



Pests of Cabbage and Integrated Pest Management (IPM) Practices for their Management

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INTRODUCTION

Cabbage is one of the important vegetable crops, which is grown across the country and as well as the cauliflower which belongs to the same family. Pests which are occurring on these vegetables can be broadly categorized into the insect pests of national significance and the insect pests of regional significance. So, in the insect pests of national significance, the diamond back moth takes the first place, where it is quite severe and cause a huge economic loss. And occasionally you also get the head borer, and the leaf webber. A butterfly pest (normally referred as the cabbage butterfly), and tobacco caterpillar are normally found more serious in northern part of India. Under the pests of regional significance, occasionally the gram caterpillar that is *Helicoverpa* is an important pest of cabbage. Some leaf eating caterpillars like semiloopers are also there. Then mustard aphid is the one which normally occurs, painted bug, mustard sawfly and the cabbage semilooper.

Nature of damage

Diamond back moth (DBM)

It is cosmopolitan in nature and is widely distributed. It attacks not only on cabbage but also the cauliflower and other cruciferous and as well as the solanaceous plants. But more seriously we get them on cabbage and cauliflower. This moth is actually a tiny moth, having a very characteristic diamond shaped marking on its back, whenever it is at rest. Hence it is normally referred as diamond back moth. It usually lays the eggs on the leaf surface. And the first instar larvae immediately after hatching will mine into the leaf, the epidermal layer, and then feed on the internal tissues. As a result, you start getting these white patches or the blotches on the leaves. Then after the completion of the first instar, the larva comes out and then starts scraping the chlorophyll content on the plant or on the leaf, as a result you start getting the white papery patches or the appearance on the leaves.

Then the later instar larvae will start making in small irregular holes on the leaves, which actually coalesce and then becomes a complete defoliation. In severe cases it also attacks the head region and which results to the, a huge reduction.

Leaf Webber

This is also widely distributed and quite regular pest, but it is of a minor importance or the status as it occasionally reaches the pest proportion. The moth is quite stout and lays the eggs in batches of a small batches about 15-20. Larvae initially gregariously feed by scraping the leaves, but later they actually web the leaves and then start feeding internally and so the severe infestation normally leads to a defoliation and also they attack the head region, leading to a rotting of the head.

Head borer

The cabbage head borer which is *Hellula undalis* is also has got a worldwide distribution. But it is sporadic in nature and occasionally becomes the serious pest. So the moth also lays a few eggs at a time. The larvae generally web the leaves and bore into the stem or the stalk. And this actually prevents the head initiation causing multiple shoots or the heads. Sometimes when at the head region or head formation at the button stage, they bore into the cabbage head and completely prevent the formation of the head.

Aphids

Two species of aphids, *Brevicoryne brassicae* and *Lipaphis erysimi* among which *Brevicoryne brassicae* is quite serious. Both adults and the nymphs are the damaging stage, and they congregate at the base of the leaves. Normally the body is covered with white waxy coating, and they suck the sap from the leaves, and because of a continuous sucking you normally see the discoloration on the leaves. Then drooping of the leaves and ultimately the withering of the leaves. If

the population is too high, then as they secrete the honeydews, so normally the fungus will grow on it and normally get the sooty mould appearance, which affects the photosynthetic activity of the plant

Cabbage butterfly

The cabbage butterfly that is *Pieris brassicae* is quite serious on the Northern India usually distributed along the Himalayan region as well as parts of the North India. Its adult is whitish in colour with a black spot on its forewing, and lays the eggs in a groups which are yellowish. The larvae are medium to large with a black and white patch, and mainly defoliate. Because of this heavy defoliation, it causes the skeletonization of the plant. This leads to a poor development of the head, and sometimes they are also known to attack the head region.

Tobacco caterpillar

Tobacco caterpillar of course again is a sporadic pest, widely distributed in India and occasionally so it causes a serious damage to the cabbage. And the moth lay the eggs in groups covered with scales or the hairs, and the caterpillar initially will scrape the leaves, and forms into a papery white appearance. And later they start defoliating and which affects the normal growth of the plant. Cabbage looper, the two species of loopers or semiloopers you get, *trichoplusia ni* and as well as *plusia* species. They also cause a similar type of damage such as the causing an irregular holes on the leaves. In severe cases, is a defoliation which results into the stunted growth, non formation of the head region and complete loss of the yield. The caterpillar can be identified based on a very characteristic semilooping characters. So which found normally on the plants feeding the leaves.

Saw fly

Mustard saw fly, occasionally we see this pest on the cabbage. It belongs to the

hymenopteran group. So the young ones look like a caterpillars, and they usually feed from the margin and leads to the defoliation.

Painted bug it is *Bagrada cruciferarum* or *Bagrada hilaris* is another sucking pest, which is widely distributed but quite serious in certain parts of the country, and sometimes causes a major damage. Both the nymphs and the adults they usually suck from the leaves, and as a result of which the wilting and drying up of the leaves is normally seen.

Integrated Pest Management (IPM)

So, for all these pests, we need to actually look at the Economic Threshold Levels (ETLs). Based on the economic threshold levels, the management practices can be initiated especially the chemical management practice. For diamond back moth, the ETL is 4-7 larvae per plant during the head formation region. For leaf webber it is 1 larvae per meter row, whereas for cabbage head borer, butterfly and the mustard sawfly it is usually 1 larva per plant. For integrated management, again we should first look at the resistant or the tolerant varieties. For example; against the aphids we do have the resistant or tolerant varieties. And wherever the regions where the aphid menace is more, then we should go for these varieties. As for pre-sowing operations, summer ploughing or the deep ploughing is very much required as it actually kills the many the resting stage of the pest. Then removal and destruction of the plant remnants. Plant remnants is also one of the important practice. And especially for diamond back moth, so we should go for sowing of two rows of bold seeded mustard after every 25 rows of the cabbage as a trap crop. So the first row of the mustard should be sown at 12 days before the transplanting, and whereas the 2nd row 25 days after the transplanting. This is very essential as it actually divert the diamond backmoth population so from the cabbage. Otherwise, you can also go with

intercropping with the tomato, garlick, coriander etc in order to harbour more of the natural enemies.

Cultural methods

For *Spodoptera*, we can grow in the castor as a trap crop so will actually attracts more of the oviposition. For cabbage butterfly, intercropping the cabbage with nasturtium is quite effective. Then for mechanical methods, the collection and destruction of the caterpillar is quite essential. As a physical method installation of the pheromone traps for monitoring the DBM tobacco caterpillar. Light trap @ 1 per acre in order to monitor the leaf webber as well as the tobacco caterpillar. And sticky trap especially, yellow sticky trap. The yellow water pan for the cabbage aphid is quite effective. And erecting the bird perches also for the defoliator management especially is quite effective. Several biocontrol agents have been recommended among which the releasing the egg parasitoids *trichogramma chilonis* or *pretiosum* @ 20,000 per acre. 4 to 6 times at weekly interval is going to take care of DBM. Then application of the commercial Bt @ 1ml per litre is also very effective against DBM. And in order to manage the tobacco caterpillar and DBM. And in order to manage the tobacco caterpillar and DBM we can go for foliar spray with 5% NSKE or commercially available azadirachtin. And also NPV against *spodoptera* @ 100 LE per acre, which is mixed with jaggery or with a sandovit as an screenguard is quite effective. So, lot of chemicals have also been recommended against it, looking into the economic threshold level, so we can go for these, the chemical pesticides in managing DBM or the cabbage borer, and especially for sucking pests like cabbage aphid. So we can go for the systemic insecticide, and for the tobacco caterpillars you can go for some of these chemicals.