



THE UNIVERSITY OF GEORGIA  
**COOPERATIVE EXTENSION**  
Colleges of Agricultural and Environmental Sciences & Family and Consumer Sciences

## **Diagnostic Guide to Common Home Orchard Diseases**

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**T**his bulletin is intended to be used as a pictorial diagnostic guide to identify the most common diseases seen on fruits grown in home landscapes, gardens, and/or orchards in Georgia. Use this guide as a supplemental resource and/or reference to the Homeowner Edition of the *Georgia Pest Management Handbook*.

In terms of plant disease management in home orchards, an integrated pest management (IPM) approach is necessary to manage plant pathogens and ensure production of quality produce. Using clean plant stock, selecting disease-resistant varieties (when available), sanitation, proper cultural care and control, and maintaining healthy plants are all essential components in minimizing home orchard plant diseases. Most fungicides are largely *protectant* in nature and must be applied before symptoms are seen.

Keeping records or a journal of past plant diseases will be useful in managing future problems in the home orchard. Remember, when applying pesticides, read the chemical label carefully and follow all instructions written on the label. More specifically, take note of the *Preharvest Intervals* (PHI – interval of time between when the last chemical spray is applied and when the fruit is harvested) for each individual chemical. The PHI will vary depending on the chemical used.



## Apples and Pears (see photos on page 6)

**Disease:** Sooty blotch and fly speck

**Pathogen:** Multiple organisms that usually occur together as a disease complex, referred to as SBFS (*Peltaster fructicola*, *Geastrumia polystigmatis*, and *Leptodontium elatius* – sooty blotch; *Zygothiala jamaicensis* – fly speck)

**Chemical Control:** Thiophanate-methyl; Captan; lime sulfur (dormant application).

**Comments:** This disease complex appears late in the summer/early fall. Pruning is important to increase air circulation. Fruit thinning is also important. Diseases favor moderate temperatures and high humidity. These are superficial diseases, and they do not cause rots. Application (rubbing with a cloth) of a bleach solution (1 ounce household bleach per gallon of water) will help to remove these, but subsequent shelf life of apples is reduced.

**Disease:** Bitter rot

**Pathogen:** *Glomerella cingulata*

**Chemical Control:** Captan; Thiophanate-methyl; sulfur.

**Comments:** This is a very important summer disease, especially when conditions are warm and moist! Pustules of spores are formed in concentric rings on the fruit. A sunken, sour-smelling rot results. Good sanitation is vital to management. Remove diseased fruit, which will hang on the tree, and any cankers formed in the woody tissues.

**Disease:** Black rot

**Pathogen:** *Botryosphaeria (Phyalospora) obtusa*

**Chemical Control:** Captan; Thiophanate-methyl.

**Comments:** A major disease on both apples and pears in the Southeast. On leaves, a symptom known as “frog-eye” leaf spot occurs. Infection occurs early in the season at silver tip; rots become evident in the late season at the calyx or bottom end. Rot will be seen as concentric rings, and it will be dark (eventually turning black). Good sanitation is important, so prune out dead wood and remove fallen debris.

**Disease:** Apple scab

**Pathogen:** *Venturia inaequalis*

**Chemical Control:** Thiophanate-methyl; Myclobutanil; Captan; Lime sulfur (use in the dormant period); sulfur.

**Comments:** Not a consistent problem in the Southeast. Cool, wet weather favors infection. Fruit and foliage must be protected season-long for adequate management if the disease does occur. Plant resistant varieties (ask local nurseries for availability). Sanitation is important. Rake and destroy fallen leaves to reduce the amount of disease that will carry over to the next year.

**Disease:** White or bot rot

**Pathogen:** *Botryosphaeria dothidea*

**Chemical Control:** Captan; Thiophanate-methyl; Lime sulfur.

**Comments:** This is a serious and common late-season problem in apples and pears. This fruit rot is a rapidly developing soft rot (unlike bitter rot and black rot, which form harder rots). Sanitation is important. Remove mummified apples (dried, dead apples hanging in the tree) and prune out deadwood.

**Disease:** Fire blight

**Pathogen:** *Erwinia amylovora* - Bacterial disease

**Chemical Control:** Difficult and expensive to control. Streptomycin sulfate is the most effective product (2-3 sprays applied during bloom). Avoid spraying too often, as resistance may develop. Apply copper sulfate or copper hydroxide as a late-dormant application ahead of bloom.

**Comments:** This is a bacterial disease, and it is very destructive on both apples and pears. Succulent tissues are most vulnerable to infection, so avoid excessive nitrogen fertilization. Avoid pruning during and after the blossom period (corresponds to insect feeding). Promptly prune out any blighted tissue; remove infected plant parts through cutting 8 to 12 inches below diseased tissue; between cuts, disinfect pruning tools using a 10 percent bleach solution.

**Disease:** Cedar-Apple Rust

**Pathogen:** *Gymnosporangium juniperi- virginianae*

**Chemical Control:** Myclobutanil; Lime sulfur.

**Comments:** Can cause extensive defoliation of apple trees. Plant resistant varieties! If possible, remove galls from nearby cedar trees (breaks the fungal life cycle, as it needs both hosts to reproduce). Only use Myclobutanil when cedar-apple rust is an annual problem.

