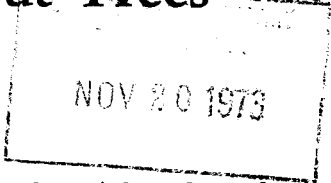


Care of Physically Injured Fruit and Nut Trees

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Freeze Injury

Portions of a tree which go into dormancy early in the fall will show less winter injury than those in which the dormant stage is delayed. Trees that are only partially freeze injured will show the most injury in such places as crotches, bases of branches, and perhaps low on the trunk, while tips of branches may show no injury.

Freezing injury is identified in the spring by dead bark extending to the snow line. The bark may crack and peel, exposing a discolored cambium and sapwood (black in the case of pear and walnut), or adhere and shrink as it dries out, forming a sunken area. In other cases, a new bark is developed beneath the old, which eventually scales off. Sometimes the wood is killed, but the cambium and inner bark remain alive. In such cases, a new sapwood cylinder is grown covering a dead black or dark brown heart. One form of winter injury is "winter sun scald" which is due to the action of the sun in warming the tissue in the daytime, alternating with the severe cold of the nights. This type of injury is always found in the south or southwest side of the trunk. Usually the bark cracks or splits open.

It is advisable to inspect all trees in the orchard immediately following a severe freeze. But do not assume that trees have been killed until the end of the following summer, since trees sometimes recover amazingly well. Unless the bark is split, the trees should be left alone until spring when injured areas are well defined. When bark is split and loose because of freeze injury, it should be tacked down to keep the wood from drying out. Large-headed galvanized roofing nails are suitable for this purpose. This will help to keep the outer layers of wood alive, prevent rotting, and promote more rapid recovery of the trees.

Freeze injury cankers are commonly inhabited by fungus and bacterial wound parasites. To protect against this, all canker areas, after becoming clearly defined, should be thoroughly cleaned of dead, loose, or ragged tissues and then coated with a wound dressing. Trees showing considerable

damage to fruiting spurs or shoots should not be pruned during the following spring. Freeze-injured trees which are not pruned often recover better than those which are pruned, as they have a larger leaf surface and can manufacture food and grow new conductive tissue faster than pruned trees. If necessary, prune the following summer after the extent of injury is apparent.

Trees recovering from freeze injury whose growth has been checked by "black heart" injury frequently set a heavy bloom the following year and overbear. Such trees should be heavily pruned the second spring to reduce the amount of fruit set and stimulate vegetative growth.

If the entire above-ground portion of the tree is killed, it sometimes is possible to regrow the tree from sprouts which originate on the uninjured portion of the trunk below ground. This is seldom practical with trees over five years old. The tree should be cut back to the uninjured part, and the wound treated. Shoots arising from below the bud or graft union must be either regrafted or removed.

Since filbert trees usually are grown on their own roots, the tree may be regrown from a root sucker if the top is killed. Choose a sucker originating below ground so that it will develop its own root system and will not be dependent on the old, rotting root system. Filbert trees with trunks less than 3 to 4 inches thick may be regrown from above-ground suckers, but the cut-off stump must be carefully painted to prevent rot. Cut the tree off just above a strongly growing sucker on the trunk. Head the sucker at about 2½ feet above ground to stimulate branching.

Wind-Damaged Trees

The feasibility of saving trees which have been uprooted by wind varies with the size and age of the tree and the extent of the damage to the root system. It is usually feasible to save trees which have less than half of the roots broken, and sometimes trees with two-thirds of the roots broken can

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be saved. Older or larger trees are more difficult to save than younger or smaller ones. If the trees are dormant when blown over, their chances of survival are much greater.

Functions of the roots are to provide moisture, anchorage, and mineral nutrients. Root breakage affects anchorage most severely and mineral nutrition the least. Pruning the top in proportion to the amount of root damage will reduce both anchorage and water requirements. If about half of the root system is destroyed, removal of about half of the top will restore the root-top ratio. Prune the tops of the limbs to reduce anchorage requirements. Trees which have been pruned first are more easily reset.

Where the roots have been lifted, dig under them so that the roots will be at approximately their original level after the trunk is raised to a vertical position. Otherwise the remaining roots may be broken when the tree is raised. Then, too, the tree must be raised without appreciable twist or side pull. By puddling the soil around the roots before raising the tree, using 100 gallons or more of water for a large tree, less root damage is likely to occur. After the tree is reset, the roots will be in more intimate contact with the soil around them.

Tree roots are injured at about 15-25 degrees F above zero, even though the above-ground part of the tree may withstand 25 degrees below zero. This means that salvaging trees with roots near the surface or actually exposed must be completed before cold weather sets in.

Props, stakes, or guy wires will be required to replace the lost anchorage. They must last until the root system has regrown, which may take several years. Props and guy wires make cultivation more difficult; stakes are better from this standpoint.

Since cultivation, particularly heavy digging, is likely to injure new root growth, it would be best to suppress weed growth by other means such as use of herbicides.

Fertilization in the first year following a windstorm would be inadvisable because of the possibility of injuring the roots and the fact that fertilization tends to favor top growth more than root growth.

Burned or Scorched Trees

The extent of injury following a fire next to or in an orchard may not be apparent until the following year. Usually the higher branches are the most seriously affected. As with freeze injury,

delay pruning until the following year when the extent of injury is clearly evident.

Mouse, Rabbit, or Porcupine Damage

Especially in severe winters with snow cover, mice, rabbits, or porcupines sometimes eat the bark of fruit trees and girdle or partially girdle them. Although a girdled tree usually will survive at least one season without treatment, repair work should be done as soon as possible after the injury occurs. If sucker shoots arise below the girdle, these may be grafted in above the wound. Cut the sucker off high enough that it can be sharpened and slipped under the bark above the wound. In the absence of suitable suckers, the area may be bridge-grafted or rootstock trees may be planted alongside the injured tree and inarched into the bark above the wound.

Sharpen the cut end of the sucker, rootstock, tree or bridge-graft scion and insert it under the bark above the wound. It may be necessary to slit the tree bark and make a groove just wide enough to insert the cut end. Be sure to leave an arch in the wood so that the end will not be torn out when the tree blows in the wind. Use small brads or finishing nails to hold the scion, sucker, or inarch until it has grown together with the trunk.

Care of Wounds and Breakage

Treatment of wound cankers is similar regardless of the source of physical injury. Usually it is most practical to simply cut off seriously damaged limbs. Pruning wounds made flush with the trunk or scaffold limb heal much more rapidly than when a stub is left. Trees which have been severely damaged in their first or second summer sometimes recover most rapidly if cut off close to the ground and allowed to regrow. If the cankered area is retained on the tree, healing will be more rapid if the margins are not ragged. The edges of the canker should be made smooth by cutting into healthy bark with a knife. The upper and lower ends of the canker should be cut to a V shape to hasten healing. Large areas of dead bark can be cut off with a drawknife.

All wounds and large pruning cuts should be covered with a wound paint. Paints with a polyvinyl acetate base are best since they provide a flexible, waterproof seal which lasts for years. Water-emulsion asphalt wound paint or grafting wax may also be used.