

Blueberry

2013 Pest Management Guide for the Willamette Valley

EM 8538 • Revised April 2013

Joe DeFrancesco, Jay W. Pscheidt, and Wei Yang

The chemicals, formulations, and rates listed here for insect, mite, and disease control are among the best recommendations based on label directions, research, and use experience. Only a thorough knowledge of the blueberry planting, its varieties, bush size and density, canopy characteristics, pest complex, and past pest problems will enable you to correctly select chemicals, rates, amount of water used per acre, and method of application for optimum pest control. Occasionally, different formulations of a product or like formulations containing a different amount of active ingredient also are registered and effective for use on the pests listed. These products also may be used; we do not intend to discriminate against them. You may wish to consult their labels and determine whether their use confers advantages over the products listed in this guide.

Two questions frequently are asked about the chemical control of insects and diseases: “How much chemical do I use per acre?” and “What is the least amount of water I need per acre to apply in my concentrate sprayer?” Notice that the recommendations below suggest an amount of formulated product (not active ingredient) to use per acre. This amount is based on a “typical” middle age and density blueberry planting with moderate pest pressure. Common sense indicates that less material may be needed (than that given) for 1- to 4-year-old plantings. Conversely, more chemical (within label limits) may be required for large, mature bushes experiencing heavy pest pressure from multiple pests.

Many insecticide labels today indicate the minimum amount of water needed per acre to apply concentrate sprays of insecticides, as well as how to calculate the amount of chemical needed per acre in a concentrate sprayer. **CHECK LABEL BEFORE SPRAYING!**

Always refer to the pesticide label for use instructions. It is the legal document regarding rate and use pattern.

Resistance management

The Fungicide Resistance Action Committee (FRAC) has helped to develop FRAC codes for fungicides based on their mode of action and target site. To better manage fungicide resistance, do not mix or alternate fungicides with the same FRAC number in a spray program. The FRAC code “M” indicates that the fungicide acts upon multiple sites and has low resistance risk. You can find the FRAC code on the label, or they are listed at the end of this publication for various fungicides.

Important information

- **Buffer regulations for the Oregon small fruit industry:** A District Court ruling resulted in spray buffer regulations near certain bodies of water. To obtain up-to-date information on this regulation and to learn whether your fields are close to affected rivers or streams, visit the following website:
 - Oregon Department of Agriculture (<http://www.oregon.gov/ODA/PEST/Pages/buffers.aspx>)
- Northwest Berry & Grape Information Network (<http://berrygrape.org/blueberry/>)
- Pacific Northwest Plant Disease Management Handbook (<http://pnwhandbooks.org/plantdisease>)
- Pacific Northwest Insect Management Handbook (<http://pnwhandbooks.org/insect>)
- Pacific Northwest Weed Management Handbook (<http://pnwhandbooks.org/weed>)

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.



Sequential stages of flower development

- 1 Dormant:** No visible swelling, bud scales completely enclose the inflorescence
2 Bud Swell: Visible swelling of bud, scales separating, flowers still completely enclosed
3 Floral Budbreak: Bud scales separated, apices of flowers visible
4 Floral Budbreak, Prebloom: Individual flowers distinguishable, bud scales abscised
5 Prebloom: Individual flowers distinctly separated, corollas unexpanded and closed
6 Bloom: Corollas completely expanded and open
7 Petal Fall: Corollas dropped

Stages and Pests

Dormant (Stage 1)	Budbreak (Stages 3 and 4)	Prebloom (Stages 4 and 5)	Bloom (Stage 6)	Postbloom to Preharvest (Stage 7)	Preharvest/ Harvest (Stage 8)	Postharvest (Stage 9)
Mummy berry	Mummy berry	Mummy berry	Mummy berry	Anthracnose	Alternaria	Bacterial canker
Bacterial canker	Phytophthora root rot	Aphids	Botrytis	Alternaria	Botrytis	Root weevils (larvae)
Crown gall	Midge	Cherry fruitworm	Alternaria	Scorch virus	Birds	Symphytan
Godronia canker	Symphytan	Winter moths	Anthracnose	Aphids	Spotted wing drosophila	
Scale insects			Shock virus Scorch virus	Leafrollers Midge Root weevils (adults) Scale (crawlers) Spotted wing drosophila Yellowjackets		

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Blueberry Pest Control Recommendations

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Dormant (Stage 1)		
Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
pH		
none	—	Sample the soil around the root zone annually to see whether pH is in the correct range for normal plant growth (4.5–5.5).
Godronia canker, bacterial canker, and crown gall		
none	—	Prune out during dry weather and destroy affected canes when first noticed.
Mummy berry—primary infection		
none	—	Destroy any cull piles near packing shed. Cultivate or rake between rows such that mummies are buried with a few inches of soil. Use 3–4 inches of mulch to cover mummies in spring.
herbicides	—	Applications of diuron or simazine to the soil for weed control may inhibit development of apothecia.
Scale insects		
dormant oil	3 gal/ 100 gal water	Use sufficient gallonage per acre to thoroughly coat plants. <i>Avoid applying oils during periods of freezing and subfreezing weather.</i> 4- to 12-hour reentry (depends on brand). Some brands of oil are approved for organic production.
Esteem 35WP	5 oz	12-hour reentry. 7-day PHI.
Budbreak (Stages 3 and 4)		
Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Phytophthora root rot		
Aliette WDG	5 lb	Do not use with copper materials. 12-hour reentry.
Fosphite	1–2 qt	Do not use copper materials within 10 to 20 days of treatment. 4-hour reentry.
Phostrol	2.5–5 pt	4-hour reentry.
Ridomil Gold SL	3.6 pt	Apply to the soil as a 3-ft-wide treated band. Apply in spring as growth resumes. 48-hour reentry.
	or	
	0.25 pt/ 1,000 ft of row	

