

## Varieties

The following descriptions are based on information from McGinnis Berry Crops, a BC propagator, and from experiences of local growers. Varieties are listed in order of maturity. All recommended varieties should have sufficient winter hardiness to be grown in most BC production areas. Choice of variety will depend on local conditions and market use. Discuss variety selection with your intended buyer(s).

### Black Currants

In recent years, great improvements have been made by plant breeders in yields, cropping reliability, fruit quality and disease resistance. If growing in an area of BC where white (5 needle) pines grow, choose blister rust immune varieties.

#### Ben Sarek

Early. Compact bush of medium vigour. Large fruit which is easy to hand harvest making it very suitable for fresh market. Some tolerance to rust but disease develops in late summer. May require training to support heavy crops.

#### Ben Connan

Early. Upright, compact bush suited to high density plantings. Hand harvest variety. Very large, attractive fruit suited to fresh market. Good fresh flavour. Some tolerance to rust, but disease develops in late summer.

#### Tahsis (trial)

(Bieloruskaya sladkaya x Titania) Late mid-season. Growth habit is spreading which makes it suitable for hand harvest or U-pick. Not suitable for machine harvest. Flowers late mid-season, tolerant of late frost, immune to White Pine Blister Rust, resistant to mildew, and has very large fruit (larger than Ben Sarek). Annual pruning is a must.

#### Blackcomb (trial)

(Ojebyn x Titania) Late midseason. Very vigorous and high yielding. Larger fruit than Titania. High level of resistance to powdery mildew and rust. Late flowering helps avoid blossom frost. Well suited to machine harvest.

#### Whistler (trial)

(Ben Tirran x Bieloruskaja Slodkaja) Late midseason. Slightly spreading habit with medium vigour. High yields of small to medium sized high quality fruit. It has fair resistance to powdery mildew and good resistance to rust. Flowering is late-mid season with good tolerance to late spring frost. Juice quality is excellent. Well suited to machine harvest.

## **Tiben (trial)**

Midseason/Late. Produces high yields of good quality fruit, even colouring, uniform ripening. High anthocyanin and brix levels. Suitable for machine harvest. Fruit holds well on the bush. Appears to be resistant to rust strains in Coastal BC.

## **Ben Alder**

Late. Upright, compact bush, well suited to machine harvesting. Small fruit, high in anthocyanins and vitamin C - excellent quality for juice. Late flowering helps avoid blossom frost. Very susceptible to rust. Resistant to powdery mildew.

## **Red Currants (Includes Red, White And Pink Varieties)**

### **RED VARIETIES**

#### **Jonkheer van Tets**

Early. Spreading, untidy growth habit, best grown as a cordon. Excellent fruit quality and flavour. Early flowering, susceptible to blossom frost. Very good rust resistance.

#### **Hron**

Midseason. Vigourous, upright bush. Produces consistent crops of good quality fruit on very long clusters. Should be well adapted for machine harvest.

#### **Rovada**

Late. Very vigourous, droopy bush. Begins cropping and reaches maturity quickly. Large fruit on very large strigs, well suited to fresh market. Blooms late, avoiding blossom frost. Resistant to powdery mildew and other foliar diseases.

### **WHITE VARIETIES**

#### **Primus**

Early midseason. Vigourous, upright bush. Fruit is excellent quality and flavour, yellow-white in colour. Flowers earlier and therefore more prone to blossom frost than Blanka.

#### **Blanka**

Midseason. Vigourous, spreading bush. Produces high yields of large, off-white fruit on very long clusters. Some resistance to blossom frosts.

## Gooseberries

### **Xenia™**

Early - midseason. Strong, upright bush.  
Excellent yields of attractive, large, dark red fruit.

### **Tixia™**

Midseason. Medium strong, upright bush. Attractive, large, bright red fruit, elongated and smooth. Should be suitable for machine harvesting.

### **Hinnomaki Red**

Midseason. Strong, upright bush. Medium size, dark red fruit. Excellent flavour. Could be adaptable to machine harvest. Good mildew resistance.

### **Invicta**

Midseason. Vigourous, spreading bush. Many large spines. Large, pale green fruit suitable for fresh market or processing. Flavour is good. Very high yielding. Good mildew resistance.

# New Plantings

## Site Selection

Currants and gooseberries are among the most hardy berry crops. As they will tolerate winter temperatures as low as  $-35^{\circ}\text{C}$ , they can be grown in all but the most extreme growing regions of BC.

Because they bloom early in the spring, they are susceptible to blossom frost. Avoid south facing slopes which encourage early blooming. Also avoid low areas with poor air drainage which create frost pockets.

## Soil

Determine the soil pH and nutrient status before planting. Have the soil tested at least six months before planting so that amendments can be added as the field is prepared. Consult a soil laboratory or contact the BCAGRI for a factsheet on soil sampling.

Soil should also be tested for nematodes. Fumigation may be required if *Longidorus*, *Xiphinema* or other virus vectors are present.

Currants and gooseberries can be grown successfully on a wide range of soil types provided drainage is good and fertility is adjusted and maintained. They will yield poorly on heavy, clay or poorly drained soils. Soil should be slightly acidic with a pH range of 5.5 to 6.5. These crops are somewhat tolerant of drought, but will yield more reliably on most soils if irrigation is provided.

## Site Preparation

Proper land preparation is a critical step in successful production. Start to prepare the field for planting the year before. Consider the following:

### ***Wireworm Control***

Check for wireworms in sites previously planted in sod. Plan for control (see “Wireworms” in “General Berry Pests” [section](#)).

### ***Weed Control***

Control established perennial weeds such as quackgrass, horsetail and Canada thistle before planting.

### ***Drainage***

In areas with poorly drained soils, sub-surface drainage should be installed 0.8 to 1.2 m (2.5 to 4 ft) below the soil surface. Refer to the “BC Agricultural Drainage Manual” for more information. Drainage systems work only as well as they are designed, installed and maintained. Use management practices that promote good drainage. Raised beds help to overcome problems with high water tables but are not a substitute for a drainage system. Other ways to promote good drainage include: incorporating a small amount of sawdust in the beds before planting, covering raised beds with sawdust mulch, cover cropping between the rows, and periodically subsoiling in the wheel tracks of harvesters or tractors.

### **Field Layout**

#### **Black currants**

If mechanical harvesting is planned it must be allowed for in the layout plan. Mechanical harvesting requires a minimum of 3.5 m (10.5 ft) between the rows. Provide a 4.5 to 5.0 m (15 to 16 ft) wide row break every 125 m (400 ft) for unloading harvesters and other machinery. Most harvesters require 7.6 to 9.0 m (25 to 30 ft) at the ends of rows (headlands) to turn around.

