OREGON STATE UNIVERSITY EXTENSION SERVICE

2023 | WILLAMETTE VALLEY

PEST MANAGEMENT GUIDE FOR CHERRIES

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This guide lists recommendations for insect, mite and disease control in cherry orchards. The chemicals, formulations and application rates listed here are based on label directions, research and orchard experience.

Pest management depends on producers and their knowledge of the orchard and its characteristics. Producers must weigh several factors: cultivar, tree size, tree density, canopy characteristics, pest complex and pest history. Consider all these factors when choosing which chemicals to apply and at what rates. Other variables include the amount of water used per acre, and the method of application.

Trade name products are mentioned as examples only. Occasionally, manufacturers register different formulations of a product that contain a different concentration of active ingredient. This does not mean that OSU Extension either endorses these products or intends to discriminate against products not mentioned. Consult product labels to 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.

Producers ask two common questions about the chemical control of insects and diseases:

- "How much chemical do I use per acre?"
- "What is the least amount of water I need per acre to apply in my concentrate sprayer?"

The schedule below suggests an amount of formulated product to use per acre, and not the amount of active ingredient. This amount is based on a "typical" orchard of middle age and average tree density, with moderate pest pressure. Less product may be needed in 1- to 4-year-old orchards. Conversely, more chemical (within label limits) may be required for large, mature trees experiencing heavy pressure from multiple pests.

It takes less spray to get good coverage on an orchard with immature trees with limited canopy, but this does not affect the rate of application by volume. For most ground-applied applications, apply products in a minimum of 100 gallons of water per acre. Spray systems that use sensors to deactivate nozzles when there are gaps in the canopy can reduce drift and pesticide use, especially in young orchards. See *Sensor Sprayers for Specialty Crop Production*, PNW 727, https://catalog.extension.oregonstate.edu/pnw727.

Always calibrate sprayers to tree size to improve coverage, reduce waste and avoid drift. See *Six Steps to Calibrate and Optimize Airblast Sprayers for Orchards and Vineyards*, PNW 749, https://catalog.extension.oregonstate.edu/pnw749.

Many insecticide labels today list the minimum amount of water needed per acre in concentrate sprays of insecticides. Labels also tell users how to calculate the amount of chemical needed per acre in a concentrate sprayer. CHECK THE LABEL BEFORE SPRAYING! Some label directions indicate dilute applications only, such as the dimethoate labels for cherry fruit fly control. Also:

- Make sure any tank-mixes of pesticides are compatible. For example, the elevated pH of some boron spray solutions weakens many insecticides. Water hardness above 250–350 ppm can also negatively affect pesticide efficacy, particularly for certain herbicides.
- Use adjuvants and spreader stickers with caution.
- Rotate pesticides by mode of action (group); do not become reliant on a single group for control.
- In this guide, mode of action (MoA) for insecticides is based on the Insecticide Resistance Action Committee (IRAC) classification (irac-online.org). Fungicide mode of action is based on the Fungicide

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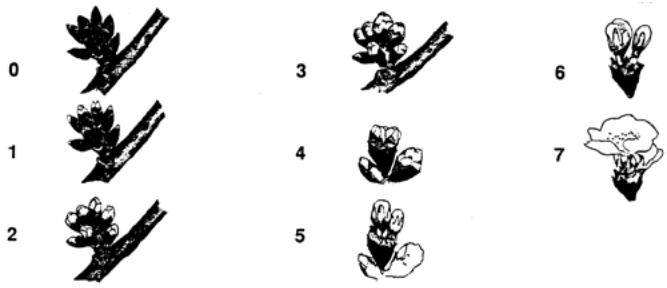
Resistance Action Committee (FRAC) classification (www.frac.info). Herbicide site of action is based on the Herbicide Resistance Action Committee (HRAC) classification (hracglobal.com).

- Premix products may have reduced rates of active ingredients, and may contribute to development of resistance.

Important: Be aware of regulations governing the application of pesticides outlined in the EPA Worker Protection Standard, particularly the Application Exclusion Zone, which is enforced by Oregon Occupational Safety and Health. All pesticide labels provide orchard reentry intervals and personal protection equipment information.

Apply pesticides judiciously and promote good relationships with neighbors.

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

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.

STAGES 0–1: Dormant and delayed dormant *Before buds open and before eggs hatch*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry 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. Liquid formulations mix best with oil and water. Thorough coverage is essential. Dilute sprays recommended during this stage.			
Horticultural mineral oil (HMO) + an insecticide registered for these pests, such as:			
Centaur 70WDG	buprofezin	34.5–46 oz	Group 16 insecticide (IGR). No more than 2 applications per season. Do not tank mix with oil. 12-hour reentry.
Diazinon 50WP	diazinon	4 lb	Group 1B insecticide. Restricted use. Limited to one dormant and one cover spray per season. Closed cab required. 24-hour reentry.
Esteem 35WP	pyriproxyfen	4–5 oz	Group 7C insecticide. Limited to 3 applications per season. Targets eggs and immature (molting) stages of leafrollers. 12-hour reentry.
Exirel 0.83SE	cyantraniliprole	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.
Shothole borer (see footnote 4, page 11). *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 they cannot be controlled with insecticides.			
Azera	azadirachtin + pyrethrins	1-2 pt	Group 3A insecticide. OMRI listed for organic agriculture. Avoid contact with blooming crops, weeds or cover crops. 12-hour reentry. 0-day PHI.
PyGanic EC	pyrethrins	1 pt- 2qt	Group 3A insecticide. OMRI listed for organic agriculture. Adjust pH of spray mixture to 5.5-7.0. Avoid contact with blooming crops, weeds or cover crops. 12-hour reentry. 0-day PHI.

