

Key Greenhouse Pests

Most of the pests discussed in this manual are arthropods (insects and mites), which can be generally classified as soil dwellers, sucking pests, or leaf-chewers. Other pests included are plant pathogens such as bacteria, fungi, viruses, nematodes, and phytoplasmas. Discussion of the pests will follow in this order.

SOIL DWELLERS include fungus gnats, shore flies, and symphylids. Fungus gnats are common greenhouse pests that infest cuttings, other tender plant materials, and potted and long-term crops such as greenhouse vegetables. Larvae found in the soil usually eat rotting plant material, algae, and fungi but will also feed on root hairs or stem and leaf tissue. Young seedlings and plugs are particularly prone to attack. Shore flies feed on algae and are not known to feed on healthy plant tissue. Both fly pests can spread fungal pathogens. Symphylids resemble small centipedes. They feed on organic matter as well as sprouting seeds, plant roots, and root hairs.

SUCKING PESTS include aphids, mealybugs, mites, soft scales, thrips, and whiteflies. Many species of aphids occur in Pennsylvania greenhouses; this manual discusses green peach aphids, potato aphids, and melon aphids. They feed on plant sap to acquire proteins and sugars needed for reproduction. Aphids excrete excess sugars in the form of honeydew—a sticky substance that coats leaf surfaces and supports the growth of black sooty mold. This sooty mold may affect photosynthesis and possibly reduce plant yields. Aphids can also transmit plant viruses.

Mealybugs are small, white, fuzzy insects often found on foliage plants and a wide range of other plants. The two main species in Pennsylvania greenhouses are citrus and longtailed mealybugs. These also excrete honeydew.

Mites are relatives of spiders, not insects, because they have eight legs when mature. The most economically important mite—the twospotted spider mite—has a broad host range and can reproduce rapidly during hot, dry periods. Larvae, nymphs, and adults cause damage by piercing plant cells and sucking out their contents. Nymphs and adults produce fine webbing that can completely cover plants if populations are high. Other mites included are the false spider, broad and cyclamen, and eriophyid mites.

Scale insects, especially the soft scales, are also major pests in greenhouses. Brown soft scales, the most common scale found on indoor plants, are reported to feed on hundreds of plant species. Their feeding can affect a

plant's health by causing leaves to turn yellow and drop and by stunting new growth. As with aphids, a byproduct of scale feeding is honeydew and subsequent growth of sooty mold. Hemispherical scale can also be found in Pennsylvania greenhouses but is usually only a problem with plants that remain in the greenhouse for long periods of time. This manual is specific for seasonal plants; hemispherical scale is not discussed. Biocontrols for brown soft scale can be used for hemispherical scale.

Several species of thrips attack greenhouse crops, but western flower thrips is the most serious. It can transmit Impatiens Necrotic Spot Virus (INSV) and several strains of Tomato Spotted Wilt Virus (TSWV). Western flower thrips feed by scraping the surface of the plant tissue and sucking up exposed juices. As the damaged leaves or flowers grow, they appear deformed, streaked, or have a silvery appearance. Western flower thrips has a broad range of host plants.

Three species of whiteflies are of primary concern in Pennsylvania greenhouses; they are greenhouse, banded-winged, and silverleaf whiteflies, although several other species attack greenhouse crops. Whiteflies have sucking mouthparts and, like aphids and scales, cause direct feeding damage to plants and excrete honeydew. Whiteflies can also transmit plant viruses through their feeding action.

LEAF-CHEWERS include caterpillars, leafminer flies, and snails and slugs. These pests chew on the leaves, reducing the leaf surface. Caterpillars are more common in open greenhouses or high-tunnel operations in which moths or butterflies have access. In many cases, hand-picking can keep these under control. Leafminers are tiny flies whose larvae feed between the upper and lower leaf surfaces, forming tunnels. Slugs and snails can make ragged holes in plant leaves if they gain access to greenhouses. Currently there are no invertebrate biocontrols for these pests. However, some IPM tactics are effective.

A key for identifying which group of pests may be found in the greenhouse is located online at <http://mrec.ifas.ufl.edu/Foliage/entomol/ncstate/key.htm> (accessed 6/3/2004).

PLANT PATHOGENS include bacteria, fungi, viruses, nematodes, and phytoplasmas. Bacteria cause leaf spots, stem rots, root rots, galls, wilts, blights, and cankers. Fungi include mildews and molds, rusts, damping-off diseases, and wilt diseases. These may attack different parts of the

plant, resulting in symptoms from reduced growth to death of the plant. Viruses can multiply only inside a living cell. While some viruses such as cucumber mosaic die quickly when outside a cell or when the cell dies, other viruses such as tobacco mosaic retain their ability to infect for years after the infected plant part dies. Many different viruses can infect plants. There are no cures for plant viruses.

Foliar nematodes, also known as bud and leaf nematodes, attack plant parts above ground. They may cause dwarfing, distorted and deformed leaves, or yellow spots or blotches that may cause the plant to shrivel and die.

Phytoplasmas are responsible for the “yellows diseases” that until recently were thought to be caused by viruses. Diseases caused by phytoplasmas are tomato big bud and aster yellows in carrot and onion. Hosts for aster yellows phytoplasma include aster, chrysanthemum, gloxinia, and other perennials and flowering plants. Phytoplasmas are transmitted by insect vectors such as leafhoppers, psyllids, and planthoppers. Infected stock can infect other plants through naturally formed root grafts.

Sanitation and exclusion are important tactics in managing any type of plant pathogen.