

IVY Gourd - An amazing vegetable

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Ivy gourd is one of the important cucurbitaceous crops and is grown for consumption and medicinal use, often called ‘Coccinia’ or ‘*kundru*’, the tender, immature small fruits make excellent curries. It is a semi-perennial dioecious, hardy vegetable and has a vast scope of growing in marginal lands where it gives fruits almost around the year. Coccinia has been cultivated in small pockets, mostly in natural fences and also as a nature-sown crop from which fruits are collected and sold in the market. Presently in tribal areas of Orissa, Jharkhand, Chattisgarh and Andhra Pradesh, the fruits of ivy gourd are being gathered from natural forests and being grown in homestead gardens and small areas. Ivy gourd is now gaining popularity among consumers and producers due to its nutritive or medicinal value and round-the-year production potential. Owing to the non-availability of standard varieties, the farmers are cultivating only landraces which have low yield potential with variable fruits. It is grown extensively in Chattisgarh, West Bengal, Bihar and Karnataka on a commercial scale and gives remunerative returns to farmers.

Vernacular Names

Kovakai–Tamil; Bimba–Sanskrit; Tondekayi–Kannada; Dondakayi–Telugu; Konduru or Kunduri–Hindi; Tondale–Marathi; Ghole, Gluru–Gujarati;

Origin and distribution

Prem Nath (1976) stated that the original home of ivy gourd is believed to be India. It is widely cultivated in the eastern part of India, Ceylon, Malaya and tropical Africa. The crop is also distributed in Burma, Pakistan and whole of the Southeast Asia. The genus has 35 species distributed in tropical Africa and Asia. The related species of *C. indica* are *C. histella* and *C. sessilifolia* originated in India. In Ghana, monoecious species are cultivated, while in Ethiopia *C. abyssinnica* has edible tuberous roots.



Nutritive value

The fruits of ivy gourd are rich sources of carbohydrates, proteins, vitamins A and C. The fruits contain Carbohydrates, protein, vitamins A and C.

| Proximate Principles | Quantity mg /100 g |
|----------------------|--------------------|
| Moisture (g) | 93.5 |
| Carbohydrates (g) | 3.10 |
| Proteins(g) | 1.20 |
| Fiber(g) | 1.60 |
| Calcium (mg) | 40.0 |
| Phosphorous (mg) | 30.0 |
| Iron (mg) | 1.40 (mg) |
| Vitamin C (mg) | 15.0 |
| vitamin A | 260 IU |

Gopalan et al (1982)

Medicinal uses

During the 1950s Aykroyd reported that the roots, stems and leaves were used to treat skin

diseases, bronchitis and diabetes. Walter et al., (1952) stated that the fresh juice extracted from the leaves and roots either by itself or in combination with certain metallic preparations is administered for diabetes. The plant is reported to reduce the amount of sugar in the urine and improve the general metabolism of patients suffering from diabetes.

The cooked leaves are used externally in eruptions of the skin and mixed with ghee, are applied as ointment to sores. Boiled in ginger oil, they are applied externally in the treatment of ringworm, psoriasis, itch etc. The potentiality of the coccinia plant extracts for the treatment of various skin and gastrointestinal infections in humans was studied (Hussain et al., 2010) by testing the ethanol and aqueous extracts against the bacteria *Enterobacter aerogenes*, *Pseudomonas eruginosa*, *Staphylococcus epidermidis*, *Bacillus subtilis* and *Salmonella typhimurium*. The results prove the potentiality of the plant extracts for the treatment of various skin and gastrointestinal infections in humans.



The young bitter fruits have also been reported to contain cucurbitacin ‘B’ in the form of a glycoside. The bitterness rapidly reduces during ripening and ultimately becomes sweet to taste and scarlet. Mukerjee et al., (1972) found that the water-soluble alkaloid fraction from the leaves possessed “hypoglycaemic B sitosterol activity” for a brief duration, B. sitosterol was

the main constituent of the petroleum ether extract.

