

Pest, Pathogen, and Treatment Chart for Bonsai and Ornamentals - 2/22/16 edited by Ian Baker, ABAS

Pest	Host Plant	Symptoms/Damage	Life Cycle/When to spray	Active Ingredient (Example Brand Name) pesticides	Notes
Two-spotted spider mites	Everything, esp juniper	Finely stippled pale leaves on broadleaf. dull, yellow foliage on junipers, webbing on highly infested plants	Egg to adult in 8 days >82F, multiple applications within a week may be necessary. Peak June - Sept.	Salts (M-Pede), Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), Sulfur (liquid formulations are less messy like Safer 3 in 1, dusting sulfur ok), bifenazate (floramite), Never mix sulfur and oils or apply within 3 weeks of each other, Chlorfenapyr (Pylon - expensive and effective)	Prefer dry and hot conditions. Mist junipers daily, hose off heavy infestations before spraying, keeps plants well irrigated in peak heat.
European Red Mites	Most damage on <i>Prunus</i> species	Occurs on many others but generally not damaging.	Dormant oil can be sprayed in delayed dormant period when buds swollen but not open on sensitive trees before eggs hatch in spring	Hort oil or Mineral Oil (JMS Stylet Oil), Sulfur, Never mix sulfur and oils or apply within 3 weeks of each other	Generally doesn't cause enough damage to warrant spraying.
Eriophyid spp. Including Pine Bud Mites	Can affect many species, <i>Pinus</i>	Causes distorted, discolored needles new needles when the emerge from sheath. Gallings and discoloration in broadleaf.	They live in the sheath, so sprays won't hit them until candles elongate, but before needles elongate. April, May	Hort oil or Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), Sulfur. Never mix sulfur and oils or apply within 3 weeks of each other	Too small to be seen with naked eye. If damage is observed, protect natural enemies, avoid broad spectrums, employ fall/winter mineral oil sprays later in the year.
Aphids	Deciduous and broadleaf	Leaf yellowing, cast skins, sticky leaves w/ sooty mold	green peach aphid develops fastest @ 75F w/ full life cycle in 7 days. Can occur April - September	Peppermint Oil (IPM), Potassium Salts (M-Pede), Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), azadirachtin (Aza Guard, growth regulator, requires multiple applications), kinoprene (Enstar, growth regulator), pyrethrins (Pyganic), bifenthrin + other pyrethroids (Talstar P), acephate (Acephate 97up, Orthene97)	Can vector viruses. Control ants with bait stations to help control aphids. Can be hosed off before spray. Avoid broad spectrum, persistent sprays to maintain predators.

Root Mealy Bugs/ Root Aphids	Everything	Reduced vigor, pale/wilted foliage, occasionally white powdery wax on soil surface,	2-4 month life cycle, crawler stages are highly mobile.	Systemic/Drench products necessary. Rosemary Oil (Sierra Natural Science 209 Systemic Pest Control), Buprofezin (Talus 70DF, growth regulator, multiple applications necessary), kinoprene (Enstar, growth regulator), imidacloprid (Merit), acephate (Acephate 97up, Orthene Turf Tree and Ornamental WSP), bifenthrin + other pyrethroids (Talstar P)	Check new plants, control ants, inspect closely at repotting, don't reuse infested soil, sanitation is key. Use an adjuvant to permeate waxy body if not spraying an oil or soap.
Mealy Bugs	Deciduous and broadleaf	White waxy masses in crotches, honeydew/sooty mold, yellow leaves and premature leaf drop.	crawler stages are highly mobile. Waxy adults are hard/impossible to spray, so multiple applications with a couple weeks necessary	Peppermint Oil (IPM), Potassium Salts (M-Pede), Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), azadirachtin (Aza Guard, growth regulator, requires multiple applications), kinoprene (Enstar, growth regulator), Buprofezin (Talus 70DF, growth regulator, multiple applications necessary)	Check new plants, control ants, sanitation is key. Use an adjuvant to permeate waxy body if not spraying an oil or soap.
Whiteflies	Deciduous and broadleaf	Similar to aphids and psyllids, excrete honeydew and sooty mold	16 day life cycle @ 86F	Salts (M-Pede), Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), BEAUVERIA BASSIANA (BotaniGard), azadirachtin (Aza Guard, growth regulator, requires multiple applications), kinoprene (Enstar, growth regulator), Buprofezin (Talus 70DF, growth regulator, multiple applications necessary)	Extremely prone to insecticide resistance. Focus on soaps and oils, rotate A.I. often.
Leaf munchers like caterpillars, worms	Deciduous and broadleaf	Munched leaves, large worms present	Larvae (caterpillars) only present through early summer. Monitor and spray April - June	BACILLUS THURINGIENSIS SSP. KURSTAKI (Deliver), BACILLUS THURINGIENSIS SSP. AIZAWAI (Xentari), Spinosad (Conserve SC)	Scout at night when actively eating. Pick off large bugs right away. <i>Bacillus</i> (BT) products are effective biological products.

