B.Sc. Horti. VIth Sem.
Insect pests of Vegetable, Ornamental, and spice crops (PPH-322)

Topic name:

INSECT PESTS OF BRINJAL / EGG PLANT AND THEIR MANAGEMENT

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welcome

LIST OF BRINJAL MAJOR INSECTS

S.No.	Common Name	Scientific Name	Family	Order
1.	Shoot and fruit borer	*Leucinodes orbonalis*	Pyralidae	Lepidoptera
2.	Hadda/spotted beetle	*Henosepilachna viginti-octopunctata.*	Coccinellidae	Coleoptera
3.	Stem borer	*Euzophera perticella*	Phycitidae	Lepidoptera
4.	Ash weevils	*Myllocerus subfasciatus.*	Curculionidae	Coleoptera
5.	Brown leafhopper	*Cestius phycitis*	Cicadellidae	Hemiptera
6.	Leafhopper	*Amrasca devastans*	Cicadellidae	Hemiptera
7.	Lace wing bug	*Urantius hystricellus*	Tingidae	Hemiptera
8.	Leaf roller	*Eublemma alivacea*	Noctudiae	Lepidoptera
9.	Spider mite	*Tetranychus cinnabarinus*	Tetranychidae	Acari
10.	Whitefly	*Bemisia tabaci,*	Aleyrodidae	Hemiptera

Shoot & Fruit Borer of Brinjal *Leucinodes orbonalis*

Scientific classification	
kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Lepidoptera
Family	Pyralidae
Genus	*Leucinodes*
Species	*orbonalis*

INSECT OF BRINJAL / EGG PLANT

Among the various pests brinjal shoot and fruit borer is highly monophagous and destructive which necessitates the grower to go in for 30 - 40 rounds of sprays. Polyphagous insects like hadda beetle, ash weevils, leafhoppers and aphids also cause severe infestation.

Host plant: It is a monophagous pest feeds only on Brinjal.

Distribution: This pest is widely distributed in China, India, Sri Lanka, Egypt, Malaysia and In India M.P. ,Rajasthan ,West-Bengal, Bihar etc.

Nature of damage

- Damage is caused by caterpillar.
- Larva is a internal feeder it immediately bore into the nearest tender shoot or flower or fruit just after hatching.
- Larval feeding, inside shoots, result in wilting of the young shoot.

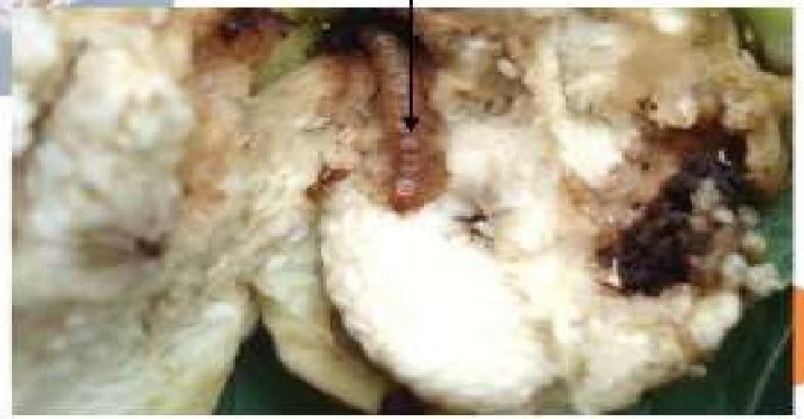
Cont…..

- In young fruits, newly hatched larvae bore into the fruit and the large holes usually seen on fruits.
- Larval feeding inside the fruit results in destruction of fruit tissue.
- A single caterpillar may destroy 4-6 fruits.

50 - 90% of damage is caused by fruit and shoot borer

Shoot damage

Fruit Damage



Life cycle of fruit & borer

- The four development stages viz., egg, larva, pupa, adult are found its life cycle.

  Egg : Female moth lays about 250 eggs singly on tender shoots and developing fruits of brinjal.

- ***Larva*** : Larva about 18-22 mm long and the caterpillar is pink in colour.

Pupa :

- Greyish boat shaped cocoon.
- The pupal period is 7-8 days.

Adult :

- ✓ Adult Forewings has black and brown patches and dots on white colour.
- ✓ The adult measures about 20-22 mm across the wings.

Fig. Life cycle of brinjal shoot and fruit borer

Management

- ***Cultural control :***

- ✓ Crop rotation is beneficial as the insect survives only on brinjal.
- ✓ Intercropping brinjal with other crops like cowpea, maize, coriander which improve the natural habitat for natural enemies (like spiders, lace wings, ladybirds etc) against the pest.
- ✓ Collection, destruction of dried shoot tips and bored fruits. This is an efficient method because the larvae tend to pupate in the plant residues.