The risers or posts for overhead irrigation should be no higher than 2.1 m (7 ft) and placed in the centre of the row.

If hand harvesting, row spacing can be reduced to 2.5 to 2.7 m (8 to 9 ft).

#### **Red currants/Gooseberries**

Red currants and gooseberries are normally spaced 2.4 to 3 m (8 to 10 ft) between rows.

### **Soil Amendments**

**pH.** Check and adjust soil pH before planting and every 3 to 4 years after planting. The optimum pH is 5.5 to 6.5. If pH is below 5.5 lime should be applied and incorporated well before planting.

**Fertilizer.** Phosphorus (P) and potassium (K) do not move in the soil. If soil test levels are low, broadcast and incorporate required P and K in the row before planting.

**Manure and compost.** Manure and compost are valuable sources of crop nutrients and organic matter. They contain nitrogen, phosphorus, potassium, calcium and several micro-nutrients. Manure can be used prior to planting as a partial source of nitrogen, but timing of application and balancing manure with other sources of nutrients is essential. Refer to sections on “Manure Use” in this guide.

## **Planting**

### **Spacing**

Between rows. See “Field Layout” above.

Between plants.

#### **Black Currants**

Plants should spaced 0.5 to 0.75 m (1.5 to 2 ft) apart if mechanical harvesting is planned. For hand harvest, a wider spacing of 1.2 m (4 ft) should be used. Compact varieties such as Ben Sarek and Ben Connan can be planted at a spacing of 1 m (3 ft).

## Red Currants/Gooseberries

Spacing will depend on the training system to be used. If grown in a bush form a spacing of 1.2 m (4 ft) should be used. Various cordon-type systems can also be used, (training plants onto supporting wires), which require a spacing as close as 0.5 m (1.5 ft).

### Planting

Planting can be done in the fall or spring. However, in colder areas, spring planting is preferred to avoid losses due to frost heaving. In coastal areas, fall planting enables earlier plant establishment.

Generally, one-year-old, bare-root nursery-grown plants are used to establish a planting. Some growers have successfully established black currant fields by directly sticking hardwood cuttings in beds mulched with black plastic. Plugs may also be used.

Set plants at the depth they were planted in the nursery or slightly deeper. Gently spread the root system of bare-root plants. Fill in the soil and press firmly around the plant to maximize soil-root contact.

Each cane should be pruned back to two buds after planting. Spring-planted plants should be cut back shortly after planting. Fall-planted plants should not be pruned until late winter. Heavy pruning will encourage growth of strong first year shoots. Irrigate after planting if possible.

### Fertilizing

No fertilizer should be put in the planting holes. Plants set out in the fall should not receive any fertilizer until the following spring. Fertilize when growth begins in the spring or 3-4 weeks after planting and again in early summer. Use caution when fertilizing young plants. Keep fertilizer about 10 cm (4 in) from the base of the plant. Spread fertilizer thinly and evenly to slightly beyond the drip line. Do not fertilize during hot weather or when the soil is dry. Refer to "Nutrition" in "Established Plantings" for further details and rates.

In the year of planting, use a complete fertilizer to supply N at about 50 kg/ha (24 kg/acre) and P and K according to soil test values.

### Cover Crops

Cover crops in currants and gooseberries are usually permanent grass covers between the rows. They suppress weeds, provide support for farm machinery, improve soil structure and water infiltration and reduce soil erosion. Grasses that work best are low-growing perennials that are easy to establish and do not creep. Mixtures should contain no more than 25% perennial ryegrass to minimize mowing. Pure stands of sheep fescue or hard fescue establish slowly but withstand traffic well and require less mowing.

Seed in early to late spring or early fall (mid-August to early September). Seed mixtures at 30 to 55 kg/ha (12 to 22 kg/acre) and fescues at 30 to 45 kg/ha (12 to 18 kg/acre). Irrigate to establish grass covers or time seeding with rainy periods. Mow cover crops regularly during the growing season to control annual weeds. Unmowed cover crops can attract field mice. Control cover crops that creep into the row by applying herbicides in a band along the edge of the cover crop beside the sawdust mulch.

## Sawdust Mulches

Mulching keeps the soil cool, aids in water conservation, increases organic matter in the soil, improves soil structure and helps control annual weeds. Apply 5 to 10 cm (2 to 4 in) of sawdust to the surface of the bed the first year and every two to three years to maintain the mulch. The roots tend to grow into the mulch.

Microbial activity, which decomposes the sawdust, takes nitrogen from the soil. Nitrogen application rates may need to be increased by 25 to 50% in the first few years if sawdust is used.

Avoid using woodwaste that contains cedar unless the volatile oils have been removed or the material is well composted. Any woodwaste containing high levels of bark, especially hog fuel, should be checked for salts.

# Established Plantings

## Nutrition

Also refer to "[Nutrient Management](#)" in this guide for more information .

## Soil Analysis

Specific soil test-based fertilizer recommendations have not been developed for currants and gooseberries. In the absence of other information, refer to the P and K recommendations for raspberries and strawberries in this guide. Conduct a soil analysis every three or four years to monitor changes in pH, P, K, Ca and Mg.

## Leaf Analysis

Leaf analysis can be a useful method to determine nutrient needs; however standard tissue levels have not been established for currants and gooseberries. Leaf analysis may also be used if a nutrient deficiency is suspected. For the best interpretation, take leaf samples at the same stage of plant development (e.g. mid-harvest or late-harvest) each year and monitor year-to-year trends in nutrient status. For routine leaf analysis, collect the most recent fully expanded leaves from the current season's growth. Select about 5 leaves from 10 plants distributed at random through the field. If leaf analysis is to be used to diagnose a problem, take separate samples from good and poor growth areas for comparison. Leaves must be free of soil, pesticide and irrigation water residue. Air dry them in an open paper bag or take them directly to a lab.

## Fertilizer

Currants and gooseberries require soil applications of nitrogen and other nutrients to maintain adequate vigour. The rate and type of fertilizer will depend on the soil type and fertility, plant age, plant spacing, leaf tissue levels and the observed vigour and productivity of the plants.

Unless using a slow release fertilizer, nitrogen should be applied in split applications — the first at bud break and the second in early June. Slow release fertilizers are applied once, usually in early spring. Follow the manufacturers' directions for blends and application rates to avoid late season nitrogen release.

