

Pest Control Products Recommended for Use on Grapes in British Columbia

Table 1. INSECTICIDES AND MITICIDES

Read the *Best Practices Guide for Grapes* section on Insects and Mites for additional control information on these and other pests. See explanatory notes on page 6 of this document.

READ THE PRODUCT LABEL BEFORE MIXING AND APPLYING ANY PESTICIDE.

| Insect or Mite | Recommended Product Choices | Grp ¹ | Oral Toxicity | Optimum pH | Max. Applics/Season | Amount per | | REI ² | PHI ³ (days) | Precautions and Notes |
|--|---|------------------|---------------|------------|---------------------|----------------------------------|---------------------------------|------------------|-------------------------|---|
| | | | | | | Ha | Acre | | | |
| Virginia Creeper Leafhopper (VCL) and/or Western Grape Leafhopper (WGL) (p. 5-30) | Sevin XLR (carbaryl) | 1A | M | | | VCL*: 640 mL WGL*: 5.25-6.4 L | VCL*: 260 mL WGL*: 2.1-2.6 L | 24 h* | 5 | Moderate to high impact on all beneficials. If only VCL is present, preserve beneficials by applying the recommended rate. Applicator's certificate needed. |
| | Malathion 500E (malathion) | 1B | S | 5 | | 1.8 L | 728 mL | 24 h* | 3 | Will suppress most beneficials except predatory mites. Not effective against the WGL. |
| | Malathion 85E (malathion) | 1B | S | 5 | | 880 mL/1000 L | | 24 h* | 3 | |
| | Guthion 50 WSB [®] , Sniper [®] (azinphos-methyl) | 1B | V | 6 | 2 | 625 g-1.25 kg | 250-500 g | 28 days | 28 | Harmful to beneficial insects. No longer available, but existing stocks can be used until Dec. 31, 2012. Applicator's Certificate needed. |
| | Assail 70 WP (acetamiprid) | 4A | S | 5-6 | 2 | 80 g | 32 g | 12 h | 7 | Toxic to bees. Target Assail sprays to small nymphs. Avoid using Group 4 products more than twice/year to prevent mite problems. Use the higher rate of Clutch when insect pressure is high. |
| | Clutch (clothianidin) | 4A | S | | 2 | 100-140 g | 40-57 g | 12 h | 1 | |
| | Surround WP (kaolin) | | S | | | 25-50 kg | 10-20 kg | 24 h* | 0 | Suppression of leafhoppers. Do not apply post-bloom on table grapes. May be harmful to beneficials. |
| | Ambush 500EC (permethrin) | 3A | S | 6 | 1 | 140 mL | 56 mL | when dry | 7 | Use for WGL only. Harmful to all beneficial arthropods. Toxic to bees. |
| | Pounce 384EC (permethrin) | 3A | S | 6 | 2 | 175 mL | 71 mL | when dry | 21 | |
| | Pyganic (pyrethrins) | 3A | S | 5.5-7 | 8 | 2.32 – 4.65 L | 0.94-1.9 L | 12 h | 0 | For use on organic grapes. Harmful to all beneficial arthropods. Toxic to bees. |
| Additional Notes: Monitor (see page 5-31) and target wingless immature stages of leafhoppers as adults are more difficult to control. Some insecticides registered for the control of leafhoppers are ineffective against the Western grape leafhopper therefore it is important to determine if this species is present in your vineyard. Consider applying insecticides only to areas where leafhoppers have exceeded the threshold level to help preserve beneficials. | | | | | | | | | | |
| Climbing Cutworms (p. 5-33) | Altacor (chlorantraniliprole) | 28 | S | | 3 | 215-285 g | 87-115 g | 12 h | 14 | Direct sprays to the developing buds. |
| | Pounce 384EC (permethrin) | 3A | S | 6 | 2 | 180-360 mL | 70-145 mL | when dry | 21 | Harmful to all beneficial arthropods. Toxic to bees. Apply at the first sign of cutworm damage in spring, to the trunk and soil surface near trunk base. Use higher rate for larger cutworms. |
| Additional Notes: To help reduce cutworm damage, do not control broadleaf weeds until shoots have elongated and the first leaves have expanded. | | | | | | | | | | |

¹Group number for resistance management (see p. 7-6, *Best Practices Guide for Grapes*)

²Re-entry interval on the label (see p. 7-2). An asterisk(*) indicates that no re-entry is shown on the label, but the WorkSafe BC re-entry interval may apply and is shown.

