

WHITEFLIES

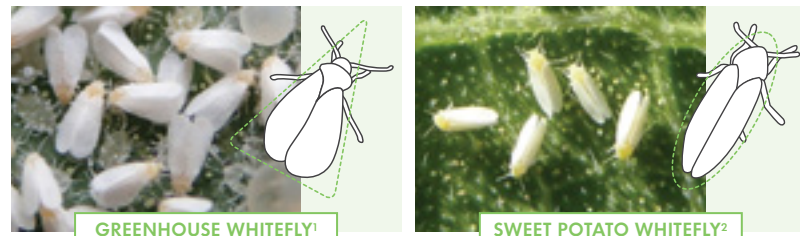
THERE ARE NUMEROUS WHITEFLY SPECIES IN THE WORLD. PAY ATTENTION TO THESE TWO + LEARN HOW TO TELL THEM APART.

The greenhouse and sweet potato are the most prevalent whiteflies in US greenhouses. Although they are similar in appearance, there are some tricks to telling them apart – which is the first step in creating an effective plan of attack. Why? Product efficacy varies between the two species.

In addition, the sweet potato whitefly has a B-biotype (A.K.A. silverleaf whitefly) and the resistant Q-biotype to consider – only testing can tell them apart. If the sweet potato whitefly is invading and you opt to forego testing, be sure to select a product with proven control to both biotypes. Safari® and TriStar® insecticides are effective options for both B- and Q-biotype sweet potato whiteflies.

The wings are your clue. The greenhouse whitefly hold its wings relatively flat and from above they form a triangular shape. The sweet potato whitefly hold its wings in a tent-like position and the narrower oval wings appear linear from above.

MUST-KNOW TRICK: It's not uncommon to have every growth stage present; eggs, larvae, pupae, adults – break the life cycle in two places, larvae and adult, to end whitefly invasion.



Compared to the smaller, slender sweet potato whitefly, the greenhouse whitefly has wings that form a triangle. Sweet potato whiteflies must be tested for B- or Q-biotype.

SPIDER MITES

THESE TINY PESTS CAN CAUSE BIG TROUBLE.

Mites generally feed by piercing the underside of leaves. Although they'll claim many greenhouse plants as a host, their favorites include marigolds, chrysanthemums, dahlias, impatiens and geraniums.

Scout often and use a hand lens as these pests are hard to see. A telltale sign includes a speckled or mottled appearance to the upper leaf surface, a result from their underside feeding. Leaves may also become dry and yellow in color. Heavy infestations will leave a fine webbing that covers the plant.

During hot, dry weather the two-spotted spider mite can complete an entire life cycle in seven days. In that time, females can lay 200 eggs. Do the math, that's a lot of mites in a short period of time.

MUST-KNOW TRICK: Mites like to hitch rides on clothing, monitor hot spots or areas with known infestation last to prevent transporting mites to other greenhouse areas.



Adult mites have four pair of legs, however just-hatched larva have only three sets. The male has a pointed abdomen and is usually smaller than the female.

APHIDS

APHIDS, POSSIBLY THE MOST COMMON GREENHOUSE PEST, CAN GO FROM "0 TO OUT-OF-CONTROL" IN NO TIME AT ALL.

Watch for aphids on and under tender new growth as these piercing-sucking insects prefer to feed on the youngest leaves. With aphids, expect "honeydew" sap droppings on leaves, which can lead to sooty mold.

Aphid populations multiply quickly with female adults producing around ten young each day in their 20-to-30 day life cycle. The key to combating a rapid population boom is to catch it early and treat with a fast and highly effective product, such as TriStar® Insecticide. A TriStar foliar spray reaches the undersides of leaves and deep within the canopy – where aphids are likely to cluster. Typical spray recommendations are two or three times at a 3-7 day interval, depending on infestation pressure.

