



Snow is One of the Best Winter Plant Protectors.

J&L Garden Center

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'Winter Plant Care'

Some plants are much more 'winter hardy' than others. Many plants that thrive in California and Oregon, without any special winter care, will struggle and die if they are not properly protected during the winter in Utah. Conversely, many plants that are not supposed to survive the winter in Utah may grow and flourish if they receive the correct winter care.

Some plants survive through several winters without any protection, and then unexpectedly die for no apparent reason. Some plants growing in one area of the yard require much more winter protection than the exact same plant growing in another area of the same yard.



Why are some plants able to survive cold winter temperatures and others do not survive?

Four reasons: 1. Winter Acclimation, 2. Winter Hardiness, 3. Winter De-acclimation, and the 4. Actual Winter Weather Conditions. Planning ahead and preparing your plants for winter can help minimize some of the factors that might otherwise damage or kill your plants.

Winter Plant Hardiness

Sometimes it isn't just the cold temperatures that cause problems during the winter. Many plants are acclimatized and synchronized to our local climate. They respond to the day length and to temperature signals each fall to prepare for winter.



If plants have been brought in from other climates, and they have not had time to acclimatize to our growing conditions, they may be damaged during the winter weather. They may not form their hardy, dormant buds in time for the sub-zero winter weather. The first winter is usually the most critical time for the plants to acclimate properly.

Sometimes it is not the cold temperatures that are the problem, but rather the drastic fluctuations in temperature, that can cause winter injuries.



For example: A boxwood growing on the north side of the house stays cold all winter. It is protected from the changing winter temperatures and it will live through the winter just fine. The exact same plant on the south side of the house may struggle and die because the sun warms it during the day (the leaves may reach 70° F.) on a bright sunny day. At night the plant freezes to -10° F., and the plant is not ready for the drastic change. It is this constant temperature change that is the problem, not the plant. A little winter protection from the sun will help the plant survive.



We live in a **'FREEZE - THAW - FREEZE - THAW'** area. The weather conditions can change frequently within the same week, or sometimes even within the same day.

While we are at the mercy of winter weather, there are some things that can be done to help prevent serious damage to many plants.

The first step to protect your plants during the winter, is to keep your plants as healthy as possible during the

spring, summer, and especially in the fall. A healthy plant will endure much more winter stress than a struggling plant can. The correct amount of water in the late-fall is essential

The next step is to find out what you can actually do to protect your plants for the winter. Listed below are some of the common winter related problems you can prevent.

Early-Frost and Late-Frost Damage

Most winter injury doesn't actually occur during the winter months. Frost injury often occurs either in the late-fall, or in the early-spring. The transition period from fall to winter, or from winter to spring, can be very unpredictable, consequently it can be hard to protect plants completely.



Early-frosts in the fall can injure plants that are not quite ready for winter. Keeping plants too wet, or giving them too much fertilizer, in the fall, can stimulate new growth. This new growth can prevent plants from getting ready for the winter weather as soon as they normally would. Trees planted in lawn areas are particularly vulnerable to this type of damage.



Late-frosts in the spring can damage plants that may have started their new spring growth too soon. A magnolia, for example, planted on the south side of a house enjoys the warmth and protection from the house. It may start to bloom and leaf out a week or two earlier than it would if it was planted in an unprotected area of the same yard. This late-frost may kill the blossoms, branches, or even kill the entire plant. The tree may have bloomed normally, and not been damaged at all, if it had been planted in another location of the yard. Covering small plants with a frost blanket may help.



Soil Heaving

Perennial plants are often damaged by 'soil heaving' rather than by cold temperatures. Alternating freezing and thawing of moisture in the soil can push shallow plant roots completely out of the soil, or it can just break some roots off of the main plant. Chrysanthemums, delphiniums, lupines, and strawberries are susceptible to this type of winter injury. Covering tender plants with a frost blanket is a great way to prevent winter injury. Also, a layer of compost or bark helps prevent 'soil heaving'. Wait until the soil freezes solid and then apply a one inch layer of a mulch, such as **Soil Pep, Black Forest, Nutri Mulch, or Bumper Crop.**



Potted Plants

Few plants growing in containers can survive the winter without some kind of winter protection. Some pots may crack or break if left outside for the winter, exposing plant's roots to the air. Roots exposed to the air die very quickly both during the summer and winter.



