



## Special Enforcement Division Agriculture Security Task Force

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**Taxonomic name:** *Oryctes rhinoceros* (Linnaeus)

**Synonyms:** *Oryctes stentor* Castelnau, 1840, *Scarabaeus rhinoceros* Linnaeus

**Common names:** Asiatic rhinoceros beetle, bebete coco (French-Reunion (La Réunion)), black beetle, coconut black beetle, coconut palm rhinoceros beetle, coconut rhinoceros beetle (English), date palm beetle, dung beetle, escarabajo rinoceronte Asiático (Spanish), fruit stalk borer, Indischer Nashornkäfer (Dutch), Indischer Nashornkäfer (German), klappertor (Dutch), kumbang badak (Indonesia), kumbang tanduk (Indonesia), oryctes du cocotier (French), Palmen-Nashornkaefer (German), rhinoceros beetle, rhinoceros du cocotier (French), scarabé du cocotier (French)

**Organism type:** insect

*Oryctes rhinoceros* is one of the most serious pests of the coconut palm. *Oryctes rhinoceros* also has a record of damage, wherever it has become established in the tropics, to native palm trees and native Pandanus.

### Description

Imagos of *Oryctes rhinoceros* are large 30-5mm long and 14-21mm breadth, black or reddish black in colour, stout and possesses a characteristic cephalic horn which is larger in males. The pygidium is densely clothed with reddish brown hairs on the ventral surface in the female (Nirula, *et. al.*, 1952) a feature which helps in distinguishing it from the male.

Please see PaDIL (Pests and Diseases Image Library) Species Content Page [Beetles: Coconut rhinoceros beetle](#) for high quality diagnostic and overview images.

### Similar Species

*Oryctes boas*, *Oryctes monoceros*

### [More](#)

### Occurs in:

agricultural areas, natural forests

### Habitat description

Thought to be native to the southern Asiatic region, the coconut rhinoceros beetle was introduced throughout the Pacific primarily as a result of the increased sea traffic during World War II (Nishida & Evenhuis, 2000). The beetle breeds in dead standing coconut palms killed by pest /disease/ lightning, decaying organic materials like compost and sawdust heaps. (Bedford, 1980). Decaying pandanus trunk in Palau (Gressitt, 1953) and heaps of decaying cocoa pod shells in New Ireland (Bedford, 1976a) are also reported as breeding sites. In India (Kurian and Pillai, 1964; Nirula, *et al.* 1952) and Mauritius (Monty, 1978) heaps of cattle-dung were the most important breeding sites, in Burma dead coconut stems, heaps of rotting paddy straw and farm yard manure were most important (Ghosh, 1923). Floating logs containing larvae in tunnels might spread the pest to new areas (Bedford, 1980).

### General impacts

There are natural factors that keep the beetle under control in its native range, its introduction into insular habitats without these natural control factors allows it to reproduce quickly and spread to become a serious pest (Nishida & Evenhuis, 2000). The coconut rhinoceros beetle is one of the most damaging insects to coconut palms and African oil palm in southern and south- east Asia and the Western Pacific islands.

The imagos are the destructive stage, they bore into the crown of the palm resulting in wedge shaped or "V" cuts in the fronds that unfurl. The beetle feeds on tissue juices. Some of the crushed fibre is pushed outside the entrance hole, where it indicates the insect's presence. In India damage of inflorescence is also reported in severely infested areas which cause reduction in yield up to 10% (Nair, 1986). Ramachandran *et al.* (1963) has reported a loss in yield of 5.5 to 9.1% due to beetle attack. From artificially pruned leaf damage stimulation studies it was observed that damage to 50% fronds corresponds to leaf area reduction of 13% and decrease in nut yield by 23% (Young, 1974).

In oil palm *O. rhinoceros* bores into the base of cluster of spears, causing wedge shaped cuts in the unfolded fronds. In younger palms the effect of damage can be much more severe (Wood, 1968; 1976). Attack by adults may reduce yield and kill seedlings. They may provide entry points for lethal secondary attacks by the palm weevil *Rhyncophorus* or by other pathogens, in some countries (Bedford, 1980). Apart from coconut and African oil palm recorded host plants include the date palm and a variety of palms grown for ornamental purpose, including

*Roystonea regia*, *Livistona chinensis*, *Corypha umbraculifera* and *Raphia ruffia* (Gressitt, 1953; Bedford, 1980); also recorded are pine apple, sugarcane, pandanus and banana (Lever, 1979).

