Coconut leaf beetle

Brontispa longissima

Scientific name: *Brontispa longissima* (Gestro)

Synonyms: *Brontispa castanea, B. froggatti, B. longissima var. Javana, B. reicherti, B. longissima var. selebensis, B. simmondsi, Oxycephala longipennis, O. longissima*

Common names: Coconut hispine beetle. Coconut leaf hispid, Coconut leaf beetle, Palm leaf beetle

Taxonomic position: Phylum: Arthropoda
Class: Hexapoda, Order: Coleoptera
Family: Chrysomelidae

Introduction: The coconut leaf beetle (*Brontispa longissima*) is one of the most damaging pests of coconut and other palms. The larvae and adults of the beetle feed on the soft tissues of the youngest leaf in the throat of the palm. Affected leaves dry up, resulting in stunting of the palm and reduced nut production. Prolonged attacks on young palms can lead to their death.

Hosts: The beetle attacks more than 20 palm species with coconut (*Cocos nucifera*) being the most favored host. Other hosts include Royal palm (*Roystonea* sp.), Alexandra palm (*Archontophoenix alexandrae*), Sago palm (*Metroxylon sagu),* California fan palm (*Washingtonia filifera),* Mexican fan palm *(W. robusta),* Bottle palm *(Hyophorbe lagenicaulis),* Chinese fan palm (*Livistonia chinensis),* Madagascar palm *(Chrysalidocarpus lutescens)* and Areca nut palm (*Areca catechu*).

Distribution: The leaf beetle is a native of Indonesia (i.e. Aru Islands, Maluku Province, Papua Province) and Papua New Guinea, including the Bismarck Archipelago. It is currently distributed in Australia (Darwin, Broome, Moa Island, Cooktown, Cairns, Innisfail, Marcoola and Townsville), many Pacific Islands, Malaysia, Singapore, Cambodia, Laos, Thailand, Vietnam, the Maldives, Philippines, Myanmar and China (Hainan, Guangdong and Taiwan provinces, with Hainan Islands, the worst affected).

Biology of the beetle: The adult coconut leaf beetle is 7.5 -10 mm long and 1.5 - 2 mm wide, with a flat body that is black in color and an orange head and shoulders. The adult male is generally smaller than the female. The larvae and adults are nocturnal in habit and remain in the unopened leaflets, moving outside only to infest nearby palms or for mating. The beetle is capable of only short flights - often only a few hundred meters - so its natural spread is slow. The eggs are brown and flat (1.4 mm long and 0.5 mm wide), commonly laid in longitudinal rows (surrounded by debris and excrement) in the unopened leaflets of both young and mature

Coconut leaf beetle- adult

The Asia-Pacific Forest Invasive Species Network (APFISN) has been established as a response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. APFISN is a cooperative alliance of the 33 member countries in the Asia-Pacific Forestry Commission (APFC) - a statutory body of the Food and Agricultural Organization of the United Nations (FAO). The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region. Specific objectives of the network are: 1) raise awareness of invasive species throughout the Asia-Pacific region; 2) define and develop organizational structures; 3) build capacity within member countries and 4) develop and share databases and information.

Symptom of leaf beetle attack on coconut palm

Typical damage on young leaves

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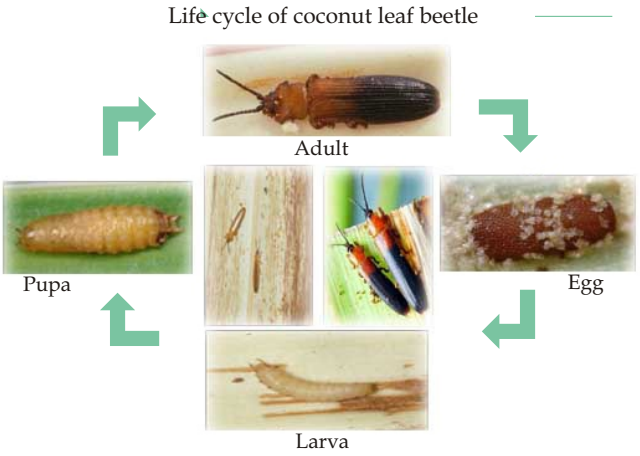
palms. They hatch in 3 - 7 days to form larvae that are white with two pincer-like spines at the rear end of the body. Older larvae have an average length of 8 - 10 mm. Larvae undergo four to six larval instars in a period of 30 - 50 days. The pupae are yellowish-white and measure 9 - 10 x 2 mm. The pupal period is four to six days. The whole cycle from egg to adult takes 5 - 9 weeks. The adult leaf beetle is fully mature two weeks after emergence from the pupa and lives for two to three months.

