Oregon State University | Extension Service

Cherry

2016 Pest Management Guide for the Willamette Valley

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The chemicals, formulations, and rates listed for insect, mite, and disease control are among the best recommendations based on label directions, research, and orchard use experience. Only a thorough knowledge of the orchard, its cultivar, tree 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.

Always refer to the pesticide label for use instructions. It is the legal document regarding use patterns. 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 schedule below suggests an amount of formulated product (not active ingredient) to use per acre. This amount is based on a "typical" middle age and density orchard with moderate pest pressure. Common sense indicates that less material may be needed (than that given) for 1- to 4-year-old orchards. Conversely, more chemical (within label limits) may be required for large, mature trees experiencing heavy pest pressure from multiple pests.

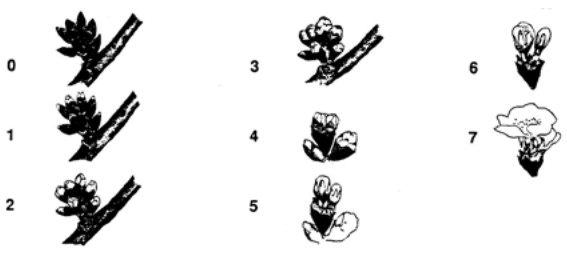

Illustration courtesy of Washington State University Extension.

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!** Some label directions indicate dilute applications only, such as the dimethoate labels for cherry fruit fly control.

Also:

1. Make sure any tank-mixes of pesticides are compatible. For example, the elevated pH of some boron spray solutions weakens many insecticides.
2. Use adjuvants and spreader stickers with caution.

Important information

1. Be aware of worker protection standards (WPS). All new pesticide labels will provide orchard reentry intervals and personal protection equipment information.
2. Diazinon is now classified as a restricted-use pesticide due to bird toxicity. Maximum per-acre application rates have been reduced to 4 lb 50W, and the preharvest interval extended to 21 days.

Stages

Dormant Season (Stage 0)
Dormant and Delayed Dormant (Stages 0–1)
Popcorn Stage (Stages 2–5)
Full Bloom (Stages 6–7)

Not shown

Petal Fall; Shuck Split; Two Weeks after Shuck Fall; Late Spring and Summer; Postharvest

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.

Cherry 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. Copper-based products alone have not worked well under conditions favorable for bacterial canker development.

Dormant and Delayed Dormant (Stages 0–1—before buds open and before eggs hatch)

Pest or disease/ Material	Amount of product per acre	Comments/Reentry interval
Scale insects, mite eggs, aphids, eggs and larvae of certain leafrollers, peach twig borer, and bud moth *Note:* When using a WP formulation with oil, fill sprayer tank one-third full with water, turn on agitator, slowly add the WP, fill tank one-half full with more water, add oil. Keep agitator running, finish filling. Thorough coverage is essential. Dilute sprays recommended during this stage. Liquid formulations mix best with oil and water.		
horticultural mineral oil (HMO) + an insecticide registered for these pests, such as:		
Centaur 70WDG	34.5–46 oz	Group 16 insecticide (IGR). No more than 2 applications per season. Do not tank mix with oil. 12-hour reentry.
Cobalt	4–6.25 oz	Group 1B + group 3 insecticide. Cold/dry conditions may cause phytotoxicity. Avoid contact with sweet cherry foliage. 4-day reentry.
Diazinon 50WP	4 lb	Group 1B insecticide. Limited to one dormant and one cover spray per season. Closed cab required. 24-hour reentry.
Esteem 35WP	4–5 oz	Group 7C (IGR). Limited to 3 applications per season. Targets eggs and immature (molting) stages of leafrollers. 12-hour reentry.
Exirel 0.83SE	10–20.5 oz	Group 28 insecticide. No more than 0.4 lb ai/A per season. Targets leafroller and peach twig borer at this timing. Use the high rate for dormant and the low rate for delayed dormant. 12-hour reentry.
Lorsban 4E	1.5–4 pt	Group 1B insecticide. Limited to one application during dormant season, foliage contact could cause leaf drop. 4-day reentry.
Supracide 2E	1–2 or 3–12 pt	Group 1B insecticide. Supracide may be used without oil for San Jose scale control. Do not apply when blossoms are open. Avoid residues by limiting to one application per season. 3-day reentry.
Shothole borer (see footnote 4, page 12) *Note:* Make first application in late February or March when overwintering adults first emerge. Spot treat infestations within orchard. Apply to infested trunk and limbs until runoff. Once beetles are in trees, insecticides have limited efficacy.		
Lorsban 4E as above	3 pt	Group 1B insecticide. Do not use Lorsban on sweet cherries after budbreak. For growing season applications (sour cherries only), target infested and neighboring tree trunks and small limbs. 4-day reentry.

