Living Among Orchards

A Guide for Living Near Tree Fruit Orchards in the Columbia Gorge

By Lesley Tamura
for *Columbia Gorge Fruit Growers*

(Photos: Lesley Tamura;
Photo of cherries: Lynn Ketchum, Oregon State University)

TABLE OF CONTENTS

TOPIC	PAGES
INTRODUCTION	1 – 2
PRUNING	3 – 4
TREE SPRAYING	5 – 7
FROST CONTROL	8 – 9
POLLINATION	10 – 11
ORCHARD & TREE MAINTENANCE DURING THE GROWING SEASON	12 – 16
HARVEST	17 – 23
CONCLUSION	24
ADDITIONAL RESOURCES	25
BACKYARD FRUIT TREES	26
PEAR VARIETIES	27
SWEET CHERRY VARIETIES	28

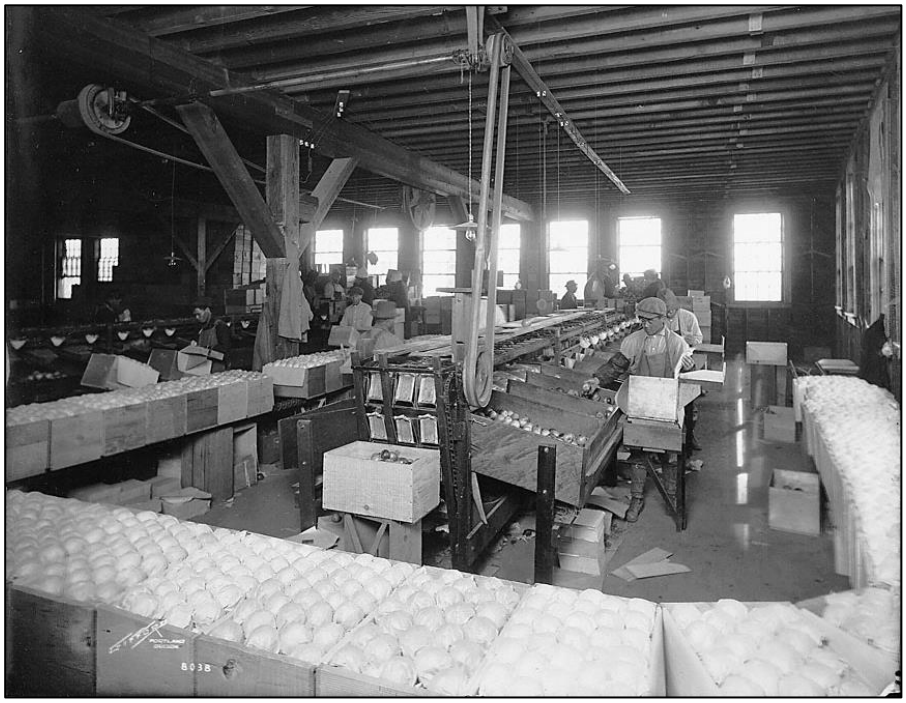
INTRODUCTION

If you live in the Gorge, you probably live near or have driven by the many fruit orchards in the area. Perhaps you have visited on-farm fruit stands and enjoyed the u-pick experience. Most likely, you have seen or heard orchard activity that makes you wonder, "What are they doing?!" We hope this guide provides you with information and context to what you might observe in our local fruit-growing industry.

Pears are Oregon's number one tree fruit crop, and the official state fruit. Oregon is the second highest producer of pears in the U.S. (behind Washington), growing one-third of the country's pears – 400-500 million pounds, a crop valued at 100 – 140 million dollars. There are over 900 farms in Oregon growing pears, many of them in Hood River and Jackson Counties. Oregon is also the third highest producer of sweet cherries in the nation, supplying 11% of the U.S. market – over 60 million pounds, generating roughly 70 million dollars.

The Mid-Columbia region is home to over 440 tree fruit orchards that produce over 450 million pounds of pears, cherries, and apples annually. Many of the orchards are family-owned and have been passed down through multiple generations. Agriculture is an important part of the history, economy and lifestyle of the Columbia Gorge.

Hood River and Wasco Counties have a rich agricultural tradition. The first fruit trees were brought to the Hood River valley in 1854 by Nathanial Coe. In 1876, E.L. Smith planted the first commercial orchard: 30 acres of apples and peaches. Apples became the primary crop in the area, but in 1919 a disastrous freeze killed many of the apple trees in the valley. Growers began planting pears trees rather than replanting apples, and pears eventually became the dominant crop. While pears are more common in Hood River, cherries have been grown in Wasco County since it was first settled. Frank Seufert planted the first commercial cherry orchard in The Dalles in 1886, and the Bing cherry, one of the most recognizable and successful varieties, was developed by Seth Lewelling, who established Oregon's first plant nursery. The area is well suited for cherry production due to the rain shadow provided by Mt. Hood; this results in less annual precipitation than Hood River. Sunny days are crucial to cherry growth and to prevent rain damage as the crop ripens.

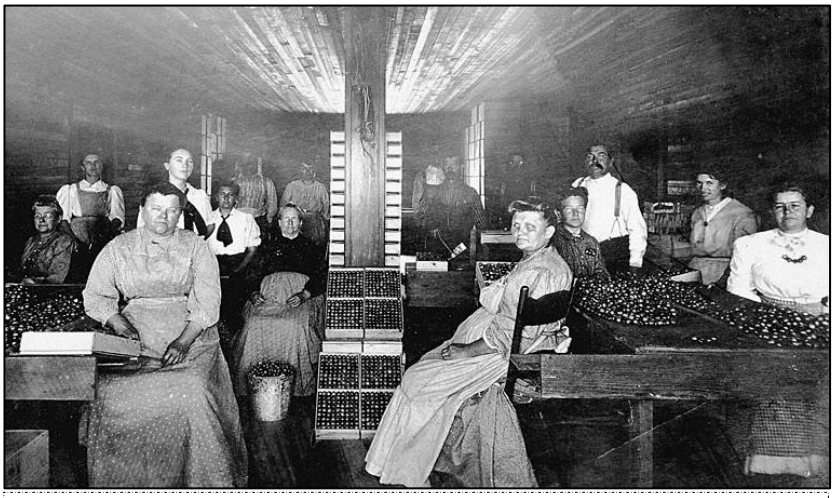


Hood River apple packing facility in the early 1900s
(Photo: Oregon Historical Society)

Growing fruit is a year-round job; each season brings a new set of responsibilities and activity. Winter is focused on tree pruning, shaping the tree for the coming year. Once springtime arrives, insect control, pollination, and frost control become the priorities. During the warm summer weather, irrigation sprinklers can be seen running until harvest begins. Cherry harvest begins in June and continues through the summer, while pear harvest begins in August and carries on through October. Once harvest is finished and the leaves have fallen from the trees, the process begins again. These activities are all part of normal farm operations, protected by the Oregon Right to Farm Law. Legislation adopted in 1993 in the Oregon legislature declares farm and forest practices as critical to the welfare of the Oregon economy, and establishes a right-to-farm law. This law protects growers from court decisions based on customary noises, smells, dust, or other nuisances or trespasses.

