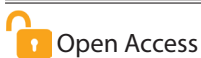




## Insect Pests Management Strategies in Flowers Crop under Greenhouse

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**Conflict of interests:** The author has declared that no conflict of interest exists.

### How to cite this article?

Priya *et al.*, 2023. Insect Pests Management Strategies in Flowers Crop under Greenhouse. *Biotica Research Today* 5(4), 332-334.

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### Abstract

Greenhouses are generally used to grow commercial flowers. As the greenhouse provides favourable environment for growth of insect pest, the menace of insect pest is higher. Therefore, regular supervision/ monitoring and suitable control measures should be adopted at the appropriate time. Sucking pests like aphids, thrips, and whiteflies attack on Rose and Gerbera; some non-insect pests like mites (red and spotted spider mite) attack on Rose, Gerbera, and Carnation; foliage feeders like *Helicoverpa*, *Spodoptera* and Leaf minor attack on Carnation, Rose, and Gerbera; Anthuriums and Orchids attacked by snails and slugs. In greenhouses, natural enemies are generally absent and therefore, a dramatic increase in pest populations has been observed. Subsequently to control greenhouse pests we have to adopt suitable pest management strategies.

**Keywords:** Greenhouse, Flower crops, Sucking pests, Management

### Introduction

Commercial flower production has become an important component of agriculture and the national economy due to its diversification. In commercial floriculture, a global boom in floriculture trade has made it increasingly difficult to produce quality flowers of international standards. A polyhouse is a structure used to grow flowers to prolong the cropping season and protect them from adverse weather conditions. Insect-pests and diseases impact flower production, so they must be continuously monitored and controlled in a timely manner. A greenhouse's success will depend on its ability to implement insect pest management strategies. Among the objectives of insect pest management practices are to prevent the establishment and spread of pests in greenhouses.

Management of insect pests depends heavily on the ability of polyhouse managers to correctly identify the key diagnosis symptoms and choose appropriate control measures in a timely manner.

### Insect Pest Diagnostic Characteristics

For a successful pest management program, the first step is to correctly identify the pest. Aphids, thrips, and whiteflies

attack roses, gerberas, and carnations, so it is necessary to have first-hand knowledge of these sucking pests. Foliage feeders like the tobacco caterpillar, tomato fruit borer and leaf miner attack on Carnation, Rose, Gerbera, *etc.* Some of the non-insect pests like mite (red and spotted spider mite) attack on anthurium and orchids. Natural enemies are generally not present in the greenhouse and hence there is drastically an increase in the population of insect pests. Therefore, to control greenhouse pests, we have to adopt integrated management strategies.

### 1. Agricultural Good Practices for Commercial Greenhouses

Plant growth and development are aided by managing greenhouses in a way that provides favourable conditions for their growth and development.

### 2. Strategies for General Pest Management

It is most conducive for insect pests to develop rapidly in greenhouses because the microclimate is most conducive. There are several biotic and abiotic factors that contribute to successful insect pest control. Three key factors include avoiding the pest infestations, detecting them early, and instituting appropriate preventative measures as soon as possible.

### Article History

RECEIVED on 17<sup>th</sup> April 2023

RECEIVED in revised form 25<sup>th</sup> April 2023

ACCEPTED in final form 26<sup>th</sup> April 2023

**Preventing Pests from Entering Polyhouse/ Greenhouse**

- To prevent lateral entry of insect pests into polyhouses, the polyhouses must be covered with insect-proof nets.
- To prevent accidental entry by insects, the polyhouse is equipped with a double-door system.
- The polyhouse needs to be kept clean inside and outside.
- Upon arrival, plant materials should be checked for pest infestations.
- To prevent insect pests from entering the polyhouse, use ultraviolet radiation-absorbing sheets as cladding.
- To maintain plant health, fertilizers and irrigation water should be used judiciously.

**Insect Pest Early Detection**

Insect pest infestations are detected by scouting, monitoring, and maintaining a field data sheet that records insect identification as well as the place where they can be found, the severity of pest, and the efficacy of control measures (Table 1). Initially, isolated spots on the border and entry doors may indicate insect infestation in a polyhouse. If there are any infestations, proper scouting should be done on the plant. It is important to examine the entire plant from the ground up, including the soil surface, older leaves, tender leaves, and new growth flushes. The under surface of the leaf is ideal for the majority of insect pests, so it is vital to inspect the under surface of the leaf regularly. Inside the polyhouse we should carefully observe the activity of the

insect that can be accomplished using yellow/ blue sticky traps and pheromone traps.

**How to Apply:** In the event of mass trapping of insect pests, more than 20 sticky cards are required per 100 m<sup>2</sup> area to hold 10-15 cm above the plant canopy. There are between one and two cards required for monitoring every 100 square feet. A field data sheet is required to record the number of insects in sticky cards two times in a week. Whiteflies, leaf minors, and aphids are attracted to yellow sticky cards, while thrips are attracted to blue sticky cards (Rathee et al., 2018).