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STAGES 2–5: Popcorn stage *Brown buds turn white just before opening*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval
Brown rot blossom blight (see footnote 2, page 11)			
Abound	azoxystrobin	12–15.5 fl oz	Group 11 fungicide. See footnote 6, page 11. Do not use with silicone-based surfactants. 4-hour reentry. 0-day PHI.
Bravo Weather Stik	chlorothalonil	3–4.1 pt	Avoid use when honey bees are active due to larval toxicity. Group M5 fungicide. Do not apply later than shuck split. 12-hour reentry.
Cabrio EG	pyraclostrobin	9.5 oz	Group 11 fungicide. 12-hour reentry. 0-day PHI.
Captan 80WDG	captan	1.9–2.5 lb	Not recommended due to concerns about pollinator brood development. Group M4 fungicide. 24-hour reentry. 0-day PHI.
CaptEvate 68WDG	captan + fenhexamid	3.75 lb	Not recommended due to concerns about pollinator brood development. Group M4 + Group 17 (Captan + Elevate) 24-hour reentry. 0-day PHI.
Cevya	mefentrifluconazole	3-5 fl oz	Group 3 fungicide. 12-hr reentry. 0-day PHI.
Elevate 50WDG	fenhexamid	1–1.5 lb	Group 17 fungicide. 12-hour reentry. 0-day PHI.
Fontelis	penthiopyrad	14–20 fl oz	Group 7 fungicide. 12-hour reentry. 0-day PHI.
Indar 2F	fenbuconazole	6 fl oz	Add a surfactant. Group 3 fungicide. 12-hour reentry. 0-day PHI.
Inspire	difenoconazole	7 fl oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Luna Sensation	fluopyram + trifloxystrobin	5–7.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. 1-day PHI.
Merivon	fluxapyroxad + pyraclostrobin	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.
Microthiol Disperss or many others	sulfur (80%)	10-20 lb	Group M2 fungicides. Do not use within 2 weeks of an oil spray. 24-hr reentry.
Miravis	pydiflumetofen	3.4-5.1 fl oz	Group 7 fungicide. 4-hr reentry. 0-day PHI
Miravis Duo	Pydiflumetofen + difenconazole	13.6 fl oz	Group 3 + 7 fungicide. 12-hr reentry. 0-day PHI
Orius 20 AQ	tebuconazole	8.6–17.2 oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Pristine	pyraclostrobin + boscalid	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Procure and generics	triflumizole	10–16 fl oz	Group 3 fungicide. 12-hour reentry. 1-day PHI.
Quadris	azoxystrobin	12–15.5 fl oz	Group 11 fungicide. 4-hour reentry. 0-day PHI.
Quash	metconazole	2.5–4 oz	Group 3 fungicide. 12-hour reentry. 14-day PHI.
Quilt Xcel	azoxystrobin + propiconazole	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Rally 40WSP	myclobutanil	2.5–6 oz	Group 3 fungicide. 24-hour reentry. 0-day PHI.
Rhyme	flutriafol	7 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
Tesaris	fluxapyroxad	3.5-5.6 fl oz	Group 7 fungicide. Do not use with EC or oil-based products. 12-hour reentry. 0-day PHI.
TopGuard SC	flutriafol	14 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
TopGuard EQ	azoxystrobin + flutriafol	6–8 fl oz	See footnote 6, page 11. Do not use with silicone surfactants. Group 3 + 11 fungicide. 12-hr reentry. 7-day PHI.
Topsin 4.5FL	thiophanate-methyl	20–30 oz	Group 1 fungicide. Tank-mix with another fungicide. 2-day reentry. 1-day PHI.
Ziram 76DF	Ziram	5–6 lb	Avoid use when honey bees are active due to larval toxicity. Group M3 fungicide. Do not apply after first cover. 48-hour reentry. 30-day PHI.
Aphids, bud moth, leafrollers, thrips *Note:* Aphids usually are of concern only on young trees. On mature trees, a spray 2 weeks after shuck fall is effective.			
Actara	thiamethoxam	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.

