

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.



Figure 1. *Dieffenbachia* in commercial production.

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.

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

1. This document is PP286, one of a series of the Plant Pathology Department, UF/IFAS Extension. Original publication date October 2011. Reviewed October 2017. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

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2008). Today, *Dieffenbachia* breeding focuses on developing disease-resistant varieties to reduce growers' chemical costs.

Bacterial Diseases of *Dieffenbachia*

Erwinia Blight, *Erwinia* Soft Rot

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.



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

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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, Phyton 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

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



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

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Xanthomonas axonopodis pv. *dieffenbachiae*

FACTORS FAVORING THE DISEASE

Xanthomonas can infest most plants in the Aroid family, including *Dieffenbachia*, *Aglaonema*, *Anthurium*, and *Synгонium*. 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, Phyton 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

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.



Figure 4. Fusarium stem rot on *Dieffenbachia*.

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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

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.



Figure 5. Anthracnose leaf spot on *Dieffenbachia*.

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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

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.

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Myrothecium roridum



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

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

SYMPTOMS

Infected roots turn brown and deteriorate rapidly.



Figure 7. Phytophthora root rot on *Dieffenbachia*.

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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.

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