

Coconut Leaf Beetle

(*Brontispa longissima*)



Central Plantation Crops Research Institute
(Indian Council of Agricultural Research)
Regional Station, Kayamkulam, Krishnapuram P.O.



KERALA- 690 533

Phone: 0479-2442160, Fax: 0479-2445733,

E-mail: headcpcri@yahoo.co.in

150/2

The coconut leaf beetle, *Brontispa longissima* (Gestro) (Chrysomelidae : Coleoptera) is one of the most serious and devastating insect pests of coconut and other palms. The possible entry of this invasive coconut hispine is another imminent threat to coconut industry in India, Sri Lanka and Bangladesh. Grubs and adult beetles inhabit the developing unopened leaves of the coconut palm and feed on leaf tissues. Severe attack results in complete defoliation of the palm. Prolonged attack particularly to young palms or those which are in poor growing conditions, may result in death of palm. The productivity of the palms is considerably affected in moderate levels of infestation.

Hosts

The beetle attacks more than 20 palm species of which coconut (*Cocos nucifera*) is the most favoured host. Other hosts include Royal palm (*Roystonea* sp.), Alexandria 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*), Oil palm (*Elaeis guineensis*), Toddy palm (*Caryota urens*) and Arecanut palm (*Areca catechu*).

Distribution

Coconut leaf beetle (CLB) was originally described in 1885 from Aru Islands (Indonesia) and Papua New Guinea. Over a period of time, it has widely spread in over 25 countries in Asia, Australia and Pacific Islands attacking a number of cultivated and wild ornamental palm species in addition to coconut palm. It is currently distributed in Australia, Pacific Island, Malaysia, Singapore, Cambodia, Laos, Thailand, Veitnam, Maldives, Philippines, Myanmar and China.

Biology

Adult beetles measure 7.5-10.0 mm long and 1.5-2.0 mm wide, with a conspicuous orange to reddish pronotum. The



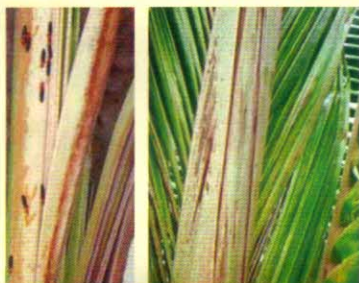
anterior part of elytra is also orange to reddish in colour. The eggs are laid in longitudinal rows in the unopened leaflets of both young and mature palms. The incubation period is 3-7 days. The emerging grubs are cream coloured and complete their larval period in 30-50 days. The full grown grubs measure 8-10mm. Pupae are yellowish white in colour measuring 8-10 mm and pupal period lasts for 4-6 days. The whole life cycle of the pest is completed in coconut palm itself and takes about 5-7 weeks. The adult beetles are nocturnal in habit and live up to 3 months.

Symptoms of damage

The grubs and adults live in the still folded heart leaf preferably that of young palms and seedlings and feed on mesophyll of both surfaces of the closely oppressed leaflets. They gnaw long incisions parallel to one another leaving longitudinal white streaks. As the frond opens, the leaf looks a characteristic scorched, rugged appearance. As the pest continuously affects developing leaves, the inner whorl of leaves



Scorched and rugged damage symptoms



Initial symptoms of damage

totally dry up. The unopened fronds of palms up to 10 years are most heavily attacked. Severe attacks destroy palm leaves, restrict growth and significantly reduce the yield. Fruit production is significantly reduced if eight or more leaves per palm are destroyed. In many cases all

central leaves of affected palms turn brown and fruit shedding is common in such palms. Stunted palms with less compact spear leaves are more susceptible to leaf beetle attack. CLB outbreak has caused extensive damage in many countries.

Mode of spread

The spread of *B. longissima* is mainly through the movement of infested seedlings. Since the flight range of the beetles is low the natural spread is at a very slow pace. Shipments of ornamental palms from countries having the pest infestation have been the main source of spread within the Asia-Pacific region.

Outbreaks

In Solomon Islands, it is estimated that about 5% CLB infested palms die annually. In 1980, coconut palms grown in more than 10,000 ha area in seven provinces in Indonesia were attacked by this beetle. In Maldives, pest outbreaks occurred on several islands of South Ariatoll causing extensive damage to coconut production in inhabited and uninhabited islands. Coconut is not only an important food crop, but is perhaps even more important for the tourism industry. The imposition of internal quarantine restrictions on the export of leaves for roof thatch or other tourist products made from leaves from CLB infested islands further affects the income of local population. CLB is therefore a serious threat to the continued income generation from tourism industry and as such, the country's food security. Similar conditions exist in other countries like Vietnam and Thailand.

