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Coleus Disease Disorder Guide

This e-GRO Alert provides a photographic guide to coleus disease disorders.

Coleus are popular bedding plants because of their foliage which are available in a wide assortment of colors and leaf shapes. Successful production of coleus requires knowledge of the disorders that can affect plant growth. This e-GRO Alert focuses on coleus disease identification.

A review of grower production guides lists the following diseases that have been reported on coleus: *Botrytis*, *Pythium* root rot, Downy mildew, and impatiens necrotic spot virus (INSV). Powdery mildew is also listed in one grower guide, but after checking the USDA fungal disease database (Farr and Rossman, 2022), we found no reports of powdery mildew on coleus in North America or Europe. It is therefore assumed the grower guide was referring to the more widely occurring problem of Downy mildew. A complete listing of confirmed coleus fungal diseases can be found in Farr and Rossman (2022).



Figure 1. With *Botrytis*, small water-soaked spot on the leaves can expand over time and extend into the stem tissue, which results in stem collapse. (Photo: Brian Whipker)

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COVID-19 protocols caused uncertainty about our ability to conduct research. This research project provided an opportunity to enjoy exploring coleus production as a joint University of Kentucky and North Carolina State University endeavor.

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A great reference chapter discussing coleus diseases was published by Harlan and Hausbeck (2016). They included *Botrytis* blight, Downy mildew, *Pythium* root rot, *Rhizoctonia* root and crown rot, and a number of viral and viroid diseases. Each disease is described with geographical occurrence, symptoms/signs, biology and epidemiology, and management. This chapter and the entire book is a great reference.

In addition, e-GRO authors have observed both sclerotinia (white mold; e-GRO Alert 10-22;

<http://www.e-gro.org/pdf/2021-10-22.pdf>) and foliar nematodes (e-GRO Alert 3-20; <http://www.e-gro.org/pdf/320.pdf> and e-GRO Alert 7-11; http://www.e-gro.org/pdf/2018_711.pdf) on coleus.

A number of diseases affecting plants mimic damage caused by other biotic and abiotic factors. Disease diagnosis can be tricky; therefore, submitting a sample to a diagnostic lab will help determine the problem you are encountering.

Botrytis Blight

Botrytis blight (*Botrytis cinerea*) or gray mold frequently occurs during propagation when relative humidity are high, frequent misting is occurring, and the cuttings might have open wounds. Initial signs of *Botrytis* are small water-soaked spot on the leaves. These spots can expand over time and extend into the stem tissue (Fig. 1). Over time, gray fuzzy spores develop. This sporulation is the typical sign growers use for disease identification (Fig. 2).

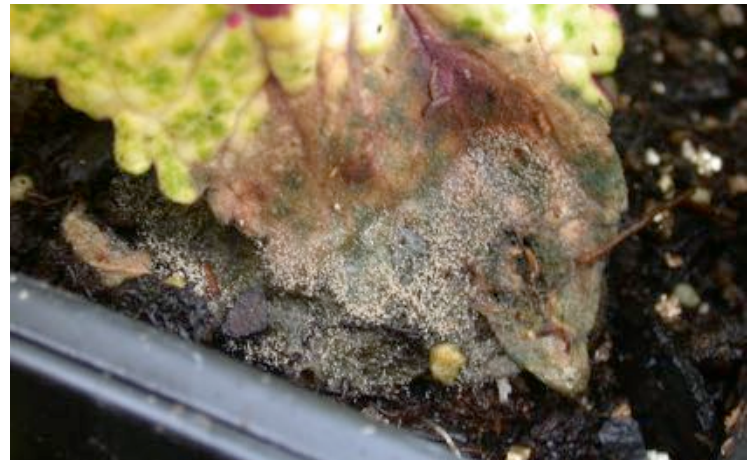


Figure 2. Over time *Botrytis* will produce gray fuzzy spores on necrotic (dead) tissue which is typically used by growers to identify the disease. (Photo: Brian Whipker)



Figure 3. With Downy mildew, sporangia typically form on the leaf underside as a fuzzy gray growth, while the top of the leaf may not exhibit any damage. (Photo: Brian Whipker)



Figure 4. Over time necrotic leaf lesions will form and lower leaf drop will occur with Downy mildew on coleus. (Photo: Brian Whipker)

Downy Mildew

Prior to 2000, Downy mildew (*Peronospora* sp.) was not a major concern to North American coleus growers. After that time, widespread infestations became so severe that some growers wondered whether or not coleus would continue to be grown. Disease outbreaks have been less severe over the last 10 years and coleus are once again part of a grower's spring crop production plan. Growing less susceptible cultivars and applying preventative fungicide sprays have aided in controlling the outbreaks of this disease. Harlan and Hausbeck (2016) recommend growing coleus with low relative humidity <85% and temperatures >75 °F to limit outbreaks. Additional Downy mildew details are provided by Harlan and Hausbeck (2016), and by Dr. Nora Catlin in e-GRO Alerts 2-15 and 5-14.

