



A Guide To Managing Tree Fruit Pests in the Home Garden

Revised October 2014

Introduction

This guide provides cultural practices and recommended pesticides to control common diseases and insect pests of fruit trees in the home garden in British Columbia.

Be aware that legislation and local by-laws in the Interior fruit-growing regions require that certain pests on fruit trees in home gardens be controlled. Poorly managed trees are a source of infection and infestation for near-by commercial orchards.

Cultural management

Use gardening practices that discourage or prevent development of pest problems:

- Select disease-resistant varieties when planting.
- Prune trees in dormant season or summer to open up canopy to improve exposure of fruit to sun, air circulation and spray coverage.
- Remove all fruit from the trees at harvest and destroy any insect-infested or disease-infected fruit to reduce the risk of problems the following year.
- Healthy trees are more resistant to many pests. Maintain trees in a healthy state with balanced fertilizer, adequate water and judicious pruning.
- Encourage natural predators such as ladybugs by not using insecticides unless needed.

Identification of Pests

Proper identification of insect pests and diseases is an important step before attempting to control the pest. Not all plant problems are caused by pests; some are caused by cultural, nutritional or environmental conditions.

Consult local nurseries, garden centres, Master Gardeners, or the *Home & Garden Pest Management Guide for British Columbia* for more detailed information on fruit tree pests and management practices to prevent pest problems and improve fruit quality and quantity. Information on tree fruit pests, including pictures of pests and their damage can also be found on the Ministry of Agriculture website at: www.al.gov.bc.ca/cropprot/tfipm/

Pesticides

Home gardeners can only use those pesticide products that include the word DOMESTIC on the label.

The table on page 7 lists the common names (active ingredients) as well as trade names of pesticides. The common name appears in the guarantee statement on the front of the product label.

Pesticides should only be used when necessary, and should always be used according to the principles of integrated pest management (IPM). Combining cultural management strategies with pesticide sprays will provide better control, often with fewer pesticide applications.

When selecting pesticides, use the least toxic product available that is effective for the pest. Products that are generally accepted for use in organic production and products that are “exempted” under the provincial IPM act (and are thus considered relatively safe) are indicated in the table on page 7.

Always read the pesticide label or enclosure for proper application rates, mixing instructions, safety precautions, and minimum waiting period before harvesting. Avoid contact with the treated plants for at least two days after spraying.

Many domestic pesticides have been withdrawn from the market, or will be withdrawn within the next several years. Commercial pest control companies with licensed pesticide applicators have access to newer and more effective agricultural pest control products that are not available to the home gardener. Consider having your fruit trees professionally treated.

Poison symbols on the pesticide label indicate the toxicity in diminishing order:

DANGER



POISON

WARNING



POISON

CAUTION

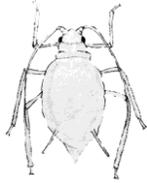


POISON

Insect & Mite Pests of Tree Fruit

Aphids

These small (2 to 3 mm) sap-sucking insects are found on leaves and shoots, and usually occur in colonies. Damage from feeding may distort leaves and fruit. Some species transmit plant virus diseases.



Management: Apply a dormant oil spray in late winter or early spring before the pre-pink stage of bud development. This treatment will kill the overwintering eggs of aphids and mites.

Do not overfertilize trees. Aphids are favoured by conditions that produce rapid growth. Encourage control by natural enemies such as lacewings and ladybugs by withholding insecticide sprays until at least 6 leaves of the terminal (end) shoots are infested with aphids. If predators are not present and populations are high enough to cause damage, spray with an insecticidal soap.

Leafrollers and Other Caterpillars

These small caterpillars attack a wide range of fruit and ornamental trees. Some feed from within rolled leaves; others skeletonize leaf surfaces. Damage to leaves and fruit may occur throughout the growing season. Fruit that is clustered together is more likely to be damaged by leafrollers.

Management: Thin fruit to singles to reduce fruit damage and increase fruit size. Watch plants for signs of feeding damage in the spring. Treat infestations with Btk (*Bacillus thuringiensis*). Btk is a bacterium that kills only caterpillars and is harmless to bees, other insects and wildlife. It is especially preferred in areas frequented by children or pets. Carbaryl or malathion can also be used. NOTE: Carbaryl applied post-bloom is also a fruit thinning agent.

