

GROWERTALKS

Columns

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Growing With Griffin: 8 Steps to Better Sanitation

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Implementing basic sanitation practices can mean the difference between a small, contained disease problem and a recurring disease problem with tentacles reaching across crops and production batches. While we all understand the importance of basic sanitation, it's easy to be lulled into complacency by a history of good luck. If you've been lucky, take note: It's only a matter of time before you're stung by a persistent pathogen.



Crop culture and sanitation go hand-in-hand. Many cultural practices can be employed to decrease the likelihood of disease incidence, such as avoiding saturated media, ensuring that foliage is dry going into night, using preventative fungicide applications, using horizontal air flow (HAF) fans, growing at proper pH and fertility levels, and properly managing temperature. However, all of these practices fall under actual growing, not sanitation. Sanitation activities either directly eradicate pathogens or prevent the spread of disease and disease vectors. Let's turn our attention to best practices that are specific to sanitation.

Perform end-of-season cleanup

It may seem strange to begin a sanitation discussion at the end of a crop, but this is a critical time to act to prevent carry-over of pathogens. Some of the most common lingering pathogens include fungi with persistent spores (e.g., *Thielaviopsis*) and water molds (e.g., *Pythium* and *Phytophthora*). While bacteria can spread rapidly in a crop, bacterial infections are less likely to persist between crops. Most viruses are short-lived outside a host, though TMV is known to be persistent.

All production areas should be thoroughly cleaned before placing a new crop. Start by removing all plant debris, accumulated media and weeds. Consider power washing floors and benching to ensure this job is done well; power washing expanded metal benching can be especially helpful.

Next, treat with a chemical cleaner, such as Strip-It. Spray or foam hard surfaces (benching, ground cloths, concrete walkways, sidewalls, etc.), keeping surfaces wet for three to five minutes prior to rinsing with clear water. (Avoid contact with crops and wear appropriate protective gear when using Strip-It.)

After rinsing, sanitize with GreenShield, KleenGrow, SaniDate 5.0 or ZeroTol 2.0. While inexpensive, bleach is a less desirable sanitizing agent because it's caustic, produces irritating fumes and quickly breaks down when in a diluted form. If a persistent virus was known in production, an additional treatment to destroy virus particles may be warranted (e.g., 20% non-fat dry milk solution or Virkon S). Contact your supplier for details and other options for clean-up following virus infection.

Think twice about reusing pots and trays

Ideally, all production will use new pots and trays to avoid the spread of disease. If pots and trays are to be reused, a few precautions should be taken. Pots associated with persistent viral or bacterial disease outbreaks should be discarded. Also, discard pots associated with outbreaks of Thielaviopsis. If planting crops sensitive to Thielaviopsis (e.g., pansies, vinca, petunia or calibrachoa), plant into new pots. If trays and pots are to be reused, subject them to the same four-step process used for end-of-season clean up: Remove all debris from the containers, soak in Strip-It, rinse in clear water and dip in a sanitizer (KleenGrow, SaniDate 5.0 or ZeroTol 2.0). Allow a slow dry after sanitizing, as most products require 10 minutes of wet contact for good efficacy.

Eliminate standing water

Two of our most problematic pathogens, Pythium and Phytophthora, have a swimming zoospore stage that can move between pots sharing contact with standing water. For this reason, avoid low areas when placing pots on ground cloth or gravel. Best practices call for elevating pots and flats on benching, crates, pallets or even PVC pipes in all production spaces, but especially in low areas where standing water can occur. Anything that keeps the containers off the ground will serve as a barrier to the spread of the swimming zoospores. Flag areas with drainage issues and correct the problem.

Treat recirculating water systems and irrigation lines

Zoospores and the very persistent oospores of Pythium and Phytophthora survive quite well in recirculating water systems. Various sanitation measures can be employed to effectively kill these spores. UV and ozone treatment will eliminate a very high percentage of spores and other pathogens. KleenGrow, SaniDate 12.0 or ZeroTol 2.0 may also be used on a pulse or continuous basis to kill disease-causing organisms.

Biofilm is the result of bacterial growth and occurs in all irrigation systems. Biofilm may be thin or thick. Advanced biofilms may be confused with calcium or iron deposits. Biofilms harbor microbes, including pathogens, and feed algae. All irrigation systems should be cleaned at least once a year to eliminate accumulating biofilm. Do so by treating overnight with Strip-It at the end of a crop cycle (plants must not be present).

Control insect pests

Several common insect pests are known to spread disease. Fungus gnat larvae and adults, along with shorefly adults, spread Pythium and Thielaviopsis spores. Control these pests and you eliminate the vector

for disease spread. Contact your supplier for effective control options, including traditional chemistries, soft options and BCAs.

Address the human factor

Greenhouse workers are critical to growing operations, but they can also spread disease. Fortunately, this risk can be greatly reduced. Start by having your staff wear disposable gloves and change them regularly. The frequency of glove change should depend on the type of activity being performed. Sticking and transplanting lines are efficient vehicles for spreading disease. These workers should change their gloves more often than other workers. Consider your risk tolerance to disease spread and train to match. On the conservative side, change gloves with each variety or batch. At a minimum, gloves should be changed at break time.

Workers performing tasks with a high risk of spreading disease should also wear aprons that are changed at break times or between tasks. For example, anyone involved in dumping diseased plants should change gloves and aprons prior to moving to another production area or starting a new task. Ideally, all high-risk activities will be performed late in the day with no return to the regular production space until the next day. The same approach can be made with respect to sticking and transplant lines: Work with high-risk varieties late in the day; this way, if a disease is present, its spread will be limited to a smaller number of plants.

Do not allow workers to use tobacco products in a greenhouse, including both cigarettes and snuff, because TMV can survive the tobacco curing process.

Isolate new material and scout crops

Isolating incoming crops facilitates discovery of disease problems prior to handling and inadvertent spread. It's also important to scout all crops in production for signs of disease. For diagnosed viral diseases and some bacterial diseases, it's best to dump infected plants. Some bacterial diseases and many fungal diseases can be treated quite effectively. One exception is Thielaviopsis, which is nearly impossible to cure; dump infected plants immediately.

Strengthen education and training

Define your plan, share it with your staff and provide training. Demonstrate your dedication by rewarding adoption, which will also help build new routines. Recent research indicates that it takes an average of two months to develop a new habit. This means that you need to continue to reinforce and reward desired behavior for at least two months. Follow up with spot checks and positive rewards to make sure the habits stick.

While sanitation may seem like an effort not worth the time or money, growers only need to talk to someone who has been stung by a recurring or rapidly spreading problem to understand that the impacts on production costs (added control measures and labor) and lost sales are far more costly than buying more gloves, aprons and effective sanitation products. Protect your crop and your profits by developing a plan and implementing it this year.

Use all products according to label directions and applicable law. Products other than those mentioned may be safe, legal and effective. **GT**

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