Initial infestations of Downy mildew can be difficult to detect. Sporangia typically form on the leaf underside as a fuzzy gray growth, while the top of the leaf may not exhibit any damage (Fig. 3). This requires continual scouting for the disease to detect early infestations. Over time the top of the leaf may develop necrotic spotting, leaf twisting, and lower leaf drop can occur (Fig. 4).

Virus: INSV / TSWV

There are a number of viral and viroid disease that infect coleus. Signs of a viral and viroid disease can mimic one another, and requires obtaining a lab diagnosis to determine the exact problem. The two most common viral diseases with coleus are Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV). INSV is covered in greater detail in e-GRO Alerts 3-37, 6-20, and 7-11. Mottled leaves, ringspots, and necrotic tissue are all signs of a virus or viral disease (Fig. 5).



Figure 5. Variation in ringspot patterns as seen on coleus caused by Impatiens Necrotic Spot Virus (INSV). [Photos: (top - W. Garrett Owen), (middle and bottom - Brian Whipker)]

Foliar Nematodes

Angular leafspots are the primary sign of a foliar nematode infestation (Fig. 6). Additional details about foliar nematodes on coleus are discussed in e-GRO Alert 3-20.

Pseudomonas Leaf Spot

Another angular leaf spot associated with coleus is *Pseudomonas* leaf spot (Fig. 7). It is a bacterial infestation that can mimic a foliar nematode problem. Lab diagnosis is required to confirm the problem.

Pythium Root Rot

Plant wilting is a typical sign of *Pythium* root rot (Fig. 8). *Pythium* is usually observed on a single or scattered plants and this pattern is useful in diagnosing this biotic problem. Upon further inspection, the root system can be discolored (Fig. 9). Submitting a sample to a clinic will confirm your in-house diagnosis.



Figure 6. Dark, angular leaf spots are typical signs of a foliar nematode infestation. (Photo: Brian Whipker)



Figure 7. Small, dark, angular leaf spots are signs of *Pseudomonas* leaf spot. (Photo: Brian Whipker)



Figure 8. Plant collapse is a typical sign of a *Pythium* root rot problem. (Photo: Brian Whipker)



Figure 9. Root discoloration (left) occurs with *Pythium* root rot, in comparison with a healthy root system on the right. (Photo: W. Garret Owen)

***Rhizoctonia* Root and Crown Rot**

Plant collapse and an infestation pattern expanding out in a circular pattern can occur with a *Rhizoctonia* root and crown rot infestations. For example, in a plug flat (Fig. 10), plant collapse occurred and the disease infected adjacent plants over time. Hair-like fungal strands called hyphae may be observed along the substrate surface (Fig. 11) but often seen in the space between the substrate and plant stem. The hyphae tend to branch at right angles which is another characteristic, but most growers should submit a sample to a diagnostic lab for proper identification.



Figure 10. Plant collapse development expanding out from a central point can occur with a *Rhizoctonia* root and crown rot. (Photo: Brian Whipker)



Figure 11. Mycelia growth (hypha mass) may be observed along the base of a plant infected with *Rhizoctonia* root and crown rot. (Photo: Brian Whipker)

Sclerotinia

The typical white cottony-like mycelia give rise to the name white mold associated with a *Sclerotinia* infestation (Fig. 12). Over time the plant will collapse (Fig. 13), and the mycelia clumps will form small, irregular-shaped, hard, black sclerotia (Fig. 14). Additional details about *Sclerotinia* on coleus can be found in e-GRO Alert 10-22 and an overview about *Sclerotinia* in greenhouse crops can be found in e-GRO Alert 9-18.



Figure 12. Mycelia growth associated with *Sclerotinia* of coleus. (Photo: W. Garrett Owen)

References:

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Figure 13. Plant collapse will occur as the disease progresses. (Photo: Brian Whipker)



Figure 14. Sclerotia are small (~0.5 cm), irregular-shaped hard, black structures that form over time out of the white mycelia clumps. (Photo: W. Garrett Owen)

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