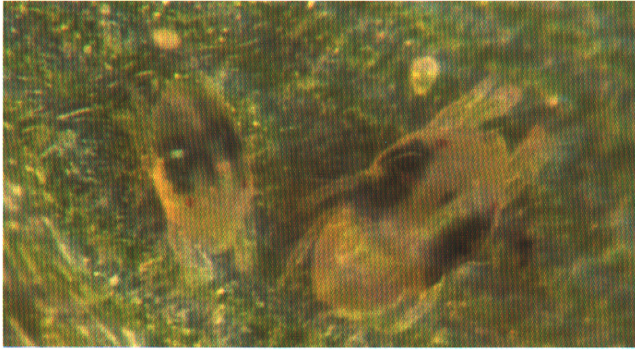


Identifying Major Pests of Greenhouse Bedding Plants

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Insects



TWO-SPOTTED SPIDER MITE (*Tetranychus urticae*). Spider mite adults are less than 1 mm in length, green-to-orange in color and have a characteristic pair of dark spots on their back. Both adults and nymphs have four pairs of legs while the larva or 1st instar has only three. All stages suck fluid from plant cells, causing a chlorosis or mottled-yellowing of the foliage. Spider mites prefer to reside on the leaf underside, but can be found on the upper leaf surface when populations are high. Look for the presence of fine webbing as an indication of high mite numbers. Left untreated, leaf drop and death of the plant will occur.



WHITEFLIES (*Trialeurodes vaporariorum*). These minute insects, 2-3 mm in length, are characterized by the presence of a white powder on both pairs of wings. The adults are active flyers and can be easily dislodged from the infested leaves by a brush of the hand. The flat, pale-white immature stages are sometimes called scales and reside with the adults on the undersides of plant foliage. Both adults and immatures suck plant sap and secrete large quantities of a sticky substance called honeydew. The black, sooty mold which often develops on honeydew-coated leaves interferes with photosynthesis and reduces general plant vigor.



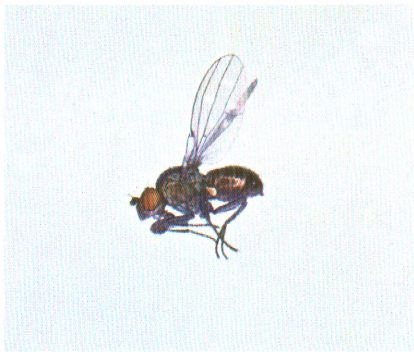
THRIPS (*Heliothrips spp.*). Thrips are small, elongate insects less than 4 mm long. Adults have fringed wings while nymphs are wingless. Thrips feed by rasping and shredding the epidermal cells of plant leaf tissue and then sucking up the cell fluids that exude from the wound. Damaged areas of the foliage or flowers become silver grey and may occur in blotches or streaks. The presence of shiny, dark, fecal droppings on the leaf is also indicative of thrips activity.



FUNGUS GNAT ADULT, above left. (*Bradysia spp.*). The adults, small, dark-bodied flies less than 3-4 mm long, are feeble flyers and tend to stay near the soil surface or on the underside of plant leaves. They can be distinguished from other greenhouse flies by the presence of a clear, delicate pair of wings, long, segmented antennae and long, dangling legs.

FUNGUS GNAT LARVA, above right. The larvae of the fungus gnat have a shiny-black head capsule and a long, white (or transparent) legless body. The 4th and final instar may be 4-6 mm long and possesses 2 small black spots located dorsally just behind the head capsule. Larvae feed on many kinds of fungi, bacteria and decaying plant material. However, the larger larvae

will feed on plant roots and can cause substantial root damage to seedlings and rooted cuttings. Most of the larvae can be found in the top 2 cm of soil.



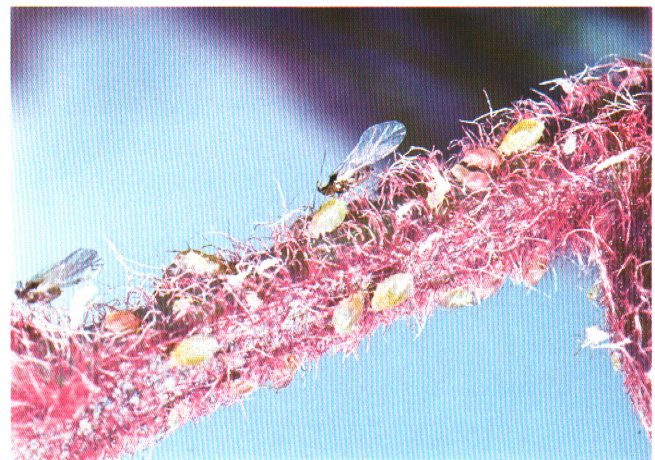
SHORE FLIES (*Scatella stagnalis*). Adults of this small dark fly can be distinguished from fungus gnats by their robust body, short antennae, short legs, and by the presence of 5 light spots on the relatively dark wings. Shore flies are strong, fast fliers compared to the more feeble and slow-moving fungus gnats. Adults tend to rest on plant leaves, bench tops, sides of pots, and on the soil surface but quickly fly when disturbed. Larvae are opaque white and lack a head capsule. The shore fly's 3 larval instars, the largest measuring 4-5 mm in length, all have a characteristic forked air tube located at the posterior end of the body. Shore fly larvae feed entirely on algae found growing on the soil surface or beneath frequently watered benches. They do not damage plants in any way but adults can be a nuisance.



