

Ladybird beetles

Scale predators

Biocontrol organisms

☞ **Red chilocorus** *Chilocorus circumdatus*

☞ **Blue chilocorus** *Chilocorus baileyi*

Red chilocorus is a helmet-shaped ladybird beetle about 5 mm long. It is a rich orange colour, with a fine black margin around the bases of the wing covers.

Blue chilocorus is slightly smaller than red chilocorus (about 3 mm long) and is a deep metallic blue colour. The adult chilocorus lays long cylindrical eggs 1 mm beneath the covers

of scale insects. At 25°C the eggs take about a week to hatch, and the larvae start feeding on the scale. They are voracious feeders, with pronounced spines covering their bodies. After about 10 days, the larvae migrate to secluded positions and pupate.

Adult beetles emerge 7–9 days later to mate and continue the cycle; they start laying eggs about 10 days after emergence. At an optimum temperature of around 28°C, the life cycle takes approximately a month. Chilocorus beetles live for 4–8 weeks.



Plate 20: Adult red chilocorus beetle and larva feeding on white louse scale (citrus snow scale)



Plate 21: Adult blue chilocorus beetle feeding on oriental scale, and non-feeding pupa (lower left)

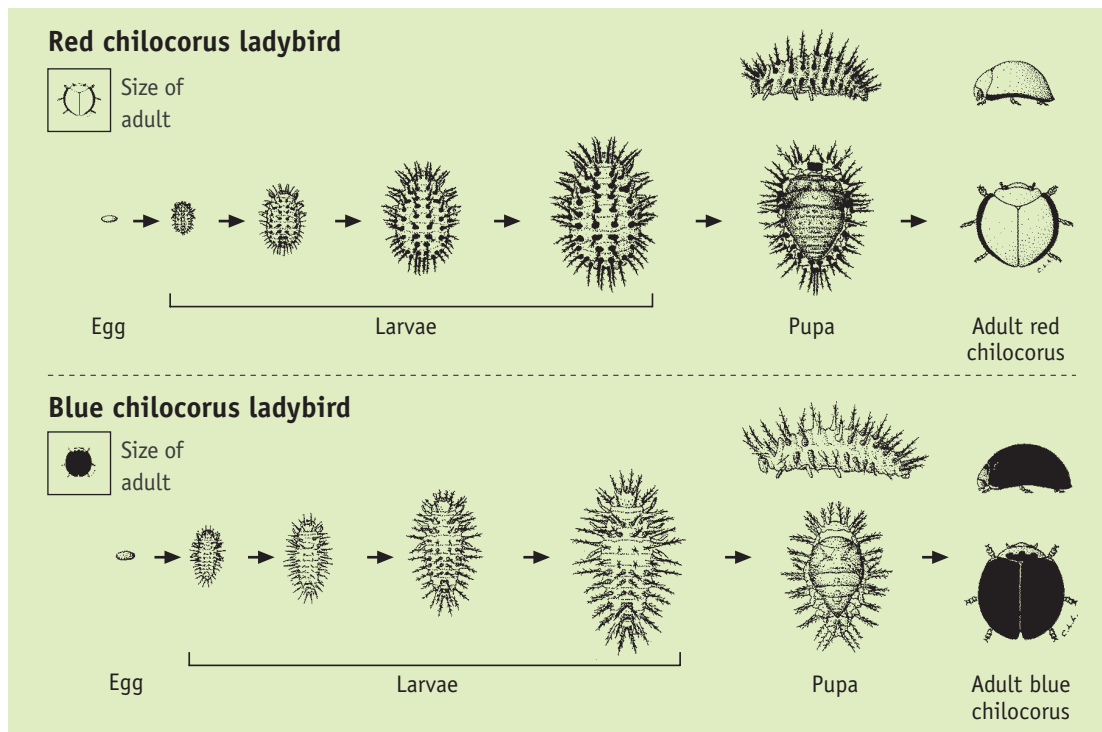


Figure 5: Life cycles of the red chilocorus and blue chilocorus ladybirds

Target pests

Armoured scale insects, including:

- ☞ Red scale *Aonidiella aurantii*
- ☞ Oriental scale *Aonidiella orientalis*
- ☞ Oleander scale *Aspidiotus nerii*
- ☞ White louse scale (citrus snow scale) *Unaspis citri*

Scale-eating ladybirds prey on a range of armoured scale insects, including oleander scale, oriental scale and white louse scale (citrus snow scale); red chilocorus also feeds on red scale. Scale insects feed by sucking sap from the plant. Heavy infestations may cause discolouration, leaf drop and shoot distortion, which can lead to twig dieback and even plant death.

