

INSECT PESTS OF OILSEEDS



Dr. Nihal R

Dr. Nihal R

INSECT PESTS OF GROUNDNUT



MAJOR PESTS OF NATIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Aphid	<i>Aphis craccivora</i>	Aphididae	Hemiptera
2	Bruchid	<i>Caryedon serratus</i>	Bruchidae	Coleoptera
3	Leaf hopper	<i>Empoasca kerri</i>	Cicadellidae	Hemiptera
4	Leaf miner	<i>Aproaerema modicella</i>	Gelechiidae	Lepidoptera
5	Termite	<i>Odentotermes sp. & Microtermes sp.</i>	Termitidae	Isoptera
6	Thrips	<i>Frankliniella schultzei & Thrips palmi</i>	Thripidae	Thysanoptera
7	Tobacco Caterpillar	<i>Spodoptera litura</i>	Noctuidae	Lepidoptera
8	White grub	<i>Holotrichia consanguinea, H. serrata</i>	Scarabaeidae	Coleoptera

MAJOR PESTS OF REGIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Red hairy caterpillar	<i>Amsacta albistriga</i> <i>Amsacta moorei</i>	Arctiidae	Lepidoptera
2	Bihar hairy caterpillar	<i>Spilosoma obliqua</i>	Noctuidae	Lepidoptera
3	Gram pod borer	<i>Helicoverpa armigera</i>	Noctuidae	Lepidoptera
4	Stem borer	<i>Sphenoptera perotetti</i>	Buprestidae	Coleoptera
5	Ear wig	<i>Anisolabis annulipes</i>	Forficulidae	Demaptera

1. Groundnut Aphid

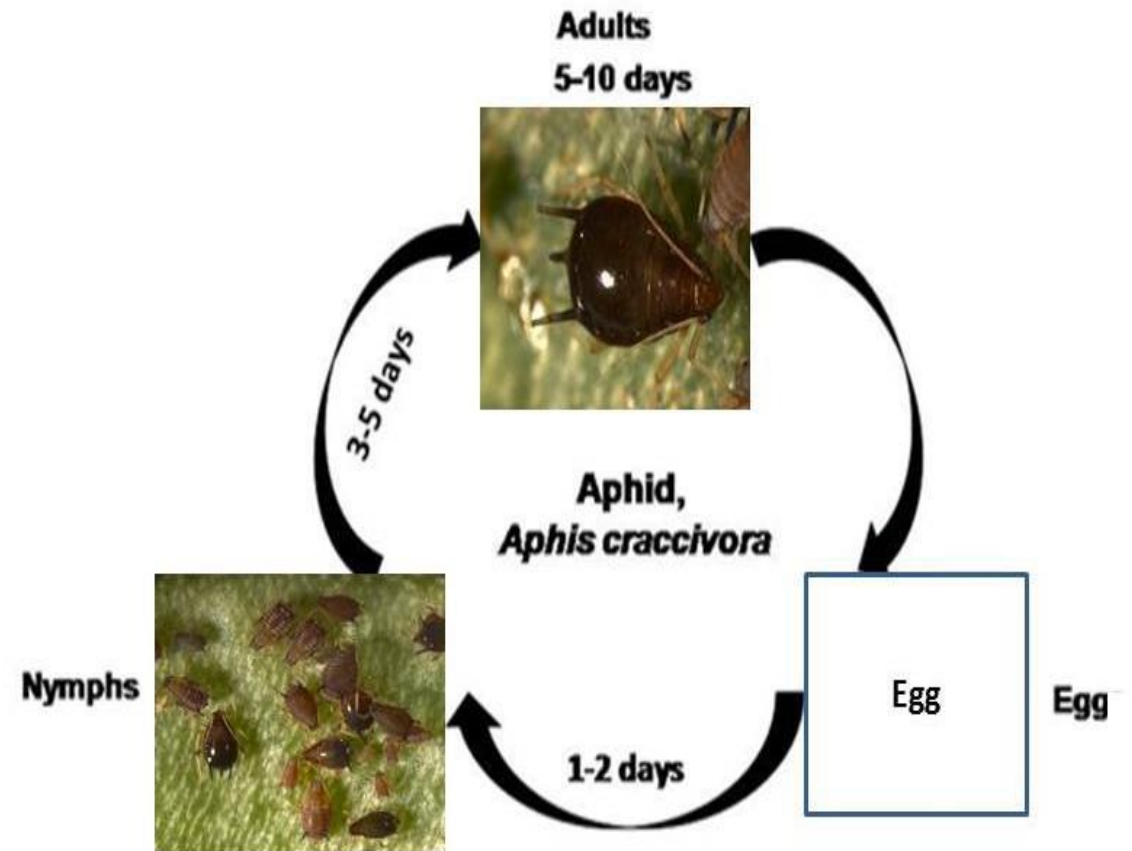
S.N: *Aphis craccivora*
(Aphididae: Hemiptera)

- **Distribution:** Most serious pests of groundnut. Throughout India; Africa, Argentina and Chile.
- **Host range:** Groundnut, peas, beans, pulses, safflower and some weeds.
- **Morphology:** The winged adults have black wings and they reach the freshly germinated groundnut plants after overwintering on collateral host plants.



Biology

- The offspring of the winged form may be wingless.
- Even without fertilization the females may produce 8-20 young ones in a life span of 10-12 days.
- The young nymphs are brownish and they pass through four moults to become adults in 5-8 days.
- The apterous females start producing brood within 24 hours of attaining that stage.
- Breeding occurs almost throughout the year and both alatae and present.



Nature of Damage

- **The tender shoots of 8 to 10-week old crop of groundnut are sometimes severely infested.**
- **The nymphs and adults suck the sap, usually from the underside of leaves.**
- **In severe cases of infestation, the crop gets withered and blighted**
- **The aphid is also a vector of a virus disease known as the rosette of groundnut.**
- **Infestation in the early stages causes stunting of the plants as well as reducing the vigour.**
- **When the attack occurs at the time of flowering and pod formation, the yield is reduced considerably.**
- **Infestation on the groundnut crop usually occurs 4-6 weeks after sowing.**
- **Yellowing and distorted terminal shoots**

Groundnut aphid damage



Management

- **Conserve predators like *Menochilus sexmaculatus* and *Ischiodon javana* (Syrphidae).**
- **Spray 625 ml of malathion 50 EC**
 - 425 ml of dimethoate 30 EC**
 - 425 ml of oxydemeton methyl 25 EC in 200 litres of water per ha.**

2. Groundnut Leaf-miner

S.N: *Aproaerema modicella*
(Gelechidae: Lepidoptera)

- **Distribution:** through out India
- **Host range:** Groundnut, soybean, arhar and *Psoralea corylifolia*.
- **Morphology:** The moth is very small with dark brown wings and small distinct white spot on fore wings.
- The larva is small and green, and has a conspicuous dark head.



Biology

- **During the day the moths remain concealed under clods of soil or in the crevices.**
- **They become active at night when they are also strongly attracted to light.**
- **S.O.O. shining sculptured eggs singly on leaves and on shoots.**
- **The eggs hatch after about 3 days.**
- **After wandering about for some time, it mines into the leaves and, later on, bites its way out.**
- **It then webs together a number of leaflets and feeds inside the chamber, thus formed.**
- **The larvae are full-grown in 9-17 days.**
- **They prepare silken cocoons to pupate in.**
- **The pupal period lasts about 4 days.**
- **Multivoltine pest.**



Nature of Damage

- **Webbing and drying of terminal leaflets [ARS PRE/ NET 2014, 2019]**
- **As a result of the mining, skeletonizing and webbing together of the leaves, the crop suffers serious losses.**
- **Bunch variety is generally severely infested.**
- **In badly infested fields the plants present a look as if the crop has been scorched or burnt up.**
- **Appearance and the small adults could be seen flying in large numbers when one walks through the crop.**





Management

- **As the adults are phototropic setting light traps may be useful.**
- **Conserve egg parasitoids *Trichogramma sp.*; larval parasitoids like *Bracon hebetor*, *Apanteles javensis*, *Asympiesiella indica*, *Stenomeseioideus ashmeadi* and *Euplectrus sp.***
- **Dusting phosalone 4% or carbaryl 10% or quinalphos 1.5% D, or spraying methyl parathion 0.025% or phosalone 0.05% or monocrotophos 0.059% or chlorpyrifos 0.05% controls the pest.**

3. White Grub

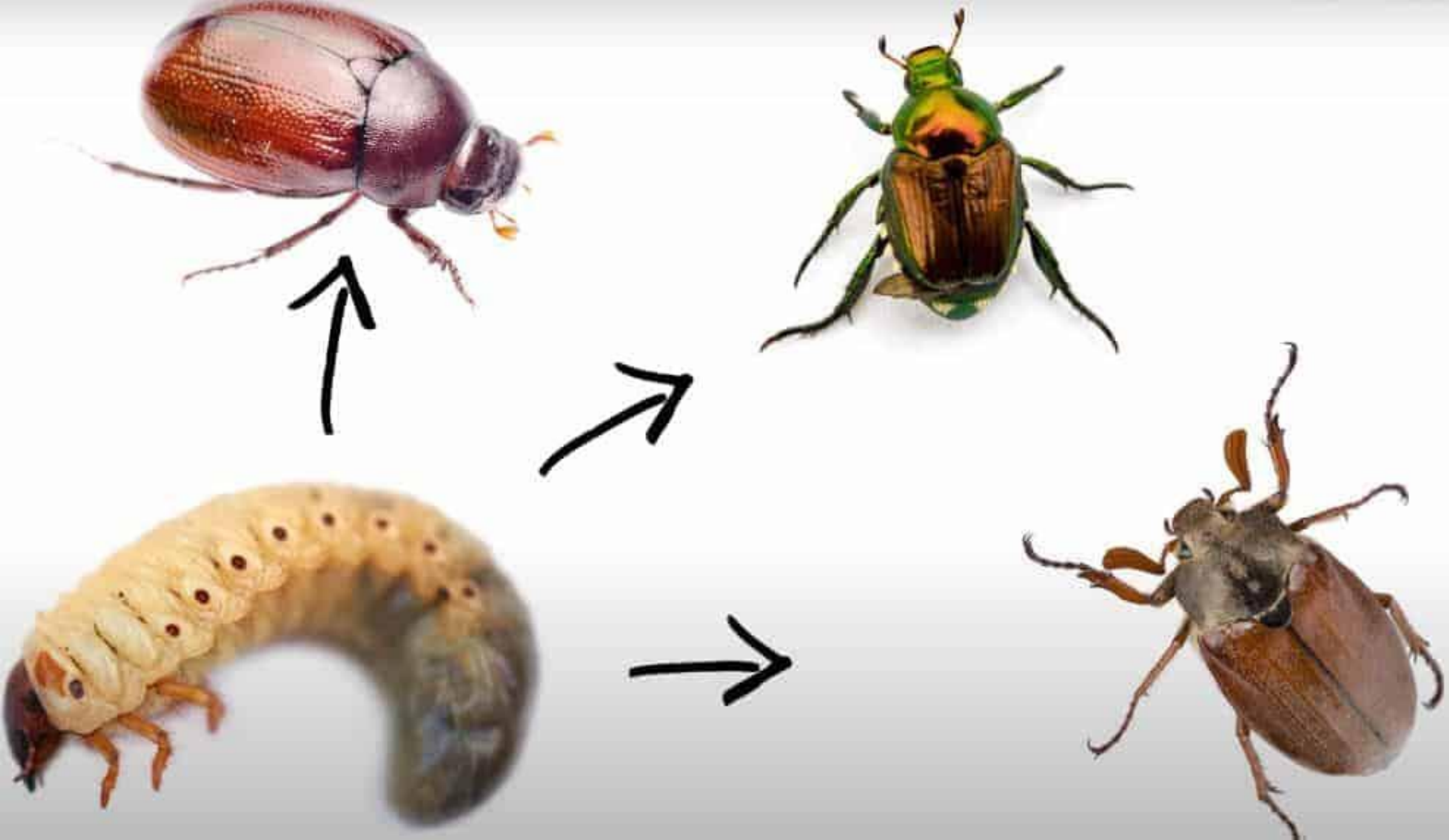
S.N: *Holotrichia consanguinea*
(Scarabaeidae: Coleoptera)

- **Distribution:** White grub is also called as root grub, may-June beetle and chaffer beetle.
- The insect neared as a pest of groundnut in 1957 in the Gujarat State.
- Widely distributed in India [JRF 2002]
- **Host range:** sugarcane, sorghum, maize, chilli, okra, brinjal, etc.
- **Morphology:** The grubs are mostly found in the upper 5-10 cm layer of soil.
- Grub are white, having a brown head and thoracic legs.
- The pupa is semicircular and creamy white.



Biology

- The presence of a large number of newly hatched larvae in June shows that this insect becomes active with the onset of the monsoon.
- The incidence is heavy in dry fields having sandy-loam soil.
- **Light sandy soil is suitable for survival and breeding of white grubs.**
- **S.O.O. singly in loose soil up to a depth of 10 cm [ARS NET/PRE 2013]**
- **The egg and grub periods are 7-10 and 60-74 days respectively**
- **After monsoon, the full grown grubs migrate to a considerable depth in the soil for pupation.**
- **The beetles remain in the soil at a depth of 10-20 cm and come out for feeding at night.**
- **Over winters in adult stage.**
- **Adults formed in November remain in soil till next June.**
- **Their population is maximum in the rainy season and there seems to be monovoltine [JRF 2015].**





May-June Beetle



Green June Beetle



Masked Chafer



Japanese Beetle



European Chafer



Oriental Beetle



**Asiatic
Garden Beetle**



**Black
Turfgrass
Ataenius**



Aphodius

Nature of Damage

- **The grubs eat away the nodules, the fine rootlets and may also girdle the main root, ultimately killing the plants.**
- **Wilting of groundnut plants in patches with damaged roots.**
- **The damage becomes evident only when the entire plant dries up due to the grubs feeding on fibrous roots.**
- **At night, the beetles feed on foliage and may completely defoliate even trees like neem, banyan [ARS NET/PRE 2016] etc.**



White grub damage in groundnut



Management

- **Plough the fields twice during May-June.**
- **It would help in exposing the beetles resting in the soil.**
- **Collection and killing of adults at night after first monsoon showers by shaking trees is the practice adopted [JRF 2001]**
- **Whenever possible, sow the crop early, i.e. between June 10 and 20.**
- **The grub is parasitized by *Scolia aureipennis* (Scolidae).**
- **The common Indian toad, *Bufo melanastictus*, and the wall lizard, *Gecko gecko* feed on the beetles.**
- **A fungus, *Metarrhizium anisopliae* and *Baeuveria brongniarti* parasitizes the adults.**
- **Treat the seed before sowing with 12.5 ml of chlorpyrifos 20EC per kg of kernels.**
- **Kill the beetles by spraying 500 g of carbaryl 50WP in 250 liters of water per ha on the preferred host plants like ber, guava, rukmanjani, grapevines, almond, etc.**

