



# Lessons learned from recent detections of CRB and a path toward a comprehensive early-warning system for PPQ

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# Background

- **Dec 2013: Detected for the first time in Hawaii**
- **Serious pest of coconut and African oil palms. Also feeds on several other crops, incl. bananas, dates, pineapples.**



# PPQ response

- **Surveys**
- **Host removals**
- **Grinding/incineration of mulch**
- **Outreach efforts**



**Access to current pest  
information  
and  
competent information  
management  
form the foundation for  
everything PPQ does.**



**PPQ Science and Technology (S&T) contributes heavily to pest information management in PPQ, with the goal of enabling a coordinated and informed response to pest threats.**



# Overview

- **look at S&T actions triggered by the recent detection of CRB ...**
- **to highlight the role of S&T in pest information management and to ...**
- **discuss where PPQ is on the path toward a comprehensive early-warning system**



## S&T Actions

- **GPDD: updated information**
- **New Pest Advisory Group (NPAG) report**
- **New Pest Response Guidelines**
- **CAPS: updated datasheet**
- **Technical Working Group report**
- **Identification and Damage Aid**
- **Protocols for alternative destruction methods**





# GPDD

- Taxonomy
- Synonyms
- Host Range
- Distribution
- Biology
- APHIS documents related to the pest (e.g. NPAG reports, PRAs, pathway analyses)
- Pdf's of information sources

## Global Pest & Disease Database

Home	Search	Reports	Cooperators
GPDD Pest ID 3112		Pest Tools ▼	View Pest Data ▼

Pest Record Created December 6, 2007  
Last Full Review May 6, 2009

### Scientific Name

*Oryctes rhinoceros* (Linnaeus, 1758)

### Taxonomic Position

Animalia : Arthropoda : Insecta : Coleoptera : Scarabaeidae

### Preferred Common Name

Coconut Rhinoceros Beetle

### Justification for Inclusion in GPDD

- CAPS FY 2014 Priority Pest List - Commodity and Taxonomic Surveys List
- CAPS FY 2015 Priority Pest List - Commodity and Taxonomic Surveys List
- CAPS Palm Commodity-Based Survey Guidelines
- EPICA Notifications. Exotic Pest Information Collection & Analysis, APHIS-PPQ Biosurveillance
- National Agricultural Pest Information System Pest (NAPIS)
- New Pest Advisory Group - pest reviewed in 2007
- New Pest Advisory Group - pest reviewed in 2014
- PPQ Risk Assessment - Pest of quarantine significance
- PestLens Notifications. APHIS-PPQ Biosurveillance

Find citations at [Google scholar](#) for this pest since 2009

### Cooperator's Database(s)



### APHIS Documents

Warning: The GPDD is an archive. The documents listed below may not be the most recent version.

- Coconut Rhinoceros Beetle Eradication Program: Guam; Environmental Assessment. December 2007
- NPAG Report: *Oryctes rhinoceros* (L.), Coconut rhinoceros beetle. March 14, 2014
- Palm Commodity-Based Survey Guidelines. September 2013

### APHIS Pest Risk Assessments

- Importation of Banana, *Musa* spp., as Fresh, Hard Green Fruit from the Philippines to the Continental United States (Rev. 002). July 21, 2009
- Importation of Fresh Papaya Fruit, *Carica papaya* L., from Fiji into the Continental United States (Ver. 004). October 25, 2010
- Pest List for Fresh Pineapple, *Ananas comosus* (L.) Merr., from Malaysia to the Continental United States (Rev. 003). August 24, 2010
- Pest List for the Importation of Fresh Papaya, *Carica papaya* L., from Malaysia into the Continental United States (Rev.006). August 24, 2010
- Pest lists for fresh Litchi *chinensis* (lychee or litchi), *Dimocarpus longan* (longan), *Mangifera indica* (mango), *Garcinia mangostana* L. (mangosteen), *Nephelium lappaceum* L. (rambutan), and *Ananas comosus* (pineapple) fruit from Thailand (Rev. Original). November 2005

