

Dieffenbachia Diseases: Identification and Control in Commercial Greenhouse Operations¹

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Introduction

This article provides guidelines to identify and treat diseases that may be encountered during the commercial production of *Dieffenbachia*. There are two bacterial diseases and four fungal diseases that growers most often report in their greenhouse environments.

Dieffenbachia

Commonly known as dumb cane, leopard lily, or yalu ni vavalagi, *Dieffenbachia* is a popular choice for interiorscape plantings, especially in malls and airport installations where its large, striking, variegated foliage is a feature. Therefore, *Dieffenbachia* is among the top 10 most popular plants produced by commercial foliage growers in Florida. There are more than 30 species and 100 cultivars. *Dieffenbachia* is in the Araceae (Aroid) family and is native to the Caribbean, Central America, and South America.



Figure 1. *Dieffenbachia* in commercial production.

In commercial greenhouse production, *Dieffenbachia* can be propagated by tip cuttings or by division of established clumps from stock plants grown in the ground. Bacterial and fungal diseases can often be rampant under these conditions. Disease-causing organisms (systemic pathogens) can be harbored within stock plant leaf and stem tissues and spread by direct contact with knives and clippers.

During the 1980s, tissue culture propagation technology was introduced to many foliage crops. Disease control, especially prevention of Dasheen mosaic virus, was an early emphasis for tissue culture researchers and pathologists (Henny et al.1981).

Dieffenbachia maculata cv. Perfection 137B was one of the first foliage plants developed by the University of Florida Mid-Florida Research and Education Center in Apopka and released for commercial growers. This *Dieffenbachia* variety was indexed against Dasheen mosaic virus (Knauss 1976). Because modern facilities now routinely use tissue-cultured, indexed *Dieffenbachia* as stock, viral diseases are rarely found in commercial production.

Once tissue culture techniques could provide clean stock plants in large numbers, breeding techniques were developed to take advantage of the diversity of foliar variegation, size, and growth habit within the *Dieffenbachia* genus. In a 10-year period in the 1980s and 1990s, more than 20 new varieties appeared on the market (Henny and Chen 2008). Today, *Dieffenbachia* breeding focuses on developing disease-resistant varieties to reduce growers' chemical costs.

Bacterial Diseases of *Dieffenbachia*

Erwinia Blight, Erwinia Soft Rot



Figure 2. *Erwinia* soft rot on *Dieffenbachia*.

Symptoms: Lower leaves of *Dieffenbachia* turn yellow and spots appear. Rotten spots feel mushy, soft, or watery. Infected areas have a rotten, fishy smell. The spots may enlarge rapidly and the centers of the spots may fall out, leaving holes.

Causal agents: *Erwinia carotovora* pv. *carotovora* and *Erwinia chrysanthemi*

Factors favoring the disease: *Erwinia* rot is especially acute during warm summer months when there is high relative humidity within greenhouse production facilities. This disease may also increase in severity during winter months when production facilities limit external air exchange, again raising the humidity.

Control and treatment: There are no chemical treatments that can rid infected plants of *Erwinia* once they have the disease, although compounds containing copper (CuPro, Phytan 27[®], Camelot) and mancozeb (Protect T/O[™], Dithane[®]) can help slow the spread of this pathogen. Control of *Erwinia* is based almost exclusively on sanitation and cultural recommendations: Remove and discard infected plants and leaves showing symptoms at once. Use surface disinfectants such as bleach on clippers and tools. Scrub benches with disinfectant between plantings. *Erwinia* can grow and persist within soil; therefore, no nonsterile native soil should be added to the planting media. Lower the greenhouse humidity. Increasing ventilation and spreading plant spacing can lower humidity and help decrease the spread and severity of infestations. Lower the frequency and amount of water. If economically possible, replacing overhead watering

with drip irrigation on individual pots would further help by eliminating leaf surface moisture and lowering humidity (Norman and Henny 1996).

Xanthomonas Leaf Spot



Figure 3. *Xanthomonas* leaf spot on *Dieffenbachia*.

Symptoms: Leaf spots are very dark, almost black, in color and are surrounded by a yellow halo. Spots start along the leaf edge and enlarge rapidly. If they reach large leaf veins, the leaf will collapse

Causal agent: *Xanthomonas axonopodis* pv. *dieffenbachiae*

Factors favoring the disease: *Xanthomonas* can infest most plants in the Aroid family, including *Dieffenbachia*, *Aglaonema*, *Anthurium*, and *Syngonium*. Be aware of cross contamination between these crops. Fertilizer studies have shown that poor nutrition favors the disease (Chase 1992). Propagate from clean stock or use tissue-cultured liners. Eliminate all plants showing symptoms. Avoid overhead irrigation, exposure to rainfall, or splashing water.