There is no local research information on which to base fertilizer recommendations. A general recommendation is to apply a complete fertilizer to supply yearly rates of 50 to 75 kg/ha (20 to 30 kg/acre) of nitrogen and rates of phosphorus and potash according to initial soil test results. Adjust fertilizer rates over the years according to leaf testing results and observations of plant vigour.

## Minor Elements

Magnesium may be low in many soils in BC. Magnesium oxide (MgO) at 2 to 8% in the basic fertilizer is usually enough to take care of the plant's needs. Correct deficiencies during the growing season by applying a spray containing 1 kg of magnesium sulphate (Epsom salts) in 100 L of water. Spray to thoroughly wet the bushes and spray under cool, slow drying conditions.

Iron (Fe), boron (B), zinc (Zn) and copper (Cu) are other minor elements that can be deficient. Foliar sprays to supply minor nutrients can be applied when the bushes are well leafed out but not during bloom. Apply during

slow drying conditions in enough water to wet the bushes. See Table 12 in "[Nutrient Management](#)" section for materials and rates. Some minor elements can also be applied to the soil to overcome deficiencies. Custom fertilizer blends are available which supply various minor nutrients.

### Pruning

Annual pruning is necessary to maintain vigour and encourage new, productive fruiting wood. Pruning is best done during the dormant period from mid December to early March.

### Black Currants

Black currants produce the highest quantities of the best quality fruit on one-year-old wood. They should be pruned heavily every year to remove older non-productive wood and encourage strong new growth. Weak growth and spreading, horizontal branches should also be removed. In some situations, the cost of hand pruning can be prohibitive. Pruning can be mechanized using specialized mechanical harvester attachments. Another optional cost-saving practice is to renovate (mow to the ground) a part of the field every fourth year.

### Red currants/Gooseberries

Unlike black currants, red currants and gooseberries produce fruit on two-year-old wood and on spurs which form on three-year-old wood. Prune to remove weak, low and diseased wood, encourage an open shape with fruiting spurs well distributed through the bush and to remove old, poorly producing wood. Red currants and gooseberries can also be trained to a cordon (permanent leg) system to allow easier harvesting and tighter spacing.

## Weeds

There are only a few herbicides registered for currants and gooseberries. Control perennial weeds prior to planting. Use of sawdust mulches will help suppress weeds. The following products are registered:

Annual Weeds	<b>Gramoxone</b> (20% paraquat)	5.5 L/ha (2.2 L/acre)	<ul style="list-style-type: none"> <li>● Apply thoroughly to cover weed growth</li> <li>● Use as needed to burn off emerged vegetation but avoid spraying canes or emerging shoots as injury will occur.</li> </ul>
Annual Weeds (Between the row only)	<b>Aim EC</b> (240 g/L carfentrazone-ethyl)	37 to 117 mL/ha (15 to 47 mL/acre)	<ul style="list-style-type: none"> <li>● Apply between the rows with a hooded sprayer to emerged weeds. Crop injury will occur if drift is allowed to come in contact with green stem tissue, leaves, blooms or fruit.</li> <li>● To improve control, apply with surfactants such as Agral 90 or Ag-Surf at 0.25% (0.25 L/100 L of water) or Merge at 1% (1 L/100 L of water).</li> <li>● Do not apply within 1 day of harvest.</li> </ul>
Annual Grasses	<b>Poast Ultra</b> (450g/L sethoxydim)	1.1 L/ha (400 mL/acre)	<ul style="list-style-type: none"> <li>● For control of quackgrass and annual grasses</li> <li>● Apply to actively growing grass that has 2-5 leaves</li> <li>● Apply with the adjuvant, Merge, at a rate of 1% of water volume used.</li> <li>● Do not apply within 15 days of harvest.</li> </ul>
Broadleaf weeds and some grasses	<b>Authority</b> (480 g/L sulfentrazone)	0.29 L/ha (0.12 L/acre)	<ul style="list-style-type: none"> <li>● Apply as a dormant application to bare soil in fall through spring, before weeds emerge.</li> <li>● Apply to crops that have been established for one full growing season and are in good health and vigor.</li> <li>● Requires 0.5 to 1.0 inch of water to activate; if adequate rainfall or irrigation</li> </ul>

			<p>is not received within 7 to 10 days after application, a shallow incorporation may be needed to obtain desired weed control.</p> <ul style="list-style-type: none"><li>● Do not apply to frozen ground. Avoid direct or indirect contact with stems or foliage, particularly new emerging shoots from the crown.</li><li>● Do not apply within 3 days of harvest.</li></ul>
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# Insects

Insecticides such as Malathion, Assail and Exirel are toxic to bees. Avoid applying them during the blossoming period. If they must be applied when bees are in the field, take the precautions listed in the section "[Pollination](#)" in this guide to avoid killing bees.

**Note:** The recommended spray rates are for mature bushes unless otherwise specified. For smaller, immature bushes use reduced amounts of spray mixture.

## Aphids

### Hosts

Several species attack currants and gooseberries.

### Damage

Aphids attack the growing tips and the undersides of leaves. Leaves become curled and yellow mottled and often develop red-coloured blisters. Older leaves may become sticky from "honeydew" secreted by the aphids. New growth becomes stunted and yields can be reduced.

### Identification

The currant aphid is the most common species. Adults are greenish yellow, about 2 mm long.

### Life History

Currant aphids over winter as eggs on new canes. They hatch when leaves begin to open and start feeding. Each generation takes about two weeks.

### Monitoring

Start monitoring when the leaves first open and continue weekly. Check growing tips and the underside of new leaves.

## Management

### *Cultural Control*

Excessive nitrogen can produce lush growth and result in increased aphid populations.

### *Biological Control*

Ladybird beetles, syrphid larvae, and parasitic wasps usually provide adequate control of aphids, especially in mature plantings. Assess levels of natural beneficials before applying insecticides.