Budbreak continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Budbreak (Stages 3 and 4)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Mummy berry—primary infection		
Captan 80WDG	1.25–3.1 lb	3-day reentry. 0-day PHI.
Captevat 68WDG	4.7 lb	Do not apply more than 2 consecutive applications or more than 21 lb/A/season. 2-day reentry. 0-day PHI.
Indar 2F	6 fl oz	Tank-mix with a wetting agent. 12-hour reentry. 30-day PHI.
Omega 500F	1.25 pt	Do not use with an adjuvant. 3-day reentry. 30-day PHI.
Quash	2.5 oz	Do not use with an adjuvant. 12-hour reentry. 7-day PHI.
Quilt Xcel	14–21 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.
Tilt/PropiMax/Bumper	6 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.
Mummy berry—apothecia		
BSP lime sulfur (29%)	16–24 gal	Spray the ground under bushes to help destroy developing apothecia.
Tetrasul 4s5	4 gal	Use 200–300 gal water/A. Must be repeated frequently since apothecia develop over several weeks. These, like most sulfur products, are approved for organic production.
Midge		
Assail 30SG	4.5–5.3 oz	Apply at egg hatch or to young larvae. 12-hour reentry. 1-day PHI.
Delegate WG	3–6 oz	Suppression of midge. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	Midge does not appear on label, but application is legal and may be effective. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Midge does not appear on label, but application is legal and may be effective. Approved for organic production. 4-hour reentry. 3-day PHI.
Imidan 70W (WSB)	1.33 lb	Midge does not appear on label, but application is legal and may be effective. 1-day reentry. 3-day PHI.
Malathion 57EC or Malathion 8 Aquamul	1.5 pt 1 pt	Midge does not appear on label, but application is legal and effective. 12-hour reentry. 1-day PHI.
Rimon 0.83EC	20–30 fl oz	Midge does not appear on label, but application is legal and may be effective. Apply at egg hatch or to small larvae. 12-hour reentry. 8-day PHI.
Success	4–6 fl oz	Midge does not appear on label, but application is legal and may be effective. 4-hour reentry. 3-day PHI.
Symphylan		
Mocap (nonbearing fields only)	1.33 qt	SLN# OR-120020 allows use in newly planted, nonbearing fields. Broadcast or band (2-ft minimum) apply to the soil. Immediately apply 1 to 2 inches of overhead irrigation water to incorporate. Consult label for use with drip irrigation. 48-hour reentry. 365-day PHI.

Budbreak continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Budbreak (Stages 3 and 4)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Winter moths (spanworms, inchworms) (see footnote 1, page 13)		
Altacor	3.0–4.5 oz	Winter moth does not appear on label, but application is legal and may be effective. 4-hour reentry. 1-day PHI.
Avaunt	6 oz	12-hour reentry. 7-day PHI.
<i>Bacillus thuringiensis</i>	—	Many brands available. See label for rate. Approved for organic production. Multiple sprays usually necessary. Inspect buds in spring as scales separate. 4-hour reentry. 0-day PHI.
Confirm 2F	1 pt	Apply at early egg hatch. 4-hour reentry. 14-day PHI.
Delegate WG	3–6 oz	Winter moth does not appear on label, but application is legal and is known to be effective. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	Winter moth may not be listed on label, but this is a legal application and is known to be effective. Do not use more than once per season. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Winter moth does not appear on label, but application is legal and is known to be effective. Approved for organic production. 4-hour reentry. 3-day PHI.
Intrepid 2F	10–16 fl oz	Apply at early egg hatch. 4-hour reentry. 7-day PHI.
Lannate LV	1.5–3 pt	Restricted use pesticide. Winter moth may not be listed on label, but this is a legal application and is known to be effective. 2-day reentry. 3-day PHI.
Rimon 0.83EC	20–30 fl oz	Apply at early egg hatch or to early instar larvae. 12-hour reentry. 8-day PHI.
Sevin XLR Plus	1–2 qt	Winter moth may not be listed on label, but this is a legal application and is known to be effective. 12-hour reentry. 7-day PHI.
Success	4–6 fl oz	Winter moth does not appear on label, but application is legal and is known to be effective. 4-hour reentry. 3-day PHI.

Prebloom (Stages 4 and 5)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Mummy berry—primary infection		
Captan 80WDG	1.25–3.1 lb	3-day reentry. 0-day PHI.
Captevate 68WDG	4.7 lb	Do not apply more than 2 consecutive applications or more than 21 lb/A/season. 2-day reentry. 0-day PHI.
Indar 2F	6 fl oz	Tank-mix with a wetting agent. 12-hour reentry. 30-day PHI.
Omega 500F	1.25 pt	Do not use with an adjuvant. 3-day reentry. 30-day PHI.
Pristine	18.5–23 oz	Do not use with any other tank additive. 12-hour reentry. 0-day PHI.
Quash	2.5 oz	Do not use with an adjuvant. 12-hour reentry. 7-day PHI.
Quilt Xcel	14–21 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.
Tilt/PropiMax/Bumper	6 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.

