

2020 | WILLAMETTE VALLEY

PEST MANAGEMENT GUIDE FOR WALNUTS

N.G. Wiman, J.W. Pscheidt and M. Moretti

This guide lists recommendations for insect, mite and disease control in walnut 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.

Many insecticide labels today list the minimum amount of water needed per acre in concentrate sprays



Photo: Robert Vidéki, Doronicum Kft., Bugwood.org

English walnuts on the tree.

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.
- Use adjuvants and spreader stickers with caution.

Important: Blackline of walnuts is a serious disease that can't be controlled by use of pesticides. For more information, see *Growing Walnuts in Oregon*, EM 8907, catalog.extension.oregonstate.edu/em8907.

Nik Wiman, Extension specialist for orchard crops and assistant professor; Jay W. Pscheidt, Extension plant pathology specialist and professor; Marcelo Moretti, assistant professor; all of Oregon State University.

Stages

Early prebloom
Late prebloom
Postbloom



Not shown

June–July; July–August

Walnut 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.

EARLY PREBLOOM *Late March to early April, when catkins begin to enlarge*

Pest or disease/ material	Amount of product/acre	Comments/reentry interval
Blight and downy leaf spot		
Badge X2	3.5–11 lb	48-hour reentry.
Bordeaux 4-2-100	—	The low-lime formula reduces the possibility of bordeaux foliage injury. See footnote 2, page 6.
C-O-C-S WDG	4–7.7 lb	48-hour reentry.
Copper-Count-N	8–12 qt	48-hour reentry.
Cuprofix Ultra 40 Dis-perss	5–10 lb	48-hour reentry.
Dithane F45	1.8 qt	Group M3 fungicide. See footnote 4, page 6. Label indicates you must tank-mix with a fixed copper product. 24-hour reentry. 75-day PHI.
Kocide 3000	3.5–7 lb	48-hour reentry.
Manzate Pro-Stick	2.4 lb	Group M3 fungicide. See footnote 4, page 6. Label indicates you must tank-mix with a fixed copper product. 24-hour reentry. 75-day PHI.
MasterCop	3-6 pt	48-hour reentry.
Nordox 75 WG	5–8 lb	12-hour reentry
Nu-Cop 50DF	4–8 lb	48-hour reentry.
Phyton 27 AG	30–50 fl oz/100 gal water	48-hour reentry.
Previsto	2–4 qt	48-hour reentry.
Regalia	1–4 qt	Use with a surfactant and on 7-day intervals. 4-hour reentry.

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LATE PREBLOOM *Early to mid-May, when shoots begin to expand*

Pest or disease/ material	Amount of product/acre	Comments/reentry interval/preharvest interval
Anthracnose Many of these chemicals have received registration for the nut crop group, may be efficacious, and are legal to use on walnut; however, most have not been tested for efficacy against anthracnose. Tank mix or alternate chemicals to prevent fungi from developing resistance. Limit the use of any one group during crop production.		
Abound	12 fl oz	Group 11 fungicide. See footnote 6, page 6. 4-hour reentry. 45-day PHI.
Aframe Plus	14–21 fl oz	Group 3+11 fungicide. See footnote 6, page 6. 12-hour reentry. 60-day PHI.
Aproach	6-12 fl oz	Do not use more than 3 applications or on trees less than 2 years old. Group 11 fungicide. 12-hour reentry. 7-day PHI.
Flint Extra	3–3.8 oz	12-hour reentry.
Luna Experience	8.8–17 fl oz	Group 3 + 7 fungicide. 12-hour reentry. 35-day PHI.
Luna Sensation	7.6 fl oz	Group 7 + 11 fungicide. 12-hour reentry. 60-day PHI.
Merivon	5–6.5 fl oz	Group 7 + 11 fungicide. Do not use with EC or oil-based prod-ucts. 12-hour reentry. 14-day PHI.
Pristine	10.5–14.5 oz	Group 7 + 11 fungicide. 12-hour reentry. 14-day PHI.
Quadris Top	12–14 fl oz	Group 3 + 11 fungicide. See footnote 6, page 6. 12-hour reentry. 45-day PHI.
Quash	3.5 oz	Group 3 fungicide. 12-hour reentry. 25-day PHI.
Quilt Xcel	14–21 oz	Group 3 + 11 fungicide. See footnote 6, page 6. 12-hour reentry. 60-day PHI.
Syllit FL	3 pt	48-hour reentry. 7-day PHI.
Tilt	4–8 fl oz	12-hour reentry. 60-day PHI.
Topguard EQ	5–8 fl oz	Do not use with silicone surfactants. Group 3 + 11 fungicide. 12-hr reentry. 45-day PHI.
Willowood Azoxy 2SC	12 fl oz	Group 11 fungicide. See footnote 6, page 6. 4-hour reentry. 45-day PHI.
Blight See materials listed for Early prebloom stage.		