### *Chemical Control*

If aphid populations are increasing in the absence of beneficials, apply:

**Malathion 25W** (25% malathion) at 2.0 to 2.5 kg/1000 L of water. Spray bushes thoroughly. Do not apply within 3 days of harvest; or

**Note:** Malathion must be applied when the temperature is 20° C or higher to be effective.

**Assail 70WP** (70% acetamiprid) at 56 to 86 g/ha (22 to 34 g/acre) in a minimum of 187 L/ha (75 L/acre) of water by ground application. Do not apply more than 4 times per season. Do not apply more than once every 12 days. Do not apply during bloom as Assail is toxic to bees directly exposed to treatment. Do not apply within 7 days of harvest; or

**Exirel** (100 g/L cyantraniliprole) at 750 to 1500 mL/ha (300 to 600 mL/acre) in enough water to obtain good coverage. Use the high rate when pest pressure is heavy. Do not apply during bloom as Exirel is toxic to bees. Do not apply more than 4 times per season or a maximum of 4.5 L/ha (1.8 L/acre). Tank mixes and sequential applications with strobilurin (Pristine, Cabrio), copper and captan fungicides are not recommended as crop injury has resulted under lab settings. Do not apply within 3 days of harvest; or

**Sivanto Prime** (200g/L flupyradifurone) at 500-750 ml/ha (196-295 ml/acre) in a minimum of 100 L/ha (40 L/acre) of water as a directed foliar spray. Do not apply more than once every 7 days. Do not exceed 2000 ml/ha (787 ml/acre) per season. Do not apply within 3 days of harvest.

## Currant Borer

### Hosts

Currants, gooseberries, black elder, sumac.

### Damage

The larvae bore into the canes resulting in undersized and yellowish foliage development in the spring. These canes usually die within two to three weeks.

### Identification

The adults are thick bodied, clear winged moths, about 13 mm long, steel blue in colour with black and yellow markings. The boring larvae are white with brown heads and reach 13 mm in length.

### Life History

Nearly mature larvae over winter in the canes just above ground level. In the spring they feed for a short time, pupate within the cane and emerge as adults in June / July. In the summer months the adults lay eggs on the canes.

These soon hatch and the young larvae bore into and tunnel within the canes.

## Monitoring

Look for wilting and dying canes in the spring. Watch for the distinctive, clear-winged moths on bright warm summer days in late June and July. Phermone lures are available and can be used in traps to determine population levels of this insect. Consult BCAGRI or your pest advisor for more information.

## Management

### *Cultural Control*

Prune out dead wood in the fall. Cut off and burn infested canes before moths emerge in June.

### *Biological Control*

There are currently no commercial biological controls for this pest. Mating disruption techniques are being researched.

### *Chemical Control*

There are no insecticides registered for this pest.

## Currant Fruit Fly

### Hosts

Currants, gooseberries, wild currants

### Damage

Maggots feed inside the berries, making them unmarketable. Infested berries drop prematurely.

### Identification

The adult fly is yellowish, 6 mm long with bands across the wings. The maggots are white and tapered at the head end.

### Life History

There is one generation per year. They over winter as pupae in the soil below bushes. The adults emerge in May when the currants flower. They then lay eggs in the developing berries. Larvae hatch and feed within berries until July.

## Monitoring

There are no reliable early detection techniques available for this pest.

## Management

### *Chemical Control*

Spray to protect the green fruit immediately following flowering. Do not spray during flowering to avoid killing bees. Repeat spray in 10 - 14 days. Apply:

**Malathion 25W** (25% malathion) at 2.0 to 2.5 kg/1000 L of water. Spray bushes thoroughly. Do not apply within 3 days of harvest; or

**Note:** Malathion must be applied when the temperature is 20°C or higher to be effective. Although malathion may be applied up to 3 days before harvest, sprays applied later than recommended will not provide control of fruit flies.

**Success or Entrust applied for leafrollers will also provide some protection against currant fruit fly.**

## Leafhoppers

### Host

Currants and gooseberries.

### Damage

Leafhoppers seldom reach damaging levels in BC. The nymphs feed on the undersides of leaves and, when abundant, cause white speckling gradually turning the whole leaf yellowish and brown. Plants lack vigour and fruit size is reduced.

### Identification

Nymphs are small, pale white insects which feed on the undersides of leaves. Adults are slender and about 3mm long. They hop and fly when disturbed.

### Life History

There are two generations per year. Leafhoppers over winter as eggs under the bark of the canes. These hatch in May and feed as nymphs for three to four weeks before becoming adults. The next generation occurs from July to September and lays over wintering eggs.

### Monitoring

Check leaves for leafhoppers and speckling in May.

## Management

### *Chemical Control*

Apply when leafhopper populations begin to build:

**Malathion 25W** (25% malathion) at 2.0 to 2.5 kg/1000 L of water. Spray bushes thoroughly. Direct sprays and use enough pressure to ensure that the undersides of leaves are thoroughly covered. Do not apply within 3 days of harvest.

**Note:** Malathion must be applied when the temperature is 20°C or higher to be effective.

### Leafrollers

#### Hosts

Many berry, fruit and ornamental crops.

#### Damage

Caterpillars feed on developing blossoms and berries and on leaves from within rolled-up shelters.

#### Identification

There are several leafroller species. The moths are small and vary in colour from tan to grey and often have patterns on the wings. The larvae vary in colour from pale yellow to dark green to black and can reach 15mm in length.

#### Life History

Most leafrollers over winter as eggs under loose bark. The eggs hatch in early April and the larvae feed until June when they pupate. The resulting moths emerge in July and lay over wintering eggs or, in some species, produce a second generation.

#### Monitoring

Look for young larvae on developing buds in the spring. When leaf rolling begins, the severity of the infestation can be estimated by the number of rolled leaves. Use monitoring guidelines and thresholds described in the raspberry section of this guide.

#### Management

##### *Cultural Control*

Pruning and weed control reduces numbers by removing over wintering sites.

##### *Biological Control*

Leafrollers have a number of natural enemies that usually keep populations at low levels.

##### *Chemical Control*

**DiPel 2XDF (*Bacillus thuringiensis*)** at 0.525 to 1.125 kg/ha (210 to 450 g/acre) in 600 L water/ha; or

**Altacor** (35% chlorantraniliprole) at 215 to 285 g/ha (86 to 114 g/acre) in enough water to ensure good coverage. Use the high rate when insect pressure is heavy. Do not apply more than 3 times per season. Do not apply more than once every 7 days. Do not apply within 1 day of harvest; or

**Exirel** (100 g/L cyantraniliprole) at 500 to 1000 mL/ha (200 to 400 mL/acre) in enough water to obtain good coverage. Use the high rate when pest pressure is heavy. Do not apply during bloom as Exirel is toxic to bees. Do not apply more than 4 times per season or a maximum of 4.5 L/ha (1.8 L/acre). Tank mixes and sequential applications with strobilurin (Pristine, Cabrio), copper and captan fungicides are not recommended as crop injury has resulted under lab settings. Do not apply within 3 days of harvest; or

**Success 480SC** (480 g/L spinosad) at 145 to 182 mL/ha (58 to 73 mL/acre) in 300 to 500 L/ha of water. Use the upper rate under high insect pressure and/or on large larvae. Apply a maximum of 3 times per year and do not apply within 3 days of harvest; or

**Entrust 80W** (80% spinosad) at 80 to 109 g/ha (32 to 44 g/acre) or **Entrust SC** (240 g/L spinosad) at 267 to 364 mL/ha (107 to 146 mL/acre) in 300 to 500 L/ha of water. Use the upper rate under high insect pressure and/or on large larvae. Apply a maximum of 3 times per year and do not apply within 3 days of harvest. It is OMRI approved for organic production.

