

---

# **P**runing & Orchard Renewal

*Richard G. St-Pierre, Ph.D. (January 2006)*

---

## **The Basics Of Pruning & Orchard Renewal**

Pruning is defined as the art and science of cutting away a portion of a plant to improve its shape, to influence its growth, flowering and fruitfulness, to improve the quality of the entire plant, or various parts, and to repair injury. The primary purpose of pruning fruit plants is to establish a balance between vegetative growth and fruit bearing growth. A certain minimum leaf area has to be maintained for fruit production. Pruning is also done to allow the penetration of light and air into the plant canopy for the improvement of fruit quality, and to aid in harvest and pest control.

Pruning branches or shoots controls function within the plant. Training is a more comprehensive form of pruning and includes the steps required to produce a particular shape. Training controls plant form, including the direction of growth. Training includes pruning, and perhaps also the use of a trellis.

## **Plant Responses To Pruning**

There is a tendency for plants to balance shoot and root growth if they are not pruned. Pruning removes leaves (photosynthetic tissue), wood (food storage

tissue), growing points (buds), and flower buds, while leaving the root system intact, unless root pruning is specifically undertaken.

### ***Positive Responses***

a) Dormant pruning of deciduous fruit plants can be invigorating by removing flower buds, thus reducing demand on the plant's stored food. The surplus food is utilized for new vegetative growth.

b) Moderate dormant pruning of deciduous fruit plants can increase yield. Fruit-producing growth, that is, one-year-old shoots and spurs, are stimulated to grow.

c) Thinning decreases self-shading, thereby increasing yields and improving fruit quality; fruiting wood should be in less than 50% shade.

### ***Negative Responses***

a) Heavy annual pruning of young fruit trees delays the onset of bearing.

b) Severe pruning at the beginning of a growth flush will weaken the plant and reduce total growth, especially when plants are young. This is because energy for new growth comes from stored food which is not replaced until new growth is complete.

## ***Neutral Responses***

a) Pruning results in a reduction of total vegetative growth, thus dwarfing the plant, despite localized vigorous growth following pruning.

b) Pruning smaller shoots and branches results in localized effects by forcing the growth of one or two new shoots from buds just below the pruning cut.

c) Removing shoot terminals in fruits with strong apical dominance (such as apples) causes lateral branching.

d) Natural heading-back by winter tipkill and browsing animals, and heading-back by pruning, tends to suppress suckering because the plant responds to the site of injury by branching. Sucker production may be stimulated within the row if annual cultivation is practiced along row edges.

## **Practical Reasons For Pruning**

Pruning can be used by the grower to accomplish the following: a) to decrease leaf surface area, therefore reducing water loss and concentrating resources during times of stress such as grafting and transplanting; b) to improve fruit size and quality by increasing the exposure of fruit to light, by reducing the number of bearing sites, and by increasing the spacing of the remaining fruit; c) to reduce disease and insect pest problems (pruning improves air circulation, light penetration, decreases relative humidity, and increases UV light penetration, both of which reduce infection); d) to increase flower bud initiation (increased light penetration increases flower bud initiation); e) to remove damaged branches; f) to produce new growth (larger fruit on newer

growth); and g) to reduce labor costs (savings of time because picking and subsequent pruning is easier).

## **Timing Of Pruning**

Pruning should be initiated when plants are still young. Early-spring pruning (late-March to early-May), prior to budbreak, is suggested. Pruning at this time will also help to stimulate vegetative growth. Active shoot growth following pruning at this time will encourage healing and will better prevent diseases from infecting the tissues.

Late-fall and early-winter pruning may leave shoots susceptible to winter damage, although this is usually only a problem if there is an extreme drop in temperature within two weeks following pruning. Under such circumstances, younger plants are more susceptible to such damage.

Summer pruning is not recommended because removal of the leaf surface limits normal growth and development, fresh cuts can enhance the spread of various diseases such as fireblight and canker, and pruning at this time may induce the formation of new shoots that will not have time to harden properly for winter. Summer pruning slows growth and can have a dwarfing effect because of the removal of leaves that produce carbohydrates.

