

INSECT PESTS OF MAIZE



MAJOR PESTS OF NATIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Stem/ stalk/ spotted stalk borer	<i>Chilo partellus</i>	Pyralidae	Lepidoptera
2	Pink stem borer	<i>Sesamia inferens</i>	Noctuidae	Lepidoptera
3	Shoot/ stem fly	<i>Atherigona soccata, A. naquii , A. oreintalis</i>	Muscidae	Diptera
4	White grub	<i>Holotrichia consanguinea, H. serrata</i>	Melolonthidae	Coleoptera
5	Cutworm	<i>Agrotis spp. and Euxoa segetum</i>	Noctuidae	Lepidoptera
6	Aphid	<i>Rhopalasisphum maidis</i>	Aphididae	Hemiptera
7	Cutworm	<i>Mythimna separata</i>	Noctuidae	Lepidoptera
8	Leaf hopper	<i>Pyrilla perpusilla</i>	Lophopidae/Fulgoridae	Hemiptera

MAJOR PESTS OF REGIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Gujhia weevil	<i>Tanymecus indicus</i>	Curculionidae	Coleoptera
2	Cob borer	<i>Helicoverpa armigera</i>	Noctuidae	Lepidoptera
3	Asian maize borer	<i>Ostrinia furnacalis</i>	Pyralidae	Lepidoptera
4	European Corn borer	<i>Ostrinia nubilalis</i>	Pyralidae	Lepidoptera

MAJOR RODENTS OF REGIONAL SIGNIFICANCE

Sl. No.	Common Name	Scientific Name	Family	Order
1	Smaller bandicoot	<i>Bandicota bengalensis</i>	Muridae	Rodentia
2	Soft furred field rat	<i>Millardia meltada</i>	Muridae	Rodentia
3	Indian gerbil	<i>Tatera indica</i>	Muridae	Rodentia
4	Field mice	<i>Mus spp.</i>	Muridae	Rodentia
5	Blue rock pigeons	<i>Columbia livia</i>	Columbidae	Columbiformes
6	Rose ringed parakeet	<i>Psittacula krameri</i>	Psittaculidae	Psittaciformes
7	House crow	<i>Corvus splendens</i>	Corvidae	Passeriformes

OTHER PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
1	Deccan wingless GH	<i>Colemania sphenarioides</i>	Acrididae	Orthoptera
2	Rusty plum aphid	<i>Hysteroneura setariae</i>	Aphididae	Hemiptera
3	Maize jassid	<i>Zygnidia manaliensis</i>	Cicadellidae	Hemiptera
4	Thrips	<i>Anaphothrips sudanensis</i> , <i>Caliothrips graminicola</i> , <i>Haplothrips gowdeyi</i>	Phlaeothripidae	Thysanoptera
5	Termites	<i>Odontotermes obesus</i> , <i>Microtermes obesi</i>	Termitidae	Isoptera
6		<i>Spodoptera exempta</i>	Noctuidae	Lepidoptera

OTHER PESTS

Sl. No.	Common Name	Scientific Name	Family	Order
7	Pink stem borer	<i>Sesamia inferens</i>	Noctuidae	Lepidoptera
8	Hairy caterpillars	<i>Amsacta albistriga, A.lactinea</i>	Arctiidae	Lepidoptera
9	Lymantrid	<i>Euproctis subnotata</i>	Lymantriidae	Lepidoptera
10	Cob caterpillar	<i>Cryptoblabes angustipennelta</i>	Pyraustidae	Lepidoptera
11	Leaf weevil	<i>Mylocerus discolor</i>	Curculionidae	Coleoptera
12	Blister beetle	<i>Mylabris macilenta, M phalerta, M. pustulata</i>	Meloidae	Coleoptera

1. Maize Borer

S.N: *Chilo partellus*

(Pyralidae: Lepidoptera)

- **Distribution:** Sri Lanka, India, Pakistan, Afghanistan, Uganda, Central and East Africa.
- It is found throughout India.
- **Host range:** It is the most destructive pest of maize and sorghum; bajra, sugarcane, Sudan grass, buru (*Sorghum halepense*), sarkanda (*Saccharum munja*), grasses etc.
- **Morphology:** The eggs are flat, oval, yellowish.
- The grown up caterpillars are long and dirty greyish white, with black head and four brownish longitudinal stripes on the back.
- The adults are yellowish-grey moths.



Biology

- **The insect breeds actively from March- April to October and for the rest of the year it remains in hibernation as a full grown larva in maize and sorghum stubble, stalks or unshelled cobs**
- **Pupates maximum in stem/ stubbles.**
- The larvae pupate sometime in March and emerge as moths in the end of that month or in early April.
- **S.O.O.- the underside of the leaves during night in clusters.**
- **The larva passing through six stages and after making a hole in the stem pupates inside it.**
- Adult, egg and larval duration in 2-12, 4-5 and 14-28 days respectively.
- The life-cycle is completed in about 3 weeks and there are probably 5 generations in a year.
- **The full grown caterpillars of the last generation hibernate in stubble, stalks, etc., and remain there till the next spring**

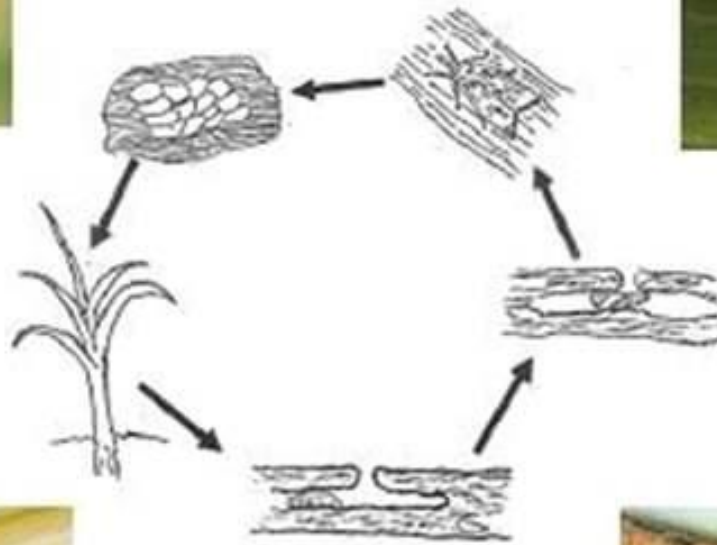
Life cycle of *Chilo partellus*



Egg batch



Adult Moth



Larvae



Pupae



Nature of Damage

- In Rajasthan, Delhi and southern districts of Haryana, it is a very serious pest of sorghum particularly of the grain crop.
- **It is a serious pest in Kharif season, whereas pink borer, *Sesamia inferens* is a serious pest in Rabi.**
- Damage to sorghum fodder is perhaps equally great, but it is not generally noticed.
- **Its caterpillars damage maize and sorghum by boring into the stems, cobs or ears.**
- **The young larvae first feed on the leaves, making a few shot holes and then bore their way downwards through the central whorl as it opens.**
- **More shot holes become visible, indicating an earlier attack and the plant also shows dead-hearts.**
- **In sorghum, the midribs are attacked by the young larvae, more than one plant being attacked by a larva**
- **Parallel shot holes are observed in newly opened leaves, Leaf windowing, pinholes.**