## Sawfly (Currant Fruitworm)

### Hosts

Red currants and gooseberries. Black currants are rarely attacked.

### Damage

The larvae feed on the leaves and can quickly defoliate plants if the infestation is severe. They feed from the edge of the leaves inward, and from the centre of the plant outward.

### Identification

The larvae are many-legged, greenish, smooth with many small black spots. The adults are small (8 mm) black sawflies, not moths, with yellowish marks on the abdomen.

### Life History

The winter is spent in a cocoon in the soil. The adult sawfly emerges in early spring and lays eggs on the foliage. Larvae hatch and feed through late May and June. A second generation begins in later July.

### Monitoring

Because the larvae are voracious feeders, plants should be monitored weekly for signs of feeding. The early stages of feeding are easy to miss - monitor inner parts of the plants carefully for signs of larvae and damage.

## Management

### *Chemical Control*

Because defoliation can occur in a few weeks, sprays should be applied at the first signs of feeding. Damage may be localized in a planting, so only certain areas may need treatment. Malathion sprays as applied for other pests will control sawfly larvae.

## Scale Insects

Scale insects are an occasional pest on older wood in currants and gooseberries. They look like small lumps or growths on the woody tissue. Good renewal pruning usually provides adequate control, aided by beneficial insects if spraying is limited.

## Spider Mites

### Hosts

Currants, gooseberries and many other fruit, vegetable and ornamental crops.

### Damage

Spider mite outbreaks can occur after insecticide sprays applied for other pests upset the predator mite balance. Heavy mite feeding can cause leaves to become yellow-flecked and plant vigour can be affected.

### Identification

Spider mites are very small, slow moving, eight-legged creatures feeding on the undersides of leaves.

### Life History

Mites over winter as adults on the plants. They become active during the warm spring days when the leaves begin to open. They have several generations per year and all stages usually occur at the same time.

### Monitoring

Mite presence is usually first noticed as yellow flecking on the leaves. When first noticed, weekly checks should be made using a hand magnifying lens.

### Management

#### *Biological Control*

Spider mites are usually kept at low levels by naturally occurring predatory insects and mites. Predatory mites are reddish and move more quickly than spider mites. Predators can be purchased for release into fields. See [raspberry](#) and [strawberry](#) sections of this guide for more information.

### **Chemical Control**

**Malathion 25W** (25% malathion) at 2.0 to 2.5 kg/1000 L of water is registered for mites, but control will likely be only partial. Spray bushes thoroughly. Direct sprays and use enough pressure to ensure that the undersides of leaves are thoroughly covered. Do not apply within 3 days of harvest.

**Note:** Malathion must be applied when the temperature is 20 C or higher to be effective.

## **Spotted Wing Drosophila**

### **Hosts**

Berries, stone fruits and numerous wild hosts

### **Damage**

Female flies lay eggs under the skin of ripe fruit. Larvae hatch and begin to feed within the fruit, causing softening in the area of feeding. There can be several larvae in a fruit, which hastens softening and fruit collapse. Holes the size of pin pricks are evident within the soft areas of infested blueberries.

### **Identification**

Adults: 2-3 mm (1/8 inch) long, brownish with red eyes and clear fly-like wings. Males have a black/grey spot on the end of each wing, as well as two black 'combs' or bands on each front leg. The females do not have spots or leg bands. Females have saw-like egg-laying organs (ovipositors) that are used to cut into fruit skin. Ovipositors are easier to see when extended. A hand-lens or dissecting microscope is needed to identify ovipositor.

**Eggs:** 0.6 mm long, oval, white, 2 filaments at one end.

**Larvae:** Legless, headless, up to 6 mm long at maturity, milky-white.

**Pupa:** 3 mm long, brown, football-shaped, two stalks with small finger-like projections on ends.

### **Life History**

SWD over winter as adult flies. In spring flies become active and lay eggs in ripening fruit. Based on climate model predictions, there could be up to five generations per year in BC. Generations overlap as flies are relatively long-lived particularly at temperatures of 20°C and cooler. Based on Japanese literature, a female can lay eggs for 10-59 days, with 7-16 eggs laid per day, and average 384 eggs per female. Eggs hatch in 2-72 hours, larvae mature in 3-13 days, and pupae reside in fruit or outside of fruit for 3-15 days. In the lab at constant temperature, one generation takes 50 days at 12°C, 21-25 days at 15°C, 19 days at 18°C, 8.5 days at 25°C, and 7 days at 28°C. Adults are attracted to and feed on ripe and decaying fruit.

### **Monitoring**

Flies can be monitored with cup-like traps baited with apple cider vinegar. Place traps when the temperature is consistently over 10°C and/or before fruit starts to ripen. Hang traps in the plant canopy in a shady location.

Check traps once per week and look for the SWD adults in the bait solution. Use a hand lens or other magnifier to see the female ovipositor. Replace the bait solution each week. Suspect fruit can also be collected and inspected for larvae.

## Management

### *Cultural control*

Where practical, remove or bury cull fruit to eliminate additional feeding and breeding sites. Keep equipment and processing areas free of old fruit. Think beyond the borders of your farm and be aware of host plants in adjacent fields. Encourage neighbours to also manage for SWD. Shorten picking interval where possible: pick early, clean and often.

### *Biological control*

To date, there are no commercially available biological controls for SWD. Research is underway to identify potential predators and/or parasites that may be useful in managing SWD.

### *Chemical control*

Chemical control will be required if trapping shows that adult SWD flies are present in the field when berries begin to ripen. Adults are the target and are killed by direct spray contact and/or when they are exposed to residues of insecticide on the treated fruit and leaves.