POSTBLOOM *Late May*

Blight See materials listed for Early prebloom stage.		
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JUNE–JULY

Pest or disease/ material	Active ingredient	Amount of product/acre	Comments/reentry interval/preharvest interval
Aphids			
Note: When possible, rely on biological control from the aphid parasitoid <i>Trioxys pallidus</i> or reduced-risk materials.			
Admire Pro	Imidacloprid	1.2–2.4 oz	Group 4A insecticide. Can be applied as soil application through chemigation system, rates and restrictions differ for this application, see label. Generic labels available. 12-hour reentry. 7-day PHI.
Asana XL	Esfenvalerate	9.6–19.2 oz	Group 3A insecticide. Do not apply a second spray within 3 weeks of the first. Do not apply more than 0.2 lb ai/A per season. Do not graze livestock in treated orchards. 24-hour reentry. 21-day PHI.
Belay	Clothianadin	3-6 oz	Group 4A insecticide. Thorough coverage necessary. 12-hour reentry. 21-day PHI.
Beleaf 60 SG	Fonicamid	2.0-2.8	Group 29 insecticide. Thorough coverage required. Aphids will cease feeding but may remain on plant for a short period after exposure. 12-hour reentry. 40-day PHI.
Brigade WSB	Bifenthrin	8–32 oz	Group 3A insecticide. Highly toxic to bees and toxic to fish and aquatic invertebrates. 12-hour reentry. 7-day PHI.
Cobalt	Chlorpyrifos + lambda cyhalothrin	22–57 oz	Group 1B + 3A insecticide. Premix product, see label as both AIs have cumulative limits/season. 24-hour reentry. 14-day PHI.
Esteem 35WP	Pyriproxyfen	4-5 oz	Group 7A insecticide, Do not exceed 2 applications or 10 oz per season. Generics are available. 12-hour reentry. 21-day PHI.
Insecticidal soap (M-Pede)	Potassium salts of fatty acids	2% by volume	OMRI listed for organic use. 0-day PHI.
Malathion 5 EC	Malathion	See labels. (1.5-4 pt)	See footnote 1, page 6. Group 1B insecticide. 24-hour reentry. 7-day PHI.
Movento	Spirotetramat	6–9 oz	Group 23 insecticide. Toxic to aquatic organisms. Minimum interval between treatments is 14 days. Limited to 21.5 oz per year. 24-hour reentry. 7-day PHI.
Supracide 2E	Methidathion	1–2 pt as dilute spray, 4–8 pt as concentrate spray	See footnote 1, page 6. Group 1B insecticide. Restricted use. Apply as a cover spray when aphids appear. Do not graze orchard floors. 48-hour reentry, depending on rate. 7-day PHI.
Transform WG	Sulfoxaflor	0.75-1.5 oz	Group 4C insecticide. No more than 2 consecutive applications or applications less than 7 days apart. Avoid drift to flowering ground cover to protect pollinators. 24-hour reentry. 7-day PHI.
Warrior II	Lambda-cyhalothrin	1.28–2.56 oz	Group 3A insecticide. Generics available. Do not apply more than 0.12 lb (7.68 fl oz or 0.48 pt of product)/acre post bloom. 24-hour reentry. 12-day PHI.
Aphids, codling moth			
Note: Monitor codling moth with pheromone traps beginning in June. See footnote 3, page 6.			
Scales (apply when crawlers appear; chemical control of scales usually is not necessary)			
Delegate WG	Spinetoram	4.5–7 oz	Group 5 insecticide. Target codling moth larvae at the onset of egg hatch. No more than 4 applications per season. Minimum 7-day interval between applications. (Suppression of codling moth only.) 4-hour reentry. 1-day PHI.
Esteem 35 WP	Pyriproxyfen	16 fl. oz	Group 7C insecticide. Thorough coverage required. This material can be effective on codling moth and scale. Target codling moth larvae at the onset of egg hatch. Do not exceed 2 applications per season. 12-hour reentry. 21-day PHI.
Entrust SC	Spinosad	4-10	Group 5 insecticide. OMRI approved for organic use. Activity for codling moth only. 4-hour reentry. 1-day PHI.
Intrepid 2F	Methoxyfenozide	12–24 oz	Group 18 insecticide. Target codling moth larvae at the onset of egg hatch or slightly earlier, some ovicidal activity. 4-hour reentry. 14-day PHI.