Most potted plants that die in the winter actually die from the lack of water, not from cold temperatures. All roots need some moisture in the soil all year round. If mother nature does not provide enough moisture during the winter, with rain or snowfall, you will have to water your plants occasionally. Potted plants do not have the benefit of maintaining an even soil moisture level as easily as plants growing in the ground.



Potted Plant Tip: Using snow is one of the best ways to water potted plants during the winter. Add snow to your containers on a regular basis. The snow will melt when the temperature is warm enough that the plant needs more moisture in the soil.

A pot in a sunny spot will need to be watered more often than a pot in a shady area. Sometimes the best way to protect potted plants during the winter is to move the pots inside a shed, to set the pots in a shady area, to put the pots right next to the house, or to actually bury the entire pot in the garden for the winter.



Dry Winters

Dry winters cause more winter injury in plants than winters with heavy snowfall. Snow is one of the best natural insulators that plants have. Snow cover protects plants from extreme temperatures (both from heat and from cold). Snow cover also helps maintain moisture in the soil for plants to use during the winter. If mother nature doesn't provide this necessary insulation, you will need to provide something to protect your tender plants.

Photo Credit: csfs-colostate-edu.jpg

Evergreen plants, plants that do not lose their leaves in the winter, use quite a bit of moisture each winter. Broad-leaved evergreens (rhododendron, laurel, Oregon grape, etc.) are most affected by



moisture loss because of their large leaf surface. Junipers and pine trees may also suffer during long, dry periods but they are much more tolerant of drought conditions.



Photo Credit: WillProffCo. untreated.jpg

When the sun shines on the leaf of a plant, the leaf temperature can get as high as 70 degrees, yet the root system remains frozen. As water evaporates from the leaf during the warm temperatures, the plant cannot replace it because the roots are still in frozen soil. The leaves may 'freeze dry'. If too many of the leaves freeze-dry, the entire plant could also die.

Winter Wind Injury

Winter winds are one of the most damaging weather conditions for many plants, especially evergreen plants. Winter winds are often cold and dry. They dehydrate leaves, they blow away the snow cover, and they can create a very cold wind chill factor. For example, if the air temperature is 20 degrees F., a 20mph wind creates a wind chill of -10F. At 0 degrees F., a 20mph wind creates a wind chill of -39F. The difference between a plant's survival or death can be the wind chill factor created by an untimely winter wind.



Bark Splitting

Bark splitting is a fairly common problem on many trees in this area. Splits can occur on the trunk or in the branches. Newly planted trees, fruit trees, and thin barked trees (locust, redbud, kwanzan cherry, etc.) are especially prone to splitting bark. Bark splits are not always fatal to the tree, although they can be an entry point for many insects or disease organisms.



Photo Credit: William Jacobi-Colorado State University.jpg

Bark splitting is usually caused by large temperature changes between day and night during the late fall and early spring. The frost freezes any water within the trunk creating a vertical split in the bark. Excessive fall growth is the major cause of this type of injury. Fertilizing trees late in the fall, or keeping trees too wet late in the fall, may promote a late surge of growth that may actually harm the tree rather than benefiting the tree. Warm November and December temperatures after a cold October may also create conditions that may cause the bark to split. The tree may start to go dormant then it may start to grow again.

The best way to prevent splitting bark is to fertilize trees in the early spring instead of the fall. Keep trees moist until they drop their leaves then cut off the water, except on newly planted trees. You can also wrap the trunk of susceptible trees (especially young trees) with tree wrap, or paint the trunk with white paint.



Photo Credit: LeonardTreeWrap.jpg

If your trees have a split in the bark the best way you can help the tree to recover, and repair the damage, is to

make sure the wound has nice clean, smooth edges. Use a sharp knife and remove all loose bark. Do not make the wound worse than it is. Most tree experts do not recommend covering the wound with any type of paint or tar. Arborists recommend leaving the wound open. A healthy tree should create a callus over the edges quickly and the tree will eventually cover the split. An unhealthy tree will struggle and may eventually die. It is sometimes better to remove an unhealthy tree, and start over, than to try to save it.