Shothole Borer and Ambrosia Beetle

Trees stressed from transplanting, poor soil drainage or mechanical injury are most often attacked. They appear wilted, and numerous small holes 1.5 to 2 mm in diameter appear in the bark anywhere on the tree. Beetles are dark brown to black and about 2 mm long.

Management: Keep trees healthy and free of stress. Irrigate and fertilize to encourage tree vigour and resistance to infestation. Remove dead or dying limbs or trees and any wood showing beetle damage. Burn or chip prunings; do not keep any fruit tree firewood with intact bark. Firewood with bark may continue to breed insects for 2 or 3 years.

Scale Insects

There are several species of scale insects that can attack fruit trees. Look for small round or shell shaped stationary scales, 2 to 5 mm wide on small limbs and twigs. Heavy infestations will retard tree growth and reduce vigour. They may also cause fruit damage.

Management: Scrape scales off the infested limbs with a knife. Prune out heavily infested branches and consider removing large old trees with encrusted scale. Apply a dormant oil spray in late winter or early spring up to pre-pink stage of bud development. Ensure thorough coverage. Trees that receive dormant oil every spring seldom have problems with scale.

Mites

Mites are tiny spider-like animals, barely visible without magnification. Several species can affect the health and vigour of fruit trees.



Management: Apply dormant oil each year in early spring (just prior to budburst). Encourage predatory (beneficial) mites by avoiding use of harmful products such as permethrin and carbaryl. If damage occurs in the summer, wash mites from leaves by sprinkling trees with a garden hose or treat with insecticidal soap at label rates.

Codling Moth

Codling moth larvae are small caterpillars that burrow into apple, crabapple and pear fruit to feed. Look for entry and exit holes on fruit plugged with dark masses of reddish-brown excrement. When mature they exit the fruit and find a sheltered site on the tree trunk, base of the tree or major limbs to spin a cocoon in which to pupate or spend the winter. There are 2 to 3 generations each summer.

Management: As part of the area-wide Sterile Insect Release (SIR) program, codling moths MUST be controlled in home gardens in the Okanagan, Similkameen and Shuswap Valleys. For further information, contact the SIR office at 1-800-363-6684 or visit <http://www.oksir.org/>

To help reduce codling moth numbers, remove and destroy any infested fruit and early dropped fruit. Thin fruit to singles to reduce damage. Harvest all fruit completely in the fall. Consider stripping all fruit from the tree or removing unwanted host trees to control the codling moth in regulated areas.

In mid-June, wrap a 10-cm-wide cardboard band (open corrugation against tree) around the base of hosts trees and major limbs. First-brood larvae will spin-up in and under the bands. Replace the bands in

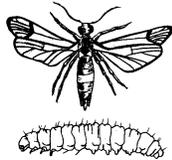
mid-July and destroy the old bands and any cocoons on the tree. Remove and destroy the second bands anytime during the winter. (SIR may apply and remove the bands for you if your home is near a commercial orchard.)

Several insecticide applications may also be required to protect the fruit over the summer. The first spray should be applied about 2 weeks after 90% of the petals have fallen or when fruit damage is first noticed. Apply another treatment one to two weeks later. To control the second generation, apply a spray again in late July or early August or when fresh larval entry holes are noticed. Insecticides available to the home gardener for codling moth include permethrin and carbaryl. Btk does not provide sufficient control. Follow all label instructions carefully.

Consider having your tree sprayed by a trained professional pesticide applicator. They have access to more effective spray materials and the equipment to properly apply the sprays to fruit trees.

Peach Tree Borer

This pest attacks peaches, apricots, cherries and several other stone fruit trees. Look for gumming at the base of the tree, caused by cream-coloured, brown-headed larvae that feed on inner bark at or just below the soil line. Young trees may be girdled and die. Older trees may be seriously weakened and become susceptible to other pests such as bark beetles.



