Oregon State University | Extension Service

Pear

2015 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.

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. Boron also is not compatible with water-soluble packets.
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.
3. Agri-Mek 0.15EC is registered on pears to control pear psylla and mites.

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.

Stages

Dormant Season (Stage 0)
Delayed Dormant (Stages 1–2)
Tight Cluster Bud or Prepink (Stage 3)
Pink or Preblossom (Stages 4–6)

Not shown

Calyx; First Cover Spray; Second Cover Spray; Third Cover Spray; Preharvest; Postharvest

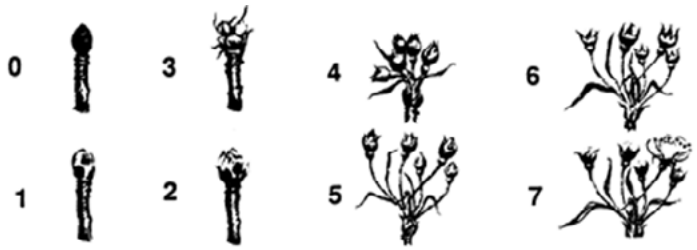

Illustration courtesy of Washington State University Extension.

Pear Pest Control Recommendations

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

Dormant (Stage 0)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Pear psylla (adults and eggs), scale *Note:* Apply just prior to egg deposition. Thorough coverage is important.		
horticultural mineral oil (HMO)	4–6 gal	The oil spray alone repels adult psylla and inhibits egg laying.
HMO + one of the following:	4–6 gal	The oil + synthetic pyrethroids kills adult psylla.
Asana XL	10–19 oz	—
Danitol 2.4EC	16–21.33 oz	Do not apply more than 42.66 oz/A per season.
Pounce 25W	12.8–25.6 oz	—
Surround	See labels.	Apply in 200 gal water at the beginning of pear psylla egg laying. Maintain coverage until bloom with additional applications to prevent egg laying. **0-day PHI**.
Warrior II	1.3–2.5 oz	**21-day PHI**.
Pear rust mite, pear leaf blister mite *Note:* Apply before bud swell if pear rust mite has been a problem in previous years.		
horticultural mineral oil (HMO) + one of the following:	4–6 gal	—
flowable sulfur (6 lb ai/gal)	2 gal	—
lime sulfur (calcium polysulfide 29%)	10 gal	—
wettable sulfur (80%)	16–20 lb	—

Delayed Dormant (Stages 1 and 2—apply when buds are swelling but before bud scales drop to minimize injury)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Pear rust mite, pear leaf blister mite *Note*: Apply before bud swell if pear rust mite has been a problem in previous years.		
horticultural mineral oil (HMO) + one of the following:	4-6 gal	—
flowable sulfur (6 lb ai/gal)	2 gal	—
lime sulfur (calcium polysulfide 29%)	10 gal	—
wettable sulfur (80%)	16–20 lb	—
Pear psylla adults, European red mite, San Jose scale, European fruit scale, lygus bug		
HMO + one of the following:	4–6 gal	If scale is a problem, increase gallonage to 500 gpa. Calibrate to discharge two-thirds of volume out of top one-third of sprayer.
Asana XL	9.6–19.2 oz	Very toxic to bees and fish.
Danitol	16–21 oz	Very toxic to bees and fish.
Pounce 25WP	12.8–25.6 oz	Very toxic to bees and fish.
Esteem 35WP	4–5 oz	Limited to 2 applications per season. **45-day PHI**.
Warrior II	1.3–2.5 oz	**21-day PHI**.
Scales, lygus bug, grape mealybug, stink bug, mite eggs		
HMO + one of the following:	4–6 gal	The ⅔:⅓ calibration should be used for all sprayers and all applications.
diazinon 50WP	4 lb	Limited to 1 application per season.
Lorsban 4E	2 qt	—
Pseudomonas (see footnote 6, page 12)		
Copper-Count-N	8–12 qt	48-hour reentry.
Cuprofix Ultra	7.5–10 lb	48-hour reentry.
Kocide 3000	5.5–7 lb	Copper may not be compatible with other spray materials. Do not attempt to mix it with other fungicides or insecticides. 48-hour reentry.
ManKocide	12–16 lb	48-hour reentry.
Nu-Cop 50DF	12–16 lb	48-hour reentry.

