

Recorded below are personal notes about the Orchard. They change frequently as information is identified, assembled and digested. 2011 spray records are chronicled and for 2012, organic alternatives will be sought and phased-in. The intent is to fine-tune & optimize the management of the orchard.

Orchard Practices Summary / Notes:

Cherries grow well on a variety of well-drained soils but are highly susceptible to poor drainage. Loam soils are ideal because they are easy to manage and generally have balanced nutrition and a good pH. The ideal site for an orchard is:

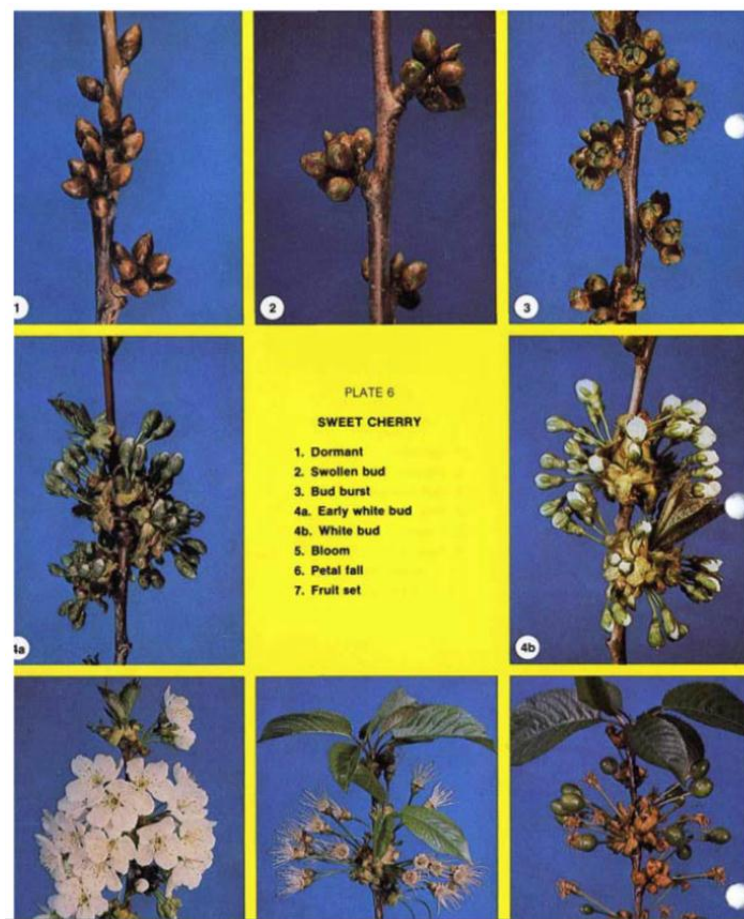
- On a sloping hill, with a grade of 4-8% to allow for air & surface water drainage and good light exposure.
- Locations within 3 or 4 km from a body of water which provides a moderating effect on temperatures in the spring and protect from spring frosts.
- A pH of 6.0 - 6.5 (slightly acidic)

There is a trend towards higher density plantings. Older plantings average 120 trees per hectare, while the newer, high density plantings may have as many as 1,940 trees per ha (BC Horticultural Statistics). The higher density plantings require careful management to maintain air circulation and prevent fungal diseases.

- **Conversions**

- 1 acre = ~ 0.4047 hectare
- 1 US gallon = 3.78541178 litres
- 1 UK gallon = 4.54609 L

- **Stages**



● January / February

○ Pruning / Scoring

- Pruning by Harry Naegel (250) 492-5682
 - At temperatures below -10°C , wood tends to crack so restrict to saw work only and wait till it gets warmer.
- Scoring 2nd year wood above the bud, from bud scales separating until 1st white, will promote branching in cherries. DO NOT score before a rain.
- Avoid scoring where there are active bacterial canker infections. To reduce the risk of bacterial canker infections spreading, spray score immediately with fixed copper.

● March

○ Burning

- It is better to mulch or chip prunings than burn.
- If burning, check venting index before burn (Call 1-888-281-2992) to ensure “Good” status.

○ Fertilizers

- Should be applied early spring until bloom.
- Fertilizer requirements depend on soils, crop, and tree age.
 - Many mature tree blocks on reasonable soils require no fertilization on a yearly basis.
 - Soil Analysis & Recommendations arranged through South Valley Sales (250) 498-6406
 - **NITROGEN, PHOSPHORUS, AND POTASSIUM (NPK):**
 - Most often these elements are added together in 'complete' NPK fertilizer mixes.
 - The amount to apply depends on the desired N rate.
 - When low N rate is required (generally pre-bloom), low N materials (5-15-30 or 5-5-20) or Zero-N materials (foliar P/K or SulPoMag) may be used.
 - When choosing fertilizers, remember that research indicates there is no horticultural benefit to high P rates (in excess of 20 lb/Acre actual P per season) and that high P applications have been associated with a plant's inability to take up required micronutrients, particularly iron and zinc, even when soil tests show there are adequate amounts of those nutrients in the soil.
 - Calculating fertilizer N and P rates from the N-P-K on the bag
 - **Pounds of N** = pounds of fertilizer multiplied by the first number as a decimal
 - Eg: 150 lbs. of 12-24-12 = 18 lbs. N (150×0.12)
 - **Pounds of actual P** = pounds of fertilizer multiplied by the middle number as decimal multiplied by 0.44 to convert to actual P (the bag number refers to the amount of P2O5)
 - Eg: 175 lbs. 15-15-15 = 11.55 lbs. P ($175 \times 0.15 \times 0.44$)
 - **Pounds of K** = pounds of fertilizer multiplied by the last number as a decimal multiplied by 0.83 to convert K2O to actual K
 - Eg: 200 pounds of SulPoMag (0-0-22) = 36.5 lbs. K ($200 \times 0.22 \times 0.83$)
 - **Example #1**
 - Since we fertilize based on nitrogen -- decide how much N you need. Then choose a fertilizer and calculate how much P you will apply.
 - My farm requires 35 lbs. N/acre; I want to use 12-24-12
 - To get 35 lbs. N -- how much 12-24-12 is required?
 - Divide amount of N needed by percent N (first number as decimal) in fertilizer (35 divided by 0.12 = 291.7 lbs. of fertilizer is needed)
 - To calculate P - multiply pounds of fertilizer by middle number as decimal and then by 0.44 (to convert to actual P)
 - $(291.7 \times 0.24 \times 0.44 = 30.8$ pounds of P applied)
 - That's more P than I expected. What if I switch to 15-15-15?
 - Figure out how much 15-15-15 to get 35 lb N.
 - 35 divided by 0.15 = 233 pounds fertilizer
 - Now calculate the P: 233 pounds fertilizer $\times 0.15 \times 0.44 = 15.4$ pounds of P applied
 - **Example #2**
 - I always use 400 lbs./Acre 12-24-12. How much N and P am I applying?
 - For N - multiply the pounds of fertilizer by 0.12 (the % N in 12-24-12) = $400 \times 0.12 = 48$ lbs.
 - For actual P - multiply the pounds of fertilizer by 0.24 (the % P2O5 in 12-24-12) and then multiply by 0.44 to convert to actual P = $400 \times 0.24 \times 0.44 = 42.2$ lbs. of actual P