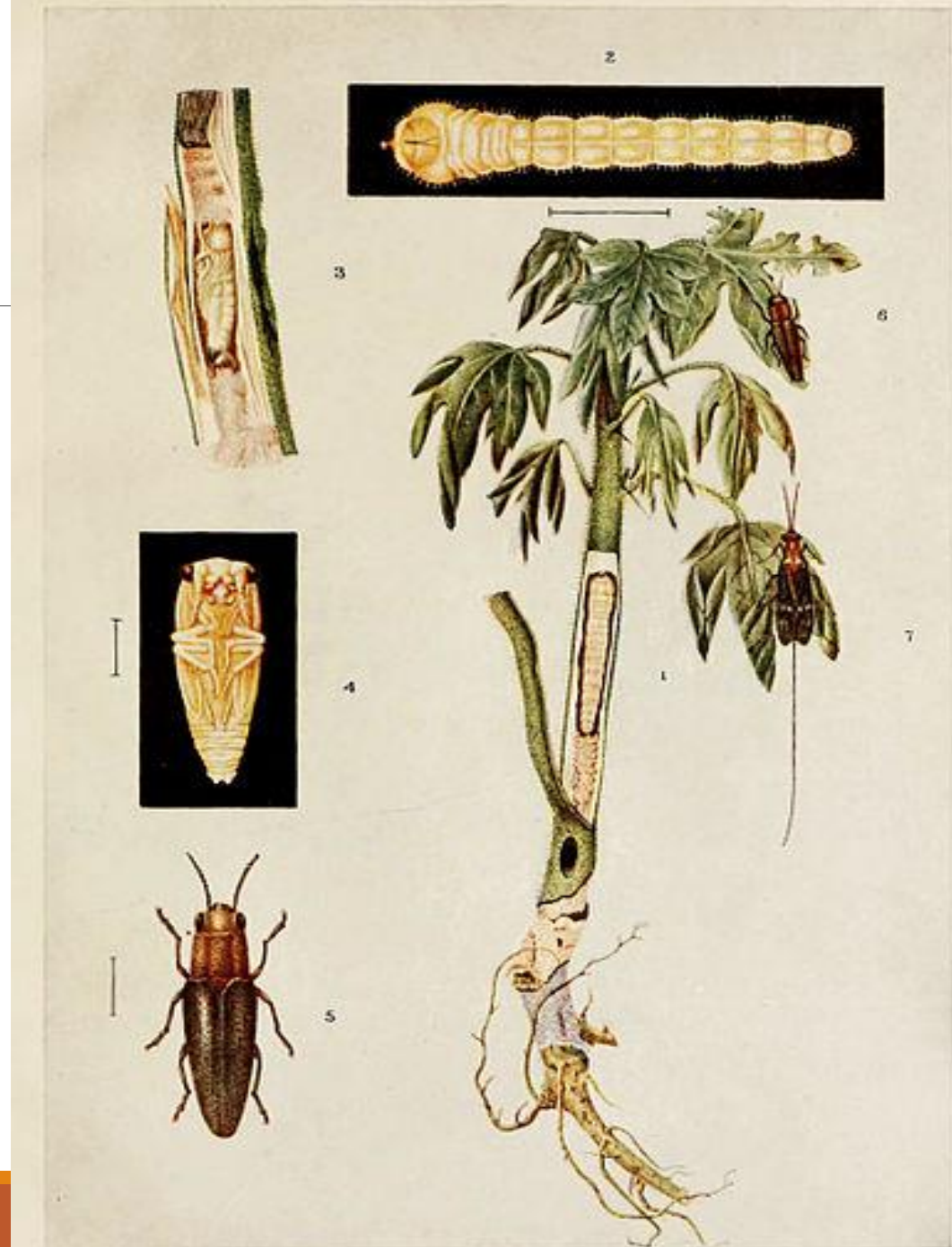
4. Groundnut Stem-borer S.N: *Sphenoptera perotetti* (Buprestidae: Coleoptera)

- **Distribution:** Andhra Pradesh, Bihar, Delhi, Gujarat, Kerala, Tamil Nadu, Madhya Pradesh, Maharashtra and Karnataka.
- **It has not been recorded anywhere outside India.**
- **Host range:** groundnut, sesamum, gram and other pulses.
- **Morphology:** The adult is a small jewel-like beetle with a striking metallic shine over a dark brown background.
- **The full-grown grub is whitish in appearance.**



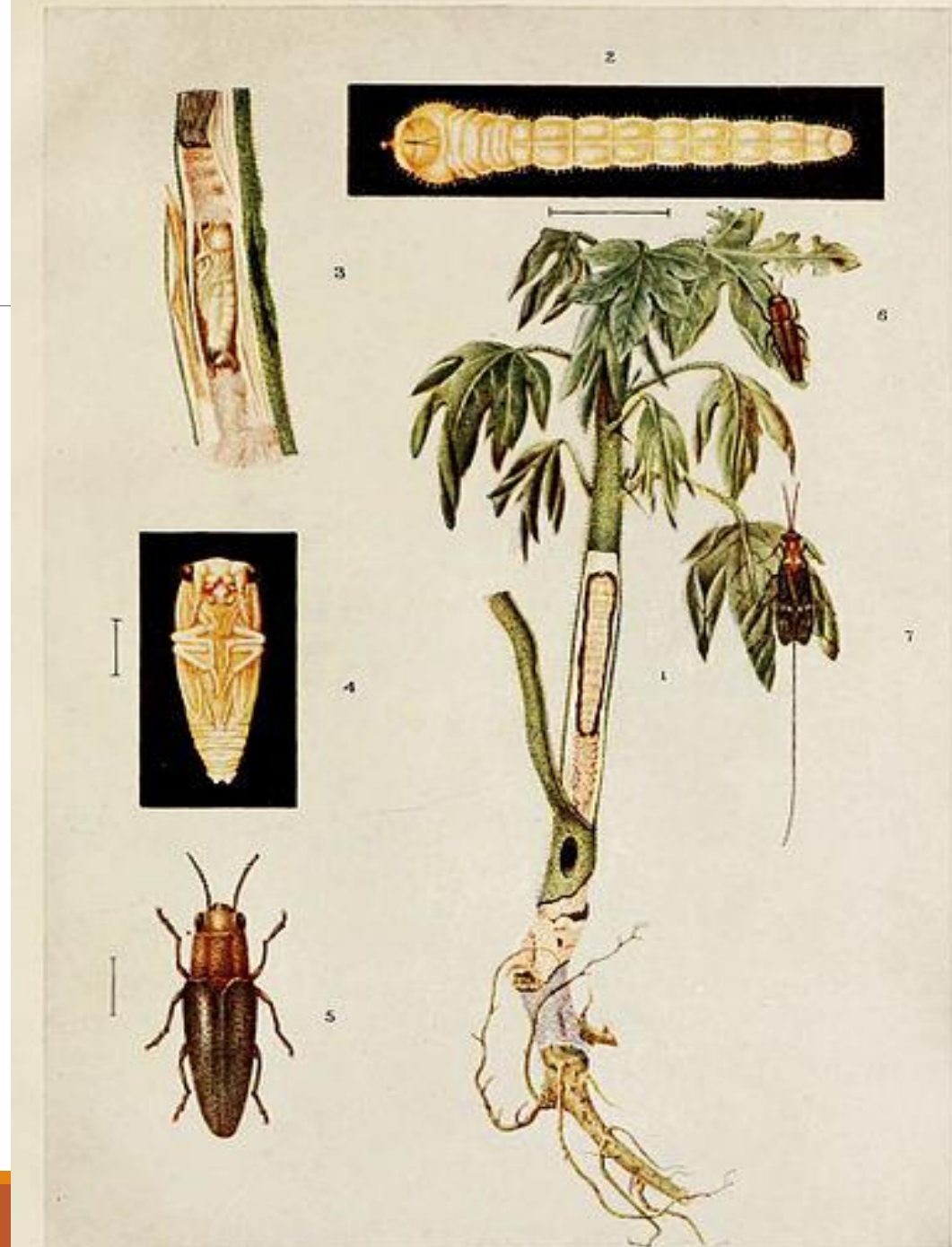
Biology

- **The beetles lay scale like eggs and glue them on to the branches.**
- **The slender grubs bore into the branches and travel down the main stem and ultimately reach the tap root.**
- **S.O.P. inside the tunnels.**
- **The pupal period lasts 7-10 days.**
- **The beetles emerge from the tunnels by cutting their way out and they start the next generation.**



Nature of Damage

- The grub of this beetle bores into the stem close to the soil surface and root and cause wilting and drying of plants.
- The damage appears in patches



Management

- **The pest can be suppressed by cutting and destroying the infested branches thus preventing the grubs from entering the tap-root.**
- **The grubs are parasitized by a braconid, *Glyptomorpha smenus* (Braconidae).**
- **No Chemical control is possible.**

5. Red hairy caterpillars

S.N: *Amsacta albistriga* and *Amsacta moorei*
(Arctiidae: Lepidoptera)

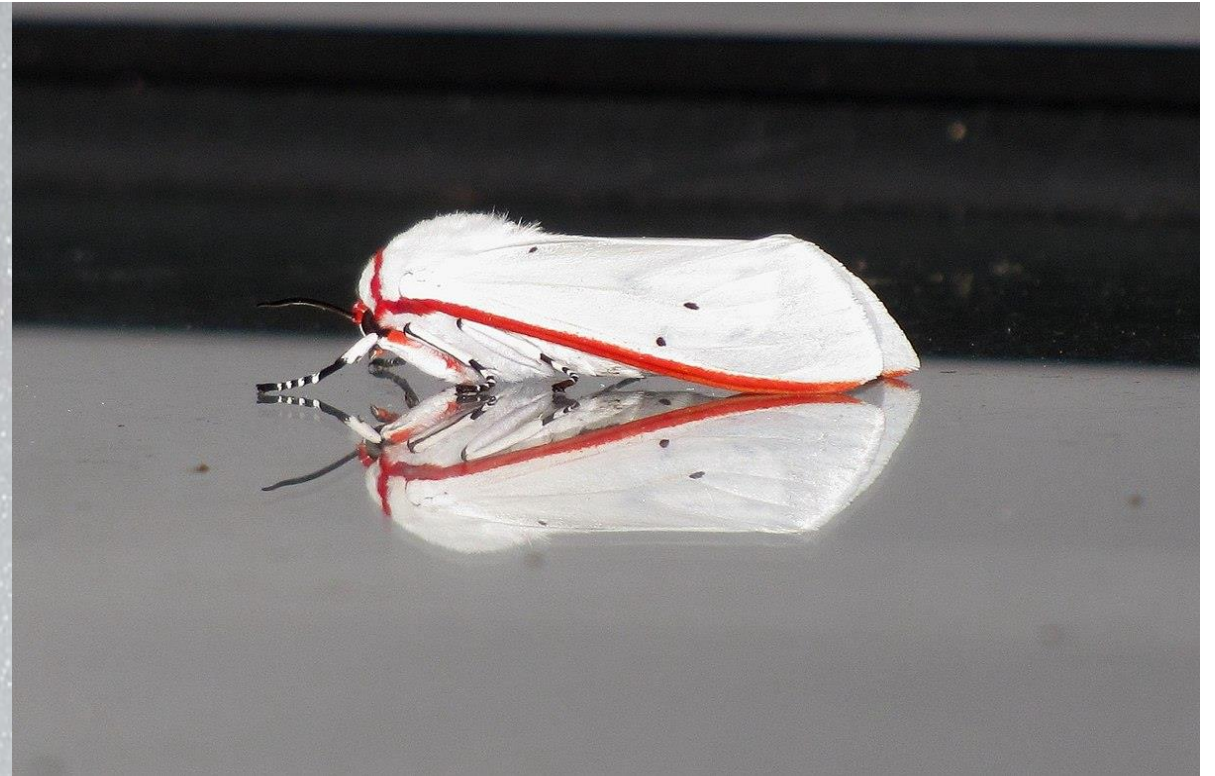
- **Distribution:** This is very serious and a devastating pest of **rainfed groundnut crop**.
- It is endemic one and its outbreak in various tracts is largely dependent on the climatic conditions and the local agricultural practices of the tracts concerned.
- **Sporadic pest [ARS PRE/NET 2014]**
- **Host range:** Groundnut, cowpea, sorghum, cotton, *Pennisetum ryploideum*, *Rhynchosis minima*, finger-millet and castor.



Morphology

- **The adults are medium sized moths.**
- **In *A. albistriga* the fore wings are white with brownish streaks all over and yellowish streak along the anterior margin and the hind wings white with black markings.**
- **A yellow band is seen on the head.**
- **In *A. moorei* the anterior marginal streak of fore wings and the band on head are red in colour.**
- **Both species are found together.**

Amsacta albistriga and *Amsacta moorei*



Amsacta albistriga and *Amsacta moorei*

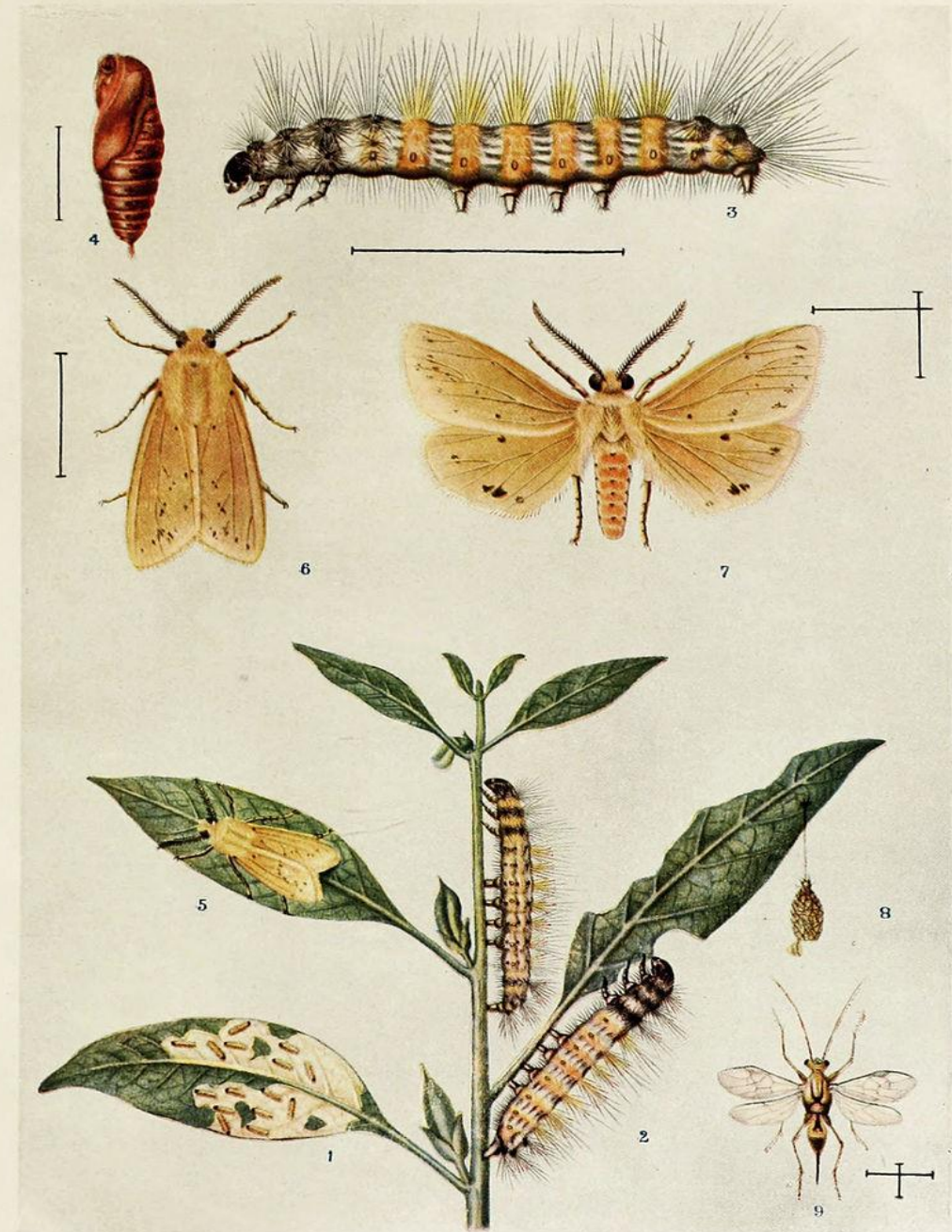


Biology

- **After the receipt of heavy rains the moths emerge from their earthen cells in the soil.**
- **The emergence may take place in waves depending on the frequent receipt of showers subsequently.**
- **Severe incidence of red hairy caterpillar occurs under high temperature and high soil moisture [CSB, 2017 Scientist-B Exam]**
- **The moths mate and commence oviposition on the same day.**
- **The egg laying may last for 2 to 6 days.**
- **The creamy or bright yellow eggs are laid in groups mostly on the under surface of cowpea leaves usually sown along with groundnut as an inter crop and also on groundnut and occasionally on other vegetation, clods of earth, stones, and dry twigs.**
- **The Egg and larval periods are 2-3 and 40-50 days respectively.**

Biology

- With the receipt of some showers, the grown up larvae burrow into the moist soil and pupate in earthen cells at a depth of 10 to 20 cm.
- The larvae may be annihilated in large numbers if rain fails at this critical stage of its development.
- They pupate mostly along field bunds and in moist and shady areas under trees in the field.
- The insect undergoes pupal diapause in the soil till next year.



