

## **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 the exact timing of weather extremes during the dormant period. Contrary to popular belief, plant damage is not generally caused by an unusually cold winter. Low temperature injury is more often associated with extreme temperature fluctuation than with prolonged cold weather.

### **TEMPERATURE FLUCTUATION**

Acclimation to temperatures much below freezing results from exposure to slowly falling temperatures and other factors. Plants that are dormant but not fully acclimated can be stressed or injured by a sudden, hard freeze. Rapid or extensive drops in temperature following mild autumn weather cause injury to woody plants. Extended periods of mild winter weather can de-acclimate plants, again making them vulnerable to injury from rapid temperature drops.

### **LOW TEMPERATURES**

Some species or cultivars of trees and shrubs are injured if temperatures fall below a minimum tolerance level. Plants most likely to suffer winter injury are those that are marginally hardy for the area or those already weakened by previous stress. Species such as rhododendron, holly, and some magnolias may survive several mild winters in the Chicago region before a more typical winter causes injury. Flower buds are often the most susceptible. If plants with marginal hardiness are used, they should be planted in protected sites, such as courtyards or sheltered areas. In general, low temperatures are much less damaging than rapid and extensive variations in temperature.

### **FROST CRACKS**

Frost cracks, sometimes called freeze cracks, appear as shallow to deep longitudinal cracks in the trunk of trees. They are most evident in winter at temperatures below 15oF. Frost cracks occur on the south or southwest sides of trees because this area experiences the greatest temperature fluctuations between day and night. A sudden drop in temperature causes the outer layer of wood to contract more rapidly than the inner layer, which results in a long vertical crack at weak points in the trunk. Once a freeze crack occurs on a tree, it is likely to appear annually. Trees most susceptible to frost cracks include London plane, oak, Norway and red maple, horse chestnut, crab-apple, walnut, linden, and willow.

### **SUNSCALD**

An elongated canker found on the trunk of thin-barked trees, such as beech, maple, willow, white pine, and linden, is often referred to as "sunscald". Sunscald develops on the south or southwest side of trees following a sudden exposure to direct sun. In

winter, the temperatures on the sun-side of the trunk may exceed air temperatures by as much as 20°F. This is thought to trigger de-acclimation of trunk tissue. The bark slowly darkens, turns reddish brown, and becomes rough. After a time, the callus tissue eventually cracks and falls away. Sometimes only the outermost cambium layer is damaged and a sunken area appears on the trunk. Affected trees often have sparse foliage; stem dieback, and stunted growth.

## **WINTERBURN ON EVERGREENS**

A browning or scorched leaf tip on evergreen foliage in late winter and early spring is a form of winter injury. Browning usually occurs from the needle tips downward.

Symptoms of winter burn are present on many narrow-leafed evergreens, such as hemlock, juniper, pine, and yew, and broad-leaved evergreens, such as boxwood and rhododendron. Winterburn is usually attributed to desiccation or loss of water through leaf transpiration. Winter sun and winds dry needles. Water in the stems and roots is frozen and unavailable to replenish the loss. A rapid drop in temperature after a warm sunny day can also cause further injury to the plant. Applying an anti-transpirant, also called anti-desiccant, helps reduce transpiration and minimizes damage to the foliage. At least two applications per season, one in December and another in February are usually necessary to provide protection all winter.

## **SPRING FREEZES**

Once spring growth has begun, a late spring frost can cause damage to de-acclimated woody stems, blossoms, and new shoots. Frozen, succulent, new tissue turns flaccid, appears water soaked, and withers within a short time. Though symptoms resemble blight diseases, freeze injury appears suddenly after a hard frost, while diseases such as bacterial fire blight, juniper blight, and pine tip blight are progressive over time.

## **ROOT DAMAGE**

Root tissues apparently do not acclimate to temperatures much below freezing and can be killed or severely injured by soil temperature below 15°F. This is especially true for shallow rooted plants. Fortunately, the presence of mulch, leaf litter, or snow cover insulates most soils sufficiently to prevent soil temperatures from falling much below freezing. Plants with frozen roots may wilt and decline after growth resumes in the spring.

## **SNOW AND ICE BREAKAGE**

Heavy snow and ice storms cause damage by bending and breaking branches. Multi-stemmed evergreens, such as yews, arborvitae, and junipers, are often the most prone to damage. To protect these plants from limb breakage prior to winter, tie branches together loosely with strips of cloth or coated twine. Remove in early spring.

The branches of many hardwoods, such as Siberian elm, maples, and birch, may be seriously damaged in ice storms. Improper removal of ice or snow from the tree or

shrub might increase damage. Heavy snow should be removed gently before it freezes to limbs and branches. Removing ice encased on branches can cause additional damage and should not be attempted. Instead, allow ice to melt off naturally.

## **SALT DAMAGE**

Salts used for de-icing pavements can cause damage to trees and shrubs. Symptoms of salt damage appear in spring and early summer and include browning of evergreens, leaf scorch, branch die back, and dead areas in turf. Branches and twigs can be killed from aerial deposits, and roots can be damaged from salt remaining in the soil. Salt will leach through well-drained soils, but damage can be extensive in poorly drained soils. Choose salt-tolerant species for sites where salt stress may be a problem.

## **GIRDLING BY ANIMALS**

Mice and rabbits often damage young trees in the winter by feeding on the bark and girdling the trees. Damage occurs most commonly when there is prolonged, heavy snow cover, and food is scarce. Rabbits feed on the bark above the snow, while mice feed near the ground level. Mice damage is usually more severe when the trees are surrounded by heavy grass, weed cover, or heavy mulch, so it is helpful to pull mulch away from trunks and branches. 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 from below the ground line to high enough above the possible snow line to prevent rabbits from reaching the trunk or branches. To help control mice 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 are often not reliable in wet weather.

## **MINIMIZING WINTER INJURY:**

- Select hardy species and cultivars.
- Avoid late-summer fertilization or pruning, which might stimulate new growth.
- Water trees and shrubs, especially evergreens, during dry periods until the ground freezes.
- Use mulch to conserve soil moisture and insulate the roots from cold temperatures.
- Protect evergreens from wind and salt spray with burlap screens.
- Apply anti-desiccant (Wilt-Pruf or Vapor Gard), starting in late fall, following label instructions.
- Wrap the trunks and major branches of newly planted trees with burlap or commercially available tree wrap products; remove in the spring.