SAN JOSE SCALE (SJS)

Piaspidiotus (=Quadraspidiotus) Perniciosus

Description:

Adults:

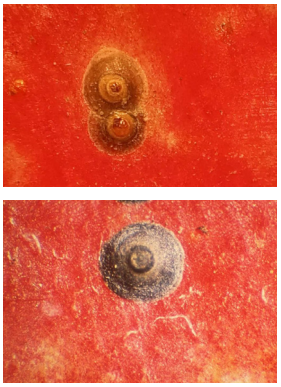
- Small armored scale insects requiring microscopic observation for accurate identification.
- Females are sessile and their pyriform body is protected by a circular, slightly convex, grey cap of ca. 0.6-0.9 inch in diameter (1.5- 2.2 mm).
- Winged males are 0.4 inch long (1 mm) and are poor flyers; they only have forewings and their mouthparts are absent. The characteristic dark band across the back differentiates SJS adult males from other species of Diaspididae.

Eggs:

- Females do not deposit eggs, but are viviparous and therefore produce live crawlers within 4-6 weeks after mating.
- Each female gives birth to 50-400 larvae (nymphs, crawlers) over a period of 6-8 weeks. A female may produce crawlers at a rate of ca. 10 juveniles per day.

Nymphal Development:

- 1st-instar nymphs, also called crawlers are the mobile stage. Once emerged, they disperse infesting new plant organs and within 1 day they fix themselves to the host tissue by deeply implanting their rostrum.
- Once attached, the crawlers form the scale cover by secreting a white waxy material (white cap stage) that eventually turns black (black cap stage). The cast exuviae are incorporated into the cover at each molt.
- 2nd-instar nymphs have a grey cover scale; later the covers turn various shades from gray to black. The size of 1st-instar nymph is 0.08 × 0.04 inch (0.2 × 0.1 mm), while the 2nd-instar is slightly bigger (0.1 inch, ca. 0.3 mm).
- The sexes can be distinguished from the 2nd-instar since the female scale cover remains round, while male scales take on an elongated shape.
- Females undergo 3 stages and 2 molts (1st- and 2nd-instar nymphs and adult).
- Males undergo 5 stages and 4 molts (1st- and 2nd-instar larvae, pronymph, nymph and adult). SJS does not have a pupal stage.



(Source all photos: European and Mediterranean Plant Protection Organization (EPPO) Global Database, https://gd.eppo.int/)

Hosts:

- The main SJS hosts belong to the Rosaceae family: apples, pears, peaches, plums and Rubus; it has also been reported on kiwifruits. Hosts include plants from over than 40 botanical families and ca. 80 genera.

Damage:

- SJS feeds on plant sap and all surface parts of young host plant tissue can be infested. Attacks generally take place on the bark but leaves and fruits may also be infested with high pest pressure.
- 1 day following the nymph attaching itself to the fruit surface, a characteristic red-violet halo appears around the insect body. Infested fruits are unmarketable and cause issues for exports.
- Heavy infestations causes the bark to crack and exude gum, reduced vigor, thin foliage, cessation of plant growth, dying branches and loss of yield. Uncontrolled infestation can kill young trees.

(Source all photos: European and Mediterranean Plant Protection Organization (EPPO) Global Database, https://gd.eppo.int/)

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SAN JOSE SCALE (SJS), *Piaspidiotus (=Quadraspidiotus) Perniciosus*

Phenology:

- SJS can have between 1 and 5 generations per year, according to the latitude and climatic conditions.
- Life cycles are completed within 60 and 30 days at 68-70°F (20-21°C) and 86-88°F (31-32°C), respectively.
- Most individuals overwinter as 1st instar-nymphs, which is a very cold resistant instar, and a few as gravid adult females. Hibernation is broken in the Northern Hemisphere between February and March when the nymphs molt, giving rise to the 2nd instars.
- New crawlers begin to emerge from adult females after ca. 2 months, usually in April, with a peak emergence in early May.
- Summer generations overlap and crawlers are present throughout summer and fall.

Life Stages & Degree Days:

- Start accumulating degree-days (DD) in California when pheromone-baited traps catch males consistently using a lower threshold of 51°F (10.6°C) and an upper threshold of 90°F (32.2°C). Be aware that traps may fail to catch any adults in cold, rainy, or windy weather.
- Alternatively, install two-sided black sticky tape before crawler emergence.
- Apply a treatment for crawlers, if needed, 600 to 700 DD after the first male catch or 200 DD after the beginning of crawler emergence.
- Total generation time for SJS is 1050 DD.

Lure Type and Maintenance:

* Please note that the lure recommendations can change depending on the trap being used.

- **PHEROCON® SJS controlled release septa;** replace at 4-week intervals.
- **PHEROCON® SJS L2** lures; replace at 8-week intervals.

Lure Storage:

- Store in unopened factory sealed packages in a cool place (< 74° F or 24° C maximum) for short periods or refrigerate longer term.
- Refrigerate or freeze unopened packages to carry over for annual storage.

Trap Design:

- PHEROCON V Trap.

Placement Time:

- SJS adults emerge at the end of February in warmer regions such as California. SJS adults appear between April and May In Central Europe, and later in Northern Europe.

Placement Pattern:

- Distribute the traps uniformly throughout the orchard and use the same locations each year.
- Hang traps 6 feet (1.8 m) high, 1-3 feet (0.3-0.9 m) inside the canopy in the NE quadrant and at least 5 trees in from the edge of the orchard.

Trap Density:

- Install at least 3 traps per block for SJS; large blocks may require 4 or more traps.
- Place additional traps in known hot spots.

Trap Maintenance:

- Traps should be replaced on a monthly basis or more frequently if the sticky liner is saturated by catches or debris.

Recommendations:

- During spring and summer, use pheromone traps to monitor the flights of SJS males and double-sided black sticky tape to monitor SJS crawlers.
- Check pheromone trap and/or sticky tape catches twice a week until the biofix is established; thereafter, check trap catches weekly.
- Traps may also be removed and covered in plastic to conduct counts at a lab.
- Use a hand lens or a stereomicroscope to identify the male SJS caught. SJS traps will attract both SJS males and scale parasitoids (Aphytis melinus and Enarsia perniciosi). Adult SJS males can be distinguished from the parasitoids by the presence of a dark band across their thorax where the wings attach.
- SJS can also be detected on twigs and branches during pruning, and on fruits during harvest or packing. The observation of red spots on the fruits can also indicate the presence of SJS. Scouting trees during the dormant period can detect infested plants and determine the level of infestation.
- Follow Trécé's recommendations for replacing pheromone lures.

Source: Recommendations and certain other sections were sourced from EPPO database and UC IPM.

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Note, always:

- Use only 1 pheromone lure per trap.
- Count and record captures as recommended.
- Change trap as needed.
- Discard lures in trash far from the area of use and remove trash afterwards.
- Follow recommendations.
- Contact local extension authorities and consultants for regional advice.

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