# The avocado leafroller

## a pest of increasing significance

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**The avocado leafroller is known to attack a variety of commercial crops and weeds, in this country and overseas. Its hosts are probably more numerous than is at present realised. But in north Queensland it is concentrating on avocados, and is becoming a serious pest.**

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The avocado leafroller, *Homona spargotis* Meyrick, has established itself as a serious pest of avocado in north Queensland. First detected in 1980 near Walkamin it was then incorrectly identified as the tea tortrix, *Homona coffearia* (Nietner). This closely related species is a serious tea and coffee pest in Sri Lanka, India, Indonesia, Papua New Guinea and the south east Asian region but does not occur in north Queensland.

The avocado leafroller is a sporadic and very minor pest of tea and coffee in north Queensland. Other recorded commercial hosts include carambola (five corner), lychee, custard apple and macadamia. The larvae have also been found feeding on thickhead, *Crassocephalum crepidioides*, a common broad leaved weed. The host range of the insect is probably more extensive.

## Appearance

Marked sexual differences occur in the adults of the species. The male is smaller than the female and is light brown with dark brown banding on the forewings, which are strongly curved with prominent wingtips.

The female with a wing span of 20 to 25 mm also has light brown forewings, but it does not have the darker wing banding found in the male.

Adults are active at night, remaining inactive and concealed within the tree canopy and in leaf litter by day. If disturbed, they will fly short distances and settle quickly within the tree. Females are more obvious in the field because of their larger size and less timid nature than the males.

Pale yellow eggs are laid in neat clusters, each containing from 100 to more than 400 eggs. The flat oval shaped eggs resemble small overlapping scales. They turn dark yellow and then orange as they develop toward hatching. After 5 to 6 days from being laid the young larvae with their black heads can be seen developing inside the eggs. On hatching, the pale creamy larvae are about 1.5 mm long and grow to about 20 to 25 mm before pupating. Fully grown larvae are creamy green with a prominent black head. Before turning into shiny brown pupae the larvae develop into pre-pupae which are yellow-green.

## Life history and habits

Both adults and larvae are nocturnal. Mating and egg laying occur between dusk and dawn. The females lay on the upper leaf surfaces on the outside of the tree canopy, and prefer fully developed mature leaves as egg laying sites. Eggs have not been detected on new shoots or leaves. Hatching occurs after 6 to 8 days and the larvae immediately move to new shoots in search of favourable food. The young larvae drop from the leaves on fine silken threads or may be blown to new shoots by the wind. At this stage large numbers of larvae perish but, because each egg mass contains numerous eggs, many still survive. On the newly emerged shoots and young leaves the larvae web and roll the leaves to provide shelters in which to feed and continue development. If disturbed they wriggle violently from their shelters and drop on silken threads. Young larvae feed almost exclusively on tender new leaves and on occasions on the fruit, but older larvae feed on both new and old leaves and on fruit.

When fully grown the larva spins a loose cocoon within its shelter and, passing through the pre-pupal stage, which lasts for 1 day, develops into the shiny brown pupa. Adults emerge in 6 to 7 days and females begin to lay eggs after a further 3 days.

Under average temperature conditions in the laboratory the complete life cycle from egg to egg requires about 33 days. This is made up of 7 days egg incubation, 16 days larval development, 1 day pre-pupal stage, 6 days pupal stage and 3 days adult pre-oviposition period.

## Damage

Larval feeding on new shoots can cause severe defoliation if control measures are not taken. The high egg laying capacity of the females produces rapid increases in

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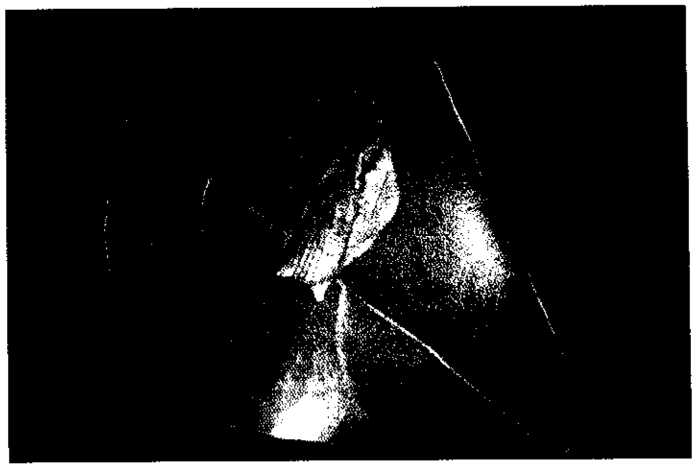

