

GROWERTALKS

Features

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Start Clean and Stay Clean For Rooting Cuttings!

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With the season for rooting cuttings just starting for most growers, now is the time to focus on your sanitation protocols. You do have a protocol, right? Just because you haven't had any disease problems with rooting cuttings in the past few years doesn't mean you won't have any this year.

In my travels around North America, I've seen many growers "rolling the dice" that they won't have a disease problem by not having a solid sanitation protocol in place. Consider sanitation an insurance policy in which you're insuring that you don't spread any disease problem beyond what came in on the cuttings you received. And don't think that all cuttings you buy are absolutely clean all the time, free of any disease or insect.

Some common disease problems that can come in on cuttings include bacterial, fungal and viral. Examples of bacterial problems may include *Xanthomonas* and *Ralstonia* (geraniums), *Erwinia*, crown gall and *Pseudomonas*. Typical fungal problems may include *Botrytis*, *Rhizoctonia*, *Pythium* and various leafspots. However, I think the most difficult problems include key viruses that are hard to detect on very young cuttings. These viruses include tobacco mosaic virus (TMV), impatiens necrotic spot virus (INSV), tomato spotted wilt virus (TSWV), cucumber mosaic virus (CMV), calibrachoa mottle virus (CbMV), hosta virus X (HVX) and others still to be discovered. Knowing that some of these viruses are mechanically transmitted (TMV) should put a scare in any growing operation that sticks cuttings of susceptible crops—such as calibrachoa and petunia—as hands and tools are main avenues of spread. Other viruses that are insect-transmitted will become more of a problem in the propagation area, making insect control absolutely imperative.



Steps of sanitation protocols

Whether you take your own cuttings from stock plants or buy in from various offshore suppliers, you need to understand the necessary steps in a sound sanitation program. These steps start even before you receive cuttings, making sure you have your sticking and propagation areas thoroughly clean and disinfected, as well as the cooler where you store cuttings before sticking. Generally, the use of disinfectants, such as peroxides (ZeroTol, Xeroton-3) and quaternary ammonium (Greenshield, KleenGrow) products, are safe to use and very effective as long as you clean soil and plant debris off surfaces first. (Remember—bleach isn't labeled for greenhouse use!)

Pictured: The sticking crew should always wear thin disposable gloves that fit each worker properly and aprons to avoid rubbing against cuttings or trays with clothes potentially carrying TMV particles.

Carts, benches, and sticking surfaces need to be cleaned regularly. Keep weeds out of the propagation areas, as they're great reservoirs for viruses and insects. Eliminate standing water under the benches and control algae on floors. If reusing trays, then dip washed trays in disinfectant (see above listed) for at least 10 minutes.

Buy your cuttings from reputable suppliers, but examine every shipment for quality. I know of some growers who are dipping cuttings they suspect have some insect problems in Botaniguard + Nemasys. Let your supplier know right away if there are any insect or disease problems with cuttings before you stick them or shortly thereafter. Shipping conditions can cause problems with ethylene (loss of lower yellow leaves), *Erwinia* (soft rot), frozen leaves and slow rooting. Make sure boxes are unpacked promptly and aren't too hot or cold. Prioritize sticking cuttings based on their sensitivity to ethylene and shipping. Try to stick all cuttings the day you receive them, concentrating on sticking all geraniums, lantana, euphorbia, ipomoea, thunbergia, purslane, lobelia, diascia, dahlia and heliotrope first. Store other cuttings in a cooler at 50F (10C) with bags open and lids slightly open on boxes. If dipping cuttings into rooting hormone, then use small disposable containers for each worker, making sure to change containers when they need to be refilled. You want to avoid transmitting diseases by sticking too many cuttings in the same rooting hormone solution or powder.

As mentioned previously, make sure your sticking line and surfaces are disinfected properly before and during sticking. I would make sure the sticking surfaces are disinfected after every break during the sticking days. The sticking crew should always wear thin disposable gloves that fit each worker properly, spraying them with disinfectant after every crop or, in cases of geraniums or TMV-susceptible crops, after every variety. The key TMV-susceptible crops include calibrachoa, petunia, lobelia and verbena. Have a small spray bottle for each worker containing either Virkon or KleenGrow, as these disinfectants are labeled as viracides, and will also kill fungal and bacterial spores. Other disinfectants may not work as well on viruses. Have the sticking crew wear aprons (either disposable or washable) to avoid rubbing against cuttings or trays with clothes potentially carrying TMV particles (best if you have no smokers on the crew).

Whether you pinch liners by hand or use a mechanical trimmer, the same sanitation protocols should be followed as for the sticking procedure. Gloves, aprons and spray bottles with either Virkon or KleenGrow are mandatory. Spray trimmer blades after every crop or after every variety with TMV-susceptible crops. Dip tools into disinfectant for at least 10 minutes and every crew member should have two knives or trimmers so while one is in use the other one is in disinfectant solution.

Additional sanitation steps should include hand-wash stations before entering the propagation area, restricted access signs for this area (avoid dragging carts through your propagation area!) and maybe footbaths. I say maybe because it's very hard to keep the footbaths effective. Footbaths should be cleaned of organic matter at least every day, new disinfectant should be added as needed and replaced every day, and every worker needs to step both feet into the baths. People stepping around the footbaths negate the effectiveness of this step and not keeping them clean and fresh means they won't work as intended.

I mentioned not dragging carts through the propagation area, as they're hard to keep wheels clean unless you take them through the footbaths. For many growers, cleaning floors daily with peroxides or quaternary ammonium products is sufficient, thus eliminating the need for footbaths.

Monitoring for pests

Another important step in sanitation protocols is the proper use of yellow sticky cards in the propagation area, especially when liners are off of mist. You need to monitor for fungus gnats, shoreflies and thrips, especially. Fungus gnat larvae can feed on new roots or bury into stems, causing problems with various root rots. Both fungus gnats and shoreflies can spread disease spores they pick up on their bodies, so controlling them is needed. Thrips can transmit INSV and TSWV, so keeping populations as low as possible is a must. Make sure sticky cards are 2 in. above the crop and monitored weekly. Change the cards at least every other week.

Scout liners closely for spider mites, whiteflies, aphids and leafminers. If you started clean, then it should be easy to maintain clean liners. In addition, look for common diseases such as Botrytis, Rhizoctonia, Pythium and leafspots. Generally, you'll have more problems with diseases if you keep too much mist on cuttings and for too long of a period. Try to get away with as little mist as possible and get liners off of mist as soon as you can. If you see any disease problems, then rogue out the diseased cuttings or leaves, and spray or drench with appropriate fungicide.

Viruses are much harder to scout in liners, but be vigilant! If you see anything suspicious, such as spotting, ringspots, mosaic patterns or other unusual leaf symptoms, then test leaf samples for common viruses using grower test kits from Agdia (www.agdia.com). You can buy kits that can test for TMV, INSV, TSWV, CMV and others. These kits are easy to use and cost-effective; you get your answers within the hour and can then send in another sample to a lab for verification. Get new kits every year and store them properly.

Finally, write up your sanitation protocols, include any pictures illustrating techniques and post them where your sticking and trimming crews will see them every day. Review protocols with your crew weekly and make sure new staff is totally ingrained with the protocols. Provide everyone with the proper equipment they need (gloves, spray bottles, aprons, etc.) and make sure they take good care of any equipment that's not disposable. Remember, your sanitation protocol is only as good as the weakest link. And here's hoping that

you never have to dump liners due to TMV or Xanthomonas ever again! **GT**

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