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Recommended Treatments for Oak Trees
 Co-Authored by Sandy Christensen, Valley Oak Spray Service
 * = Begin checking for pests
 ↔ = Period to treat pests

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<i>Quercus lobata</i> , valley oak <i>Quercus kelloggii</i> , black oak												
Oak Pit Scale (<i>Asterolecanium quercicola</i>) 1/4" volcano-like pits in 2 and 3 year old twigs												
Fruitree Leafroller (<i>Archips agraspilis</i>) Small green caterpillar hangs on thread. Chews young leaves		*	*	↔								
Oak Tree Hopper (<i>Platycoctis vittata</i>) 1/2" long, rose-thorn shaped insect found on 2 year old twigs			Tempo	↔	2x April and/or May							
California Oak Worm (<i>Phryganidia californicum</i>)				↔	Superior Oil			↔				
Oak Anthracnose, which kills young shoots in spring			↔	↔	Fungal Flow or Cleary's 3336 at leaf unfolding							
Fertilize Weak Trees Fertilize Normal Trees	Greenbelt 22-14-14				*		At 2 lb/100 gal At 4 lb/100 gal			*		

Orthene 1x just after hatching. Timing is critical
 Permethrin-Tempo are alternative treatments.

Monitor and treat if caterpillars are seen
 Watch for 1" moths



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<i>Quercus agrifolia</i> Coast live oak	For trees too large or inaccessible to spray, soil drench with Merit Systemic Insecticide in January controls a broad range of sucking insects and some moth larvae											
Fruitree Leaf Roller (<i>Archips agraspilis</i>) Small green caterpillar hangs on thread chews young leaves			↔	Orthene 1x just after hatching Tempo - Permethrin								
Oak Tree Hopper (<i>Platycotis vittata</i>) 1/2" long, rose-thorn shaped insect found on 2 year old twigs with young.			**	↔	Permethrin or oil - Orthene 2x, April and May							
Western Tussock Moth (<i>Orygia vestusta</i>) Black caterpillar w/orange markings and 4 toothbrush-like hair clusters on back			**	↔	Superior oil or Permethrin							
Sycamore Bark Moth (<i>Ramosia resplendens</i>) Broken granular bark on lower trunk				↔	Permethrin Pro - 4 applications on lower 8 feet of trunk							
California Oak Worm (<i>Phryganida californicum</i>)				↔	Superior oil				↔	Tempo + Permethrin		
Stanford whitefly (<i>Tetalemodes stanfordii</i>) 1/4" black dots on underside of leaf. Usually surrounded by ring of white juveniles.			↔	↔	Superior oil + Tempo insecticide, sprayed from beneath							
Oak Gall Wasp (<i>Dryocosmus minusculus</i>) (<i>Andricus chrysolepidicola</i>)			↔	↔	Soil drench with Merit Systemic Insecticide							



