



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Lecture 13

PESTS OF COTTON – SAP FEEDERS AND FOLIAGE FEEDERS

More than 1326 species of insects have been reported attacking cotton in the world. However, in India, only 162 species have been recorded, among which only 15 species may be called as major pests

Major pests				
1.	Leafhopper	<i>Amrasca devastans</i>	Cicadellidae	Hemiptera
2.	Cotton aphid	<i>Aphis gossypii</i>	Aphididae	Hemiptera
3.	Thrips	<i>Thrips tabaci</i>	Thripidae	Thysanoptera
4.	Whitefly	<i>Bemisia tabaci</i>	Aleyrodidae	Hemiptera
5.	Mealy bug	<i>Phenacoccus solani</i> <i>Paracoccus marginatus</i>	<i>Pseudococcidae</i>	<i>Hemiptera</i>
Minor pests				
6.	Red cotton bug (Minor but regular)	<i>Dysdercus cingulatus</i>	Pyrrhocoridae	Hemiptera
7.	Dusky cotton bug (Minor but regular)	<i>Oxycarenus</i> <i>hyalinipennis</i>	Lygaeidae	Hemiptera
8.	Tobacco Cutworm	<i>Spodoptera litura</i>	Noctuidae	Lepidoptera
9.	Leaf roller	<i>Sylepta derogata</i>	Pyraustidae	Lepidoptera
10.	Semiloopers	<i>Anomis flava</i> <i>Xanthodes graelsi</i> <i>Tarache nitidula</i>	Noctuidae	Lepidoptera
11.	Stem weevil	<i>Pempherulus affinis</i>	Curculionidae	Coleoptera
12.	Shoot weevil	<i>Alcidodes affaber</i>	Curculionidae	Coleoptera
13.	Surface weevil	<i>Attactogaster finitimus</i>	Curculionidae	Coleoptera
14.	Black scale	<i>Saissetia nigra</i>	Coccidae	Hemiptera
15.	White scale	<i>Pulvinaria maxima</i>	Coccidae	Hemiptera

Major pests

I. Sucking pest

1. Leafhopper:

Amrasca devastans (Cicadellidae: Hemiptera)

Distribution and status: Major pest in all cotton-growing region of India

Host range: Cotton, potato, brinjal, castor, bhendi, tomato, hollyhock and sunflower.

Damage symptoms: Both nymphs and adults suck the sap from the under surface of leaves, tender leaves turn yellow, leaf margins curl downwards and reddening sets in. In the case of severe infestation leaves get a bronze or brick red colour which is typical “hopper burn”.

ETL: 50 nymphs / adults per 50 leaves or yellowing and curling from the middle to upper portion of the plants in 25 % of plants in the field

Bionomics: 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

- i. Early sowing and close spacing of cotton reduces pest infestation particularly if the rainfall is heavy
- ii. Setup light trap to monitor the broods of leaf hopper and to attract and kill
- iii. Release predators viz., *Chrysopa carnea*
- iv. Spray monocrotophos 36 WSC @ 1000 ml/ha and NSKE 5% @ 25 kg/ha or 750 ml endosulfan 35 EC in 1000 L of water per hectare.
- v. Use resistant varieties like MCU 3, MCU 5 and MCU 9

2. Cotton aphid:

Aphis gossypii (Aphididae: Hemiptera)

Distribution and status: India, occasionally serious.

Host plants: Cotton, bhendi, brinjal, chillies, guava

Damage symptoms: It is a potential pest on cotton infesting tender shoots and under surface of the leaves. They occur in large numbers, suck the sap and cause stunted growth, gradual drying resulting in death of the plants. Development of black sooty mould due to the excretion of honey dew gives the plant, a dark appearance. Crinkling of leaves ETL: 5% of infested plants.

Bionomics: The aphids are greenish brown, soft bodied and small insects. The alate as well as apterous females multiply parthenogenitically and viviparously. A single female may produce 8-22 nymphs in a day which become adults in about 7-9 days. They are often attended by ants for the sweet honey dew secretion. Winged forms may be seen under crowded conditions.

Management

- i. Monitor the nymphs and adults of early season sucking pests from the 14th day after sowing.
- ii. Conserve natural enemies viz., *Monochilus sexmaculatus*, *Coccinella septumpunctata*, *Aphelinus mali*, *A. flavipes*, *Phylloscopus tristis*
- iii. Spray any of the following insecticides with 500 L water/ha

3. Thrips:

Thrips tabaci (Thripidae: Thysanoptera)

Damage symptoms: Both nymph and adult lacerate the tissue and suck the sap from the upper and lower surface of leaves and in cases of severe infestation they curl up and become crumbled. Silvery sheen on the lower surface can be seen in early stages of attack.

ETL: 1 No./leaf

Bionomics Adults small, slender, yellowish to brown with fringed wings and drift away on disturbance. Nymph very minute, slender, yellowish and microscopic.

Management

- i. Monitor the nymphs and adults from the 14th day after sowing.
- ii. Spray any of the following insecticides with 500 L water/ha • Buprofezin 25 SC 1000 ml
• Profenofos 50 EC 1000 ml • Diafenthiuron 50 WP 600 g • Thiacloprid 21.7 SC 100-125 ml • Fipronil 5 SC 1.5-2.0 L • Thiamethoxam 70 WS 430 g • Imidacloprid 70 WG 30-35 g or 48 FS 500-900 ml or 70 WS 500-1000 g or 30.5 SC 60-75 ml or 17.8 SL 100 -125 ml • Lambda cyhalothrin 2.5 EC or 600-1000 or 5 EC 300-500 ml • Methyl demeton 25 EC 500 ml • Dimethoate 30 EC 500 ml.