## Blueberries (see photos on page 7)

**Disease:** Botrytis blight

**Pathogen:** *Botrytis cinerea*

**Chemical Control:** Captan (apply during bloom and early fruit development)

**Comments:** Disease affects green twigs, flowers, leaves and fruit. Outbreaks often occur after freeze injury to flowers in the spring, especially when followed by cool, wet weather. Fruit rot does not generally occur until after fruit is harvested. Sanitation is important. Remove infected fruit/mummies and maintain a good mulch layer.

**Disease:** Mummy berry

**Pathogen:** *Monilinia vaccinii-corymbosi*

**Chemical Control:** Captan (apply to early developing foliage and during bloom)

**Comments:** Sanitation is important. Rake and remove mummies (dead fruit on the ground); prune annually.

**Disease:** Septoria leaf spot

**Pathogen:** *Septoria albopunctata*

**Chemical Control:** Captan

**Comments:** Rake and remove infected leaf debris. Summer pruning or topping will help remove older, infected tissues. Increased spacing will improve air circulation, resulting in dryer foliage.

**Disease:** Twig blight and Fruit rot

**Pathogen:** *Phomopsis vaccinii*

**Chemical Control:** Captan (apply during bloom and early fruit development)

**Comments:** Twig blight: remove infected twigs in winter; choose resistant cultivars when available. Fruit rot: harvest fruit before it becomes overripe.

## Brambles (Raspberries and Blackberries) (see photos on pages 7-8)

**Disease:** Anthracnose

**Pathogen:** *Elsinoe veneta*

**Chemical Control:** Captan; Bordeaux mixture; copper; lime sulfur (late dormant application).

**Comments:** Disease affects canes, leaves, fruit and stems of berry clusters. Symptoms on canes are ash grey lesions with raised purple to brown borders. Sanitation is very important. After harvest, cut old floricanes to the ground, and remove and destroy them.

**Disease:** Orange rust

**Pathogen:** *Kunkelia nitens*

**Chemical Control:** NONE

**Comments:** Attacks all brambles except red raspberries. Establishes a systemic infection and, once infected, no cure is available. Symptoms include stunting and limited fruit production. Symptoms occur shortly after leafing out. When disease is first detected, dig up and discard/destroy any infected plants to reduce spread.

**Disease:** Rosette or double blossom

**Pathogen:** *Cercospora rubi*

**Chemical Control:** NONE

**Comments:** Most damaging to blackberries. In the spring, infected buds from the previous year produce numerous leafy sprouts – “rosettes” or “witches brooms.” Berries do not develop from infected blossoms. Remove/destroy nearby wild brambles – they serve as reservoirs; remove infected rosettes and blossom clusters before they open.

**Disease:** Orange felt (orange cane blotch)

**Pathogen:** *Cephaleuros virescens*

**Chemical Control:** Copper sprays (high rates for late dormant and fall applications; lower rates when succulent tissue is present).

**Comments:** Remove old floricanes after harvest; increase air circulation in canopy; avoid stressing plants; improve drainage.

**Disease:** Cane blight

**Pathogen:** *Leptosphaeria coniothyrium*

**Chemical Control:** Bordeaux mixture; Lime sulfur (late dormant application); Captan; Copper sprays.

**Comments:** Remove old floricanes after harvest; increase air circulation in canopy; avoid stressing plants; improve drainage. Sanitation is very important. Remove dead and infected canes during and after harvest. Avoid stressing plants. During the summer, prune by pinching off tender primocanes when they reach 3-4 feet high. Remove 1-4 inches of primocane tip; avoid making severe pruning cuts on older tissues. Do not prune ahead of predicted rains; prune when 3-4 days of dry conditions are predicted.

## Bunch Grapes

(see photos on pages 8-9)

**Disease:** Black rot

**Pathogen:** *Guignardia bidwellii*

**Chemical Control:** Captan; Mancozeb; Myclobutanil; copper.

**Comments:** Annual pruning in February; removing infected berries both on the ground and on the plant. After pruning, only the permanent trunk, one-year-old fruiting canes and short spurs should remain. Sanitation is important. Remove mummified fruit! Disease spread is favored by moist, wet weather.

**Disease:** Powdery mildew

**Pathogen:** *Uncinula necator*

**Chemical Control:** Myclobutanil; copper; lime sulfur (late dormant application); sulfur (may cause damage on certain varieties and when temperatures are above 90° F).

**Comments:** Annual pruning in February will help to remove inoculum; remove infected berries both on the ground and on the plant. After pruning, only the permanent trunk, one-year-old fruiting canes and short spurs should remain.

**Disease:** Downy mildew

**Pathogen:** *Plasmopara viticola*

**Chemical Control:** Captan; Mancozeb; copper hydroxide.

**Comments:** Annual pruning in February; remove infected berries both on the ground and on the plant. After pruning, only the permanent trunk, one-year-old fruiting canes and short spurs should remain.