### Synonyms



# NPAG

- Evaluates the significance of new pest introductions
- Provides background information (biology, detection & identification history)
- Recommends actions to the PPQ Management Team
- Recommends quarantine status



NEW PEST ADVISORY GROUP (NPAG)  
 Plant Epidemiology and Risk Analysis Laboratory  
 Center for Plant Health Science & Technology

### NPAG Report

*Oryctes rhinoceros* (L.): Coconut rhinoceros beetle

Coleoptera: Scarabaeidae

NPAG Chair Approval Date: March 14, 2014



Adult female *O. rhinoceros* (Left), and larvae (right) (Mark Schmaedick, American Samoa Community College (Molet, 2013))

**This report is an internal PPQ document, intended to be used as an aid in PPQ decision making. The technical recommendations listed at the end of this document do not necessarily represent PPQ policy.**

**Initiating Event and Pest Identification:** John Bowers (PPQ-PHP) notified NPAG on January 3, 2014 that the coconut rhinoceros beetle (CRB), *Oryctes rhinoceros*, had been detected in a CRB trap during a CAPS survey on a U.S. Air Force base in Honolulu, Oahu, Hawaii, and is a new state record (Bowers, 2014). It was identified by Natalia J. Vandenberg (USDA-SEL) on January 3, 2014 (APHIS, 2014). In 2007, CRB was detected for the first time in a U.S. territory in Guam, and was not known to occur elsewhere in the United States (NPAG, 2007). NPAG developed a report at that time and recommended that PPQ 1) maintain a reportable/actionable port policy, 2) assess CRB for inclusion on the APHIS Regulated Plant Pest List, and 3) continue cooperative efforts to eradicate CRB populations in Guam (NPAG, 2007).



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# New Pest Response Guidelines

- Pest biology
- Identification
- Survey procedures
- Regulatory procedures
- Pathways
- Hosts



## New Pest Response Guidelines

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Department of  
Agriculture

Animal and  
Plant Health  
Inspection  
Service

Plant Protection  
and Quarantine

*Oryctes rhinoceros* L.  
Coleoptera: Scarabaeidae

Coconut Rhinoceros Beetle



# CAPS Datasheets and Survey Manuals

- Pest information
- Survey procedures

## *Oryctes rhinoceros*

### Scientific Name

*Oryctes rhinoceros* (Linnaeus, 1758)

### Synonyms:

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

### Common Name

**Coconut rhinoceros beetle (CRB)**, coconut beetle, rhinoceros beetle, palm rhinoceros beetle, Asiatic rhinoceros beetle

### Type of Pest

Beetle

### Taxonomic Position

**Class:** Insecta, **Order:** Coleoptera,  
**Family:** Scarabaeidae

### Reason for Inclusion in Manual

Suggestion from CAPS Community

### Pest Description

Descriptions of all life cycles can be found in Gressitt (1953).

Eggs: Eggs are whitish brown and 3 to 4 mm (approx.  $\frac{1}{8}$  to  $\frac{3}{16}$  in) (Giblin-Davis, 2001). Eggs are initially soft and oblong but swell into a rubbery circle four to five days after being laid (Hinckley, 1973).



Figure 1. *Oryctes rhinoceros* female (Mark Schmaedick, American Samoa Community College).



Figure 2. *Oryctes rhinoceros* male (Aubrey Moore, University of Guam).



# Identification and Damage Aid

- Survey Guide specifically for delimitation surveys in HI

## Coconut Rhinoceros Beetle (CRB) Identification and Damage Aid



# Protocol for alternative destruction methods

- Detailed instructions for steam treatment, both in ground and in trailer





# How do we coordinate and keep track?



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# How do we coordinate and keep track?





