LIFECYCLES

Cultivating Communities

Fruit Tree Care

on Southern Vancouver Island

Educational Booklet Compiled by the LifeCycles Project Society

LIFECYCLES FRUIT TREE PROJECT

LifeCycles Project work focuses on health, healing and connecting people to the food they eat and where it comes from. We endeavour to honour the land and its treaties by strengthening our relationship and responsibilities to them. We live and work on unceded Coast Salish Territories*, specifically of the Lekwungen and W_SÁNEC peoples. Many of our practices, including the fruit trees we harvest and care for, came to these lands through the ongoing process of dispossession and colonialism. We hold this understanding in our interactions and engagements with this land and its people.

** The term Coast Salish is used to encompass a number of Indigenous peoples, including Esquimalt, Hul'qumi'num, Klahoose, Lekwungen (Songhees), MALAXEt, Musqueam, OStlq'emeylem, Pentlatch, Scia'new (Beecher Bay), Sliammon, Shishalh, Skxwú7mesh-ulh Úxwumixw, Stó:lo, Straits, Tsleil-Waututh, T'Sou-ke, W_SÁNEC (Pauquachin, Tsartlip, Tsawout, Tseycum), and Xwemalhkwu.*

Home is Where We Live – LifeCycles Project Society
Coast Salish Territories
A-808 Viewfield Rd
Victoria, BC
V9A 4V1

Phone: 250-383-5800
Email: info@lifecyclesproject.ca
Web: www.lifecyclesproject.ca

This booklet was compiled to support the planting and care of the Capital Region's urban orchard. It was compiled from multiple sources, some of which are credit in the text. We also pulled from resources published by Cornell University and Washington State University, which are linked in our final section "Resources for Further Learning."

Contents

Background and Who We Are

In the 1800s, colonization saw Coast Salish Territories become one of the premier fruit growing regions of the British Empire. Today, the many old (standard sized) fruit trees in backyards across the region are remnants of old orchards that once flourished in our mild climate and fertile soils. The unceded Coast Salish Territories of the Lekwungen and W_SÁNEC peoples became an important fruit production area for settler society. This continued up until the mid-1900's, when innovations in irrigation technology enabled the Okanagan and Similkameen to be developed as fruit growing areas. With advents in agriculture and irrigation, orchards were more commonly irrigated and the zero or little irrigation orchards of our area gave way to more heavily mechanized orchard production in the interior, where hot summers and cool winters provided an ideal climate for many fruiting trees.

The previous two generations have found less time to cultivate and harvest apple trees in this place, and many of Victoria's old apple trees now drop their annual loads on someone's lawn. While the wasps gorge on homegrown fruit, Victorians bring home bags of shiny Granny Smith apples shipped from the Okanagan, the USA or New Zealand. Such market varieties are chosen for durability and good looks rather than flavour, quality or regional suitability. As a result, many varieties that were valued in the past for exceptional texture, taste, good storage ability or suitability to place are being lost. With them goes centuries of history and careful selection along with our ability to discern and appreciate the subtle nuances of their flavours.

LifeCycles aims to connect people to the abundance of this place and maintain local food values through community stewardship. As an organization run by settlers we are working to understand how we can decolonize our practices and give back to the land. In the spirit of reciprocity, generosity and sharing we hope to cultivate the foundations for a different way of organizing society. We believe that together we can cultivate a new spirit of community that is nourished by and rooted in this incredible place.

LifeCycles Programs

Fruit Tree Project

Powered by volunteers, our Fruit Tree Project imagines the urban orchard as a place where we all create abundance together. Each year hundreds of volunteers harvest tens of thousands of pounds of fruit, which is shared: among homeowners, volunteers, food banks & community organizations and back to the project itself. More than just fruit harvesting, or project also connects people in caring for place and each other.

LifeCycles Fruit Tree Project harvests fruit by connecting volunteer pickers with generous tree owners. We then share the resulting yield forward with over 45 community partners. We also offer tree care services and education to ensure we give back to the lands that sustain us.

Farm Gleaning

LifeCycles utilizes our existing systems, specialized knowledge and relationships within the local farm community to undertake the volunteer recruitment, training and relationship building required to operate a farmer supported gleaning program.

Farmers participating in the project currently receive in-kind tax receipts for the estimated market value of product. We work to efficiently harvest and distribute this product to neighborhood based food hubs in the region.

Growing Schools

LifeCycles' Growing Schools Program provides integrated school garden support across the Capital Region. We work with educators who believe in the power of food to bring health to our communities and to the land, air and sea from which it comes.

Our program helps school communities integrate native plants and cultivated food crops into outdoor classrooms and playgrounds.

Victoria Seed Library

A partnership between LifeCycles and the Greater Victoria Public Library, the Victoria Seed Library is a way for hobby and beginner gardeners to share seeds and steward a regionally adapted seed collection. We also consult and advise on the development of Community Seed Sharing programs with friends across the continent.

Seed Library Members "sign out" and grow seed from our amazing collection of locally grown seeds. When their plants mature, members save seed and return a portion back to the Seed Library. Becoming a Seed Library Member is free, and you don't need to be a member of the public library to participate. All you need to do is attend one of our workshops, events, or member orientation sessions.

Community Food Program

Learn, grow, eat and share. For over 20 years, LifeCycles has been partnering with social service agencies to offer practical food and garden education to community members. These programs support local food systems and foster food justice awareness throughout our community.

Together we work to deepen our collective understanding of where food comes from and grow our connection to this place. Our Community Food Program aims to increase access to fresh, healthy and local food by creating a food literate region. Our Community Food Programs are about more than recipes and labels; they are about fostering an awareness of food justice and supporting communities in actively participating in a secure local food system.

Welland Community Orchard

The Welland Legacy Park houses a community orchard that is among the largest & most diverse in Canada. Together with the Town of View Royal and dozens of volunteers, we are working to create a new model of public park stewardship, protecting and nurturing this local treasure. We provide hands-on education to volunteers who are trained in sustainable food production, fruit tree maintenance and native pollinators, to care for and restore this unique heritage orchard, located at 1215 Stancil Lane and accessible from the Galloping Goose Trail. We also have a plant nursery at Welland where we grow plants to support the improved health of the region's urban orchard.

Tree Biology

All text in this Tree Biology section is taken directly from: UC Davis: Fruit & Nut Research & Information website. They also offer information about tree reproduction and pollination. http://fruitandnuteducation.ucdavis.edu/generaltopics/Tree_Growth_Structure/

A tree is a perennial plant with woody supportive tissue and a single main stem or trunk. The above ground part of a tree (trunk, branches and leaves) captures light and transports sugars from leaves to fruits and roots. The below ground portion of a tree (roots) takes up water and nutrients and transports them to the leaves and fruit. All plants must acquire resources (nutrients, water, and light) to survive and reproduce.

A few simple principles govern the processes of tree resource capture and reproduction, and give rise to the wide variety of trees that we see on a daily basis.

Photosynthesis

Light interception by leaves powers photosynthesis.

