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Evaluation of ivy gourd (*Coccinia grandis* L.) genotypes for growth, yield and yield attributing traits

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Abstract

The present investigation was carried out to evaluate ivy gourd (*Coccinia grandis* L.) genotypes for growth, yield and yield attributes. The experiment was conducted at College of Horticulture, Venkataramannagudem during *late kharif* season of 2021-22 with two replications in Randomized Block Design. Total fifteen ivy gourd genotypes were evaluated for growth, yield and yield attributes. Significant variation was observed among all the genotypes. Mean performance of genotypes for growth, yield and yield attributes revealed that genotype VRGIG-11 recorded highest vine length, internodal length, petiole length, leaf area and fruit yield per vine. Number of primary branches recorded maximum in VRGIG-12, chlorophyll content was highest in VRGIG-6. First female flower appearance at earlier node, minimum days taken for first female appearance, minimum days to first fruit set and minimum days for first harvest noticed in VRGIG-5. Minimum days taken for 50% flowering, less number of days taken from fruit set to maturity and more number of fruits per vine was recorded in VRGIG-7. Most of the genotypes showed 100.00 percentage fruit set except VRGIG-2, VRGIG-5 and VRGIG-3. VRGIG-13 recorded maximum fruit diameter and fruit weight. Fruit length recorded highest in VRGIG-4 and number of seeds found minimum in VRGIG-2.

Keywords: Ivy gourd, mean performance, genotypes, growth, yield, attributes

Introduction

Ivy gourd (*Coccinia grandis* L.) is also known as little gourd, scarlet gourd, kundru, tondali, bimba *etc.* It belongs to the family Cucurbitaceae. The crop is native to India and has chromosome number $2n = 24$. Based on the edible quality of tender fruits they have been classified into 2 distinct types *i.e.* bitter and sweet. Genus *Coccinia* has nearly 30 species confined to Tropical Africa but only one species *Coccinia grandis* (Syn. *Coccinia indica*) is extensively cultivated in India, Myanmar, Srilanka and Malaysia. In India, this is widely grown in states like Karnataka, Tamil Nadu, Kerala, Maharashtra, Andhra Pradesh, Gujarat, Telangana and West Bengal.

Immature fruits of ivy gourd are used as vegetable. Apart from fruits, young shoots and leaves are consumed as fried, boiled or blanched. It can also be used for various preparations of salads and mixed vegetables. It is most popular green in Thailand. The flesh is processed into dehydrated chips and can be stored for a longer period.

It prefers hot and humid climate. Plants undergo dormancy during winter season. It can be seen on grassland, bush wood, on roadsides, in hedges and sparse forests from the plains upto 1500 m altitudes. Plant grows well in the areas having uniform distribution of rain and high humidity. Ivy gourd grows best in sandy loam and is not adapted to heavy soils. It needs good drainage and is very susceptible to water logging.

Ivy gourd is an under exploited dioecious cucurbit. It is an aggressive climbing or prostrate herb with long tuberous roots. Fruits are smooth, bright green with white stripes when immature, becoming bright scarlet when ripe. Eventhough the crop is dioecious, the female plants are capable of producing parthenocarpic fruits. Ivy gourd can be propagated by seeds, cuttings and tuberous roots. But seed propagation is not in vogue due to its dioecious nature (50% male plants) (Pandey, 2008) [5]. Since, it is having good commercial, nutritional and medicinal value, bringing an improvement in ivy gourd is essential so as to promote indigenous vegetables and also to expand the area under this crop. In view of expanding the area for cultivation of ivy gourd, genotypes have collected and evaluated in Godavari zone of Andhra Pradesh.

