

## On a SCALE of one to ten\_\_\_\_\_????

By Michael J, Green

There are 435 individual species of scale in the United States in two broad categories (1) armoured scales and (2) soft scales. The only cactus reference seen that identifies scale pests<sup>1</sup> implies that armoured scales are not a problem, but lists several soft scales that are. Excellent color keys for scale insects in California are available from the California Department of Food and Agriculture.

Soft scale insects seem to vary considerably and cactus are definitely susceptible to soft scale (see photos). One species, *Dactylopius confusus*, commonly found on Opuntias, was and still is grown and harvested for its red dye component carmine. It is a major, multimillion dollar business in certain parts of Mexico.

Diagnostics generally are the presence of honeydew and sooty mold, ants, wilted or discolored leaves, yellow, orange, brown or black little patches (scales) on the stems and the bottom of the leaves (color depends on species and age). Identification needs magnified lenses and photo guides. Ants protect scales from their natural enemies. Some scale species weaken plants and inhibit growth. Plant parts may die if they remain heavily infested with scales.

A correct identification of the scale family to which your pest species belongs is important. Imidacloprid controls most soft scales but does not control armored scales or cottony cushion scale (*Icerya purchasi*) which is commonly mistaken for mealybug.

Imidacloprid can dramatically increase cottony cushion scale populations because it is very toxic to one of its natural enemies (vedalia beetle, *Rodolia cardinalis*). It is poisoned by feeding on scales that have ingested the insecticide.

The best control is to carefully quarantine new plants for a while BEFORE adding them to the existing collection. This is always advisable for new plants in the collection to prevent spreading of any diseases and pests!

Inspect plants to determine whether female scales, nymphs, honeydew, or sooty mold are present. To distinguish live scales from dead, try flipping over the female scale body or cover using a sharp tool. Dead scales remain on plants, and sometimes a large proportion of scales are dead or parasitized by natural enemies. During the growing season inspect for ants. If the ants have swollen, almost translucent abdomens, they are probably feeding on honeydew produced by scales or other insects that suck plant juices. Generally, what works on mealybug works.

If infested, gently scrape off the scales with a plastic scrub pad. A hard jet of water can spray off the crawlers on the spines. Manual control should be done away from the collection or in an isolated place. Watch the wind direction, eggs and first generation nymphs can cover great distances when caught by a breeze!

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<sup>1</sup> The website [www.cactusclinic.com](http://www.cactusclinic.com) which has been taken offline.

Scales are often controlled by small parasitic wasps and predators including beetles, bugs, lacewings, and mites. Predatory *Chilocorus*, *Hyperaspis*, and *Rhyzobius* species lady beetles (ladybugs) can easily be missed. The twicestabbed lady beetle, *Chilocorus orbis*, is shiny black with two red spots on its back, and reddish underneath. The multicolored Asian lady beetle, *Harmonia axyridis*, is a relatively large, variably colored species. Parasitic wasps are often the most important natural enemies of scales. Natural predators will then die if there is not a sufficient ongoing diet.

Ant control, habitat manipulation, and pesticide management are the key conservation strategies. Grow flowering plants near scale-infested cacti to help attract and support natural enemies. Adult lacewings, lady beetles, and parasitic wasps live longer, lay more eggs, and kill more scales when they have plant nectar or pollen and insect honeydew to feed on. Minimize dust, which interferes with natural enemies. If current levels of scales are intolerable, step up the attack.

Horticultural oils are specially refined petroleum products such as Volk or Neem oils. To avoid oil injury, only to apply to well watered plants. In addition to the oil, insecticidal soap or a mixture of oil and soap can be sprayed. Horticultural oils can be an advantage, because applying any systemic insecticide, and thus watering, could be catastrophic in the dormant season. Do not apply any oil when it is foggy, freezing (under 32°F), hot (over 90°F), or rainy, or within a day of when these conditions are expected. *Avoid products called dormant oil or dormant oil emulsions.* These are more likely to injure plants.

If you choose to use a chemical pesticide, keep in mind that a scale acts like a cover and thus protects the insect itself against insecticides. Use specific systemic insecticides to control the adults. Apply several times with 10 day intervals, unless otherwise indicated. Try to use insecticides with different active components: malathion, imidriclopid (Advanced Garden Tree and Shrub), carbaryl (Sevin), permethrin, and acephate (Ortho Systemic Insecticide). It will help prevent the insects from becoming resistant.

#### References:

Gill, R. J. 1982. *Color-Photo and Host Keys to the Armored Scales of California*. Scale and Whitefly Key #5. Sacramento: Calif. Dept. Food Agric.

Gill, R. J. 1982. *Color-Photo and Host Keys to the Soft Scales of California*. Scale and Whitefly Key #4. Sacramento: Calif. Dept. Food & Agric.

Gill, R. J. 1988-1997. *The Scale Insects of California Parts 1-3*. Sacramento: Calif. Dept. Food & Agric.

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7408.html>

[www.mortonarboretumphc.org/feature%20articles/Insects/Understanding%20and%20Identifying%20Scale%20Insects%](http://www.mortonarboretumphc.org/feature%20articles/Insects/Understanding%20and%20Identifying%20Scale%20Insects%20)

<http://extension.missouri.edu/explore/agguides/pests/g07274.htm>



**Coccus hesperidum**

[www.agro.bayer.gr](http://www.agro.bayer.gr)



**Saissetia oleae**

<http://www.viarural.com.ar/viarural.com.ar/agricultura/aa-insectos/saissetia-oleae.htm>



[Cochineal scale insects \(Dactylopius coccus\)](#)

<http://fireflyforest.net/firefly/2005/09/19/cochineal/>



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***Rodolia cardinalis* adults attacking  
cottony cushion scale.**

PHOTO: J.K. Clark,

<http://www.ipm.ucdavis.edu/>



DPI Photo

[http://creatures.ifas.ufl.edu/fruit/cottony\\_cushion01.htm](http://creatures.ifas.ufl.edu/fruit/cottony_cushion01.htm)