



COCONUT RHINOCEROS BEETLE

Statewide Communications Plan

This document was produced through a collaborative effort:



REPORT INVASIVE SPECIES
643-PEST
643pest.org
CALL OR CLICK TO PROTECT HAWAII



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LIST OF DEFINITIONS

Term	Definition
Chipping	Using a woodchipper to process plant matter to achieve a reduced particle size material.
Compost	A relatively stable, decomposed, organic, humus-like material suitable for landscaping or amending soil.
CRB Response	Refers to the task force primarily responsible for managing the monitoring and detection of CRB on O’ahu.
Green waste	Organic plant debris such as grass clippings, leaves, palm fronds, coconut husks, and branches. Green waste can become brown as it decomposes.
Green waste facility	A facility that processes organic waste materials, such as grass clippings, leaves, and branches, to create compost or mulch.
Grinding	Refers to using a tub grinder or horizontal grinder to process plant matter to achieve a reduced particle size material.
Heat treatment	A method, including but not limited to, hot composting in which microbial activity brings the average temperature at the core of the material to at least 131° F for at least 72 hours.
High-risk material, breeding material	Plant and/or soil materials which CRB may breed and feed on including, decaying plant matter, coconut debris, tree stumps, mulch, compost, various types of bagged gardening materials, dirt, grass clippings, and leaf litter.
Host plant	Any plant that adult CRB has been known to feed on. This does not include unsprouted seeds.

LIST OF DEFINITIONS

Term	Definition
Infested island	An island where CRB populations have become established (e.g. O’ahu.)
Non-infested island	An island where CRB populations have not become established or are present at low levels (e.g., islands outside of O’ahu as of early 2024).
Mulch	Plant matter that has been chipped, ground, or shredded and is intended to be used as a protective covering for establishing a vegetative landscape that is spread or left on the ground to reduce evaporation, maintain even soil temperature, reduce erosion, control weeds, or enrich the soil.
Quarantine	This involves establishing designated zones within a property to facilitate inspection, treatment, and monitoring of incoming materials for CRB infestation before their distribution or movement elsewhere on the property.

MAJOR PARTNERS



CRB Response

CRB (Coconut Rhinoceros Beetle) Response provides education, awareness, detection, prevention, and treatment resources for partners and the public to protect Hawaii's communities, industries, and natural environment from the threats and impacts of CRB. crbhawaii.org



Invasive Species Committees

The island invasive species committees (ISCs) support CRB prevention and response through community awareness and island-based support needs for monitoring, controlling, and managing the spread of this invasive pest as needed. hawaiiinvasivespecies.org



Department
of Agriculture
STATE OF HAWAII

Hawai'i Department of Agriculture

The Hawai'i Department of Agriculture (HDOA) responds CRB threats by coordinating surveillance, control measures, and research to manage CRB populations and prevent their spread. They also enforce regulations that restrict the movement of potentially infested materials. hdoa.hawaii.gov



US Department of Agriculture

The USDA plays a vital role in preventing the introduction and eradicating major pests like CRB in the United States. As a major funder of CRB response efforts in Hawai'i, USDA supports interdictions at ports of entry to prevent CRB introduction. usda.gov



UH College of Tropical Agriculture and Human Resources

With expertise in pest control and agricultural innovation, CTAHR contributes to CRB research, extension services, and outreach efforts across the state. ctahr.hawaii.edu

HOW TO USE THIS PLAN:

This communications plan empowers educators, organizers, community leaders, and outreach specialists with CRB knowledge and messaging tools.

Use the plan to:

- Learn essential CRB information (identification, impacts, management)
- Find tailored messages for diverse audiences
- Engage stakeholders and amplify your efforts to protect our islands



Stakeholder messages have been divided into messages and key actions for “infested” islands and “non-infested” islands:

