



# Field Guide:

## Coconut Rhinoceros Beetle

*Coconut rhinoceros beetle adults kill palm trees by chewing big holes through their growing leaves to feed on sap, making distinct zig-zag shaped cuts in the palm fronds.*



Plant  
Protection  
Program

AMERICAN PUBLIC GARDENS ASSOCIATION

Photo: Hawaii Department of Agriculture

# COCONUT RHINOCEROS BEETLE

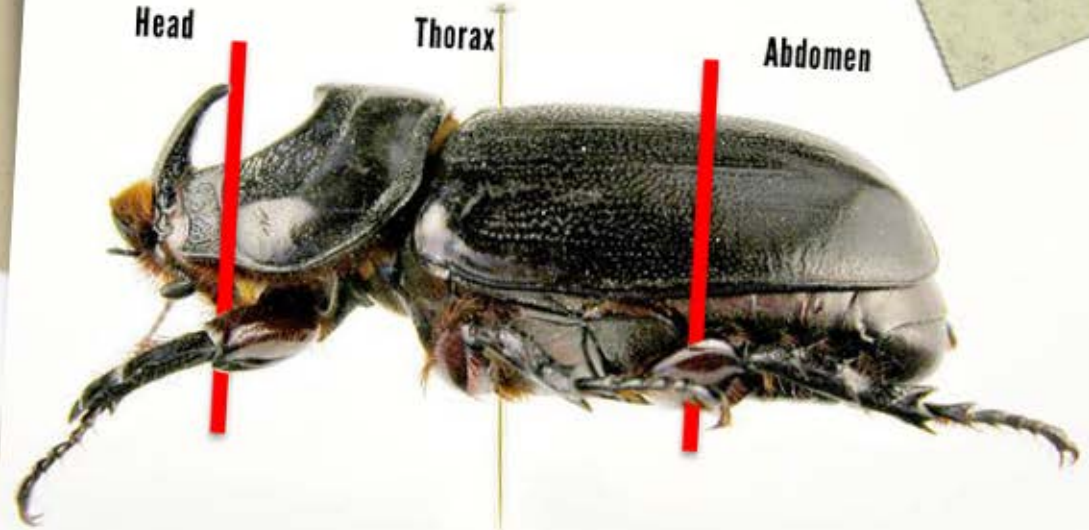
## Identification



2 cm

5488585

⤴ Top view of a coconut rhinoceros beetle (*Oryctes rhinoceros*) adult. The beetle is named for the horn on its head! They are large (about 2 inches long) and are shiny black with rusty-colored hairs around their faces. Females have similar hairs on their back ends.



Head

Thorax

Abdomen

2 cm

⤴ Side view of a coconut rhinoceros beetle (*Oryctes rhinoceros*) adult. Beetles have three body segments: the head (far left, the segment with the horn!), thorax (the middle of the beetle, where the legs and wings attach), and abdomen (the end of the beetle).

5488587



2 cm

5488589

⤴ Coconut rhino beetle larvae (called grubs) are yellowish white with reddish brown heads and legs. Insects breathe through tiny holes called 'spiracles,' which are the reddish dots down the sides of the grubs.

⤴ Bottom view of a coconut rhinoceros beetle (*Oryctes rhinoceros*) adult. Like all insects, rhino beetles have six legs. The spines on the front legs are an adaptation to help with digging. Beetles have flexible, segmented feet (called 'tarsi') with claws on the ends for a super grip!



PHOTO CREDITS

5488585, 5488587, 5488589 Pest and Diseases Image Library, Bugwood.org Bottom Left Hawaii Department of Agriculture, <http://hdoa.hawaii.gov/>

PLANT HEROES

# COCONUT RHINOCEROS BEETLE

## Life Cycle

The coconut rhino beetle (*Oryctes rhinoceros*) has six distinct life stages.

A coconut rhinoceros beetle (*Oryctes rhinoceros*) adult. That's one big beetle!