**Disease:** Pierce's disease

**Pathogen:** *Xylella fastidiosa* - Bacterial disease

**Chemical Control:** NONE (do not plant vinifera wine or table grapes at elevations below 1,300 feet). Muscadines are generally resistant, and some other native grapes have limited resistance.

**Comments:** Vectored by various sharpshooters (such as glassywinged sharpshooter). New growth is stunted, yellow, deformed (resembles zinc deficiency). Choose more resistant cultivars; native grapes are generally more resistant. Do not propagate from symptomatic vines.

**Disease:** Phomopsis

**Pathogen:** *Phomopsis viticola*

**Chemical Control:** Lime sulfur (late dormant application)

**Comments:** A late dormant application of lime sulfur is very beneficial for control of this disease. Mancozeb should be applied weekly from the time that green tissue is observed until the Preharvest Interval is reached (66 days).

**Disease:** Botrytis bunch rot

**Pathogen:** *Botrytis cinerea* - see Blueberry-Botrytis blight image

**Chemical Control:** Captan

**Comments:** Apply Captan at bloom, bunch closing, veraison (ripening point of grapes), and preharvest.

## Figs

(see photos on page 8)

**Disease:** Root knot nematode

**Pathogen:** *Meloidogyne* spp.

**Chemical Control:** NONE

**Comments:** Prune tops to balance weakened roots; attentive watering and fertilization may prolong tree life. Nematode infested plants usually die sooner or later regardless of treatment. Plant new trees away from this site! Nem-A-Cide – organic amendment containing chitin that promotes growth of beneficials that feed on nematodes (unfortunately, it will reduce both parasitic and saprophytic nematode populations).

**Disease:** Rust

**Pathogen:** *Cerotelium fici*

**Chemical Control:** Copper sprays – Bordeaux mixture

**Comments:** Not fatal but will reduce tree vigor and size and quality of fruit. Attacks the leaves, usually in late summer. Infected leaves turn yellow-brown and drop. Under-side of leaves have reddish brown spots/pustules. Sanitation is important.

**Disease:** Anthracnose

**Pathogen:** *Glomerella cingulata* - see Apple-bitter rot image

**Chemical Control:** NONE

**Comments:** Not serious; Increase air circulation and avoid excess irrigation; sanitize.

# Apples and Pears

**Disease:** Sooty Blotch and Fly Speck



Dull black sooty blotches and individual "fly specks"

**Disease:** Bitter Rot



Concentric rings of acervuli



V-shaped lesions extending to core of fruit

**Pathogen:** *Glomerella cingulata*



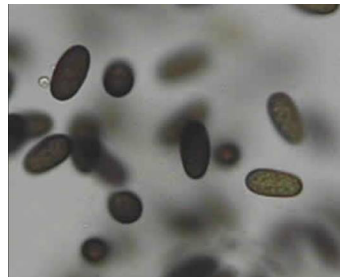
Conidia (J. Brock, UGA)

**Disease:** Black Rot



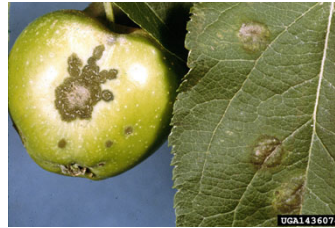
Brown, bruised look on the calyx end of fruit

**Pathogen:** *Botryosphaeria (Phyalospora) obtusa*



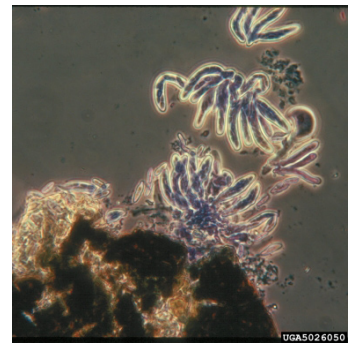
Conidia

**Disease:** Apple Scab



Black, scabby lesions on leaves and fruit

**Pathogen:** *Venturia inequalis*



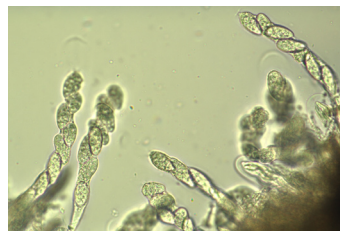
Perithecia and spores

**Disease:** White or Bot Rot



Depressed, soft, enlarged lesion on fruit

**Pathogen:** *Botryosphaeria dothidea*



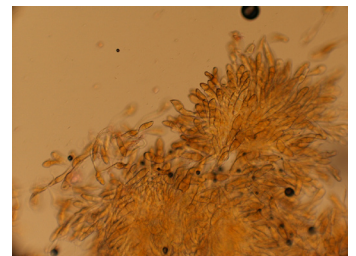
Ascospores within asci

**Disease:** Cedar-Apple Rust



Lesions on apple leaves

**Pathogen:** *Gymnosporangium juniperi-virginianae*



Teliospores

**Disease:** Fire Blight



Shepard's crook symptom on foliage



Dieback on branch due to presence of a canker



Telial gall on cedar (alternate host)

# Blueberries

**Disease:** Mummy Berry



Shoot-blight phase  
(Bill Cline, NCSU)

