

# COTTONY CUSHION SCALE

*Integrated Pest Management for Home Gardeners and Landscape Professionals*

Cottony cushion scale, *Icerya purchasi*, can infest many woody ornamentals and certain crops (Fig. 1). Common hosts in California are citrus, coccolus, nandina, and pittosporum. Its cottony egg sac and profuse honeydew production make cottony cushion scale easy to spot in the landscape.

## IDENTIFICATION AND LIFE CYCLE

The body of the female cottony cushion scale is orange, yellow, or brown, but its most distinguishing feature is the elongated, fluted, white cottony egg sac that is attached to its body. The egg sac contains from 600 to 800 red eggs and may become two to three times as long as the body of the female; the resulting length of the female plus the egg sac can be almost ½ inch (Fig. 2). Females usually occur on twigs. Eggs hatch into crawlers in a few days during warm weather, but take up to 2 months to hatch in winter. The crawlers are red with black legs and antennae. They settle along leaf veins and begin to produce the white cottony secretion they are known for. In order to increase in size, scales shed their outer skin (molt) and grow a new, larger covering. Each time the scale molts, it leaves behind its white, cottony, molting skin. Immature scales look reddish for a short period of time before they begin producing more cottony secretions. Second-instar nymphs settle on twigs and leaves, usually along leaf veins. Third-instar scales move to branches and trunks. Adults may be found on branches or on the trunks of trees. The minute, red, winged male is rarely seen; the loose cottony cocoons from which males emerge, however, may be detected in secluded places on trees or on the ground.

Cottony cushion scale has two to three generations a year. Unlike most other scales, it retains its legs and its mobility throughout its life. Cottony cushion scale completes its life cycle in 3 months during warm weather conditions. For photographs of each life stage of cottony cushion scale, consult *Stages of the Cottony Cushion Scale (Icerya purchasi) and its Natural Enemy, the Vedalia Beetle (Rodolia cardinalis)*, listed in the Suggested Reading section.

## DAMAGE

Like other scales, cottony cushion scale decreases the vitality of its host by sucking phloem sap from the leaves, twigs, branches, and trunk. Feeding can result in defoliation and dieback of twigs and small branches when infestations are extremely heavy. Heavy populations can severely reduce the yield of citrus trees. Like other soft scales, cottony cushion scale excretes honeydew, which is usually accompanied by blackish, sooty mold growth and ants.

## MANAGEMENT

Unless disrupted by insecticides, dust, or ants, natural enemies provide excellent control of cottony cushion scale. An exception is on *Coccolus laurifolius*; it often is highly infested with cottony cushion scale, especially when grown away from the coast, because scale-feeding vedalia beetles avoid this plant.

## Biological Control

Cottony cushion scale is usually well controlled by two introduced natural enemies. The most famous one is the vedalia beetle, *Rodolia cardinalis* (Fig.3). This red and black lady beetle was introduced from Australia in the 1890s and saved California's fledgling citrus industry from destruction by these pro-

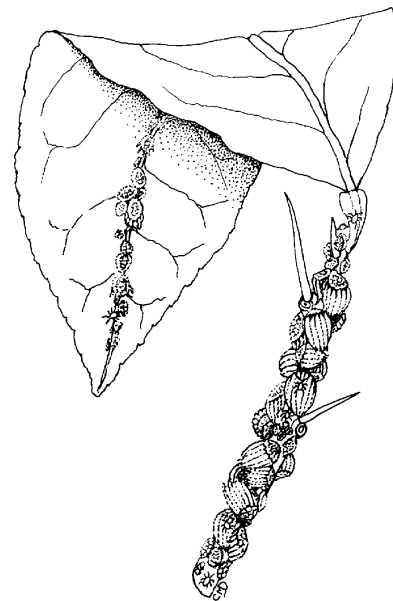


Figure 1. Colony of cottony cushion scale.