● April

- **Irrigation**
 - Irrigation water is turned-on. Time to check the System.
 - **Don't Irrigate During Bloom**
 - If a cool moist spring, most soils will make it through bloom without irrigation.
 - With particularly light soils that will be too dry after bloom, irrigate before flowers start to open.
- **Pollination**
 - Move bees into the orchard at about 10-15% bloom.
 - You need flowers open to keep the bees in the orchard when they first come out of the hive.
 - Similkameen Apiaries - Blair & Cheryl Tarves
 - 2098 Ritchie Drive, Cawston, B.C., V0X 1C2, 250-499-2555
- **Don't Mow**
 - During bloom it can move Thrips from the flowers on the orchard floor into the trees.
 - This is especially important in nectarines, Cherries, McIntosh and Spartans.
- **Bacterial Canker**
 - Spring fixed copper sprays may help reduce the incidence of bacterial canker in cherries. Young trees, and Staccato, Skeena, Chelan and Sweetheart varieties seem more susceptible to infections.
 - Fixed copper should go on before any green tissue is showing.
- **Sprays - Personal PRECAUTIONS**
 - Avoid inhalation of vapour, dust, or spray mist and contact with eyes, skin or clothing.
 - Wash thoroughly after handling and before eating or drinking.
 - Wear goggles or a face shield, chemical-resistant gloves, a hat, a long-sleeved shirt, long pants and rubber boots during mixing/loading, application, clean-up and repair activities. A NIOSH-approved respirator is also required in greenhouses.
 - If clothing becomes contaminated, remove and wash separate from household laundry before reuse.
 - Clean spray equipment thoroughly after every use.
 - Do not contaminate domestic or irrigation water, lakes, streams or ponds by the cleaning of equipment or the disposal of wastes.
 - Do not enter or allow workers to enter into treated areas until 24 hours after application.
- **Liquid Zinc (38L / 100 gal)** or Zinc Sulphate (20-40 lbs. / acre) + Tech Spray Mg (8 ounces/100 gallon)
 - **Purpose / Type: Nutrient / Fertilizer. (Organic)**
 - Clear liquid fertilizer sprayed on fruit trees as a nutrient. Prevents zinc deficiency and maximizes yields.
 - **Timing: Apply early ~ April 10 (Stage: Dormant)**
 - Zinc sulphate burns green tissue and should be applied as early in the spring as possible.
 - Apply after buds have begun to swell but before green tip.
 - Temperatures should be expected to reach at least 5°C (40°F).
 - Should be applied at least once per year. If missed, other forms of zinc may be used later.
 - Zinc may be applied in the fall, but fall applications are usually less effective than those made in spring as a dormant application. Fall application may be needed where deficiencies are difficult to correct or where multiple applications of oil in the spring may cause injury. With some deficiencies, particularly on sweet cherry, both a fall and spring application may be necessary.
 - **Cautions:**
 - Thoroughly rinse spray tank, pump, lines, and nozzles after use.
 - Complete spraying early enough in the afternoon to ensure spray has plenty of time to dry before temperatures begin to drop.
 - Should **not** be applied within three days before or after applying oil - Longer if during cool weather.

- **Dormant Oil (6 gal. / 100 gal)**

- **Purpose / Type: Pest Control (Organic)**

- A petroleum or vegetable based oil used in both horticulture and agriculture. Treats peaches, apples, cherries, pears, Asian pears, plums, and roses for insects and conditions including scale, European red and brown mites, aphid eggs, leaf curl and shot hole fungus. Red mite eggs are easily visible on fruit spurs.
 - Applied as a dilute spray on plant surfaces to control disease-causing fungi, scale insects and their overwintering eggs that take up residence in the cracks and crevices by smothering the target pests, and are only effective if applied directly to the pest, and provide no residual controls.
 - Dormant oil can be made at home with common household ingredients.



Brown Mite & Egg



Black Cherry Aphid

- **Method #1: Suffocation**
 - Mix together 1 cup of vegetable oil and 2 tablespoons of liquid soap.
 - Pour the oil/soap mixture into a gallon of water. Shake well before and during use.
 - **Method #2: Deteriorate insect's waxy outer coating thereby exposing it to the elements**
 - Mix 5 tbsp. hydrogen peroxide, 2 tbsp. baking soda & 2 tbsp. soap (preferably of a natural origin like olive oil – ie. Castile soap) with 1 gallon of water.
 - Pour mixture into a sprayer and shake vigorously before applying it.
 - The baking soda and hydrogen peroxide work to sterilize fungal spores that are potentially damaging to fruit trees. This spray is also great for use after pruning as a way to seal the tree and keep unwanted pests out.

- **Timing: ~ April 20 (Stage: DORMANT to Swollen Bud)**

- Should not be applied within three days before or after applying Zinc.... Longer if during cool weather.
 - Apply on a clear dry day, with no breeze and preferably above freezing. Temperatures below 35°F can damage bark

- **Cautions:**

- Can damage leaves & needles on surrounding evergreens and perennials, so it's advisable to cover any susceptible plants in the over-spray zone with a tarp.

Controlling Brown Rot (Monilinia Fructicola), Mildew/Botrytis

- Brown rot is a fungus that causes serious damage during wet seasons. Prolonged wet weather during bloom may result in extensive blossom infection. It is possible to control with good air circulation and mildew resistant varieties (ie. Lapins) if the weather cooperates (Lots of Wind and Little to no Rain – Common in the Okanagan)
- Infections require open bloom, rain and warmth. Fruit become more susceptible when they colour and develop more sugar. The higher the temperature, the quicker a brown rot infection can occur (@ 4°C occurs within 12 hours ... @ 26°C within 2 hours)
- Sources of Infection:

- **Overwintering:** The fungus overwinters in mummified fruit on the ground or in the tree, and in twig cankers. Cold can induce trees to develop cankers under the bark of the trunk or branches. Cankers are usually associated with the production of amber-coloured gum that contains bacteria and oozes on to the outer bark.
 - **Spring infection:** Two types of spores are produced in spring which can infect blossoms. Conidia are produced on cankers and fruit mummies in the tree. Apothecia (small mushroom like structures) form on mummies lying on the ground. The apothecia discharge ascospores during the bloom period, but don't contribute to fruit infection later in season. Fruit mummies hanging in the tree are thought to be the main source of initial inoculum in the B.C. interior.
 - **Secondary Infection:** Spores produced on blighted blossoms provide a source of infection for ripening fruit. Infected fruit become covered with greyish spores which spread by wind and rain to healthy fruit. Insects may also contribute to spread of brown rot spores.

- **Organic Controls**



- **Orchard sanitation:**
 - Removing fruit mummies and pruning any cankered or dead twigs will reduce inoculum levels, which will improve the effectiveness of fungicide. Although sanitation alone is insufficient, it is a good Integrated Pest Management control strategy. Sanitation will decrease inoculum levels, which will improve the effectiveness of fungicide sprays. Repeat applications of Kumulus and Summer Oils can lead to problems.
 - **Pruning:**
 - Some cherry varieties such as Lapins tend to produce large clusters of fruit. Brown rot may develop in these clusters more easily due to difficulty of obtaining good fungicide coverage and slower drying of fruit in the middle of the clusters. When pruning remove excessive branches to allow for increased air flow.
 - **Avoid injuring or bruising fruit at harvest.**
 - Pick only sound fruit. Discard fruit with brown spots or rot. Dispose of culls and rotted fruit promptly by burying. Pre-cool and keep fruit in cold storage until it reaches destination.