**Dead
heart**



Management

- Destroying the stubble, weeds and other alternate hosts of the stem borer by ploughing the field after harvest to reduce carry over.
- Destruction of crop residues and chopping of stems harboring diapausing larvae could be very effective in reducing borer population.
- Removal and destruction of dead-hearts and severely infested plants in reducing the pest incidence.
- Resistant varieties are **Antigua Gr. 1, Jawahar Composite, HOPM 1, DHM 117, HM4, HMS, Vivek hybrid S, HMM I, PEHM 1, Pusa Composite 3, Pusa Composite 4, Amar, Azad Kamal.**
- Release *Trichogramma chilonis* @ 1 lakh per ha on 10-15 days old maize crop.
- Spray the crop 2-3 weeks after sowing or as soon as borer injury to the leaves is noticed with fenvalerate 20EC @ 100 ml/ha, cypetmethrin 10 EC @ 100 ml/ha or deltamethrin 2.8 EC @ 200 ml/ha. or monocrotophos 36SL @ 275 ml/ha, or carbaryl 50WP @ 250 g/ ha. (whorl application of granular insecticide)

2. European Corn Borer

S.N: *Ostrinia nubilalis*
(Pyralidae: Lepidoptera)

- **Distribution:** Europe, erstwhile USSR, Japan and other countries of the Far-East, Mexico and North America but **it does not occur in India.**
- **Host range:** Sorghum, other millets, potato, bean, beet, celery, hemp, cowpea, soybean, aster, dahlias and some weeds.
- **Morphology:** Eggs are flattened, scale-like and They are white when freshly laid, but change to pale yellow later on.
- The newly emerged larva is has black head and pale yellow body, with rows of black or brown spots on the dorsal surface. The full-grown larva is flesh or cream-coloured, with a faintly spotted dorsum.
- The pupa is light to dark reddish brown.
- The female has pale yellow to light brown wings.
- The male is slender, and is slightly smaller and has darker wings than those of the female.

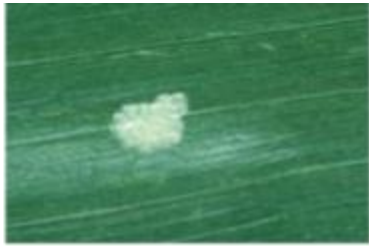






Biology

- This insect passes through 1-5 generations depending upon the climatic conditions.
- The full-grown larvae pass the winter in diapause inside tunnels made in the stalks, stubble and cobs.
- Before changing into pupae, the larvae make circular exits for the moths to escape in the late spring or early in summer.
- Egg, larva and pupa duration in 3-12, 25 and 8-11 days respectively.
- The female lays about 400- 600 eggs in clusters of 3-50 on the underside of the leaves.
- The eggs hatch in 3-12 days, depending upon the temperature.
- All the larvae do not survive owing to various causes. More than one larva may often be found in a single plant.
- As many as 167 eggs and 42 larvae have been recorded in a single stalk and 42 larvae in one cob.
- The larvae pass through 5 or 6 instars and become full- grown in 25-44 days.
- Pupation takes place within the tunnels made in the stalk, stubble or cobs. The pupal stage lasts 8-11 days.
- The female moth lives for 6-24 days, depending upon the weather.



Egg mass



1st instar



Mature larva



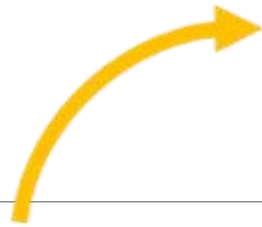
Pupa



Female moth



European
Corn Borer
Life Cycle



Nature of Damage

- The attack by the first generation larvae results in a much severe damage than that by larvae of the second or the subsequent generations.
- As a result of the attack, the plant weakens and the cobs get stunted.
- Tunneling by larvae of the second generation weakens the grown up plants.
- This results in stalk breaking, ear-dropping and shriveled ears.







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Mangement

- The use of resistant or tolerant varieties of maize will minimize losses caused by this borer.
- The ploughing-under of the crop residues and sanitary measures result in the reduction of nest population, as the overwintering larvae are destroyed to a great extent.

3. Asian Maize Borer

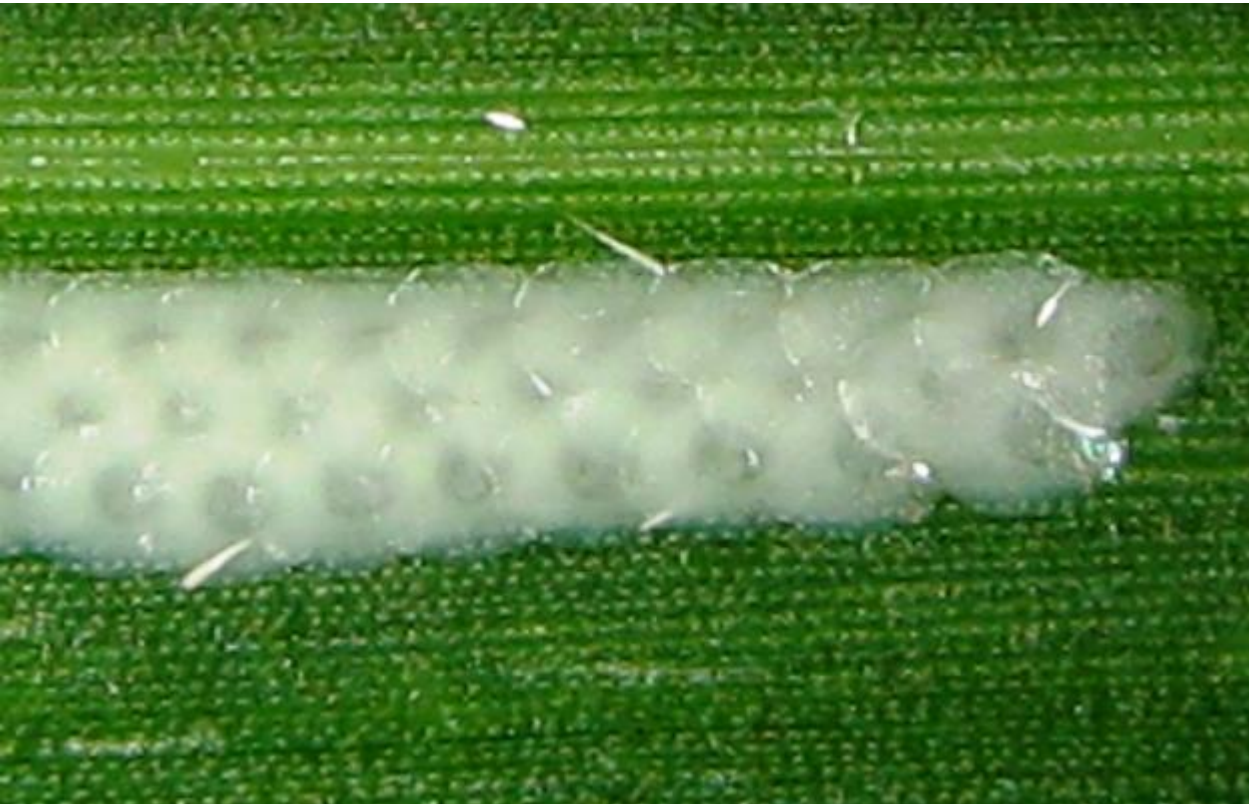
S.N: *Ostrinia furnacalis*
(Pyralidae: Lepidoptera)

- **Distribution:** Korea, Philippines, many asian countries, some parts of India etc.
- **Host range:** Maize, sorghum, millets, Indian hemp, hops, Artemisia many wild grasses etc.
- **Morphology:** The grown up larva is 20 mm in with dark brown head and is pinkish on the upper side of the body.
- The female moth is yellow to light brown in colour.
- The male is dark brown and has a tapering abdomen.



