

Pruning Fruit Trees: Rules of Shoot Growth

Pruning fruit trees is usually perceived as a very difficult task for the inexperienced. This is due primarily to the uncertainty involved in deciding what to prune, where to cut, and how much wood to remove. Pruning decisions can be made much easier if we know the way a tree grows naturally. The purpose of this article is to present some basic principles and observations on shoot growth. While these rules were developed with tree fruit in mind, they are generally applicable to deciduous trees in the landscape.

Rules of Shoot Growth

- 1. If two branches are identical in length, and diameter, and they emerge from the tree trunk at the same location, they will have the same growth potential.** Such limbs have comparable hormone levels, leaf area, and they will receive comparable nutrients and growth promoting substances from the roots.
- 2. The steeper the angle of a branch, the more vigorously it will grow, provided all the other conditions are identical.** This rule is especially important since it gives you, the pruner, a glimpse into the future about growth potential of limbs in a tree. Upright limbs, which form an angle with the trunk of 30 degrees or less, are apt to be too vigorous, grow inappropriately large, and by the nature of their vigor, be quite unproductive. Conversely, a limb that is flat and forms an angle of 90 degrees or more with the trunk will be weak and display little if any terminal growth. Further, vigorous upright shoots may grow from these flat limbs, and pose continual problems in the future. Flat limbs or limbs that form a wide angle with the trunk in general are productive limbs. However, after two or three years of cropping, growth on these limbs becomes weak, they often become shaded, and they produce small fruit. These limbs must be removed to allow more vigorous limbs to develop.
- 3. A branch at the same angle but located higher up in the tree will grow more vigorously than lower branches.** This rule is significant in that the limb size in the tops of trees can give you warning as much as several years in advance, about development of troublesome limbs in the tops of trees. If two limbs are of equal size, and one is located in the top of the tree, one can be almost assured that the limb in the top will grow too vigorously and shade out the limb(s) located in the bottom of the tree. The answer here is to remove large or equal sized limbs in the tops of trees before they become a problem.
- 4. The thicker of two branches that are identical in all other respects will always grow more vigorously than the thinner branch.** In addition to branch angle, limb diameter is an excellent indicator of future growth potential of that limb. The translocation system that brings growth promoting factors from the roots and other portions of the tree is larger in a large diameter limb, thus these limbs will grow more. It has been the author's experience that even severe pruning on these large diameter limbs will not slow their growth sufficiently. If a limb is too large, and its presence is retarding development of fruitful limbs in other portions of the tree, it should be removed.

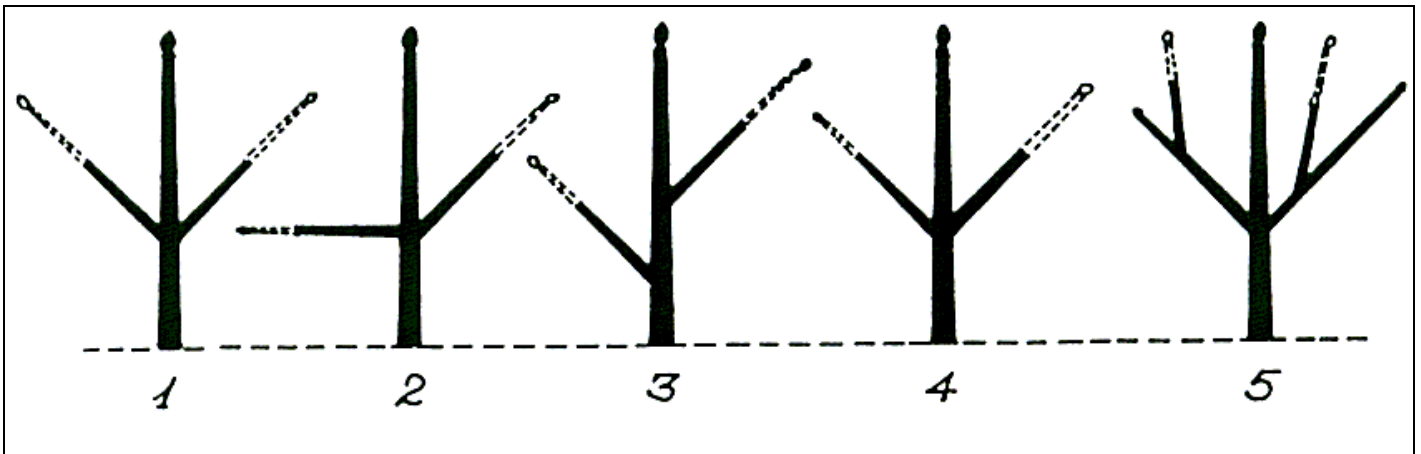


Figure 1. Basic principles of shoot growth.

Adapted from *Pruning the Slender Spindle*, H. Oberhoffer, 1990. BC Ministry of Agriculture and Fisheries, Victoria, BC, Canada.

5. Branches closer to the central leader grow more vigorously than those further from it.

The location of a limb relative to the trunk influences its growth potential. This rule helps one decide which limb to leave or remove, depending on whether it is deemed desirable to have a limb with greater or lesser growth potential.

6. The more severely a tree is pruned, the smaller that tree will be. An unpruned tree always grows more (trunk diameter) than a pruned tree. Although shoot growth near a pruning cut may be vigorous and give the impression that growth has been stimulated, the overall growth of a tree will be reduced. Therefore, an unpruned or lightly pruned tree will always be larger than a moderately or severely pruned tree.

7. Unpruned or lightly pruned trees will flower and fruit at a younger age. There is always the tendency to want to do something to a young tree to encourage a tree to flower and set fruit. The activity that encourages the earliest flowering of a tree is to do no pruning or very modest pruning. Pruning cuts made on a young tree should be made only for specific purposes. For example, if a branch is too upright, it will have a weak connection with the trunk which in the future may result in limb breakage and substantial damage to the tree. If two limbs come from the trunk at the same location, growth of the top of the tree will be reduced. One of the two limbs should be removed.

8. The later in the spring pruning is done, the shorter the growth will be from a terminal bud. If pruning is done during the winter, buds have an opportunity to develop before rapid shoot growth starts. If pruning is done later in the spring, after shoots have started to grow, terminal growth will be reduced for that season. Late pruning and the resultant reduction in terminal growth can be a good thing, especially if trees are so vigorous that flowering and fruiting are reduced by vigorous growth.

Understanding the rules of shoot growth and the responses to pruning, can be very useful, and help make anyone a better pruner and horticulturist.

UMass Extension Agriculture and Landscape Program 4/12

UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations. Contact the State Extension Director's Office if you have concerns related to discrimination, 413-545-4800 or see www.extension.umass.edu/civilrights/.