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.

Tight Cluster Bud (after scales drop) or Prepink (Stage 3)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Scab (see footnote 9, page 12)		
Adament 50WG	4–5 oz	Group 3 + 11 fungicide. Effects on shape have not been studied. 12-hour reentry. **75-day PHI**.
Flint 50WG	2–2.5 oz	Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **14-day PHI**.
Inspire Super	12 fl oz	Group 3 + 9 fungicide. 12-hour reentry. **14-day PHI.**
mancozeb	3 or 6 lb	Do not use the 6 lb/A rate beyond bloom. 24-hour reentry.
Merivon	4–5.5 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Procure	8–16 fl oz	12-hour reentry. **14-day PHI**.
Sovran	4–6.4 oz	See footnote 8, page 12. Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **30-day PHI**.
Sulforix	2 qt/100 gal water	See footnote 5, page 12.
Syllit 65WP	1.5–3 lb	Mix with another fungicide. See footnote 1, page 12. 48-hour reentry. **7-day PHI**.
Topguard	13 fl oz	Mix with another fungicide. 12-hour reentry. **14-day PHI.**
Ziram 76DF	6–8 lb	48-hour reentry. **5-day PHI**.
Rust mite		
Envidor	6.6–10.67 oz	**7-day PHI.**
Fujimite 5EC	2 pt	**14-day PHI.**
Nexter	6.6–10.67 oz	**7-day PHI.**
Pear psylla adults *Note:* All of the products listed below are detrimental to predatory mites with this timing.		
Asana XL	9.6–19.2 oz	Do not exceed 0.375 lb ai/A per season.
Pounce 25WP	12.8–25.6 oz	Do not exceed 2 applications prebloom.
Warrior II	1.3–2.5 oz	**21-day PHI**.

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Pink or Preblossom (Stages 4–6—just before blossoms open)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Scab (see footnote 9, page 12)		
Adament 50WG	4–5 oz	Group 3 + 11 fungicide. Effects on shape have not been studied. 12-hour reentry. **75-day PHI**.
Flint 50WG	2–2.5 oz	Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **14-day PHI**.
Inspire Super	12 fl oz	Group 3 + 9 fungicide. 12-hour reentry. **14-day PHI.**
mancozeb	3 or 6 lb	Do not use the 6 lb/A rate beyond bloom. 24-hour reentry.
Merivon	4–5.5 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Pristine	14.5–18.5 oz	Do not make more than 2 consecutive applications or with an HMO. 12-hour reentry. **0-day PHI.**
Procure	8–16 fl oz	12-hour reentry. **14-day PHI**.
Sovran	3.2–6.4 oz	See footnote 8, page 12. Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **30-day PHI**.
Sulforix	2 qt/100 gal water	See footnote 5, page 12.
Syllit FL	1.5–3 pt	Mix with another fungicide. See footnote 1, page 12. 48-hour reentry. **7-day PHI**.
Topguard	13 fl oz	Mix with another fungicide. 12-hour reentry. **14-day PHI.**
Ziram 76DF	6–8 lb	48-hour reentry. **5-day PHI**.
Powdery mildew (see footnote 9, page 12)		
Adament 50WG	4–5 oz	Group 3 + 11 fungicide. Effects on shape have not been studied. 12-hour reentry. **75-day PHI**.
Flint 50WG	2–2.5 oz	Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **14-day PHI**.
Fontelis	14–20 fl oz	Do not use with thinning agents. 12-hour reentry. **28-day PHI**.
HMO such as JMS Stylet oil	1–2 gal/ 100 gal water	Do not use within 10 days of a sulfur application.
Inspire Super	12 fl oz	Group 3 + 9 fungicide. 12-hour reentry. **14-day PHI.**
Kumulus	10–20 lb	24-hour reentry.
Merivon	4–5.5 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Oso SC	3.75–13 fl oz	4-hour reentry. **0-day PHI.**
Ph-D	6.2 oz	4-hour reentry. **0-day PHI**.
Pristine	14.5–18.5 oz	Do not make more than 2 consecutive applications or with an HMO. 12-hour reentry. **0-day PHI.**
Procure	8–16 fl oz	12-hour reentry. **14-day PHI**.
Sovran	4–6.4 oz	See footnote 8, page 12. Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **30-day PHI**.
Sulforix	2 qt/100 gal water	See footnote 5, page 12.
Topguard	8–12 fl oz	12-hour reentry. **14-day PHI.**
Unicorn DF	2–3 lb	Group 3 fungicide + sulfur. 24-hour reentry. **75-day PHI**.