○ **Conventional Chemical Controls**



- **Blossom** - Orchards with a history of brown rot require one or more sprays to protect blossoms. Spray when first blossoms open. If wet weather persists, repeat spray at 50 per cent bloom and at full bloom. Select blossom sprays from the following lists of fungicides:
 - Pristine (pyraclostrobin + boscalid), Rovral (iprodione), Indar (fenbuconazole), Topas or Mission (propiconazole), Elevate (fenhexamid), Captan (Maestro), **Lance (boscalid)**, Nova (myclobutanil), Bravo 500 (chlorothalonil), Senator (thiophanate-methyl), Serenade (Bacillus subtilis- suppression only) or Funginex (triforine). Note: Do not apply Bravo after shuck split to avoid fruit injury.
- **Ripening fruit** - Apply one of the following sprays when the fruit changes colour and a second spray just before picking. Additional sprays may be needed with wet weather. Do not exceed 2 applications of Topas or 2 applications of Vanguard for fruit rot control. Control insects that cause fruit injury.
 - Pristine (pyraclostrobin + boscalid), Rovral (iprodione), Indar (fenbuconazole), Topas or Mission (propiconazole), Elevate (fenhexamid), Captan (Maestro), **Lance (boscalid)**, Nova (myclobutanil), , Senator (thiophanate-methyl).
- **Immature Fruit** - In most Okanagan orchards fungicide coverage on the blossom and ripe fruit stages are sufficient for good brown rot control. However orchards with a history of brown rot problems may want to consider fungicide coverage of green fruit, particularly if weather is wet. Fruitlets are most susceptible prior to shuckfall.
- **Mature Fruit** - Ripe fruit ready to be picked, especially apricots and peaches, are very susceptible to brown rot infection. A pre-harvest application of a brown rot fungicide immediately before harvest (1-3 days) is needed to provide these fruit with an adequate shelf life. Generally the shelf life is approximately three weeks for treated fruit kept at around 13°C. Use only fungicides that have a minimum preharvest interval of 3 or less days.

▪ **Cautions: To protect Bees, INSECTICIDES ARE NOT APPLIED DURING BLOOM**

- **Fungal resistance** to fungicides such as Senator and Rovral has developed on many crops throughout the world. Vanguard, Nova, Indar, Topas, Mission, Lance, Pristine and Elevate are also at risk for resistance. Alternate fungicides with different modes of action, or use registered tank mixes to reduce the risk of resistance developing in the orchard.
- Do not use Indar, Mission or Topas in sequential sprays. The same goes for Pristine and Lance.
- Do not alternate Pristine with Lance
- Coverage is critical. Use full label rates and adequate water to ensure good coverage of fruit.
- Use Kumulus with a material that will control all 3 diseases, (Rotate Senator, Rovral, or Pristine)
 - Save the class 3 fungicides (Indar, Topas, Nova (1 day to harvest), Mission (3 days to harvest)) for close to harvest.
- Do not apply any material or any group of materials too frequently, with the exception of Kumulus.
 - Avoid the use of Kumulus (1 day to harvest) if temperatures will reach or exceed 27 C within 3 days of spraying.

○ **Lance WDG (150 gr. / 100 gal)**



- **Purpose/Type: Group 7 Fungicide for Brown Rot (Monilinia Fructicola), Mildew/Botrytis**
 - Penetrates fruit & inhibits spores germination and mycelial growth and sporulation of the fungus on leaves
- **Timing: ~ April 29 (Stage: **Bloom**)**
 - Apply first spray when blossoms open
 - Fungicides must be on BEFORE the infection occurs.

● May

- **Irrigation**
 - Water extensively in hot weather, especially when the days are long and windy.
 - Do not drought cherry trees if you want them to set good fruit buds for next year.
- **Thinning**
 - Manual thinning is required to achieve good fruit size.
- **Weed Control**
 - Weeds compete with orchard trees for moisture and nutrients. Annual grass weeds that occur in sweet cherries include annual bluegrass, wild oats and barnyardgrass. Annual broadleaf weeds are common as well. Most important: Species whose seeds are not killed by soil fumigation, such as sweet clover.
 - Life Cycle:
 - Summer annual weeds germinate in the spring, flower and fruit in the summer or fall and die before the onset of winter. Winter annuals germinate in the fall, overwinter in a vegetative state, flower in the spring, form seeds and then die. Perennial weeds live for many years. They spread through flowering and seed production as well as through expansion of their root system. Perennials can also be spread vegetatively through the movement of tubers, rhizomes and root systems.
 - Note: PHI (Pre-Harvest Interval or days between spraying and picking) on the herbicides utilized.
 - Most are over 30 days PHI, so do not spray herbicides too close to harvest, even if spot sprayed.
 - Conventional Chemical Controls:
 - Herbicides Options (Round-up, Touch-down, Credit etc.)
 - Residual and non-residual herbicides are used to control orchard floor vegetation. The rotation of herbicides is dependent on the spectrum of weeds to be controlled.
 - Cultural Controls:
 - Mechanical weeding, hand weeding, cover cropping and mulching are used to control weeds. Cover crops are grown between orchard trees and alleys as effective weed control, as well as protection from leaching and erosion. Mulches are occasionally used but are generally considered to be more expensive than herbicides. Early season weed control is used to minimize the impact of competition and reduce weed seed development. Tillage and cultivation are used only in the year prior to planting.

Combo Spray: Kumulus, Indar & Bioprotec

- **Kumulus DF (6 lbs. / 100 gal)**
 - **Purpose/Type:** Group M Fungicide (control of fungal diseases and rust mites) **(Organic)**
 - A patented low-dust, easy-mixing formulation of sulphur that helps to minimize the risk of scorching
 - KUMULUS enters powdery mildew cells then converts to hydrogen sulfide which disrupts fungal cell function.
 - Has three distinct particle sizes, each with a specific function:
 - Small: Rapid activity (50% of particles are less than 2 microns)
 - Medium: Sustained release (40% are 2 – 5 microns)
 - Large: Residual control (10% are 5 – 8 microns)
 - **Timing:** Apply ~ **May 11** (Stage: **Petal Fall / Husk Fall**) – Powdery Mildew
 - Apply in a regular spray program from the bloom stage until just before harvest.
 - **Cautions:**
 - Do not apply more than 8 applications per season
 - Do not apply during periods of dead calm or when wind speed is >16 km/h at the application site as measured outside of the treatment area on the upwind side. Keep a 5 metre buffer zone.
 - KUMULUS DF is miscible and compatible with POLYRAM DF.
 - Do not mix with dinitro compounds, tetradifon or oils.
 - Do not direct spray above plants to be treated. Turn off outward pointing nozzles at row ends and outer rows.
 - Do not apply if temperature above 27⁰C (in shade) and high humidity prevails or are expected 3 days after treatment.
 - Do not apply under intense sunshine or when rain or night frost is expected.
 - Do not use within 30 days of an oil spray. Do not apply later than 1 day before harvest.
- **Indar 2F (57 grams / 100 gal)** - (fenbuconazole)
 - **Purpose:** Fungicide
 - Controls rusts, apple scab and powdery mildew summer diseases such as flyspeck in apples, sooty-blotch, fruit-brown rot, blossom-blight, cherry-leaf spot in stone fruit, peach scab mummyberry in blueberries, cranberry fruit rot complex in cranberries, cottonball tip blight (Monilinia oxycocci).
 - Provides excellent residual activity and may be applied at 7-10-day intervals as needed
 - **Timing:** Apply ~ **May 11** (Stage: **Petal Fall / Husk Fall**)
 - If conditions are favorable for disease development, apply again at full bloom and at petal fall. For fruit brown rot, begin applications two to three weeks before harvest using a seven-to-20-day spray interval.

