



Landscape Alberta Nursery Trades Association

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Plant Information Bulletin from the LANTA Nursery Growers

High Mortality in Urban Trees

Urban tree and shrub mortality rates in Alberta have spiked this year mainly due to a weather phenomenon in the autumn of 2009 and successive years of drought.

Plant nursery growers and garden centres are reporting higher than normal returns on newly planted (1- 2 year) trees and shrubs, particularly in the Calgary region, which is the hardest hit. Similarly, property owners across the province are noticing a large number of plants that failed to leaf out this past spring.*

One nursery grower in the Calgary region has reported losses of between 25% - 30% of newly planted trees and almost 100% loss of one particular tree variety that was planted over six years ago.

So what happened to cause such a large loss of plants? Simply put, in the fall of 2009 there was a sudden and sharp drop in temperature that caused extensive tissue damage in the plants – this is technically called an **advective freeze** and resulted in what is called **consequential dormancy**. In Calgary this occurred between October 6th and 15th when temperatures suddenly dropped from above freezing to -16C. (*Officially recorded at a Calgary weather station on October 12th, although in some areas the temperature was unofficially recorded at -19 degrees Celsius.*)

Why were so many “prairie hardy” plants unable to withstand this sharp swing in temperature? To answer that question one has to understand a little bit about plant science.

Plants prepare themselves for the winter season (dormancy) by going through a process horticulturists call **hardening off**, which is triggered in plants by the gradual decrease in day-time temperatures and the length of daylight (photoperiod). Within a plant, chlorophyll production slowly decreases, antifreeze proteins develop and leaves prepare to drop (abscission). This is known as **predictive dormancy** and occurs when an organism enters a dormant phase *before* the onset of adverse conditions.

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Consequential dormancy occurs when organisms enter a dormant phase *after* adverse conditions have arisen. This is commonly found in areas with an unpredictable climate and this is what we believe happened in October 2009 – indicated by leaves frozen in place on the plants. The result of the tissue damage was not seen until this spring, when many plants failed to break dormancy as they normally would.

Another cause of tree mortality is drought. Although 2010 has so far been wet, successive dry years since 2001 have taken a significant toll on a number of tree species throughout the province. Many drought-stressed trees (ash in particular) have also been attacked by an insect called the cottony psyllid (*Psyllopsis discrepans*) and this has further contributed to tree mortality.

Alberta's climate presents a challenge when it comes to growing urban trees and shrubs, but plant scientists and nursery growers have developed many hardy plants once thought difficult or impossible to grow in our harsh climate, and we have embraced the diversity they have brought to our cities, parks and gardens.

Sometimes however nature throws us harsh weather conditions such as hail, wind, frosts and prolonged winters that test our resolve to continue developing new hardy plant varieties. However, if we didn't try to meet the challenge of growing new and diverse plants in Alberta, our urban landscapes would be a monotonous monoculture of spruce and aspen.

**In some cases, trees that appear to be dead may have the ability to come back, given sufficient time and resources. These trees need to be given a chance to demonstrate whether or not they can survive.*

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