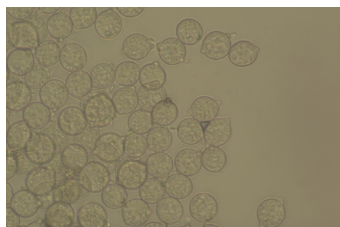


Mummies on the bush  
(Bill Cline, NCSU)



Infected green berries  
(H. Scherm, UGA)

**Pathogen:**  
*Monilinia vaccinii-corymbosi*



Conidia



Mummies  
(H. Scherm, UGA)



Apothecia  
(H. Scherm, UGA)

**Disease:** Botrytis Blight

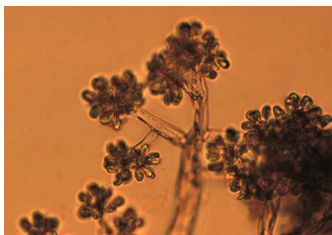


Blighted flowers (covered  
in conidia)



Berries covered in conidia  
(Bill Cline, NCSU)

**Pathogen:**  
*Botrytis cinerea*



Conidiophore and conidia

**Disease:**  
Septoria Leaf Spot



Small leaf spots with tan  
center and purple border  
(black dot in center - pyc-  
nidia of pathogen)  
(Bill Cline, NCSU)

**Pathogen:**  
*Septoria albopunctata*



Narrow, filiform, several-  
celled conidia

**Disease:**  
Twig Blight and Fruit Rot

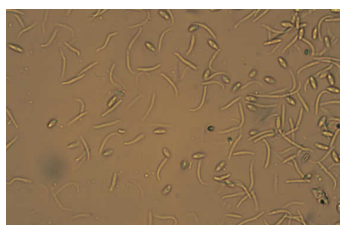


Dieback of blueberry twigs  
(Bill Cline, NCSU)



Fruit rot  
(Bill Cline, NCSU)

**Pathogen:**  
*Phomopsis vaccinii*



Conidia (two types: alpha  
[oval or fusoid] and beta  
[long and curved])

## Brambles (Raspberries and Blackberries)

**Disease:** Orange Felt  
(Orange Cane Blotch)



Yellow, disc-shaped spots  
on canes


**Pathogen:**  
*Cephaleuros virescens*



Algal sporangiophores

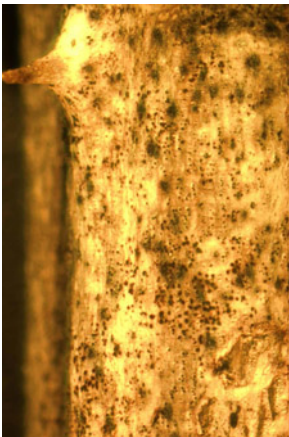
# Brambles (Raspberries and Blackberries) (continued)

**Disease:** Cane Blight




Dieback of canes

**Pathogen:**  
*Leptosphaeria coniothyrium*



Pycnidia



Ascospores in ascus

**Disease:** Orange Rust



Orange rust of blackberry, asexual stage  
UGA CAES Department of Plant Pathology Charles Mims

Yellow-orange pustules on leaf surfaces (usually lower leaf)

**Pathogen:**  
*Kunkelia nitens*



Orange rust of blackberry, spermatogonial stage  
UGA CAES Department of Plant Pathology Charles Mims



Spores

**Disease:** Rosette or Double Blossom



Bunchy growth at nodes

**Pathogen:**  
*Cercospora rubi*



Spores


**Disease:** Anthracnose



Small, purplish or tan, slightly raised or sunken spots along young canes (NCSU/PDIC, courtesy of Bill Cline)


## Figs

**Disease:** Root Knot Nematode



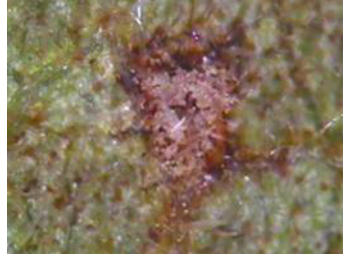
Knotty, galled roots (not fig roots) (D. Langston, UGA)

**Disease:** Rust

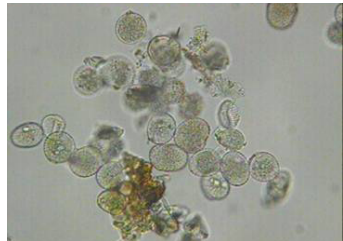


Small, reddish pustules on the underside of the leaves

**Pathogen:**  
*Cerotelium ficis*



Pustule (uredinial stage) on underside of leaf



Urediniospores

# Bunch Grapes

**Disease:** Black Rot



Small, yellowish spots on leaves

**Disease:** Black Rot



Sunken oval lesion with pycnidia of the fungus (black dots)

**Disease:** Black Rot



Shriveled mummies (infected berries)