STAGES 2–5: Popcorn stage *Brown buds turn white just before opening*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval
Altacor 35 WDG	chlorantraniliprole	2–4 oz	Group 28 insecticide. Leafroller and bud moth only. 4-hour reentry.
Bacillus thuringensis kurstaki (Btk)	bacterium	See label.	Group 11B2 insecticide. Generic. OMRI listed. Can provide excellent, targeted control of leafrollers. Apply when temperatures exceed 60°F. Repeat application 2–3 times. 4-hour reentry.
Delegate 25WG	spinetoram	4.5–7 oz	Group 5 insecticide. Leafroller and thrips only at this timing. 4-hour reentry.
Diazinon 50WP	diazinon	4 lb	Group 1B insecticide. Restricted use. Limited to one dormant and one cover spray per season. Closed cab required. Allow 5 days before introducing bees. 24-hour reentry.
Entrust SC	spinosad	4–8 oz	Group 5 insecticide. OMRI listed for organic use. No more than 3 applications of Group 5 materials per year or 29 oz Entrust. Targets leafrollers and thrips at this timing. 4-hour reentry, 7-day PHI.
Intrepid 2F	methoxyfenozide	8–16 oz	Group 18 insecticide (IGR). Leafroller only. 4-hour reentry.
Success 2L	spinosad	4–8 oz	Group 5 insecticide. Leafroller and thrips only. 4-hour reentry.
Transform WG	sulfoxaflor	0.75-1.5 lb (aphids), 2.75 lb (thrips)	Group 4C insecticide. Avoid drift to flowering cover crops and weeds. No more than 8.5 oz per year. 24-hour reentry. 7- day PHI.
Syneta beetle (see footnote 5, page 11) *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	spinosad	4–8 oz	Group 5 insecticide. OMRI listed for organic use. No more than 3 applications of Group 5 materials per year or 29 oz Entrust. 4-hour reentry, 7-day PHI.
Imidan 70-W	phosmet	0.75 lb/100 gal	Group 1B insecticide. Restricted use. 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 2L	spinosad	4–8 oz	Group 5 insecticide. No more than 4 applications or 29 oz per year. 4-hour reentry.

STAGES 6–7: Full bloom

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Brown rot blossom blight (see footnote 2, page 11) See materials listed for popcorn stage.			

PETAL FALL *75% petal fall*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Brown rot blossom blight (see footnote 3, page 11) See materials listed for popcorn stage.			
Leaf spot (see footnote 2, page 11)			
Bravo Weather Stik	chlorothalonil	3–4.1 pt	Group M5 fungicide. Do not apply after shuck split. 12-hour reentry.
Captan 80WDG	captan	1.9–2.5 lb	Group M4 fungicide. 24-hour reentry.
Cevya	mefentrifluconazole	4-5 fl oz	Group 3 fungicide. 12-hr reentry. 0-day PHI.
Echo 720	chlorothalonil	3–4.1 pt	Group M5 fungicide. 12-hour reentry.
Flint Extra	trifloxystrobin	2.5–3.8 oz	Group 11 fungicide. 12-hour reentry. 1-day PHI.
Indar 2F	fenbuconazole	6 fl oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Luna Sensation	fluopyram + trifloxystrobin	5–7.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. 1-day PHI.
Merivon	fluxapyroxad + pyraclostrobin	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	tebuconazole	8.6–17.2 oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Pristine	pyraclostrobin + boscalid	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Procure and generics	triflumizole	10–16 fl oz	Group 3 fungicide. 12-hour reentry. 1-day PHI.
Quilt Xcel	azoxystrobin + propiconazole	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Rally 40WSP	myclobutanil	2.5–6 oz	Group 3 fungicide. 24-hour reentry. 7-day PHI.
Rhyme	flutriafol	7 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
Syllit FL	dodine	1–3 pt	Group U12 fungicide. 48-hour reentry. 7-day PHI.
Tilt and generics	propiconazole	4 fl oz	Group 3 fungicide. 12 to -24-hour reentry. 0-day PHI.
TopGuard SC	flutriafol	14 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
TopGuard EQ	azoxystrobin + flutriafol	6–8 fl oz	See footnote 6, page 11. Do not use with silicone surfactants. Group 3 + 11 fungicide. 12-hr reentry. 7-day PHI.
Ziram 76DF	ziram	6 lb	Group M3 fungicide. 48-hour reentry. 30-day PHI.
Aphids, bud moth, leafrollers *Note:* If this petal fall spray is used (particularly systemic materials against aphids), spray only after bloom and after bees have been removed from orchard.			
Actara	thiamethoxam	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. 14-day PHI.
Altacor 35 WDG	chlorantraniliprole	2–4 oz	Group 28 insecticide. Targets leafroller with this timing. 4-hour reentry. 10-day PHI.
Assail 70WP	acetemiprid	1.1–2.3 oz	Group 4A insecticide. Targets aphids with this timing.. Note that SG formulation also available and rates differ. 12-hour reentry. 7-day PHI.
Bacillus thuringensis kurstaki (Btk)	bacterium	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	spinetoram	4.5–7 oz	Group 5 insecticide. Targets leafroller with this timing. 4-hour reentry. 7-day PHI.
Entrust SC	spinosad	4–8 oz	Group 5 insecticide. OMRI listed for organic use. No more than 3 applications of Group 5 materials per year or 29 oz Entrust. 4-hour reentry. 7-day PHI.
Imidacloprid 2F	imidacloprid	3.2–6.4 oz	Group 4A insecticide. Generic, several product names. Targets aphids with this timing. Do not apply when bees are active. 12-hour reentry. 7-day PHI.
Intrepid 2F	methoxyfenozide	8–16 oz	Group 18 insecticide (IGR). Targets leafroller with this timing. 4-hour reentry. 7-day PHI.
Success 2L	spinosad	4–8 oz	Group 5 insecticide. Targets leafroller with this timing. 4-hour reentry. 7-day PHI.
Transform WG	sulfoxaflor	0.75-1.5 lb	Group 4C insecticide. Targets aphids. Avoid drift to flowering cover crops and weeds. No more than 8.5 oz per year. 24-hour reentry. 7- day PHI.

