Grower 101:

Pest Counts and Action Thresholds

Manage primary greenhouse pests by counting pests and using action thresholds.

By Steven K. Rettke

Aphids leave behind sooty mold, honeydew and cast skins as seen on this Easter lily.

Making pesticide application decisions based on pest counts and action thresholds is part of integrated pest management, which has been promoted throughout the green industry for the past few decades. Counting pests and using action thresholds requires time and knowledge but results in less pesticide use and can improve plant quality. This article reviews pest counting and action thresholds as effective greenhouse pest management and control.

WESTERN FLOWER THRIPS

There are no universally accepted thresholds for western flower thrips because of numerous variables that cause the threshold number to change. A general guideline to start with might be 15 thrips per yellow sticky card per week per 1,000 sq.ft. This arbitrary number is only a suggested starting point, and it may often be necessary to refine your own action thresholds with experience.

If releasing predatory mites for biological controls, it may be necessary to begin when as few as two thrips per card per week per 1,000 sq.ft. are observed. Plants that are sensitive to thrips damage such as African violet and streptocarpus may have a threshold of less than 10 adult thrips captured on sticky traps per week per 1,000 sq.ft. Alternatively, moderately sensitive plants such as impatiens, rose, gerbera, mum and gloxinia may have action thresholds ranging as high as between 18-30 thrips per trap per week per 1,000 sq.ft. A poinsettia crop has a low sensitivity to thrips damage and can have an action threshold of 40 or more adults captured per trap per week per 1,000 sq.ft.

When these various threshold guidelines are reached, it should be a signal to begin examining individual crop plants more closely, especially those plants closest to the sticky traps. However, the distribution pattern of western flower thrips in the greenhouse is random. Therefore, thrips could potentially be found anywhere throughout the greenhouse. Some methods to scout for thrips on plants include: 1) Tapping the plant (especially flowers) over a piece of white paper to dislodge the thrips; 2) exhaling carbon dioxide on the flowers in order to agitate the thrips and coerce them to leave their cryptic hiding places; and 3) pulling-back and closely examining the nectar-producing flower organs with a hand lens to detect thrips presence.

APHIDS

It is probably not possible to use action thresholds to manage aphid populations. If winged aphids are found on sticky cards, populations are usually already high. As a result, plant inspections are the only reliable way to scout for aphids. To simplify scouting efforts, attempt to group aphid-susceptible plant species together. (chrysanthemum, sunflower, gazania, portulacca, pepper and others).

The distribution pattern of aphids in the greenhouse is typically spotty, with clumped populations (melon aphids). On the other hand, green peach aphid species have a greater tendency to sometimes move throughout the crop. This behavior forces scouting to be more widespread. Look for plant symptoms such as distorted, discolored terminal tissue and various aphid signs such as honeydew, sooty mold, cast skins and the actual aphids themselves.

FUNGUS GNATS

When using yellow sticky traps to capture adult fungus gnats, it is most effective to place traps horizontally (flat) near the root medium. Sticky traps placed in this position typically catch 50 percent more of the pests than traps set-up in the traditional vertical position at canopy level. Adult fungus gnats are weak flyers and generally will not be found in high numbers around the tops of crop canopies. Yellow traps should also be placed under benches if the floor is not cement.

Potato disks or wedges placed within the medium to attract fungus gnat larvae can determine density counts. The disks are typically 1-2 inches in diameter and are pressed ½-inch into the growing mix. The wedges (French fry shape) are approximately ½ inch square and ½-2 inches long. Disks are best used in propagation areas, while wedges are best used with more established, deeper-rooted crops. Place the disks every 100 sq.ft. in propagation areas and the wedges every 1,000 sq.ft. in production areas. Count fungus gnat larvae feeding on potato 48 hours after placement in media. It has been shown that after 72 hours the potato pieces may dry out and lose their drawing capabilities. Or worse yet, they may begin to rot, promoting a breeding ground for the larvae.

Some action thresholds have been determined for fungus gnat larvae when using the potato disks. Within propagation areas as few as 3-5 larvae per disk (after 48 hours) can cause significant damage to the small, shallow root systems. Alternatively, when using the potato wedges in a 6-inch pot, it may require as many as 15-20 larvae per disk (after 48 hours) before any meaningful root damage occurs.

WHITEFLIES

Although the use of yellow sticky traps can improve scouting efficiency, when scouting for whitefly it is especially important to inspect crop foliage. It is critical to start scouting early so whitefly populations are not allowed to build-up. High populations of whiteflies are one of the more difficult pests to suppress in the greenhouse.

Typically, on infested plant foliage a consistent top-to-bottom distribution of whitefly growth stages can be observed. For example, adults will usually be found on the undersides of the upper canopy leaves. When inspecting for eggs, concentrate on the undersides of lower adjacent leaves just below the upper canopy.

Smaller scales (1st/2nd instar nymphs) are then found on the undersides of foliage below the leaves containing eggs. Larger scales (3rd/4th instar nymphs) are found on the undersides of the next level of lower/older foliage. Finally, whitefly adults will be emerging from pupae found on the lowest/oldest leaves closest to the soil media.

Similar to aphids, whiteflies often produce sticky honeydew with the corresponding growth of the black sooty mold fungus. If this becomes readily visible, then it is certain that high whitefly infestations are already present within the crop.

When using biological controls (e.g., *Encarsia formosa* — parasitic wasps) it is necessary to estimate counts of whitefly scales (nymphs) within a pest management unit in order to determine how many beneficials to release. Though how to rapidly estimate the total number of whitefly scales in your greenhouse will not be discussed in this article, it has been determined a release ratio of 30:1 (scale to wasp) will prevent a population build-up of whiteflies. An even smaller release ratio of 150:1 (scale to wasp) will only be required if most of the scale nymph counts are early 1st/2nd instars. When using any kind of biological control tactic, it is crucial to start releases early before high pest levels are reached.

TWO-SPOTTED SPIDER MITES

Obviously, since spider mites are unable to fly during any life stage, they will not be observed on sticky traps. Hence, when scouting for mites it is necessary to inspect individual plants within the crop. Looking for symptoms and signs such as leaf stippling and webbing help to indicate which plants to inspect more closely with a 15x magnifying hand-lens.

Some specific thresholds of two-spotted spider mites on ivy geraniums have been determined through research. It was shown that action thresholds of seven mites per leaf are reached on plants greater than five weeks in production. Alternatively, action thresholds of only two mites per leaf are reached on plants less than five weeks in production. Estimated pest mite counts are required when releasing beneficial predatory mites (e.g., *Phytoseiulus persimilis*). Release one predatory mite for every 4-10 two-spotted mites counted. GPN

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