Consider the following when planning a spray program:

1. All of the recommended products are toxic to bees. Avoid application when crops are blooming and bees are in the field. If sprays are necessary during this time, they should be applied at night.
2. Use enough water and pressure to ensure adequate coverage (up to 500 L/ha of water). Flies prefer to feed in the lower, shaded part of the canopy.
3. Use spray equipment that will allow effective coverage. Currently, no products are registered for aerial application.
4. To limit development of resistance, rotate between the recommended products.
5. A 7 – 14 day spray interval may be necessary to protect fruit through the ripening period depending on temperature and pest pressure.
6. A post-harvest spray may be necessary to prevent flies from building up on residual fruit and spreading to adjacent later ripening crops.

The following products are registered for SWD control:

**Delegate WG** (25% spinetoram) at 315 to 420 g/ha (126 to 168 g/acre). Do not apply more than 3 times per year. Allow a re-treatment interval of at least 7 days. Do not apply within 3 days of harvest; or

**Entrust SC** (240 g/L spinosad) at 333 to 444 mL/ha (133 to 178 mL/acre). Minimum re-treatment interval is 5 days. It is OMRI approved for organic production. Do not apply more than 3 times per year and do not apply with 3 days of harvest.

**Exirel** (100 g/L cyantraniliprole) at 1000 to 1500 mL/ha (400 to 600 mL/acre) in enough water to obtain good coverage. Do not apply more than 4 times per season or a maximum of 4.5 L/ha (1.8 L/acre). Tank mixes and

sequential applications with strobilurin (Pristine, Cabrio), copper and captan fungicides are not recommended as crop injury has resulted under lab settings. Do not apply within 3 days of harvest.

The following products received emergency registration for SWD in 2018

**Malathion 85E** (85% malathion) at 1 L/ha (400 mL/acre) in up to 1000 L of water. Apply when the temperature is 20°C or more. Apply between June 1 and November 30, 2018. Do not apply more than 2 times per year. Do not apply within 3 days of harvest

For more information see supporting document: [Spotted Wing Drosophila Brochure](#)

### **Weevils (Clay-coloured Weevil, Black Vine Weevil, other species)**

#### **Hosts**

Currants, gooseberries, other small fruits and ornamentals

#### **Damage**

Adult weevils feed on the opening buds in the spring on warm nights. Later in the growing season they feed on the ripening fruit and in the leaves, leaving notches along the edge. The larvae eat the bark off the roots, weakening or killing plants.

#### **Identification**

The adults are night feeders so are seldom seen. They are about 1 cm long with long tapering downward-curved mouth parts. The grubs are whitish with brown heads and they are found in a curled C-shape.

#### **Life History**

Most weevils over winter as adults in the soil. They climb the plants on warm spring nights to feed. In May to July eggs are laid in the soil where the grubs feed on the roots throughout the summer. There is one generation per year.

#### **Monitoring**

Adult weevils can be found by checking a planting after dark. Shaking the upper foliage over a white piece of paper or beating tray is effective in finding weevils. Since the adults cannot fly, infestations are often first localized near the edges of the planting.

#### **Management**

##### ***Chemical Control***

Sprays must be applied before egg laying occurs - in late April for clay-coloured weevils and late-June for black vine weevil control:

**Exirel** (100 g/L cyantraniliprole) at 1000 to 1500 mL/ha (400 to 600 mL/acre) in enough water to obtain good coverage. Use the high rate when pest pressure is heavy. Do not apply more than 4 times per season or a

maximum of 4.5 L/ha (1.8 L/acre). Tank mixes and sequential applications with strobilurin (Pristine, Cabrio), copper and captan fungicides are not recommended as crop injury has resulted under lab settings. Do not apply within 3 days of harvest; or

**Actara 25WG** (25% thiamethoxam) at 210 to 280 g/ha (84 to 112 g/acre) in sufficient water to obtain coverage of foliage. Apply when weevils or weevil damage is detected. Repeat application if insect populations rebuild. Use the higher rate for heavy infestations. Do not apply more than twice per season. Do not apply within 3 days of harvest; or

Malathion sprays as applied for other pests will also kill adult weevils.

# Diseases

## **Anthracnose (*Drepanopeziza ribis*) and Septoria Leaf Spot (*Septoria ribis* = *Mycosphaerella ribis*)**

### **Hosts**

Currants and gooseberries.

### **Damage**

These fungal diseases cause yield loss and reduce vigour of susceptible varieties in wet seasons. Disease is more severe in wet seasons. Infected leaves yellow and drop in mid-season.

### **Symptoms**

Small, dark brown, angular or round spots appear on leaves, petioles and flower stems. Spots contain tiny, black or grey fungal fruiting bodies visible in wet weather. On currants, anthracnose can also cause “fly-speck” spots on fruit. Infected fruit may crack open and drop.

### **Disease cycle**

These fungi over winter on dead leaves, fallen fruit and twigs on the ground. In spring, airborne spores infect new leaves at the base of the bush. Three to four weeks later, spores produced on these leaves spread in water droplets to upper leaves.

### **Monitoring**

Watch for the first spots on lower leaves in spring. By the time symptoms are seen on upper leaves, the disease is usually widespread.

### **Management**

#### ***Cultural control***

Grow disease-resistant varieties. Most newer commercial varieties have some resistance.

Prune bushes and control weeds and grass to improve air circulation. Irrigate so that leaves dry off before night-fall.

Rake up and destroy fallen leaves to remove the over wintering fungus.

Cultivate between rows to bury fallen leaves in fall or before bud-break in spring.

**Chemical control**

If the disease was a problem the previous season, apply fungicide sprays in the spring. Start when the first new leaf is fully open, and repeat as long as wet weather continues. Post-harvest sprays applied in the fall may also help to reduce overwintering inoculum.

**Bordeaux Mixture 8-8-100.** Apply when foliage is dry. Do not apply during fruiting, as may leave a visible residue; or

**Copper 53W** (copper sulphate) at 3 to 5 kg/ha (1.2 to 2 kg/acre) in 1000 L of water. Add 4 kg of hydrated lime per 1000 L. Do not apply more than 4 times per season. Do not re-enter treated fields within 48 hours of application. Do not apply within 2 days of harvest; or

**Proline 480 SC** (480 g/L prothioconazole) at 315 mL/ha (126 mL/acre) in enough water to obtain good coverage. Apply at the first sign of disease. Repeat 10 to 14 days later if conditions remain favourable for disease. Do not apply more than twice per year. Do not apply more than 820 mL/ha (328 mL/acre) per crop per year. Will provide suppression of *Septoria* only. Do not apply within 7 days of harvest; or

**Inspire Super** (86 g/L difenoconazole, 249 g/L cyprodinil) at 836 to 1161 mL/ha (338 to 470 mL/acre). Apply before symptoms appear when conditions are conducive for disease. A second application may be made 10 to 21 days later. Apply in a minimum of 200 L/ha (81 L/acre) of water. Do not make more than two applications per crop per season. Do not apply within 1 day of harvest; or

**Sercadis** (300 g/L fluxapyroxad) at 250-666 mL/ha (100-266 mL/acre) in enough water to obtain good coverage. Apply prior to onset of disease development. Spray in rotation with fungicides from other groups on a 7 to 14 day schedule. Use the shorter spray interval when disease pressure is high. Do not apply more than 3 times per crop season. Can be applied up until the day of harvest; or

Currants only:

**Ferbam 76WDG** (76% ferbam) at 6.75 kg/ha (2.7 kg/acre). Do not apply within 14 days of harvest.

**Note:** Ferbam is registered on currants only. Ferbam is not acceptable to all markets. Check with your packer before using.