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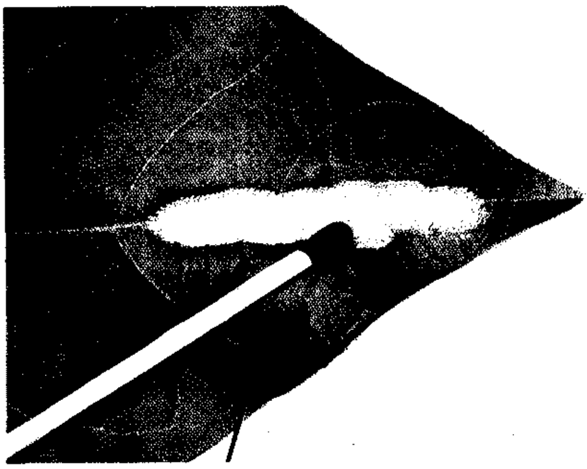

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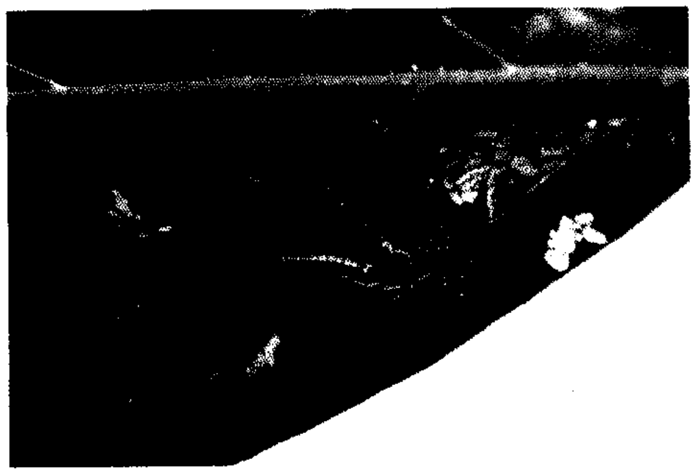

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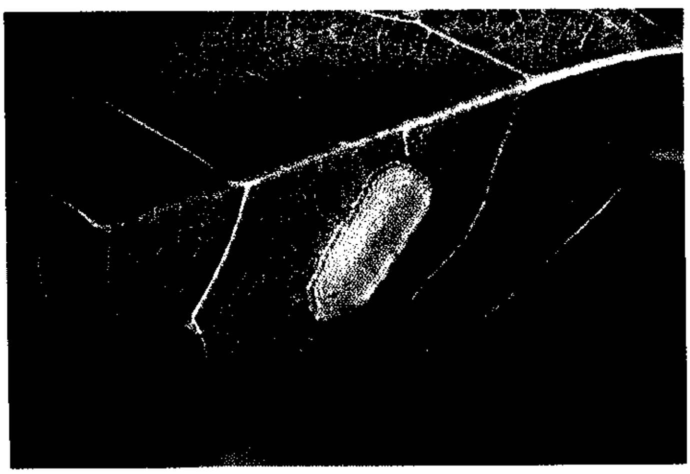


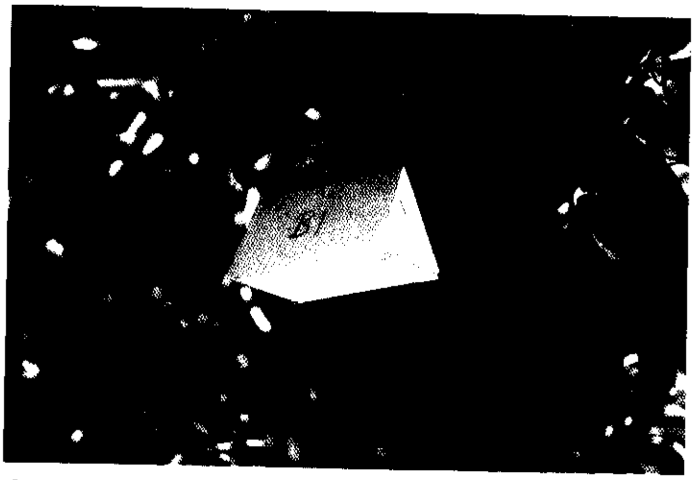
Plate 1. Egg masses of the avocado leafroller, on avocado leaves.

Plate 2. Egg mass of the avocado leafroller. The match gives some idea of size.

Plate 3. Egg mass of the avocado leafroller. The black spots are the heads of larvae, almost ready to emerge.

Plate 4. Adult moth (female) of the avocado leafroller.

Plate 5. Third instar avocado leafroller larvae with early stage damage.



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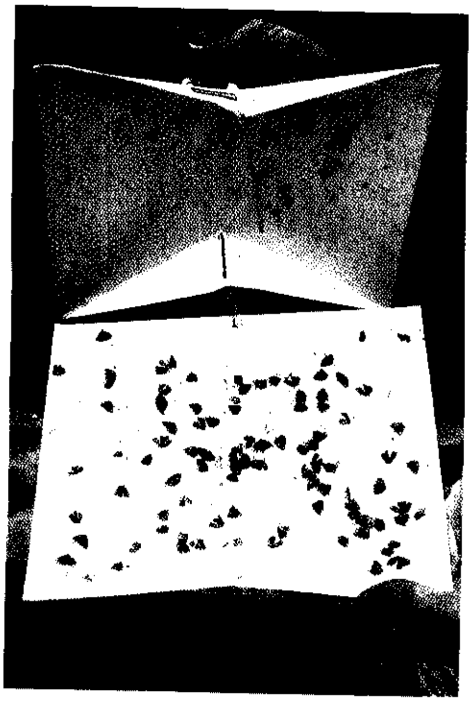

