CT IPM
Integrated Pest Management Program
Department of Plant Science and Landscape Architecture
UConn Extension

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Tips on Cleaning Empty Greenhouses Between Crops

Between crop cycles is a good time to thoroughly clean and disinfect your empty greenhouses. Greenhouses should be thoroughly emptied and cleaned at least once a year or after each crop cycle.

Cleaning earlier is better than just before opening your greenhouses for spring production. Maintaining a clean growing environment is less expensive and more effective than reacting to disease and pest issues that develop because of improper sanitation practices.

Disease causing pathogens can survive in organic matter and plant debris, in soilless media spilled on the greenhouse floor, on surfaces (bench and floors), and in irrigation lines and nozzles.

Cleaning and sanitizing greenhouses, benches, containers, and tools are important to help prevent diseases.

Remove all weeds that will harbor aphids, two-spotted spider mites, thrips, and whiteflies. Take the time to remove weeds hidden behind furnaces and along the greenhouse sidewalls. Remove any pet plants and or unsaleable plants that may harbor pests.

It is also a good time to repair any tears or holes in weed barrier mats. Do not place stone or gravel over landscape fabric. The gravel traps any spilled potting media providing an ideal environment for the growth of weeds.



Figure 1 & 2: Weeds with a gravel floor and hiding behind the furnace. Photos by L. Pundt

Pre-Cleaning
Clean up clutter. Sweep and remove all organic crop debris and plant material. Organic matter inactivates many of the disinfectants (oxidizing agents that kill fungi and bacteria). Organic matter may harbor pathogens, too. Microbes can also hide underneath the organic debris.

Sweep, scrub, or power wash organic matter off all surfaces including greenhouse sidewalls, floors, and benches. The greenhouse floor is a major source of pathogens and pests.

Sweep the floor or use a shop vacuum cleaner on concrete floors or floors covered with landscape fabric to remove all plant debris, potting media particles and algae. Follow with a high-pressure water cleaning. Rinse away detergent and debris. Repeat until surfaces are clean.

Non-porous surfaces are much easier to clean than porous surfaces such as wooden benches. Wooden benches are notoriously difficult to clean because many of the commercial sanitizers do not penetrate well into porous surfaces. Wire benches should be disinfected because they can still harbor algae and pathogens in crevices.

Remove and clean irrigation systems using a product with a low pH to help remove the fertilizer salts buildup such as KleenGrow or Sanidate 5.0. Flush to remove any pathogens. Soak breaker nozzles in disinfectants, too.

Many growers use specific greenhouse cleaners such as Strip It Pro, which is a blend of acids, surfactants and wetting agents that can be applied with a foaming attachment removing organic matter and mineral deposits without scrubbing. Apply with a foamer and allow to sit for 5 minutes before rinsing with a high–powered hose.

Using Disinfectants
After the surfaces are cleaned of organic matter, you can then use a disinfectant. Slow drying of disinfectants increases contact time helping to increase their effectiveness.
There are many different commercially available disinfectants developed specifically for greenhouse use.

Carefully read the label of the product you are interested in using. Each product has a specific range of activity on different types of surfaces and safety precautions such as personal protective equipment needed and plant safety precautions. Read all labels carefully for specific instructions.

Q Salts or Quaternary Ammonium Compounds
Q Salts or quaternary ammonium compounds include Green-Shield 11, Physan 20 and KleenGrow.

Green-Shield 11 is labeled as a general disinfectant for use on hard, non-porous surfaces. Green Shield controls fungal, bacterial, and viral plant pathogens as well as algae. Treated surfaces must remain wet for at least 10 minutes. Prepare a fresh solution daily or when visibly dirty. Green shield lasts four times longer in solution than bleach without the volatility and odor of bleach. It provides residual control if surfaces remain wet.
Physan 20 is a disinfectant for use on pre-cleaned non-porous surfaces such as floors or walls. Treated surfaces must remain wet for at least 10 minutes.

KleenGrow is more tolerant of organic matter, pH, and temperature changes, as well as hard water than Green-Shield. KleenGrow is active against fungi, vegetative bacteria, some viruses, and algae. It also has some residual activity from seven to 30 days after application.

Peroxy Acids
Peroxy acid products such as XeroTol 2.0, SaniDate 5.0, PERPose Plus and X3 are commercially available general disinfectants. Their concentrated form can cause irreversible eye damage, and they are skin irritants. Wear all PPE and follow all safety precautions as recommended on their labels. Peroxy acids are effective against fungi, vegetative bacteria, bacterial spores, viruses, and algae.

ZeroTol is a broad-spectrum bactericide and fungicide that works on contact to kill plant pathogens and their propagules, including spores. It sanitizes all greenhouse structures, benches, and walkways. This strong oxidizing agent works by surface contact. All surfaces must be wet before treatment.

SaniDate is used to disinfect and suppress algae, fungi, viruses, and bacterial growth on hard non-porous surfaces such as walkways, benches, and glazing. Remove all plant debris before use. Treated surfaces must remain wet for at least 10 minutes.

PERPose Plus (hydrogen peroxide and hydrogen dioxide) can be used on greenhouse structures, benches, and walkways. All surfaces should be thoroughly wetted and remain wet for 10 minutes.

X3 (hydrogen peroxide, peroxyacetic acid and octanoic acid) can be used on greenhouse surfaces. Allow treated area to remain wet for 10 minutes.

Organic (Organic Materials Review Institute OMRI listed) products include SaniDate, PERpose Plus and ZeroTol.

Sodium hypochlorite

Clorox (sodium hypochlorite) can be volatile and irritating to skin and eyes. Use chlorine bleach with caution, as it is highly volatile, and damaging to human health and can irritate mucus membranes and lungs. For your personal safety, it should only be used in a well-ventilated area. Chlorine bleach is also highly corrosive to metals and damaging to soft plastics.

Mix fresh solutions every two hours because its efficacy drops, as the chlorine gas is lost at the liquid surface. Exposure to sunlight also reduces its efficacy.

Sodium hypochlorite can also be phytotoxic to certain sensitive plants, especially poinsettias and begonias. Walks, benches, tools, and plant containers can be treated in nurseries.

Figure 3 & 4 Phytotoxicity damage to poinsettia and begonia from chlorine bleach. Photos by L. Pundt

The Do's and Don'ts of Using Chlorine Bleach as a Surface Disinfectant in Greenhouses, by Paul Thomas, e-Gro Alert: https://www.e-gro.org/pdf/2015_406.pdf

Cleaning and Sanitizing Commercial Greenhouse Surfaces University of Kentucky Factsheet
https://plantpathology.ca.uky.edu/files/ppfs-gh-07.pdf

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