BEHAR HAIRY CATERPILLAR.

Nature of Damage

- **The larvae that hatch out from the eggs feed gregariously by scraping the under surface of tender leaflets leaving the upper epidermal layer intact.**
- **As they grow they feed voraciously on leaves leaving behind the petiole and midribs of leaves and the main stem of plants and may be seen marching from one field to another in thousands.**
- **The severely damaged crop presents the appearance as though the entire area has been grazed by cattle.**
- **Often it results in total loss of pods.**
- **Skeletonize of leaves and total defoliation leaving only midribs of groundnut.**
- **Though it is principally a major pest of groundnut it prefers cowpea to a great extent.**



Management

- **The pupae may be collected at the time of summer ploughings and destroyed.**
- **Setting bonfires or light traps attract the moths.**
- **Dig out a trench around the field (1 X 1 foot) to trap migrating hairy caterpillars and later to destroy them**
- **Vegetative trapping of migratory larvae by keeping twigs of *Jatropha* or *Calotropis* is practiced.**
- **Egg masses should also be collected and destroyed [JRF 2006]**
- **Stray grown up larva found in the field may be collected and destroyed.**
- **Nuclear polyhedrosis virus has been found promising**
- **Natural enemies of the insect include the predatory pentatomid bug *Eocanthecona furcellata* attacking the larvae and the larval parasitoids viz., *Cotesia flavipes*, *Glyptapanteles creatonoti* (Braconidae), *Exorista civiloides*, *Sturmia inconspicua* and *Tachina fallax*.**
- **The larvae are also infected by the fungus *Aspergillus sp.***

Management

- **A week after emergence of moths the field should be dusted with methyl parathion 2% dust to kill the first instar larvae which are vulnerable at this stage.**
- **Grown up larvae are killed by spray application of [has alone 0.05% or parathion 0.05% at 2.5 liters per hectare.**

6. Termites

S.N: *Odontotermes obesus*
(Termitidae: Isoptera)

- Termites are serious pests of groundnut in WB, UP, Rajasthan, Gujarat, Haryana and Punjab
- The termites are endemic in red and sandy soils in Karnataka
- These are social insects, live in termitarium, with indistinct castes i.e., Workers, Soldiers, King and Queen
- Workers are small (4mm) and have a soft, white body and brown coloured head



Nature of Damage

- They attack tap root system and make it hollow as a result
- Wilting of plants in patches
- Premature death of plant.
- They also attack the pods and scarifies i.e. it feeds on outer surface of the pods as a results in weaken the shells, make them liable to entry and growth of fungi, *Aspergillus flavus* that produce 'aflotoxins'
- Loss – 5-50% depending upon the intensity of attack.



Management

- **Repeated mechanical cultivation reduces the termite population**
- **Harvesting the groundnut as soon as they mature and early removal of produce from the field will reduce the termite damage to pods**
- **Locate termite colony and destroy queen by removing her physically by breaking open the mounds or treating the mounds with chemicals**
- **By inserting the mounds with aluminium phosphide tablets @ 2 tablets / 1 mt. area mound and close all openings with mud after inserting the tablet.**
- **In place of fumigant, pour chlorpyrifos 20 EC @ 3-5 ml / lit. i.e. 18 lit. of water / mound**
- **Pour the solution through the hole made in the center of closed mound or through an open chimneys in case of open mounds**
- **Application of carbofuran 3G @ 10kg / acre or phorate 10 G @ 8 kg / acre**

7. Pod borer (Ear wig)

S.N: *Anisolabis annulipes*
(Forficulidae: Dermaptera)



- It is a pest of groundnut in South India
- It is distributed in TN and Karnataka
- Adult is a dark brown to black coloured insect with forceps like cerci and leg joints are white in colour
- Eggs laid in soil or pods
- They attack the pods and bores and they feeds on the kernels and bored pods are plugged with excreta, sand particles and discolored pulp.
- Causing up to 20% loss to the yield.





Thank you...

INSECT PESTS OF MUSTARD



PESTS OF NATIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Sawfly	<i>Athalia lugens proxima</i>	Tenthredinidae	Hymenoptera
2	Aphid	<i>Myzus persicae</i> , <i>Lipaphis erysimi</i>	Aphididae	Hemiptera
3	Painted bug	<i>Bagrada hilaris</i>	Pentatomidae	Hemiptera
4	Pea Leaf-miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera

PESTS OF REGIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	DBM	<i>Plutella xylostella</i>	Plutellidae	Lepidoptera
2	Bihar hairy caterpillar	<i>Spilosoma oblique</i>	Arctiidae	Lepidoptera
3	Head borer	<i>Hellula undalis</i>	Pyralidae	Lepidoptera
4	Leaf webber	<i>Crocidolomia binotalis</i>	Pyralidae	Lepidoptera

MINOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Jassid	<i>Empoasca binotata</i>	Cicadellidae	Hemiptera
2	Flea beetles	<i>Phytotreta cruciferae</i>	Chrysomelidae	Coleoptera
3	Leaf-miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera
4	Cabbage Butterfly	<i>Pieris brassicae</i>	Pieridae	Lepidoptera
5	Noctuid larvae	<i>Agrotis ipsilon</i> , <i>Helicoverpa armigera</i>	Noctuidae	Lepidoptera

Crop-stage wise IPM

Crop stage	Pest
Seedling	Aphid, Painted bug, Mustard sawfly, Bihar hairy caterpillar
Vegetative	Painted bug, Mustard sawfly, DBM, Leaf miner, Head borer and leaf Webber, Bihar hairy caterpillar
Flowering	Aphid, BHC, DBM
Pod formation	Aphids

1. Mustard Aphid

S.N: *Lipaphis erysimi*

(Aphididae: Hemiptera)

- **Distribution:** World-wide.
- **Host range:** toria, sarson, raya, taramira, cabbage, cauliflower, knolkhol, etc.
- **Morphology:** Adults and nymphs are louse like, pale-greenish insects.



Biology

- **This insect is most abundant from December to March when it infests various cruciferous oilseeds and vegetables.**
- **During summer, it is believed to migrate to the hills and evidence that aphids also survive on abandoned stray plants of cabbage and on cruciferous weeds in the plains.**
- **The pest breeds parthenogenetically, They grow very fast and are full-ted in 7-10 days.**
- **About 45 generations are completed in a year.**
- **Cloudy and cold weather (20°C or below) is very favorable 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.**



Nature of Damage

- **Both the nymphs and adults suck cell-sap from leaves, stems, inflorescence or the developing pods.**
- **Due to the very high population of the pest, the 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

- Sow the crop early wherever possible, preferably up to third week of October.
- Apply recommended dose of fertilizers.
- Conserve parasitoids- *Diaeretiella rapae* (Braconidae) and *Lipolexis gracilis*.
- Conserve Predators- *Brinckochrysa scelestes* (Chrysopidae), *Coccinella septempunctata* and *Menochilus sexmaculatus* (Coccinellidae); *schiodon scutellaris* and *Syrphus serarius* (Syrphidae).
- Pathogenic Fungi- *Entomophthora coronata* and *Cephalosporium aphidicola*
- Apply any one 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: **625-1000 ml of oxydemton methyl 25EC, dimethoate 30EC, quinalphos 25EC, malathion 50EC: 940-1500 ml of chlorpyrifos 20 EC** in 200-315 litres of water per ha depending on the stage of the crop..

2. Painted Bug

S.N: *Bagrada hilaris*

(Pentatomidae: Hemipter)

- **Distribution:** Myanmar, Sri Lanka, India, Iraq, Arabia and East Africa.
- **Host range:** cruciferous crops, rice, red gram, sugarcane, indigo, coffee etc
- **Morphology:** Nymphs are black with a number of brown markings.
- Adults are sub-ovate, black and have a number of orange or brownish spots.



Biology

- **The painted bug is active from March to December and during this period all 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 life-span of 3-4 weeks.**
- **The eggs hatch in 3-5 days during summer and 20 days during December.**
- **The nymphs develop fully in five stages and transform themselves into adults in 16-22 days during the summer and 25-34 days during the winter.**
- **The entire life-cycle is completed in 19-54 days and it passes through 9 generations in a year.**

Bagrada bug life stages



Nature of Damage

- **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

- Give first irrigation 3-4 weeks after sowing as it reduces the bug population significantly.
- The eggs are parasitized by *Gryon sp.* (Scelionidae), while *Alophora sp.* (Tachinidae) parasitize the adults.
- Spray one liter of malathion 50 EC or quinalphos 25 EC in 150-200 liters of water per ha once in October and again in March-April.

3. Mustard Sawfly

S.N: *Athalia lugens proxima*

(Tenthredinidae: Hymenoptera)

- **Distribution:** Asian Countries.
- **Host range:** Mustard, toria (*Brassica campestris*), rapeseed, cabbage, cauliflower, knol-khol, turnip, radish, etc.
- This is one of the very few hymenopterous insects noticed to infest crops in India.
- **Hymenopteran pest belonging to family- Tenthredinidae, Cephidae, Eulophidae etc.**
[JRF-2006].



Morphology

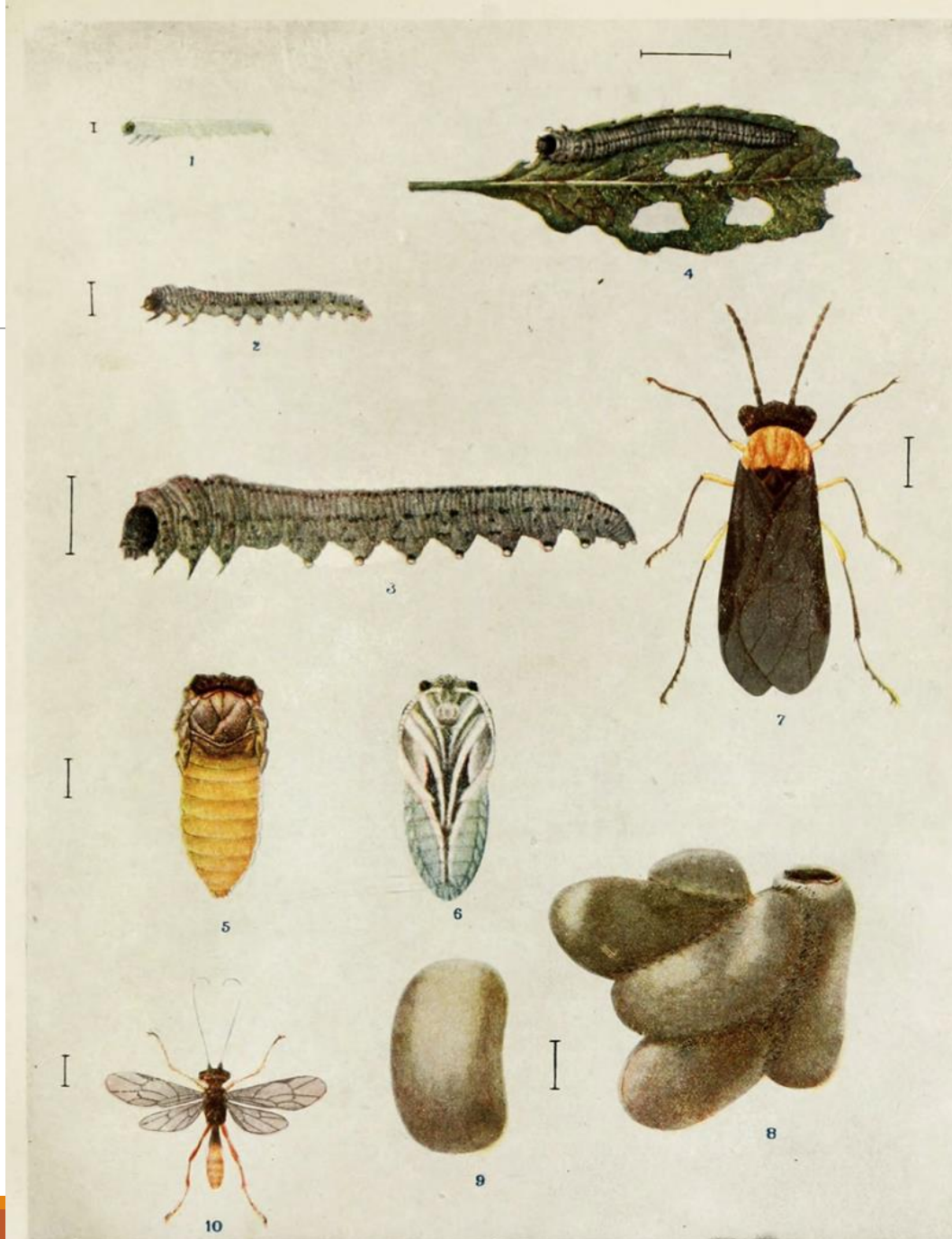
- Larvae which are dark green and have 7 pairs of abdominal prolegs on abdominal segments 2 to 8.
- There are five black stripes on the back, and the body has a wrinkled appearance.
- The adult is black with yellowish femora and thorax.





Biology

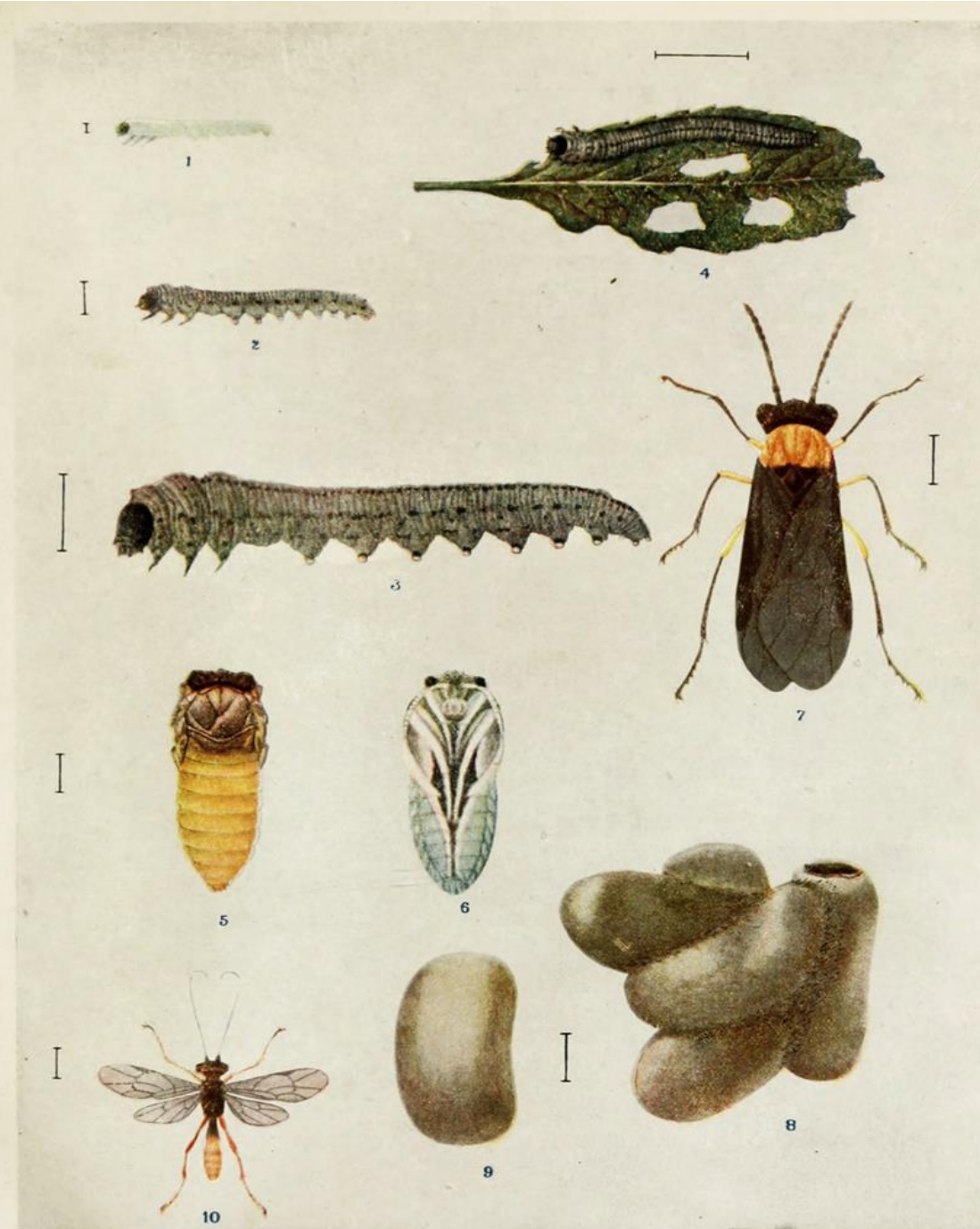
- It is a pest of cold weather active from October to March and the larvae rest in their pupal cocoons in the ground during summer.
- **S.O.O. singly in slits made with saw like ovipositors along the underside of the leaf margins [ARS PRE/ NET 2016, ICAR NET 2019]**
- The egg, grub and pupal periods are 4-8, 13-18 and 10-15 days respectively.
- Larvae remain hidden during the day time and, when disturbed, fall to the ground and feign death.