Thrips	Deciduous and broadleaf	Finely stippled pale leaves with fine black fecal spots. Similar to mites.	Complex life cycle. Eggs on underside of leaves, pupae in soil. Larve and adults on leaves. Multiple sprays necessary. 11 day life cycle @ 77-87F	Peppermint Oil (IPM), Potassium Salts (M-Pede), Mineral Oil (JMS Stylet Oil), Neem Oil (Triact 70), BEAUVERIA BASSIANA (BotaniGard), Spinosad (Conserve SC), pyrethrins (Pyganic), bifenthrin + other pyrethroids (Talstar P), azadirachtin (Aza Guard, growth regulator, requires multiple applications), Chlorfenapyr (Pylon - expensive and effective)	Because they pupate in soil, diligent control is necessary to prevent future infestations. Multiple sprays throughout growing season of different products necessary. A single thrips is called a thrips.
Borers - Termites: Many different species of beetle, moth, and termite	Conifers, trees with deadwood	Bleeding, cracked, gnarled, oozing, rough, or wet bark and dieback of limbs, shoots, or entire plants. Brown granular excrement from larval tunnel.	It depends. Monitor carefully.	CARBARYL (Seven), Imidacloprid (Merit), acephate (Acephate 97up, Orthene Turf Tree and Ornamental WSP), bifenthrin + other pyrethroids (Talstar P)	Termites require injection into deadwood holes since tissue is... dead. Keep plants healthy, avoide trunk damage, if possible, prune infested limbs, prevent bark sunburn with shade cloth or white covering
Dormant Sprays			Only when plants are dormant, not budding Dec. Jan.	Spray Lime Sulfur @ 1% solution. If starting with 28% solution, use 1:25 ratio or 5 oz/gal. If starting with 97% solution, use 1:85 or 1.5 oz/gal, Mineral Oil (JMS Stylet Oil, Hi Yield Dormant Oil), Peppermint Oil (IPM), Potassium Salts (M-Pede)	Suggested that Lime Sulfur is safe on 2, 3 needle pines and shimpaku, but NOT other evergreens, azaleas, euonymus

Pathogens

Powdery Mildew	Deciduous and broadleaf	Fine powdery coating on leaves, die back of portions or entire leaves.	Development favors warm days and cool nights 68F-86F with high humidity. Higher temps not favorable.	Mefenoxam (Mefenoxam 2 AQ), Propiconazole (Propiconazole 14.3), Myclobutanil (Myclobutanil 20EW T&O) Preventative: Wettable Sulfur, Peppermint Oil (IPM), Potassium Salts (M-Pede), Curative: 28% Lime Sulfur, Neem Oil (Triact 70), Mineral Oil (JMS Stylet Oil), Potassium Salts of Phos Acid (Monterey Garden Phos, SYSTEMIC), Copper Octanoate (Grotto), Tebuconazole (Tebuconazole 3.6F Foliar), Chlorothalonil (Chlorothalonil)720 SFT,	Maintain plant spacing for good airflow. While shade is critical, careful not to overshadow sensitive plants.
Juniper tip blight	Junipers	young tips turn yellow then brown and die back. Black fruiting bodies may be present under magnification.	Most active in spring with milder temps ~60F	Propiconazole (Propiconazole 14.3), Mancozeb (Manzate Max),	Prune infected tips, sanitize pruners, maintain airflow, spray preventatively
Anthracnose	affects many deciduous and evergreen trees and shrubs	dark lesions on leaves. In severe cases it may also cause sunken lesions and cankers on twigs and stems.	Most active in spring with milder temps ~60F and wet weather or wet foliage		Maintain plant spacing for good airflow. While shade is critical, careful not to overshadow sensitive plants.
Pine needle cast/Needle blight <i>Elytroderma</i>	<i>Pinus spp</i>	Browning of needle with black lesions, premature needle dropping (cast)	Life cycle can track with pine cycle over seasons, so if observed, treat preventatively	Chlorothalonil 720 SFT, Azoxystrobin (Artavis 2SC)	Maintain plant spacing for good airflow. While shade is critical, careful not to overshadow sensitive plants.

Root rot <i>Pythium</i> + others	Everybody	Low vigor, stunted growth, wilting, brown black dead roots, anerobic smell to soil	Many different disease can be a culprit. <i>Pythium</i> and other water molds are a serious problem. Not all root rot is <i>Pythium</i> caused	Potassium Salts of Phos Acid (Monterey Garden Phos, SYSTEMIC), Fluopicolide (Adorn), Cyazofamid (Celoxid SC), Fenamidone (OHP Fen Stop)	Must not allow standing water in root zone. In winter, tilt pots for drainage or otherwise ensure roots don't remain submerged. Allow adequate dry down in spring and fall.
Leaf curl	<i>Prunus spp</i>	distorted reddish, cankerous leaf curling	wet conditions of spring. Infection occurs when leaves remain wet for longer than 12.5 hours at temps below 61F. Treat with a fungicide in winter a couple of times after leaves drop.	Copper Octanoate (Grotto), Thiram (Spotrete F)	

- The basic trend here is to use oils and soaps and fungicides as a first line of defense and for regular/scheduled sprays.
- More targeted materials and systemics should be reserved for specific needs.
- Recommended chemicals for each list work from most preferred at top to least at the bottom.
- Plant health and sanitation come before spraying anything.
- Always read the label for your specific formulation and species of tree, follow the label dosage recommendations.
- Including an adjuvant/spreader/sticker additive to sprays not already containing soap or oil can help ensure even coverage and help the pesticide coat the pest and foliage.
- The above is list is not exhaustive of all options and many products can be used for different pests. Listed products should be available to non-licensed consumers in California through professional sales outlets i.e. domyown.com
- Use a high quality sprayer that can produce a fine mist.
- Spray from the bottom up to coat undersides of leaves. Incidental spray will mostly coat the top, then make another pass, aiming downwards to cover tops of leaves until the liquid just begins to run off.
- Wear personal protective equipment! The label will give guidelines, but it is always smart to wear long pants and sleeves, gloves, respirator, and safety glasses.
- Store pesticides safely, out of reach, and only in properly labeled containers.
- Not all pesticides are equally toxic, in fact many new products are extremely safe to the environment and organisms, but still it is a great responsibility to be applying pesticides judiciously. Some pesticides are still very toxic to humans and the environment.
- UNDERSTAND WHAT YOUR ARE SPRAYING AND WHY - Spray and pray is not a good strategy.