Master Gardener

Basic Plant Pathology, Diseases of Ornamentals and Turf

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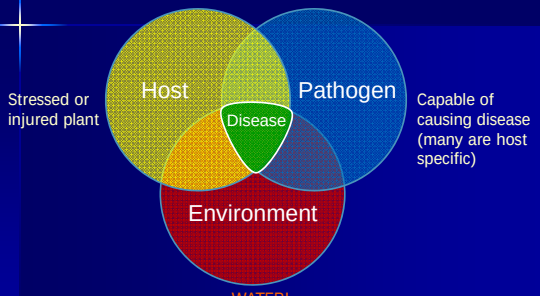
Plant Disease Diagnosis

- Be a detective – ask questions...
  - Is this normal for the plant?
  - What is the plant care history?
    - Fertilizer, water, pesticides, etc.
  - Is there a pattern to the symptoms?
    - Uniform = abiotic (not caused by a pathogen)
    - Random = biotic (caused by a pathogen)
- Symptom = what the plant shows
- Sign = visible pathogen presence

Planted too deep

- Poor growth
- Secondary root system
- Plants will not recover

Disease Triangle



Stressed or injured plant

Capable of causing disease (many are host specific)

WATER!
(wet foliage or soils, high humidity, poor air circulation)

Plant diseases are caused by…

- Fungi
- Bacteria
- Viruses
- Nematodes
- Phytoplasmas
  - Aster Yellows

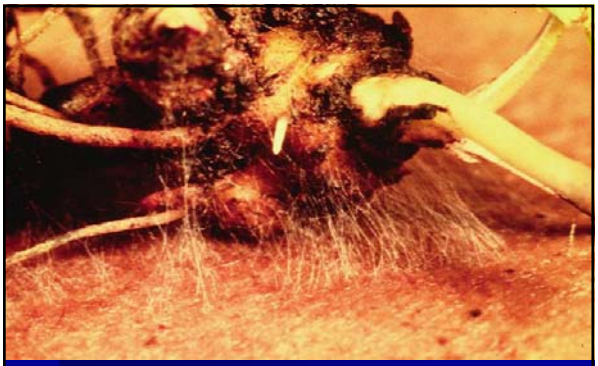
Fungi

- Over a million species of fungi
- Not all are plant pathogens
  - Roughly 8,000 cause disease in GA
- Most are beneficial and are needed in the environment
  - Fermentation
  - Decomposition

Slime mold

- Simple fungi
- Grows on organic material
- Does not harm plants

Mushrooms – Fairy Ring



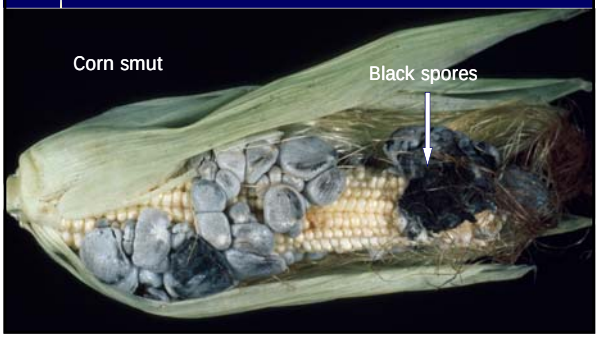
- The fungus grows and expands by hyphae
- Mass of hyphae is called “mycelium”

Fungi reproduced by…

- Spores
  - Reproductive unit
- Hyphae
  - Thread-like material, makes up the "body" of the fungus
- Sclerotia
  - Tightly wound hyphae with a hardened, protective crust
  - Survival structures