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JUNE–JULY *Continued from page 4*

Pest or disease/ material	Active ingredient	Amount of product/acre	Comments/reentry interval/preharvest interval
Intrepid Edge	Methoxyfenozide + spinetoram	10–18 oz	Group 18 + Group 5 insecticide. Target codling moth larvae at the onset of egg hatch or slightly earlier, some ovicidal activity. No more than 18 oz or 4 applications per season. 4-hour reentry, 7-day PHI.
Movento	Spirotetramat	6–9 oz	Group 23 insecticide. 14-day minimum application interval, no more than 21.5 oz/A per year. Targets scale and aphids only. 24-hour reentry. 7-day PHI.
Supracide 2E	Methidathion	1–2 pt as dilute spray, 4–8 pt as concentrate spray	See footnote 1, page 6. Group 1B insecticide. Apply as a cover spray when aphids appear. Do not graze orchard floors. 48-hour reentry, depending on rate. 7-day PHI.

JULY–AUGUST

Pest or disease/ material	Active ingredient	Amount of product/acre	Comments/reentry interval/preharvest interval
Walnut husk fly			
Treatments may not be required every year; monitor with yellow sticky cards or other trap. See footnote 5, page 6.			
Note: Baits can be combined with insecticides to enhance control and reduce reliance on coverage. Commercial baits include Brandt Insect Bait and NU-Lure Bait. Follow labels for mixing directions and rates.			
Ambush 25W	Permethrin	12.8–25.6 oz	Group 3A insecticide. Do not graze treated orchards. Extremely toxic to fish and aquatic habitat. Do not apply more than 1.6 lb ai/A per season. 24-hour reentry. 14-day PHI.
Asana XL	Esfenvalerate	9.6–19.2 oz	Group 3A insecticide. Do not apply a second spray within 3 weeks of the first. Do not apply more than 0.2 lb ai/A per season. Do not graze livestock in treated orchards. 24-hour reentry. 21-day PHI.
Assail 70WP	Acetamiprid	1.1–4.1 oz	Group 4A insecticide. Apply when egg-laying females are present. No more than 4 applications per season. 12-hour reentry. 14-day PHI.
Baythroid XL	Beta-cyfluthrin	2–2.4 oz	Group 3 insecticide. 12-hour reentry. 14-day PHI.
Belay	Clothianadin	3–6 oz	Group 4A insecticide. Thorough coverage necessary. 12-hour reentry. 21-day PHI.
Brigade WSB	Bifenthrin	8–32 oz	Group 3A insecticide. Do not graze livestock on treated cover crops. Highly toxic to bees. Toxic to fish and aquatic invertebrates. 12-hour reentry. 7-day PHI.
Cobalt	Chlorpyrifos + lambda cyhalothrin	22–57 oz	Group 1B + 3A insecticide. Premix product; see label as both AIs have cumulative limits/season. 24-hour reentry. 14-day PHI.
Delegate WG	Spinetoram	4.5–7 oz	Group 5 insecticide. Do not apply more than 3 consecutive treatments of group 5 materials. 4-hour reentry. 1-day PHI.
Entrust SC	Spinosad	4–10	Group 5 insecticide. OMRI approved for organic use. 1-day PHI.
GF-120 NF	Spinosad + bait com-pounds	10–20 oz or 1–3 oz/tree (spot treatment)	Group 5 insecticide. OMRI approved for organic use. Attracticide (bait-spray) applied as coarse droplet spray; thorough coverage is not necessary. Apply at first emergence of adult flies.
Imidan 70W	Phosmet	2–8.5 lb	Group 1B insecticide. Water soluble bags. Do not apply after hull split. Mechanically harvested nuts only. 7-day reentry. 28-day PHI.
