

Image Citations

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Cover

Design by Ryan Blaedow, North Carolina Forest Service
 Oak: Rainbow Treecare Scientific Advancements, Minnetonka, MN
 Two-lined Chestnut Borer: Pennsylvania Dept of Conservation and Natural Resources

Forest Protection Introduction

Tree Stress Agents: Illustration by Ryan Blaedow, North Carolina Forest Service

Forest Entomology Introduction

Clerid Beetle: David Cappaert, Michigan State University, Bugwood.org
 Gypsy Moth Egg Masses: Manfred Mielke, USDA Forest Service, Bugwood.org
 Eastern Hercules Beetle: Allen Bridgman, South Carolina Department of Natural Resources, Bugwood.org
 Insect Anatomy (Side View): Illustration by Gary Blaedow, West Allis, WI
 Mouthparts: Illustration by Gary Blaedow, West Allis, WI
 Insect Anatomy (Top View): Illustration by Gary Blaedow, West Allis, WI
 Metamorphosis: Illustration by Gary Blaedow, West Allis, WI
 Cecropia Moth Caterpillar: Ryan Blaedow, North Carolina Forest Service
 Cecropia Moth Adult: Daniel Herms, The Ohio State University, Bugwood.org
 Eastern Tent Caterpillar: Lacy L. Hyche, Auburn University, Bugwood.org
 Beetle Galleries: Ronald F. Billings, Texas Forest Service, Bugwood.org
 Wood Borer Gallery: Lacy L. Hyche, Auburn University, Bugwood.org
 Aphids: Whitney Cranshaw, Colorado State University, Bugwood.org
 Frasier Fir Stand: Ronald F. Billings, Texas Forest Service, Bugwood.org
 Pales Weevil: USDA Forest Service - Region 8 Archive, USDA Forest Service, Bugwood.org
 Tip Moth Damage: A. Steven Munson, USDA Forest Service, Bugwood.org

Scale Insects

Fig. 1 Gerald J. Lenhard, Louisiana State Univ, Bugwood.org
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Aphids

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- Fig. 10 Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org
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Hemlock Woolly Adelgid

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- Fig. 8 Harvard Forest, harvardforest.fas.harvard.edu/research/hwa.htm

Balsam Woolly Adelgid

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- Fig. 7 Jason Moan, North Carolina Forest Service

Pine Webworm

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Redheaded Pine Sawfly

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Eastern Tent Caterpillar

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Forest Tent Caterpillar

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- Fig. 8 James B. Hanson, USDA Forest Service, Bugwood.org

Fall Webworm

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Orangestriped Oak Worm

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- Fig. 8 Erich G. Vallery, USDA Forest Service - SRS-4552, Bugwood.org
- Fig. 9 James Solomon, USDA Forest Service, Bugwood.org

Pine Colaspis Beetle

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Bagworm

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- Fig. 4 Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org

Fall Cankerworm

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Locust Leafminer

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- Fig. 6 Bruce W. Kauffman, Tennessee Department of Agriculture, Bugwood.org

Gypsy Moth

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Japanese Beetle

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- Fig. 3 David Cappaert, Michigan State University, Bugwood.org
- Fig. 4 Ryan Blaedow, North Carolina Forest Service
- Fig. 5 naturesperspective.com

Southern Pine Beetle

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- Fig. 3 Ronald F. Billings, Texas Forest Service, Bugwood.org
- Fig. 4 Erich G. Vallery, USDA Forest Service - SRS-4552, Bugwood.org
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Black Turpentine Beetle

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Elm Bark Beetles

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- Fig. 7 Linda Haugen, USDA Forest Service, Bugwood.org

Hickory Bark Beetle

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Pine Sawyer Beetles

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Ambrosia Beetles

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Asian Longhorned Beetle

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Emerald Ash Borer

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Sirex Woodwasp

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Pales Weevil

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- Fig. 4 Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org

Nantucket Pine Tip Moth

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Twig Pruners and Girdlers

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- Fig. 6 Gale and Jeanell Strickland, BugGuide.net

Forest Pathology Introduction

- Chestnut Blight: The American Chestnut Foundation Image Archive
- Disease Triangle: Ryan Blaedow, North Carolina Forest Service
- Oyster Mushrooms: USDA Forest Service - North Central Research Station Archive, USDA Forest Service, Bugwood.org
- Fusiform Rust: Paul A. Mistretta, USDA Forest Service, Bugwood.org
- Dutch Elm Disease: Linda Haugen, USDA Forest Service, Bugwood.org
- Oak Anthracnose: Robert L. Anderson, USDA Forest Service, Bugwood.org
- Pruning Wound: Joseph O'Brien, USDA Forest Service, Bugwood.org
- Brown Spot Needle Blight: Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org
- Hyphae: University of Wisconsin, Turfgrass Diagnostic Lab
- Spore Tendrils: Ministry of Agriculture and Regional Development, Bugwood.org
- Spores: H.C. Evans, CAB International, Bugwood.org
- Bacterial Leaf Scorch: Theodor D. Leininger, USDA Forest Service, Bugwood.org
- Bacteria: Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, Bugwood.org
- Virus: Sebastian Kaulitzki, Dreamstime.com
- Nematodes: David Cappaert, Michigan State University, Bugwood.org