Popcorn Stage (Stages 2–5—blossom buds white just before opening)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Brown rot blossom blight (see footnote 3, page 12)		
Abound	12–15.5 fl oz	See footnote 6, page 12. Do not use with silicone-based surfactants. 4-hour reentry. **0-day PHI**.
Adament 50WG	4–8 oz	Group 3 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Bravo Weather Stik	3–4.1 pt	Do not apply later than shuck split. 12-hour reentry.
Bumper 41.8EC	4 fl oz	12-hour reentry. **0-day PHI**.
Cabrio EG	9.5 oz	12-hour reentry. **0-day PHI**.
Captan 80WDG	1.9–2.5 lb	24-hour reentry.
CaptEvate 68WDG	3.75 lb	(Captan + Elevate) Do not apply more than 2 consecutive applications. 24-hour reentry. **0-day PHI**.
Elevate 50WDG	1–1.5 lb	12-hour reentry. **0-day PHI**.
Fontelis	14–20 fl oz	12-hour reentry. **0-day PHI**.
Indar 2F	6 fl oz	12-hour reentry. **0-day PHI**.
Luna Privilege	2.8 fl oz	Group 7 fungicide. 12-hour reentry. **0-day PHI**.
Luna Sensation	5–5.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Merivon	4–6.7 fl oz	Group 7 + 11 fungicide. Do not use with EC or oil-based products. Only nonionic surfactants can be used within 14 days of harvest. 12-hour reentry. **0-day PHI**.
Orius 20 AQ	8.6–17.2 oz	12-hour reentry. **0-day PHI**.
Pristine	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Procure	10–16 fl oz	12-hour reentry. **1-day PHI**.
Quadris Top	12–14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. **0-day PHI**.
Quash	2.5–4 oz	12-hour reentry. **14-day PHI**.
Quilt Xcel	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Rally 40WSP	2.5–6 oz	24-hour reentry.
Rovral 4F	1–2 pt	Do not make more than 2 applications per season. Do not use past shuck split. See footnote 3, page 12. 24-hour reentry.
Tilt	4 fl oz	12-hour reentry. **0-day PHI**.
TopGuard	14 fl oz	Group 3 fungicide. 12-hour reentry. **7-day PHI**.
Topsin 4.5FL	20–30 oz	Tank-mix with another fungicide. 2-day reentry. **1-day PHI**.
Ziram 76DF	5–6 lb	Do not apply after first cover. 48-hour reentry. **30-day PHI**.

Popcorn Stage continues on next page

CONTINUED—Popcorn Stage (Stages 2–5—blossom buds white just before opening)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Aphids, bud moth, leafrollers *Note:* Aphids usually are of concern only on young trees. If undesirable on mature trees, a spray 2 weeks after shuck fall is effective.		
Actara	2–2.75 oz	Group 4A insecticide. Aphids, thrips, and leafrollers at this timing. No more than 11 oz/A per season (of this and/or any other thiamethoxam product). 12-hour reentry.
Altacor 35 WDG	2–4 oz	Group 28 insecticide. Leafroller only. 4-hour reentry.
Bacillus thuringensis (*B.t.*)	See label.	Group 11B2 insecticide. Generic. OMRI listed. Can provide excellent control of leafrollers. Apply when temperatures exceed 60°F. Repeat application 2–3 times. 4-hour reentry.
Delegate 25WG	4.5–7 oz	Group 5 insecticide. Leafroller and thrips only at this timing. 4-hour reentry.
Diazinon 50WP	4 lb	Group 1B insecticide. Limited to one dormant and one cover spray per season. Closed cab required. Allow 5 days before introducing bees. 24-hour reentry.
Entrust 2SC	1.25–2.5 oz	Group 5 insecticide. OMRI listed. No more than 4 applications or 29 oz per year. Leafroller and thrips only at this timing. Targets larval stages. *Note*: Entrust 80WP is an alternative formulation. 4-hour reentry.
Intrepid 2F	8–16 oz	Group 18 insecticide (IGR). Leafroller only. 4-hour reentry.
Success 2L	4–8 oz	Group 5 insecticide. Leafroller and thrips only. 4-hour reentry.
Syneta beetle (see footnote 5, page 12) *Note:* A local problem in certain Valley orchards. Adults may emerge and require control between early popcorn and petal fall. Place a beating tray or sheet under limbs and shake or tap branches to find beetles. Most damage is seen on pinhead-size and smaller cherries. Insecticides should be applied no later than shuck fall if this prebloom application is not made.		
Entrust SC	4–8 oz	Group 5 insecticide. OMRI listed. No more than 4 applications or 29 oz per year. 4-hour reentry.
Imidan 70WP	1.3 lb	Group 1B insecticide. Early popcorn is the time to treat if weather allows. Tart cherries only. Wait at least 5 days before introducing bees. If not spraying pre-bloom, spray at petal fall but before shuck fall—**after bees are removed**. 3-day reentry.
Success	4–8 oz	Group 5 insecticide. No more than 4 applications or 29 oz per year. 4-hour reentry.
Full Bloom (Stages 6–7)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Brown rot blossom blight (see footnote 3, page 12) See materials listed for Popcorn Stage.		

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.