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 fifteen ivy gourd genotypes including two check varieties were evaluated for growth yield and yield attributes. Thirteen genotypes were collected from different places in Andhra Pradesh and checks from CHES, Bhubaneswar. The experimental site was well prepared, cultural practices include mulching, 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 6 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 and 2. Highest vine length was recorded in genotype VRGIG-11 (595.15 cm), internodal length was maximum in VRGIG-11 (14.25 cm), highest petiole length in VRGIG-11 (5.05 cm) and leaf area was maximum in VRGIG-11 (20667.20 cm²). In all these traits VRGIG-11 performed superior over check varieties *viz.*, Arka Neelachal Sabuja and Arka Neelachal Kunkhi. More number of primary branches were recorded in VRGIG-12 (7.75) and genotype VRGIG-6 (52.94) recorded the highest chlorophyll content than checks.

These results are in accordance with Panigrahi *et al.* (2015)^[6], Bharathi and Madan (2020)^[1], Jitendra *et al.* (2020)^[4], Saikia *et al.* (2017)^[7] and Hitesh *et al.* (2012)^[3] in ivy gourd.

Female flower appearance at earlier node was recorded in VRGIG-5 (5.07), minimum days to first female flower was noticed in VRGIG-5 (37.50), Minimum number of days to 50% flowering in VRGIG-7 (52.50), days for first fruit set was minimum in genotype VRGIG-5 (44.50), VRGIG-5 had taken minimum days for first harvest (49.50) and VRGIG-7 (5.50) had taken minimum days from fruit set to maturity. Most of the genotypes showed 100.00 percentage fruit set except VRGIG-2 (65.00), VRGIG-5 (85.00) and VRGIG-3 (95.00), Flowering behavior may be due to change in length of photoperiod and inherent properties of genotypes. This was supported by Harshitha *et al.* (2010) in ridge gourd. Maximum fruit length was recorded in VRGIG-4 (6.91 cm), fruit diameter was highest in VRGIG-13 (2.34 cm), maximum fruit weight in VRGIG-13 (27.47 g). Reproductive phase of ivy gourd fruit depends on the carbohydrate import, translocation physiology in developing fruit and stomata conductance. Less number of seeds was recorded in VRGIG-2 (42.50) showed superior performance over check varieties, more number of fruits per vine was recorded in VRGIG-7 (369.20), highest yield had obtained in VRGIG-11 (7.40 kg) which was superior over check varieties. Supporting results were obtained by Panigrahi *et al.* (2015)^[6], Bharathi and Madan (2020)^[1], Saikia *et al.* (2017)^[7] and Hitesh *et al.* (2012)^[3] in ivy gourd.

Table 1: Mean performance ivy gourd genotypes for different growth parameters.

Genotype	Vine length (cm)	Internodal length (cm)	Number of primary branches	Petiole length (cm)	Leaf area (cm ²)	Chlorophyll content (SPAD values)
VRGIG-1	445.90	9.92	5.92	2.94	2754.43	42.83
VRGIG-2	94.00	4.86	5.75	1.99	1308.88	27.84
VRGIG-3	417.05	9.50	6.25	3.58	9650.59	42.99
VRGIG-4	451.85	9.25	6.75	3.14	5593.58	43.35
VRGIG-5	484.55	8.76	5.28	2.90	3308.79	39.99
VRGIG-6	496.10	9.25	5.92	3.84	10300.90	52.94
VRGIG-7	513.60	10.58	6.75	4.69	11841.71	51.79
VRGIG-8	491.65	8.87	6.28	3.69	4802.83	49.39
VRGIG-9	506.35	9.55	5.92	3.99	4746.18	44.02
VRGIG-10	479.70	10.33	6.08	4.14	9480.00	50.84
VRGIG-11	595.15	14.25	7.58	5.05	20667.20	49.30
VRGIG-12	545.90	9.66	7.75	3.99	6423.66	50.29
VRGIG-13	559.85	11.17	7.58	4.17	10466.52	44.29
Arka Neelachal Sabuja	531.70	10.08	7.50	4.11	14849.33	50.69
Arka Neelachal Kunkhi	540.05	10.17	5.69	3.77	17653.16	50.77
Mean	476.89	9.74	6.46	3.73	8923.18	46.09
SE(m) ±	6.47	0.51	0.12	0.08	787.57	0.39
CD @ 5%	19.80	1.55	0.38	0.23	2411.98	1.18

Table 2: Mean performance of ivy gourd genotypes for yield and yield attributing parameters.