Prebloom continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Prebloom (Stages 4 and 5)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Aphids		
Actara	3–4 oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 3-day PHI.
Assail 30SG	2.5–5.3 oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Diazinon 50W	1 lb	For bee safety, do not apply to bloom or within 5 days of introducing bees. Do not apply more than once per season. 5-day reentry. 7-day PHI.
Esteem 35WP	5 oz	Aphids do not appear on label, but application is legal and may be effective. Avoid direct application and/or spray drift to beehives. 12-hour reentry. 7-day PHI.
M-Pede	2 gal	Insecticidal soap. Other brands available. Apply as full cover spray, 2 gal/100 gal water. Repeat applications are likely to be necessary. Approved for organic production. 12-hour reentry. 0-day PHI.
Malathion 57EC or Malathion 8 Aquamul	1.5 pt 1 pt	Aphids do not appear on label, but application is legal and effective. Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Neem (Aza-Direct, Neemix)	—	Refer to label for rate, use pattern, and precautions. These, and most other brands of azadirachtin (neem), are approved for organic production.
Platinum	5–12 fl oz	Applied to the soil and translocated to the leaves. 12-hour reentry. 5-day PHI.
Provado 1.6F	3–4 fl oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 3-day PHI.
Cherry fruitworm		
Altacor	3.0–4.5 oz	Cherry fruitworm does not appear on label, but application is legal and may be effective. 4-hour reentry. 1-day PHI.
Avaunt	3–6 oz	Toxic to bees; do not apply when bloom is present. 12-hour reentry. 7-day PHI.
Confirm 2F	1 pt	Apply at early egg hatch. 4-hour reentry. 14-day PHI.
Danitol	10–16 fl oz	Restricted use pesticide. Toxic to bees; do not apply when bees are present. 24-hour reentry. 3-day PHI.
Delegate WG	3–6 oz	Do not apply more than a total of 19.5 oz/season. Toxic to bees; do not apply when bloom is present. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	For bee safety, do not apply to bloom or within 5 days of introducing bees. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Approved for organic production. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.
Esteem 35WP	5 oz	Avoid direct application and/or spray drift to beehives. 12-hour reentry. 7-day PHI.
Intrepid 2F	10–16 fl oz	Apply at early egg hatch. 4-hour reentry. 7-day PHI.
Lannate LV	1.5–3 pt	Restricted use pesticide. For bee safety, do not apply within 5 days of pollination. 2-day reentry. 3-day PHI.
Malathion 57EC or Malathion 8 Aquamul	1.5 pt 1 pt	Highly toxic to bees; avoid application when bees are present. 12-hour reentry. 1-day PHI.
Sevin XLR Plus	1–2 qt	For bee safety, do not apply within 5 days of pollination. 12-hour reentry. 7-day PHI.
Success	4–6 fl oz	Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.

Prebloom continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Prebloom (Stages 4 and 5)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Winter moths (spanworms, inchworms) (see footnote 1, page 13)		
Altacor	3.0–4.5 oz	Winter moth does not appear on label, but application is legal and may be effective. 4-hour reentry. 1-day PHI.
Asana XL	4.8–9.6 fl oz	Restricted use pesticide. Toxic to bees; do not apply when bloom is present. 12-hour reentry. 14-day PHI.
Avaunt	6 oz	Toxic to bees; do not apply when bloom is present. 12-hour reentry. 7-day PHI.
<i>Bacillus thuringiensis</i>	—	Many brands available. See label for rate. Approved for organic production. Multiple sprays usually necessary. Inspect buds in spring as scales separate. This pest usually requires a first Bt application prior to bloom. 4-hour reentry. 0-day PHI.
Brigade WSB	8–16 oz	Restricted use pesticide. Do not apply when bloom is present. 12-hour reentry. 1-day PHI.
Confirm 2F	1 pt	Apply at early egg hatch. 4-hour reentry. 14-day PHI.
Delegate WG	3–6 oz	Winter moth does not appear on label, but application is legal and is known to be effective. Toxic to bees; do not apply when bloom is present. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	This pest may not be listed on label, but this is a legal application and is known to be effective. Do not apply to bloom or within 5 days of introducing bees. Do not use more than once per season. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Winter moth does not appear on label, but application is legal and is known to be effective. Approved for organic production. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.
Intrepid 2F	10–16 fl oz	Apply at early egg hatch. 4-hour reentry. 7-day PHI.
Lannate LV	1.5–3 pt	Restricted use pesticide. This pest may not be listed on label, but this is a legal application and is known to be effective. Do not apply to bloom or within 5 days of introducing bees. 2-day reentry. 3-day PHI.
Rimon 0.83EC	20–30 fl oz	Apply at egg hatch or to early instar larvae. To minimize effects on honeybee brood development, do not apply if bees are actively foraging. 12-hour reentry. 8-day PHI.
Sevin XLR Plus	1–2 qt	This pest may not be listed on label, but this is a legal application and is known to be effective. Toxic to bees; do not apply to bloom or within 5 days of introducing bees. 12-hour reentry. 7-day PHI.
Success	4–6 fl oz	Winter moth does not appear on label, but application is legal and is known to be effective. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Bloom (Stage 6)		
Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Botrytis gray mold, Alternaria fruit rot, ripe rot (anthracnose) (see footnote 6, page 15)		
Abound	6–15.4 fl oz	For ripe rot control. Do not use more than 3 times per year or 2 consecutive applications or with a silicone-based surfactant. 4-hour reentry. 0-day PHI.
Captan 80WDG	1.25–3.1 lb	Apply at early bloom and at 10- to 14-day intervals through petal fall. 3-day reentry. 0-day PHI.
Captevate 68WDG	3.5–4.7 lb	Do not apply more than 2 consecutive applications or more than 21 lb/A/season. 2-day reentry. 0-day PHI.
Elevate 50WDG	1.5 lb	For Botrytis control. 12-hour reentry. 0-day PHI.
Iprodione 4L	1–2 pt	For Botrytis control. 1-day reentry. 0-day PHI.
Omega 500F	1.25 pt	For ripe rot control. Do not use with an adjuvant. 3-day reentry. 30-day PHI.
Pristine	18.5–23 oz	Do not use with any other tank additive. 12-hour reentry. 0-day PHI.
Quilt Xcel	14–21 fl oz	For ripe rot control. 12-hour reentry. 30-day PHI.
Switch 62.5WG	11–14 oz	Do not use more than 2 consecutive applications or more than 56 oz/A/season. 12-hour reentry. 0-day PHI.
Ziram 76DF	3 lb	Do not apply more than 3 weeks past full bloom. 2-day reentry.
Mummy berry—secondary infection		
Captan 80WDG	1.25–3.1 lb	3-day reentry. 0-day PHI.
Captevate 68WDG	4.7 lb	Do not apply more than 2 consecutive applications or more than 21 lb/A/season. 2-day reentry. 0-day PHI.
Indar 2F	6 fl oz	Tank-mix with a wetting agent. 12-hour reentry. 30-day PHI.
Pristine	18.5–23 oz	Do not use with any other tank additive. 12-hour reentry. 0-day PHI.
Quash	2.5 oz	Do not use with an adjuvant. 12-hour reentry. 7-day PHI.
Quilt Xcel	14–21 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.
Tilt/PropiMax/Bumper	6 fl oz	Use of propiconazole for mummy berry control has been associated with an increase in Botrytis severity. 12-hour reentry. 30-day PHI.
Shock and scorch virus		
none	—	Look for symptoms and have suspected plants tested. Check with OSU as to when samples will be accepted for virus testing.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Postbloom to Preharvest (Stage 7)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Anthrachnose (ripe rot) and Alternaria fruit rot (see footnote 6, page 15)		
Abound	6–15.4 fl oz	Do not use more than 3 times per year or 2 consecutive applications or with a silicone-based surfactant. 4-hour reentry. 0-day PHI.
Captan 80WDG	1.25–3.1 lb	3-day reentry. 0-day PHI.
Captevate 68WDG	4.7 lb	Do not apply more than 2 consecutive applications or more than 21 lb/A/season. 2-day reentry. 0-day PHI.
Omega 500F	1.25 pt	For ripe rot control. Do not use with an adjuvant. 3-day reentry. 30-day PHI.
Pristine	18.5–23 oz	Do not use with any other tank additive. 12-hour reentry. 0-day PHI.
Quash	2.5 oz	Do not use with an adjuvant. 12-hour reentry. 7-day PHI.
Switch 67.5WG	11–14 oz	Do not use more than 2 consecutive applications or more than 56 oz/A/season. 12-hour reentry. 0-day PHI.
Ziram 76DF	3 lb	Do not use later than 3 weeks after full bloom. 2-day reentry.
Scorch virus		
none	—	Remove plants that test positive for this virus.
Aphids		
insecticidal soap, neem, diazinon, Esteem, malathion, Assail, Actara, Provado, or Platinum	—	See prebloom section for use, rates, and preharvest intervals.
Midge		
Assail 30SG	2.5–5.3 oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Delegate WG	3–6 oz	Suppression of midge. Do not apply more than a total of 19.5 oz/season. Toxic to bees; do not apply when bloom is present. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	Midge does not appear on label, but application is legal and may be effective. For bee safety, do not apply to bloom or within 5 days of introducing bees. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Midge does not appear on label, but application is legal and may be effective. Approved for organic production. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.
Imidan 70W (WSB)	1.33 lb	Midge does not appear on label, but application is legal and may be effective. Highly toxic to bees exposed directly to treatment. Do not apply if bees are foraging in the area. 1-day reentry. 3-day PHI.
Malathion 57EC or Malathion 8 Aquamul	1.5 pt 1 pt	Midge does not appear on label, but application is legal and may be effective. Highly toxic to bees; avoid application when bees are present. 12-hour reentry. 1-day PHI.
Rimon 0.83EC	20–30 fl oz	Apply at egg hatch or to early instar larvae. To minimize effects on honeybee brood development, do not apply if bees are actively foraging. 12-hour reentry. 8-day PHI.
Success	4–6 fl oz	Midge does not appear on label, but application is legal and may be effective. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.