³Pre-harvest interval (see p. 7-13).

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|---|---|------------------|---------------|------------|---------------------|-----------------------|------------|------------------|-------------------------|--|
| | | | | | | Ha | Acre | | | |
| Snailcase Bagworm (p. 5-46) | Dipel 2X DF (<i>Bacillus thuringiensis</i>) | 11 | S | 6 | 4 | 125-250 g/ 400L water | | 24 h* | 0 | Apply in late summer when larvae are feeding. |
| Grape Mealybug (p. 5-44) | Insecticidal Soap | | S | | | 1% spray (1L/100 L) | | 24 h* | 0-5 | Target sprays to the crawler stage in the spring. Do not apply with sulphur or within 3 days of sulphur. Also suppresses leafhoppers. |
| | Movento 240 SC (spirotetramat) | 23 | S | | 2 | 365-585 mL | 148-236 mL | 12 h | 7 | Movento has good systemic activity. DO NOT apply to table grapes. Toxic to bees. |
| | Malathion 500E (malathion) | 1B | S | 5 | | 1.8 L | 728 mL | 24 h* | 3 | Target sprays to the crawler stage in the spring. Will suppress most beneficials except predatory mites. |
| | Malathion 85E (malathion) | 1B | S | 5 | | 880 mL/1000 L | | 24 h* | 3 | |
| | Clutch (clothianidin) | 4A | S | | | 2 | 140-210 g | 57-85 g | 12 h | 1 |
| Additional Notes: It is important to monitor for and control mealybugs if you have or suspect leafroll virus in your vineyard. | | | | | | | | | | |
| Scale Insects (p. 5-45) | Insecticidal Soap | | S | | | 1% spray (1L/100 L) | | 24 h* | 0-5 | Target sprays to the crawler stage in the summer. Do not apply with sulphur or within 3 days of sulphur. Also suppresses leafhoppers. |
| | Movento 240 SC (spirotetramat) | 23 | S | | 2 | 365-585 mL | 148-236 mL | 12 h | 7 | DO NOT apply to table grapes. Toxic to bees. |
| | Malathion 500E (malathion) | 1B | S | 5 | | 1.8 L | 728 mL | 24 h* | 3 | Target sprays to the crawler stage in the summer. Will suppress most beneficials except predatory mites. |
| | Malathion 85E (malathion) | 1B | S | 5 | | 880 mL/1000 L | | 24 h* | 3 | |
| | Additional Notes: It is important to monitor for and control scale insects if you have or suspect leafroll virus in your vineyard. | | | | | | | | | |
| Grape Phylloxera (p. 5-34) | Movento 240 SC (spirotetramat) | 23 | S | | 2 | 365-585 mL | 148-236 mL | 12 h | 7 | Movento has good systemic activity. DO NOT apply to table grapes. Toxic to bees. |
| | Clutch (clothianidin) | 4A | S | | 2 | 140-210 g | 57-85 g | 12 h | 1 | Toxic to bees. Avoid using Group 4 products more than twice/season for all registered uses to prevent mite problems. Use the higher rate when insect pressure is high. |
| Additional Notes: Resistant rootstocks provide an effective means of combating phylloxera. | | | | | | | | | | |
| Thrips (p. 5-39) | Entrust (spinosad) | 5 | S | 7 | 3 | 109 g | 44 g | dry-15 days | 7 | For suppression of thrips. |
| | Success 480 SC (spinosad) | 5 | S | 6-7 | 3 | 182 mL | 74 mL | dry-15 days | 7 | For suppression of thrips. |

