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## Greenhouse Cleanup: tips for the transition between crops and seasons

We're growing more varieties of plants than ever, facing more pests and using more varied approaches to control them. There's one thing that can undermine all our efforts to produce and sell beautiful ornamental plants: inadequate sanitation practices. We've all seen how plant quality drops off when weeds start to grow in the greenhouse or algae gets started and colonizes on the floor in a wet corner.

The transition days as we move to a new season or start a new crop are a great time to assess greenhouse conditions and perform a few tasks that can benefit us in the coming crop cycle and months ahead.

First, as the current crop ramps down, choose your final insecticide applications to be broad spectrum to clean up any lingering adult pests, pupating juveniles or eggs that haven't hatched yet. The insecticide of your choice plus an insect growth regulator (IGR) or ovicide will ensure you aren't harboring any insect lifestages that will make an appearance next spring. You might consider a mechanical insecticide at this point in production and use Ultra-Pure Oil horticultural insecticide, miticide and fungicide or a horticultural oil of your choosing. Take advantage of the cooler temperatures and lower humidity to make oil applications that control insects, mites, and some fungal pathogens. Oils also shine up the leaves of foliage plants (but you might not want this effect on a crop like poinsettia).

Another way to control pests that are hiding in plants, media and on tables and floors is with applications that fill the greenhouse space, like with fogging or Total Release cans. Pylon<sup>®</sup> TR total release miticide/insecticide, Pageant<sup>®</sup> TR Intrinsic<sup>®</sup> total release fungicide, Beethoven<sup>®</sup> TR miticide/insecticide or the product of your choice applied through low volume (LV) fog applications can reach insects, mites, and plant pathogens that are sometimes missed with spray wands.

During this last stage of crop production before the greenhouse transitions, check your Sensor<sup>®</sup> insect monitoring and trapping cards regularly so you'll know what flying pests are present. Choose your controls to target them specifically.

Second, when your crop is finished and the house is empty or near empty, this is a good time to look at the structure itself and make any needed repairs. We'll focus here on the areas that factor into pest pressure: access points and pest refuges. Access points are openings where pests can enter, like tears in greenhouse screening, broken windows or panels, or torn plastic. Those should be repaired before the next season or crop to keep pests out, especially since rodents will be looking for cozy places to spend the winter. Pest refuges are places where pests can hide and be sheltered from harsh elements. These can include stacks of pallets or paper or containers, bins of media, or even places where algae are growing. Let's talk about algae in more detail.

Where water has been dripping or pooling, we'll often get algal growth, from a very small amount to large green carpets. It's common on plastic coverings, greenhouse floors, on walkways and under benches, and directly below valves and spigots. It doesn't take much algae to encourage fungus gnats, shoreflies, and drain flies. Some fly pests can be treated with beneficial nematodes like Millenium® beneficial nematodes (*Steinernema carpocapsae*) and Nemasys® beneficial nematodes (*S. feltiae*), and removing the algae will also help control these pests in the greenhouse. Repair of dripping valves and treatment of places where water collects will help keep the pressure low in the following seasons.

When the greenhouse is nearly empty, it's a good time to canvas for any weed germination under benches (or even in the wooden tables themselves) and remove those before they set seed, harbor powdery mildew or hide insect pests.

Finally, we come to sanitizing production areas, tools, equipment, and surfaces in the greenhouse. Quaternary ammonium products like Green-Shield® II disinfectant and others disinfect and clean inside the greenhouse to prevent the movement of insects, mites, and pathogens between plants, facilities, and seasons. They also kill slippery algae and fungus growing on walkways, making these areas safer for workers. Sanitize benches, trays, planting containers, and hand tools; then move on to larger equipment and clean conveyors and potting areas, bins and racks.

If your operation is one that slows down or transitions at this time of year, take advantage of the brief lull to clean up your greenhouses as much as you can. While you change your light bulbs and check your fire alarm batteries, reduce your pest pressure and protect your houses from overwintering critters you don't want to deal with next year. Sanitation might be one of the most important IPM activities we can do. Have a great, clean winter!



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