



# DISEASES

## Pinyon Pine Diseases and Insects no. 2.948

by C. Francis, W.R. Jacobi and W.S. Cranshaw<sup>1</sup>

### Quick Facts...

Pinyon pines are well-suited to many parts of Colorado.

They make good visual screens, windbreaks, and wildlife habitat.

Major diseases include black stain root disease, dwarf mistletoe, armillaria root disease, and pinyon decline.

Common insect pests are pinyon pitch mass borer, Ips beetles, pinyon tip moth, pinyon pitch nodule moth, pinyon needle scale, and pinyon spindlegall midge.

To ensure optimum health, avoid wounding trees, choose an appropriate site, water properly, and give trees adequate space.

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### Major Diseases

#### Black Stain Root Disease (*Leptographium wagneri*)

This vascular disease causes extensive black staining of the sapwood in the root and lower stem before killing the sapwood. Bark beetles tend to follow as secondary pathogens and eventually cause the death of the tree. Spread occurs through root grafts and root contacts, and by insects that carry the spores (reproductive structures of the disease). Affected trees usually are in a group.



Figure 1: Vertical staining from black stain root disease.

#### Dwarf Mistletoe (*Arceuthobium divaricatum*)

These are small, leafless, parasitic flowering plants that grow on branches and spread only to other pinyon pines. They kill slowly by robbing the tree of its nutrients and water. Reproduction occurs when sticky seeds explosively discharge from the plant and adhere to the branches and needles of their next host. The life cycle from germination to dissemination is six years. This relatively slow rate of spread allows time for appropriate action.



Figure 2: Dwarf mistletoe broom and plants.

#### Armillaria Root Disease (*Armillaria* spp.)

*Armillaria* spreads along roots and by rhizomorphs (fungal-root-like structures). One tree or a group can be attacked. The fungus can subsist on dead, woody material for more than 35 years. *Armillaria* prefers to infect trees that are already stressed by environmental factors or other pathogens. It prefers moist sites and moderate temperatures and is rarely found on extremely hot, cold or dry sites.



Figure 3: White fungal fans of *Armillaria* spp.

**Table 1: Diseases of pinyon pines.**

Signs and Symptoms	Management Options
<b>Black Stain Root Disease</b>	
<ul style="list-style-type: none"> <li>• Yellowing and browning of needles.</li> <li>• Old needles drop prematurely; crown appears thin.</li> <li>• Resin may be exuded along trunk.</li> <li>• Distress cone crop or abnormally small cones.</li> <li>• Bands of jet-black wood at root collar and roots. Color does not cross annual rings like stain fungi carried by insects.</li> </ul>	<ul style="list-style-type: none"> <li>• Plant junipers, spruce or true firs in areas with the fungus. Ponderosa pine and Douglas-fir are hosts of other forms of this fungus, so do not plant them.</li> <li>• Trenching between trees may stop root-to-root spread if the trees on the other side of the trench are disease free.</li> </ul>
<b>Dwarf Mistletoe</b>	
<ul style="list-style-type: none"> <li>• Swelling of the bark at the infection site.</li> <li>• Brooming of highly infected branches.</li> <li>• Yellow foliage, reduced foliage and death of branches of infected areas of the crown.</li> <li>• The parasite itself: Yellow to green or brownish-green, segmented shoots, 1/2 to 6 inches long and 1/8 inch in diameter, protrude from branches. They form one to two years after infection.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove highly infected trees.</li> <li>• Prune lower infected branches, leaving at least one-third of the live crown. Shoots die as soon as the branches are pruned, so branch disposal is not a concern. Monitor effectiveness for 2-3 years. Repeat pruning as necessary.</li> <li>• If space permits, cut or plant other species in 50-foot or wider buffer zones between infected and healthy trees.</li> <li>• Remove the pinyon pine and plant another species in its place. Chemical sprays such as Florel remove mistletoe shoots, reduce seed production and prevent infection of new trees. This does not kill</li> </ul>
<p>the plant, so retreatment is necessary until infected trees are removed and new trees are planted.</p>	
<b>Armillaria Root Disease</b>	
<ul style="list-style-type: none"> <li>• Thin crown and/or chlorotic needles.</li> <li>• Distress cone crop.</li> <li>• Resin flow at tree base.</li> <li>• Yellow, stringy rot at tree base.</li> <li>• White mycelial fans just under bark on roots and tree base.</li> <li>• Rhizomorphs on roots: black, shoestring-like structures with a white, nonwoody core.</li> <li>• Honey-colored mushrooms at tree base.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove infected species and plant resistant species such as juniper.</li> <li>• Improve growing conditions.</li> </ul>
<b>Pinyon Decline</b>	
<ul style="list-style-type: none"> <li>• Red or yellow needles.</li> <li>• Dead branches may be on one side of the tree or scattered around the tree.</li> <li>• As some branches die, others may remain green and appear healthy.</li> <li>• Within a group of trees, some may die, some may show no symptoms, and others may have part of the crown die next to live trees.</li> </ul>	<ul style="list-style-type: none"> <li>• If no precipitation occurs, water trees growing on well-drained soils once a month from November to June.</li> <li>• Cut trees with more than 40 percent dead branches, remove them from the site. Dying trees and firewood may attract bark beetles and are a potential fire hazard.</li> <li>• Chip removed trees for mulch, cut them up for firewood (stored off-site) or bury them in a landfill. Never stack firewood or fresh-cut wood</li> <li>• Other diseases and insects may damage these trees and need management.</li> </ul>



Figure 4: Erratic branch mortality of pinyon decline.

