

# **EVALUATION TRIAL OF IVY GOURD GENOTYPES (*Coccinia grandis* L) UNDER PRAYAGRAJ AGRO CLIMATIC CONDITIONS**

## **ABSTRACT**

The present investigation entitled **Evaluation trial of ivy gourd genotypes (*Coccinia grandis* L) under Prayagraj agro climatic conditions** was carried out during October, 2022 to March 2023 at Horticultural Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology And Sciences. The experiment was laid out in a randomized block design with seven genotypes in three replications. The genotypes such as G<sub>1</sub>-Arka Neelachal Khunki, G<sub>2</sub>-Arka Neelachal Sabuja, G<sub>3</sub>-Local Geda, G<sub>4</sub>-Local Denga, G<sub>5</sub>-Surekha, G<sub>6</sub>- CHIV-7 and G<sub>7</sub>-CHIV-8. It was concluded that the 7 genotypes showed significant effect on almost all the growth and yield characters as well as quality of ivy gourd. The genotype G<sub>2</sub>-Arka Neelachal Sabuja found superior in terms of vine length (315.11 cm), petiole length (6.37 cm), internodal length (12.71cm), fruit diameter (2.87 cm), average fruit weight (21.08 g), No. of seeds for per fruit (122), No. of fruits per plant (422), fruit yield per plant (8.82 kg) ,fruit yield per hectare (17.35 t/ha), TSS (4.33), Ascorbic acid (15.34 mg/100g) and minimum days taken for first female flower anthesis (35.17 days) whereas maximum fruit length obtained from genotype G<sub>1</sub>. Arka Neelachal Khunki (6.12 cm). Among the different genotypes the highest Gross return (Rs/ha) (3,47,000), Net return (Rs/ha) (1,90,140), benefit cost ratio (2.21) was also obtained from genotype G<sub>2</sub> i.e Arka Neelachal Sabuja.

**Key words:** *Ivy Gourd, Genotypes, growth, yield*

## **1. INTRODUCTION**

Ivy gourd (*Coccinia grandis* (L.) Volgi.) is a semi perennial, dioecious creeper widely cultivated in South East Asian countries belongs to the family Cucurbitaceae with chromosome no.  $2n = 24$ . It is an underexploited semi-perennial creeper, commonly known as Kundru in Hindi and Kundul in Assamese. Ivy gourd is a minor cucurbit originated and domesticated in Central Africa, India and Asia. In India, it is widely grown in Tamil Nadu, Karnataka, Kerala, Maharashtra, Gujarat, Andhra Pradesh, Bihar, Uttar Pradesh and Odisha. In fact, it is indigenous to India and its of their huts. This minor vegetable has unique medicinal value of controlling diabetes, bronchitis, skin disorders and it checks fever. It is also used as trauma aid by people in villages when there is an

accident. The plant is used as a laxative. It is used internally in the treatment of gonorrhoea. Aqueous and ethanolic extracts of the plant have wild form is also found in many parts of India (Maurya, 2013). In southern states, it is grown all-round the year while in east, west and north; it remains dormant during cool winter.

Ivy gourd is a perennial, dioecious climbing vine that may spread with support of a tree, shrub, fence or any supports but sensitive to shade and water logging condition. Ivy gourd produces profuse branching with tuberous root; tendrils simple and sometime bifid, its leaves are arranged alternately along the stems, they vary from heart to pentagon shape and are up to 10 cm wide and long. The upper leaf surface is glabrous, whereas the lower surface is hairy. Flower large white in color star shape, solitary; peduncle medium in size. Male flower: calyx campanulate, glabrous, 5 lobed, obtuse; corolla white, campanulate, glabrous 5 lobed, short and acute; stamens 5 (2+2+1) inserted at the base of calyx tube, filaments connate into a central column. Female flower; solitary peduncle cylinder, calyx and corolla similar to male flower. Stigma 3, subulate villous at base. Ovary is inferior. Fruits ovoid, cylindrical sometime elliptic in shape, 10-12 cm long, 2.5-4.0 cm across, smooth light green with white strips and scarlet color when ripe. Seeds are tan-colored and 6-7 mm long. The fruit of species *Coccinia adenensis* are bitter in test due to present of cucurbitacin 'b' in the form of glycoside but lose their bitterness rapidly during ripening. The roots and stems are succulent and probably enable the plant to survive during prolonged drought (Pier, 2003)

