

Fruit Bud Hardiness

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If severe cold can kill entire trees, it can obviously damage fruit buds. Cold sensitivity in buds varies with the season and weather, which helps to explain how sweet cherry trees in Traverse City, Michigan, can withstand temperatures of -30° F without bud damage, but trees in The Dalles are damaged at -10°F.

Cherry buds become hardy sometime in October. This hardiness capability is largely due to their ability to supercool (cooling below the freezing point of a liquid without solidifying). Once this ability is obtained, buds are capable of withstanding temperatures around -6°F until the period of rest is fulfilled, generally sometime in January. During this time, the buds would not grow even if temperatures were warm.

What happens though if the temperature drops below -6°F? Are the buds automatically killed? Not necessarily. Tree fruit buds have an ability to become more resistant to cold over a period of time. Cold days, when temperatures remain below freezing, cause the bud hardiness to drop. As long as the florets around the buds remain frozen, bud hardiness in cherries will drop about 4° per day. This will continue until the buds reach a hardiness level of about -30°F. If temperatures drop faster than the buds can adjust, then some or all of the flower buds may be killed. At this point, the supercooled liquid freezes with the resultant crystals rupturing the cell walls. On the other hand, if temperatures rise above freezing, the buds quickly lose their added hardiness and return to a hardiness level of about -6°F.

Once rest is satisfied for the fruit tree, sometime in mid-January, the temperature at which buds are damaged rises slowly but still remains near 0°F until just before the buds begin to open. As bud development progresses, the ability to reharden with freezing is lost. This generally takes place in mid-February. Therefore, if the temperature drops below 0°F after mid-February the buds may not be able to respond and they may be killed as was the case in 1995.

Healthier trees seem to have a somewhat greater capacity to endure cold temperatures. Therefore proper irrigation, nutrition and pruning during the growing season can affect cold tolerance the following winter. With cherry trees, over-watering is probably as serious a concern and a greater problem than under-watering. Likewise, too much fertilizer can cause rampant growth and weak buds. Finally, healthy buds must have light to survive. A good annual pruning is necessary to maintain leaf and flower bud development in the tree center.

Highlights

- *Base line hardiness of cherry buds is about -6°F.*
- *Cherry buds have the ability to gain about 4° of hardiness per day.*
- *Once temperatures rise about freezing, the added hardiness below -6°F can be lost in a few hours.*
- *As spring approaches, buds lose their ability to gain hardiness.*
- *Tree health is important in imparting cold tolerance to buds.*