Nearly everything that occurs in orchards is based on weather. An unexpected snowfall in the spring can freeze half the blossoms on the trees, or a few minutes of hail can wipe out an entire crop. As weather patterns have become more unpredictable, growers can't be certain year to year that they will have a crop to harvest. While all commercial fruit orchards follow a similar seasonal schedule and must accomplish the tasks described in this guide, each operation approaches these tasks differently based on how many acres they manage, the number of employees available, equipment, weather, etc.

The Columbia Gorge has changed and evolved greatly over the years, but farming remains an integral part of our community. Together, we can ensure that it continues that way and that those in *and* outside of agriculture can peacefully co-exist. This document aims to help you understand the rhythm of the seasons in the orchard. We will discuss common practices you may observe throughout the year, why they are important, and what you need to know.



Women packing cherries in a Hood River warehouse in the early 1900s.
(Photo: Oregon Historical Society)

This guide is brought to you by Columbia Gorge Fruit Growers (CGFG). CGFG is a non-profit association that represents 440 growers and 20 shippers of tree fruit in Hood River, Wasco, Sherman counties in Oregon; and Klickitat and Skamania counties in Washington. The mission of CGFG is to encourage and promote the fruit industry through legislation, research, education and marketing, and to support growers through the exchange of information regarding sound practices and regulations. CGFG is funded by annual assessments charged to each grower-member based on the tonnage of fruit produced. This funding is used to finance scientific research at our local Oregon State University Extension research facility, provide educational trainings to orchard employees, support migrant programs (including Migrant Summer School), offer scholarships to local graduating high school students, and support ag-related organizations such as Oregonians for Food and Shelter.

PRUNING

What is pruning and why do we do it?

During pruning, each tree must be pruned by hand to remove any unnecessary vegetative wood, give the tree structure, and space out the wood that will produce fruit buds.

It is important to remove wood from the tree that will not produce fruit buds, since this extra wood will take away water and nutrients from the fruit later in the growing season. It is also critical to remove wood that will block sunlight and air circulation from the center of the tree. In some orchards, wood is also removed to leave room for ladders to be placed in trees later during harvest.

To do this, we use various tools: a pair of loppers to make smaller cuts, a foldable handsaw for larger limbs, extendable chainsaws for cutting large limbs, etc. For orchards with taller trees, 10-12 foot ladders are used.

Tree loppers used for pruning
(Photo: Hickok/Gemplers)

Loppers and foldable hand saws

Once the tree is pruned, the smaller wood that has been cut needs to be moved away from the tree. This is done with hand rakes or with large mechanical rakes pulled behind tractors. Once the wood cut from the tree is moved out into the grass rows between trees, a large brush mower attached to a tractor is used to cut up the wood into mulch. The larger pieces of wood (from large limbs that have been removed) are too big to be mulched by the brush mower and are left to be collected by hand later.

When does it happen?

October – April (with some additional pruning done in summer)

November – April

Pruning occurs during late fall and winter when trees are dormant. Because cold temperatures, snow and rain often stops work for days or even weeks at a time, many orchards have to continue pruning into early-to-mid spring as trees are coming out of dormancy. While this is normal and doesn't damage trees, it is best to do as much pruning as possible during the dormant period.

For cherries specifically, it is critical that the weather is dry for at approximately 2 days prior to pruning and 2 days after pruning so moisture does not absorb into the recently-cut areas. This leads to bacterial diseases in the trees. Summer pruning in cherries is done to remove 1-year old wood that has grown and is blocking sunlight from entering the center of the tree. Summer sun after harvest helps to strengthen buds and increase bud development for the following year.

What will you see and hear happening in the orchards?

- Workers setting ladders in and around the trees and using loppers and saws to cut wood out of the tree.
- Workers rake wood away from the trees before moving on to the next tree. Others may be using extendable chainsaws to cut larger limbs out of trees.
- Tractors are driving up and down each row to rake and cut the brush wood. The larger wood pieces that cannot be cut into mulch are removed from the orchard, gathered into a pile and burned.
- People walking or driving by the orchards may see smoke; this is from the burn piles of wood.

Burn pile of larger pieces of wood cut from trees
(Photo: Lesley Tamura)

What do you need to know?

When we burn wood in our burn piles, we are following important fire safety protocols: we have burn permits from our local fire department; we are monitoring the fire; water and shovels are nearby in case we need to keep the fire from spreading too far, etc.

Tractors hauling heavy brush mowers move between orchards, requiring them to sometimes drive on the road along with cars. Tractor drivers try not to obstruct traffic, but at times it is unavoidable. Please be patient with anyone driving a tractor on the road, and do not pass the tractor unless traffic laws allow and you have full visibility of any oncoming traffic.

Brush mower attached to a tractor
(Photo: Lesley Tamura)

TREE SPRAYING

What is tree spraying and why do we do it?

Without insect and disease control methods, crops would experience enough damage to cause huge economic losses.

Throughout the growing season, we need to control insect pests and diseases, as well as provide the trees with essential nutrients for health and fruit growth. To do this, we use Airblast sprayers pulled behind tractors. These sprayers are filled with 300-400 gallons of water, and various powders and liquids are mixed in until dissolved. This mixture is then pumped through small nozzles as the tractor drives between trees, applying the mixture onto the leaves and branches. The idea behind any spray application is to "get every drop to the crop." Spray that goes elsewhere will not benefit the fruit; therefore, our tractors and sprayers are carefully calibrated to maximize the benefit of spraying. The tractor that pulls the sprayer must drive at a consistent speed for good coverage, and each spray nozzle has been measured and adjusted to put out a specific number of gallons per acre.

Tractors pull Airblast sprayers between the tree rows
(Above Photo: Leslev Tamura; Below Photo: Kasco)

Each product we use is registered with the Environmental Protection Agency and approved for use on specific crops and in specific quantities.