INFESTED ISLAND

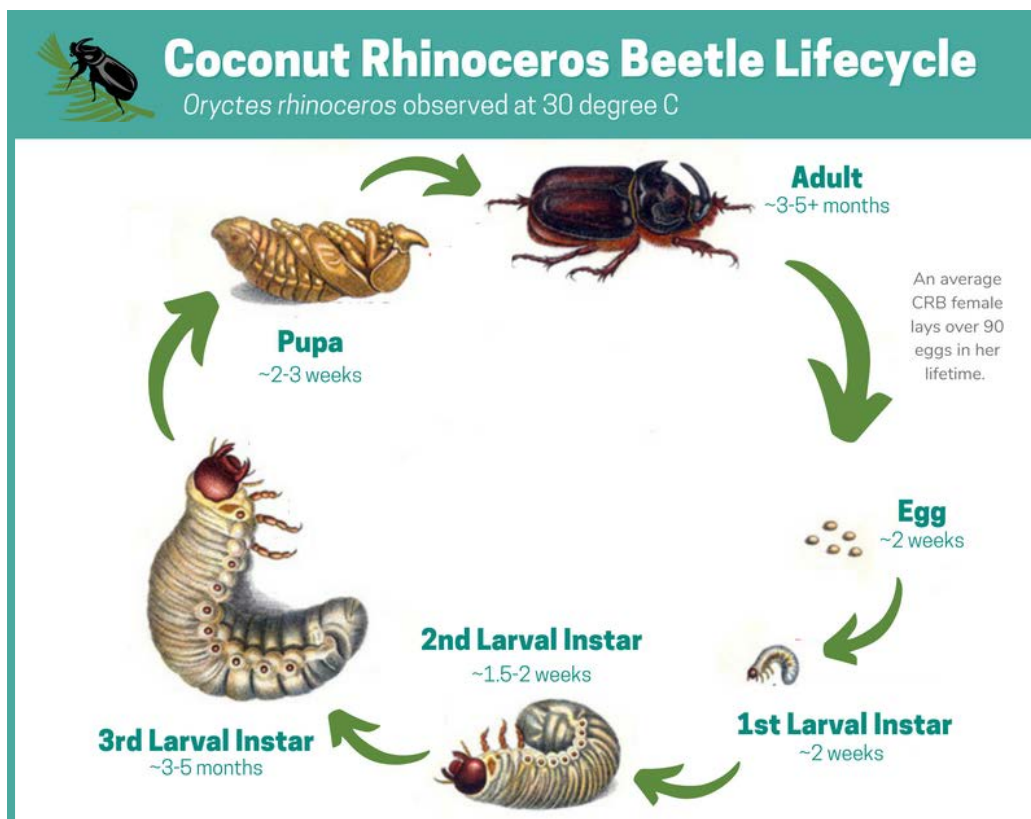
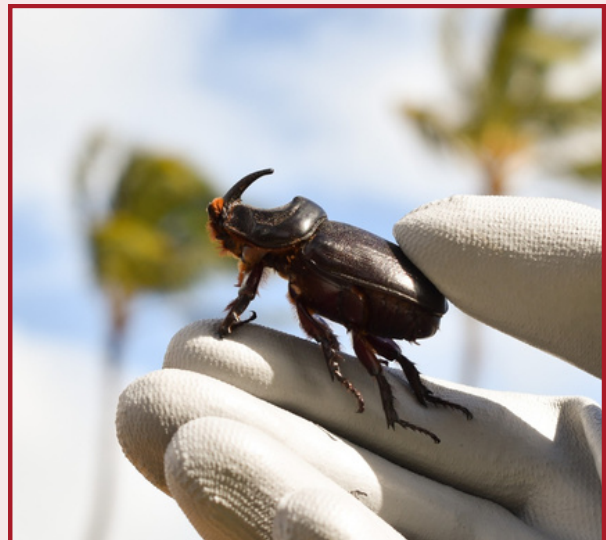
An island where CRB populations have become established (e.g. O’ahu). Management efforts on infested islands often focus on mitigation and control measures to reduce CRB populations and minimize damage. Individuals, communities, and land owners assume control.

NON-INFESTED ISLAND

An island where CRB populations have not become established or are present at low levels (e.g., other islands in the state). Management efforts on uninfested islands typically focus on prevention, early detection, and rapid response measures. Resources/assistance may be available from agencies.

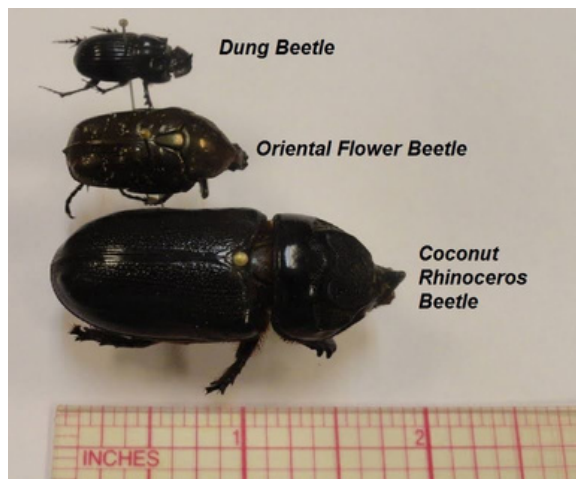
WHAT IS CRB?