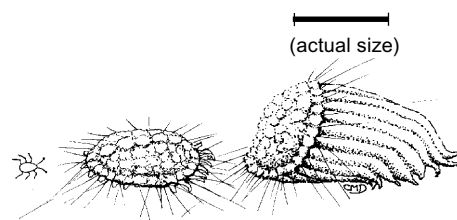
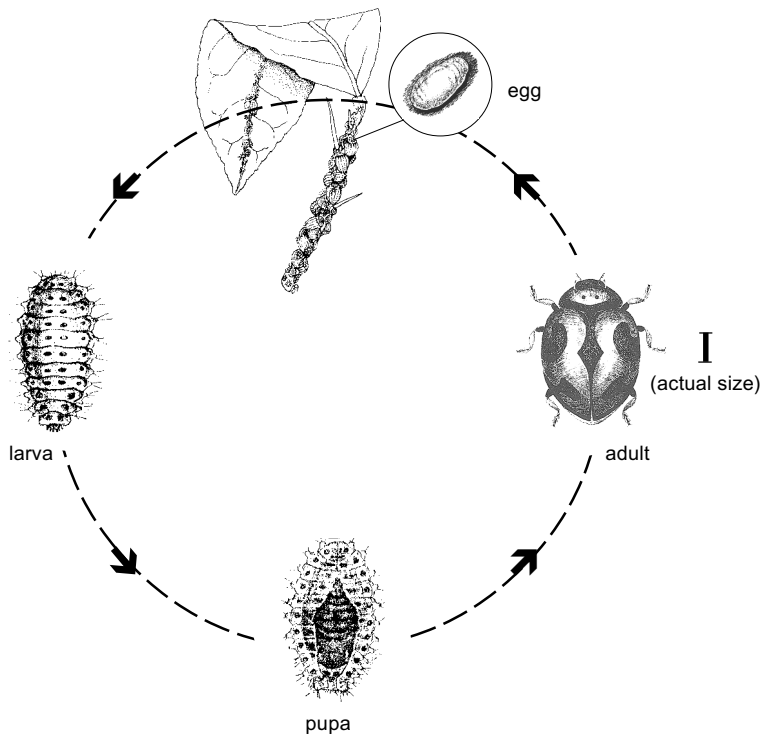


Figure 2. Various cottony cushion scale life stages (from left to right: crawler, adult female, adult female with egg sac). Actual size of female with egg sac is about ½ inch long.

lific scales. Adult female beetles lay their oblong red eggs underneath the female scale or attached to her egg sac. The newly hatched, young, reddish beetle larva chews its way into the egg sac and feeds on scale eggs and crawlers. The larva molts several times and

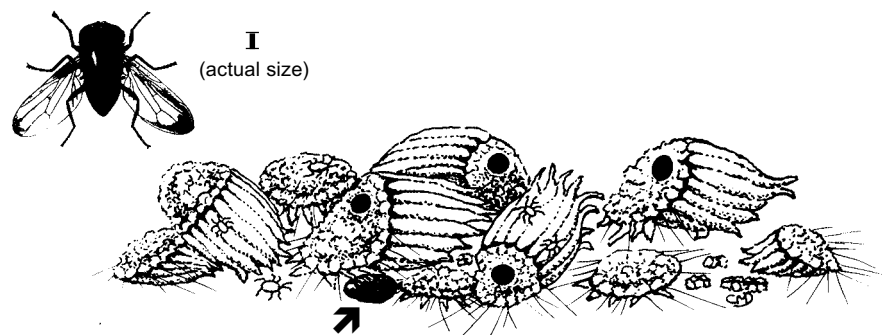


**Figure 3. Life cycle of vedalia beetle. Adult female beetle lays eggs underneath the scale or attached to scale egg sacs. The beetle larva and adult beetle feed on the scale eggs and scale.**

gradually increases in size. Mature larvae and adult beetles feed on all scale stages. The fourth and last larval instar stops feeding, crawls towards the outside of the tree, and attaches its rear end to a leaf in preparation for pupation. Reddish beetle pupae develop within the grayish skin of the last larval instar. The entire life cycle of the vedalia beetle is 5 to 6 weeks in warm weather. For photographs of each life stage of vedalia, consult *Stages of the Cottony Cushion Scale (Icerya purchasi) and its Natural Enemy, the Vedalia Beetle (Rodolia cardinalis)*, listed in the Suggested Reading section.

The other important natural enemy, the parasitic fly *Cryptochaetum iceryae*, deposits one to four eggs inside each third-instar or adult female scale body. The eggs hatch into larvae that feed within the scale. After four molts, the larvae pupate. The oblong pupal case may remain inside the scale or appear

outside the dead scale, leaving one or more round emergence holes (Fig. 4). Fly pupae are orangish when they first emerge from scale egg sacs and darken just before the adult *Cryptochaetum* emerges. The life cycle of the *Cryptochaetum* fly is about 4 weeks in warm weather.



