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Cowpea: A warm season crop

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ABSTRACT

Cowpea [*Vigna unguiculata* (L.) Walp.] is a typical warm season crop adapted to tropics. It is annual and herbaceous legume known as black eye bean, China pea, southern pea and lobia. Its tender pods are used as vegetable and dry beans as pulse. It is also cultivated as fodder, green manure and cover crop due to its nutritive value and soil improving properties. Its 100 g green tender pods contain 4.3 g protein, 2.0 g fibre, 8.0 g carbohydrates, 74 mg phosphorus, 2.5 mg iron, 13.0 mg vitamin-C, 0.9 mg minerals, etc. It is known as vegetable meat due to high amount of protein in grain with better biological value on dry weight basis. Its grain contains 23.4% protein, 1.8% fat and 60.3% carbohydrates on dry weight basis. It is a rich source of calcium and iron.

***Keywords*:** Cowpea, Taxonomy and botany, Varieties, INM and Yield.

1. INTRODUCTION

Vegetable cowpea [*Vigna unguiculata* (L.) Walp.] is a popular vegetable cultivated widely in India throughout the year. It is cultivated both for its tender pods and also for its dry seeds used as pulse for culinary purpose. Africa is considered as primary centre of origin of cowpea (Prabhakara *et al*., 2022). The most probable progenitor of cowpea is var. *mensensii*. It is annual and herbaceous legume known as black eye bean, China pea, southern pea and lobia. Its tender pods are used as vegetable and dry beans as pulse. It is also cultivated as fodder, green manure and cover crop due to its nutritive value and soil improving properties. Its 100 g green tender pods contain 4.3 g protein, 2.0 g fibre, 8.0 g carbohydrates, 74 mg phosphorus, 2.5 mg iron, 13.0 mg vitamin-C, 0.9 mg minerals, etc (Gopalakrishnan, 2007). It is known as vegetable meat due to high amount of protein in grain with better biological value on dry weight basis (Gangadhara *et al*., 2023). Its grain contains 23.4% protein, 1.8% fat and 60.3% carbohydrates on dry weight basis. It is a rich source of calcium and iron. The article highlights the production technology of cowpea.

2. TAXONOMY AND BOTANY

Three cultivated sub-species have been identified under the species *Vigna unguiculata* to which cowpea belongs:

1. *Vigna unguiculata* ssp. *unguiculata* (dual purpose type)

2. *Vigna unguiculata* ssp. *cylindrica* (Syn: *Vigna unguiculata* ssp. *catjang, Vigna sinensis* ssp. *catjang*) (grain purpose type)

3. *Vigna unguiculata* (L.) Walp. subsp*. sesquipedalis* (L.) (Vegetable type/ Yard long bean)

Cultivated group *unguiculata* is the most diverse of cultivated *Vigna unguiculata* and is widely distributed commonly called as cowpea. This is prostrate, semi erect and pole (climbing) and pods are linear, coiled, round with 20-30 cm of length.

Sesquipedalis, known as yard long or asparagus bean or vegetable cowpea or snake bean used as vegetable. It is climbing or trailing vine. It is a sub-species of the cowpea and grown primarily for its strikingly long immature pods. Pods are green bean, 30-90 cm long, fleshy and tending to shrink when dry (Sable *et al*., 2025). All the three cross each other. In a cross between *Vigna unguiculata* ssp. *unguiculata* (2n=22) and *Vigna unguiculata* subsp*. sesquipedalis* (2n=24), F_1 had 2n=23.

Cow pea is a diploid (2n=22). It is a vigorously growing annual herb with strong tap root system. Growth habit ranges from erect to climbing with profuse branching. Stem is cylindrical and twisting. Inflorescence is an un-branched axillary raceme bearing several flowers at terminal end of peduncles. Anthesis takes place early in the morning between 6:30 and 9:00. The process of opening of corolla takes 45-60 min. Dehiscence is much earlier and varies from 10:00 PM. to 12:45 AM. For hybridization purpose, emasculation is to be done 20 hrs before anthesis. Safest time for emasculation is morning hours preceding day of anthesis. Stigma becomes receptive from 12 hours before blooming to 6.0 hours after anthesis (Gopalakrishnan, 2007).

Purple colour flowers of cowpea

3. VARIETIES

Thar Jyoti

A highly photo-insensitive, high yielding and early maturing variety takes 40- 42 day for first flowering, and 48-50 DAS for first harvesting of tender green pods has bean developed by ICAR-Central Institute for Arid Horticulture-Central Horticultural Experiment Station (ICAR-CIAH- CHES), Godhra, Gujarat. Its plants grows up to 50-56 cm in height. Dark green pods are 25- 26.50 cm long with girth of 2.5 cm and weight 9. 65 g. The number of pods/ plant varies between 120-150. Pod yield 20- 25 t/ ha. It has been recommended for commercial cultivation under dry land areas (Gangadhara *et al*., 2023).

Arka Suman

It is released from ICAR- Indian Institute of Horticulture Research (ICAR IIHR), Bangalore. Its plants are erect, bushy and photo insensitive. Pods are medium long, tender, fleshy, crisp, without parchment with good cooking qualities. Pod yield is 18 t/ ha in 70-75 days.

