



St. Augustine Orchid Society

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Orchid Hygiene

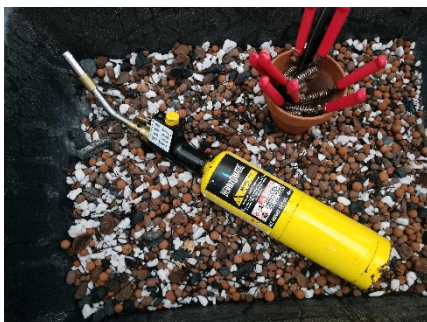
by Sue Bottom, sbottom15@gmail.com

We are often lectured on how important good sanitation is to prevent the occurrence and spread of disease in our growing area. There are rots that spread by splashing water, fungal spores dispersed on air currents and viral particles that can be exchanged between plants via plant sap. You do your best to keep the growing area, supplies and tools as clean as possible and yet you continue to find problem plants. There are so many different ways of spreading contaminants. See how you answer these questions; perhaps there are some other hygienic practices to incorporate into your growing regimen.

Horizontal Surfaces. You might have a table or bench near your growing area that you use for staging or grooming your orchids. It is so easy to contaminate this surface by casually placing potentially contaminated materials on it as you putter around your growing area. Make it a habit to disinfect the surface regularly and keep newspaper handy to use as a temporary tablecloth and barrier to cross contamination.

- ★ Do you collect spent blooms and place them on the table prior to discarding them or do you place them directly in a sealed container?
- ★ Do you ever put your used cutting shears or razor blades on the table while you are in the process of repotting a plant?
- ★ When you are getting plants ready for an exhibit or the show table, do you remove the wire products and place them on your working bench?

Cutting Tools. You use your cutting tools to carve up your plants during repotting, snip off spent inflorescences and remove diseased tissue. It is critically important that these tools not convey disease from plant to plant. Razor blades should be used once and discarded directly into a sharps container (unless you heat sterilize them between uses). Cutting tools should be sterilized between plants, and sometimes between cuts.



1. Use a torch to sterilize your cutting tools, then you don't have to wonder if your solution is strong enough or you have let the shears in contact with the sterilant for long enough.

There are plenty of opinions on how best to prevent disease and virus spreading via shears, knives, and other cutting tools. Common chemical sterilant recommendations include solutions of quaternary ammonium compounds (Phyosan, Consan, Green-Shield, pool algacide, etc.), trisodium phosphate, Lysol, isopropyl alcohol, peroxide products (ZeroTol, Sanidate, etc.), but studies comparing these materials at their recommended rates and contact times indicate they do not deactivate all virus particles.

Side-by-side studies of 16 disinfectants resulted in the recommendation of only three, 2% Virkon S, 10% Clorox regular bleach solution (0.5% sodium hypochlorite) and 20% nonfat dry milk ([Li et al.](#)). Perhaps if the tests had



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been conducted at higher concentrations or if the contact time had been greater than 10 minutes, some of the other commonly used disinfectants would have rated higher. Of the three recommended chemical disinfectants, I have only tried the bleach solution and found it is terribly corrosive on tools, rusting them in a day. To be safe, buy one of the torches with a self-igniting trigger used to solder copper pipes. The torch is not kind to the cutting tools either, but it is ready to use right away after disinfection and in fact, the hot cutting tool can be used to help cauterize plant wounds.



2. Store your sanitized pots in a clean area, not under your plant benches.

Reusing Pots. Some growers only use new, clean pots. If you choose to reuse your pots and baskets, they should be sterilized. First, you remove all the roots, debris and other organic material from the pot. Plastic pots can be sterilized by dropping them into a 10% bleach solution for an hour or more. Clay pots are porous and can absorb pathogens so they have to be heat sterilized by baking at 400F for an hour or two. Wooden baskets and other products are permeable like clay, but unlike clay are not amenable to heat treatment. You can clean them and soak them in a disinfecting solution, but this may not remove all pathogens. Consider them to be single use products, and replace them with metal or plastic products than can be

sterilized between uses.