Biology

- **S.O.O: In flat masses on the underside of leaves.**
- Egg and pupal duration in 3 and 6 days respectively.
- The newly hatched larvae feed within the leaf whorl, under a protective **silken web**.
- After about 9 days of feeding they migrate downwards and bore into the stem.
- The egg and pupa duration in 3 and 6 days respectively.
- They feed there and complete five instars within 18 days.
- **S.O.P: Normally, inside tunnels made in the stem but also inside the maize ear in-between ear sheaths or in ear stalk.**
- One or more generations may be completed in a year depending upon the prevalent temperature and host plant.
- In colder climates the caterpillars hibernate in the stalks or the cobs and over-winter in that stage of development.
- They pupate next Summer when the crop is ready in the field.



Nature of Damage

- Only the larvae of this pest are destructive and they make tunnels into the stalks and the ears.
- Maize plants are usually attacked 3-4 weeks after sowing.
- The larvae first feed on leaf tissue, then tunnel into the midrib, and thereafter reach the tassels or bore into the stalks and the ears.
- The development of the plants, the production of tassels and of the ears may be affected.
- When the pest attack is towards the base of the stalk the plant collapses, dries up and dies.
- At some places there are heavy crop losses.
- Windowing and tunneling.
- Management same as in case of maize borer

(a) Characteristics of ACB damage to corn plants



Egg masses deposited on stem holes created by ACB larvae



Holes in cob at tip and in soft parts preferably eaten by ACB larvae



Cut stem due to heavy stem boring by ACB



Pinholes in immature corn leaves



Gunshot appearance of ACB feeding sites



Heavy lodging of the corn plants owing to heavy infestations at the stem and roots

4. Maize Shoot fly

S.N: *Atherigona soccata*
(Muscidae: Diptera)

- The shoot fly is a serious pest of maize, particularly on the crop grown during summer season.
- It attacks the very young (3-4 days old) seedlings, producing deformed, twisted and dead hearted plants.
- The pest will be discussed in detail under 'Sorghum'.
- The maize crop in its early stage is attacked by the stem fly *Atherigona orientalis* (Muscidae) in U.P. and by *A. naqvii* in Punjab, Delhi and Rajasthan.
- **Attacks at 4-6 leaf stage**

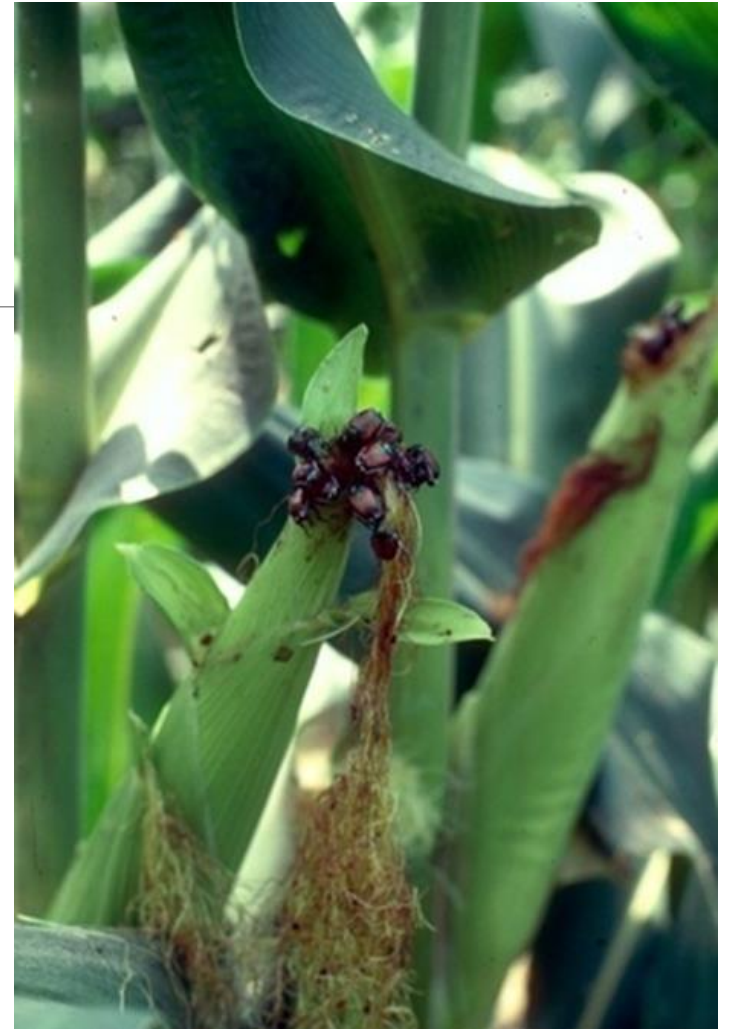


5. Cob borer

S.N: *Helicoverpa armigera*

(Noctuidae: Lepidoptera)

- Adult is brown coloured moth with a ‘V’ shaped speck on fore wings and has a dull black border on the hind wing.
- Larva is green with dark broken grey lines and dark pale bands; shows color variation from greenish to brown.
- **Feeds on silk and developing cobs**
- Set up of light traps
- Set up sex pheromone traps at 12/ha
- Two applications of NPV at 10 days interval at 1.5 X10¹² POB along with
- Crude sugar 2.5 kg + cotton seed kernel powder 250 g on the ear heads
- Apply at silk drying stage either carbaryl 10 D 25 kg/ha (or) spray carbaryl 50% WP 1.0 kg./ha in 500-600 L of water per ha. Repeat the insecticidal application 15 days later.



Caterpillar feed on silk and later bores the cobs

Nature of Damage

- The caterpillar feed for while on silk or tender leaves and later bores
- The cob feeds on tender milky grains at the top of the cob and also feed partially on developing grains
- Bored area of the cob is plugged with excreta
- More than 50 % cobs are damaged by larvae