## **Pruning Equipment Required**

A number of tools are available that will enable a grower to prune properly. A

pruning knife is used for light trimming such as the pruning of shoots and roots on transplanting. Secateurs are used for the thinning of diseased shoots, the removal of suckers, and the removal of branches up to 1.25 cm in diameter. Loppers are used for pruning branches up to about 4 cm in diameter. A pruning saw is necessary for cutting out large branches, and for root pruning.

Pruning tools must be kept clean and sharp. Properly made, clean pruning cuts and overall vigor and health of the plant are the most important factors in the healing of wounds.

Large orchards will require the purchase of pneumatic or hydraulic pruners which will help the grower save time and reduce the possible development of repetitive stress disorders from manual pruning.

## Types Of Pruning Cuts

The two basic types of pruning cuts are the heading-back cut, and the removal or thinning cut. Heading-back cuts are made anywhere on a branch or twig between two leaf nodes. Such cuts are designed to stimulate dormant buds below the cut to break dormancy and to develop new branches. Removal or thinning cuts involve the removal of an entire twig, branch or stem at its origin (point of branching). These cuts are designed for the removal of excessive growth without stimulating bud break and subsequent growth. Such cuts allow for enhanced flowering and fruit set, and improved fruit quality on inside branches.

## Making Pruning Cuts

The primary consideration is to not damage the plant, thus disturbing growth and leaving a wound vulnerable to infection. The branch collar evident in older branches should not be cut off because the collar tissue forms a rapidly growing, disease-resistant callus over the pruning cut. On young plants, the collar may not be evident, however, do not cut flush to the main stem or main branch. Large branches require 3 cuts. The first cut is underneath (this prevents the tearing of bark). The second cut is on top, removing most of branch except for a stub. The third is to remove the stub. For small branches, or ends, make the cut at a slight angle with the high point just above a desirable bud (this will promote the growth of the bud). All cuts should be made cleanly, leaving a smooth surface and without tearing the bark. For the best healing, cuts should not be covered or treated. Exposure to air promotes healing. Hot, dry conditions may require some shading of large cuts.

The disinfection of tools is important to help control the spread of disease, but is not 100% effective. If disease is not present, then disinfection is probably not necessary, however, in such instances, growers must be able to distinguish diseased plant tissue from healthy plant tissue. When pruning diseased growth, tools should be disinfected with Lysol (1 part Lysol to 19 parts water), or household bleach (1 part bleach to 9 parts water) after every cut of diseased tissue. Lysol is less corrosive to pruning tools. It is preferable to spray disinfectant on pruning tools after every cut, however, in practice, this isn't very workable. Dipping tools in disinfectant will eventually dilute the

disinfectant and make it ineffective. Consequently, the disinfectant solution must be replaced often. Disinfection of tools is practical only when moving from diseased plants to healthy plants if a considerable amount of pruning is necessary. Pruned material should be removed and burned.

## **Orchard Renovation**

Orchards may need to be renovated once they reach a mature, bearing age. Orchard renovation involves the removal of 5 to 10% of the orchard/plantation each year in order to provide for space to replace plants and to plant new cultivars. This practice would make it easier to recover from disease problems and to adapt to changes in the market. Once initiated, this becomes a constant process which must be planned for because the new plantings will not begin to bear acceptable yields for the following 4 to 6 years.

## **Pruning Transplants**

It is usually thought that pruning at planting time improves a transplant's chances of survival or growth because the reduction in actual and potential leaf area will reduce the transplant's requirements for water. This practice certainly does reduce water requirements and therefore may be useful under drought conditions. However, the practice is labor-intensive and may have long-term negative effects on plant vigour. Studies with apple, birch and linden, where pruned transplants have been compared to unpruned transplants, have indicated that shoot pruning at the time of transplanting

substantially reduces root growth and subsequent shoot growth. Studies with pears have found no advantages or disadvantages with this practice.

## **Pruning Saskatoons**

Regular, careful pruning is important to maintain plant health and to improve yield and fruit quality. Properly pruned saskatoon orchards can produce for more than 30 years. If pruning is neglected, orchard lifespan may be less than 12 years.