- ★ Do you reuse shards from broken pots for drainage in the bottom of the pot? Do you sterilize these shards first?
- ★ How about those bamboo stakes? Rhizome clips? Butterfly clips? Twist ties? Wire hangers? Do you discard them or sterilize them prior to reuse?
- ★ Do you store your sterilized pots in a clean area? Or do you stack them under your plant benches where irrigation water from the plants above drip on them?



3. Sterilize your grow and carry trays just like you do your reused pots.

Plant Trays. If you grow or transport plants in flats or carry trays, you should recognize they can potentially become contaminated and a source of infection for the next plant placed in that tray, just like your reused pots. The trays should be cleaned of organic matter and then disinfected using a 10% bleach solution. Another precaution would be to place a piece of newspaper on the tray before adding plants you are transporting.

Repotting. This is the big one; the one that everyone focuses on. You are using sharp cutting instruments to carve up your plants for repotting and opening wound after



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wound on the plant as you prepare it for its new home. Plant sap can be transferred onto working surfaces, cutting tools and most troublesome, your hands. There are a myriad of ways that you can swap spit between the plant you are repotting and the next one to be repotted.

- ✦ You bring your plant over to the potting area and place it on a horizontal surface, and then proceed to remove the rhizome clips, plant stakes, pot hangers, etc. Have you laid out some newspaper to put the potentially contaminated plant and do-dads on?
- ✦ Then you separate the plant from the pot. Do you have to use a knife to separate roots from the pot? Do you sterilize the knife like you would your cutting shears?
- ✦ Do you discard spent potting media or use it in your garden? Or do you try to separate organic from inert materials so you can reuse it? If you chose door number 2, did you take steps to remove accumulated salts and kill pathogens through heat sterilization?
- ✦ When you cut the plant to prepare it for its new home, are you sure the shears were sterilized?
- ✦ When you have a diseased plant, do you keep cutting until you find clean tissue? Do you sterilize the shears between cuts?
- ✦ Do you water blast the papery sheaths off the plant? Do you place the wet plant on your newspaper so all of a sudden that newspaper is not much of a barrier anymore?

Hands. Then you pot up your division using sterile pots and wire products, and insert your plant tag and you are ready for the next one. But wait, during each step of the repotting process your hands might have become contaminated from fungal or bacterial spores or virus particles. Do you wash your hands with hot soapy water between plants? How about those foaming ethyl alcohol-based hand sanitizers to eliminate bacterial and fungal spores? Wear single use latex gloves?

Many people recommend wearing latex gloves during the repotting process and changing them after each plant is finished to prevent transferring virus. I have to confess that I have not crossed the bridge to changing latex gloves with each plant, although I wonder if this might be the reason I still am finding virused plants in my greenhouse, often within a year of repotting them. You can dip your hands in a 10% bleach solution to deactivate viral particles, but you will soon have chemical burns. Do not do this unless you are wearing gloves. Here is an alternative, prepare a hand washing station filled with a 20% wt/vol solution of nonfat dried milk (NFDM). Rinse any debris of your hands after repotting and then dip your hands in the NFDM bowl and rub your hands together for a minute or two.

Dead Heading. Those beautiful flowers all ultimately die and you want to remove them. Of course, they can have fungal spores, or thrips can lay their eggs in them or they can contain



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viral particles that can be spread during the removal process. Do you walk through your growing area removing spent inflorescences? They should be placed in a sealed container like a coffee can immediately after removal from the plant. If you use shears, sterilize them after each cut. Of course, this cut is then an open wound for pathogens to enter the plant. If you wait until the flower is ready to separate from the plant naturally, it can be separated with a gentle tug and then placed directly into the coffee can without letting the plant sap touch your skin.



4. Keep long S hooks in your growing area so you can easily hang the water wand when you are done watering.

Watering Practices. We assume our water does not contain any contaminants, and this may be true as long as you are not using surface water from a backyard pond as your raw water source. Even if the water is pure at its source, there are many places where pathogens can be introduced into the irrigation system.