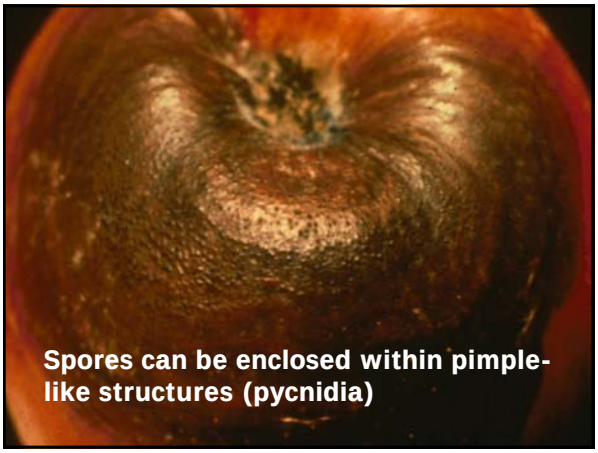
Fungal spores

Spores are dispersed in water and wind

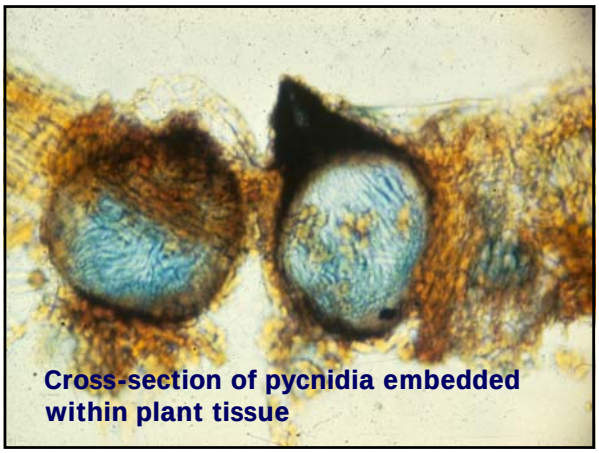


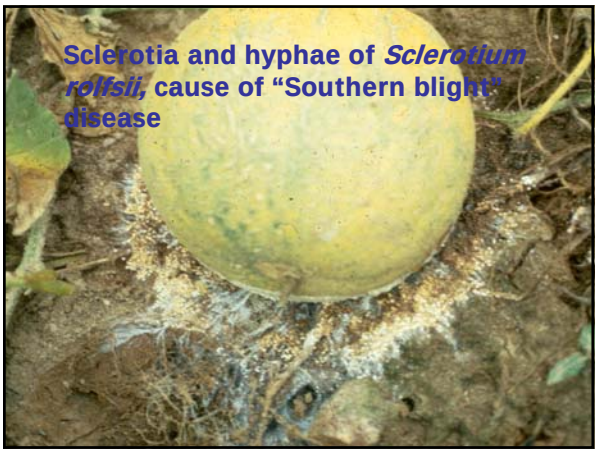
- Spores are produced at ends of modified hyphae (conidiophores)

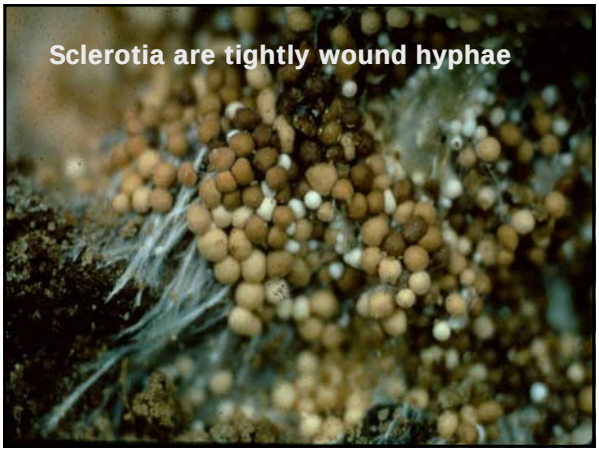
Hyphae and spores on rotting peach

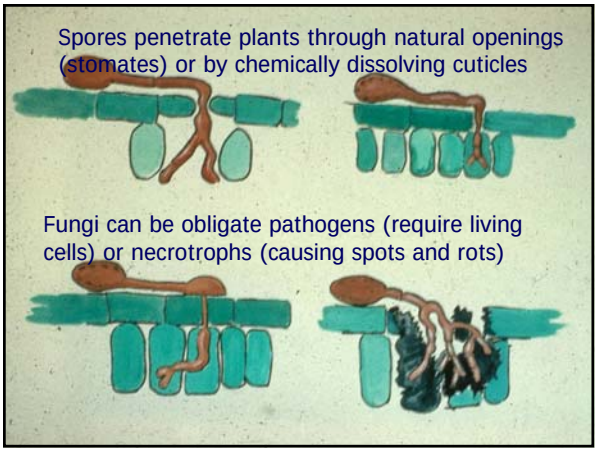


Spores can be enclosed within pimple-like structures (pycnidia)