- **BioProtec (1.6 litres / 100 gal)**
 - **Purpose:** Aqueous Biological Insecticide (Group 11) – *Bacillus thuringiensis* subspecies *kurstaki* (**Organic**)
 - Is selectively toxic to some species of lepidopteran (large order of insects that includes moths and butterflies) larvae.
 - Caterpillars must ingest it to be killed as it is a stomach poison only and therefore not effective on eggs, pupae and adult moths. Both sides of foliage where insects are feeding must be thoroughly covered with the spray solution.
 - It is most effective against small, young larvae that are actively feeding. After ingestion of a sufficient dose, they cease feeding within a few minutes and death occurs in 2 – 5 days.
 - **Timing:** Apply ~ **May 11** (Stage: **Petal Fall / Husk Fall**)
 - Resistant to UV light, Bioprotec CAF will last for up to 8 days on the leaves of all types of plants.
 - **Cautions:**
 - Avoid application when significant rainfall is imminent.
 - For early morning applications, foliage should not be wet with dew to the point of runoff
- **Combo Spray: Zintrac, Bortrac, Hydromag, Urea**
 - **Zintrac 700 (400 ml / acre)**
 - **Purpose / Type:** Foliar Nutrient (Zinc).
 - A highly concentrated liquid fertilizer for the correction of zinc deficiency in fruit and vegetable crops. For foliar or soil application, Zintrac 700 is quickly taken up by the crop and has lasting feeding effect. With 39.6% zinc, Zintrac 700 contains 8-10 more times zinc than a typical liquid chelate and 3-4 times that of sulphate or nitrate based liquids. Zintrac 700 is widely tank mixable and can be co-applied with many agrochemicals.
 - **Timing:** Apply ~ **May 18** (Stage: **Husk Fall**)
 -
 - **Cautions:** No Significant Hazards
 - **Bortrac 150 (400 ml / acre)**
 - **Purpose / Type:** Foliar Nutrient (Boron).
 - A liquid fertilizer for the correction of boron deficiency in canola, corn, sugarbeet, roots, vegetables and fruit crops.
 - Boron should be applied at pink, or with a bloom fungicide spray, unless tests indicate boron is too high. As soon as the leaves are well enough developed to absorb foliar sprays calcium, nitrogen and phosphorous may also be helpful at this time.
 - **Timing:** Apply ~ **May 18** (Stage: **Husk Fall**)
 -
 - **Cautions:** No Significant Hazards
 - **Hydromag (1.6 Litres / acre)**
 - **Purpose / Type:** Foliar Nutrient (Magnesium).
 - A liquid fertilizer for the correction of magnesium deficiency in stone fruits & vegetable field crops.
 - Magnesium is a permanent constituent of chlorophyll and also takes part in the synthesis of proteins and carbohydrates
 - **Timing:** Apply ~ **May 18** (Stage: **Husk Fall**)
 -
 - **Cautions:** No Significant Hazards
 - **Urea (11 lbs. / acre)**
 - **Purpose:** Nitrogen Nutrient.
 - Foliar fertilization with urea is common because it provides trees with nitrogen at the time when the tree roots cannot absorb it freely, for example during dry spring weather
 - Seasonal uptake, storage, and remobilization of nitrogen (N) are of critical importance for plant growth. The use of N reserves for new growth in the spring is especially important for sweet cherries, for which new shoot and fruit growth is concomitant and fruit development occurs during a relatively short bloom-to-ripening period.
 - Sweet cherries grafted on precocious, dwarfing rootstocks such as the interspecific (*P. cerasus* × *P. canescens*) hybrids Gisela® 5 and 6 tend to produce large crops but smaller fruit when crop load is not balanced with adequate leaf area.
 - During fall, total N in leaves decreases by up to 51% and increased in canopy organs such as flower spurs by up to 27% (DW). The N concentration in flower spurs increases further in spring by up to 150% (DW). Fall foliar applications of urea increases storage N levels in flowering spurs (up to 40%), shoot tips (up to 20%), and bark (up to 29%). Premature defoliation decreased storage N in these tissues by up to 30%. Spur leaf size in the spring was associated with storage N levels; fall foliar urea treatments increased spur leaf area by up to 24%. Foliar urea applications increased flower spur N levels most when applied in late summer to early fall. Such applications also affected the development of cold acclimation in cherry shoots positively during fall; those treated with urea were up to 4.25 °C more cold-hardy than those on untreated trees.
 - **Timing:** Apply ~ **May 18** (Stage: **Husk Fall**)
 -
 - **Cautions:** No Significant Hazards

- **Kumulus DF (6 lbs. / 100 gal)**
 - **Purpose:** Group M Fungicide (control of fungal diseases and rust mites) **(Organic)**
 - **Timing:** Apply ~ **May 27** (Stage: **Summer**) – Powdery Mildew
 - Apply in a regular spray program from the bloom stage until just before harvest.
 - **Cautions:** See original description

June

- **Irrigation**
 - Water extensively in hot weather, especially when the days are long and windy.
 - Do not drought cherry trees if you want them to set good fruit buds for next year.
- **Weeds – June 9, spray all weeds with Roundup**
- **Birds**
 - Feed on ripening fruit and can destroy an entire crop. Damage becomes less noticeable in older orchards due to the larger crop size. Common birds causing damage in cherries are; red-wing blackbirds, starlings, robins, goldfinches, orioles, blue jays, cedar waxwings and gulls.
 - Once birds establish, they are difficult to deter from feeding on the crop. Controls must start early in the season.
 - An integrated approach, using a variety of these repellent methods must be used. There are four types of bird repellent methods currently available to growers:
 - **Acoustical:** Acoustical repellents rely on sound to scare birds away. Birds have a hearing range similar to humans. Therefore, acoustical repellents can be irritating to humans if used in populated areas.
 - **Visual:** Birds generally have very good eyesight and react to both movement and things that resemble their enemies (eg. osprey kites). However, visual deterrents are not as effective as acoustical ones and visual deterrents are usually used together with acoustical systems.
 - **Physical:** Nets are either draped directly on top of the trees, or fastened to an overhead structure which totally encloses the orchard. However birds can often get under the netting and cause more damage when they cannot escape the enclosure.
 - **Biochemical:** Currently, no products are registered in Canada for food use.

- **ISOMATE - P (approx. 400 loops – one on every perimeter tree, every other one inside)**
 - **Purpose:** Pheromone Mating Disruption of the Peach Tree Borer (**Organic**)
 - **Timing:** Apply ~ **June 6** (Stage: **Fruit Set / Summer**)
 - Place dispensers on lateral branches in mid point of tree canopy.
 - Apply dispensers uniformly in the treated area.
 - **Cautions:**
 - Do not open foil envelopes until ready to use. Avoid inhalation of vapors or contact with liquid ingredients.
 - Harmful if swallowed. Avoid contact with skin, eyes and clothing. When handling dispensers wear chemical resistant gloves and eye protection.
 - Harmful if absorbed through skin. Causes moderate eye irritation.
 - After handling, wash thoroughly with soap and water before eating, drinking, chewing gum, using tobacco or using the toilet.
 - Remove and wash contaminated clothing before reuse.

