



TIPS FOR GREENHOUSE BIOSECURITY MANAGEMENT

Biosecurity concerns in a greenhouse are primarily centred around materials (growing media, plant material, etc.) coming into the greenhouse, as well as the surrounding environment. It is crucial to maintain a clean production and packing area as well as the surroundings to mitigate pest risks. The incidence and severity of a pest occurrence is a function of the relationship between the crop, the pest, and the environment (**Figure 1**), so all three areas must be considered to determine a suitable course of action.

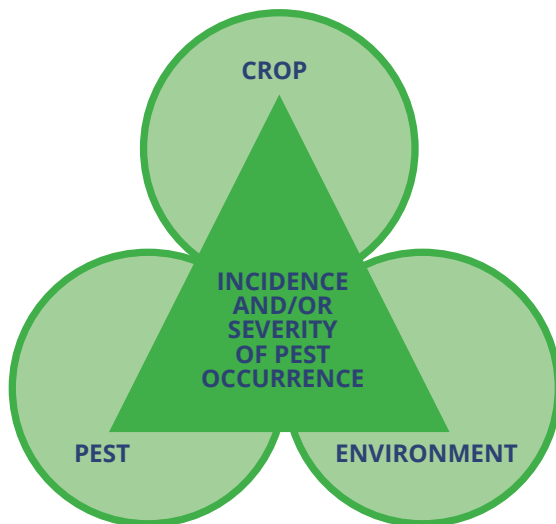


Figure 1. Plant Pest Triangle (CFIA, Greenhouse Vegetable Sector Biosecurity Guide)

Consider the following tips when thinking about managing the biosecurity of greenhouses.

WATER CONSIDERATIONS

- **Test water for pathogens, nutrient levels, pH, salts, chlorine**
- **Recirculated wastewater should be treated**
- **Monitor irrigation system for buildup of biofilms, chelated nutrients, etc.**

Keep areas around water sources clean of crop wastes and other sources of infestation

CROP CONSIDERATIONS

- **Minimize plant stress**
 - » Avoid nutrient deficiencies or toxicities by managing nutrients
 - » Avoid salt stress
 - » Avoid water stress (too little or too much)
 - » Ensure adequate airflow
- **Use crop rotation to disrupt pest lifecycles**
 - » Sanitize in between crops as much as possible
- **Monitor for insects and diseases on the parent material and the established crop**

SOIL AND GROWING MEDIA CONSIDERATIONS

- **Do not re-use growing media**
- **Soil may be treated by heat pasteurization, solarisation, or fumigation if soilborne pests are present above threshold levels**
- **Ensure materials coming in (growing media) are clean and use certified products whenever possible**
- **Have growing media tested to make informed decisions on fertility plans**

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TIPS FOR GREENHOUSE BIOSECURITY MANAGEMENT (CONT)

ENVIRONMENTAL CONSIDERATIONS

- **Maintain a clean production and packing area**
 - » Ensure containers and implements used are cleaned between uses/plant species/production areas
 - » Have separate containers and implements for each area and do not transfer between them
- **Monitor for environmental conditions that favour disease development**
- **Monitor and control pest vectors surrounding greenhouse structures**
- **Dispose of organic debris properly**
 - » Compost/cull piles should be located away from the production area
 - » Organic debris should be removed promptly from the production area

PEST CONSIDERATIONS

- **Note alternate hosts for problematic pests**
- **Determine the lifecycle of the pest and the stages at which they are most likely to infect the plant (flight period, instar, crop stage, etc.)**
 - » Consider the best timing for efficient and effective control

The following resource published by CFIA offers in-depth information on best management practices for the greenhouse vegetable sector:
<https://www.inspection.gc.ca/plants/plant-pests-invasive-species/biosecurity/greenhouse-vegetable-sector-biosecurity-guide/eng/1484722296145/1484722331070>

SOURCES OF INOCULUM CONSIDERATIONS

- **Manage weeds immediately surrounding the greenhouse**
 - » Eliminates secondary habitats for pests and disease
- **Use of screens on vents to prevent the incoming movement of insect pests**
- **Implement strategies to limit accidental movement of insects and pests via farm labour**
 - » Specific clothing and shoes for greenhouse work
 - » Consider 'Order of Entry' throughout the day and the week when managing farm tasks
 - » Allocate tools that do not leave the greenhouse space wherever possible (pruners, ladders, buckets etc)

POST-SEASON CONSIDERATIONS

- **Remove all organic matter from the greenhouse and greenhouse vicinity**
 - » Leaves, old soil, plant debris
 - » Move all dirty growing supplies out of the room for cleaning
- **Implement rinse, wash and sterilize cycles to tackle insect and pest inoculum**
- **Once the space is clean, any and all personnel and supplies should be clean upon entry to prevent contamination before replant**

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