

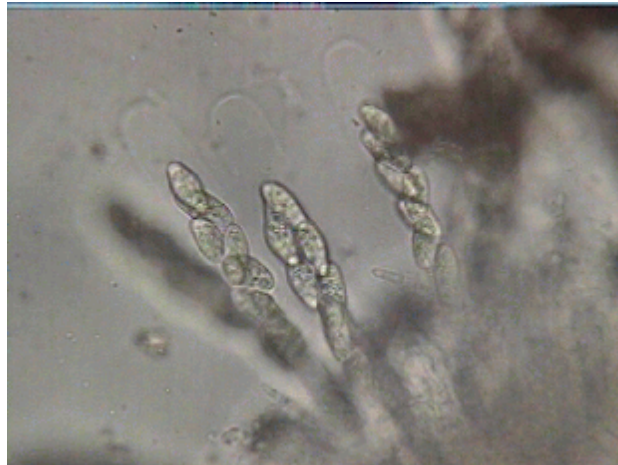


The University of Georgia

Cooperative Extension Service

College of Agricultural & Environmental Sciences

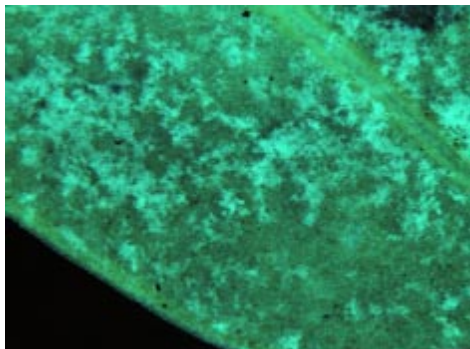
SIMPLIFIED FUNGI IDENTIFICATION KEY



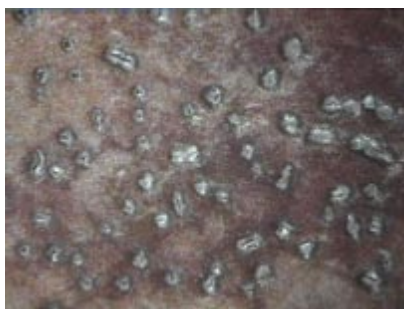
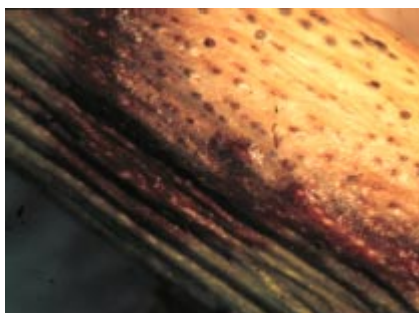
Jean Williams-Woodward
Extension Plant Pathologist

Simplified Fungi Identification Key:

- 1a. Conidia (spores) produced on naked (open) conidiophores 2

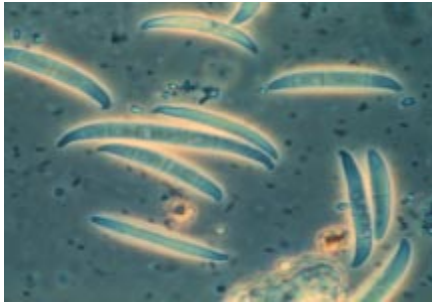


- 1b. Conidia produced in an acervulus or pycnidium (fungal fruiting structures) 11



- 1c. No conidia readily produced by fungus or seen on sample 18
- 2a. Both conidia and conidiophores (stalk-like, spore-bearing structures) hyaline (colorless) or brightly colored 3
- 2b. Either conidia or conidiophores (or both) with a distinct pigment (brown, black, gray, etc.) 7
- 3a. Conidia typically 1-celled, round to elongated 4
- 3b. Conidia typically 2-celled, elongated to cylindrical 6

