



## A FIELD STUDY OF PEST OF CAULIFLOWER IN EASTERN PLAIN ZONE AREAS

Rudra Pratap Singh\*, Mukesh Kumar Mishra<sup>1</sup>, Umesh Chandra<sup>1</sup> and Narendra Pratap<sup>1</sup>

Chaudhary Charan Singh (P.G.) College, Heonra-Saifai, Etawah - 206 130 (U.P.), India.

<sup>1</sup>N.D. University of Agril. and Tech., Kumarganj, Faizabad - 224 229 (U.P.), India.

### Abstract

In the present study, different insect pests of cauliflower crop were studied. Those pests who damage this crop are Tobacco caterpillar, *Spodoptera litura* (Fabricius); Diamond back moth, *Plutella xylostella* (Linnaeus); Cabbage caterpillar, *Pieris brassicae* (Linnaeus); Cabbage semi-looper, *Thysanoplusia orichalcea* (Fabricius); Cabbage borer and *Hellula undalis* (Fabricius). Pest problem is one of the major constraints for achieving higher production in agriculture crops. India loses about 30% of its crops due to pests and diseases each year. Most vegetable crops are subjected to pest damage seeds, roots, leaves, stems and fruits are all susceptible damage range to plant vigour to plant depth and crop loss.

**Key words :** *Spodoptera litura*, *Brassica oleracea*, metamorphosis.

### Introduction

Human civilization and life is impossible to conceive without plant. Plants are diverse group of living things upon which all non photosynthetic organisms ultimately depends. They make beauty our surroundings, purify our air, act as sound barriers, manufacture precious oxygen and help us for saving energy through their cooling shade in summer and their wind reduction in winter. Plants Provide a sheer inexhaustible source of widely varying materials *i.e.*, timber, fibres, natural dyes, food, oil and soap etc. Vegetables are the important component of daily diet. Vegetables are eaten in a variety of ways, as part of main meal and as snacks. The nutritional content of vegetables varies considerably, though generally they contain little protein or fat, and varying proportions of vitamins such as vitamin A, vitamin K and vitamin B6, provitamins, dietary minerals and carbohydrates. Vegetables contain a great variety of other phytochemicals, some of which have been claimed to have antioxidant, antibacterial, antifungal, antiviral and anticarcinogenic properties. Some vegetables also contain fibre important for gastrointestinal (GI) function. These crops provide a cheap source of protein vitamins and other elements essential for human health and well being.

The group 'cole crops' is said to be derived from the wild cabbage, 'cole warts' (*Brassica oleracea* L.).

\*Author for correspondence: E-mail : rudra.agento@gmail.com

Coastal regions of England and Southern and Western Europe are known to be its native place. All cole crops require cool season. It is an annual plant that is grown in fields. The head is eaten while the stalk and surrounding thick, green leaves are used in vegetable broth or discarded. Cauliflower is grown on many different types of soil but does best in a rich, well drained soil with a high moisture-holding capacity. High humus content in the soil will provide better aeration and water penetration. If a soil is low in organic matter, stable or green manures can be supplied. Cauliflower grows best on a neutral or slightly acid soil (pH 6.0 to 6.5) (Girish *et al.*, 2010).

These vegetable crops are attacked in every season by number of fungal disease, bacteria, virus, insects and pests caused high damage to the production. Insects and pests generally attacked because of their liking and to complete their life cycle. They damage and used every parts of the plant and ultimate causes high economic loss to the farmers. Pest is an organism that effect vegetable crop. Most of the insects considered common vegetable pests undergo a developmental process known as metamorphosis, which simply means that the insect changes form during its life. Metamorphosis may be complete or incomplete. Complete metamorphosis consists of four stages—egg, larva, pupa, and adult. Increasing international trade and tourism have led to an increase in the introduction of exotic pests that pose a

**Table 1** : Some important pests on cauliflower crops to complete their life cycle.

S. no.	Plant name	Pest	Effect
1.	Cauliflower ( <i>Brassica oleracea</i> var. <i>botrytis</i> Linn.)	a) <b>Tobacco caterpillar,</b> <i>Spodoptera litura</i> (Fabricius)	Larvae gregariously feeding on cauliflower leaves of plants.
		b) <b>Diamond back moth,</b> <i>Plutella xylostella</i> (Linnaeus)	This gives the appearance of translucent windows on the leaf Caterpillars chew on stems and leaves of plants
		c) <b>Cabbage caterpillar,</b> <i>Pieris brassicae</i> (Linnaeus)	Caterpillars gregariously feeding on leaves of plants
		d) <b>Cabbage semi-looper,</b> <i>Thysanoplusia orichalcea</i> (Fabricius)	Caterpillars chew on leaves of plants
		e) <b>Cabbage borer,</b> <i>Hellula undalis</i> (Fabricius)	Bore in leaves of vein Feeding damage results in curling and yellowing leaves, stunting plant growth, and deforming developing heads.

considerable economic threat to the agro-ecosystems. Thousand types of insects can affect vegetables (Bhat *et al.*, 2011).

