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Pests Identification and their Management in Cabbage Crop

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INTRODUCTION

Introduction Cabbage (*Brassica oleracea*, capitata group) is a member of the crucifer crop group, which also includes cauliflower, broccoli, collards, kale and Brussels sprouts. All crucifers belong to the mustard family (Brassicaceae). Cabbage is one of the world's leading vegetables in terms of total production. In Uganda, cabbage is grown in all districts and is steadily becoming an economic enterprise, being particularly favoured for its high yield potentials, high market demand and reliable ease of storage and transport. The economic benefits aside, cabbage is a good source of many minerals particularly calcium and potassium, and is also relatively high in vitamins A and C. Cabbage, like other *brassicas* contains mustard oils, compounds that inhibit the growth of cancer. These substances boost the body's production of the enzymes that disable potential carcinogens and then remove them from the system. In addition cabbage also contains a number of antioxidants that protect the body from cancer and heart disease.

1. Diamondback moth: *Plutella xylostella* (L.) (Plutellidae :Lepidoptera)

Nature of damage

- Mining and skeletanization of cabbage leaves
- Scrapping of epidermal leaf tissues producing typical whitish patches on leaves.
- Full-grown larvae bite holes in the leaves and feeds on curd.

Symptoms

- Leaves are completely drilled with holes, resulting in under sized head.
- Withered appearance of affected leaves.

2. LEAF WEBBER : *Crocidolomia binotalis* (Pyralidae:Lepidoptera)

- Regular pest of minor status but occasionally reach serious proportions
- Widely distributed in Indian subcontinent, South Asia and Australia.

Nature of damage

- Young larvae on hatching feed gregariously on leaves and later web the leaves together and feed within the web accumulating faecal matter.

Symptoms

- Webbed leaves with fecal matter.
- Rotting of cabbage heads.

3. Cabbage head borer: *Hellula undalis* Fabricius (Pyralidae :Lepidoptera)

- Worldwide distributed, sporadic but occasionally serious pest.

Nature of damage

- Caterpillars web the leaves and bore into stem, stalk or leaf veins.
- They prevent head initiation causing multiple shoots or heads.
- Later stage bore into cabbage head.

Symptoms

- Webbed leaves.
- Holes in cabbage head with fecal matter.

4. Aphids: *Brevicoryne brassicae, Lipaphis erysimi* (Aphididae: Homoptera)

- Most common species attacking cole crops with a very wide range of distribution.
- This pest infests crucifers in cold season.
- Humid, but rainless and cool weather favours multiplication.

Nature of damage

- The nymphs and adults suck sap from plant causing loss of vigour
- Sooty mould develops on excreted honeydew reducing photosynthesis.

Symptoms

- Curling of infested leaves.
- Early stage plant wither and die.
- Plants remain stunted.

5. Cabbage butterfly: *Pieris brassicae* (Pieridae : Lepidoptera)

Damage symptoms

- Caterpillars scrape the leaves and eat up leaves leaving only the main veins.
- Defoliation.
- Bores into the heads of cabbage.

6. Tobacco caterpillar: *Spodoptera litura* (Noctuidae: Lepidoptera)

Nature of damage

- In early stages, the caterpillars are gregarious and scrape the chlorophyll content of leaf lamina.

Damage symptoms

- Papery white appearance.
- Irregular holes on the leaves.
- Skeletonization leaving only veins and petioles.
- Heavy defoliation.

7. Cabbage looper: *Trichoplusia ni, Plusia spp.* (Noctuidae: Lepidoptera)

- Polyphagous and widely distributed.
- Caterpillars of *Plusia* spp and *Trichoplusia ni* look more or less alike.
- Semiloopers having body thin anteriorly green with light wavy white lines and a broad lateral stripe on either side.

Damage symptoms

- Scrapping and feeding on the leaves.
- Later defoliate the plant leaving only the midribs and main veins.

8. Mustard sawfly: *Athalia lugens proxima* (Tenthridinidae: Hymenoptera)

Damage symptoms

- Grubs on hatching nibble the margins of tender leaves, but later on bite holes in leaves.
- Dark brown or black caterpillars aggregating on the cut edges of leaves.

