

**Description**

Mature female scales are round and reddish brown with concentric circles and a nipple near the center. Crawlers are yellow, but soon begin to form a waxy cover over their bodies. Male scales are elongated and emerge as a tiny, winged fly for mating. Red scale has 2-5 generations per year and they overwinter on the trees.

**Damage**

CA red scale attack citrus twigs, leaves, branches and fruit. Infested leaves may have yellow halos around each scale insect. Severe infestations can cause leaf yellowing and drop, twig and limb dieback, and occasionally kill the tree.

**Monitoring and Treatment Decisions**

Red scale is not active below 53°F. Use pheromone traps to determine when male flights are occurring. The first generation of crawlers will emerge ~550 degree days after male flights. Degree days are the number of hours accumulated above 53°F in a day.

Starting in July count 100 fruit in a ten-acre block. If more than 30% of the fruit has scale, treat.

**Low Impact Management**

Prune to thin canopies, removing excess vegetation in the center. Flecks of sunlight should be visible on the ground below the canopy at noon on a sunny day. Prune when growth flushes start in the spring to avoid cold damage.

Control ants and dust in the orchard to protect natural enemies. Release natural enemies such as *Aphytis* wasps or *Rhyzobius* lady beetles (see below).

**Pesticide Options**

For effective spray timing, use pheromone traps to monitor male scale flies. Put traps up in March and maintain through October. Change the sticky card weekly and the pheromone lure monthly.

Order through [www.evergreengrowers.com](http://www.evergreengrowers.com), [www.trece.com](http://www.trece.com), or [www.iscatechnologies.com](http://www.iscatechnologies.com).

Traps may be saved from year to year. Lures have a limited shelf life and need to be refrigerated.

**Look for this:** →

*California Red Scale Female*  
Flattened shape and nipple in center

**Not this:** →

*Brown Soft Scale*  
Rounded shape, no nipple



**Oil** is the most selective pesticide available. It has the least impact on natural enemies. However, use it sparingly as treatments eliminate younger scale stages, making control by *Aphytis* wasps more difficult. Complete coverage is critical.

**Timing:** 1) July – Aug: 1.4 gal/100 gal water 2) Mar. 15 to 50% bloom: 1.2 gal/100 gal water to avoid tree injury. Do not spray oil when there is frost risk.

**Options:** Golden Pest Spray Oil, Lescro Horticultural Oil, Narrow Range 415 Spray Oil, Omni Oil 6-E, 415 Summer Spray Oil, Sunspray Ultrafine Oils, 415/440 Superior Spray Oil, Volck Dormant Oil. **Check label for your crop & pest!**

**Insect Growth Regulators:** Pyriproxyfen (Esteem) and Buprofezin (Centaur). Spray when crawlers have completely emerged and become white caps (~1800 DD after biofix - first male flight). Insect growth regulators kill the scale when it molts. Optimal timing is June-July. Safe for parasitic wasps, predatory mites, spiders, and lacewings but very toxic to Vedalia beetles.

**Organophosphates & Carbamates** There are populations of red scale that are resistant to Lorsban and/or Sevin, so spraying may **increase** scale.

**Timing:** treat the crawler stage, usually May or August - about 555 degree-days (accumulated above a 53°F threshold). See the UC degree day calculator for California Red Scale at: <http://ipm.ucanr.edu/calludt.cgi/DDmodel?model=CRS>.

Monitor for crawlers by wrapping sticky tape around 1-year-old branches (½" diameter) with both gray and green wood and infested with live female scales.

### Organic Management Options

- *Aphytis* wasp releases.
  - Petroleum oil sprays: 440 Superior or Supreme Spray Oil, OMNI Oil 6, Pest Fighter Year-Round Spray Oil.
  - Non-synthetic oil sprays: Vegol Insecticidal Oil.
- Check with your certifier before applying!**

### *Aphytis melinus* Wasps

Adult *Aphytis* are tiny wasps ~2mm long, yellow, with short knobby antennae. They may be confused with the adult male California red scale which, though similar, has longer antennae, a dark band around its back and only one pair of wings.

*Aphytis* feed on and deposit their eggs in 3<sup>rd</sup> instar females of the California red scale. The wasp larvae then parasitize the scale insect. *Aphytis* will have 2 or 3 generations for each scale generation per year.

The threshold for *Aphytis* activity is ~42 degrees F, the highest rate of growth is ~80 degrees. At the lower temperatures, the wasps' life expectancy is about 3 days, at higher temperatures, about 15 days.

### Timing of Wasp Releases

*Aphytis* parasitic wasps prefer to attack 3<sup>rd</sup> instar females, which occur ~800 degree days after the males fly and can be detected in traps. (3<sup>rd</sup> instar is 250 degree days after crawlers).

In the foothills, releases typically start in March, if temperatures are not consistently below the 42° threshold. Release 100,000 parasites per acre per year: 50,000 from March through May: 10,000 every 2 weeks. 1-2 releases of 5-10,000 per month in June, August, Sept, and Oct. No releases from mid-June to late July. Once you have an established population, release 5,000 per acre.

### Guidelines for Effective Wasp Releases

**Release wasps as soon as possible on the day of arrival!** Release them in the morning, if possible. *Aphytis* viability decreases rapidly with storage. They are heat sensitive, so keep them cool. Wrap cups in moist newspaper and keep in the shade until they are released. If absolutely necessary, store in a cool (~60° F), dark place until use. Do **not** freeze, refrigerate, or place insects directly on ice packs.

If the wasps are active when they arrive, open the cover partway and tap it to release a few as you walk along. Otherwise, tip it up and tap a few out onto trees or use a small paintbrush to gently move wasps from the cup onto a branch in the canopy of the tree. Walk through the orchard and spread the wasps on every 6<sup>th</sup> tree in every 6<sup>th</sup> row. Add extra to hot spots.

### Helping *Aphytis* to naturalize

*Aphytis* are very sensitive to broad spectrum pesticides and the effects will vary depending on the pesticide used and time elapsed. Always test for pesticide residue before releasing *Aphytis*. Oil sprays will kill off only *Aphytis* that are walking around at the time of application. Begin releasing *Aphytis* again 2-4 weeks after oil application. Control ants as they prevent the *Aphytis* wasps from laying their eggs in the scale. Providing perennial grasses and flowering plants for *Aphytis* to supplement their food may increase their life span, reproductive rates, and allow them to naturalize in your orchard.

### Compiled from:

**California Red Scale.** Beth Grafton Cardwell. [http://ucanr.org/sites/KACCitrusEntomology/Home/California\\_Red\\_Scale/](http://ucanr.org/sites/KACCitrusEntomology/Home/California_Red_Scale/)

**The Nuts and Bolts of *Aphytis* Releases.** Beth Grafton Cardwell. <http://ucanr.edu/sites/KACCitrusEntomology/files/4587.pdf>

**UC IPM Pest Management Guidelines for California Red Scale.** <http://www.ipm.ucdavis.edu/PMG/r107301111.html>