

# Fruit Production Recommendations 2010-2011

Ontario Ministry of Agriculture, Food & Rural Affairs

## Chapter 5: Berry Crops



### Blueberry Calendar

Read the product label and follow all safety precautions.

Consult the product label for suggested water volumes. For mature highbush blueberries, use 700–1,000 L of water per ha unless otherwise noted on the label.

Products are listed according to insecticide and fungicide family groups. Use products from different groups to prevent the development of pest resistance. For resistance management, refer to *Pest Resistance to Insecticides, Fungicides, Miticides*, page 23.

For preharvest interval, re-entry period, maximum number of applications and chemical group, see Table 5-9. *Products Used on Blueberries*, page 103.

Diseases and Insects	Products	Rate	Comments
<b>Dormant (late winter)</b>			
Scale insects Lecanium scale	Lime Sulphur plus Dormant Oil Spray	50 L Lime Sulphur plus 12.5 L oil/1,000 L water	Apply when plants are dormant. Spray to the point of runoff. Ensure thorough spray coverage. Do not use within 10 days of Bravo, Captan or Maestro, or phytotoxicity may result. Do not use within 48 hours of freezing temperatures.
<b>Early spring, prior to bud break</b>			
Phytophthora root rot	Ridomil Gold 480 SL	Banded: 37 mL/100 m	If phytophthora root rot has been identified, apply 37 mL/100 m of row to the soil surface in a 1 m band centered over the row. Apply in at least 2,000 L of water per ha.
<b>Bud swell to pink bud</b>			
Leaf tiers	Decis 5 EC	150 mL/ha	Damage occurs very early in the season. If leaf tier was a problem in the past, spray at the bud cluster stage as flower buds begin to swell and pink tissue becomes visible.
Blueberry spanworm	Delegate WG	200 g/ha	<b>Delegate WG:</b> Spray if spanworms (also known as inchworms or loopers) are numerous. Provides suppression rather than control.

Diseases and Insects	Products	Rate	Comments
Mummy berry ( <i>Monilinia</i> )	Funginex DC Topas 250 E or Mission 418 EC  Allegro 500 F  Serenade ASO	1.7–3.0 L/ha 500 mL/ha 300 mL/ha  2.24 L/ha  24.0 L/ha	Cultivate before bud break to bury overwintering inoculum. Monitor for trumpet-shaped structures erupting from mummified berries on the ground. Protection is needed when these structures are present. Spray to prevent primary infection of blueberry shoots. Make the first application when the flower buds swell and repeat to ensure protection until first bloom. Funginex: Do not spray after pink bud stage. Topas or Mission: Use a maximum of two applications per season. Allegro: Provides suppression rather than control. See Table 2-6. <i>Efficacy Ratings for Pesticides</i> , page 12. Serenade ASO: Provides suppression rather than control of mummy berry. See notes on <i>Bacillus subtilis</i> (Serenade ASO, Serenade MAX), page 14. Expect best results from multiple applications or when used in rotation with other products.
<b>Green tip</b>			
Anthracnose fruit rot Phomopsis	Cabrio EG Pristine WG  Bravo 500  Allegro 500 F	1.0 kg/ha 1.3–1.6 kg/ha  7.2 L/ha  2.24 L/ha	Apply fungicides to prevent twig blights and reduce overwintering inoculum. Pristine: Use 1.6 kg/ha for phomopsis stem canker. Pristine and Cabrio: Both include active ingredients in the same fungicide group. Use a maximum of two consecutive applications, then alternate with fungicides from different families. Bravo: Will also control alternaria fruit rot. Allegro: Provides suppression rather than control. See Table 2-6. <i>Efficacy Ratings for Pesticides</i> , page 12.
<b>Pink bud</b>			
Anthracnose fruit rot Phomopsis	Use one of the fungicides listed at <b>Green tip</b> .		
<b>DO NOT APPLY INSECTICIDES WHILE BLUEBERRIES ARE IN BLOOM. SEE BEE POISONING ON PAGE 214.</b>			
<b>First bloom</b>			
Anthracnose fruit rot Phomopsis	Cabrio EG Pristine WG  Switch 62.5 WG  Allegro 500 F	1.0 kg/ha 1.3–1.6 kg/ha  775 g /ha  2.24 L/ha	<b>Pristine and Cabrio:</b> Both include active ingredients in the same fungicide group. Use a maximum of two consecutive applications then alternate with fungicides from different families. Pristine: Use 1.6 kg/ha for phomopsis stem canker. Allegro: Provides suppression rather than control of these diseases. See Table 2-6. <i>Efficacy Ratings for Pesticides</i> , page 12.
Botrytis twig and blossom blight Botrytis fruit rot (grey mould)	Supra Captan 80 WDG or Maestro 80 DF Ferbam 76 WDG  Elevate 50 WDG  Lance WDG Pristine WG  Switch 62.5 WG  Serenade ASO	2.25 kg/ha 2.25 kg/ha 3.75 kg/1,000 L water  1.7 kg/ha  560 g/ha 1.3 kg/ha  775 g/ha  4.0-15.0 L/ha	Fungicides for botrytis blights are more important when wet weather occurs. Repeat at 7–10 day intervals through bloom if weather is wet. Choose fungicides from different families to reduce the development of resistant strains. Ferbam: Do not use later than mid-bloom. Serenade ASO: Provides suppression, rather than control, of botrytis blight. Expect best results from multiple applications or when used in rotation with other products. See notes on <i>Bacillus subtilis</i> (Serenade ASO, Serenade MAX), page 14.
<b>Petal fall</b>			