9. Painted bugs: *Bagrada hilaris* (Pentatomidae: Hemiptera)

Nature of damage

- Nymphs and adults suck sap from leaves.

Damage symptoms

- Wilting and drying of leaves.

Integrated pest management

I. Resistant or tolerant varieties

- Aphids All season, Red Drum Head..

II. Pre-sowing operations (to manage DBM)

- Summer ploughing.
- Removal and destruction of plant remnants, stubbles and debris.
- Sowing of two rows of bold seeded mustard after every 25 rows of cabbage as a trap crop. Plant the first row 12 days before transplanting and second row 25 days after transplanting.
- Intercropping with tomato, garlic, coriander and carrot in alternate rows.

III. Management in the main field.

Cultural methods (To manage Tobacco caterpillar)

- Field sanitation and roughing.
- Planting Ocimum/Basil (Repellent plants).
- Use of ovipositional trap crops such as castor @ 250 plants/acre.
- Intercropping cabbages with *Nasturtium* results in fewer eggs laid on cabbage by the butterflies (Cabbage butterfly).

B. Mechanical methods

Sl. No.	Operations	Target pest
1.	Collection and destruction of Caterpillars	Cabbage borer, leaf webber, Cabbage butterfly
2.	Install pheromone traps @ 4-5/acre for monitoring	DBM, Tobacco caterpillar
3.	Light traps @ 1/acre	Leaf webber, Tobacco caterpillar
4.	Install yellow sticky traps, yellow water pan traps @ 12/acre to monitor alates	Cabbage aphid
5.	Erecting bird perches for encouraging predatory birds such as mynah, drongo etc.	Tobacco caterpillar, Cabbage butterfly

C. Biological control

Sl. No.	Operations	Target pest
1.	Release egg parasitoid, *T. chilonis/pretiosum* @ 20,000/acre 4-6 times at weekly interval. Release larval parasitoids, *Diadegma semiclausm* @ 1,00,000/acre (Hills – below 25 –27ºC) or *Cotesia plutellae* (plains) @ 20,000/acre from 20 days after planting	DBM
2.	Commercial Bt @ 1ml/l of water	
3.	Foliar spray with 5% NSKE or azadirachtin 0.03% (300 ppm) neem oil based WSP @ 1000-2000 ml in 200-400 l of water/acre	DBM, tobacco caterpillar
4.	Spray NPV @ 100LE/ac in combination with jaggery 1 kg, sandovit 100 ml or Robin Blue 50 g thrice at 10-15 days interval on observing the eggs or first instar larvae in the evening hours.	Tobacco caterpillar

C. Chemical control

Sl. No.	Operations	Target pest
1.	Spray flubendiamide 20% WG @ 0.1 g or lufenuron 5.4% EC @ 1.2 g or spinosad 2.5% SC @ 1.2 ml or indoxacarb 15.8% EC @ 0.2 ml/l or emamectin benzoate 5% SG @ 60- 80 g in 200 l of water/acre or fipronil 5% SC @ 320–400 ml in 200 l of water/acre. (last spray should be 15 days before harvesting).	DBM

2.	Foliar spray with dimethoate 30% EC @ 264 ml in 200-400 l of water/acre or phosalone 35% EC @ 571 ml in 200-400 l of water/acre or acetamiprid 20 % SP @ 300 ml in 200-240 l of water/acre.	Cabbage aphid
3.	Spray trichlorfon 5% GR @ 300 g/acre or thiodicarb 5% GR @ 300g/acre or chlorfluazuron 5.4% EC @ 600 ml in 200 l of water/acre	Tobacco caterpillar
4.	Malathion 50 EC @ 600 ml in 200-400 l of water/acre	Cabbage borer

CONCLUSION

Successful control of cabbage pests, particularly the leaf feeding caterpillars, depends on proper pest identification, timing of applications and insecticide coverage. Because the different species caterpillars may be susceptible to different insecticides, it is important to identify the species involved in an infestation. Most of the eggs of the foliage feeding caterpillars are laid on the under surfaces of the leaves and the larvae, until mature, tend to feed on the underside of the foliage or in the bud.