

Preventing Winter Damage on Evergreens and Landscape Trees

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Freezing temperatures during winter can damage evergreens, trees and shrubs several ways. Damage becomes visible in the early spring as gray-brown to red, dry foliage or needles (Figure 1) and cracked bark. Plants that are stressed, exposed to sweeping winds or were planted too late in the season are especially vulnerable in a season with unusually low temperatures. Some of the most affected common evergreens in West Virginia are boxwood, Leyland cypress and juniper. Damage is also witnessed as bark cracks on apple, Kwanzan cherry and willow.

Winter Burn and Desiccation

Winter burn occurs in desiccated needle and leaf tissue when water leaves the plant faster than it is absorbed. Several environmental factors can influence desiccation. Needles and leaves of evergreens always transpire water, even during the winter months. Water loss is increased during periods of strong winds and sunny weather, even if the ambient temperature is very low. The heat of the sun can cause stomates on the lower sides of the leaves to open, which increases transpiration. The southwest facing side of the plant typically has the most noticeable winter burn damage, especially if the plant has no protection from wind-induced withering.

When the ground remains frozen at the rhizosphere, root systems are not able to uptake and replenish lost water. Desiccation can be severe if the fall has been particularly dry and there is not sufficient moisture to supply the roots adequately during transient ground thawing.

Damage Prevention:

It is important to take proper measures during the fall and winter months to protect boxwood and other evergreens from desiccation. If fall rain is not sufficient, providing plants with a deep soaking before winter will supply sufficient water to the entire root system and vital parts of the plant before the ground freezes. Watering during transient ground thawing on warm winter days also helps to rehydrate plant tissues.

Mulching around the base of the plant provides an insulation layer that maintains uniform soil moisture around roots, preventing the ground from freezing and able to supply water to the leaves and needles as needed. Mulch can also prevent frost heaving by buffering alternative freezing and thawing of the soil. Black plastic mulch is not recommended, due to the potential of heat buildup during sunny periods. It can encourage early bud development in the spring, making plants more susceptible to a late frost.

Although unattractive, windbreaks made out of burlap, canvas or similar materials protect boxwoods and other small evergreens. Windbreaks reduce the force of the wind, thereby reducing water loss from leaves.



Figure 1. Boxwood showing brown, bleached leaves due to winter injury. Photo: MM Rahman

Damage Repair:

Prune away any damaged parts of the plant in the spring before new growth starts. This helps the plant recover from any winter burn. April is the perfect time of year to prune boxwood plants, as they haven't started to sprout new growth. To repair the plant and make way for healthy, new growth, cut the tips of any damaged branches just above a living, green leaf. Use shears for smaller branches and loppers for large branches that are larger than one inch in diameter.

For ease of maintenance and long-term prevention of winter burn damage, consider establishing boxwood and other evergreen plants that are suitable to West Virginia's hardiness zone. Anti-transpirant and anti-desiccant garden sprays can help retain moisture and prevent water loss. These compounds are sprayed directly onto the plant and can also protect plants from some fungal diseases.

Winter stress can also predispose plants to biotic diseases. For example, Leyland cypress is an intergeneric hybrid with a shallow root system, which makes it susceptible to high levels of stress. It can be stressed to a level where *Seiridium* fungus can infect the stem and trunk to cause a canker known as Seiridium canker (Figure 2).

The same predisposition to fungal infection from stress applies to other evergreens, such as boxwood. If leaves turn brown or tan after proper pruning in the spring, it's possible the plant is suffering from a fungal leaf disease. Common symptoms include brown discoloration and presence of black fungal fruiting structures on leaves. These structures are commonly seen on dead leaves attacked by a fungus called *Macrophoma*. Another type of fungus, *Volutella*, may cause similar symptoms but produce orange-pink colored fruiting structures instead.



Figure 2. Winter injury on Leyland cypress followed by Seiridium sp. infection, causing Seiridium canker. Photo: MM Rahman

Winter Crack and Bark Split

Thin-barked, deciduous trees like maple, cherry, mountain ash, apple, peach, tulip, ash, willow, birch and linden are highly susceptible to winter-induced crack or bark split on the trunk, especially when the bark is young and tender. This problem is also known as southwest injury, because in most cases the crack develops on the south or southwest side of the tree. During the cold of winter when the tree remains dormant, afternoon sun or strongly reflected light from snow or another source warms the phloem and cambial areas just beneath the outer bark of a tree. As these areas warm, the living cells within become active. When the temperature of this area suddenly drops as the sun goes behind a cloud or sets for the day, the newly activated cells can die from a sharp drop in temperature. The resulting damage appears as discoloration and vertical cracks. Uneven expansion and contraction of upper and lower bark layers caused by thawing and quick freezing can also exert pressure and cause a split on outer bark. In many cases, minor injury to the bark can be the initial point of split, such as landscape tree trunks damaged by a mower or weed trimmer. In most cases, the tree tries to heal the split area by producing calli (Figure 3).

Damage Prevention:

Protecting the tree trunk with a commercial tree wrap is the most effective way to protect sensitive trees from winter crack and bark split. The wrap reflects the light away from the trunk of the tree, thus preventing the sun from warming the tissues to the point where they can become damaged if followed by sudden temperature drop. Tree wrap is usually applied just before hard freezes, approximately the beginning of November, and then is removed when the chance of hard freezes has passed near the end of April. Removal is important at that time as the wrap can hold in moisture and create a favorable environment for insects and diseases. Newly planted trees should be wrapped for the first couple of winters until they have a chance to develop thicker bark. Similarly, naturally thin-barked trees should be

wrapped for several winters. It is also a good idea to avoid planting highly susceptible trees in unprotected southwestern exposures.



Figure 3. Bark split on maple, showing partial healing by growing calli around the split. Photo: MM Rahman

Drought stressed trees tend to be more susceptible to southwest injury. Make sure trees are well watered prior to soil freezing. Do not locate susceptible trees near large, light-colored and reflective surfaces. Although sun-induced damage typically happens on the southwest side of a tree, it can happen on other sides if the light being reflected towards the tree trunk is intense enough. For example, white fence or a building within close proximity of the tree.

Establishing a mulched area that extends in a 2 to 3 foot radius around the tree trunk usually eliminates damage caused by mowers and weed trimmers since there is no need to cut very close to the tree.

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