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Crop Protection Strategies Following IPM under Protected Cultivation

Shweta Verma[1], Samiksha[2], Vivek kumar Patel[3] and Saipayan Ghosh[4]
[1]Department of Horticulture, BBAU, Lucknow (U.P.)
[2]Department of Horticulture, SHUATS, Naini, Prayagraj, (U.P.)
[3]Department of Plant Pathology, PGCA, RPCAU Pusa Samastipur, Bihar
[4]Department of Horticulture, PGCA, RPCAU Pusa Samastipur, Bihar

SUMMARY

Insect pests are responsible for causing devastating effects in crops grown under protected cultivation thereby reducing crop yield and productivity. Inside protected structures, the hot and humid atmosphere is congenial for massive increase in pest population. It has also been reported the absence of natural predators in the greenhouse conditions. Due to these factors, interior insect situations are frequently more concerning than outdoor ones. Arthropod pest damage to greenhouse crops varies depending on the pest and the season. Besides, the type of crop has a significant impact on the amount of damage that can be endured. IPM is a methodical approach for controlling insect pests that includes a number of tactics and strategies in order to either lower the population of pests or lessen their negative economic effects.

INTRODUCTION

The use of integrated pest management (IPM) in greenhouse production is beneficial. It entails the coordinated application of numerous strategies (cultural, physical, mechanical, chemical, and biological) in order to optimise output in a way that is secure and safe for the environment. IPM refers to the management of all crop pests, including nematodes, insects, and mites. The integrated mode is a yield attributing and cost efficient technique to keep the majority of pests below threshold limit, generate higher economic returns and preserve the eco-system.

Insect management strategies

IPM practices include regulated problem, monitoring, pest identification, documentation of pest management procedures, exclusion strategies, adequate sanitation, soil or plant nutrient testing, use of selected insecticides and timely application of biological control measures. The different strategies of IPM are hereby discussed below.

A. Exclusion

Growers must utilize exclusion as their first line of defence due to issues with the use of chemicals in a greenhouse setting. Vents and other openings can be covered with insect-proof screening. In order to prevent access of even the smallest insects, all openings, including those in cooling pads and ventilation units, should be screened.

B. Sanitation

It should be used to manage insects and diseases because it is strongly related to exclusion. The greenhouse should be kept clean by implementing the following procedures.
(i) Before starting a fresh crop, a greenhouse should be completely cleaned. All remaining roots and debris should be collected, burnt or buried to eliminate the possibility of any insect life cycle (egg, larva, pupa, adult, etc.).
(ii) Steer clear of planting outdoor crops close to greenhouses as they act as hosts for disease and insect pests.

C. Selection of resistance varieties

The use of resistant variants, which give pests an innate ability to resist, holds true in pest management. In addition to being more cost-effective, managing pests with host plant resistance is also safer for the environment.

D. Tillage

Deep summer ploughing is a useful technique to reduce insect soil-dwelling stages. Fruit fly, red pumpkin beetle and cutworm pupae remain in the soil as cocoons to finish the latent stage of their life cycles. Deep ploughing the soil after harvesting and then closing the greenhouse door kills these pupae.

E. Insecticides

Chemical pest control is still farmers' top option since it is simple to use, effective, and quick against the targeted pests. When utilizing any pesticides, the following actions are advised:

(a) Right dose of using insecticide
(b)Apply insecticide at the right time
(c)Application of insecticide

F. Biological control

In a greenhouse setting, biological management entails raising nematodes, parasitoids, insect predators and disease organisms that prey on insect pests. To assault the bug on the host plant, these microscopic creatures are grown in the lab and sprayed on the crop in the greenhouse. As a part of IPM, microbial or bio-pesticides are less expensive than chemical pesticides.

Management practices of specific greenhouse insects

Numerous insects that harm plants grown in the wild also harm plants grown in greenhouses. But a few insects and mites appear to be a recurring issue for greenhouse producers. In comparison to open fields, controlling or effectively managing insect problems can be more challenging in greenhouses. By using these steps, the significant greenhouse-specific insects can be managed or controlled:

Aphid (*Aphis gossypii*)

1. Aphid populations in greenhouses should be controlled by using beneficial insects such ladybird beetles, wasps, and other insects.
2. The crop should be sprayed with malathion (0.1 %) or monocrotophos (0.05%).
3. The cold water should be applied on the leaves to dislodge these pesky pests.

White flies (*Bemessia Tabaci*)

1. New crop should not be planted in or near green houses that currently have a white fly problem.
2. Application of bio-agents is quite effective.
3. Volunteer host plants incuding weeds should be destroyed, both during production as well as lean period.

Thrips (*Scritothrips dorsalis*)

1. The thrips from flying or moving should be prevented into the greenhouse using small mesh screens.
2. Plants should be sprayed with dimethoate (0.05%) or fipronil (0.0075%).
3. The thrips should be prevented from flying or moving into the greenhouse using small mesh screens.

CONCLUSION

From the above discussion, it has been determined that an integrated approach can be used to manage greenhouse pests effectively. In order to control insect pests, it is crucial for Indian greenhouse producers to take into account as many IPM exclusion measures as they can. Growers have relatively few alternatives for managing these pests, once they get inside the greenhouse. It is a better option to manage pest at entrance. Therefore, it is crucial to prevent pests from entering the greenhouse. It is necessary to design and implement integrated techniques using biological control agents, plants, and microbial diseases along with a small amount of ecologically safe pesticides for non-target organisms.

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