4. Mealy bug:

Phenacoccus solan (Pseudococcidae: Hemiptera)

Distribution and status: During the last few years mealybugs, which were considered to be minor pests in many crops have acquired the status of major pests especially in cotton, vegetables and fruits. Recently in India the cotton crop in Punjab, Rajasthan, Maharashtra and Gujarat is being seriously infested with mealybug.

Host range: Polyphagous pest. Ornamental plants, fruit crops, vegetables and field crops. Ninety one host plants spread across 24 families has been recorded in India till date.

Damage symptoms: Plants infested during vegetative phase exhibit symptoms of leaf curling, distorted and bushy shoots, crinkled and/or twisted and bunchy leaves. Plants dry become stunted and dry. Late season infestation during reproductive crop stage results in late opening of bolls, reduced plant vigour, early crop senescence, affecting the yield badly.

Bionomics: The body is covered with very short waxy filaments. Long tails and stripes on the body are absent. This species does not produce an egg mass or ovisac. Mealybugs are white to pink in colour and measure 3–4 mm in length. In case of *M. hirsutus*, eggs as well as crawlers are pink in colour. The crawlers measure 0.3 mm in length. Immature females and newly matured females are greyish-pink which are dusted with mealy white wax. Adult females are 2.5–4.0 mm long, soft-bodied, elongate oval and slightly flattened. Females are provided with 9-segmented antennae, anal lobe bars, numerous dorsal oral rim ducts on all parts of the body except the limbs and long, flagellate dorsal setae. Males have one pair of very simple wings, long antennae and white wax filaments projecting posteriorly with no mouthparts.

Management

1. Early crop termination
2. Destruction of cotton stalks.
3. Destroy alternate weed host growing on field bunds, water channels and wastelands.
4. Use acid delinted seeds for sowing.
5. Grow pigeonpea, bajra or maize as border crop wherever possible.
6. Regularly monitoring of the pest.
7. Neem Seed Kernel Extract (NSKE 5%) 50ml/L + Neem oil 5ml/ L + detergent powder 1gm/L or Fish oil rosin liquid 10 ml mixed with neem 10ml/L or Karanj oil 10ml /L can be sprayed as spot application on infested stalks.
8. Use *Cryptolaemus montrouzieri* adults /grub@ 10 per infested plants wherever available.
9. Spray biopesticides viz., *Verticillium lecanii* (Potency 2 X 10⁸ C.F.U /gm) 10gm/l and *Beauveria bassiana* (Potency 10⁸ spores/ml) 10ml/l.
10. Spray less hazardous insecticides, such as acephate, 75 SP 2.0 kg, malathion 50 EC 2 L, buprofezin 25 SC 2.0 L/ha. As the last option, spray moderately hazardous insecticides:

Quinolphos 25 EC or Chlorpyriphos 20EC 3 L or Profenophos 50EC Thiodicarb 75WP 5.0gm/l
2.5 L in 800- 100 L of water per ha

5. Whitefly:

Bemisia tabaci (Aleyrodidae: Hemiptera)

Distribution and status: India, Sri Lanka, Nigeria, Congo, 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 bolls and poor boll opening. It also transmits the leaf curl virus disease of cotton. The insect is highly polyphagous and known to have biotypes.

ETL: 5-10 nymphs / leaf

Management

1. Use white fly tolerant varieties like LK 861, Amravathi, Kanchan, Supriya, LPS 141
2. Treat 100 kg seeds with Imidacloprid 48 FS 500-900 ml or Imidacloprid 70 WS 500-1000 g Thiamethoxam 30 FS 1.0 L l or Thiamethoxam 70 WS 430 g
3. Timely sowing with recommended spacing, preferably wider spacing is essential, avoid late sowing.
4. Avoid the alternative cultivated host crops of the whitefly (Brinjal, bhendi, tomato and tobacco) in the vicinity of the cotton crop.
5. Grow cotton only once in a year either in winter or summer season in any cotton tract.

6. Adopt crop rotation with non-preferred hosts such as sorghum, ragi, maize etc., to check the build up of the pest.

7. Remove and destroy alternate weed hosts like *Abutilon indicum*, *Solanum nigrum* from the fields and neighbouring areas.

8. Follow judicious irrigation management and nitrogenous fertilizer application to arrest the excessive vegetative growth and pest the buildup.

9. Monitor the activities of the adult whiteflies by setting up yellow pan traps and sticky traps at 1 foot height. Also monitor through in situ counts

10. Collect and remove whitefly infested leaves from the plants and those which were shed due to the attack of the pest and destroy them.

11. Spray NSKE 5% and neem oil 5 ml or fish oil rosin soap at 1 kg / 40 L of water (or) in combination with recommended dose of insecticide (2 ml/L).

12. The use of the synthetic pyrethroids should be discouraged / minimized to 2-3 sprays in cotton to avoid the problem of whitefly.

13. Avoid repeated spraying of synthetic pyrethroids.

14. Spray any of the following insecticides with 500 L water/ha.

• Acetamiprid 20 SP 100 g • Fenprothrin 30 EC 250-340 ml • Azadirachtin 0.15% 500-1000 ml • Fipronil 5 SC 1.5-2.0 L • Azadirachtin 5% 750 ml • Imidacloprid 17.8 SL 100 -125 ml • Bifenthrin 10 EC 800 ml • Profenofos 50 EC 1.0 L