- **Diazinon (2L / 100 Gallons) – Applied to Lapins & Sweethearts**
 - **Purpose / Type:** Group 1B Organophosphate (OP) Insecticide/Miticide - Black Cherry Aphids
 - Diazinon is an OP insecticide and acaricide (a chemical which kills mites and ticks), which acts as a contact stomach and respiratory poison. In common with other OPs, diazinon's toxic action is achieved by inhibiting acetylcholinesterase, an enzyme essential for normal nerve impulse transmission.
 - It is used throughout the world to control a wide range of sucking and chewing insects and mites on a range of crops, including deciduous fruit trees, citrus fruit, bananas, vegetables, potatoes, beet, sugar cane, coffee, cocoa, tea, tobacco, cotton, and rice. It is also used to control agricultural soil-dwelling insects, and is applied as a sheep dip to control ectoparasites such as sheep scab and blow fly strike(1). Diazinon use in homes controls cockroaches, ants, and carpet beetles, and is in insecticidal pet collars(2). Trade names for diazinon include Knox-out, Dianon and Basudin(3).
 - **Timing:** Apply ~ **June 14** (Stage: **Fruit Set / Summer**)
 - Alternative may be **Onslaught**
 - **Cautions:**
 - Class II 'moderately hazardous' pesticide and poisons humans through its effects on nerve enzymes. The main symptoms of acute Diazinon poisoning are headache, nausea, dizziness, pin-point pupils, blurred vision, tightness in the chest, difficulty in breathing, muscle weakness or twitching, difficulty in walking, vomiting, abdominal cramps, and diarrhoea.
 - Effects on the central nervous system may include confusion, anxiety, drowsiness, depression, difficulty in concentrating, slurred speech, poor recall, insomnia, nightmares, and a form of toxic psychosis resulting in bizarre behaviour.
 - Use of Diazinon by farmers has been linked to increased risk of non-Hodgkins lymphoma
 - Works effectively if temperature is 20°C or more. Apply by ground only. Do not allow spray mixture to sit overnight.

Table 5.1.1.1 Summary Table of Registered Alternative Active Ingredients to Diazinon for the Control of Cherry Pests, as of 15 December 2006

Pest	Registered Alternatives to Diazinon (Resistance Mode of Action (MoA) group) ¹
cherry fruit fly	<ul style="list-style-type: none"> • (1A): carbaryl^{2,3} • (1B): azinphos-methyl⁴, dimethoate^{2,5}, phosalone², phosmet^{2,6} • (3): cyhalothrin-lambda • (4): imidacloprid⁷ • (5): spinosad⁸
black cherry aphid	<ul style="list-style-type: none"> • (1A): carbaryl^{2,3} • (1B): malathion^{2,9}, phosalone² • (2A): endosulfan² • Other: insecticidal soap¹⁰
mealybug	<ul style="list-style-type: none"> • (1A): carbaryl^{2,3} (scale insects) • (Other): insecticidal soap¹⁰

• **Combo Spray: Admire, Lance, Kumulus** – Lapins & Sweethearts



Western Cherry Fruit Fly

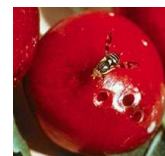


Black Cherry Fruit Fly

○ **Admire (94 ml / 100 gal)**

▪ **Purpose:** Group 4 Insecticide contains Imidacloprid for Cherry Fruit Flies

- Cultural - Destroy infested cherries before the larvae emerge. Removal of all cherries before they all turn red will greatly reduce fruit fly numbers for next season. At the time of cherry bloom, search out and destroy any unmanaged hosts within a distance of at least 250 m.
- Chemical- The low efficiency of yellow sticky traps and zero tolerance for fruit flies in fruit requires protection of the fruit throughout the summer when fruit flies are active, regardless of trapping results. If using traps, apply a control product within 5 days of first fly capture and maintain control until harvest. In the absence of traps, begin protecting fruit about the time Lambert cherries begin to colour. Research shows female fruit flies will lay eggs in green fruit. This means application of sprays to the new later maturing varieties when the fruit may still be green.



▪ **Timing:** Apply ~ **June 20** (Stage: **Summer**) – Cherry Fruit Fly

- Monitor for adult cherry fruit fly and apply as a foliar spray within 6 days of first fly emergence.
- Thorough uniform coverage of foliage is necessary for optimal control.
- A maximum of five (5) foliar applications of ADMIRE 240 F Insecticide may be made per crop per year.
- Allow at least 10 days between applications.
- Do not apply within 10 days of harvest.

▪ **Cautions:**

- Do not apply when rainfall is forecast for the next 48 hours
- Do not reenter treated areas for 24 hours after foliar application
- Admire and Alias have some residual contact activity against adult flies (2-3 days) but will kill young larvae hatching in the egg for 10 to 12 days post treatment because it is absorbed into the fruit. These products will also move into the branches and out to the growing tips where it will control any black cherry aphids present.
- Some research shows mite populations increase after neonicotinoid products such as Admire and Alias are applied. Therefore do not use Admire or Alias more than twice per season. Avoid use of any chemicals harmful to predatory mites in blocks treated with Admire and Alias to avoid possible mite flare-up. Monitor mites the following spring to assess the risk of mite problems.

○ **Lance WDG (150 gr. / 100 gal)**

▪ **Purpose/Type:** Group 7 Fungicide for Brown Rot (*Monilinia Fructicola*), Mildew/Botrytis

- Penetrates fruit & inhibits spore germination and mycelial growth and sporulation of the fungus on leaves

▪ **Timing:** ~ **June 20** (Stage: **Bloom**)

- Apply first spray when blossoms open
- Fungicides must be on BEFORE the infection occurs.



○ **Kumulus DF (6 lbs. / 100 gal)**

▪ **Purpose:** Group M Fungicide (control of fungal diseases and rust mites) (**Organic**)

▪ **Timing:** Apply ~ **June 20** (Stage: **Summer**) – Powdery Mildew

- Apply in a regular spray program from the bloom stage until just before harvest.

▪ **Cautions:** See original description

- **Combo Spray: Dimethoate, Lance, Kumulus** – Stellas

- **Dimethoate (32 oz / 100 gal)**

- **Purpose: Group 1B Organophosphate Insecticide**

- Trade names include Cekuthoate, Chimidor 40, Cygon 400, Daphene, De-Fend, Demos NF, Devigon, Dimate 267, Dimet, Dimethoat Tech 95%, Dimethopgen, Ferkethion, Fostion MM, Perfekthion, Rogodan, Rogodial, Rogor, Roxion, Sevigor, Trimetion.
- Dimethoate is an insecticide used to kill mites and insects systemically and on contact. It is used against a wide range of insects, including aphids, thrips, planthoppers and whiteflies on ornamental plants, alfalfa, apples, corn, cotton, grapefruit, grapes, lemons, melons, oranges, pears, pecans, safflower, sorghum, soybeans, tangerines, tobacco, tomatoes, watermelons, wheat and other vegetables. It is also used as a residual wall spray in farm buildings for house flies.

- **Timing: Apply ~ June 20 (Stage: **Summer**)** – Cherry Fruit Fly

- **Cautions:**

- Dimethoate is moderately toxic by ingestion, inhalation and dermal absorption. As with all organophosphates, dimethoate is readily absorbed through the skin. Skin which has come in contact with this material should be washed immediately with soap and water and all contaminated clothing should be removed. Organophosphates are easily absorbed through the lungs. Persons with respiratory ailments, recent exposure to cholinesterase inhibitors, impaired cholinesterase production, or with liver malfunction may be at increased risk from exposure to dimethoate. High environmental temperatures or exposure of dimethoate to visible or UV light may enhance its toxicity.
- Cholinesterase inhibitor may be fatal if swallowed. Persons who work with organophosphate materials for long periods of time should have frequent blood tests of their cholinesterase levels. If the cholinesterase level falls below a critical point, no further exposure should be allowed until it returns to normal
- Harmful if absorbed through skin or inhaled. Protective clothing must be worn when handling dimethoate. Before removing gloves, wash them with soap and water. Always wash hands, face and arms with soap and water before eating or drinking.
- Causes moderate eye irritation.
- Avoid breathing product vapors or spray mist.
- Avoid contact with eyes, skin or clothing. After work, remove all work clothes and shoes. Shower with soap and water. Wear only clean clothes when leaving the job. Wash contaminated clothing and equipment with soap and water after each use. Keep contaminated work clothes separate from regular laundry.
- Symptoms of over exposure are headaches, nausea, vomiting, cramps, weakness, blurred vision, pin point pupils, tightness in chest, labored breathing, nervousness, sweating, watering of eyes, drooling, muscle spasms and coma.