The Coconut rhinoceros beetle (*Oryctes rhinoceros*) is a destructive pest species that primarily targets coconut palms and other palm species. Native to Southeast Asia, it has spread to many tropical and subtropical regions worldwide, including Hawai'i. The beetle was first detected on the island of O'ahu in December 2013. Adult beetles are large, usually dark brown or black, with a characteristic horn-like projection on their heads, resembling that of a rhinoceros hence the name. They feed on the tender tissues of coconut palms, causing damage to growing tips, leaf bases, and even the heart of the palm. This feeding activity weakens the palm, making it more susceptible to other pests and diseases and ultimately leading to stunted growth, reduced yield, and in severe cases, palm death.



IDENTIFYING CRB

There are several beetles in Hawai'i that look similar to Coconut Rhinoceros Beetle. Dung beetles and Oriental flower beetles are common look-a-likes that often get reported. The major differences between CRB and other beetles include size, appearance, food sources, and the time day that adult beetles are active.



To identify a suspected CRB, send pictures to 643pest.org or call (808) 643-PEST (7378). For larvae, photograph both top and bottom and capture a short video of the larvae crawling on a flat surface. For adult beetles, take a clear picture with a ruler for scale. On non-infested islands, keep the specimen until identification can be confirmed. See pg. 55 for more details on what to do with CRB specimens.

Coconut Rhinoceros Beetle (CRB)

VS

Oriental Flower Beetle (OFB)

Invasive species

Nuisance



- Curls into a "C" shape

Crawls on its side
Large head capsule
Up to 4 inches



- All black
- Horn
- Nocturnal (Night active)

~2 to 2.5 inches



Primary food source: palms



- Curls into an "e" shape
- Tucks head into midbody

Crawls flat on its back
Raster line on rear end
Up to 2 inches



- Shiny metallic brown color
- Antennae
- Diurnal (Day active)

~0.75 inch



Primary food source: fruits

Oriental flower beetle (*Protaetia orientalis*) is fairly widespread across Hawai'i and is often mistaken for the Coconut rhinoceros beetle (*Oryctes rhinoceros*).

PRIMARY FOOD SOURCES IN HAWAI'I:



Coconut palms



Royal palms



Date palms



Fan palms

CRB are not host-specific; if their primary food sources are unavailable, they feed on other palms and other agriculturally and culturally important plants.

SECONDARY FOOD SOURCES IN HAWAI'I:



Foxtail palms



Sago palms



Pineapple



Kalo



Banana



Sugarcane



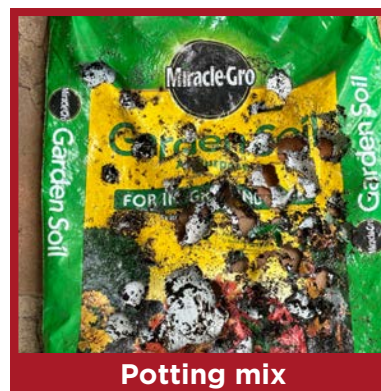
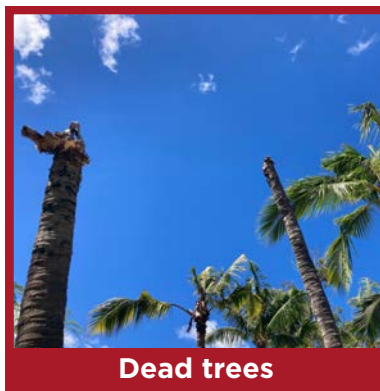
Hala

Other food sources? CRB can also feed on many other palm species, usually preferring those with thicker trunks. Ongoing research at the University of Hawai'i is exploring other potential food sources in Hawai'i.

HIGH-RISK MATERIALS

for breeding and larval growth

CRB lay eggs in decaying plant matter but they prefer coconut debris, tree stumps, mulch, compost, and various gardening materials. CRB larvae (grubs) have been found in other places like dirt, grass clippings, planter boxes, a dead root of a living citrus tree, the tops of palms, and leaf litter.



SIGNS OF INFESTATION:

Adult beetles feed on the inner spear or heart of the palm. Using their strong front legs and horn, they burrow into the palm and suck the juices they extract. The damage left behind can vary depending on the plant species.