Saskatoons may be pruned using the practices of typical renewal pruning of deciduous shrubs. The steps involved in pruning saskatoons are simple and straightforward. The objective is to create plants with an open centre and vigorous shoots. Pruning should be carried out so as to create a balance between older, but less productive growth and newer, more productive growth.

Proper pruning removes unproductive or damaged wood and encourages strong, healthy growth. Thinning or removal of stems is used to rejuvenate and promote new growth of strong stems; such thinning begins after 3 to 4 years of bearing fruit. The removal of older, less productive stems, allowing the production of new plant growth should be encouraged because the largest fruit are usually produced on 2 to 4 year old shoots. Removal pruning should be a yearly job. Substantial pruning does not become necessary until the orchard is about 6 to 10 years old.

For the first three years following

orchard establishment, pruning is primarily associated with the maintenance of plant health and the encouragement of vigour. During this period, pruning primarily involves the removal of weak, diseased, damaged and dead shoots. Low, spreading branches should be removed and the centers of shrubs thinned to keep them open and thus allow good air circulation.

Yearly pruning should be carried out in late-March to early-May, prior to budbreak. The reasons for pruning in the spring while the plant is still dormant are to remove any wood which was killed or damaged over the winter and to do this before the plant puts any energy into new growth which may have to be removed. There are three basic pruning steps which should be carried out each spring: 1) Remove dead, damaged or diseased stems; 2) Cut back weak or spindly growth; 3) Remove stems greater than 2.5cm in diameter at ground level.

Once the shrubs reach 3 to 6 years of age, depending on the vigour of growth and stem production, renewal thinning may begin. This involves the removal of 1/4 to 1/3 of the older stems back to the crown each year. Thus, flowering wood is present every year, and each shrub is completely renewed on a 3 to 4 year cycle. Certainly any stems greater than 2 to 2 ½ m in height need to be pruned out to facilitate harvest.

If the orchard is machine-harvested, damaged stems will have to be pruned out following harvest to avoid infection by canker.

Regular pruning is important to

contain canker, blackleaf and fireblight (always remember to disinfect pruning tools after pruning diseased plant material, and before pruning healthy plant material, and also to burn pruned material).

Pruning for disease control may be carried out anytime between late-winter and late-fall. Pruning for control of canker and blackleaf may be easiest in autumn after leaf-fall because, at this time, it is easy to see the split bark symptomatic of canker, and the infected leaves symptomatic of blackleaf that remain attached to the stems.

Once the saskatoon orchard reaches mature bearing age (6 to 7 years), a program of orchard renewal or renovation could be considered. This involves the complete removal of all plants in 5 to 10% of the rows every 4 to 5 years in order to provide space to replace plants and to plant new cultivars. This practice would make it easier to recover from disease problems and to adapt to changes in the market. Once initiated, this becomes a constant process which must be planned for because the new plantings will not begin to bear acceptable yields for the following 4 to 6 years.

---

*Copyright 2006 by Richard G. St-Pierre, Ph.D.  
www.prairie-elements.ca. All rights reserved. Any copying or publication or use of this publication or parts thereof for financial gain is not permitted. Users of this publication are allowed to print one (1) copy for personal use only. Otherwise, this publication may not be reproduced in any form, or by any means, in whole or in part for any purposes without prior written permission of the author. Due recognition must be given to the author for any use which may be made of any material in this publication. Requests for permission to copy or to make use of material in this publication, in whole or in part, should be addressed to: Richard St-Pierre, Email: prairie.elements@sasktel.net*

*Disclaimer:* This publication was designed to be an educational resource for individuals who are interested in growing saskatoons, in orchards, shelterbelts, or gardens. Every effort has been made to ensure the accuracy and effectiveness of the information in this publication. However, the author makes no guarantee, express or implied, as to the information and procedures contained herein. The information cannot be guaranteed because knowledge of the biology and culture of the saskatoon may not be applicable to all locations every year. Additionally, the information that is available often changes over time. Little scientific research has been done on many aspects of the culture and management of saskatoons. Consequently, this publication can only serve as a guide. All actions taken which are based on the information presented in this publication are solely the responsibilities of the readers or users, and the author is not liable for any direct, indirect, incidental, or consequential damages in connection with or arising from the furnishing, performance, or use of this material. Comments on information contained in this publication are welcomed.