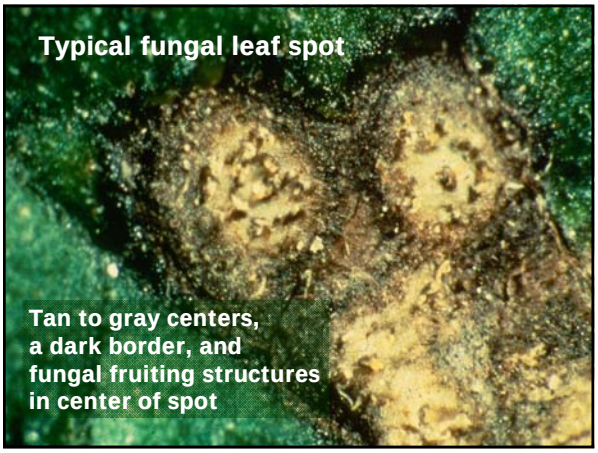

Cross-section of pycnidia embedded within plant tissue

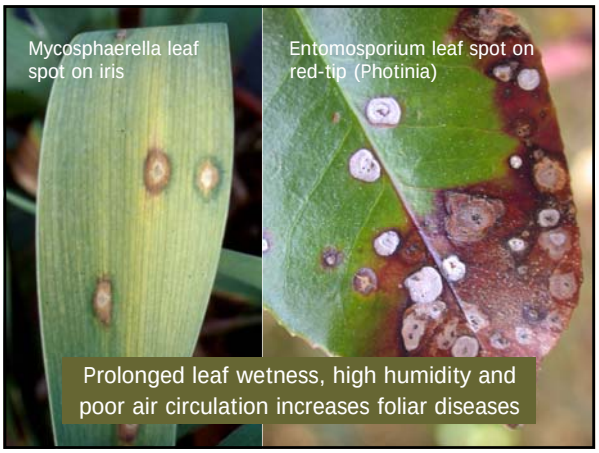

Sclerotia and hyphae of *Sclerotium rolfsii,* cause of "Southern blight" disease

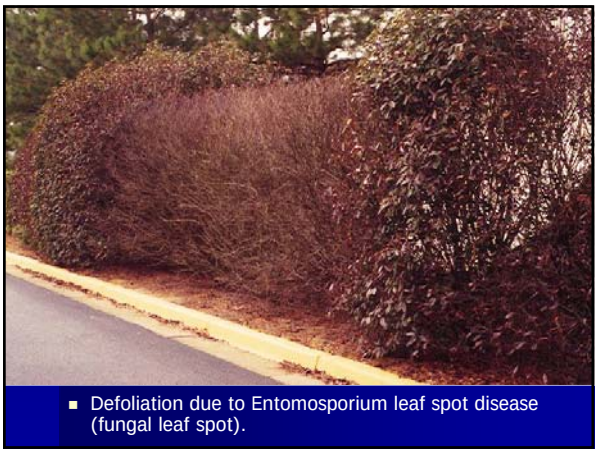

Sclerotia are tightly wound hyphae


Spores penetrate plants through natural openings (stomates) or by chemically dissolving cuticles
Fungi can be obligate pathogens (require living cells) or necrotrophs (causing spots and rots)


Fungal leaf spot diseases
Many different fungi cause leaf spotting
Black spot of rose


Typical fungal leaf spot
Tan to gray centers, a dark border, and fungal fruiting structures in center of spot





Fungal leaf spots rarely cause harm; mostly an aesthetic problem

- Oak leaf blister

- Phyllosticta leaf spot

- Cercospora leaf spot

- Discula leaf spot (birch)