Chemical control of scale pests is difficult because they have hard, waxy, protective covers and remain stationary for most of their lives. The



Plate 22: Blue chilocorus larva

developing resistance of scale insects to pesticides is an increasing problem in many regions.

Suitable crops/environments

Like most beneficial insects, these predatory ladybird beetles prefer environments protected from extremes of heat and low humidity, free from dust and toxic pesticides. They can be used in both enclosed and orchard situations.

Before release

Outdoor releases should be made early in the season before pest numbers have built up to damaging levels. Ladybirds should be released into indoor or nursery environments whenever scale insects are present. Best results are obtained when a full release is made early in the season, followed by regular 'dribble' releases at intervals of 3–6 weeks.

At release

Chilocorus is supplied in punnets containing a minimum of 30 beetles. The lids should be opened and the beetles dislodged by lightly tapping the container onto plant foliage near the scale infestations.

Recommended release rates

Orchards: A minimum of 20–50 punnets per hectare

Enclosed situations: A minimum of one punnet per 20–50 m² is recommended. Higher rates of release may be required where there is a history of scale problems.

After release

When released, the beetles should disperse throughout the treated area. Adults will begin to consume scale insects immediately. They will lay eggs into the scales, but it may be up to 2 weeks before larvae have grown large enough to be visible feeding on the pest. Larvae are responsible for most of the scale control.

Regular monitoring by an experienced scout is recommended to check that the beetles are established. Booster releases may be needed in crops with heavy infestation of scale. Do not expect to see adult beetles readily after release.



Plate 23: Red chilocorus larvae feeding on white louse scale (citrus snow scale)



Plate 24: Red chilocorus pupae on a citrus twig

Note that the young larvae are very different from adult beetles.

Cultural practices to aid ladybird beetle establishment

Practices that reduce wind and dust will help the beetles to establish. Avoid releasing the beetles where bright lights may attract them away from the release area. In shopping centres and office blocks it is best to release beetles out of hours.

Large populations of ants may interfere with the predators and reduce their performance. In these situations ants should be controlled or excluded from the crop.

Chemical use

Ladybird beetles are very effective predators of scale insects, but may be harmed by pesticides. Copper and nutritional sprays will usually not harm them and some miticides are also quite safe; but organophosphate, carbamate and synthetic pyrethroid insecticides are toxic. If an insecticide is applied, a minimum of 4 weeks should elapse before the ladybird beetles are released. If a clean-up scabicide is warranted, an application of narrow-range petroleum spray oil is recommended if possible.

Drift of pesticides from neighbouring areas should be prevented. Some insect growth regulators (IGRs) are also toxic to predatory beetles.

Additional information

Ladybird beetles are usually dispatched by overnight courier where available and should be received within 1–2 days. Honey is supplied as food for the beetles.

The predators should be released as soon as possible after they arrive. In the event of adverse weather such as extreme heat or high rainfall, they may be stored for 1–2 days before release

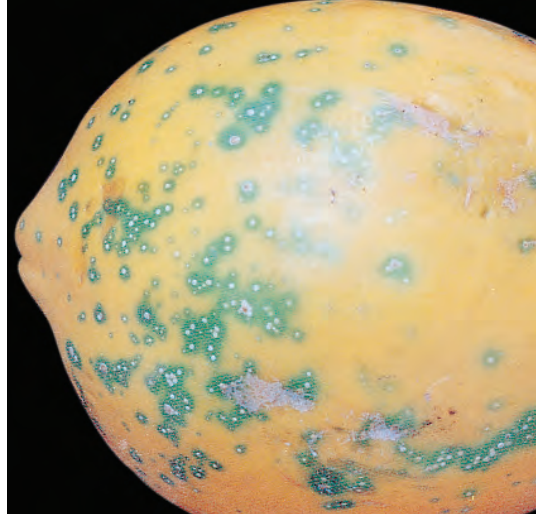


Plate 25: Papaw infested with oriental scale

in a cool, dark room at about 17°C. Extra honey should be placed under the lids if the original supply has already been consumed.

Other natural enemies of scales

Parasitic wasps *Aphytis* spp.

Parasitic wasps *Comperiella* spp.

Lacewing *Mallada signata*