### Materials and Methods

To determine which pest effect on cauliflower a field survey was conducted in Dobhihara of Sultanpur district and Pithla of Faizabad district, U.P. in India. The field survey was undertaken on August to December 2011. The selected areas are known to vegetable growing areas and has suitable environment for the production of vegetable specially cauliflower. Out of these areas Dobhihara and Pithla is famous for growing vegetable crops. The field survey includes collection of information through farmer's interviews. The farmer tries to evert the potential insect pest damaged by restoring to the use of insecticide. Only those farmers interviewed who are actively involved in vegetable farming. On the basis of questionnaires, farmers were interviewed and details were obtained concerning vegetable crop and their pest and pest induced changes in vegetable crops formal interview were conducted in farmer's field keeping in the view the convenience of the respondents. Before conducting an interview, the objective of the activity was briefly explain to the respondent highlighting the need, importance the possible outcome. A central systematic sampling system was used in Dobhihara village that ranged between 5000sq. meter areas. Samples were collected from each vegetable from the field, and thoroughly inspected leaves, stem, curd and area for identification of different pests.

### Materials used for the study

Cauliflower (*Brassica oleracea* var. *botrytis* Linn.) vegetable is used for the several varieties of present study:

- a) Pusa Ageti,      b) Pusa Katki

### Observations

Field survey was done in Dobhihara of Sultanpur district and Pithla of Faizabad district situated in the month of August to December to the whole survey was done in the morning session (before 7 am) since pests are sensitive to temperature so we can't notice their activity in sunlight. Initially damage is caused by larva which skeletonizes the foliage of host plant and renders it unfit for consumption. Firstly feeds on leaves and later on entire inside the curd thus causing damage to the crop. When larvae are small, damage is evident as small irregular holes or "shot holes" in the leaves. If larvae are numerous, they may eat the entire leaf, leaving only the veins. The climatic condition of these areas is favorable to the pest so this area is good for the reproduction for tobacco moth and other pests. The whole activity of pest from initial damage to final damage was observed for a month in the field. Farmers were asked how they manage the damage of pests. Considering this cause they use insecticide once in 7 days. Crop damage is usually first evident on plants growing on ridges and knolls in the field. Damage can only be prevented by early field monitoring and the application of insecticides, if larval numbers exceed the action threshold. The recorded observations are shown in table 1.

### Results and Discussion

The samples of fresh and affected vegetables were collected from field and identified various pests like Tobacco caterpillar, *Spodoptera litura* (Fabricius); Cabbage caterpillar, *Pieris brassicae* (Linnaeus); Diamond back moth, *Plutella xylostella* (Linnaeus); Cabbage semi-looper, *Thysanoplusia orichalcea* (Fabricius); Cabbage borer, and *Hellula undalis* (Fabricius) by morphological method. These pests cause



**Figs. A to D :** Tobacco caterpillar on host plant.  
**Figs D :** Tobacco caterpillar affected cauliflower.  
**Fig. H :** Diamond back moth affected cauliflower.

**Figs B & C :** Tobacco caterpillar chew plant's leaf.  
**Figs. E to H :** Showing diamondback moth.

so many changes in vegetable plants and also affect crop production. Tobacco caterpillar (figs. A, B, C & D) is particularly damage to seedlings and may disrupt head formation in cabbage, broccoli, and cauliflower. The presence of larvae of these pest cause in florets complete rejection of produce, even if the level of plant tissue removal is insignificant. The tobacco caterpillar, *Spodoptera litura* is one of the most important insect pests of agricultural crops in the Asian tropics. This species is widely distributed throughout tropical and temperate Asia, Australia and the Pacific Island (Feakin, 1973; Kranz *et al.*, 1977). Diamondback moth (DBM), *Plutella xylostella* is an important pest of cruciferous crops and particularly cabbage and cauliflower (Devi *et al.*, 1995). *P. brassicae*, *P. canidia* and *P. rapae* were found to be major pests of cabbage and cauliflower (Nair, 1970; Butani and Jotwani, 1984; Gupta, 1990; Bhatia and Verma, 1994; Bhatia and Verma, 1995; Bhatia and Gupta 2003; Badenes- Perez and Shelton, 2006; Kumar *et al.*, 2007; Sharma *et al.*, 2008). Similarly, crop damage caused by these pests also reported earlier (Hutchison *et al.*, 2011). It is also reported that the diamondback moth (DBM) (*Plutella xylostella*) is the single most destructive pest of cabbage and leafy greens worldwide. The entire plant may become riddled with holes under moderate to heavy populations. Larvae also feed in the developing heads of cabbage, causing deformed heads and encouraging soft rots. According to Clementine *et al.* (2009) these pests bore hole into the leaves and as a consequence reduce the photosynthetic activity of the leaves. Therefore, they may reduce cauliflower fruit yield (figs. E, F G & H).

