

Cooperative Extension

California Red Scale (*Aonidiella aurantii*)

The University of Arizona \$ College of Agriculture \$ Tucson, Arizona 85721 (part of the publication “Citrus Arthropod Pest Management in Arizona”)

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DESCRIPTION AND LIFE HISTORY: California red scales are armored scales, occurring in isolated pockets in Maricopa County, primarily in the Phoenix area. Although California red scale can sporadically be found in Yuma, because of abatement efforts, Yuma County is considered a scale-free area.

The adult female are immobile, have a rounded cover, and appear as small reddish-brown spots or scabs. They are clearly visible when on the fruit. A fully grown female will be about 2.1 mm in diameter and can give birth to 100 to 150 yellowish colored crawlers (first instar). The crawler is the only stage in which female scales can move. Crawler can disperse from tree to tree on their own by crawling, but heavily rely on wind, birds, machinery, or labor crew to move longer distances. Once a crawler finds a suitable place to settle, it will form a nipple “scale like” stage. The female will go through three more molts to reach reproductive maturity.



Figure 17. An orange infested with California red scale.

After the crawler stage, the male scale will undergo two additional “scale like” molts before its final molt into a

winged adult. In Arizona, there are four to seven distinct flights of male California red scale occurring between April and November. The male resembles a small “gnat”, 0.8 to 1.2 mm in length.



Figure 18. An adult male California red scale, referred to as a flyer. (photo courtesy of Jack Kelly Clark, University of California, Regents).

DAMAGE: California red scale attacks all parts of the tree including twigs, leaves, branches, and fruit. Heavily infested fruit may be downgraded in the packinghouse and, if population levels are high, serious damage can occur to trees. Severe infestations cause leaf yellowing and drop, dieback of twigs and limbs, and occasionally death of the tree. Tree damage is most likely to occur in late summer and early fall when scale populations are highest and moisture stress on the tree is greatest.

CONTROLS:

Regulatory:

The Arizona Department of Agriculture and The Yuma County Citrus Pest Control District both have programs to monitor for California red scale and abate infestations.

This document and others on citrus insect pests can be found at

<http://cals.arizona.edu/crops/citrus/insects/citrusinsect.html>

Monitoring consists of a grid network of pheromone traps to detect the presence of male “flyers”. If detected extensive scouting surrounding the area of the detection is conducted to find the infestation. All control efforts are currently being administrated through these agencies, and have been highly successful.



Figure 19. A pheromone trap used to monitor adult male California red scale activity.

Commonly used chemicals: The products listed here are those that have been used by The Yuma County Citrus Pest Control District program, or have potential use.

•**Chlorpyrifos.** 28 day PHI at rates exceeding 3 lbs-ai per acre or 14 days PHI for rates of 3 lbs-ai per acre or less. Chlorpyrifos (LORSBAN) is an organophosphate that is has been used to control California red scale, although it is no longer considered the product of choice. Chlorpyrifos is applied at an average rate of 4 to 6 lb-ai per acre. Thorough coverage is need for chlorpyrifos to be most effective. It is toxic to bees and should not be applied during daylight hours during bloom. Additionally, chlorpyrifos is toxic to predatory insects, mites, and parasitoids. Do not apply more than 10 lbs-ai per acre per season. The restricted entry interval for chlorpyrifos is 1 day.

•**Pyriproxyfen.** 1 day PHI. Pyriproxyfen (ESTEEM) is an insect growth regulator which has is highly active against California red scale, and is currently the product of choice for abatement efforts. It acts by sterilizing the adults and can cause nymphal mortality. Pyriproxyfen should be applied when a majority of the scales are small nymphs. It is applied at rate of 0.11 lbs-ai per acre. Pyriproxyfen is fairly selective, and although it is not known to disrupt parasitoid activity; it can negatively

impact vedalia and other lady beetle populations, as well as lacewing larvae. Do not exceed 0.17 lbs-ai per acre per season. Do not exceed two applications per season. Allow at least 21 days between applications. The restricted entry interval for pyriproxyfen is 12 hours.

•**Buprofezin.** 60 day PHI. Buprofezin (APPLAUD) is an insect growth regulator that disrupts the molting process through chitin synthesis inhibition. The labeled rate for buprofezin in citrus for control of scales is 1.5 to 2.0 lbs-ai per acre. Since this material affects molting, treatment should be made during peak crawler (first instar) emergence. The scales will go through several molts before they are killed, therefore several weeks may pass before populations are noticeably reduced. Do not make more than two applications per season, and allow at least 60 days between applications. Buprofezin is very selective and although it will negatively impact ladybeetle and lacewing larvae to a limited degree, it is very safe to predaceous mites and parasitoids. The restricted entry interval for buprofezin is 12 hours.

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