SHUCK SPLIT

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Leaf spot			
Bravo Weather Stik	chlorothalonil	3–4.1 pt	Group M5 fungicide. Do not apply after shuck split. 12-hour reentry.
Captan 80WDG	captan	1.9–2.5 lb	Group M4 fungicide. 24-hour reentry. 0-day PHI.
Cevya	mefentrifluconazole	4-5 fl oz	Group 3 fungicide. 12-hr reentry. 0-day PHI.
Echo 720	chlorothalonil	3–4.1 pt	Group M5 fungicide. Do not apply after shuck split. 12-hour reentry.
Flint Extra	trifloxystrobin	2.5–3.8 oz	Group 11 fungicide. 12-hour reentry. 1-day PHI.
Indar 2F	fenbuconazole	6 fl oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Luna Sensation	fluopyram + trifloxystrobin	5–7.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. 1-day PHI.
Merivon	fluxapyroxad + pyraclos- trobin	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	tebuconazole	8.6–17.2 oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Pristine	pyraclostrobin + boscalid	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Procure and generics	triflumizole	10–16 fl oz	Group 3 fungicide. 12-hour reentry. 1-day PHI.
Quilt Xcel	azoxystrobin + propi- co- na-zole	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Rally 40WSP	myclobutanil	2.5–6 oz	Group 3 fungicide. 24-hour reentry. 0-day PHI.
Rhyme	flutriafol	7 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
Syllit FL	dodine	1–3 pt	Group U12 fungicide. 48-hour reentry. 7-day PHI.
Tilt and generics	propiconazole	4 fl oz	Group 3 fungicide. 12- to 24-hour reentry. 0-day PHI.
TopGuard SC	flutriafol	14 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
TopGuard EQ	azoxystrobin + flutriafol	6–8 fl oz	See footnote 6, page 11. Do not use with silicone surfactants. Group 3 + 11 fungicide. 12-hr reentry. 7-day PHI.
Ziram 76DF	ziram	6 lb	Group M3 fungicide. 48-hour reentry. 30-day PHI.
Shothole (see footnote 7, page 11) *Note:* In addition to leaf spot materials, the following can be used:			
Captan 80WDG	captan	1.9–2.5 lb	Group M4 fungicide. 24-hour reentry. 0-day PHI.
Echo 720	chlorothalonil	3–4.1 pt	Group M5 fungicide. 12-hour reentry.
Fontelis	penthiopyrad	14–20 fl oz	Group 7 fungicide. 12-hour reentry. 0-day PHI.
Ziram 76DF	ziram	6 lb	Group M3 fungicide. 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	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
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	thiamethoxam	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. 14-day PHI.
Diazinon 50WP	diazinon	4 lb	Group 1B insecticide. Restricted use. Limited to one dormant and one cover spray per season. Closed cab required. 24-hour reentry. 21-day PHI.
Transform WG	sulfoxaflor	0.75-1.5 lb	Group 4C insecticide. Avoid drift to flowering cover crops and weeds. No more than 8.5 oz per year. 24-hour reentry. 7- day PHI.