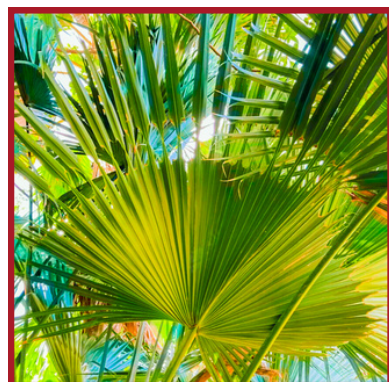
45-degree v-cuts:



2-inch bore holes:



Scalloped edges & snowflake patterns:





WHY SHOULD WE CARE?

Environmental Impacts

- The loss of loulu (*Pritchardia* spp.), our native fan palms, which are especially susceptible to CRB damage, impacts both biodiversity and cultural uses
- Increased coastal erosion due to loss of coastal vegetation
- Increased need for insecticides for mitigation measures
- The full extent of CRB's effects on ecosystems, including pollinators and decomposers, remains uncertain, posing risks to ecosystem functioning and resilience



WHY SHOULD WE CARE?

Economic Impacts

- Reduction of private property values
- Loss of tourism and negative impacts to visitor experience
- Increased costs associated with removing and replacing dead palms
- Loss of yield in commercial palm production
- Increased costs from mitigation measures
- Increased number of hazard trees and damage after storms

