

# Winter Damage

## Cold temperatures this winter struck normally temperate regions of the South causing widespread damage.

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Snow insulates lower buds of rhododendron while upper buds are killed by a combination of wind desiccation and poor acclimation to cold.



**E**xpect considerable flower bud damage and stem dieback on deciduous and broadleaf evergreen shrubs this spring. The damage will be pronounced from Minnesota to Florida.

In Minneapolis-St. Paul lows ranged from -30 to -34 degrees F. In Athens, GA, the mercury fell to 3 degrees F.

In both locations, similar temperatures have been recorded in previous years. Unfortunately, this year the plants were not fully acclimated and had not reached their maximum cold tolerances when the December freeze hit.

Additionally, the low temperatures persisted which accentuated the degree of injury. Plant exposure to prolonged low temperatures is usually more serious than short-term exposure (several hours).

### Cold acclimation

Cold acclimation occurs in two stages, the first being triggered by short days in late summer and fall. The second stage is triggered by repeated exposure to low temperatures as well as freeze/thaw cycles.

It is obvious from the temperature data for the Athens area, that the plants never received the necessary low temperatures.

The same was true for Minnesota, where Dr. Harold Pellett at the University of Minnesota Landscape Arboretum reported flowers buds of the Northern

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Lights hybrid azaleas were killed. These azaleas were bred and selected for flower bud cold tolerance down to -45 degrees F. But, the plants did not acclimate and, consequently, flower buds were killed.

Forsythia buds are often killed by low temperatures. Flower buds will open below the snow line where they are insulated. Notice that the vegetative buds are seldom injured and the leaves develop normally. This points out that flower buds are more susceptible to low temperatures than vegetative buds.

The Rhododendron Society rates various cultivars by their *flower bud hardiness*. H-1 is cold hardy to -25 degrees, H-3 to -5 degrees, H-5 to 15 degrees, and H-7 to 32 degrees F.

### Dehydrating winds

Coupled with low temperatures were dehydrating winds. The wind passing across a leaf or stem surface acts as a driving force to remove water (via transpiration) from the tissue. If water is removed from leaves faster than it is replaced, cells will die.

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Additionally, if the soil is frozen, roots cannot absorb water and the injury is even greater.

In general, broadleaf evergreens were more severely injured than deciduous plants. Plants shielded from the wind suffer less winter damage.

### Rapid freezing

Dr. John Havis, University of Massachusetts, has frozen and thawed leaves of *Rhododendron catawbiense* 'Grandiflorum' at varying rates. All leaves subjected to rapid freezing were killed. Slow freezing, rapid and slow thawing did not result in injury.

Rapid freezing probably does not occur frequently in nature. Dr. Pellett has measured plant tissue that was 20 to 25 degrees F.

warmer than the air temperature on bright, sunny days. When a cloud passes overhead there is a rapid plunge in air temperature that results in the death of some cells. Over time, the cumulative effect is yellowish to brownish foliage.

This type of injury results in the poor winter color of *Thuja occidentalis*, American arbutivae, many junipers, other needle and broadleaf evergreens.

Nurserymen have selected away from this characteristic to provide *Techny* and *Nigra* arbor-

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vitaes which maintain dark green through the winter. Wintergreen Korean boxwood (*Boxus microphylla koreana*) maintains good green foliage color while the Korean form turns sickly brown.

### Location and frost cracks

Proper siting of plants in the landscape can literally save lives or at least preserve foliage color. Controlled studies in Kansas and Minnesota have proven plants perform best on north, northeast and northwest exposures where temperature fluctuations in winter were reduced and summer temperatures were relatively cool. The south and southwest exposures were the worst.

Bark splitting and frost cracks may also result from great temperature fluctuations. Rapid temperature drops cause contraction and splitting. Frost cracks usually occur on the south or southwest side of trees.

Norway maple (*Acer platanoides*) and London plane

tree (*Platanus x acerifolia*) are particularly susceptible to frost cracking. Other species also experience this phenomenon to various degrees. The best remedy is to plant non-frost cracking species.

Winter protection comes in many forms, but the most logical is the use of plants that are perfectly cold hardy in your area. Invariably, plants are used outside their zones of adaptability and suffer from cold "comeuppance". Gardenia is sold and planted in Zone 8 (10 to 20 degrees F.) but invariably is killed to the ground as it was in 1981-1982 and this year. In fact, plants look so bad this year, they may not resprout from the base.

Plants can be protected with burlap, boards, plastic structures, etc. Nurserymen protect their container plants by storing them in plastic covered houses. In the production phase this is acceptable but in a landscape situation it is almost impossible.

To prevent snow and ice damage on yews, boxwood and other plants that tend to split, tie branches with string, wrap in burlap, or build a protective cover.

Anti-desiccants (films) have been used with variable success on evergreens. The idea is to cut down on water loss through the leaves. Repeated applications through the winter might improve results compared to a single late fall application.

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### Readers are encouraged to write the magazine about their experiences with winter kill this year.

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Since we are always learning, I'd appreciate observations from readers about winter kill in their area.

This article begins a regular series in WEEDS TREES & TURF on plant identification and problems. You may reach me by writing the magazine, 7500 Old Oak Blvd., Middleburg Heights, OH 44130. Let me know what you'd like to discuss.

WT&T

Coming in May  
the  
Insect Control Guide