### Pinyon Decline

Trees stricken with pinyon pine decline slowly die over several years. Affected trees have distinct symptoms that separate this disease from other problems commonly seen on pinyons. It is not related to bark beetles, black stain root disease or other common problems. Environmental stresses such as winter drought followed by a hot summer may trigger the decline.

### Major Insects

#### Pinyon “Pitch Mass” Borer (*Dioryctria ponderosae*)

The larvae of this insect are pale yellow or pink with a light brown head. Larvae live underneath a pitch mass. Adult moths are active and lay eggs in tree wounds from late June through August. The larvae undergo four molts before changing to the pupal stage. Pupation takes place in the chamber of pitch

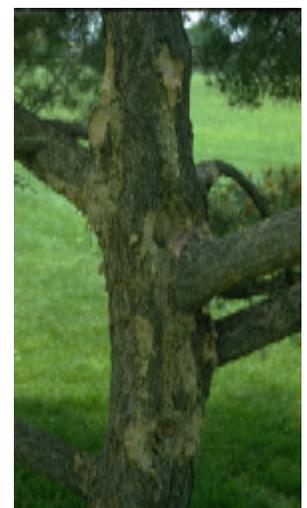


Figure 5: Pitch mass borer damage.



Figure 6: *Ips* galleries on pinyon.

and silk produced by the larvae. Larval feeding over the summer causes most of the damage. Generations take one to two years.

**Ips (Engraver) Beetles (*Ips* spp.)**

Adults are 1/8 to 1/4 inch long and reddish-brown to black. They have a pronounced cavity on the rear end that is lined with three to six pairs of tooth-like spines. Larvae are small, legless grubs (1/4 inch) that are white to dirty gray with dark heads. Adults lay eggs along galleries. Once the larvae hatch, they feed just inside the bark and mine away from the pupal chamber. From egg to adult takes 21 to 40 days in summer and several months in winter. The beetles are dormant from November to March. There are two to five generations per year.

**Pinyon Tip Moth (PTM) (*Dioryctria albovittella*)**

**Pinyon Pitch Nodule Moth (PPNM) (*Retinia arizonensis*)**

PTM: Adults are small grayish moths. Larvae are light golden brown with a dark brown head capsule up to 3/4 inches long. They overwinter in a small, silk cocoon on the bark. In mid- to late May, they feed by tunneling into the base of the unopened buds. They

**Table 2: Insects of pinyon pines.**

Signs and Symptoms	Management Options
<b>Pinyon "Pitch Mass" Borer</b>	
<ul style="list-style-type: none"> <li>• Large gouges in the cambium of the trunk and branches exude a creamy, pinkish pitch.</li> <li>• Tree is disfigured and branches are weakened.</li> <li>• Branch and twig dieback.</li> </ul>	<ul style="list-style-type: none"> <li>• "Worm" borers out with a flexible wire, if they haven't tunneled too far in.</li> <li>• Preventive trunk sprays when adults are active can reduce new attacks. Thorough coverage is important, especially around active</li> </ul>
<b>Ips (Engraver) Beetles</b>	
<ul style="list-style-type: none"> <li>• Yellowish or reddish-brown boring dust in bark crevices or around tree base.</li> <li>• Y- or H-shaped galleries just beneath the bark.</li> <li>• Pitch tubes at entry points are about 3 inches long and 3/4 inch wide.</li> <li>• Needles change from green to yellow to reddish brown.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote tree vigor with proper watering, spacing and nutrients.</li> <li>• Newly planted or stressed trees are highly susceptible. Reduce stress to reduce susceptibility.</li> <li>• To prevent subsequent generations, thoroughly wet bark and branches with preventive insecticides prior to egg laying in late March to early April and late July to early August. Sevin, Dursban or Astro are</li> </ul>
<b>Pinyon Tip Moth (PTM) Pinyon Pitch Nodule Moth (PPNM)</b>	
<ul style="list-style-type: none"> <li>• Twig dieback due to terminal feeding (PTM, PPNM).</li> <li>• Holes in cones created by the feeding (PTM).</li> <li>• Large amounts of pitch around wound site (PTM).</li> <li>• Pitch nodules at wound site are round, smooth and light purple or red (PPNM).</li> <li>• Disfigured form and weakened tree (PTM, PPNM).</li> </ul>	<ul style="list-style-type: none"> <li>• Spray in midsummer when larvae are exposed on the plant and/or in May when larvae become active and begin to enter stems (PTM).</li> <li>• Apply preventive insecticides (e.g., Orthene, Dursban, permethrin) in late July and early August when the larvae are exposed on the exterior of the twigs (PPNM).</li> </ul>
<b>Pinyon Needle Scale</b>	
<ul style="list-style-type: none"> <li>• Older needles are generally attacked. Needles turn yellow, die and drop. Tree develops a "tufted" appearance because only new needles remain.</li> <li>• Repeated attacks can kill young trees, weaken older trees. Weakened trees are more susceptible to bark beetle attacks.</li> <li>• The white, cottony wax on the eggs can be quite visible in heavily infested trees.</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching trunk sprays of dimethoate (Cygon) are specifically registered to control this insect.</li> </ul>
<b>Pinyon Spindlelegall Midge</b>	
<ul style="list-style-type: none"> <li>• Spindle-shaped galls about 1/2 inch long at the base of developing needles.</li> <li>• Discoloration (yellow or red) of the affected area.</li> <li>• Premature death of attacked needles.</li> </ul>	<ul style="list-style-type: none"> <li>• Predatory and parasitic wasps keep populations low.</li> <li>• Insecticides are most effective during egg laying and early gall growth. Use the silk produced by the pupae to time emergence. Older needles are not affected. Treat only newly developing needles.</li> <li>• Dimethoate (Cygon) is the most effective insecticide. It can kill midge larvae within newly formed galls. Wait until new galls are seen in July or early August. Spinosad and permethrin are effective at egg laying.</li> </ul>