The earliest sprays (in February and March) typically contain oil, sulfur, and/or clay. The sulfur helps to control adult insects, while the oil and clay repel pests by creating a protective barrier on plant surfaces, making the tree an unsuitable environment for certain insects to land, feed, and lay eggs. The clay used to repel pests, kaolin clay, is widely used in many products, including skin care, makeup, and toothpaste. When spraying makes the orchards look white, it typically means that either kaolin clay or calcium carbonate, both organic products, has been sprayed.

Later in the growing season, the sprays can also contain insecticides, fungicides, and/or bactericides to limit pest populations, and nutrients (such as calcium, zinc, and boron) that are absorbed through the leaves to support fruit growth and tree health. Cherries are especially susceptible to mildew growth when the weather is humid, leading to multiple fungicide applications.

Many spray products should be applied when temperatures are between 35° F - 75° F, so growers typically start spraying during early mornings before the weather is too warm. If it is too cold, it can take a very long time to dry and depending on the product, slow drying increases the chance of marking the fruit. If it's too hot, the spray will dry too fast before it is absorbed into the tree and leaf tissue.

It is also important to avoid spraying during windy conditions whenever possible, as the spray is only effective when it is applied where it is intended: in the trees. Since the Gorge is a notoriously windy area, some growers spray late at night once the wind has died down. All spray products have a Restricted-Entry Interval (REI), or a specific amount of time that must pass before people can work in the area that was sprayed. This REI was determined by the Environmental Protection Agency and can range from 0 hours to 2 days.

Both conventional and organic orchards need to control pests and disease, and use various methods to do so. Contrary to popular belief, organic fruit also requires sprays for pest control and nutrient application. In fact, many conventional orchards also use certified-organic products in their spray applications. While spraying is the primary method of control, orchards also use non-spraying methods to control pests. This includes pheromones that disrupt insect mating. Mating disruption technology uses synthetically produced chemicals to confuse males and limit their ability to locate females. These pheromone-based products come in the form of plastic rings placed in the trees, or air puffers that release the pheromone intermittently. We also use practices that encourage the population of beneficial insects. These beneficial insects (including yellow jackets, wasps, earwigs, etc.) act as predators to the pests that damage fruit and are an essential part of pest management.

When does it happen?

February – November

Spraying begins when trees are still dormant and continues throughout the growing season until the final spray is applied after the fruit has been harvested. The timing of each spray is critical, as it is dependent on many factors, including fruit growth and insect life cycle. It is important to spray when the trees are fairly dry so they will absorb everything properly; in addition, it is important that the weather is dry enough for a few hours after spraying so the rain does not wash off the spray before it can absorb and dry.

The number of sprays applied per year varies, as it is heavily dependent on pest pressure levels. In years with low pest pressure, the sprays are focused more on providing the trees and fruit with essential nutrients for health.

What will you see and hear happening in the orchards?

- Sprayers make a high-pitched whine when in use, and as they spray the mixture of water and products you will see a plume of mist rising above the treetops.
- Anyone handling, mixing, or applying spray products is required to be trained in safe methods of application.
- Spray applicators wear personal protection equipment (PPE) when needed. Each product has a required list of PPE that must be used; many products only require long pants, long-sleeved shirts, socks and shoes. Some products require a face respirator as well.
- Spray applicators typically use additional PPE, including waterproof rain suits and respirator helmets. These are used primarily for convenience, as it keeps the spray mixture from soaking our clothes and keeps it off our faces.

Respirator helmet
(Photo: Kasco)

What do you need to know?

Commercial orchards are required to follow state and federal rules to keep people safe when spraying. All employees are required to be trained in safety practices, and those involved in handling, mixing or applying sprays are required to have additional training. Anyone not involved in handling or applying spray products is required to maintain a distance of 25 – 150 feet (depending on the products used) away from the spray equipment while it is in use. Relevant information, including the REI, has been communicated to all orchard employees so they are aware of which areas to work in and which areas to keep out of.

Anyone not trained must check in with management before entering the orchard; it is not usually obvious where sprays have been applied, so please **do not** use private orchard property for running, biking, etc.

If someone is spraying an orchard near a public roadway, spray applicators will do their best to turn off the sprayer when cars are driving by. However, they cannot always see the cars coming in time. If you are concerned about your car driving through the spray mist, please slow down and allow the person time to see you and turn off the sprayer.

Residential homes that have fruit trees in their yards are responsible for managing pests and disease so it does not spread to nearby commercial orchards. For assistance managing backyard fruit trees, see the Additional Resources section.

Growers often post signs like this to notify people of recent spray activity.

FROST CONTROL

What is frost control and why do we do it?

When overnight temperatures are cold, the fruit buds can be damaged or even killed. To prevent this, we use various methods to push cold air out of the orchard and create heat around the trees to keep them warm enough so that fruit buds will survive.

As the fruit buds develop and blossom, they are more susceptible to cold temperatures and therefore frost control measures will be used more often. For each stage of fruit bud development there is a temperature threshold that we must try to maintain to avoid damage. As the blossom flowers are more exposed, they are most susceptible to cold damage.

When does it happen?

March - May

Throughout the spring, the fruit buds eventually open to reveal the flower blossoms inside. As the blossoms are more exposed to the open air, they become more vulnerable to cold temperatures. Because of this vulnerability, growers will need frost control measures more often as the flowers open.

What will you see and hear happening in the orchards?

- One method we use is frost fans: tall towers with large fan blades attached that are powered by motors. These frost fans typically run on propane gas, and they serve two purposes: to push cold air out of the orchard, and to pull any warm air from above down and circulate it among the trees.
- As the temperature changes during the night, the fans may stop and restart.
- Some orchards are "frost-free", meaning that the air naturally drains without the use of fans.
- We also use heaters placed throughout the orchard. "Smudge pots" are one type of heater; tall and slender, these heaters run on diesel fuel. Another type of heater runs on propane gas; these sit lower to the ground and look like small spaceships.
- Smudge pots and propane heaters must be individually lit and monitored throughout the night. Both of these generate heat around the trees and can be used in place of or in addition to frost fans.

Frost fan tower with blades, engine and propane tank
(Photo: Lesley Tamura)

Smudge pot heater
(Photo: Lesley Tamura)

Propane heater
(Photo: Lesley Tamura)

Orchard vehicles drive through the orchard checking the fans and heaters throughout the night, propane supply trucks are on-call throughout the night to refill frost fan and heater tanks as needed, and mechanics are on-call to repair machines when they malfunction, regardless of the hour.

