

Major Pests of Cole Crops and Their Integrated Management

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ARTICLE ID: 56

Abstract:

Cabbage and cauliflower one of the most common vegetable crops through the world. The insect pests of the major constraints in profitable cultivation of these crops and there are diamond back moth (*Plutella xylostella*), cabbage head borer (*Hellula undalis*), cabbage aphid (*Brevicoryne brassicae* and *Myzus persicae*), Mustard Sawfly, *Athalia lugens*, cabbage butterfly (*Pieris brassicae*) and tobacco caterpillar (*Spodoptera litura*). The feeding damage by these pests spoils the quality of the head and renders unfit for human consumption. To overcome the problems, concentrated effort developing sustainable and safe integrated pest management strategies include the use of mustard as trap crop, crop rotation, modern cultural mechanical practices, application of neem based insecticides, bio control agents and lastly judicious use of eco-friendly chemical insecticides. This is not simple and economical, but also effective and environment friendly in managing the insect pest on cabbage and cauliflower.

Key words: Cole crops, insect pest, identification, bionomics, management

Introduction:

Cole crops have a prominent place in autumn vegetables. All these vegetables are generally taken as main vegetable crop in *rabi* season. In the field of employment generation, these crops are in a better position than other crops. In recent years, development, research and propagation of hybrid varieties have made significant progress in the production of these crops. It is used in making vegetable, soup, pickle, salad, biryani, pakoda etc. It also has various importance in Ayurvedic medicine. Along with increasing digestion power, it is very beneficial in the diagnosis of diabetes. In these vegetables, vitamins (A and C) and minerals (potassium, calcium, phosphorus and sodium) etc. are available in sufficient quantity for a balanced diet of daily life, which is very important for human health.

These vegetables are a better source of income for the farmer as well as being tasty. Just as these vegetables are tasty to eat, in the same way insects also find them tasty because of their soft and tender properties, due to which insects harm these vegetables to the maximum. Due to lack of knowledge to protect these vegetables, farmers are unable to do anything other than incurring financial loss. Therefore, there is an urgent need to get proper technical information on the subject of identification, method and time of damage and their control of major insects that cause damage to cabbage vegetables, which is analyzed as follows:

Major insect-pests Cole crops:

Sl. No.	Name of Major Insects-pest	Damage time	Stage of Damage
1	Diamond Back Moth, <i>Plutella xylostella</i>	September-March	Sundi (Caterpillar)
2	Cabbage head borer, <i>Hellula undalis</i>	October-March	Sundi (Caterpillar)
3	Cabbage aphid, <i>Brevicoryne brassicae</i>	Whole year	Child and adult
4	Tobacco caterpillar, <i>Spodoptera litura</i>	October-March	Sundi (Caterpillar)
5	Mustard Sawfly, <i>Athalia lugens</i>	September-December	Grav

1. Diamond Bank Moth, *Plutella xylostella*

Damage symptoms: The outbreak of this pest is maximum on cabbage crops. Small caterpillars feed on the lower surface of the leaves and make small holes. When the infestation of this pest is high, the leaves of the small plants are completely destroyed, due to which the plants die, as well as its infestation is more in the big plants as well. Caterpillars make holes in the tops of large plants, in which their excrement is filled. In this way the market value of cabbage decreases. When cabbage is infested with this pest in the initial stage, the growth stops completely.



Integrated Management

- Two rows of mustard should be sown on both sides of every 25 rows, so that the female of this pest can be attracted and lay eggs on mustard leaves. While planting the crop, it should be kept in mind that cabbage should be transplanted 30 days after the

sowing of mustard. Dichlorbhas 76 EC 01 ml in mustard crop. It should be sprayed by mixing it in per liter of water so that the insect dies.

- b. Nasik-1 variety of cauliflower has resistance to this pest.
- c. One of the following insecticides should be sprayed on the affected crop at the rate of per hectare at the rate of per hectare.

Indoxacarb 14.5SC	-	200-250ml
Spinosad 25 SC	-	600- 700 ml
Chlorfluazuran 5.4 EC	-	1500 ml

2. Cabbage Head Borar, *Hellula undalis*

Damage symptoms: The newly developed caterpillar usually bores into the leaves near the veins. The holes are often of a bright colour, in which the faeces of the insect are clearly visible. Fully grown caterpillars feed on plants by boring into the centre of the stem, preventing the formation of flower heads. In the event of severe outbreak, many long tubes are seen in the tops of the flowers. Infected tops rot and give off a foul smell. This pest mostly infects young plants of the main crop and nursery plants.



Integrated Management

In infected crops, one of the following insecticides should be sprayed at the rate of per hectare.

Indoxacarb 14.5SC	-	200-250ml
Spinosad 45 SC	-	125-150 ml

3. Cabbage aphid, *Brevicoryne brassicae*

Damage symptoms: Both nymphs and adults of this pest cause damage by sucking the juice of the leaves. They stick to the leaves in thousands. As a result, the leaves turn yellow and the development of the tops is stopped. Due to sticking of aphid and yellowing of outer leaves, the market value of cabbage decreases.



Integrated Management

- a. Neem leaf or Niboli should be sprayed by making a solution of 10 percent concentration.