Petal Fall (75% petal fall)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Brown rot blossom blight (see footnote 3, page 12) See materials listed for Popcorn Stage.		
Leaf spot (see footnote 2, page 12)		
Adament 50WG	4–8 oz	Group 3 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Bravo Weather Stik	3–4.1 pt	Do not apply after shuck split. 12-hour reentry.
Captan 80WDG	1.9–2.5 lb	24-hour reentry.
Echo 720	3–4.1 pt	12-hour reentry.
Gem 500SC	1.9–3.8 oz	12-hour reentry. **1-day PHI**.
Indar 2F	6 fl oz	12-hour reentry. **0-day PHI**.
Luna Privilege	2.8 fl oz	Group 7 fungicide. 12-hour reentry. **0-day PHI**.
Luna Sensation	5–5.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Merivon	4–6.7 fl oz	Group 7 + 11 fungicide. Do not use with EC or oil-based products. Only nonionic surfactants can be used within 14 days of harvest. 12-hour reentry. **0-day PHI**.
Orius 20 AQ	8.6–17.2 oz	12-hour reentry. **0-day PHI**.
Pristine	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Procure	10–16 fl oz	12-hour reentry. **1-day PHI**.
Quilt Xcel	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Rally 40WSP	2.5–6 oz	Has some curative (kickback) activity. **7-day PHI**.
Rubigan 1EC	6–12 oz	Do not apply more than 48 oz/A per season. **0-day PHI**.
Syllit FL	1–3 pt	48-hour reentry.
Tilt	4 fl oz	12-hour reentry. **0-day PHI**.
TopGuard	14 fl oz	Group 3 fungicide. 12-hour reentry. **7-day PHI**.
Ziram 76DF	6 lb	**30-day PHI**.
Aphids, bud moth, leafrollers *Note:* If this petal fall spray is used, spray only after bloom and after bees have been removed from orchard.		
Actara	2–2.75 oz	Group 4A insecticide. Targets aphids at this timing. No more than 11 oz/A per season (of this and/or any other thiamethoxam product). 12-hour reentry.
Altacor 35 WDG	2–4 oz	Group 28 insecticide. Targets leafroller with this timing. 4-hour reentry.
Assail 70WP		Group 4A insecticide. Targets aphids with this timing. 12-hour reentry.
Bacillus thuringensis (*B.t.*)	See label.	Group 11B2 insecticide. Generic. OMRI listed. Can provide excellent control of leafrollers. Apply when temperatures exceed 60°F. Repeat application 2–3 times. 4-hour re-entry.
Delegate 25WG	4.5–7 oz	Group 5 insecticide. Targets leafroller with this timing. 4-hour reentry.

Petal Fall (75% petal fall) continues on next page

CONTNINUED—Petal Fall (75% petal fall)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Aphids, bud moth, leafrollers (continued)		
Entrust 2SC	1.25–2.5 oz	Group 5 insecticide. OMRI listed. No more than 4 applications or 29 oz per year. Targets leafroller with this timing. Note Entrust 80WP is an alternative formulation. 4-hour reentry.
Imidacloprid 2F	3.2–6.4 oz	Group 4A insecticide. Targets aphids with this timing. Do not apply when bees are active. 12-hour reentry.
Intrepid 2F	8–16 oz	Group 18 insecticide (IGR). Targets leafroller with this timing. 4-hour reentry.
Success 2L	4–8 oz	Group 5 insecticide. Targets leafroller with this timing. 4-hour reentry.
Syneta beetle See materials listed for Popcorn Stage.		

Shuck Split		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Leaf spot		
Adament 50WG	4–8 oz	Group 3 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Bravo Weather Stik	3–4.1 pt	Do not apply after shuck split. 12-hour reentry.
Captan 80WDG	1.9–2.5 lb	24-hour reentry.
Echo 720	3–4.1 pt	12-hour reentry.
Gem 500SC	1.9–3.8 oz	12-hour reentry. **1-day PHI**.
Indar 2F	6 fl oz	12-hour reentry. **0-day PHI**.
Luna Privilege	2.8 fl oz	Group 7 fungicide. 12-hour reentry. **0-day PHI**.
Luna Sensation	5–5.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Merivon	4–6.7 fl oz	Group 7 + 11 fungicide. Do not use with EC or oil-based products. Only nonionic surfactants can be used within 14 days of harvest. 12-hour reentry. **0-day PHI**.
Orius 20 AQ	8.6–17.2 oz	12-hour reentry. **0-day PHI**.
Pristine	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Procure	10–16 fl oz	12-hour reentry. **1-day PHI**.
Quilt Xcel	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Rally 40WSP	2.5–6 oz	Has some curative (kickback) activity. **7-day PHI**.
Syllit FL	1.5–3 pt	48-hour reentry. Use with another fungicide. **7-day PHI**.
Tilt	4 fl oz	12-hour reentry. **0-day PHI**.
TopGuard	14 fl oz	Group 3 fungicide. 12-hour reentry. **7-day PHI**.
Ziram 76DF	5–6 lb	48-hour reentry. **30-day PHI**.

Shuck Split continues on next page

CONTNINUED—Shuck Split		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Shothole (Coryneum blight) (see footnote 7, page 12)		
Captan 80WDG	1.9–2.5 lb	24-hour reentry.
Echo 720	3–4.1 pt	12-hour reentry.
Fontelis	14–20 fl oz	12-hour reentry. **0-day PHI**.
Ziram 76DF	5–6 lb	48-hour reentry. **30-day PHI**.
Powdery mildew *Note:* Can be a problem in some years in western Oregon. Materials used for brown rot and/or leaf spot can be effective on this disease as well.		
Two Weeks after Shuck Fall		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval**
Leaf spot See materials listed for Shuck Split.		
Aphids *Note:* Aphids are of concern primarily in young orchards. Use this spray if the popcorn spray was not made and aphids are increasing.		
Actara	2–2.75 oz	Group 4A insecticide. No more than 11 oz/A per season (of this and/or any other thiamethoxam product). 12-hour reentry.
Diazinon 50WP	4 lb	Group 1B insecticide. Limited to one dormant and one cover spray per season. Closed cab required. 24-hour reentry.
Late Spring and Summer		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Brown rot on fruit *Note:* Apply materials prior to harvest before wet weather is expected. Pay close attention to preharvest spray restrictions.		
Abound	12–15.5 fl oz	See footnote 6, page 12. Do not use with silicone-based surfactants. 4-hour reentry. **0-day PHI**.
Adament 50WG	4–8 oz	Group 3 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Bumper 41.8EC	4 fl oz	12-hour reentry. **0-day PHI**.
Cabrio EG	9.5 oz	12-hour reentry. **0-day PHI**.
Captan 80WDG	2–2.5 lb	24-hour reentry.
CaptEvate 68WDG	3.75 lb	(Captan + Elevate) Do not apply more than 2 consecutive applications. 24-hour reentry. **0-day PHI**.
Elevate 50WDG	1–1.5 lb	12-hour reentry. **0-day PHI**.
Fontelis	14–20 fl oz	12-hour reentry. **0-day PHI**.
Indar 2F	6 fl oz	12-hour reentry. **0-day PHI**.
Luna Privilege	2.8 fl oz	Group 7 fungicide. 12-hour reentry. **0-day PHI**.
Luna Sensation	5–5.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **1-day PHI**.
Merivon	4–6.7 fl oz	Group 7 + 11 fungicide. Do not use with EC or oil-based products. Only nonionic surfactants can be used within 14 days of harvest. 12-hour reentry. **0-day PHI**.