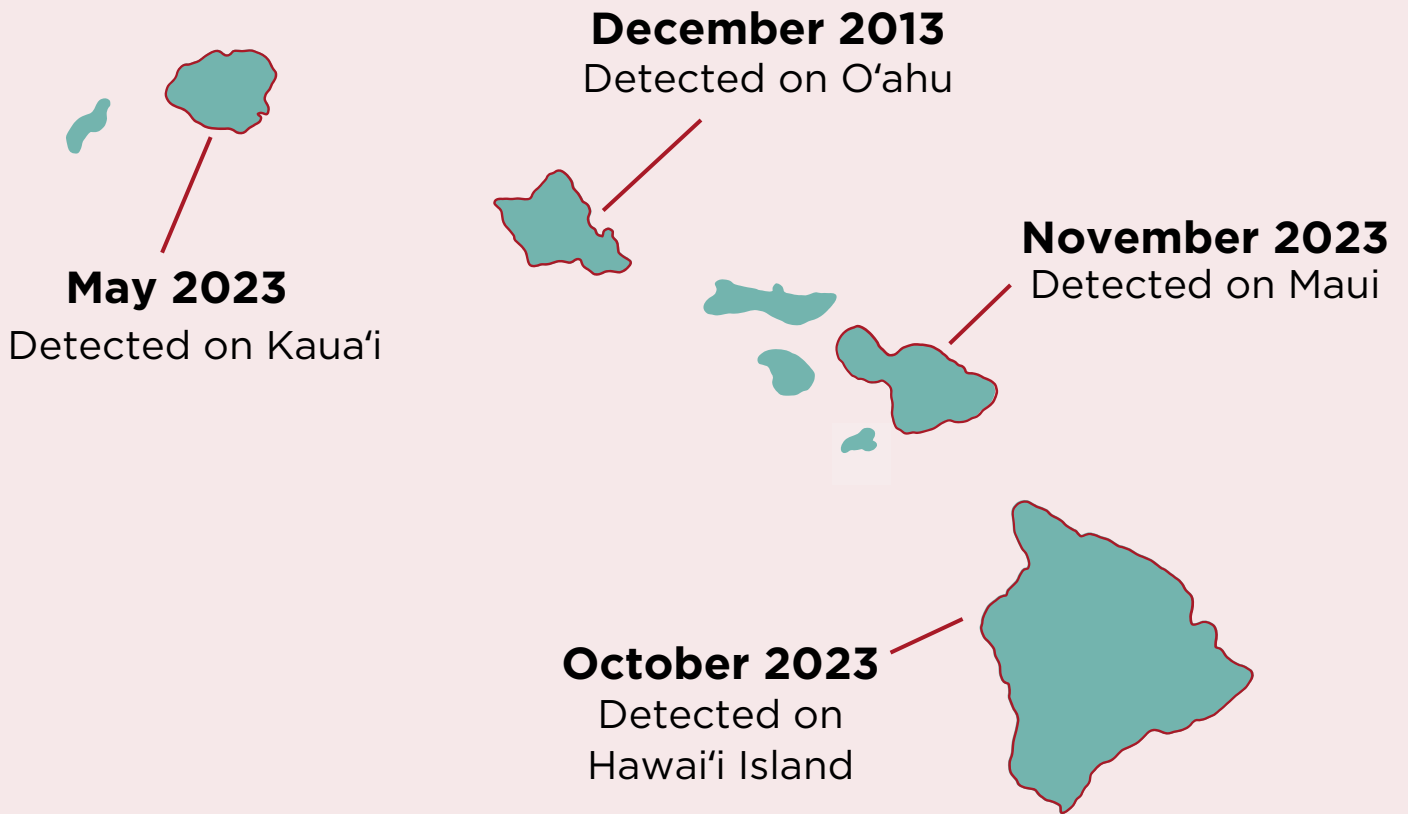


WHY SHOULD WE CARE?

Cultural and Social Impacts

- Loss of medium for cultural practitioners, including weavers and hula practitioners
- Loss of crucial subsistence crops and unique coconut varieties
- Endangers sacred coconut groves, such as Kapuāiwa on Molokaʻi and Wailuanuiahōʻano groves on Kauaʻi
- Disrupts sustainable agricultural practices and threatens composting and organic farming efforts

CRB IN HAWAII



WHAT'S BEING DONE?



Delimiting surveys and monitoring



Rules and Regulations



Treatments



Research



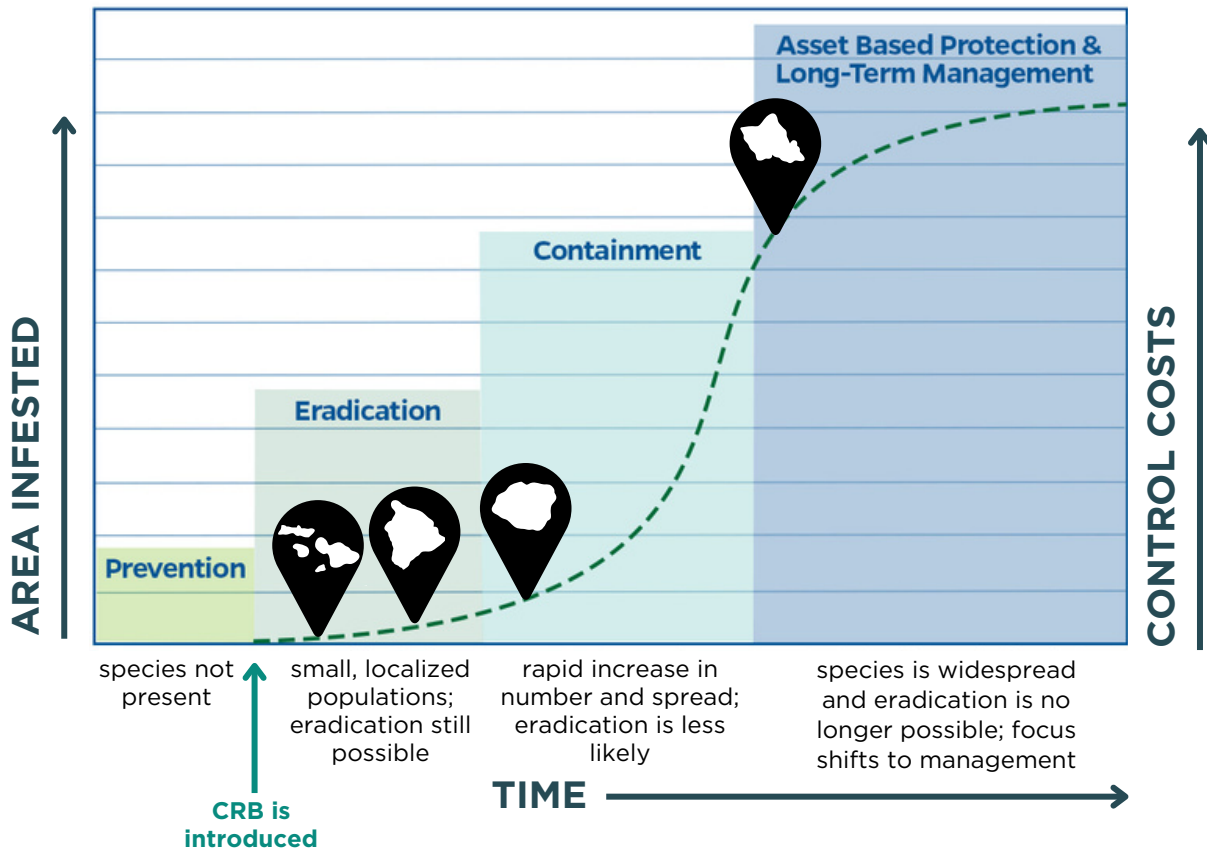
Outreach & education












Collaboration

CURRENT STATUS OF CRB

Invasion Curve By County (updated February 2024)



