

Presented at the 6 th Annual Alaska Greenhouse & Nursery Conferenc  
February 11 & 12, 1987, Anchorage, Alaska.

## PRUNING PRINCIPLES for NURSERY STOCK

Catherine I. Wright

Alaska Division of Agriculture  
Alaska Plant Materials Center  
Palmer, Alaska 99645

Pruning is an important function of nursery management. But very little is actually documented about some of the techniques used. The information, techniques and practices are changing as we learn more about how trees heal themselves.

In the nursery, pruning is a way to modify plant form and structure. It can cause certain responses in the plant. Pruning the stem or trunk of young trees induces distribution of photosynthates towards the canopy or upper portion of the stem. It has been documented that in locations where wind moves the tree, photosynthates are distributed to the lower portion of the trunk which causes a larger diameter trunk to develop.

Pruning is done to enhance the natural form and beauty of the plants. The practices used vary with the cultivar, market objective and personal preference of the nursery owner. Market objective influences the type and amount of pruning. Small inexpensive plants do not justify the time and dollars spent on extensive pruning.

A pruning program begins when the liners are planted. Spreading conifers, Junipers and Thuja, and some shrubs can be cut back to induce branching and compactness at the time of planting. Trees that should have a central leader but have multiple leaders, should be pruned to the straightest leader at the time of planting.

The pruning of lateral branches at planting is often a matter of personal preference. They can be retained to aid in trunk development or they can be stripped off to develop a smooth bark. Small branches may be stripped off by running a gloved hand along the trunk.

The development of a good stem structure and canopy is aided by pruning or thinning the canopy. The weight and wind resistance of the canopy is reduced and more photosynthates can be sent to the canopy.

Prune conifers and excurrent trees to a single leader. Weak double leaders should be pruned by keeping the branch with a narrow branch angle which can be trained to be the single leader.

Branches that join the stem at acute angles should be removed if they are not necessary for the form of the tree. They are more prone to being broken in wind and ice storms. Main scaffold branches should form wide angles at the trunk (30o-60o).

Inward growing or crossing branches should be pruned back. Prune back branches that are growing more rapidly than others. The cut should be made directly above a bud which will produce growth in the desired direction. When two or more buds are at a node choose one bud to produce the new stem. The bud can be supported with a small piece of masking tape or surgical tape. Surgical tape may work better in Alaska because it will stick to itself and not the bark of the stem.

Evergreens may be pruned or sheared for form or to correct a malformation. Pines should be pruned before the candles produced in the spring have begun to open up. Up to 1/3 of the candle may be removed.

A good practice is to clean and sterilize pruning tools periodically throughout the day. A recommended practice in larger nurseries is to sterilize tools at the end of each row being pruned.

It has been documented that diseases are transmitted on pruning tools. Dutch Elm Disease is an example of a disease transmitted in such a manner.

Root pruning is also done to modify growth. It can be used to:

- \* reduce vegetative growth
- \* develop more compact root systems
- \* aid in hardening the plant for digging prior to storage & shipping
- \* modify the root system to fit in a container
- \* encourage radial root development

Roots may be modified by the planting method used, fertilizer placement, trickle irrigation, toxic barriers such as copper or by the use of containers.

To ensure greater success in transplanting liners, root prune plants that develop sparse root systems or tap roots. It is best done when the plants are young, before planting in the field or 1 - 2 years after field planting.

Root prune in the field after a flush of growth has been completed. Do not root prune during a flush of growth, drought or prior to an anticipated drought. Irrigate the field immediately following root pruning. An adequate supply of soil moisture must be available to root pruned plants.

A tractor mounted 'U' blade is often used to root prune trees in the field.

At the time of planting the roots should be positioned in the planting hole to assure radial distribution of the developing roots. Plants with unilateral or bilateral root systems do not develop good anchorage. These plants often blow over and are limited in their ability to prevent dehydration.

Pruning is also used to modify flowering and fruiting. Why modify flowering and fruiting?

- \* flowering plants sell more readily & at higher prices
- \* prevent flowering when the grower wants to induce vegetative growth
- \* to keep plants in a juvenile condition for propagation, cuttings from juvenile plants root more readily than cuttings from mature plants

Early spring pruning of young vigorous apple trees helps to stimulate growth and discourages the formation of flower buds. Pruning at the time of flower bud development can stimulate flower bud formation and retard vegetative growth.