- ★ If you collect rainwater, are you assuming that it is pure? Or are you adding small amounts of disinfectants to kill any pathogens that may have been washed in from the roof surface and taken up residence in your holding tank?
- ★ Have you ever taken a Q-tip or toothbrush and rubbed it on the inside of your irrigation system to see if a biofilm deposit that has built up on the inside of your hoses or PVC piping? You might be surprised at what you find, particularly if you test the part of the system conveying water after fertilizer has been added to it, downstream of a Dosatron or venturi siphon.
- ★ When you are done watering, do you drop your hose down to the ground? Or do you hang the nozzle up so it will not come into contact with pathogens that may be present in the soil?
- ★ Do your store pots or carry trays under your plant benches? Or are they kept in a clean area where they will not be contaminated from water dripping out of pots?
- ★ Do you ever hydrate your vanda roots by dunking them in a bucket of water? One plant after another so any pathogens present on one can be transferred to the rest?

Good Intentions. Sometimes you can create a problem while trying to solve a different problem.

- ★ Do you cut yellowing leaves with a sterile tool? You get one point for the sterile tool, but you have also just created an open wound through which pathogens can enter the plant. If you wait for the plant to form its corky barrier at the abscission zone, the leaf can be removed with a gentle tug. Of course, a diseased leaf should be removed from the plant



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sooner rather than later, and you can dust it with a fungicide or cinnamon to form an artificial barrier.

- ★ Do you ever dunk plants in a Sevin solution to get ants or cockroaches out of the plants? Do you think the fungal spores in the first pot might be transferred to the second pot?
- ★ Do you ever use a toothbrush dipped in isopropyl alcohol to remove scale from a plant? Do you sterilize it first?

Virus Testing. When you are virus testing, you are trying to determine if the plant tissue contains virus particles, so your sanitary precautions should be in overdrive. Do not casually allow contaminated fluids to contact your fingers or horizontal surfaces where they can infect other plants.

- ★ When you cut the leaf tissue of the plant you suspect is virused with a razor, do you drop the contaminated blade directly into a spent sharps container or do you lay it down on the bench while you continue with the test procedure?
- ★ When you place the sample in the mesh bag, are you wearing single use gloves or do you get plant sap on your fingers?
- ★ After your testing is completed, do you discard the mesh bag directly into a closed container or do you lay it down on the table while you consider your next step?

Good sanitation practices are more than just keeping your growing area clean and weed free. If all your plants were healthy and free of bacterial, fungal and viral pathogens, there would be no need to flame your shears or follow these hygiene protocols because there would be no contamination to transfer between plants. However, we all get colds from time to time and know germ organisms are ubiquitous in the environment. When cultural conditions are favorable for their growth, plant infections can and do occur. As a matter of prudence, assume that each plant is potentially contaminated and take steps to prevent cross contamination during your orchid labors. You would rather be known as Dr. Joseph Lister than Typhoid Mary.

Citations and Additional Reading:

Chase, A.R., The truth about milk and TMV. *Greenhouse Product News*. November 2014. Accessed online 10/11/17 <http://www.gpnmag.com/article/truth-about-milk-and-tmv/>

Jones, K. Hygienic Practices. Species Orchid Society of Western Australia website. Accessed online 9/30/17: http://members.iinet.net.au/~emntee/Hygienic_Practice.htm

Lewandowski, D. J., Hayes, A. J., and Adkins, S. 2010. Surprising results from a search for effective disinfectants for *Tobacco mosaic virus*-contaminated tools. *Plant Dis.* 94:542-550.



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Losenge, T., Faust, J.E. and Scott, S.W. (2012). The transmission and management of tobacco mosaic virus in a greenhouse environment. *Acta Horticulturae*. 937. 85-90.

Li R., Baysal-Gurel F., Abdo Z., Miller S.A., Ling K-S. Evaluation of disinfectants to prevent mechanical transmission of viruses and a viroid in greenhouse tomato production. *Virology Journal*. 2015;12:5. Accessed online 9/30/2017: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4312592/>

Wintermantel WM. A comparison of disinfectants to prevent spread of potyviruses in greenhouse tomato production. *Online Plant Health Progress*. 2011. Accessed online 9/30/17: <https://www.plantmanagementnetwork.org/pub/php/research/2011/disinfect/>