**Pathogen:**  
*Guignardia bidwellii*



Pycnidia in a mummified grapevine berry

## Bunch Grapes (continued)

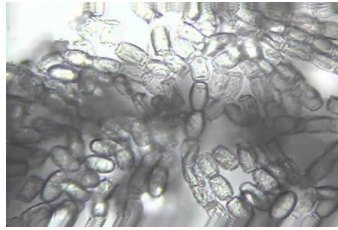
**Disease:**

Powdery Mildew

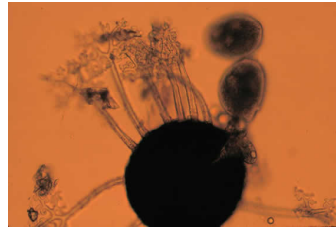


White powdery fungal growth on berries

**Pathogen:** *Uncinula necator*



Conidia



Cleistothecia

**Disease:**

Pierce's Disease



Scorched leaves with a defined margin and yellow / chlorotic border

**Disease:**

Downy Mildew



Yellow, irregular-shaped lesions on upper surface; whitish-gray fungal growth directly under lesions on lower surface of leaves

**Pathogen:** *Plasmopara viticola*



Conidiophores and conidia



**Disease:**

Botrytis Bunch Rot



Masses of gray conidia covering infected grapes

**Disease:**

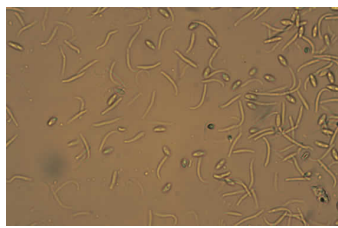
Phomopsis



Small, black pycnidia of the fungus on the cane

**Pathogen:**

*Phomopsis viticola*



Two spore types: alpha and beta conidia

### Muscadines

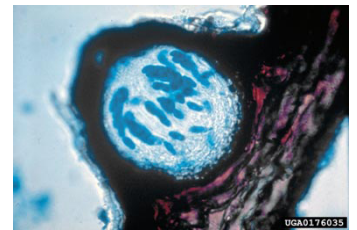
**Disease:** Black Rot



Circular brown leaf spots

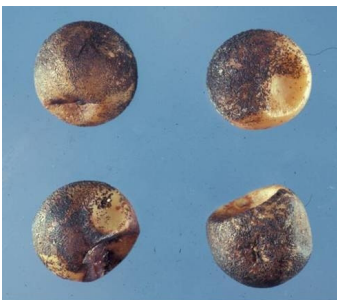
**Pathogen:**

*Guignardia bidwellii*



Pycnidia containing conidia

**Disease:** Bitter Rot



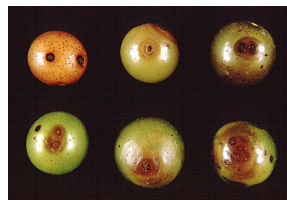
Black acervuli covering berries (Bill Cline, NCSU)

**Disease:** Ripe Rot



Dark brown rot with pink masses of spores covering part or all of fruit (Bill Cline, NCSU)

**Disease:** Macrophoma Rot



Small, sunken, black fruit spots; round, with distinct edges (Bill Cline, NCSU)

**Pathogen:** *Guignardia bidwellii*



Conidia

## Muscadines (continued)

**Disease:**

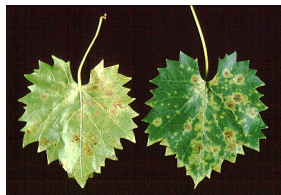
Powdery Mildew



Surface russeting on fruit (Bill Cline, NCSU)

**Disease:**

Angular Leaf Spot



Light yellow spots; irregular brown flecks develop in the center (Bill Cline, NCSU)

**Pathogen:** *Mycosphaerella angulata*



Asci



Ascospores

## Peaches, Nectarines and Plums

## Strawberries

**Disease:** Brown Rot



Masses of conidia covering light brown fruit rot

**Pathogen:**

*Monilinia fructicola*



Apothecia (sexual fruiting structure) on a peach mummy



Conidia

**Disease:** Peach Scab



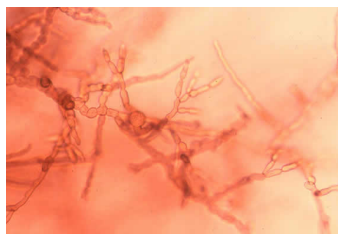
Raised dark brown lesions on twigs



Greenish brown-black lesions covering fruit, sometimes surrounded by yellow halo

**Pathogen:**

*Cladosporium carpophilum*



Conidiophores and conidia

**Disease:**

Peach Leaf Curl



Deformed leaves (wrinkled, puckered, and/or curled)

**Disease:** Gummosis



Gum/jelly produced on trunk

**Pathogen:**

*Botryosphaeria dothidea*

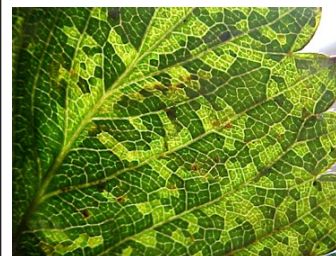


Conidia

**Disease:** Leaf Spots



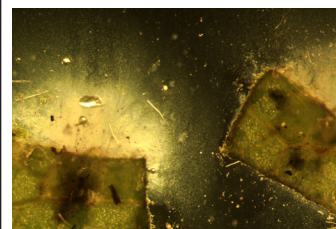
Leaf spot (gray/white center with purple border) - *Mycosphaerella* sp.



