

# Integrated Pest Management in Greenhouse Crops

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Scouting and monitoring for pests is a critical step in quantifying potential damage that can be caused by a pest and aids in determining if intervention to control the pest is warranted. Scouting also helps growers determine the prevalent life stage of the insect or severity of the disease which is often critical to properly selecting and timing management strategies.

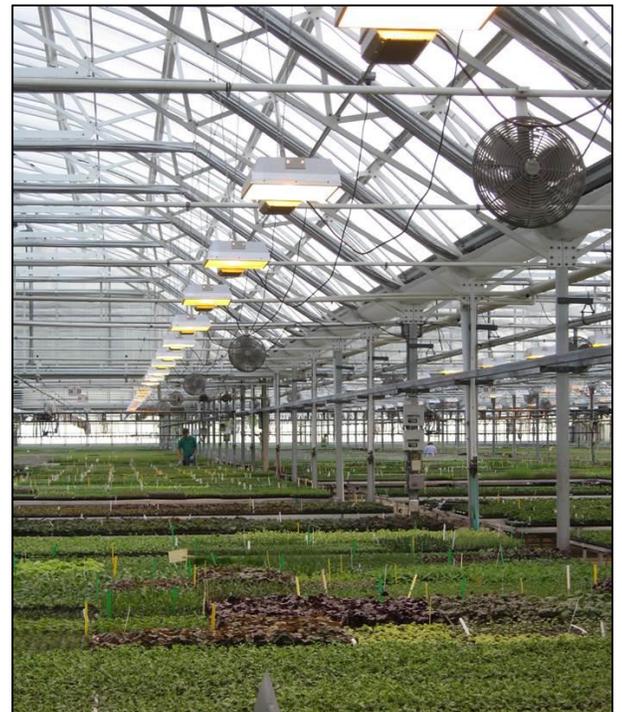
Scouting for insect and disease pests involves monitoring the crop and cropping area for insects and diseases. Scouting for diseases includes monitoring the crop for signs, like visible fungal colonies, and disease symptoms, like leaf spots, and may include following a specific protocol to determine the incidence or severity of the disease. Scouting for insect pests includes looking for the insect at all life stages – egg, immature or adult – and attempting to quantify the population. Scouting for insects may also include inspecting for crop damage caused by the insect and setting traps to collect them.

Growers should keep records of their scouting, including maps of their greenhouse, a record of sampling and pest pressure, as well as the control measures utilized including specific materials, rates and dates. Scouting should begin as soon as plants are placed in the greenhouse.

## Tools for scouting

Scouts may find the following tools useful:

- **Hand lens** for inspecting small insects, mites, insect eggs or feeding damage.
- **White paper** over which you can shake plants to count pest and beneficial insects.
- **Yellow sticky cards.**
- **Colored flags or wooden stakes** to mark pest hotspots or spray treatments to crops.
- **Permanent marker** to write scouting dates on sticky cards.
- **Camera** for taking pictures.
- **Containers** for collecting plant, disease and insect samples.
- **Diagram of your facility** made by hand or graphing program.
- **Reference materials** for helping identify pests (find these resources at the ).
- [MSU Diagnostic Services submission forms](#) to guide information gathering and streamline sample submission.
- **Contact information** of your local diagnostic services or [Michigan State University Extension greenhouse educator](#).



## Methods for scouting

In order to make the most out of time spent scouting, consider the following general recommendations:

- Section the greenhouse into manageable portions and scout them separately. Scouting a single range or bay at a time provides a methodical system to ease in recordkeeping.
- Walk down available paths when scouting. Seek to inspect new areas or greenhouse benches each time. Reexamine hotspots weekly where you have recorded high pest populations previously.
- Inspect 20 plants per 1,000 square feet of production space by turning over leaves, shaking the plant over a piece of white poster board and removing the plant from the pot to look at the roots, if the crop is highly susceptible to root pathogens.
- Insert flags of different colors in pots signifying hot spots of each pest. Insert stakes in pots describing what each bay or plant grouping has been sprayed with: plant growth regulators, insecticides or fungicides.
- Consider placing indicator plants for each pest species or insect-spread virus in the greenhouse and check them once or twice a week:
  - Tomato, eggplant, lantana or marigold for greenhouse whitefly or silverleaf whitefly.
  - Marigolds, crotons, chrysanthemums, roses, impatiens and ivy geraniums for spider mites.
  - Peppers and fuchsias for aphids.
  - Gerbera, verbena or chrysanthemum for thrips.
  - Petunia or fava bean for impatiens necrotic spot virus or tomato spotted wilt virus.
- If using biological control with banker plants, inspect the numbers of insects on them weekly to ensure a sufficient population for your beneficial insects.
- Scouting each range or bay weekly.

## What am I looking for?

One of the hardest things to learn about scouting is how to pick up on the visual cues that something is damaging the crop. Damage can come in many forms. Consider the following signs of insect damage and disease:

- Cupped, chlorotic, stippled, spotted or malformed foliage.
- Any discolored or damaged foliage or flowers.
- Aggregation of insects.
- Shed skins of aphids that look like dandruff.
- Pockets of less vigorous or dying plants.
- Anything out of the ordinary.

## Using sticky cards

In the greenhouse, yellow sticky traps are utilized to capture pests. The index-sized cards should be placed at plant level. Follow these general guidelines to get the most benefit from using sticky cards:

- Place a minimum of one sticky card per 1,000 square feet of production area.
- Replace the sticky card weekly, recording the number of each type of insect per card. A common trick is to attach a tag or write the date the card was placed to ensure cards are replaced frequently enough.
- Check the sticky card for the presence of beneficial insects if using biological control methods.



Yellow sticky traps can be used to capture pests.

- Yellow sticky cards are highly attractive to thrips, whiteflies, fungus gnats and winged aphids. Blue sticky cards are more selective and tend to mostly attract thrips. Sticky cards are not useful for detecting building hotspots of aphids or spider mites.

## Recordkeeping

- Create a diagram of your facility by hand or using a computer image created by a program like Google Earth. Mark hot spots of different pests with colored tacks or stickers on paper maps or indicate them with different colored marks on a whiteboard weekly. Next to the marks, write the date scouted to see where hotspots have moved in the greenhouse.
- After gathering sticky cards, create a graph in a program such as Microsoft Excel where you can monitor populations, especially if using biological control methods.

For more information on integrated pest management of greenhouse crops and other floriculture production topics, [subscribe to the MSU Extension Floriculture newsletter](#).



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