**Insect Pest Management Strategies** (Dale and Nibe, 2008; Mouden et al., 2017)

- The previous crop must be removed. The polyhouse should not contain any residue.
- Weed control in and around the green house. In clean sunshine hours in the inner side of the green house, spraying is to be done with the help of air blast sprayers, due to this air born diseased organisms and viruses are destroyed.
- Heating soil in sunlight can sterilize the soil. Covering seed beds with 25-micron plastic for 15 days during the summer.
- The use of micronets of 192 microns should be used to prevent the entry of insect pests into the greenhouse from the outside.
- To control the Lepidoptera's pest, the use of pheromone traps viz., Helilure, Spodolure and Gossyplure is suitable.
- Sticky traps with yellow and blue labels can be used to

Table 1: Scouting and Monitoring Technique under Polyhouse (Singh, 2015)

Techniques	Aphids	Leaf miners	Spider mite	Thrips	Whiteflies	Caterpillars
<b>a) Scouting</b>						
1. Insect under a leaf's surface	0	-	0	0	0	0
2. Stippling/ white spots on the upper surface of leaves caused by insects	-	-	0	0	-	-
3. Leaves which insects are used to make mines	-	0	-	-	-	-
4. Insect new flush or terminal region for feeding	0	-	0	0	-	-
5. Tap flowers over a white surface and look for movement	0	-	0	0	-	-
<b>b) Observation</b>						
1. Honeydew and sooty mold	0	-	-	-	0	-
2. Holes on leaves	-	-	-	-	-	0
3. Yellow spot on the upper surface of leaves	0	-	0	0	-	-
4. Curling of leaves	0	-	-	-	-	-
5. Distortion of new growth	0	-	0	-	0	-
6. Improper opening of the flower buds	-	-	-	0	-	-
7. Leaves and flower webbing	-	-	0	-	-	-
<b>c) Monitoring</b>						
1. Plant canopy with a sticky card	0	0	-	0	0	-
2. Pheromone traps	-	-	-	-	-	0

control sucking pests.

- Marigold is used to control the *Helicoverpa*, leaf miner and thrips as a trap crop, collect the larvae/ caterpillars from the marigold and destroy them.
- To effectively prevent pest infestations, it is important to select pest-resistant varieties.
- Destroy the egg masses of *Spodoptera* before eclosion.
- The use of egg parasitoid, *Trichogramma chilonis* at the rate of 1.5 lakh ha<sup>-1</sup> to control the *Helicoverpa armigera*.
- Application of HaNPV 250 LE ha<sup>-1</sup> is also effective against *Helicoverpa armigera*.
- The use of 54000 *Chrysoperla carnea* grubs or adults ha<sup>-1</sup> can be helpful in controlling whiteflies.
- Biopesticides such as *Beauveria bassiana* or *Verticillium lacani* at the rate of 2-3 g l<sup>-1</sup> of water with 2 ml l<sup>-1</sup> detergent is helpful to control whiteflies.
- Under chemical control, the use of Imidacloprid 17.8 SL at the rate of 0.3 ml l<sup>-1</sup> of water is effective against whiteflies, thrips, and aphids.
- Mite infestation increases in summer, so micro-sprinklers should be used to maintain temperature and humidity in greenhouses.
- Use of Abamectin 1.9 EC @ 0.5 ml l<sup>-1</sup> or Verticillium 3 g l<sup>-1</sup> reduce the infestation of mites other acaricides like Dicofol 18.5 EC (2 ml) or Ethion 50 EC @ 2.5 ml l<sup>-1</sup> of water is effective for controlling the mites.
- A foliar application of Indoxacarb 14.5 SC @ 1.25 g l<sup>-1</sup> of water for control of *H. armigera* and leaf miner.
- Infestation of Leaf miners can be reduced using plastic paper sheets on the soil surface, as this will prevent pupation in the soil.

## Conclusion

Increasingly, flower growing is seen not just as a necessity, but as a lucrative business venture with huge exportable opportunities. As the food grain production has become self-sufficient in the wake of the green revolution, and higher quality flowers are produced from a wider range of producers, a suitable technological base is necessary to address the everyday challenges. Realizing the full potential of commercial floriculture presents its own challenges. A common problem is the recurrence of insect pests on these commercial flower crops. This pest multiplies and spreads rapidly in polyhouse environments, which can be detrimental to achieving marketable yields. Especially in protected conditions, standardization of production technology is essential for commercial flower production accomplishment.

## References

- Dale, N.S., Nibe, N.B., 2008. Integrated Pest Management in Greenhouse. *Agrobios Newsletter* 7(4), 53-63.
- Mouden, S., Sarmiento, K.F., Klinkhamer, P.G., Leiss, K.A., 2017. Integrated pest management in western flower thrips: past, present and future. *Pest Management Science* 73(5), 813-822. DOI: <https://doi.org/10.1002/ps.4531>.
- Rathee, M., Singh, N.V., Dalal, P.K., Mehra, S., 2018. Integrated pest management under protected cultivation: a review. *Journal of Entomology and Zoology Studies* 6(2), 1201-1208.
- Singh, K.P., 2015. Diseases and Pest Management in Flower Crops under Polyhouse. ICAR- Directorate of Floricultural Research. College of Agriculture Campus, Shivajinagar, Pune (Maharashtra) India. pp 7-11.