



Winter Pest Management in Backyard Deciduous Fruit Trees

PAMELA M. GEISEL, Academic Coordinator, UC Statewide Master Gardener Program; and
DONNA C. SEAVER, Program Representative, UC Statewide Master Gardener Program



All deciduous fruit trees are susceptible to insect and disease problems affecting fruit quality and tree health. The winter dormant period, which occurs after leaves fall but before buds begin to break open in the spring, is the best time to manage several problems. Key management practices at this time of year are

- pruning to remove dead, diseased, and broken branches, promote vigor, open the canopy to sun, and improve air circulation
- sanitation to remove mummified fruit on the tree and diseased wood, fruit, and leaves from the ground
- applying dormant oil sprays to control pests
- applying dormant or delayed dormant sprays to limit infection and prevent the spread of certain diseases

PRUNING

The absence of leaves in winter provides a clear view of the framework of the tree and the opportunity to thin (completely remove) or head (cut back) any branches. The amount of dormant pruning will be less if trees receive appropriate summer training and pruning. For pest and disease control, prune out any dead, diseased, crossed, or broken branches as well as water sprouts and root suckers. Remove and destroy all diseased wood.

Periodically disinfect cutting tools with a sanitizing liquid or a 1:1 bleach and water solution during pruning and at any time tools come into direct contact with diseased tissue. Oil shears immediately after use to avoid corrosion.

Paint the trunk and lower branches of young trees that are exposed to hot afternoon sun with a 1:1 mixture of white interior latex paint and water to prevent sunburn injury and reduce borer infestations. Apply the paint mixture from 2 inches (5.1 cm) below the soil line to 2 feet (61 cm) above.

SANITATION

Sanitation is necessary to prevent disease and pests and reduce the need for sprays. If possible, rake and dispose of all leaves after they drop and before the first rains. Remove and destroy over-wintering fruit (mummies) in the tree and on the ground to eliminate sources of insects and diseases the next season.

DORMANT OR DELAYED DORMANT SPRAYS

Dormant sprays or *delayed dormant sprays* are generic terms for applications of pesticides—including fungicides, highly refined horticultural oils, and oils in combination with a pesticide—applied when trees are dormant or just coming into bud swell. Dormant sprays provide efficient and economical treatment for a number of diseases and over-wintering pests, such as

- scale (San Jose, European fruit lecanium, etc.) – in many fruit tree species
- European red and brown mite eggs – in stone fruit and pears
- peach twig borer (only when combined with an insecticide such as Spinosad) – in apricot, nectarine and peach, sometimes plum, and prune
- blister mites – in pears
- pear psylla – in pears
- aphid eggs – in many fruit tree species
- leaf curl (fungus) – in nectarine and peach
- shot hole (fungus) – in apricot, nectarine, and peach

Oils used at this time of year include insecticidal oils, narrow range, supreme, or superior-type oils. A supreme or superior-type oil spray, applied during the delayed dormant period just as eggs are about to hatch, should keep European red and brown mites below damaging levels if predators are not disrupted by sprays for other pests. Supreme or superior-type oils will kill overwintering eggs of aphids on fruit trees if applied as a delayed dormant application just as eggs are beginning to hatch in early spring. These treatments will not give complete control of aphids and are probably not justified for aphid control alone.

Dormant oil sprays alone DO NOT control oriental fruit moth, navel orangeworm, peach twig borer, or two-spotted and Pacific spider mites.

Dormant disease control applications use

materials such as copper, lime sulfur (calcium polysulfide), Bordeaux (a mix of powdered copper and hydrated lime), or a synthetic fungicide to limit infection and prevent the spread of certain fungal diseases like leaf curl, shot hole, powdery mildew, and scab.

Applying dormant or delayed dormant treatments

A dormant spray may not be warranted every year in the backyard orchard except where peach leaf curl is consistently a problem. Decide if you need to apply by noting the amount of insect and disease damage during the previous growing season.

Treat at the onset of dormancy in late November until delayed dormancy, just before buds begin to open (bud swell) in February or early March. The exact timing during the dormant period can vary depending on the disease being controlled. Once flower buds begin opening, you risk damaging the fruit and may kill pollinating bees with certain insecticidal sprays.

Spraying after pruning allows maximum coverage as there are no leaves to block the spray. Pump sprayers or compressed air sprayers can be used. Avoid making applications on water-stressed trees to avoid injury.