**Blister Rust (White Pine Blister Rust) (*Cronartium ribicola*)****Hosts**

Currants, gooseberries and white (5-needle) pine (*Pinus monticola*, *Pinus strobus*).

**Damage**

Defoliation may occur on susceptible varieties, but often has little impact on yield. Some black currant varieties, such as Ben Alder, and most gooseberries are susceptible to rust. Ben Sarek, Tiben and Ben Connan are less susceptible but will develop some disease. Titania and Tisal are immune. Resistance breaking rust

strains have been detected in other areas, but it is not known whether they are present in BC. Red currants are usually less affected.

White pine is killed by this fungus. Do not plant any susceptible varieties of *Ribes* within 300 m (1000 ft.) and preferably 1 km from any white (5-needle) pine. Do not grow currants, other than immune varieties such as *Titania*, in white pine forest areas such as eastern Vancouver Island or the southern Interior valleys.

## Symptoms

Small raised, orange pustules of the fungus develop on the underside of infected leaves. These are usually clustered in large yellow leaf spots, which may be visible on the top and bottom of the leaf. Brown, hair-like growths may develop in the spots from early spring through fall. Heavily infected leaves yellow and drop.

## Disease cycle

Currant and gooseberry leaves become infected by airborne spores (aeciospores) from pines in the spring. Each spore produces a group of pustules on the underside of the leaf. Pustules produce orange urediospores which infect more leaves until the fall. The hair-like growths are columns of dark orange to brown teliospores. When these germinate they appear to have been dipped in icing sugar, as they produce white basidiospores. Most Basidiospores are released in late summer and are spread by wind to infect white pines.

## Monitoring

Check for the appearance of pustules on the underside of leaves from spring through summer.

## Management

### *Cultural control*

Plant immune or resistant varieties (see variety recommendations). Remove ornamental 5-needle pines within 300 m (1000 ft) of the field.

### *Chemical control*

**Nova** (40 % myclobutanil) at 340 g/ha (135 g/acre) in enough water to obtain good coverage. Apply at the first sign of disease and repeat 7 to 14 days later. Pre-bloom, bloom, and immediately after bloom are the most critical times for the control of white pine blister rust. Do not apply more than 3 times per season. Do not apply within 6 days of hand harvest. Do not apply within 1 day of mechanical harvest.

## Botrytis Fruit Drop, Fruit Rot And Blight (*Botrytis cinerea*)

### Damage

The fungus, *Botrytis*, may cause significant yield loss on currants especially if wet weather occurs during bloom, fruit ripening or harvest.

## Symptoms

Infections occurring during bloom may cause flowers to blight and fruit to drop prematurely. Shoots may also be infected resulting in blight and die-back.

## Disease Cycle

Botrytis is a very common fungus. It over-winters on branch tips and on dead twigs or organic debris on the ground. In the spring, masses of spores are produced on this material and carried by wind currents to new growth. Blossoms, twigs and fruit may be infected under periods of high relative humidity and cool temperatures.

## Monitoring

Examine twigs for symptoms of infection. Alert pruners to symptoms of twig infection and attempt to prune these out where possible. Watch for blossom infections particularly during periods of wet weather.

## Management

### *Cultural Control*

Improve air movement in the field by adequate pruning.  
Avoid high levels of nitrogen which promotes excessive leaf growth.

Avoid planting in areas subject to spring frosts as frost-damaged tissue may encourage infection and spread.

### *Biological Control*

None

### *Chemical Control*

Protect blossoms with fungicide sprays applied at the start of bloom. Repeat sprays as required particularly in wet conditions. To delay development of resistance, alternate the products listed below. Never apply fungicides from the same group more than twice in succession.

### **Group 3/ Group 9**

**Inspire Super** (86 g/L difenoconazole, 249 g/L cyprodinil) at 1033 to 1475 ml/ha (418 to 597 ml/acre) starting at early bloom or when conditions are conducive to disease. A second application may be made 10 to 21 days later. Apply in a minimum of 200 L/ha (81 L/acre) of water. Do not make more than two applications per crop per season for Botrytis. Do not use more than 5.9 L/ha (2.4 L/acre) per crop per season. Do not apply within 1 day of harvest; or

### **Group 7**

**Lance WDG or Cantus WDG** (70% boscalid) at 560 g/ha (224 g/acre) in enough water to obtain good coverage. Apply beginning at early bloom. Spray in rotation with other fungicides on a 7 to 14 day schedule.

Use the shorter interval when disease pressure is high. Do not apply more than 4 times per season. Do not make more than two consecutive applications of Lance or Cantus. Lance or Cantus can be applied up to the day of harvest; or

**Sercadis** (300 g/L fluxapyroxad) at 250-666 mL/ha (100-266 mL/acre) in enough water to obtain good coverage. Apply beginning at early bloom, prior to onset of disease development. Spray in rotation with fungicides from other groups on a 7 to 14 day schedule. Use the shorter spray interval when disease pressure is high. Do not apply more than 3 times per crop season. Can be applied up until the day of harvest; or

**Note:** Sercadis will only provide suppression of Botrytis

### Group 7/11

**Pristine WG** (25.2 % boscalid, 12.8 % pyraclostrobin) at 1.3 to 1.6 kg/ha (0.52 to 0.64 kg/acre) in enough water to obtain good coverage. Apply beginning at early bloom. Spray in rotation with other fungicides on a 7 to 14 day schedule. Use the shorter interval when disease pressure is high. Do not apply more than 4 times per crop per season. Do not apply Pristine or other products containing Group 7 or 11 fungicides more than twice in succession. Do not re-enter treated fields for hand harvesting within 24 hours of application. Do not re-enter fields for all other activities until residues have dried. If mechanical harvesting, application can be made up to the day of harvest.

