

# Propagation of Pests

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Propagation of woody and herbaceous plant material is an important part of the nursery industry whether growers are producing their own stock or producing liners to sell. Propagation by cuttings is the primary way in which nursery stock is propagated. This requires plants to be maintained in a consistently moist, warm environment for an extended period of time. This can lead to the propagation of a number of pests in addition to the desired plants.

Cuttings can be susceptible to a number of pests that may be uncommon on mature plants. This is because of the environment in which they are grown. Generally cuttings are propagated in a greenhouse or hoop house to protect them from environmental stress. This makes them susceptible to a number of pest common greenhouse foliar pests such as spidermites and aphids. In addition, cuttings are kept consistently moist with mist. This encourages soil dwelling pests such as fungus gnats and shore flies. Cuttings are also susceptible to pests because they are under a great deal of stress and less able to defend themselves than rooted plants. Pest on cuttings will reduce plant vigor and thus root establishment and survival.

Aphids have piercing-sucking mouth parts that they use to drink plant phloem. Phloem carries sugars produced via photosynthesis to plant roots. The more aphids drink the less energy the plant has to function and produce roots. Aphids can quickly kill cuttings which are vulnerable due their lack of roots and small size. The most common

aphids encountered in greenhouses are the green peach aphid (*Myzus persicae*), cotton aphid (*Aphis gossypii*), and potato aphid (*Macrosiphum euphorbiae*). These are generalist feeders that will infest hundreds of plant species. All aphids can be easily monitored for by looking for honeydew and shed skins that accumulate on leaves. You can also look for the aphids themselves on the underside of leaves and growing shoots.

The twospotted spider mite (*Tetranychus urticae*) is a pest common in nursery and greenhouse crops. It will also infest cuttings and rapidly reduce plant vigor. Inspect stock plants for mites before cutting. Beat foliage on a paper plate or sheet of paper to dislodge mites so they can be seen. Treat plants if necessary and reinspect before using for propagation. Mites reproduce very rapidly so even a few mites present on cuttings could become a severe problem. Mites damage plants by sucking the contents out of mesophyll cells leaving a yellow spot. This reduces the amount of chlorophyll present in leaves and thus photosynthesis. This stippling damage will not heal. Leaves on deciduous plants will be replaced where as damage on evergreen plants will remain for many seasons. Thus, it is important to prevent mites from contaminating your cuttings and to detect mite populations early before they do much damage.