Figure 7: Pinyon tip moth.



Figure 8: Pinyon pitch nodule moth.

mine the pith of the terminal growth, causing more damage as they grow. Large larvae move on to new tissue, cones or shoots. Pupation occurs inside the terminals and cones. Adults lay eggs from late June through August. There is one generation per year.

PPNM: Adults are a rusty brown. The larvae are reddish-yellow caterpillars with a black head and dark area behind the head. They overwinter as partially grown larvae within pitch nodules. Feeding resumes in spring and pupation follows in late spring. Adult flights typically peak in late July and early August. Eggs are laid on needle sheaths and the newly hatched larvae feed on young needles, later tunneling into shoots. There is one generation per year.

### Pinyon Needle Scale (*Matsucoccus acalyptus*)

Females overwinter on the needle as a legless nymph that resembles a small black bean. Development into the mobile adult form resumes in the spring. Mating occurs in early April. Eggs are laid in masses around the collar, branch crotches and underside of larger branches. The eggs are covered by a white, cottony wax. Newly hatched nymphs settle on the previous year's needles. Second stage nymphs form in late summer and overwinter on the needles. There is one generation per year.



Figure 9: Pinyon needle scale.

### Pinyon Spindlegall Midge (*Pinyonia edulicola*)

Adults are tiny flies, about 1/16 inch long, with an orange abdomen. The larvae are small, legless orange maggots found within needle galls. Adults mate and lay eggs on terminal buds from mid-June until early July. The eggs hatch and the larvae migrate down to newly formed needles. Six to 15 larvae occupy each gall, which is formed as a result of larval feeding. The larvae fully develop within the gall, then change to the pupal stage. The pupae produce a silken, frothy, white covering within the gall. This stage lasts two to three weeks. Adults pull the pupal case out with them as they emerge. There is one generation per year.



Figure 10: Spindlegall midge.

### Related Fact Sheets

2.925, Dwarf Mistletoe Management.

2.926, Healthy Roots and Healthy Trees.

2.932, Environmental Disorders of Woody Plants.

7.833, The Science of Planting Trees.

7.423, Trees and Shrubs for Mountain Areas.

7.417, How to Plant Trees and Shrubs.

7.420, Protecting Trees During Construction.

## Proper Maintenance

Pinyon pines are a hardy species, but it is still important to minimize stress and wounding. They are drought-tolerant and do not grow well above 7,500 feet. To reduce stress, provide adequate space, avoid overwatering, and do not plant them in soils high in clay. Activities that can cause wounding are construction, planting, yard work and logging.

If you are building on a site with established pinyons, do not locate structures within two tree heights of the tree. This is the extent of the underground root system. Proper planting of new or transplanted pinyons can minimize problems in the short and long term. Use lawnmowers and weed trimmers carefully to avoid trunk damage. Log carefully to avoid basal scarring and accidental branch removal.

In general, closely planted and overcrowded pinyons are more susceptible to insects and diseases than trees with adequate light and space. Excessive moisture in irrigated landscapes promotes succulent growth and branch cracking. These conditions provide good entry, egg laying and feeding sites for some insect species. Pruning can also create infestation sites. Allow enough time for wounds to close before adult insects are active.

<sup>1</sup> C. Francis, former student, forest sciences; W.R. Jacobi and W.S. Cranshaw, professors; bioagricultural sciences and pest management.