PESTS MOST COMMONLY ENCOUNTERED ON CALIFORNIA NATIVE PLANTS

Plant Species	Pest Species	Pest Description	Symptoms
<p><i>Acer macrophyllum</i> Big Leaf Maple</p> <p><i>Acer negundo</i> <i>californicum</i> California Box Elder</p> <p><i>Alnus rhombifolia</i> California White Alder</p>	<p><i>Verticillium albo-atrum</i> Verticillium Wilt</p> <p><i>Agrius burkei</i> Alder Beetle</p>	<p>A soil borne fungus which enters through roots and travels up vascular tissue to plug up water conduction vessels.</p> <p>A small blue-green, shiny beetle exiting through D-shaped holes in the bark in March and April.</p>	<p>One or two dying or dead branches in an otherwise healthy looking tree. Typically kills 1 to 2 branches per year.</p> <p>Branches and eventually upper trunk of trees turning brown and dying. Bumpy surface features on branches and trunks. Black, wet-looking circles with a white egg-laying site in the center. Branches and gradually entire trees dying.</p>
<p><i>Arbutus menziesii</i> Madrone</p>	<p><i>Botryosphaeria ribis</i> Twig Blight</p> <p><i>Malacosoma californica</i> Western Tent Caterpillar</p>	<p>Blight kills shoots in spring by girdling twig with cankers. Often begins at flower clusters.</p> <p>2 inch long, brown, hairy caterpillars form tents of webbing, containing hundreds of larvae.</p> <p>Refer to Rhododendron</p>	<p>Terminal shoots of previous year's growth turn pale green, then brown. Twigs develop longitudinal cankers, often becoming trunk cankers.</p> <p>18 to 24 inch long "tents" on terminal shoots of tree.</p>
<p><i>Arctostaphylos</i> sp. Manzanita</p>	<p><i>Othiorhynchus sulcatus</i> Black Vine Weevil</p> <p>Woolly Aphid (Latin name unknown)</p> <p><i>Phytophthora cinnamomi</i> Water Mold Disease</p> <p><i>Botryosphaeria ribis</i> Madrone Twig Blight</p>	<p>Wooly masses on stems and twigs in the interior of plants.</p> <p>A fungus which infects the base of stems at the ground, gradually girdling the trunk or major limbs.</p> <p>A fungal disease which causes cankers and gradually kills branches.</p>	<p>Plants which have been sheared to form dense edges gradually declining. The interior of the plant is often completely covered with white woolly masses of insects.</p> <p>The most common cause of death in Heath family plants, as well as many other genera. Individual stems die from the ground up.</p> <p>Major branches develop black, depressed areas, caused by the fungus, gradually dying. Symptoms are the same as those in Madrone.</p>



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<i>Arctostaphylos</i> sp. (without leaf hair)	<i>Camallia covenii</i> <i>Gall Aphids</i>	Fungus decays frequently wet foliage.	Center of the plant decays, leaving leaves only on the perimeter.
<i>Artemisia pycnocephala</i> Beach Sand Wort	<i>Botrytis cinerea</i> Gray Mold	Forms soft galls at the tips of twigs. 1/8 inch long orange maggots inside.	Galls stop shoot elongation.
<i>Baccharis pilularis</i> sp. Dwarf Coyote Brush	<i>Rhopalomyia californica</i> Baccharis Gall Fly	3/8 inch long insects with transparent wings.	Feed on the underside leaves, leaving yellow, stippled spots devoid of chlorophyll.
	<i>Corythuca morrilli</i> Baccharis Lace Bug	White larvae, to 1 inch long, tunnel in woody parts.	Dieback of branches or entire plant.
	<i>Chrysothrips bacchari</i> Flathead Borer	Larvae are 1/2 inch long, black-brown. Adults are metallic blue-black.	Chew leaves, often defoliating plant.
<i>Calocedrus decurrens</i> Incense Cedar	<i>Frithabda flavolimbata</i> Baccharis Leaf Beetle	Canker causing fungus spores "hatch" in crevasses in bark or the undersides of branches 2 feet from branch end, causing the branch to die.	Some branch ends in the lower third of the canopy die, more appear in the upper part of the tree, eventually infecting the main stem.
	<i>Botryosphaeria ribis</i> (dothidea) Twig Blight	Refer to <i>Arctostaphylos</i>	
<i>Cercis occidentalis</i> California Redbud	<i>Phytophthora cinnamomi</i> Water Mold Disease	1/4 inch larvae are found in stem galls.	1 inch long, swollen gall section on 2 and 3 year old wood of C.g. and its hybrids. Terminal shoots beyond galls are stunted.
<i>Ceanothus griseus</i> (and hybrids with C.g. as a parent)	<i>Periploca ceanothiella</i> Ceanothus Stem Gall	Plants whose foliage is frequently wet in warm weather develop zonal spots on leaves.	Zonal spots on leaves on trees which are in too much shade or humid air.
<i>Chilopsis linearis</i> Desert Willow	<i>Cercospora capreaeata</i> Leaf Spot	Refer to <i>Acer</i>	
	<i>Verticillium albo-atrum</i> Verticillium Wilt		