Late Spring and Summer 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—Late Spring and Summer		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Brown rot on fruit (continued)		
Orius 20 AQ	8.6–17.2 oz	12-hour reentry. **0-day PHI**.
Procure	10–16 fl oz	12-hour reentry. **1-day PHI**.
Quadris Top	12–14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. **0-day PHI**.
Quash	2.5–4.0 oz	12-hour reentry. **14-day PHI**.
Quilt Xcel	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 12. **0-day PHI**.
Sulfur, wettable (92%)	5–10 lb	Phytotoxic when temperatures over 85°F. 24-hour reentry.
Tilt	4 fl oz	12-hour reentry. **0-day PHI**.
TopGuard	14 fl oz	Group 3 fungicide. 12-hour reentry. **7-day PHI**.
Topsin 4.5FL	20–30 fl oz	Tank-mix with another fungicide. See footnote 3, page 12. 2-day reentry. **1-day PHI**.
Bacterial canker, cherry witches' broom		
None	—	Prune out cankers and dead limbs during dry weather.
Cherry fruit fly *Note:* First emergence can be in early May or as late as mid-June depending on location, elevation, weather, slope, and population pressure of an orchard. Growers should obtain emergence dates and base spray timing on local emergence information. SOUTH VALLEY: Douglas or Lane County Extension. MID- and NORTH VALLEY: North Willamette Research and Extension Center. Cherries are not susceptible until fruit are ripe enough to have a blush tint.		
Actara	4.5–5.5 oz	Group 4A insecticide. No more than 11 oz/A per season (of this and/or any other thiamethoxam product). 12-hour reentry. **7-day PHI.**
Asana XL	4.8–14.5 fl oz	Group 3 insecticide. Do not apply past the white bud/prebloom stage. Do not apply more than 0.2 lb a.i./A per season. May aggravate spider mite problems. See label for concentrate rate. 12-hour reentry. **14-day PHI.**
Assail 70WP	2.3–3.4 oz	Group 4A insecticide. No more than 4 applications per season. 12-hour reentry. **7-day PHI.**
Delegate WG	4.5 oz	Group 5 insecticide. Avoid repeated applications targeting cherry fruit fly. Apply no less than 1 week apart, maximum 4 times per season. **7-day PHI.**
Diazinon 50WP	4 lb	Group 1B insecticide. Limited to one dormant and one cover spray per season. Closed cab required. WPs may leave residues visible at harvest. 24-hour reentry. **21-day PHI.**
Dimethoate 4E	2.66 pt	Group 1B insecticide. Apply once at 7 days following cherry fruit fly emergence. Do not mix dimethoate with Syllit. Thorough coverage is important. Phytotoxicity can occur and varies from marginal leaf burn to defoliation. No more than 1 application. 10- to 14-day reentry. **21-day PHI.**
Entrust 2SC	1.25–2.5 oz	Group 5 insecticide. OMRI listed. No more than 4 applications or 29 oz per year. Note Entrust 80WP is an alternative formulation. 4-hour reentry. **7-day PHI.**

Late Spring and Summer 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—Late Spring and Summer		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Cherry fruit fly (continued)		
Exirel 0.83SE	10–17 oz	Group 28 insecticide. Some risk of fruit marking. No more than 0.4 lb ai/A per season. 12-hour reentry. **3-day PHI.**
GF-120 NF	10–20 oz	Group 5 insecticide. OMRI listed. Attracticide bait spray. Does not control spotted wing drosophila. Begin applications when flies emerge or 2–3 weeks before ripening. Apply to inner canopy and underside of leaves using coarse nozzles. Repeat applications on 7- to 14-day intervals. 4-hour reentry. **0-day PHI.**
Imidacloprid	4.8–6.4 oz	Group 4 insecticide. Several product names. 12-hour reentry. **7-day PHI.**
Imidan	2.125 lb	Group 1B insecticide. Sour cherries only. 3-day reentry, or 14-day reentry for general public as in "U-pick". **14-day PHI.**
Lambda-cyhalothrin	2.6–5.1 oz	Group 3 insecticide. Several product names, also a component in premix formulations. Can cause secondary pest problems at this timing. 1-day reentry. **14-day PHI.**
Malathion	See labels.	Group 1B insecticide. Many formulations and product names are available: WP, ULV, and EC. WPs may leave residues visible at harvest. ULV formulation is not a standalone product for SWD; do not use sequential sprays of ULV formulation. Repeated applications can cause secondary pest problems (mites and leafminers). Cross-resistance with other Group 1B materials and carbaryl (Sevin). Potential phytotoxicity. 12-hour reentry. **1- to 3-day PHI.**
Sevin 4F	1.5–2 qt	Group 1A insecticide. Note other formulations available. 12-hour reentry. **3-day PHI.**
Success 2L	4–8 oz	Group 5 insecticide. 4-hour reentry. **7-day PHI.**
Voliam Flexi	6–7 oz	Group 4A + 28 insecticide. No more than 14 oz per season. No more than 0.172 lb of thiamethoxam products (i.e., Actara) per season. Do not apply by air. 12-hour reentry. **14-day PHI.**

See also spotted wing drosophila on the next page.