All organisms, animals and plants, must obtain energy to maintain basic biological functions for survival and reproduction. Plants convert energy from sunlight into sugar in a process called photosynthesis. Photosynthesis uses energy from light to convert water and carbon dioxide molecules into glucose (sugar molecule) and oxygen. The oxygen is released, or "exhaled", from leaves while the energy contained within glucose molecules is used throughout the plant for growth, flower formation, and fruit development.

There are several structures within a leaf that have important roles in the movement of nutrients and water throughout a plant. Each plant contains a branched system of tubes called *xylem*, which is responsible for water transport from the roots (where it is taken up) to the leaves (where it is used in photosynthesis). Water flows up from the roots, through the trunk and branches, to the leaves, where it is used in photosynthesis.

Alongside xylem is another system of tubes called *phloem*, which transports the glucose formed in photosynthesis into the branches, fruit, trunk and roots of the tree.

The ends of both the xylem and phloem transport systems can be seen within each leaf vein. The structure of xylem and phloem in a plant is

analogous to arteries and veins in humans, which move blood to and from the heart and lungs.

Leaves contain water which is necessary to convert light energy into glucose through photosynthesis. Leaves have two structures that minimize water loss, the cuticle and stomata. The *cuticle* is a waxy coating on the top and bottom of leaves which prevents water from evaporating into the atmosphere.

Although the cuticle provides important protection from excessive water loss, leaves cannot be impervious because they must also allow carbon dioxide in (to be used in photosynthesis), and oxygen out. These gases move into and out of the leaf through openings on the underside called *stomata*. After carbon dioxide enters the leaf through stomata it moves into the mesophyll cells where photosynthesis occurs and glucose is constructed.

Respiration

Photosynthesis is the process by which plants use light energy to convert carbon dioxide and water into sugars. The sugars produced by photosynthesis can be stored, transported throughout the tree, and converted into energy which is used to power all cellular processes. Respiration occurs when glucose (sugar produced during photosynthesis) combines with oxygen to produce useable cellular energy. This energy is used to fuel growth and all of the normal cellular functions. Carbon dioxide and water are formed as by-products of respiration.

Respiration occurs in all living cells, including leaves and roots. Since respiration does not require light energy, it can be conducted at night or during the day. However, respiration does require oxygen which can be problematic for roots which are overwatered or in soils with poor drainage. If roots are inundated for long periods of time they cannot take up oxygen and convert glucose to maintain cell metabolic processes. As a result, waterlogging and excessive irrigation can deprive roots of oxygen, kill root tissue, damage trees, and reduce yield.

Fruit Quality

Light isn't just important for leaves – light exposure also affects fruit and nut quality.

Light interception by leaves is essential for the growth and survival of fruit trees because it enables plants to convert energy from light into

sugar to fuel flowering and fruit growth. Although the green skin of developing fruit can produce sugar via photosynthesis, fruit is primarily a sink, requiring input of supplemental sugars from surrounding leaves. The leaves closest to an individual fruit serve as the primary source and provide the majority of sugars required for development. As a result, leaves immediately adjacent to a fruit have the strongest influence on the composition and size of that specific fruit. It is essential that the leaves closest to developing fruit (in both fruit and nut tree crops) intercept enough light to ensure high quality crop production.

Independent of the nearby leaves, the quality of fruit improves with exposure to light during development. When fruit are exposed to an optimal amount of light, they achieve higher sugar content, more complex flavor, and deeper color. Since sugar content, flavor, and color are all important components of consumer appeal, fruit tree growers must consider the need for light interception by leaves and fruit when making decisions about how to prune and train their trees.

Although light is necessary for plant survival and fruit production, excessive light and temperature can damage both leaves and fruit. The proteins and enzymes in fruit and nut tree plant cells function best at intermediate temperatures. When temperatures increase above a critical level, often as a result of excessive light exposure, proteins and enzymes begin to break down resulting in cell damage and death. Sunburn results from excessive light interception and heat, which kills photosynthetic tissue and results in low quality fruits and nuts. [This is not a common problem on Vancouver Island.]

Tree Structure and Light Capture

The woody components of a tree (branches and trunk) make up the majority of the above ground biomass, and serve two important functions:

1. as structures to orient leaves to enable maximum light capture, and
2. as “tubes” along which water, nutrients and sugars are transported among the leaves, flowers, fruits, and roots.

The shape and distribution of branches defines tree structure. The structure of a tree is governed by physiological processes within the tree and environmental factors, both of which determine the extent to which pruning and training practices can be used to achieve ideal conditions for fruit and nut production.

In this section, we will review the basic processes that govern tree growth and architecture. With an understanding of basic tree biology,

anyone can go out and make observations of trees, deduce important facts about how that tree grows annually, and predict where flowers and fruit are produced in the canopy.

Basic Branch Anatomy

Trees are primarily composed of dead woody tissue that provides structural support for leaves and fruit. Embedded within the woody support tissue are points of living tissue, called *meristem*, which produce new branches, leaves, and flowers. Apical and lateral meristem are two primary types of meristem in trees that determine architecture, and play different roles in determining the overall shape of a tree canopy.

Apical meristem is found at the tips of growing shoots, while
Lateral meristem is found in buds that occur along branch edges.

Apical Dominance & Branch Growth Patterns

The presence of apical meristem at the tip of a branch suppresses development of lateral meristem further down the branch. The suppression of lateral meristem by apical meristem is called apical dominance. Since apical dominance suppresses lateral meristem growth, the majority of lateral meristem buds do not go on to develop into shoots. However, if the apical meristem is removed, it eliminates apical dominance in that branch and lateral meristem will develop into new shoots during the following growing season.

Constraints on Branch Growth Imposed by Limited Resources

The distribution of resources within a branch is another important determinant of branch anatomy. Although some of the glucose produced by photosynthesis is transported to the roots, most glucose travels only short distances to local sinks (including nearby fruit and growing wood). As a result of apical dominance, the majority of available resources in a branch are allocated to shoot tip extension and growth at the expense of lateral branch production. Because sugars are primarily taken up and used for growth in nearby tissues, branches are tapered and no lateral branch will exceed the diameter of the primary branch from which it is produced.

Branch Anatomy & Apical Dominance Combine to Determine Tree Architecture

The overall form of a tree can be described based on simple observations of the pattern and distribution of branch growth along the main trunk. Specifically, the relative positions of branches as they are produced each year, the number of shoots produced per branch each year, and the angle at which branches are produced from the primary stem. Subtle changes

in any of these factors can result in dramatic differences in overall tree architecture. Opposite branches are produced in successive pairs on opposite sides of the main stem. Both opposite and spiral arrangements minimize self-shading of lower leaves by upper leaves. Almost all tree fruit and nut crop species currently grown in California follow a spiral branch placement pattern, although branch angle and apical dominance vary substantially.

There are two important factors which determine overall tree structure. First, the number of lateral shoots produced per year, or the strength of apical control, has an important impact on overall canopy structure. A tree with weaker apical dominance will produce more lateral shoots per year and result in a dense canopy, whereas a tree with stronger apical dominance will produce fewer lateral shoots per year and a less dense, and open, canopy. Second, trees that produce branches at very narrow angles have an upright growth habit and a vertical canopy. Intermediate branch angles result in a rounder intermediate tree shape common in fruit and nut tree crops. In contrast, a combination of very wide branch angles and less rigid branches results in a downward "weeping" growth habit.