- b. Chrysopa 50,000 per hectare predatory insect should be released thrice on the crops.
- c. The leaves affected by Mahu insects should be cut and removed along with the insects.
- d. One of the below mentioned insecticides should be sprayed on the pest affected crop at the rate of per hectare.

Dimethoate 30 EC - 800-1000 ml

Imidacloprid 17.8 SL - 100-125 ml

Acetamiprid 20 SP - 200 gms

4. Tobacco caterpillar, *Spodoptera litura*

Damage symptoms: The caterpillar (larvae) of this pest is initially found in the form of a group and it eats the lower surface of the leaves, leaving only the veins of the leaves. In case of severe infestation, it damages flowers and buds.



Integrated Management:

- a. The field should also be deep ploughing in the summer season, so that the pupa lying in the dormant state inside the soil is destroyed.
- b. In small farms, egg masses and small caterpillars can be destroyed by holding them by hand.
- c. Parasitic insects like *Trichogramma* etc. of eggs should be released from time to time.
- d. Chemical control of this pest should be done like diamond back moth pest.

5. Mustard Sawfly, *Athalia lugens*

Damage symptoms: The grubs of this pest damage the leaves of cabbage vegetables. The grubs feed on the leaves and make holes in them. In case of severe infestation, the leaves are completely eaten. As a result the plants die. In case of infestation in large plants, the size of the head remains small.



Integrated Management:

- a. The larvae of sawfly can be collected and destroyed by hand in the morning and evening.
- b. Irrigation of the field reduces the outbreak of this pest.

- c. Fertilizers should be used in balanced quantity.
- d. Neem based insecticide (NSKE) should be sprayed by making a solution at the rate of 5 ml per liter of water.
- e. In the event of high outbreak, one of the following insecticides should be used at the rate of per hectare.

Fipronil 5. SC	-	800-1000 ml
Emamectin Benzoate 5SG	-	100-125 grams
Dichlorbhas 76 EC	-	400-500 ml

The following are the major useful techniques of integrated pest management and insecticide resistance. By adopting these, pest management can be done and insect resistance to insecticides can be prevented.

1. Field cleaning and crop stubble should be removed and destroyed in time. After that, deep ploughing should be done in summer, so that the number of larvae and pupae come out of the soil and get destroyed in the hot sun or by birds.
2. The ridges of the field should be cleaned so that the plants and weeds that give shelter to insects do not flourish.
3. Seeds of only approved varieties/hybrids should be used for weeding and should be purchased from a recognized establishment and trusted sources only.
4. Thiomethoxam 70 WS before sowing the seeds or Imidacloprid 70 WS. It should be extinguished only after treating it at the rate of 5-7 grams per kg of seed; this does not cause the outbreak of juice sucking insects for about 30-40 days. By that time the number of natural enemies of the pest increases.
5. Tolerant gene format of sucking pests should be planted. These can delay the spraying of insecticides and protect the natural enemies of pest insects.
6. Between the rows of vegetables, intercropping of moong, urad, groundnut and soyabean should be taken. This reduces the pest attack on the main crop and the number of natural enemies / friendly insects can be protected.
7. Pests should be destroyed daily by using light trap (160 watt mercury vapor valve should be used in light trap).

8. Scent-loop (pheromone trap) should be installed in the field at the rate of 8-10 per hectare. If 8 adult insects are found per trap per night for three consecutive nights, then its control action should be started.
9. From the very beginning, bird-shelter sites (Bird Pachar) should be made of English 'T' shaped wood.
10. For the control of caterpillars and borer insects, 7-8 Tricho card (eggs of *Trichogramma chilonis*) should be used at the rate of per hectare.
11. Insecticides should be used only when the prescribed economic damage is above the level.
12. For the control of green bollworm and borer, after 35-40 days of sowing NPV should be sprayed at the rate of 250 LE per hectare in the evening.
13. Neem oil or neem seed kernel extract should be sprayed by making a solution of 5 ml per liter of water for the control of sap sucking insects.
14. Pyrethroide should be used only once during the crop season at the last moment. Excessive use or repeated spraying of synthetic pyrethroids can make pest infestations more severe, as synthetic pyrethroids kill a large number of friendly insects/natural enemies.
15. Spinosad, Thiodicarb, Novaluran, Thiclopid and Emamectin Benzoate can be used for the control of borer and green grubs.
16. Imedacloprid 17.8 SL @ 100 ml or Acetameprid 20 SP @ 75 grams or Dimethoate 30 EC @ 800-1000 ml per hectare can be used to control the sucking pests.

Follow these for best results of insecticides:

- **Appropriate time:** Pesticides should be used only when required.
- **Appropriate chemicals:** Appropriate insecticides should be selected.
- **Proper quantity:** Approved and proper quantity of pesticides should be used.
- **Proper method:** Proper insecticide spraying equipment and spraying method should be used.
- Insecticides should be used alternately, so that resistance to insecticides can be prevented in insects.

Conclusion:



Successful management practices of cabbage and cauliflower pests depends on proper pest identification modern cultural measure time of insecticidal application and judicious use of eco-friendly chemical insecticide with coverage of plants. Because the different species of pests may be susceptible to different insecticides. It is important to identify the species involved is an infestation. Most of the foliage feeder insects are feed to the leaves and flower head.