MUSTARD SAWFLY.

Biology

- **S.O.P-** in the soil to a depth of 25-30 mm in water proof cocoons [ARS NET 2013].
- The pest completes 2-3 generations from October to March.
- **Parthenogenetic development is also observed.**



MUSTARD SAWFLY.

Nature of Damage

- it is a serious pest of all cruciferous plants at seedling stage.
- 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

- *Perilissus cingulatar* (Ichneumonidae) parasitizes the grubs.
- The bacterium, *Serratia marcescens* (Enterobacteriaceae) causes mortality of the grubs.
- Spray application of carbaryl 0.1% or methyl parathion 0.025% controls the pest.

4. Green Peach Aphid

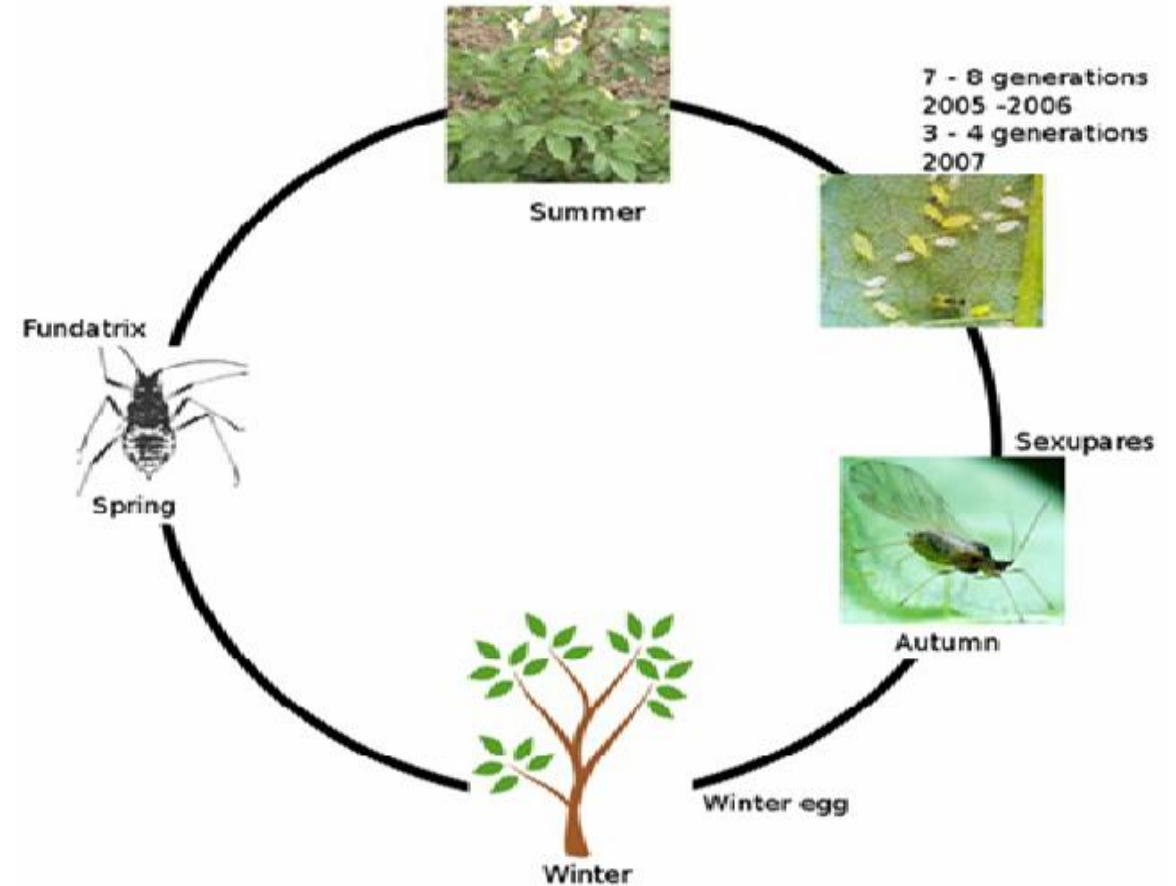
S.N: *Myzus persicae*
(Aphididae: Hemiptera)

- **Distribution:** distributed throughout India.
- **Host range:** Mustard and other cruciferous plants, peaches, beans, potato, tobacco, etc.
- **Morphology:** pear-shaped, yellowish-green winged or wingless insects.
- *Lipaphis erysimi* is pale green coloured aphid,
- *Myzus persicae* is yellowish green in colour [JRF 2002]



Biology

- Active from December to March with peak activity during February.
- The nymph undergoes 4-5 instars taking 4-7 days for apterous and 8 days for alate forms.
- Longevity of adult is 15-27 days for alate and 10-25 days for apterous forms.



Damage

- **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 honey dew attracts sooty mould.**



Management

- **In mustard early sowing is done to protect the crop from Aphids.**
- **Sow the crop in first week of October.**
- **Spray 500 ml of dimethoate 30EC or 625 ml of oxydemeton methyl 2SEC in 250 liters of water/ha or imidacloprid 0.01% or acetamiprid @ 0.01% when aphids start congregating on top flower buds.**
- **Only one spray is needed.**

5. Pea Leaf-miner

S.N: *Chromatomyia horticola*
(Agromyzidae: Diptera)

- **The larvae feed by making mines into the leaves and cause heavy damage.**
- **The systemic insecticides Oxydemeton methyl 25 EC or dimethoate 30 EC or granular insecticides recommended for the control of mustard aphid should also be used for controlling the leaf-miner.**





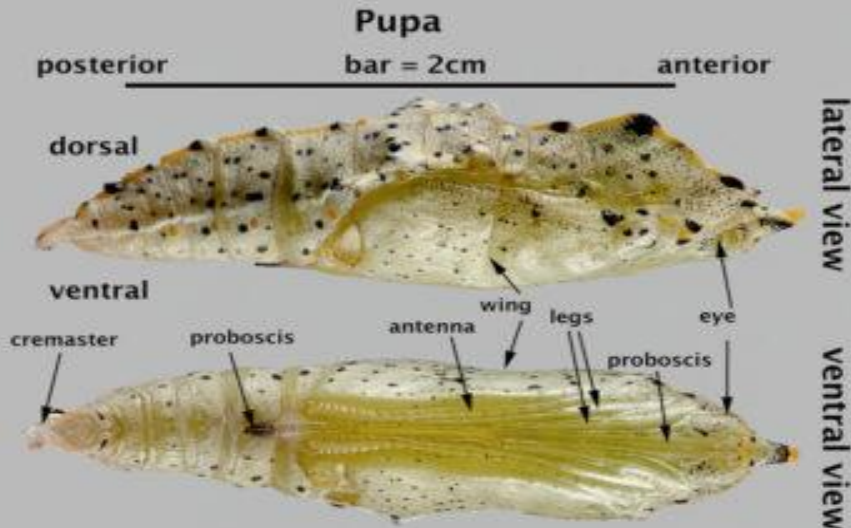
6. Cabbage Caterpillar

S.N: *Pieris brassicae*
(Pieridae: Lepidoptera)

- **The caterpillars feed on leaves, young shoots and green pods.**
- **When young, they feed gregariously but the grown-up caterpillars migrate from one field to another.**
- **When in the gregarious stage, the caterpillars can be easily controlled by picking and destroying the infested leaves.**
- **They should be controlled with malathion 5 per cent @ 37.5 kg per ha or 500 ml of dichlorvos 85 SL in 200-300 litres of water per ha**



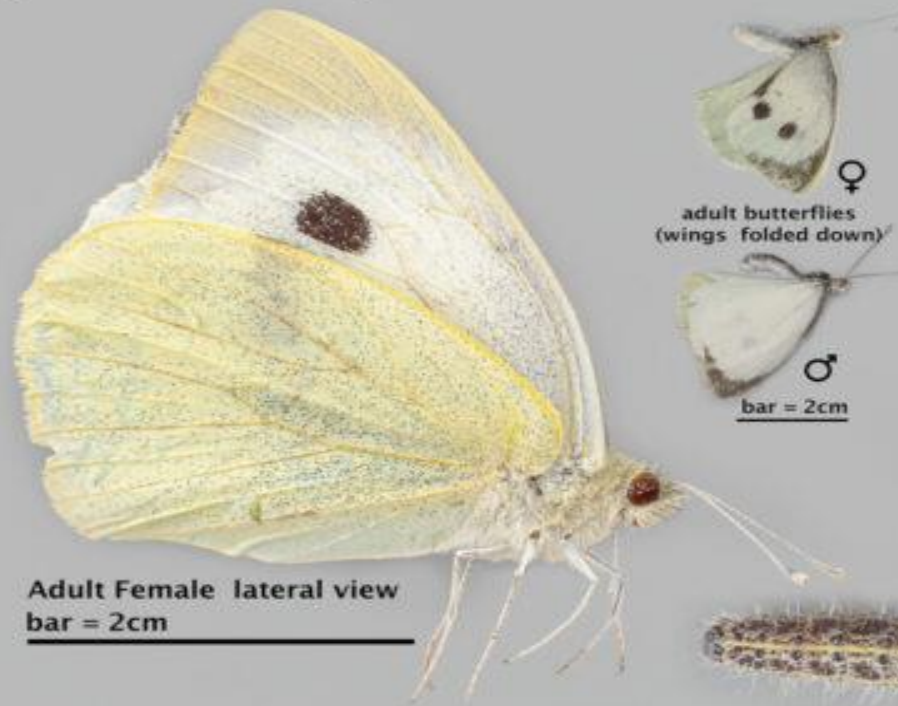
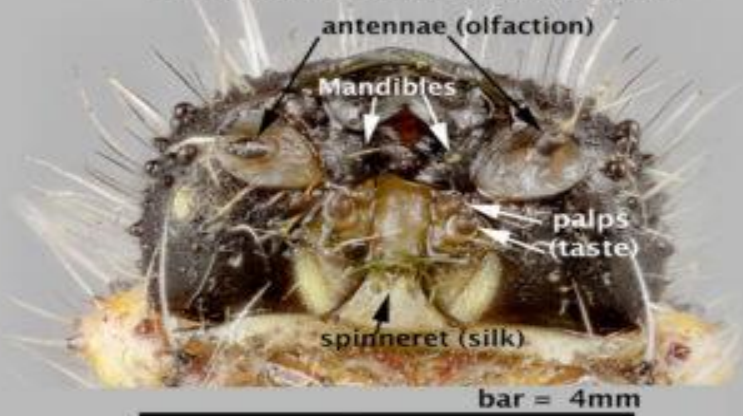
Development of the Large White (*Pieris brassicae*)



pre-pupa, lateral view



L5 head anterior-ventral view



head capsule width per larval instar (mm):

Instar	Head capsule width (mm)
L1 (neonate)	0.8-0.9
L2	1.75-1.8
L3	2.5-2.6
L4	3.25-3.49
L5	4.0-4.2



size data from:
Brosenski, M., & Cupta, M. K. (2017). Biology of Cabbage Butterfly *Pieris brassicae* Linn. (Lepidoptera: Pieridae). Int. J. Curr. Microbiol. Appl. Sci. 6, 3639-3644.

THANK YOU....



INSECT PESTS OF SUNFLOWER



Dr. NIHAL R

Dr. NIHAL R

MAJOR PESTS OF NATIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Head borer	<i>Helicoverpa armigera</i>	Noctuidae	Lepidoptera
2	Defoliators	<i>Spodoptera litura</i> , <i>Spilosoma oblique</i>	Noctuidae Arctiidae	Lepidoptera
3	Semilooper	<i>Thysanoplusia orichalcea</i>	Noctuidae	Lepidoptera
4	Red hairy caterpillar	<i>Amsacta lactina</i> , <i>Amsacta moorei</i>	Arctiidae	Lepidoptera
5	Weevil	<i>Mylocerus undecimpustulatus</i>	Curculionidae	Coleoptera
6	Bug	<i>Nezara viridula</i>	Pentatomidae	Hemiptera
7	Leaf hopper	<i>Amrasca bigutulla bigutulla</i>	Cicadellidae	Hemiptera

MAJOR PESTS OF NATIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
8	Aphid	<i>Uroleucon carthami</i>	Aphididae	Hemiptera
9	Cotton aphid	<i>Aphis gossypii</i>	Aphididae	Hemiptera
10	Thrips	<i>Microcephalothrips abdominalis</i>	Thripidae	Thysanoptera
11	Fruit fly	<i>Craspedoxantha octopunctata</i>	Tephritidae	Diptera
12	Whitefly	<i>Bemisia tabaci</i>	Aleyrodidae	Hemiptera
13	Green potato bug	<i>Nezara viridula</i> <i>Dolycoris indicus</i>	Pentatomidae	Hemiptera
14	Pea leaf-miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera

MAJOR PESTS OF NATIONAL SIGNIFICANCE

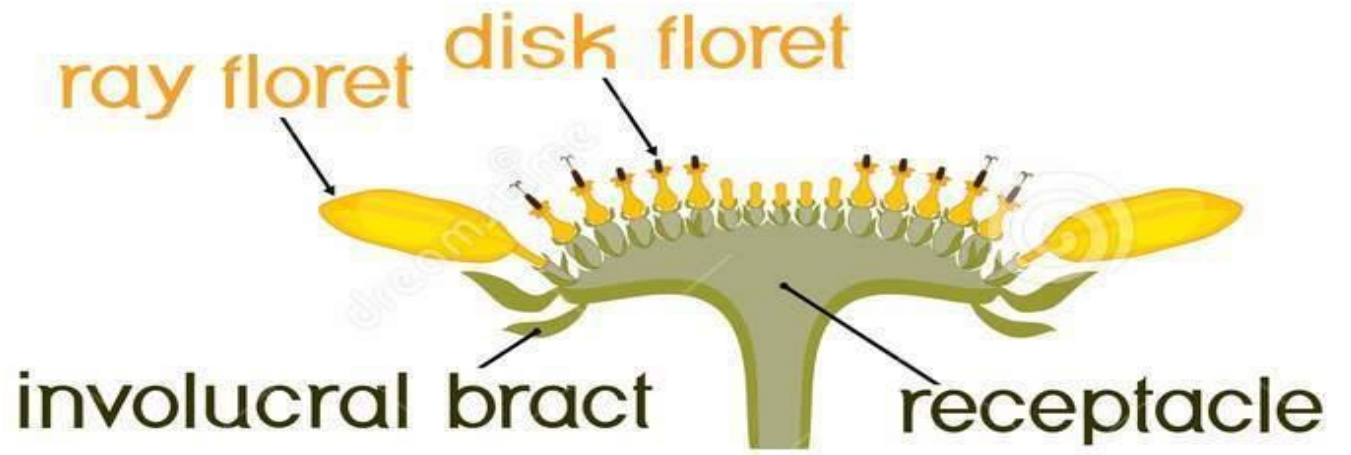
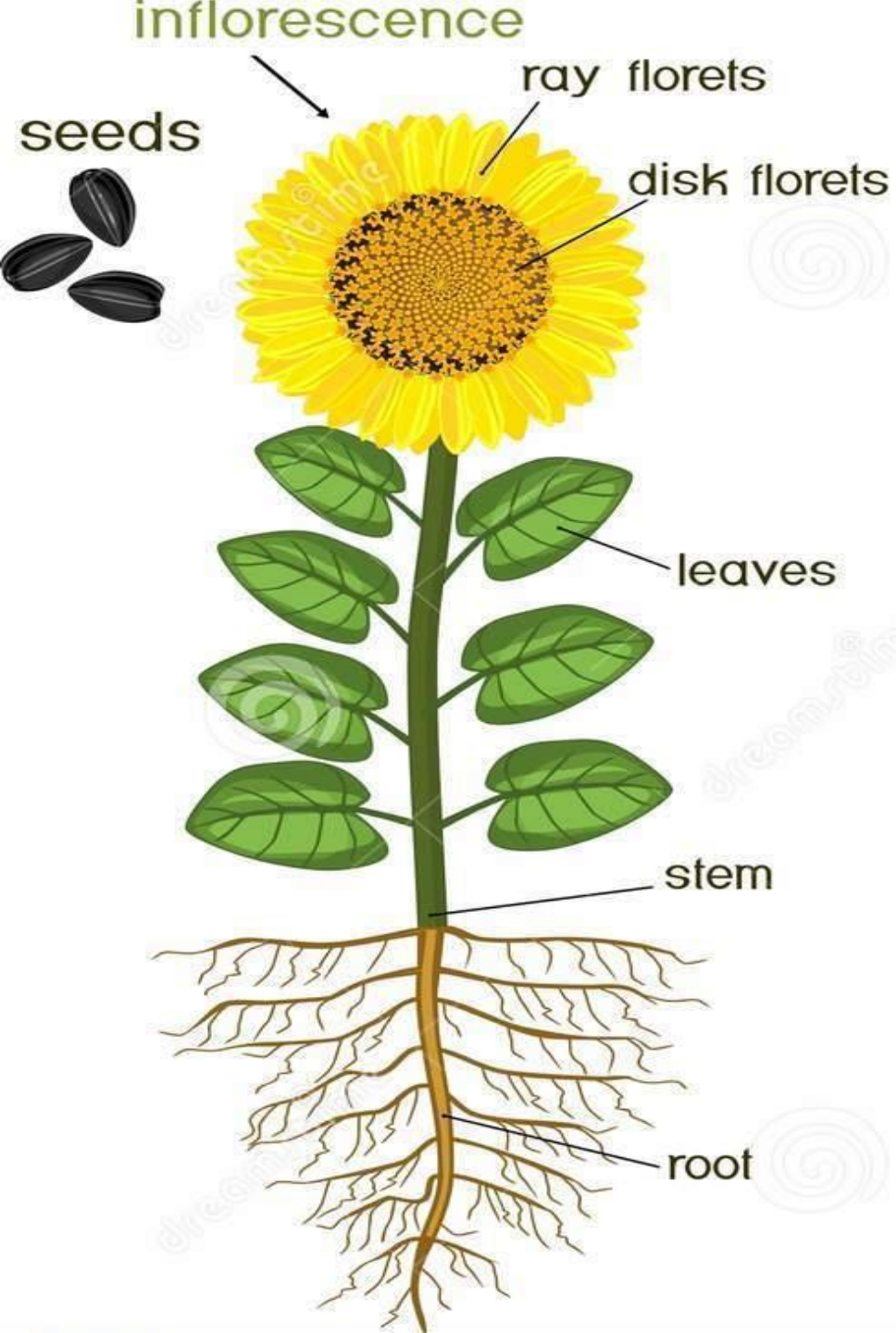
Sl. No.	Common Name	Scientific Name	Family	Order
15	Castor hairy caterpillar	<i>Euproctis subnotata</i>	Lymantriidae	Lepidoptera
16	Greasy cutworms	<i>Agrotis ipsilon</i>	Noctuidae	Lepidoptera
17	Parrot	<i>Psittacula krameri</i>		
18	House sparrow	<i>Passer domesticus</i>		
19	Dove	<i>Streptopelia risoria</i>		
20	Crow	<i>Corvus splendens</i>		

1. Head Borer

S.N: *Helicoverpa armigera*
(Noctuidae: Lepidoptera)

- **On a bloom, usually, larvae on hatching would get into the bottom of the peripheral florets and feed on ovaries.**
- **The head or capitulum borer causes considerable damage to developing grains in the head capsule.**
- **During pre-anthesis stage they feed scraping the bracts first and later feed through ray-florets which cover disc florets and finally find access to immature seeds.**
- **The larval growth is better supported by developing seeds.**
- **The young larva first attacks the tender parts like bracts and petals, and later reproductive parts of the flower heads.**





inflorescence



Nature of Damage

- **Bigger larvae mostly feed on seeds by making tunnels in the body of the flower heads and often remain concealed.**
- **They may also shift to the backside of the heads and even leaves, and feeding may continue up to maturity.**
- **Star bud stage of the crop is most vulnerable and suffers maximum yield loss.**



5586530



5586529



5586528

Management

- **Spray of NPV @ 250 LE/ha.**
- **Spray NSKE (5%)**
- **Spray 2.0 kg of acephate 75SP or 2.5 liters of chlorpyrifos 20EC or 1.25 liters of monocrotophos 36SL in 250 litres of water per ha at the initiation of star bud stage, and repeat after two weeks if necessary**

2. Tobacco caterpillar: S.N: *Spodoptera litura* (Noctuidae: Lepidoptera)

- **Distribution:** in all sunflower growing areas.
- **Biology:** S.O.O. underneath the leaves in clusters.
- Egg, larval and pupal periods are 3-4, 15-28 and 7-10 days respectively.
- S.O.P. in the soil in an earthen cell.
- Early instar larvae scrape on green matter that give a mesh like appearance to damaged leaves.
- Older larvae cause total defoliation.



Management

- **Monitoring adults through pheromone traps**
- **Collection and destruction of egg masses and gregarious early instars present on undersurface of leaves.**
- **Spray of monocrotophos 0.05% or dichlorvos 0.05% or cypermethrin 0.005% in 500 liter water/ha in case of severe incidence.**
- **Use of poisoned bran bait (125 ml monocrotophos + 1 kg jaggery + 10 kg rice bran) is effective against later instars.**

3. Bihar hairy caterpillar S.N: *Spilosoma oblique* (Arctiidae: Lepidoptera)

- **The larvae are foliage feeders.**
- **Early instars feed on chlorophyll and later instars defoliate the crop.**
- **Drying up of infested leaves is a characteristic symptom.**



Management

- **Collection of infested leaves which show characteristic drying symptoms will reduce the population to a great extent because of the gregarious nature of young larva.**
- **Spraying contact insecticides quinalphos or carbaryl at 0.05 -0.1%.**

4. Green semiloopers:

S.N: *Trichoplusia ni*, *Thysanoplusia orichalcea*
(Noctuidae: Lepidoptera)

- **Distribution:** Regular pest of sunflower in Maharashtra, Karnataka during august and September
- **Host range:** cotton, legumes, solanaceous plants, sweet potato and some cucurbits.



Nature of Damage

- Larvae are green in colour with a thin white lateral line and two white lines on the back, active and form loop in motion; swollen at posterior end and tapers anteriorly.
- **Pupate in white transparent silken cocoons in leaf litter or crop debris. Life cycle takes 30 days.**
- **Early instars feed on chlorophyll of tender leaves causing transparent leaf spots, later feed from leaf margin and defoliate leaving midribs in case of severe incidence.**
- **Spray quinalphos 0.05% or 500 ml of dichlorvos 85SL in 250 litres of water per ha.**
- **Repeat after two weeks, if necessary.**



5. Leaf hoppers

S.N: *Amrasca biguttula biguttula*
(Cicadellidae: Hemiptera)

- The incidence would start from seedling stage and prevail right through entire plant life.
- Stunted growth of plant, cupped and crinkled leaves, burnt appearance of leaf margins
- Summer crops are likely to suffer more with this pest than kharif crop.
- S.O.O into the spongy parenchymatous tissue between the vascular bundles and the epidermis.
- The nymphs moult five times and the whole life cycle is completed in two weeks to more than a month.



Management

- **Insecticides like phosphamidon (0.03%) or dimethoate (0.03%) or monocrotophos (0.05%) or imidacloprid (0.019%) may be sprayed @ 650-700 liter spray solution per hectare if the pest build up is very high.**
- **Seed treatment with imidacloprid @ 5g and 7.5 g/ kg of sunflower seed protects from jassid up to**
- **35 - 40 days after sowing.**



Thank You

INSECT PESTS OF SESAME



Dr. Nihal R

MAJOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Leaf webber	<i>Antigastra catalaunalis</i>	Crambidae	Lepidoptera
2	Gall fly	<i>Aspondylia sesami</i>	Cecidomyiidae	Diptera
3	Aphid	<i>Aphis gossypii</i>	Aphididae	Hemiptera
4	Sphinx caterpillar	<i>Acherontia styx</i>	Sphingidae	Lepidoptera
5	Leaf hopper	<i>Orosius albicinctus</i>	Cicadellidae	Hemiptera
6	Green bug	<i>Nezara viridula</i>	Pentatomidae	Hemiptera

MINOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Cricket	<i>Brachytrypes portentosus</i>	Gryllidae	Orthoptera
2	Lygaeid bugs	<i>Elasmolomus sordidus</i>	Lygaeidae	Hemiptera
3	Pentatomid bugs	<i>Eusarcocoris ventralis</i>	Pentatomidae	Hemiptera
4	Caterpillars	<i>Spilosoma obliqua, Amsacta moorei, Pericalia ricini</i>	Arctiidae	Lepidoptera
		<i>Spodoptera exigua, Pulsia signata</i>	Noctuidae	Lepidoptera
5	Weevils	<i>Tanymecus chloroleucas</i>	Curculionidae	Coleoptera
6	Sesamum midge	<i>Dasineura sesame</i>	Cecidomyiidae	Diptera

1. Til Leaf and Pod Caterpillar

S.N: *Antigastra catalaunalis*
(Crambidae: Lepidoptera)

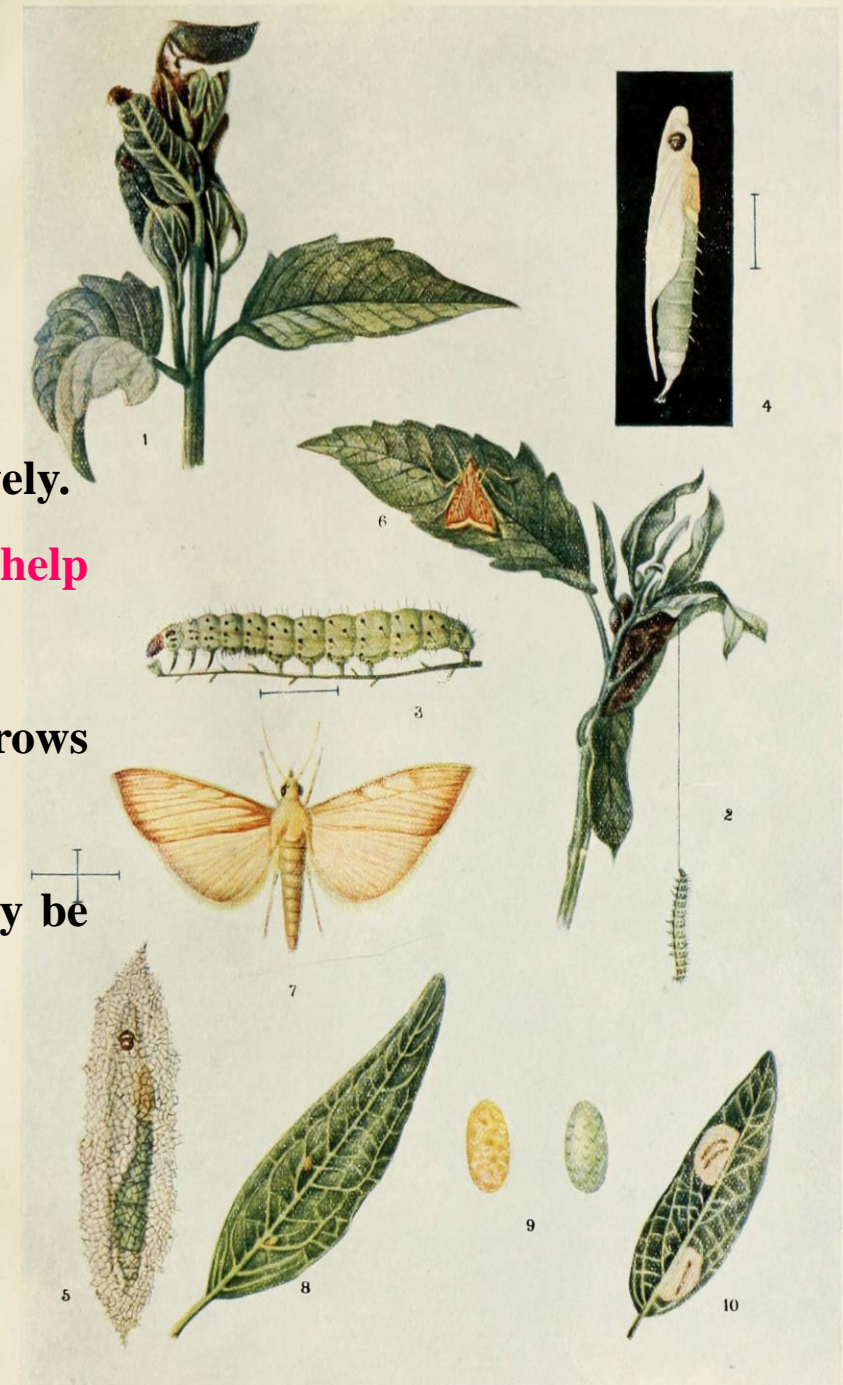


- **Distribution:** serious and regular pest of til and is also distributed throughout India
- **Morphology:** The eggs are shiny, pale-green.
- The full grown larva is pale green with black head and tubercles having thin hairs on the body.
- The moth is a small insect having dark brown markings on the wing-tips.



