

Cryptognatha nodiceps (396)

Common Name

Coconut scale ladybird beetle. (No generally accepted common name found.)

Scientific Name

Cryptognatha nodiceps

Distribution

Asia, North America (Hawaii and Florida), the Caribbean, Oceania. It is reported from Fiji, Northern Mariana Islands, Samoa. It was introduced into Fiji in 1928 (from Trinidad), into Florida between 1936 and 1938 (from Puerto Rico and Trinidad), into Hawaii in 1936 (from Fiji) and again in 1969 (from Trinidad), into French Polynesia in 1960 (from Fiji), into Vanuatu in 1964 (from Fiji), and into Pakistan in 1984 (from Trinidad). There have also been introductions from Trinidad and Puerto Rico to other Caribbean countries.

Prey

Aspidiotus destructor, the coconut scale, a pest of both coconuts and banana (**see Fact Sheet no. 104**). In Fiji, *Cryptolaemus nodiceps* also feeds and survives on white peach scale (*Pseudaulacaspis pentagona*) on mulberry (**see Fact Sheet no. 52**). Other armoured scales, and perhaps soft scales are hosts.

Description & Life Cycle

Both larvae and adults of *Cryptognatha nodiceps* eat scale insects at all stages of development. Eggs are laid singly under the covering of the female scale after it has been removed and eaten. The larvae are about 7 mm long at maturity, with deep yellow bodies covered in long, waxy (spidery) outgrowths (Photo 1) (**see Fact Sheet no. 395** - *Cryptolaemus montrouzieri*). The pupae are also yellow, and attached to leaves or stems by the remains of the old larval skins.

Adult beetles are almost round (about 2mm long) and shiny. Wing cases have dark markings or are black, head and pronotum (the part extending from the head over the thorax) are brown. The life cycle is about 3-4 weeks. Adults eat up to 20 scales a day.

Impact

Cryptognatha nodiceps was introduced into south Florida (Miami) in 1936 and 1938 from Puerto Rico and Trinidad. However, later surveys showed that populations of the beetle were low and its impact on *Aspidiotus destructor* not clear. Inconsistent results have been noted elsewhere: successful introductions occurred in Jamaica, but not in several other Caribbean islands, and there were failures, too, in Pakistan, French Polynesia and Angola. By contrast, Swaine (1971)¹ says: "A very effective ladybird predator introduced [into Fiji] from Trinidad in 1928. By 1934, the scale was of no economic importance in Fiji. Both the adult and the larvae feed voraciously on the scale". But whether it remains in Fiji has been questioned by Lopez *et al.* (2004)².

Detection & inspection

Look for small (2 mm) round, black beetles, and larvae (up to 7 mm) with yellow bodies covered in long waxy outgrowths.



Photo 1. Larvae of *Cryptognatha* of different ages among a large colony of coconut scale, *Aspidiotus destructor*.

Management of Biocontrol Agents

PEST RISK ASSESSMENT

The fact that the ladybird beetle, *Cryptognatha nodiceps*, is not specific to *Aspidiotus destructor*, may mean it will have undesirable effects on non-target species. Safety tests will be needed before introductions are made. However, it is possible that the risk to non-target pests may be beneficial, allowing *Cryptognatha* to survive when *Aspidiotus* populations are low, as was the case in Fiji. Careful considerations of these conflicting views will be necessary.

CRYPTOGNATHA AND THE USE OF INSECTICIDES

If *Cryptognatha* is present or has been introduced, avoid the use of organophosphate, carbamate and synthetic pyrethroid insecticides. If these pesticides have been used, leave at least 4 weeks before the ladybird beetles are released. Some insect growth regulators can be harmful too. Copper and nutritional sprays are generally not harmful and many miticides are also quite safe.

Also, stop using insecticidal soaps or oils (white or horticultural), as these may harm ladybird beetles; however, the residues of these products on the leaves are not likely to be toxic, and leaving a period before releasing the beetles should not be necessary.

INCREASING NATURAL POPULATION OR INTRODUCTIONS

Sleeve cages can be very useful for protecting ladybird beetle populations initially. They can be used for native populations as well as introductions to protect them from parasitoids, predators and ants. The beetles are kept close to their prey where they can immediately start to feed and lay their eggs. In Fiji, *Cryptognatha nodiceps* was established throughout the islands by distribution of colonies of 100 to 500 individuals, showing the hardy nature of this ladybird.

ANT CONTROL

In most situations, ants are unlikely to interfere with the biocontrol of the coconut scale by *Cryptognatha nodiceps* as this armoured scale does not produce honeydew. However, Waterhouse & Norris (1987) report a resurgence of coconut scale where ladybird populations are low due, perhaps, to the presence of ants attending other scales or mealybugs on the same tree that do produce honeydew. In this case, ants would remove *Cryptognatha* allowing populations of coconut scale to rise.

If ant control is needed, use one of the following methods:

- Use hot water at 47°C (and above) to kill the ants in their nests. Hot water up to 49°C will not damage plants.
- Use 'Tanglefoot'. This is a sticky inert substance that is applied over duct tape wrapped around the trunk of the tree. Replace when it becomes covered in debris or dead ants.
- Prune any low hanging branches or remove any weeds that allow ants to bridge the gap between ground and branches which might allow them to reach the scale insects on the trees.
- Use a bait.

In general, three types of chemicals are used against ants: (i) stomach poisons, e.g., Maxforce® (fipronil), Amdro® (hydramethylnon), and borax (commercial products and home-made - add 4 teaspoon borax, 1 cup sugar, and 3 cups water); (ii) insect growth regulators (e.g., Engage® (methoprene), and Distance® (pyriproxyfen); and (iii) poisons that work on the nervous system, that is, neurotoxins, e.g., bifenthrin, fipronil, and imidacloprid. Stomach poisons kill all queens, intercastes and workers; insect growth regulators stop the queens from laying eggs, whereas neurotoxins disrupt insects' central nervous system. It is likely that future products will combine toxins that cause rapid death and insect growth regulators, e.g., Extinguish Plus® (hydramethylnon and methoprene).

A note of caution: Although it is possible to combine a lure (such as peanut butter, fish, sugar, etc.) with a pesticide as an ant bait, it is not recommended because of the danger in leaving concentrated pesticides unattended in the environment, including dwellings.

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¹Swaine G (1971) *Agricultural Zoology in Fiji*. Her Majesty's Stationery Office, London; and ²Lopez VF *et al.* (2004) Biology and prey range of *Cryptognatha nodiceps* (Coleoptera: Coccinellidae), a potential biological control agent for the coconut scale, *Aspidiotus destructor* (Hemiptera: Disapididae). *Biocontrol Science and Technology* 14, 475-485; and Gordon RD *et al.* (1985) The Coccinellidae (Coleoptera) of America North of Mexico. *Journal of the New York Entomological Society* Vol.93(1), pp 1-912; and Vandenberg NJ (2002) Family 93 Coccinellidae Latreille 1807. In: 'American Beetles Volume 2'. Eds Arnett RH Jr *et al.* CRC Press Baton Rouge; and Waterhouse DF, Norris KR (1987) *Biological Control Pacific Prospects*. Inkata Press; and from Pacific Invasive Ant Toolkit. (<http://piat.org.nz/index.php?page=getting-rid-of-ants/>).

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