



Pest & Disease INDUSTRY FACT SHEET

Black Scale: The Pest and its Management



Black scale on an olive branch



Black scale. Note the light brown crawlers, and a parasitic wasp on the right.

What is it?:

The black (or olive) scale, *Saissetia oleae* (Olivier), is a pest of olives, citrus and many other plants. Mild summer weather, ant activity, and particular pruning, fertilizer, irrigation and broad-spectrum insecticide programs, favour this pest. This article describes the pest and the damage it causes, and outlines IPM measures to limit its abundance in olive orchards.

History:

The adult female scale lay about 2,000 eggs under their hemi-spherical, brown-black bodies. The oval eggs are pearly white when laid and later turn pinkish. Egg laying may extend for a month or more. The time to hatch varies from two (summer) to four (autumn) weeks. Therefore crawlers may hatch and emerge from under an individual scale for four or more weeks.

On hatching the minute, cream-coloured crawlers may remain beneath the mother scale for several days, and then emerge and crawl about in search of suitable leaves and young, tender twigs to settle upon.

The scale then develop through two immature oval-shaped stages, growing progressively larger, darker (greyish brown) and more hemispherical. An H-pattern formed from ridges on the back of the immatures and adults is distinctive for this species.

In southern Australia there are two generations per year. Egg hatching occurs in December-January, and again



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in autumn. The autumn generation produces fewer eggs. The exact timing of egg laying and crawler emergence must be determined by crop monitoring (see Monitoring section). Most adult black scale are found in the lower and inner parts of the canopy.

Damage:

Heavy infestations can cause severe defoliation, reduce the next season's crop, and coat fruit with honeydew. The latter supports the development of unsightly sooty mould that downgrades fruit quality and further reduces tree vigour

The Influence of Weather

Hot (above 35°C), dry conditions kill eggs and young scale. Mild temperatures and high relative humidity favour this species.

Biological Control

Several introduced species of parasitic wasp (most notably *Metaphycus* spp. and *Scutellista caerulea*) are highly effective at biologically controlling black scale. Ladybirds (*Cryptolaemus montrouzieri*) and lacewing larvae are important predators.

Most organophosphate (OP) and synthetic pyrethroid insecticides kill these natural enemies. Their spraying in or near to an olive orchard will invariably disrupt this biological control and result in an olive scale outbreak. Ants are often attracted to feed on the honeydew, and interfere with the biological control of black scale. Dense ant populations should not be allowed to build up.

Cultural Control

Pruning to create open, airy trees discourages black scale infestation, however you need to be mindful of how you harvest your olive trees and the type of pruning that is required to accommodate your particular harvesting method. Closed canopy orchards typically have the most severe and frequent outbreaks. Heavy irrigation and excessive chemical fertilization, especially with nitrogen products, can favour this pest and should be avoided.

On trees that are worst affected by scale, placing bands around the lower trunk to exclude ants is recommended as a non-disruptive alternative to insecticides. Attach a 20-25 cm width Hessian band (to stop the trunk sweating) over which is tightly stretched Glad-wrap plastic. Smear over the plastic a coating of sticky Bird-off or Takgel. This plastic will need replacing in time as dust and captured insects reduce the stickiness.

Monitoring, Spray Thresholds and Insecticide Control

Orchards producing for oil extraction can tolerate relatively high black scale infestations. To decide whether a spray treatment is necessary in orchards producing preserving olives, the Californians recommend the following monitoring method: randomly choose 10 terminal branches from each of 10 trees and count the number of live adult scale on the terminal 45 cms of each selected branch. Moderate infestations (considered in California to be an average of 4 or less live adult scale per branch) can be well controlled by a 1.3% petroleum oil spray, but heavier infestations may require the addition of an OP insecticide such as methidathion to the 1.3% oil spray.¹ (Restricting the use of an OP-oil mix to a spot-spray of the worst affected trees is recommended to help minimize the disruptive effect of the OP insecticide on the natural enemies.)

To assess whether the scales are alive, squash them with your fingers. If alive, the body fluids will wet your fingers. If dead, they'll be dry and dusty.

Timing is important

To decide the optimal spray time, monitor every 1-2 weeks once adult scales have formed by selecting a sample of 30-40 adult scale from different positions in several trees and turning them over to determine when egg laying

occurs and when the crawlers emerge from under the mother scales. Good spray timing and coverage are each essential for good black scale control using insecticides. The best time to spray is as soon as possible after crawler emergence is complete. Spraying early (before crawler emergence is complete) or too late (when the new scales have started to grow) gives a lesser kill. **Spraying before the crawlers have begun to emerge results in a total spray failure.**

A high-pressure spray of 4,000-4,750 L/ha that fully wets the entire canopy, and good tank agitation to keep the oil well mixed, are both essential to ensure a good spray result.

Because of the long period over which the crawlers may be emerging, in some situations two oil sprays about 3-4 weeks apart may be needed to achieve the best results, particularly with heavier infestations.

Irrigate well before spraying. Spray at night or early morning if the maximum temperature is expected to exceed 30 °C. Avoid spraying during a heat wave. If a spray is required in winter reduce the oil spray rate to 1.0%.

Visit the AOA Website www.australianolives.com.au to view a list of chemicals legally permitted to be used to control black scale. <http://www.australianolives.com.au/article-detail/chemical-permits>

Acknowledgement

This information was compiled by Greg Baker, Senior Entomologist, SARDI. Ph. 08 8303 9544.

More information

Australian Olive Association Ltd

C/- Post Office

Coomandoor SA 5265

Phone: (08) 8573 6545

Email: secretariat@australianolives.com.au

Chemical Permit Coordinator:

Mr Peter McFarlane

Phone: (08) 8376 2161 or 0418 839 836

Email: peter@mc.com.au