

## Chapter 4 /Fungal Diseases of Plants

**Fungal diseases of plants** are caused by pathogenic fungi that infect plants, leading to physiological and structural damage. These diseases are among the most common and destructive plant disorders, affecting crop yields, quality, and economic value globally.

### Key Characteristics:

#### 1. Prevalence:

- Fungal diseases account for **70–80% of all plant diseases**, making them the leading cause of crop losses worldwide.
- Examples include **rusts, blights, mildews, and rots**, affecting fruits, vegetables, grains, and ornamental plants.

#### 2. Geographic Distribution:

- Some fungi thrive in **tropical climates** (e.g., **anthracnose, leaf spot diseases**).
- Others are dominant in **temperate regions** (e.g., **powdery mildew, black rot**).
- A few fungi remain dormant in **cold climates** but cause severe outbreaks in warmer regions.

#### 3. Transmission & Survival:

- Fungi spread via **spores** carried by **wind, water, insects, or soil**.
- Many survive winter in **plant debris, seeds, or soil**, re-emerging in spring.
- Some fungi require **two different host plants** to complete their life cycle (e.g., **wheat rust**).

#### 4. Symptoms & Damage:

- **Visible signs** include **spots, mold, wilting, stunted growth, and tissue decay**.
- Some fungi produce **toxins (mycotoxins)** that harm humans and animals consuming infected crops.
- Severe infections can **kill entire plants** or reduce yields by **20–50%**.

#### 5. Control & Management:

- **Chemical fungicides** (e.g., **azole-based inhibitors**) are widely used but face resistance issues.
- **Biological control** (e.g., *Trichoderma* spp., *Bacillus subtilis*) offers eco-friendly alternatives.
- **Cultural practices** like **crop rotation, pruning, and sanitation** reduce fungal spread.
- **Resistant plant varieties** are bred to withstand fungal attacks.

### Examples of Major Fungal Diseases:

- **Powdery Mildew:** White fungal growth on leaves (e.g., grapes, roses).
- **Late Blight:** Caused by *Phytophthora infestans*, devastating potatoes (e.g., Irish Potato Famine).
- **Rust Diseases:** Orange/brown pustules on leaves (e.g., wheat, coffee rust).
- **Fusarium Wilt:** Yellowing and wilting of stems (e.g., bananas, tomatoes).
- **Botrytis Blight (Gray Mold):** Soft rot on fruits and flowers (e.g., strawberries, grapes).

### How to Identify and Control Common Plant Fungal Diseases

BY Jolene Hansen

<https://www.gardentech.com/blog/pest-id-and-prevention/keep-your-garden-free-from-fungal-disease>



Whether you're nurturing your first tomato plants or consider yourself a garden pro, plant disease can hit unexpectedly. The most common garden offender is fungal disease. Michigan State University Extension confirms that fungal pathogens are behind 85 percent of all plant diseases.<sup>1</sup>

Fungal pathogens wait in soil, sneak up on new plants, and even bide their time on pruning shears before seizing opportunities to strike. Once active, fungal diseases exploit plant weaknesses, leaving plants prone to more disease and insect pests. Protecting your garden with savvy cultural practices and effective fungal treatment helps keep the beauty and the bounty flowing.

### **Understand the Opposition**

For a look at the different ways fungal pathogens operate, consider these common fungal diseases:

**Black spot:** Dark spots on the upper sides of leaves reveal black spot in action. Never on leaf undersides, the spots expand until the leaf is yellow and dotted with black. Like many fungal diseases, black spot must have water freely available on the plant surfaces, in droplets or as a film of water, before it can reproduce and spread. Crowded, wet conditions and overhead watering help black spot flourish.



**Rust:** This fungal disease earned its name from the rust-orange pustules that form on the undersides of leaves. The fungus grows and spreads, upper leaf surfaces discolor, and leaves eventually fall from the plant. Cool, moist weather and wet foliage fuel rust as it spreads with the help of wind, water, and unwitting insects.



**Botrytis blight:** Once beautiful and vigorous flower petals and buds decay and rot, and show signs of fuzzy, gray mold with botrytis blight. Pathogens behind this airborne disease attack during cool, damp spring and fall days. High humidity, poor air circulation and overcrowding create prime botrytis blight conditions.



### **Get Culture on Your Side**

In keeping with the principles of [Integrated Pest Management](#), an effective challenge to fungal disease involves balancing proper plant culture with an appropriate response.

