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THAR JYOTHI

Photo-insensitive and early maturing variety of vegetable cowpea for year-round cultivation

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Thar Jyothi photo insensitive, early maturing and high yielding variety of vegetable cowpea developed by ICAR-CIAH, RS-Central Horticultural Experimental Station (CHES), Vejalpur, Godhra, Gujarat. It has been developed through pure line selection breeding method from local material collected from Chitradurga district of Karnataka.

Salient features of Thar Jyothi

It is a photo insensitive type and high yielding variety of vegetable cowpea. It grows up to of 50-56 cm height, having dark green leaves with dark green pods which can be cultivated round the year. It is having short stature (bushy growth habit) grows up to of 50-56 cm height. It is an early flowering and early maturingvariety. It takes 40-42 days for first flowering and 48-50 days after sowing for first harvesting of fresh tender dark green colour pods. It is having an average pod length of 25 to 26.50cm with pod girth of 2.5cm and pod weight of 9.65g in rainfed semi-arid conditions. The total number of pods per plant varies between 120-150 and an average yield of 1.5 to 2.0 kg/plant of fresh pods was obtained with yield potential of 20-25 t/ha. The 'Thar Jyothi' is rich in nutritional value in terms of proteins (4.82g/100), vitamin-C (15.8mg/100g), total phenols (2.435mg/g) and total antioxidant activity (14.0µ.moltrolox.equi./g).The variety 'Thar Jyothi' performing well under rainfed semi-arid conditions and has exhibited tolerance to cowpea mosaic virus and rust diseases under rainfed semi-arid conditions.

PRODUCTION TECHNOLOGY

Soil and climate

Vegetable Cowpea is a warm season crop and comes up well under rainfed conditions where temperature ranging from 21°C to 35°C with 6 - 7 pH range. The climbing yard long beans prefers mild climate than dual purpose types.

Sowing, seed rate and spacing

The seeds are dibbled or drilled behind the plough. The seed rate for this crop is 35-40kg/ha with a spacing of 30cm × 30cm is followed. In India the crop is grown almost all the season mainly kharif with onset of monsoon ranging from early June to end of July, Rabi-October to November (Southern India), summer (February- March) in north Indian plains and April-May in Hills.

Manure and fertilizer

Although vegetable cowpea is a legume crop, it responds well to the application of fertilizers. About 25 t/ha of FYM is applied at least fifteen days before sowing. A fertilizer dose of 25:75:60: kg NPK/ha is recommended. Half of the N, full P and K are applied as basal dose and remaining half N is applied 25 -30 days after sowing.

Intercultural operations

Shallow cultivation during the early stages of crop is necessary to check the weeds and to facilitate earthing up. Light earthing up along with fertilizer application is highly advantageous for growth of plants. This facilitates better root growth and prevents lodging of young seedlings. Two hand weeding are required before the earthing up.

Irrigation

Cowpea is a hardy crop comes up well in rainfed conditions. It is sensitive to water logging and requires less moisture compared to other vegetables. Flowering and pod development periods are the critical stages. Grain types or dual purpose types requires 2-3 protective irrigations at flowering and pod development stage.

Harvesting and Yield: Tender pods are harvested after attaining full size but before they become fibrous. In bush type, the crop is ready for harvest two months after sowing and only 3-4 picking are obtained.Thar Jyothi takes 48-50 days after sowing for first harvesting of fresh tender pods and average yield of 20-25t/ha of fresh pods are obtained.

Major diseases and insect pest management

Rust (*Uromyces phaseolivignae*): The disease mostly attacks leaves and rarely stem and petioles. Rust pustules appear in the form of minute, slightly raised spots which enlarge to form reddish brown sori. These sori in advanced stage turn dark brown to black with formation of teliospores. Severely affected leaves turn yellow and may fall off.

Control measures: To manage the disease, destroy infected plant debris and follow crop rotation and wider plant spacing. Spray the crop with Indofil M-45 @ 2.5 g per litre of water.

Anthracnose (*Colletotrichum lindemuthianum*): This is a seed borne fungal disease and attacks leaves, stem and pods. Infected spots show dark-brown sunken spots with raised reddish or yellowish margins. Tissues underneath the necrotic spots are thin and papery and produce abundant pinkish slimy mass in humid conditions.