Management: Remove borers after cutting into their tunnels with a sharp knife or by probing with a piece of stiff wire; metal coat hangers work well. Protect trees from re-infestation with trunk-collars made from tar paper, thin aluminum or plastic sheeting. The collars must cover the area around the base of the tree and 45 cm up the trunk to exclude the larvae. Make sure the top of the collar is well sealed against the tree trunk. Polyester batting wrapped around the base of infested trees prior to adult emergence will trap and remove emerging adults.

There are currently no registered insecticides for homeowners for the control of peach tree borers. Commercial pesticide applicators can use Thionex or Rimon.

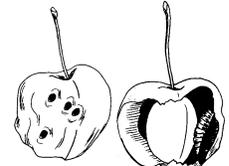
Peach Twig Borer

Peach twig borer larvae bore into the developing shoots causing them to wilt and die. The caterpillars also attack the ripening fruit, creating holes and furrows at the stem end.

Management: Watch for wilted shoots and destroy any larvae present. If the pest was a problem the previous year, apply carbaryl at pink and husk fall stages.

Western Cherry Fruit Fly

The western cherry fruit fly overwinters under cherry trees as a pupa in the soil. About the time cherry fruit begins to turn pink, adults emerge and lay their eggs in developing fruit.



Eggs hatch into white maggots that feed around the pit of cherry fruit. There are no visible signs on infested fruit until the maggots are nearly mature and have cut exit holes through the skin. The maggots drop from the fruit, burrow in the ground and may remain in the soil for 1 or 2 years.

Management:

All owners of cherry trees in the Okanagan, Creston or Similkameen areas are required by law to prevent and control infestations of cherry fruit flies. Contact your local Regional District By-Law enforcement officer for further information. Owners should carefully consider the costs and benefits of growing backyard trees before planting, and remove trees that will not get adequate care.

Non-chemical control requires removal of all fruit before the larvae emerge. This reduces breeding sources and fruit fly populations for next season. It is important that all fruit remaining on the tree after harvest be removed and destroyed to prevent fruit fly production.

A new non-chemical option for controlling cherry fruit fly involves preventing the fly from reaching the fruit to lay eggs. 'Kootenay Covers' are large, specially designed net bags that can be placed over cherry trees up to 18 feet in diameter. The covers must be applied before cherry fruit fly emergence, and secured around the tree until after harvest. For more information see: www.kootenaycovers.com.

Chemical Control: The only insecticide available to the home gardener for cherry fruit fly control is carbaryl. The first application should be made when fruit begins to colour. Repeat every 5-7 days as necessary to ensure the fruit remains protected until harvest. Observe pre-harvest intervals and remove all fruit at harvest. Commercial spray services have other, more effective products available for use.

Diseases of Tree Fruit

Spotted Wing Drosophila

Spotted wing drosophila is a serious new fruit fly pest of soft fruit and berries. It is now widespread in Coastal and Interior fruit growing areas of B.C.

Unlike most vinegar flies which normally infest overripe, fallen, decaying fruit, spotted wing drosophila females lay their eggs inside intact ripening fruit. Larvae hatch and begin to feed within the fruit, causing softening in the area of feeding. Known hosts in B.C. include cherry, peach, plum, nectarine, apricot, strawberry, blueberry, blackberry, raspberry, mulberry, salmonberry, thimbleberry, fig, table grape, Oregon grape, currant, elderberry and honeysuckle.

Management: Good sanitation practices are critical to controlling spotted wing drosophila. Clean up leftover and fallen fruit. Seal fruit in plastic bags or freeze for at least 48 hours before disposal. Home composting of infested fruit will not kill flies.

Harvest on time, pick clean and often, as overripe unharvested fruit serve as sources of infestation. Refrigerate fruit as soon as possible after picking.

Insecticides containing pyrethroids or malathion registered for control of other fruit pests in the home garden will provide control of spotted wing drosophila. Read and follow label directions and do not apply when bees are present.

Powdery Mildew

Powdery mildew is a fungal disease that infects leaves and fruits of apple, cherry, crabapple, pear, peach, and nectarine. Look for a greyish-white, powdery growth on the surface of shoots, leaves and blossoms. Infection can cause russetting of fruit.

Management: Prune for good air circulation and light penetration to reduce mildew and other diseases. Remove infected “white tipped” apple shoots during dormant season pruning. For stone fruit, rake and remove or compost leaves in the fall to help reduce disease pressure.