Caterpillars are also feeds on tender leaves for a short time



Caterpillars feeds on developing grain



**Caterpillar also feed partially on developing grains and
bored holes are plugged with excreta**

6. Maize Aphids

S.N: *Rhopalosiphum maidis*

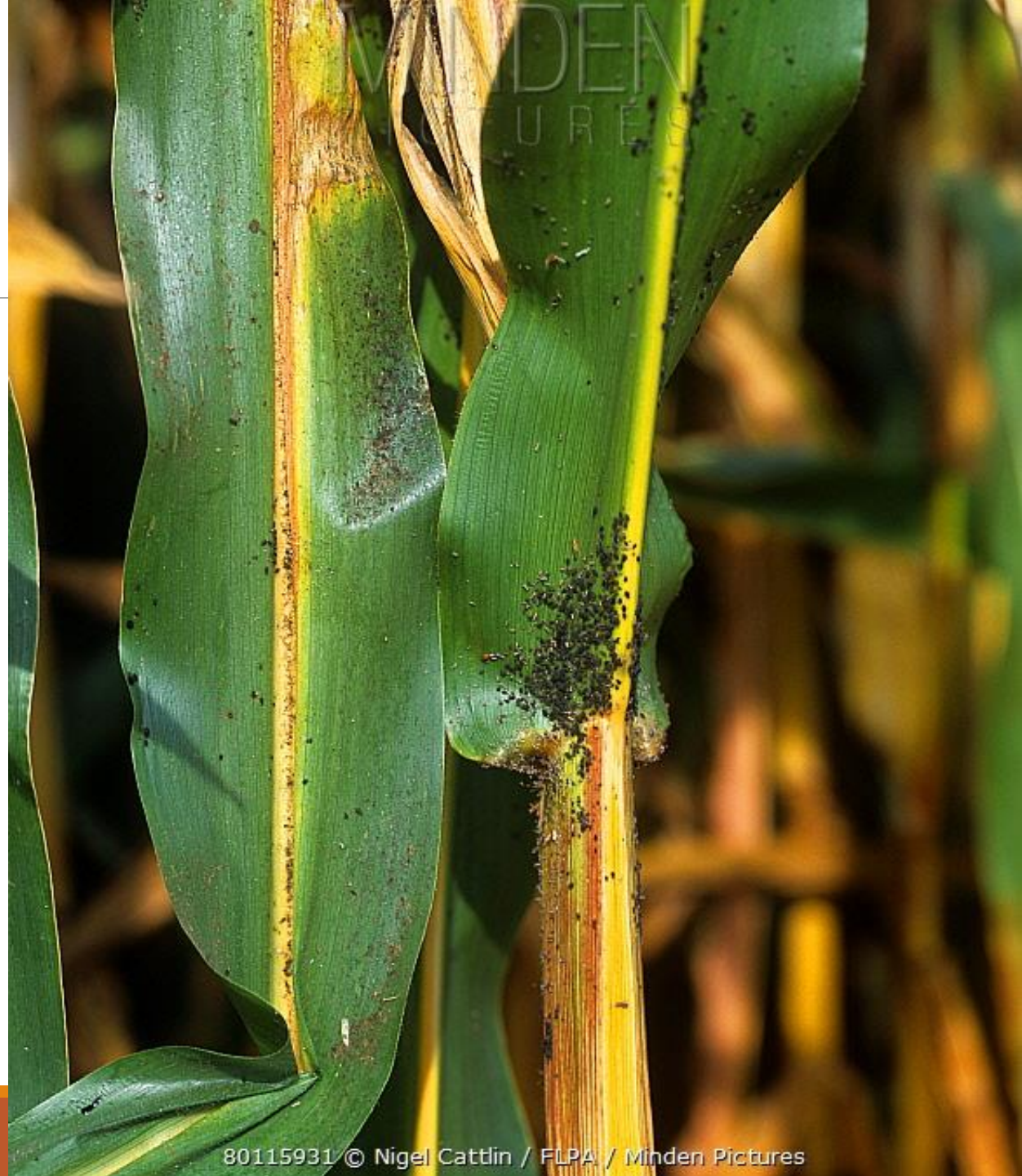
Aphididae: Hemiptera

- The aphids are bluish-green in colour with black coloured legs, antennae and cornicles
- The female give birth to apterous forms that moult four times to become adults
- Under stress, aphids produce winged adults, which moult five times to become adults
- Nymphal development is completed in 12-15 days



Nature of Damage

- Aphids suck the sap from the leaves during vegetative stage of the crop as a result yellowing, tanning and drying of leaves.
- If young plants are infected they seldom to produce ears. It also suck the sap from the cob and tassel
- The aphid colony may sometimes cover completely the emerging tassel and surrounding leaves preventing the emergence
- Ears and shoots are also infested and seed set may be affected
- Large populations produce sticky honeydew, on which black sooty mould grows
- It also transmits maize mosaic virus
- Aphids are colonizing species on sweet corn, and may be especially abundant in the developing tassel and occasionally on the ear and flag leaves.
- sweet corn pests are broad-spectrum.



7. Army worm

S.N: *Mythimna separata*

(Noctuidae : Lepidoptera)

(Detailed refer under paddy)

- The adult is stout bodied, medium sized moth, greyish brown in colour
- On the fore wings we find 2 white spots and prominent vein in the wings
- Larvae feeds on leaf whorls makes large holes thus affect the yield because of stunted growth of plants and do not get any cob.
- Later instar larvae feed by cutting the leaf from edge to wards midrib



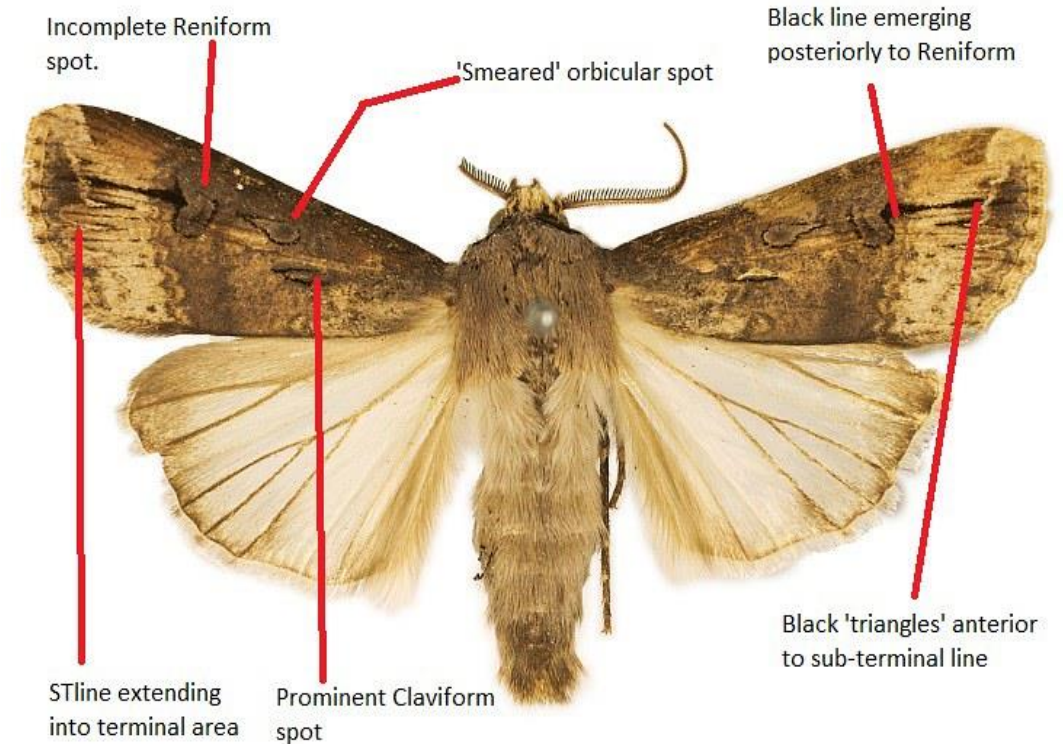
8. Maize cut worm

S.N: *Agrotis ipsilon*
(Noctuidae : Lepidoptera)

- Adults are dark grey, black or brown coloured moths with markings on the front wings and pale white coloured hind wings.
- They have wing span of 40 – 50 mm and 20 – 30 mm long
- Females are darker than males but some time similar