SLUGS (*Mollusca*). These soft-bodied, nocturnal animals are covered with large amounts of slime instead of a characteristic external shell. Slugs chew irregular holes in leaves or stems of many plant varieties. This damage may be confused with caterpillar injury but the presence of shiny patches of dried slime on the foliage or soil is diagnostic of slug activity. During the day, they hide under risers, pots, flats or other debris laying under benches.



MEALYBUGS (*Pseudococcidae*). The elongate (3-5 mm) oval bodies of these motile insects are covered with a white, mealy secretion that give them their name. Numerous short, waxy spines are present along the body margin and at least 2 long, wax filaments may be present at the posterior end. These sap feeders are usually found in leaf axils or along the larger leaf veins. Mealybugs secrete large amounts of honeydew which causes a lush growth of black, sooty mold. This reduces photosynthesis and causes a general decline in plant vigor.



APHIDS (*Aphidae*). Sometimes called plant lice, these soft-bodied insects vary in color and range in size from 2-5 mm. Adults may be winged or wingless while nymphs always lack wings. All stages possess piercing-sucking mouth parts and a pair of cornicles located at the posterior end of the abdomen. Aphid feeding can cause severe leaf curl and other leaf distortions. The copious amount of honeydew ejected through the insect's anus can cause excessive growth of black, sooty mold. Aphids generally prefer tender new foliar growth or expanding flower buds but tend to feed on the underside of old leaves.

Diseases



POWDERY MILDEW (*several genera*). This disease is characterized by the appearance of white, powdery spots on the leaf surface. If the leaf or flower is heavily infected, the tissue will be entirely coated by a white, cobwebby mat. Often, the affected leaf will begin to yellow under this growth. This powdery, white material is the spores and mycelium of the fungus and growth is confined to the leaf surface. Occasionally, black specks are seen on the affected leaves. These are the fungal fruiting and survival structures. The spores are spread around the green house by air currents.



FLOWER BLIGHT (*Botrytis sp.*). Flower damage caused by this fungus appears as premature fading and drying of petals. Generally, the central florets of aging flowers are first to be affected. As the disease progresses, the floral parts mat together, and under high moisture conditions, fuzzy gray or yellow growth appears on affected parts. Occasionally, this disorder will cause leaf spotting, usually where infected florets fall on leaves. The spots, which are initially well defined, gradually enlarge and become water-soaked and brown. Fungal spores are carried around the greenhouse by air currents.



CROWN ROT (*Botrytis sp.*). When environmental conditions are cool and moist, the soft, succulent growing tips of bedding plants are susceptible to *Botrytis*. Once the crown is infected, it will rapidly become covered with the downy, greyish-yellow spores of the fungus. Soon the plant crown darkens, becomes water-soaked and rotted. Survival of the pathogen occurs on plant debris and spore dispersal takes place by air currents.



DAMPING OFF (*Pythium sp.*, *Rhizoctonia solani*). Poor seedling stands can result if the seedling is attacked before emergence. In young seedlings, the stem may be constricted, resulting in its wilting and toppling over. If the seedling is slightly more mature when attacked, it will remain standing but appear stunted or wilted and there will be sunken dark lesions on the lower stem. Using a hand lens, it may be possible to distinguish the coarse, brown, threadlike

hyphae of *Rhizoctonia* and its occasional dark-brown sclerotia or resting structures, from the fine, colorless hyphae of *Pythium*. The fungi are carried around the greenhouse by the movement of soil and dust on which they can survive.



SEEDLING BLIGHT (*Botrytis* sp.) Botrytis blight of seedlings can cause extensive damage in a seedling flat under cool, moist conditions. The fungus usually gets started on injured seedlings but can move onto adjacent, healthy seedlings. Leaf surfaces rapidly become covered with the downy, grayish-yellow spores of the fungus. The affected leaf tissue becomes water soaked and darkens to a dark brown. The pathogen survives on plant debris and spreads around the greenhouse by air currents.



COTTONY ROT (*Sclerotinia sclerotiorum*). This organism occasionally causes damping off. More often it attacks older plants causing a rotting of lower stem and leaf tissue. As the mycelium grows over plant parts, they shrivel up, dehydrate and die. There are several characteristic features of this pathogen which make it fairly easy to diagnose. The mycelium is thick, coarse, white and cottony in appearance and it spreads over infected plant tissue as a dense mat. Often, small black resting structures are formed in and on affected plant tissues. These bodies are called sclerotia and they can usually be seen on the base of an infected plant stem. This organism is soil-borne and survives in unsterilized soil.

Photo credits for bedding plant bulletin

Seedling blight, cottony rot, flower blight: Dr. Frank Laemmle, MSU

Crown Rot: Dr. Chuck Powell, Ohio State

White flies: Dr. Mark Acerno, U. of Minnesota

Spider mite: Dr. Brian Croft, MSU

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