Varieties

In ivy gourd, there are some clones grown in different parts of India. In south India mainly in

and central India, where winter is not distinct plant growth continues and thus plants produce fruits in two to three flushes. The average temperature for growth would be around 30 -

and maturity & production. The soil has to support the vines for at least three years and have a pit system of growing in pandals or trellis or arbours adopted in ivy gourd so that deep soil can

| Name of the variety | Method of breeding | Salient features | Year of release | Institute involved |
|---------------------|---------------------------------------|--|-----------------|--------------------|
| Indira Kundru 35 | Clonal selection | Fruits are long and light green having 6.0 cm fruit length and 2.43 cm fruit diameter. It is high high-yielding variety, producing about 22.0 kg fruits/ plant. yield potential 410 – 450 q/ha | 2006 | IGKV, Raipur |
| Indira kundru 05 | Clonal selection | Fruits are light green and oval-shaped (4.30 cm fruit length and 2.63 cm fruit diameter). It is- yielding variety, producing about 21.08 kg of fruits/ plant. Yield potential 400 – 420 q/ha | 2006 | IGKV, Raipur |
| Sulabha | Clonal Selection | Fruits are long (9.25), and pale green, with an average fruit weight is 18.48. The variety gives an average yield of 60 tonnes/ha. Is a clonal selection of CG – 23, It takes 37 days from planting to first flowering. The first harvesting can be done 45 – 50 days after planting. The average fruit length is 9.25 cm, and the fruit weight is 18.48 g. The fruit shape is cylindrical. The fruit colour is light green with continuous striations. Yield potential 400 – 425 q/ha | 2006 | KAU, Vellanikkara |
| TNAU Coccinia CO 1 | Clonal selection from Anaikatti Local | Perennial in nature, high yielding, long green fruits with white striped, less seeded sweet (4.5 o brix), suitable for culinary and salad. | 2012 | TNAU, Coimbatore |

Tamil Nadu, Andhra Pradesh and Karnataka, fruits are smaller, and thinner in size with green longitudinal stripes. Whereas, in Bihar, some types were identified with bigger fruits longer than two inches and thicker with more than one-inch diameter. Some of the clonal selections developed from IGKV, KAU and TNAU are furnished above.

Climate

Coccinia thrives well under hot or moderately warm and humid climates. It remains under dormancy when temperatures go down during December – January. When the temperatures rise in February – March, new flush of growth commences. Under south

35° C with a maximum ranging around 40 C and a minimum between 20 - 25° C. It performs reasonably well in high-rainfall areas.

Soil Conditions

Ivy gourd is sensitive to water logging. Hence a well-drained sandy loam and fertile soil is ideal for it. It performs well in light soils if provided with an adequate nutrient supply. Below a pH of 5.5, it cannot be successfully grown and prefers a soil pH between 6.0 and 7.0. The minimum soil temperature should not go below 10° C and maximum beyond 25° C, the optimum range is around 18 – 22° C for quick germination of vines

support the vine for longer periods.

Planting of cuttings

Ivy gourd is propagated vegetatively through vine cuttings and tuberous roots. Semi-hardwood cuttings of 25-30 cm long, 1.5 cm to 2 cm thick are used for planting during June to July and or February to March. Cuttings are planted in pits at a distance of 3m x 3m. Pits of 30 cm x 30 cm x 30 cm size are filled with a mixture of soil and 5 kg well-rotten farmyard manure. Half a kg of neem cake in each pot can, be mixed to avoid insect pest damage to its roots. About 10 per cent of male plants have to be planted to ensure a good fruit

set. It attains heavy vegetative growth and needs a permanent bower system for training vines. Hence pandals are erected at about 1.5 m height with iron pillars lined with GI wire.

Nutritional Requirements

The amount of fertilizers to be applied depends on the type and nutrient status of the soil.



However, in general, 60 kg nitrogen, and 40 kg potash per hectare are applied to get a good yield. Half the quantity of nitrogen is given at monthly intervals in four splits. Farmyard manure @ 3 kg/plant is also to be applied just after pruning.

Intercultural Operations

Ivy gourd does not require much attention for interculture. In the early stages, before they start vining, it is required to be kept free from weeds around the pits. Vines have to be trained over pandals or supports, weeding of the pits are necessary under the canopy of vine growth in pandals, weed growth down below, and are nearly arrested. The only attention is that big weeds have to be manually pulled out, without disturbing the vines at later stages.

Water Management

In spring and summer crops, frequent irrigation is required, while in rainy season crop irrigation may not be necessary at all if rainfall is well distributed between July and September.

Growth regulator application

A study on the effect of different growth regulators viz., GA, NAA and 2,4, D on fruit characters and seediness revealed that the longest fruit (5.95 cm) was obtained with GA3 100 ppm, followed by NAA 400 ppm and all other treatments were superior to control (5.00cm). Among the different treatments, GA3 100 ppm and 2,4, D 100 ppm were found to be more effective on fruit girth, which recorded 5.71 and 5.70 cm respectively. GA3 - 100 ppm (13.25 g) and GA3 - 200 ppm (12.75 g) gave significantly superior individual fruit weight over control (8.03g). Among the treatments, GA3 - 100 ppm (1.72 g) and NAA - 400 ppm (1.73 g) produced lesser amounts of seeds and gave better individual fruit weight (Prabu and Natarajan, 2006).