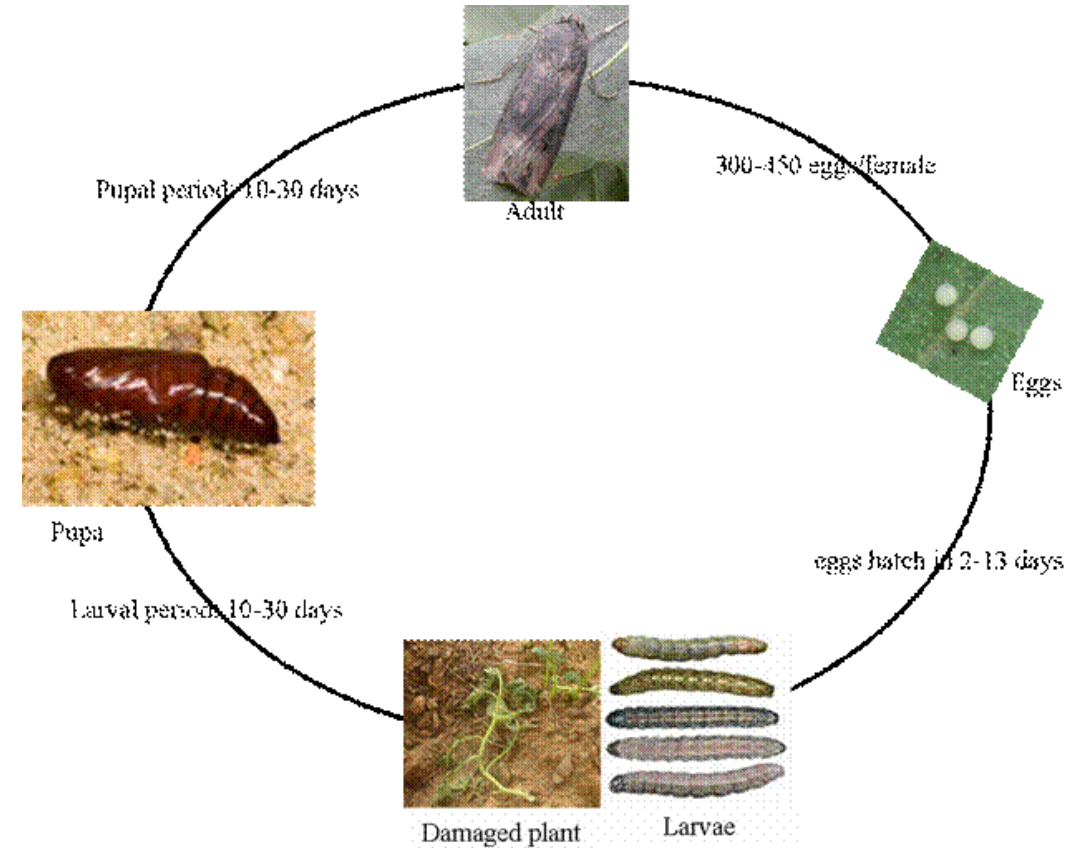


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Biology

- **Eggs** : A female moth lays about 300 eggs in groups of 30 on the ventral surface of leaves or in moist soil (I.P – 2-13 days).
- **Larva** : the larva is **dark brown** with a **red coloured head** and when full grown 3.5 cm long and hide in soil during day time (L.P – 10-30 days).
- **Pupa** : full grown larvae pupates in an earthen cocoon (P.P – 10-30 days)



Nature of Damage

- Cut worms usually feed at night or during overcast days.
- Newly hatched larvae feed on leaves of weeds or young maize plants leaving small irregular holes in the leaves.
- Later instar larvae cut off the plants at ground level feed on leaves and thus defoliate the plants.



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Black cutworm damage in corn row

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Leaves of maize seedling eaten by a cutworm

Control measures

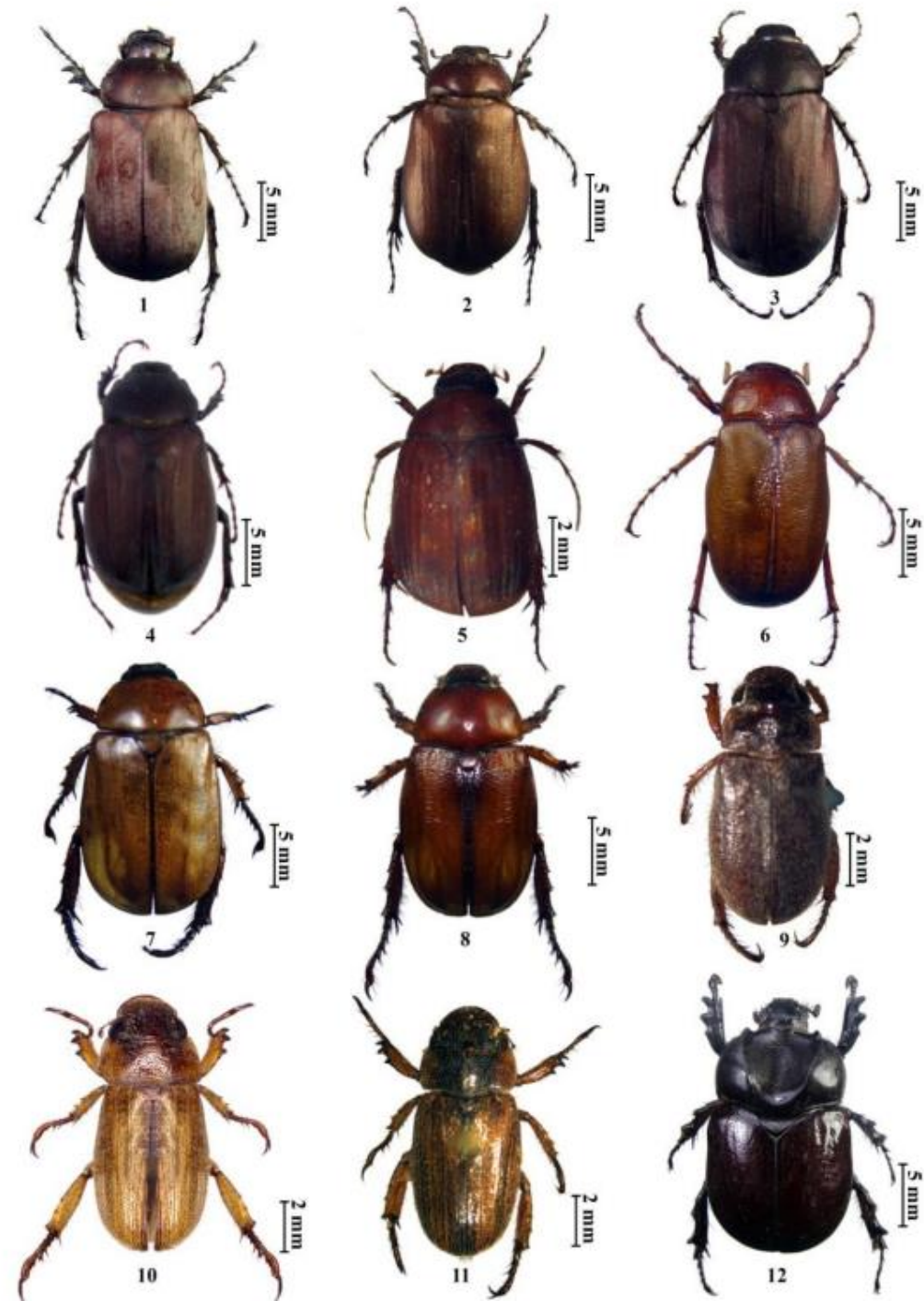
**Application of a contact insecticide
gives excellent control of the pest**

9. White Grubs

S.N: *Holotrichia serrata*

(Scarabaeidae : Coleoptera)

- Adult is a reddish brown beetle measures about 20 – 25 mm in length
- They have lamellate type of antennae.
- Grub is a c- shaped scarabaeiform larvae





Scarabaeiform larvae are larvae that are grub shaped and their bodies are curled to form a shape like the letter C. This shape of beetle larvae is named after the Scarab beetles.



