



Anatomy of a Successful Pruning

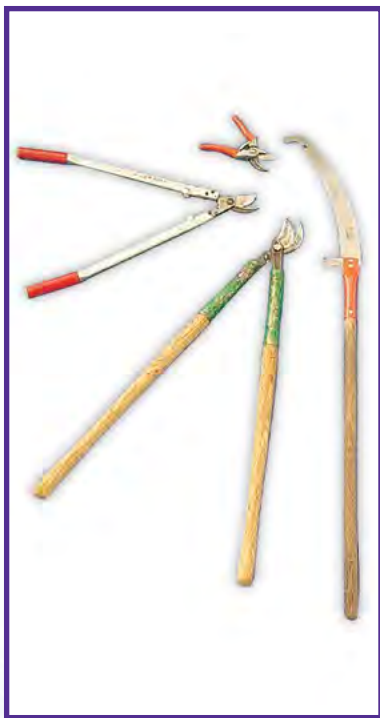
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Pruning is a very useful silvicultural treatment both for improving the final quality of a stand and for controlling certain pests. However, pruning causes wounds that the tree must close as quickly as possible. Knowing a few facts about tree anatomy allows us to carry out this operation efficiently while preserving the tree's health.

At the junction of the branch and the trunk there is a thicker part, called the branch collar, which is composed mainly of stem tissues that envelop the branch. The collar is easily visible in deciduous trees but harder to see in conifers, partly because of the pronounced angle between the branches and the trunk.

collar. Although the wounds may close more quickly than with traditional pruning, wood discoloration and decay usually develop more frequently with this method. In fact, cutting into the branch collar removes protective tissues that normally prevent micro-organisms from invading the tree.

Pruning also accelerates the transition from juvenile wood to mature wood, a remarkable advantage, particularly in conifers. Juvenile wood generally forms during the first 20 years of growth. It has a number of characteristics that affect wood mechanical properties and reduce its quality. For example, it contains shorter fibres and is generally less dense than adult wood. The formation of juvenile wood appears to be promoted by hormones and nutrients coming from the branches and tree tops. One or two prunings performed when the tree is young therefore promote the development of adult wood. Furthermore, the bark of young conifers is thin, and pruning usually creates wounds that close quickly in those trees. Pruning performed on older individuals with thicker bark causes wounds that close much more slowly.

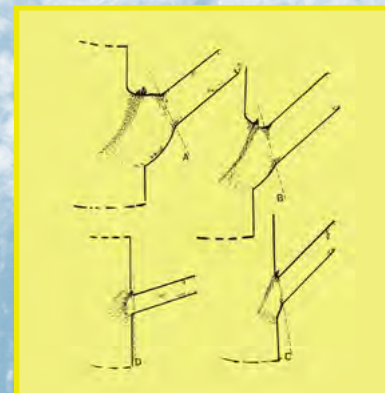


Pruning should be done just outside the branch collar, using an appropriate and well-sharpened tool. In many conifers, since the branch collars are not well developed, pruning may be done near the trunk while taking care not to damage the bark.

Another school of thought recommends cutting directly through the centre of the branch



Plantation of pruned white pines.
Photo: NRCan



Proper cutting angles and positions. Figure: Shigo, A.L., 1989. *Tree pruning: A worldwide photo guide*. Shigo & Trees Associates, Durham, NH, USA. p. 29.

Branching Out

from the Canadian Forest Service - Laurentian Forestry Centre

The speed at which wounds will close is directly linked with the tree's vigour. It is also important to remember that in spite of appearances, most of the collar is formed by vascular cambium tissues, not by the outer bark.



Good cut.
Photo: NRCan



Bad cuts.
Photo: NRCan

It is therefore recommended to prune young trees, using the right tools, just outside the collar located at the base of the branches. The protection area located inside the collar should prevent micro-organisms from penetrating

the parts of the tree that bore these branches. Proper pruning promotes the formation of healthy, knot-free wood, results in more cylindrical stems, and reduces the proportion of juvenile wood in conifers.

Defence mechanisms

Bark is the tree's first line of defence. When the bark is damaged, the tree reacts through various mechanisms such as:

- more intense wall lignification;
- significant accumulation of resin in conifers;
- increased growth near the wounds to quickly cover the injury;
- compartmentalization.

Compartmentalization involves various protective tissues that completely surround the wood that has been exposed, for example, to fungi that cause decay, thereby protecting the adjacent healthy wood.

To find out more about compartmentalization, see *Branching Out* No. 65 (2011).



On a tree pruned at 19 years (arrow), closure of the wound after 10 years.
Photo: British Columbia Forest Service

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