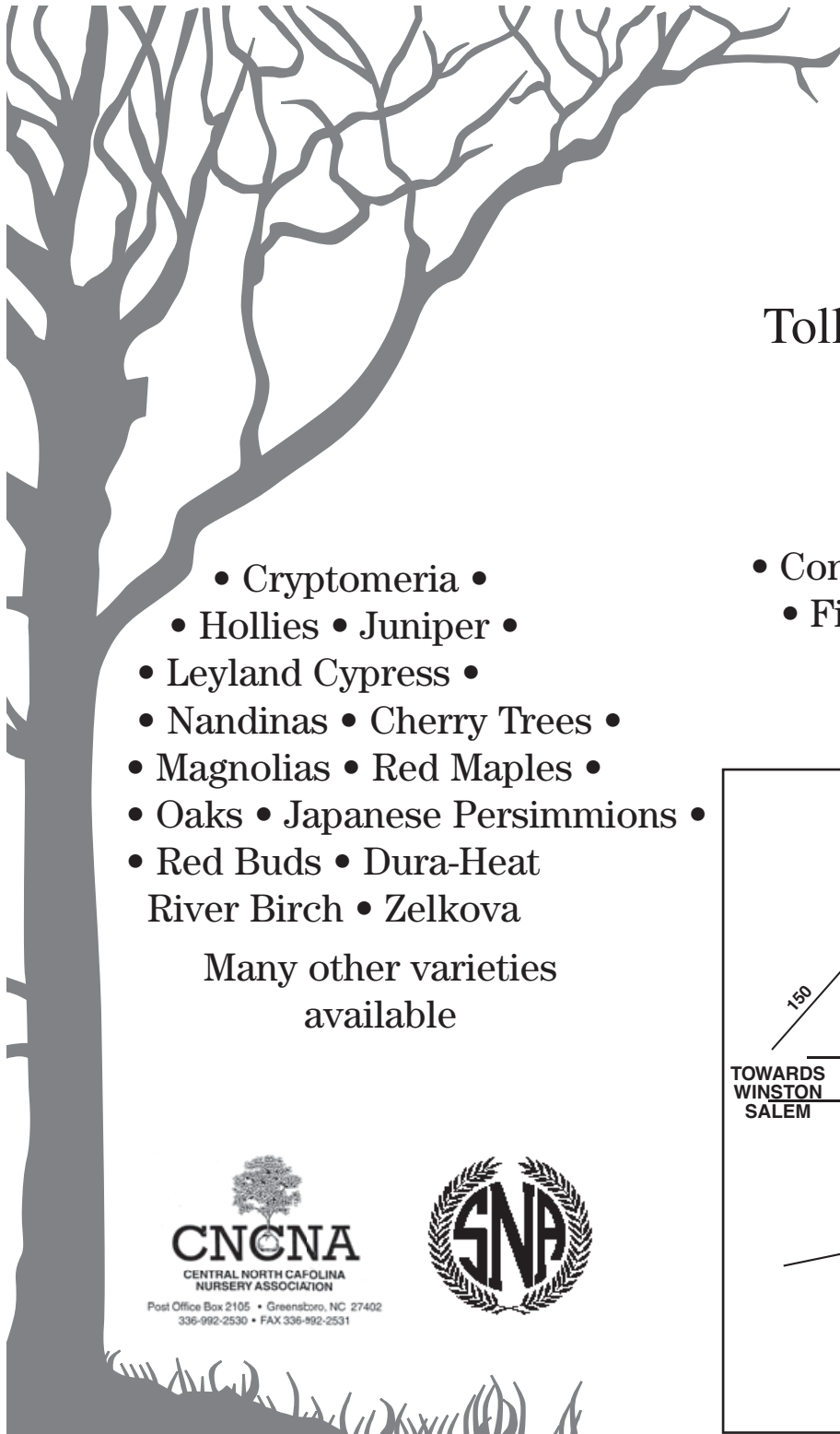
Although aphids and spider mites may be common in mature, outdoor plants they are often kept at bay by natural enemies such as lady beetles and minute pirate bugs. Therefore, you only notice them when an outbreak

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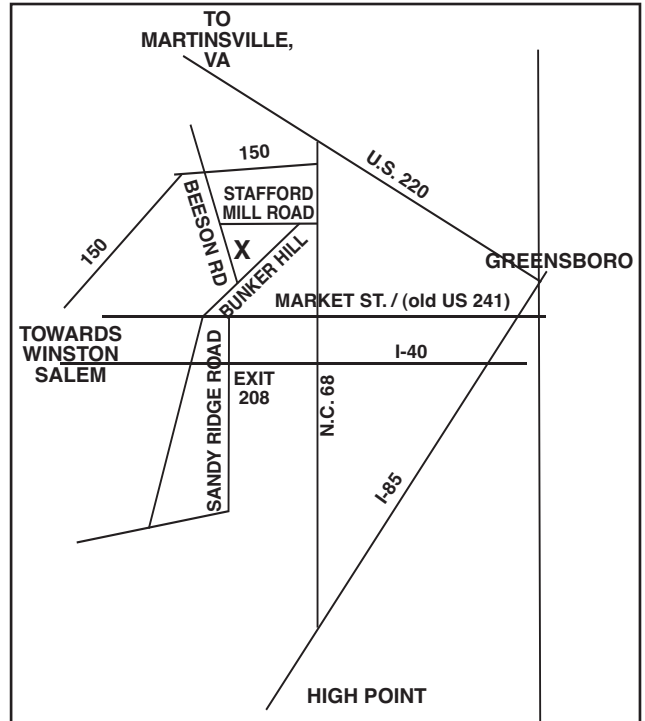
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occurs. In greenhouses and hoop houses where propagation occurs, access by natural enemies is restricted. Therefore, a lone insect is likely to survive and reproduce rather than get eaten by a predator. Monitoring is important to detect and treat small populations.

