

Staking: Yardlong bean is climbing in nature and it needs support/stacking with bamboo or iron poles with gunny threads or coir or plastic wire for its commercial cultivation.

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. Irrigate yard long bean at 4-15 days interval depending upon soil during pre-flowering stage. Once flowering starts frequent but light irrigation is required.

Harvesting and Yield: Tender pods are harvested after attaining full size but before they become fibrous. Harvesting starts 45 days after sowing. Yardlong bean varieties usually pods are harvested at alternate days. Thar Surya takes 44- 46 days after sowing for first harvesting of fresh tender pods and average yield of 30-32 t/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.

Anthrachnose (*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 kilogram 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 Diafenthuron 50WP @ 1.5g/litre, Imidacloprid (17.8% SL) @ 1ml/litre or Acetamiprid 2ml/litre of water. Repeat the spray at 10-15 days 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, neem oil 3%, NSKE 5%, use any of these chemical insecticides like chlorpyrifos @ 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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