Master Gardener Foundation
Grays Harbor & Pacific Counties, Washington

Pest Corner

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Understanding Plants' Winter Injury

Bud and Stem Damage

Buds and stems will die or be damaged if the tissue is not genetically able to withstand cold temperatures, or if they have de-acclimated. Some buds or tissues may be killed while others remain healthy (on some cultivars of tender rhododendrons, cold may partially or completely kill flower buds). At flowering time, there may not be a full complement of flowers on the plants.

Frozen Roots

Roots in an above-ground container may freeze and die.
Because in some plants the stem tissue is much cold hardy than roots, the top of the plant is not damaged by the freeze. The plant may leaf out in the spring and then, **for no apparent reason**, wither and die. Check for dead roots to see if this type of injury has occurred. Dead roots are usually brown to black and may be soft. Live roots may have white growing tips and will be white to greenish under the bark. Next winter, set containerized plants in a protected area, such as a cool garage or greenhouse. In western Washington, the containers can be buried in sawdust or ground bark.

Sun Scald of Leaves

This occurs during periods of severe cold or extended cold weather, combined with bright sunshine. The leaves of some broadleaved evergreen plants can heat up to 50° to 60° F during sunlit days. This causes a type of rapid de-acclimation. When the sun sets, the de-acclimated leaf tissue freezes rapidly. Ice crystals form in the individual cells within the leaf, rupturing and killing them. The effect is death of leaf tissue, particularly those leaves oriented toward the afternoon sun. The leaves on the outside of the plant, and especially those on the south and southwest side, are most susceptible. Damage is often most severe on leaves that are perpendicular to the sun's rays. Plants vary in their susceptibility to sun scald.

Wind and Sun

Alone or in combination, can damage evergreens because they cause the plants to transpire or lose water through their leaves. The water is not replaced because **the roots cannot pick up water in cold or frozen soil**. The leaves turn brown, starting with brown edges or needle tips and progressing between the veins or down the needles. The most severe damage will be on tissue farthest away from the veins, such as leaf edges, leaf tips and tops of plants. Damage is usually most severe on the side

of the plant exposed to sun and air flow. The most acute damage happens on the south and west sides of the plant. Prevent by shading the plant and/or protect from wind.

Sun and Wind Scald of Bark

Sun scald occurs on sunny days in winter when the bark of a tree is warmed by the sun on the southwest side of the trunk. The bark and cambial tissues de-acclimate and are not able to re-acclimate quickly enough when the sun sets and the temperature drops abruptly. The result is damage or death of tissue. The bark may crack open, or it may separate from the tree without splitting. Sun scald is more prevalent on stressed, recently transplanted, smooth-barked, or thin-barked trees. Wrap the trunks of recently transplanted trees and those which may have been stressed during the growing season with a light-colored wrapping from the soil line to the first set of branches. Leave this material on for the first winter and through the first growing season.

Bark Splitting and Frost Cankers

A common injury caused by cold temperatures near the soil surface; and it may occur where there is no protection by mulch or snow cover. After thawing the dead bark dries, splits, and separates from the wood girdling the crown. This prevents the plants from transporting water and food from the leaves to the roots. This will result in the death of roots and eventually the entire plant.

In the spring, the twigs and leaves above may appear alive and green, but the plant is actually dead. Leaves may start to grow in the spring and then wither and die for no apparent reason. Sometimes, instead of the bark splitting, it adheres to the wood instead of cracking, and as it dries it forms a sunken area or a canker. Stem wounds may increase the chance of bark splitting.

Leaf Droop, Leaf Roll

Drooping of leaves and leaf roll are protective reactions to cold. They reduce the amount of leaf surface exposed to cold or drying winds. Leaves return to normal as temperatures warm. Dramatic in Fatsia japonica. In very cold weather, it is normal for entire leaves to roll inward on some rhododendrons. If leaves are not killed by extreme cold, even partially damaged ones will recover and the plant will return to normal when the weather improves.

Limb and Branch Breakage

Branches may break due to heavy snow or ice. Prune the broken portion of branches left on the tree or shrub back to another branch or the main trunk. On large branches make this cut just outside the branch collar. Wait to prune other branches that may have been killed by the cold. It is easier to determine which stems are actually dead after growth starts in the spring. The leaves may be dead, but that does not necessarily mean that the stems and vegetative buds are dead.

Delayed Symptoms

The results of winter injury sometimes take months or years to appear. Sometimes the leaves live on their reserves until they are depleted. This occurs slowly in cool weather

or rapidly when the weather suddenly becomes hot. Prune as described above. Graft unions may be sensitive to damage from cold winter temperatures. Only a portion of the graft may be injured; it may function for years until another kind of stress causes it to fail. Winter-damaged tissue may allow the entry of disease organisms and insects.

How to Tell if a Tree or Branch Is Alive

Before pruning a sad-looking plant to almost nothing or pulling it out altogether, check to see if it is still alive. Scrape the bark away with a fingernail or make a shallow slant cut just under the bark with a pocket knife. Live branches are bright green or white just beneath the bark. Dead branches are brown and may be soggy. Check the tree or shrub in several places: at the twigs, down the branches, and at the crown or soil line. If the outer twigs have died, move towards the trunk until you hit live tissue; older wood may be more hardy than younger wood. Sometimes faded green branches may begin to regrow and do not die. Remove damaged tissue after you give the plant a chance to recover and it starts to grow again.

What to Do for Winter-Injured Plants

1. Don't do much until late spring when new growth begins on the live wood and does not begin on the dead wood. Then prune to remove dead wood. Before doing anything, check to be sure the crown is alive.
2. Prune properly. Do not leave stubs. Prune back to live, green, healthy wood. Prune to a bud, stem or trunk. Prune out only dead and severely damaged wood. Do not prune live wood. The larger the leaf surface area of the plant, the better it can manufacture food and grow new tissues.
3. Water properly. Make sure the plant is not further damaged by drought. Pay special attention to evergreens and plants situated under eaves. Water properly throughout the spring, summer and fall. Do not overwater. (See EB1090, Watering Home Gardens and Landscape Plants.)
4. Fertilize properly (soil nutrients may have washed away during flooding).
5. Mulch with a loose organic mulch
6. On damaged fruit trees, remove as much of the developing fruit as possible to allow it to overcome the winter injury rather than produce fruit.
7. Give the injured plant special care and attention to avoid further stress.

Adapted by Cecilia (O. Shores) from WSU EB1645, and from articles published by Don Tapio, GH County Extension Agent.