- **Lance WDG (150 gr. / 100 gal)**

- **Purpose/Type: Group 7 Fungicide for Brown Rot (*Monilinia Fructicola*), Mildew/Botrytis**

- Penetrates fruit & inhibits spores germination and mycelial growth and sporulation of the fungus on leaves

- **Timing: ~ June 20 (Stage: **Bloom**)**

- Apply first spray when blossoms open
- Fungicides must be on BEFORE the infection occurs.

- **Kumulus DF (6 lbs. / 100 gal)**

- **Purpose: Group M Fungicide (control of fungal diseases and rust mites) (**Organic**)**

- **Timing: Apply ~ June 20 (Stage: **Summer**)** – Powdery Mildew

- Apply in a regular spray program from the bloom stage until just before harvest.

- **Cautions: See original description**

- **Combo Spray: Falgro, Agaryl, No Foam**

- **Falgro (18 tabs / tank)**

- **Purpose: Plant Growth Regulator contains Gibberellic Acid (**Organic**)**

- To delay ripening and improve fruit quality of red and black sweet cherries.
- FALGRO TABLET PLANT GROWTH REGULATOR delays fruit ripening 4 to 5 days, thus lengthening the picking period and delaying the period of susceptibility to rain cracking. The treatment also increases fruit size, firmness, and resistance to postharvest disorders.
- Rate: Dissolve 20 FALGRO TABLET PLANT GROWTH REGULATOR tablets in 1000 litres of water (20 ppm) and apply as a foliar spray to run-off 21 days before normal harvest. The fruit are straw colored at that stage. Harvest when fruits are at the desired shade of red. Do not harvest within 21 days after spraying.
- Gibberellic Acid, a naturally occurring plant hormone was developed in Canada in the early '70's for use on sweet and sour cherries and rhubarb roots. Dr. Norman Looney, a Research Scientist at Agriculture and Agri-Food Canada, did the original development work with gibberellic acid on sweet cherries in BC
- Falgro is an excellent harvest management tool. The delay in fruit maturity allows for more uniform ripening and lengthens the picking period. Falgro allows growers to "stretch out the season". By using gibberellic acid, growers can extend the season and allow for better planning of fruit pickers. In the Okanagan Valley, June is the rainiest month of the year and mature cherries are prone to splitting in rainy weather. Falgro delays the maturity of certain varieties as much as possible into the drier month of July, thus avoiding cherry ripening in June and reducing the susceptibility to rain cracking.
- Another benefit from delayed maturity is fruit size enhancement. Fruit sizing is linear; the longer the fruit is on the tree, the bigger it gets. This is not due to a fertility effect or from a growth promoting effect of the chemical. but from the direct result of the delay in fruit ripening. When maturity is delayed, there is an opportunity for the fruit to size up 10% or more

- **Timing: Apply ~ June 21 (Stage: **Summer**)**

- Apply when fruit is light green to straw color (about 3-4 weeks before harvest)

- **Cautions:**

- High rates may delay fruit color development but give the maximum delay in harvest. Apply lower rates for less delay in ripening and less inhibition of color. Do not apply within 1 week of harvest.

• July

- **Irrigation**
 - Water extensively in hot weather, especially when the days are long and windy.
 - Do not drought cherry trees if you want them to set good fruit buds for next year.

- **Harvest**
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- **Leafrollers in Cherries**
 - If leafrollers are found during harvest the affected fruit cannot be packed.
 - If before the start of harvest (7 days) consider applying Entrust or Success as a leafroller plus Cherry Fruit Fly spray.
 - If you are less than 7 days to harvest apply a B.t. product (Dipel or Bioprotec) using high water volume to be sure to get the tiny leafrollers where they are hiding in the shade. Bioprotec is the preferred material because it has a longer life in the sunshine. It is probably necessary to wait a minimum of one day between spraying and continuing harvest for the leafrollers to eat the B.t. and start to get sick, so that they fall off the cherries
 - Organics –use only Dipel for leafroller control during harvest.

- **Gibberellic Acid**
 - Purpose / Type:
 - Applied as a growth regulator to delay the harvest of the fruit.

- **Nova 40 (340 g/ha)**
 - Purpose / Type: Group 3 Fungicide for Brown Rot or Powdery Mildew
 - For Powdery mildew and rust diseases – NovaTM 40W is a systemic fungicide providing longlasting, effective control of all three diseases.
 - Timing: Apply ~ July 13 (Stage: **Summer**)
 - Application at husk fall is important for fruit protection.
 - Can be applied it up to 14 days before harvest.
 - Cautions:
 - Maximum of 6 applications per growing season.
 - Copper products tank mixed with Nova reduce the effectiveness of the fungicide.
 - The worker restricted entry interval (REI) is 2 hours (when spray has dried) for all crops. Workers who must enter fields within this time period should wear a long-sleeved shirt, long pants and chemical-resistant gloves.

- **Malathion 25 WP (1-1.5kg/acre)**
 - Purpose / Type: Spotted Wing Drosophila (SWD)
 - Works well in hot weather (unlike pyrethroids like Ripcord)
 - Has a 3 day to harvest interval (for aphids) but should control SWD for 7 days.
 - Timing: Apply ~ July 13 (Stage: **Summer**)
 - Cautions:
 - Don't use Malathion 85 E as it is suspected of causing damage to fruit (leathering) and leaf drop in cherries.

- **GF-120 TM NF (1:5 ratio in water)**
 - **Purpose / Type:** Group 5 Insecticide for Cherry Fruit Fly (**Organic**)
 - Product performs as a true bait, attracting only targeted insects. The goal is to strategically place large droplets where flies will find them in their normal search for food. Uniform coverage is not as critical as with conventional sprays. The application technique for GF-120 NF is an ultra low volume application, but with large droplets. Large droplets (5 or more millimeters in diameter) help the product remain viable in the field for longer periods of time.
 - Target the top 1/3 of the tree foliage providing the fruit flies with product closer to the places where they normally move. A band directed towards the upper and inner canopy will work best.
 - The targeted droplet size is a diameter of 5 millimeters (0.2 inch), using D1 or D2 nozzles with the swirl plates removed, and an operating pressure of 45 to 60 psi.
 - If the droplets are too small, there will not be enough product to control the fly, and if the droplets are too large, the droplet will spread out and not be effective for control.
 - **Timing:** Apply ~ **July 20 to end of Harvest (Stage: Summer)**
 - Repeat applications every 5-7 days, shortening the application interval during rainy periods and as fruit ripens.
 - **Cautions:**
 - A total of 10 sprays are allowed
 - There is no pre-harvest interval. GF-120 can be applied up to and including the day of harvest.
 - Highly toxic to bees when exposed to direct treatment
 - When mixing, triple rinse the GF-120 container, adding the rinsate to the spray solution.
 - Constant agitation of the spray solution is recommended to ensure uniformity of spray mixture.
 - GF-120 is required to remain a liquid to be effective as a bait. The product resists wash off, but will lose effectiveness if exposed to rain and overhead irrigation.
 - Once diluted, GF-120 should be used within 24 hours.
 - Do not apply during periods when heavy rain is expected. Re-apply immediately after a rain.

