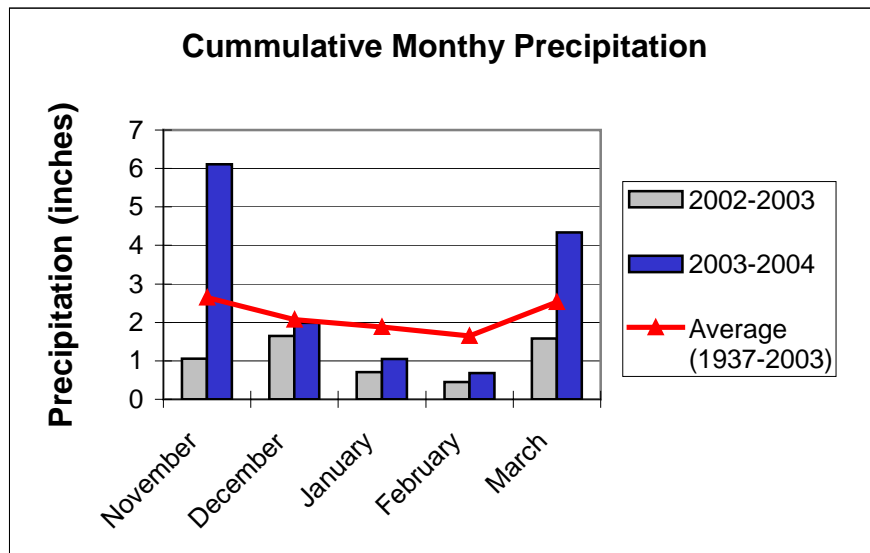
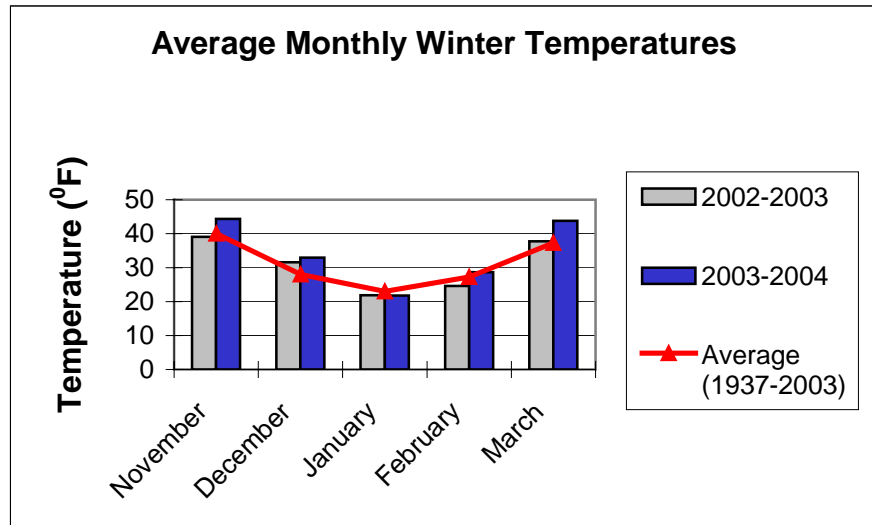


Winter Weather and Plant Problems
Karel Jacobs, Ph.D, Plant Pathologist and Cindy Terrell, PHC Assistant
The Morton Arboretum
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Winter weather causes injury to trees and shrubs that, while not usually lethal, can lead to prolonged stress and reduced growth and vitality. **How does winter weather relate to pests and diseases?** Winter-damaged trees are stressed and therefore less resilient to disease and insect attack, and dead tissue that results from winter injury provides entry points for many secondary pathogens. Snow cover enhances survival and growth of many insects and pathogens because it protects their dormant, or quasi-dormant, overwintering structures in soil and debris. Gypsy moth and Japanese beetle winter survival is documented to increase with snow cover and milder temperatures during the winter months. See more on insect survival during winter from a previous PHC report by Dr. Fred Miller (<http://www.mortonarb.org/plantinfo/plantclinic/phc/articles/overwintering-strategies-of-insects.pdf>).

