

Major Plant Disease Symptoms Caused by Fungi

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Introduction

- Fungi are spore-forming, non-chlorophytic, eukaryotic (cells having true nuclei) organisms and most of the true fungi are filamentous and branched.
- Over 20,000 species of fungi are parasites and cause disease in crops and plants (USEPA 2005).
- Fungal parasites are by far the most prevalent plant pathogenic organism.
- Individual species of fungi can parasitize one or many different kinds of plants.

Diagnostic Signs and Symptoms of Fungal Infections

- Fungi can cause general or localized signs and/or symptoms.
- In the majority of cases, fungal infections cause general necrosis of host tissue and often cause stunting, distortions and abnormal changes in plant tissue and organs.
- The following symptoms are common in fungal infections whether alone or in combination with other fungal pathogens.:
- **Leaf Spots** are very common in both biotic and abiotic plant disorders.
- Fungal leaf spots often take the form of localized lesions consisting of necrotic and collapsed tissue.
- Leaf spots can vary in size and are generally round and concentric, but can be ovoid or elongated on both leaves and stems of the host.
- The typical fungal leaf spot will have a “bulls-eye-like” appearance consisting of roughly concentric rings that may display zones of different colors such as yellow, red or purple, and will often have a tan center.
- As the spots develop, they are not restricted by the leaf veins as can be the case in bacterial leaf spots.
- Fungal leaf spots will usually have a dry texture but are not dry and papery

Common symptoms of fungal infections

- **Anthracnose:** an ulcer-like lesion that can be necrotic and sunken.
- These lesions can appear on the fruit, flowers and stems of the host - e.g. Apple Anthracnose of stems and or leaves (*Cryptosporiopsis* sp. Formally *Pezicula* sp.), or Dogwood Anthracnose (*Discula destructiva*).
- **Canker:** a localized necrotic lesion on woody tissue, often sunken - e.g. Apple European Canker (*Nectria galligena*), Douglas fir, upper Twig Canker (*phomopsis* sp.), and many more.



... Common symptoms of fungal infections

- **Damping Off:** a rapid collapse and death of very young seedling.
- Either the seed rots before emergence or the seedling rots at the soil line and falls over and dies.
- Several soil-born fungi cause this disease. The most common genera involved are *Fusarium*, *Rhizoctonia* and *Pythium*.
- **Scab:** localized lesion on host fruit leaves tubers and other plant parts.
- These infections usually result in a roughened, crust-like area on the surface of the host - e.g. Apple Scab (*Venturia inaequalis*) and Pear Scab (*Venturia pirina*).
- **Soft and dry root rots:** rot and disintegration of fleshy leaves, roots, tubers and fruit - e.g. Damping Off of seedlings, *Rhododendron Phytophthora* Root Rot (*P. cinnamomi*), *Armaillaria* spp.
- Root Rot of trees and hundreds of other plants.



- **Blight:** rapid generalized browning and death of leaves, floral organs, stems and branches.
- Blights can refer to both biotic and abiotic disorders.
- e.g. Tomato Early Blight (*Alternaria tomatophilai*, formally, *A. solani*) and Tomato and Potato Late Blight (*Phytophthora infestans*).
- **Dieback:** progressive death of shoots and twigs generally starting at the tip of the infected plant part.
- e.g. Shoot Dieback of Apple, Brown Rot of Cherry (*Monilinia* sp.) and Poplar Shoot Dieback (*Venturia populina*).
- Bacteria are probably more commonly associated with Diebacks (*Pseudomonas syringae*).
- **Decline:** progressive loss of vigor over a period of time.
- General decline can be caused by many factors including fungal, bacterial, environmental and other factors, usually in combination.



- **Galls:** enlarged parts of plant organs, usually caused by excessive multiplication or enlargement of plant cells.
- e.g. Pine Western Gall Rust (*Peridermium harknesii*), Clubroot - (*Plasmodiophora brassicae*) enlarged roots that look like clubs or spindles - e.g. Clubroot of Crucifers (*Plasmodiophora brassicae*).
- **Leaf Curls:** curling, thickening & distortion of leaves - e.g. Almond Leaf Curl, Peach Leaf Curl, Pear Leaf Blister, Maple Leaf Curl and many more caused by *Taphrina* sp.
- **Wilts:** generalized loss of turgidity as in vascular wilts – Maple Verticillium Wilt, Damping Off and so on.
- Both woody and herbaceous plants are subject to wilts.



Almond Leaf Curl - *Taphrina* sp.



Maple Verticillium Wilt - *Verticillium* sp.

- **Powdery** : mildew is a superficial, white to light grayish, powdery to mealy growth on leaves, but may also occur on stems and flowers.
- Affected leaves usually turn yellow, wither and die rapidly.
- The problem is common on cucurbit-type vegetables and on small grains.
- **Downy Mildew:** Downy mildew symptoms are pale yellow green to yellow areas on the upper leaf surface; light gray to purplish moldy growth on the under surface of the leaf.
- Blue mold of tobacco is a downy mildew disease. Deformed plant growth ("crazy top") may result from downy mildew as in the case of sorghum downy mildew of corn or grain sorghum.
- **Rusts:** often produce spots similar to leaf spots, but the spots are called "pustules."
- Rust pustules are bright yellow, orange-red, reddish-brown or black in color.
- The pustules are usually raised above the leaf surface, and, when rubbed with a white cloth, a colored deposit the same color as the pustule can usually be seen on the cloth.
- In severe cases, the leaf withers and dies rapidly. Some types of rust also occur on stems. Rusts are common on grains and grasses.



Powdery mildew



Rust

- **Smuts:** mycelium or black spores on seeds, in the form of galls or seeds “replaced” by spores.