What do you need to know?

The noise from the frost fans is unavoidable and it is the best method we have for frost control. The fans will continue to run until the temperature increases enough for the buds to be out of danger, so you may hear them even after the sun rises.

Propane vaporizer, placed between the propane tank and the heaters. This is used to convert liquid propane to vapor before sending it through the system to the individual heaters.
(Photo: Lesley Tamura)

POLLINATION

What is pollination and why do we do it?

During bloom, there are not enough bees in the natural environment to pollinate the many millions of blossoms in the orchards throughout the area. Each year, orchardists rent hives of bees from professional beekeepers to distribute throughout the orchard for a short pollination period.

Certain fruit varieties are self-pollinating and do not necessarily require cross-pollination to occur; however, many varieties require cross-pollination with other varieties to grow fruit. Research shows that all varieties benefit from cross-pollination, leading to larger and better crop yields.

Bee hives strapped to a wood pallet
(Photo: Lesley Tamura)

When does it happen?

April – May

The time period for pollination is heavily dependent on weather and can last anywhere between 1-2 days and 1-2 weeks. If the weather is too warm during bloom time, the pollen in the flowers dries out quickly before bees have an opportunity to pollinate, leading to smaller crops later in the year. Bees also have preferred weather conditions for leaving the hive; too cold, rainy, or windy, and the bees will not venture out of the hive unless absolutely necessary. Alternatively, given the exact right weather conditions, bees are able to pollinate a large area within only a few hours. Each blossom needs to be visited multiple times by bees to be properly pollinated and develop into a pear or cherry.

What will you see and hear happening in the orchards?

- The beehives are typically brought in at night when it is dark; this is so the bees will stay inside the hive during transport.
- A forklift is used to remove the hives from the truck, and the hives are then placed in the orchard during bloom.
- Some orchards spread the beehives throughout the orchard, while others may leave all the hives grouped in a central area.
- You may see beehives strapped to wood pallets either distributed throughout the orchard or gathered in one area of the orchard.
- The hum of bees can often be heard throughout the trees, and the pollen can create a very sweet smell – almost sickly sweet, depending on how sensitive your nose is.
- Once the bloom period is finished, the hives are removed from the orchard and the beekeeper returns at night to load the hives onto a truck and take them to the next place.

Bees collect pollen from the fruit blossoms
(Photos: Lesley Tamura)

What do you need to know?

Blossom time is beautiful and is very popular for both locals and tourists. Appreciating the orchard blossoms is a popular pastime. However, entering the orchards without permission is trespassing; please respect that orchards are private property.

It is critical for the health and safety of the bees that people **DO NOT disturb the beehives in any way**. These hives are not only critical for our jobs of growing fruit, they are the property and livelihood of the beekeepers and should be respected as such. Damaging the beehives negatively impacts beekeepers' ability to earn a living as well as the bees themselves.

While the beehives are in the orchard, we do not spray any products that may be harmful to the bees, so if you see spraying occurring during this time then the mixture only includes ingredients that will not endanger the bees in any way.

ORCHARD & TREE MAINTENANCE DURING THE GROWING SEASON

What is growing season maintenance and why do we do it?

There are many activities that happen during the months before the crop is harvested. These activities are focused on general maintenance of the orchard, keeping the trees healthy, and monitoring the crop as it grows. Each of these activities is important to growing quality fruit.

TREE PLANTING

Tree planting occurs in the spring. Growers typically order their trees from tree nurseries at least one year prior to planting, and the trees are shipped and delivered in large boxes, called bins. Many growers use an implement attached to a tractor that will create a large hole in the ground for planting. In their first year, pear and cherry trees will grow leaves and fruit buds, but the fruit buds will not flower. In their second year, the tree will grow leaves and fruit buds, and those buds will flower but not grow fruit. It is not until the third year that the trees can actually grow fruit. The tree's ability to grow fruit beginning in the third year also depends on various factors: pollination, strength of the tree, sufficient water, weather conditions, etc.

Large drill attached to a tractor for digging tree holes
(Photos: Lesley Tamura)

FERTILIZER

Fruit trees require fertilizer each year. Calcium is the primary ingredient in fertilizer, but growers can also work with consultants to test the orchard soil and determine which nutrients are lacking. This information can be used to create a custom blend of fertilizer to bring the soil nutrient levels into balance. If the crop yield turns out to be larger than expected, a second fertilizer application may occur to support the additional strain on the tree.

MOWING GRASS

Orchards use grass as a cover crop in the rows between trees to improve soil retention and water quality. The grass roots hold the soil in place, and reduce the amount of water and wind erosion. By reducing erosion, grass helps the soil maintain its nutrient levels while keeping harmful sediment from entering nearby water sources. The grass needs to be maintained during the growing season, just like in someone's yard.

IRRIGATION

Like all plants, fruit trees require regular watering during the warm weather months. The goal is to provide the trees enough water that the roots can access it and remain healthy and strong, but not overwater. Overwatering can cause problems, including pushing the fertilizer deeper into the ground and out of reach of the tree roots. Cherry trees are especially susceptible to problems from overwatering; it can lead to fungal diseases and cankers, stunted trees, etc.

Growers often utilize tools to know when to begin irrigating each section of the orchard, including soil moisture meters placed underground to measure the amount of moisture at various depths. Some even have automated valves that can be programmed to begin irrigation automatically once the soil moisture meter reads a certain level of dryness, although these systems are rare due to the high cost.

PEAR THINNING

For summer pears (Bartlett and Starkrimson) to grow to necessary sizes for market, they need to be spaced out on the tree. To do this, we remove many of the pears from the tree, leaving space between the pears remaining. As they grow, the Bartlett pears will fill this space. How each orchard approaches Bartlett thinning also depends on how the pears will be processed – if you intend to sell your pears in the "fresh" market (sold for fresh eating), they need to be larger. If you intend to sell your pears to a cannery, they don't need quite as much size. The goal is to balance quality and size with tonnage – if you thin too many pears from the tree, you may have large Bartletts for harvest but not enough of them. If you don't thin enough, you might have a lot of pears, but perhaps they are too small.