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<i>Crataegus douglasii</i> Hawthorn	<i>Archips argyrospilus</i> Fruit Tree Leaf Roller	1 inch long, bright green worm which hangs on a silver thread.	Young leaves just emerging with holes in leaf margins chewed. Mature leaves with the leaf end folded over.
	<i>Calliroa cerasi</i> Pear Slug (larva of Sawfly)		Leaved skeletonized. Can be washed off foliage. Second generation in summer most destructive.
<i>Comarostaphylys diversifolia</i> Summer Holly	<i>Phytophthora cinnamomi</i> Water Mold Disease	Refer to <i>Arctostaphylos</i>	
<i>Fallugia paradoxa</i> Apache Plume	<i>Irwiniella amylovara</i> Fireblight	A bacterial disease which is carried from infected flower spurs by bees to infect previously uninfected ones in spring.	On Apache Plume usually only kills one or two branch ends per year and not consistently.
<i>Fragaria chilensis</i> Native Strawberry	<i>Oligonychus</i> Root Weevil	Refer to <i>Arctostaphylos</i>	
	<i>Phytophthora</i> sp. Root Rot		
	Spider Mites	Refer to <i>Myrica</i>	
<i>Fraxinus latifolia</i> Oregon Ash	<i>Prociophilus californicus</i> Ash Curl Aphid	Gray, 1/4 inch aphids feed on underside of leaflets in spring.	Curled, "arthritic-looking" leaflets in mid-spring. When examined, the entire inside of the leaflets is coated with insects. Sooty mold and a sticky carbohydrate deposit on pavement or cars beneath trees.
<i>Fraxinus velutina</i> Arizona Ash	<i>Phorodendron serotinum</i> Mistletoe (parasite)	12 to 18 inch clusters of olive colored leaves on branches.	A parasitic plant which weakens branches, eventually killing them.
<i>Heteromeles arbutifolia</i> Toyon	<i>Heliothrips haemorrhoidalis</i> Greenhouse Thrips	Several generations per year.	This insect causes black shiny specks on undersides of leaves and sucks sap from undersides of leaves.
	<i>Rhynocapus illex</i> Toyon Thrips	One generation per year in spring of 1/16 inch long larvae in growing plants.	Cause severe distortion of new foliage.



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<i>telomeles arbutifolia</i> cont'd)	<i>Spirocaea pyracanthae</i> Leaf Blotch	Refer to Rhododendron	
<i>Juniperus</i>	<i>Otiorynchus sulcatus</i> Black Vine Weevil <i>Phomopsis juniperovora</i> Phomopsis Blight		
<i>Mahonia aquifolium</i> Oregon Grape	<i>Coryphista meadii</i> Mahonia Looper	1 inch long caterpillars crawling up stems skeletonize leaves in May-June.	Stripped looking Mahonia with only skeletons of leaflets left.
<i>M. pinnata</i> California Holly Grape <i>Myrica californica</i> California Wax Myrtle	Spider Mite	Greenish to orange specks on undersides of leaves. Move quickly when exposed.	Remove chlorophyll spots from leaves' upper sides. Commonly a problem in plants in low light and/or poor air movement. Especially bad if plants are in poorly drained clay soil in inland locations.
<i>Pinus densiflora</i>	<i>Pinus</i> sp.	Woolly bits attached to base of needles or on twigs. Suck sap as an aphid and result in sooty mold.	White, woolly, minute individual insects gather in quantities at base of needles of 1 and 2 year old wood. Can seriously weaken growth beyond site of infestation.
<i>P. mugo</i>	Pine Adelgid		
<i>P. pinea</i>			
<i>P. thunbergiana</i> <i>Pinus radiata</i>	<i>Ips paraconfusus</i> Pine Bark Beetle	1/4 inch long brown beetle larvae 1/4 inch long legless, white grubs which tunnel in vascular tissue.	Mature tree seems to suddenly turn from green to tan. Earlier symptoms include individual branches dying, or to 1/2 of the tree dying. Quantities of larval tunnels found beneath loose bark.
<i>P. ponderosa</i> <i>P. attenuata</i>	<i>Dendroctonus valens</i> California Turpentine Beetle	1/2 inch long brown beetle. Larvae tunnel in tissue, usually at base of tree.	Brassy brown 1 inch long pitch tubes in root collar or in large exposed roots. May precede Bark Beetles.