Postbloom to Preharvest continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Postbloom to Preharvest (Stage 7)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Leafrollers (orange tortrix) (see footnote 2, page 14)		
Altacor	3.0–4.5 oz	Orange tortrix leafroller does not appear on label, but application is legal and may be effective. 4-hour reentry. 1-day PHI.
Avaunt	6 oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 7-day PHI.
<i>Bacillus thuringiensis</i>	—	Many brands available. See label for rate. Approved for organic production. 2–3 sprays 7 days apart may be necessary for satisfactory control. 4-hour reentry. 0-day PHI.
Brigade WSB	8–16 oz	Restricted use pesticide. Highly toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Confirm 2F	1 pt	Apply at early egg hatch. 4-hour reentry. 14-day PHI.
Danitol	10–16 fl oz	Restricted use pesticide. Toxic to bees; do not apply when bees are present. 24-hour reentry. 3-day PHI.
Delegate WG	3–6 oz	Do not apply more than a total of 19.5 oz/season. Toxic to bees; do not apply if bees are foraging in the area. 4-hour reentry. 3-day PHI.
Entrust	1.25–2 oz	Approved for organic production. Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.
Imidan 70W (WSB)	1.33 lb	Toxic to bees; do not apply if bees are foraging in the area. OR 24c registration. 1-day reentry. 3-day PHI.
Intrepid 2F	10–16 fl oz	Apply at early egg hatch. 4-hour reentry. 7-day PHI.
Lannate LV	1.5–3 pt	Restricted use pesticide. Also will help suppress aphids. Highly toxic to bees; do not apply if bees are foraging in the area. 2-day reentry. 3-day PHI.
Mustang	4.3 oz	Restricted use pesticide. Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Rimon	20–30 fl oz	Apply at egg hatch or early instar larvae. To minimize effects on honeybee brood development, do not apply if bees are actively foraging. 12-hour reentry. 3-day PHI.
Sevin XLR Plus	1–2 qt	Highly toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 7-day PHI.
Success	4–6 fl oz	Toxic to bees exposed to treatment for 3 hours following treatment. 4-hour reentry. 3-day PHI.
Scale insects (crawler stage)		
Diazinon 50W	1 lb	Scale may not be listed on label, but this is a legal application and is known to be effective. Toxic to bees; do not apply if bees are foraging in the area. 5-day reentry. 7-day PHI.
Esteem 35WP	5 oz	Avoid direct application and/or spray drift to beehives. 12-hour reentry. 7-day PHI.
Malathion 57EC or Malathion 8 Aquamul	2 pt 1.25 pt	Scale does not appear on the label, but application is legal and effective. Toxic to bees; avoid application when bees are present. 12-hour reentry. 1-day PHI.