## 2. MATERIALS AND METHODS

A field experiment entitled "Evaluation trial of ivy gourd genotypes (*Coccinia grandis* L) under Prayagraj agro climatic conditions" was carried out in the department of horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences during 2022-2023. The experiment was laid out in a randomized block design with seven genotypes in three replications. The genotypes such as G<sub>1</sub>-Arka Neelachal Khunki, G<sub>2</sub>-Arka Neelachal Sabuja, G<sub>3</sub>-Local Geda, G<sub>4</sub>-Local Denga, G<sub>5</sub>-Surekha, G<sub>6</sub>- CHIV-7 and G<sub>7</sub>-CHIV-8. All the package of practices was followed as per recommendations to raise a quality crop. Five plants are selected randomly genotypes per application and observations were recorded on growth, yield, and quality parameters on these plants. Data on various parameters was recorded and statically analyzed by applying the technique of analysis of variance using randomized block design. The level of significance was kept at 5% (p<0.05).

## 3. RESULTS AND DISCUSSION

All the parameters are shown in tabular form in Table no 1, Table no 2 and Table no 3

1. The Days taken for first flowering , the minimum days was recorded in G2 – Arka Neelachal Sabuja (35.17 days) , followed by G5 – Surekha (37days) and the maximum days at G6 - CHIV-7 (52 days). The number of days from planting of first female flower is an important character, which indicates earliness or lateness of the crop in general. The early and late female flower appearance help in the occurrence of early/late flush of the crop. The variation in days to first female flower anthesis might have been due to internodal length, petiole length and vine length. Similar result for days to first female flower anthesis had also reported by **Bharathi et al (2011), Nag et al., (2012)** and **Saikia J. and Phookan D.B. (2018)**
2. The maximum vine length (cm) was observed with G2 – Arka Neelachal Sabuja (315.11 cm) followed by G1 – Arka Neelachal Khunki (310.56 cm) whereas minimum was reported in G6 – CHIV- 7 (265.29 cm.) The variation in vine length might have been due to genetic makeup of the genotypes, which in some way influenced this morphological expression through the activity of endogenous growth regulators. Similar result for vine length had also recorded by **Bharathi et al (2011), Nag et al., (2012)** in ivy gourd, **Basmati et al., (2014)** in spine gourd, **Ara et al., (2012)** in pointed gourd.
3. The maximum Internodal length (cm) was observed with G2 – Arka Neelachal Sabuja (12.71 cm) followed by G1 – Arka Neelachal Khunki (10.49 cm) whereas minimum was reported in G7 – CHIV- 8 (8.05 cm). The variation in internodal length might have been due to vine length, genetic characters and morphological characters. The Arka varieties finds better at adapting environment and better nutrient uptake than the local varieties. Similar result for vine length had also recorded by **Bharathi et al (2011), Nag et al., (2012)** and **Saikia J. and Phookan D.B. (2018)**.
4. The maximum Petiole length (cm) was observed with G2 – Arka Neelachal Sabuja (6.37 cm) followed by G7 – CHIV-8 (5.90 cm) whereas minimum was reported in G3 – Local Geda- 7 (4.23 cm.) The variation in petiole length might have been due to internodal length, vine length, genetic characters and morphological characters. The Arka varieties finds better at adapting environment and better nutrient uptake than the local varieties. Similar result for vine length had also recorded by **Bharathi et al (2011), Nag et al., (2012)** and **Saikia J. and Phookan D.B. (2018)**.
5. Maximum Fruit length (cm) was observed with plants G1 – Arka Neelachal Khunki (6.12 cm), followed by G2 – Arka Neelachal Sabuja (5.67 cm) whereas minimum was reported in G3 – Local Geda (3.22 cm.) Fruit length is an important character contributing towards yield. The variation in fruit length might have been due to fruit diameter, fruit volume and genetic and morphological differentiation. Variation in fruit length had been also found by **Hazara et al. (1998), Krishana Prasad et al. (1999), Dora et al. (2002), Khan et al. (2009), Bharathi et al. (2011)** in pointed gourd, **Bharathi et al. (2006)** in spine gourd, **Bharathi et al. (2008), Nag et al. (2012)** in ivy gourd.
6. Maximum Fruit Diameter (cm) was observed with plants G2 – Arka Neelachal Sabuja (2.87 cm), followed by G4 – Local Denga (2.84 cm) whereas minimum was reported in G1 – Arka Neelachal Khunki (1.81 cm). Fruit diameter is an important character contributing towards yield. The variation in fruit diameter might have been due to internodal length, fruit length, genetic characters and morphological characters. Similar result for fruit diameter had also recorded by **Dora et al. (2002 a), Bharathi et al (2008), Khan et al. (2009), Bharathi et al. (2011), Nair et al. (2012)** in pointed gourd, **Celine et al. (2010)** in snake gourd, **Basumaty et al. (2014)** in spine gourd, **Nag et al. (2012)** in ivy gourd.