LATE SPRING AND SUMMER

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry 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	azoxystrobin	12–15.5 fl oz	Group 11 fungicide. See footnote 6, page 11. Do not use with silicone-based surfactants. 4-hour reentry. 0-day PHI.
Cabrio EG	pyraclostrobin	9.5 oz	Group 11 fungicide. 12-hour reentry. 0-day PHI.
Captan 80 WDG	captan	2–2.5 lb	Group M4 fungicide. 24-hour reentry. 0-day PHI.
CaptEvate 68WDG	captan + fenhexamid	3.75 lb	Group M4 + Group 17. (Captan + Elevate) 24-hour reentry. 0-day PHI.
Cevya	mefentrifluconazole	3-5 fl oz	Group 3 fungicide. 12-hr reentry. 0-day PHI.
Elevate 50WDG	fenhexamid	1–1.5 lb	Group 17 fungicide. 12-hour reentry. 0-day PHI.
Fontelis	penthiopyrad	14–20 fl oz	Group 7 fungicide. 12-hour reentry. 0-day PHI.
Indar 2F	fenbuconazole	6 fl oz	Add a surfactant. Group 3 fungicide. 12-hour reentry. 0-day PHI.
Inspire	difenoconazole	7 fl oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Luna Sensation	fluopyram + trifloxystrobin	5–7.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. 1-day PHI.
Merivon	fluxapyroxad + pyraclostrobin	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.
Miravis	pydiflumetofen	3.4- 5.1 fl oz	Group 7 fungicide. 4-hr reentry. 0-day PHI
Miravis Duo	Pydiflumetofen + difenconazole	13.6 fl oz	Group 3 + 7 fungicide. 12-hr reentry. 0-day PHI
Orius 20 AQ	tebuconazole	8.6–17.2 oz	Group 3 fungicide. 12-hour reentry. 0-day PHI.
Procure and generics	triflumizole	10–16 fl oz	Group 3 fungicide. 12-hour reentry. 1-day PHI.
Quadris	azoxystrobin	12–15.5 fl oz	Group 11 fungicide. 4-hr reentry. 0-day PHI.
Quadris Top	azoxystrobin + difenoconazole	12–14 fl oz	Group 3 + 11 fungicide. 12-hr reentry. 0-day PHI.
Quash	metconazole	2.5–4.0 oz	Group 3 fungicide. 12-hour reentry. 14-day PHI.
Quilt Xcel	azoxystrobin + propiconazole	14 fl oz	Group 3 + 11 fungicide. 12-hour reentry. See footnote 6, page 11. 0-day PHI.
Rhyme	flutriafol	7 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
Sulfur, wettable (92%)	inorganic sulfur	5–10 lb	Group M fungicide. Phytotoxic when temperatures over 85°F. 24-hour reentry.
Tesaris	fluxapyroxad	3.5-5.6 fl oz	Group 7 fungicide. Do not use with EC or oil-based products. 12-hour reentry. 0-day PHI.
Tilt and generics	propiconazole	4 fl oz	Group 3 fungicide. 12- to 24-hour reentry. 0-day PHI.
TopGuard	flutriafol	14 fl oz	Group 3 fungicide. 12-hour reentry. 7-day PHI.
TopGuard EQ	azoxystrobin + flutriafol	6–8 fl oz	See footnote 6, page 11. Do not use with silicone surfactants. Group 3 + 11 fungicide. 12-hr reentry. 7-day PHI.
Topsin 4.5FL	thiophanate-methyl	20–30 fl oz	Group 1 fungicide. Tank-mix with another fungicide. See footnote 3, page 11. 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 or the phenology model (available from uspest.org).			
Actara	thiamethoxam	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.

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LATE SPRING AND SUMMER *Continued from page 7*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Asana XL	esfenvalerate	4.8–14.5 fl oz	Group 3 insecticide. Restricted use. Do not apply past the white bud/pre-bloom 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	acetemiprid	2.3–3.4 oz	Group 4A insecticide. No more than 4 applications per season. Note that SG formulation also available and rates differ. 12-hour reentry. 7-day PHI.
Delegate WG	spinetoram	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	diazinon	4 lb	Group 1B insecticide. Restricted use. 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 400/400EC	dimethoate	2.66 pt	Group 1B insecticide. Restricted use. Apply once at 7 days following cherry fruit fly emergence. Do not mix dimethoate with Syllit. Phytotoxicity can occur and varies from marginal leaf burn to defoliation. Thorough coverage is important. Use only once per season.14-day reentry. 21-day PHI.
Entrust SC	spinosad	4-6.4 oz	Group 5 insecticide. OMRI listed for organic use. No more than 3 applications of Group 5 materials per year or 29 oz Entrust. 4-hour reentry, 7-day PHI.
GF-120 NF	spinosad + bait compounds	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 nozzles that give coarse droplets. Repeat applications on 7- to 14-day intervals. 4-hour reentry. 0-day PHI.
Imidacloprid 2F	imidacloprid	4.8–6.4 oz	Group 4 insecticide. Generic; several product names. 12-hour reentry. 7-day PHI.
Imidan	imidan	2.125 lb	Group 1B insecticide. Restricted use. Tart cherries only. 3-day reentry, or 14-day reentry for general public as in U-pick. 14-day PHI.
Malathion	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	carbaryl	1.5–2 qt	Group 1A insecticide. Restricted use. Note multiple formulations and generics are available. Repeated applications can cause secondary pest problems. Cross-resistance with Group 1B materials. Potential phytotoxicity. 12-hour reentry. 3-day PHI.
Success	spinosad	4–8 oz	Group 5 insecticide. 4-hour reentry. 7-day PHI.
Voliam Flexi	thiamethoxam + chlorantraniliprole	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.
Warrior II	lambda-cyhalothrin	2.6–5.1 oz	Group 3 insecticide. Restricted use. Several product names, also a component in premix formulations. Can cause secondary pest problems at this timing. 1-day reentry. 14-day 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 11.			
Baythroid XL	beta-cyfluthrin	2.4–2.8 oz	Group 3 insecticide. Restricted use. Rotate with other resistance management groups. 12-hour reentry. 7-day PHI.
Danitol 2.4EC	danitol	10.66–21.33 oz	Group 3 insecticide. Restricted use. Rotate with other resistance management groups. 24-hour reentry. 3-day PHI.
Delegate WG	spinetoram	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.