Shoot vs. Spur Bearing

The bearing habit of a species can be described by the location and types of buds which produce flower and fruit. Flower buds are borne laterally on shoots or spurs. Although green unripe fruit are photosynthetic, they require supplemental carbohydrates for proper development. In most fruit and nut tree crop species, the majority of carbohydrates required for fruit development are acquired from two sources: 1) reserves stored from the previous growth season in adjacent branch tissue, and 2) photosynthesis throughout the growing season in nearby leaves.

Each fruit and nut crop species has a distinct bearing habit and growth form. Flower buds are formed laterally on woody tissue, terminally at shoot tips, or on spurs.

Alternate Bearing in Tree Fruit and Nut Crops

Alternate bearing refers to the tendency of an entire tree to produce a greater than average crop one year, and a lower than average crop the following year. Long term studies of flower and fruit production in almond demonstrated that individual spurs alternate between years in which flowers and fruits are produced and years in which only leaves are produced. Based on these observations, if the majority of spurs on a tree bear fruit in one year the tree will produce a greater than average crop,

and the following year most of the spurs will produce only leaves resulting in a smaller than average crop.

Two observations support the idea that alternate bearing in individual spurs occurs as a result of fluctuations in local resource storage across years:

1. Individual spurs, not branches or whole trees, alternate leaf and fruit production each year.
2. The majority of sugars produced by a leaf are transported only short distances to adjacent fruit or branch tissue.

Combined, these observations suggest that high levels of resources used in one year result in depleted local resource storage during dormancy. The following year (as a result of low resource storage), only leaves are produced. Leaves have lower resource demands than fruit and result in increased local storage for the following year when fruit are produced.

The mechanism for alternate bearing in pistachio was investigated by UC Davis Professor Polito. After pollination, as pistachio fruit grow, new flower buds develop within the branch. UC Davis Professor Polito demonstrated that growing fruit suppress developing flower buds that would otherwise mature in the next year. As a result, during years with greater than average fruit production, the majority of developing flower buds are suppressed so that the following year only a few flowers and fruit are produced. This results in regular oscillations between high and low yields in alternating years. This same phenomenon happens in fruit trees on Southern Vancouver Island.

Weather conditions impact flower and fruit development and can exacerbate the alternate bearing tendency of individual tress or whole orchards. For example, a severe frost during bloom would kill developing flower tissue and result in a very low fruit set. As a result of the low fruit set, and reduced use of stored carbohydrates at each individual spur, the following year the majority of spurs will produce flowers and set fruit. If all spurs on a tree are synchronized to flower during the same year it will generate a whole tree, and even whole orchard, pattern of alternate bearing.

An understanding of the mechanisms responsible for alternate bearing in fruit and nut tree crops is important when critically evaluating the range of pruning and training strategies commonly used by growers to minimize alternate bearing. Fruit thinning is an important strategy used by commercial growers to manage alternate bearing (or “bi-annualism”).

Tree Planting

Some of the text in this Tree Planting Section is taken from the International Society of Aboriculture's Trees Are Good Program. For more information visit http://www.treesaregood.org/treeowner

Considering that most trees have the potential to outlive the people who plant them. The decision about what kind of tree to plant can have long-term implications. The most important thing is to match the tree to the site.

Do you want the tree to provide shade, fruit, or seasonal color, or act as a windbreak or screen? Does the space lend itself to a large, medium, or small tree? Are there overhead or belowground wires or utilities in the vicinity? Do you need to consider clearance for sidewalks, patios, or driveways? Are there barriers to future root growth, such as building foundations?

Consider the soil conditions - Is it deep, fertile, and well drained, or is it shallow, compacted, and infertile?

How much maintenance are you willing to provide? Do you have time to water, fertilize, and prune the newly planted tree until it is established, or will you be relying on your tree service for assistance?

Purchasing a tree is a lifelong investment. How well this investment grows depends on the type of tree selected and the planting location, the care provided during planting, and the follow-up care after planting.

Selecting Nursery Stock

A high-quality tree, when planted and cared for correctly, may become a long-lasting asset to your property. In contrast, a low quality tree may develop costly problems over time, increasing the need for maintenance and reducing the benefits a tree can provide.

What determines Tree Quality

A high-quality tree has:

- strong form with well-spaced, firmly attached branches
- a trunk free of wounds and damage
- a quality root system to support healthy growth

A low-quality tree has:

- weak form in which multiple stems originate from the same point and branches grow into each other
- a trunk with wounds form handling or incorrect pruning
- limited, crushed, or circling roots in an undersized root ball or container

**These problems, alone or in combination with each other, can greatly reduce the tree's prospects for a long, attractive, healthy, and productive life. When buying a tree, inspect it carefully to identify problems related to form, injuries, or roots (remember the acronym FIR)*

Form

When buying a young shade tree, it is important to note that the branches you see may not be present at maturity. Many lower branches will be shaded out as the tree grows, or pruned away to allow clearance for pedestrians, traffic, mowing, or other activities.

Young trees often have few naturally occurring branches. Branching increases as a tree ages. As a result, many nurseries prune young trees to spur crown growth. While giving a tree a fuller appearance, this practice may lead to issues that must be addressed later with corrective pruning measures.

Good, strong form – or architecture – starts with branches evenly spaced along the trunk. The branches should have firm, sturdy attachments with the trunk. Very upright branches with narrow angles of attachment may cause problems later on as they grow into the trunk. Branches that press against the trunk or each other signal problems. Areas of contact may become compressed, may crack, or die back. When several branches are growing at the same position on the trunk, the likelihood of weak attachments, compression, and cracks increases greatly.

If you desire a tree with multiple trunks, make certain that the trunks are well separated at the ground line. Remember, trunks expand in diameter as they grow. Two trunks may be slightly separated when small, but as they grow in girth, the trunk will squeeze together.

Many architectural issues can be addressed through corrective pruning or training. Begin corrective pruning one year after planting. Space the pruning over several years.

Remove only broken or torn branches at the time of planting to allow tree to recover from the stress of transplanting. After a year, start corrective pruning by removing any branches that died after planting.

Injuries

Never buy a tree without thoroughly checking the trunk. If the tree is wrapped, remove the wrap and inspect the trunk for wounds, incorrect pruning cuts, and insect injuries. Wrap can be used to protect the trunk during transit, but should be removed after planting.

Incorrect pruning cuts on the main trunk are major problems. Cuts that remove or injure the swollen collar at the base of branches may lead to problems, such as canker formation, decay, and cracking. Incorrect pruning practices that leave a stub prevent a tree from recovering from the cut.

Roots

Nursery trees are often classified based on how they are produced, harvested, and sold. Each type of tree has a unique root system:

- bare root: no soil surrounding roots; usually on small trees
- balled and burlapped: roots of field-grown trees surround by soil and held together with burlap and wire or rope
- container: roots and soil in a container

Bare Root Stock

Bare roots should not be crushed, torn, desiccated, or discoloured. The ends of the roots should be cleanly cut. Damaged roots may be cut cleanly prior to planting and watering.