Prevention	Eradication	Containment	Management
 Pre-border inspection and border detection  Interstate quarantines and port prevention	 Delimiting surveys and treatment  Local quarantines and BMPs	 Delimiting surveys and treatment prioritizing outlying infestations  Local quarantines and BMPs	 Support landowner treatment, reduce pest densities at outgoing ports  Intrastate quarantines and BMPs


 Outreach to stakeholders and homeowners, research, collaboration, and communication are critical throughout all stages of pest management.

CRB ON O'AHU



2013

- First CRB found at Māmala Bay (Dec)

2015

- First detection in Pearl City Peninsula

2016

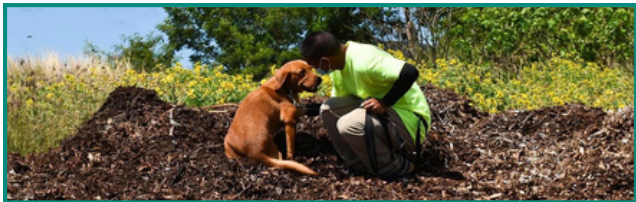
- No finds in Nānākuli from (2016-2019)

2017

- First find in Kunia

2019

- September: 3 CRB dogs (and their handlers) joined CRB Response Team



2021

- Vacuum Steam unit proven effective to treat breeding material

2023

- CRB response **shifts from eradication to containment** on O'ahu

2014

- CRB Response program established
- Traps deployed across O'ahu for delimiting surveys

CRB detections:

- Navy Marine Golf Course (Feb)
- Iroquois Point (March)
- 'Ewa Beach (July)
- Nānākuli (Dec)

2018

- No trap finds at Māmala Bay after years of strict green waste management
- 1st trap find in Waimānalo (July)
- 1st trap find at Mililani Agricultural Park (Nov)

2020

- Tree injections of Imidacloprid and Acephate shown to be effective
- October: 1st find on North Shore, O'ahu

2022

- Fumigation with sulfuryl flouride shown to kill all life stages of CRB, increasing capacity to address infested material
- July: HDOA approved Interim Rule 22-1 restricting movement of CRB host material on & to and from O'ahu

WHAT CAN EVERYONE DO?

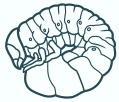
4 STEPS TO STOP THE SPREAD OF CRB

Geographic spread of CRB is largely due to human-vectored transportation through movement of plants and high-risk materials from infested areas. Source materials from non-infested areas and treat when applicable. We recommend following these four steps: (1) inspect and report, (2) prevent the spread, (3) manage high-risk material, and (4) stay informed.

Inspect and Report



Inspect all host plants for damage and high-risk material for the presence of CRB.



For non-infested islands, hold on to the specimen until identified and report to the statewide pest reporting system 643Pest.org or call (808) 643-PEST (7378). See pg. 55 for more details.

Prevent the Spread



Don't import or purchase host plants or high-risk materials from CRB infested areas.



Don't purchase bags of gardening material with visible CRB damage.



Participate in a community CRB trapping program to support early detection efforts.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Deliver green waste to an official processing facility in a timely manner.



Don't stockpile compost, mulch, potting medium for more than 4 months (unless in a sealed, CRB-proof container).

- If not possible, thoroughly search through high-risk material every 4 months.



Quarantine new materials and keep separate from inspected, clean materials already onsite.


Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island Invasive Species Committee (ISC).

Sanitation is key. Secondary options include regular quarantines, inspections, and/or treatment of plants and high-risk materials to prevent introductions, population growth, or establishment.





CRB impacts us all, from increased landscaping costs to the loss of treasured trees. However, we are not powerless. By learning about CRB, promptly reporting sightings, managing potential breeding sites, and actively participating in community control efforts, everyone can play a crucial role in early detection and prevention. Public reporting is vital for identifying new infestations and safeguarding our islands.



Key messages & actions for

GENERAL PUBLIC

Residents, Renters, Homeowners

GENERAL PUBLIC

Residents, Renters, Homeowners

Key Messages/Actions:

INFESTED ISLAND

Inspect and Report



Inspect host plants for damage and any high-risk materials for presence for CRB. Kill any CRB found.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile or move green waste or other high-risk materials without thorough inspection or proper treatment.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.