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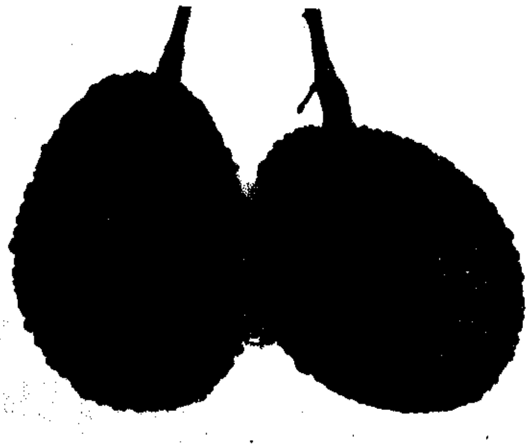

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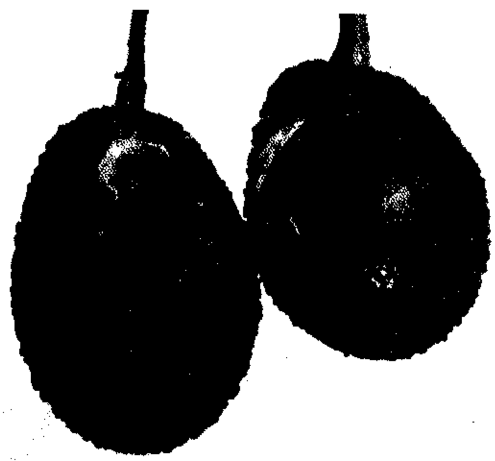

Plate 6. Standard pheromone sticky trap used to monitor populations of avocado leaf miner adults. Only males were taken.

Plate 7. A one night catch of adult moths taken in a heavily infested orchard.

Plate 8. Typical webbing of the avocado terminal and shoot.

Plate 9. Typical webbing on Hass avocados.

Plate 10. Typical damage to Hass avocados.

population with subsequent high levels of damage, which is more severe if the trees are flushing at the time. The first symptoms are the bunched and bent appearance of new shoots. This is due to the webbing of new leaves preventing the normal expansion of shoots. In severe cases new shoots are completely defoliated.

Serious damage also results from superficial scarring of the fruit by larvae. This occurs when fruit or fruit and leaves are webbed together.

The preferred feeding site is on the upper neck of the fruit where the pedicel joins the fruit. In this site larvae web between the pedicel and fruit providing a silken shelter. On the rough skinned variety, Hass, young larvae can conceal themselves with webbing between the skin protrusions and scar most of the fruit surface.

## Control

Owing to its concealed habits and the inability to achieve adequate insecticidal contact with larvae, early attempts to control this pest were only partly successful. When larvae can be made to vacate their shelters, chemical control is relatively easy since the preferred feeding sites are located on the outside of the tree and easily covered by insecticide sprays.

Trials conducted in north Queensland during 1984 showed that excellent control of the avocado leafroller could be achieved by applying a combination spray of chlorpyrifos and dichlorvos. Dichlorvos, acting as a fumigant, causes the larvae to leave the leaf shelters rapidly and be exposed to chlorpyrifos. At the recommended rates of 500 g and 1 kg of dichlorvos and chlorpyrifos/ha respectively, over 95% larval mortality has been recorded in field tests within 4 hours of treatment. Spraying should be carried out before young larvae move to the fruit.

Note that 500 g of dichlorvos is contained in 1 L of Mafu® 500 or 1 L of Vapona® 50; 1 kg of chlorpyrifos is contained in 2 L of Lorsban® 50 or 2 L of Chlorpyrifos® 500.

Varietal preferences are not marked but fruit damage to Hass, Wurtz and Shepperd because of fruit and tree growth characteristics appears to be more severe than to other varieties.

Natural control from parasites and predators exerts only a minor influence on numbers. Field collections of eggs, larvae and pupae have shown that the green lacewing *Chrysopa* sp. is a predator of the eggs and parasitic wasps have been collected from pupae. To be efficient, parasites must be able to deposit their eggs within the host larvae. This task requires long ovipositors to seek out the host within the leaf shelters. The native wasp parasite, *Brachymeria* sp. found to parasitise *H. spargotis*, does not have a long ovipositor and appears to be an inefficient parasite.

An extremely efficient wasp parasite was introduced into Sri Lanka in the thirties and forties to control the closely related species, *H. coffearia*, and steps have been taken to evaluate its possible introduction into north Queensland.

At present synthetic sex pheromones are being tested to determine their value in predicting early adult presence and therefore subsequent larval population increases so that insecticide usage can be optimised.