



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Lecture 12

Pests of *Brassica*

The important cruciferous oilseeds cultivated in India are yellow and brown sarson (*Brassica campestris* var. *sarson*), toria (*B.campestris* var. *toria*), raya (*B. juncea*) and taramira (*Eruca sativa*)

Major pests				
1.	Mustard Aphid	<i>Lipaphis erysimi</i>	Aphididae	Hemiptera
2.	Painted Bug	<i>Bagrada hilaris</i>	Pentatomidae	Hemiptera
3.	Mustard Sawfly	<i>Athalia lugens</i>	Tenthredinidae	Hymenoptera
4.	Green Peach Aphid	<i>Myzus persicae</i>	Aphididae	Hemiptera
5.	Pea Leaf-miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera
6.	Bihar Hairy Caterpillar	<i>Spilosoma obliqua</i>	Arctiidae	Lepidoptera
7.	Cabbage butterfly	<i>Pieris brassicae</i>	Pieridae	Lepidoptera
8.	Diamondback moth	<i>Plutella xylostella</i>	Yponomeutidae	Lepidoptera
Minor pests				
9.	Jassid	<i>Empoasca binotata</i>	Cicadellidae	Hemiptera
10.	Leaf webber	<i>Crociodomia binotalis</i> <i>Hellula undalis</i>	Pyralidae	Lepidoptera
11.	Noctuid caterpillars	<i>Agrotis ipsilon</i> , <i>Mythimna loreyi</i> and <i>Helicoverpa armigera</i>	Noctuidae	Lepidoptera
12.	Flea beetles	<i>Phyllotreta cruciferae</i> and <i>Phaedon hrassicae</i>	Coleoptera	Chrysomelidae
13.	Leaf-miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera

1. Mustard Aphid:

Lipaphis erysimi (Aphididae: Hemiptera)

Distribution and status: Distributed worldwide and is a serious pest Host range Cruciferous oilseeds like toria, sarson, raya, taramira and Brassica vegetables like cabbage, cauliflower, knol-khol,.

Bionomics: They are louse like, pale-greenish insects abundant from December to March. During summer, it is believed to migrate to the hills. The pest breeds parthenogenetically and the females give birth to 26-133 nymphs. They grow very fast and are full-fed in 7-10 days. About 45 generations are completed in a year. Cloudy and cold weather (20°C or below) is very favourable for the multiplication of this pest. The winged forms are produced in autumn and spring, and they spread from field to field and, from, locality to locality.

Damage symptoms: Both the nymphs and adults suck cell-sap from leaves, stems, inflorescence or the developing pods. Vitality of plants is greatly reduced. The leaves acquire a curly appearance, the flowers fail to form pods and the developing pods do not produce healthy seeds. The yield of an infested crop is reduced to one-fourth or one-fifth.

Management

1. Sow the crop early wherever possible, preferably up to third week of October.
2. Apply recommended dose of fertilizers.
3. Apply anyone of the following insecticides when the population of the pest reaches 50-60 aphids per 10 cm terminal portion of the central shoot or when an average of 0.5-1.0 cm terminal portion of central shoot is covered by aphids or when plants infested by aphids reach 40-50 per cent

Foliar sprays - 625 -1000 ml of oxydemton methyl 25 EC, dimethoate 30 EC, endosulfan 35 EC, quinalphos 25 EC, malathion 50 EC; 940-1500 ml of chiorpyriphos 20 EC in 600-1000 L of water per ha depending on the stage of the crop.

Granular insecticides - 10 kg of phorate 10 G, 33 kg of carbofuran 30 per ha followed by a light irrigation.

4. Conserve parasitoids *Ischiodon scutellaris* (Fabricius), *Diaeretiella rapae* M'Intosh (Braconidae) and *Lipolexis gracilis* Forester (Aphididae), predators viz., *Syrphus serarius* (Wiedmann) (Syrphidae). *Brinckochrysa scelestes* (Banks) (Chrysopidae), *Coccinella septempunctata* Linnaeus, *Menochilus sexmaculatus* (Fabricius) (Coccinellidae) and entomopathogens viz., *Entomophthora coronata* and *Cephalosporium aphidicola*.

2. Painted Bug:

Bagrada hilaris (Pentatomidae: Hemiptera)

Distribution and status: Widely distributed in Myanmar, Sri Lanka, India, Arabia and East Africa.

Host range: Crucifers, rice, sugarcane, indigo and coffee

Bionomics: The full-grown black nymphs are about 4 mm long and 2.66 mm broad. Sub-ovate, black adult bugs are 3.71 mm long and 3.33 mm broad with a number of orange or brownish spots. It is active from March to December and during this period all the stages can be seen. It passes the winter months of January and February in the adult stage under heaps of dried oilseed plants lying in the fields. These bugs lay oval, pale-yellow eggs singly or in groups of 3-8 on leaves, stalks, pods and sometimes on the soil. Eggs may be laid during day or night. A female bug may lay 37-102 eggs in its lifespan of 3-4 weeks. Egg period is 3-5 days during summer and 20 days during December. There are five nymphal instars with a duration of 22 -34 days. The entire life cycle is completed in 19-54 days and it passes through 9 generations in a year.

