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Integrated Pest Management (IPM) Under Polyhouse Conditions

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Integrated pest management is a method to control pests by integrating a variety of strategies, such as physical, mechanical, biological, cultural and chemical methods of pest management. The main aim of IPM is to reduce dependence on chemicals, *i.e.* using them only as a last resort, while at the same time managing pest populations at an acceptable level. It helps to reduce resistance build up in the pest populations. In the recent years, IPM has emerged as one of the modern ways of reducing insect pest damage. IPM holds that wiping out an entire pest population is often impossible and may be uneconomical. Hence the main emphasis is on control, not eradication. IPM programmes first work to establish acceptable pest levels, called action thresholds, and apply controls if those thresholds are crossed. The thresholds are pest and site specific, meaning that it may be acceptable at one site, but at another site may not be acceptable. The success of any IPM depends on good understanding of the crop, the pest, the climate and the control measures. Historically, the main focus of IPM programmes was on agricultural insect pests.

General pest management strategies under polyhouse

Since the microclimate inside the polyhouse is most congenial for the rapid development of insect pests, successful control of the insect pests depends on several biotic and abiotic factors. Avoidance of pests, early detection of infestation, if any, and timely imposition of correct curative measures are three key factors influencing the success of pest management.

Avoidance of pest entry into polyhouse

- Use of insect proof nets to avoid lateral entry of insect-pest into the polyhouse.
- Provision of double-door system to avoid accidental entry of insect pests into the
- polyhouse.
- Maintaining sanitation in and around the polyhouse.
- Inspection of planting materials upon arrival for infestation of any pests.
- Use of ultra-violet radiation absorbing sheets as cladding material for avoiding the entry
- of insect pest into the polyhouse.
- Judicious use of fertilizers and irrigation water to maintain plant health.

Early detection of insect pest infestation

Detection of insect pest infestation includes scouting and monitoring of insect pests population and maintaining a field data sheet for recording the insect identified, location on the plant, severity of pest and effectiveness of any control measure applied. Initial infestation of insect pests in the polyhouse begins as isolated spots along the border and entry doors. Proper scouting of the plant must be done to detect infestations, if any. Entire plant has to be inspected properly starting form bottom of the plant including soil surface, then the older leaves, younger tender leaves and new flush growth. It is important to check on the under surface of the leaves, as most of the insect pests prefer the under surface of the leaves. Yellow and blue sticky traps and pheromone traps can be used for monitoring the activity of different insect-pests inside the polyhouse. Sticky cards have to be held 10 – 15 cms above the plant canopy. One to two cards per 100 square meter area are required for monitoring and more than 20 cards per 100 square meter area for mass trapping of the insect-pest. The sticky cards have to be tested twice a week and total number of each insect observed in the card has to be written in field data sheet. Yellow sticky cards attract whitefly, leaf miner and aphids the most, while blue sticky cards attract thrips.

General pest management strategies:

(i) Physical control

The abiotic factors such as temperature, moisture, relative humidity and light will have a direct influence on the development of pests. Slight variations in these abiotic factors will disrupt the growth and development of diseases and pests.

(ii) Mechanical control

It is based on the knowledge of pest behaviour. Hand picking, installation of bird perches, mulching and installation of traps are a few examples.

(iii) Cultural control

It includes crop production practices that make crop environment less susceptible to pests. Crop rotation, adjusting of row and plant spacing, staggering of planting dates and destruction of old crop debris are a few examples. Cultural controls are based on pest biology and development.

(iv) Biological control

It includes augmentation and conservation of natural enemies of pests, such as insect predators and parasitoids. In IPM programmes, native natural enemy population is conserved and *non-native* agents are released with utmost caution.

(v) Resistant varieties

Breeding for pest resistance is a continuous process. Resistant varieties are bred and selected when available in order to protect against key pests. Genetically modified (GM) plants have been used on a large scale in some of the countries in the recent past and have drastically curtailed pesticide use.

(vi) Chemical control

Pesticides are used to keep the pest population below economic threshold when the pests cannot be controlled by other means. These are applied when the pest's damaging capacity is nearing the threshold.

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