Balled and Burlapped Stock

You should be able to see the trunk flare (the area where the trunk widens and connects with the roots) at the top of the root ball. Avoid buying plants with badly damaged or compressed root balls. The top of the root ball should be flat. Rounding may be indication of major woody root loss.

The diameter of the root ball should be at least 10 to 12 times the diameter of the trunk as measured six inches (15cm) above the trunk flare.

Container Stock

Roots should not twist or circle in the container. Remove the root ball from the container for inspection, paying special attention to larger,

exposed roots. Circling roots may girdle and kill other roots or the entire tree if wrapped around the lower trunk.

Fine circling roots may be cut away before planting. Larger roots may be straightened if still flexible. As with balled and burlapped stock, you should be able to see the basal trunk flare with container-grown plants.

How to Plant

When?

Ideally, trees are planted during the dormant season — in the fall after leaf drop (October – November) or in early spring before bud-break (February and early March). Weather conditions are cool and allow plants to establish roots in the new location before spring rains and summer heat stimulate new top growth. Healthy balled and burlapped or container trees, however, can be planted throughout the growing season if given appropriate care.

Planting Stress

Balled and burlapped trees lose a significant portion of their root system when dug at the nursery. As a result, trees commonly exhibit what is known as "transplant shock". Transplant shock is a state of slowed growth and reduced vitality following transplanting. Container trees may also experience transplant shock, particularly if they have circling or kinked roots that must be cut. Increasingly fruit trees are planted in their dormant period from bare root nursery stock, which helps reduce transplant shock. Proper site preparation, careful handling to prevent further root damage, and good follow-up care reduces transplant shock and promotes faster recovery.

Nine Steps to Planting a Tree

Carefully follow the nine simple steps below to help your tree establish quickly in its new location. Note: Before you begin planting your tree, be sure you have located all underground utilities prior to digging.
Contact Call Before You Dig via BC One Call at 1-800-474-6886

1. **Identify the trunk flare.** The trunk flare is where the trunk expands at the base of the tree. This point should be partially visible after the tree has been planted. Remove excess soil from the top of the root ball prior to planting if the root flare is not visible.
2. **Dig a shallow, broad planting hole.** Holes should be 2 to 3 times wider than the root ball, but only as deep as the root ball. Digging a broad planting pit breaks up the surrounding soil and provides newly emerging tree roots room to expand.

3. **Remove the containers or cut away the wire basket.** Inspect container tree root balls for circling roots. Straighten, cut, or remove them. Expose the trunk flare, if necessary.
4. **Place the tree at the proper height**. Take care to dig the hole to the proper depth – and no more. The majority of a tree's roots develop in the top 12 inches (30cm) of soil. If the tree is planted too deep, new roots will have difficulty developing because of a lack of oxygen. In poorly drained or heavily clayed soils, trees can be planted with the base of the trunk flare 2 to 3 inches (5 to 7.5 cm) above grade. When placing the tree in the hole, lift it by the root ball, not the trunk.
5. **Straighten the tree in the hole.** Before backfilling, have someone view the tree from several directions to confirm it is straight. Once planted, it is difficult to reposition the tree.
6. **Fill the hole gently, but firmly.** Pack soil around the base of the root ball to stabilize it. If the root ball is wrapped, carefully cut and remove any fabric, plastic, string, and/or wire from around the trunk and root ball to prevent girdling and to facilitate root growth. Fill the remainder of the hole, firmly packing the soil to eliminate air pockets that may dry out roots. Further reduce air pockets by watering periodically while backfilling. Avoid fertilization at the time of planting.
7. **Stake the tree, if necessary.** Studies have shown that trees establish more quickly and develop stronger trunk and root systems if they are not staked at the time of planting. Staking may be required, however, when planting bare root stock or planting on windy sites. Stakes may also offer protection against lawn mower damage and vandalism. Dwarf fruit trees need staking as do some semi-dwarf trees. One or two stakes used in conjunction with a wide, flexible tie material on the lower half of the tree will hold the tree upright and minimize injury to the trunk, yet still allow movement. Remove support staking and ties after the first year of growth.
8. **Mulch the base of the tree.** Mulch is organic matter spread around the base of a tree to hold moisture, moderate soil temperature extremes, and reduce grass and weed competition. Common mulches include leaf litter, pine straw, shredded bark, peat moss, or composted wood chips. A 2- to 4-inch (5- to 10-cm) layer is ideal. More than 4 inches (10 cm) may cause a problem with oxygen and moisture levels. Piling mulch right up against the trunk of a tree may cause decay of the living bark. A mulch-free area, 1 to 2 inches (2.5 to 5 cm) wide at the base of the tree, reduces moist bark conditions and prevents decay.
9. **Provide follow-up care.** Keep the soil moist, but not water-logged. Water trees at least once a week, barring rain, and more frequently

during hot, windy weather. When the soil is dry below the surface of the mulch, it is time to water. Continue until mid-fall, tapering off as lower temperatures require less-frequent watering.

Other follow-up care may include minor pruning of branches damaged during the planting process. Prune sparingly after planting and delay necessary corrective pruning until a full season of growth in the new location has occurred.

Completing these nine simple steps will maximize the likelihood that your new tree will grow and thrive in its new home.

Where to Go to Get Healthy Fruit Trees

Le Coteau Farm 2010 Ltd.| 304 Walton Place, Victoria, B.C. V9E 2A4
Phone: 250-658-5888. Email: farms@lecoteau.com

Fruit Trees and More, Custom Propagation Nursery
724 Wain Rd., North Saanich, BC, Canada, V8L5N8.
Phone: 250-656-4269. Email: bvduncan@FruitTreesAndMore.com

Salt Spring Apple Co.
529 Fulford-Ganges Road. Salt Spring Island, BC. V8K 2K1.
Phone: 250-537-4935. Email: admin@SaltSpringAppleCompany.com

Variety Selection and Size

There are so many cultivars (or cultivated varieties) to choose from! Deciding what to plant is one of the most enjoyable tasks of growing fruit trees. But it also can be frustrating for those who are new to growing fruit.

When choosing cultivars, look for those with outstanding hardiness, disease resistance, and fruit quality. Home fruit growers whose livelihoods do not depend on their garden harvest may find a lower-yielding yet higher-quality cultivar the best choice.

Keep in mind that peaches, figs and sour cherries are the only tree fruits grown in our region that are self-fruitful. When growing other tree fruits, you need to plant at least two different cultivars to get good pollination and fruit set, or have another pollinating tree in a nearby yard. Some popular heritage varieties are triploids and therefore produce sterile pollen, which will not help pollinate other trees. Be sure to talk to your nursery provider about pollination needs.