Symptoms of attack and damage: The beetle attacks palms of all ages, but young palms are more susceptible than older ones, because the heart leaves of old palms are firmer and less suitable as breeding grounds for the beetle. Larvae of the beetle chew on large areas of the surface of leaflets still in the throat of the palm (the spear leaf), which causes the death of underlying tissues. Such leaflets show longitudinal white streaks. As the leaf emerges, the leaflets curl and turn brown, giving a characteristic scorched and ragged appearance. Photosynthesis is reduced to zero in affected leaflets. As the spear unfurls, the beetle moves on to other palms or the next emerging spear. The beetle does not attack leaves that emerge undamaged. Severe attacks destroy unopened leaves, affect growth of the palm and reduce its productivity. In most cases, all the central leaves of affected palms appear brown and fruit shedding is common in such palms. Stunted palms with less compact hearts are more susceptible to leaf beetle attacks. Damagecaused to millions of palms and substantial yield loss have been reported from countries infested by the beetle. A study commissioned by FAO showed that, if left uncontrolled, beetle infestations would cause in excess of US$ 1 billion damage in Vietnam alone.



Spread: The coconut leaf beetle spreads mostly through the movement of infested palms. Its natural spread is very slow since the beetles cannot fly long distances. Shipments of ornamental palms from infested countries have been the main source of spread within the Asia-Pacific region.


A coconut palm severely affected by leaf beetle

Strategies to avoid further spread: Since the spread of the beetle is mainly through the movement of beetle-affected palms, all palms meant for transportation from known areas of infestation should be checked to make sure they are beetle-free. A simple inspection of the young leaves in the throat of the palm will be sufficient. To avoid further spread, non-infested countries in the region should adopt strict quarantine measures to control the import of plant materials, soil and any organic materials from infested countries. Potential spread through animals and human beings who can carry eggs, larvae or adults of the beetle on their bodies cannot be ruled out. Passengers traveling from beetle-infested countries should be encouraged to examine their baggage for the presence of the beetle/eggs/larvae. Countries such as India, Bangladesh and Sri Lanka, major coconut growers, are at high risk because neighboring countries including Myanmar and Maldives are already infested. Raising awareness and capacity building through training programs is essential to contain the problem. Countries already afflicted by the beetle may adopt intensive biocontrol programs to minimize losses due to attacks and to check the further spread of the beetle.

FAO is helping countries that lack expertise in biological control to develop integrated pest management programs that suit each country's unique environment. This support has assisted countries in identifying the coconut beetle to species level, in collecting and importing natural enemies of the beetle, rearing them in captivity for evaluation and releasing them in

Control:

Mechanical- Blockading and cutting of coconut palms up to three kilometers from the infestation spot are done to prevent the beetle from spreading. The pest is also controlled by pruning, clean culture and proper disposal of infested coconut palms and parts thereof.

Chemical - Several insecticides including imidacloprid, dieldrin, aldrin, phosdrin, aldicarb, dichlorvos, fenthion, monocrotophos, chlorfenvinfos, idiofenphos, trichlorophon, quinalphos, deltamethrin, dimethoate, cypermethrin, diazinon, azinophos, methidathion and chlordane are being used to control the coconut leaf beetle. Some insecticides are also injected in to the trunk of infested palms. However, the effect of these treatments lasts only for 3-4 months. Repeated applications may be impractical and uneconomic and cannot be used as a long-term control measure. In China, hanging insecticide bags on infested palms has been attempted successfully to check the spread of the beetle.

Biological- Two parasitoids of coconut leaf beetle viz., *Tetrastichus brontispae* and *Asecodes hispinarum,* have been successfully used in several countries to control the beetle. Use of the entomopathogenic fungus *Metarrhizium anisopliae* is also promising.

Infection of the beetle by *Metarrhizium anisopliae*

Asecodes hispinarum