MUST-KNOW TRICK: Infestations usually begin when winged aphids enter the greenhouse. Consider ventilator screens and keep outdoor weeds in check to reduce their living environment.



Aphids may be winged or wingless and feed with a piercing "beak" mouthpart. They are the only insects with cornicles (pipe-like tubes) on their abdomen.

THRIPS

THESE LITTLE GUYS HIDE IN PROTECTED PARTS OF THE PLANT.

Adult thrips are winged and can enter the greenhouse via contaminated material or by fly-in during the summer months. These tiny pests are only about 1/25" in length and hide deep within the plant. High-pressure, fine droplet sprays are suggested to penetrate into these plant areas. Leaves may become mottled and silvery and many thrips species, most notably the western flower thrips, vector disease including tomato spotted wilt virus and impatiens necrotic spot virus.

A few host favorites of the western flower thrips include geraniums, verbenas, marigolds, mums, impatiens and dahlias. Inspection of new material as it enters the greenhouse can help prevent thrips invasion.

MUST-KNOW TRICK: Use blue sticky cards to monitor thrips as they are attracted to this color. Use yellow sticky for nearly every other pest.



Thrips can range from light brown to black in color. Adults have four long-haired fringed wings that they hold flat to their back.

PHOTO CREDITS: 1) Whitney Cranshaw, Colorado State University, Bugwood.org, 2) David Riley, University of Georgia, Bugwood.org, 3) Scott Bauer, USDA Agricultural Research Service, Bugwood.org, 4) Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org 5) Metin GULESCI, Bugwood.org, 6) Frank Peairs, Colorado State University, Bugwood.org, 7) Chazz Hesselein, Alabama Cooperative Extension System, Bugwood.org

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GREENHOUSE INSECTS

Nufarm offers powerful insecticides with proven effectiveness on the most threatening pests. Our solutions bring you multiple modes of action to manage resistance development and deliver results that grow healthy, marketable greenhouse crops.

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CREATE YOUR PLAN, UTILIZE MULTIPLE MODES OF ACTION.



PEST	DISTANCE® INSECT GROWTH REGULATOR	ENGULF™ GHN GREENHOUSE AND ORNAMENTAL MITICIDE	GNATROL™ WDG BIOLOGICAL LARVICIDE	MALLET® 0.5 G INSECTICIDE	MALLET® 2F T&O INSECTICIDE	MINX™ 2 MITICIDE/INSECTICIDE	OVERTURE® INSECTICIDE	SAFARI® INSECTICIDE	TAME® MITICIDE/INSECTICIDE	TETRASAN® MITICIDE	TRISTAR® 8.5 SL INSECTICIDE
	IRAC 7D	IRAC 20D	IRAC 11A	IRAC 4A	IRAC 4A	IRAC 6	IRAC UN	IRAC 4A	IRAC 3	IRAC 10B	IRAC 4A
	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL	—	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL	OZ/100 GAL
APHID	6–8	—	—	SEE LABEL	1.7	4	—	FOLIAR 4–8 DRENCH 12–24	10.6	—	4
FUNGUS GNAT	3–6	—	3.2–26	SEE LABEL	SOIL-STAGE LARVAE ONLY 1.7	—	—	DRENCH 12-24	—	—	8.5–16.5
LEAFMINER	8–12	—	—	SEE LABEL	1.7	8	—	FOLIAR 4–8 DRENCH 12–24	5.3–10.6	—	8.5
MEALYBUG	8–12	—	—	SEE LABEL	1.7	—	—	FOLIAR 4–8 DRENCH 12–24	16	—	8.5
SCALE	8–12	—	—	SEE LABEL	1,000 SF DRENCH* 0.46–0.6	—	—	4–8	5.3–10.6	—	8.5–16.5
SHORE FLY	3–6	—	—	—	—	—	—	—	—	—	—
SPIDER MITE	—	2–4	—	—	—	4	—	—	8–16	8–16	—
TARSONEMID MITE	—	—	—	SEE LABEL	—	4	—	—	—	—	—
THRIP	6–8	—	—	SEE LABEL	SUPPRESSION 1.7	8	8	4–8	5.3	—	12.5–25.3
WHITEFLY	6–8	—	—	SEE LABEL	1.7	8	—	FOLIAR 4–8 DRENCH 12–24	5.3–10.6	—	8.5–16.5