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<i>Pinus radiata</i>	<i>Fusarium subglutinans</i> Pine Pitch Canker	Spores travel by air to begin infections in shoot tips or trunks during windy, wet weather.	12 to 24 inch long terminal shoots turn pale green then yellow, then brown. Shoots affected increase geometrically in serious cases. Trunk cankers are typified by sap streaming down trunks, and entire tree turning pale green. This symptom is the one most often seen in inland locations.
<i>P. muricata</i>			Round to fusiform galls on branches. In spring, yellowish-orange powdery spores are produced in fissures on the galls. Quantities of galls on twigs may be large enough to kill trees. "Hip" cankers on trunks caused by the same disease may result in trunk breakage after many years of infection.
<i>Pinus radiata</i>	<i>Peridermium harknessii</i> Western Pine Rust		Stunted trees, with many dead terminal shoots. Inadequate leaf surface is produced, as leaved are killed before they open completely.
<i>Pinus halepensis</i>			
<i>Platanus racemosa</i> Western Sycamore	<i>Gnomonia platani</i> Sycamore Anthracnose	Spores are splashed or blown onto young foliage as it uncurls. Infections of the leaves petiole and twig occur in March to April.	Droplets of black excrement on the underside of yellow-stippled leaves.
	<i>Corythucha sp.</i> Sycamore Lace Bug	Eggs are attached to young leaves in spring to hatch in May to June as wingless young extract sap from the undersides of leaves.	Yellow or brown spots on leaves. Stunting of twigs. This is the only mobile species of Scale. Not a consistent problem on Western Sycamore.
	<i>Stomacocium platani</i> Sycamore Scale	White, woolly specks under bark plates, 3 to 5 generations per year. Eggs hatch in spring and crawlers leave twigs to crawl into foliage.	Most serious on cultivars of Fremont Cottonwood from inland locations which are used in coastal sites.
<i>Populus fremontii</i> Fremont Cottonwood	<i>Melampsora occidentalis</i> Melampsora Rust	Forms 1/8 inch diameter clusters of orange spores on undersides of leaves.	



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Plant Species	Pest Species	Pest Description	Symptoms
<i>Prunus lyonii</i> lilac/loil ;atalina Holly-leaf ;herry	<i>Coryneum beijerinckii</i> Shot Hole Fungus	Fungus overwinters on lesions in bark. Spores are spread by spring rains. Damaged cells are walled off by new tissue, dead spot drops out.	Leaves have brown spots which later drop out leaving holes.
<i>Thamnos californica</i> ;offeeberry	<i>Dibotryou morbosum</i> Black Knot Disease <i>Saisetia oleae</i> Black Scale	A fungus which produces stem galls on 2-4 year old wood. Black 1/8 inch bumps on 2 and 3 year old wood.	Plants gradually decline. Woody galls found on hard wood. Plants weaken, heavily infested branches die.
<i>Rhododendron occidentale</i> ative Azalea	<i>Dematophora necatrix</i> Dematophora Root Rot <i>Otiorynchus sulcatus</i> Black Vine Weevil	Decay of trunk tissue at ground level. Adult Black Vine Weevil are a black beetle approximately 1/2 to 5/8 inch long. The larvae are legless, cream colored grubs with a tan head.	Plants decline. Inspection of trunk tissue at base of stem reveals brown vascular tissue. The adults cause leaf edge notching, usually in the lower portions of the plant, while the grubs are consuming bark and vascular tissue from major roots from below ground.
<i>Rosa californica</i>	<i>Botrytis cinerea</i> Gray Mold Rust	A fungus which kills foliage which is frequently wet. Orange pustules cover undersides of leaves in spring and summer, a fungus. Gray or brown encrustations on foliage.	Middle aged foliage turns gray or gray-brown, dropping off early in season. Orange pustules are scattered over plant on undersides of leaves. Reduces chlorophyll production. Makes an entire Redwood tree look brownish and unhealthy.
<i>Sequoia sempervirens</i> oast Redwood	<i>Avidia stastae</i> Redwood Scale	Gray or brown encrustations on foliage.	Makes an entire Redwood tree look brownish and unhealthy.
<i>Sequoia sempervirens</i> oast Redwood	<i>Botryosphaeria ribis</i> Twig Blight <i>Botryosphaeria ribis</i> (dothidea) Twig Blight	Branch ends in otherwise healthy trees die. Cankers on the undersides of branches are evidence. Refer to Calocedrus	Cankers of 2-4 inches long, 1/4 inch wide girdle the branch, next year to kill another 2 feet of same branch.