Sun-scald

Sun-scald is another type of injury that can kill a tree during the winter. This injury is deadly to the thin barked trees and to newly planted trees. Sun-scald is caused by many of the same conditions that cause bark splitting. Too much water, too much fertilizer, or warm weather in November and December all make the trees susceptible to sunburn during the winter.



Sun-scald is caused when the sun reflects off the snow and heats up the bark (similar to a skier getting sunburned). The bark then freezes at night. These freeze / thaw cycles kill the bark, which slowly kills the tree. Sun-scald can also be caused by pruning a tree heavily. If you remove too many branches, you may remove the shade the trunk is used to. The trunk gets sunburned and the tree is damaged.



Prevent sun-scald by wrapping the trunk, or painting the trunk white. Make the tree goes dormant by not fertilizing and reducing the amount of water in the fall.

If you drive past a peach orchard during the winter, you will notice the trunks of all the trees have been painted white - to prevent this type of winter injury.

Four Ways to help Prevent Winter Injury

(1) Don't let the soil dry out. Water your plants occasionally during the fall. Don't keep your plants too wet in the fall, just keep them moist until the ground freezes. A plant that freezes with moist roots will be much healthier than a plant that freezes with dry roots. Evergreen plants need more water than deciduous plants at this time of the year. Try shoveling snow from other areas of the yard to water any dry plants.



(2) Put mulch around the base of your plants to help insulate the soil from hard frosts. Mulch also helps to keep moisture in the soil. Wait until the ground freezes before mulching your plants with **Black Forest, Soil Pep, Bumper Crop,** leaves, or bark. If you wait until the ground freezes, your plants will be able to go dormant naturally, helping prepare them for winter. Do not use grass clippings because they may cause disease problems. Apply one or two inches of mulch around hardy plants. You may need to add six



to eight inches of mulch around your tender plants. Newly planted shrubs need more protection than your older shrubs.

(3) Spray your plants with Wilt Pruf.

Wilt Pruf is an anti-desiccant. Wilt Pruf seals moisture inside the plants and it stops evaporation from the leaves. Wilt pruf is not poisonous and will not harm animals. Spray Wilt Pruf when the temperature is above 40 degrees and will stay above freezing until the spray dries, usually one to two hours. Wilt Pruf is good to use on all plants, especially on 'Broad-leaved Evergreens' and all newly planted shrubs. Wilt Pruf is also great to spray on your Christmas trees to help prevent them from drying out so quickly. Wilt Pruf can also be used during the spring or summer to help plants from dehydrating in the hot weather.



(4) Wrap the trunks of young trees with Tree Wrap

to prevent sun-scald and bark splitting. Sun-scald and bark splitting are often caused by extreme winter weather conditions; too hot, too cold. They can also be caused by extreme fluctuations in the temperatures. Newly planted trees, fruit trees and thin barked trees (locust, redbud, kwanzan cherry, etc.) are especially prone to this type of damage during the winter. Many orchardists spray the trunks of their trees with white paint (instead of wrapping them) in the fall to prevent this type of damage during the winter.



Natures Way of Preventing Winter Injury

Have you ever wondered how some trees and shrubs can survive minus 40 degree F weather and still come through in the spring with a flush of new green growth, while other plants die when the temperature drops to 32 degree F? *Mother Nature* has a well designed plan for everything, including the winter protection of trees and shrubs from *Jack Frost*.



Our native trees and shrubs are acclimatized and synchronized to our local, natural environment. They respond to day length and temperature conditions to know when they should go into dormancy and when to break dormancy. A tree brought in from Oregon or Southern California may not survive our climate because they simply are not synchronized with our local growing conditions or seasons. Plants growing within their natural range are governed by the day length and the temperature of that range. When planted outside their natural range, they must adapt to the local growing conditions as quickly as possible to survive. That is why the first winter is the hardest on newly planted shrubs and trees. Once they are acclimatized to local conditions they will survive the winter conditions much better.