Malathion 5 EC	Malathion	See labels. (1.5-4 pt)	See footnote 1, page 6. Group 1B insecticide. Note multiple formulations. 24-hour reentry. 7-day PHI.
Success Naturalyte Insect Control	Spinosad	4–10 oz	Group 5 insecticide. Entrust is the organic formula-tion. 24-hour reentry. 14-day PHI.
Warrior II	Lambda-cyhalothrin	0.02–0.04 lb ai/A (1.28–2.56 fl oz)	Group 3A insecticide. Apply no more than 7.68 oz after bloom. 24-hour reentry. 14-day PHI.

Fall webworm

Insecticides labeled for walnut husk fly and *Bacillus thuringiensis* will control this pest. Only spot treatments are necessary. Completely drench the infested branch. Applications made when the larvae are small are most effective.

FOOTNOTES

1. More than one type of formulation usually is available for most insecticides. Lower rates can be used on smaller trees.
2. Bordeaux 4-2-100 means 4 pounds of copper sulfate plus 2 pounds of hydrated lime in 100 gallons of water. In any bordeaux formula, ingredients always are listed in the same order — copper sulfate, hydrated lime, then gallons of water.
3. Early summer nut drop can be a result of codling moth infestation. Inspect nuts for larvae and monitor moths with pheromone traps. See *Walnut Production Manual* by David D. Ramos for information on codling moths as a pest of walnuts.
4. Resistance to copper products has been seen widely in California and may be a problem in the Pacific Northwest. However, copper-resistant bacteria do not seem to cause as much disease as ones that are copper sensitive. Adding mancozeb (such as Dithane or Manzate) will boost the copper ion concentration and may result in improved disease control. Bacteria, however, will become resistant to the higher copper concentrations.
5. Monitor yellow sticky cards placed high (upper half) in the canopy by late May or early June two times per week or more for walnut husk fly captures. Attraction to sticky cards can be enhanced with ammonium carbonate tubes (superchargers). Use captures of adult flies to time insecticide applications. All listed insecticides for walnut husk flies can be enhanced by tank mixing commercial fruit fly baits, or use GF-120, a bait/insecticide formulation. Coverage is less important when using insecticide with baits. You can squeeze captured female flies to determine if eggs are present, indicating impending egg laying and potential crop damage. Egg laying begins one to two weeks after adult emergence. Orchard sanitation practices such as flailing or removing dropped preharvest and postharvest nuts from the orchard floor can greatly reduce the number of overwintering flies.
6. Sprayers used for AFrame Plus, Quadris Top, Quilt Xcel or Willowood Azoxy 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. A model known as XanthoCast can determine blight risk. Temperatures during periods of leaf wetness are measured and a daily index is calculated. A sliding seven-day accumulation of the daily index is calculated. Estimates of inoculum levels can be done the year before in June (for California) by examining 10 trees, where low disease risk = less than 50 total blighted nuts per tree; moderate disease risk = 50 to 150 blighted nuts per tree; and high disease risk = 150 blighted nuts per tree or more.