Small Bartlett pears have been removed from the tree
(Photo: Lesley Tamura)

The stems of 2 Bartletts remain after the pears were thinned off, leaving only one pear behind to grow
(Photo: Lesley Tamura)

There is a natural occurrence in the month of June called "June drop" when the trees release some of the smaller pears and they fall to the ground. The tree is calibrating the load that it can support, and releasing the weaker pears that are not growing as well. Many growers will wait until this has happened, and then thin the

pears that remain. There is usually a second "drop" later in the season, but not as many pears will be released in the second drop.

Winter pears (including Anjou, Bosc, Comice, Forelle, and Seckel) do not require thinning; they can achieve optimal size even when growing together in small bunches.

TREE TRAINING

Tree training includes tying the tree with strap and is especially important for pear trees. As the pears grow larger during the season, they weigh down the limbs. If the load on the limb is too heavy, the limb can break from carrying the weight. We use tree strap to tie limbs that are in danger of breaking to add extra support.

Tree limbs tied to hold the weight of the pears
(Photos: Lesley Tamura)

WEED SPRAYING

Weeds that grow in the tree rows should be treated or removed periodically during the spring and summer. If we allow the weeds to grow, then they are taking away water and nutrients from the trees. Depending on how tall the weeds grow, they may also be blocking the irrigation water from reaching the tree roots and grass cover crop. Tall weeds also provide excellent coverage for rodents in the orchard, such as gophers and voles, which can damage or kill trees. Once harvest begins, tall weeds make it more difficult and dangerous for pickers to work in and around the trees as well. Many orchards will also apply weed spray in the fall after harvest to prevent weeds from emerging early in the spring. This must be done before leaves fall off the trees and cover the ground.

PROTECTING CHERRIES FROM CRACKING/SPLITTING

Cherries are a tender fruit, and they are risky and expensive to produce. Apart from attacks by birds and insects, rain can ruin the entire crop just as it reaches maturity for picking. Rain pooling around the stem of the cherry or sitting on the fruit's skin can be quickly absorbed into the cherry. When this happens, the cherry's flesh expands more quickly than the skin can stretch to accommodate it, and when the pressure is too great, the skin splits. Unfortunately, once the cherry has cracked, it is worthless for the fresh market. Damaged cherries can be sold for juice, but the costs of picking and sorting cracked cherries will far exceed

any revenue earned. Depending on the amount of damage to the crop, it may not be economical to pick the fruit and the grower may be forced to leave the fruit on the trees. While cherries are commonly grown in Hood River County, they are the primary crop grown in Wasco County due to the fact that Wasco County has dryer weather and less rainfall per year.

Time is of the essence when drying a cherry crop after rain. After a few hours, every minute of additional "wet time" increases the likelihood of cracking or splitting in the fruit. If the rain has occurred during the night, the water should be removed from the cherries before the sun comes out and the temperatures start to rise; the warmer the temperature, the higher the rate of cracking.

Cherries split from absorption of rain.

(Photo (left): Clive Kaiser, Oregon State University; Photo (right): Journal of the American Society for Horticultural Science

Growers use an integrated approach to reduce rain damage, combining several methods to minimize the risk of fruit cracking. One method is to blow the water off the cherries with fans: growers that have frost fans will run them to remove the water from the fruit, but this only works on trees that are within the range of the fan. Trees outside of the fan's range will still be soaked. Another method commonly used is to drive between the trees with Airblast tree sprayers while running the sprayer fans. While effective, this method is slower and not practical for larger or multiple blocks. If the rain continues, the tractor and sprayer may have to make multiple passes through the same areas.

Beginning in the 1980s, growers pioneered the use of helicopters to dry the cherries and found they are the quickest and most effective way to save the crop after rain. While effective, this method is also very expensive. Contracting with a helicopter company for the season can mean the difference between saving the crop and losing it.

Flying a helicopter just above the treetops produces a downwash of air and turbulence which blows most of the rainwater off the leaves and fruit. The turbulence rebounds from the ground, providing side wash and blowing the trees dry on both sides.

Helicopter flying low over the tree tops to blow off excess water.
(Photo: Clive Kaiser, Oregon State University)

Growers continue to experiment with retractable orchard covers to protect from rain, but these are usually prohibitively expensive and can create other problems for the cherry crop. An increase in humidity can develop under the cover, leading to an increase in mildew and rot in the fruit.

Unfortunately, Mother Nature can be fickle, and sometimes growers have the frustrating experience of finally finishing drying the cherry crop only to be hit with another rain and have to start the process all over again.

An example of a retractable cover over cherry trees to protect from rainfall
(Photo: Lynn Long, Oregon State University)

When does it happen?

Spring and Summer (before harvest begins)

Many of these activities overlap with each other, as well as overlapping with spraying and frost control, so during this time there is a lot of multi-tasking occurring. For growers with cherries and pears, they are also balancing the different schedules for each crop: preparing for the earlier cherry harvest while doing necessary maintenance for the pear trees, balancing two different spray schedules, etc.

What will you see and hear happening in the orchards?

- General activity in the orchard: tractors and other equipment moving through the orchard and between orchards, workers using ladders and other tools, etc.
- During thinning you will see very small pears on the ground underneath trees.
- As cherry growers need to dry the cherries after rainfall, you will hear see and hear frost fans running, tree sprayers driving through the orchards blowing water off the fruit, and possibly helicopters flying over the orchards.

What do you need to know?

Tree and fruit maintenance activities during the growing season are important to the health of the orchard. Most of these activities will go unnoticed by casual observers.

HARVEST

What is harvest and why do we do it?

Harvest season is when our fruit is picked from the trees by hand, transferred to buckets or bins, and transported to processing plants (called packing houses) for sorting and storage before being sold to grocery stores all over the world. While other crops can be harvested by machine, cherries, pears and apples are delicate crops that must be picked by hand.

CHERRIES

Most varieties of cherries are picked into hard plastic buckets that hold 20 pounds. Once the bucket is full, the cherries are carefully emptied into a bin that measures approximately 4 feet x 4 feet x 16 inches tall. Each bin can hold roughly 17 buckets, totaling 340 pounds on average.

Cherries are picked and then placed into a kidney-shaped bucket. The bucket is shaped this way so it sits comfortably against the picker's body. The bucket is attached to a harness the picker wears and can be detached from the harness to empty the fruit into the bin.
(Photo: Oregon Department of Agriculture)

Pickers use aluminum ladders to reach the cherries at the highest points of the trees
(Photo: Ashley Thompson, Oregon State University)

For Rainier cherries (yellow cherries with a pink blush and yellow flesh inside), the cherries are picked into rectangular buckets and the buckets are placed directly into the bin, rather than emptying the cherries. This is because Rainier cherries are the most delicate; the less they are handled, the better.