Angular Leaf Spot (restricted by veins) (Courtesy of Jeff Cook)

**Pathogen:**

*Xanthomonas* sp.



Bacterial Streaming (@ 40x)

## Strawberries (Continued)

**Disease:** Anthracnose

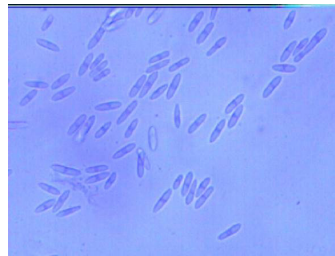


Light to dark brown sunken lesions on fruit (Courtesy of Tom Jennings)

**Pathogen:** *Colletotrichum* sp.



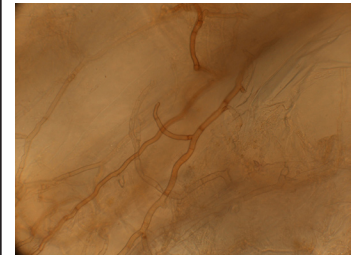
Long, black setae



Conidia

**Disease:** Rhizoctonia Root Rot and Crown Rot

**Pathogen:** *Rhizoctonia* spp.



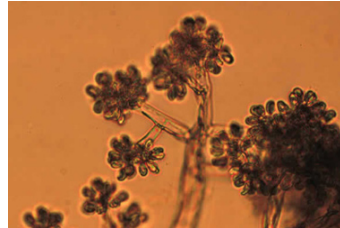
Robust, separate, pigmented, branching mycelia

**Disease:** Anthracnose



Botrytis blight on strawberry fruit

**Pathogen:** *Botrytis cinerea*



Conidiophores and conidia

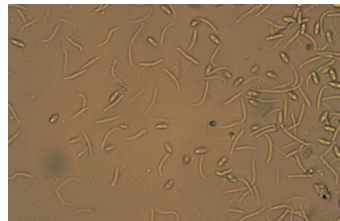


**Disease:** Phomopsis Leaf Blight



V-shaped leaf lesions progressing from leaf margin to leaf interior

**Pathogen:** *Phomopsis obscurans*



Conidia (two types)

## Muscadines

(see photos on pages 9-10)

**Disease:** Black rot

**Pathogen:** *Guignardia bidwellii*

**Chemical Control:** Captan; Myclobutanil.

**Comments:** Remove fallen debris and mummified fruit; during the winter, remove all old fruit stems to eliminate overwintering sites for fungi. When spraying Captan or Myclobutanil as a COVER SPRAY, Captan may cause mild phytotoxicity to fruit when conditions are wet and cool.

**Disease:** Bitter rot

**Pathogen:** *Melaconium fuligineum*

**Chemical Control:** Captan; Immunox.

**Comments:** Remove fallen debris and mummified fruit; during the winter, remove all old fruit stems to eliminate overwintering sites for fungi.

**Disease:** Ripe rot

**Pathogen:** *Glomerella cingulata* - see Apple-bitter rot image

**Chemical Control:** Captan

**Comments:** Remove fallen debris and mummified fruit. During the winter, remove all old fruit stems to eliminate overwintering sites for fungi.

**Disease:** Macrophoma rot

**Pathogen:** *Botryosphaeria dothidea*

**Chemical Control:** Captan

**Comments:** Remove fallen debris and mummified fruit. During the winter, remove all old fruit stems to eliminate overwintering sites for fungi.

**Disease:** Angular leaf spot

**Pathogen:** *Mycosphaerella angulata*

**Chemical Control:** Captan

**Comments:** This pathogen can cause leaf spotting that can lead to rapid defoliation. Remove fallen debris and mummified fruit; during the winter, remove all old fruit stems to eliminate overwintering sites for fungi. Pruning is equally important.

**Disease:** Powdery mildew

**Pathogen:** *Uncinula necator* - see Grape-powdery mildew image

**Chemical Control:** Wettable sulfur

**Comments:** Attacks young berries – causes a russeted look. Berry drop and reduced size result from infections. Improve air circulation and use proper sanitation practices.

## Peaches, Nectarines and Plums

(see photos on page 10)

**Disease:** Brown rot

**Pathogen:** *Monilinia fructicola*

**Chemical Control:** Chlorothalonil (do not use after shuck split); Captan; Sulfur; Lime sulfur (dormant application); Thiophanate-methyl; Myclobutanil.

**Comments:** Major disease of these fruits in Georgia. Disease infects blooms, stems and fruit. Sanitation is the key! Remove and/or prune infected tissues and areas on trees. Remove and discard mummies. During wet summers, green fruit injured by insects and/or environment will develop brown rot. Remove any fruit that has fungal growth.

**Disease:** Peach scab

**Pathogen:** *Cladosporium carpophilum*

**Chemical Control:** Chlorothalonil; Captan; Sulfur; Thiophanatemethyl.

**Comments:** Disease infects both fruit and twigs of current years' growth. Small, oval to round, gray to black spots on fruit. Fruit may crack because of coalescing of scabs. Pruning trees to promote penetration of sunlight and air circulation is necessary.