Diseases and Insects	Products	Rate	Comments
Cherry fruitworm Cranberry fruitworm	Malathion 25 W	2.25 kg/ha	<p>Moths lay eggs on developing fruit and larvae tunnel into fruit. Use pheromone traps to monitor moth activity and to time the spray more accurately.</p> <p>Sevin: Apply 5–7 days after trap catches peak. A second insecticide is required if trap catches remain elevated seven days after application. Use for cranberry fruitworm only.</p> <p>Malathion: Apply 5–7 days after trap catches peak. Repeat twice at 4-5 day intervals. A fourth insecticide is required if trap catches remain elevated after last application. Malathion also controls aphids.</p> <p>Dipel: Spray at peak trap catch and continue at 3–7 day intervals, to a maximum of four applications. Acidify spray mix to below pH 7.0 and apply on cloudy days or at dusk. See <i>Biopesticides and reduced risk products for insect control</i>, page 17, and notes on <i>Bacillus thuringiensis var. kurstaki</i>, page 17.</p>
	Sevin XLR	4.0 L/ha	
	Dipel 2X DF	1.68 kg/ha	
Anthracnose fruit rot	Cabrio EG	1.0 kg/ha	<p>Most fruit infections occur in the bloom to green fruit stage. Infected fruit soften near harvest time and orange spore masses develop on the fruit.</p> <p>Alternate with fungicides from different families.</p> <p>Pristine and Cabrio: Both include active ingredients in the same fungicide group. Make no more than two consecutive applications, and then alternate with fungicides from different families.</p> <p>Bravo: Also controls alternaria fruit rot. Bravo may cause fruit injury if applied to green fruit.</p> <p>Allegro: Provides suppression rather than control of anthracnose.</p>
	Pristine WG	1.3–1.6 kg/ha	
	Switch 62.5 WG	775 g/ha	
	Bravo 500	7.2 L/ha	
Phomopsis	Cabrio EG	1.0 kg/ha	<p><b>Pristine and Cabrio:</b> Both include active ingredients in the same fungicide group. Make no more than two consecutive applications, and then alternate with fungicides from different families.</p> <p>Bravo: Also controls alternaria fruit rot. Bravo may cause fruit injury if applied to green fruit.</p> <p>Allegro: Provides suppression rather than control of phomopsis.</p>
	Pristine WG	1.6 kg/ha	
	Bravo 500	7.2 L/ha	
	Allegro 500 F	2.24 L/ha	
European chafer larvae Japanese beetle larvae	Admire 240 F or Alias 240 SC	1.2 L/ha 1.2 L/ha	<p>Do not apply during bloom. Apply just prior to egg hatch (shortly after adults are active) to damp soil around bushes and to grass covered areas around blueberry field. Apply in 200 L water per ha. Move the product into the root zone with 5–10 mm irrigation within 24 hours of application but avoid over watering. Use a maximum of one application per season, at petal fall, fruit ripening or after harvest.</p>
<b>Green Fruit</b>			
Blueberry spanworm	Delegate WG	200 g/ha	<b>Delegate WG:</b> Spray if spanworms (also known as inchworms or loopers) are numerous. Provides suppression rather than control.
<b>Fruit ripening</b>			
Botrytis fruit rot (grey mould)	Supra Captan 80 WDG or Maestro 80 DF	2.25 kg/ha 2.25 kg/ha	<p>Spray at 7–10 day intervals if botrytis grey mould was not well controlled during bloom. Choose fungicides from different fungicide groups to reduce the development of resistant strains.</p> <p>Serenade ASO: Provides suppression, rather than control, of botrytis grey mould. Expect best results from multiple applications or when used in rotation with other products. See notes on <i>Bacillus subtilis</i> (<i>Serenade ASO</i>, <i>Serenade MAX</i>), page 14.</p>
	Elevate 50 WDG	1.7 kg/ha	
	Lance WDG	560 g/ha	
	Switch 62.5 WG	775 g/ha	
	Serenade ASO	4.0-15.0 L/ha	

