

An Overview and Importance of Greenhouse Pest Management

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Introduction

Warm and humid conditions and abundant food in the greenhouse provide an excellent, stable environment for pest development. In general, the natural enemies that serve to keep insects under control outside are not in the greenhouse. For these reasons, insect conditions often grow in this indoor environment much faster and with greater density than outside. Insect problems can remain chronic unless identified and corrected. Effective pest control in green vegetables and ornaments depends on a number of factors. Proper cultural practices can reduce the likelihood of onset and increased invasion. Early detection and diagnosis are key to controlling heat-retaining insects, as well as proper selection and use of pesticides when needed. Insects that attack plants produced under the normal greenhouse system also attack plants produced in floating systems. Floating systems are more likely to have problems with mold lice, coastal flies and worms. Some heat-retaining insects can transmit diseases to plants that are usually more severe than insect-borne damage. These “carry-on” insects include aphids, leafhoppers, thrips and flies. In these cases, the disease must be controlled by pest control in advance. Freely spray the plants full of pesticides, making sure you spray the lower leaves and stems to cover well. Repeat treatment every five to seven days or until the pests are gone. Scale insects require strict control measures, but can usually be immersed in neem oil.

Pest control is an important part of any greenhouse operation. Pests can include weeds, nematodes, algae, insects, spiders, diseases, and any unwanted organisms that damage plants

directly or indirectly. Many nursery resorts use Integrated Pest Management (IPM) techniques to control their pest problems.

IPM can be defined as a systematic pest control that focuses on long-term prevention or stress that has a small effect on human health, the environment, and the unintended.

Integrated pest control in thermal control plants is complex, and each problem situation or production goal is accompanied by a wide range of possible solutions. There are also many legal implications regarding the recommendation and use of any pesticide management product or product in accordance with the instructions specified on the product label. The user of any pesticide is always responsible for his actions.



Common Greenhouse Insects and Related Insects: -

Since greenhouse conditions allow for rapid growth of pests, early detection and diagnosis of pests are necessary to make control decisions before the problem gets out of hand and you lose the economy. Other common and important greenhouse insects to look out for are aphids, fungal mosquitoes, trips, flies, caterpillars, leaf miners, mealybugs, worms, slugs and snails.

Aphids or plant lice are small, soft, sluggish insects that cling to clusters of leaves and stems of the plants they carry. They are mammals that attach their beaks to the leaf or stem to produce plant milk. They are usually found on the underside of small leaves, and, in general, prefer to eat tender, small growth. The aphids grow rapidly. In the nursery, each female is able to give birth to a daughter that is about seven days old. These female reproductive aphids may or may not have wings. Adult aphids can lay six to ten chicks a day for a period of 20 to 30 days. The population may grow in a relatively short period of time.

Fungal Lice, Coastal Flies and Bloodworms

High humidity and wetland resources growing in nursery houses provide an ideal breeding ground for several species of mosquitoes. These insects are plentiful outside where they can breed in almost any stagnant water that stays in place for a few days.



Fungus Foxes larvae can be harmful insects to other plants that trap heat. The caterpillars of many species are scavengers, eating organic matter in the soil. However, the larvae of some species will eat the hair of the roots, penetrate the roots or invade the crown or stem of the plant. Plants infested with fungal mosquitoes are usually weak and may begin to wither.

Coastal flies are insect-like insects that resemble fungi. They are distinguished by having short horns, red eyes and heavy black bodies. A pair of smoky wings with several distinct dots can be seen by observing the insect. They are beautiful planes and can be seen resting almost anywhere in the greenhouse.

Blood worms are bright red “worms” that can be seen moving through the water of floating plants. These long, crocodile larvae resemble legs that have no legs and have a distinct brown head. The redness is due to the presence of haemoglobin, the same oxygen-carrying substance present in human blood. The presence of haemoglobin allows the insect to grow in water with very low oxygen content.

Thrips are small, small insects about 1/25-inch long. They vary in colour from light brown to dark. They have four wings, each with long hair, set on their back. Plant-feeding thrips causes economic damage when it attacks the flowers, buds and small fruits of the plant.

Cutworms, Armyworms, Loppers and other worms

All larvae are immature stages of moths. They chew the leaves, stems and fruits of many kinds of plants. Infection may begin when moths enter through ventilators or when invasive plants are brought to a hot spot. Cutworms can be very serious pests of small plants. They hide during the day in the ground or in holes in trees and eat plants at night.