Dormant applications of lime sulphur will help to reduce overwintering mildew. If further control is needed, spray at the pink-bud stage with a fungicide containing sulphur at label rates. Repeat every 10 to 14 days as required. Sulphur may burn foliage and fruit at temperatures above 26°C, and should not be used on apricots. PureSpray Green mineral oil may also be used as a summer spray to suppress powdery mildew. Follow label directions.

Fire Blight

Fire blight is a serious bacterial disease of pear, apple, quince and other woody ornamentals in the rose family, such as hawthorn, mountain ash and firethorn. Leaves and branches rapidly wilt, appear scorched and die. Dead shoot tips often form a crook. Discoloured, slightly sunken areas called cankers develop on twigs and branches. Fresh cankers often ooze bacterial slime. Fire blight infection can kill young trees.

Management: Fire blight is a highly infectious disease that can be spread by rain, wind, insects, and tools. Cut out infected shoots and branches as soon as noticed, and burn or take cuttings to the landfill. Make cuts well below any visible signs of infection. Disinfect tools after each cut by dipping them in a 10% solution of Lysol, 70% rubbing alcohol or 10% household bleach. Continue to monitor for and remove new infections. Reduce nitrogen fertilizer applications and soil moisture to limit susceptible new growth. Avoid running sprinklers that wet the blossom of susceptible trees during warm weather.

During the dormant season, remove overwintering cankers by making cuts 15-30 cm below the canker margin. If planting apple, select varieties that are less susceptible to fire blight.

There are no chemical sprays that can cure fire blight once a tree is infected. Preventative sprays with copper are sometimes used during the blossom period in pear, but may cause injury (russetting) to the fruit.

Pear Trellis Rust

Pear trellis rust is a disease of pears and junipers in the coastal area. When pears are grown within 30 m of infected junipers, numerous orange or yellow spots will appear on the pear leaves. In late August, the spots swell up and spore-bearing fungal structures emerge from the lower leaf surface. In severe cases, fruit may also be infected and twigs may have overwintering infections in the form of swollen galls. Spores produced on pears can infect junipers, while spores produced on junipers can infect only pears.

Management: In the coastal area, do not plant junipers and pears close to one another. They should be at least 30 m (100 feet) apart to minimize damage. Remove old, infected junipers close to pear trees before April to prevent infection of pear leaves. Pick off infected pear leaves (if not too numerous) before August to prevent infection of junipers.

Scab (Apple and Pear)

Scab is a common fungal disease of apple and pear trees. Early leaf infections appear as olive-green spots with feathery margins that become brown to black. Fruit lesions are circular, brown to black in colour, and become corky in appearance. The apple and pear scab fungi are closely related but not identical. The disease does not spread from one to the other. On apples, the fungus overwinters on fallen leaves. On pears, it overwinters on leaves and also on infected twigs.



Management: Avoid planting highly susceptible varieties in wet coastal areas where scab is a serious problem. Scab resistant apple varieties are available. Rake up and remove or compost fallen leaves to reduce the overwintering fungus. Prune for good air circulation and light penetration.

Fungicide sprays are not usually necessary in the home garden in dry Interior areas if good sanitation is practiced. If needed, apply a recommended fungicide at bud break in the spring and repeat at the pink-bud stage; one week after petal fall and then two weeks later. Additional sprays may be needed in wet climates on susceptible varieties. Use a fruit tree spray containing captan, sulphur or lime sulphur, according to label directions. A biopesticide containing garlic powder as the active ingredient is also registered for suppression of scab.

Brown Rot

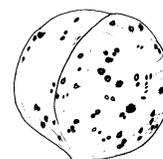
Brown rot is a fungal disease that begins at the blossom stage. Infected blossoms wilt, shrivel and become covered with greyish mold. On peaches and apricots the infection may spread to twigs causing dieback. Fruit rot first appears as small, circular brown spots that increase rapidly in size causing the entire fruit to rot. Light brown to greyish spores appear in tufts on rotted areas. Infected fruit eventually turn into shrivelled, black mummies that may drop or remain attached to the tree through the winter. Brown rot can be serious on injured fruit such as cherries split by rain.