### Conclusion

Through the field studies in four villages' *viz*: Dobhihara of Sultanpur district and Pithla of Faizabad district, we observed that these districts are facing problems with pests on the various vegetable crops including cauliflower. We found cauliflower is attacked by three types of pest generally. To estimate the damage on the crops caused by these pests needs detailed survey and study.

### References

Badenes-Perez, F. R. and A. M. Shelton (2006). Pest management other agricultural practices among farmer growing cruciferous vegetable in central and western highland of Kenya and the western Himalaya India. *International journal of pest management*, **52(4)**: 303-315.

Baidoo, P. K. and M. B. Mochiah (2011). The influence of nutrient application on the pests and natural enemies of pests of okra *Abelmoschus esculentus* L. Moench. *Journal of Applied Biosciences*, **41**: 2765-2771.

Bhat, D. M., R. C. Bhagat and A. Qureshi (2011). A survey of insect pests damaging vegetable crops in Kashmir Valley (India), with some new records. *Journal of Entomological Research*, **35(1)**: 85-91.

Bhat, O. K., V. Kaul and K. C. Bhagat (1994). Incidence of pests associated with the rhizosphere of tomato in Jammu. *Annals of Plant Protection Sciences*, **2(2)**: 23-26.

Bhatia, R. and D. Gupta (2003). Insect and mite pest status of subtropical horticultural crops in Himachal Pradesh. *Journal of Insect Science*, **16(2)**: 1-8.

Butani, D. K. and M. G. Jotwani (Eds.) (1984). *Insects in vegetables*. Periodical Expert Book Agency Delhi, India, pp. 356.

Capinera, J. L. (Eds.) (2001). *Handbook of vegetable pests*. Academic Press, California USA, pp. 729.

Chauhan, U., O. P. Bhalla and K. C. Sharma (1997). Biology and seasonality of the diamondback moth, *Plutella xylostella* L. (Lepidoptera: Yponomeutidae) and its parasitoids on cabbage and cauliflower. *Pest Management in Horticultural Ecosystems*, **3(1)**: 7-12.

Clementine, L., Dabiré-Binso and N. Malick (2009). Preliminary studies on incidence of insect pest on okra, *Abelmoschus esculentus* L. Moench in central Burkina Faso. *African Journal of Agricultural Research*, **4(12)**: 1488-1492.

Devi, N. and D. Raj (1995). Biology and parasitization of diamondback moth, *Plutella xylostella* L. infesting cauliflower in mid hill region of Himachal Pradesh (India). *Journal of Entomological Research*, **19(1)**: 83-89.

Feakin, S. D. (1973). Pest control in groundnut, *PANS Manual* No. 2, Centre for Overseas Pest Research, London, p. 197.

Flint, M. L. (1998), *Pests of the Garden and Small Farm*. 2nd Edition, Univ. Calif. Agric. Nat. Res. Publ, p. 3332, Oakland.

Girish, C., T. S. Verma and S. Sharma (2010). Nutrient Content of Cauliflower (*Brassica oleracea* L. var. *botrytis*) as Influenced by Boron and Farmyard Manure in North West Himalayan Alfisols. *Journal of the Indian Society of Soil Science*, **58**: 248-251.

Hutchison, W. D., P. C. Bolin and R. L. Hines (2011). *Diamondback moth*. Department of Entomology, University of Minnesota.

Kranz, J., H. Schumutterer and W. Koch (1977). *Disease, Pests and Weeds in Tropical Crops*. Berlin and Hamburg, Verlag Paul Parley, p. 55.

Mochiah, M. B., P. K. Baidoo and M. Owusu- Akyaw (2011), Influence of different nutrient applications on insect populations and damage to cabbage. *Journal of Applied Biosciences*, **38**: 2564-2572.

Obeng-Ofori, D. and J. Sackey (2003). Field evaluation of non-synthetic insecticides for the management of insect pests of okra *Abelmoschus esculentus* L. Moench in Ghana. *Ethiopian J. Sci.*, **26**: 145-150.

Ruggles Gates, R. (1953). Wild cabbage and effect of cultivation. *Journal of genetics*, **51(2)**.