



**BP-2-W**

Reviewed 5/01

**Plant Disease Control  
Purdue University  
Cooperative Extension Service  
West Lafayette, IN 47907**

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# WINTER INJURY OF ORNAMENTALS

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Extreme cold, drying winds, bright sunlight or a sudden drop in temperature are common causes of winter injury to trees and shrubs. The frequency and severity of winter damage is determined by a number of factors including the plant species or cultivar involved, the location and conditions under which the plant is grown, and when the weather extremes occur in the dormant period.

To help recognize the typical symptoms and likely cause(s) of winter injury, see below:

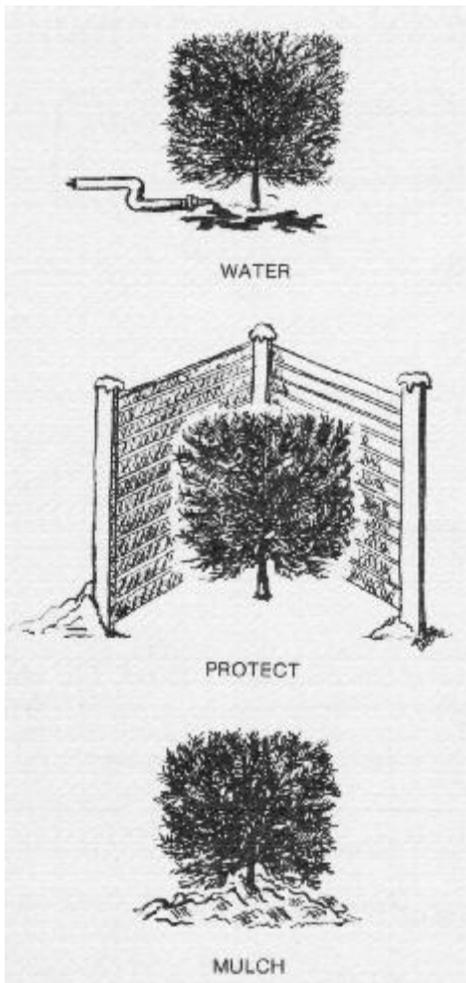
## Symptoms and Causes of Winter Injury

Symptom	Cause*
1. Buds or branches are dead or leaf out and then temperature injury collapse; delayed leaf development on older parts of branches.	A. Low

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| <p>2. <i>Evergreens</i>--browning of needles especially on<br/>desiccation<br/>windward side; <i>deciduous plants</i>--tips of branches<br/>dry and brittle, not leafed out.</p> | <p>B. Winter</p>   |
| <p>3. Elongated, sunken dead areas in the bark, especially<br/>sunscald<br/>on southwest side of trunk.</p>  | <p>C. Winter</p>   |
| <p>4. Damaged or broken limbs and branches; evergreens<br/>ice breakage<br/>bent to the ground.</p>  | <p>D. Snow or</p>  |
| <p>5. Base of trunk and/or lower limbs stripped of bark.<br/>by animals</p>  | <p>E. Girdling</p> |

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\*Capital letters refer to section on causes and control

### Fall Protective Measures



## Causes and Control

The major types of winter injury are described below along with recommendations to reduce winter damage. Winter hardiness is an important factor in selecting ornamental trees or shrubs. Also, proper care and maintenance of a planting, which may include location, exposure, soil type, protection or screening, mulching and other practices are important in the establishment and care of ornamentals.

**A. Low temperature injury:** This type of damage occurs with any of the following winter conditions: winter temperatures are much below normal; temperatures are below normal in the early fall or late spring; or winter temperatures fluctuate during the dormant period so that dormancy is broken and plant tissues are damaged.

To prevent low temperature injury: 1) Select cultivars of trees and shrubs that are hardy in your area. Many varieties of ornamentals such as magnolia, forsythia, pyracantha, cotoneaster, rhododendron, azalea, holly, purple leaf plum and many stone fruit trees are marginal in winter hardiness and may be subject to winter damage in Indiana. 2) Harden off plants early in the year so that they are ready for winter. Avoid late summer fertilization or pruning which may stimulate new growth; most importantly, do not fertilize trees or shrubs after mid-July. 3) Avoid planting most conifers and evergreen broadleaf plants such as rhododendron and holly in protected southern exposures or areas where they are exposed to winter winds. Also, do not plant in wet spots where plants cannot harden off properly. 4) Water trees and shrubs during dry periods in the summer and before freeze-up in the fall or early winter if the soil is dry. Trees and shrubs withstand severe winter temperatures much better if soil moisture is adequate. A mulch of wood chips, sawdust, leaves or straw applied several inches thick over the root zone after soil temperatures are below 40 to 45 degrees F will conserve soil moisture and help protect the root system from winter damage.

