GROWERTALKS

Features

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Sticky Business

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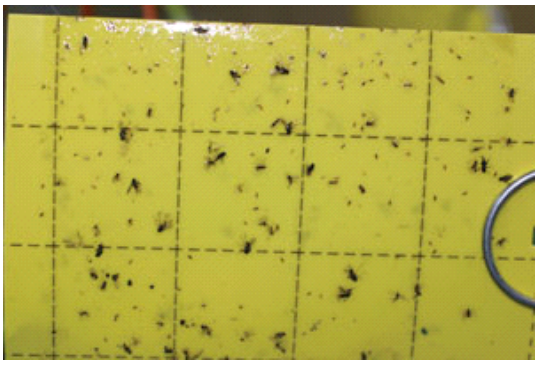
Sticky cards are an important part of your pest management program. They can help you detect early pest infestations and “hot spots” more effectively than intensive plant sampling and can be used by both wholesale and retail growers. (In retail operations, it may be helpful to use signage to explain to customers that the cards are used for insect monitoring.) Sticky cards will trap the adult flying stages of thrips, whiteflies, fungus gnats, leafminers, leafhoppers, shore flies and winged aphids.



Sticky cards with a grid system may make it easier to count the insects on the card. This card primarily shows thrips and fungus gnats.

However, wingless aphids, thrips larvae, mites (broad, cyclamen and spider), female scale insects and immature whitefly nymphs don’t fly and therefore, can’t be caught on the cards. That’s why random plant inspection (of roots and foliage) is also needed to help you make informed pest management decisions. Why root inspections? For root aphids, root mealybugs and to assess general root health.

Types of cards

Most greenhouse growers use 3 in. x 5 in. sticky cards. Some cards have a grid system that makes it easier to count the insects on the cards. Larger sticky cards are also available for use in greenhouse tomato production. Commercially available cards are yellow, blue or even white (for tarnished plant bugs). However, yellow sticky cards are best for general pest monitoring.

Blue cards are more attractive to thrips (and even shoreflies) and may be used to detect low populations of thrips on especially sensitive crops. Some growers insert a sex pheromone cap (Thripsline) to their blue cards as a lure early in the production cycle. The lure contains a mating aggregation pheromone that attracts both male and female Western flower thrips to the upper crop canopy. Thripsline can be used as an early detection tool for Western flower thrips, or used before spraying to help improve contact with the thrips. Keep

in mind that this pheromone lure cannot be used to control thrips populations. There are also some concerns about how long the pheromone scent lasts in the greenhouse and how effective the pheromone lure may be when many different types of plants are in flower.

Using sticky cards

Use at least three to four cards per 1,000 sq. ft. or a minimum of one card per 1,000 sq. ft. with additional cards placed near entranceways and over especially problem-prone species or cultivars. Some growers use either clothespins or magnetized clips to attach cards to bamboo stakes. As plants increase in height, cards can be moved up the stake. Placing the cards in the fridge helps make them a little less sticky and easier to use.

As more growers are using biological control programs, the use of sticky cards needs to be fine-tuned. If you're releasing biological control agents with a winged stage, reduce the number of sticky cards used. Adult parasitic wasps will be caught on the traps. You'll also want to schedule your weekly counts so that the cards are not up the evening that you're releasing the winged biological control agents. Wait one or two days before putting the cards back up. Talk to your biological control supplier about the number of cards to use in your particular situation to gather the data needed on both pest and beneficial insect activity.

If you're using bumblebees for pollination in potted tomato crops to be sold with the tomato fruit, reduce or eliminate the use of blue sticky cards. (Bumblebees are attracted to blue cards).

Check the cards at least once per week. Sometimes, spot-checking twice a week can be helpful as insect development speeds up with increasing temperatures. When the whitish bloom disappears from whiteflies, it's hard to identify that orange-ish insect on the card. More frequent inspections will also allow quicker identification of localized infestations.

Change the cards weekly as they lose effectiveness when their surface becomes coated with debris. You may be able to change the cards less frequently in the winter months because of slower insect development and activity.

Insect identification tips

Magnification is helpful to see the identifying characteristics of the insects found on the cards—either a 10X to 20X hand lens (some of the newer loupes have LED lights, which are helpful). An Optivisor makes it easier to see the entire card and keep track of insect counts. Correct identification is needed to help you choose the most appropriate control(s).

In conventional greenhouses (with regular sprays), the major insect pests caught on cards will already be familiar to you (whiteflies, thrips, fungus gnats, leafminers, leafhoppers, winged aphids, etc.) Line drawings of these insects are available online and in a number of Extension publications (see references).

