

Winter damage to evergreen trees

Springtime needle discoloration on previously healthy evergreens is often a result of some form of winter injury.

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

Key to correctly diagnosis of evergreen browning is careful tree or shrub examination. You may start with branches as colour change of the foliage may be the most obvious symptom. Following branches examination next thing to check are the roots and trunk as they may give clues as to the exact cause of the problem. If tree is large using binoculars you may perform careful inspection of the tree crown to see if there is any physical damage by porcupine, birds and hail. Next examination should be performed on the ground to look for any roots and trunk damage but also possible soil compaction, salt and chemical damages may also be necessary to find the possible reason for the discolouration.

Winter damage on coniferous and its severity can look different depending on tree 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 part of trees and affect a just few branches, at the treetop, on one side or even the entire tree. If you see winter burn on the north side of the plant you know that the wind was the major culprit; more often the most severe damage is on the south side and the sun was the major culprit. The tree could lose most of its needles and die.

It is very important to keep in mind that many trees and shrubs even after losing many needles may survive winter damage and recover after few growing seasons. You need to know if it is just the needles that 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 be also trimming off live buds.
- If by early June the buds have not started to grow you know you have a dead branch to prune off, or, in extreme cases, a dead tree.
- The best way to find out if branch is dead or alive is using following simple method. If tree branches are still bending and green the will flush out and new needles will grow back. If tree branches snaps- they are dead and no new growth will occur.

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

Winter injuries can include:

Winter desiccation –is caused when water leave the tree needles faster than it is taken up. During winter, coniferous needles still lose a miniscule amount of moisture into the air.

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

Sunscald – is happened when winter temperature fluctuations cause injury by damaging the bark of hardwood trees. It rarely kills the tree, but the damaged bark then 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 – is happened when high fluctuations in temperatures during the winter months causes this damage, and 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 in the early in the spring once the ground thaws.
- Consider fertilizing trees following harsh winter conditions, but stop using nitrogen or any 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 dead branch
- Use hardy plant varieties recommended for the specific horticultural zones of the province.
- Do not plant trees and shrubs around 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. A slow water flow around the trees' drip line for several hours 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)