Control and treatment: The primary mechanisms of a *Xanthomonas* bacterial infection are via splashing water, contaminated tools, soil, and insects. Worker contact and/ or unsanitary plant handling should also be monitored. Bactericides containing copper compounds (CuPro, Phytan 27[®], Camelot), mancozeb (Protect T/O[™], Dithane[®]), and *Bacillus subtilis* (Cease[®], Companion[®]) can be used successfully to control this disease if used on a regular preventative basis.

Fungal Diseases of *Dieffenbachia*

Fusarium Stem Rot



Figure 4. Fusarium stem rot on *Dieffenbachia*.

Symptoms: Stem turns mushy at the base. The affected area has a reddish or purple discoloration. Tiny bright red fruiting bodies may appear on the bases of severely infected plants. Infected leaves show papery spots with light and dark rings, like a bulls-eye.

Causal agents: *Fusarium solani* or *Fusarium oxysporum*

Because Fusarium stem rot symptoms (fungus) look very similar to Erwinia soft rot symptoms (bacteria), accurate identification prior to selection and application of chemicals is key.

Factors favoring the disease: *Fusarium* usually enters a greenhouse operation and becomes a problem via infected propagation material or contaminated soil. Workers, equipment, and clippers can contribute to secondary spread.

Control and treatment: Use indexed starting materials from tissue culture or stock plants known to be free of disease. Treat cuttings with a fungicidal dip prior to sticking. After sticking, drench cuttings with a fungicide (OHP 6672™, Cleary's 3336®). Remove infected plants as soon as the disease is detected. Do not reuse the soil or the container.

Anthracnose Leaf Spot



Figure 5. Anthracnose leaf spot on *Dieffenbachia*.

Symptoms: Tan, water-soaked spots appear with a yellow halo along the leaf edge. Look for black specks in concentric rings within the spot. These are the spores that spread the disease. The *Colletotrichum* fungus is a weak opportunistic pathogen frequently observed after fertilizer or pesticide damage.

Causal agent: *Colletotrichum gloeosporioides*

Factors favoring the disease: Condensation dripping from the glass or plastic roof overhead will splash the spores and spread the disease. The disease favors cool temperatures.

Control and treatment: Keep foliage dry. Irrigate early enough in the day for *Dieffenbachia* foliage to dry quickly. Do not let water sit on the leaves overnight since the disease favors cool temperatures. Maintain greenhouse heat and ventilation systems.

Fungicides containing mancozeb (Protect T/O™, Dithane®) can control Anthracnose leaf spot.

Myrothecium Leaf Spot and Petiole Rot



Figure 6. Myrothecium leaf spot and petiole rot on *Dieffenbachia*.

Symptoms: Petiole rot on older leaves. Leaf spots appear anywhere leaves are wounded, especially at the leaf tips and along breaks in the main vein. On the underside of the leaf, black and white fungal fruiting bodies and spores are almost always present in a circular pattern.

Causal agent: *Myrothecium roridum*

Factors favoring the disease: Newly planted tissue-cultured plants are very susceptible to this disease.

Control and treatment: Monitor worker handling to avoid breaking plant tissues. The fungus gains access through wounds. Keep the foliage as dry as possible. Water early in the day and provide good air circulation. Strobilurin fungicides (Heritage®, Compass™, Insignia®, Disarm®, FenStop™) and fludioxonil (Medallion®) provide the best control of this disease.

Phytophthora Stem and Root Rot and Leaf Spot



Figure 7. Phytophthora root rot on *Dieffenbachia*.

Symptoms: Infected roots turn brown and deteriorate rapidly.

Causal agents: *Phytophthora* spp.

Factors favoring the disease: This disease occurs if plants are placed on the ground or grown in the ground.

Control and treatment: Grow plants on raised benches. Do not place plants on the ground soil at any time. Fosetyl-al (Aliette®), metalaxyl (Subdue® MAXX®), dimethomorph (Stature®), fluopicolide (Adorn™), and phosphorous acid (Alude™, K-Phite®, Vital®) provide very good control.

Note: The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication do not signify our approval to the exclusion of other products of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.

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