



### Insect Pests of Sunflower and Its Integrated Management

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Sunflower plays host to a number of insects which includes head borer, cut worm, hairy caterpillar, jassid, and semi looper. Such pests can cause plant injury and economic loss depending upon the severity of infestation. The infestation must be monitored regularly, usually weekly, to determine the species present and if populations are at economic thresholds. This section provides information about the most common pests affecting sunflower.

#### Introduction

Oilseed crops contribute much in our national economy. Among oilseeds, sunflower (*Helianthus annuus* L.) commonly known as 'Surajmukhi' is one of the potential oil yielding crops gaining popularity because of its wider adaptability to different agroclimatic conditions. It is an important oilseed crop contributes 14% of the total oilseed production from nine major oil seed crops. The genus *Helianthus* (Helio=Sun, anthus= flower). It is the third most important oilseed crop of world after soybean, Rape seed & Mustard in India. The production of this crop is quite low despite the release of several high yielding varieties. Among the factors responsible for lower productivity, the crop attacked by large number of insect pests at different stages of crop growth which an alarming feature. To avoid these losses, it is essential that the knowledge about the damage caused by major insect pests and pest management strategies should be imparted to the farmers. Identifying when sunflowers crops are susceptible to pests is the first step in good pest management. Economic damage is most likely to occur during establishment and from flowering until maturity. Major insect pests and their management practices have been discussed.

#### 1. Sunflower head borer (*Helicoverpa armigera*)

Head borer is a polyphagous insect and a severe pest of sunflower responsible for causing 20-25 per cent loss in yield under normal conditions. However, sometimes the damage is so severe and loss goes up to 40-70 per cent. The eggs of this insect are laid singly on tender parts of the plant and flower bud. They hatch in 4-6 days. Newly hatched larvae feed on leaves, buds and flowers for a short period of time and after making a hole in the disc may enter in it to feed the developing seed. Grown up larvae bore inside the disc by making a hole in the disc may enter in it to feed the developing seed. Growing larvae bore inside the disc by making apparent tunnels. After devouring the seed in one head the larvae move to the next head resulting in heavy loss of the crop. Star bud stage of crop is more vulnerable and suffers maximum yield losses. Third and fourth instar larvae are more noxious than younger ones.

*Helicoverpa* larvae infest sunflower from vegetative until late seed filling. They may also shift to the backside of the heads and even leaves, and feeding may continue up to maturity. The full grown larvae are greenish in colour and about 3.5 cm long. Adult moth is greenish to brown with a 'V' shaped speck on forewings and dull black border on the hind wings. Eggs are laid on the host plants singly. The egg period is 7 days. Fully grown larvae are 2" long, greenish with dark brown grey lines and dark and pale bands. It shows colour variation from greenish to brown. The larval duration is 14 days. It pupates in soil for 10 days.

### Management

1. Early sown crop usually suffers lower attack of pests.
2. Deep ploughing of the field is helpful to kill the hibernating larvae.
3. Install sex pheromone trap in the field @20 traps/ha.
4. Release of egg parasitoid, *Trichogramma* sp @ 50,000 adults/ha at weekly interval keep the head borer at bay.
5. Spray nuclear polyhedrosis virus (HaNPV) @ 250 LE/ha for the control of 1st and 2nd instar larvae.
6. Spray of *Bt.k.* @1.5 kg/ha.
7. Application of 5% neem seed kernel extract at 10 days interval protects the crop from insect damage.
8. Need based spray of Indoxacarb 15.8 EC @ 73 g a.i/ha or 2.5 kg of carbaryl 50 WP or 2 kg of acephate 75SP in 250 lit of water per ha at the initiation of star bud stage and repeated after two week if necessary.

### 2. Hairy caterpillar (*Spilosoma oblique*)

Hairy caterpillars are polyphagous pest found throughout the year. Among various hairy caterpillars, Bihar hairy caterpillar is major ones causing severe damage to the sunflower crop. They are called hairy caterpillar because they have profused hairy growth on their body in larval stage. The female lays eggs in cluster on the lower surface of leaves. After hatching, the tiny larvae feed gregariously on the chlorophyll content of the leaf up to second instar. The attacked leaves look like a dirty paper, which can be recognized from a distance. After this stage larvae start dispersing throughout the field and feed voraciously leaving only the veins of the leaves without any green material. The full grown larvae are more harmful. After finishing the foliage of one field they migrate to the adjacent field resulting in complete destruction of the crop.