### Group 9/12

**Switch 62.5** (cyprodinil/fludioxonil) at 775 to 975 g/ha ( 310 to 390 g/acre). Make the first application at early bloom and repeat at 7 to 10 day intervals. Do not apply more than 3 times per season. Do not make more than 2 consecutive applications of Switch. Alternate with other fungicide groups to prevent development of resistance. Do not apply within 1 day of harvest.

### Group 17

**Elevate 50 WDG** (50% fenhexamid) at 1.7 kg/ha (0.7 kg/acre) in enough water (up to 1000 L/ha) to obtain good coverage. Apply up to 4 times per season beginning at early bloom. Do not make more than two consecutive applications of Elevate. It should be alternated with other fungicide groups to prevent development of resistance. Do not apply within 1 day of harvest; or

### Biofungicides

**Serenade Max** (14.6% *Bacillus subtilis*) at 3.0 to 6.0 kg/ha (1.2 to 2.4 kg/acre). Begin applications at the first sign of disease or when conditions favour disease development. Repeat as necessary on a 7-10 day interval. Serenade may be applied up to and including the day of harvest

**Note:** Serenade is a bacterial-based biofungicide. It is approved for organic production.

## Powdery Mildew (*Sphaerotheca mors-uvae* and *Sphaerotheca macularis*)

### Hosts

*S. mors-uvae* is more commonly found on *Ribes* in the Pacific Northwest. It attacks currants, gooseberries and ornamental *Heuchera*. *S. macularis* has a very wide host range including strawberries, raspberries and many weeds and flower crops.

### Damage

Infected fruit is unmarketable due to the fungal coating, and may be discoloured, or crack and rot. Severely affected plants are stunted.

### Symptoms

A white or greyish, powdery growth appears on leaves, green shoots and fruit. Later, this changes to a brown coating containing tiny, black specks, which are the fungal fruiting bodies. Infected currant fruit are often small and pale-coloured.

### Disease cycle

The fungal fruiting bodies over winter on fallen leaves and fruit. Airborne spores infect new leaves and fruit every year in late spring, usually near the start of bloom. Warm, humid weather and late-season dew and fog favour mildew development.

### Monitoring

Check leaves for the first signs of white, powdery growth before and during bloom.

### Management

#### *Cultural control*

Plant resistant varieties. See variety descriptions.

Prune bushes and control weeds for good air circulation.

Cultivate between rows in fall to bury infected leaves.

#### *Chemical control*

On susceptible varieties apply sprays every 7-14 days in spring to protect emerging foliage and young fruit.

**Bordeaux mixture 8-8-100.** Apply when foliage is dry. Do not use near harvest as it may leave a visible residue.

**Microscopic Sulphur WP** (92% sulphur) at 5 kg/ha (2.0 kg/acre). Apply at 10-14 day intervals from the onset of disease until fruit colouring. Sulphur may burn foliage when temperatures are above 32°C during or

within 3 days of application. Apply in sufficient water to obtain good coverage. Do not use more than 8 sprays per season. Do not apply within 1 day of harvest.

**Sulphur 80% DF** (80% sulphur) at 31 kg/3000 L of water. Begin at pre-bloom stage or when disease first appears and repeat at 7-10 day intervals. Do not allow spray drift onto sensitive plants. Sulphur may burn foliage when temperatures are above 32o C during or within 3 days of application. Do not apply within 21 days of an oil treatment. Do not apply within 1 day of harvest.

**Pristine WG** (25.2 % boscalid, 12.8 % pyraclostrobin) at 1.6 kg/ha (0.64 kg/acre) in enough water to obtain good coverage. Apply beginning at early bloom. Spray in rotation with other fungicides on a 7 to 14 day schedule. Use the shorter interval when disease pressure is high. Do not apply more than 4 times per crop per season. Do not apply Pristine or other products containing Group 7 or 11 fungicides more than twice in succession. Do not re-enter treated fields for hand harvesting within 24 hours of application. Do not re-enter fields for all other activities until residues have dried. If mechanical harvesting, application can be made up to the day of harvest; or

**Nova 40W** (40 % myclobutanil) at 340 g/ha (136 g/acre) in enough water to obtain good coverage. Apply at the first sign of disease development and repeat in 7 to 14 days. Do not apply more than 3 times per season. Do not apply more than two consecutive applications of Nova or Mettle fungicides. Do not apply within 6 days of harvest if hand picking or 1 day of harvest if picking by machine. Do not allow re-entry into the field for 8 days for hand setting of irrigation lines and 6 days for training and hand harvest activities; or

#### **Gooseberries only:**

**Lime Sulphur** (23% calcium polysulphide) at 15 L/1000 L of water at the green tip stage before earliest flowers open, and again at the calyx stage. Later sprays may result in visible residue on fruit. Do not apply when foliage is wet or when temperature is above 27o C. May cause yellowing and defoliation on some varieties, or if applied at calyx without an earlier application at green tip stage; or

**Mettle 125 ME** (125 g/L tetraconazole) at 219 to 365 mL/ha (88 to 146 mL/acre) in enough water to ensure thorough spray coverage. Begin applications when disease first appears or when conditions favour disease development. Repeat applications as required at 14 to 21 day intervals. Do not apply more than two consecutive applications of Mettle or Nova fungicides. Do not apply more than 2 times per season. Do not use within 14 days of harvest.

# Viruses

## Reversion Disease

Reversion is a viral disease spread by the gall mite. This virus and the mite are not known to occur in North America. It is a very serious disease of Ribes in Europe. Importation of all Ribes species from Europe is strictly forbidden to prevent introduction of this disease.

## Gooseberry Vein Banding Virus

The Gooseberry Vein Banding Virus causes pale-yellow streaks along leaf veins of currants and gooseberries. It is spread by grafting, cuttings and aphids. Symptoms usually become visible when the first leaves expand in spring.

## Tomato Ringspot Virus

The Tomato Ringspot Virus causes variable yellow leaf spotting or streaking along veins. Yellow spots may turn brown. Symptoms may appear on only a few leaves, or the entire plant may turn yellow. It is spread by grafting, cuttings and Xiphinema (sting) nematodes. (Note: Yellowing may also be caused by lime sulphur - see "Powdery Mildew").

## Management

Start with certified, virus-free plants whenever possible.

Test soils for nematodes and fumigate soil before planting.

Control aphids which can spread viruses.

Remove and burn any infected plants when observed.