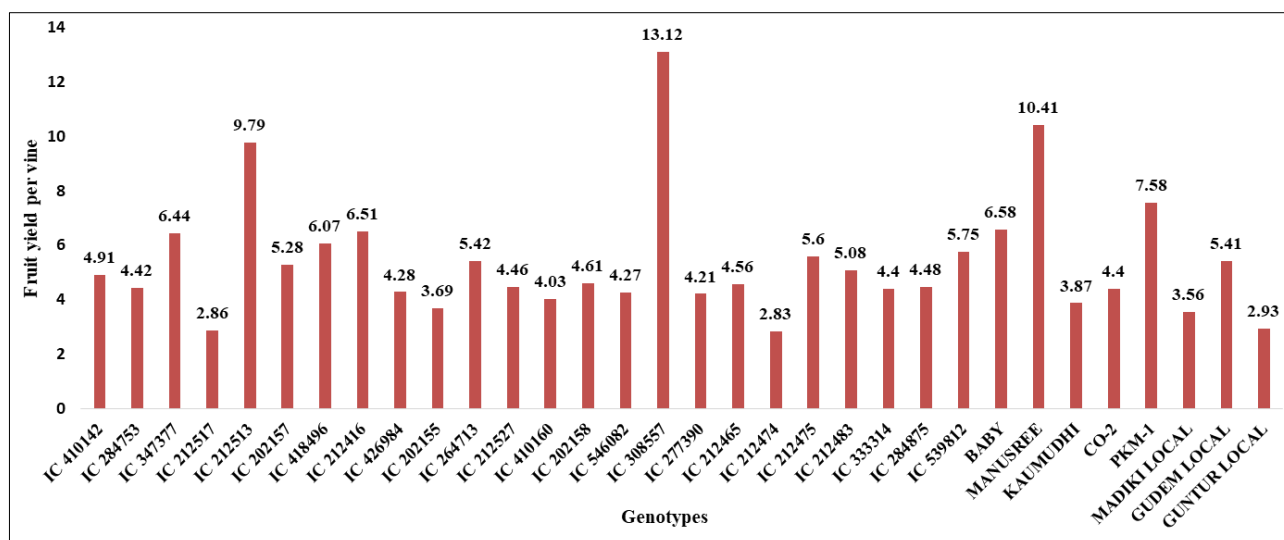


Fig 3: Fruit yield per vine in different snake gourd genotypes

Conclusion

The present study revealed that, the genotype IC-308557 recorded good results in growth, yield and quality attributing parameters followed by Baby, Manusree and IC-277390. These four genotypes were performed well among the other genotypes taken under the present study. Since the genotypes were evaluated for one season, they can be evaluated for one more season to know the consistency and selected genotypes could be used for crop improvement programme.

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