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CONTINUED—Late Spring and Summer		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Spotted wing drosophila *Note:* Begin monitoring just before fruit starts to change to its ripening color, or earlier to monitor population levels. See footnote 8, page 12.		
Baythroid XL	2.4–2.8 oz	Group 3 insecticide. Rotate with other resistance management groups. 12-hour reentry. **7-day PHI.**
Danitol 2.4EC	10.66–21.33 oz	Group 3 insecticide. Rotate with other resistance management groups. 24-hour reentry. **3-day PHI.**
Delegate WG	4.5–7 oz	Group 5 insecticide. Apply no less than 1 week apart, maximum 4 times per season. 4-hour reentry. **7-day PHI**.
Diazinon 50WP	4 lb	Group 1B insecticide. Limited to one dormant and one cover spray per season. Closed cab required. WPs may leave residues visible at harvest. 24-hour reentry. **21-day PHI.**
Dimethoate 4E	2.66 pt	Do not mix dimethoate with Syllit. Thorough coverage is important. Phytotoxicity can occur and varies from marginal leaf burn to defoliation. **Use only once per season.** 10- or 14-day reentry. **21-day PHI.**
Entrust 2SC	1.9–2 oz	Group 5 insecticide. OMRI listed. No more than 4 applications or 29 oz per year. Note Entrust 80WP is an alternative formulation. 4-hour reentry. **7-day PHI.**
Exirel 0.83SE	13.5–20.5 oz	Group 28 insecticide. Some risk of fruit marking. No more than 0.4 lb ai/A per season. 12-hour reentry. **3-day PHI.**
Malathion	See labels.	Group 1B insecticide. Many formulations and product names are available: WP, ULV, and EC. WPs may leave residues visible at harvest. ULV formulation is not a standalone product for SWD; do not use sequential sprays of ULV formulation. Repeated applications can cause secondary pest problems (mites and leafminers). Cross-resistance with other Group 1B materials and carbaryl (Sevin). Potential phytotoxicity. 12-hour reentry. **1- to 3-day PHI.**
Sevin 4F	2–3 qt 3 lb	Group 1A insecticide. *Note*: other formulations available. Repeated applications can cause secondary pest problems (mites and leafminers). Cross-resistance with Group 1B materials. Potential phytotoxicity. 12-hour reentry. **3-day PHI**.
Success 2L	4–8 oz	Group 5 insecticide. 4-hour reentry. **7-day PHI.**
Warrior II	1.28–2.56	Group 3A insecticide. Can cause secondary pest problems at this timing. 1-day reentry. **14-day PHI.**
Shothole borer (see footnote 4, page 12) *Note:* Spot-treat as needed. See Delayed Dormant Stage.		
Pear slugs *Note:* Usually controlled with insecticides applied for control of other pests. Pear slugs should be controlled on young trees during "establishment years."		
Fruit cracking		
hydrated lime	20–25 lb	Thorough coverage of fruit is essential. Will reduce, not eliminate, cracking.

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Postharvest		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Shothole borer (see footnote 4, page 12)		
Spider mites *Note:* Spider mites seldom are a problem on cherries in the Willamette Valley except on young trees.		
Acramite 50WS	0.75–1 lb	Unclassified mode of action. Do not use more than once per season. 12-hour reentry. **3-day PHI.**
Apollo 4SC	4–8 oz	Group 10A miticide. Do not use more than once per season. Do not rotate with other group 10A materials in the same season. 12-hour reentry. **21-day PHI.**
Envidor 2SC	16–18 oz	Group 23 miticide. Targets rust and spider mites. Do not use more than once per season. 12-hour reentry. **7-day PHI.**
Horticultural Mineral Oil (HMO)	1–2 gal	Can cause phytotoxicity if applied within 2 weeks of a sulfur application. 4-hour reentry. **0-day PHI.**
Nexter 75WSB	5.2–10.6 oz	Group 21A. Ground application only. Two applications per season. 12-hour reentry. **300-day PHI.**
Omite 30WS	5–6 lb	Group 12C miticide. Postharvest use only. Each water soluble bag contains 2.5 lbs. 2-day reentry. **No PHI.**
Onager 1EC	24 oz	Group 10A miticide. Postharvest use only. Do not rotate with other group 10A materials in the same season. 12-hour reentry. **28-day PHI.**
Savey DF	3–6 oz	Group 10A miticide. Does not control rust mites. Do not rotate with other group 10A materials in the same season.12-hour reentry. **28-day PHI.**
Zeal 72WSP	2–3 oz	Group 10B miticide. 12-hour reentry. **7-day PHI.**
Increased fruit set		
Solubor or Borosol	5–8 lb 2–4 qt	Late September or early October use with 60 gal or more of water. Don't mix boron sprays with pesticides. The elevated pH of the boron spray solution weakens many insecticides. Use this rate for foliar application.

Dormant Season (October and January—Stage 0)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Shothole *Note:* Use of copper may **increase** bacterial canker in some orchards. If you use these products, apply the first spray in October before the fall rains and again in early January. Do not graze sheep in orchards sprayed with coppers. Toxic amounts of copper can build up in orchard soils after decades of use.		
Bordeaux 12-12-100	See footnote 1, page 11.	—

Footnotes

1. Bacteria resistant to copper products have been detected in many Willamette Valley crops. Some growers report control of bacterial canker by the application of bordeaux 12-12-100 in October and January; others report little or no control. Some research trials have shown that copper products can significantly **increase** this disease. If you choose to use copper-based products, thoroughly spray the trunks and lower scaffolds as well as the upper branches, and limit total number of applications. Bordeaux 12-12-100 means 12 lb of copper sulfate plus 12 lb of hydrated lime in 100 gal of water. In any bordeaux formula, the ingredients always are listed in the same order—copper sulfate, hydrated lime, then gallons of water.

