

Natural predators of spider mites

Natural predators are beneficial insects, that actively hunt and consume specific pest species. Spider mites have many natural predators including lady beetles, predatory mites, rove beetles, and predatory thrips. These natural predators need to be protected through conscientious spray programs (avoiding disruptive sprays) and some can be purchased from suppliers for augmentative releases to address spider mite population flares.

Californicus

The more common predatory mite species *Neoseiulus californicus* ('*Californicus*') is described as an 'aggressive and robust mite'. *Californicus* mites are less than 1mm long and are pear-shaped. Their colouring is dependent on diet but can be clear to pink or orange. Eggs are clear to white, oval-shaped and similar to that of the eggs of the two-spotted spider mite, but distinctively larger. Females can lay up to 4 eggs per day, eggs tend to be laid on the underside of the leaves along veins or on leaf hairs. Adult *Californicus* can consume up to 5 adult spider mites daily and can live for up to 20 days.

Californicus is known for its resilience to differing environmental conditions. They remain active in both warm and cool temperatures and can survive well in both high and low humidity better than most other predatory mites. In optimal conditions (30°C), their lifecycles can be as fast as 4 days, almost twice as fast as that of their prey. *Californicus* are also less sensitive to pesticide residues which enables faster re-establishment after chemical applications.

Stethorus

The small, shiny, black mite-eating ladybird beetle or *Stethorus* is one of the most important predators of spider mites in bananas. Three species of *Stethorus* occur in bananas, but the main species is *Stethorus fenestralis*. All three species appear identical to the naked eye and all species are specialist spider mite predators.

Stethorus numbers increase following mite flares, as mites provide ample food supplies that allow *Stethorus*' populations to flourish and eventually bring the mite levels back under control. *Stethorus* are high-density predators, meaning they are attracted to mite hotspots. Interestingly, both adult and larval *Stethorus* beetles primarily feed on mites, making them very effective predators against these pests.



Figure 1 Spider mite in the red circle and two adult *Stethorus* beetles on the underside of the banana leaf.



Figure 2 Zoomed in adult *Stethorus* beetle.

The life cycle of *Stethorus*

There are four distinct stages in the life cycle of *Stethorus*. The elongated, translucent to pale brown eggs are laid singly under the leaves, either on or close to the mite colonies. The eggs are about 0.2 mm long and can easily be distinguished from the smaller spherical (and usually more numerous) mite eggs.

Larvae are hairy and vary in colour depending on their age. Larvae go through four stages of maturation, each separated by a moult. Young larvae are pale cream becoming dark grey at maturity. Fourth-stage larvae eventually stop feeding when they are about 2 mm long and attach themselves to the leaf where they pupate.

The pupae are black, hairy and about 1 mm long. Pupae may be found anywhere on the underside of the leaf; however, they tend mostly to be found close to or on the midrib. The pupal stage is easily seen on a leaf, as a skin remains after the adult emerges. To determine whether a pupa is alive or is simply an empty pupal skin, smear it gently with a finger. A wet streak will indicate it was alive and if no wet streak is produced it, was an empty skin.

Adults are shiny black, almost circular beetle and are about 1 mm long. They also occur on the underside of the leaf.

Looking after your *Stethorus* population

Broad spectrum insecticides are a major cause of mite flares because they destroy beneficial predators like *Stethorus*. Avoid using these chemicals (e.g. products containing bifenthrin) to control mites. Check your leaves to see if you have *Stethorus* present and get a gauge on the population levels. Although research specifically in bananas hasn't yet been undertaken to determine how many *Stethorus* need to be present to control spider mites, they can keep spider mite populations in check when spider mite pressure is low.

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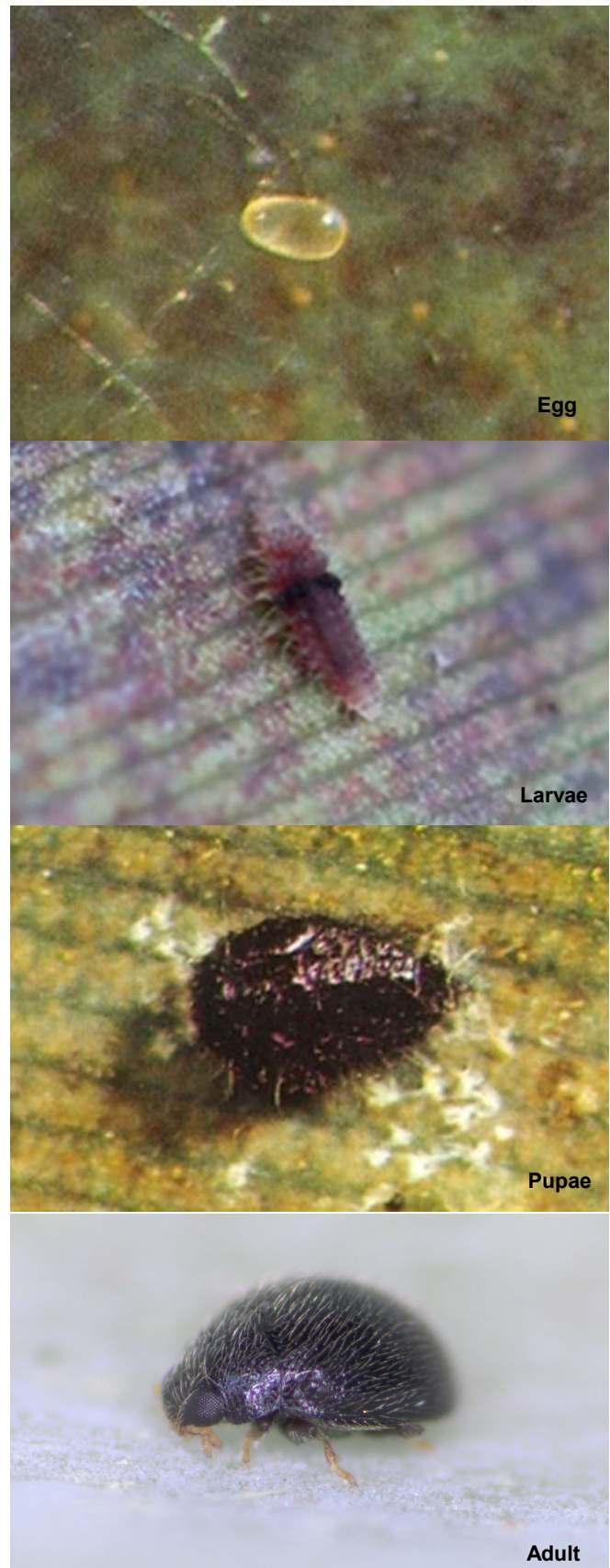


Figure 3 Lifecycle of *Stethorus* beetles is four main stages; egg, larvae, pupae and adult.

This factsheet has been produced as part of the National Banana Development and Extension Program which is funded by Hort Innovation, using the banana industry research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture. The Queensland Government has also co-funded the project through the Department of Agriculture and Fisheries.

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