Biological control:-

- Natural enemies against shoot and fruit borer-

- *Predators*

  Campyloneura sp. (a bug), *Coccinella septempunctata* (seven spotted ladybird beetle).

- *Parasitoids*

  Pseudoperichaeta sp, *Phanerotoma sp.*

- *Entomopathogens*

  Fungus *(Bipolaris tetramera)*, Baculovirus,Nuclear polyhedrosis virus.

- ✓ Release egg parasitoid: *Trichogramma chilonis* @ 50,000/ha, four times from 30 DAT.

Chemical control:

- Soil application of Carbofuran 3G at 30kg/ha 10 days after transplanting is very effective.
- Cultivation of brinjal under protected cultivation(net house condition) is found to reduce the incidence of shoot and fruit borer.
- Spray any one of the following chemicals starting from one month after planting at 15 days interval.
- Azadirachtin0.03%,Profenophos 0.05 %,

  Carbosulfan @ 3 ml/l, Spinosad 48SC 160ml/ha, .

Latif M.A., *et al*(2010)

Leafhopper (*Amrasca biguttula biguttula*) of brinjal

Scientific classification	
Order	**Hemiptera**
Family	**Cicadellidae**
Distribution and status	**Major pest in all**
Host range	**Cotton, potato, brinjal, castor, bhendi, tomato and sunflower**

Damage symptoms:

- Both the **nymphs** and **adults suck sap** from the under surface of leaves.
- Tender leaves **turn yellow, leaf margins curl downwards**.
- In the case of severe infestation leaves get a **bronze** or **brick red colour** which is typical **"hopper burn".** Crop growth retarded.

Adult

Nymph

Damaged leaf

- The adult is **wedge-shaped** about **2 mm**.
- long and **pale green** in colour.
- The front wings have a **black spot** on their posterior parts.
- The nymphs are wingless and are found in large number on the **lower surfaces of leaves**.
- They **walk in diagonal** directions of their body.

Life cycle of Leaf hopper

- Adult **green** and **wedge** shaped, lay eggs **singly** within leaf veins.
- Incubation period **4-11** days.
- Nymph **light green** and translucent found between the veins of leaves on the under surface.
- Nymphal period **7-21** days. Nymphs moult **five** times.
- Life cycle is completed in **15-46** days.
- **Eleven** generations are known to occur in a **year**.

Management

- Early sowing and close spacing of cotton reduces pest infestation particularly if the rainfall is heavy.
- Setup light trap to monitor the broods of leaf hopper and to attract and kill.
- Release predators viz., *Chrysopa carnea*.
- Spray monocrotophos 36 SL @ 1000 ml/ha and NSKE 5% @ 25 kg/ha in 1000 litre of water per hectare.

Whitefly (*Bemisia tabaci*) of brinjal

SCIENTIFIC CLASSIFICATION

Kingdom: **Animalia**

Phylum: **Arthropoda**

Class: **Insecta**

Order: **Hemiptera**

Family: **Aleyrodidae**

Genus : ***Bemisia***

Species : ***tabaci***

DISTRIBUTION AND STATUS:

India, Sri Lanka,West Africa, Japan and Europe

HOST RANGE:

Cotton, tomato, tobacco, sweet potato, cassava, cabbage, cauliflower, melon, brinjal and bhendi.

DAMAGE SYMPTOMS:

- **Nymphs** and **adults suck the sap** from the under surface of leaves.
- Severe infestation results in **premature defoliation**, development of **sooty mould**, **shedding of buds and poor boll opening**.
- It also **transmits** the **leaf curl virus disease of cotton**.
- The insect is highly **polyphagous.**

Whiteflies on underside of leaf

Eggs

Whiteflies on underside of leaf

- Adult is a minute insect with **yellow body** covered with a **white waxy bloom.**

- Eggs are laid on **leaves.** Egg period is **three** days.
- Nymph is **greenish yellow oval in outline**.
- Nymphal period is **5-33 days in summer**, **17-73 days in winter**.


Nymphs and eggs


Adult


Nymph IV


Colony on leaf


Pest Symptoms

MANAGEMENT

- Timely sowing with recommended spacing, preferably wider spacing is essential, avoid late sowing.
- Avoid the alternative cultivated host crops of the whitefly (Brinjal, bhendi, tomato and tobacco) in the vicinity of the cotton crop.
- Grow cotton only once in a year either in winter or summer season in any cotton tract.
- Adopt crop rotation with non-preferred hosts such as sorghum and maize etc., to check the build up of the pest.