Anthracnose

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Brown Spot Needle Blight

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Pine Needle Cast

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Dogwood Anthracnose

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Fusiform Rust

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- Fig. 2 Forest Insect and Disease Leaflet #26
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Hypoxyylon Canker

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Pitch Canker

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Wetwood / Slime Flux

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White Pine Blister Rust

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- Fig. 6 Petr Kapitola, State Phytosanitary Administration, Bugwood.org
- Fig. 7 Joseph O'Brien, USDA Forest Service, Bugwood.org
- Fig. 8 Minnesota Dept of Natural Resources Archive, MN Dept of Natural Resources, Bugwood.org

Beech Bark Disease

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Sudden Oak Death

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Thousand Cankers Disease

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- Fig. 10 Ned Tisserat, Colorado State University, Bugwood.org

Fireblight

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Bacterial Leaf Scorch

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Oak Decline

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Oak Wilt

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Dutch Elm Disease

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Laurel Wilt

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Annosus Root Rot

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Armillaria Root Rot

- Fig. 1 Rocky Mountain Research Station/Forest Pathology Archive, USDA Forest Service, Bugwood.org
 Fig. 2 Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org
 Fig. 3 Andrej Kunca, National Forest Centre - Slovakia, Bugwood.org
 Fig. 4 Mike Schomaker, Colorado State Forest Service, Bugwood.org
 Fig. 5 Joseph O'Brien, USDA Forest Service, Bugwood.org
 Fig. 6 Robert L. Anderson, USDA Forest Service, Bugwood.org

Littleleaf Disease

- Fig. 1 Daniel H. Brown, USDA Forest Service, Bugwood.org
 Fig. 2 Clemson University - USDA Cooperative Extension Slide Series, , Bugwood.org
 Fig. 3 Clemson University - USDA Cooperative Extension Slide Series, , Bugwood.org
 Fig. 4 Clemson University - USDA Cooperative Extension Slide Series, , Bugwood.org
 Fig. 5 Jason Moan, North Carolina Forest Service

Phytophthora Root Rot

- Fig. 1 Linda Haugen, USDA Forest Service, Bugwood.org
 Fig. 2 André Bolay, St. Fédér. de Recherches Agronomiques de Changins, Bugwood.org
 Fig. 3 Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org
 Fig. 4 H.J. Larsen, Bugwood.org
 Fig. 5 Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org
 Fig. 6 Andrej Kunca, National Forest Centre - Slovakia, Bugwood.org
 Fig. 7 Andrej Kunca, National Forest Centre - Slovakia, Bugwood.org

Procera Root Disease

- Fig. 1 Robert L. Anderson, USDA Forest Service, Bugwood.org
 Fig. 2 Robert L. Anderson, USDA Forest Service, Bugwood.org
 Fig. 3 Manfred Mielke, USDA Forest Service, Bugwood.org
 Fig. 4 Manfred Mielke, USDA Forest Service, Bugwood.org
 Fig. 5 Robert L. Anderson, USDA Forest Service, Bugwood.org
 Fig. 6 Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org

Disorders and Abiotic Stress Agents

Wind: Steven Katovich, USDA Forest Service, Bugwood.org
Snow/Ice: Minnesota Department of Natural Resources Archive, Minnesota Department of Natural Resources, Bugwood.org
Rain: R.L. Croissant, Bugwood.org
Lightning: Ryan Blaedow, North Carolina Forest Service
Hail: Joseph O'Brien, USDA Forest Service, Bugwood.org
Storms: Joseph O'Brien, USDA Forest Service, Bugwood.org
Flooding: Karan A. Rawlins, University of Georgia, Bugwood.org
Drought: Robert L. Anderson, USDA Forest Service, Bugwood.org
Salt Damage: Paul A. Mistretta, USDA Forest Service, Bugwood.org
Frost/Freezing: Joseph O'Brien, USDA Forest Service, Bugwood.org
Heat: Ryan Blaedow, North Carolina Forest Service
Air Pollution: Tim Tigner, Virginia Department of Forestry, Bugwood.org
Fire: Dale Wade, Rx Fire Doctor, Bugwood.org
Mechanical Damage: Joseph O'Brien, USDA Forest Service, Bugwood.org
Root Injury: Joseph O'Brien, USDA Forest Service, Bugwood.org
Herbicide Damage: Purdue University, Botany and Plant Pathology Extension Service
Nutrient Imbalances: Joseph O'Brien, USDA Forest Service, Bugwood.org
Frost Cracks: James Solomon, USDA Forest Service, Bugwood.org; Joseph O'Brien, USDA Forest Service, Bugwood.org
Sun Scald: Ryan Blaedow, North Carolina Forest Service; William Jacobi, Colorado State Univ, Bugwood.org
Soil Compaction: Peter Bedker, Bugwood.org
Soil Grade Changes: USDA Forest Service - Forest Health Protection - St. Paul Archive, USDA Forest Service, Bugwood.org
Improper Pruning: Joseph O'Brien, USDA Forest Service, Bugwood.org
Deep Planting: Joseph LaForest, University of Georgia, Bugwood.org
Improper Mulching: Gary Watson, Morton Arboretum, Bugwood.org
Included Bark: Joseph O'Brien, USDA Forest Service, Bugwood.org
Girdling Roots: Joseph O'Brien, USDA Forest Service, Bugwood.org
Genetic Disorders: Iowa State University, University Extension

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