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| Insect or Mite | Recommended Product Choices | Grp ¹ | Oral Toxicity | Optimum pH | Max. Applies/Season | Amount per | | REI ² | PHI ³ (days) | Precautions and Notes |
|---|---|------------------|---------------|------------|---------------------|---|---|------------------|-------------------------|--|
| | | | | | | Ha | Acre | | | |
| Thrips (p. 5-39) | Clutch (clothianidin) | 4A | S | | 2 | 140 g | 57 g | 12 h | 1 | Toxic to bees. Avoid using Group 4 products more than twice/season to prevent mite problems. Use the higher rate when insect pressure is high. |
| | Additional Notes: Thrips are not normally an economic concern for wine grapes. Inspect table grapes for the presence of thrips in spring from around 75% bloom to the end of fruit set and apply insecticides as required. Avoid mowing cover crops during bloom and fruit set. | | | | | | | | | |
| Two-Spotted Spider Mites and European Red Mites (p. 5-40) | Insecticidal Soap | | S | | | 1% spray (1L/100 L) | | 24 h* | 0-5 | Do not apply with sulphur or within 3 days of sulphur. Also suppresses leafhoppers. |
| | Malathion 500E (malathion) | 1B | S | 5 | | 1.8 L | 728 mL | 24 h* | 3 | Will suppress most beneficial insects except predatory mites. |
| | Malathion 85E (malathion) | 1B | S | 5 | | 880 mL/1000 L | | 24 h* | 3 | |
| | Agri-mek (abamectin) | 6 | V | 6-7 | 2 | 585-1170 mL | 236-474 mL | 12 h - 21 day | 28 | Use higher rate for severe infestations. Applicator's Certificate needed. |
| | Nexter (pyridaben) | 21 | S | 4-9 | 1 | 300-600 g | 120-243 g | 24 h | 25 | Safe for beneficial insects; high rates harmful to predatory mites. |
| | Envidor 240 SC (spirodiclofen) | 23 | S | 5-7 | 1 | 0.75 L | 300 mL | 12 h -6 days | 14 | Toxic to predatory mites. Post-bloom application only. |
| | Acramite 50 WS (bifenazate) | 25 | S | <7 | 1 | 568 g (spider mite); 851 g (Eur. red mite) | 230 g (spider mite); 345 g (Eur. red mite) | 12 h -5 days | 14 | May be harmful to beneficial insects and predatory mites. Rates are equivalent to 2-3 pouches per 2 acres. |
| | PureSpray Green Spray Oil 13E (mineral oil) | | S | | | 10 L | 4 L | 12 h | 0-wine 14-table | Summer oil for suppression of mites. Do not apply within 14 days of a sulphur or captan spray. |
| Additional Notes: To preserve and enhance beneficial species that help to control mites, apply pesticides only when necessary and only to parts of the vineyard where pest populations are sufficiently high to warrant control. Rotate materials from different chemical groups to help prevent development of mite resistance. | | | | | | | | | | |
| Grape Erineum Mite (p. 5-42) | Kumulus DF (sulphur) | | S | | | 3.4 kg | 1.3 kg | 24 h | 21-wine 1-table | May cause injury during hot weather See label for sensitive varieties. |
| | PureSpray Green Spray oil 13E (mineral oil) | | S | | | 10 L | 4 L | 12 h | 0-wine 14-table | Summer oil for suppression of mites. Do not apply within 14 days of a sulphur or captan spray. |
| | Insecticidal Soap | | S | | | 1% spray (1L/100 L) | | 24 h* | 0-5 | Do not apply with sulphur or within 3 days of sulphur. Also suppresses leafhoppers. |
| Additional Notes: Erineum mite is seldom a problem in vineyards where sulphur is applied routinely for powdery mildew control. Applications of sulphur are most effective early in the season when galls are first being formed on new leaves. | | | | | | | | | | |
| Grape Leaf Rust Mite (p. 5-43) | There are no miticides currently registered specifically for the control of grape leaf rust mite. Sulphur (Kumulus) applied for grape erineum mite will also help to control grape leaf rust mite. Apply in high volume sprays during bud swell to woolly bud stage. | | | | | | | | | |
| Spotted Wing Drosophila (p. 5-37) | Emergency registration requests for Delegate, Entrust, Malathion and Ripcord will be resubmitted for the control of spotted wing drosophila in 2012. Please see labels for rates, pre-harvest intervals and directions. Emergency labels will be posted at: http://www.agf.gov.bc.ca/pesticides/k_4.htm | | | | | | | | | |

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³Pre-harvest interval (see p. 7-13).