Monitor for mites. Admire/Alias/Sevin sprays tend to stimulate mite problems

● August

- **Irrigation**
 - Water extensively in hot weather, especially when the days are long and windy.
 - Do not drought cherry trees if you want them to set good fruit buds for next year.

- **Harvest**
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- **Post-Harvest Pruning**
 - Post harvest is an excellent time to do some big cuts in cherries, especially high in the trees. This will let more light into the tree to strengthen fruit buds for next year. There is also less risk from bacterial canker infections during the hot dry days of summer.

● September

- **Irrigation**
 - Watering is needed after harvest to keep cherry trees healthy and leaves green to help set up buds for next seasons crop. Do not water stress trees, or leaf drop can result in blind wood and decreased fruit bud set for next year.

- **Field Mice**
 - Cause damage by gnawing the stems and roots of trees. Injury to the trees can begin in late summer or when food becomes scarce in the fall, but usually occurs in winter under a protective snow cover. Below ground injury may be extensive but not visible from the surface until the plants fail to leaf out normally. Severe damage, such as complete girdling of the trunk or roots can kill trees.
 - Field mice are found in areas of dense vegetation where they feed on seeds, tubers, rhizomes and other plant material. They create a network of runways on the ground surface through which they travel. They nest in cavities in the ground. Litters are produced monthly throughout the growing season.
 - **Conventional Chemical Controls:**
 - Registered active ingredients include diphacinone, chlorophacinone, and zinc phosphide.
 - Tree trunks can also be treated with repellents containing thiram which discourages rodent feeding because of the taste.
 - **Organic Controls:**
 - Vegetation in and around the orchard is managed to discourage rodents.
 - Maintaining a weed free strip within tree rows reduces mouse habitat.
 - Physical barriers placed around tree trunks are another option on young trees.

- **Coryneum Blight**
 - A fungus disease of apricots, peaches, and cherries. Fruit symptoms are most severe when there is frequent wet weather at husk fall. On peach, apricot and cherry fruit, coryneum blight causes small reddish-brown to purple spots, some of which appear scabby later in the season. On peach twigs, small, dark, circular to elliptical spots develop, some becoming gummy. Twig infections on apricots and cherries are not common, although bud infections occur on apricots. Shotholes in leaves are common on cherries and may also occur on peaches and apricots
 - **Chemical Control**
 - To prevent twig and bud infections, apply fixed copper fungicide (not copper sulphate) after harvest on peaches, or September 1 (before fall rains) on apricots and cherries. This spray also helps to control peach leaf curl.
 - Fall applications of fixed copper prevent the formation of new twig cankers but WILL NOT remove existing cankers.
 - A spring fungicide application is necessary to prevent fruit infections in orchards where coryneum has been a problem. In such cases, an aggressive program is required for a minimum of three years in order to minimize the chance of fruit infections from old twig cankers.



● October/November/December

○ **Cherry Post-Harvest Treatments**

- Immediately after harvest apply Dimethoate, Assail, Alias or Admire for cherry fruit fly prevention. There are still plenty of cherry fruit fly adults around to lay eggs in fruit left on the trees. There are always some cherries left on the tree that can build up the fruit fly population for next year. We expect that any of the above chemicals will also control Spotted Wing Drosophila in the fruit. Post-Harvest sprays will also control Pear Slug (Cherry Slug, Sawfly larvae) on cherries.
- Within two weeks after harvest apply zinc sulphate (summer-rate).
 - Consider applying Quintec as an after-harvest mildew clean-up spray on susceptible blocks (Sweetheart, Stacatto), then Lime Sulphur in October for a further clean-up of problem blocks.

○ **Late summer or fall foliar urea application**

- Dr. Greg Lang of Michigan State University has found that late summer or autumn urea sprays increased the shoot hardiness of the cherries that he tested and produced up to 20% larger spur leaves in the spring. As a whole, throughout the growing season, the spur leaves are the most important leaves for supplying nutrients to developing fruit. Greg speculates that if the spur leaves are larger then photosynthesis is increased and there are more carbohydrates being exported to the developing fruit.
- In his trials Greg applied two applications of low biurate urea as a foliar spray. An application on August 31 and a second application about one week later actually gave the best uptake of N into spur tissues and provided earlier acquisition of cold hardiness in the year that it was treated. However, application can be made up to leaf fall.
- Each application should consist of 15 to 20 pounds of actual N/acre. Dilute sprays of 250 gallons/acre are possible, but some leaf burn at the leaf margin should be expected with these dilute sprays. Concentrate sprays ranging from 25 to 75 gallons/acre showed less phytotoxicity when applied with a curtain-type sprayer (small volume, small droplet size). The reduced toxicity which was noted with the concentrate sprays is probably due to less pooling of the material along leaf margins and therefore less burning of the foliage.
- It is also a good idea to apply boron in the fall. Studies show that there is greater boron uptake in the fall while leaves are still on the tree than during a delayed dormant application in the spring.

○ **Final Foliar Nutrient**

- It is now late enough to apply a final foliar nutrient post-harvest spray to all bearing trees as needed without the concern of stimulating new growth. A fall nutrient spray is recommended after the crop comes off and before the leaves start to drop. How much and which nutrients you choose to put on depends on tree growth/crop load/fertilizer program in your orchard. See page 10-21 of the production guide for suggestions, and for problem blocks talk with field service.
- General recommendation for orchards:
- Nitrogen (Feed Grade Urea up to 10 kg per acre, or a mix of Feed Grade Urea + 20-20-20 up to a total of 15 kg per acre). The addition of 20-20-20 (5kg per acre) is a good way to get a bit of Potassium and Phosphorous.
- Boron is readily taken up at this time, however should not be applied if levels are already high or has been applied to the ground in the last 3 years or to leaves at pink of this year. Bortrac (200mL per acre) or Solubor (1 kg per acre) are the fall rates if needed.
- Magnesium Sulphate can be included up to 6 kg per acre
- Zinc Sulphate should not be mixed with other nutrients, however, Zintrac (400mL per acre) or Tiger Claw Zinc formulations (2L per acre) can be used for extra Zinc.
- New research in Cherry fall foliar: Low vigour blocks may benefit from extra foliar nutrients in the Fall. Talk with your Field Service about suggestions from Dr. Greg Lang.
- Most nutrients (except Zinc Sulphate) can be mixed with the Fall Fixed Copper spray.
- Organic – Use only organically acceptable nutrients.
- If you have apple leaf scab in the orchard it may be appropriate to apply extra feed-grade urea to aid in the decomposition of the leaves over winter. Other cultural practices can help to decrease overwintering inoculum, talk with Field Service. Organic – use an organic nitrogen source, and cultural practices.
- This is a good time of year for soil samples. Anyone planning to replant next spring is strongly encouraged to get a soil sample done. Contact your Field Person for assistance.