7. Maximum Average Fruit Weight (gm.) was observed with plants G2 – Arka Neelachal Sabuja (21.08 gm.), followed by G5 – Surekha (19.04 gm.) whereas minimum was reported in G3 – Local Geda (16.28 gm.) The variation in fruit weight might have been due to fruit length, fruit volume, and specific gravity, genetic and morphological differentiation. Similar result for fruit diameter had also recorded by **Dora et al. (2002 a), Bharathi et al (2008), Khan et al. (2009), Bharathi et al. (2011), Nair et al. (2012)** in pointed gourd, **Celine et al. (2010)** in snake gourd, **Basumaty et al. (2014)** in spine gourd, **Nag et al. (2012)** in ivy gourd.
8. Maximum Number of seed per fruit was observed with plants G2 – Arka Neelachal Sabuja (122), followed by G5 - Surekha (118) whereas minimum was reported in G6 – CHIV-7 (71). The variation in average fruit weight might have been due to fruit diameter, fruit length and morphological characters. Similar result for number of seed per fruit had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)**
9. Maximum Number of fruits per plant was observed with plants G2 – Arka Neelachal Sabuja (422), followed by G5 - Surekha (384) whereas minimum was reported in G6 – CHIV-7 (237) The variation in number of fruits per plant might have been due to internodal length, vine length and morphological characters. Similar result for number of fruits per plant had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)**
10. Maximum Fruit yield per plant (kg) was observed with plants G2 – Arka Neelachal Sabuja (8.82kg), followed by G5 – Surekha (7.49kg) and the minimum at G6 - CHIV-7 (3.88kg). The yield per plant due to various genotypes was found significant. The variation of fruit yield per plant (kg) might have been due to internodal length, vine length, number of secondary branches, and number of fruits, average fruit weight, and fruit volume, and specific gravity, genetic and morphological difference. Similar result for fruit yield per plant had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)**
11. Maximum Fruit yield tonnes per hectare (ton) was observed with plants G2 – Arka Neelachal Sabuja (17.35t/ha), followed by G5 – Surekha (15.32t/ha) and the minimum at G4 – Local Denga (8.25t/ha). Yield is a complex character and is determined by many genes and is largely influenced by environmental conditions. In the present study data regarding yield per plant as well as per hectare showed significant differences among the genotypes. Yield in each genotype is a result of the cumulative effect of different characters which includes internodal length, vine length, number of secondary branches, number of fruits, average fruit weight, fruit yield per plant, fruit volume, specific gravity, genetic and morphological differences. Similar result for fruit yield per hectare had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)** in ivy gourd
12. TSS (°Brix) , Maximum was recorded with plants G2 – Arka Neelachal Sabuja (4.33) , followed by G5 –Surekha (3.95) and the minimum at G6 – CHIV-7 (2.53). The variation in total soluble solids might be due to better adoptability in the environmental conditions, higher nutrient uptake and genetically characters. Similar result for fruit yield per hectare had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)**
13. Ascorbic Acid (mg/100g of fruit pulp), Maximum was recorded with plants G2 – Arka Neelachal Sabuja (15.34) , followed by G1 – Arka Neelachal Khunki (14.33) and the minimum at G6 – CHIV-7 (11.18). The variation in ascorbic acid might be due to better adoptability in the environmental conditions, higher nutrient uptake and genetically characters. Similar result for fruit yield per hectare had also recorded by **Bharathi et al (2011)** and **Nag et al., (2012)**
14. Among the different genotypes the highest Gross return were obtained from genotype G2 – Arka Neelachal Sabuja (Rs/ha) (3,47,000) followed by genotype G5 –Surekha

(Rs/ha) (3,06,400) with net return of (Rs/ha) 1,90,140 and (Rs/ha) 1,49,540 respectively. These genotype exhibited maximum Benefit: Cost ratio of 2.21 and 1.95 respectively.

