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G91-1035 Tree Injuries -- Prevention and Care (Revised July 2002)

Dave Mooter

University of Nebraska - Lincoln

Mike Kuhns

University of Nebraska - Lincoln

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Tree Injuries -- Prevention and Care

It takes proper care and maintenance to keep trees healthy and safe. This is a guide toward that objective.

Dave Mooter, Community Forester
Mike Kuhns, Former Extension Forester

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It has been said that a tree is not planted until it has been in the ground five years. This is especially true in Nebraska, where trees are sometimes difficult to grow.

Injury Prevention

Proper planting and maintenance are the keys to keeping trees healthy and safe. The best way to care for tree injuries is to prevent them from happening.

Proper Selection and Planting

The first and possibly most important steps in injury prevention are proper selection, placement, and planting of a new tree (see NebGuide G77-347, *How To Plant Landscape Trees*) (Figure 1). Look at the site carefully and completely. Is the space large enough to accommodate the mature tree's crown and roots?

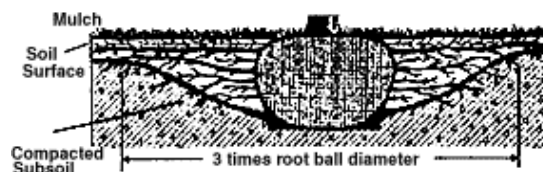


Figure 1. Trees should be planted in shallow, wide holes to allow rapid root growth after planting. Planting trees too deep is a common problem.

At the nursery select trees with well-developed crowns and no wounds on the trunk or branches. Trees pruned heavily in the nursery or severely wounded in handling may have serious problems later.

Mulching

Mulching is an important maintenance practice for trees. Properly applied mulch increases growth rates, prevents basal damage, and conserves soil moisture. Organic mulch should be applied around the tree to a depth of two to four inches. Monitor mulched areas during the winter to detect any rodent activity. Mulch should be renewed as needed to keep a good depth.

Use wood chips, bark or some other natural material as mulch. Avoid using rocks or plastic sheeting. Rocks cause soil compaction, and plastic sheeting suffocates root systems.

Woven weed barrier fabric can be effective at reducing weed competition. It allows moisture and oxygen to enter the soil. It does not, however, add organic matter to the soil or reduce compaction like a natural mulch.

Mulch should be spread a foot or more from the base of the tree in all directions. Mulch can be placed directly on grass when mulching established trees. There is no need to till the soil.

Watering

Trees should be watered (in the absence of adequate rainfall) two to three times per week for a total of one inch of water. Daily watering causes a lack of soil oxygen, smothering roots. It can reduce the number of deep roots. Larger amounts of water should be applied once or twice a week.

Water with a hose or coarse-droplet sprinkler at a rate low enough to keep water from running off. Do not inject water "deep" into the soil.

Most tree roots are not very deep (within the upper 6 to 12 inches of soil), and deep roots will receive water if enough is applied to the soil surface.

Tree roots extend away from the tree at least as far as the tree is tall, and in most cases much farther. Therefore, it is usually beneficial to water the entire yard to water a tree.

Fertilizing

Fertilize trees only when necessary. If growth is adequate and steady, foliage appears healthy, and there has been no major disturbance around the tree, no fertilization is needed.

When fertilizing is necessary, slow release, balanced, granular fertilizer or soil-applied liquids should be distributed over the tree's entire root zone. Applying fertilizer through holes augered into the soil or with fertilizer spikes is not recommended. Routine trunk injections of fertilizers into healthy trees are not recommended.

Pruning

For a complete description of shade tree pruning techniques refer to EC82-1224, *Pruning Shade Trees*. Here are some important considerations to minimize tree damage when pruning or dealing with wounds.

Natural Target Pruning

When pruning trees, it is important to make final cuts at the proper location. Cuts should be made from just outside the **branch bark ridge** (readily visible on most species) to just outside the swollen branch base or branch collar (*Figure 2*).