Quick reference guide to 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*: <https://catalog.extension.oregonstate.edu/weed>

Ingredient common name (herbicide mode of action) and product name example	Nuts			Pome fruit		Stone fruit						Rate
	Chestnut	Hazelnuts	Walnut	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)
isoxaben (21) Trellis SC					NB	NB	NB	NB	NB	NB	NB	0.5 to 1 lb ai/a (0.66 to 1.33 lb/a product)
indaziflam (29) Alion												0.046 to 0.085 lb ai/a (3.5 to 6.5 oz/a product) depending on soil texture.
mesotrione (27) Callisto, Broadworks												0.093 to 0.187 lb ai/a (3 to 6 fl oz/a product)
napropamide (3) Devrinol												4 lb ai/a (8 lb/a)
norflurazon (12) Solicam												1.95 to 3.98 lb ai/a (2.5 to 5 lb/a Solicam)
oryzalin (3) Surflan												2 to 6 lb ai/a (2 to 6 quarts/a Surflan)
pendimethalin(3) Prowl												Prowl H ₂ O: 1.9 to 6 lb ai/a (2 to 6.3 quarts/a) depending on desired length of control and crop.
pronamide (3) Kerb												1 to 4 lb ai/a (2 to 8 lb/a) depending on species present and soil texture.
simazine (5) Princep												See product label for rates. Princep Caliber 90 is a Special Local Needs label (OR-080038) for sweet cherries only.
sulfentrazone (14) Zeus XC/Sulfentrazone 4SC												0.125 to 0.375 lb ai/a (4 to 12 oz/a) depending on soil classification; established 3 years.
terbacil (5) Sinbar WDG						NB	NB					0.4 to 0.8 lb ai/a (0.5 to 1 lb/a), newly established; 2 to 4 lb/a Sinbar, bearing, depending on soil type.
trifluralin (3) Treflan 4L/EC												0.5 to 1 lb ai/a (1 to 2 pints/a Treflan 4L)
trifluralin (3)+ isoxaben (21)+ oxyfluorfen (14) Showcase	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	2.5 to 5 lb ai/a (100 to 200 lb/a Showcase)
Applications that are soil and foliar active												
flazasulfuron (2) Mission												0.033 to 0.045 lb ai/a (2.14 to 2.85 oz/a)
flumioxazin (14) Chateau SW												0.188 to 0.38 lb ai/a (6 to 12 oz/a Chateau WDG). Do not apply within 300 yards nondormant pears.
oxyfluorfen (14) Goal 2XL												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	Nuts			Pome fruit		Stone fruit						Rate
	Chestnut	Hazelnuts	Walnut	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plums	Prunes	
oxyfluorfen (14) + penoxsulam (2) Pindar GT												1.47 lb ai/a oxyfluorfen + 0.015 lbs ai/a penoxsulam (1.5 to 3 pints/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)
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
Final-San-O												14 to 26 fl oz/gal. Apply prior to planting or non-cropped areas.
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	NB	NB	0.06 to 0.125 lb ai/a (6 to 8 oz/a Select Max)
clopyralid (4) Stinger												Apples: 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)
diquat (22) Reglone		NB	NB	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	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) Rely 280												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) Sanda												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.
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 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 preharvest 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.

Nonemergency 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 www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/Miscellaneous-Industries.aspx or call 503-229-5263. The Tricounty Hazardous Waste and Recycling Program conducts periodic collection events for unused pesticides in Hood River, Sherman, and Wasco counties. Visit www.tricountyrecycle.com/managing-my-materials/hazardous-waste or call 541-506-2632. Most area chemical distributors offer plastic pesticide container recycling. For information on container preparation, contact your chemical supplier.