Prevent the Spread



Store bags of soil, compost, and mulch in a sealed, CRB proof container (thick plastic).



Don't purchase bags of gardening material with CRB damage and inform store employees.

Stay Informed



Keep yourself and others informed and engaged with the latest CRB prevention and control strategies.



Ask your landscapers, nurseries, and waste disposal sites about their CRB prevention and management practices.



Give business to companies that actively employ these best management practices.

Note: If CRB is no longer eradicable on your island, responsibility for control shifts to private landowners. In cases of limited infestations, agencies may offer resources and assistance.

GENERAL PUBLIC

Residents, Renters, Homeowners

Key Messages/Actions:

NON-INFESTED ISLAND

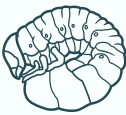
Inspect and Report



Inspect host plants for damage and any high-risk materials for presence for CRB.



If you suspect CRB Report to 643pest.org or call (808) 643-PEST (7378).



Take photos of feeding damage or beetles. For larvae, take a brief video of it moving on a flat surface. Store specimens until ID'd. See pg. 55 for more info.

Prevent the Spread



Don't import or purchase host plants or high-risk materials from CRB infested areas.



Before purchasing bagged gardening materials, inspect for presence of CRB or damage on host plants.



Participate in a community CRB trapping program to support early detection efforts.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Reduce stockpiling high-risk materials to prevent breeding.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.

Stay Informed



Keep yourself and others informed and engaged with the latest CRB prevention and control strategies.

Educating everyone on CRB identification is essential for early detection. Training should emphasize symptoms of infestation and the importance of prompt reporting.



Landscape professionals have a frontline role in detecting CRB and preventing its spread, as they come into close contact with CRB feeding sites like the crown of palms, and often import, generate, transport, or use a large amount of materials that CRB could breed in.



Key messages & actions for

LANDSCAPE PROFESSIONALS

Nurseries, Arborists, Tree Trimmers, and
Landscapers

LANDSCAPE PROFESSIONALS

Nurseries, Arborists, Tree Trimmers, and Landscapers

Key Messages/Actions

INFESTED ISLAND

Inspect



Inspect high-risk materials and host plants for CRB or damage.



If present, notify the property owner and kill any CRB found.

Prevent the Spread



Don't move or sell plants with suspect or recent CRB damage.



Source compost, mulch, steer manure, and other materials from as local as possible and check regularly for presence of CRB.



Deliver green waste to an official processing facility in a timely manner.

Manage High-Risk Materials



Treat palms with pesticides if there is an active infestation.



Treat high-risk materials before moving/removing materials on infested islands.



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile green waste, compost, mulch, or potting medium for more than 4 months (unless in a sealed, CRB-proof container).

- If not possible, thoroughly search through high-risk material every 4 months.

Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island ISC.



A thorough palm inspection involves checking for any sign of CRB at the crown, trunk and root area. An inspection should be done before transport.

LANDSCAPE PROFESSIONALS

Nurseries, Arborists, Tree Trimmers,
and Landscapers

Key Messages/Actions

NON-INFESTED ISLAND

Inspect and Report



Inspect host plants while trimming. Look for damage to the crown and the root ball.



If you find CRB or damage, take photos and report it to 643pest.org or (808) 643-PEST (7378).



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. For more info see pg. 55.

Prevent the Spread



Don't import CRB host plants from infested areas.



Deliver greenwaste to an official processing facility in a timely manner.



Source compost, mulch, steer manure, and other materials from as local as possible and check regularly for presence of CRB.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile green waste, compost, mulch, potting medium for more than 4 months (unless in a sealed, CRB-proof container).

- If not possible, thoroughly search through high-risk material every 4 months.

Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island ISC.



Refer to CRB Management Guide pg 53-57 and the resources (pg 59) for up to date sources of information.



Provide customers pamphlets and other resources on CRB. Contact CRB Response or your local ISC for materials.

Retailers play a vital role in preventing the spread of CRB by ensuring products like bagged soils, compost, and mulch, as well as potted plants are pest-free. Educating customers adds another layer of defense.



Key messages & actions for

RETAILERS

Hardware Stores, Big Box Stores,
and Garden Centers

RETAILERS

Hardware Stores, Big Box Stores,
and Garden Centers

Key Messages/Actions

INFESTED ISLAND

Inspect and Report



Regularly inspect host plants and gardening materials (especially bagged materials) for CRB damage. Kill any CRB found. See pg 55 for disposal info.