**Disease:** Gummosis

**Pathogen:** *Botryosphaeria dothidea*

**Chemical Control:** No practical chemical control. Where gummosis is present, use of Captan for scab control is the preferred treatment.

**Comments:** Disease causes sunken lesions with oozing amber-colored resin or gum on trunks, limbs, and twigs. Small twigs may be killed as disease progresses. Prune out and remove dead wood. Irrigation during periods of dry weather helps to reduce plant stress and may minimize disease.

**Disease:** Peach leaf curl

**Pathogen:** *Taphrina deformans*

**Chemical Control:** Chlorothalonil; copper hydroxide; liquid lime sulfur; Captan; Thiophanate-methyl; Bordeaux mixture.

**Comments:** Disease occurs in cooler areas of the state – primarily the upper Piedmont and mountains. Apply this to nectarines and peaches only. Sanitize. For successful control, the fungicides must be applied before bud swell.

## Strawberries

(see photos on pages 10-11)

**Disease:** Leaf spots; Anthracnose; Botrytis blight

**Pathogen:** *Mycosphaerella fragariae* - Leaf spot pathogen

**Chemical Control:** Captan; Thiophanate-methyl

**Comments:** Leaf spot – upper leaf surface first as tiny, round, purple spot 1/8” in diameter; spot becomes gray with purple border. Loss of foliage is common.

**Disease:** Leaf spots; Anthracnose; Botrytis blight

**Pathogen:** *Anthracnose* – *Colletotrichum* sp.

**Chemical Control:** Captan

**Comments:** Anthracnose is a major disease of strawberries when conditions are wet. Anthracnose infects stolons, petioles, crowns, fruit and leaves. Small dark lesions form on stolons and petioles in summer. Crowns can be infected, resulting in plant death. Remove infected plants or fruit and destroy or bury. Always purchase disease-free plants!

**Disease:** Leaf spots; Anthracnose; Botrytis blight

**Pathogen:** *Xanthomonas* sp.

**Chemical Control:** Copper fungicides

**Disease:** Leaf spots; Anthracnose; Botrytis blight

**Pathogen:** *Botrytis cinerea*

**Chemical Control:** Captan

**Comments:** Botrytis is often present in strawberry leaves, etc., even if symptoms are not present. These quiescent infections give rise to production of spores under wet conditions during bloom. Blossoms need to be protected season-long to reduce fruit infection and to prevent epidemic development.

**Disease:** Rhizoctonia root and crown rot

**Pathogen:** *Rhizoctonia* spp.

**Chemical Control:** Soil fumigation

**Comments:** Root rot is favored by cool weather, but crown rot is worse in hot weather. Plants start collapsing as fruiting starts. The bottom of the leaves are purple and leaves curl up as the original crown is killed. Buy disease-free plants.

**Disease:** Phomopsis leaf blight

**Pathogen:** *Phomopsis obscurans*

**Chemical Control:** Captan; Myclobutanil – most effective.

**Comments:** Disease starts in the fall or spring after planting. It spreads rapidly and can destroy most of the foliage. Remains active as long as there is green foliage. Symptoms occur as circular red to purple spots on leaflets; the spots enlarge and develop gray centers, making large V-shaped lesions. Fruit and calyx infection also occurs. Remove infected foliage. Fruit infection is prevented by controlling foliar infection.

# Chemical Reference List

## Protectant Fungicides

(*must be applied BEFORE symptoms appear*):

**Captan:** a wettable powder fungicide that is used to manage fungal diseases. Among these are scab, black rot, sooty blotch and fly speck on apple, botrytis gray mold and mummy berry on blueberry, Phomopsis cane and leaf spot, downy mildew, and black rot on grapes, brown rot and scab on peaches and nectarines, and botrytis gray mold and leaf spot on strawberry.

- Does NOT control powdery mildew or apple rust diseases;
- Is NOT registered for use on blackberries or raspberries;
- Should NOT be used within one week of using sulfur or spray oils.

**Chlorothalonil:** known as daconil and sold as either Dragon Daconil 2787 or Ortho Multipurpose Fungicide Daconil 2787 liquid flowable; this is used only for early season disease control on peach, nectarine, and plum.

- Do NOT use after petal fall;
- NOT registered for apple, pear, blackberry, raspberry, strawberry, grape, or blueberry;
- ONLY to be used early in the growing season;
- Consult the label for specific disease recommendations.

**Dry wettable or flowable sulfurs:** wettable powders or flowables that are used to manage powdery mildews, scab of peaches, and various other fungal diseases.

- Do not use during hot temperatures – causes leaf burning and fruit russetting;
- Only moderately effective against Apple Scab.

**Lime sulfur:** liquid formulation that is used for dormant sprays on stone fruit for peach leaf curl and on brambles for cane blight, spur blight, and anthracnose. This fungicide has a foul odor that most people dislike. Lime sulfur is also dangerous, especially to eyes, and it is caustic. Handle and use with care.

**Mancozeb:** a wettable powder or dry flowable (DF) formulation; it is used primarily by commercial fruit growers and may not be available in packages specifically for use by home fruit growers (trade name Dithane DF). This contact fungicide provides excellent control of black rot, Phomopsis cane and leaf spot and downy mildew on grapes, but cannot be applied within 66 days of harvest. Thus, this chemical is used only in the early growing season.