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LATE SPRING AND SUMMER *Continued from page 8*

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Diazinon 50WP	diazinon	4 lb	Group 1B insecticide. Restricted use. 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/400EC	dimethoate	2.66 pt	Group 1B insecticide. Restricted use. Do not mix dimethoate with Syllit. Phytotoxicity can occur and varies from marginal leaf burn to defoliation. Thorough coverage is important. Use only once per season. 10- or 14-day reentry. 21-day PHI.
Entrust SC	spinosad	4-6.4 oz	Group 5 insecticide. OMRI listed for organic use. No more than 3 applications of Group 5 materials per year or 19.2 oz of Entrust. See SLN 24(c) label OR-120013 for management of spotted wing drosophila in cherry allowing shorter PHI 4-hour reentry, 3-day PHI.
Exirel	cyantraniliprole	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	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.
Mustang Maxx	zeta-cypermethrin	4 oz	Group 3 insecticide. Applications must be 7 days apart. 12-hour reentry. 14-day PHI.
Sevin	carbaryl	2–3 qt 3 lb	Group 1A insecticide. Note multiple formulations and generics are 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	spinosad	4–8 oz	Group 5 insecticide. 4-hour reentry. 7-day PHI.
Warrior II	lambda-cyhalothrin	1.28–2.56	Group 3A insecticide. Restricted use. Can cause secondary pest problems at this timing. 1-day reentry. 14-day PHI.
Shothole borer (see footnote 4, page 11) *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.

POSTHARVEST

Pest or disease/ material	Active ingredient	Application rate/acre	Comments/re-entry interval/preharvest interval (PHI)
Shothole borer (see footnote 4, page 11)			
Spider mites *Note:* Spider mites seldom are a problem on cherries in the Willamette Valley except on young trees.			
Acramite 50WS	bifenazate	0.75–1 lb	Unclassified mode of action. Do not use more than once per season. 12-hour reentry. 3-day PHI.
Apollo 4SC	clofentezine	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	spirodiclofen	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)	mineral oil	1–2 gal	Can cause phytotoxicity if applied within 2 weeks of a sulfur application. 4-hour reentry. 0-day PHI.
Nexter	pyridaben	5.2–10.6 oz	Group 21A miticide. Ground application only. Two applications per season. 12-hour reentry. 300-day PHI.
Omite 30WS	propargite	5–6 lb	Group 12C miticide. Postharvest use only. Each water-soluble bag contains 2.5 lbs. 2-day reentry. No PHI.
Onager 1EC	hethythiazox	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. 12-hour reentry. 28-day PHI.
Savey DF	hethythiazox	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	etoxazole	2–3 oz	Group 10B insecticide. 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.

STAGE 0: Dormant season *October and January*

Pest or disease/ Material	Active ingredient (AI)	Application rate/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.

Follow the 'RULES' for fungicide stewardship

- **R**otate or mix fungicides of different chemical groups.
- **U**se labeled rates.
- **L**imit total number of applications.
- **E**ducate yourself about fungicide activity, mode of action and class — as well as resistance management practices.
- **S**tart a fungicide program with multisite mode of action materials.

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.
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 during some 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 FRAC 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 trunks and limbs when adults are emerging and reinvading during delayed dormant.
5. Syneta beetle is a small, pale leaf- and fruit-feeding beetle that causes fruit scarring from 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, QuiltXcel, Quadris, Quadris Top or TopGuard EQ 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 than those recommended here 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. Homemade traps can also be effective. Use 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. Place traps just before fruit starts to change to its ripening color. Check traps weekly. Various kinds of flies will be captured in this nonspecific trap, so learn to identify SWD. Males are easily identified by the spots on the wings 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. Many resources on management of SWD are available in the OSU Extension Catalog, catalog.extension.oregonstate.edu.

Effectiveness of fungicides and bactericides for control of cherry diseases

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.