**B. Winter desiccation:** Dormant trees and shrubs, especially evergreens, continue to lose moisture even in the coldest winter periods. The rate of water loss increases with fluctuating temperatures, drying winds and/or full sunlight. When the ground is excessively dry or frozen, water is lost faster from the buds, young bark, or foliage of evergreens than it can be replaced from the roots. As a result, drying or desiccation of tissues occurs with the death of foliage, buds or even the cambium. Damage is usually more severe with plants in exposed sites or in areas where temperatures fluctuate during the winter.

Apply water and mulch as suggested under low temperature injury (step A.4). Also, conifers and broadleaf evergreens can be further protected by spraying an antidesiccant (e.g., Wilt-Pruf or Vapor Gard) in the late fall and throughout the winter months when temperatures are above 45 degrees F. For small trees or shrubs, place screens made of canvas, burlap, plastic or wood slats on the exposed south and west sides to reduce winter

desiccation. The screens should be at least 2 feet from the tree or shrub and anchored securely.

**C. Winter sunscald:** Newly planted, thin-barked trees, such as the maples, tuliptree, ash and crabapples may be damaged in winter when the bark surfaces are warmed by a bright winter sun and then chilled rapidly when temperatures drop sharply at night. The bark tissue and cambium are killed by this rapid temperature change, and the dead bark falls away the next spring to expose the underlying heartwood. This type of injury characteristically occurs on the south and west sides of the trunk.

Winter sunscald can be prevented by wrapping the trunk of newly transplanted trees with burlap, sissalkraft paper or other tree wrapping materials. The wrap should be kept in place for at least 2 years. Also, before wrapping, spray the bark with an insecticide to prevent damage by bark borers.

**D. Snow and ice breakage:** Multistemmed evergreens, such as yews, arborvitae and junipers, are often damaged by heavy accumulations of snow or ice. The soft, brittle branches of many hardwoods, such as chinese elm, maples, and birch, may be seriously damaged in ice storms. Improper removal of ice or snow from the tree or shrub might increase the damage.

Evergreens can be protected from snow and ice by tying the branches together with strong rope or twine. If ice accumulates on trees or shrubs, prop the branches up to prevent breakage. Never break ice off trees or shrubs by beating the ice covered branches. This only increases the damage and causes further breakage.

If severe branch breakage occurs because of heavy ice or snow, the branch stubs should be pruned back to the main stem to promote rapid healing and callus formation before growth resumes in the spring.

**E. Girdling by animals:** Mice and rabbits often damage young trees in the winter by feeding on the bark and girdling the tree. Damage from these rodents occurs most commonly in winters when there is prolonged, heavy snow cover and food is scarce. Rabbits feed on the bark above the snow, while mice tunnel under the snow and feed near the ground level. Mouse damage is usually more severe when the trees are surrounded by heavy grass, weed cover or heavy mulch.

The most effective deterrent to girdling by mice or rabbits is to wrap the trunk and low branches of young trees with screen wire or hardware cloth. Be certain the wire wrap is buried below the ground line and extends high enough above the possible snow line to prevent rabbits from reaching to trunk or branches. To help control mouse damage, maintain an area free of grass or weeds for a 1- to 2-foot radius around the base of the tree.

Various chemicals are available to repel mice and rabbits, but these do not afford the reliability of a well-made screen.

## Correcting Winter Damage

If winter injury occurs, the following steps will reduce permanent damage to the plants involved:

1. Be patient; wait until the threat of a late spring freeze is over before pruning winter-damaged branches. Then, prune only the obviously dead or damaged branches.
2. Fertilize the damaged trees or shrubs with a complete fertilizer, such as 10-6-4. The fertilizer can be spread on the ground surface under the area where the branches extend (drip line) in the early spring so the rains will wash it into the root zone.
3. Winter-damaged trees and shrubs should be watered during dry periods in the summer to prevent further injury. Soak the root area thoroughly with a sprinkler, or use a root lance for deep watering.
4. Branch dieback may occur after growth starts in the spring. This is caused by damage to the cambium, and these branches should be pruned out as they die.

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**NEW 10/82**

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