# PestLens

An early-warning system supporting PPQ's efforts to protect U.S. agriculture and the environment against exotic plant pests

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*Colosius confusus* (Gastropoda: Veronicellidae), a new slug species described from South America 0

First report of the bacterium *Xanthomonas citri* subsp. *citri* (Gammaproteobacteria: Xanthomonadales), causal agent of citrus canker, in Burkina Faso 0

First report of *Potato spindle tuber viroid* (PSTVd) infecting *Argyranthemum frutescens* (marguerite) and *Diascia* sp. 0

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## First report of the coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae), in Hawaii

Reported by PestLens on: Thursday, January 16, 2014

Source: Hawaii Department of Agriculture

Event: New Location

On December 23, 2013, the coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae), was detected during routine surveys at Joint Base Pearl Harbor-Hickam in Hawaii. Nine adult beetles have been trapped. Surveys are being conducted to determine the extent of the infestation. This is the first report of *O. rhinoceros* in Hawaii.

*Oryctes rhinoceros* is primarily a pest of *Cocos nucifera* (coconut) and other palms, but it has a wide host range, including *Ananas comosus* (pineapple), *Musa* spp. (banana), and *Saccharum officinarum* (sugarcane). Its distribution includes the coconut-growing regions of Asia, the Middle East, Oceania, Mauritius, Réunion, and Guam. *Oryctes rhinoceros* is listed as reportable in the PEST ID database (queried 1/15/14).

### Reference(s):

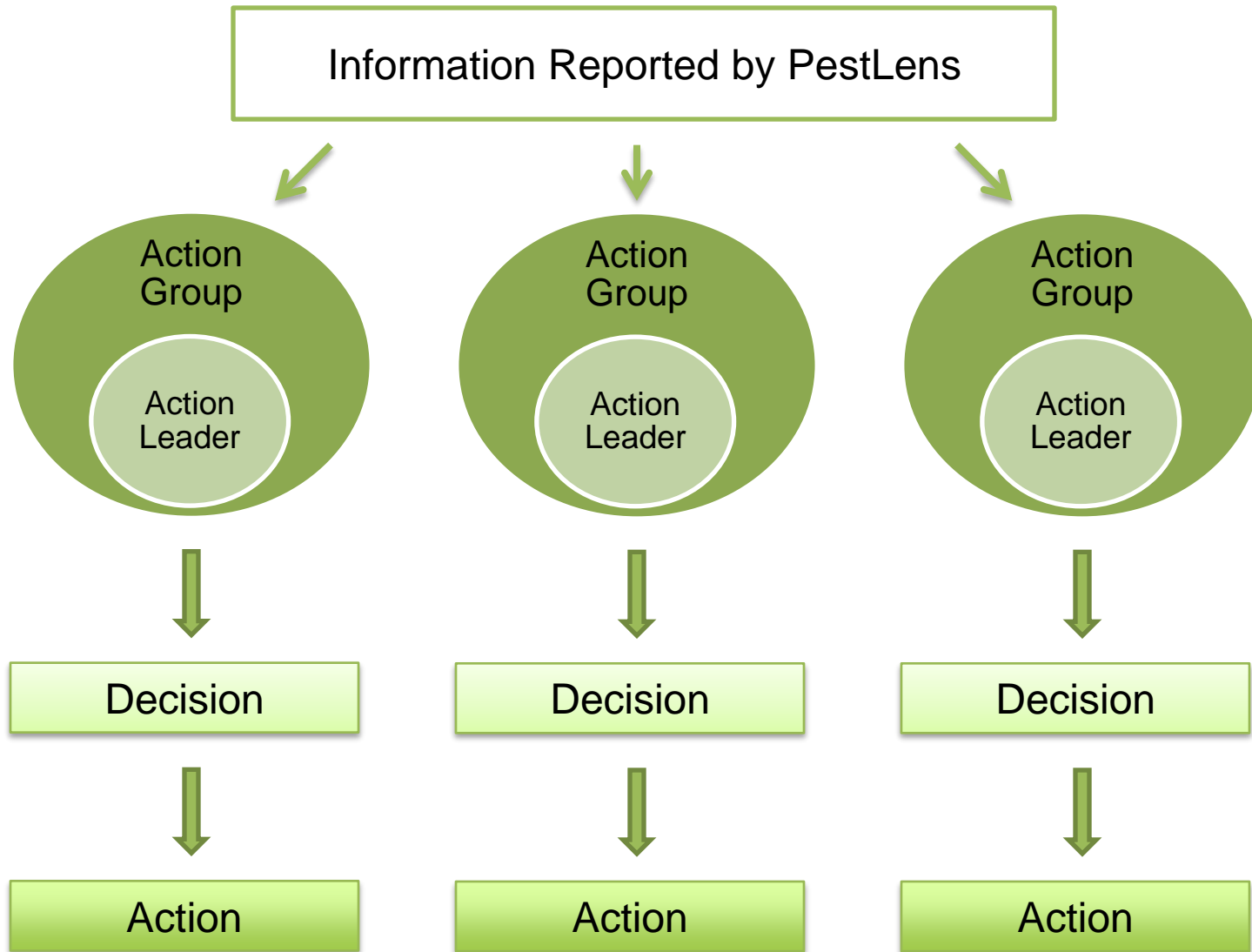
1. HDOA. 2014. Destructive beetles found on Oahu coconut trees. Hawaii Department of Agriculture (HDOA). January 9, 2014. Last accessed January 16, 2014, from <http://hdoa.hawaii.gov/blog/main/destructive-beetles-found-on-oahu-coconut-trees/>.

