

# Sanitation, Sanitation, Sanitation

IT MAY SOUND SIMPLE, BUT THE HIGHEST QUALITY PLANTS ARE FIRST ACHIEVED FROM MAINTAINING A CLEAN GROWING ENVIRONMENT. AND NO MATTER HOW CLEAN YOU ARE, THERE MAY BE ROOM FOR IMPROVEMENT.

**By James A. Bethke**

**W**hen I was in college, I had a job cleaning rooms in a heart valve production company. In this company, there were various levels of sanitation and cleaning that were required, and the levels of sanitation were monitored on a daily basis using sophisticated equipment. Where the heart valves were assembled was where the highest level of clean was required, and every day, every square inch of space in the room had to be touched with concentrated disinfectant — including the florescent light bulbs and

housing. After touching every surface and prior to leaving the room, we would spray the room with an aerosol disinfectant. Filtered air flowed into the clean rooms and out into the second level of clean, which also required a lot of attention. Obviously, the office spaces did not require as much cleaning as the lab spaces. What should also be obvious is that the product coming out of that facility was of the highest quality, and it was in great demand.

One of the factors in ornamental plant production that affects the quality of the plant is the level of clean (pests, damage or disease) and one way to significantly reduce or exclude pests and damage

is starting clean and staying clean. What is the elephant in the room? Complacency. Complacency is when someone is self-satisfied while at the same time unaware of or ignoring actual threats. In this industry, it puts plants at risk.

One of my colleagues is fond of putting a slide in his presentations that says “SANITATION SANITATION SANITATION,” one word right on top of the other and filling the slide. It doesn’t matter what the subject matter, invasive pests and disease, pest control or quality control, he is correct. Sanitation is the foundation of all disease and pest management programs in commercial floriculture and



nursery crops, and you will hear that word in most presentations at most conferences, especially when pest and disease control is discussed. Just as in the heart valve production facility, the level of effort you put into being clean will have an effect on the level of pest management you will eventually have to employ.

Even in ornamental plant production, there are obvious levels of clean required (high level of sanitation and clean). Not every facility will have the same issues or utilize the same best management practices to address the issues. In addition, there is a great variety of production types in ornamental plant production. Those that are propagating material and need to be virus free will need a high level of clean, whereas those that are producing seed trays that are shipped in less than six weeks will not need nearly the same level of clean. If a crop/monoculture is going to be on-site for a lengthy period of time, the chances of pest and disease proliferation and infection is high and will require a higher level of sanitation. In addition, if you are shipping out of the county, state or country, you will most likely need a much higher level of clean due to phytosanitary requirements.

### A Clean Start

The cleaner you start a production area, the cleaner it will most likely remain. It is very important to remove all old crop residues, which may be harboring insect pests and diseases. If necessary, sterilize the growing environment with a disinfectant prior to new plant introduction because it will reduce or eliminate pathogen inoculum.

Pests and pathogens can ride on containers, soil, equipment, new plants and people. Therefore, anything that enters a production area should be cleaned, sterilized or isolated before introducing them into a cleaned environment. Soil and other potting media should be sterilized and soil that is not used right away should be kept tarped or in enclosed containers to keep it clean. Carts, tractors, trucks, etc., should also be cleaned before entering a clean production area. Workers can also be a source of pests and pathogens. Are they wearing brightly colored clothing? Have they just come from a pest or pathogen infested area?

One of the most important things you can do is to make sure that you are starting with clean plants or propagated material. Inspecting propagated material and maintaining pest- and pathogen-free stock plants for propagation will ensure a clean start. Additionally, if you bring in larger plants for finishing, isolate the introductions until you are sure they are pest and pathogen free before you introduce them into a clean production area alongside other plants. It is easy to want to just get in there and get started, but it will most likely cause great headaches as the pest or pathogen population begins to grow and spread.



**Figure 1 (top).** High level of sanitation and strict entry requirements implemented.

**Figure 2 (bottom).** Pots and flats should be washed and sterilized prior to use especially if they are being reused.

### Trapping and Monitoring

Once you start clean and to ensure that it remains clean, you will need to do a good job of monitoring for pests and disease. Early detection of a problem leads to an easier solution, and it maintains a clean growing environment to produce a high-quality plant. As I mentioned, the heart valve company monitored the level of clean with sophisticated equipment, but it doesn't take a lot of sophistication to monitor pests and diseases.