Footnotes continue on next page

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Footnotes (continued)

2. Young trees not being sprayed for brown rot may need an application of fungicide during bloom for adequate control of cherry leaf spot. This is more of a problem in high rainfall areas or years.
3. Fungal pathogens have shown resistance to several fungicides when one is used exclusively. Alternate or tank-mix with fungicides with different modes of action. Fungicides from different groups have different modes of action. Some products may already be a mix of two different fungicides. One or two applications during bloom may adequately control brown rot when products with systemic (translaminar) activity are used.
4. Shothole borer can have three generations in Valley orchards. Look for new adults and/or sawdust pushed from emergence holes in late winter, June/July, and again in September/October. This pest prefers young and/or stressed trees. Cultural controls include pruning of infested limbs, and severely infested trees should be removed before adult beetles emerge in spring. Maintaining tree vigor and health with a good nutrition program helps trees resist shothole borer. Chemical control is difficult and consists of spot-treating infested trunks and limbs with a delayed dormant dilute Lorsban spray when adults are emerging and reinvading. Do not use Lorsban on sweet cherry foliage.
5. Syneta beetle is a small, pale leaf- and fruit-feeding beetle that causes fruit scarring shortly after pollination through the time cherries are pinhead size. It is a localized problem in the Valley and within orchard blocks. Adults begin emerging and feeding in orchards before bloom or as late as early fruit set. First emergence has been as early as April 6 or as late as early May depending upon elevation and slope of individual blocks. Beetles may be present for 4–6 weeks in an orchard. Best time for control is PREBLOOM (popcorn) if beetles are present. Imidan was historically the favored insecticide but can only be used on tart cherries. Do not introduce bees for 5 days post spray of this insecticide because of possible residues and associated bee kills. DO NOT APPLY IMIDAN TO TREES IN BLOOM! Spinosad (Entrust/Success) compounds have less risk for pollinators, but avoid spraying when bees are active. Ground emergence cages and "tap trays" for pear psylla monitoring are used to determine presence of Syneta.
6. Alternate group 11 fungicides with a fungicide that has a different mode of action. Do not use more than two sequential applications. Sprayers used for Abound should **not be used on apples** such as Gala, Cox's Orange Pippin, and McIntosh. Even a small amount of drift can severely impact these apple trees.
7. Good information on the control of shothole in sweet cherry is lacking. Much of our information is derived for the same disease on peaches or almonds. Other materials also may be effective. Applications past shuck split may be needed in years when heavy spring rains continue past bloom.
8. Monitor for spotted wing drosophila (SWD) with commercial traps or clear, quart-sized plastic deli cups with lids (or any plastic container). Drill or puncture about 10 3⁄16-inch holes near the rim of the cup for fly entry. Bait traps with pure (unflavored) apple cider vinegar plus a drop of unscented liquid soap or use commercial lures. Hang the trap in a shady, cool location within the tree canopy. Just before fruit starts to change to its ripening color, place as many traps as you will be able to maintain. Check traps weekly. Various kinds of flies will be captured in this nonspecific trap, so learn to identify SWD. Treatment thresholds have not been established, but preventive measures should be taken when the first SWD is captured and fruit starts to ripen. Chemical controls target adults and can help prevent females from laying eggs in fruit, but have limited effect on larvae feeding within the fruit. Monitoring guidelines are based on the data currently available and designed for ease of grower adoption and use. During past growing seasons, SWD were captured in mid-May in the Mid-Columbia area and earlier west of the Cascades. Watch the SWD website for regional detections of SWD at: http://spottedwing.com

Follow the "Rules" for fungicide stewardship:

Rotate or mix fungicides of different chemical groups.
Use labeled rates.
Limit total number of applications.
Educate yourself about fungicide activity, mode of action, and class—as well as resistance management practices.
Start a fungicide program with multisite mode of action materials.

For more information about fungicides registered for use on cherries and their specific modes of action, consult OSU Extension publication EM 8951, *How to Reduce the Risk of Pesticide Resistance in Cherry Pests in Oregon*.

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.