Rootstocks

Many home gardeners are now choosing small, size-controlled fruit trees grown on "dwarfing" rootstocks. Smaller trees make picking, pruning, and pest control easier, and they set fruit at a younger age than full-sized trees. They also have shorter life-spans. Larger standard sized fruit trees require less watering and care once established and have capacity to produce an abundance of fruit for your community for generations – LifeCycles Fruit Tree Project is primarily made possible by these older, standard sized trees. Large standard trees are beautiful, architectural additions to a landscape, which can be enjoyed by several generations. LifeCycles is keen to emphasize that larger trees can be relatively care free in their later years, require much less water, and are more resilient to neglect that are their dwarfing counterparts.

Rootstocks control the height of the tree and give it other special characteristics, such as resistance to insects or diseases, solid anchorage in the ground, and early fruit production. An important rootstock quality is what soil & weather conditions it can tolerate. Heavy soil, moisture preference, drought tolerance and winter hardiness are all characteristics determined by the root stock. A cultivar is grafted onto this special rootstock, so you are essentially buying two plants—the rootstock that anchors the tree and the cultivar that produces the fruit.

Key considerations when choosing rootstock include: size, disease tolerance, soil and weather conditions. Key considerations when choosing the cultivar include: hardiness, flavor, productivity and disease tolerance.

Mature tree size depends on the vigor of the rootstock, the scion cultivar (the cultivar grafted onto the rootstock), the depth and physical characteristics of the soil, and cultural practices. Fully dwarf apple trees grow just 8 feet tall when fully mature at 15 to 20 years of age. The fruit of a small tree is as good in flavor as the fruit of the same cultivar grown on intermediate- or full-sized trees.

Common apple rootstocks include:
M.9 (20-35% seedling height) A strongly dwarfing rootstock that produces a very short, 8- to 10-foot-tall tree. It needs a soil with high water-holding capacity and good drainage. Plants should be staked or trellised, and they are very susceptible to the disease fire blight. Trees grown on M.9 rootstock can bear fruit the second or third year after planting and reach full production in six years. These trees usually have a life span no longer than 30 years.

M.26 (40-50% seedling height) Produces slightly larger, 11- to 14-foot-tall trees that tend to be poorly anchored in the ground. Trees must be planted in well-drained soil but cannot tolerate very dry conditions. Trees grown on M.26 rootstock can bear fruit the second or third year after planting and reach full production in six years. These trees often do not live longer than 50 years.

MM.111 (70-85% seedling height) Produces large, semi-standard-sized, 19- to 24-foot-tall trees. Roots tolerate a wide range of soil conditions, including dry soil, and plants are less subject to collar rot than are those grown on MM.106. Trees grown on MM.111 rootstock can bear fruit their third or fourth year after planting and reach full production in 8 to 10 years. These trees are a good size for planting in areas with heavy deer pressure if you can protect them from browsing deer when they are small. Trees can live to be well over 100 years old.

Size-controlling rootstocks are also available for other tree fruits**. For pears**, Old Home x Farmingdale rootstock offers good fire blight resistance. OHxF 333 performs well in New York and produces trees that are about 10 to 12 feet tall. Pear trees grown on OHxF 97 rootstock are nearly as tall as standard trees but produce fruit much sooner.

For peaches, Lovell and Bailey are acceptable rootstocks and produce 12- to 15-foot-tall trees.

Plum and prune cultivars grafted on sand cherry or Nanking cherry rootstocks grow just 15 feet tall. Plum trees are commonly propagated on *Prunus* St. Julian A and myrobalan (*Prunus cerasifera*) rootstocks. Myrobalan grows in a wide range of soils, including poorly drained sites.

Cherry trees were traditionally propagated mostly on Mahaleb and Mazzard rootstocks, which usually don't produce fruit until about their seventh year. Mahaleb is the more winter hardy of the two and produces a smaller, 15- to 18-foot-tall tree. However, it is damaged by collar rot in poorly drained soils. Mazzard rootstock generally produces larger, 24- to 28-foot-tall trees and is preferred for sites with questionable drainage. Giessen rootstock, developed in Germany, produces smaller trees and begins fruiting as early as the third year.

Caring for Your Tree

The age of your tree may determine the type of maintenance that is required. Trees can be grouped into three categories based on age:

1. Young – trees that have not reached their full growth potential and are not yet able to reproduce. High growth rates.
2. Mature – trees that have reached all or most of their full growth potential and are able to reproduce. Growth rate is reduced.
3. Senescing or senior – trees that have stopped growth and development and may or may not be in decline as a result of age.

Young Trees

A newly-planted tree or a small-caliper tree, that has been planted for less than 3 to 5 years, can be considered a young tree. A young tree that has been recently planted is still establishing its root system and adjusting to its new site, and requires a different level of care.

Proper care of your young, newly-planted tree will speed up root establishment and help it grow to its full potential.

Proper watering and mulching are needed to get young, newly planted trees off to a good start. Newly planted trees can be vulnerable to stress until they become established in the landscape. A young tree must be watered regularly during its first few years. The soil should be moist to a depth of 12 inches (0.3 m) below the soil surface. Slow, deep watering once a week is preferred over fast, shallow watering.

Careful consideration should be given before you prune a young tree. Young trees are pruned after they have been in the ground for one year, and are pruned to promote shape, vigour and health.

Mature Trees

Pruning mature trees is done to remove broken, dead, and/or diseased branches and encourage fruit set. Ideally, large-diameter branches should not be removed. Mature trees have a hard time compartmentalizing (closing) large wounds and these may become an entry point for disease and/or decay.

Senescing Trees

A senescing or veteran tree is an old tree that has reached the upper limits of its lifespan and is not adding significant height or crown spread

each growing season. The vitality and survival of a veteran tree can be dramatically affected by changes to its site conditions. Too much or too little of anything can stress these senior citizens of the urban forest.

Senescing (veteran) trees require watering and mulching just as they have all of their lives.

Veteran trees should be inspected at least annually for signs of decline or failure, insect and disease problems, and nutrient deficiencies.

Over time, the soil around veteran trees can become compacted by foot and mower traffic. To help avoid compaction and to maintain a vigorous root system, a wide mulch layer should be applied. If compaction is already a problem, special techniques, such as soil aeration, can be used to increase water and air movement in the soil. These can damage roots if not done properly so should be done by knowledgeable people.

Regardless the age or stage of life of your tree, there are additional maintenance tasks you can perform to keep your tree structurally sound, vigorous, and attractive.

Mulching and Soil Building

Organic mulches moderate soil temperature, retain moisture, reduce soil compaction, and keep weeds and grass away. But most important, mulch keeps lawnmowers and line trimmers (or weed whackers) away from the trunk of your tree.

Mechanical and mower damage to trunks and roots can lead to severe decay and the death of trees. This is easily prevented through mulching by keeping lawn-care equipment away from the trunks and exposed roots of your tree.

Fallen leaves work well as a mulch. Add fresh or decayed leaves under your tree, making sure not to pile organic materials directly against the trunk of your tree (where it may rot and damage the tree – it can even kill it!). Mulch all the way out to the drip line of your tree. Do not exceed a depth of 12" with your mulch. Too much mulch can smother tree roots and cause problems for the long-term health of your tree.