Table 2. HERBICIDES

Read the *Best Practices Guide for Grapes* sections on Weeds and Vineyard Floor Management for additional information on cover crops and instructions for using herbicide effectively. See explanatory notes on page 6 of this document. **READ THE PRODUCT LABEL BEFORE MIXING AND APPLYING ANY PESTICIDE.**

| Herbicide | General Characteristics, Rates and Restrictions | | | | | | | | | | | Weeds Controlled (X = good-excellent control; x= poor control or top kill) | | | | Comments |
|--|---|-----------------------------|-----------------|---------------|------------------------|------------|---------------------------------------|--|--------------------------------|--------------------------|-----------------------------------|--|------------------|----------------|---------------------|--|
| | Product name (active ingredient) | Chemical Group ¹ | Dermal Toxicity | Oral Toxicity | Applicator Certificate | Optimum pH | Maximum Amount or Applications/Season | Pre-Harvest Interval (days) ³ | Re-entry Interval ² | Target Weed Growth Stage | Water Volume/ha | Application Rate(s) | Annual Broadleaf | Annual Grasses | Perennial Broadleaf | |
| Aim EC (carfentrazone) | 14 | S | S | N | | 1 | 3 | 12 h | Growing plants (≤ 10cm) | Minimum 100 L/ha | 37-117mL /ha (15-47 ml/acre) | X | | X | | Use a hooded sprayer |
| | | | | | | 2 | 30 | 12 h | Sucker management | 200 L/ha | 150 mL /ha (61 ml/acre) | X | | X | | Apply with an adjuvant. See label. |
| Casoron G4 (dichlobenil) | 20 | S | S | N | | | | 24 h | Germinating seeds | Apply to moist soils | 110-175 kg/ha (44-70 kg/acre) | X | X | X | X | Treat only dormant vines established for 2 or more years |
| Chateau WDG (flumioxazin) | 14 | S | S | N | | 2 | 60 | 12 h | Germinating seeds | Apply to moist soils | 280-420 g/ha (113-170 g/acre) | X | X | x | x | For use in established vineyards. Rates vary by soil type; see label |
| Devrinol 50 DF (napropamide) | 15 | S | S | N | 5.5-7 | 1 | | 12 h | Germinating seeds | Apply to moist soils | 9 kg/ha (3.6 kg/acre) | x | X | | | For use in established vineyards |
| Frontier (dimethenamid) | 15 | S | S | N | | 1 | 1-2 years | 24 h* | Germinating seeds, seedlings | Minimum 170 L/ha | 1.4 L/ha (566 mL/acre) | X | X | | | For 1 st or 2 nd year non-bearing grapes |
| Gramoxone Ⓜ (paraquat) | 22 | M | M | Y | <7 | | 7 | 24 h | Growing plants | 1100 L/ha | 5.5 L/ha (2.2 L/acre) | X | X | x | X | Apply in May to early June |
| Ignite SN (glufosinate ammonium) | 10 | S | S | N | 5.5 | 6.7 L | 40 | 12 h | Growing plants | 330-1100 L/ha | 2.7-5.0 L/ha (1.1-2.0 L/acre) | X | X | x | X | For use in established vineyards. |
| Karmex DF (diuron) | 7 | S | S | N | | | | 12 h | Germinating seeds, seedlings | 250-400 L/ha | 2.25-3.25 kg/ha (0.9-1.3 kg/acre) | X | X | x | X | For use in established vineyards. Rates vary by soil type; see label |
| Roundup, Laredo, Victor, Wrangler, Touchdown (glyphosate) | 9 | S | S | N | 5-7.5 | 3 | 14 | 12-24 h | Growing plants | 90 – 330 L/ha | See label | X | X | X | X | For use in established vineyards. Rates vary by product; see label |
| Venture L (fluazifop-P) | 1 | S | S | N | | 1 | 30 | 24 h* | Growing plants | 50-200 L/ha | 2 L/ha (800 mL/acre) | | X | | X | For bearing and non-bearing grapes |

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Table 3. FUNGICIDES

Read the *Best Practices Guide for Grapes* section on Diseases for additional information on disease management. See explanatory notes on page 6 of this document.