Diseases and Insects	Products	Rate	Comments
Anthraco nose fruit rot	Switch 62.5 WG	775 g/ha	Most infections take place during bloom. Fungicides at this time are not necessary if good control was achieved earlier.
European chafer larvae Japanese beetle larvae	Admire 240 F or Alias 240 SC	1.2 L/ha 1.2 L/ha	Apply just prior to egg hatch (shortly after adults are active) to damp soil around bushes and to grass covered areas around blueberry field. Apply in 200 L water per ha. Move the product into the root zone with 5–10 mm irrigation within 24 hours of application but avoid over watering. Use a maximum of one application per season, at petal fall, fruit ripening or after harvest.
Blueberry maggot	Imidan 50 WP Cygon 480-AG Lagon 480 E Malathion 25 W  Sevin XLR  GF-120 NF	2.25 kg/ha 830 mL/ha 825 mL/ha 2.25 kg/ha  4.0 L/ha  1.5 L/ha	<p>Monitor for blueberry maggot using yellow sticky traps.</p> <p>Ontario is considered free from blueberry maggot, except for regulated areas. Growers in regulated areas (including Wainfleet and Charlotteville townships) should spray for this pest. Growers outside regulated areas should consider border sprays and practice best management practices to prevent infestation. For more information, see Blueberry Maggot at <a href="http://www.ontario.ca/crops">www.ontario.ca/crops</a>.</p> <p>Apply the first spray when first blueberry maggots are trapped or when berries begin to turn blue, about July 5–15, depending on the area and season. Apply a second spray about 5–12 days later, depending on the product. Protection is needed as long as adults are active. Imidan and Cygon provide 10–12 days protection under normal conditions. Residual activity of Sevin and Malathion is 5–7 days.</p> <p>Cygon, Lagon: Use a maximum of two applications per season. Do not use on crops destined for USA markets.</p> <p>Imidan: Use a maximum of two applications per season.</p> <p>GF-120 NF: This is a bait formulation that requires large droplet size (4–6 mm); specialized application equipment may be needed. Begin applications when first blueberry maggot flies are trapped or 2–3 weeks before fruit begins to ripen. Repeat application at least every 7 days. GF-120 will lose effectiveness if exposed to rain or overhead irrigation.</p>

Blueberry maggot is a regulated pest; infestations must be reported to the Canadian Food Inspection Agency.

Blueberry maggot can spread to new areas in soil, harvest containers, or when infested fruit is purchased from another region and dumped on your farm.

Use best management practices to prevent spread of blueberry maggot to new areas.

See [www.ontario.ca/crops](http://www.ontario.ca/crops).

Table 5-9. Products Used on Blueberries

Use this table as a guide but refer to product label for specific information.

The **preharvest interval** is the number of days between the last spray and first harvest.

The **re-entry period** is the minimum interval that must be observed between application of the pesticide and work in the treated crop without protective equipment. If no re-entry period is stated on the label, assume the spray solution must be dry before re-entry can occur.

The **maximum number of applications** is the labelled maximum number for the growing season and may be higher than what is recommended for resistance management or for the preservation of beneficial insects.

