

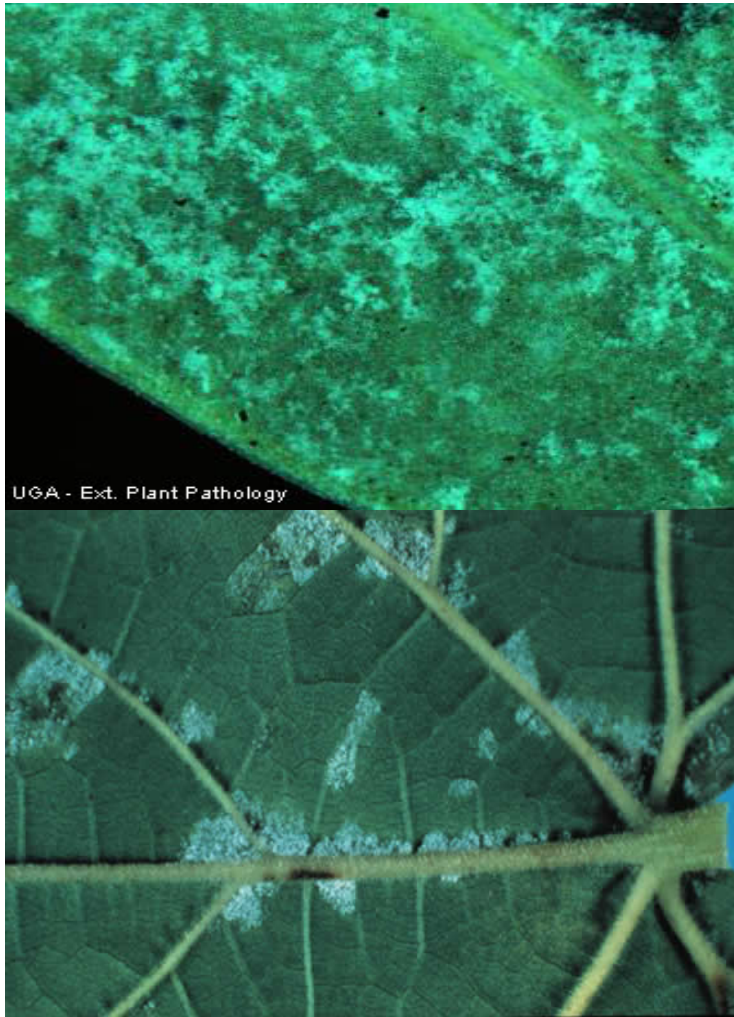
# Downy Mildew

**Important diseases:** Downy mildew of vegetables, fruits, ornamentals, forages, and field crops, Blue mold of Tobacco.

Downy mildews are primarily foliage blights that attack young, tender leaves, twigs, and fruits. Downy mildew of grape, spinach, and tobacco cause serious economic losses. It spreads rapidly through fields and is dependent on a wet, humid environment with cool or warm, but not hot, temperatures to grow and infect. A film of water is needed on plant tissue for spore germination and infection. Downy mildew fungi are related to *Pythium* and *Phytophthora*. Several different fungi cause downy mildew disease including *Peronospora* (mildew on tobacco, spinach, soybeans, alfalfa, onion, many ornamentals), *Plasmopara* (on grape, sunflower), *Bremia* (on lettuce), *Pseudoperonospora* (on cucurbits), *Peronosclerospora* (on sorghum and corn), *Sclerospora* (on grasses, millet), and *Sclerophthora* (on corn, rice, wheat).



Symptoms of downy mildew infection include small, pale yellow spots with indefinite borders on the upper leaf surface. Purplish discoloration of the upper leaf surface is seen on some hosts. A downy growth of fruiting structures and hyphae (sporangiophores) may be seen directly under the spots on the underside of the leaf or on fruits or stems.



Sporangiophores (conidiophores) of the fungus causing downy mildew are long, branched, white initially, and emerge from stomata on the leaf surface. Downy mildew fungi are identified based upon the branching structure of the sporangiophores. The tips of *Plasmopara* sporangiophores are somewhat swollen with peg-like appendages. *Peronospora* sporangiophores appear similar to elk or deer antlers.



Sporangia (spore-containing "sacks") are produced on the tips of the sporangiophore branches. Initially the sporangia are white in color, but they may darken as they age.