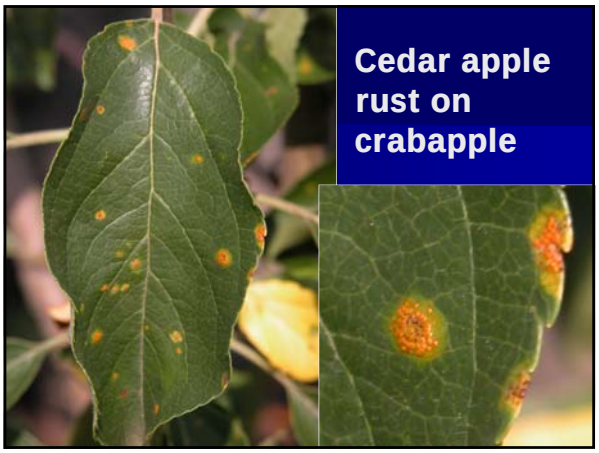
Powdery mildew

- Numerous host specific fungi (not all the same)
- Same symptom/sign
  - White spores and hyphae
- High humidity, warm days, cool nights, low light favor infection
  - Inhibited by wet leaves

Crape myrtle powdery mildew

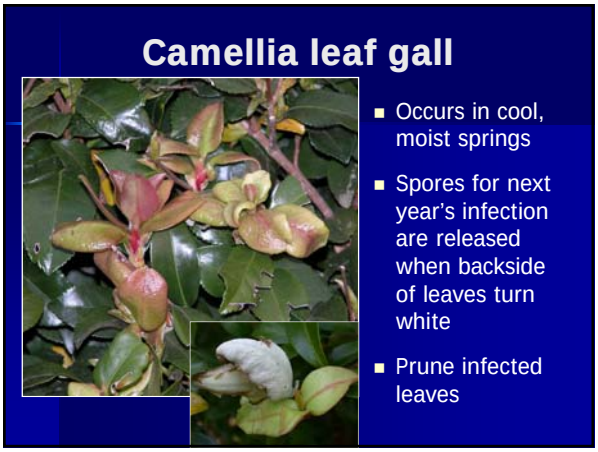
Cedar-apple rust

- Orange telial horns disperse spores to apples, crabapples in spring
- Leaf spots and fruit distortion occur on apple/crabapple
- Spores then spread back to cedar in summer

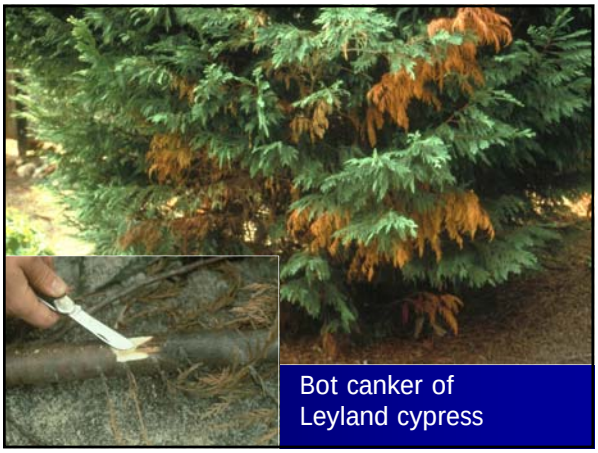

Cedar apple rust on crabapple


Cedar Quince Rust


Daylily Rust
Geranium Rust

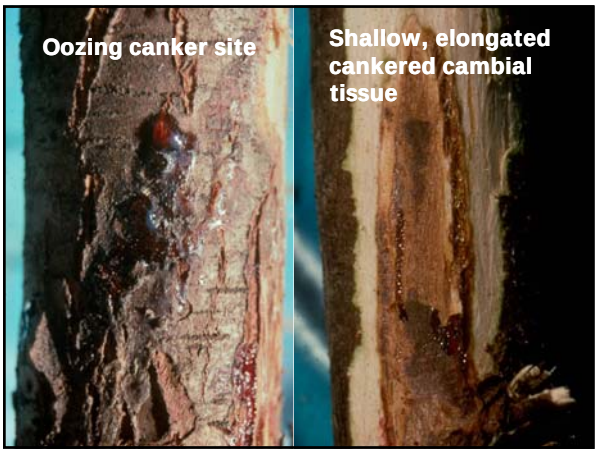

Camellia leaf gall
Occurs in cool, moist springs
Spores for next year's infection are released when backside of leaves turn white
Prune infected leaves


Azalea leaf and flower gall
Occurs only in cool, moist springs


Bot canker of Leyland cypress

Seiridium canker

- Very common
- Drought-stressed and wounded trees
- Irrigate trees during periods of drought