A good time to spray is right after a period of rain or foggy weather. Do not spray during fog, rain, or during or prior to freezing weather (under 32°F [0°C]). To avoid damage to deciduous trees, oils should not be applied within 30 days before or after applications of sulfur or certain other fungicides. Oils are generally not recommended for use during the dormant season on walnut trees. Always read the label carefully for restrictions and follow product directions.

Fixed copper fungicides contain some form of elemental copper, such as tribasic copper sulfate, copper oxychloride sulfate, or cupric hydroxide. For some diseases it may be necessary to make several applications to protect newly emerging shoots and flowers, especially during rainy weather. Do not apply copper compounds after bloom because it will cause russetting of the fruit.

Lime sulfur (calcium polysulfide) is less widely recommended as a dormant spray for general use; however, it is a useful tool for apple or pear scab problems when applied just as buds swell. Lime sulfur and other sulfur-containing compounds should not be applied within 3 weeks of an oil



application or tree damage may result. Avoid using lime sulfur on apricot trees, since they are particularly sensitive to sulfur.

Bordeaux is a mixture of copper sulfate, hydrated lime, and water. Bordeaux has been an outstanding fungicide and bactericide that has been used for decades mainly because it is very persistent on the trees and able to withstand winter rains. However, it requires careful preparation, takes longer to mix, stains surfaces blue, and is incompatible with other pesticides. Currently there are no premixed Bordeaux products registered in California. Additionally, no lime products are registered for mixing with copper to make a Bordeaux mixture.

Dormant treatments may not always be required. For some insect pests and diseases, one dormant application may be adequate with good spray coverage. For other problems, and depending on pest pressure, up to three applications may be necessary for good control. Decide if, and how many applications, you need to apply by noting the amount of insect and disease pressure during the previous growing season.

Apricot

- Prune to maintain lower fruiting wood. Prune out dead, diseased, crossed, or broken branches. Thin out excessive wood to allow light and air into the canopy and ensure good spray coverage. Avoid making heading cuts except on young trees. Some heading cuts might be appropriate if you are trying to establish branching in a gap.
- To control San Jose scale, mites, or aphid eggs, thoroughly spray trees, including the trunk, with dormant oil, just prior to bud break.
- Before rains begin, remove and destroy all mummified fruit hanging on branches to reduce brown rot.
- Apply fixed-copper fungicide during or just after leaf fall but before onset of winter rains if shot hole fungus has been a problem during the growing season.
- *Warnings:*
 - Do not use sulfur products on apricot trees.
 - To prevent *Eutypa* infections, prune at least 6 weeks before rain is expected or after the rainy season ends, because *Eutypa* fungus is carried in rainfall.

Cherry

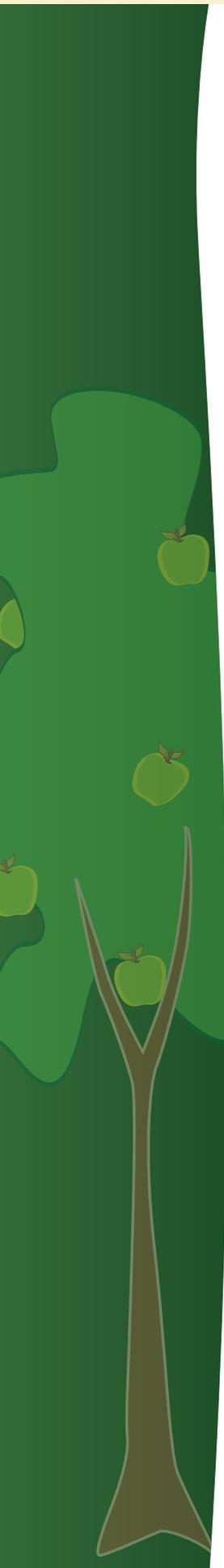
- Prune to maintain a convenient height for cultural practices. Prune out dead, diseased, crossed, or broken branches. Thin out about 10 percent of the previous year's growth on mature trees to let light and air into the tree and ensure good spray coverage.
- Spray trees thoroughly, including the trunk, with dormant oil late in dormant season, just prior to bud break to control scale, mite eggs, and aphids.