Postbloom to Preharvest continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Postbloom to Preharvest (Stage 7)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Spotted wing drosophila (SWD) (see footnote 4, page 15)		
<i>Note:</i> Even if SWD is not listed on a label, it is legal to use the following for SWD management. These products target the adult stage of SWD. Treatment is recommended when flies are present and fruit begins to color.		
Asana XL	9.6 fl oz	Restricted use pesticide. For bee safety, do not apply within 7 days of pollination. Toxic to fish and aquatic invertebrates. Achieves 100% mortality and provides about 10–14 days residual control. 12-hour reentry. 14-day PHI.
Brigade WSB	16 oz	Restricted use pesticide. Do not apply when bees are present. Toxic to fish and aquatic invertebrates. Achieves 100% mortality and provides about 10–14 days residual control. 12-hour reentry. 1-day PHI.
Danitol	10–16 fl oz	Restricted use pesticide. Do not apply when bees are present. Toxic to fish and aquatic invertebrates. Achieves 100% mortality and provides about 10–14 days residual control. 24-hour reentry. 3-day PHI.
Delegate WG	3–6 oz	Toxic to bees; do not apply when bloom is present. Achieves 100% mortality of SWD and provides about 5–7 days residual control. 4-hour reentry. 3-day PHI.
Diazinon 50W	1 lb	One application per season allowed; consider other pests that may need to be managed with diazinon. Do not apply to bloom or within 5 days of introducing bees. Toxic to fish and most aquatic invertebrates. Achieves 100% mortality and provides about 7–10 days residual control. 5-day reentry. 7-day PHI.
Entrust	1.25–2 oz	Approved for organic production. Toxic to bees exposed to treatment for 3 hours following treatment. Achieves 100% mortality of SWD and provides about 5–7 days residual control. 4-hour reentry. 3-day PHI.
Imidan 70W (WSB)	1.33 lb	Highly toxic to bees exposed directly to treatment. Do not apply if bees are foraging in the area. Toxic to most aquatic invertebrates. Achieves 100% mortality and provides about 7–10 days residual control. 1-day reentry. 3-day PHI.
Lannate LV	1.5–3 pt	Restricted use pesticide. Do not apply to bloom or within 5 days of introducing bees. Toxic to fish and most aquatic invertebrates. Achieves 100% mortality and provides about 7–10 days residual control. 2-day reentry. 3-day PHI.
Malathion 57EC or Malathion 8 Aquamul	1.5 pt 1 pt	Highly toxic to bees; avoid application when bees are present. Toxic to most aquatic invertebrates. Achieves 100% mortality and provides about 7–10 days residual control. 12-hour reentry. 1-day PHI.
Mustang	4.3 oz	Restricted use pesticide. Toxic to bees; do not apply if bees are foraging in the area. Toxic to fish and other aquatic invertebrates. Achieves 100% mortality and provides about 10–14 days residual control. 12-hour reentry. 1-day PHI.
Pyrethrin products	Varies	Consult label for rate and use directions. Toxic to bees; do not apply if bees are foraging in the area. Highly toxic to fish. Provides about 80% control of SWD but has no residual activity. The Pyganic brand of pyrethrin is approved for organic production.
Sevin XLR Plus	1–2 qt	Toxic to bees; do not apply to bloom or within 5 days of introducing bees. Toxic to aquatic invertebrates. Achieves 100% control of SWD. 12-hour reentry. 7-day PHI.
Success	4–6 fl oz	Toxic to bees exposed to treatment for 3 hours following treatment. Achieves 100% mortality of SWD and provides about 5–7 days residual control. 4-hour reentry. 3-day PHI.

Postbloom to Preharvest continues on next page

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

CONTINUED—Postbloom to Preharvest (Stage 7)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Root weevils (adults) (see footnote 3, page 14)		
Actara	4 oz	Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 3-day PHI.
Asana XL	9.6 fl oz	Restricted use pesticide. Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 14-day PHI.
Brigade WSB	8–16 oz	Restricted use pesticide. This pest does not appear on the label, but is a legal use and known to be effective. Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Malathion 57EC or Malathion 8 Aquamul	2 pt 1.25 pt	Root weevil does not appear on the label, but application is legal and effective. Toxic to bees; avoid application when bees are present. 12-hour reentry. 1-day PHI.
Mustang	4.3 oz	Restricted use pesticide. Toxic to bees; do not apply if bees are foraging in the area. 12-hour reentry. 1-day PHI.
Neem (Aza-Direct, Neemix)	—	Refer to label for rate, use pattern, and precautions. These, and most other brands of azadirachtin (neem), are approved for organic production.
Yellowjackets		
Heptyl butyrate traps	—	See Washington State University publication EB 0643, <i>Yellowjackets and Paper Wasps</i> , for further use directions.
pressurized insecticide sprays	—	Numerous products. Apply as spray to entrance hole of aerial nests. Do not contaminate berries.
Growth regulator to promote ripening		
Ethephon (Ethrel)	4–8 pt	Use 150–200 gal water/A. 2-day reentry.
Preharvest/Harvest (Stage 8)		
Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Bird prevention		
Labels for bird repellents include Bird Shield and ReJex-iT.	—	Netting is the most effective alternative for control. Falconing techniques are very effective if used correctly. Reflective tapes also show some effectiveness. Other mechanical methods and noise devices are used under a variety of circumstances with varying levels of effectiveness. Consult your local Extension agent.
Botrytis gray mold		
none	—	Adjust overhead irrigation so foliage and fruit do not remain wet for extended periods of time.
Alternaria fruit rot		
none	—	Do not handle or pick fruit when fruit is wet. Clean debris from picking buckets and packing lines. Cool fruit rapidly after picking.
Spotted wing drosophila (SWD) (see footnote 4, page 15)		
See materials listed for Postbloom to Preharvest (Stage 7)		