Pink or Preblossom 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—Pink or Preblossom (Stages 4–6—just before blossoms open)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Pseudomonas		
streptomycin 21.2%	28.8 oz	Do not overuse; bacterial populations can quickly develop resistance to this antibiotic. 12-hour reentry. **30-day PHI**.
Pear psylla adults *Note:* Some of the following pesticides are toxic to bees and fish. All are detrimental to predatory mites with this timing. Carefully read the labels for precautions.		
Asana XL	9.6–19.2 oz	Do not exceed 0.375 lb ai/A per season.
Assail 70WP	1.1–3.4 oz	**7-day PHI**.
Centaur WDG	34.5–46 oz	**14-day PHI**.
FujiMite 5EC	2 pt	**14-day PHI**.
Nexter	6.6–10.67 oz	**7-day PHI**.
Pounce 25WP	12.8–25.6 oz	Do not exceed 3 applications per season.
Proaxis	2.56–5.12 oz	For psylla suppression only. **21-day PHI**.
Rimon 0.83EC	20–30 oz	**14-day PHI**.
Calyx (when three-quarters of the petals have fallen, before calyx or central fruit cluster closes)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Scab and powdery mildew See materials listed for Pink or Preblossom Stage.		
Bull's eye rot		
Ziram 76DF	6 lb	48-hour reentry. **14-day PHI**.

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First Cover Spray (about 15 days after petals fall)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Scab (see footnote 9, page 12)		
Adament 50WG	4–5 oz	Group 3 + 11 fungicide. 12-hour reentry. **75-day PHI**.
Flint 50WG	2–2.5 oz	Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **14-day PHI**.
Inspire Super	12 fl oz	Group 3 + 9 fungicide. 12-hour reentry. **14-day PHI.**
mancozeb	3 lb	24-hour reentry. **77-day PHI**.
Merivon	4–5.5 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Pristine	14.5–18.5 oz	No more than 2 consecutive applications. Do not use with an HMO. 12-hour reentry. **0-day PHI.**
Procure	8–16 fl oz	12-hour reentry. **14-day PHI**.
Sovran	3.2–6.4 oz	See footnote 8, page 12. Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **30-day PHI**.
Sulforix	2 qt/100 gal water	See footnote 5, page 12.
Syllit FL	1.5–3 pt	Mix with another fungicide. See footnote 1, page 12. 48-hour reentry. **7-day PHI**.
Tebuzol 45DF	4–8 oz	5-day reentry. **75-day PHI**.
Topguard	13 fl oz	Mix with another fungicide. 12-hour reentry. **14-day PHI.**
Ziram 76DF	6 lb	48-hour reentry. **14-day PHI**.
Powdery mildew (only if needed—see footnote 9, page 12)		
Adament 50WG	4–5 oz	Group 3 + 11 fungicide. 12-hour reentry. **75-day PHI**.
Flint 50WG	2–2.5 oz	Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **14-day PHI**.
Fontelis	16–20 fl oz	Do not use with thinning agents. 12-hour reentry. **28-day PHI**.
HMO such as JMS Stylet oil	1–2 gal/ 100 gal water	Do not use within 10 days of a sulfur application.
Inspire Super	12 fl oz	Group 3 + 9 fungicide. 12-hour reentry. **14-day PHI.**
Kumulus	10–20 lb	24-hour reentry.
Merivon	4–5.5 fl oz	Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Oso SC	3.75–13 fl oz	4-hour reentry. **0-day PHI.**
Ph-D	6.2 oz	4-hour reentry. **0-day PHI**.
Pristine	14.5–18.5 oz	Do not make more than two consecutive applications or with an HMO. 12-hour reentry. **0-day PHI**.
Procure	8–16 fl oz	12-hour reentry. **14-day PHI**.
Sovran	4–6.4 oz	See footnote 8, page 12. Rotate with other fungicides. Do not make more than 2 consecutive applications. 12-hour reentry. **30-day PHI**.
Sulforix	2 qt/100 gal water	See footnote 5, page 12.
Tebuzol 45DF	4–8 oz	5-day reentry. **75-day PHI**.
Topguard	8–12 fl oz	12-hour reentry. **14-day PHI.**
Unicorn DF	2–3 lb	Group 3 fungicide + sulfur. 24-hour reentry. **75-day PHI**.