**Table 1: Evaluation of growth parameter in ivy gourd genotypes**

<b>Genotype</b>	<b>Vine length (cm)</b>	<b>internodal length (cm)</b>	<b>Petiole length (cm)</b>	<b>Days to first female flower initiation</b>
G <sub>1</sub> . ARKA NEELACHAL KHUNKI	310.56	10.49	5.31	45.33
G <sub>2</sub> . ARKA NEELACHAL SABUJA	315.11	12.71	6.37	35.17
G <sub>3</sub> . LOCAL GEDA	298.69	8.77	4.23	42.00
G <sub>4</sub> . LOCAL DENGGA	289.43	7.64	4.46	43.33
G <sub>5</sub> . SUREKHA	307.91	9.59	5.41	37.00
G <sub>6</sub> . CHIV -7	265.29	8.23	5.83	52.00
G <sub>7</sub> . CHIV - 8	274.44	8.05	5.90	47.33
<b>F-Test</b>	S	S	S	S
<b>S.Ed</b>	3.66	0.59	0.41	0.75
<b>CD @ 5%</b>	7.97	1.28	0.89	1.62

<b>Genotypes</b>	<b>Fruit length (cm)</b>	<b>Fruit diameter (cm)</b>	<b>Average Fruit weight (g)</b>	<b>No. of seeds per fruit</b>	<b>No. of fruits per plant</b>	<b>Fruit yield per plant(kg)</b>	<b>Fruit yield per ha(t/ha)</b>
G <sub>1</sub> . ARKA NEELACHAL KHUNKI	6.12	1.81	18.09	107	321	6.68	14.24

G <sub>2</sub> - ARKA NEELACHAL SABUJA	5.67	2.87	21.08	122	422	8.82	17.35
G <sub>3</sub> - LOCAL GEDA	3.22	2.24	16.28	85	265	4.46	9.64
G <sub>4</sub> - LOCAL DENGA	3.38	2.84	17.34	92	273	4.84	8.25
G <sub>5</sub> - SUREKHA	4.11	2.77	19.04	118	384	7.49	15.32
G <sub>6</sub> - CHIV -7	4.35	2.51	16.75	71	237	3.88	8.46
G <sub>7</sub> - CHIV - 8	4.46	2.56	16.52	115	244	4.31	8.55
<b>F-Test</b>	S	S	S	S	S	S	S
<b>S.ED</b>	0.22	0.15	0.23	0.84	2.75	0.19	0.19
<b>CD @ 5%</b>	0.49	0.32	0.57	1.82	5.99	0.42	0.41

**Table 2: Evaluation of yield parameters in ivy gourd genotypes.**

**Table 3: Evaluation of quality parameters and economics in ivy gourd genotypes.**

Treatments	Quality parameters		Economics		Benefit Cos ratio
	TSS	Ascorbic acid	Gross Returns (Rs/ha)	Net Returns (Rs/ha)	
G <sub>1</sub> . ARKA NEELACHAL KHUNKI	3.82	14.33	2,84,800	1,27,940	1.81
G <sub>2</sub> . ARKA NEELACHAL SABUJA	4.33	15.34	3,47,000	1,90,140	2.21
G <sub>3</sub> - LOCAL GEDA	3.30	13.84	1,92,800	35,940	1.22

G <sub>4</sub> . LOCAL DENGGA	3.66	13.42	1,65,000	8,140	1.05
G <sub>5</sub> . SUREKHA	3.95	12.32	3,06,400	1,49,540	1.95
G <sub>6</sub> . CHIV -7	2.53	11.18	1,69,200	12,340	1.07
G <sub>7</sub> . CHIV - 8	2.83	12.85	1,71,000	14,140	1.09
<b>F-Test</b>	S	S			
<b>S.ED</b>	0.19	1.34			
<b>CD @ 5%</b>	0.41	2.79			

#### 4. CONCLUSION

From the present investigation , it is concluded that the genotype G<sub>2</sub>-Arka Neelachal Sabuja found superior in terms of vine length (315.11 cm), petiole length (6.37 cm), internodal length (12.71cm),fruit diameter (2.87 cm), average fruit weight (21.08 g), No. of seeds for per fruit (122), No. of fruits per plant (422), fruit yield per plant (8.82 kg) ,fruit yield per hectare (17.35 t/ha), TSS (4.33), Ascorbic acid (15.34 mg/100g) and minimum days taken for first female flower anthesis (35.17 days) whereas maximum fruit length obtained from genotype G<sub>1</sub>. Arka Neelachal Khunki (6.12 cm). Among the different genotypes the highest Gross return (Rs/ha) (3, 47,000), Net return (Rs/ha) (1, 90,140), benefit cost ratio (2.21) was also obtained from genotype G<sub>2</sub> i.e. Arka Neelachal Sabuja.

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