Insect Pests of Greenhouse-Grown Pansy

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Pansy (*Viola* X *wittrockiana*) is one of the most widely grown bedding plants in U.S. greenhouses. Like many ornamental bedding plants pansy is susceptible to various insect pests. Pests may be present in the early stages of plant growth or appear later when plants are in flower. The major insect pests of pansy are aphids, fungus gnats, shoreflies, western flower thrips, and caterpillars. Whiteflies and two-spotted spider-mites are generally considered minor pests.

Aphids

Aphids generally attack pansy in the spring and/or late summer. They are usually located on young terminal growth. Aphids feed on plant tissue with their piercing-sucking mouthparts causing plant stunting, wilting, leaf yellowing, and upward curling of leaves. A by-product of their feeding is a sticky, honeydew substance that coats plant leaves. This honeydew serves as a medium for black sooty mold fungus. The presence of black sooty mold fungus and/or aphid cast-skins can reduce the marketability of a pansy crop.

Aphids are soft-bodied insects that have tubes (cornicles) on the end of their abdomens. Females can give birth to live young. The young females produced can then produce their own young in 7 to 10 days. Females can give birth to 60 to 100 live young per day for a period of 20 to 30 days. This ability to quickly reproduce can result in tremendous numbers of aphids within a short period of time. Aphid reproduction depends on plant quality, nutrition, and temperature. Adult aphids may be winged or wingless. Young develop into wingless adults unless the host (plant) becomes crowded in which case the young develop into winged forms. This allows aphids to spread rapidly to other areas of the greenhouse. Aphids can overwinter outside the greenhouse as eggs. In the spring, eggs hatch and the young develop into winged females that fly into the greenhouse. Once inside the greenhouse, they produce live, wingless female offspring. If winged adults are found on yellow sticky cards this indicates that a heavy population is present and management strategies need to be implemented immediately.

Fungus Gnats

Fungus gnat larvae cause direct damage by feeding on roots (root hairs). They are especially destructive to seedlings and young pansy plants that are becoming established. Their root feeding reduces the plants ability to take-up water and nutrients, and creates wounds which serve as an entry site for fungal pathogens. Larvae can also directly introduce fungal pathogens such as pythium root rot and black root rot. Fungus gnat adults are generally considered a nuisance, but they have been implicated in transmitting fungal diseases through their fecal droppings or through spores that are attached to their body.

Fungus gnat adults are small, slender, mosquito-like black or dark-brown insects about 1/8 inch long. Each wing possesses a distinctive "Y"

shaped vein. They have long legs and antennae that are longer than the head. Adults are weak fliers and are usually found flying over the medium surface or lower leaves. Fungus gnat larvae are whitish with a shiny black head. It is approximately 1/4 inch long at the final stage of development. The life cycle consist of an egg stage, 4 larval stages, a pupae stage, and an adult. A generation can be completed in 21 to 40 days. Fungus gnat adults are highly attracted to fresh medium or medium that is approximately 2 to 4 weeks old. Females deposit eggs in cracks on the medium surface. Eggs hatch in 3 to 5 days, giving rise to white larvae. Larvae are generally found within the top 1 inch of the medium surface often around the interior edge of pots or flats. Larvae feed and develop in about 2 weeks. Pupation occurs in the medium. Adults emerge after 4 to 7 days. Adults live about 7 to 10 days and females can lay approximately 150 eggs.

Shoreflies

Shoreflies are primarily a nuisance pest. Shorefly damage consists of excrement ("fly specks") left on the foliage. Larvae feed on algae and do not normally injure plants through direct feeding. However, larvae have the potential to transmit pathogens such as pythium root rot and black root rot. Shoreflies are usually a problem under excessive moist conditions and where algae is present.

Shorefly adults look like house flies. They are 1/8 inch long and are black in color. Shoreflies have dark-wings with approximately 5 light-colored spots on each wing. Antennae are shorter than the head. They are stronger fliers than fungus gnat adults. Larvae are yellowish-brown with no head capsule. They are 1/4 inch long when mature. Shorefly has a life cycle consisting of an egg stage, 3 larval stages, a pupae stage, and an adult. A generation can be completed in 15 to 20 days. Each female can lay between 300 to 500 eggs where algae is present such as medium surfaces, benches, and floors. Eggs hatch in 2 to 3 days. Larvae that emerge are located under the top layer of the medium surface where they feed on algae. The larval stage lasts approximately 7 to 10 days. Pupation occurs in the medium. Adults emerge in 4 to 5 days and live about 3 to 4 weeks. Adults move very rapidly on medium and leaf surfaces.