First Cover Spray 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—First Cover Spray (about 15 days after petals fall)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Pear psylla (only if a problem)		
Agri-Mek, Epi-mek 0.15EC	16–20 oz	Use up to second cover (late June). Effectiveness of Agri-Mek diminishes in late season. Alternate with other available insecticides for summer control of pear psylla as a resistance management strategy. **28-day PHI**.
Assail 70WP	1–3.4 oz	**7-day PHI**.
Calypso 4F	4–8 oz	**30-day PHI**.
FujiMite 5EC	2 pt	**14-day PHI**.
Provado 1.6F	16–20 oz	**7-day PHI**.
Codling moth (see footnote 2, page 12)		
Altacor	3–4.5 oz	**5-day PHI**.
Assail 70WP	3.4 oz	**7-day PHI**.
Avaunt 30WDG	6 oz	**28-day PHI**.
Calypso 4F	4–8 oz	**30-day PHI**.
Carpovirusine	6.8–13.5 oz	**0-day PHI**.
CYD-X	1–6 oz	**0-day PHI**.
Danitol 2.4EC	16–21.3 oz	**14-day PHI**.
Delegate	6–7 oz	**7-day PHI**.
diazinon 50WP	4 lb	Limited to 1 application per season. See footnote 3, page 12. **21-day PHI**.
Entrust 80WP	4–5 oz	**1-day PHI**.
Esteem 35WP	4–5 oz	**45-day PHI**.
Exirel	10–17 oz	**3-day PHI.**
Imidan 70WP	4–5 lb	A water-soluble bag formulation (70WSB) also is available. **7-day PHI**.
Intrepid 2F	16 oz	Apply at or just prior to egg hatch. **14-day PHI**.
Virosoft	See label	**0-day PHI**.
Pear psylla, aphids		
Ultor 1.25SC	10–14 oz	**7-day PHI**.
Rust mites only		
Agri-mek, Epi-mek 0.15EC	10–20 oz	**28-day PHI**.
Envidor 2SC	18 oz	**7-day PHI**.
Nexter 75WP	5.2–10.67 oz	**7-day PHI**.
Vendex 50WP	6–8 oz	**14-day PHI**.

