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Pests of Brinjal and Their Management

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Abstract

Brinjal, proudly referred as the “King of vegetables” extensively grown in India. Several insect pests, viz. fruit and shoot borer, spotted leaf beetle / *Hadda* beetle, ash weevil, bud worm, whitefly, green leafhopper, brown leafhopper, mealybug, thrips, lacewing bug and red spider mite are found to cause considerable yield loss in brinjal from different parts of the world. These pests can be well efficiently managed by advocating several integrated pest management strategies including, cultural, physical, mechanical, bio-control agents, bio-pesticides and chemical methods.

Introduction

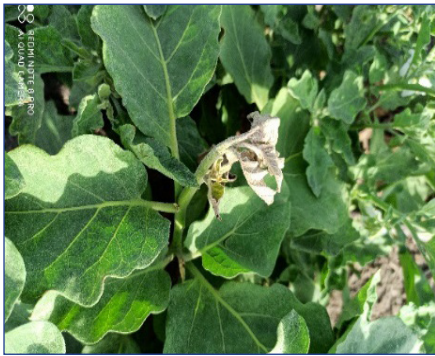
Brinjal or eggplant is one of the most important vegetable crops grown in the tropics and sub-tropics. Eggplant commonly referred as the “King of vegetables”. It is a high fiber, low calorie food that is rich in nutrients. It helps in reducing the risk of heart disease and also controls blood sugar level. The insect pests play a crucial role for quantitative and qualitative loss, by attacking the crop from nursery to harvesting. Brinjal is being attacked by more than 70 insect pests. Amongst, fruit and shoot borer, green leafhopper, brown leafhopper, whitefly, lacewing bug, spotted leaf beetle, ash weevil and red spider mite causes major damage to the crop in different parts of the world. They can be managed efficiently using integrated pest management strategies. The damage symptoms and management measures are given hereunder.

Fruit and Shoot Borer: *Leucinodes orbonalis* (Crambidae: Lepidoptera)

Pinkish larva bores into tender shoots in the early stage of crop and feed the internal tissues causes withering of terminal shoots / dead hearts (Figure 1). It also bores into petioles of leaves, flower buds and developing buds, causes withering of leaves, shedding of buds. After forming of fruits the larva bores in to the fruits with presence of their excreta. The white moth with brown markings laid their eggs in calyx.

Green Leafhopper (GLH): *Amrasca devastans* (Cicadellidae: Hemiptera)

Green colour hoppers suck the sap from leaves and inject their saliva into the leaf tissues causing phytotoxemia and they can be seen on lower surface of the leaves. Due to toxic secretions, it produce various symptoms like marginal chlorosis, bronzing (browning), puckering (development of crinkles, curls and fold) and drying of leaves (Figure 2a). It acts as a vector for the transmission



(a) Drying of terminal shoot



(b) Damaged shoot with excreta



(c) Bore hole with excreta

Figure 1: Damage symptoms of brinjal fruit and shoot borer

of mosaic virus. The female hoppers insert their eggs into the leaf veins. They are more serious during the non-rainy season. The alternate hosts for GLH include cotton, potato, bhendi, sunflower, etc.

Brown Leafhopper: *Hishimonus phycitis* (Cicadellidae: Hemiptera)

Brown colour hoppers inject their toxins into the plant tissues causing reduction in size of leaves, shortened petioles, excessive growth of branches and stunting of plants. It is a vector of little leaf disease. Resulting as conversion of floral parts into leafy structures and plants become bushy in nature (Figure 2b). They also occur in other solanaceous plants (potato, tomato, tobacco) and weeds (*Datura*).

Whitefly: *Bemisia tabaci* (Aleyrodidae: Hemiptera)

White tiny moth like adult lay their eggs on the lower surface of leaves with short stalks. Both nymph and adults suck sap from ventral side of the leaves. It causes yellowing, premature defoliation and curling of leaves and the plants become stunted in growth. Honey dew excreted by nymphs lead to the development of sooty mould.

Lacewing Bug: *Urentius hystricellus* (Tingidae: Hemiptera)

Adults suck sap from upper surface while the nymphs feed from lower surface. This cause white speckles that coalesce (mottled appearance), presenting a bleached



(a) Crinkling of leaves



(b) Little leaf (Phyllody)



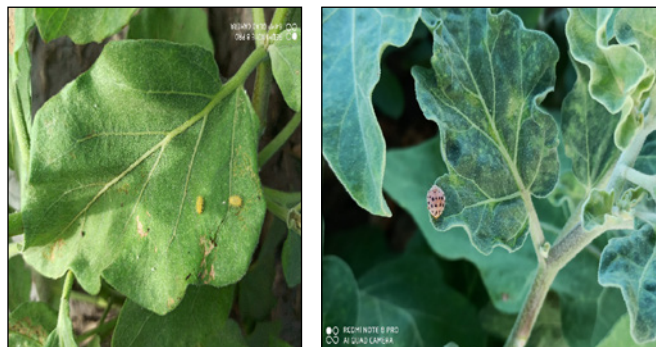
(c) Mottling of leaves

Figure 2: Damage symptoms caused by green leafhopper (crinkling), brown leafhopper (little leaf) and lacewing bugs (mottling)

up look and yellowing of leaves (Figure 2c). Affected leaves are covered with exuviae (moulted skin) and excreta.