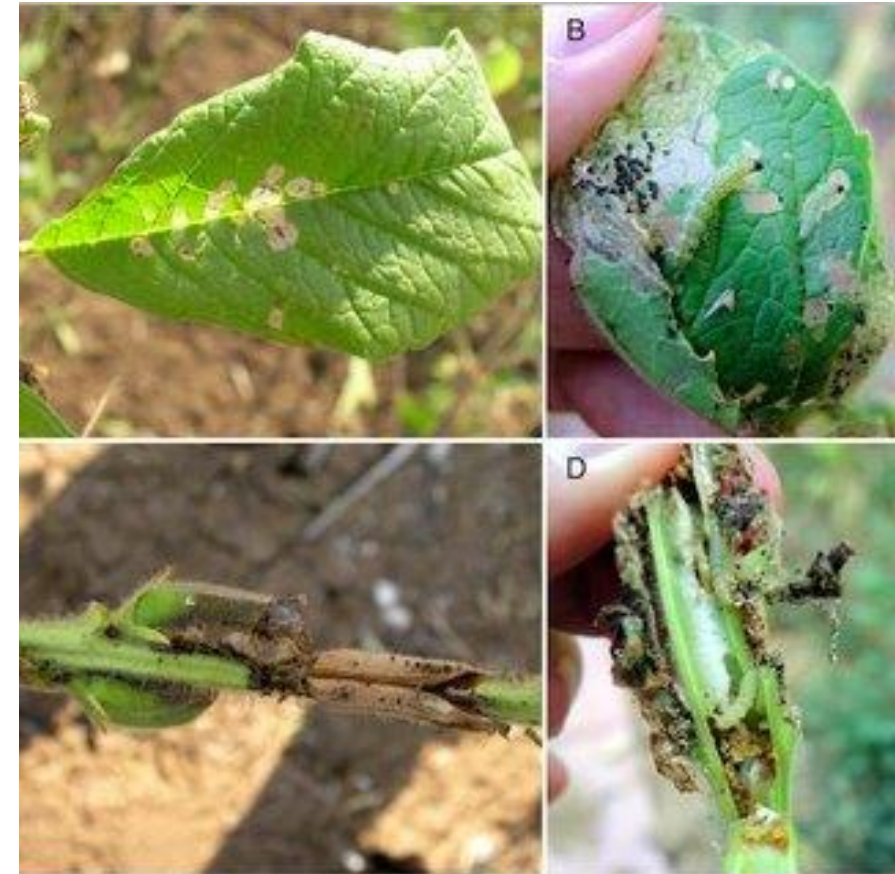
Biology

- **S.O.O. singly on the tender portions of plants at night.**
- The egg, larval and pupal periods are 2-7, 10-20 and 4-20 days respectively.
- **Soon after, it binds together the tender leaves of the growing shoot with help of silken threads and continues to feed in the webbed mass.**
- The size of this rolled mass increases gradually as the caterpillar grows older.
- It becomes full-grown in about 10 days in summer, but the period may be prolonged to 33 days in winter.
- **S.O.P. in soil or plant itself.**
- **Hibernates as a larva inside pods, stubble or the harvested stalks.**
- **Multivoltine pest**



Nature of Damage

- **The larvae web together the top leaves or bore into tender shoots and capsules and feed on them.**
- **An early attack kills the whole plant, but infestation of the shoots at a later stage hampers further growth and flowering.**
- **One larva can destroy 2-3 young plants.**
- **The maximum infestation occurs in May and again in September-October.**
- **A severe infestation of the pest will contribute to the low yield.**
- **The pest is capable of sustaining itself on some wild species of sesamum.**



Management

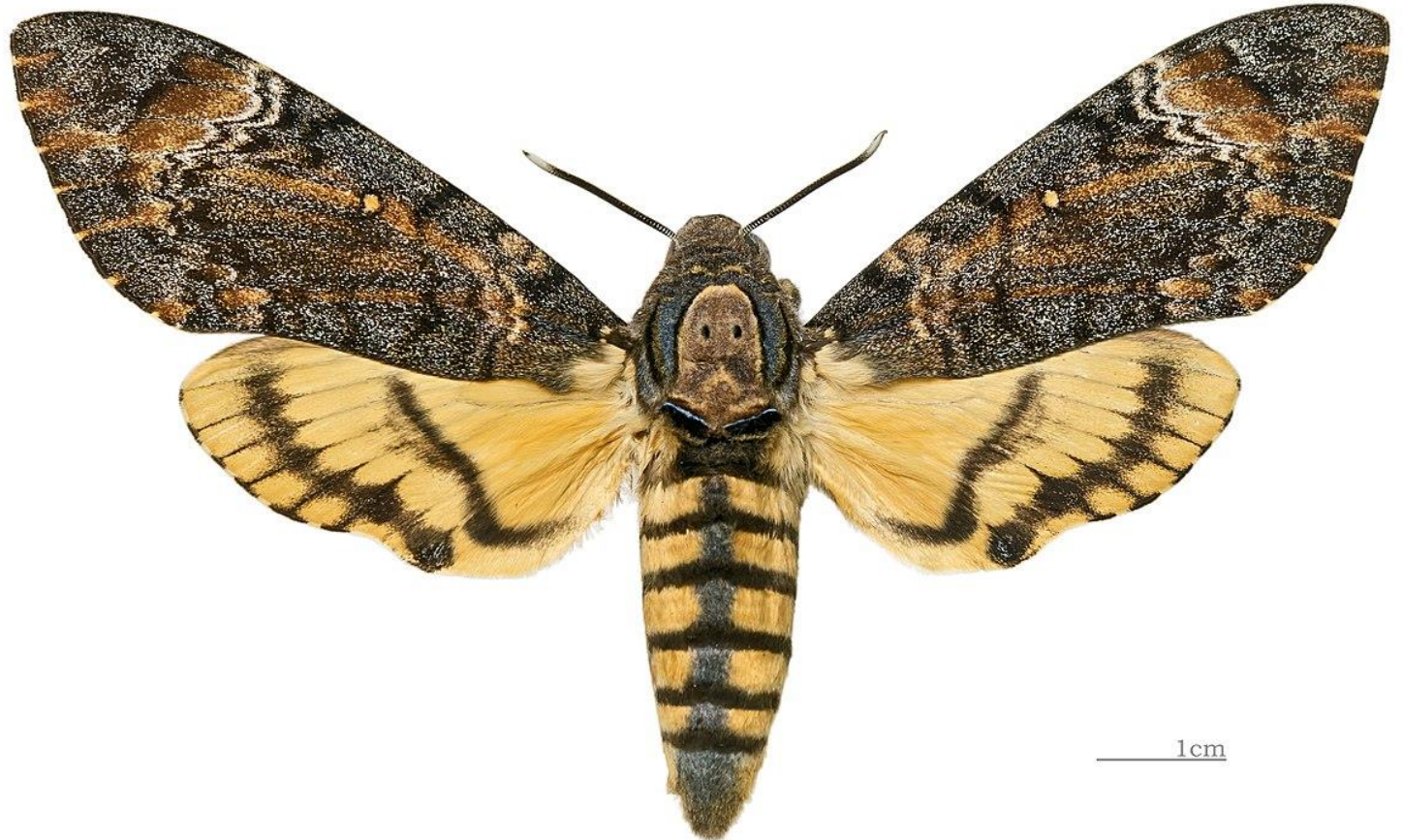
- Collect and destroy the webbed leaves and infested pods.
- Larval parasitoids *Bracon hebetor*, *B. kitcheneri* (Braconidae), *Cremastus flavoortictalis* and *Temelucha bigutula* (Ichneumonidae)
- **Spray the crop twice (first at pest appearance and then at flowering stage with 250 ml of fenvalerate 20 EC or 375 ml of deltamethrin 2.8 EC or thrice with 500 ml of cypermethrin 10 EC at pest appearance, flowering and pod formation in 250litres of water per ha.**

2. Til Hawk-moth

S.N: *Acherontia styx*

(Sphingidae: Lepidoptera)

- **Distribution:** Common in India
- **Host range:** Sesamum, potato, niger, brinjal, lablab and ornamental plants such as balsam, jasmine etc.



Morphology

- **Also known as hawk moth, sphinx-moth or death's head moth based on its structural and behavioral characteristics.**
- **The adult is a large reddish brown, robust thick set moth.**
- **The forewings are decorated with a mixture of dark brown and grey patterns with dark or black wavy markings and a prominent yellow spot on each wing.**
- **There is a prominent Death's head mark or skull -like marking on the thorax and violet and yellow bands on abdomen.**
- **The moths are swift fliers and often make hawk like darts to a source of light at dusk.**
- **The full-grown caterpillar, often retracts some of its anterior body segments and looks like a sphinx.**
- **The horn-like projections on the hind end of the abdomen are conspicuous.**
- **The body of the larva is plump and is decorated with a pleasant mixture of soft colours.**

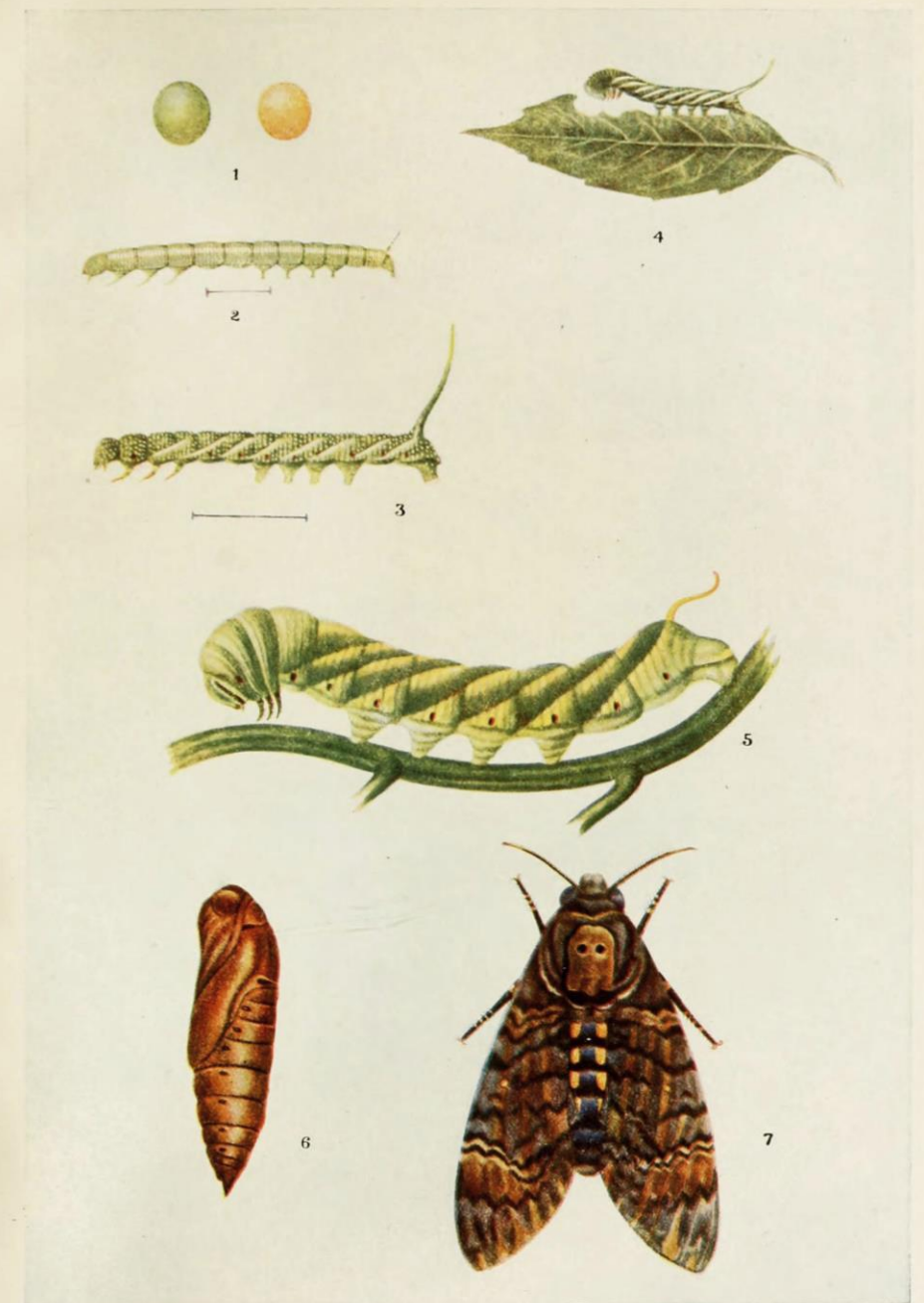


1 cm



Biology

- **S.O.O. singly on the underside of leaves.**
- **The pale-yellow larvae emerge in 2-5 days and start feeding on leaves.**
- **The larval period is usually long and may last two months or more.**
- **The changes in coloration of the larvae and adults aid them in protective mimicry.**
- **The impression of ferociousness created by the larva as well as by the moth is probably a protection against predators.**
- **There are 3 generations in a year.**
- **The winter is passed in the pupal stage in soil.**



TIL SPHINX.

Nature of Damage

- **The larvae feed voraciously on leaves and defoliate the plants.**
- **The insect is capable of inflicting heavy damage at times, but generally it is not a very serious pest in India.**
- **However, it draws our attention because of its peculiar characteristics.**
- **The moth is also harmful because it sucks honey from honey combs in apiaries, although at times is stung to death by the bees.**

Management

- **Hand-pick the larvae in the initial stages of attack and destroy by keeping in kerosene oil.**
- **Plough the field during winter to expose the hibernating larvae and pupa**
- **The eggs parasitoid - *Agriommatus acherontiae* (Pteromalidae)**
- **Larval parasitoid- *Apanteles acherontiae* (Braconidae)**
- **Dusting carbaryl 10% controls the pest.**

3. Sesame Gall-fly

S.N: *Asphondylia sesame*

(Cecidomyiidae: Diptera)

- **Distribution:** important and specific pests of gingelly
- occurs all over India



Biology

- **The adult is mosquito-like and small.**
- **The female lays eggs singly into the ovaries of flower buds, buds, flowers and developing capsules.**
- **The eggs hatch in 2-4 days.**
- **The young maggots feed on floral parts and cause malformation of the buds which fail to develop into seeds.**
- **The larvae complete their development in 14-21 days and pupate inside the galls.**
- **The fly emerge from the gall in 7-12 days.**
- **The life-cycle is completed in 23-37 days.**
- **There are several generations in a year.**

Nature of Damage

- The small whitish maggots feed on the ovary which results in the malformation of pod without proper setting of seeds.
- **When infestation is severe, the crop may be a total failure.**
- However, some varieties are comparatively resistant to its attack.



Management

- **Clip the galls and pick and burn the shed buds.**
- ***Eurytoma dentipectus* and *E. nesiotus* (Eurytomidae) parasitize its maggots.**
- **Dusting carbaryl 10% or quinalphos 1.5%D on the 25th, 50th and 65th day from sowing minimizes its incidence.**

Minor pests

4. Lygaeid bugs suck milk out of the seeds, feed on the tender shoots and capsules.
5. Cotton aphid *Aphis gossypii* infests the tender stem and leaves and causes curling of leaves.
6. **The leaf hopper *Orosius albicinctus* is a vector of the sesamum phyllody disease.**

Thank you.....



INSECT PESTS OF SAFFLOWER



MAJOR PESTS NATIONAL IMPORTANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Caterpillar	<i>Condica capensis, Helicoverpa armigera</i>	Noctuidae	Lepidoptera
2	Aphid	<i>Uroleucon carthami</i> <i>Uroleucon compositae</i>	Aphididae	Hemiptera
3	Bud fly	<i>Acanthiophilus helianthi</i>	Tephritidae	Diptera

PESTS OF REGIONAL IMPORTANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Gujhia weevil	<i>Tanymecus indicus</i>	Curculionidae	Coleoptera
2	Thrips	<i>Frankliniella sulprea</i>	Thripidae	Thysanoptera
3	Composite thrips	<i>Microcephalothrips abdominalis</i>	Thripidae	Thysanoptera
4	Flower thrips	<i>Thrips florum</i>	Thripidae	Thysanoptera
5	Stem fly	<i>Melanagromyza obtuse</i>	Agromyzidae	Diptera
6	Semilooper	<i>Eublemma rivula</i>	Noctuidae	Lepidoptera
7	Mealy bug	<i>Ferrisia virgata</i>	Pseudococcidae	Hemiptera

PESTS OF REGIONAL IMPORTANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Leaf hoppers	<i>Empoasca punjablensis</i>	Cicadellidae	Hemiptera
2	Peach Aphid	<i>Myzus persicae</i>	Aphididae	Hemiptera
3	Lace wing	<i>Monanthia gubulifera</i>	Tingidae	Hemiptera
4	Bug	<i>Dolycoris indicus</i>	Pentatomidae	Hemiptera
5	Leaf miner	<i>Chromatomyia horticola</i>	Agromyzidae	Diptera

1. Safflower Caterpillar

S.N: *Condica capensis*
(Noctuidae: Lepidoptera)

- **Distribution:** It is a serious pest of safflower throughout India.
- **Host range:** Jute, *Coreopsis niger*, Blumea.
- **Morphology:** The adult moth possesses dark brown fore wings and light brown hind wings.
- The full grown caterpillar is smooth, greenish with purple markings and humped on the anal segment.