**Figure 4. Adult parasitic fly (*Cryptochaetum iceryae*), black pupal case (indicated by arrow), and female cottony cushion scales, some with parasite emergence holes.**

Both the vedalia beetle and *Cryptochaetum* are active in coastal areas; the vedalia beetle is also abundant in southern California desert regions and is the predominant species in interior areas of California. Both of these natural enemies can be extremely effective in controlling cottony cushion scale because of their short generation time (4 to 6 weeks) and host specificity, attacking only cottony cushion scale.

Conserve natural enemies by controlling ants and dust and by avoiding the use of persistent insecticides. If you find cottony cushion scale, look for the vedalia beetle and its red eggs and larvae on top of scale egg sacs or the beetle's pupal cases. Inspect female scales for *Cryptochaetum* emergence holes and pupal cases. If you find evidence of these natural enemies, then insecticide treatments are not necessary.

**Controlling Ants**

Ants protect scale insects from predators and parasites in order to farm the honeydew produced by the scales. To improve biological control, keep ants out of trees and shrubs by banding the trunks with sticky substances such as Tanglefoot or by using ant baits. Protect young or sensitive trunks (especially citrus) from possible injury by wrapping the trunk with a collar of duct tape or fabric tree wrap and coating this with the sticky material. Check the sticky material every week or two and stir it with a stick to prevent the material from becoming covered with debris that ants can cross. Alternatively, pesti-

cide baits, such as ant stakes, may be placed near nests or on ant trails beneath plants. For the most effective and economical control, treat in early spring when ant populations are active, but before they become heavy. (For more information, see *Pest Notes: Ants*, listed in the Suggested Reading section.)

### Chemical Control

Although adult females with their white, ridged egg sacs are the most obvious stage, adults are not well-controlled by insecticides. The females and their eggs are protected both by the cottony egg sac and by their position

inside the canopy of the tree, making them difficult to treat. If scales cannot be tolerated, apply narrow range oil to deciduous hosts during the dormant season or spray foliage with insecticides when the females are dead and the tiny reddish scale crawlers and younger instars are out on the leaves.

You can use traps made of double-sided sticky tape to determine when crawlers are hatching. Before crawlers begin to emerge in spring, tightly encircle several twigs or branches near adult female scale with transparent tape that is sticky on both sides (available at stationary stores). Change the tapes at regular intervals, about weekly, and examine them with a hand lens to identify the crawlers. Once eggs begin hatching, scale crawlers get stuck on the tapes and appear as red or orange specks. Spray after you observe a sharp increase in crawler production.

Natural enemies are the best method for controlling cottony cushion scale, so look carefully for their presence and avoid insecticides if you find evidence of them attacking cottony cushion scale. If natural enemies are absent, and the population is in a treatable stage, the organophosphates malathion or acephate (Orthene) can be effective.

Do not apply imidacloprid (Merit) for cottony cushion scale control. Although imidacloprid has scale insects listed on the label, it does not kill cottony cushion scale. To make matters worse, imidacloprid is very toxic to vedalia beetles. The beetles are poisoned when they feed on cottony cushion scale that have ingested the imidacloprid. Cottony cushion scale outbreaks have been observed following use of this insecticide because the vedalia beetles were removed and the insecticide did not control the pest.

### SUGGESTED READING

Dreistadt, S. H., J. K. Clark, and M. L. Flint. 2004. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. 2nd ed. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 3359.

Grafton-Cardwell, E. E. 2002. *Stages of the Cottony Cushion Scale (Icerya purchasi) and its Natural Enemy, the Vedalia Beetle (Rodolia cardinalis)*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 8051.

UC Statewide IPM Project. Jan. 2000. *Pest Notes: Ants*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7411. Also available online at: <http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html>

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ILLUSTRATIONS: **Cottony cushion scale colony (Figs. 1, 3, 4); cottony cushion scale life stages (Fig. 2):** Christine M. Dewees. **Pupa, larva, egg (Fig. 3):** *Natural Enemies of the Fluted Scale*. 1890. Washington, D.C.: Dept. of Agric. **Vedalia beetle (Fig. 3):** E. O. Essig. *Injurious and Beneficial Insects of California*. 1913. The Monthly Bulletin II(1, 2). Sacramento: State Commission of Horticulture. **Adult fly (Fig. 4):** *Natural Enemies Handbook*, UC ANR Publ. 3386.

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

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

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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