Spotted Leaf Beetle: *Henosepilachna vigintioctopunctata* (Coccinellidae: Coleoptera)

This phytophagous coccinellid is one of the key pests of brinjal. Both adults and grub scrape the green matter of the leaves and fruit (Figure 3). The leaves give a stifled appearance. In severe infestation, leaves are skeletonized leaving only veins and plants may wither. They also occur in cucurbits especially bitter gourd.



Grubs;

Adult beetle;



Scrapped leaf;



Skeletonized leaves

Figure 3: Life stages and damage symptoms caused by spotted leaf beetle

Red Spider Mite: *Tetranychus cinnabarinus* (Tetranychidae: Acari)

This is a polyphagous pest generally found on the under surface of leaves but in heavy infestations it may be found all over the leaf surface. Both nymph and adults imbibe leaf sap from between veins and produce soft profuse webbings. This results in characteristic whitish speckles on the leaves (Figure 4a).



(a) White speckles

(b) Bore hole on bud

Figure 4: Symptoms of red spider mite (white speckles) and bud worm (bore hole)

Bud Worm: *Scrobipalpa blapsigona* (Gelechiidae: Lepidoptera)

Pink color larvae bore into the tender flower buds (Figure 4b) and cause shriveling and shedding of buds resulted in drooping and withering of leaves. It prevents the formation of fruits.

Integrated Pest Management (IPM) Practices

Owing to the importance and economic value of this crop, a farmer should necessarily take timely decision for managing these pests and avoid yield loss. Many farmers failed to control pests (especially shoot and fruit borer) in brinjal due to the sole dependence of chemical pesticides which destroy natural enemies and pollute the

environment. Also frequent use of synthetic pyrethroids results in the increased population of sucking pests and mites. By deploying the following integrated pest management strategies, one can easily manage the pests of brinjal in an effective manner.

Cultural Control

- Avoid mono cropping of brinjal.
- Avoid using synthetic pyrethroids as they cause resurgence of sucking pests.
- Avoid using insecticide at the time of fruit maturation and harvest.
- Grow tall crops like maize, sorghum and pearl millet on border of the field to reduce whitefly population.
- Weeding and earthing up in rows should be done 25-30 days after sowing to prevent soil based pupation.
- Grow resistant varieties like Annamalai, Pusa purple round, Arka Kusumakar, Chaklasi Doli, Pusa purple Long, Pusa Purple Round, Punjab Barsati, Punjab Neelam and Pant Samrat against fruit and shoot borers.
- Grow resistant varieties such as Annamalai, Punjab chamikila, Kalyanpur, GB-1 and GB-6 against aphids, hopper and whiteflies.

Mechanical Control

- Collect and destroy the damaged tender shoots, fallen fruits and fruits with bore holes to prevent population build up.
- Uproot and burn old plants before planting new plants since they harbour pest and carry over infestation.
- Shake plants to dislodge the grubs, pupae and adults in a pail of kerosenated water early in the morning or collect them mechanically and destroy.

Physical Control

- Set up light trap @ 1/ha during the peak emergence of adult moths, thus egg laying can be minimized.
- Set up sex pheromone trap (Leucinlure) @12/ha to reduce

the adult population of fruit borers.

- Monitor the whitefly, thrips, jassids and aphids population by using yellow and blue sticky traps @ 12/ ha.

Biological Control

- Spiders, *Chrysopa zastrowii sillemi* and *Geocoris tricolor* are naturally predaceous on leafhoppers and aphids.
- Release egg parasitoid *Trichogramma chilonis* @1 lakh/ha against fruit and shoot borer.
- Eulophid parasitoid, *Pediobius foveolatus* cause mortality under natural condition against *hadda* beetle.
- Spray of *B. thuringiensis* var. *kurstaki* (Dipel) @ 2g /lit. of water against fruit and shoot borer is effective.
- The fungus, *Paecilomyces farinosus* is pathogenic to whitefly.

Chemical Control

Spray any one of the following insecticides with surfactant thoroughly covering foliage during early morning or late evening hours.

1. Fruit and shoot borers / Budworms

- Azadirachtin 1 % @ 3 ml/lit. (or) chlorantraniliprole 18.5 SC @ 0.3 ml/lit. (or) spinosad.
- 45 SC 0.5 ml/lit. (or) thiodicarb 75 WP @ 2 g/lit. (or) emamectin benzoate 5 SG @ 0.4 g/lit.

2. Whiteflies / Leafhoppers / Aphids / Lacewing bugs

- Thiamethoxam 25 WG @ 0.4g/lit. (or) acetamiprid 20 SP @ 0.1 g/lit.

3. Spotted leaf beetles

- Quinalphos 1.5 D @ 25 kg/ha (or) chlorpyrifos 20 EC @ 2.5 ml/lit.

4. Red spider mites

- Fenazaquin 10 EC @ 2 ml/lit. (or) propargite 57 EC @ 2 ml/lit. (or) spiromesifen 22.9 SC.
- 0.8 ml/lit. (or) dicofol 18.5 EC @ 2 ml/lit.

Conclusion

The above mentioned IPM measures can be imposed wherever applicable for the successful management of pests in brinjal.

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