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Second Cover Spray (15 or more days after first cover spray)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Scab and powdery mildew		
See materials listed for First Cover Stage.		
Pear psylla		
Assail 70WP	1.7–3.4 oz	Will provide suppression of San Jose scale at 3.4 oz/A. **7-day PHI**.
Centaur	34.5 oz	**14-day PHI.**
Ultor	10–14 oz	**7-day PHI.**
Pear psylla and scale		
Centaur	34.5 oz	**14-day PHI.**
Ultor	10–14 oz	**7-day PHI.**
Codling moth (see footnote 2, page 12)		
Altacor	3–4.5 oz	Do not use an adjuvant with Altacor. **5-day PHI**.
Assail 70WP	3.4 oz	Will provide suppression of San Jose scale at 3.4 oz/A. **7-day PHI**.
diazinon 50WP	4 lb	Limited to 1 application per season. See footnote 3, page 12. **21-day PHI**.
Exirel	10–17 oz	**3-day PHI.**
Imidan 70WP	3.5–5 lb	A water-soluble bag formulation (70WSB) also is available. **7-day PHI**.
Scale, aphids		
diazinon 50WP	4 lb	Limited to 1 application per season. See footnote 3, page 12. **21-day PHI**.
Ultor	10–14 oz	**7-day PHI.**
Spider mites		
Acramite 50WS	0.75–1 lb	**7-day PHI**.
Agri-Mek, Epi-mek 0.15EC	10–20 oz	Use up to second cover (late June). Effectiveness of Agri-Mek diminishes in late season. Alternate with other available insecticides for summer control of pear psylla as a resistance management strategy. **28-day PHI**.
Apollo 50SC	4–8 oz	**21-day PHI**.
Envidor 2SC	18 oz	**7-day PHI**.
Fujimite	2 pt	**14-day PHI**.
Kanemite 15SC	21–31 oz	**14-day PHI**.
Nealta	13.7 oz	**7-day PHI.**
Nexter 75WP	5.2–10.67 oz	**7-day PHI**.
Onager	12–24 oz	**28-day PHI**.
Savey 50DF	4–6 oz	One application per season. Do not use any combination of Apollo, Onager, and Savey in the same growing season. **28-day PHI**.
Vendex 50WP	1–2 lb	Do not apply more than 3 times between petal fall and harvest. **14-day PHI**.
Zeal 72WDG	2–3 oz	**14-day PHI**.

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Third Cover Spray (usually about last of July or first week in August)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Codling moth (see footnote 2, page 12)		
Altacor	3–4.5 oz	**5-day PHI**.
diazinon 50WP	4 lb	See footnote 3, page 12. **21-day PHI**.
Exirel	10–17 oz	**3-day PHI.**
Imidan 70WP	3–5 lb	A water-soluble bag formulation (70WSB) also is available. **7-day PHI**.
Pear psylla, codling moth, scale, aphids		
diazinon 50WP	4 lb	See footnote 3, page 12. IMPORTANT: In some areas, diazinon no longer gives adequate control of pear psylla.
Spider mites		
Acramite 50WS	0.75–1 lb	**7-day PHI**.
Agri-Mek, Epi-mek 0.15EC	10–20 oz	Use up to second cover (late June). Effectiveness of Agri-Mek diminishes in late season. Alternate with other available insecticides for summer control of pear psylla as a resistance management strategy. **28-day PHI**.
Apollo 50SC	4–8 oz	**21-day PHI**.
Fujimite	2 pt	**14-day PHI**.
Nealta	13.7 oz	**7-day PHI.**
Savey 50WP	4–6 oz	**28-day PHI**.
Vendex 50WP	1–3 lb	Do not apply more than 3 times between petal fall and harvest. **14-day PHI**.
Zeal	2–3 oz	**28-day PHI**.

Preharvest		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Storage rots, such as Bull's eye rot		
Merivon	4–5.5 fl oz	Do not use with EC or oil-based products. Group 7 + 11 fungicide. 12-hour reentry. **0-day PHI.**
Ph-D	6.2 oz	4-hour reentry. **0-day PHI.**
Pristine	14.5–18.5 oz	Do not use if used for powdery mildew or scab during the growing season. 12-hour reentry. **0-day PHI**.
Ziram 76DF	6 lb	48-hour reentry. **14-day PHI**.