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| Disease | Recommended Product Choices | Grp ¹ | Oral Toxicity | Max. Applics/Season | Amount per | | REI ² | PHI ³ (days) | Precautions and Notes |
|--|--|------------------|---------------|-------------------------|---|----------------|------------------|--|---|
| | | | | | Ha | Acre | | | |
| Powdery Mildew (p. 5-4) | Kumulus DF or Microthiol Disperss (sulphur 80%) | M | S | | 4.2 kg | 1.7 kg | 24 h | 21-wine 1-table | Repeated applications may harm beneficial mites. Apply at 10-day intervals. May cause injury during hot weather (> 27 °C) and on sensitive varieties. |
| | PureSpray Green Spray Oil 13E (mineral oil) | NC | S | | 10 L | 4 L | 12 h | 0-wine 14-table | Summer oil for suppression of powdery mildew. Apply on a 10-21 day interval. Do not apply within 14 days of a sulphur or captan spray. |
| | Quintec (quinoxifen) | 13 | S | 3 | 300 ml | 122 ml | 12 h | 14 | Apply at 14 day intervals. |
| | Vivando (metrafenone 300g/L) | U8 | S | 3 | 750 ml | 300 ml | 12 h to 4 days | 14 | Apply at 14-21 day intervals; use shorter interval for high disease pressure. Do not apply more than 2 sequential sprays. |
| | Nova (myclobutanil 40%) | 3 | S | 2 | 200 g | 81 g | when dry | 14 | Apply at 21-day intervals. Limit group 3 fungicides to 2 sprays per season for resistance management. |
| | Inspire (difenoconazole) | 3 | S | 2 | 292 mL | 118 mL | 2-10 days | 7 | Apply at 11-21 day intervals. Limit group 3 fungicides to 2 sprays per season for resistance management. |
| | Lance or Cantus WDG (boscalid 70%) | 7 | S | 3 | 315 g | 128 g | 12 h | 14 | Apply on a 10-14 day schedule. Use the shorter interval when disease pressure is high. May also suppress botrytis bunch rot. |
| | Pristine WG (boscalid + pyraclostrobin) | 7+11 | S | 3 | 420-735 g | 170-300 g | dry to 21 days | 14 | See label for details on rates and spray intervals. Also suppresses botrytis. Do not use on table grapes. |
| | Flint (trifloxystrobin 50%) | 11 | S | 2 | 105-140 g | 43-57 g | 12 h to 12 days | 14 | Apply preventively and continue as needed on a 14-21 day interval. Limit group 11 fungicides to 2 sprays per season for resistance management. |
| | Sovran WG (kresoxim-methyl 50%) | 11 | S | 2 | 240-300 g | 100-122 g | 48 h | 14 | |
| | Milstop (potassium bicarbonate) | NC | S | | 2.8-5.6 kg | 1.1-2.3 kg | 4 h | 0 | Apply at 7-14 day intervals. |
| | Serenade MAX (<i>Bacillus subtilis</i>) | 44 | S | | 3.0 – 6.0 kg | 1.2-2.4 kg | 24 h* | 0 | Biofungicide. Disease suppression only. Do not tank mix with other products or fertilizers. |
| | Regalia Maxx (<i>Reynoutria sachalinensis</i>) | P | S | | 0.125 - 0.25 % solution (1.25-2.5 L/1000 L water) | | dry | 0 | Apply preventatively or when disease symptoms first appear. Biofungicide. Disease suppression only. |
| | Actinovate SP (<i>Streptomyces lydicus</i>) | NC | S | | 425-840 g/ha | 172-340 g/acre | dry | 0 | Biofungicide. Disease suppression only. |
| Lime Sulphur (sulphide sulphur 22%) | M | S | 1 | 100 L / 1000 L of water | | 48 h | 120 | Apply 500L of spray mixture/ha during dormant stage in late fall or early spring prior to bud swell. Spray to point of runoff. | |
| Good control of mildew from early shoot growth onward is critical. Key timings include: 5 to 10 cm growth; just before or immediately after bloom; at regular intervals, or according forecasting programs, until grapes begin to soften and red varieties begin development of colour and white varieties change from green to white or yellow. | | | | | | | | | |