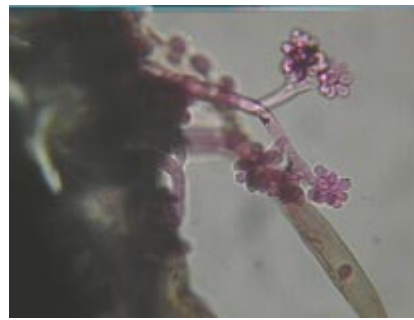
3c. Conidia 3 or more-celled, elongated to slightly curved, “canoe-shaped” *Fusarium*



4a. Conidiophores short, truncated; ovoid to “barrel-shaped” conidia produced in single chain; white mycelium evident on tissue; conidial state of powdery mildew *Oidium*

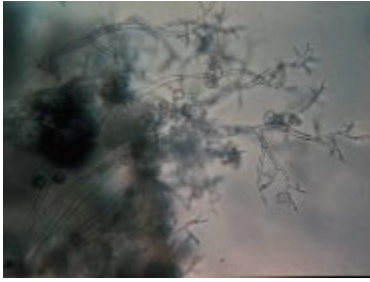


4b. Conidiophores slender, long (often darkly-colored when viewed through stereo microscope), branching irregularly at end; terminal cells enlarged or rounded and bear clusters of conidia *Botrytis*



4c. Conidiophores highly branched 5

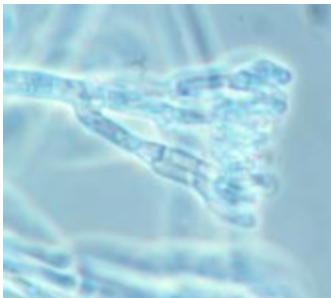
- 5a. Tips of conidiophores (sporangiophores) pointed (similar to elk or deer antlers); spores ovoid and “large” *Peronospora* (downy mildew)



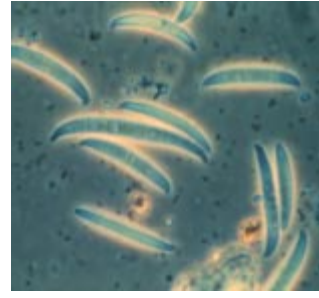
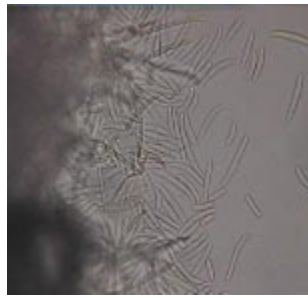
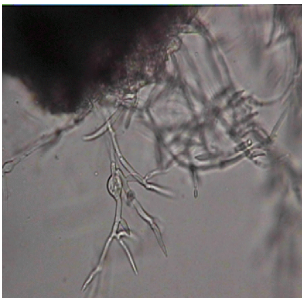
- 5b. Tips of conidiophores (sporangiophores) swollen with peg-like appendages; spores ovoid and “large” *Plasmopara* (downy mildew)



- 6a. Conidiophores highly branched at apex; conidia slender, cylindrical with a septum (cross wall) directly in the middle of spore *Cylindrocladium*



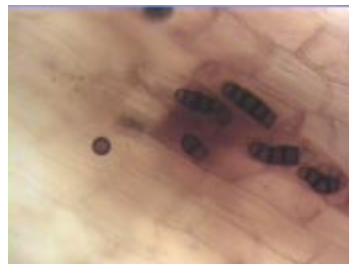
- 6b. Conidiophores simple or branched with ovoid to elongated conidia of variable size (1 or 2-celled microconidia or 3 or more-celled macroconidia) *Fusarium*



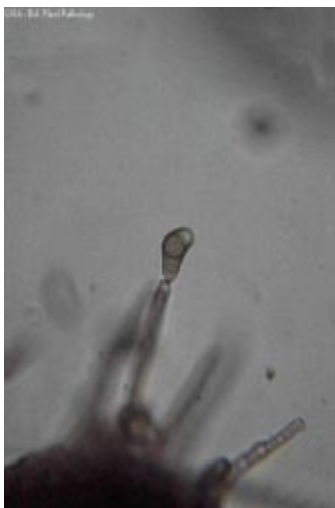
- 7a. Conidia 1-celled, ellipsoid, and darkly pigmented produced in a “head” at the apex of branched, long conidiophores (sporangiohores) *Choanephora*