Soil fertility tests are recommended where feasible. Knowing the specific needs of your soil can significantly help you appropriately care for your tree. Soil assessments can be completed through Integrity Sales in Central Saanich.

Sheet Mulching to Control Weeds

Sheet mulching is a strategy to smother weeds and/or grass. It is commonly used around perennial trees and shrubs to control weeds and improve soil quality.

1. Mark the drip line with ribbon and stakes. The circular sheet mulch should start 6" from the base of the tree out to 6" past the 'drip line' (where the canopy ends).
2. Dampen the area well and let it sit overnight.
3. Dig a narrow 4" deep trench along the ribbon line and not beneath the branches as the roots are there!
4. Cut back any grass or weeds within your newly demarcated area and leave it in place. Dampen the cuttings with your hose.
5. Add a 1" layer of finished compost, spread evenly and dampen.
6. Dampen both sides of cardboard (make it soggy), and add at least two layers (like lasagna), to the entire area to be mulched, being sure to overlap sheets.
7. Tuck your layer of cardboard into the trench, as this will block the advance of your lawn into your new fruit tree friendly bed! Dampen again.
8. Spread 6-12" of straw over your cardboard layer and dampen.

Once installed, your sheet mulch can be annually maintained by pulling any weeds that appear and adding small amounts of mulch under the drip line of your tree.

Fertlizing Fruit Trees

Fruit trees benefit significantly from annual applications of a small amount of organic fertilizers, beginning one year after planting. The simplest and easiest fertilizer, or soil amendment, commonly recommended is dolomitic lime, commonly sold as Dolopril.

Dolomitic lime is a mineral nutrient that helps balance pH and restore magnesium and calcium levels in soils. Our winter rains wash a lot of magnesium and calcium from the soil, so an annual application of a *small amount* of lime can be helpful. Over doing it with the lime can be devastating, so be sure to follow the directions on the package (some math will be required).

LifeCycles sells an all-purpose organic tree fertilizer, with directions on how to apply it. Our fertilizer has a small amount of lime, along with other organic amendments to provide a more complete profile of plant

nutrients. This is a more balanced amendment and, if applied in a small amount each year, can help significantly with fruit set and tree vigor.

You can also purchase complete organic fertilizers from garden stores. Fertilizer is not recommended for most other trees other than cultivated fruit trees.

Figs tend to respond poorly to fertilizing and produce more fruit in slightly less nutrient rich soils.

When trees can't get enough nutrients from the soil, the result can be decreased vegetative growth, light fruit set, and small fruit.

Whatever you do, don't overdo the application of fertilizers! Too much fertilizer can be as detrimental as too little, particularly when it comes to nitrogen. Nitrogen fertilizers fuel the annual extension growth in the trees. Annual extension growth is the amount that a branch grows each year.

To gauge annual extension growth, measure the distance from the tip of the branch back to the "ring" formed by the scars from the previous year's buds that encircle the branch, marking the end of the previous season's growth. You generally should get about 18 to 24 inches of annual extension growth during the first several years. Thereafter, 10 to 12 inches is sufficient for mature trees.

Watering

Generally, it is best to use ten gallons (38 liters) of water per inch (2.54 cm) of trunk diameter for each watering. Slow, deep watering is preferred to fast, shallow watering.

- Water regularly, not constantly, once per week during the summer is enough
- Keep the soil around the tree moist, not wet
- Deep watering!
- For older trees, water in the 'drip line' (where the canopy ends)
- For younger trees, water around the base of the tree

Pruning

Pruning newly planted trees should be avoided until the tree is established in the landscape. Remove only dead, dying, or broken limbs

and prune lightly to remove crossing or rubbing branches. Remember that newly planted trees need as much of their canopy as possible to produce the food and energy necessary to establish their root systems quickly.

Young fruit trees are often pruned to encourage them to grow into a suitable shape. Pruning is surgery for a tree and we recommend it only be done by people who know what they are doing.

LifeCycles offers fruit tree pruning workshops at the Welland Legacy Park during pruning seasons (detailed below). We also offer fruit tree pruning services and will come and prune your trees for a reasonable price. Contact us for more details.

Proper pruning is essential in developing a fruit tree with a strong structure and desirable form. Pruning young trees to establish good form and structure can start after the first growing season and/or after the tree has recovered from transplant shock.

A correct pruning cut removes the branch just outside of the collar. A ring, or "doughnut," of sound tissues then grows around the cut. Do not make cuts flush to the trunk. The closing tissues may form only to the sides of the flush cuts. Trunk tissues above and below flush cut branches often die. When high summer or low winter temperatures occur, cracks or long, dead streaks may develop above and below the dead spots.

When to Prune

- Pruning to increase light and air circulation is often done in July and early August. Pruning for air circulation is important in helping prevent disease in this climate.
- Pruning to stimulate growth is often done in the dormant period, from February to March.
- Pruning for shape is commonly done in February and March, though is increasingly being done in July and early August.
- Pruning for other reasons is best done in either Feb/March or July/early August. For more detailed information about the pros and cons of winter vs. summer pruning, we recommend attending one of our pruning workshops at Welland.

How to Prune

You'll need *sharp, clean* pruning tools to make clean, smooth pruning cuts that heal quickly. We recommend *only* using quality, sharp hand

held secateurs (for all cuts under a thumbs width) and a quality, sharp, folding pull (or pruning) saw (for all cuts larger than a thumb size).

When pruning, remove branches in order of: cracked, broken, and diseased branches, first; any new growth (suckers) causing crowding in the canopy, second; and finally, if two branches are rubbing, remove the least needed of the two. If you have unanswered pruning questions, it's a good idea to contact a local expert for advice specific to your trees. Pruning is a science and an art and requires experience and knowledge to do well. Pay attention to how your tree responds to pruning cuts and try to learn from your mistakes. Again, we strongly recommend attending a workshop if you want to start learning to prune.

Why prune?

Some pruning techniques, such as how to prune to promote lateral fruitful growth, are difficult to describe in a basic tree care booklet. We strongly recommend attending a workshop and doing further learning before making any major cuts on your trees. Fruit trees are pruned for the following reasons:

- To remove dead and diseased wood.
- To remove damaged or dangerous wood.
- To make the tree easier to harvest.
- To make the tree safe and/or remove it from harm's way.
- To reduce conflict with nearby structures or other trees.
- To create a shape that allows sunlight and air to circulate the interior of the tree (important for disease management in our wet, fungal environment).
- To stimulate vegetative (non-fruit) growth and encourage lateral fruitful growth.
- To maintain the shape and height of your tree or train young trees to a certain shape.

Fruit Thinning

Thinning the fruit on your trees encourages a healthier harvest of larger fruit, prevents branches from breaking, discourages pests and diseases, and decreases the amount of fallen or excess fruit come harvest time. By removing fruit from the tree, you allow the tree to put more energy to to the fruit that remains. In the best years, it can be necessary to remove more than 50% of the fruit from your tree to ensure it sets healthy, abundant fruit. In other poorer years, little fruit thinning may be

necessary. Pears & peaches typically don't need thinning but should be watched as they can break branches in heavy set years.