Putting the following practices into action helps protect your garden and limit its vulnerability:

- Choose plant varieties with proven disease resistance, and match your planting site to the plant's requirements. Poor matches predispose plants to stress and disease.
- Irrigate wisely. Overhead watering can disrupt powdery mildew spores, but it also encourages water-spread pathogens. Water close to the ground to reduce wet leaves, and water early in the day so excess moisture dries by nightfall.
- Improve air circulation and increase light penetration in and around plants through judicious pruning and proper spacing. Thinning plants or rearranging surroundings can help.
- Prune infected plant parts promptly and dispose of the debris — don't compost it. Always cut back into healthy tissue, so no disease remains.
- Sterilize your pruning implements by wiping them with a common household disinfectant. When you suspect disease, wipe before and after each cut or well-intentioned snips may spread the problem.



### **Fight Fungal Disease From the Start**

A proven fungicide that prevents disease from becoming active and treats it quickly is a crucial part of your protection plan. [GardenTech® Daconil® Fungicide](#), with the active

ingredient chlorothalonil, provides protection against a broad spectrum of fungal pathogens and simplifies controlling fungal disease in your garden.

Prevention is key to protection, particularly with regard to susceptible plants or plants that have experienced fungal problems in the past. Most roses, for example, are especially at risk for blackspot and other fungal diseases. The University of California Statewide Integrated Pest Management Program recommends a fungicide containing chlorothalonil, the active ingredient in Daconil® Fungicide, to protect healthy rose tissue and prevent botrytis blight and black spot.<sup>2</sup>

Used as a preventive and an active treatment, Daconil® Fungicide can prevent, control, or stop more than 65 types of fungal disease on flowers, vegetables, shrubs, fruit, and shade trees. Follow label directions for the plant you're treating and the suspected threat. For example, on ornamentals such as roses and azaleas, use Daconil® Fungicide as a preventive, before disease appears, as recommended by North Carolina State University's Plant Pathology Extension<sup>3</sup> and Clemson Cooperative Extension.<sup>4</sup> Protect hollyhocks, known for their vulnerability to rust, from the early seedling stage on. For flowering annuals, such as zinnias, which are prone to powdery mildew, treat at the first sign of disease.

### **Manage Edible Harvests**

When protecting vegetables and other edible crops, always follow what's known as the PHI or pre-harvest interval. The amount of time recommended between treatment and harvest, PHI, varies depending on your crop and the disease. For example, when using Daconil® Fungicide to treat squash or tomatoes, as recommended by the University of Wisconsin-Extension,<sup>5</sup> you can treat right up to harvest day. But allow beans, which are often plagued by rust and botrytis blight, seven days between treatment and harvest. Simply follow the label instructions for the crops involved.

When it comes to protecting your garden, it's not your years of experience that matter. With good garden practices and GardenTech® Daconil® Fungicide, you can stop fungal disease in its tracks and get back to enjoying your garden's bounty.

*Always read the product label and follow the instructions carefully.*

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#### **Related Articles in Pest Management:**

- [What Is Integrated Pest Management?](#)
- [Fight Blight on Your Tomatoes](#)
- [Common Diseases of Tomato, Pepper, Eggplant, and Potato](#)

#### **RESOURCES:**

1. Isleib, Jim, "[Signs and symptoms of plant disease; Is it fungal, viral, or bacterial?](#)" Michigan State University Extension, 2012.
2. Koike, S.T., et al., "[UC Pest Management Guidelines Rose \(Rosa spp.\)](#)," University of California Statewide Integrated Pest Management Program, updated 2009.
3. Jones, R.K. and D.M. Benson, "[Rose Diseases and Their Control in the Home Garden](#)," North Carolina State University, 1999.
4. Williamson, Joey, James Blake, and Nancy Doubrava, "[Azalea & Rhododendron Diseases](#)," Clemson Cooperative Extension, updated 2015.
5. Gevens, Amanda, Ken Cleveland, and Lauren Thomas, "[Home Garden Fungicides](#)," University of Wisconsin-Extension, revised 2012.

1- [https://youtu.be/AKY\\_pelBZek?si=buVuK4yZoIbL05h6](https://youtu.be/AKY_pelBZek?si=buVuK4yZoIbL05h6) كيف تهاجم الفطريات الخلايا النباتية

2-Introduction aux agents pathogènes des plantes / <https://youtu.be/ZM2X-XBRKHM?si=YegWY3XvQUmB4Q1N>