Root Disease Symptoms

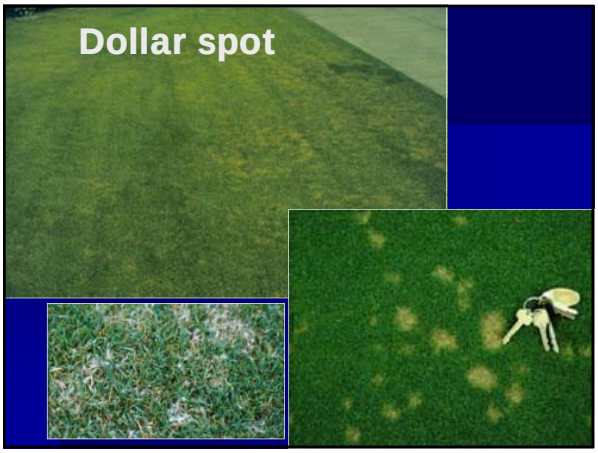
- Wilting, stunting, leaf yellowing and drop, softening and discoloration of roots and stems, branch dieback, plant death

- Most plants you buy already have some root rot
- Prevent root rot by:
  - Plant high
  - improve soil drainage
  - redirect water
  - do not over-water
  - do not over-fertilize

Turf Diseases: Dollar spot

- Affects mostly bermuda and zoysia
- Favored by low fertility (nitrogen), dry soil, and heavy dews
- Develops at cooler temperatures (59 to 86 F)

Dollar spot



Brown Patch

- Affects all turf grasses
- Favored by high fertility (nitrogen), high moisture and high humidity
- Develops at warmer temperatures (75-95 F)

Curvularia (Melting out)

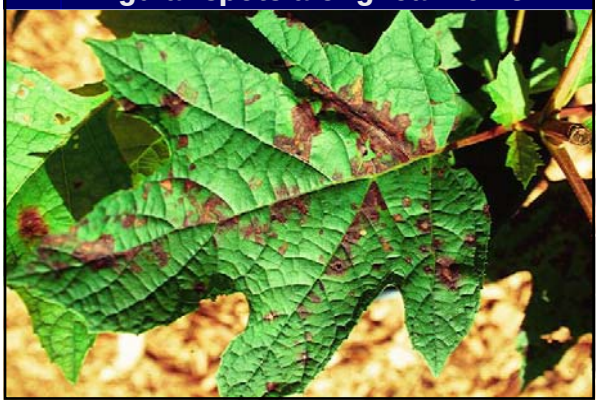
- Common saprophyte
- Attacks unhealthy turf
- Favored by drought stress and low potassium (K)

Bacteria

Bacterial diseases

- Infection causes disintegration of tissues, water-soaking, branch cankers
- Plant wetness, high humidity and warmer temperatures favor disease development
- Bacterial cells spread by water-splashing, tools, hands, or insects