Control measures: Use disease free seed and follow crop rotations. Treat the seed with Captan/Captaf or Thiram @ 2-3 g per kg of seed. Spray the crop with Indofil M-45 @ 2g/l litre of water or copper oxychloride @ 0.25 percent.

Powdery mildew (*Erysiphe polygoni*): Characteristic white powdery mass of fungus appears on leaves and then spreads to other plant parts. Defoliation occurs in severe cases. The pathogen has wide host range and can survive on other leguminous crops.

Control measures: Spray with 0.5% wettable sulphur or with benlate or Bavistin 0.15%. If needed, repeat the spray at 14-day intervals.

Bacterial blight (*Xanthomonas vignicola*): Bacterial blight is a seed borne disease. The affected leaves show light yellow, irregular to circular spots with necrotic brown centre which later on changes to straw colour. Dark green water soaked lesions of variable shapes and sizes appear on pods, which later on turn, yellow and dry.

Control measures: Uprooting of the diseased plant and also, avoid the irrigation through diseased plant to protect the healthy plants from further infection. Use disease free seeds and grow the resistant varieties.The disease spreads rapidly when moisture is present hence, avoid overhead watering. Drenching with Copper Oxychloride (COC) @ 4-5g/l of water effectively control the disease.

Cowpea mosaic virus: This virus disease is seed borne and also transmitted by aphids *(Aphis craccivora)*. A characteristic symptom of the mosaic virus is an intermixing of light and dark brown areas. Infected leaves are generally smaller than the healthy ones. The leaves show puckering and curling. The plants remain stunted and produce deformed pods.

Control measures: Use the yellow sticky traps (10 numbers/ha). Spraying of neem oil @ 3% followed by the systemic insecticides such as., Dimethoate 30% EC (Rogor) or Imidacloprid (17.8%SL) @ 1ml/litre of water. If required, repeat the spray at fortnightly intervals.

Cowpea yellow flecks: This virus disease is transmitted by whitefly (*Bemisia tabaci*). The Leaves of the diseased plants are reduced in size and develop bright yellow irregular patches interspersed with green areas. In severe cases, the entire leaf looks golden yellow in colour.

Control measures: Remove and destroy the infected plants. Control the insect vector by spraying Diafenthiuron 50WP @1.5g/litre, Imidacloprid (17.8% SL) @ 1ml/litre or Acetamiprid 2ml/litre of water. Repeat the spray at 10-15days intervals based on the insect vector population.

Aphids (*Aphis craccivora*): Aphids damage the crop by sucking cell sap from tender plant parts like growing shoots, flower stalks and pods and by spreading cowpea mosaic virus disease. Infested leaves turn yellow and show curling. A sugary substance called honeydew excreted by aphids is noticed on leaves and it further causes sooty mould that reduces the amount of sunlight that reaches the leaves thus further contributing to reduction in yield. Mild damp weather favours development of aphid population.

Control measures: Use the yellow sticky traps (10 numbers/ha). Spraying of neem oil @ 3% followed by the systemic insecticides such as., Dimethoate 30% EC (Rogor) 2ml/litre or Imidacloprid (17.8%SL) or Acephate 95% SG @ 1ml/litre of water. If required, repeat the spray at fortnightly intervals.

Spotted pod borer (*Maruca testulalis*): Adults prefer to lay eggs on flower buds, flowers, terminal shoots and tender pods. The larvae feed from inside a webbed mass of leaves, flowers, flower buds and pods. This concealed feeding habit protects the larvae from natural enemies and insecticides and causing severe damage throughout the reproductive cycle of the crop**.**

Control measures: Use pheromone traps, NSKE 5%, use any of these chemical insecticides like chlorpyriphos @ 0.05%, Novaluron 10% E.C @ 1.0 ml/l, Profenophos 50% EC @ 2.0 ml/litre, Flubendiamide @ 0.2 ml/litre and Emamectin benzoate @ 0.4 g/litre of water were effective against spotted pod borer.

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