Table 1. Effectiveness of Fungicides for Control of Cherry Diseases*

Fungicide	Fungicide group #	Properties**	Brown rot (blossom blight)	Brown rot (fruit rot)	Cherry leaf spot	Powdery mildew	Shothole
Abound	11	B, F, Ls, P	Good***	Good	Good	Excellent***	Fair–Good
Bravo	M5	B, F, P	Good–Fair	Not registered	Excellent	Not effective	Good
Bumper/Orbit/Tilt	3	B-N, C, F, Ls, P	Good–Excellent***	Good–Excellent***	??	Fair–Good***	Slight
Cabrio	11	B, F, Ls, P	Good***	Good	Fair–Good	Excellent***	??
Captan	M4	B, F, P	Good	Good	Good	Not effective	Good–Excellent
Copper-based products	M1	B, Bact, F, P	Slight	Not registered	Good	Slight	Good
Echo 720	M5	B, F, P	Good–Fair	Not registered	Excellent	Not effective	Good
Elevate	17	F, N, P	Good–Excellent***	Good–Excellent***	Fair	Not effective	??
Fontelis	7	B, F, P	Good–Excellent***	Good–Excellent***	??	Good–Excellent***	Good
Gem	11	B, F, Ls, P	Good***	Fair–Good***	??	Excellent***	??
Indar	3	B-N, C, F, Ls, P	Excellent***	Excellent***	Good–Excellent	Slight***	??
HMO	Not classified	E, F, I, P	??	??	??	Good–Excellent	??
Kaligreem	Not classified	E, B-N	??	??	??	Poor	??
Luna Privilege	7	F, P	Good–Excellent***	Good–Excellent***	??	Good–Excellent***	??
Orius	3	B-N, C, F, Ls, P	Good–Excellent***	Good–Excellent***	Good***	Fair–Good***	??
Oxidate	Not classified	D	??	??	??	??	None
Procure	3	B-N, C, F, Ls, P	Good***	??	Fair***	Good***	??
Quash	3	B-N, C, F, Ls, P	Good–Excellent***	Good***	??	Good***	??
Quintec	13	N, F, P	None	None	None	Good	None
Rally	3	B-N, C, F, Ls, P	Good-Fair***	Good–Fair***	Excellent***	Fair***	Slight
Rovral	2	B-N, F, Ls, P	Good***	Not registered	Slight	Not effective	Fair–Good
Sulfur	M2	F, I, P, V	Fair	Fair	Fair	Good	Not effective
Syllit	M7	B, F, P	??	Slight	Good	Not effective	??
TopGuard	3	B-N, C, F, Ls, P	Good***	Good***	Excellent***	Good***	??
Topsin	1	B, C, F, Ls	Good***	Good***	??	Good***	Not effective
Vivando	U8	N, F, P	??	??	??	Fair–Good	??
Ziram	M3	B, F, P	Slight	Slight	Fair	Not effective	Good–Excellent
Combination products							
Adament	3 + 11	B-N, C, F, Ls, P	??	??	Excellent	Excellent	??
CaptEvate	M4 + 17	B, F, P	Good	Good	Good	Not effective	Good
Luna Sensation	7 + 11	B-N, F, Ls, P	Good–Excellent***	Good–Excellent***	Good	Excellent***	??
Merivon	7 + 11	B-N, F, Ls, P	Good–Excellent***	Good–Excellent***	Good	Excellent***	??
Pristine	7 + 11	B-N, F, Ls, P	Good	Good	Good	Good–Excellent**	??
Quadris Top	3 + 11	B-N, C, F, Ls, P	??	??	Excellent	Excellent	??
Quilt Xcel	11 + 3	B-N, C, F, Ls, P	Excellent	Excellent	??	Excellent***	Fair–Good

*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.

**Properties: B = broad spectrum of activity; Bact = bactericidal; B-N = broad to narrow spectrum of activity; C = curative; D = Disinfectant; E = eradicant; F = fungicidal; Fs = fungistatic; I = insecticidal; Ls = locally systemic; N = narrow spectrum of activity; P = protectant; V = vapor active; ?? = Unknown.

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

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Table 2. Quick Reference Guide for Herbicides Labeled for Use in Fruit and Nut Crops

- Shaded boxes indicate the herbicide is labeled for use in that crop.
- Nonbearing (NB) indicates the herbicide is labeled only for crops that will not be harvested for 1 year (365-day preharvest interval).
- Herbicides in ***bold, italic*** type are recommended for new plantings.
- For more complete information, please refer to the *PNW Weed Management Handbook: http://pnwhandbooks.org/weed/*.

Ingredient common name (herbicide mode of action)	**Product name example**	**Nuts**			**Pome fruits**		**Stone fruits**						**Rates**
		Chestnut	Hazelnut	Walnut	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plum	Prune	
Applications that are soil active (herbicides in italics and bold are recommended for new plantings)													
diuron (7)	Karmex												1.6 to 3.2 lb ai/A (2 to 4 lb/A Karemx 80DF)
dichlobenil (20)	Casoron												4–6 lb ai/A (100–150 lb/A Casoron). Apply in cold, wet weather.
isoxaben (21)	***Trellis, Gallery***				NB	NB	NB	NB	NB	NB	NB	NB	0.5–1 lb ai/A (0.66–1.33 lb/A product)
indaziflam (29)	Alion												0.046–0.085 lb ai/A (3.5–6.5 oz/A product) depending on soil texture
napropamide (3)	***Devrinol***												4 lb ai/A (8 lb/A)
norflurazon (12)	Solicam												1.95–3.98 lb ai/A (2.5–5 lb/A Solicam)
oryzalin (3)	***Surflan***												2–6 lb ai/A (2–6 qt/A Surflan)
pendimethalin (3)	***Prowl***												Prowl H_2O: 1.9–6 lb ai/A (2–6.3 qt/A) depending on desired length of weed control and crop
pronamide (3)	***Kerb***												1–4 lb ai/A (2–8 lb/A). Rate depends on species present and soil texture.
simazine (5)	Princep												See product labels for rates. Princep Caliber 90 is a Special Local Needs label (OR-080038) for sweet cherries only.
sulfentrazone	Zeus XC												0.25–0.375 lb ai/A (8–12 oz/A) depending on soil classification; established 3 years
terbacil (5)	Sinbar						NB	NB			NB		0.4–0.8 lb ai/A (0.5–1 lb/A), newly established; 2–4 lb/A Sinbar, bearing, depending on soil type
trifluralin (3)	***Treflan 4L/EC***		NB										0.5–1 lb ai/A (1–2 pt/A Treflan 4L)
trifluralin (3) + isoxaben (21) + oxyfluorfen (14)	Showcase	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	2.5–5 lb ai/A (100–200 lb/A Showcase)
Applications that are soil and foliar active													
flumioxazin (14)	Chateau SW/WDG												0.188–0.38 lb ai/A (6–12 oz/A Chateau WDG). Note differences in rates and uses in SW and WDG labels. Avoid contact with green bark on small trees.

