

REDUCED CHEMICAL PEST MANAGEMENT FOR FRUIT & NUT TREES

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As result of increasing environmental contamination and pesticide safety concerns, we strongly recommend the use of reduced or non-chemical approaches to pest management where possible. Integrated pest management (IPM) emphasizes the use of non-chemical methods first, and the use of chemical pesticides only as a last resort. These methods include proper pest identification, periodic monitoring, appropriate cultural practices, release of beneficial insects if appropriate, applications of lowest toxicity pesticides, and then application of certain pesticides if all other methods fail.

Be sure to thoroughly read all labels to determine if a pesticide is appropriate for a given pest and crop, and always use the protective clothing and gear stated on the label when applying pesticides. If your pest problem is eliminated with a single spray, or in the case of some fungicides if the weather turns dry, no additional sprays may be necessary, even though the label says to use every 7 to 14 days. When spraying, be sure to thoroughly cover leaves and/or branches.

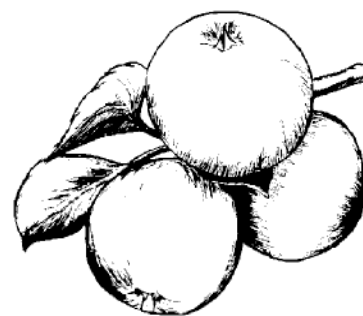
In a few cases, beneficial insects may be purchased through mail-

order catalogs and released on the trees. Such insects include *Trichogramma platneri* for codling moth and *Aphytis melinus* for California red scale. Releasing lady beetles (lady bugs) is usually not effective because they quickly fly away. In most cases, predatory insects will come when the conditions are right.

Tables. The tables on the following pages are intended as a quick guide for managing pests using the least toxic approaches.

Products or methods in bold are preferred over others based on efficacy or safety. Some of the products and methods listed may not be as effective as chemical pesticides. For example, codling moth can be very difficult to control using cultural practices. Oil and other low-toxicity insecticides are not effective or require a large number of applications if populations are high. In some cases, applications of Sevin may be the only effective control measure for codling moth.

For more thorough information, several publications are available from your local UC Cooperative Extension office. Some of the information in these publications is more suited for commercial producers rather than backyard gardeners.



- *Pests of the Small Farm and Garden*
- *Pests of Landscape Trees and Shrubs*
- UC IPM *Pest Notes* (free; also on web site - see below): Aphids, Codling Moth, Cottony Cushion Scale, Fire Blight, Leaf Curl, Powdery Mildew, Scales, Spider Mites, Thrips, and Walnut Husk Fly.
- *Integrated Pest Management publications* for: 1) Stone Fruits, 2) Apples and Pears, 3) Citrus, 4) Almonds, and 5) Walnuts.

In addition, the most up-to-date information can be found on the UC IPM web site: <http://www.ipm.ucdavis.edu>.

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SUMMARY OF REDUCED CHEMICAL METHODS OF MANAGING SELECTED
INSECT AND DISEASE PESTS OF BACKYARD FRUIT TREES

-- DORMANT SEASON--

Disease or Insect	Product or Method	Signal	When to Use	Frequency	Comments
Peach leaf curl (peach, nectarine)	Copper product (e.g., copper sulfate, fixed copper)	WARNING	1) Late fall and 2) At bud swell	1-2x /year	Toxic to some soil or- ganisms. Product must contain at least 50% copper.
Shot hole (almond, apricot, peach, nectarine)	Lime sulfur	DANGER	1) Late fall and 2) At bud swell	1-2x /year	May cause eye dam- age. Do not use on apricot. Not registered for use on almond.

NOTE: Copper or lime sulfur should be applied to peaches & nectarines each year; fall spray may be adequate except in wet springs. Copper is preferred because it is less hazardous. Do not mix lime sulfur with oil. Use spreader sticker to reduce washing off by rain.

European fruit lecanium (scale) (decid. fruits/nuts)	Superior/ Supreme Oil	CAUTION	Early dormant season (by mid-Jan.)	1x per year	Avoid use of products labeled "Dormant oil", it may injure trees. Do not use within 30 days of sulfur or cap- tan Can also treat scale with summer oil during crawler stage, but timing is more diffi- cult. Avoid applying oil during dry, warm, and windy periods; best to apply just <i>after</i> rain or fog.
Red mites, aphid eggs, San Jose scale, kuno scale, walnut scale (decid. fruits/nuts)	Superior/ Supreme Oil	CAUTION	Late dormant season to bud swell	1x per year	

WARNING ON THE USE OF CHEMICALS : Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked.

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. Never burn pesticide containers.