- 7b. Conidia 2 or more-celled 8
- 8a. Conidia produced singularly at apex of simple conidiophores 9
- 8b. Conidia produced singularly or more often in chains at apex of conidiophores 10
- 8c. Conidia (chlamydo spores) produced on short conidiophores within or on root tissue *Thielaviopsis*



- 9a. Conidia 3 to 4-celled, bent, “boomerang-shaped”, with enlarged central cell *Curvularia*



- 9b. Conidia darkly to lightly pigmented, multi-celled, ovoid to cylindrical, center cells tend to be wider than cells at either end; conidiophores simple or clustered *Helminthosporium*



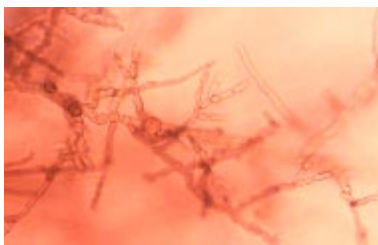
- 9c. Conidia hyaline (colorless) to lightly pigmented, multi-celled with 5 or more septations (cross walls), one end may be more narrow than other; conidiophores produced in clusters *Cercospora*



- 10a. Conidiophores short; conidia oval with both horizontal and vertical internal septa (cross walls); may be saprophytic or pathogenic *Alternaria*



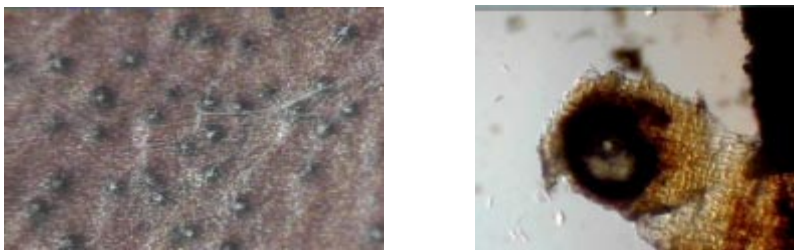
- 10b. Conidiophores long, upright and branching at apex; conidia variable in shape (oval, cylindrical or irregular) and produced in chains, may be saprophytic or pathogenic *Cladosporium*



11a. Conidia produced in acervulus or similar structure with a solid to semi-solid base, spores rupture through host tissue at maturity 12



11b. Conidia produced in pycnidia (enclosed globular or round structure that may be embedded in host tissue) 15



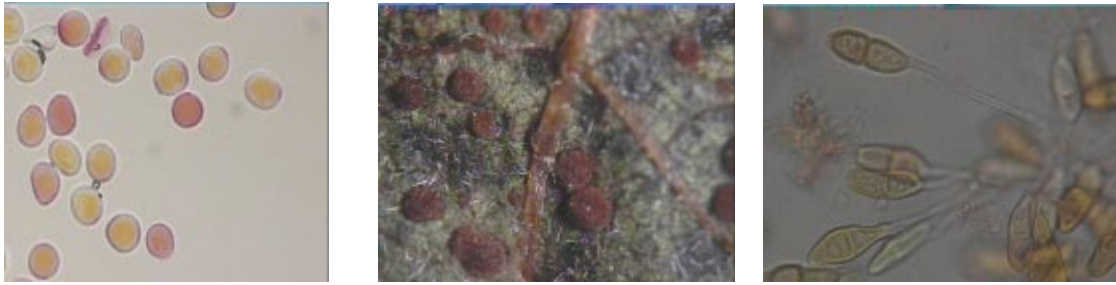
12a. Conidia 1-celled, brightly or darkly colored, rupturing through host tissue 13

12b. Conidia 1-celled, hyaline (colorless) or cream, salmon, or pink-colored in mass, ovoid, cylindrical or slightly curved; long, black setae (non-septate, hair-like projections) may or may not be produced *Colletotrichum (Gloeosporium)*

