

Needle Blight

Mycosphaerella gibsonii



Photo: H. Hashimoto, Bugwood.org # 1949016



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Needle Blight

- Fungal pathogen
- First recorded in Japan in 1913
- Serious disease of exotic and native trees in *Pinus* spp.
- Mostly affects seedlings and saplings
- Under epidemic conditions, may cause 100% infection rates and 50-80% death rates
- Disease severity influenced by:
 - Species infected, age of tree infected, environmental conditions



Needle blight symptoms on *Pinus thunbergii*.

Photo: H. Hashimoto, Bugwood.org # 1949016



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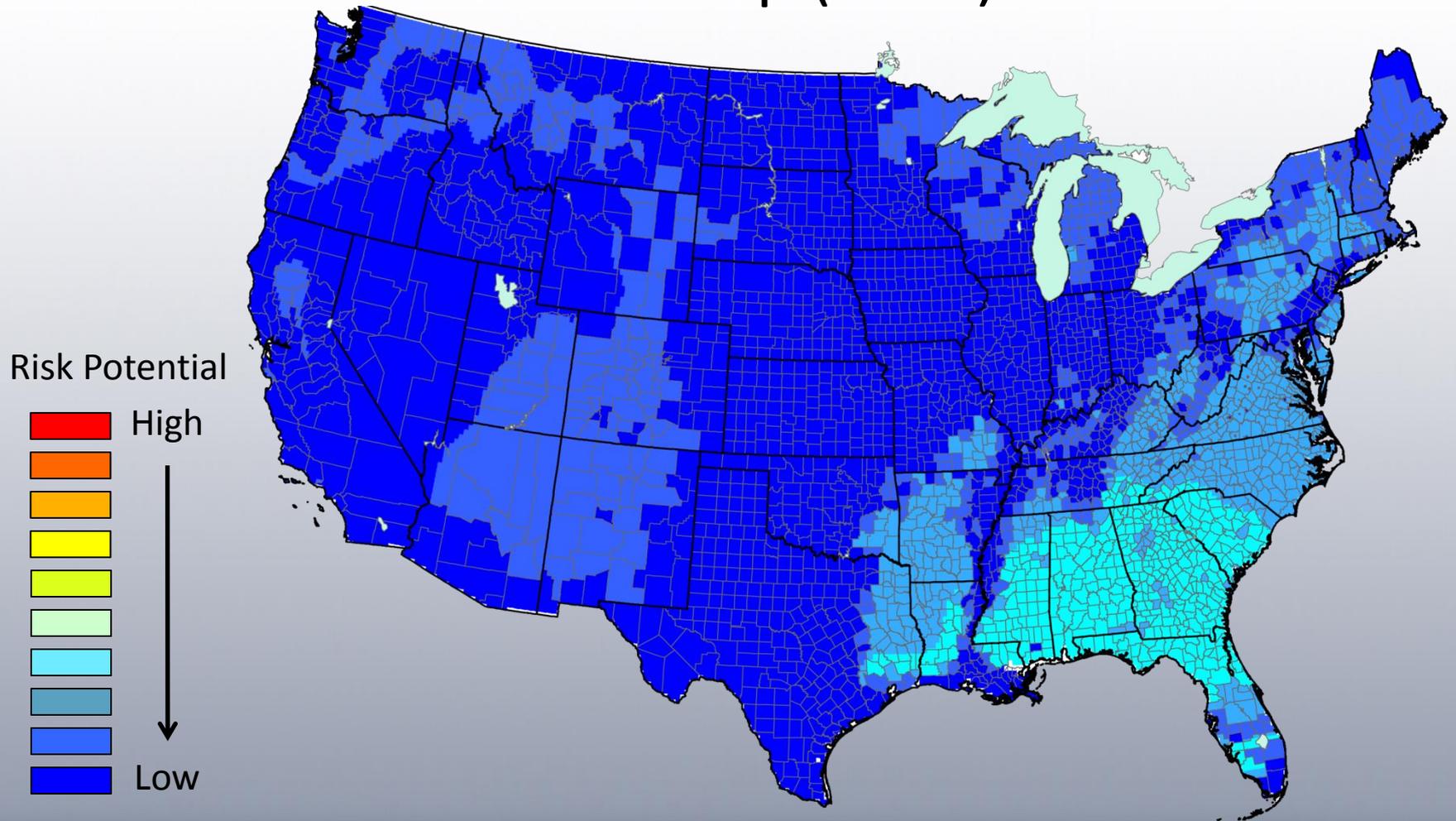


Host Plants

- Numerous species of *Pinus* trees including:
 - Rocky Mountain bristle cone pine
 - shortleaf pine
 - lodgepole pine
 - slash pine
 - ponderosa pine
 - white pine
 - loblolly pine
- Under laboratory conditions, other conifers are susceptible
- Resistance to the disease reported in a few *Pinus* spp.



Potential Distribution Risk Map (2011)



Map courtesy of www.nappfast.org – accessed 11/12/2013



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Disease Symptoms

- Appear within 2 to 5 weeks of infection on lower needles
- Lesions that are 5–10 mm long
 - initially light, yellow-green bands; fade to gray-brown
 - no reddish tint
- Dark fruiting bodies on lesions.
- Host loses leaves, has stunted growth, and may die



Lesions on infected *Pinus thunbergii* needles.

Photo: European and Mediterranean Plant Protection Organization, epo.int



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Identification

Fungal species can be distinguished by examining conidia - asexual non-motile spores of a fungus.



