

Technical Services
TRAINING GUIDE



Disease Management:
**Be Proactive,
Not Reactive**

AN ARTICLE BY:

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Your Expert

Pierre-Marc de Champlain graduated from the University of Sherbrooke with a Bachelor's Degree in Biotechnological Engineering, developing an integrated knowledge of biological sciences. Thanks to the university's revolutionary practices in cooperative training and problem-based learning, Mr. de Champlain is attuned to the fast-paced evolutions in the industry and how suppliers are applying them in the field.

Prior to working at Berger, Mr. de Champlain worked at Lang 2000, working to improve practices in the treatment of polluted water. Before Lang 2000, he worked in the Université de Sherbrooke's Biology Department, performing soil ecology research. He began his career as a research assistant at Agriculture and Agri-Food Canada's Food Research and Development Center, performing work to help preserve food quality and ensure safe food processing.

Mr. de Champlain considers Berger's horticultural niche extremely captivating; its direct impact in the field enables him to use his extensive background in research to the benefit of growers worldwide.



Disease Management: Be Proactive, Not Reactive

Before a grower can troubleshoot a crop problem, the grower must know that there is a problem with the crop. Being familiar with the normal growth of a crop is a "must" in knowing when there might be a disease or an environmental factor affecting the crop. New plant introductions are launched annually and some can grow and finish differently from what the grower is accustomed to pertaining to previous releases of the same species or plant group. If problems are suspected when growing a new crop, don't wait to ask questions or allow the problem to go unchecked. Utilizing horticultural and company internet resources and/or consulting with a technical advisor that supports the crop line should be done immediately. If available, obtain a picture of the plant showing normal growth and review crop cultural data information to ensure that proper growth parameters are being met, and then compare to what is being observed.





Step N° 1

Diagnosing the Problem

Once it is determined that the crop has a problem, diagnosing the problem is the next step. First, consider environmental factors, recent crop treatments, crop disease susceptibilities and the time of year the problem is observed. Environmental factors are often overlooked when beginning the diagnostic process. Climate-related conditions that could have affected the crop (cold, heat, drought, wind, rain) or crop treatments (pesticide application, fertilization, irrigation, PGR applications) should be investigated. Inspect heater units to ensure that the heat exchangers are intact (not cracked or rusted out), and that the units are properly ventilated to the outside with no leaks. Petroleum-powered equipment used inside the greenhouse or outside near intake vents can introduce ethylene and other gases phytotoxic to crops, causing flower-drop, reduced plant vigor and defoliation.



Step N° 2

Monitoring Data

Climate effects including unseasonably cold temperatures, extended precipitation events and other weather anomalies that occur during crop production must be carefully monitored, with cultural practices being adjusted accordingly. For example, in extended periods of dark, low-light days, plant growth and transpiration will slow down or cease, because there isn't sufficient light available to grow the plant. In these situations, substrates will remain wet for longer periods and may require the application of preventative fungicides to inhibit or control opportunistic root pathogens. Irrigation and fertilizer schedules must be adjusted to avoid fertilizer salt buildup if substrates aren't drying down. Ensuring good air movement (e.g. HAF fans) throughout the greenhouse will keep the air mixed while maintaining even temperatures and lower humidity levels during dark-weather days.



Step N° 3

Identifying Symptoms

If the problem is found to be environmental, correct the problem and continue to grow the crop, if salvageable. If environmental factors are ruled out, make a list of common diseases for the affected crop, take photos of the affected plants, and then research the symptoms and/or contact a diagnostic lab to submit tissue samples (roots, foliage, stems) for analysis. Many diseases cause a variety of symptoms, so the only way to know is to have the pathogen cultured for identification. If multiple pathogens are identified, the appropriate control strategies can be applied without causing further plant decline and costs from using the wrong control strategy, or not treating with the correct chemical control.