Did you know? Rainier cherries are sweet but naturally yellow, without the blush. Consumers found that combination confusing; people often equate the color yellow with lemons rather than with sweetness. Red equates to sugar and flavor, so consumers wanted more red on the Rainier cherries. Researchers developed a method for giving Rainier cherries a red blush: growers lay reflective sheets of Mylar on the ground to increase the fruit's exposure to sunlight, essentially giving the cherries sunburn to achieve the blush effect. With or without the blush color, the cherries taste the same.
(Photo: Stemilt Growers)


Cherries are emptied from buckets into bins. Full bins are stacked and loaded onto trucks for transport
(Photo (left): Rick Steigmeyer, Wenatchee World; Photo (right): Ashley Thompson, Oregon State University)

Each operation runs their harvest a bit differently, but it is fairly standard to track each picker's full buckets. 10-15 pickers may be grouped together, and while they each pick to fill their own buckets, they are emptying the cherries into communal bins. A "bucket checker" is assigned to each group, tracking how many buckets each person has filled, checking that each bucket is filled completely, and observing the quality of the cherries. Some orchards weigh each bucket prior to emptying it into a bin with portable scales and then track weight, paying pickers by the pound rather than the bucket. It is crucial that cherries are picked gently and with the stem still on them, so "checkers" are an important part of maintaining a quality crop.

Cherries must be delivered to the packing house on the day they are picked. The goal is for cherries to move from field to cold storage within 4 hours after they are picked. Once picked, cherries should be kept in the shade with a damp piece of burlap covering them to keep them cool. Full bins are brought to the "loading area", or the place in the orchard where full bins await transport. Cherry bins are then stacked, loaded onto trucks and delivered to the cold storage facility, where they will be hydro-cooled. The hydro-cooler drenches the cherries in 34° F water for 5 minutes to bring their internal

Pickers empty their full buckets into bins while checkers monitor for cherry quality, to ensure the stems are still attached, that there are not too many leaves mixed in, etc.
(Photo: Lynn E. Long, Oregon State University)

temperature down. The cherries are placed directly into cold storage at 34° F. They can be packed the same day of picking, or up to 3 days after being picked. The goal is to have the cherries out the door of the cold storage facility and on the way to grocery stores within 2 days in refrigerated trucks. Ideally, cherries will arrive on store shelves within 2-5 days of being picked.

PEARS

Pears (and apples) are picked by hand and placed into a cloth bag pickers wear on the front of their body. The bags hold 40-50 pounds of pears when full and have ropes on the bottom that keep the bag closed and allow for the picker to adjust how many pears can fit. When the bag is full, it is carefully emptied into a bin – a large wooden or plastic box that measures 4 feet x 4 feet x 30 inches tall. These bins can hold between 1000 – 1200 pounds of pears. Depending on the crop yield for the year, it takes a different number of trees to fill a bin. On an average year, a bin can be filled by picking 1.5 – 3 trees; on a very light crop year, it may take up to 7-8 trees to fill the bin.

If pears are dropped during picking, they cannot be put into the bin; once a pear has touched the ground, it has been exposed to rot spores. These spores can spread to other pears in the bin during processing or while in storage, causing fruit to rot before it has been sold.

Pickers fill their bags with pears, and then gently empty them into the bin.

It is critical that pears are handled gently throughout the entire process; any pears with bruises or broken skin will be discarded.

(Photos: Lesley Tamura)

A bin full of Bosc pears; Bosc pears have a russet brown color and a long neck.
(Photo: Lesley Tamura)

Green Bartlett pears
(Photo: Lesley Tamura)

While pickers are filling the bins, bin checkers are walking from bin to bin, checking the pears for excessive bruises or punctures. As the pickers move from tree to tree, tractors are moving the bins along with them so they don't have to walk as far with full bags of pears.

Once the bin is filled, the picker begins with a new bin, while a tractor moves the full bin to a "loading area" – a specific place in the orchard where full bins await transport. A forklift is used to stack the bins and load them onto flatbed trailers, and the bins are then driven to a packing house.

A tractor driver brings a full bin to the loading area
(Photo: Lesley Tamura)

A forklift is used to stack the bins and load them onto a truck for transport to the packing house
(Photos: Lesley Tamura)

At the packing house, the fruit is unloaded from the trucks by forklifts and moved to the area where the fruit is processed. The pears are cleaned, sorted for quality and size, and obvious "culls" are removed and discarded. This sorting is done partly by hand, but mostly by machine. Obvious culls are removed by hand before progressing in the sorting process, but many pear packing houses now have optical fruit lines that take photos of each pear, looking for any defects – punctures, bruises, animal damage, misshapen pears, etc. Each pear is then sorted into its own "cup", and the cups sense the weight of the pear. As the cups move along the line, the cup releases the pear into a bin based on quality and weight. Once fruit has been sorted, it is then stored in cold-storage rooms that are carefully calibrated to maintain the fruit quality. Pears can be held in cold storage for months; in fact, some winter pear varieties must be stored for 30 - 60 days in order to ripen properly later. Once the fruit is sold to a grocery store, it is removed from cold storage, packed into boxes, and transported.

When does it happen?

June - July

When to harvest cherries is determined by a variety of factors: visual indicators – primarily color – as well as sugar content (called "brix"). Taste, size, firmness and market conditions are also considered. Field consultants will typically walk through the cherry block, looking at all parts of the tree, and cutting into cherries to see the internal color. For dark sweet cherries, if the inside of the cherry is still white, it is not ready for harvest. The inside should be a light shade of pink to black, depending on the variety.

There are many factors that determine how long cherry growers have to harvest the crop: market conditions, weather, and cherry firmness. It is critical to maximize size and weight of the cherries without sacrificing too much firmness, which means when to harvest and how long growers are given to harvest is always a delicate balancing act. Cherries sold to export (foreign) markets are generally picked slightly earlier. Packinghouse field consultants are constantly in contact with sales and marketing departments to ensure they can guide cherry growers to make decisions on harvest timing decisions. Some years, due to weather, cherry quality, or market conditions, the cherries are left on the tree rather than picked.

August – October

Summer pears, including green and red Bartlett and Starkrimson pears, are harvested in August to early September. Winter pears, including Comice, green and red Anjou, Bosc, Forelle, and Seckel are typically harvested in early fall. Generally, winter pear harvest begins 18-21 days after the first day of summer pear harvest, but this timing is dependent on weather and can be shortened or lengthened from year to year.