Damage symptoms: Both nymphs and adults suck cell sap from the leaves and developing pods, which gradually wilt and dry up. The nymphs and adult bugs also excrete a sort of resinous material which spoils the pods.

Management

1. Give first irrigation 3-4 weeks after sowing as it reduces the bug population significantly. (ii) Spray 1.0 L of malathion 50 EC or 625 ml of endosulfan 35 EC or quinalphos 25 EC in 500- 600 L of water per ha once in October and again in March-April.
2. Conserve egg parasitoid *Gryon* sp. (Scelionidae) and the adult parasitoid *Alophora* sp. (Tachinidae).

3. Mustard Sawfly:

Athalia lugens (Tenthredinidae: Hymenoptera)

Distribution and status: Widely distributed in Indonesia, Formosa, Myanmar and the Indian Sub-continent.

Host range: Mustard, toria (*Brassica campestris*), rapeseed, cabbage, cauliflower, knolkhol, turnip, radish, etc

Bionomics: Dark green larvae have 8 pairs of abdominal prolegs. There are five black stripes on the back, and the body has a wrinkled appearance. A full-grown larva measures 16-18 mm in length. The adults are small orange yellow insects with black markings on the body and have smoky wings with black veins. The mustard sawfly breeds from October to March and undergoes pupal diapause during summer. The adults emerge from these cocoons early in October. They live for 2-8 days and lay 30-35 eggs singly, in slits made with saw like ovipositors along the underside of the leaf margins. Egg period is 4-8 days and the larvae feed exposed in groups of 3-6 on the leaves during morning and evening. They remain hidden during the day time and, when disturbed, fall to the ground and feign death. There are 7 instars with a larval period of 16-35 days. Pupation is in water proof oval cocoons in soil and the pupal period is 11-31 days. Lifecycle is completed in 31-34 days. It completes 2-3 generations from October to March.

Damage symptoms: The grubs alone are destructive. They bite holes into leaves preferring the young growth and skeletonize the leaves completely. Sometimes, even the epidermis of the shoot is eaten up. Although the seedlings succumb; the older plants, when attacked, do not bear seed.

Management:

1. Give first irrigation 3-4 weeks after sowing as it reduces the bug population significantly. (ii) Spray 1.0 L of malathion 50 EC or 625 ml of endosulfan 35 EC or quinalphos 25 EC in 500-600 L of water per ha once in October and again in March-April.

2. Conserve larval parasitoid *Perilissus cingulator* Morby (Ichneumonidae) and the bacterium, *Serratia marcescens* Bizio (Enterobacteriaceae)

4. Green Peach Aphid:

Myzus persicae (Aphididae: Hemiptera)

Distribution and status: Throughout India Host range: Mustard, peaches, beans, potato, tobacco, turnip, radish, etc

Bionomics: The aphids are minute (2.0-2.5 mm long), delicate, pearshaped, yellowish-green winged or wingless insects. It remains active from December to March with peak activity during February. The nymph undergoes 4-5 instars taking 4-7 days for apterous and 5-8 days for alate forms. Apterous adults produce 5-92 young ones per female while the alate forms produce 8-49 nymphs. Longevity of adult is 15-27 days for alate and 10-25 days for apterous forms.

Damage symptoms: Both nymphs and adults damage plants by actively sucking their sap. After the appearance of inflorescence, the aphid congregates on terminal buds and feeds there. As a result, there is flower shedding, poor-pod formation and shriveling of grains. The insect also transmits virus diseases. The honeydew attracts sooty mould.

Management:

1. Sow the crop in first week of October.
2. Spray 500 ml of dimethoate 30 EC or 625 ml of oxydemeton methyl 25 EC in 750 L of water/ha when aphids start congregating on top flower buds. Only one spray is needed.

5. Pea Leaf-miner:

Chromatomyia horticola (Agromyzidae: Diptera)

Distribution and status: Northern India

Host range: Cruciferous plants, antirrhinum, nasturtinum, pea, linseed (*Linum usitatissimum*) and potato (*Solanum tuberosum* L.).

Bionomics: The adults are two-winged flies having greyish black mesonotum and yellowish frons. It is active from December to April or May and is believed to pass the rest of the year in soil, in the pupal stage. The adults emerge at the beginning of December and after mating, start laying eggs singly, in leaf tissues. The eggs hatch in 2-3 days and the larvae feed between the lower and upper epidermis by making zig-zag tunnels. Maggot after 5 days pupates within the galleries. The adults emerge in 6 days and lifecycle is completed in 13-14 days. The pest passes through several broods from December to April-May.

Damage symptoms: The large number of tunnels made by the maggots interferes with photosynthesis and proper growth of the plants, making them look unattractive. If the attacked leaves are held against bright light, the minute slender larvae can be seen feeding within the tunnels.

Management

Spray 1.0 L of dimethoate 30 EC in 750 L of water per ha and repeat spray at 15 days interval. A waiting period of 20 days should be observed for picking of pods.