Integrated Pest Management of Pigeonpea Crop

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Pigeon pea *(Cajanus cajan)* is a short-lived perennial legume primarily produced in India, which accounts for about 75% of global output and 20% of the country's pulse production. The crop is sown an area of 5.05 million hectares with annual production of 4.34 million tons (Anonymous 2024). To meet the ever-increasing demand for higher grain yields, farmers increasing plant densities, inadequate use of fertilizers which have resulted in an increased population of number/incidence of pests. The crop is also requiring different types of climatic conditions from sowing to maturity which is very conducive for development of insect-pests and diseases. Keeping this in mind, the information about identification, damaging symptom and integrated management of the major pests is given below:

Major Insect-Pests

Blister beetle (*Mylabris pustulata*)

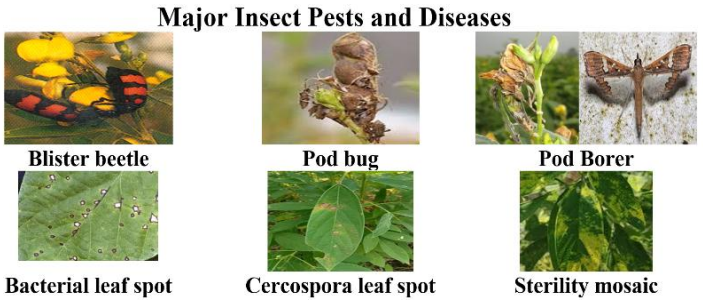
The elytra of adult beetle are black in colour with a round orange spot and two transverse wavy orange bands across the wings. When disturbed, the beetles emit a fluid containing cantharidin that causes blisters on human skin. It is polyphagous pest and adult beetle feeds on flowers, tender pods and young leaves, resulting in fewer pods. It causes higher in the month of September, leading to up to 95% flower damage.

Management

Hand-picking or using an insect net to collect and crush the beetles. Care should be taken to protect the skin while handling the beetles. The beetle can also be controlled with application of indoxacarb @ 500 ml/ha in 250 litres of water (Anonymous 2024a)

Pod bug (*Clavigralla gibbosa)*

The newly emerged bugs were yellow to light salmon colored but after 2-3 hours changed to brown. The adults are brown-grey in colour. The female lays eggs on pods or leaves of the host plant. Both nymphs and adults use their mouthparts to pierce the pod wall and suck the sap from the developing seeds. The attack is noticeable from the white patches that appear on the surface of pods and leaves. As a result of



continuous sap feeding, premature drying of pods is noticed. When such pods are opened, shrivelled and malformed seeds are observed. Further, such seeds easily succumb to secondary infection by fungal pathogens and pose problems in post harvesting process. Seeds spoiled by the pod bug neither germinate nor acceptable as human food. The main reason for outbreak of the pest is due to continuous and indiscriminate use of same insecticide and monoculture and also due to favorable climatic conditions during reproductive stage of the crop (Anonymous 2024a, Singh et al, 2008)

Management

- Prefer high-yielding, pest -resistant and early-maturing varieties those can help avoid excessive soil moisture stress during flowering and pod formation.
- Apply organic manure 2-4 weeks before sowing.
- Spray the crop with 3250 ml of homemade neem extract using 250 litres of water per hectare with manually operated knapsack sprayer at podding stage. Repeat the spray after one week, if necessary (Taggar *et al*, 2021). To prepare neem extract, boil 5.0 kg mixture of neem leaves and fruits in 10 litres of water for 30 minutes. Then, filter this material through muslin cloth and use the filterate for spraying at the recommended dose (Anonymous 2024a)

Pod borer complex

The spotted pod borer (*Maruca vitrata*) and gram pod borer (*Helicoverpa armigera*) are the most important insect-pests of pigeonpea crop. *Maruca* appears at flower initiation stage. The full-grown larva

has a pale body lined by rows of conspicuous black or brown spots on its dorsal surface. Its' larvae damage the flower buds, flowers and green pods. The larva feeds from inside a webbed mass of leaves, flowers, flower buds and pods webbed together with silken threads.

Management (Anonymous 2024a)

- The crop should be sown in the second fortnight of June and avoid excessive application of nitrogenous fertilizers
- Record the observations from a minimum of 25 randomly selected plants per acre. If the average number of webs is five per plant, then spray the crop with 150 ml Coragen 18.5 SC chlorantraniliprole) or 100 ml Fame 480 SC (flubendiamide*) or 500 ml Kingdoxa 14.5 SC (indoxacarb) or 150 ml Tracer 45 SC (spinosad) using 250 litres of water per acre with manually operated knapsack sprayer. Repeat the spray at pod initiation/podding stage of the crop. The insecticides used for the management of spotted pod borer also control other pod borers infesting arhar.

Precautions

Because honey bees and other pollinators may be killed by the use of above insecticides it is, therefore, advised to spray the crop during evening as the population of these pollinators is minimum at that time.

Diseases

Phytophthora stem blight

The disease is caused by *Phytophthora drechslera* fungus. It primarily impacts young seedlings right after they emerge, often leading to their demise. Brown to black necrotic lesions developed on stems that have well-defined margins and a slight depression. In certain instances, the stem may swell into a cankerous formation at the edge of the lesion, which can result in breakage at that site. On the leaflets, the lesions can appear circular or irregular, potentially causing the entire foliage to become blighted. It is more prevalent with hot and humid weather persists in the crop season (Anonymous 2024a).

Control (Anonymous 2024 b)

- Select fields for crop those don't have a history of blight, follow crop rotation with short legumes and do deep ploughing in summer months.
- Avoid planting in low-lying areas and grow the crop only on ridges to ensure good drainage.
- The potassium application reduces disease infestation and.
- Grow crop early and select disease resistant varieties
- Remove and destroy the disease infested plants

Sterility mosaic

It is transmitted by an eriophyid mite *(Aceria cajani)* and characterized by stunted and bushy plants, leaves of reduced size with chlorotic rings or mosaic symptoms, and partial or complete cessation of flower production.

Control

- To check the primary source of infection, so do not allow any pigeonpea plant standing around sugarcane, cotton and other fields during winter season.
- Apply recommended acaricides against Aceria *cajani* mite vector

Cercospora leaf spot

The disease caused by *Cercospora cajani* and primarily occurs on the lower leaves of plants as irregular, tan spots. Severe infection causes excessive leaf drop and stunting of the plant. The disease is more prevalent during prolonged rainy season with high humidity and high temperatures between 28-32° C.

Control

- Use disease-free seed for sowing.
- Remove and destroy plant debris after harvesting.
- Follow crop rotation at least for three years with non-leguminous crops

Bacterial leaf spot

This disease is caused by *Xanthomonas campestris*. Angular dark-brown spots appear on the leaf surface and usually concentrated on one side of the mid-rib. The spots may develop on veins, petioles, main stems and branches. Use disease free seed to reduce infection.

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