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Postharvest (Stage 9)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval/Preharvest interval (PHI)
Bacterial canker		
<i>Note:</i> Make an application following harvest and prior to fall rains; repeat in 1 month. The best time to apply is when leaves are falling off; this protects leaf scars. Some brands of copper are approved for organic production.		
Bordeaux (8-8-100)	—	See footnote 5, page 15.
Copper-Count-N	8–10 qt	12-hour reentry.
Cuprofix Ultra 40 Disperss	3–4 lb	48-hour reentry.
Kocide 3000	1.75–3.5 lb	2-day reentry.
Nordox 75WG	6.5–10 lb	Use a spreader-sticker. 12-hour reentry.
Nu-Cop 50DF	6 lb	1-day reentry.
Phyton 27 AG	20–40 fl oz	48-hour reentry.
Root weevils (larvae) (see footnote 3, page 14)		
Neem (Aza-Direct, Neemix)	—	Applied to the soil in early fall. Refer to label for rate, use pattern, and precautions. These, and most other brands of azadirachtin (neem), are approved for organic production.
parasitic nematodes	—	Applied to the soil in early fall. Follow label directions for rate and irrigation requirements.
Platinum	12 fl oz	This pest does not appear on the label, but this is a legal use. Platinum has been known to be effective in other crops for larvae control. 12-hour reentry. 75-day PHI.
Symphylan		
Mocap (nonbearing fields only)	1.33 qt	SLN# OR-120020 allows use in newly planted, nonbearing fields. Broadcast or band (2-ft minimum) apply to the soil. Immediately apply 1 to 2 inches of overhead irrigation water to incorporate. Consult label for use with drip irrigation. 48-hour reentry. 365-day PHI.

Footnotes

1. WINTER MOTHS: There are four species of winter moths native to the Northwest. Their life histories are similar in that there is but one generation/year characterized by eggs that overwinter on the trunks and branches of deciduous trees and shrubs. The larvae (inchworms or spanworms) begin emerging as early as March, with egg hatch usually complete by mid-April. The larvae feed on many plants, particularly those of the rose family. Blueberry plantings become infested when moths deposit eggs on plants in late fall and winter and/or when larvae infesting host plants adjacent to the planting are blown in on silken threads. This larval migration often leads growers to believe that previously applied sprays failed to control the pest.

CONTROL: Recognize that larvae are active in March and can burrow into buds, causing damage prior to bud burst. Early-season control is necessary. Infestations of winter moth that are a result of in-field infestations (eggs having overwintered on trunks and limbs of blueberry plants) can be reduced by the dormant oil + insecticide spray during the winter. Careful inspection of buds and newly expanding plant growth from April through early bloom will indicate need for additional sprays. Because larvae are present into June and because the larvae can blow into blueberry plantings from surrounding trees, you must monitor fields even after insecticides have been applied. Repeat sprays may be necessary. Use least-toxic alternatives when pollinators and/or bloom are present.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

2. **LEAFROLLERS:** The most common leafroller in western Oregon blueberries is the orange tortrix. It does direct feeding damage to the berries, provides an entry route for fruit rots, and may become an insect contaminant at harvest. It overwinters as a larva under leaves plastered to the trunks and limbs and among leaf litter of host plants. Most infestations on blueberries occur when moths of the spring generation (flight beginning mid-April and peaking early to mid-June) fly in and deposit eggs on plants.

CONTROL OF LARVAE—PREBLOOM: In-field infestations of larvae should be evaluated and treated (if necessary) from late March to early April, with the April date being on the late side for effective control if mild winter/early spring weather occur.

CONTROL OF LARVAE—LATE JUNE/EARLY JULY: Use pheromone traps to monitor moth activity in individual plantings from May through harvest to help in deciding whether to control larvae. Sprays to control larvae in late June and early July are necessary in caneberries when individual trap catches exceed 70 moths/week or more than 200 moths are caught in a trap by June 1. We do not have adequate information on blueberries at this time. Choice of insecticide will depend on presence of bloom or proximity of harvest. **NOTE:** If *Bacillus thuringiensis* is used, two and possibly three applications at 7-day intervals may be necessary to achieve adequate control of heavy infestations. Use of this product with this timing should begin about 3 to 4 weeks prior to anticipated harvest because of its relatively slow action.

CONTROL OF LARVAE—AUGUST THROUGH HARVEST: A second flight begins in late July or early August, with large numbers of moths active through September. Larvae from these flights may infest fruit of the blueberry varieties harvested from mid-August through September. Pheromone traps used as above will help in the decision-making process of whether or not to control orange tortrix.

NOTE: Obliquebanded leafroller adults occasionally are lured to orange tortrix traps. Be sure to distinguish between the two species, as obliquebanded leafroller seldom is a pest in blueberries.

Also, orange tortrix traps will “pull in” males of the orange tortrix from a long distance from the blueberry planting, giving the false impression at times that a large infestation of larvae will follow within 2 to 3 weeks. For this reason, we recommend the placement of “guard” traps a few hundred yards, and in the predominant downwind direction, from the planting. They will intercept moths coming from areas that do not pose a threat to the blueberry field. Do not consider these moths when evaluating the need to spray a given block, but try to identify the source of infestation for future reference.

Finally, always try to verify the presence of larvae in a planting to justify a spray application. Do this by placing a white sheet under a few plants and shaking limbs vigorously. The larvae will hang down on silk threads, eventually falling to the sheet. Rolled leaves and leaves plastered to berries also are indications of infestation.

3. **ROOT WEEVILS:** Several species of root weevils have been found damaging blueberries in Oregon. Black vine weevil, strawberry root weevil, and obscure root weevil are three of the most common species whose larvae girdle roots, setting back growth tremendously. Adult weevils, although causing negligible injury to the leaves, can be contaminants of fruit.