In outdoor production, fungus gnats (*Bradysia* spp.) and shore flies (*Scatella stagnalis*) are generally not a problem. This is because these insects require potting media that is very moist all the time. In typical greenhouse production, these pests often indicate that plants are being over watered and the media is staying too moist. However in propagation, plants must remain moist in order to survive and root properly.

Therefore, you are likely to encounter these pests in your propagation operation.

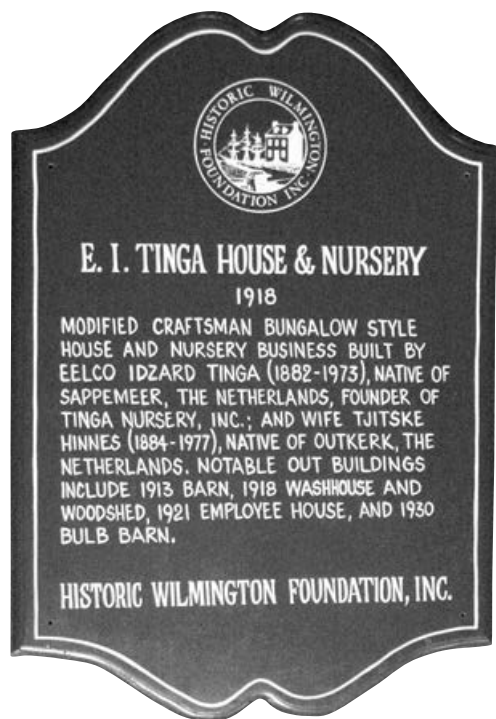
An important distinction needs to be made between fungus gnats and shore flies. Fungus gnat larvae eat fungus and plant roots where as shore flies and their larvae only consume algae that grows as a consequence of moist soil. Therefore, fungus gnats are a pest that can damage your plants. Shore flies are a nuisance and are unappealing to customers. They leave fecal spots on foliage but otherwise will not damage your plants. It is important to tell the difference so control efforts are not wasted particularly if plants will be potted as nursery stock in your own nursery rather than sold.

Fungus gnats and shore flies

are relatively easy to tell apart even with your naked eye. Fungus gnats are part of a primitive group of flies that have antennae longer than their head. They are black and delicate looking with long legs and clear or grey wings. They often run on the surface of potting soil. Shore flies have short antennae that are not obvious, short legs, and stout bodies.

Fungus gnat and shore fly abundance can be monitored with yellow sticky cards. They are also easily seen flying around plants, on foliage, and in pots. The incidence of fungus gnats and shore flies can be reduced by using well drained potting media (which plants need anyway). Greenhouse sanitation is especially important. Reduce standing water in the greenhouse

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as these puddles grow algae for shore flies. Keep the greenhouse free of dirt, potting media, plant debris, and other organic matter. These provide a substrate for fungus and algae that will support fungus gnat and shore fly survival. (Organic matter and debris also support plant pathogens, provide thrips with pupation sites, and encourage other pests.) If possible, prevent insects from entering the propagation house with screen over vents and fans.

Insect growth regulators, such as Adept (diflubenzuron), Citation (cyromazine), Distance (pyriproxifen), or Enstar II (s-kinoprene), applied as a drench can be used to manage fungus gnat larvae. Gnatrol (*Bacillus thuringiensis*) is derived from naturally occurring bacterial and can be used to manage fungus gnat larvae. Predaceous mites (*Hypoaspis miles*) and parasitic nematodes *Steinernema carpocapsae* and *S. feltiae* are biological control agents that have also been used against fungus gnats in commercial greenhouses.

A few pests can quickly dispatch cuttings because they have few or no roots and are already under stress. Therefore, plants you have invested time and resources into nurturing for weeks or months could

die colonized by pests. With careful monitoring pest can be kept to tolerable levels in propagation houses. The key is to detect insects early before they damage and kill the cuttings.

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Recommendations for the use of chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products does not imply endorsement by the North Carolina Cooperative Extension Service nor discrimination against similar products not mentioned. Individuals who use chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label.



Figure 1. Fungus gnat adult on yellow sticky card. Notice long, slender legs and antennae. Photo by Whitney Cranshaw, Colorado State University.



Figure 2. Shore fly adults on greenhouse frame. Notice fecal spots. Photo by Whitney Cranshaw, Colorado State University.

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