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Postharvest (in fall after all fruit is harvested)		
Pest or disease/ Material	**Amount of product per acre**	**Comments/Reentry interval/Preharvest interval (PHI)**
Pear leaf blister mite, pear rust mite		
lime sulfur solution (Ca polysulfide 29%) +	4 gal/ 100 gal water	Use this rate postharvest through September. Lime sulfur also helps control psylla and mites.
horticultural mineral oil (HMO)	0.75 gal/ 100 gal water	—
Sulforix	Follow label directions	—
Pear leaf blister mite, pear rust mite, scale, aphid and mite eggs, pear psylla		
lime sulfur solution (Ca polysulfide 29%) +	3–5 gal/ 100 gal water	Use this rate postharvest in late fall when temperatures cool (mid-October through November).
superior oil	1.5–2 gal/ 100 gal water	—
Anthracnose *Note:* Apply before fall rains.		
bordeaux 8-8-100	—	—
Copper-Count-N	8–12 qt	48-hour reentry.
Cuprofix Ultra 40 Disperss	7.5–10 lb	48-hour reentry.
Kocide 3000	5.25–7 lb	48-hour reentry.
ManKocide	12–16 lb	48-hour reentry.
Nu-Cop 50DF	12–16 lb	48-hour reentry.
Ziram 76DF	6 lb	48-hour reentry. **14-day PHI**.

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

Footnotes

1. Syllit is not compatible with lime and should not be combined with oils or oil emulsions. Alternate with other products to delay development of resistant fungi.
2. Notice of first emergence of codling moth sometimes is sent out by Extension agents to growers and/or newspapers. Pheromone traps are available to monitor emergence and activity in individual orchards.
3. Diazinon is compatible with Ziram and wettable sulfur.
4. Although Topsin is registered for use for control of scab, powdery mildew, and storage rots, it is not recommended for use in orchards. The use of Topsin in orchards will increase the possibility that tolerant (resistant) strains of fungi will develop and increase losses in orchards and packing houses where Mertect 340F or Decco Salt #19 are used. Topsin also is toxic to earthworms, which help decompose scab-infected leaves.
5. Do not use lime sulfur on Anjou and Comice pears after the dormant application as it interferes with fruit set. It should be recognized that although lime sulfur and other sulfur materials are relatively low in cost, they are not without limitations. The use of sulfurs may result in phytotoxicity when temperatures exceed 90°F following application.
6. Pseudomonas injury may resemble fire blight. Although fire blight generally is not a problem in the Willamette Valley, it has been observed in some years. Do not use copper-based products on Anjou, Comice, or Forelle pears past delayed dormant stage.

   The use of copper-based products at this time has also been associated with a lower population of apple scab isolates resistant to fungicides in Pennsylvania. It may have utility for the same use on pears in Oregon.
7. Integrated pest management principles are being used successfully in Pacific Northwest orchards to manage insects, mites, diseases, and other pests. These research-based techniques provide effective monitoring methods and management practices for sustained and economical control of pests while minimizing damage to beneficial organisms. Improved health and minimal environmental impact are benefits often cited in IPM-managed orchards using reduced pesticide programs.

   The comprehensive reference, *Orchard Pest Management: A Resource Book for the Pacific Northwest*, 1993, edited by Beers, Brunner, Willet, and Warner, was produced by research and Extension personnel from the tri-state region. It serves as OSU's guide to effective IPM principles for managing insect and mite pests in the state. We recommend its use in conjunction with the numerous regional OSU Extension Service Orchard Pest Management Guides produced and/or distributed in the different tree fruit districts of the state. It addresses key elements of IPM for controlling pests, including prevention, monitoring, indicating "Action Levels" or pest densities at which time to apply controls, and effective alternative strategies based on current knowledge. Although designed for the commercial orchard, many principles and control considerations apply to non-commercial trees.
8. Sovran drift may injure sweet cherry cultivars such as Van. Please be extra careful when spraying near cherry orchards.
9. Do not exceed four applications per season of Group 11 fungicides such as Sovran, Flint, Pristine, etc.

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. Spotts Model for Estimating Pear Scab Infection Periods

Average temperature (°F) during leaf wetness	Minimum hours of leaf wetness required for infection
45	25
46	22
48	19
50	17
52	15
54	13
55	12
57	12
59	11
61	11
63	10
64	10
66	10
68	10
70	10
72	10
73	10
75	10

In the fall, examine all leaves on 10 shoots on each of 10 trees scattered throughout the orchard. If you find fewer than six leaves with scab, the overall risk from scab is low enough to skip the first fungicide spray at pink stage.