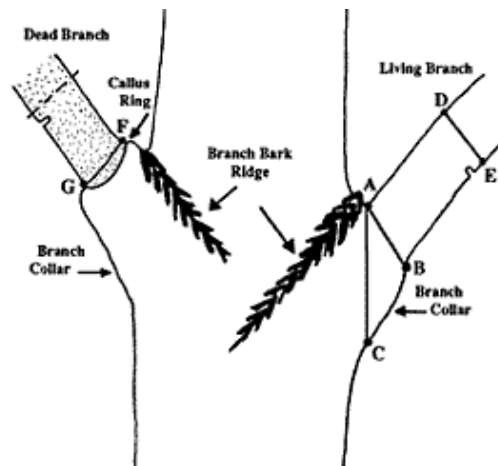


Figure 2. Diagram of a proper pruning cut (A to B), an improper flush cut (A to C), an improper stub cut (D to E), and a proper removal of a dead branch (F to G).

A cut between these "natural target" points removes all branch tissue but does not cut into trunk wood. Leaving stubs leads to unwanted sprouting and decay of the remaining stem tissue. Cuts made too close (flush cuts) leave much larger wounds than proper cuts and can cause dieback of the surrounding cambium. As a result, flush cut wounds do not heal properly, causing major damage to the trunk from which the tree may not recover.

Avoid over-pruning trees. Prune lightly once a year for several years rather than heavily all at once. A good rule-of-thumb is to prune off no more than about 25 percent of a tree's foliage in one year. Also try to avoid having to prune branches that are over 1 to 2 inches in diameter.

Pruning branches when they are small makes smaller wounds that close quickly. When branches die, they should be pruned back to the nearest live branch, and no stub should be left. Take care not to injure the branch collar or any callus that may have formed since the branch died (*Figure 2*).

Maintenance Pruning

Trees should **not** be pruned unless there is good reason for pruning. Reasons may include safety, removal of dead or injured branches, correction of a structural defect, or interference with utility lines. Removal of healthy branches to "thin" a crown or for similar reasons is **never** necessary.

Topping

Topping, tipping, heading back and dehorning are all terms used to describe severe cutting back of a tree's crown. It is a poor arboricultural practice and should not be used for healthy tree maintenance.

Though topping often leads to many large, fast-growing sprouts, these sprouts are attached to stubs that soon become rotten. The sprouts then become hazards as they grow larger.

In some instances, as in the case of severe storm damage, this practice can be used to get a few more years of life from a tree prior to its removal.

CODIT

CODIT -- **Compartmentalization Of Decay In Trees** -- is a concept that describes the reactions that take place in a tree in response to wounding. When a tree is wounded, it sets up defensive walls against the invasion of

decay fungi and other microorganisms. The vessels near the wound are plugged with gums, resins, and chemicals that resist the spread of decay. The living tissues outside the wounded area then begin to form a callus layer in an attempt to close the wound.



Figure 3. Callus ring around well-made pruning wound.

A properly made cut results in a doughnut-like ring of callus forming all the way around the wound (*Figure 3*). Wound closure for small wounds may take only a few months. Larger wounds may take years to close, or may not close at all.

Other Wounding Agents

Use of Mowers and Other Yard Equipment

Trees often are wounded by careless use of yard equipment like mowers, weed whips, and other trimming equipment. These injuries cut through important vascular tissue just inside the bark, which can lead to decay and ultimately death of the tree. A bed of natural mulch around the tree eliminates the need to trim or mow close to the tree's base (*Figure 4*). Extreme care should be taken when digging up or tilling the soil under a tree. Many large and small roots will be cut by such digging, especially if it occurs close to the trunk.



Figure 4. Mulch beds around trees help prevent basal injuries.

Trenching and Excessive Change in Soil Grade

Trenching next to trees cuts major roots. Where possible, tunneling should be used to leave the upper 18 inches of soil undisturbed. When tree roots must be cut they should be cut cleanly. Ripping or tearing tree roots with a backhoe or other implement leaves large open wounds or may shatter roots, preventing the formation of new roots.

Changes in soil grade can seriously injure trees. About 90 percent of the tree's root system lies within the upper 18 inches of the soil. Covering tree roots with as little as 3 inches of soil can cause damage by suffocating roots. Filled areas should be properly tiled and graveled to allow for air movement and drainage (*Figure 5*).