Management: Remove rotten fruit from the tree and fallen fruit from the ground to reduce disease spread and overwintering potential. Prune out any cankered or dead twigs as they are found. Thin fruit to reduce fruit-to-fruit contact. Remove and destroy any mummified fruit during winter pruning, and remove excessive branches to allow for increased air flow. Avoid injuring or bruising fruit when harvesting, and discard all fruit with brown rot spots before storing. To reduce brown rot in peaches being ripened for canning, spread them out in a single layer so that they do not touch one another.

Trees with a history of brown rot may require one or more fungicide applications. Spray trees at the pink bud stage and at full bloom and again during fruit ripening if rainy conditions persist. A fruit tree spray containing captan may be used. If a commercial applicator is hired to do the spraying, other, more effective agricultural fungicides may be used.

Coryneum Blight (Shot Hole)

Warm, wet weather favours this fungal disease which infects buds, blossoms, leaves, fruit and twigs. Leaves develop numerous small, tan to purplish spots that drop out causing a shot hole appearance. Red to purplish spots also form on the fruit and can be accompanied by a clear, gummy exudate. Gummy twig and branch cankers also occur.



Management: During the dormant season rake up and destroy fallen leaves and prune out and destroy branches with cankers. Avoid over-tree sprinkler irrigation. To prevent fruit infection, spray at the husk fall stage with a fruit tree spray containing captan according to label directions. Do not use sulphur sprays on apricot.

To prevent twig and bud infections, apply fixed copper fungicide after harvest on peach, or early September (before fall rains) on apricot and cherry.

Peach Leaf Curl

Leaf curl infection of peach and nectarine occurs in late winter or very early spring, as soon as buds begin to swell. In spring, infected buds produce leaves with a reddish tinge, a thick, crisp texture and curled growth. A white dusting of the fungus forms on the leaf surface and the leaves may drop early. In wet, cooler seasons, secondary leaves may also become infected. Repeated defoliation weakens trees, and can lead to tree death in 2 to 3 years.

Management: No peach variety is immune to leaf curl, but 'Pacific Gold' and 'Renton' are partially resistant, and 'Redhaven' and most varieties derived from 'Redhaven' have some tolerance. Avoid infection by planting and training trees under the

eaves of buildings or other sites where they are protected from rain or by erecting a temporary shelter over trees. The fungus attacks buds and newly-developing leaves so trees require most protection from rain during the early spring. Prune off and dispose of dead twigs or branches.

Apply a protective spray of lime sulphur before the buds break in the spring. Complete coverage is essential for effective control. Control measures are of no value after the disease becomes evident. Application of copper sulphate after harvest in September will give adequate control of leaf curl in most years in the Interior. However, in wet years or in wet climate areas, the late winter dormant spray is also needed.

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200-1690 Powick Rd
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Pesticide Products Registered for Tree Fruit in the Home Garden (2014)

Home gardeners should only use “Domestic” labeled pesticides. Agricultural producers should refer to the appropriate Ministry of Agriculture and Lands production guide for current pest management recommendations. The products listed below were registered for use by Health Canada at the time of publication in 2014. The registration status of pesticides in Canada is constantly changing, as new reduced risk products are introduced, and older products are taken off the market. Always check the current label and follow all label instructions and precautions when using pesticides.