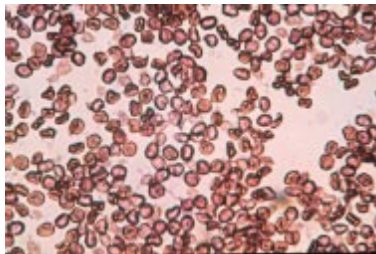


12c. Conidia 3 or more-celled 14

- 13a. Conidia (uredospores) orange-red, circular to ovoid with thickened, often rough cell walls; 2-celled, reddish teliospores often seen *Puccinia* (*Rust fungi*)



- 13b. Conidia (teliospores or chlamydospores), darkly pigmented, spherical and ornate with spines or net-like ridges; ruptures through host tissue as a black-brown powdery mass; may form large fleshy galls *Smut fungi* (*Ustilago*, *Tilletia*)



- 14a. Conidia hyaline (colorless), 4-celled with lateral cells smaller than two central cells; slender, bristle-like appendage formed on 3-uppermost cells *Entomosporium*



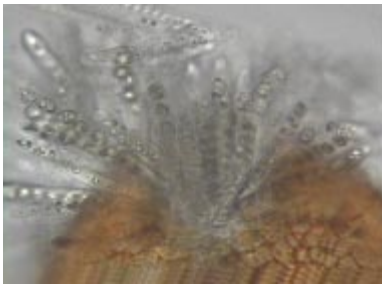
- 14b. Conidia have 3 darkly pigmented center cells, and clear, pointed end cells; two or more clear appendages arise from one end cell and a single short appendage from other end cell; often a secondary pathogen *Pestalotia* (*Pestalotiopsis*)



- 14c. Conidia have 4 darkly pigmented internal cells and clear pointed end cells, with a single appendage on each end cell *Seiridium*

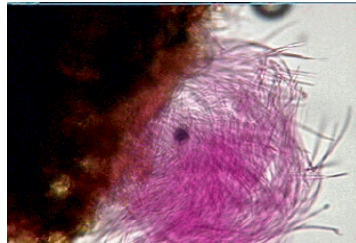
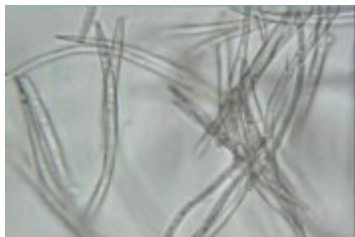


- 15a. Typically, eight conidia (ascospores) produced in sac-like structure (ascus) within brightly colored (orange to red) pycnidia (perithecia) *Nectria*

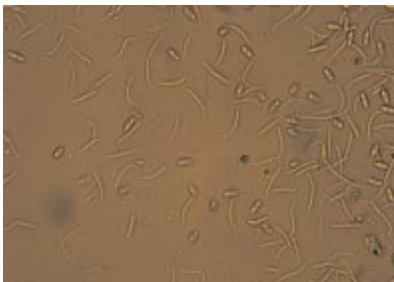


- 15b. Conidia single celled 16

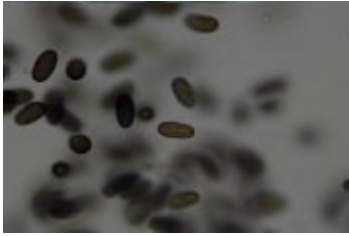
- 15c. Conidia multi-celled, filiform to elongated, hyaline (colorless) *Septoria*



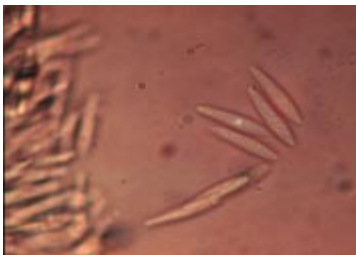
- 16a. Conidia of two types; hyaline, oval to fusoid-shaped alpha-conidia and long, thin, curved or bent beta-conidia *Phomopsis*