Fungicide or bactericide	FRAC group	Properties	BROWN ROT		Powdery mildew	Shothole	Bacterial canker
			Blossom blight	Fruit rot			
Abound	11	Broad spectrum, fungicidal, locally systemic, protectant	Good	Good	Fair to good	Fair to good	Not effective
Bravo	M5	Broad spectrum, fungicidal, protectant	Good to fair	Not registered	Not effective	Good	Not effective
Cabrio	11	Broad spectrum, fungicidal, locally systemic, protectant	Good	Good	Fair to good	??	Not effective
Captan	M4	Broad spectrum, fungicidal, protectant	Good	Good	Not effective	Good–excellent	Not effective
Cevya	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	??	??	Good	??	Not effective
Copper-based products	M1	Broad spectrum, Bact, fungicidal, protectant	Slight	Not registered	Slight	Good	Not effective
Echo 720	M5	Broad spectrum, fungicidal, protectant	Good to fair	Not registered	Not effective	Good	Not effective
Elevate	17	Fungicidal, narrow spectrum, protectant	Good–excellent	Good–excellent	Not effective	??	Not effective
Flint	11	Broad spectrum, fungicidal, locally systemic, protectant	Good	Fair to good	Fair to good	??	Not effective
Fontelis	7	Broad spectrum, fungicidal, protectant	Good–excellent	Good–excellent	Good	Good	Not effective
Gatten	U13	Fungicidal, narrow spectrum	??	??	Good	???	Not effective
Indar	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Excellent**	Excellent**	Slight**	??	Not effective
Inspire	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Fair to good**	Fair to good**	Good**	??	Not effective
HMO	Not classified	Eradicant, fungicidal, insecticidal, protectant	??	??	Good–excellent	??	??
Kaligreen	Bicarbonate	Eradicant, broad to narrow spectrum	??	??	Poor to slight	??	??
Magister	Not classified	Fungicidal	??	??	Good	??	??
Miravis	7	Broad spectrum, fungicidal, protectant	Good–excellent	Good–excellent	Good	Good	Not effective
Procure	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good	??	Good**	??	Not effective
Quadris	11	Broad spectrum, fungicidal, locally systemic, protectant	Good	Good	Fair to good	Fair to good	Not effective
Quash	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good–excellent	Good	Good**	??	Not effective
Quintec	13	Narrow spectrum, fungicidal, protectant	Not effective	Not effective	Good	Not effective	Not effective
Rally	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good to fair	Good to fair	Fair**	Slight	Not effective
Rhyme	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good	Good	Good	??	Not effective
Rovral	2	Broad to narrow spectrum, fungicidal, locally systemic, protectant	Excellent**	Not registered	Not effective	Fair to good	Not effective
Sulfur	M2	Fungicidal, insecticidal, protectant, vapor active	Fair	Fair	Good	Not effective	Not effective
Syllit	U12	Broad spectrum, fungicidal, protectant	??	Slight	Not effective	??	None–slight
Tebucon	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Fair to good**	??	Not effective
Tesaris	7	Broad spectrum, fungicidal, protectant	Good–excellent	Good–excellent	Good	Good	Not effective
Tilt	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Fair**	Slight	Not effective
Torino	U6	Fungicidal, protectant	??	??	Good–excellent	???	Not effective
Topsin M	1	Broad spectrum, curative, fungicidal, locally systemic	Good**	Good**	Fair**	Not effective	Not effective
TopGuard	3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good	Good	Good	??	Not effective
Vivando	U8	??	Not effective	Not effective	Fair to good	Not effective	Not effective
Ziram	M3	Broad spectrum, fungicidal, protectant	Slight	Slight	Not effective	Good–excellent	Not effective
Combination products							
Luna Experience	3 + 7	Broad to narrow spectrum, fungicidal, locally systemic, protectant	Good	Good	Good**	??	Not effective
Luna Sensation	7 + 11	Broad spectrum, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Good–excellent	??	Not effective
Merivon	7 + 11	Broad spectrum, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Good–excellent	??	Not effective
Miravis Duo	3 + 7	Broad to narrow spectrum, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Good–excellent	Good	Not effective
Pristine	7 + 11	Broad spectrum, fungicidal, locally systemic, protectant	Good	Good	Good **	??	Not effective
Quilt	11 + 3	Broad to narrow spectrum, curative, fungicidal, locally systemic, protectant	Good–excellent	Good–excellent	Good–excellent	??	Not effective

?? = no information available. **Resistant pathogens will lower the effectiveness of this fungicide.

Quick reference guide to herbicides labeled for use in fruit 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:* https://catalog.extension.oregonstate.edu/weed

Ingredient common name (herbicide mode of action) and product name example			Stone fruit						Rate
	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plums	Prunes	
Applications that are soil active									
dichlobenil (20) Casoron									4 to 6 lb ai/a (100 to 150 lb/a Casoron); apply in cold, wet weather.
diuron (7) Karmex									1.6 to 3.2 lb ai/a (2 to 4 lb/a Karmex 80DF)
Fluridone (12) Brake ON!									Rate 0.19 to 0.40 lb ai/A (21 to 43 fl oz/A Brake on!).
isoxaben (21) Trellis SC	NB	NB	NB	NB	NB	NB	NB	NB	0.5 to 1 lb ai/a
indaziflam (29) Alion									(0.66 to 1.33 lb/a product)
mesotrione (27) ***Callisto, Broadworks***									0.046 to 0.085 lb ai/a
napropamide (3) Devrinol									(3.5 to 6.5 oz/a product) depending on soil texture.
norflurazon (12) Solicam									0.093 to 0.187 lb ai/a
oryzalin (3) Surflan									(3 to 6 fl oz/a product)
pendimethalin(3) Prowl H20									4 lb ai/a (8 lb/a)
pronamide (3) Kerb									1.95 to 3.98 lb ai/a
simazine (5) Princep									(2.5 to 5 lb/a Solicam)
sulfentrazone (14) Zeus XC/Sulfentrazone 4SC									2 to 6 lb ai/a
terbacil (5) Sinbar WDG			NB	NB					(2 to 6 quarts/a Surflan)
trifluralin (3) Treflan 4L/EC									Prowl H2O: 1.9 to 6 lb ai/a
trifluralin (3)+ isoxaben (21)+ oxyfluorfen (14) Showcase	NB	NB	NB	NB	NB	NB	NB	NB	(2 to 6.3 quarts/a) depending on desired length of control and crop.
Applications that are soil and foliar active									
clopyralid (4) Stinger									Pome Fruit: 0.094 to 0.25 lb ae/a (0.25 to 0.66 pints/a Stinger) Others: 0.12 to 0.25 lb ae/a (0.33 to 0.66 pints/a Stinger)
flazasulfuron (2) Mission									See product label for rates. Princep Caliber 90 is a Special Local Needs label (OR-080038) for sweet cherries only.
flumioxazin (14) Chateau SW									0.125 to 0.375 lb ai/a
oxyfluorfen (14) generic									1.25 to 2 lb ai/a (5 to 8 pints/a Goal 2XL)