- Thin fruit about 30 to 45 days after full bloom – early April to mid-May – when the developing fruit is about an inch in diameter.
- Thin apples to 6 to 8 inches apart, and Japanese plums to 4 to 6 inches. Fruit any closer on the branch is TOO CLOSE and the fruit will likely not be able to fully develop. Pears usually don't need thinning.

Pest and Disease Management

Some pests/disorders merely cause temporary, cosmetic problems and may not need treatment. A local expert can help you decide whether treatment is necessary or if your tree will recover without damage.

The first and best defense in disease prevention is good variety selection.

Insect and Disease Problems

Improve your knowledge about insects and diseases that may affect tree health and learn proper steps for diagnosis.

Insects and diseases can threaten tree health. As soon as you notice any abnormality in your tree's appearance, you should begin a careful examination of the problem. By identifying the specific symptoms of damage and understanding their causes, you may be able to diagnose the problem and select an appropriate treatment.

Pest & disease diagnosis can be effectively done by searching relevant terms in google images until you find something that matches what you see on your tree.

Stress

Plant health requires sufficient water and light and a proper balance of nutrients. Too much or too little of any of these environmental elements may cause plant stress.

Trees deal with environmental stresses, such as shading and competition for water and nutrients, by adjusting their growth and development patterns to reflect the availability of the resources. Although trees are adapted to living in stressful conditions in nature, many times the stresses they experience in the landscape are more severe than they can

handle and may make them more susceptible to certain insects and diseases.

Diagnosis

Correct diagnosis of plant health problems requires a careful examination of the situation.

1. **Accurately identify the plant.** Many insects and diseases are plant-specific. This helps limit the list of suspected diseases and disorders.
2. **Look for a pattern of abnormality.** Compare the affected plant with other plants on the site, especially those of the same species. Non-uniform damage patterns may indicate insects or diseases. Uniform damage over a large area (perhaps across several plant species) usually indicates disorders caused by such factors as physical injury, poor drainage, chemical damage, or weather.
3. **Carefully examine the landscape.** The history of the property and adjacent land may reveal many problems. Most living pathogens take a relatively long time to spread throughout an area, so if a large percentage of plants becomes affected virtually overnight, a pathogen or insect is probably not involved.
4. **Examine the roots.** Brown- or black-colored roots may signal problems. Brown roots often indicate dry soil conditions or the presence of toxic chemicals. Black roots usually reflect overly wet soil or the presence of root-rotting organisms.
5. **Check the trunk and branches.** Wounds caused by weather, fire, mechanical damage, or animals can provide entrances for pathogens and wood-rotting organisms. Large defects may indicate a potentially hazardous tree.
6. **Note the position and appearance of affected leaves.** Dead leaves at the top of the tree are often the result of environmental or mechanical root stress.

Twisted or curled leaves may indicate viral infection, insect feeding, or exposure to herbicides. The size and color of the foliage may tell a great deal about the plant's condition.

Maintenance

Your ability to grow terrific tree fruits may depend on your ability to control pests and diseases. You will face many of the same challenges as commercial growers, but it's unlikely that you will have the same powerful pest control tools that they have. For example, home fruit growers typically use hand-operated sprayers or those run by small electric or gasoline motors. Compared with commercial-sized sprayers,

these machines have a smaller capacity and lower pressure and require more energy to do an effective spraying job.

This makes it especially important for you to follow cultural practices that keep trees healthy and minimize disease and pest buildup. In addition to doing a good job of site preparation, choosing a location with good air drainage, and planting disease-resistant cultivars, there are several easy steps you can take to help prevent pest and disease problems:

- Maintain a complex ecosystem around your plantings that provides habitat for beneficial insects.
- Prune out dead twigs and branches during the dormant season.
- Rake up and destroy leaves and diseased fruit in the fall, after harvest.
- Familiarize yourself with disease and insect life cycles so that you can correctly time control measures.

Home gardeners should be aware of the following major diseases and insects of tree fruits. If located, further internet, library or consulting research may be needed to determine appropriate methods for controlling pests and disease.

Many Universities and Horticulture Societies have published very helpful resources on-line to help diagnose and treat diseases in fruit trees. UBC's Botanical Garden also has a wonderful on-line forum where you can ask questions of horticulturalists and search questions asked by others – check it out at forums.botanicalgarden.ubc.ca

Common Fruit Tree Pests and Diseases

Deer

Deer particularly love the young shoots of fruit trees and can completely defoliate a young tree in minutes. They will also eat mature trees as high as they can reach (they will stand on their hind ends to feed). When planting a new tree it is important to provide deer protection to that tree if there is any risk of a deer getting access to it.

Mice

Mice like to burrow under and around the roots of trees, in order to eat the young juicy root shoots of those trees. Watch for small holes around the roots of your trees and try to move mice along if found in your trees. They can do significant damage.

Coddling Moth

The larva of this moth is a worm found commonly in homegrown apples. As an adult, this iridescent gray moth deposits eggs on leaves and fruit. The eggs hatch about 6 to 20 days later, usually after flower petals have fallen. Although other generations may occur during the season, it is most important to control this first generation, through mechanical squishing or organic sprays, especially the adults before they lay eggs and the larvae that hatch from eggs deposited on fruit and foliage. Picking up and destroying fallen fruit once a week through harvest reduces the potential for coddling moth infestations the following year.

Apple Maggot

The adult flies are slightly smaller than houseflies. They emerge from the soil between mid-June and mid-August and feed for about a week. Then the females lay eggs under the skins of apples. After hatching, the maggots bore through the fruit. In heavy infestations, many larvae can be found in a single fruit. Picking up and destroying fallen fruit once a week from early August through harvest reduces the potential for maggot infestations the following year. Apple maggot emergence and activity can be monitored by hanging red ball sticky traps.

Leafrollers

Leafrollers, the larvae of certain tortricid moths, often feed and pupate within the protection of rolled-up leaves. They feed inside nests made from leaves of their host plants, rolled together and tied with silk. Once inside their leaf nests, leafrollers chew holes through the tissue, sometimes adding more leaves to the nest to keep themselves protected

from predators. Leafroller damage is usually minor, but some years it may be quite severe. When there are lots of nests in a plant, defoliation may occur. High numbers of leafrollers may also feed on fruits, causing scarring and deformation.

Aphids

These tiny insects cause apple leaves to twist and roll. Aphids suck juices from plant leaves and secrete honeydew. Small green aphids are common on fruit trees in our region and can be mechanically controlled by squishing and killing them, or by using a dish soap and water spray. Aphids can be controlled by having a diverse garden to attract beneficial insects like ladybugs and lacewings. Plants n the carrot family, with but umbelliferous flowers, are particularly attractive to predators of aphids.

Scab

This fungal disease is easily recognized by the olive-green to black spots it causes on fruit and foliage. Severely infected leaves are dwarfed, cupped, or curled and drop prematurely. Fruits infected during the early season may be severely deformed or may drop by early June. The scab organism survives the winter in dead apple leaves on the ground. Primary infections occur during rainy periods from the time green tissue appears in the spring until the end of June. Many secondary spores are produced within the primary lesions. These are washed from the lesions by rain and are spread to other susceptible tissues, where, under appropriate environmental conditions, they cause secondary infections. Good scab control early in the season makes control in late summer easier. Home gardeners should seriously consider selecting cultivars that are resistant to scab.