Control

Mechanical

Blockading and cutting of coconut palms 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 palms and plant parts thereof.

Chemical

Several insecticides including imidacloprid, diclorvos, fenthion, monocrotophos, quinalphos, deltamethrin, dimethoate, cypermethrin and diazinon are being used to control the CLB. Some systemic insecticides are also injected into the trunk of infested palms. However, the effect of these treatments lasts only for 3-4 months. 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* Ferriere (Hymenoptera: Eulophidae), a pupal parasitoid and *Asecodes hispinarum* Boucek (Hymenoptera: Eulophidae), a larval parasitoid have been successfully used in several countries to control the beetle. Use of entomopathogenic fungus, *Metarhizium anisopliae* is also promising. The red ant, *Oecophylla smaragdina* F. (Formicidae) and the earwig, *Chelisoches morio* F. (Chelisochidae) are reported as predators of the pest in Indonesia and Solomon Islands.

Possible threat

The outbreak of the pest in Myanmar and Maldives in recent years poses a great threat and concern to the nearby countries such as India, Sri Lanka and Bangladesh. It is feared that the pest will find its way from Maldives to Sri Lanka and Southern parts of India to derail the economy of these important coconut growing regions of the world. As countries to the West of Myanmar, Bangladesh and India are at a very high level of risk, since the beetle will not be stopped at land borders. For all those countries,

where coconut and coconut based industries support millions of people, the pest incursion would be catastrophic.

Strategies for preventing the introduction of pest in India

1) Quarantine measures

Establishment of strict quarantine laws on the movement of all types of coconut materials and other hosts of this pest from CLB infested countries should be envisaged. Various developmental stages of the pest such as eggs, grubs, pupae or adults can be carried by transport of infested planting materials (both coconut seedlings and ornamental palms) across the countries. Hence, strict quarantine measures should be undertaken in the import of ornamental plant materials from the CLB endemic tracts. When exporting agriculture produces out of designated CLB infested areas, it is important not to pack them in any materials which have coconut leaves. Shifting of soil and organic materials also should be passed through strict quarantine. All planting materials should accompany phytosanitary certificate from the exporting country. Quarantine should be strictly followed in the collection of germplasm materials and exchange of genetic resources between countries. Passengers travelling from beetle-infested countries should be encouraged to examine their baggage for the presence of the beetles / eggs / larvae.

2) Surveillance

As the spread of the pest from Maldives to India can happen at any time, regular surveillance for the pest should be undertaken in the southern states of India where most of the coconut cultivation is centered. Since plants and planting materials are imported through prescribed sea ports and air ports, areas nearby these should be monitored at regular intervals for locating the pest. In the surveillance work, the unopened spindle leaves of coconut seedlings and young plants should be examined for any possible infestation and if doubtful cases located, it should be immediately reported to the competent authority.

3) Awareness and vigilance

There is a need for educating the coconut growers and developmental workers about the pest and its bioecology so that they will be able to monitor the pest effectively in their areas of operation. Organizing seminars, awareness programmes, pest alert notifications, presentation of bulletin of information on all aspects of *B. longissima* are all helpful in building up an awareness and vigilance of the pest among the farmers and agricultural developmental staff. Raising awareness and capacity building through training programmes is essential to contain the problem. Countries already afflicted by the pest may adopt intensive biocontrol programmes to minimize losses due to infestation and to check the further spread of the beetle.



**In case the pest is noticed, kindly inform
to
The Director, CPCRI, Kasaragod
or
The Head, CPCRI,
Regional Station, Kayamkulam**

Text Prepared by

**P. Rajan
C.P.R. Nair
A. Josephraj Kumar
Chandrika Mohan**

Edited by

**C.R. Raju
S. Kalavathi**

Published by

**Dr. George V. Thomas
Director, CPCRI,
Kasaragod - 671 124, Kerala, India
Phone: 04994-232893, 232894 Fax: 04994-232322,
E-mail: directorcpcri@gmail.com**

October 2009

Printed at

Niseema Printers and Publishers, Kochi - 18, Ph : 0484-2403760

*Dr. George V. Thomas
Director, CPCRI, Kasaragod
Dr. Chandrika Mohan
Head, CPCRI, Regional Station, Kayamkulam*