### Employee Commitment

In a good sanitation program, commitment is key and employee behavior is worth examining. Have your workers become complacent? Is that

hose still touching the ground? It pays to periodically scrutinize aspects of your production and production facility because good sanitation requires a conscious effort on the part of every employee. Managers should implement programs to keep sanitation on the forefront of their job, and remind workers about the importance of sanitation. This can be accomplished by sending out memos, hanging posters, sending texts or emails to employees or holding weekly team meetings. In addition, have you considered a sanitation training program tailored to fit your working environment? I am sure your workers are required to take scheduled training classes. Consider adding a short module about the importance of sanitation.



## Self Assessment

A possible solution to complacency is to do a self-assessment. It will encourage you to look at every aspect of your production facility with the idea that clean, quality plants are first attained through effective sanitation of the growing and surrounding environments. Below is a series of

questions that you might ask yourself about how to improve your level of sanitation. Some of the answers to the questions will indicate an issue that needs addressing or it may encourage you to change your practices or purchase new equipment that will improve your level of clean. Further, you will be able to periodically reassess at some time in the

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**Figure 3a and 3b.** Workers can easily move pests and disease into a clean greenhouse, especially if they have been in an infested greenhouse or nursery.

future and observe progress in sanitation practices at your facility. Keep records of areas that need attention periodically and follow up.

Ask yourself the following questions as a self-assessment of the level of sanitation at your facility.

- Is your staff trained in sanitation procedures?
- Are there environmental conditions on your facility that cause stress in your plants?
- Are the areas where you store pots, flats, potting soil, etc., clean and free of dirt, old media, used pots, etc.?
- Do you routinely disinfect benches, floors and the greenhouse structure?
- Are there areas that retain water?
- Do you use non-porous benches and structures for holding plants?
- Do you keep records of your sanitation practices?
- Are workers going directly from old, potentially infested crops to newly planted crops?

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- Do they wash their hands or change clothing before they go from crop to crop?
- Do you have a vegetation-free zone around the outside perimeter of your production facility?
- Do you rogue diseased or infested plants and dispose of them properly?
- Do you use sterilized soil (steam or fumigate) before adding it to the pots/trays/liners etc.?
- Do you have pet plants or other crops at your facility that can serve as a refuge for pests?
- Do you employ a plant-free period in your production?
- Are you spacing your plants to allow air exchange and good pesticide coverage?

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**Figure 4.** *Inspect propagated plant material carefully before sticking and bringing them into the greenhouse.*

- Are there trash receptacles in each greenhouse or growing area and are they used and emptied daily?
- Is the greenhouse glazing material free of holes, tears, or leaks that could allow insect or disease entry?
- Do you properly clean and disinfect at the beginning of and between crop cycles?
- Do your workers wear colorful clothing that is attractive to insect pests?
- Do you regularly monitor stock plants used for propagation for pests?
- Do you fill pots, transplant, or seed in an area away from the production area?
- Do you regularly clean tools and equipment with soap and water, and sterilize them periodically?
- Do you use solid floors?
- Do you clean field equipment before it enters the nursery?
- Do you move transplant stock between or within nurseries?
- Are you familiar with the common insects pests of the crop(s) you are growing?
- Are you using insect exclusion screens? If so, do you check them regularly for needed repairs?
- Do you place crop debris (leaves, stems, etc.) into a closed or covered container or bag?



- Does the incoming plant material have existing pests or disease symptoms?
- Do you have a quarantine area that holds new or incoming plants away from production areas?
- Are algae present?
- Do you use trapping methods as a means of sanitation or keeping plants

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


**Figure 5 (top).** Carts and trailers should be cleaned and sterilized prior to entry into the greenhouse.

**Figure 6 (bottom).** The ends of irrigation hoses should never touch the ground or they will become contaminated with pathogens.

clean and free of pests?

- Are you familiar with the common diseases of the crop(s) you are growing?
- Do you have a dump pile for old, dead or diseased plants?
- Do you reuse the soil from a dump pile?
- Are your garden hose nozzles or other irrigation tubing off the floor?
- Are your tools sterilized or disinfected (cutting, digging, etc.)?
- Do you reuse your pots or hydroponic trays?
- Do the leaves of your plants remain wet for extended periods of time?
- Are the hands of workers that touch plants cleaned often?
- Does water splash when watering?
- Do you have weeds in pots, floors, walkways, roadsides or surrounding environment?
- Does the incoming plant product/liner have existing weeds?
- Do you employ weed barriers?

I know that to be told to keep something clean seems somewhat simplistic, but doesn't it make sense? I know from experience that a higher quality product can be produced from a clean and well maintained growing environment. I also know that every grower, no matter how clean they are, can always improve. Hopefully, the information herein will help you take a fresh look at your property and take you to another level of clean. 

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