Biology

- **A female lays about 60 eggs singly or in small clusters on leaves and stems.**
- **The eggs hatch in 4- 5 days.**
- **The larva grows feeding on the leaves and becomes full-grown in 2 weeks.**
- **It pupates in the soil for 10-15 days**

Nature of Damage

- **The larvae feed on the leaves and defoliate the plants which lose their vigor and become stunted.**
- **Spray the crop with 2.5 kg of carbaryl 50 WP in 250 liters of water/ha.**

2. Safflower Bud Fly

S.N: *Acanthiophilus helianthi*
(Tephritidae: Diptera)

- **Distribution:** Delhi, Uttar Pradesh, Haryana and Madhya Pradesh in India.
- This is also one of the important pest of safflower in north India.
- **Morphology:** The maggots that feed on with buds and are destructive.
- The adult fly is ash colored with brown legs





Biology

- The adults are active from March to May.
- The females lay eggs in clusters of 6-24 within the flower buds or the flowers.
- The eggs hatch in about one day in April and young maggots start feeding on florets and the thalamus.
- They pupate inside the buds.
- The pupal stage lasts 7 days.
- The adults emerge out of the bud through the holes made by the larvae before they pupate.
- The life cycle lasts for about 25 days and during a cropping season about three generations are noticed.



Fig. 2. a) 1st instar larva; b) 2nd instar larva; c) 3rd instar larva



Fig. 3. Changes in coloration of pupa (from left to right); Scale: Bar 2.20 mm



Fig. 4. Larva and pupa of *Acanthiophilus helianthi* Rossi



Fig. 5. Larva and pupa of *Acanthiophilus helianthi* Rossi inside flower head of safflower



Fig. 6. Larva of *Acanthiophilus helianthi* Rossi inside flower head of safflower



Fig. 7. Infested flower head including pupa of *Acanthiophilus helianthi* Rossi

Nature of Damage

- **The injury is caused by the maggots which feed upon the floral including the thalamus as a result of which buds fail to open.**
- **The infested buds begin to rot and an offensive smelling fluid oozes at the apices giving soaked appearance to the buds.**
- **The pest causes reduction in the yield of safflower seed.**

Management

- **The early removal and destruction of infested buds is helpful in checking the spread of the pest.**

3. Safflower Aphid

S.N: *Uroleucon compositae*
(Aphididae: Hemiptera)

- **Distribution:** Karnataka, Uttar Pradesh, Madhya Pradesh, Punjab and Haryana.
- **Morphology:** The aphids are small shining black, soft bodied insects.
- The nymphs are smaller in size and are reddish brown in colour.
- **Biology:** The aphid is active from December to April.
- It completes its life cycle in 11-16 days.
- The adult aphid has a lifespan of 17 days.



Nature of Damage

- **The aphids suck the sap from leaves, twigs, flowers and capsules.**
- **In infested plants, the height, number of leaves and shoots reduce significantly.**
- **The plants become weak, remain stunted and sometimes dry up.**
- **Seed production is seriously affected.**
- **The aphids secrete honeydew which attracts a black sooty mould.**



Management

- **The aphid is parasitised by *Aphidencyrthus aphidivorus* and preyed upon by *Brumoides suturalis*.**
- **Spray 250 ml of dimethoate 30EC or monocrotophos 36SL or 625 ml of chlorpyriphos 20 EC in 250 liters of water/ha and repeat the spray after 15 days, if necessary**

4. Safflower aphid

S.N: *Uroleucon carthami*
(Aphididae: Hemiptera)

- **This large aphid occurs on the plants only when they have already flowered and does not cause any severe damage.**
- **It is preyed upon by the coccinellid beetle *Brumoides suturalis* F.**



Other pests

- Larvae of *Helicoverpa armigera*, *H. pertigera*, *Spodoptera exigua* feed on the leaves and the former one even bores into flower heads and devours the developing seeds.
- Leaf thrips *Frankliniella sulphurea*: The nymphs and adults of the thrips feed on the leaves in all the stages of crop growth and cause crinkling of leaves in cases of severe attack.
- Pod fly *Melanagromyza obtuse*: The maggots mine the stem and girdle the plants causing withering of leaves and death of plants. The infestation is noticed usually on a month old crop and is a pest of importance on this crop
- Safflower semilooper *Eublemma rivula* The larvae bore into the stem and flower heads and feed on the contents. Up to 51% of flower heads are infested and the loss in yield may go up to 15%. It is, therefore, an important pest of the crop. The adult moth is small with buff coloured wings having an oblique line in the middle of each of the fore wings.

Thank you.....



INSECT PESTS OF LINSEED



Dr. NIHAL R

PESTS OF REGIONAL IMPORTANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Linseed gall midge	<i>Dasineura lini</i>	Cecidomyiidae	Diptera
2	Armyworm	<i>Spodoptera exigua</i>	Noctuidae	Lepidoptera
3	Jassid	<i>Empoasca kerri var. motti</i>	Cicadellidae	Hemiptera
4	Whitefly	<i>Bemisia tabaci</i>	Aleyrodidae	Hemiptera
5	Mirid bug	<i>Creontiades pallidifer</i>	Miridae	Hemiptera
6	Pentatomid bug	<i>Piezodors hybneri</i>	Pentatomidae	Hemiptera
7	Thrips	<i>Caliothrips indicus</i>	Thripidae	Thysanaptera

PESTS OF REGIONAL IMPORTANCE

Sl. No.	Common Name	Scientific Name	Family	Order
8	Hairy Caterpillar	<i>Spilosma obliqua</i>	Arctiidae	Lepidoptera
9		<i>Grammodes stalida</i>	Noctuidae	Lepidoptera
10	Whitefly	<i>Bemisia tabaci</i>	Aleyrodidae	Hemiptera
11		<i>Euproctis scintillans</i>	Lymantriidae	Lepidoptera
12	Moths	<i>Spodoptera litura; Helicoverpa armigera</i>	Noctuidae	Lepidoptera
13	Amyworm	<i>Spodoptera exigua</i>	Noctuidae	Lepidoptera

1. Linseed Gall-midge

S.N: *Dasineura lini*
(Cecidomyiidae: Diptera)

- **Distribution:** In India- Andhra Pradesh, Madhya Pradesh, Bihar, Uttar Pradesh, Delhi and Punjab.
- **Morphology:** The adult of this gall-midge is a small orange fly



Biology

- **The female lays 29-103 smooth, transparent eggs in the folds of 8-17 flowers or in tender green buds, either singly or in clusters of 3-5.**
- **The eggs hatch in 2-5 days.**
- **Just after emergence, the larvae transparent, with a yellow patch on the abdomen.**
- **These larvae feed inside flower buds and eat the contents.**
- **They pass through four instars in 4-10 days and when full-grown become deep pink and measure about 2 mm in length.**
- **The full-grown maggots drop to the ground, prepare a cocoon and pupate in soil.**
- **The pupal period lasts 4-9 days.**
- **A generation is completed in 10-24 days.**
- **There are four overlapping generations during the season.**

Nature of Damage

- **Its tiny maggots feed and produce galls.**
- **They destroy flower-buds and thus prevent pod formation.**



Management



- The adult flies can be killed by using light traps.
- The flies are also attracted in day-time to molasses or gur added to water.
- As the incidence of this pest is more on the late-sown crop as compared with the normal-sown crop, the practice of normal-sown crops should be adopted if possible.
- The maggots are parasitized by *Systasis dasyneurae* (Miscogasteridae).
- Other larval parasites include *Elasmus sp.* (Elasmidae), *Eurytoma sp.* (Eurytomidae), *Torymus sp.* (Torymidae) and *Tetrastichus sp.* (Eulophidae).
- Dust 5 per cent carbaryl @ 15-20 kg/ha or spray carbaryl 50WP @ 1.125 kg/ha in 200-250 liters of water/ha.

2. Beet Armyworm

S.N: *Spodoptera exigua*

(Noctuidae: Lepidoptera)

- **The beet armyworm may cause damage by feeding on leaves.**
- **Spray the crop with 1.125 kg of carbaryl 50WP or 1.0 liter of malathion 50EC in 200-250 liters of water per ha.**





Thank you.....

INSECT PESTS OF CASTOR



MAJOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Shoot & capsule borer	<i>Dichocrosis punctiferalis</i>	Crambidae	Lepidoptera
2	Castor semilooper	<i>Achaea janata</i>	Noctuidae	Lepidoptera
3	Gall midge	<i>Aspondylia ricini</i>	Cecidomyiidae	Diptera
4	Tobacco caterpillar.	<i>Spodoptera litura</i>	Noctuidae	Lepidoptera
5	Slug caterpillar	<i>Parasa lepida</i>	Cochlididae/ Limacodidae	Lepidoptera
6	Tussock caterpillar	<i>Euproctis sp., Orgyia postica, Somena scintillans, Olene mendosa</i>	Lymantridae	Lepidoptera

MAJOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
7	Wooly bear	<i>Pericallia ricini</i>	Arctiidae	Lepidoptera
8	Butterfly	<i>Ergolis merione</i>	Nymphalidae	Lepidoptera
9	Whitefly	<i>Trialeurodes ricini</i>	Aleyrodidae	Hemiptera
10	Thrips	<i>Retithrips syriacus</i>	Thripidae	Thysanoptera
11	Root grub	<i>Holotrichia sp.</i>	Scarabaeidae	Coleoptera

MINOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Grasshoppers	<i>Chrotogonus spp.</i> and <i>Cyrtacanthacris ranacea</i>	Acrididae	Orthoptera
2	Jassids	<i>Amrasca devastans</i> ; <i>Empoasca flavescens</i> ; <i>E. notata</i>	Cicadellidae	Hemiptera
3	Scale	<i>Aspidiotus destructor</i>	Diaspididae	Hemiptera
4	Coccids	<i>Parasaissetia nigra</i>	Coccidae	Hemiptera
5	Bug	<i>Nezara viridula</i>	Pentatomidae	Hemiptera
6	Thrips	<i>Scirtothrips dorsalis</i>	Thripidae	Thysanoptera

MINOR PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
7	Bag worm	<i>Clania crameri</i>	Psychidae	Lepidoptera
8		<i>Phycita clientella</i>	Pyralidae	Lepidoptera
9	Tobacco caterpillar	<i>Spodoptera litura</i>	Noctuidae	Lepidoptera
10	Hairy caterpillars	<i>Amsacta moorei; Spilosoma obliqua</i>	Arctiidae	Lepidoptera
11	Gall fly	<i>Asphondylia ricini</i>	Cecidomyiidae	Lepidoptera
12	Red spider mite	<i>Tetranychus telarius; Oligonychus coffee</i>	Tetranychidae	Acari

1. Castor shoot and capsule borer

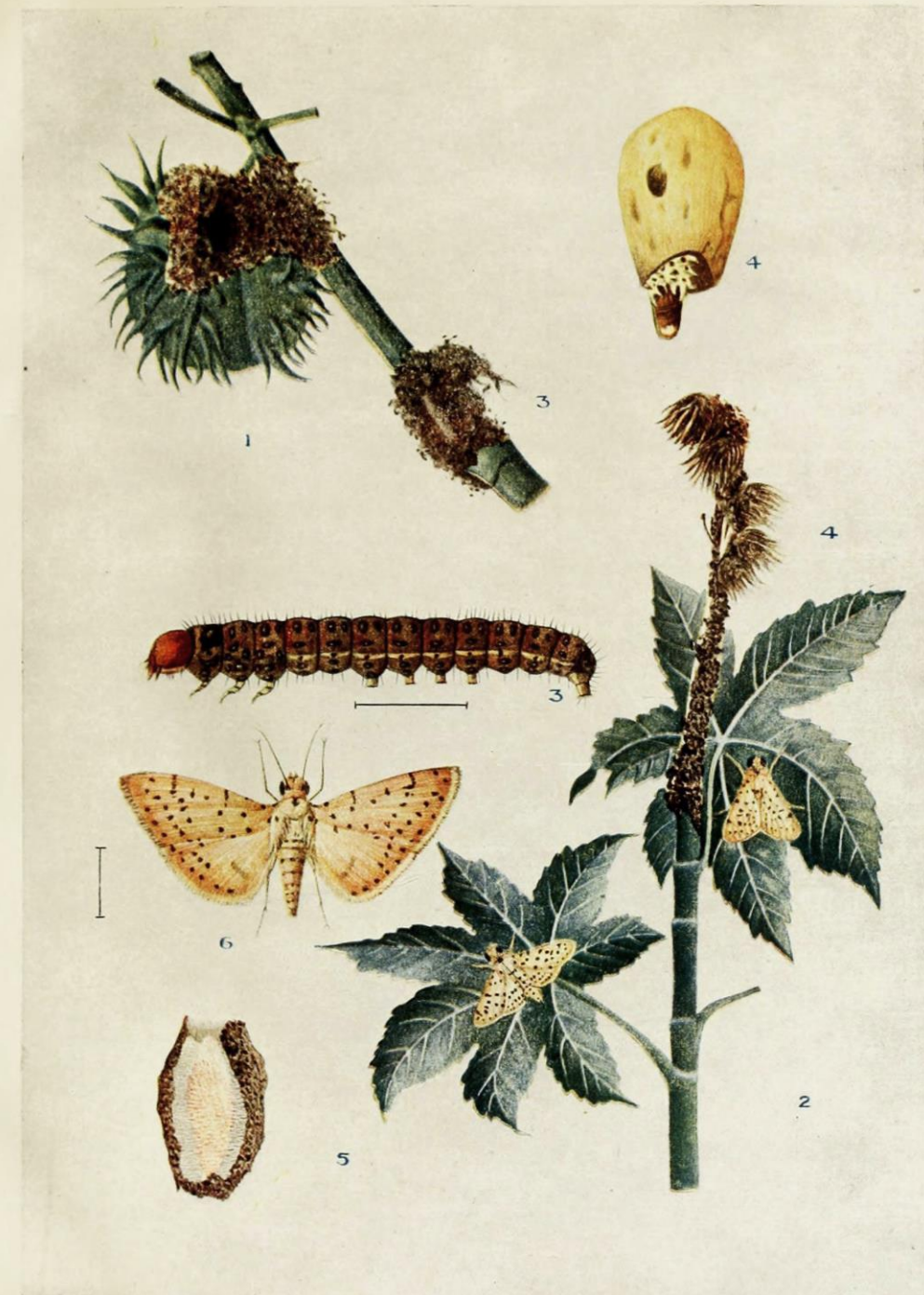
S.N: *Conogethes punctiferalis*
(Pyralidae: Lepidoptera)

- **It is a regular pest of castor and distributed throughout the plains and the hills of the Indian Union.**
- **It attacks variety of host plants and causes different types of damages when it attacks.**
- **Castor and cardamom – shoot and capsule borer**
- **Sorghum – Ear head borer**
- **Mango – Inflorescence caterpillar**
- **Ginger – Rhizome borer**
- **Guava, Peach, Jack, Tomato- Fruit borer**
- **Similar to fruit sucking moth it has suctorial proboscis-piercing juice**