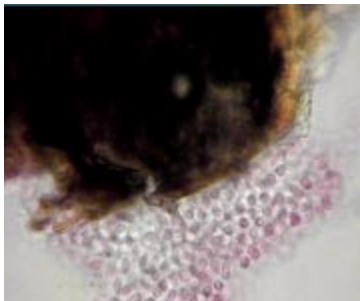
- 16b. Conidia of one type, hyaline (colorless) 17
- 16c. Conidia of one type, darkly pigmented, elliptical *Sphaeropsis (Botryosphaeria)*



- 17a. Conidia hyaline, fusoid (spindle-shaped), wider in the middle than on the ends *Fusicoccum (Botryosphaeria)*



- 17b. Conidia hyaline, vary small, rounded to elliptical, often extruded in tendrils when emerging from the pycnidia's ostiole (opening) *Phyllosticta* or *Phoma*



- 17c. Conidia, hyaline, "large" (greater than 10µm), elliptical *Macrophoma (Botryosphaeria)*

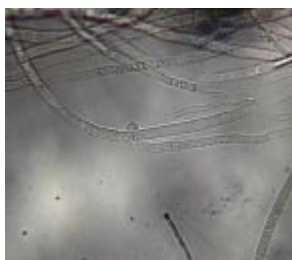
- 18a. Hyphae (mycelium) often lightly pigmented, with right angled branches; septa (Cross walls) occur near branching point *Rhizoctonia*



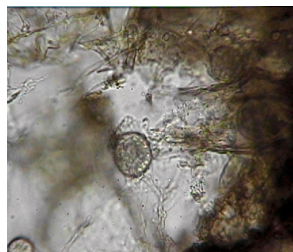
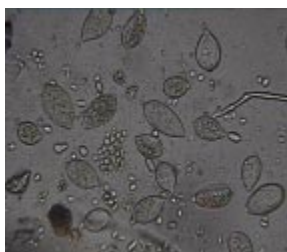
- 18b. Fluffy white mycelium formed on infected tissue; hard, black irregularly-shaped sclerotia (survival structures) often form internally in infected stems and flowers *Sclerotinia*



- 18c. Profuse, white mycelium radiates across infected tissue or soil in a fan-like manner; hyphae may have clamp connections (bridge-like growth) above hyphae septa; hard, small round, yellow to brown sclerotia form on infected tissue *Sclerotium*



- 18d. Non-septate (no cross walls) hyphae observed in root, stem or leaf tissue; hyphae may appear “wide” with grainy texture; irregular hyphal swellings (finger-like projections) or thick-walled oospores (survival structures) may be observed; round or lemon-shaped sporangia may be present *Pythium* or *Phytophthora*



ATTENTION!
Pesticide Precautions

Observe all directions, restrictions and precautions on pesticide labels. It is dangerous, wasteful and illegal to do otherwise.

1. Store all pesticides in original containers with labels intact and behind locked doors. **“KEEP PESTICIDES OUT OF REACH OF CHILDREN.”**
2. Use pesticides at correct label dosage and intervals to avoid illegal residues or injury to plant and animals.
3. Apply pesticides carefully to avoid drift or contamination of non-target areas.
4. Surplus pesticides and containers should be disposed of in accordance with label instructions so that contamination of water and other hazards will not result.
5. Follow directions on the pesticide label regarding restrictions as required by State and Federal Laws and Regulations.
6. Avoid any action that may threaten an Endangered Species or its habitat. Your County Extension Agent can inform you of Endangered species in your area, help you identify them and through the Fish and Wildlife Service Office identify actions that may threaten Endangered species or their habitat.

Trade names are used only for information. The University of Georgia College of Agriculture and Environmental sciences offer educational programs, assistance and materials to all people without regard to race, color, or national origin, age, sex or handicap status.

AN EQUAL OPPORTUNITY EMPLOYER

Special Bulletin 37

January 2001

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30 1914, The University of Georgia College of Agriculture and the U.S. Department of Agriculture cooperating.

Gale A. Buchanan
Dean and Director