Nature of Damage

- Adults feeds on the leaves and tender shoots.
- Grubs feeds on the root and rootlets as a results death of the plants.



Roots damaged by root grubs

Non insect pests (Bird pests)



Blue rock pigeons
Columbia livia



Rose ringed parakeet
Psittacula krameri



House crow
Corvus splendens

Non insect pests (Bird pests)

Crop damage occurs at various stages of crop production due to birds

- Seeds may be removed after sowing
- Seedlings may be pulled out
- Grains in milky stage or the ripening stage may be fed upon under uprooted conditions
- Crop losses by birds are also known to vary in different seasons and in different locality and management of birds require a clear understanding of the bird pests in various localities

Nature of Damage

- **The pigeons and Crows inflict the damage at the germination and seedling stages.**
- These birds pick up the seeds from the field after the post sowing irrigation and feed on the soaked seeds which were in process of germination
- They also pluck out on the developing young seedlings
- **At flowering stage** – the rose ringed parakeet infest the male inflorescence (tassel) and feed on the anthers and pollen grains
- **At tender cob stage** – the parakeets damage the cobs with silky style and green husk (green tender spathe)
- **At milky stage of the crop** – when they split and strip away the covering bracts there by exposing the grain for easy feeding and further damage
- This type of damage is continued till the cobs reach dough stage
- **Damage by crows starts at this stage and they completely remove the spathes and eat the grains.**

Management

- Killing of **any bird species is now illegal in India** and also not approved by the public, Now use repellents

1. Using Visual repellent – It is polypropylene metallic shinning tape (11mm wide and 0.025mm thick, one side red and other side silver) that reflects sun light, causing flashing effect and produces a humming noise in wind, there by scaring birds.

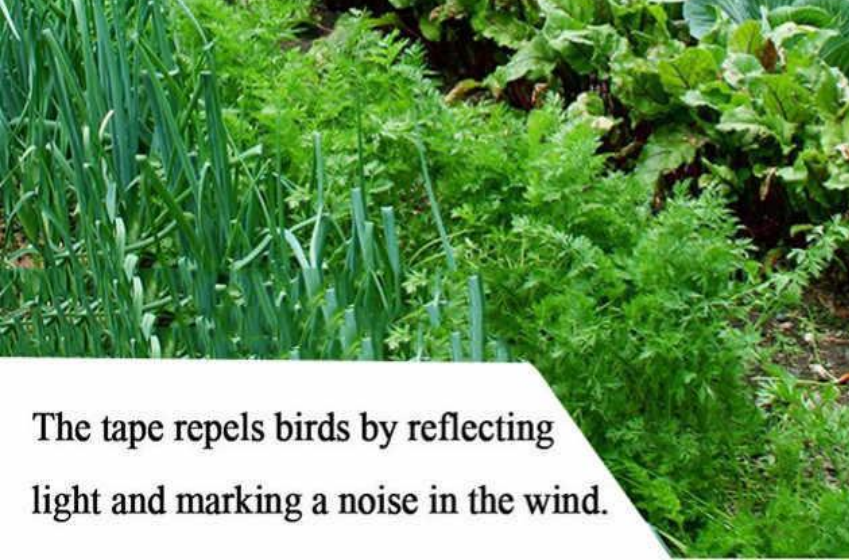
2. Using auditory repellents – In India and several other countries, birds have been traditionally scared by producing noise orally, with fire crackers or by beating drums and empty cans

Automatic acetylene exploders or **bird scaring guns** that produce a loud noise periodically have been used to scare birds in some parts of India

All noise producing devices have a major draw back once the birds to adjust to this sound does not scare.

3. Using Chemical repellents – a. Many chemicals when used as seed dressings, sprays or dusts effectively repel the birds from crops there by reducing bird damage. Seed treatment with methiocarb has been found effective in reducing the damage.

Thiram – a fungicide, protects sprouting maize from crows



The tape repels birds by reflecting light and marking a noise in the wind.

10. Fall armyworm (FAW)

S.N: *Spodoptera frugiperda*
(Lepidoptera: Noctuidae)

- It is a destructive pest native to Americas, recently invaded India and presently causing economic damage in maize.
- The incidence of this pest was first observed in Shivamogga, Karnataka on 18" May 2018.
- FAW was later reported in Tamil Nadu, Andhra Pradesh, Telangana, Maharashtra, Madhya Pradesh, Odisha, Bihar, West Bengal, Gujarat, Chhattisgarh and Kerala at mild to alarming levels in farmer's fields.
- It is primarily a pest of maize. If maize is not available it will look for sorghum. If both are not available it will attack other crops belonging to Poaceae, the family of grasses, such as sugarcane, rice, wheat, ragi, fodder grasses etc.



Identification

- Adult moth is a strong flier, can fly over 100 km in search of host plants.
- Pheromone traps specific to FAW will attract male moths.
- Male moth has two characteristic markings, viz., a fawn coloured spot towards the centre and a white patch at the apical margin of forewing.
- Forewing of female is dull with faint markings.



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Identification

- The larvae grow rapidly by chewing holes in leaves, or completely devouring entire grass blades.
- At first, larvae are less than a centimeter long and may be a bright green.



Identification

- As they age through six instars (larval "stages"), they normally change to a darker green-brown color



Identification

- It takes about 16-30 days for the caterpillars to mature (depending on temperature) at which time they burrow into the ground where they pupate.
- Pupae are reddish brown and may be found in high densities in the soil of infested areas



Identification

- The best way to tell larvae of fall armyworms from other armyworms in the genus *Spodoptera* (as well as other caterpillars in the family Noctuidae) is through a combination of traits.
- The most often cited characteristic is the inverted yellow "Y" on the head (extending up the pronotum) as seen here



