

## Cluster Bean: Major Insects, Their Management, Uses and Benefits

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### Introduction

Cluster bean (*Cyamopsis tetragonaloba* (Linn.) Taub.) represent its derivation from the Sanskrit word “GAUAAHAR” which means cow fodder or otherwise fodder of the livestock. It belongs to the leguminaceae family. Basically, known for its drought and high temperature tolerance. Cluster bean is commonly known as guar and on the basis of wild species; the centre of origin is Tropical Africa. It is mainly cultivated as vegetable and green manure crop. Further, cluster bean meal and seeds are used as high protein cattle feed. The cluster bean is mainly grown during the rainy (kharif) season, but it can be grown during the summer season under irrigated conditions. Sowings can be done from 2nd week of July to 1st week of August and during summer from the last week of February to 1st week of March. Seed rate of 15-20 kg/ha is usually considered as optimum. Sowing in paired rows or solid rows is better compared to the broadcasting method. It gives better performance at 60 cm inter-row spacing compared to 40 cm for early maturing varieties whereas closer spacing is recommended for late sown conditions. Such an important vegetable crop is found to be attacked by various insects and mite pests during its different growth stages and causing heavy yield losses.

### Major insect-pest of Cluster bean

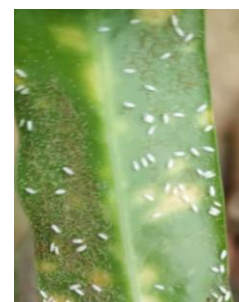
The cluster bean is attacked by a large magnitude of insect pests such as aphids, (*Aphis craccivora* Koch), jassids [(*Empoasca fabae* (Harris)]; *E. krameri* Ross & Moore and *E. kerri* Pruthi), whitefly, [*Bemisia tabaci* (Genn.)], hairy caterpillars [*Ascotis imparta* (Walk.)] bihar hairy caterpillar, [*Spilosoma oblique* (Walk.)], stem fly [*Ophiomyia phaseoli* (Tryon)], pod borer, [*Etiella zinckenella* (Treit.)] and so many. Among these, aphids, jassids and white flies have been reported as the major sucking pests of cluster bean.

**Aphids:** The aphids are the small soft bodied insects with long legs and antennae, they are slow moving insects and come in the shades of green, red brown, black and yellow. The aphids have needle like mouthparts which they use to suck the sap from the plant. They feeding underside of young leaves and shoots tips in cluster bean. The aphid was found sucking the cell sap from the tender tissue of cluster bean plants. Symptoms of aphid attack include decreased growth rates, mottled leaves, leaf yellowing, low yield, browning, wilting and death. The most annoyances they cause is the secretion of honey dew that sticks to the plants leaves, stem and can harbor many fungal diseases.



**Jassid:** The nymph of the jassid is light green, translucent, wingless found between the veins of the leaves on under side of the plant. The adult is green and wedge shaped. Symptoms of jassid include yellowing of the tender leaves, the margin of the leaves start curling downwards and reddening sets in and severe infestation leaves get a bronze and give typical burn hopper symptom, the leaves when crushed crumbled and broken down, and the leaves dries up , shed and growth of crop is retarded.

**Whitefly:** The whiteflies are soft bodied, winged insects, are small upto the size of 1/12 of an inch and somewhat are in triangular in shape and are found in cluster on underside of the leaves. Like aphids they also suck sap from plants because of their piercing mouthparts and produce sticky substance known as honey dew. Heavy infestation of whitefly will quickly weaken the plant and plant may unable to do photosynthesis. Leaves wilt, turn pale, growth will be stunted and eventually leaves may shrivel and drop off the plant.



### **Management of major insect pest of cluster bean**

#### **1. Cultural control:**

- ❖ Destruction of debris, crop residues, weeds and alternate host
- ❖ Hand collection and destruction of infested leaves and fruits

- ❖ Use insect resistant varieties recommended by state agriculture universities of particular region
- ❖ Adoption of proper crop rotation and avoid growing of cucurbits around the main crop
- ❖ Install yellow and blue sticky traps in large quantities at 30cm from the ground to monitor the incidence of sucking pest and to determine their severity
- ❖ Grow barrier crop along the border of the main crop e.g. maize is good to detect the whitefly.

**2. Biological control:** The biological control by natural enemies (predators, parasitoids and pathogens) has significant impact on the aphid, jassid, whitefly population. These natural enemies eat the insect found attached to the crop plants, hence reduce the damage due to insects. Predators catch and eat their prey. Some common examples of aphid, jassid, whitefly predators are as follows:

**3. Chemical method:**

- ❖ Spray the crop with 5% neem oil solution with neem kernel extracts as best treatment in reducing the aphid, jassid and whitefly population. To prepare the sufficient solution of the extract for 4000 square meters, 3-5 kg neem kernel is required.
- ❖ Beneficial insects such as predatory ladybirds, lacewings, soldier beetles and parasitoid wasps are important agents to control the major sucking pests such as aphids, leafhoppers and mites.

**Uses of cluster bean:**

- ❖ Used as vegetable at tender stage, in various parts of India.
- ❖ Mucilaginous seed flour is used for making guar gum (galactomannan) which is used in textile, paper, cosmetic and oil industries. The gum forms hydrates rapidly in water into a viscous gel and are therefore used in various products such as-
  - No calorie binding agent (stiffener in soft ice cream)
  - In pharmaceutical industry
  - In cloth and paper industry
  - Oil well drilling
  - Used as absorbent for explosives
- ❖ Used for forage

- ❖ Green manure
- ❖ Also used to fix atmospheric nitrogen around 30-70 kg/ha which had a residual effect of ~15-20 kg/ha. It has the ability to fix nitrogen and thus is good for planting in different 4 cropping systems.
- ❖ The crop possesses the capacity to maintain soil fertility.
- ❖ Also young pods of cluster bean are used as vegetables, which are also known for a cheap source of energy (16 Kcal), protein (3. 2g), fat (1. 4 g), carbohydrate (10. 8 g), vitamin A (65. 3 IU), vitamin C (49 mg), calcium (57 mg) and iron (4. 5 mg) for every 100 g of edible portion.

**Benefits of Cluster bean:**

- ❖ Benefit for Diabetes
- ❖ Stronger bones
- ❖ Better heart health
- ❖ Appropriate blood pressure
- ❖ Helpful for pregnant women
- ❖ Improve blood circulation
- ❖ Better digestion
- ❖ Keep mind calmer