

Greenhouse Aphid Management

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Identification of some common aphids: Aphids are all generally small (1-3mm) and soft bodied, and have a pair of unique structures that resemble "tailpipes" near the end of their abdomen, called cornicles. Adults may or may not have wings. More than 20 aphid species can infest various greenhouse crops. Three of the most common are:

Green peach aphid: Very common aphid. Color varies from light green to rose. Have a pronounced indentation between the base of their antennae on the front of their head. Color of the cornicles is the same as the body except the extreme tips, which are dark. [Fig. 1]



Melon aphid: Very common aphid. Small. Color varies from light yellow to very dark green, almost black. Have no pronounced indentation between the base of their antennae. The entire length of their cornicles is always black, regardless of their body color. [Fig.2]



Foxglove aphid: Somewhat less common. Also called glasshouse potato aphid. Broad host range, and has often been found on ivy and zonal geraniums, salvia, and cineraria, among many other crops, in the northeastern U.S. Looks very much like green peach aphid in size, shape and color, except they are shiny, and the area of the abdomen around the bases of the cornicles is darker green than the rest of the body. [Fig.3]



Damage: Aphids can infest most greenhouse crops. Their mere presence can ruin the beauty of a plant. They feed by inserting their stylet-like mouthparts through plant tissue directly into the phloem and removing plant sap. Feeding can cause stunting and plant/leaf deformities. Large infestations can reduce plant vigor. They produce a sweet, sticky secretion called "honeydew," which leads to unsightly grey sooty mold. White cast skins that they leave behind as they molt from one stage to another are unsightly. Aphids are responsible for the transmission of about 60% of all plant viruses on agricultural crops world-wide.

Biology of common greenhouse aphids: Aphids reproduce parthenogenetically, i.e., all the insects present are females, and each female gives birth to more females without the need to mate. These females give birth to living nymphs rather than lay eggs. An unborn aphid already contains a complement of developing nymphs (= "paedogenesis"). Aphid nymphs are genetic clones of their mothers. Populations can increase explosively - newborns can reach adulthood and begin to reproduce in as little as 7 days. As a colony increases in age and size on individual plants, the proportion of winged forms increases.

Aphids may be found feeding on buds, stems, and the lower surfaces of leaves. Some will migrate to new host plants or young plant tissue and will actively search for soft, fresh plant tissue. As plants begin to form flower buds, a previously undetected aphid infestation can become terribly apparent as they move up the plant onto the recently developed stems, buds, and flowers

Aphids on the upper canopy will be easier to contact with sprays. Systemic insecticides will be most effective against those feeding on new growth. Aphids on older growth lower in the canopy are often most difficult to kill

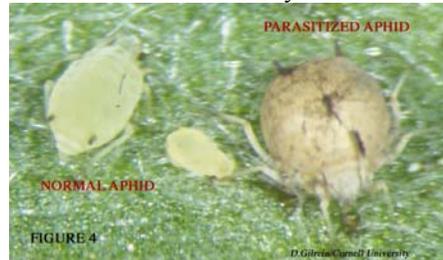
chemically, and may be responsible for producing new aphids that will reinfest the upper canopy. Green peach aphids are prone to develop winged forms on mums, and may be more likely to spread quickly throughout a mum crop. Melon aphids do not develop winged forms as readily and are not as likely to be detected on yellow sticky traps.

Monitoring: White cast skins on leaves of a plant may indicate an aphid colony on the leaves or stems above. Ants are often attracted to the honeydew, so if you see ants on your plants, inspect them carefully for aphids. Group aphid-susceptible plants together for easier monitoring. Inspect plant material brought into your growing areas; do not purchase infested plants or cuttings. Inspect the greenhouse thoroughly for all sources of all pests, including aphids, before a new crop arrives. If possible, quarantine newly-arrived plants, and inspect thoroughly before moving them into production areas.

The scouting procedure for each PMU is made up of three components: plant inspection, sentinel plants, and yellow sticky cards. Yellow sticky cards for winged adults, coupled with plant inspections for non-winged aphids, can give a good overall picture of the presence, size, and location of an infestation, and reveal if control strategies are working. Sentinel plants can indicate whether an insecticide or a natural enemy was effective.

It is important to know what living, dead, and parasitized aphids [Fig. 4] look like.

Parasitized aphids should not be crushed or removed from plants. Parasitoid wasps will emerge from these cases to continue parasitizing aphids.



A. Plant Inspection. Some form of foliar scouting must be used to monitor aphids, because yellow sticky cards used alone will only reveal the activity of winged aphids, which are much less common than the unwinged forms. A map of infested locations may help to target areas to be sprayed and monitored.

B. Sentinel plants. When infested plants are found during plant inspection, some of these plants are marked with flagging tape or survey flags, and are used as "sentinel plants.

The insects on these sentinel plants are then monitored weekly to note whether control measures are having an effect. Examine plants carefully and frequently to determine if repeat applications will be required. For example, if aphids on the sentinel plants are increasing even though insecticides are being applied, then you have an early indication that something is wrong before a large infestation can develop.

C. Yellow sticky cards. Yellow sticky cards can monitor when winged aphids are active and may detect a migration of aphids into the greenhouse, particularly in the spring and summer. In New York we suggest using one 3-by-5 inch card per 1,000 sq. ft. Cards should be positioned vertically just above the crop canopy. Additional cards placed near doors or vents can detect whether insects are moving into the greenhouse from outside. Cards should be counted at least weekly, and changed weekly or when they are full.

Management: Sanitation is vital. Eliminate all weeds within or near your greenhouses. Discard old stock plants, hanging baskets that have not sold, and don't keep "pet" plants. Screen doors and vents to prevent migration into the greenhouse, especially during the Fall and Spring. Avoid planting aphid-susceptible cultivars near doorways or vents where they could be infested from an outside source.

Aphid control is much more successful when an infestation is detected and controlled early in a crop. There are fewer aphids, spray coverage is better while the crop canopy is sparse, and the risk of phytotoxicity is reduced. Among the worst times to first notice an aphid infestation is when they are crawling all over the flowers. Therefore, a regular scouting program should be implemented to detect aphids throughout the crop.

Insecticides: Systemic or translaminar insecticides tend to be more effective than contact insecticides, provided that a sufficient amount of insecticide reaches the aphid feeding sites. Contact insecticides can be very effective with thorough spray coverage and good canopy penetration. Two applications of foliar sprays, a week apart, are often needed, but follow label directions. Keep careful scouting records to evaluate the effectiveness of various chemicals under your own conditions. Resistance to various insecticides is common in aphids. Strains of some species are resistant to carbamate, organophosphate, and/or pyrethroid insecticides.

Biological Control: Commercially available natural enemies for aphids include ladybird beetles, lacewings, parasitic wasps (e.g. *Aphidius colemani*), predaceous midges (*Aphidoletes aphidomyza*) and insect-pathogenic fungi (*Beauveria bassiana*). It is usually best to use fungal pathogens while the infestation is small, not against a major infestation. Repeated applications at 3-5 day intervals may be necessary for a rapidly growing infestation. Researchers and growers are investigating the use of various natural enemies for aphid control on greenhouse crops.

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