Genotype	Node of first female flower appearance	Days taken for first female flower appearance	Days taken for 50% flowering	Days taken for first fruit set	Days taken for first harvest	Days taken from fruit set to maturity
VRGIG-1	7.50	59.00	71.50	67.50	72.00	8.00
VRGIG-2	8.09	52.50	75.00	60.50	65.50	8.00
VRGIG-3	11.75	66.00	71.50	73.00	78.50	7.50
VRGIG-4	12.50	57.00	60.50	64.50	69.50	7.50
VRGIG-5	5.07	37.50	60.50	44.50	49.50	7.00
VRGIG-6	18.84	52.50	59.50	59.50	64.50	7.00
VRGIG-7	16.00	51.00	52.50	56.50	61.50	5.50
VRGIG-8	10.67	57.00	71.50	66.00	71.00	9.00
VRGIG-9	8.00	41.00	63.50	50.00	55.00	9.00
VRGIG-10	9.80	56.50	60.50	66.50	71.50	10.00
VRGIG-11	16.50	55.50	63.00	67.50	72.50	12.00
VRGIG-12	10.67	54.00	69.50	65.00	70.00	11.00
VRGIG-13	12.84	54.00	57.00	63.00	68.00	9.00
Arka Neelachal Sabuja	14.00	51.00	64.50	59.00	64.00	8.00
Arka Neelachal Kunkhi	12.84	56.50	71.00	65.50	70.50	9.00
Mean	11.67	53.40	64.77	61.90	66.90	8.50
SE(m) ±	0.41	0.61	4.61	0.25	0.40	0.22
CD @ 5%	1.25	1.83	NS	0.77	1.26	0.69

Genotype	Fruit set percentage (%)	Fruit length (cm)	Fruit diameter (cm)	Individual fruit weight (g)	Number of seeds per fruit	Total number of fruits per vine	Yield per vine (kg)
VRGIG-1	100.00	5.55	1.77	13.02	76.00	167.80	1.79
VRGIG-2	65.00	4.25	1.06	2.82	42.50	53.60	0.12
VRGIG-3	95.00	6.52	2.09	19.62	122.50	196.20	2.58
VRGIG-4	100.00	6.91	1.91	19.37	98.00	251.90	4.24
VRGIG-5	85.00	6.66	1.94	19.22	93.50	213.40	3.49
VRGIG-6	100.00	5.50	2.24	18.27	104.00	160.60	2.34
VRGIG-7	100.00	6.54	2.19	24.05	108.00	369.20	7.32
VRGIG-8	100.00	6.11	1.90	16.56	107.00	213.50	3.09
VRGIG-9	100.00	5.96	1.98	17.34	106.00	188.90	2.74
VRGIG-10	100.00	6.60	2.14	20.33	101.00	185.00	3.62
VRGIG-11	100.00	6.70	2.09	23.84	117.50	366.40	7.40
VRGIG-12	100.00	5.84	2.29	18.99	119.50	158.10	3.02
VRGIG-13	100.00	6.50	2.34	27.47	134.00	303.00	6.45
Arka Neelachal Sabuja	100.00	5.73	2.10	19.32	133.50	303.00	4.70
Arka Neelachal Kunkhi	100.00	6.72	2.26	23.01	123.00	284.90	6.06
Mean	96.33	6.14	2.02	18.88	105.73	227.70	3.93
SE(m) ±	2.00	0.10	0.07	0.57	8.12	13.94	0.23
CD @ 5%	6.28	0.32	0.22	1.78	25.48	43.76	0.73

Conclusion

Based on our findings, it was found that VRGIG-11 recorded good results in growth, yield attributing parameters followed by VRGIG-13 and VRGIG-7. These three genotypes were performed well over the check varieties viz., Arka Neelachal Sabuja and Arka Neelachal Kunkhi. Since the genotypes were evaluated for one season, they can be evaluated for one more season to know the consistency and selected genotypes were further used for crop improvement programme.

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