Pests:

- Feeding by insects & mites on foliage or branches can hurt host trees in various ways. The damage weakens trees so that they grow poorly; it reduces bloom and fruit set; and it results in the production of small, low quality fruit.
- Plant damaging insects and mites include aphids, caterpillars, scale insects, spider mites and wood borers.
- **Aphids:**
 - Several types of aphids feed on the foliage and young stems of stone fruits throughout the growing season. Aphids often cause newly developing leaves to twist and curl. They feed by sucking plant sap from the leaves and small succulent stems. During feeding they inject saliva into the plant to aid in feeding and digestion. Aphid saliva is often toxic to the plant resulting in stunted, twisted or curled leaves.
 - Those most commonly found include Black Cherry Aphid (on Cherries), Green Peach Aphid (on all fruit) and Apple Grain Aphids AGA (on Plums). AGA may heavily infest buds and very young growth in spring, but they cause no injury and do not require treatment.
- **Cherry Fruit Fly (Spotted Wing Drosophila (SWD))**
 - Spotted Wing Drosophila can infest all stone fruits, grapes, and berries.
 - The adult fly punctures the fruit and lays its eggs within. After the eggs hatch, the larvae (maggots) tunnel through the fruit. The fruit can appear normal for several days, but eventually sunken areas develop. Usually only one maggot infests each fruit. If substantial infestation occurs near harvest, the damage may not be apparent externally. Feeding injury not only damages the fruit directly, but also allows brown rot and other fruit diseases to develop.

Note the differences between Spray Intervals and Pre-Harvest Intervals.



Female



Eggs

Trade Name	Chemical Class	Target Stages	Max. Applications	Spray Interval ¹ (days)	Pre-harvest Interval	Rate	Notes:
Admire 240F ²	chloronicotinyl	Larvae, Adults	2	10	10	94 ml	Will not control LR, also controls aphids
Assail 70 WP	acetamiprid		2	7	7	97 gr	For suppression only, also control aphids
Dimethoate 480 EC	organophosphate	Larvae, Adults	1	14-18	21	910 ml	Also controls aphids, cherry fruitworm, pear sawfly and apple mealybug. phytotoxic to some varieties
Diazinon 50W Basudin 50%	organophosphate	Adults	3	7	10	1.8 kg	No longer register for backyard used. Will not control LR, controls aphids
Entrust 80W	spinosad	Adults	4	7-10	7	44 gr	Organic. Also controls LR
GF-120	spinosad	Adults	4	7 or less	0	625 ml	Organic. Will not control LR, Cherry Fruit Worm. Re-apply after rain. Ratio off 4 to 1
Success 480SC	spinosad	Adults	4	7	7	74 ml	Will control LR
Guthion 50WP /Sniper 50 WP/ APM 50%	organophosphate	Adults	2	14	15	0.9 kg	May cause leaf drop.
Sevin XLR ²	carbaryl	Adults	No limit ²	5-7	2	930 ml	May also suppress LR
¹ Minimum days between sprays when applied at recommended rates in absence of rainfall/overhead irrigation							
² Minimize use to avoid mite problems							
³ Registered for aphids, but will also control fruit fly adults.							

SOFT FRUIT FUNGICIDES AND THE DISEASE COMPLEX												
CIs	\$/acre	Material	Brown Rot	Mildew	Botry	Alter-naria	Days To Harvest:				Rate/Ac	Comments
							Chry	Pch	Cot	Plum		
1	60	Senator	++	+	++	X	1	1	X	1		Resistance persists even when fungicide not being used. Systemic action.
2	50	Rovral	+++	+	+	+++	1	1	1	1	610 gr	Rating for Botrytis may be up to +++ as reported in California. Systemic action.
3	17	Topas	+++	++	++	+	3	3	3	3	200ml	Rating for mildew may be as high as +++. May cause leaf burn if applied at high temp. Systemic action. Rainfast in 1 hour.
3	20	Mission	+++	++	++	+	3	3	3	3	120ml	Rating for mildew may be as high as +++. May cause leaf burn if applied at high temp. Systemic action. Rainfast in 1 hour.
3	28	Indar	++++	+	++	X	1	1	1	1	57 gr	Rating for mildew may be ++ or +++, needs more work done locally. Systemic action.
3	32	Nova	++	++++	X	X	1	1	X	X	140 gr	There may be resistance building. Resistance builds by degrees. Systemic action.
3	40	Funginex	++	++	X	X	BI	BI	X	BI	1 lt	Systemic action.
7	27	Lance	+++	+	++	+	0	0	0	0	150 gr	Rainfast in 2 hours.
9	31	Vanguard	++++	X	++++	+++	X	2	2	2	300 gr	Less effective on fruit due to high summer temp and humidity. Systemic action. Rainfast in 2 hours. Phytotoxic to cherries.
11	25	Cabrio	+	++	+	?	10	10	10	10	270 gr	Limited data available, may be +++ for mildew. Also controls Anthracnose. Systemic action. Rainfast when dry.
17	82	Elevate	++	+	++++	?	1	1	X	X	690 gr	Not Systemic.
M	8	Kummulus	+	+++	X	X	1	0	X	X	2.8 kg	Phytotoxic to Apricots. Works well on mildew, but it has a short residual period. Not systemic.
M	26	Maestro	++	X	+++	X	2	2	2	2	1.6 kg	May cause staining on apricots when used prior to harvest. Registered for brown rot only. Not systemic.
M	37	Bravo	++	X	+	++	40(H)	60(H)	X	X	2.0 / 3.6 lt	Registered for brown rot only. Not Systemic
		Pristine WP	+++	++	++	no data	0	0	0	0	300-405gr	
M	100	Lime-sulphur	X	++	X	?	BI	BI	BI	BI		Not Systemic.

+ suppression; ++ fair control; +++ good control; ++++ excellent control

H - Apply only up to husk fall. Do not apply after husk fall.

X - Not registered for this crop, or not effective.

BI - Apply only up to bloom. Do not apply after bloom.

Combined chart of 2-Generation Leafroller and Codling moth spray materials

Chemical	Grp*	Codling Moth Effect	Leafroller Effect	Additional Information	Re-entry Period	Registered On	Days to Hrvt
Success	5	Poor Not registered Suppression only	Excellent	Needs high pH in spray tank (do not mix with acid, vinegar or Seniphos). Hard on earwigs.	24 hours	Pome & Stone Groups	7
Entrust	5	Poor Suppression only	Excellent	Organic formulation of Success. Needs high pH in spray tank (do not mix with acid, vinegar or Seniphos). Hard on earwigs.	24 hours	Pome & Stone Groups	7
Delegate	5	Good	Excellent	The 'new' Success. Needs high pH in spray tank (do not mix with acid, vinegar or Seniphos). Good residual life. Hard on beneficials	24 hours	Pome & Stone Groups	7
Intrepid	18	Fair	Good	Cross resistance for leafrollers with organophosphates (Guthion).	24 hours	Apples & Pears	14
Confirm	18	Poor	Poor	Cross resistance for leafrollers with organophosphates (Guthion). Considerably weaker than Intrepid.	24 hours	Apples & Pears	14
Altacor	28	Very good	Excellent	Mild ovicidal activity, strong on larva. Good residual life. CM rate is middle of rate range for leafroller.	24 hours	Pome & Stone Groups	14
Calypso	4	Good	Does NOT work	Use high rate for high CM pressure. Toxic to lacewings. Controls aphids.	24 hours	Apples & Pears	30
Assail	4	Good	Does NOT work	Highly toxic to bees. Controls aphids.	24 hours	Apples & Pears	7
Virus	N/A	Fair	Does NOT work	Slow to act. Degraded by sun light.	24 hours	Apples only	0
Diazinon	1B	Poor	Poor	Not recommended for Codling Moth or Leafrollers	48 hours	Pome & Stone Groups	14
Azinphos-methyl (Guthion) (Sniper)	1B	Fair to Good	Does NOT work	Extremely toxic. Kills many beneficial insects. 14 DAY re-entry period	14 DAYS	Pome & Stone Groups NOT Sour Cherries	21

See the 2010 Integrated Fruit Production Guide for more information