### Management

1. The eggs are laid in cluster; these can be collected and destroyed manually.
2. The leaves on which large numbers of first instar larvae feed gregariously can also be collected and destroyed mechanically.
3. Light trap should be installed in the field and attracted moths should be destroyed.
4. Application of *Bacillus thuringiensis* (Bt) @1.0 Kg/ha has been found effective in controlling hairy caterpillars.
5. Spot application of chlorpyrifos 20EC 1.0 ml/litre of water are highly effective for the control of gregarious phase larvae.
6. Digging trench around the field and dusting them with carbaryl 10% or methyl parathion 2% dust prevents the migration of caterpillars from one field to another.
7. Need based application of Quinalphos 25 EC @ 1.5 ml/liter of water should be done in the evening.

### 3. Jassids (*Amrasca biguttula biguttula*)

It is another important pest of sunflower. Jassids are small, very active, greenish yellow insects and can be seen in clusters on the lower surface of the leaves, both nymphs and adults suck the plant sap. The damage is characterized by typical yellowish-white spot on the leaves. Under severe infestation the leaf gets curled giving the 'hopper burn' symptoms. Seeds are also shriveled. The oil content reduces resulting drastic reduction in oil yield. Use of higher dose of nitrogen coupled with frequent irrigation make the plant more susceptible to jassid attack.

#### Management

1. Balanced dose of fertilizers should be applied because excess nitrogen makes the plant more susceptible.
2. Green colour card board painted with sticky material should be kept in the field. Flying jassids come in contact with sticky board and die.
3. Release of *Chrysoperla* sp. @ 2500 eggs or larvae/ha manage the jassid population.
4. Spray of 5% neem seed kernel extract protects the crop from insect damage.
5. Application of oxydemeton methyl 25 EC or dimethoate 30 EC @ 1.0 ml/liter or Imidachloprid 17.8 SL @20g a.i./ha the insect pest effectively.
6. Seed treatment with imidacloprid helps to manage jassids.

### 4. Cut worm (*Agrotis ypsilon*)

This is a polyphagous pest causing serious problem in sunflower cultivation during recent years. It may be serious during March – April in the field where sunflower follows potato. Greasy brown colour larvae feed on the young roots and basal portion of the plant below the ground and kill the plant by cutting at the base. Sometimes the young plant is partially dragged into the soil where the larvae feed on it. Larvae may also climb plants and browse on or cut off leaves. Crop areas attacked by cutworms tend to be patchy and the destruction of seedlings in one area may cause cutworms to migrate to adjacent fields. Larvae are up to 50 mm long, hair less with dark heads and usually darkish coloured bodies, often with longitudinal lines and/or dark spots. Larvae curl up into a C-shape and remain still if picked up. Moths are a dull brown-black colour with one generation per crop.

#### Management

1. Deep ploughing of the field should be done after harvesting of the crop in order to expose the pupal stage of pest.
2. Sowing of the crop in ridges to avoid cutworm damage in the germinating seedling.
3. Treat the seed with chlorpyrifos 20 EC @ 12 ml/kg seed.
4. Treat the soil with Chlorpyrifos 20EC @ 2.5 Litre/hactare.
5. Dust the crop with methyl parathion 2% @25-30kg/ha or malathion 5% or carbaryl10% dust @ 15-20 kg/ha.

### 5. Semi looper (*Trichoplusia ni*)

Leaves are with holes and severe damage results in skeletonization and defoliation. Adult is a stout moth, head and thorax grey in color with basal tufts ferruginous, grey wavy forewings with a slender mark. Larva is slender, attenuated anteriorly and green in colour with light wavy lines and broad lateral strip on either side.

#### Management

1. Hand-pick and destroy caterpillars.
2. Use light trap to attract and kill adults.

3. Spray Indoxacarb 15.8 EC @ 73 g a.i/ha or quinolphos or 1.0 L 500L of water/ha.

#### **Protection from Birds**

The birds like parrot, house sparrow and dove cause damage to the crop at the time of seed formation. Some birds also feed on sown seeds.

#### **Management**

1. Use of bird scarers are very important from the starting of seed development stage to harvest.
2. Metallic ribbon tied around the perimeter of the crop to reduce the attack of parakeets.
3. Seed treatment with chlorpyrifos 20 EC @ 12 ml/kg seed protects the sown seeds from bird damage.

#### **Conclusion**

The loss caused by above discussed insect pest may be minimized by adopting adequate cultural and mechanical practices right from ploughing of the field up to harvesting of the crop. This is cross pollinated crop attracting plenty of pollinators which contribute a lot in seed setting and its quality. Considering the pollination aspect the following points should be kept in mind during chemical control.

1. Spraying of toxic pesticides at the time of pollination to be avoided
2. Eco-friendly management practices should be used.
3. Use of chemicals should be avoided.
4. If chemical insecticide is in evitable then selective chemical should be used.
5. Dust formulation should be avoided.
6. Granular formulation should be used.

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