A coconut rhinoceros beetle pupa found on Guam by "rhino hunters" for the Coconut Rhinoceros Beetle Eradication Project.



adult  
~95 days



pupa  
~20 days

Female rhino beetles lay their whitish brown eggs in decaying palm trunks or compost. The eggs hatch into 1st instar grubs.

egg  
~12 days



1st instar grub  
~19 days



There are three grub or larval stages, each bigger than the last, that feed on decaying plant material.

Third instar grubs dig chambers in the compost and turn into pupae. After about 20 days, they emerge as new rhino beetle adults and can fly off to find mates.



3rd instar grub  
~32 days

2nd instar grub  
~21 days



The coconut rhinoceros beetle has three immature stages, called larval instars. By the time they reach the third stage, they can be 3 inches long!



### PHOTO CREDITS

Top Left Aubrey Moore, [www.eurekalert.org](http://www.eurekalert.org) Top Right, Bottom Left Hawaii Department of Agriculture, <http://hdoa.hawaii.gov/> Bottom Right Dr. Aubrey Moore, University of Guam Cooperative Extension Service, <http://guaminsects.net/anr/content/crb-life-cycle-diagram>



# COCONUT RHINOCEROS BEETLE

## Host Trees

<< These healthy coconut palms (*Cocos nucifera*) are beautiful landscape trees, and can grow in sandy and exposed areas where many species can't.

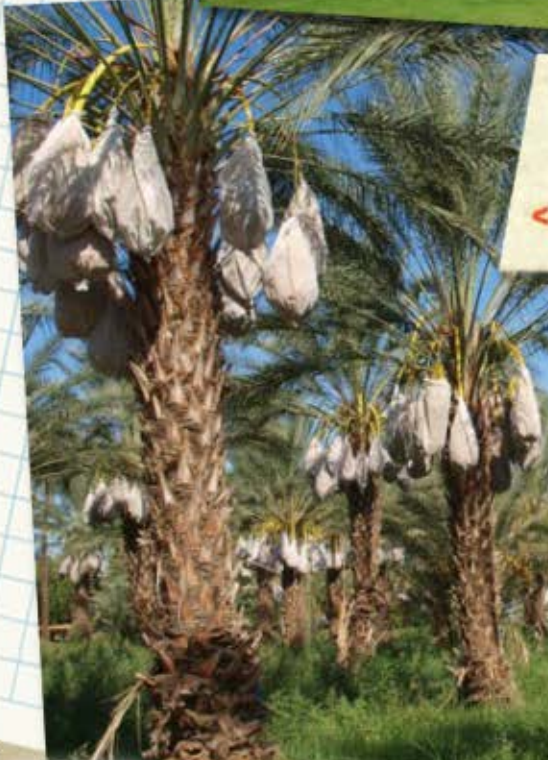


5409034



UGA1197022

<< Date palms (*Phoenix dactylifera*), like those seen here, are vulnerable to damage by the coconut rhino beetle. The clusters of dates are contained within mesh bags in this photo to protect them.



5491095



5491096

^ The large green fruits near the center of this tree are coconuts, which are the fruits of the coconut palm (*Cocos nucifera*)! Coconut palms are one of the favorite foods of the coconut rhinoceros beetle.

<< These are dates, the fruit of the date palm. The coconut rhino beetle threatens the trees that grow these sweet treats!

### PHOTO CREDITS

5409034 Forest and Kim Starr, Starr Environmental, Bugwood.org 1197022 Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org 5491095 Patti Anderson, Division of Plant Industry, Bugwood.org 5491096 Patti Anderson, Identifying Commonly Cultivated Palms, USDA APHIS ITP, Bugwood.org



# COCONUT RHINOCEROS BEETLE

## Host Trees



<< The fruit of the screwpine (*Pandanus* sp.) tree looks similar to a pineapple!