DETECTION: Depending on the species, adults begin emerging in early May, with 90% emergence usually occurring by mid-June, depending on how warm spring temperatures have been, elevation and slope of the planting, and depth of the insulating sawdust layer. To determine when adults emerge and become active, inspect new sucker growth near crown for leaf notching. With the aid of a flashlight, you can most easily see the adult weevils when they are feeding on foliage on warm, still evenings after sunset.

CONTROL: All weevils are females and have the ability to lay more than 500 eggs during the course of the season. Applications of insecticides to control weevils are timed to 80% to 90% adult emergence but prior to egg laying. This usually is in June.

Weevils are difficult to control with insecticides. Therefore, it is necessary to time foliar sprays carefully. Weevils are active at night. Applications should be made after dark (usually 10 p.m. to after midnight) on warm, still evenings when weevils are on foliage. Two or three sprays approximately 1 week apart are necessary to begin to control an established infestation.

Obviously, you also must consider the presence of bloom and the damage caused by the sprayer to the bloom and by the insecticide to pollinators. Custom programs often must be devised for individual blocks, depending on emergence pattern of the adult weevils, blueberry variety, presence of bloom and pollinators, and proximity to harvest.

Neem, Platinum, or parasitic nematodes can be applied to the soil for control of the larvae in established plantings. Applications made in fall when larvae are young yield best results. Degree of control, however, depends on soil moisture and available irrigation or rainfall. Refer to label for use pattern and precautions.

4. **SPOTTED WING DROSOPHILA:** The spotted wing drosophila (SWD) is a new and exotic pest that attacks a wide variety of fruits and was first discovered in Oregon in 2009. Adult SWD flies resemble the common vinegar flies found in the kitchen, around compost piles, or on fallen, decaying, and rotting fruit in the fields. Unlike common vinegar flies, SWD flies prefer ripe to overripe fruit on the plant.

A female SWD lays one to three eggs in each fruit; a single female can lay several hundred eggs in her lifetime (each adult lives for an average of 3 to 4 weeks). The larvae feed inside the fruit for about 5 to 7 days until they are ready to pupate. The brownish-yellow pupa is a nonfeeding stage lasting 4 to 5 days. Pupae often remain inside fruit with their respiratory horns sticking out of the fruit for breathing purposes until adult fly emergence. The adult fly then emerges, mates, and begins a new generation of pests. It has been estimated that three to nine generations might occur in Oregon, depending on environmental conditions.

To recognize SWD damage on suspect fruit, look for the following: two hairlike filaments attached to each egg sticking out of fruit (the egg is within the fruit); scarring or spotting on the fruit surface; liquid exuding out of a scar (where eggs were laid) when fruit is squeezed; softening, collapsing, and/or bruising of fruit at the damage site; and small, white larvae and pupae inside the fruit (visible to the naked eye if fruit is opened). Adult flies can be monitored with apple cider vinegar traps, and fruit can be checked for larval infestation with a salt extraction method or a fruit dunk flotation method. For further information on identification and monitoring, visit OSU's spotted wing drosophila website at <http://spottedwing.com>

MANAGEMENT STRATEGIES: In addition to the chemical controls mentioned in this publication, the following cultural management strategies and biological control can help mitigate SWD infestations:

- Harvest in a timely manner. Pick fruit at regular intervals to prevent egg-laying opportunities. Avoid overripe fruit on plants.
 - Clean up infested fruit. To prevent SWD populations from building, remove and dispose of leftover, fallen, and infested fruit.
 - Reduce the amount of alternate hosts in surrounding areas. Potential perimeter and wildland hosts for SWD may include snowberry, dogwood, Himalayan blackberry, wild rose, flowering cherry, crabapple, and others.
 - Biological control: Anecdotal observations suggest that predaceous bugs (e.g., minute pirate bugs, big-eyed bugs), parasitic wasps, and lacewing larvae may be important biological control agents. Use pesticides judiciously to protect natural enemies.
5. Bordeaux 8-8-100 means 8 lb copper sulfate plus 8 lb hydrated lime in 100 gallons of water. In any bordeaux formula, the ingredients always are listed in the same order—copper sulfate, hydrated lime, then gallons of water.

Bacteria resistant to various copper formulations have been detected in nurseries throughout the Willamette Valley and in blueberry fields in British Columbia. Resistant bacterial populations will reduce the effectiveness of copper-based products.
 6. Although registered, Bravo and Aliette have not been shown to be consistently effective against ripe rot. Ziram was effective in 1998 field trials.

Effectiveness of Fungicides for Control of Blueberry Diseases*

Fungicide	Fungicide group #	Mummy berry (primary)	Mummy berry (secondary)	Botrytis blight	Anthracnose fruit rot	Alternaria fruit rot	Pseudomonas bacterial canker	Phytophthora root rot
Abound	11	Moderate?	Moderate?	Moderate	Excellent	??	Not effective	Not effective
Aliette	33	Not effective	Not effective	Not effective	Poor	??	Not effective	Good
Bravo	M5	Moderate	Poor	Moderate	Moderate–Poor	Not effective	Not effective	Not effective
Captan	M4	Moderate	Moderate	Moderate	Moderate	Moderate	Not effective	Not effective
Copper-based products	M1	??	??	Moderate–Poor	??	??	Good**	Not effective
Elevate	17	Moderate?	Moderate?	Good–Excellent**	Poor	??	Not effective	Not effective
Fosphite	33	Not effective	Not effective	Not effective	Poor	??	Not effective	Good
Indar	3	Good	Good	?	Poor	??	Not effective	Not effective
Iprodione	2	Moderate–Poor	Moderate–Poor	Excellent**	??	??	Not effective	Not effective
Omega	29	Moderate–Good	Moderate–Good	Poor–Moderate	Good	??	Not effective	Not effective
Phostrol	33	Not effective	Not effective	Not effective	Poor	??	Not effective	Good
PropiMax	3	Moderate–Good	Moderate–Good	Poor	Poor	??	Not effective	Not effective
Quash	3	Good	Good	Moderate**	Good	??	Not effective	Not effective
Regalia	Plant extract	Moderate	Poor	??	??	??	??	??
Ridomil	4	Not effective	Not effective	Not effective	Not effective	Not effective	Not effective	Excellent**
Serenade	Biological	Poor–None	Poor–None	??	Not effective	??	Not effective	Not effective
Tilt	3	Moderate–Good	Moderate–Good	Poor	Poor	??	Not effective	Not effective
Ziram	M3	Poor	Poor	Moderate–Poor	Moderate	Moderate	Not effective	Not effective
Combination products								
Captevate	M4 + 17	Moderate	Moderate	Good–Excellent	Moderate	Moderate	Not effective	Not effective
Pristine	7 + 11	Poor	Good	Excellent**	Excellent	??	Not effective	Not effective
Quilt Xcel	3 + 11	Moderate–Good	Good	Moderate	Excellent	??	Not effective	Not effective
Switch	12 + 9	None–Poor	Poor	Good–Excellent**	Good	??	Not effective	Not effective