BRINJAL EPILACHNA BEETLES/ SPOTTED BEETLE/ HADDABEETLE

Henosepilachna vigintioctopunctata

Scientific classification

Phylum : Arthropoda

Class : Insecta

Order : Coleoptera

Family : Coccinellidae

Genus : *Henosepilachna*

Species: *H.vigintioctopunctata*

Host plant:

- It is a polyphagous pest.
- Also attack bitter gourd, bottle gourd, potato and tomato.
- Beetles with 12 and 28 spots are very common.
- Epilachna beetles are serious pest of brinjal, potato and tomato.

Distribution:

Commonly occurs throughout south-east Asia.

The beetles of the genus *Epilachna* are peculiar in the sense that they are the enemies of the farmer while the rest of the allied genera of the family coccinellidae (Lady bird beetles) are very useful friends as they are predators and they keep a number of serious pests like aphids, scales etc., under effective control.

Marks of identification

- The adult beetle is small *round to slightly oblong in shape* measuring about 5 mm in length and 3.5 mm in width.
- The underside of the beetle is flat as the upper side is convex.
- The adult beetles are light brick red or pinkish, or *pale brown and mottled with black spots*.
- The beetles have *small black dots on the pronotum and the forewing* (Elytra) which covers the body from the dorsal side.
- These black dots are symmetrically placed in a crescent manner.
- There are two species, one having 6 spots on each elytra, *Epilachna dodecastigma* (Epilachna 12-stigma) and another having as many as 14 spots on each elytra, *Epilachna vigintioctopunctata* (Epilachna 28-punctata).
- Their *eggs are yellowish; cigars shaped*, and are deposited on leaves in groups of 5-7.
- The body of *grub is broad in front and narrows behind*.
- The *grubs are yellowish in colour* and stout bodied, *with short spine like hair on the body*, covers entire body.

Nature & symptoms of damage:

- ***Both grubs and adults feed by scraping chlorophyll from epidermal layers of leaves,*** **leaving the veins and veinlets, and cause *characteristic skeletonized patches on the leaves* and forming *ladder-like windows*.**
- **The minute grubs on hatching start damaging the plant by *feeding on the fresh matter of the leaf surface* leaving veins and vein lets.**
- **They confine their feeding activities generally to the *under surface of leaves*.**
- **The activity of the pest is *more on the lower leaves* which are covered by the upper ones.**
- **The *young grubs are found in batches* whereas this tendency disappears when they advance in age.**
- **The full grown grubs are voracious eaters when compared to young stages.**
- **They *start their appearance in the field in July-August* which is over wintering adults.**
- **in severe cases even calyx of the fruit may also be infested**
- **Later, the affected areas on *leaves dry and falloff* and damage appear in the form of holes in the leaves, and *plant presents an unhealthy appearance*.**

feeding damage and faeces of larvae of Hadda beetle

Life cycle Hadda beetle:

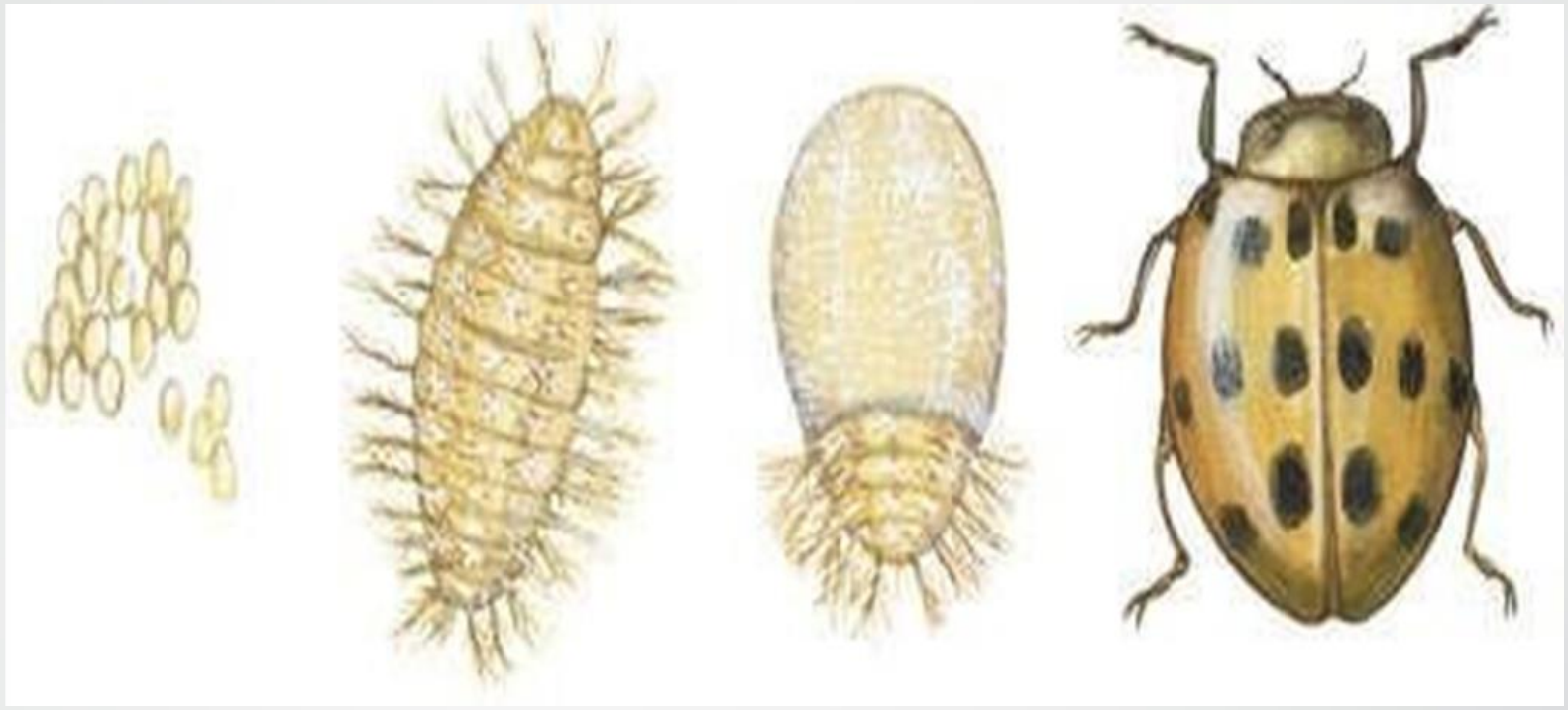
- Female lays as many as 120 to 180 eggs, *Yellowish, elongated, cigar-shaped eggs are laid in batches of 30-35 eggs, generally on lower surface of leaves*, with their tips pointing, glued to the leaf surface in a vertical position.
- They hatch in 2 to 4 days and *spiny, yellowish grubs* start feeding on the epidermis of leaves, leaving the veins and the vein lets. Grubs are yellowish with spines all over body.
- The larval (grub) stage lasts for 11 to 15 days.
- *Pupation is on leaves*, pupae are hemispherical. At that time, the full grown grub attaches the last segment of its abdomen to the leaf surface by means of a sticky secretion and the pupa is formed within the last larval skin which splits on the dorsal side. The pupae period varies from 3-6 days after which the adults emerge.
- The adults are also quite voracious feeders and they feed both on the upper and lower surface of the leaf. Adult lives for one month to more than two months.
- The entire life cycle is completed in 18 to 25 days during hot season and it may be as long as 50 days in winter.
- All the stages of the pest are found on the plants only.
- The pest has 7 generations a year.

Eggs

Mature larva of Hadda beetle

Pupa of Hadda beetle

Adult



(I) Female lays as many as 120 to 180 eggs.
(II) Egg hatched in 2 to 4 days.
(III) larval (grub) stage lasts for 11 to 15 days.
(IV) pupal period varies from 3-6 days.
(V) Adult lives for one month to more than two months.

Management:

- As the beetles are found to be sluggish during the morning hours, *hand picking* will prove on effective control measure.
- *Collect and destroy egg masses*
- *Collect and destroy skeletonized leaves with adults and grubs*.
- *Shake plants to dislodge* grubs, pupae and adults and destroy.
- Insecticides of plant origin viz., Rotenone, Nicotine and Pyrethrum have been found to be quite effective. Rotenone 1% at 6-9- kg/acre.
- Spray 5% Neem Seed Kernel Extract (NSKE) or 2% Neem oil at fortnightly intervals.
- Spraying with DDVP 100 EC @ 0.05% to 0.1% concentration (Nursery as well as planted crop) or malathion 0.16% or methyl parathion 0.03% effectively control the pest.
- If infestation is severe Carbaryl 2g/litre of water or Dichlorvos 2ml/litre of water may be sprayed.


Thank
you!