Active Ingredient(s) (AI)	Product Name	Crops	PHI ¹ (Days to harvest)	AI typically allowed in organic production ²	Pesticides Exempted Under IPM Act ³	Pests Controlled and Comments
FUNGICIDES						
tribasic copper sulphate	Green Earth BORDO Copper Spray	apple, peach	1 day	yes	no	Controls anthracnose, coryneum blight, peach leaf curl. Best used as a dormant or fall spray to avoid injury to fruit and foliage.
calcium polysulphide (lime sulphur)	Lime sulphur	apple, cherry, pear, peach, plum	1 day	yes	yes	Use as dormant spray to control peach leaf curl, mites, scale and aphid eggs. Lower rates can be used in summer for apple scab and powdery mildew. May be phytotoxic in hot weather. Do not use on apricot.
sulphur 80-92%	Garden Sulphur, Sulphur Dust Fungicide-Miticide	apple, pear, cherry, peach, plum,	1 day	yes	yes	Used for powdery mildew and apple scab. Slightly effective for brown rot. May be phytotoxic in hot weather. Do not use on apricot.
mineral oil 99%	PureSpray Green Concentrate	apple, cherry, peach, plum, apricot, nectarine	0 days	yes	yes	For suppression of powdery mildew when used as a summer spray. Do not exceed the recommended concentration or plant injury may result.
garlic powder	Bioprotec Fruit Tree Fungicide	apple, pear	0 days	yes	no	For suppression of apple scab and pear scab.
INSECTICIDE / FUNGICIDE MIXTURES						
carbaryl + malathion + captan	King Fruit Tree and Garden Spray	apple, apricot, cherry	7 days	no	no	Toxic to bees. Spray pre-blossom and after petal fall. Controls aphids, apple maggot, cherry fruit fly, codling moth, leafroller, peach tree borer, pear slug, scale, scab and brown rot. Will cause fruit thinning on apple if applied within 25 days of blossom.

Active Ingredient(s) (AI)	Product Name	Crops	PHI ¹ (Days to harvest)	AI typically allowed in organic production ²	Pesticides Exempted Under IPM Act ³	Pests Controlled and Comments
INSECTICIDES AND MITICIDES						
acetamiprid	Acetamiprid RTU	apple and pear	7 days	no	no	For aphids, leafhoppers and leafminer.
Btk (<i>Bacillus thuringiensis</i>)	BTK Bioinsecticide, Bioprotec ECO, Safer's BTK Biological Insecticide	All fruit trees	0 days	yes	yes	Biological control of caterpillars such as leafrollers and fruitworms. Non-toxic to bees and beneficial insects. Apply in dry conditions.
carbaryl	Sevin	All fruit trees	7 days	no	no	Toxic to bees and beneficial insects. Controls aphids, apple maggot, codling moth, cherry fruit fly, fruitworm, leafhopper, leafminer, leafroller, mealybug, pear slug, scale. May cause fruit thinning on apples.
soap (potassium salts of fatty acids)	Insecticidal Soap	fruits	0 days	yes	yes	Low toxicity contact insecticide for aphids, scales and spider mites; low toxicity to bees and beneficial insects
horticultural oil (mineral oil)	Dormant Oil, Horticultural Oil	All fruit trees	n/a	yes	yes	Low toxicity dormant application for insect and mite eggs, including aphids and scales.
malathion	Malathion	All fruit trees	7 days	no	no	Organophosphate; strong odour, toxic to bees. Controls aphids, codling moth, leafrollers, leafhoppers, mealybug, psylla, scale, spider mites
permethrin	Ambush Tree & Garden, Wilson Fruit Guard, Bio-Environmental Permethrin, Later's Origins Yard & Garden, Wilson Bug-X, Garden Protector	apple, pear, peach, nectarine, plum,	7 days	no	no	Synthetic pyrethroid; harmful to bees and beneficial insects; repeated use will cause a build up of mites. Controls codling moth, leafroller, bud moth, fruitworm, apple maggot, leafhoppers.
pyrethrins	Trounce, Safer's End-All, Later's Origins Complete Insect Control, Scotts EcoSense Bug-B-Gon	All fruit trees	1 day	yes	yes	Natural insecticides obtained from pyrethrum flower; repeated use will cause a build up of mites. Controls aphids, leafhoppers, earwigs, beetles, whitefly. Some pyrethrin formulations acceptable in organic production.

AI = active ingredients

¹ PHI – Pre-harvest interval: The number of days you must wait before harvesting edible plants, vegetables or fruits after applying a pesticide.

² AI typically allowed in organic production – Active ingredients are generally accepted by organic growers associations for use on certified-organic crops or plants, but particular formulations may not be compliant. Certified organic growers should consult product lists provided by their association.

³ Exempted Under IPM Act – Pesticide products that are classed as “excluded” under the IPM Act by the B.C. Ministry of Environment. These pesticides are considered to be of low toxicity or relatively low risk. Their use or sale does not require a license, certificate or permit. However, they all must be registered with Health Canada.