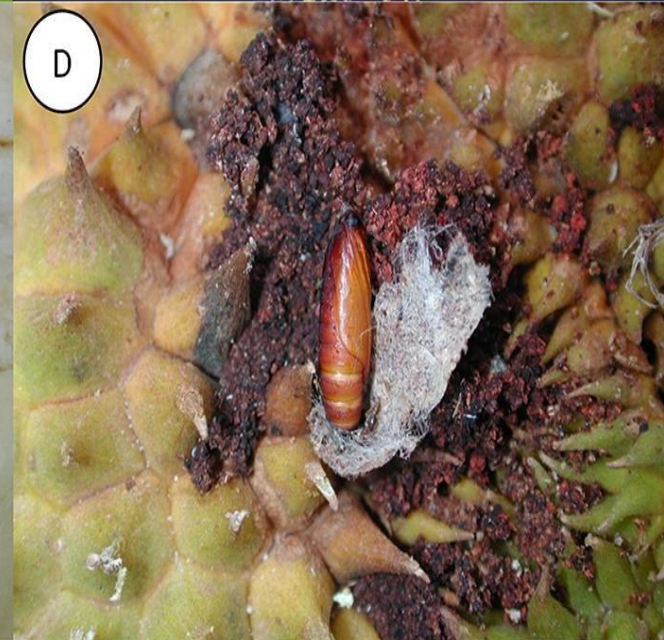
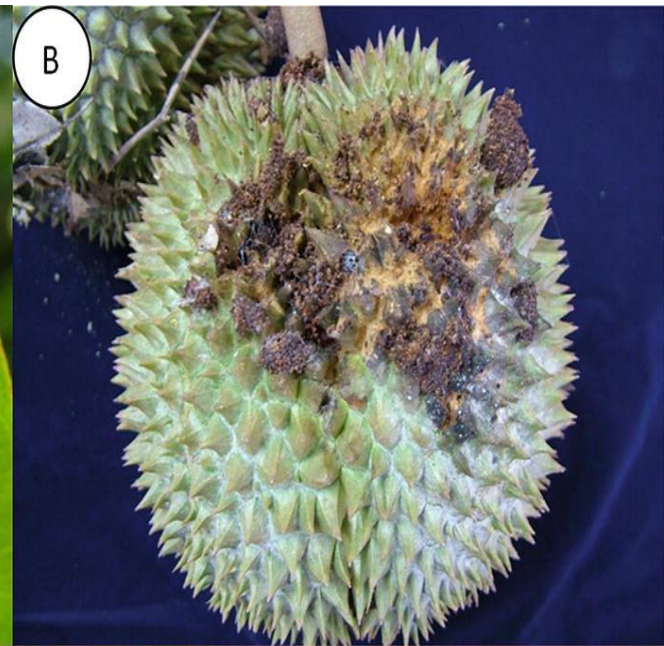
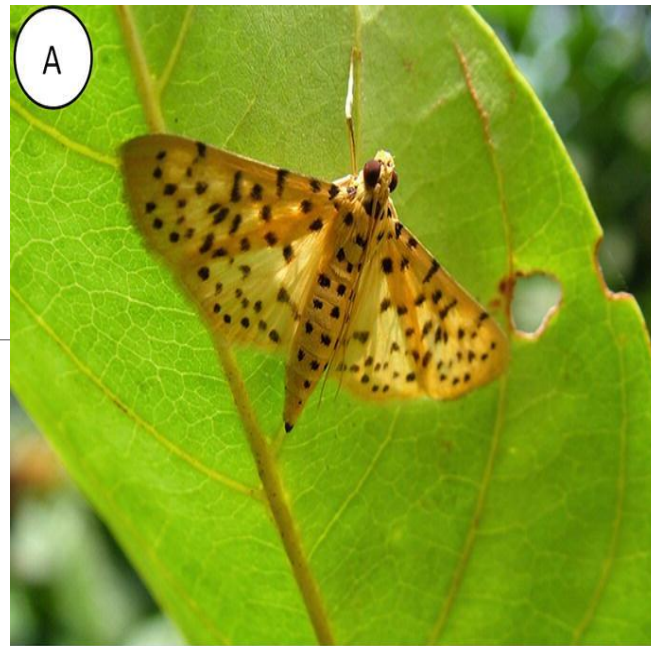
Biology

- **Eggs:** are laid in groups of up to 6 on inflorescence and capsules as well as other tender parts of the plant. (I.P – 3-6 days)
- **Larva:** 5 larval instars and measures about 2.5 to 3cm in length, pinkish brown in colour with numerous tubercles on the body (L.P – 12-16 days)
- **Pupa:** pupation takes place in side the stem in silken cocoon or inside the capsules (P.P – 6-7 days)
- **Adult longevity – 5-10 days**
- **The pest appears from flowering stage up to maturity stage**



Nature of Damage

- Newly hatched larva feeds on greenish coloured capsules in between warts
- Later bores in to the capsules and feeds on developing seeds
- It webs the capsules along with excreta and frass
- Larva also bores into tender shoots and attached inflorescence
- There by killing the terminal shoots.



Symptoms of Damage

- **Capsule with bored holes**
- **Damaged capsules webbed together**
- **Peduncle and capsules showing galleries made of silk and frass**

Management

- **Avoid growing varieties which are having compact inflorescence**
- **Mechanical collection and destruction of attacked shoots and seed capsule**
- **Chemical control – Initiate chemical sprays at the time of flowering of primary spikes**
- **Spray methyl parathion 50 EC @ 1 ml / lit. of water**
or
- **Dust with methyl parathion 2 % D @ 10 kg / acre**
or
- **Spray – quinalphos @ 2 ml / lit. of water**
or
- **Dimethoate @ 2 ml / lit. of water**

2. Castor semilooper

S.N: *Achaea janata*
(Noctuidae: Lepidoptera)

- **It is a specific pest of Castor and Country wide distribution**
- **Adult is a stout bodied, greyish-brown colored moth with wavy lines on the fore wings**
- **Hind wings are white with black patches or markings**
- **Host plants:** Castor, Rose, Pomegranate, Tea, *Tridax procumbens*, *Euphorbia hirta*, *E. hypericifolia*



Biology

- **Eggs:** Female moths lays 400-500 eggs scattered all over the ventral surface of the plant. (I.P – 3-4 days)
- **Larva:** is a semilooper , body grey/ black in colour with red or white lateral stripes, fully-grown larva about 6-7cm long
- Larva will be camouflage with colour of the crop canopy.
- Color pattern of 3rd and 4th instar larva is variable.
- Some time if larva with red stripes.
- It is semilooper i.e non functioning of first pair of prolegs. (L.P – 20-25 days)
- **Pupa:** pupation takes place in leaf fold or in leaf litter or in soil with the help of cocoon, pupa is ash grey in colour. (P.P – 10-25 days).



Nature of Damage

- **First instars nibble on the leaves and second instars make bite holes on the leaves**
- **later instars will eat the leaf completely leaving behind mid rib.**
- **Usually it won't be attack stem.**
- **Severe incidence – Capsule also affected**
- **Adult moth – Suck the juice from Citrus fruits also Serious – July - December**



Management

- **Hand picking of older larvae during early stages and destroy**
- **Provide bird perching points @ 7 to 10 / ha**
- **A number of Hymenopteran parasites attack the pest during the various stages of its life cycle**
- ***Trichogramma australicum* – Egg parasite**
- ***Apanteles spp., Microplitis maculopennis* - Larval parasites - @ 2 parasites / plant need not to take up chemical control**
- **Chemical control : spray methyl parathion 50 EC @ 1 ml / lit. of water**
- **or**
- **Dust 2 % methyl parathion @ 10-15 kg / acre**
- **or**
- **Spray the crop with quinalphos @ 2 ml / lit. of water**

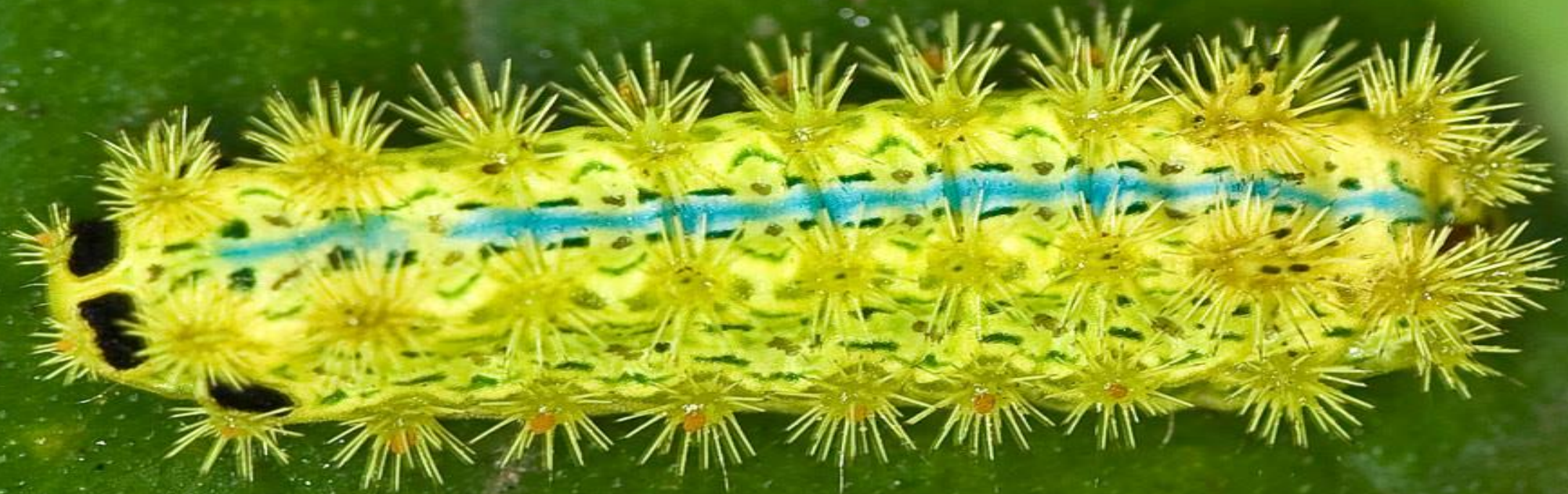
3. Castor slug caterpillar

S.N: *Latoia lepida*

(Limacodidae: Lepidoptera)

- **It is most common in the southern regions of the country especially TN and Karnataka has been recorded from Ceylon also.**
- **This pest damages the castor plant sporadically.**
- **Adult is a medium sized moth with brown colored wings and a prominent green band at the base of the fore wings**
- **Host plants : Castor, Cocoa, pomegranate, Mango, Wood apple etc.,**





Biology

- **Eggs:** are laid in groups and covered with hairs and each group contains 20-30 eggs on the under surface of the leaves. (I.P -6-7 days)
- **Larva:** Larva greenish in colour with white lines and four rows of tubercles tipped with red and black colour, ventral surface flat and it moves like a slug (L.P- 40-45 days)
- **Pupa:** pupation takes place on the stem or it pupates on the plants in cocoons which are covered with spines and hairs which cause irritation to human skin. (P.P- 9-10 days)

Nature of Damage

- **Larvae feed on the leaves leaving only midrib and veins**

4. Castor woolly bear

S.N: *Pericallia ricini*
(Arctiidae: Lepidoptera)

- Adult is a grey coloured moth with dark spots on pinkish hind wings
- **Alternate hosts:** Pumpkin, banana, Gingely, Moringa, beans, cotton etc.,
- The larva blackish brown in colour with red head and long thick hairs arising on the bluish warts found on the body
- **Caterpillars feed on the leaves and defoliate the plant**
- **They are usually found in colonies, it is naturally parasitized by *Apanteles ricini***



5. Castor butter fly

S.N: *Ergolis merione*

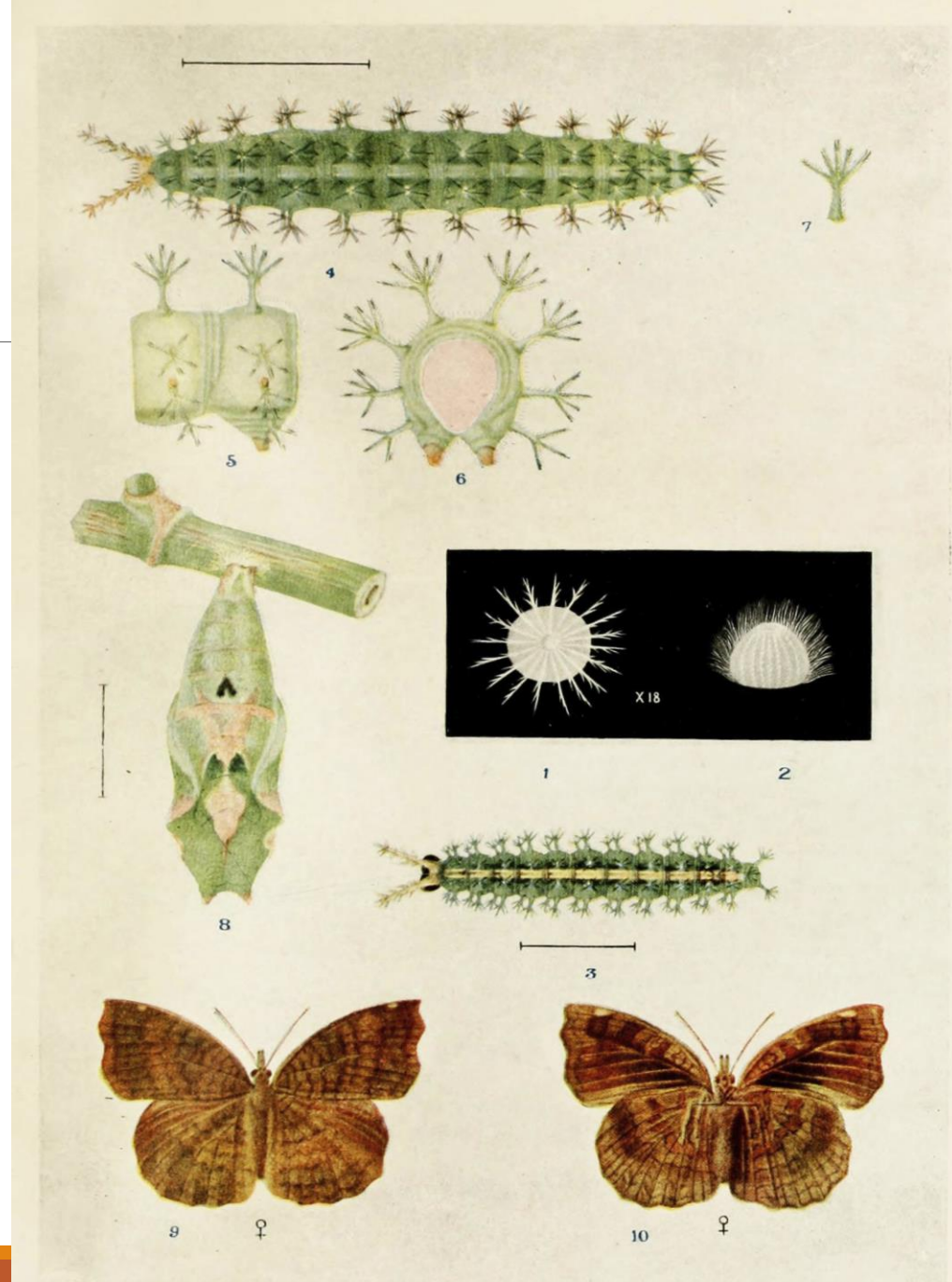
(Nymphalidae: Lepidoptera)

- **It is a specific butter fly pest of castor**
- **Adult is a brownish coloured butter fly with black wavy lines on the wings.**
- **Larva feeds on the leaves and remain on the upper surface and thus cause defoliation**



Biology

- **Eggs:** are spherical, laid singly on the leaves.
- **Larva:** Larvae are green in colour with branched spines and yellow stripes on the dorsal side.
- **Pupa:** Chrysalis which hanging from leaves.



CASTOR BUTTERFLY.



6. Leaf hopper

S.N: *Empoasca flavescens*

(Cicadellidae: Hemiptera)

- **Adults are small, wedge shaped hoppers and pale green in colour**
- **Nymphs are yellowish green in colour**
- **Adults as well as nymphs will move diagonally**



Nature of Damage

- **Both nymphs and adults suck the sap from the leaf resulting in typical 'hopper burn'**
- **Initially marginal yellowing of leaves and**
- **Later on distortion of veins and leaf curling is observed**
- **The yellow colour of the leaf will change to brown and the margins of leaf become dry and brittle**
- **Due to hopper burn and stunting caused by heavy population as a result in poor development of capsules**



7. Thrips

S.N: *Scirtothrips dorsalis*

(Thripidae: Thysanoptera)

- It is common on Castor, Ground nut
- It is highly polyphagous pest
- Adults are minute and yellow and have fringed wings



Nature of Damage

- **Nymphs and adults scrape the leaves, they suck the oozing sap from the leaves, as a result there will be development of white patches which later on turn into brown streaks particularly near the veins and midribs as a result in curling of affected areas particularly flowers and later dry up and do not form capsules**



8. Red spider mite

S.N: *Tetranychus urticae*
(Tetranychidae: Acarina)

- It is a country wide distribution and polyphagous habit.
- All the active stages of mites fed on leaf preferably on ventral surface and breed near stalk in between main veins
- It inserts stylets in to the leaf tissue and suck the plant juice
- Removal of chemicals and other pigmentation results in characteristic blotching is the typical symptom
- Infested leaves actually exhibit yellow speckled appearance which later on turn brown



Management

- **Growing resistant variteies – RC – 1067, RC- 1069, RC- 1071, RC – 1072**
- **Spray the crop with dicofol @ 2.5 ml / li. of water**

Thank you.....