Conidia of *Mycosphaerella* sp.

Photo: William Jacobi, Colorado State University, Bugwood.org, #5366775



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Spread and Transmission

- Pathogen spreads on infected nursery stock
- Hyphae can overwinter in affected needles or as a latent infection on healthy-looking needles
- Spores dispersed by rain splash or overhead irrigation
- 2 to 3 days of moist, humid conditions required for fungal dispersal and infection



Monitoring and Management

- Monitoring
 - conduct a survey for visual symptoms and collect blighted needles
- Chemical control
 - in nurseries, use maneb (or mancozeb) or copper-based fungicides
- Cultural control
 - all diseased seedlings should be removed and burned early in the season



Look-alike Species

Dothistroma blight (*Mycosphaerella pini*)



M. pini symptoms on *Pinus ponderosa*.



Note – Needles infected by *M. gibsonii* do not have a reddish tint as with other pine diseases.

Photos: (Left) Robert L. James, USDA Forest Service, Bugwood.org #1241609;
(Right) Susan K. Hagle, USDA Forest Service, Bugwood.org #1241610



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Look-alike Species

Diplodia blight (*Sphaeropsis sapinea*)



Note - Needles infected by *M. gibsonii* do not have a reddish tint as with other pine diseases.

S. sapinea symptoms on *Pinus ponderosa*.

Photos: (Left) Joseph O'Brien, USDA Forest Service, Bugwood.org #5029014; (Right) Susan K. Hagle, USDA Forest Service, Bugwood.org #1241526



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Look-alike Species

Brown Spot Needle Blight (*Mycosphaerella dearnessii*)



M. dearnessii symptoms on *Pinus palustris* (longleaf pine)



M. dearnessii symptoms on *Pinus sylvestris* L. (Scots pine)

Photos: (Left) - David J. Moorhead, University of Georgia, Bugwood.org, #0908075; (Right) - Darroll D. Skilling, USDA Forest Service, Bugwood.org, #1949034

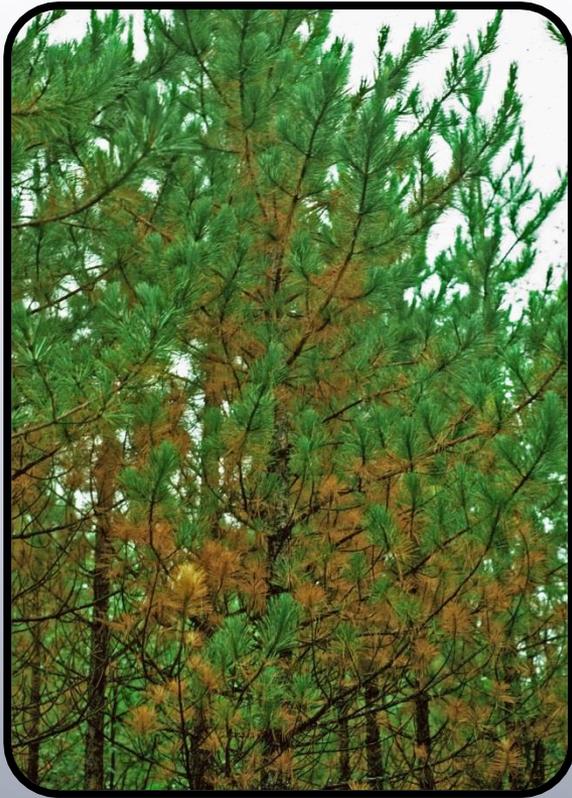


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Look-alike Species

Pine Needle Rust (*Coleosporium asterum*)



C. Asterum symptoms on *Pinus resinosa*
(red pine)



Above: *C. Asterum* symptoms on red pine.
Below: fruiting bodies (aecia) on pine host

Photos: (Left) USDA Forest Service - North Central Research Station Archive, USDA Forest Service, Bugwood.org , #1406007; (Right top) Susan K. Hagle, USDA Forest Service, Bugwood.org #1241526; (Right bottom) - USDA Forest Service - North Central Research Station Archive, USDA Forest Service, Bugwood.org , #1406003



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Look-alike Species

Needle Cast (*Ploioderma* and *Lophodermium* spp.)



Ploioderma needle cast symptoms on
Pinus virginiana (Virginia pine)



Lodgepole
pine needle
cast symptoms
(above);
Immature
fruiting bodies
of *Ploioderma*
spp.
on *Pinus nigra*
Arnold (below)

Photos: (Left) – David J. Moorhead, University of Georgia, Bugwood.org, #0485002; (Top Right) – USDA Forest Service Archive, USDA Forest Service, Bugwood.org, #1241614;
(Bottom right) - Sandra Jensen, Cornell University, Bugwood.org, #5492330



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Look-alike Species

Pitch Canker Disease (*Fusarium circinatum*)



Pitch canker symptoms on
Pinus elliottii Englem
(slash pine)



Longleaf pine with pitch
canker, note resin soaked
wood & resin on stem



Slash pines showing resin
on outside of stem

Photos: (Left) – Terry S. Price, Georgia Forestry Commission, Bugwood.org, #1247233; (Middle) – Jason Smith, University of Florida; (Right) – Tyler Dreaden, University of Florida



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Collaborating Agencies

- U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS)
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- National Plant Diagnostic Network (NPDN)
- Sentinel Plant Network (SPN)
- Protect U.S.
- University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)



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