Root pruning or digging some plants one year in advance of sale stimulates the initiation and development of floral primordia. An example of such a plant is flowering dogwood. The pruning should be done when the foliage is fully developed and just prior to bud initiation for the species. More information regarding this practice on plants grown in Alaska is needed before recommendations can be made.

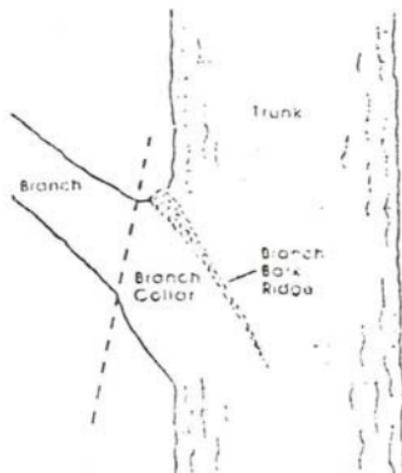
Shrubs that flower on the current seasons wood should be pruned prior to flowering, in late winter or early spring.

Lilacs and shrubs that flower very early in the spring on wood produced during the last growing season should be pruned soon after flowering.

Proper pruning is still one of the best ways to keep a tree healthy. Recently much has been learned about how trees heal themselves. This knowledge has changed pruning practices. Frank Santamour, Jr. and Alex L. Shigo have reported that plants respond to injury by compartmentalizing and separating themselves from the injury in two steps. In the first step, trees surround the wound with a chemical barrier to limit the spread of the decay producing organisms. During the second step, compartmentalization takes place in the wood grown after the injury. A decay-resistant wall is formed by the cambium or growth layer to protect new growth (Agriculture Research/ March 1986).

According to Alex Shigo, proper pruning means removing dead, dying or living branches in such a way that the branch collar is not injured or removed. Previously, the practice was to prune flush with the trunk or stem.

The branch bark collar or ridge is the key to proper pruning. No cuts should start behind the bark ridge. A slightly swollen branch collar that often remains on some branches is not considered a stub. Leaving the collar will require that the angle of the cut vary with the angle the branch joins the tree.



Pruning tools have been designed to make flush cuts. It will be difficult to make the proper cut on the down stroke using the present tools. The upstroke could be used to more easily make the proper cut.

After 13 years of study Shigo also reports that wound dressings do not prevent decay and are of limited benefit for wound healing. Some materials reduce discoloration but discoloration is not a sign of decay. Other materials stimulate callus formation, however, Shigo reports that callus formation is not associated with the decay process (Journal of Arboriculture, Nov. 1983, vol. 9 no. 11, page 285).

While proper pruning is one of the best ways to keep a tree healthy, topping is hazardous to a tree's health. Topping is the drastic removal or cutting back of large branches in mature trees. It may also be called heading back, stubbing or dehorning. Reasons often given for topping include:

- \* the tree reached a height considered unsafe
- \* fear that a strong wind may blow the tree over
- \* stimulate new growth, the tree will appear to be rejuvenated
- \* to remove hazardous, dead and diseased wood, but healthy wood is usually also removed
- \* to prevent interference with utility lines

Topping is hazardous to a tree's health because:

- \* the crown to root ratio is changed when so much of the tree is removed
- \* stored food reserves are depleted
- \* the bark is exposed to the sun's direct rays which increase the chances of sunscald damage
- \* buds are removed which would produce normal sturdy branches
- \* large branch stubs seldom heal properly providing a point for insect invasion and fungal decay
- \* dense, upright branches are stimulated to grow just below the cut. These branches are not as structurally sound as naturally occurring branches.
- \* new growth is rapid, and if the tree lives it will grow back to the original height faster and denser than before
- \* trees are more vulnerable to wind and ice damage
- \* the tree is disfigured

Alternatives to topping include thinning out by removing selected branches back to a lower lateral branch. This decreases the chance of sunscald. Pruning cuts made close to the collar do not leave a stub for insect or disease invasion.

The tree may need to be removed and replaced with a smaller, shorter growing species. Avoid planting where the tree will interfere with utility lines.