Peach and Nectarine

- Prune to maintain a convenient height for cultural practices. Prune out dead, diseased, crossed, or broken branches. Prune off about one-half of last year's wood to thin the crop and ensure sun and air penetration and good spray coverage.
- Prune early varieties more severely than later-maturing varieties.
- Spray trees thoroughly, including the trunk, with dormant oil late in dormant season, just prior to bud break to control scale and mite eggs.
- Remove and destroy all mummified fruit hanging on branches to reduce future pest problems.
- Spray copper fungicide twice to control peach leaf curl and shot hole, first around mid-November or after the leaves have fallen and then in the first half of February. The second spray should occur at bud swell but before the flowers open.

Plum (including cherry-plum, pluot, and prune)

- Prune out dead, diseased, crossed, or broken branches. Thin out about 20 percent of last year's growth to allow light and air into the canopy and ensure good spray coverage. Make heading cuts only on young trees or where you are trying to establish a new branch.
- Thoroughly spray trees, including the trunk, with dormant oil late in dormant season, just prior to bud break to control San Jose scale, mites, and aphids. (Dormant spray will not completely control aphids.)
- Remove and destroy all mummified fruit from the trees to reduce brown rot.



Pome fruit (apple, pear, and quince)

- Prune to maintain a convenient height for cultural practices. Thin out about 15 to 20 percent of last year's growth to let light and air into the canopy to maintain productive fruiting wood and ensure good spray coverage. Remove dead, diseased, crossed, or broken limbs as well as water sprouts and root suckers.
- Spray trees thoroughly, including the trunk, with oil late in dormant season, just prior to bud break to control scale, European red mites, blister mites (pears only), aphids, and pear psylla adults (pears only).
- Spray with lime sulfur (calcium polysulfide) at bud swell, but before bloom shows, to control scab, blister mites, and pear psylla adults and eggs in pears.
- Remove and destroy over-wintering fruit in the tree and on the ground to reduce codling moth and scab disease. Remove and destroy fallen leaves to reduce scab infections in the following spring.

Please contact your local Master Gardener for more information or go online to <http://camastergardeners.ucdavis.edu>.

We gratefully acknowledge support for this project from the *Elvenia J. Slosson Research Endowment for Ornamental Horticulture*. Content used in this publication was excerpted from the UC Integrated Pest Management Program's Web site (<http://www.ipm.ucdavis.edu/>). Poster design: Will Suckow Illustration. Photos: Jack Kelly Clark.

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 their original labeled containers in a locked cabinet or shed, away from foods or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

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

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse the 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: 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 or the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

RESOURCES ACCESSIBLE ONLINE

Web Sites

California Master Gardeners

<http://camastergardeners.ucdavis.edu/>

California Backyard Orchard

<http://homeorchard.ucdavis.edu>

UC Statewide Integrated Pest Management Project Pests in Gardens and Landscapes – Fruit and Nuts

<http://ipm.ucdavis.edu/PMG/GARDEN/fruit.html>

Publications/Brochures

California Master Gardener Handbook ANR Publication 3382

<http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=3382>

Calendar of Operations for Home Gardeners

Apples and Pears - <http://anrcatalog.ucdavis.edu/pdf/7258.pdf>

Apricots - <http://anrcatalog.ucdavis.edu/pdf/7259.pdf>

Cherries - <http://anrcatalog.ucdavis.edu/pdf/7260.pdf>

Peaches and Nectarines - <http://anrcatalog.ucdavis.edu/pdf/7261.pdf>

Plums - <http://anrcatalog.ucdavis.edu/pdf/7262.pdf>

Dormant Sprays Defined

<http://ucce.ucdavis.edu/files/datastore/268-329.pdf>

Home Orchard

ANR Publication 3485

<http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=3485>

Pests of the Garden and Small Farm – A Grower’s Guide to Using Less Pesticide

ANR Publication 3332

<http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=3332>

UC IPM Pest Notes - Insects, Mites, etc.

