

Abiotic Diseases

Drought Injury

Hosts: All Christmas Trees

Description of Damage:

Drought damage may not show up for a year or more and the effect may be cumulative. The most common sign of drought is a dying of branches starting at the top of the tree (Fig.1). Twig tips of current year's growth may wilt or droop. Tips may initially remain green and eventually brown (Fig. 2). Cumulative effects of drought may yield short needles and sparse or thin crown. Trees weakened by drought are susceptible to invasion by secondary insects and/or diseases. These are sometimes referred to as secondary pests which are opportunistic and under normal circumstances would not affect a healthy tree. Armillaria root rot and bark beetles are examples of opportunistic invaders.



Fig. 1



Fig. 2

Management Techniques:

IPM Strategies:

Reduce competition from weeds.

When feasible provide irrigation, especially to newly planted transplants.

Do not plant shallow-rooted species such as true firs and spruce in sandy soils.

Fall Needle Drop

Hosts: All Christmas Trees

Description of Damage:

Older needles, especially on the interior of the tree turn yellow and shed. This is a normal phenomenon. Lower light in the interior of the tree as well as physiological stress will cause these older needles to die. It is often most pronounced in late summer and fall. Needles usually yellow before they drop off (Figs. 1, 2). This fall needle drop is most often seen on white pines (Fig. 3).



Fig. 1



Fig. 2



Fig. 3

Management Techniques:

IPM Strategies:

Cultural practices to maintain tree vigor and health may help to reduce large quantities of fall needle drop.

Frost Damage

Hosts: True firs, Douglas fir, spruce

Description of Damage:

Late spring frosts (when temperatures go below freezing) as buds are breaking or new tender growth is elongating can kill tender opening buds (Fig. 1) and elongating shoots. Buds and shoot tips may droop, turn tan, then brown and die (Figs. 2, 3, 4, 5, 6). New shoots usually develop next to the dead ones. Damage will normally appear a few days after cold temperatures.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

Management Techniques:

IPM Strategies:

Varieties that tend to break bud early are more susceptible.

Remove dead shoots.

Avoid planting susceptible trees in low-lying areas that may serve as “frost pockets”.

Winter Injury

Hosts: All Christmas Trees

Description of Damage:

In late winter and early spring look for needles to turn reddish-brown especially on the south or west side of the tree (Fig. 1). Branches or the entire tree may be affected. Buds are usually not affected and should continue to develop normally.



Fig. 1

In late winter and early spring on sunny days daytime temperatures begin to rise which may break dormancy. Transpiration is a biological process which causes moisture to evaporate from plant tissue, in this case the needles. During the growing season, roots absorb moisture and this moisture is expended from the needles. In winter and early spring, moisture in the ground is frozen and therefore roots cannot absorb it. On mild, sunny days needles will lose moisture (transpire) and it cannot be replaced. The result is needle browning and death. A rapid rise in daytime temperatures followed by a rapid decrease in temperatures at night causes moisture in the needles to freeze and the result is tissue death. Winter injury will often begin above the snowline (Fig. 2). Branches below the snowline are insulated and protected from rising temperatures. Though the damage occurs in late winter or early spring, symptoms may not show up until later in the spring.



Fig. 2

Management Techniques:

IPM Strategies:

First look for symptoms on the south or west side of the tree or above the snowline. If the entire tree is turning reddish-brown it may be signs of a disease or drought stress.

Winter injury usually cannot be prevented. Mulching around the base of the tree will reduce frost heaving. Cultural practices to maintain tree vigor and health may help to alleviate winter injury.