*These ratings are relative rankings based on labeled application rates, good spray coverage, and proper spray timing. Actual levels of disease control will be influenced by these factors in addition to cultivar susceptibility, disease pressure, and weather conditions.

**Resistant pathogens will lower the effectiveness of these fungicides.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Blueberry Cultivar Susceptibility to Disease

Cultivar	Mummy berry (primary)	Mummy berry (secondary)	Blueberry scorch	Bacterial canker	Ripe rot
Aurora	R	?	?	?	?
Berkeley	MR	S	S	?	I
Bluecrop	S	MR	T*	MR	S
Bluejay	R	R	S	S	I
Blueray	S	S	S	S	S
Bluetta	R	MR	T	I	S
Chandler	I	S	?	S	?
Collins	S	I	S	?	R
Concord	MR	I	T*	?	I
Coville	S	MR	?	S	S
Darrow	R	I	S	S	I
Dixi	R	I	S	?	I
Draper	I	?	?	?	?
Duke	?	MR	T*	I	I
Earliblue	S	S	S	?	S
Elliott	D	I	?	R	R
Herbert	D	S	S	?	S
Ivanhoe	?	I	T	?	I
Jersey	MR	I	T	S	I
Lateblue	MR	I	S	?	I
Legacy	?	?	?	?	R
Liberty	R	?	?	?	?
Northland	S	S	*	?	I
Olympia	R	MR	MR	?	I
Patriot	?	MR	S	S	I
Pemberton	MR	I	S	?	I
Ranococas	S	I	T	R	I
Reka	I	MR	T	?	I
Rubel	R	I	S	MR	I
Spartan	D	I	S	I	S
Toro	MR	I	?	?	I
Weymouth	S	MR	S	R	R

MR = Moderately resistant; R = Resistant; I = Intermediate; S = Susceptible; T = Tolerant; ? = Unknown;
D = Described as resistant but unknown reaction in the Pacific Northwest relative to other cultivars.

*Susceptible to a strain of the virus found in British Columbia.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.

Basic Elements of Safe Pesticide Use

- Always read the label with care. This is the first step in selecting the right material for the job. Never rely on your memory. Before opening the container, pay strict attention to warnings and cautions printed on the label.
- Keep all pesticide and spray materials out of the reach of children, pets, and irresponsible persons. Storage outside of the home, away from food and feed, and under lock and key is the safest method.
- Store only in the original container and keep tightly closed.
- NEVER smoke, eat, or drink while applying pesticides.
- Avoid inhalation or direct contact. Always wear protective clothing and safety devices as recommended on the label.
- Avoid spills. If spills occur, take immediate action to remove contaminated clothing and wash thoroughly.
- After each application, bathe and change to clean clothing. Wash clothing after each use. Always use fresh clothing when starting new application.
- Avoid contamination of fish ponds and water supplies. Cover feed and water containers when treating around livestock or pet areas.
- Keep separate equipment for use with hormone-type herbicides to avoid accidental injury to susceptible plants. Also avoid applications under wind conditions that could create drift to nontarget areas.
- Rinse empty containers three times before disposing of them. Add the rinse to the spray tank and dispose of containers according to local regulations to avoid hazard to humans, animals, and the environment.
- Follow label directions for mixing and application to keep residues within the limits prescribed by law.
- Plan ahead. Discuss with your physician the materials you will be using during the season so that he or she can be prepared to provide the appropriate treatment in case of accidental exposure. If symptoms of illness occur, call the physician or get the patient to a hospital immediately. Always provide the medical personnel with as much information as possible.
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

Oregon Poison Center

The Oregon Health & Science University
3181 S.W. Sam Jackson Park Road
Portland, OR 97239
Phone: 1-800-222-1222

If a person has collapsed or is not breathing, dial 911.

Prepared by Joe DeFrancesco, assistant professor; Jay W. Pscheidt, Extension plant pathology specialist; and Wei Yang, Extension agent, North Willamette Research and Extension Center; all of Oregon State University. The information in this pest management guide is valid for 2013. Trade-name products and services are mentioned as illustrations only. This does not mean that the Oregon State University Extension Service either endorses these products and services or intends to discriminate against products and services not mentioned. Due to constantly changing laws and regulations, the Oregon State University Extension Service can assume no liability for the suggested use of chemicals contained in this guide. Pesticides should be applied according to the label directions on the pesticide container.

© 2013 Oregon State University. This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties. Oregon State University Extension Service offers educational programs, activities, and materials without discrimination based on age, color, disability, gender identity or expression, genetic information, marital status, national origin, race, religion, sex, sexual orientation, or veteran's status. Oregon State University Extension Service is an Equal Opportunity Employer.

Revised April 2013.

Use only one material except where a combination is indicated. Follow label precautions when tank-mixing oils, fungicides, and insecticides. Materials are not listed in order of preference.