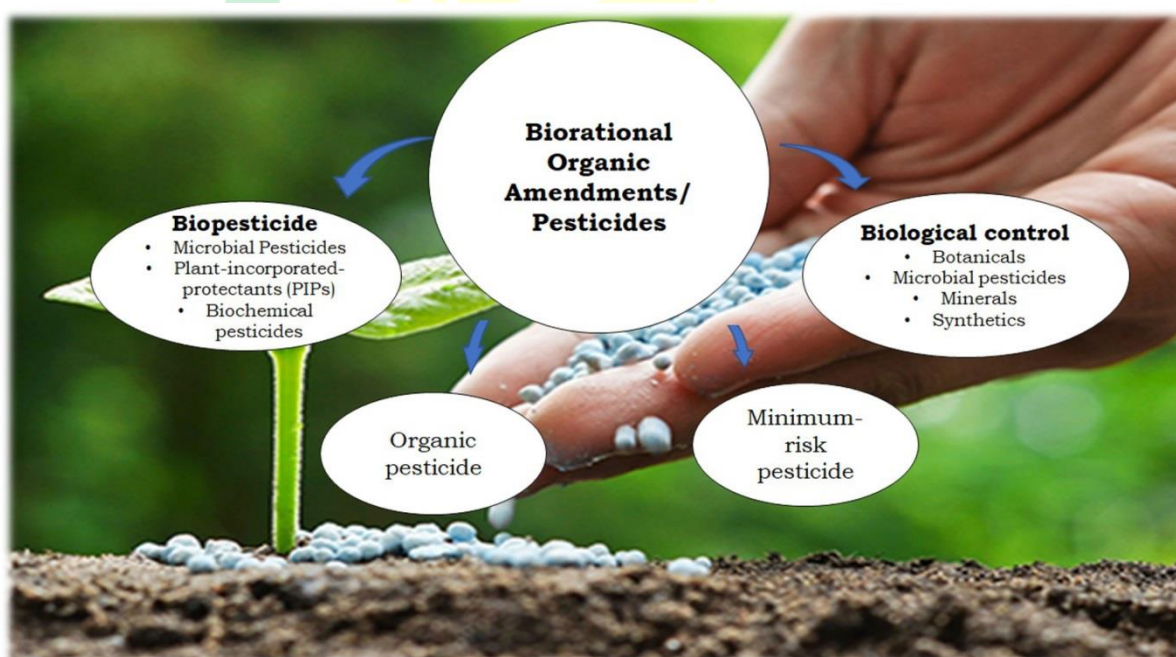
General Pest and Worm Control Strategies

Cultural controls are Important Insects that are usually introduced into the heat sink with fresh plant material. Some may enter the greenhouse in the summer when the ventilators are open. Many are able to live a short time between harvesting or removal of crops and the production of the next crop. Cultural controls are key interpretations against insect infections.

The following cultural practices will help prevent insect invasions:

- Carefully inspect new plants to prevent accidental pest infiltration.
- Keep doors, screens and ventilators in good condition.
- Use clean or sterile soil or ground media. Clean or dispose of tools, apartments and other equipment.

- Keep the area clean, trimmed near the heat sink to minimize invasive weed infestation.
- Eliminate groundwater pools. Growth of algal and moss in these areas can be a source of fungal pests and problems for coastal flies.
- Dispose of rubbish, boards and garbage in the area.
- Remove all vegetation and any plant waste; clean the heat sink well after each production cycle.
- If possible, let the greenhouse freeze in the winter to eliminate soft insects such as flies.
- Avoid over-watering and encourage good ventilation to reduce wet areas that allow for fly breeding.
- Avoid wearing yellow clothes that attract a lot of insects.
- Keep a greenhouse free of weeds at all times.
- End the attack by discarding or removing the most affected plants.



Sanitation Methods

The first steps you should take in a pest control program are prevention, and starting with a clean production area is important. Greenhouses can be sprayed or otherwise treated before establishing a new plant to help eliminate pest problems in previous plants. However, when



plants of different stages of growth or species are planted in the same area, pesticide treatment is recommended before establishing the next crop. Removal of weeds and other pests will also help prevent problems in the new crop.