Adaptation of plant varieties to certain regions has developed over a long time, thousands of years. So, even if we were to



take the same type of tree that grows naturally in Oregon and plant it in our region, the tree from Oregon may not survive our much colder climate. For example, both Noble Fir and Concolor Fir grow well in Oregon. In Utah, a Noble Fir will not survive, while a Concolor Fir will grow just fine.

This is the direct result of the Noble Fir not being able to synchronize itself to our autumn and winter conditions. The tree cannot develop hardy dormant buds and plant tissue before the onset of sub-zero temperatures.

Many trees die, or are injured, because of **freezing stress**. Freezing (dieing), or non-freezing (survival) of a plant, is determined by the location of where the ice crystals form within the plant itself. If the formation of ice occurs within a plant cell, that cell will inevitably die. If enough cells within the plant die, the plant may suffer or die too. If the freezing occurs between cells, rather than inside the cell, the plant can handle the frost better.

Example: A professional chef tears lettuce apart instead of slicing it with a knife. When cut by a knife, the damaged lettuce cells will turn brown almost instantly. The lettuce leaves do not turn brown when they are torn apart because the plant tissue separates around the edges of the plant cells without damaging the delicate cell membranes.



How Native Plants Adapt to Winter

Our native species of trees and shrubs prepare themselves for sub-zero temperatures in one of two ways. These two ways are either by **freeze-induced cell dehydration**, or by **supercooling cellular water** below freezing temperatures.



Freeze-induced cell dehydration

To avoid ice formation inside the cell, most cold hardy tree and shrub species rely on **freeze-induced cell dehydration**. These species permit ice to form outside of the cells - in between the cells. The water starts to freeze at temperatures just below 32 degrees F, forming ice crystals just outside the cell walls. Sugars and other organic molecules inside the cell help prevent ice from forming inside the cell as quickly as outside the cell in much the same way as salt in water slows salt water from freezing as quickly as regular water.



In comparison to water, ice is dry, so the humidity outside of the cell is lower than the humidity inside the cell. Water from inside the cell is then drawn out of the cell in an attempt to equalize humidity levels between the outside and inside of the cell. The dry ice draws water from the cell much like a dry paper towel absorbs water. As the temperature continues to drop, water is continually drawn out of the cell and freezes onto the dry ice crystals outside of the cell until there is almost no free water left within the

cells. Without free water inside the plant cells, the plant can withstand some pretty cold weather.



However, formation of ice can occur inside the cells of these plants if the winter weather raises temperatures above 32 degrees F, allowing water to re-enter the cell. A quick, sudden temperature drop of more than 2 degrees per hour can result in ice formation within the cell because water may not be able to leave the cell fast enough. These cells will die and may result in injury or death to the plant, even though that plant would have otherwise survived our cold winter weather.

This is the reason why Freeze/Thaw cycles are so devastating to so many plants.

Supercooling Water

A second way plants withstand extreme winter temperatures is by preventing the formation of ice in a cell by **supercooling the water**. In order for an ice crystal to form, it must have a speck of dust or other microscopic impurity in the water to form that *first* ice crystal. Once the first ice crystal has formed, other water molecules lock onto it causing rapid growth of ice crystals. When there are absolutely no impurities in water, water can be cooled to -40 degrees F. without freezing. This is known as supercooling of water. Some tree and shrub species have absolutely pure water within their cells and avoid winter damage by supercooling their water. Needless to say, if the temperature should drop lower than -40 degrees F, ice formation would occur within the plant cells and the cells would die, resulting in frost damage, or death to those plants.



Mother Nature has a well designed plan for everything, including the winter protection of trees and shrubs from Jack Frost.



More Resources

<http://planthardiness.ars.usda.gov/PHZMWeb/>

<http://pss.uvm.edu/ppp/pubs/oh54.htm>

<http://forestry.usu.edu/htm/city-and-town/tree-selection/hardiness-zones/>

https://extension.usu.edu/files/publications/publication/HG_500_2.pdf

http://extension.usu.edu/files/publications/publication/HG_Horticulture_2007-01pr.pdf