### **Geographical range**

**Native range:** South eastern Asia (Bedford 1976b).

**Known introduced range:** *Oryctes rhinoceros* is distributed throughout Asia and the Western Pacific. Bedford (1980) reviewed the historical account of this species, "In Burma the pest first appeared in the extreme south of the peninsula. It probably entered from Malaysia about 1895 and worked its way north throughout the coconut growing areas of lower Burma over the following 15 years (Mc Kenna and Shroff, 1911). It was accidentally introduced to a number of copra-producing areas of the Pacific and Indian Oceans. It is believed to have been introduced in rubber seedling pot plants from Ceylon (Sri Lanka) to the Pacific island of Upolu, Western Samoa in 1909 (Jepson, 1912); from there it spread to the neighbouring island of Savai'i and to Tutuila in American Samoa. In 1921 the beetle was recorded in Niuaotupapu (Keppel) Island in the Kingdom of Tonga, but it was successfully eradicated in a campaign from 1922 to 1930. Wallis Island, about 320 km west of Samoa, became infested in 1931 (Cohic, 1950). During the Second World War there was an increase in aircraft and shipping activity in the Pacific region; the beetle was introduced to the Palau Islands about 1942 (Gressitt, 1953), New Britain in 1942, and West Irian (Catley, 1969). Further establishments occurred in Vavau (Tonga), 1952 (Dumbleton, 1952); New Ireland, 1952; Pak Island and Manus Island (New Guinea), 1960; Tongatapu (Tonga), 1961; and the Tokelau Islands, 1963. The beetle was found at Suva on Viti Levu (main island of the Fiji group) early in 1953 (Swaine, 1966), and it has spread to at least 42 islands of the group, including all the important copra-producing ones, despite an intensive quarantine program to prevent this (Bedford, 1976a). In the Indian Ocean the island of Diego Garcia was infested during the First World War, possibly by beetles carried on troop ships (Orian, 1959). Specimens were collected in the Cocos (Keeling) Islands in 1940. In 1962 it was found in Mauritius (Vinson, 1963) and in 1978 in La Réunion (Monty, 1978)".

### **Introduction pathways to new locations**

**Aircraft:** *Oryctes rhinoceros* L. has been found alive in an aircraft hold and also in a polystyrene box containing tissue culture flasks from South East Asia.

**Military:** Introduced throughout the Pacific primarily as a result of the increased sea traffic during World War II, (Nishida & Evenhuis, 2000).

**Nursery trade:** It is believed to have been introduced in rubber seedling pot plants from Ceylon (Sri Lanka) to the Pacific island of Upolu, Western Samoa in 1909

**Transportation of habitat material:** The beetle breeds in decaying organic materials like compost and sawdust heaps. Transportation of this material could be a pathway of introduction to new areas.

### **Local dispersal methods**

**Natural dispersal (local):**

**Water currents:** Floating logs containing larvae in tunnels might spread the pest to new areas.

### **Management information**

**Integrated management:** Integrated control measures adopted on a community basis are essential to bring an effective control of an *Oryctes rhinoceros* population. The major components of the Integrated Pest Management Package consist of mechanical, chemical and biological methods. Mechanical methods consist of examining trees for infestation and removing the beetle physically. Prophylactic methods (preventive measures) include the use of pesticides, naphthalene balls *etc.* to repel the beetles. Oil cakes of neem and marroti (*Hydnocarpus wightiana*) have also provided good results.

**Biological:** Biological control of the beetle is the most important component of the IPM package. The green Muscardine fungus *Metarhizium anisopliae* M. is a pathogen which kills the pest in conditions of low temperature and high humidity. The viral pathogen Baculovirus of *Oryctes* (OBV) is very effective and kills the grub in 15-20 days of infestation and it affects the longevity and fecundity of adult beetles. Insect predators are frequently observed in the natural breeding grounds of the beetle, which feed on the eggs and early instar larvae of the beetle. The important predators are *Santalus parallelus* Payk., *Pheropsophus occipitalis* Macleay, *P. lissoderus*, *Chelisoche morio* (Fab.) and species of *Scarites*, *Harpalus* and *Agrypnus*. As these predators help in the natural check of the pest population, conservation of the predator fauna is essential. Restricting and managing the breeding sites could check the proliferation of the pest. Proper disposal of breeding grounds and field sanitation are important steps in IPM of *Oryctes*. An effective trapping method with rotting castor cake slurry kept in mud pots has been developed for rhinoceros beetle. More details are available from [Integrated Pest Management Information Package](#).