Some plant pathogens remain active in plant tissue all winter. For example, fungi that cause certain canker and anthracnose diseases continue growing in bark and wood provided the winter temperature drop is not too severe or prolonged. The target appearance of cankers is the result of winter growth by the pathogen and delimitation of infected tissue by the host once its growth resumes in the spring.

How severe was this past winter? The two charts on the next page show that the 2003-04 winter was good for both plants and overwintering insects and pathogens. Temperatures were at or above normal, and slightly higher than the previous year. Rain and snowfall were lower than normal in January and February, but well above normal in the critical months of November and March. Each time the temperature dipped below zero last winter, there was at least four inches of snow on the ground and extended cold periods coincided with snow cover. This contrasts sharply with the prior year (2002-03) when precipitation was far below normal and extended periods of freezing temperatures occurred without protection from snow cover. The depth of soil freezing at the Arboretum this past winter is estimated to have been only one half of 2002-03 year (18 inches vs. 36 inches, respectively (Thanks Ralph Grieco!)). This year we don't expect to see anything close to the winter injury we had the previous year (remember the redbuds?). In fact, John Sosnowski (staff horticulturist) says the roses aren't damaged at all- and they are usually a good indicator for winter injury. A word of caution, however; as we are not yet past the average last frost date of May 2nd at The Arboretum, frost damage may still happen.



Even though we don't anticipate seeing much winter damage this year, **now is the time to begin looking for damage**. Below is a list of the different types of winter injury you may encounter:

- **Excessive drying/winter drought** causes browning of foliage of evergreens, e.g. white pine, due to water deficit in the plant when the amount of water lost by foliage exceeds what is taken up by the roots. Warm, sunny, winter days and dry or frozen soil worsen the deficit. People don't often think of winter drought as the cause of this problem because needles remain green until the warm temperatures arrive in spring.
- **Low temperature injury** appears as a fairly uniform distribution of twig and branch dieback. This occurs when winter or late spring temperatures are much below normal or when temperatures fluctuate widely and break plant dormancy. The line of demarcation between dead and living tissue is uniform and relatively easy to see.

- **Frost injury** kills succulent stem tissue, leaves, and buds if a late spring frost occurs. Look out for this damage in the coming weeks as we have not yet passed the average last frost date (May 2nd), and the latest frost on record is June 12th!
- **Winter sunscald** occurs during late winter/early spring when temperatures are above freezing during the day and below freezing at night. This is exactly what occurred during the last two weeks of March when temperatures got up to the seventies with night temperatures falling to the teens. Cambial tissues become active when warmed by the sun only to freeze at night. The result is a superficial, elongated canker usually on the southwest side of a tree. Species with thin, smooth, or even dark colored bark are most susceptible to sunscald, e.g. maple.
- **Frost cracking** occurs mainly on hardwoods species such as ash, when temperatures drop rapidly in a short period of time. Similar to sunscald, the warmed bark on the sunny (southwest) side of the tree may crack vertically. The cracks often originate from a prior wound or branch stub.
- **Salt spray injury** resembles that of desiccation or drought stress except appearing in a pattern associated with a "spray zone" (one-sided and more pronounced closer to the source of salt). Symptoms of foliar browning, marginal scorching, leaf/needle drop, bud and flower death, and twig and branch dieback occur on the side of the tree facing the road or sidewalk.

How to manage winter injury? We can't control the weather, but we can intervene to prevent permanent winter damage and lessen the likelihood of attack by secondary diseases and insects.

- Wait until the threat of spring frost is over, and then prune winter-damaged branches. Also, branches that have had cambial damage may not die until after growth resumes; prune these as they die.
- Consider fertilizing damaged trees and shrubs in early spring with a complete fertilizer (e.g. 10-6-4). Water damaged trees thoroughly during dry periods this summer.
- Plant species adapted to local conditions and use protected sites for plants at their hardiness limit.
- Do not use high nitrogen fertilizer late in the growing season- it may extend succulent growth at the expense of dormancy.
- Avoid planting in low-lying areas that are most subject to frost.
- Shade, or use tree wrap, on young and thin-barked trees to reduce scald and frost cracks.