Product name	Registration number	Common name	Group	Preharvest interval	Minimum re-entry	Maximum number applications per season (on label)
<b>Products used to control or suppress insects and mites</b>						
Admire 240 F	24094	imidacloprid	4	14 days	24 hours	1
Alias 240 SC	28475	imidacloprid	4	14 days	24 hours	1
Cygon 480-AG	25651	dimethoate	1B	15 days		2
Decis 5 EC	22478	deltamethrin	3	14 days		
Delegate WG	28778	spinetoram	5	3 days	12 hours	3
Dipel 2X DF	26508	<i>Bacillus thuringiensis</i>	11	1 day		4
GF-120 NF	28336	spinosad	5	0 days		5
Imidan 50 WP	23006	phosmet	1B	15 days	3 days/15 days <sup>1</sup>	2
Lagon 480 E	9382	dimethoate	1B	15 days		2
Malathion 25 W	14656	malathion	1B	1 day		
Sevin XLR	27876	carbaryl	1A	2 days		
Superior 70 Oil	9542 14981	mineral oil			12 hours	
Surround WP	27469	kaolin		1 day		
<b>Products used to control or suppress diseases</b>						
Allegro 500 F	27517	fluazinam	29	30 days	24 hours	4
Bravo 500	15723	chlorothalonil	M	54 days	48 hours	3
Cabrio EG	27323	pyraclostrobin	11	29 days	12 hours/28 days <sup>2</sup>	4
Elevate 50 WDG	25900	fenhexamid	17	1 day	4 hours	4
Ferbam 76 WDG	20136	ferbam	M	40 days		
Funginex DC	27686	triforine	3	60 days	48 hours	3
Lance WDG	27495	boscalid	7	0 days	4 hours	4
Lime Sulphur	16465	calcium polysulphide	M	dormant application		1

Maestro 80 DF	26408	captan	M	2 days	72 hours	
Mission 418 EC	28016	propiconazole	3	60 days	72 hours	2
Pristine WG	27985	boscalid + pyraclostrobin	7+11	0 days	29 days <sup>3</sup>	4
Ridomil Gold 480 SL	28474	metalaxyl-M and S	4	80 days	12 hours	1
Serenade ASO	28626	<i>Bacillus subtilis</i>	44	0 days		
Supra Captan 80 WDG	24613	captan	M	2 days	72 hours	
Switch 62.5 WG	28189	cyprodinil + fludioxonil	9+12	1 day	12 hours	3
Topas 250 E	24030	propiconazole	3	60 days	72 hours	2

A blank cell indicates the information is not specified on the product label.

<sup>1</sup> 15 days for pick-your-own harvest.

<sup>2</sup> 28 days for hand harvest.

<sup>3</sup> For hand harvest, otherwise when dry.

## Notes on Blueberry Diseases

For information on the activity of fungicides to blueberry diseases, see Table 5-10. *Activity of Fungicides on Blueberry Diseases*, on this page.

Table 5-10. Activity of Fungicides on Blueberry Diseases

Ratings in shaded cells indicate the disease is listed on the product label for control or suppression. Use fungicides only for diseases listed on the product label for the crop and for the disease. Additional information is provided in this table to assist the grower in choosing the best fungicide for control of diseases listed on the product label.

Fungicide group	Product	Mummy berry (shoot blight)	Phomopsis stem canker	Anthraco nose fruit rot	Botrytis fruit rot	Alternaria fruit rot	Phytophthora root rot
M	Ferbam 76 WDG	+			+	+	0
M	Maestro 80 DF	+	++	++	+ to ++	+	0
M	Supra Captan 80 WDG	+	++	++	+ to ++	+	0
M	Bravo 500	0	++	+	+ to ++	+	0
3	Funginex DC	+++	++	0	0	0	0
3	Mission 418 EC	+++	+	0	0	0	0
3	Topas 250 E	+++	+	++	0	0	0
4	Ridomil Gold 480 SL	0	0	0	0	0	+++
7	Lance WDG	0			+++		0
7&11	Pristine WG	++	+++	+++	+++	++	0
9&12	Switch 62.5 WG	++	+	+++	+++	+++	0
11	Cabrio EG	+	+++	+++	+ to ++	++	0
17	Elevate 50 WDG	0	0	0	+++	0	0
29	Allegro 500 F	+	+	+			
44	Serenade ASO	+			+		0

Use fungicides only for control of diseases listed on the product label.

0 = No control; + = Poor to fair control; ++ = Good control, some limitations; +++ = Excellent control, few if any limitations.

Blank cell = Information is unavailable.

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