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Pest Management in Propagation[©]

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INTRODUCTION

When it comes to pest management the best place to start your program is from the beginning, and this means in propagation. If your young plants are not clean of insects and disease, it is going to be an uphill battle.

To start, if you have your own stock plants, keep them clean. This can be challenging because these plants are often allowed to grow large and dense in order to produce many cuttings. Getting good spray coverage on plants with dense growth can be very difficult. Often pest populations seemed to be under control, but their numbers are frequently just knocked back. In these situations, systemic insecticides can be useful but remember they may not control all pests present - and in some cases, create more problems. If your target pests are two-spotted spider mites, whitefly, aphids or western flower thrips, biocontrol has proven to be very effective for these pests. These beneficials can find their way into very dense plants, getting where contact sprays sometimes cannot

get. Always make sure you have correctly identified the pest or pathogen before you start any pest management program.

SCOUT CUTTINGS PRIOR TO STICKING

Once cuttings have been taken (or if you buy them in), a thorough inspection should be done to check for potential problems. Sometimes you can see large adult insects, but the tiny eggs and immature insects/ mites can easily slip by - hitch-hiking their way in. This is because of their small size and some eggs, like those of the western flower thrips, are laid inside of the plant tissue so they cannot be seen. Also, when cuttings are shipped in, they often arrive in large volumes, and frequently it's a race against the clock to get them stuck. This rush may not leave time for adequate inspections.

One approach growing in popularity is to dip the cuttings before sticking them (Fig 1). Researchers in Canada have been looking at immersing cuttings in treatments like insecticide soaps, oils and microbials (like *Beauveria bassiana*). The work was done at Vineland Research and Innovation Centre and the dip trials proved to be very successful. To learn more, you can look on their website, <http://www.vinelandresearch.com>, where they cover rates, pests and how to. They even have videos, showing how to do the process.

This does not mean you should immediately run out and start dunking your cuttings to control pests. Testing must always be done to make sure there are no phototoxicity issues from these treatments and that the treatment works to control the target pest.

Even if you start with a clean cutting, that does not insure that pests will not arrive on their own. One of the easiest things to do to help monitor whether a problem has arrived is to use sticky cards. Yellow cards will attract most flying insects including fungus gnats, shore flies, thrips, winged aphids, whiteflies and others (Figs. 2 and 3). Sticky cards will not help you monitor for mites, since mites do not fly.

STARTING A BIOLOGICAL CONTROL PROGRAM IN PROPAGATION

Once the cuttings have been stuck – is the optimum time to start a biological control program. For some reason growers often wait to treat for pests until they are out of the propagation stage, which just gives pests time to multiply. Beneficial insects, mites and nematodes work well in propagation, looking in every nook and cranny for pests to feed on. Pesticide applications in propagation can be challenging because you need good spray coverage without causing phytotoxicity. Sprays can get washed off in mist and with systemic drenches. And, you need the cuttings' roots to develop before the pesticide can be taken up.

Predatory mites can be applied on the stuck cuttings and will get right to work feeding on pests. One example is *Neoseiulus cucumeris*, a predatory mite that forages on a lot of different pest species – such as western flower thrips, broad mite, and spider mites. It is very economical to use easy to get from insectaries, such as Beneficial Insectary <https://www.insectary.com/>, Bioline <https://www.biolineagrosciences.com/>, Biobest <https://www.biobestgroup.com/>, or Koppert <https://www.koppertus.com/>.

Slow release sachets can be used in propagation (Fig. 4). These water resistant systems slowly release predatory mites for many weeks; they feed on pests, including thrips, broad mites, cyclamen mites, spider mites and whitefly.

One control method that thrives in propagation under mist are the beneficial nematodes. They are increasingly being used by many commercial growers to very effectively control fungus gnats (which feed on roots of cuttings) and shore flies (which feeds on algae and bacteria); the nematodes love the propagation environment. They are also compatible with most pesticides (talk to your supplier) - and are very affordable to use. Another advantage, *you do not have to worry about developing resistance issues* with them, which occurs with pesticide usage.

SUMMARY

Controlling pests early is key to a successful pest management program. Starting with clean propagation/ liner material will help make the rest of the growing process a lot easier. Using biological control in this early stage will not only stop the pests from starting, but also will reduce the amount of pesticide sprays used - reducing chances of resistance issues. Also, if young plants are free of non-biocontrol friendly pesticide residue - once growers pots up their young plants - they can immediately start using beneficials without worrying about pesticide residues.



Figure 1. Immersing cuttings in treatments containing insecticide soaps, oils and microbials (like *Beauveria bassiana*) is an excellent IPM for pest control.

Figure 2. Sticky cards are essential part of managing pests in a greenhouse. In propagation they can help monitor fungus gnat populations which are a major pests problem for young plant producers. They will also trap pests like thrips, whiteflies and other flying insects.





Figure 3. Adult fungus gnats can be easily identified by their mosquito shaped body and the “Y” shaped vein on their wings.



Figure 4. Slow release sachets can be used in propagation. These water resistant systems slowly release predatory mites for many weeks; they feed on pests like thrips, broad mites, cyclamen mites, spider mites and whitefly.