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<i>Sequoiadendron giganteum</i> Giant Sequoia	<i>Botryosphaeria ribis</i> (<i>dothidea</i>) Twig Blight	Refer to <i>Calocedrus</i>	
<i>Umbellularia californica</i> California Laurel	<i>Euthoracaphis umbellulariae</i> California Laurel Aphid	Powdery gray, 1/16 inch long insects in clusters on the undersides of leaves in late spring.	Results in sooty mold on foliage and anything beneath. Not dangerous to tree but messy.
	<i>Glomerella chrysiulata</i> Leaf Blight	Leaves and twigs die and turn brown hanging on the tree in late spring-summer.	Single twigs to major parts of branches, usually in the lower third of the canopy, die and turn brown.

Non-Chemical Pest Control Methods

Sucking Insect Pests	Control Measures	Procedure for Use
Aphid	Predatory Midge <i>Aphidoletes aphionymza</i>	Most effective indoors. Apply when aphids first noted at 1 midge per 10 sq. ft or 4,500 per acre.
	Green Lacewing <i>Chrysoperla rufilabris</i>	Release 10 eggs/larvae per plant or 1,000 eggs per 200 sq. ft in mid-spring. Repeat releases weekly until controlled.
Scale	Ladybird Beetle <i>Hippodamia convergens</i>	Distribute ½ pint (4,500 insects) per 2,500 sq. ft or 1 gallon per 10 acres. Wet the base of the infested plant and release at dusk.
	Black Scale Parasite <i>Metaphycus hevolus</i>	Release 1,000 to 3,000 per acre in infested trees in early spring.
	Red Scale Parasite <i>Aphytis melinus</i>	Apply 10,000-100,000 per year per acre in 2-6 releases September-October. More efficiency.
Mealy Bug	Green Lacewing <i>Chrysoperla rufilabris</i>	Release 10 eggs/larvae per plant or 1,000 eggs per 200 sq. ft in mid-spring. Repeat releases weekly until controlled.
	Mealy Bug Destroyer Beetles <i>Cryptolaemus montrouzieri</i>	Apply 2 beetles per sq. yard or 2-5 per plant, or 500 per acre. Repeat as necessary.
	Mealy Bug Parasitic Wasp <i>Leptomastix dactylopii</i>	Distribute 2 wasps per sq. yard or 5 wasps per badly infested plant in mid-spring.
	Greenhouse Thrips <i>Heliethrips haemorrhoidalis</i> <i>Thripobius semiluteus</i>	Release several hundred wasps per tree or row when first greenhouse thrips are found (probably May). Release in late afternoon into plants which have been moistened, but not standing water drops on foliage.
Spidermites	Green Lacewing & <i>Phytoseiulus persimilis</i>	Release 2,000-3,000 mites per sq. ft when first encountered. Repeat weekly until control is achieved.



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NON-CHEMICAL PEST CONTROL

Chewing Insect Pest	Control Measure	Procedure for Use
Black Vine Weevil (syn. Strawberry Root Weevil) <i>Otiorhynchus sulcatus</i>	Nematodes <i>Heterobdittis bacteriophora</i> and <i>Steinernema feltiae</i>	Apply 325-500 nematodes per sq. inch of soil surface by mixing in water in a 2-gallon sprayer in mid-February.
Caterpillars of Moths or Butterflies	Egg Wasps <i>Trichogramma minutum</i>	Distribute 12,000 wasps per 500 sq. ft. in mid spring. Repeat during peak season of the caterpillar damage.