

How We Ensure Sanity



At a plug production facility, good sanitation is a necessary part of a successful business — both theirs and yours.

By Ryan Hall

The concept of a clean growing facility is not new; however, in recent years, basic greenhouse and nursery sanitation has become a mainstay of everyday operations. Growers have seen two economically destructive diseases that have decimated crops and growers' bottom lines.

Ralstonia solanacearum race 3 biovar 2 made its impact on greenhouse growers, destroying geranium crops throughout the United States. And greenhouse growers were not the only ones hit. In recent years, *Phytophthora ramorum*, or sudden oak death, has plagued West Coast nurseries. The list of host plants for this ecologically devastating disease keeps growing; many of these hosts are commonplace nursery varieties sold in huge quantities throughout the market.

Ralstonia gave many growers a wake-up call on the importance of keeping growing areas, mother stock and irrigation water clean of pathogens and vectors. With the help and guidelines from large-scale breeders, we at Pacific Plug & Liner, Watsonville, Calif., implemented strict sanitation protocols to help avoid and manage future disease problems. These protocols along with a history of managing diseases like tobacco mosaic virus created a good foundation when *Phytophthora ramorum* came along.

The commercial greenhouse industry has established common sanitation practices to limit disease spread. Weed-free structures, protective clothing such as gloves, regular disinfections of tools and preventative pesticide applications are now commonplace practices for disease control. With the pressure of new and more economically destructive diseases, many growers have implemented more rigorous sanitation programs, many modeled after cutting production facilities, which have very low tolerances for disease. Below are the basic sanitation protocols from Pacific Plug & Liner. Many of these guidelines are applicable to finish growers and can provide a good checklist for your own company.

Where To Use Footbaths

When planning footbaths for the facility, you have to take certain factors into consideration: Most importantly, the footbath cannot hamper the operation of the greenhouse. We decided to install the baths where critical crops are grown and at the main greenhouse entrance where all employees and visitors pass. The main entrance bath has a concave basin to allow carts to be disinfected as well. A spillover drain makes sure the bath stays at an effective level. The chemical Virkon S was selected as the disinfecting agent for the footbaths due to its efficacy against viruses and bacteria. Virkon S is also known to be more effective where there is a greater concentration of organic material that may get into the footbath.

Advice About Sanitizer

At Pacific Plug & Liner, waterless hand sanitizer is used as a general disinfectant for employees' hands and gloves any time they are working in the facility; every row in the greenhouse has a dispenser located near the



Top: Having hand sanitizer readily available helps ensure its use and prevent the spread of disease. **Bottom:** Insect screening on all vents will help keep out pests such as thrips and whiteflies and the viruses they vector. (Photos: Ryan Hall)

First Class



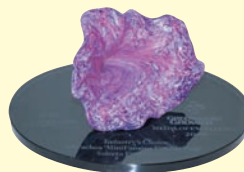
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footbath, so the sanitizer is located within easy reach no matter where an employee is in the greenhouse. Visitors are required to clean their hands prior to handling any plant material.

One thing to watch out for with hand sanitizer is some are alcohol based. After we installed the hand wash/sanitizer stations, employees started complaining of dry hands. In response, we changed to a similar brand of sanitizer that includes aloe, which eliminated the dry-hands problem.

Special Clothing Needs

Special clothing is one of those protocols that might be more important in plug production than

in finish production. Here, employees handling plant material in the production cycle are required to wear aprons and gloves at all times. The frequency of glove changing depends on the crop: Gloves are changed more often when working with more sensitive crops. But everyone, regardless of crop, changes gloves a minimum of three times a day; this is reflective of a change with every break period. Aprons are reused but disinfected at the end of each day with Virkon S.

Pacific Plug & Liner is looking at implementing a color-coded system of clothing and tools. This system will allow us to segregate clothing for certain crops and ensure clothing and tools will not be intermixed among departments and

crops. Geraniums and virus-free petunia and calibrachoa varieties will be the first crops that follow this protocol.

Controlling Insects

Other than the common insect control methods, such as spraying and sticky card capture, Pacific Plug & Liner has implemented certain insect controls to help keep insects out of the greenhouse entirely. All roll up walls are covered with insect screening to block entry of pests like thrips and whiteflies. Zero tolerance for weeds has been established, and employees are required to remove weeds in the greenhouse as they see them. Weekly treatment for algae and other nuisances



Left: For maximum efficacy, footbaths should be placed where they will be used by everyone entering the greenhouse. Right: All stock production should be on benches and not on the floor to control fungus gnats.



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helps keep fungus gnat problems to a minimum; this is especially critical during poinsettia propagation.

Currently Pacific Plug & Liner uses water treated with chlorine as well as weekly applications of hydrogen peroxide to keep algae at bay. We are constantly looking at new techniques and products that may improve efficacy and save time. Local injection into irrigation systems in problematic areas such as propagation will be an area that we focus on in the future.

Start Clean

Like most growers, we purchase 90 percent of our cuttings from overseas suppliers. Many of these suppliers have gone to great lengths to offer disease-free and certified cutting material. These disease-indexed products have performed better in production and ultimately produce a superior finished product. Geranium cuttings were one of the first crops to receive this certification. Annuals and perennials are now following the same path with positive results.

When maintaining our own stock plants, efforts are made to grow plants on raised benches and keep them free of pathogens and insects that can vector viruses. A goal of Pacific Plug & Liner is to bring in clean starter material for initiation of additional stock plants. This clean material can be certified or elite cuttings, stage three tissue culture or clean liners from a reputable supplier.

Management And Training

By far the most critical component of a successful sanitation program is training staff to understand its importance: Footbaths are not effective if staff jump over them, and hand sanitizer can only prevent pathogen spread if it is used.

At Pacific Plug & Liner, the training process has been in place for three years. This training has come in the form of education and policing. More and more each day the staff comes to understand and realize the importance of the program. When this occurs, the tools one has implemented start to work for themselves.


Training is a never-ending job. As staff comes and goes, you must make sure the new employees understand the rules. Management must also understand and follow protocols: Without support from the top, you cannot expect staff to follow suit.

Summary

Both finish growers and propagators can see a great benefit from ensuring better sanitation. For some,

this may be purely aesthetic: Growers with a clean range are looked at more positively by the industry, which includes visitors that may become future business partners. Employees benefit from a cleaner work environment. And, of course, there are the operational benefits: A cleaner environment reduces

the number and size of large-scale outbreaks and typical problems associated with unclean practices.

Many cutting suppliers strive to give their customers a clean start. You can benefit greatly from this if you implement a strategy to keep that plant clean all the way through to the end customer. 

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