**Copper compounds:** this includes Bordeaux mixture (copper sulfate and hydrated lime) and fixed copper fungicides; Bordeaux mixture is a dry wettable powder and the fixed coppers are liquid or powder formulations.

- Bordeaux mixture – can be phytotoxic to plants depending on amount applied and weather conditions;
- Fixed coppers – less harmful than Bordeaux mixture but it lacks compatibility with other fungicides;
- Used for various fungal diseases of apple, stone fruit, and grape and Fire blight on apples.

**Sulfur:** available as a dry wettable or flowable formulation and sold under many trade names. Sulfur products are generally very effective against powdery mildews on most fruit crops. Unfortunately, it is not highly effective for most other fruit crop diseases. It does provide good control against brown rot and scab of peach. When applied during hot temperatures (above 85 degrees F), some leaf burn and fruit russetting may occur.

## Systemic Fungicides:

**Myclobutanil:** sold as Immunox (registered for various diseases of apples, stone fruits, and grapes). This fungicide is locally systemic and is very effective for early-season disease control on apples (cedar apple rust, powdery mildew, and scab); on stone fruits, it is effective for brown rot and powdery mildew, and on grapes it is used to manage black rot, anthracnose, and powdery mildew. It does NOT control downy mildew, Phomopsis cane, or leaf spot on grapes.

- On apple and grape, the Preharvest interval is 14 days;
- On peach and plum, the Preharvest interval is 0 days;
- Rate of this fungicide is 1/2 fluid ounce per gallon on all tree fruit crops;
- Rate for grapes is 2 fluid ounces per gallon (every 2 weeks).

Thiophanate-methyl: systemic fungicide 3336 WP 50% wettable powder sold as Dragon Systemic Fungicide 3336 WP or Cleary's 3336 WP for use on apple, peach, nectarine, and plum.

- Intended for backyard use by home fruit growers;
- NOT labeled for use on strawberry;
- Do NOT apply within 24 hours of harvest.

# References

## Literature:

1. Brannen, P.M. Orange Felt (Orange Cane Blotch) of Blackberry. <http://www.smallfruits.org/bramble/pestinformation/OrangeFelt.pdf>
2. Brannen, P. M. and G. Krewer. Cane Blight of Blackberry. <http://www.smallfruits.org/bramble/pestinformation/CaneBlightFactSheetii.pdf>
3. Compendium of Strawberry Diseases. 2nd edition. APS Press.
4. Eaker, T.H. 2002. Sanitation Measures for Limiting Diseases in the Home Orchard. <http://pubs.caes.uga.edu/caespubs/pubcd/C856.htm>
5. 2006 Georgia Pest Management Handbook – Homeowner Edition.
6. The Southern Region Small Fruit Consortium. IPM/Production Guides.

## Images:

1. UGA1236183 – Clemson University - USDA Cooperative Extension Slide Series.
2. UGA1436071 – Clemson University - USDA Cooperative Extension Slide Series.
3. UGA1234176 – Clemson University - USDA Cooperative Extension Slide Series.
4. UGA5026050 – Jody Fetzer, New York Botanical Garden.
5. UGA4213005b – Minnesota Department of Natural Resources Archives, Minnesota Department of Natural Resources.
6. UGA1234145 – Clemson University - USDA Cooperative Extension Slide Series.
7. UGA4823038 – Edward L. Barnard, Florida Department of Agriculture and Consumer Services.
8. UGA1496476 – UGA Plant Pathology Archives.
9. UGA1436096 – Clemson University - USDA Cooperative Extension Slide Series.
10. UGA1436097 – Clemson University - USDA Cooperative Extension Slide Series.
11. UGA1436095 – Clemson University - USDA Cooperative Extension Slide Series.
12. UGA1495075 – UGA Plant Pathology Archives.
13. UGA0176033 – M. Clerjeau, INRA, Centre de Recherches de Bordeaux.
14. UGA1436098 – Clemson University - USDA Cooperative Extension Slide Series.
15. UGA0162045 – Jack Clark, University of California-Davis.
16. UGA1495106 – UGA Plant Pathology Archives.
17. UGA1495099 – UGA Plant Pathology Archives.
18. UGA5077075 – David Langston, UGA.
19. UGA0176035 – M. Clerjeau, INRA, Centre de Recherches de Bordeaux.
20. UGA1436094 – Clemson University - USDA Cooperative Extension Slide Series.
21. UGA1436082 – Clemson University - USDA Cooperative Extension Slide Series.
22. UGA1236149 – Clemson University - USDA Cooperative Extension Slide Series.
23. UGA1492030 – UGA Plant Pathology Archives.
24. UGA1436090 – Clemson University - USDA Cooperative Extension Slide Series.
25. UGA1496549 – UGA Plant Pathology Archives.

Images 1-25 are available at <http://www.forestryimages.org/>. Unlabeled images are from the Extension Plant Pathology Archives, Dr. Phil Brannen, or Holly Thornton.



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