Step N° 4

Knowing the Diseases Category

Greenhouse crop disease symptoms fall into three categories: root, stem and leaf. Plants with root diseases will usually exhibit yellowing of lower leaves or leaf drop, display uneven growth across the crop (e.g. stunted plants inter-mixed with normal plants on the same bench) and have sparse brown-to-black, or even disintegrating roots present. Plants with stem diseases can also exhibit lower leaf yellowing, but also soft stems which causes the plants to fall over or collapse. Cankers and sunken areas near the stem base are also indications of a stem disease. Leaf disease symptoms can include distorted leaves, leaf drop, leaf spots, stunted plants and overall plant mottling. Knowing the category will narrow down the diagnosis and help identify the disease affecting the crop.





Step N° 5 Planning Ahead

Reduce the chance for plant diseases by planning ahead prior to purchasing and installing the crop. Prior to planting, clean and disinfect benches, remove fallen plant debris** (e.g. foliage, spent flowers, etc.), and ensure that the area is “weed-free” (e.g. dirt/gravel floors) before bringing new plant material into the area. Do not allow “pet” plants into the greenhouse and remove remaining unsold plants after the crops are shipped to prevent disease and insect problems from occurring. Spores and mycelia that remain on unsold plants can be splashed by irrigation or spread by workers maintaining the crop. Weeds harbor pathogens and attract insects, some of which are vectors for transmitting the pathogen from weed to crop. Ensure that the grow area and greenhouse perimeter are kept “weed-free” throughout the year. When you receive new cuttings or plugs, make sure you inspect them properly before you bring them into the greenhouse.



Step N° 6 Choosing a High-Quality Substrate

The growing medium used for planting and growing the crop must also be considered. Substrates must provide an optimum root environment and support, otherwise, root development and crop performance will be compromised, thus increasing the opportunity for diseases and other cultural issues. Choosing a consistent, high-quality substrate that matches crop requirements and grower cultural practices can be challenging. Unfortunately, substrates are usually purchased based on price. Many times, lower-cost potting mixes aren't consistent from crop to crop since the raw materials used vary in grade and consistency from load to load. Peat, perlite, bark or other aggregates that are too fine in texture are often used to cut costs, which contributes to low airspace and excessive moisture retention. Improperly aged or processed organic components can alter the substrate physical properties during crop production, requiring irrigation, fertilization and pH adjustments.



Step N° 7 Conditioning Growing Media

It is important to properly condition the growing media before potting. This includes adjusting the water content and fluffing the material adequately for compressed formats before filling containers or trays to optimize physical characteristics. If the media is too dry, multiple irrigations required to completely wet the soil matrix after planting can cause media compaction, leading to reduced air-space which compromises the root environment. Root stress, coupled with saturated media, increases the incidence of root diseases such as Phytophthora and Pythium. Choosing consistent high-quality growing media from a reputable company backed by excellent customer and technical support will significantly reduce the likelihood of root disease issues. With it's ISO certification, Berger always offers consistent, high-quality substrates backed by comprehensive technical support to aid the grower in successful crop production and post-production performance.

Here are a few takeaways for a successful disease management program:

1. Proper Sanitation Practices

- Start clean and stay clean (pots & trays, transplants/seed, media, water, benches, floors, **plant debris)

2. Proper Cultural Practices

- Water management
- Monitoring & manipulating environment (temperature, relative humidity)
- Monitoring EC and pH

3. Work Flow

- Work in the newly planted areas first (Propagation > Finished)

4. Growing Media

(consistency, quality component blends, reputable supplier/technical support)

5. Know Your Crops

- Environmental conditions conducive to disease development
- Disease symptoms Vs Nutritional symptoms

6. Frequent Scouting is Important

7. Plant Protection Products

- Proper disease identification
- Proper timing & interval



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Every year brings news of a newly-reported plant disease, or an established plant disease that has resurfaced and is affecting crops previously unaffected. By following the recommendations in this article, impacts from plant diseases can be much reduced, which also decreases shrink and increases profit. Berger Technical Services Advisors are here to provide recommendations and resources for growers that experience crop difficulties. Remember, be proactive, not reactive.

Pierre-Marc de Champlain



To get more information on solutions tailored to your day-to-day challenges, contact your Berger specialist today!