Arka Garima

Its plants are tall, photo-insensitive. Pods are light green, long, thick, round, fleshy and stringless. It is suitable for vegetable purposes tolerates heat and low moisture stress. Pod yield is 18 t/ ha in 70-75 days.

Arka Samrudhi

Its plants are erect, bushy and photo-insensitive. Pods are green, medium thick, medium long round, tender, fleshy without parchment with good cooking qualities. Pod yield is 19 t/ ha in 70-75 days.

Arka Mangala

It is released from ICAR- Indian Institute of Horticulture Research (ICAR IIHR), Bangalore. Its plants are 3- 4 m tall. Pods are 70-75 cm long, light green, stringless, round, tender with a crisp texture. It matures in 60 days. Pod yield 25 t/ ha in 100 days.

Pods of different varieties of cowpea

Pods of Arka Mangala

CULTIVATION

Climate and soil

It is a warm season crop and comes up well between 21- 35 ^{o}C. Grain types and dual purpose types are tolerant to hardy conditions including high temperature, drought and poor soil, while, climbing yard long bean prefers mild climate than grain types. Well-drained humus rich sandy loam soils are well suited for its cultivation. It thrives under a wide range of soils if proper drainage is provided. It can be cultivated round the year. The ideal sowing time is first fortnight of June, October and February.

Sowing

Land is prepared to a fine tilth by ploughing and harrowing. Seeds of bushy varieties are dibbled at a spacing 60 cm × 15 cm with 1- 2 seeds per place, while, trailing varieties (Yard long bean) are grown on trellis by sowing seeds in channels at 1.5 m × 0.30 -0.45 m spacing. During rainy season, seeds are sown in raised beds of 90 cm width. Seed rate is 25 kg/ ha for bushy varieties and 5.0- 6.0 kg/ ha for pole type (Yard long bean).

General field view of Arka Suman

General field view of Arka Garima

General field view of Arka Samrudhi

General field view of Arka Mangala

Nutrient management

The optimum fertilizer dose is 25:60:40-50 kg NPK/ ha along with 10-15 t/ ha FYM (Chattopadhyay *et al*., 2020). Use of biofertilizers can have a greater importance in increasing fertilizer use efficiency. Organic manure is to be applied as basal during land preparation. Full dose of P, K and half dose of N are to be applied at the time of sowing and rest half dose of N at 15-20 DAS along with weeding and earthing up. Application of 75% RDN through inorganic + 25% RDN through vermicompost (*Rhizobium* and PSB enriched) gives higher yield as compared to RDF (50:75:60 kg NPK/ ha) in yardlong bean (Sable *et al*., 2025 and Sindhuja *et al*., 2021). Micronutrients (0.2%) formulation (Zn, Fe, Mn, Cu and B) with spreader surfactant/ one shampoo sachet with one lemon can be sprayed twice for getting the higher yield (Sable *et al*., 2025 and Vinay *et al*., 2024).

Irrigation

Cowpea is sensitive to water logging and requires less moisture as compared to other vegetables. Two- three protective irrigations are required at flowering and pod development stages for grain types, while, water requirement of vegetable types with protected and long fruiting phase is more as compared to grain types. Pole (vegetable) types requires irrigations at 4-15 interval depending on soil types during pre-flowering phase. Hardening of plants by restricting irrigation during pre-flowering stage is advantageous for avoiding excess vegetative growth and will induce early flowering. Light but frequent irrigation is to be given when plant starts flowering, wherein, excess irrigation and frequent rains during fruiting time induces vegetative phase at the expense of fruiting.

Interculture

Earthing up and hand weeding is necessary during early stages of crop to check weed growth. Light earthing up with fertilizer application is highly beneficial for root and plant growth. Climbing types are to be trailed on bower or trellis.

Nipping of excess vegetative growth is a common practice for inducing flowering and fruiting in bush and semi-trailing mainly when there is rain during flowering and fruiting phase.

Training in climbing types

Harvesting and yield

Green tender fruit are harvested after attending full size but before they becomes fibrous. Yard long bean pods are usually harvested in alternate days and harvesting period extends up to 45 days under good management practices. It yields 15- 18 t ha. Arka Mangala variety yields 25 t/ ha in 100 days. In bush types harvesting is completed by 5-6 pickings of tender pods.

PLANT PROTECTION

Stem fly management

Neem seed powder extract (4%) or neem formulation with 10000 ppm azadirachtin (2 ml/ L). Acephate 75 WP @ 0.75 g/ L.

Pod borer management

Spray Neem seed powder extract 4%.

Chloripyriphos 20 EC @ 2.5 ml/ L as soon as eggs are noticed on flower buds. The spray has to be given at the flower bud stage.

Powdery mildew management

Foliar application of Carbendazim (0.1%) (Chattopadhyay *et al*., 2020 in cowpea) or Hexaconazole (0.05%).

Rust management

Spray Chlorothalonil (0.2%) or Propiconozole (0.025%).

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