### Other articles about this pest:

- Coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae), may have spread to Saipan
- Wodyetia bifurcata* (foxtail palm) a host of coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae)
- Acoustic detection of coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae)
- Update on coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae), in Guam
- Coconut rhinoceros beetle, *Oryctes rhinoceros*, found in Yigo, Guam
- Control of coconut rhinoceros beetle, *Oryctes rhinoceros*, using *Oryctes baculovirus*
- Coconut rhinoceros beetle, *Oryctes rhinoceros*, outbreak in American Guam



Action Group	Action	Details	Completed
Cooperative Agricultural Pest Survey	Updated pest fact sheet for CRB	A sub-section entitled "Status of Infestation in Hawaii" was added to the distribution section.	07/02/2014
Deregulation Evaluation of Established pests	No action		---
Global Pest and Disease Database	Added new distribution record		02/04/2014
National Identification Services	No action		---
New Pest Advisory Group	Wrote NPAG report	NPAG first analyzed CRB after it was detected in Guam in 2007. NPAG updated that report in response to the recent detection in Hawaii, among other things incorporating a pathway analysis component.	02/06/2014
New Pest Response Guidelines	Write NPRG for CRB	A draft document has been prepared and is currently undergoing PERAL-internal review. Subsequently, the document will be reviewed by government external subject-matter experts.	pending
S&T – not part of specific action group	Technical Working Group provided report to PPQ MT	Report included biology and treatment options	06/09/2014
S&T – not part of specific action group	Developed Visual Survey Guide	Specifically for delimiting surveys in HI	03/01/2014
S&T – not part of specific action group	Developed protocol for steam treatment	Both for in-ground and on trailer treatment	



# Lessons learned

- Notification component is working well, but for domestic pest events, information could be reported through PestLens earlier.
- Need to create a more comprehensive list of action groups
- Participation of action groups needs to be increased
- Some refinements to PestLens still need to be made
- **Proof of concept for a PPQ early-warning system**
- Full integration with certain other information systems (GPDD, IPHIS, ARM, etc.) will take us to the next level





**Fully-functioning, effective early warning system**

**Maximally informed decision-making**

**Organized and systematic response**

**Efficient use of resources**

**Increased collaboration in PPQ**

**Accountability to stakeholders**



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