These are fan palms (*Pritchardia* sp.), or Loulu, growing in Hawaii. These kinds of palms are the only ones native to Hawaii, and many species are already endangered or threatened. Damage by the coconut rhino beetle could make them go extinct! >>



Close-up of the fan-shaped leaf of a fan palm (*Pritchardia* sp.)



Screwpine trees (*Pandanus* sp.) >>> are important salt-, drought-, and heat-tolerant species on many Pacific islands and may be attacked by the coconut rhinoceros beetle.



Fan palms (*Pritchardia* sp.) have clusters of fruit located near the top. Some species of fan palms are only found on certain islands in Hawaii!

# COCONUT RHINOCEROS BEETLE

## Host Trees

The fruit and flowers of a banana tree, which is vulnerable to the coconut rhino beetle. >>

Banana trees (*Musa* sp.), such as these, are sometimes attacked by the coconut rhinoceros beetle. The clusters of ripening bananas are inside protective mesh bags in this photo. >>



^ These oil palms (*Elaeis guineensis*) are one of the favorite foods of the coconut rhinoceros beetle.

<< Fruit of an oil palm (*Elaeis guineensis*), which is used to make palm oil for cooking and industry. The coconut rhino beetle threatens the health of these palm trees, which are a very important agricultural species in many parts of the world.

PHOTO CREDITS

1197012 Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org 5369833 Whitney Cranshaw, Colorado State University, Bugwood.org 1399156 Manfred Mielke, USDA Forest Service, Bugwood.org 1574345 Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org



# COCONUT RHINOCEROS BEETLE

## Damage

When coconut rhinoceros beetle adults feed on coconut tree sap, they often create very distinct zig-zag or diamond-shaped cuts on the palm fronds.



▲ The large holes seen here at the base of the fronds of this palm are feeding damage caused by coconut rhino beetle adults. They burrow into the growing top of the palm to feed on the tree's sap.



Diamond-shaped patterns >> cut into palms fronds mean that coconut rhino beetle was here!

PHOTO CREDITS

Left, Top Right, Bottom Right Hawaii Department of Agriculture, <http://hdoa.hawaii.gov/>

PLANT  
HEROES



Help them do battle with invasive bugs and nasty fungi that threaten trees and plants.

**PLANTHEROES.ORG**

### Why Do Plants Need Heroes?

Every year, plant pests and diseases damage and kill millions of trees, both in our neighborhoods and in natural areas. This damage has a negative impact on vital ecosystem services like air and water purification and costs billions of dollars in cleanup and lost revenue.

### Who are the Plant Heroes?

The Plant Heroes are four young adults who share a love of nature and interest in science. A non-governmental organization (NGO) has heard about their passion and invited them to join together as a "super team" to detect and combat bugs and diseases that harm plants and ecosystem health. The Plant Heroes scout for these threats and report suspicious sightings to their county extension or local forester, who contacts officials and provides mission details and scientific supplies in order to defeat the bad bugs and diseases.

### How can you be a Plant Hero?

Help neutralize the threat of plant pests and diseases by becoming a part of the Plant Hero team. Take the Plant Hero Pledge and explore the website to learn more about what to look for and how to report suspicious plant pests and diseases. The more you know, the more you can protect the plants in your own yard, neighborhood and community!

### Plant Heroes is brought to you by the American Public Gardens Association

Founded in 1940 as the American Association of Botanical Gardens and Arboreta, the American Public Gardens Association adopted its new name in 2006. Over the last seven decades, the Association's has emerged as the premiere association for public gardens in North America.

Today, the Association's 500 member institutions are located throughout the United States, the District of Columbia, Canada, and seven other countries. Our vision is "A World Where Public Gardens Are Indispensable" as they provide botanic, conservation, community, education, and economic resources to their community.

The Association is committed to increasing the knowledge of public garden professionals throughout North America—through information sharing, professional development, networking, public awareness, and research—so that they have the tools to effectively serve visitors and members.



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Association**

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