Western Flower Thrips (WFT)

Thrips generally attack pansy when the plants are in flower. Feeding by WFT causes a scarring of the petals, this is most apparent on darker-colored flowers (white streaks are particularly noticeable). In addition, deformation of flowers occurs when WFT feeds in flower buds before they open fully.

Western flower thrips are small (less than 2 mm) insects that have piercing-sucking mouthparts. Females are the predominant sex found in greenhouses, especially when populations build-up. Males, which are smaller than females, are present when populations are low. The life cycle consists of an egg stage, two young stages, two pupal stages, and an adult. Development from egg to adult is temperature dependent with optimum temperatures between 80 to 85°F. Females can live from 27 to 45 days and can lay between 150 to 300 eggs during their lifetime. Eggs, which are laid in leaves, hatch in two to four days. Young feed on leaves and flowers for one to two days before molting. WFT then pupates in the medium, leaf litter, or other protected place. The pupal stages last approximately six days before adults emerge.

Caterpillars

Caterpillars are the larvae (young) of moths

(adults). They can invade greenhouses causing considerable damage to pansies. Generally, adults migrate into greenhouses through vents, sidewalls or doors when left open. The adults lay eggs on plant foliage. These eggs hatch into the typical "worm" stage. They are usually noticed in this "worm" stage. Caterpillars can do considerable damage in a short period of time if left unchecked by feeding on the foliage. Common caterpillars that are found in greenhouses are beet armyworm, black cutworm, and variegated cutworm.

Management Strategies

1. CULTURAL

A. Sanitation

Remove all plant and medium debris from the greenhouse and place it far away from the greenhouse interior and exterior. These are places were fungus gnat adults can lay eggs and WFT can pupate. Eliminate weeds inside the greenhouse and around the perimeter. Weeds serve as refuge for pests to hide. Reduce algae inside the greenhouse. Algae serves as a breeding site for fungus gnats and shore flies.

B. Plant Culture

Avoid overwatering and underwatering plants as stressed plants are more susceptible to insects. Do not over-fertilize plants, especially with excess nitrogen as this results in soft succulent growth that is highly susceptible to insects. Excess moisture from overwatering can create conditions for algae growth. As mentioned above, fungus gnats and shore flies breed in algae.

2. CHEMICAL

Read the label to make sure pansies (i. e. bedding plants) are listed as some materials can be phytotoxic to pansies. If feasible, test materials on several plants before exposing the entire crop to an insecticide. Be sure to cover both upper and lower plant surfaces in order to get maximum control with

foliar-applied insecticides. For more information on insecticides registered for bedding plants, which may include pansies, consult the extension publication ID-218 Spring Greenhouse Bedding Plant Insect/Mite and Disease Management.

3. BIOLOGICAL

Parasites (*Aphidius colemani*), predators (Green Lacewing), beneficial nematodes (Nemasys®), and beneficial fungi (Naturalis-O®/ Botaniguard®) may be used on pansies to control various insect pests. However, biological controls must be applied early enough before pest populations get out of hand. It is best to contact extension or university personnel on the proper procedures for effective use of biological controls. Order biological controls from a reliable supplier and check before releasing to be sure what you release is alive. Biological controls are compatible with most biorational insecticides such as insect growth regulators, neem products, and *Bacillus thuringiensis.*

4. SCOUTING

Scouting consists of looking at plants or yellow sticky traps on a regular basis for the presence of insect pests. Place yellow sticky traps approximately 2 per 1000 ft^2. Place the traps approximately 1 inch above the crop canopy. Check sticky traps weekly. Be sure to replace traps at least every two weeks. Use a 10X hand-lens to identify insects on sticky traps. Visually inspect plants for the presence of non-winged insect pests such as aphids and immature WFT.