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| | | | | | Ha | Acre | | | |
| Botrytis Bunch Rot (p. 5-10) | Rovral (iprodione 50%) | 2 | S | 2 | 1.5 kg | 600 g | 12 h | 7 | Apply beginning at mid to late bloom. Protect fruit before complete bunch closure. |
| | Elevate (fenhexamid 50%) | 17 | S | 3 | 1.12 kg | 450 g | 4 h | 7 | Do not apply more than 2 consecutive sprays |
| | Scala (pyrimethanil 400 g/L) | 9 | S | 3 | 2.0 L | 810 mL | 24 h | 7 | Apply at 7 day intervals. Thorough coverage of bunches is essential. |
| | Vangard (cyprodinil 75%) | 9 | S | 2 | 750 g | 300 g | 48 h | 7 | Caution, drift may injure cherries. Thorough coverage of the bunches is essential. |
| | Switch 62.5 WG (cyprodinil + fludioxonil) | 9+12 | S | 2 | 775-975 g | 314-395 g | 12 h to 7 days | 7 | 21 day application interval. Thorough coverage of bunches is essential. |
| | Pristine WG (boscalid + pyraclostrobin) | 7+11 | S | 3 | 420-735 g | 170-300 g | dry to 21 days | 14 | Suppression only for botrytis. See label for details on rates and spray intervals. Do not use on table grapes. |
| | Serenade MAX (<i>Bacillus subtilis</i>) | 44 | S | | 3.0 – 6.0 kg | 1.2-2.4 kg | 24 h* | 0 | Biofungicide. Disease suppression only. Do not tank mix with other products. May also suppress sour rot. |
| | Regalia Maxx (<i>Reynoutria sachalinensis</i>) | P | S | | 0.25 % solution (2.5 L/1000 L water) | | dry | 0 | Biofungicide. Disease suppression only. |
| Key timings for Botrytis fungicide applications: bloom, just before bunch closing, veraison, and pre-harvest. Botrytis control becomes more difficult as the fruit matures because heavy canopy growth and bunch closing make it difficult to place the fungicide where it is needed, and grapes become increasingly susceptible. | | | | | | | | | |
| Sour Rot (p. 5-12) | Serenade MAX (<i>Bacillus subtilis</i>) | 44 | S | | 3.0 – 6.0 kg | 1.2-2.4 kg | 24 h* | 0 | Disease suppression only. Do not tank mix with other products or fertilizers. |
| | Reduce fruit damage by controlling mildew, bunch rot, and feeding injury from wasps and birds. | | | | | | | | |

Explanatory Notes / Legend:

- This publication is a companion document to the *Best Practices Guide for Grapes for British Columbia Growers*. Page number references in this document refer to more detailed information in the Best Practices Guide.
- Products:** This list includes pesticide products considered compatible with B.C. Interior vineyard pest management programs. Limited field performance information is available on Malathion and Surround. Refer to insect and diseases descriptions in the *Best Practices Guide for Grapes* for other control options and best management practices.
- Chemical Group:** Do not repeat the use of pesticides with the same Chemical Group number as this practice will select for resistant individuals or strains within a population.
- Toxicity:** S (slightly toxic), M (moderately toxic), V (very toxic) – see page 7-2 of the *Best Practices Guide for Grapes* for more information.
- Re-entry Intervals:** Do not enter or allow workers to enter the vineyard until the re-entry time has passed following a pesticide application. Note: Re-entry interval may vary by activity, See label for details where a range of re-entry times are shown. An asterisk (*) indicates that no re-entry is shown on the label, but the WorkSafe BC re-entry interval may apply and is shown.
- Pests/Diseases/Weeds Controlled:** list includes only pests, diseases and weeds against which a pesticide is registered and recommended for use in the B.C. Interior.
- Maximum Applications/ Season:** product labels often indicate the maximum number of times a product can be used per season. In some cases we have recommended fewer applications for resistance management purposes.
- Notes on impacts to beneficial insects and mites:** Comments reflect current understanding of toxicity of products to common beneficial insects and mites found in vineyards in the B.C. Interior. Toxicity can vary among vineyards according to the history of pesticide use.

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