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Ingredient common name (herbicide mode of action) and product name example	Apple	Pear	Stone fruit: Apricot	Cherry	Nectarine	Peach	Plums	Prunes	Rate
oxyfluorfen (14) + penoxsulam (2) Pindar GT									1.47 lb ai/a oxyfluorfen + 0.015 lbs ai/a penoxsulam (1.5 to 3 pints/a)
Quinclorac (4) Quinstar 4L									0.375 lb ai/A (12.6 fl oz/A Quinstar 4L)
rimsulfuron (2) Matrix									0.063 lb ai/a (4 oz/a Matrix FNV per year)
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)
ammonium nonanoate Axxe									6% to 15% v/v OMRI certified
caprylic acid + capric acid Suppress									6% to 9% v/v . OMRI listed.
carfentrazone (14) Aim EC									Green sucker control in hazelnuts: 0.031 lb ai/a (2 fl oz/a Aim EC)
clethodim (1)	NB	NB	NB	NB		NB	NB	NB	0.06 to 0.125 lb ai/a (6 to 8 oz/a Select Max)
diquat (22) Reglone	NB	NB	NB	NB	NB	NB	NB	NB	0.375 to 0.5 lb ai/a (1.5 to 2 pints/a)
fluazifop (1) Fusilade DX	NB	NB							0.25 to 0.375 lb ai/a (16 to 24 oz/a Fusilade DX). Refer to specific grassy weeds listed on label.
glufosinate (10) generic									0.88 to 1.5 lb ai/a (1.5 to 2.5 quarts/a Rely 280); sucker control: 1.75 quarts/a. Do not make spot spray applications to suckers.
glyphosate (9) Roundup									General weed control and grass suppression in row middles; read label carefully for crops listed and geographic location.
halosulfuron (2) Sandea									Pome fruit: 0.035 to 0.094 lb ai/a (0.75 to 2 oz/a); nut crops: 0.031 to 0.063 lb ai/a (2/3 to 1 1/3 oz/a)
paraquat (22) Gramoxone SL 2.0									Green sucker control in hazelnuts: 0.625 to 1 lb cation/a (2.5 to 4 pints/a Gramoxone 2.0 SL; 1.7 to 2.7 pints/a Firestorm)
pyraflufen (14) Venue									0.001 to 0.005 lb ai/a (0.7 to 4 fl oz/a product). Green sucker control in hazelnuts: 3 to 4 fl oz/a.
saflufenacil (14) Treevix									0.045 lb ai/a (1 oz/a)
sethoxydim (1) Poast							NB	NB	Grass suppression in row middles: 0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a product)

OSU resources for plant protection

Information on plant protection is available from several sources at Oregon State University:

- OSU Integrated Plant Protection Center. Online weather data and degree day information for insect pests and diseases uspest.org/wea/
- Pacific Northwest Plant Disease Management Handbook, pnwhandbooks.org/plantdisease
- Pacific Northwest Insect Management Handbook, pnwhandbooks.org/insect
- Pacific Northwest Weed Management Handbook, 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 they 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, 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 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 nontarget 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 specified on the pesticide label.
- Follow the pre-harvest interval on the pesticide label before harvesting crops or gardens and before allowing livestock to graze fields.

Emergency response for exposure and spills

- For any pesticide exposure emergency, dial 911.
- First aid for exposure is indicated on the pesticide label.
- For information on poison emergency treatment call the National Poison Center Poison Help Line at 1-800-222-1222.
- For emergency information related to pesticide spills contact the Oregon Emergency Response System at 1-800-452-0311.

Non-emergency information

- **General pesticide information —** The National Pesticide Information Center provides objective, science-based information about pesticides and pesticide-related topics. Visit npic.orst.edu/index.html or call 1-800-858-7378.
- **Pesticide licensing and regulation —** The Oregon Department of Agriculture regulates most aspects of pesticide use in the State of Oregon. Visit www.oregon.gov/ODA/programs/Pesticides/Pages/AboutPesticides.aspx or call 503-986-4635.
- **Worker protection —** The federal Worker Protection Standard for Agricultural Pesticides protects agricultural workers from pesticide exposure at work. The Oregon Occupational Safety and Health Administration is the state agency responsible for administering the WPS in Oregon. For information on WPS requirements for employers, visit https://osha.oregon.gov/Pages/topics/worker-protection-standard.aspx or call 1-800-922-2689.
- **Pesticide waste —** The Oregon Department of Environmental Quality regulates the disposal of pesticide waste in the State of Oregon. Visit https://www.oregon.gov/oda/programs/Pesticides/RegulatoryIssues/Pages/PesticideStorageDisposal.aspx or call 503-229-5263. Most area chemical distributors offer plastic pesticide container recycling. For information on container preparation, contact your chemical supplier.