Training and Pruning

Vines have to be trained like a single stem until they reach the pandal, after that the secondary and tertiary branches are allowed. This practice will induce more number of flowers, which develop bold fruits at the nodes. After completion of the first crop harvest, during winter months vines are to be pruned up to a height of 1.5 m and are irrigated and fertilized sufficiently to induce new growth so that the plants are ready for the second season crop likewise the vine is maintained for three to four years.

Diseases and pests

Most diseases and insect pests are common as in other cucurbitaceous vegetables;

however, powdery mildew, downy mildew, mosaic and fruit flies are major problems under south Indian conditions.

Mildews

- Spraying of Dinocap 1 ml/l or Carbendazim 0.5 g/l is effected to control powdery mildew. Spraying Mancozeb or Chlorothalonil 2 g/l twice at 10-day intervals will reduce the downy mildew incidence.

Mosaic disease

It is spread by insect vectors; hence control of vectors with insecticides will check the disease spread. If the plants get infection in the early stage of their growth 10 – 15 days old, the plant growth is arrested; the size and number of leaves are reduced considerably. Diseased leaves may also have deformations.

- Spraying of dimethoate (0.05 %) at 10-day intervals efficiently controls the insect vector.
- Selection of cuttings from healthy plants will prevent the disease spread to new orchards.

Fruit fly

Fruit fly is a serious pest in Ivy gourd. The following measures are to be taken for control.

- Collection of the damaged fruits and destruction. The fly population is low in hot day conditions and peaks in the rainy season. Hence, the sowing time may be adjusted accordingly.
- Exposing the pupae by ploughing interspaces in the orchard land.
- Using 20 x 15 cm poly bag fish meal traps with 5 g of fish meal + 1 ml of dichlorvos dipped in cotton @ 50 traps/ha. Fish meal and cotton are to be renewed once in 20 and 7 days respectively.
- Need-based spraying of neem oil @ 3.0% was also found to effectively control fruit flies

Harvesting, yield and storage

Ivy gourd gives a continuous harvest for about 9 – 10 months of the year. Picking should be done at 3 – 4 days intervals when fruits are tender. Ivy gourd gives an average yield of 10-12.5 t/ha, but higher yield of about 30- 40 t/ha can be obtained with intensive management practices. On an average a single plant can yield 30-40 kg fruits per year, yield will vary according to the clones and management practices. The fruits can easily be stored in good quality for one to two weeks under ordinary room conditions. The respiration rate was faster at higher temperatures (40°C) but remained stable at lower temperature (10°C). This shows that the respiration rate was less at lower temperature, which in turn increases the shelf life of the ivy gourd fruit (Sushma Rani et al., 2013).

References

- Gopalan, C., Rama Sastri, B.V. and Balasubramanian, S.C. 1982. Nutritive value of Indian Foods, Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
- Hussain, A., Shadma, W., Zarin, I. and Hussain, S.M.D. 2010. Antibacterial Activity of the Leaves of *Coccinia indica* (W. and A) Wof India. *Advances in Biological Research* 4 (5): 241-248.
- Mukherjee, K., Ghosh, N.C. and Datta, T., 1972. *Indian Journal of Experimental Biology*, 10: 347-349.
- Prabu, M. and Natarajan, S. 2006. Effect of growth regulators on fruit characters and seediness in ivy gourd (*Coccinia grandis* L.). *Agric. Sci. Digest*, 26 (3) : 188 – 190.
- Prem Nath, 1976. *Vegetable for the tropical region*. ICAR, New Delhi.
- Priyatharsini, 2008. Evaluation of certain ivy gourd genotypes (*Coccinia grandis* L.) for growth, yield and

quality under coimbatore condition. M.Sc. Thesis Submitted to TNAU, Coimbatore.

- Sushma Rani, T., Kavitha, C.V., Alagusundaram, K. 2013. Studies on Respiration Rates in *Coccinia grandis* (Ivy Gourd) at Different Temperatures. *J Food Process Technol*, 4:4.
- Walter, R.A. 1952. *Foods Research*, 17: 560.
- Wilson, D., Jiju, J. K. K., Abdul Khader, K. M., Sunny, K., Oommen and Prabu, R. 2004. Performance of the F1 progeny of ivy gourd (*Coccinia grandis*) *Proceedings of the 19th Kerala Science Congress*, p 505 - 507.