

## Winter damage to evergreen trees

Springtime needle discoloration on previously healthy evergreens often results from some form of winter injury.

There are many reasons why evergreen trees and shrubs turn brown and change colour or lose needles. Many environmental conditions such as winter desiccation, salt, frost, drought, flood, soil deficiency and many other environmental factors sometimes cause needle and leaf discoloration and not necessarily insects or diseases.

Key to correct diagnosis of evergreen browning is careful tree or shrub examination. You may start with branches, as a colour change of the foliage may be the most apparent symptom. Following the branches examination, the next thing to check is the roots and trunk, as they may give clues as to the exact cause of the problem. If the tree is large, using binoculars, you may carefully inspect the tree crown to see if there is any physical damage by porcupines, birds and hail. The subsequent examination should be performed on the ground to look for roots and trunk damage. Still, possible soil compaction, salt and chemical damages may also be necessary to find the likely reason for the discoloration.

**Winter damage on coniferous** and its severity can differ depending on the tree and the species. Cedar leaf scales fade from green to light tan or reddish-brown, while Needle tips of spruce and pine turn brown. Winter damage may occur on different parts of trees and affect a few branches at the treetop, on one side or even the entire tree. If you see winter burn on the plant's north side, you know that the wind was the primary culprit; more often, the most severe damage is on the south side, and the sun was the primary culprit. The tree could lose most of its needles and die.

It is essential to remember that many trees and shrubs, even after losing many needles, may survive winter damage and recover after a few growing seasons. You need to know if the needles are dead **OR if the buds are also dead.**

- If it is just needles, the tree and shrub will survive and maybe look a little sparse for a year.
- If the buds are green and alive, trees and shrubs will grow out of it.
- Don't trim the dead branches off now. You may also be trimming off live buds.
- If the buds have not started to grow by early June, you know you have a dead branch to prune off or, in extreme cases, a dead tree.
- The best way to find out if the branch is dead or alive is by following the simple method. If tree branches are still bending and green, they will flush out, and new needles will grow back. If tree branches snap- they are dead, and no new growth will occur.

Winter hardiness, plant variety, soil drainage, location and environmental conditions are some factors to consider for tree selection choice regarding winter damage to trees and shrubs.

Winter injuries can include:

**Winter desiccation** –is caused when the water leaves the tree needles faster than it is taken up. During winter, coniferous needles still lose a minuscule amount of moisture in the air.

Meanwhile, the root system freezes in the soil and cuts off the water supply to the tree. Water loss is more significant on windy days and mild sunny days. The sun's heat increases the air's temperature, causing the stomata to open and lose that water. This injury can damage or be deadly to many species of coniferous trees.

**Sunscald** happens when winter temperature fluctuations cause injury by damaging the bark of hardwood trees. It rarely kills the tree, but the damaged bark becomes an entry point for insects and disease. Young trees with thin bark can suffer from sunscald, but many types of fruit trees, as well as ash, oak, birch and willow, are also affected.

**Cold temperature damage** happens when high-temperature fluctuations during the winter months cause this damage, not a prolonged winter. In Alberta, we experience a temperatures shift from – 40 C to 10 C relatively quickly. Generally, dry soils are more likely to damage roots than soils that contain a good moisture supply. Root injury may be worse during winters with little snowfall. Winter root damage may not be noticed until the following summer when the plants suddenly turn brown and die.

**Tips** to minimize winter injury:

- Water trees early in the spring once the ground thaws.
- Consider fertilizing trees following harsh winter conditions, but stop using nitrogen or other fertilizers after June 30.
- Use mulching to keep moisture around trees. Wood chips– five to 12 cm (4-6 inches) thick – will keep moisture longer in the roots zone.
- Don't prune tree branches with dead needles till June 30 – if after this date there is no new growth, you may perform proper tree pruning and remove a dead branch
- Use hardy plant varieties recommended for the specific horticultural zones of the province.
- Do not plant trees and shrubs near buildings or other reflective structures.
- Do not wrap evergreens with burlap or plastic. Warm and sunny winter days will increase the internal temperature. This high temperature may damage warmed tissue when severe cold follows. Plants wrapped this way may also break dormancy.
- First help is to water evergreens in the fall. Adequate fall watering is the most beneficial for the tree. For several hours, a slow water flow around the trees' drip line will provide enough water for those roots to survive winter and early spring.



Picture 1: Winter desiccation on spruce ( L ) and new growth among dead needles ( R )



Picture 2: Winter damage on cedar ( L ) and 2 years later cedar recovery ( R )