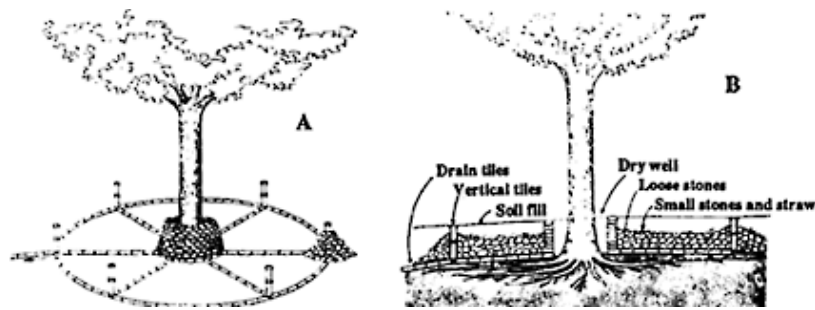


Figure 5. A. Perforated drain tile is laid out on original grade, leading from a stone or cement-block well around the tree's trunk. B. Tiles are covered with coarse gravel and soil to new grade.

Animal Damage

Animals can cause wounds, especially on smaller trees. Field mice (voles), rabbits, squirrels and deer commonly feed on the young bark of trees during the winter when food sources are scarce. Animal damage can be prevented by excluding the animals from the area around the tree. This can be done with a simple wire fence around the tree or yard. Discourage rodents by using a plastic tree guard around the trunk.

Insect Damage

Insects cause several types of wounds. Some bore directly into the main stem and branches. Others feed on young shoots and leaves.

Inspect trees regularly for signs of insect damage. When damage is noted, take care to identify the problem properly and use appropriate controls.

Injury Treatment

Cavities and Drainage Tubes

Cavities in trees require only minimal care. Clean out any loose wood or debris. Check the cavity for carpenter ants or termites. These insects should be controlled as necessary.

Do not fill the cavity, but rather allow it to remain open. Do not scrape the inside of a cavity to remove dead wood. This may expose live tissue and re-wound the tree, allowing decay to spread.

Drainage tubes should *not* be used in trees. Drilling holes to drain water from interior cavities opens a path for new decay.

Wounds

Wound treatment should be confined to removal of loose bark or wood. Leave the wound exposed so the tree may begin the natural process of callus formation and healing or sealing over. "Scribing" a wound in an elliptical shape once was recommended to help water and nutrients flow around the wounded area. This is no longer recommended since it only makes wounds larger and does not improve sap flow.

Wound Dressings

Wound dressings are not recommended for any tree wounds, whether the wounds come from pruning, other tree maintenance practices, or natural damage.

Wound dressings actually have been found to increase decay. Wounds should be left exposed to the open air to seal naturally.

Injections and Implants

Some insects, diseases and nutrient deficiencies can be controlled through the use of chemical injections or implants. Injections and implants, however, require holes drilled into the trunk, and should be used only after all other available treatments have been considered.

Since injection holes are wounds, they should be made in accordance with manufacturers' recommendations to minimize the damage they cause. Injection holes should be kept as small and as shallow as possible; injection should not be repeated more than once every two or three years, except in severe cases.

Injection points should not be filled or treated with wound dressing after treatment.

Cabling and Bracing

Trees that have severe structural defects or that have suffered serious damage sometimes can be saved by cable and bracing techniques. **In all cases cable and bracing should be done by a professional arborist who is familiar with this technique.** Improper cabling or bracing can result in damage to the tree, and the creation of a living hazard.

Hazard Identification

Trees that have large, dead branches or show signs of interior decay should be inspected by a professional forester or arborist. These trees can become major liabilities if left standing. In many cases accidents can be prevented through proper pruning.

Tree work can be dangerous, and many tasks should be left to professional arborists. The Nebraska Arborists Association is a professional organization that promotes proper tree care in the state. You can contact the Nebraska Arborists Association through any District Forester to find out who your nearest arborist is, or check the yellow pages of the phone book under Tree Services.

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