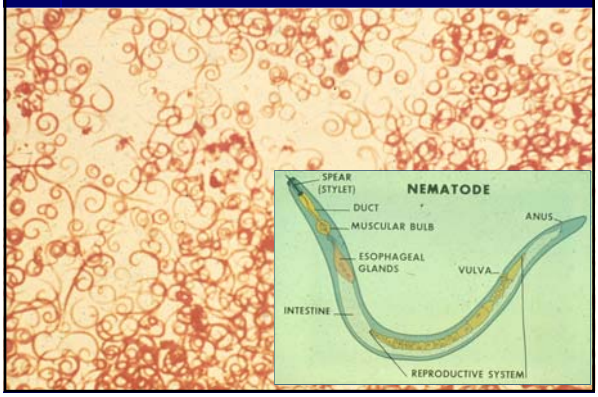
Angular spots along leaf veins

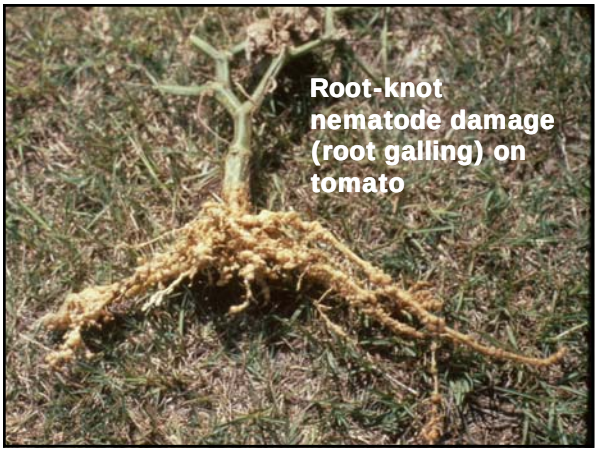


Fire blight of apple, pear, crabapple, pyracantha, cotoneaster, photinia

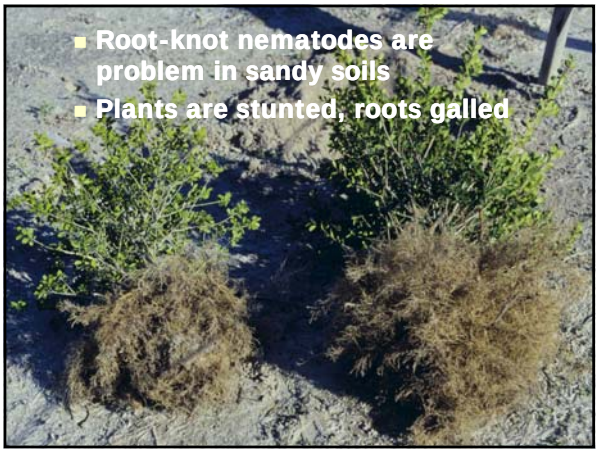
- Occurs in warmer, wet springs
- Secondary summer infections can occur during wet years
- Prune affected branches to reduce spread

Nematodes





Root-knot nematode damage (root galling) on tomato



- **Root-knot nematodes are problem in sandy soils**
- **Plants are stunted, roots galled**

- Infested plants die branch by branch, show bronzing, yellowing, stunting

Foliar nematode (*Aphelenchoides* sp.)

Viruses

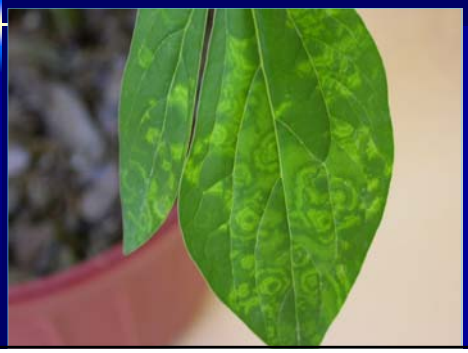
Flower break virus in tulips

Camellia yellow mottle virus

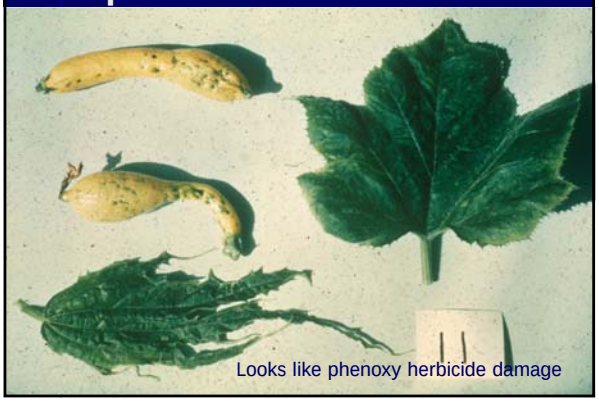
Virus Diseases

- Common symptoms
  - Tissue deformation
  - Stunting
  - Leaf necrosis
  - Mottling
  - Mosaic variegation
  - Ring spots

Ring spot symptom – always a virus disease



Squash mosaic virus



Looks like phenoxy herbicide damage

Viruses are spread by…

- Insect vectors
  - Aphids, thrips, whiteflies
- Seed (Cowpea mosaic virus)
- Vegetative propagation
  - Cuttings, grafting, etc.
- Tobacco products
  - Tobacco mosaic virus
- No chemical control for virus diseases

To prevent diseases…

- Follow good sanitation practices
- "Right plant in the right location"
- Manage the landscape environment
- Use resistant cultivars
- Eliminate disease-prone plants
- Use chemical control (fungicides) to prevent infection