The end of the ascospore infection period occurs after the first rain following the accumulation of 1,620 degree days (32°F base) starting at delayed dormant stage.

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Table 2. Effectiveness of Fungicides and Bactericides for Pear Disease Management

Fungicide or bactericide	Fungicide group #	Pear scab	Powdery mildew	Bull's eye rot	Storage rots	Fire blight
Blight Ban	Not classified	??	??	??	??	Poor–Fair
Bloomtime Biological	Not classified	None	None	None	None	Poor–Good
Copper-based products	M1	??	Fair??	Poor	??	Fair
Flint	11	Excellent**	Excellent**	Fair	??	None
Focus	3	Good**	Excellent**	??	??	None
Fontelis	7	Good**	Good**	??	??	None
Horticultural mineral oils	Not classified	??	Good	??	??	None
Kasumin	24	??	None	??	??	Fair–Good**
Lime sulfur	M2	Good	Fair	??	??	None
Mancozeb products	M3	Good	None	Poor	??	None
Oso	17	??	Good	??	??	None
Oxytetracycline	41	None	None	None	None	Fair–Good**
Ph-D	17	??	Good	??	??	None
Procure	3	Good**	Excellent**	??	??	None
Scala	9	Fair–Good	None	??	??	None
Serenade Max	Not classified	??	Fair	??	??	Fair–Good
Sovran	11	Excellent**	Excellent**	??	??	None
Streptomycin	25	None	None	None	None	Poor–Excellent**
Sulfur	M2	Fair	Good	??	??	None
Syllit	M7	Good**	None	??	??	None
Tebuzol	3	Good**	Excellent**	??	??	None
Topguard	3	Good**	Good–Excellent	??	??	None
Topsin[1]	1	Good**	Good**	Excellent	Good	None
Ziram	M3	Fair	None	Fair	Fair–Good	None
Combination products						
Adament	3 + 11	Good–Excellent	Excellent	??	??	None
Inspire Super	3 + 9	Good	Excellent	??	??	None
ManKocide	M3 + M1	Excellent	None	Poor	??	Fair
Merivon	7 + 11	Excellent**	Excellent**	??	Fair–Good	None
Pristine	7 + 11	Good–Excellent**	Excellent**	Good	Fair–Good	None
Unicorn	3 + M2	Good	Good	??	??	None

[1] See footnote 4, page 12.

*These ratings are relative rankings based on full 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. Possible ratings for disease control include none, poor, fair, good, or excellent.

**Resistant pathogens will lower the effectiveness of this fungicide.

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.

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Table 3. 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. It has a 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 persist in soil and are soil active													
diuron (7)	Karmex												See label for crop-specific application rates.
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 10-G***												4 lb ai/A (40 lb/A Devrinol 10-G)
norflurazon (12)	Solicam												1.97–7.8 lb ai/A (2.5–10 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			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***												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 persist in soil and have both soil and foliar activity													
flumioxazin (14)	Chateau												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	
CONTINUED—Applications that persist in soil and have both soil and foliar activity													
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													
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	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												0.001–0.005 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)
2,4-D (4)	Saber												Green sucker control in hazelnuts: 0.7–0.95 lb ai/A (1.5–2 pt/A)

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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/*)
- Codling moth development information (*http://ippc2.orst.edu/cgi-bin/ddmodel.pl?clm*)
- Pear scab infection season information (*http://ippc2.orst.edu/cgi-bin/ddmodel.pl?spp=asp*)
- Pear scab infection period information for the Hood River Valley (*http://ippc2.orst.edu/hr/*)
- Fire blight risk information (*http://ippc2.orst.edu/cgi-bin/ddmodel.pl?fbl*) Directions for the use of each model are available at each site.
- 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.

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.

Pesticides are toxic and should be handled with care—but can be used safely if you follow recommended precautions. Follow all label requirements; 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.

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