Table 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.

Ingredient common name (herbicide mode of action)	Product name example	Nuts			Pome fruits		Stone fruits						Rates
		Chestnut	Hazelnut	Walnut	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plum	Prune	
CONTNUED—Applications that are soil and foliar active													
oxyflurofen (14)	Goal												1.25–2 lb ai/A (5–8 pt/A Goal 2XL)
penoxsulam (2)	Pindar GT												(1.5–3.0 pt/A)
rimsulfuron (2)	Matrix												0.063 lb ai/A (4 oz/A Matrix FNV per year)
saflufenacil (14)	Treevix												0.045 lb ai/A (1 oz/A Treevix)
Postemergence contact and translocated herbicides													
2,4-D (4)	Saber												Green sucker control in hazelnuts: 0.7 to 0.95 lb ai/A (1.5 to 2 pints/A Saber)
acetic acid	WeedPharm												
carfentrazone (14)	Aim												Green sucker control in hazelnuts: 0.031 lb ai/A (2 fl oz/A Aim EC)
clethodim (1)	Select Max		NB	NB	NB	NB	NB	NB	NB		NB	NB	0.068–0.121 lb ai/A (9–16 fl oz/A Select Max)
clopyralid (4)	Stinger												Apples: 0.094–0.25 lb ae/A (0.25–0.66 pt/A Stinger) Others: 0.12–0.25 lbs ae/A (0.33–0.66 pt/A Stinger)
diquat (22)	Reglone		NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	0.375–0.5 lbs ai/A (1.5–2 pt/A)
fluazifop (1)	Fusilade DX		NB	NB	NB	NB							0.25–0.375 lb ai/A (16–24 oz/A Fusilade DX). Refer to specific grassy weeds listed on label.
glufosinate (10)	Rely 280												0.88 to 1.5 lb ai/A (1.5 to 2.5 qt/A Rely 280); sucker control 1.75 qt/A
glyphosate (9)	Roundup												General weed control and grass suppression in row middles. Read label carefully for crops listed and geographic location.
halosulfuron (2)	Sandea												Apples: 0.035–0.094 lb ai/A (0.75–2 oz/A) Nut crops: 0.031–0.063 lb ai/A (⅔–1⅓ oz/A)
paraquat (22)	Gramoxone Inteon												Green sucker control in hazelnuts: 0.625–1 lb cation/A (2.5–4 pt/A Gramoxone Inteon; 1.7–2.7 pt/A Firestorm)
pyraflufen (14)	Venue												0.001–0.006 lb ai/A (0.7–4 fl oz product/A)
sethoxydim (1)	Poast										NB	NB	Grass suppression in row middles: 0.28–0.47 lb ai/A (1.5–2.5 pt/A product)

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OSU Internet Resources for Plant Protection

Information regarding plant protection is available from several sources at OSU. The following listings are excellent examples:

- OSU Integrated Plant Protection Center. Online weather data and degree day information for insect pests and diseases (*http://uspest.org/wea/*)
- 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*)

Using Pesticides Safely

Always Read the Label

The single most important approach to pesticide safety is to read the pesticide label before each use and then follow the directions. If still in doubt after reading the label, contact a person qualified to help evaluate the hazard of the chemical and its use. Qualified people include extension specialists, county educators, pesticide product representatives, and retailers.

Pesticides are toxic and should be handled with care—but can be used safely if you follow recommended precautions. Follow all label requirements, and strongly consider any recommendations for additional personal protective clothing and equipment. In addition to reading and following the label, other major factors in the safe and effective use of pesticides are the pesticide applicator's qualifications, common sense, and positive attitude. Always take all safety precautions when using pesticides.

In case of accidents involving pesticides, see your doctor at once. It will help your doctor to know exactly which pesticide is involved. The label on the container gives this information. Take to the physician the pesticide label or information from the label, such as the product name, registration number of the U.S. Environmental Protection Agency (EPA), common name and percentage of active ingredient, and first aid instructions. If the label cannot be removed, take along the pesticide container (if not contaminated), but do not take it into the hospital or doctor's office.

Pesticide Safety Checklist

- Use pesticides only when necessary and as part of an Integrated Pest Management (IPM) program.
- Always read the label and follow the instructions.
- Do not allow children to play around sprayers or mixing, storage, and disposal areas.
- Wear appropriate protective clothing and equipment.
- Never eat, drink, or smoke while handling pesticides.
- Avoid drift into non-target areas and pesticide runoff into streams, rivers, lakes, irrigation ponds and canals.
- Avoid spilling materials on skin or clothing.
- Have access to clean water, soap, and first aid supplies.
- Keep pesticides in a dry and locked storage area away from food and feed.
- Triple rinse or pressure rinse empty containers and dispose or recycle in accordance with state and local regulations.
- Stay out of recently sprayed areas until the spray has dried, and observe the restricted entry intervals (REI) specified on the pesticide label.
- Follow the pre-harvest interval (PHI) on the pesticide label before harvesting crops or gardens and before allowing livestock to graze fields.

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 by Nik G. Wiman, orchard crops specialist and assistant professor, Department of Horticulture, North Willamette Research and Extension Center; Jay W. Pscheidt, Extension plant pathology specialist and professor, Department of Botany and Plant Pathology; and Ed Peachey, associate professor (practice), vegetable production and weed science, Department of Horticulture; all of Oregon State University.

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