But, as greenhouses are sprayed less often, both beneficial and innocuous insects may fly in from outdoors. And, you may also catch winged biological control agents on the cards. So, correct insect identification is a little more complicated.

Master Gardener programs may offer a basic entomology session as part of their training programs. Sometimes, training program information is available online (even on YouTube). To find a Master Gardener Coordinator in your state, see www.extension.org/pages/State_and_Provincial_Master_Gardener_Coordinators.

In addition, becoming familiar with the basic orders or groups of insects is helpful (i.e. how do you tell the difference between a fly and a wasp?). A number of different dichotomous keys are also available online. For example, see “Keys to Orders and Groups of Insects and Other Arthropods on Ornamentals” by visiting www.entomology.umn.edu/cues/4015/key/. If you need additional help on identification, contact your Extension entomologist.

As I’ve been working with more growers using biological controls, a PowerPoint presentation (online at www.ipm.uconn.edu) was used as a reference tool to help growers train their employee scouts. This presentation gave an overview of some of the common insects (both good and bad) that scouts were seeing on their sticky cards in Connecticut greenhouses. (Other types of insects may be found in other regions of the U.S. and Canada).

Here are tips on identification of some of the more commonly observed beneficial insects we saw:

- Shoreflies can be easily confused with generalist predatory hunter flies. Shoreflies have five whitish-clear spots on their grayish wings and are about half the size of hunter flies. They’re generally darker than the hunter flies (especially the male hunter flies, which are lighter gray than the females).
- Hunter flies have wings that are uniformly clear with no spots. In the bright sunlight, their wings are often very iridescent. Hunter flies are not commercially available, but may be introduced into a greenhouse on incoming plant material.
- Hover flies may fly into greenhouses in April. Hover fly adults have clear yellow and black markings with only a single pair of wings. Adults are pollen and nectar feeders, whereas the clear, slug-like larvae feed on aphids and other soft-bodied insects.
- Different types of parasitic wasps (*Hymenoptera sp.*) can also be caught on the sticky cards. Many species have clear veins with only one distinct angular vein along the front of each forewing. In comparison with beneficial fly species, they often have longer elbowed antennae and wasp waists. Their bodies may also be more pointed toward the rear. Some specific types of parasitic wasps that we saw in unsprayed greenhouses were: *Hexacola sp.* (a shorefly parasitoid that lays its eggs into shorefly larvae) and *Synacra pauperi*, which is a naturally occurring parasite of fungus gnats.
- As you release commercially available biological control agents, it’s easier to become familiar with their identifying characteristics. Save the sticky cards you use in your quality assessment of Encarsia or Eretomocerus wasps to use as a training tool for your scouts. Eretomocerus is easily confused with the smaller, male Western flower thrips.
- You may also see nuisance pests on the cards. Midges, moth flies and shoreflies all tend to be found in areas with poor drainage. You may also see other miscellaneous pests. If numbers continue over a period of weeks, save the cards to have the insects identified.

Data collection and record keeping

Some sample scouting forms are online (www.ipm.uconn.edu) or your biological control supplier may have scouting forms. Many growers develop their own Excel worksheet to collect data that is converted into weekly graphs for decision-making.

Train your employee scouts and give them specific directions. Often, it's a balancing act between time (and cost) available and what data you really need to have to make a pest management decision that week. As more data is collected, you can fine-tune your tolerance levels and thresholds. Estimates can be helpful, as you really don't need to know whether you have four or eight shoreflies (a nuisance pest) on a sticky card. You can develop your own tolerance threshold and make estimates. For example, perhaps above and/or below 20 may be sufficient for you.

In larger production houses, carts can be adapted for mobile data collection. For example, in one case, one bamboo stake holds the cards collected from one acre of production. The scout enters the data directly into an Excel file on the computer. Once the data is entered, cards are discarded.

Sticky cards, plant inspections and the use of indicator plants can all help you detect pest and beneficial insects early, improving pest management decision making and plant quality.

> **Some helpful references:**
> Identifying Some Pest and Beneficial Insects on Your Sticky Cards, University of Connecticut Greenhouse IPM Program—www.ipm.uconn.edu.
>
> Sticky Trap Monitoring of Insect Pests, University of California—www.ipm.ucdavis.edu/PMG/r280390411.html#REFERENCE.
>
> Greenhouse IPM with an Emphasis on Biocontrols—extension.psu.edu/ipm/resources/pestproblemsolver/greenhouse/greenhouseipm/view.

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