PHYTOTOXICITY WARNING: Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high. Injury may also result from excessive amounts of the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since manufacturers often change formulations, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

SUMMARY OF REDUCED CHEMICAL METHODS OF MANAGING SELECTED DISEASES OF
BACKYARD FRUIT TREES

-- SPRING AND SUMMER--

Disease	Product or Method	Signal	When to Use	Frequency	Comments
Apple/ pear scab	General comments	Few or no sprays necessary in dry springs. All sprays are preventive only. Green tip (delayed dormant) spray most important.			
	Cultural methods	Remove fallen leaves in winter.			
	Wettable sulfur	CAUTION	1) Green tip 2) Just before petals open 3) Late bloom	1-3x	
	Copper product	WARNING		1-3x	Late application may russet fruit.
Fireblight <i>(pears, Asian pears, apples)</i>	General comments	Also attacks quince, crabapple, loquat, and <i>Pyracantha</i> .			
	Cultural methods	Cut branches >12" below infection, sterilize shears between cuts.			
	Copper product (e.g., copper sulfate, fixed copper) (>50% copper)	WARNING	Bloom period	Every 4-5 days thru bloom	Spray <u>only</u> if fireblight has been a problem in past years. Begin treating when avg. temp. >60F. Late application may russet fruit.
Brown Rot <i>(stone fruits and almonds)</i>	General comments	Few or no sprays necessary in dry springs.			
	Cultural methods	Remove mummified fruits. Thin fruit in April for air circulation.			
	Copper product (e.g., copper sulfate, fixed copper) (>50% copper)	WARNING	1) Bud swell 2) Full bloom 3) Petal fall 4) Before harvest	1-3x	Spray #1 also for peach leaf curl. Spray #2 & 3 during wet springs. Sprays #2 & 3 may russet fruit. Spray #4 if spring infection severe. Sprays after bloom may russet fruit.
	Wettable sulfur	CAUTION	same	1-3x	Do not spray w/in 30 days of oil.
Grape powdery Mildew	Wettable sulfur, dusting sulfur	CAUTION	Budbreak to 2" thru berry softening	Every 7-10 days	Use 10-day interval during cold or very hot weather. All sprays are preventive only. Can use wettable in early season, dusting later. Do not use when temperature >90°F.
	Garden Fungicide	CAUTION	same	same	Sulfur+surfactants (Safer® brand)
	Neem oil	CAUTION	same	same	Do not spray within 30 days of sulfur.
Bunch Rot <i>(grape)</i>	Cultural methods	Remove leaves around clusters in early June for air circulation. Use two-wire trellising and mid-season hedging of shoots for air circulation. Avoid sprinkling vines. Avoid excess nitrogen fertilization. Remove & destroy infected clusters.			

SUMMARY OF REDUCED CHEMICAL METHODS OF MANAGING SELECTED
INSECT AND MITE PESTS OF BACKYARD FRUIT TREES

-- **SPRING AND SUMMER**--

Disease	Product or Method	Signal	When to Use	Frequency	Comments
Coddling Moth	General comments	Usually 3 generations; treat only 1st generation unless populations high. Monitor degree days and/or fruit; spray during egg hatch period.			
	Cultural methods	Attach cardboard bands early May, remove late May, kill larvae/pupae. Also attach cardboard in August, remove & burn late fall. Can bag fruit & use mass trapping.			
	Narrow range oil	CAUTION	Egg hatch period(s)	3-5x per generation	Do not use within 2 mo. of sulfur application (causes leaf burn). Not as effective as Sevin.
	Sevin (carbaryl)	CAUTION		1x	Use only as last resort. Kills beneficials; may increase mites. Apply at petal fall. Applying during bloom may thin fruit.
Peach Twig Borer (peach, nectarine)	General comments	Look for hibernacula (frass in crotches) in winter to identify.			
	Bacillus thuringiensis (Bt)	CAUTION	1) Early bloom 2) 1 week later	2x	Kills young larvae feeding on new shoots.
Scale insects (decid. fruits and nuts)	Summer oil	CAUTION	Crawler stage	1-2x	Control ants with tanglefoot. Apply double-sided sticky tape to twigs late April, monitor weekly to determine crawler stage. Better to control in dormant season.
	Insecticidal soap	CAUTION	Crawler stage	1-2x	
	Neem oil	CAUTION	Crawler stage	1-2x	
Calif. Red scale (citrus)	Narrow range oil	CAUTION	summer	1x	Oil spray directed at crawlers and immature scales.
Aphids (decid. fruits and nuts)	General comments	Most serious on plums. Watch for natural enemies. Use dormant spray for aphid eggs.			
	Cultural practices	Tanglefoot on trunk if have ants. Avoid excess nitrogen fertilization.			
	Forceful water spray		Control often necessary in early spring only; treat before leaves curl.	Re-treat only if populations increase again.	Knocks off aphids & honeydew; Spray early AM to allow to dry.
	Pyrethrins	CAUTION			Do not use on water-stressed plants or when the temperature exceeds 90°F.
	Insecticidal soap	CAUTION			
	Narrow range oil	CAUTION			
	Neem oil	CAUTION			
Other insecticides	variable	Chemical control usually not necessary; use other methods first.			
Cultural practices	Avoid dusty conditions and broad spectrum insecticides (especially Sevin).				
Two-spotted spider mite (decid. fruits and nuts)	Forceful water spray		Late spring & summer	As needed	Knocks off mites; Spray early morning to allow to dry.
	Insecticidal soap	CAUTION	Summer	1x	Treatments rarely necessary for backyard trees.
	Narrow range oil	CAUTION	Summer	1x	