Whitefly Identification and Monitoring

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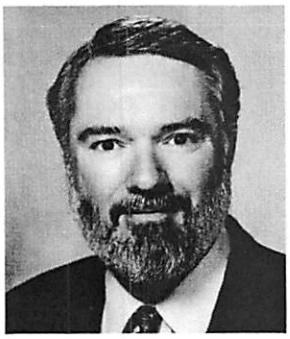

Whiteflies are a common insect problem for greenhouse growers in the southeast. Whiteflies cause foliar mottling and poor plant growth by sucking sap from leaf tissues using piercing-sucking mouthparts. They also produce honeydew, a sticky sweet fluid in which sooty mold grows. Two culprits are common in Southeastern greenhouses: the greenhouse whitefly (GHWF) and the sweet potato whitefly (SPWF). Both pests can complete a life cycle in 21 to 45 days, and, in a short time, several generations may coexist and spread over a wide area.

Whitefly control can be difficult, because the adults can fly, and several life stages cling to the underside of leaves, therefore, spray coverage is difficult. The egg and pupa stages do not feed and their outer covering resists penetration by insecticides. Often, by the time the grower recognizes that a problem exists, eradication is extremely difficult. In extreme cases, it may be more cost effective to destroy the crop rather than incur the expense of eradication.

Identification

Training workers and growers to identify and report whitefly infestation is important for effective management. Employees who are responsible for pest control should be able to distinguish the greenhouse whitefly from the sweet potato whitefly and recognize life stages. Both whitefly species have six stages in the life-cycle. Adults deposit eggs connected by short hooks to the undersides of leaves, often in a crescent-shaped pattern. Eggs of the GHWF are oval-shaped. They are white when young; turning dark gray before hatching. SPWF eggs are cigar-shaped and yellowish when young; turning light brown before hatching.

The first nymphs, often called "crawler," have legs and antennae. After several hours, they settle on the leaf to begin feeding and lose their legs. The next two nymph stages are immobile feeders that are larger than the first stage.

The fourth nymph stage is immobile and does not feed. This "false" pupa is the best stage to distinguish between the two species. The pupa of the GHWF is round with sides raised perpendicular to the leaf surface, while the SPWF pupa is dome-shaped. The GHWF has a fringe of short hair-like filaments around the periphery that is absent from pupae of the SPWF.

Adult whiteflies begin laying eggs 1 to 3 days after emerging from the pupae. SPWF adults are yellowish and smaller than the GHWF. The SPWF are narrower and hold the wings at a 45-degree angle over the body, while the wings of the GHWF are held flatter.

Monitoring

Management must make the decision and commit the resources to start an effective whitefly monitoring program. This means assigning one or more responsible, trained employees to scouting, trapping, and record keeping. These components are essential for pest management decisions that will be made to control the whiteflies and to ultimately reduce insecticide use.

Start crops with pest-free, plant material. If transplants are obtained from a specialists propagator, isolate and inspect the shipment before moving them into the production area or the greenhouse. Open all boxes and remove the transplants to a well-lighted surface so the plants can be examined for the presence of whiteflies. In the case of highly susceptible crops, such as poinsettia, geranium, or hibiscus, it is prudent to isolate new plant material in a "dirty" greenhouse for a week or ten days to see if whiteflies develop.

The purpose of scouting is not only early detection of whiteflies, preferable before adults spread and lay eggs, but also to determine their distribution within the crop and the life stages present.

Begin scouting when the propagation material is potted and placed in the greenhouse.Scouting should be done at least once a week. First, overview the crop to identify plants with mottled foliage or stunting. Examine these areas carefully. Next, examine several plants from each bench, some from the middle and others from the sides and back of each bench. If the plants are on the floor in bays, randomly choose 10 plants per bay. Pay particular attention to plants close to doors and vents.

Examine each plant systematically from top to bottom. Check the upper and lower surfaces of several leaves. Pay close attention to young leaves, since adults prefer to feed and lay eggs there. Use a hand lens to identify the whitefly species present and to count the life stages on at least two leaves of infested plants. Mark each infested plant so the population can be tracked and the effectiveness of insecticide applications can be checked.

Yellow sticky cards continuously trap flying adults during times when they are active. These traps provide an accurate indication of pest presence and movement. However, they represent little more than a token effort, unless the cards are placed almost touching foliage, are changed according to a schedule, and data are recorded and used. Place at least one sticky card per 1,000 square feet or two in a small freestanding greenhouse. Additional cards may be placed close to doors and vents, among susceptible cultivars, or in known whitefly "hot spots." Yellow cards are more attractive to whiteflies than blue cards.

Hang the cards on firm, adjustable supports, all facing in the same direction and level with the top of the foliage. Make counts of whitefly species and life-stages during scouting trips. Devise a location marking system so the cards can be taken down, replaced, and transported to a convenient location for closer scrutiny. Sticky cards should be replaced at least once per week. To check the effectiveness of pesticides, hang fresh cards after application and the insecticide reentry period has passed.

Record Keeping
Accurate records of whitefly species, life-stages, and locations, combined with careful study can help those involved in control decisions to identify infestation sources, susceptible cultivars, and insect population movements. Consider the following record-keeping tips:

1. Keep all scouting reports together in a loose-leaf notebook organized by crop. If cuttings were ordered from a propagator, record the source and date the cuttings were received and note any observations from an initial inspection of the cuttings.

2. Keep records of pesticides used and application dates including pesticide type, rate, and application method.

3. Develop greenhouse maps to show trap placements and problem areas.

4. Keep the records after a crop is finished. Past records can be used to identify problem areas for screening, repairs, or special sanitation between crops.

The following are an examples of the kinds of information to record during scouting and from traps. Each greenhouse operation should tailor a system/form to meet special needs.

GREENHOUSE INSPECTION REPORT

Date:
Location Cultivar
No. Plants Checked
No. Plants Infested
Number of Eggs, Nymphs, Pupae, Adults

INSECT TRAP REPORT INFORMATION

Date:
Location Trap No
Crop
Date placed
Whitefly, Thrip, Fungus gnat, Shorefly
Other Insects