Canker

Infections on limbs and trunks in the fall develop into small circular reddish or purple spots that become elliptical and sunken the following spring. As anthracnose cankers mature, cracks develop on tree bark, separating the diseased tissue from the healthy bark as the tree compartmentalizes the infection limiting the lesion expansion and begins to heal itself. Although the anthracnose canker does not expand after the first year of infection, it can produce spores on dead bark for several years. Prune canker our if possible. Some old trees have lots of canker and continue to produce. The primary problem with canker is that it can girdle trees and branches (making it impossible for nutrients to move up and down) resulting in total death above the point of girdling. This is a particularly big issue for young and dwarf trees with small branch and trunk diameters, but it shouldn't be discounted on larger trees either.

Fire Blight
Fire blight is a destructive bacterial disease of apple, pear and other related species such as hawthorn, quince and mountain ash. It causes severe blighting of blossoms, shoots, limbs and fruit. Outbreaks of fire blight occur periodically in British Columbia pear and apple orchards.

Black Knot
This fungus infects plum and cherry trees, causing rough, black enlargements on the twigs. The knots are often two to four times the diameter of the twigs and up to 8 inches long. Prune black knot–infected twigs at least 8 inches below the knot in winter or early spring and destroy them. Do not allow this disease to build up, or severe pruning will be necessary.

Pear Rust
European pear rust is a fungal disease of pears, causing bright orange spots on the leaves. It also affects junipers, causing perennial canker-like swellings on the branches. Bright orange spots on the upper leaf surface. As summer progresses brown, gall-like outgrowths develop on the corresponding lower leaf surface.

Gummosis
Gummosis is not a disease, but a symptom commonly seen in Cherry Trees. The oozing may be caused by injury from improper pruning or lawn mower strikes, disease, cultural problems or insects. To treat the cherry tree for gummosis, first find out what is causing the problem. In general, healthy cherry trees often recover from gummosis on their own, though some may require treatment with fungicides or pesticides. Keeping the tree healthy is the best protection against gummosis.

Determining Fruit Ripeness

Fruit Ripeness Guide

Apple	Fully coloured Tastes good Full-size	Cut an apple open and look at the seeds. If the seeds are dark brown or black, it's ripe! Gently pull upwards. If the fruit separates from the stem, it's ripe!	If the seeds of the apple are light brown or white, it's not ripe!

Cherry	Fully colored Tastes good	Grab a cherry and gently pull upwards. If the fruit separates from the stem, it's ripe!	If the cherry does not separate from the stem, it's not ripe!
Fig	Soft Bulging Splits or tears	Gently squeeze a fig. If it's soft, and also bends toward the stem, it's ripe!	If the fig is perpendicular to the stem or is firm, it's not ripe! If milky white sap comes out of the stem once picked, it's not ripe!
Quince	Fully coloured Full-size Noticeable scent	Grab a quince and gently pull upwards. If the fruit separates from the stem, it's ripe!	If the quince does not separate from the stem, it's not ripe!
Pear	Full-size Firm ALMOST fully coloured	Grab a pear, tilt horizontally and pull. If the fruit separates from the stem, it's ripe! *Pears ripen from the inside out, so they should be harvested before the outside becomes soft.*	If the pear does not separate from the stem, it's not ripe!
Plum	Slightly soft Tastes good	Grab a plum and gently pull upwards. If the fruit separates from the stem, it's ripe!	If the plum does not separate from the stem, it's not ripe!

How to Harvest Fruit

1. **Cradle the fruit** gently, but firmly in the palm of your hand.
2. **Support the stem** between the thumb and the index finger.
3. **Rotate your hand upward** while lifting the fruit towards the spur. If the fruit is ripe, it will release easily from the tree.

How you pick your fruit can influence the quality of the fruit and, in some cases, the amount of fruit produced the next year. Apples, pears, and plums grow on spurs. These small projections from the branch are needed for future fruit production so take care not to remove the spurs when you remove the fruit. Also, it is important to pick the fruit with the stem on if you intend to store it for any length of time

Attracting Pollinators and Improving Habitat

Fruit tree blossoms must be pollinated in order to produce fruit. The blue orchard mason bee is a non-aggressive native pollinator that pollinates blossoms much more efficiently than your average honeybee. Unfortunately, the population of these heroes of pollination has declined steadily, in part, due to pesticide use and urban development.

How to Attract Native Bees?

- Grow a wide variety of flowering plants that produce blooms throughout the year
- Provide nesting boxes and habitat
- Provide a regular water source using a bird bath or pond
- Provide access to mud and other building materials bees need

Nesting boxes and Mason Bee cocoons can be purchased through West Coast Seeds, Bee Diverse, Garden Works and other local retailers in season. LifeCycles also has some nesting boxes available for sale.

Seed eating birds can also be a great benefit to pest control in your trees. Consider feeding birds in backyards where cat predation is not a risk or installing nesting boxes for chickadees, sparrows and other cavity nesting birds.

Resources for Further Learning

BOOKS

The Fruit Expert, by D.G. Hessayon. Moderately useful especially for beginners.

The Fruit Gardener's Bible: A complete guide to growing fuits and nuts in the home garden, by Lewis Hill and Leonard Perry. Fairly basic, varieties are more for Eastern US.

Fruit Trees in Small spaces, by Colby Eierman. Published in Oregon, geared more for south of us, has some very basic information.

The Apple Grower: A guide for the organic orchardist, by Michael Phillips. Published in Vermont. Well regarded among organic orchard books.

The Holistic Orchard: Tree fruits and berries the biological way, by Michael Phillips. Published after the Apple Grower, another well regarded book among organic orchardists.

Fruitful Legacy, by Susan Dolan. USA orchard history book.

The Backyard Orchardist: A complete guide to growing fruit trees in the home garden, by Stella Otto. Originally published over 20 years ago, with a second edition published in 2015.

WEBSITES

UBC Botanical Garden – Online Forum
http://forums.botanicalgarden.ubc.ca

Washington State University Tree Fruit Extension Service
http://treefruit.wsu.edu/

Cornell University Tree Fruit Information
http://fruit.cornell.edu/

Province of British Columbia Information for Fruit Tree Growers
http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/crop-production/tree-fruits

LOCAL ORGANIZATIONS
BC Fruit Testers Association
http://bcfta.ca/

Welland Legacy Park and Community Orchard
http://lifecyclesproject.ca/our-projects/welland-community-orchard/

POLLINATORS

The Xerces Society
https://xerces.org/

Habitat Acquisition Trust
http://hat.bc.ca/images/Pollinator-Guide-Web.pdf

Hutchings Bee Service
https://sites.google.com/site/hutchingsbeeservice/home

LifeCycles
http://lifecyclesproject.ca/resources/fruit-tree-bee-tips