Pears are pressure-tested to determine when to harvest – a sampling of pears are picked every 2-3 days in the time leading to harvest. A machine measures how many pounds of pressure are required to "punch" a rod through the pear. Different types of pears are picked at different pressures. Summer pears, like Bartlett and Starkrimson pears, are picked at a higher pressure, while winter pears (Anjou, Bosc, Comice, Forelle, Gem, etc.) are picked at lower pressures. Pears typically lose 0.25 – 0.33 pounds of pressure per day, which allows field consultants to estimate when each orchard will begin to harvest the crop. Orchards at lower elevations in the valley begin harvest first, and orchards at the highest elevations will be the last to begin harvesting their pear crop.

Pears are always picked before they are ripe; if we wait too long, pears will become overripe and begin to break down internally. Pears ripened on the tree generally have little or no storage life.

Depending on the firmness of the pears and the weather before and during harvest, the amount of time available to harvest the crop can vary. On average, growers may have 6-8 days to harvest summer pears and 15 – 21 days to harvest winter pears. During harvest, the pears still on the trees are continually pressure tested to determine how many additional days we are allowed to pick. The harvesting of different varieties of pears can sometimes overlap.

Inclement weather can also delay harvest. During summer pear harvest, hot temperatures can shorten work days. During winter pear harvest rain is usually the problem, since the metal ladders become slick when wet and this can be dangerous. When pears are wet, they also become more difficult to pick, as they are slippery and easier to drop, but also more delicate and much easier to puncture or bruise. If the trees are wet it is very uncomfortable to pick, since the pickers' clothes become soaked quickly. If we lose hours or days to rain we do not get the opportunity to make up that time later, we simply have less time to pick our crop.

What will you see and hear happening in the orchards?

- Orchard employees are picking fruit while standing on the ground, on 10-12 foot ladders, or on moving platforms.
- Tractors are moving empty, partially full and completely full bins around the orchard, and forklifts are stacking and loading bins onto trucks.
- A common sound heard in the orchards during harvest is music; employees will often play music or sing as they work.
- Sometimes fruit is harvested when it is still dark outside, so you may see people working in orchards while wearing headlamps or with large spotlights providing light.
    - This is more commonly seen during cherry harvest, because cherries cannot be picked in the heat of the day. It causes the fruit to become too hot, mushy, and can result in a bad storing and eating experience. Cherry harvest will often begin very early in the morning and end for the day after

only a few hours, or sometimes cherries are picked in the middle of the night when temperatures are still cool enough.

- Trucks hauling bins will be on the roads all day, every day during the harvest season, moving bins between orchards and packing houses. Due to the short timeframe to harvest the entire crop, orchards are often working 7 days a week, which means trucks are hauling 7 days a week as well.

- During the cherry growing and harvest season, people living near orchards will often hear the propane cannons and flare guns that are timed to fire periodically. There is not any actual ammunition, but the noise is meant to scare birds out of the orchards. These cannons and guns are necessary to prevent excessive bird damage to the cherry crop; without a deterrent, the birds will eat the cherries. The sounds can be especially inconvenient for pet owners, since it scares dogs. However, it is the most cost-effective method available to cherry growers to keep birds from causing excessive damage.

What do you need to know?

During the harvest season, large trucks hauling bins full of fruit are often on the road. These trucks often drive slower than the usual flow of traffic, since they must be careful not to jostle the bins and damage the fruit. During harvest trucks are hauling fruit every day of the week. Please be patient with higher levels of traffic during harvest season!

Flatbed trucks are often used to haul fruit bins during harvest.
(Photo: Lesley Tamura)

All agricultural operations are required to follow strict food safety rules. These rules are created with the specific intent of avoiding contamination of produce at all levels: where it is grown, how it is harvested, how it is transported, how it is processed and packed, etc. All agricultural employees are trained in food safety practices annually, and food safety inspections occur during harvest to ensure that these practices are followed. Part of the food safety program includes tracking who comes into the orchard during the growing and harvesting seasons, including all visitors. When people use orchards as part of their walking/running/biking paths, or to pick fruit to take home without permission, they are not only trespassing on private property and stealing from a business, but also breaking food safety protocols put into place to make sure produce is safe for consumers.

Although harvest is the culmination of our growing season, our work does not end when harvest is finished. Before the next pruning season begins, there are many things to do: applying the final post-harvest tree spray to provide the trees with necessary nutrients before the next growing season, cleaning and servicing equipment, applying fall weed spray before the leaves fall from the trees and cover the ground, draining and winterizing our irrigation system so the pipes and valves do not get damaged during the cold winter weather, and using chainsaws to cut down any weak or dying trees that need to be removed before planting new ones in the spring. Growing fruit is a 365 day-a-year job. There are parts of the year that are less busy, but caring for the trees is constant.

CONCLUSION

We hope you now have a better understanding of what it takes to grow pears and cherries throughout the year. Each task we do is critical to growing our crops and must be timed correctly to be effective.

If you live near an orchard and it raises issues for you, please remember – communication is key! Maintaining open lines of communication with your orchard neighbors is important. While it is not always possible or practical to modify our farm practices to accommodate neighbors, we do our best to act responsibly and minimize the impacts of our work on others. As discussed in the introduction, growers are protected in their use of normal farming practices under the Right to Farm Law. Growers do not take this Right to Farm lightly, and we try our best to be good neighbors.

The Columbia Gorge has changed over time to become a destination for tourists and outdoor sports enthusiasts, but the heart of the area continues to be agriculture. Annual events such as Blossom Festival and Harvest Festival draw visitors and locals alike, and the Fruit Loop hosts 28 on-the-farm fruit stands, wineries and breweries offering tree-ripened fresh fruit, flowers, and homemade products and crafts.

Local growers are proud of the work we do to cultivate and distribute quality fruit to people all over the world. It is our priority to practice our trade in ways that reflect positively on our local community. Most importantly, we see ourselves as good stewards of this beautiful land, inherently connected and invested in caring for it.

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Ashley Thompson, Oregon State University Extension Service

ADDITIONAL RESOURCES

Columbia Gorge Fruit Growers

Learn about the tree fruit industry in the Mid-Columbia area and find information about the crops grown here. If you have backyard fruit trees that you'd like to remove, CGFG offers a Backyard Tree Removal program (see next page).