Aphids (Pest Note) - <http://ipm.ucdavis.edu/PDF/PESTNOTES/pnaphids.pdf>

Aphids (Quick Tip) - <http://ipm.ucdavis.edu/PDF/QT/qtaphids.pdf>

Scale (Pest Note) - <http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pnscales.pdf>

Scale (Quick Tip) - <http://ipm.ucdavis.edu/PDF/QT/qtscales.pdf>

UC IPM Pest Notes - Pesticides and Other Management Methods

Bordeaux Mixture - <http://ipm.ucdavis.edu/PDF/PESTNOTES/pnbordeauxmixture.pdf>

UC IPM Pest Notes - Plant Diseases

Apple Scab - <http://ipm.ucdavis.edu/PDF/PESTNOTES/pnapplescab.pdf>

Leaf Curl/Peach Leaf Curl - <http://ipm.ucdavis.edu/PDF/PESTNOTES/pnleafcurl.pdf>

In Spanish

Consejos/sugerencias rápidas sobre insectos dañinos en el hogar y en el jardín

Áfidos o pulgones (Notas breves) - <http://ipm.ucdavis.edu/PDF/QTSP/qtspaphids.pdf>

FOR FURTHER INFORMATION

To order or obtain ANR publications and other products, visit the ANR Communication Services online catalog at <http://anrcatalog.ucdavis.edu> or phone 1-800-994-8849. You can also place orders by mail or FAX, or request a printed catalog of our products from

University of California
Agriculture and Natural Resources
Communication Services
6701 San Pablo Avenue, 2nd Floor
Oakland, California 94608-1239

Telephone 1-800-994-8849 or 510-642-2431
FAX 510-643-5470
E-mail: danrcs@ucdavis.edu

©2009 The Regents of the University of California
Agriculture and Natural Resources
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the written permission of the publisher and the authors.

Publication 8368
ISBN-13: 978-1-60107-596-3

The University of California prohibits discrimination or harassment of any person on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994: service in the uniformed services includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) in any of its programs or activities.

University policy also prohibits reprisal or retaliation against any person in any of its programs or activities for making a complaint of discrimination or sexual harassment or for using or participating in the investigation or resolution process of any such complaint.

University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University’s nondiscrimination policies may be directed to the Affirmative Action/Equal Opportunity Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6th Floor, Oakland, CA 94607, (510) 987-0096.

For information about ordering this publication, telephone 1-800-994-8849. For assistance in downloading this publication, telephone 530-754-3927.

To simplify information, trade names of products have been used. No endorsement of named or illustrated products is intended, nor is criticism implied of similar products that are not mentioned or illustrated.

An electronic copy of this publication can be found at the ANR Communication Services catalog Web site, <http://anrcatalog.ucdavis.edu>.



This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Pest Management—Urban.

pr-07/09-LR/CR

Ask a UC Master Gardener



Winter Pest Management in Backyard Deciduous Fruit Trees

The best time to manage several pest and disease problems is during winter when the trees are dormant—after leaves fall but before pink bud, in the spring.

Four Bloom Stages of Nectarine and Peach



dormant bud



bud swell



pink bud



full bloom

Please contact your local Master Gardener for more information (<http://camastergardeners.ucdavis.edu>).

We gratefully acknowledge support for this project from the *Elvenia J. Slosson Research Endowment for Ornamental Horticulture*.

Content used in this publication was excerpted from the UC Integrated Pest Management Program's Web site (<http://www.ipm.ucdavis.edu/>).

Project management: Pamela M. Geisel; Donna C. Seaver. Poster design: Will Suckow Illustration. Photos: Jack Kelly Clark.

No endorsement of listed sites, products, or information is intended, nor criticism implied of those not mentioned. The University of California does not discriminate in any of its policies, procedures, or practices. The University is an affirmative action/equal opportunity employer.

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 their original labeled containers in a locked cabinet or shed, away from foods or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine pesticides to the property being treated. Avoid drift onto neighboring properties or gardens containing fruits or vegetables ready to be picked.

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse the 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: 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 or the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.



Winter Pest Management in Backyard Deciduous Fruit Trees

Pruning and sanitation are key management practices when fruit trees are dormant:



- **Prune** to remove dead, diseased, oozing, and broken branches

Bacterial canker (shown left)

- **Practice sanitation** by removing mummified fruit on trees and fallen fruit and leaves

Mummy fruit caused by brown rot aid in spreading disease (shown right)



Winter Pest Management in Backyard Deciduous Fruit Trees

Apply dormant sprays – the exact timing during the dormant period can vary depending on the disease being controlled.

- **Dormant and delayed dormant oil sprays** control insect pests

San Jose scale (shown, right) and most soft scales; Peach twig borer (with insecticide); aphid and European red and brown mite eggs; and pear psylla adults and eggs



- **Dormant and delayed dormant sprays** limit infection and prevent spread of diseases

Shot hole fungus; peach leaf curl fungus (shown, left)