

Greenhouse Sanitation Decreases Pest Problems

Here is a quick test we are sure you will pass: In the greenhouse production of floriculture and specialty crops, what do pathogens, insect pests, algae and weeds have in common?

- A) They reduce crop value and potentially make plants unmarketable
- B) They require control measures that add production expense
- C) They can be greatly mitigated by following sanitation protocols and practices
- D) All of the above

The answer, of course, is D: all of the above. Contaminants such as pathogens, weed seeds and insects can come from a variety of sources, including the incoming plant material, water, growing substrate, reused containers and the nearby surroundings. They can also hitch a ride on employees. Practices that prevent these introductions will go a long way to having a cleaner greenhouse, reduced crop losses, lower pesticide cost, and higher-quality plants.

Clean floors and benches.

Before each crop cycle, remove plant debris (including weeds), used substrate and old plants, including “pet” plants. Next, power wash with a detergent, and apply a disinfectant such as a quaternary ammonium surfactant (such as Greenshield or KleenGrow) or a hydrogen peroxide-based product (such as PERpose Plus or SaniDate), following the product label and pesticide safety protections (Figure 1). Continue to remove soil and plant debris and rogue affected plants during production.

Use clean media and new pots and trays. It’s tempting to reuse plastic pots and flats, but research has shown that they can harbor pathogens even when cleaned between uses. Unless you have high-valued containers, and have invested in professional cleaning equipment such as steam sterilization, reduce risk by recycling the plastic and starting with new containers. Use a blended substrate or substrate components from a professional horticulture supplier that can ensure the product is free of weed seeds, insect pests and pathogens.

Start with pest-free plants. When growing a diverse range of crops, it’s practically impossible to start with 100% clean material. However, the introduction of pest-free plants will be substantially less when obtained from companies with very strict sanitation protocols. Upon receipt, inspect all plants and, ideally, place them in an isolated and enclosed area for a few days and scout for diseases, insect pests, and growing disorders. If pests are identified, apply protective compounds before moving or transplanting plants in other areas of the facility. If plants exhibit unusual growth, contact the supplier and send a sample to a diagnostic lab for analysis.

Exclude pest entry **Cover all exposed soil inside greenhouses with landscape cloth or concrete.** Remove weeds immediately outside the greenhouse. Consider screening of air-intake vents in actively-cooled greenhouses.

Manage employee entry. Stock-plant facilities provide a model to avoid pests entering via employees. Workers should start in high-risk areas early in the day, and only essential staff should enter these zones. Design the entryway with an appropriate level of pest exclusion, with the ultimate being a positive-pressure double-door entry incorporating foot bath, boots, hand wash, gloves and clothing changes.

Control water-borne pathogens.

If you reuse water or source it from a reservoir, assume it contains pathogens. There are many different technology options to treat irrigation water, and the first step is usually to filter out all particulate matter such as plant debris, soil particles and algae. Sanitizing treatment technology options include chemical (such as chlorine or ozone), physical (such as UV) or biological (such as constructed wetlands or slow sand filtration) techniques. Visit the Clean Water3 website (www.cleanwater3.org) for research-based information on water treatment options.

Sanitize tools and equipment.

Many pathogens and viruses can be spread through cutting tools, such as knives, pruners, and trimming machines. Regularly sanitize blades between blocks of plants using undiluted ethyl or isopropyl alcohol. While other disinfecting products can be effective, some require a prolonged contact time (e.g., 10 minutes or more) or lose efficacy within hours as diluted solutions degrade.

Use good watering practices. Some pathogens are spread by splashing of water, while others are more problematic when the root zone is kept too moist. Generally, and except during early stages of propagation, allow the substrate to dry somewhat before watering. Unless plants are wilted, avoid watering in the late afternoon or evening so that the foliage is dry by sunset. Keep irrigation nozzles clean and off bench and floor surfaces.

In conclusion, we encourage you to take a holistic look at your growing system, and identify critical-control points where there is risk of contamination. Prevention is the key to avoiding a pandemic in your greenhouse. [gpn](#)

Reference to commercial products does not imply endorsement or bias against those not mentioned.

Erik Runkle is professor and floriculture Extension specialist in the Department of Horticulture at Michigan State University. Paul Fisher is professor and Extension specialist at the University of Florida. Erik can be reached at runkleer@msu.edu.

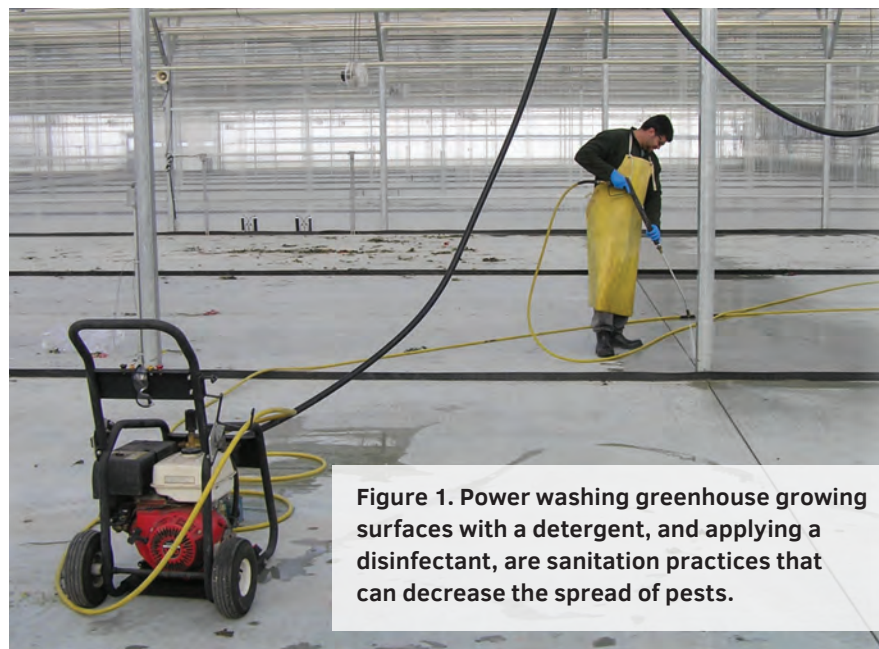


Figure 1. Power washing greenhouse growing surfaces with a detergent, and applying a disinfectant, are sanitation practices that can decrease the spread of pests.