Phone: (541) 387-4769 http://www.cgfg.org

Oregon State University Extension Service Tree Fruit Resources

Learn more about growing and caring for many types of trees and plants. Find guidance and resources about tree health, gardening techniques, caring for garden soils and lawns, weed and pest management, plant diseases, home food safety and home food preservation. Recipes featuring Oregon's agricultural products are featured on the website as well.

Ask an Expert allows people to submit questions and get answers directly from the experts at OSU Extension Service.

Phone: (541) 386-3343 https://extension.oregonstate.edu/

Hood River Soil & Water Conservation District

Learn about how to become a better steward of your land! The HRSWCD helps landowners, managers, and residents identify, understand and correct or prevent threats to natural resources by using a wide variety of conservation practices. They can assist with irrigation water management and system upgrades, mud and manure management, livestock and pasture management, stream protection, fish passage, noxious weed abatement, native plants and more. These services are offered free of charge and financial assistance may be available to help you implement these projects.

Phone: (541) 386-4588 https://hoodriverswcd.org/

Oregon Farm Bureau

Learn about Oregon agriculture, agricultural education opportunities, and search/download "Oregon's Bounty" – a directory of over 200 farm stands and u-pick offered by OFB members across the state. Both farmers and non-farmers can join OFB to support Oregon agriculture and show they care about the survival of Oregon's farms, ranches, and rural communities.

Phone: (503) 399-1701 https://oregonfb.org/

Oregon Sweet Cherry Commission

Learn about nutritional information, cherry recipes, and the health benefits of sweet cherries.

Phone: (503) 274-5458 https://www.osweetcherry.org/

USA Pears

Learn about different varieties of pears, check out pear recipes, and watch videos of pear growers in the Pacific Northwest.

Phone: (503) 652-9720 https://usapears.org/

BACKYARD FRUIT TREES

Residential homes that have fruit trees in their yards are responsible for managing pests and disease so it does not spread to nearby commercial orchards.

Oregon Administrative Rules (ORS 570.405) allows the State Department of Agriculture to protect areas from insects and other plant pests that may be a menace to the horticultural, agricultural or forestry industries. Specifically, OAR 603-052-0156 requires that all host trees, including those in commercial orchards and on residential, public, and abandoned property which are near commercial fruit orchards shall be sprayed by the owner using the agricultural chemicals at the rate, at the times and in the manner recommended by Oregon State University. Hood River County Ordinance #263 and Wasco County Ordinance #P94-0117 require that fruit tree diseases and pests be controlled; if they are not, the county may require destruction of the crop or trees at the owner's expense.

Option #1: Treat your trees for pests and diseases following a crop-specific spray schedule

Controlling pests and disease may require numerous applications of pesticides, fungicides and/or bactericides during each growing season. Products used to manage pests and disease in fruit trees can be purchased at any store that carries garden products, including Home Depot, Lowe's, Walmart, Ace Hardware, etc., as well as online retailers such as Amazon.com.

For assistance, OSU Extension offers numerous resources for managing your backyard fruit trees:

- OSU Extension Service YouTube Channel
- "Ask an Expert" program to submit questions about your specific trees and needs
- Articles and informational guides: "Home Orchard Concepts from Start to Finish", "Growing Tree Fruits and Nuts in the Home Orchard", "Managing Diseases and Insects in Home Orchards", and much more!

Option #2: Remove fruit from trees

Removing the fruit from the host tree(s) as soon as it forms usually prevents pest pressure from building. However, it may not prevent disease from spreading so it is important to monitor the tree(s) for any signs. If you notice that your trees look unhealthy, call your local OSU Extension office for assistance.

Option #3: Remove the trees completely

If you are not interested in managing pests and diseases in your residential fruit trees, the Backyard Tree Removal Program offers a small financial reward for removal of trees. Call the Columbia Gorge Fruit Growers office to register for the program. Local arborists offer tree removal services.

Columbia Gorge Fruit Growers: (541) 387-4769 cgfg2@hrecn.net

Do you need information about tree spraying or removal?

Call your local Oregon State University (OSU) Extension office for information.

Hood River County OSU Extension: (541) 386 – 3343
Sherman County OSU Extension: (541) 565 - 3230
Wasco County OSU Extension: (541) 296 – 5494

Or, call Hood River Soil & Water Conservation District for Landowner Technical Assistance: (541) 386-4588

PEAR VARIETIES

For more information, visit https://usapears.org/

BARTLETT

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

RED BARTLETT

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

STARKRIMSON

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

SECKEL

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

GREEN ANJOU

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

RED ANJOU

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

BOSC

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

COMICE

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

CONCORDE

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

SECKEL

TEXTURE & FLAVOR WHEN RIPE

CRISP — SOFT & JUICY

SWEET — VERY SWEET

Photos: USA Pears

SWEET CHERRY VARIETIES

Listed in approximate order of ripening

Dark Sweet Cherries

CHELAN	ROYAL HAZEL	BLACK PEARL	SANTINA
			

BURGUNDY PEARL	BENTON	BING	EBONY PEARL
			

TAMARA	ATTIKA	ROYAL EDIE	ROYAL HELEN
			

LAPIN	SKEENA	REGINA	SWEETHEART
			

Blush Sweet Cherries

EARLY ROBIN	RADIANCE PEARL	RAINIER
		

Photos: Oregon State University Extension

How to Ripen Pears

Pears are always picked before they are ripe; this is because pears ripened on the tree have little to no storage life. Tree-ripened pears will become overripe quickly and break down internally. When you purchase pears at a grocery store or fruit stand, store them in the refrigerator at home until you want to ripen them - pears in cold storage can last for quite a long time. Remove the pears as you need them, and remember to handle them carefully. Pears bruise easily, and bruised fruit does not store well.

To ripen, let pears sit at room temperature until they soften to the desired firmness. Placing pears in a paper bag and folding it closed keeps ethylene gas close to the fruit and speeds up the ripening process (any bag will work, but paper is preferred over plastic as it allows the fruit to breathe). To speed up the process even more, place a banana, avocado or apple in the bag with the pears, as this releases more ethylene gas.

Some people prefer pears when they are still firm and not yet fully ripened; others like them fully ripened and softer. Once the pears reach your desired level, put them back in the fridge. This will significantly slow down further ripening.

Bartlett pears will change color from green to yellow as they ripen, but other varieties will not change color. For pears that do not change color, one test is to Check the Neck™ - apply gentle pressure to the neck (stem end) of the pear with your thumb daily. If it yields to pressure, it's ripe. Easy!

Check the Neck™ - USA Pears