

Apple

San Jose Scale

Scientific name: *Diaspidiotus* (= *Quadraspidiotus*)
perniciosus

(Reviewed 8/06, updated 3/09)



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DESCRIPTION OF THE PEST

Female San Jose scales give birth to living young that emerge from under the edge of the scale covering. These tiny yellow [crawlers](#) wander in a random fashion until they find a suitable place to settle. Immediately upon settling, the crawlers insert their mouthparts into the host plant and begin feeding and secreting a white waxy material ([white cap](#) stage); eventually the waxy covering turns black and is known as the [black cap](#) stage. Later the covers turn various shades from gray to black.

San Jose scales overwinter predominantly in the black cap stage, although in mild years some adult mated females may also survive. In late January, these nymphs resume their growth. Immature male and female scales are indistinguishable until the first molt. At this time, the male scale covering begins to elongate, while the female's remain circular. Males molt a total of four times. Following the final molt, adult [male](#) scales emerge from the scale covering as tiny, yellow winged insects. They mate with the females who remain under the scale covering. After about 2 months, crawlers begin to emerge from the females, usually in April; peak emergence is generally in early May. There are usually four generations a year. Summer generations overlap and crawlers are present throughout summer and fall.

DAMAGE

If heavy scale infestations are left unchecked, trees may be seriously damaged, resulting in reduced vigor, thin foliage, cracked or dying branches, and the eventual death of the tree. Young trees may be killed before fruiting. Infested fruit develop a reddish purple [ring](#) surrounding each spot where a scale settles.

MANAGEMENT

San Jose scale is the most common and the most damaging of the scales found in apple orchards. Dormant season treatments are the key to controlling this pest. The only other effective treatment time is in May. Natural enemies can contribute significantly to control when not disrupted by insecticides.

Biological Control

Natural enemies that feed on San Jose scale include two predaceous beetles: the [twicestabbed lady beetle](#), *Chilocorus orbus*, and another small beetle, *Cybocephalus californicus*. A number of small chalcid and aphelinid wasps parasitize this scale. These predators and parasites may be helpful in reducing scale populations, but insecticides used during the growing season for other pests can disrupt this natural control and scale populations increase rapidly.

Organically Acceptable Methods

Biological control and approved oil sprays are organically acceptable methods, but San Jose scale is rarely a pest in organic orchards.

Monitoring and Treatment Decisions [Degree-day calculator](#) [Degree-day table](#)

Monitor for San Jose scale during the dormant period by checking prunings to make sure scale hasn't developed in tree tops. Also check fruit at harvest for the presence of scale.

Due to the damage potential of this pest, annual dormant sprays are recommended in most areas. Oil sprays work the best on the black cap stage, so apply them in early January. Control heavy populations of San Jose scale by applying an insecticide plus oil spray during the delayed dormant period.

If inadequate control is achieved with the dormant spray, treatments are also effective when applied soon after the emergence of the crawlers in May. Use [pheromone traps](#) in March to monitor for male San Jose scale flights and double-sided sticky tape for monitoring crawlers in April and May. Time a treatment, using a 51°F lower threshold and 90°F upper threshold, for 600 to 700 DD after the beginning of the male flight or 200 degree-days after crawler emergence begins.

Common name (trade name)	Amount to use**		R.E.I.+ (hours)	P.H.I.+ (days)
	(conc.)	(dilute)		

When choosing a pesticide, consider information relating to the [impact on natural enemies and honey bees](#) and environmental impact.

DORMANT

A.	NARROW RANGE OIL#	6 gal	1.5 gal	4	0
MODE OF ACTION: Contact including smothering and barrier effects.					
COMMENTS: Check with certifier to determine which products are organically acceptable.					

DELAYED DORMANT

A.	NARROW RANGE OIL	6 gal	1.5 gal	4	0
MODE OF ACTION: Improves translaminar movement and insecticide persistence.					
... PLUS ...					
PYRIPROXYFEN					
	(Esteem) 0.86EC		Label rates	12	45
	(Seize) 35WP	4–5 oz	—	12	45
MODE OF ACTION GROUP NUMBER ¹ : 7C					
COMMENTS: Apply from delayed dormancy through pink bud.					

... Or ...

CHLORPYRIFOS*					
	(Lorsban) 4EC		Label rates	4 days	0
MODE OF ACTION GROUP NUMBER ¹ : 1B					

COMMENTS: Avoid drift and tailwater runoff into surface waters or choose alternative materials. Chlorpyrifos has been found in surface waters at levels that violate federal and state water quality standards.

... Or ...

ESFENVALERATE					
	(Asana XL)		Label rates	12	21
MODE OF ACTION GROUP NUMBER ¹ : 3					

B.	METHIDATHION*				
	(Supracide) 2EC	6–12 pt	0.75–1.5 pt	3 days	0
MODE OF ACTION GROUP NUMBER ¹ : 1B					

COMMENTS: Apply before blossoms open or injury may occur.

CRAWLER TREATMENT

A. DIAZINON* 50WP 4 lb 0.75–1 lb 4 days 21

MODE OF ACTION GROUP NUMBER¹: 1B

COMMENTS: Avoid drift and tailwater runoff into surface waters or choose alternative materials.

B. NARROW RANGE OIL# 6 gal 1.5 gal 4 0

MODE OF ACTION: Contact including smothering and barrier effects. Check with certifier to determine which products are organically acceptable.

** For dilute application, rate is per 100 gal water to be applied in 300-500 gal water/acre, according to label; for concentrate applications, use 80-100 gal water/acre or lower if the label allows.

+ Restricted entry interval (R.E.I.) is the number of hours (unless otherwise noted) from treatment until the treated area can be safely entered without protective clothing. Preharvest interval (P.H.I.) is the number of days from treatment to harvest. In some cases the REI exceeds the PHI. The longer of two intervals is the minimum time that must elapse before harvest.

* Permit required from county agricultural commissioner for purchase or use.

Acceptable for use on organically grown produce.

¹ Rotate chemicals with a different mode-of-action Group number, and do not use products with the same mode-of-action Group number more than twice per season to help prevent the development of resistance. For example, the organophosphates have a Group number of 1B; chemicals with a 1B Group number should be alternated with chemicals that have a Group number other than 1B. Mode of action Group numbers are assigned by IRAC (Insecticide Resistance Action Committee). For additional information, see their Web site at <http://www.irac-online.org/>.

PUBLICATION



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UC ANR Publication 3432

Insects and Mites

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