

# Cold Hardiness Considerations in Vermont Orchards

## S E R V I C E

In cold temperate regions such as Vermont, considerations for tree response to low temperature events are important. Apple trees begin to enter dormancy after harvest in the fall, with early cool temperatures and reduced day length prompting trees to begin leaf drop. At this time woody tissues begin to export cellular fluids into intracellular spaces. This allows cells to undergo freezing conditions with both more physical 'space' available for expansion and also increases soluble solids in the cell liquids, thereby decreasing their freezing point. This state of para-dormancy due to physiological changes in the tree can only be broken after a certain number of chilling hours below 40° have been reached. Because Vermont accumulates plenty of this cold conditioning weather, low-chill varieties are not required here, as they may be in more temperate growing areas. Accumulation of cold temperature units may be of more relevance during late winter freezes after the tree is conditioned to break dormancy.

Apricots, for example, are quite cold-hardy in terms of absolute minimum temperature they can withstand during dormancy, but require only 250-900 chilling hours as opposed to 200-2000 for apple. After reaching those hours much earlier than apples, apricots tend to bud out very early in the spring, and are often damaged by cold events. After reaching the required chilling hours the tree is relying on eco-dormancy, or generally cool weather, to prevent it from budding out. Late spring freezes which follow extended warm weather can therefore damage apple trees that have initiated growth, just as with apricots. For each bud stage development from green tip to bloom the tree becomes less tolerant of cold temperatures. Critical temperature values for damaging apple and other fruit trees are available from [Michigan State University's Extension website](http://www.maizecrops.com/extension/fruit-trees/cold-hardiness/).



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Trees that have undergone recent pruning may be more susceptible to midwinter deep freeze damage ([Pruning in Response to Deep Midwinter Cold](#))

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