Identification

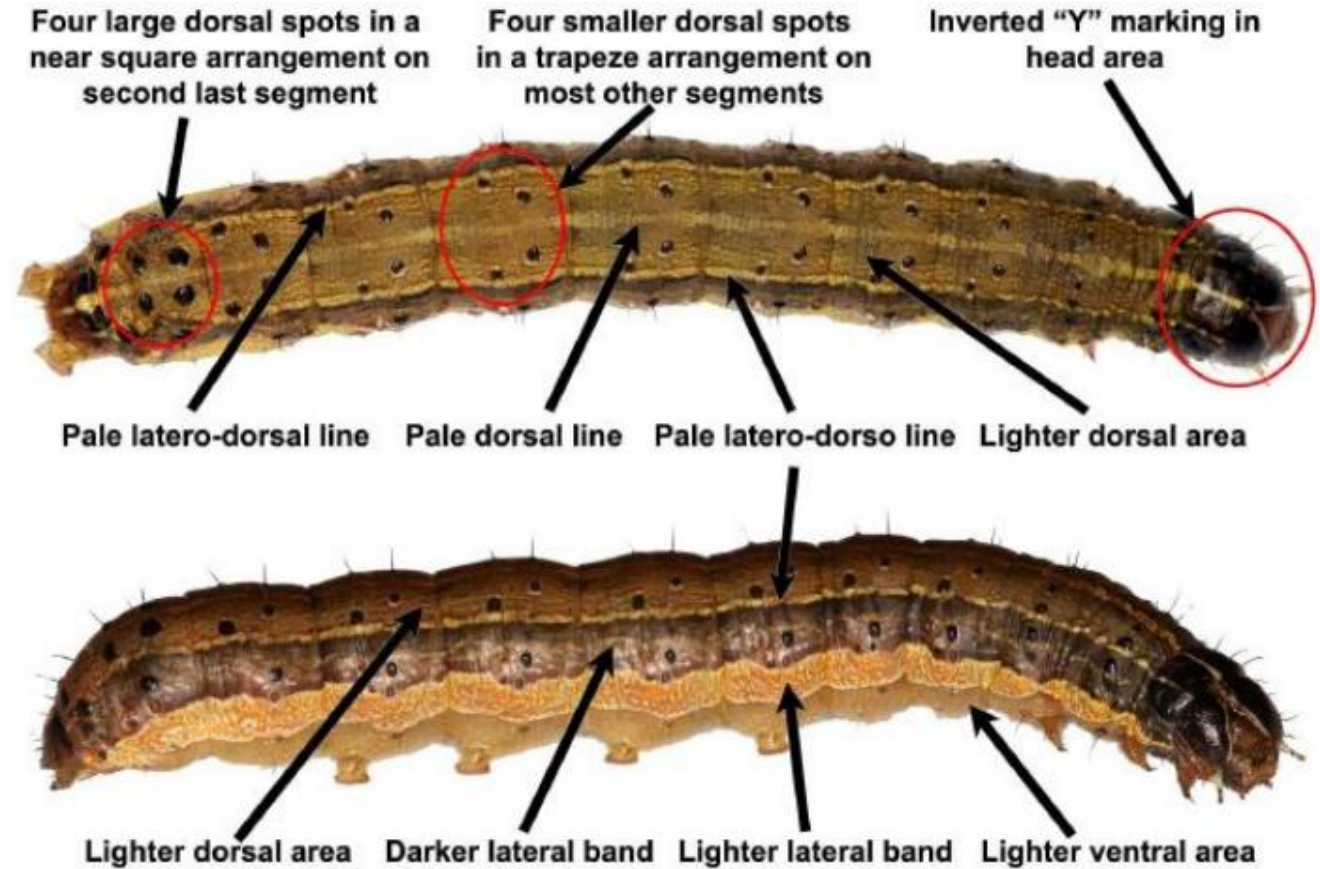
- However, some other members of the genus have a similar "Y" and some fall armyworm instars lack it (later ones show it best).
- key that includes a character that is more reliable and separates out *S. frugiperda* from its relatives in the first couplet: the dorsal pinnacula (top-most black spots with an associated seta) are as big or bigger than the spiracles



FAW: characteristic marks on caterpillars



Fall armyworm characteristic marks. D Visser ARC-VOP Roodeplaat



Fall armyworm characteristic spots, bands and lines. D Visser ARC-VOP Roodeplaat

FAW: young larvae – length 6-9 mm

Top view



FAW: mature larvae – length 30-36 mm

Side view

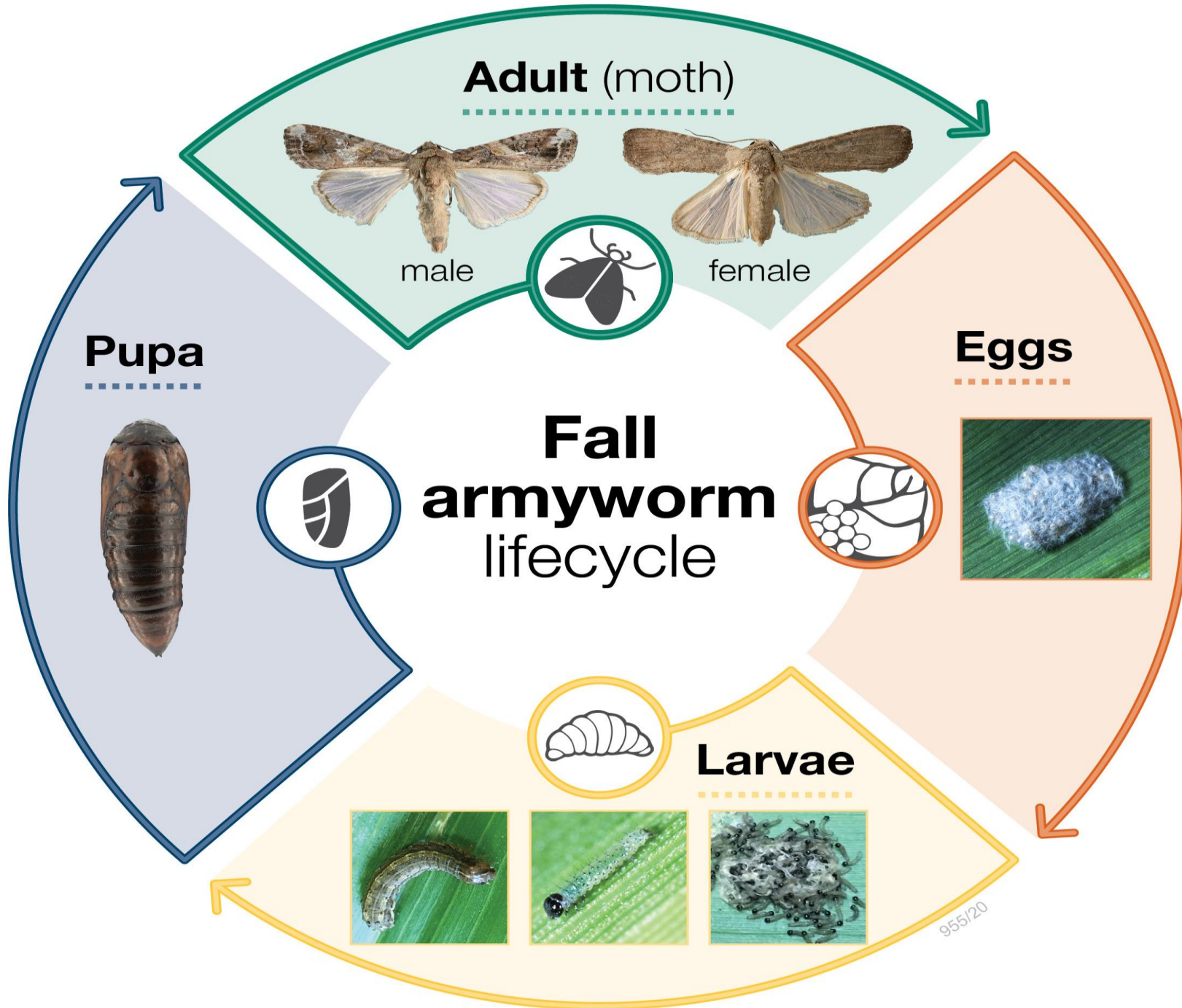


FAW: pupae, soil cells and cocoons



Biology

- A female moth lays over 1000 eggs in single or multiple clusters, covered with hairs. (I.P.:4 to 6 days).
- New born larvae in groups disperse from the hatching site and reach to feed on epidermal layers of lower surface of young leaves.
- Larvae undergo 6 stages called in stars in its growth of 15 to 18days and then undergo pupation.
- Pupa is reddish brown in colour and takes 7 to 8 days to emerge into adult moth.
- Adult moth can survive 4 to 6 days.
- Total life-cycle takes 30 to 35 days as observed from August to January



Symptoms and management

Symptom based treatment is very much essential in FAW management because of two reasons, viz.,

- the stage of symptom progression indicate the stage of larval growth, and
- the stage of larval growth decides the choice of pesticide/ control measure.