*SEE LABEL FOR ADDITIONAL DRENCH RATES

APHID SOLUTIONS	FUNGUS GNAT SOLUTIONS	SPIDER MITE SOLUTIONS	THRIPS SOLUTIONS	WHITEFLY SOLUTIONS
<p>Aphid populations can multiply extremely fast. Depending on severity, control of aphid infestations generally require two to three applications of alternating IRACs at three- to seven-day intervals.</p> <p>OUR TOP PICKS</p> <p>TRISTAR: Midway-to-finish spray for quick broad-spectrum knockdown with “just right” residual that’s softer on beneficial insects PREFERRED SOLUTION</p> <p>TAME: Combat difficult insects with knockout of adults within one hour and eggs when they hatch, gentle on delicate ornamentals reduces phytotoxicity concerns</p> <p>DISTANCE IGR: Targeted mode of action helps break the life cycle by preventing eggs, larvae and pupae from maturing into adults</p>	<p>Scout for fungus gnats in soil media as they prefer to eat organic matter over healthy plants. Since all four life stages may be present at once, it’s important to break the life cycle by targeting at least two stages.</p> <p>OUR TOP PICKS</p> <p>GNATROL WDG: Offers highly selective control of fungus gnat larvae, OMRI Listed® eases worker safety, environmental and resistance concerns</p> <p>DISTANCE IGR: Targeted mode of action helps break the life cycle by preventing eggs, larvae and pupae from maturing into adults</p> <p>SAFARI: The leading drench/spray insecticide in the market controls more insects faster and longer than any comparable insecticide</p>	<p>Mites reproduce quickly and are present in various life stages. Therefore, rotating solutions that affect eggs, pupae and adults with differing IRAC modes of action are vital to a strong mite program.</p> <p>OUR TOP PICKS</p> <p>ENGULF GHN: This advanced higher-concentrate formula delivers up to 28 days of control to 18 common mites and is friendly to 11 beneficials</p> <p>MINX 2: This water-based abamectin offers daytime use flexibility without the heat-related limitations of EC formulas, plus a caution signal word and reduced PPE</p> <p>TETRASAN: Affects mites at all life stages without harming beneficial insects, its systemic action reaches mites on the underside of leaves</p>	<p>Thrips control has been complicated due to high levels of resistance to some insecticides. When targeting thrips, be sure to continuously rotate pesticide modes of action to help delay resistance.</p> <p>OUR TOP PICKS</p> <p>OVERTURE: The industry standard for rotation delivers outstanding control to immature adult thrips, including resistant species, and is soft on beneficials</p> <p>TRISTAR: Midway-to-finish spray for quick broad-spectrum knockdown with “just right” residual that’s softer on beneficial insects</p> <p>MINX 2: This water-based abamectin offers daytime use flexibility without the heat-related limitations of EC formulas, plus a caution signal word and reduced PPE</p>	<p>Invasive whiteflies come in both B- and Q-biotypes. The Q-biotype can be particularly costly as it is prone to insecticide resistance and readily carries viruses from infected plants to the broader crop.</p> <p>OUR TOP PICKS</p> <p>SAFARI: The leading drench/spray insecticide in the market saves labor by controlling more insects faster and longer than any comparable insecticide</p> <p>DISTANCE IGR: Targeted mode of action helps break the life cycle by preventing eggs, larvae and pupae from maturing into adults</p> <p>TAME: Combat difficult insects with knockout of adults within one hour and eggs when they hatch, gentle on delicate ornamentals reduces phytotoxicity concerns</p>