Start with Insect less Plants

Selection of non-infected plants, plugs, cuttings or replacements is very important. Carefully inspect all plants brought to the production site and dispose of or treat those found to be infested. Where possible, pest or pest-resistant plant species should be used to reduce the need for pesticide application. Being aware of the dangers of plant and / or insect species will greatly enhance your ability to anticipate problems throughout the production cycle. The use of pesticides, such as systemic insecticides used in growing plants or immediately after planting, may protect young plants, which grow faster if the pressure of pests during planting is high.

Maintain Good Cultural practices

Plants under pressure are very attractive and can withstand minor insect damage. Use fertilizer and irrigation techniques to help reduce the conditions that put plants before they are attacked.

Temperature, humidity and light may also be important factors for both the pests and the use of certain pesticides.

Early Detection is the key to Good Management

Once the plants are established, there are several ways to monitor the onset of pest problems. The yellow sticky traps set in the production area can be used to detect the first movement of old flies, trips, adult leaf-miner flies, fungal mosquitoes and lice. Plants should also be inspected regularly, especially under the leaves, or by spraying plant parts on plain paper to remove pests. This method is useful for detecting small insects, which are difficult to identify as spider mites and thrips. Regularly inspecting plants that are particularly attractive to certain insects can be helpful in detecting low levels of insects. Control techniques or systems should be used when significant numbers of pests, or related damage, are identified first.

See the Damage and Explain the Problem Insect damage is largely due to the way they feed. Learn to detect the damage caused by large arthropod pests and always try to find and measure pest infestation before choosing a control method. Many species of insects and



worms that are exposed to heat are harmless. Avoid using pesticides on “ghost” insects or unsolved problems. Get acquainted (gain, obtain) with present-day species of parasites (parasites and predators), and consider the consequences of this free help when making management decisions.

Biological Control Agents Natural enemies are available to trade to control other heat-trapping insects. For a list of resources, see ENT-53, North American Organic Assistant Vendors. The levels of pest control found in beneficial organisms will vary greatly depending on a number of factors, including:

- Affected species
- Natural enemy types used
- the timing of the release of the natural enemy related to insect formation and plant growth
- unprofitable profit numbers
- temperature range and variable range
- time of year
- the nature of the benefit of the exemption
- The use of pesticides before and after the release of profits.

Biological control usually requires more time than pesticides to bring the number of insects under control. Natural enemies need time to disperse to release sites and search for prey or strangers. Proper natural enemies should be removed as soon as the insects are found in the greenhouse.



Natural enemies do not provide rapid enough control of pests that are already causing great losses, and they will not normally eliminate the invasion. In some cases, the use of pesticides or other insect repellent is recommended to reduce invasion before releasing natural enemies. Knowledge of pest biology and insect control is important in determining when to release. Greenhouse managers should avoid unnecessary pesticides / pesticides before and after the release of natural enemies. If insecticide / miticide treatment is needed, limit the treatment to “hot spots” to avoid treating all traces of heat. Use a selected pesticide, as short as possible. For example, *Bacillus thuringiensis* (Bt) products can be used to control caterpillars without injuring natural enemies in a tropical environment.

Pest control Workers in a tropical area need to increase the effectiveness of pesticides and pesticides. In order to give adequate control, the pesticide should be used in the right dose, where the insects are. Adequate coverage and pressure are required to penetrate the dense foliage and reach the target insects. This is especially important for insects that absorb the lower part of the leaves. Older, lower leaves can be removed to open a canopy of other plants to increase spray spread. Pesticides or pesticides should sometimes be repeated several times to keep the insects at an acceptable level. The timing of the application of pesticides is important. Some insects are endangered by pesticides only at certain stages of their life cycle. To control whitefly, start early control steps. If the control action is delayed until a large number of adult flies are seen, then too many eggs and immature stages, which are very difficult to control, are often present. With a limited number of pesticides available for use in a tropical environment, there is always concern that insects may be resistant to pesticides.



Managers have to rotate between different pesticides to be used sequentially when controlling certain pests. Variations should include pesticides of different categories of chemicals that use different methods of pest control. This will prevent, or at least delay, the development of resistance to a particular pesticide. To aid in the application of pesticides, plants that are more susceptible to pests and that can be legally sprayed with the same material should be grouped together. This will reduce the chances of misusing unregistered plants. Additionally, transporting contaminated material through the greenhouse can spread to other areas.