First sign of infestations: Egg mass

- Eggs are laid in masses on leaves, mostly on the underside of the leaves.
- Females can deposit the eggs in more than one layer before they are covered by anal hairs of moth.



Elongated papery windows

- Start observing the maize crop from seedling stage.
- If elongated papery windows of all sizes are seen spread all over the leaves in a few adjacent plants the crop might have been infested with FAW.
- This symptom is caused by 1st and 2nd instar FAW larvae which feed by scrapping on leaf surface.
- Early identification of this symptom is a must for effective management of FAW
- Young FAW larvae use ballooning to spread to new host plant.
- One fall armyworm batch contains too many eggs so ballooning occurs just after hatching.
- Ballooning is one of the reasons why infestation in field can reach 100%



Fall armyworm first instars. D Visser ARC-VOP Roodeplaat

Management at this stage

- It is easy to manage the larvae at this stage with botanical and microbial pesticides.
- The choices are 5% Neem Seed Kernel emulsion (NSKE) or azadirachtin 1500ppm @ 5ml/lit water.
- *Bacillus thuringiensis* variety kurstaki formulations (Dipel 8 1 @ 2ml/l of water or Delfin 5WG @ 2g /lit water).
- Entomopathogenic fungi *Metarhizium anisopliae* (1×10^8 cfu/g) @ 5g/l and /or *Nomuraea rileyi* rice grain formulation (1×10^8 cfu/g) @ 3 g/l water.
- However, when infestation is more than 10% in the field, it is better to resort to chemical pesticides which are recommended below for the bigger larvae.
- Apart from pesticide sprays, put some sand/soil alone or mixed with lime/ash (9:1) into the plant whorl when the whorl is well formed to withstand its weight.
- This will directly harm larvae and increase the effectiveness of pesticides sprayed, especially by acting as reserve for microbial pesticides.

Infestation in later stages

- Fall armyworm infestation often are only noted at later stage, when large holes, accompanied by larval droppings, are noticed in the whorls and on surrounding leaves.
- When dry the excrement takes appearance that of sawdust.
- The caterpillars usually hide deep in the whorl while the excrement they produce serve as a protective barrier which also helps to camouflage them from predators



Management at this stage

- Damage at this stage needs application of chemical pesticides.
- The choices are,
 - Emamectin benzoate 5 SG @ 0.4 g/l
 - Spinosad 45 SC @ 0.3 ml/l
 - Chlorantraniliprole 18.5 SC @ 0.4 ml/l

Detection of FAW caterpillars and moths



Fall armyworm caterpillars and moths on maize plants. D Visser ARC-VOP Rooideplaat

Caterpillars are usually found in whorls of young maize plants. On mature plants they may infest ears, where they feed on soft tissue like kernels, soft inner leaves, and silk hairs. They rarely feed on older mature leaves. Moths hide in debris or in other secluded places on the ground, as well as in whorls.

Management at this stage

- Pesticides sprays fail to control 5th and 6th instar larvae.
- Only effective measure at this stage is poison baiting.
- Mix 10 kg rice bran and 2 kg jaggery in 2-3 litres of water and keep the mixture for 24 hours to ferment.
- Add 100g Thiodicarb 75% WP and roll into balls of 0.5- 1 cm diameter just half an hour before application in the field.
- Add some sand while rolling if the balls are too sticky.
- The bait should be applied into the whorl of the plant in the evening. The above mixture is sufficient to cover one acre.

Damage at reproductive stage

- In reproductive stage of the maize crop, tassel and com ears are the vulnerable parts.
- Tassel damage is most common, which would not lead to economic damage, but boring into corn ears directly affects the yield.
- Sweet corn ear is more prone to FAW damage, which render the ears unmarketable.



Management at this stage

- Chemical control measures are not advisable in reproductive stage of maize crop since tassel damage may not cause economical loss and spraying on corn ears are futile as larvae hiding inside the ear would not be exposed to sprays.
- Moreover spraying chemicals in sweet corn and baby corn is strictly not advisable, since it is often consumed with less processing.
- Choosing a variety with tight husk and husk covering the tip could offer some protection against FAW.

S.No	Crop Stage	Action threshold	Spray sequence
1.	Seedling to early whorl stage - (02 weeks after emergence)	First catch of 3 months/ trap and /or 5% infested plants	<p>Spray any of the chemical pesticides listed if the infestation crosses 10% at this stage</p> <ul style="list-style-type: none"> • Emamectin benzoate 5 SG @ 0.4 g/l • Spinosad 45 SC @ 0.3 ml/l • Chlorantraniliprole 18.5 SC @ 0.4 ml/l
2.	Early whorl to midwhorl stage- (24 weeks after emergence)	5-10% infested plants	<ol style="list-style-type: none"> 1. First spray: Btk formulations viz., Dipel 8L @ 2ml/l of water or Delfin 5WG @ 2g/l water 2. Spray any of the chemical pesticides listed for the second spray and/ or if the infestation crosses 10% <ul style="list-style-type: none"> • Emamectin benzoate 5 SG @ 0.4 g/l • Spinosad 45 SC @ 0.3 ml/l • Chlorantraniliprole 18.5 SC @ 0.4 ml/l
3.	Mid-whorl to late whorl stage - (47 weeks after emergence)	10-20% infested plants	<ol style="list-style-type: none"> 1. First Spray: any of the chemical pesticides listed. Alternate the pesticide for second spray. <ul style="list-style-type: none"> • Emamectin benzoate 5 SG @ 0.4 g/l • Spinosad 45 SC @ 0.3 ml/l • Chlorantraniliprole 18.5 SC @ 0.4 ml/l 2. Apply Thiodicarb 75% WP based poison bait if bigger larvae are found feeding inside the whorl
4.	Late-whorl stage (7 weeks onwards of emergence)	>_ 20 % infested plants	<ol style="list-style-type: none"> 1. First Spray: any of the chemical pesticides listed. Alternate the pesticide for second spray. <ul style="list-style-type: none"> • Emamectin benzoate 5 SG @ 0.4 g/l • Spinosad 45 SC @ 0.3 ml/l • Chlorantraniliprole 18.5 SC @ 0.4 ml/l 2. Apply Thiodicarb 75% WP based poison bait if bigger larvae are found feeding inside the whorl
5.	Tasseling stage to harvest	>_10% ear damage	No insecticide application, but manually pick and destroy the larvae.

Thank You!