- Collection and destruction of various bio-stages of the beetle from the manure pits.

- Incorporation of the entomopathogenic fungus, *Metarhizium anisopliae* in manure pits to check the perpetuation of the pest.
- Soaking of castor cake at 1kg in 5 litres of water in small mud pots and placing them in coconut gardens to attract and kill the adults.
- Longitudinally split tender coconut stem and green petiole of fronds can be treated with fresh toddy and kept in the garden to trap the beetles.
- Setting up of light traps following the first rains in summer and monsoon.
- Field release of Baculovirus inoculated adult rhinoceros beetle reduces the leaf and crown damage caused by the beetle.
- Mixture of either neem seed powder + sand (1:2) at 150 g per palm or neem seed kernel powder + sand (1:2) at 150 g per palm applied in the base of the 3 innermost leaves in the crown effectively controls the pest. (Ramaraju & Pretheep Kumar., July 7th 2005).

### Nutrition

"The beetles can attack many different palms including coconut, betel nut, sago palm and dates. They can also feed on pandanus and other fleshy plants." (Vargo, 2000)

### Reproduction

Mating occurs in breeding sites (Zelazny, 1975). The female coconut rhinoceros beetle burrows into rotting stumps, standing palms and rubbish piles to lay her eggs. The life cycle lasts from 4 to 9 months allowing more than one generation per year. In India average adult longevity is about 4.7 months and fecundity per female is 108 eggs (Nirula, 1955).

### Lifecycle stages

The duration of immature stages of *Oryctes rhinoceros* has been studied by various authors under differing conditions. Whitish brown eggs are 3 to 4mm long and take 8 to 12 days to hatch. Developmental period is 1st instar larvae 10 to 21 days, 2nd instar larvae 12 to 21 days, 3rd larvae 60 to 165 days, pre-pupae 8 to 13 days and pupae 17 to 28 days (Bedford, 1976a; Catley 1969; Cherian and Anantanarayanan 1939; Goonewardena, 1958; Gressitt 1953; Hinckley 1973; Kurian and Pillai, 1964; Nirula 1955). Mature larvae are C-shaped, with brown head capsule and legs. The imagoes remain in the cocoon for about 11 to 20 days (Lever, 1979). Mating occurs in breeding sites (Zelazny, 1975). The life cycle lasts from 4 to 9 months allowing more than one generation per year. In India average adult longevity is about 4.7 months and fecundity per female is 108 eggs (Nirula, 1955). Life history data for *Oryctes*, and related species like *Scapanus*, and *Strategus* are summarised by Bedford (1980).

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New tactics are being employed to drive the population to zero. Canine skills are being utilized to sniff out rhino breeding sites. Four dogs were recruited from Georgia and Guam Customs and Quarantine officers were dispatched to bring the dogs to Guam. Handlers were hired and training for both the dogs and their handlers began in July. The dogs were deployed in November and they are helping the eradication team to detect breeding sites so that they can be destroyed.



**Native Range**

- Asia
- Bangladesh
- Cambodia

- China
- Indonesia
- Lao People's Democratic Republic
- Malaysia
- Myanmar (Burma)
- Pakistan
- Philippines
- Sri Lanka

**Alien Range**

- American Samoa
- Australia
- Fiji
- Guam
- Mayotte
- Palau
- Papua New Guinea
- Reunion (La Réunion)
- Samoa
- Tokelau
- Tonga
- Wallis and Futuna

Taiwan

## Japanese Battle of the Bugs!



Beetle battles are a centuries-old tradition in Japan and other parts of Asia, where **rhinoceros beetles** are often kept as pets. (Hey, at least you don't have to walk them or clean out their litterboxes!) Every year, the biggest, baddest bugs compete in Insect World Battle Championships which are held in Tokyo.

Kids buy their bugs from specialty pet stores or--believe it or not--bizarre vending machines. (OK, not so bizarre when you consider you can also buy dried squid and underwear from vending machines in Japan.) The largest beetle specimens can cost thousands of dollars. (Probably because of all the betting at the tournaments.)



Thailand

Viet Nam (Vietnam)

**For more information or to report sightings of the COCONUT RHINOCEROS BEETLE (CRB) around the island, you can contact the CRB office at 475-1426/27 Ext. 19 at the USDA Plant Inspection Facility.**