Manage High-Risk Materials



Don't store gardening materials outdoors.

- Store indoors whenever possible.
- For outdoor storage, use CRB-proof containers or secure coverings.



CRB have been known to breed in bagged mulch and soil. Stippling around the holes are indicative of CRB.

Prevent the Spread



Do not sell plants with visible CRB damage.



Do not move/sell bags of gardening material with CRB damage. Kill all CRB found.

Stay Informed



Train staff to identify and report CRB damage to plants and bagged gardening materials.



Place signs next to gardening materials asking shoppers to be on the lookout and report CRB damage to bags.



Provide customers pamphlets and other resources on CRB. Contact CRB Response or your local ISC for materials.

RETAILERS

Hardware Stores, Big Box Stores,
and Garden Centers

Key Messages/Actions

NON-INFESTED ISLAND

Inspect and Report



Regularly inspect host plants and bagged gardening material for CRB damage.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



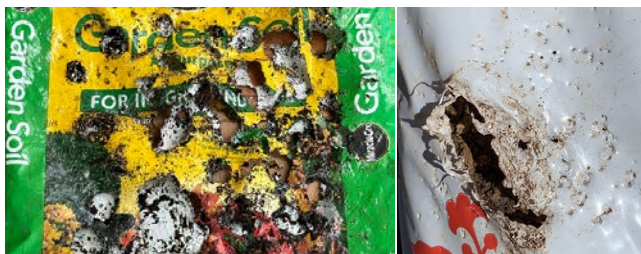
Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg. 55 for more info.

Manage High-Risk Materials



Don't store gardening materials outdoors.

- Store indoors whenever possible.
- For outdoor storage, use CRB-proof containers or secure coverings.



CRB have been known to breed in bagged mulch and soil. Stippling around the holes are indicative of CRB.

Prevent the Spread



Don't import host plants, soil, compost, and mulch from infested areas.



Source compost, mulch, steer manure, and other materials from as local as possible and check regularly for presence of CRB.



Don't move/sell bags of gardening material with CRB damage.



Install, maintain, and regularly check CRB traps around perimeter. Contact CRB Response or your local ISC for guidance.

Stay Informed



Train staff to identify and report CRB damage to plants and gardening materials.



Place signs next to gardening materials asking shoppers to be on the lookout and report CRB damage to bags.



Provide customers pamphlets and other resources on CRB. Contact CRB Response or your local ISC for materials.

Green waste and compost facilities are a crucial link in CRB management, transforming potential breeding grounds into safe resources. Without their commitment to safe disposal options and compost production, controlling CRB becomes significantly harder. Safe facilities protect our communities, and ensures reliable options for responsible disposal and sourcing of materials. This partnership is vital in combating CRB spread.



Key messages & actions for

GREEN WASTE & COMPOST FACILITIES

GREEN WASTE & COMPOST FACILITIES

Key Messages/Actions

INFESTED ISLAND

Inspect and Report



Regularly inspect finished compost for CRB. Kill any CRB found.

Manage High-Risk Materials



Grind or chip incoming material within 48 hours prioritizing high-risk material (coming from heavily infested area, palm material, decaying wood chips).



Hot compost to 131° F to control CRB.



Regularly monitor finished materials every 4 months (visual during turnover).

- Once finished compost cools to about 110° F it can be infested and is very good breeding material for CRB.

Prevent the Spread



Safeguard compost in a CRB-proof container while still hot or treat before transporting off site especially to less infested areas.



Install, maintain, and regularly check CRB traps around perimeter. Contact CRB Response or island ISC for guidance.

Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island ISC.



Ensure all materials sourced from infested areas (O'ahu) have been properly treated and safely moved (Interim rule 23-1).

GREEN WASTE & COMPOST FACILITIES

Key Messages/Actions

NON-INFESTED ISLAND

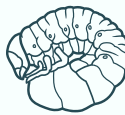
Inspect and Report



Inspect incoming palm material for CRB damage and high-risk material for presence of CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg. 55 for more info.

Prevent the Spread



Inspect material before moving/removing/selling by physically turning over and sifting.



Install, maintain, and regularly check CRB traps around perimeter. Contact CRB Response or island ISC for guidance.

Manage High-Risk Materials



Quarantine incoming material from finished products and keep whole until ready to process.



Keep compost temperature above 131° degrees F.



Regularly monitor finished materials every 4 months (visual during turnover).

- Once finished compost cools to about 110° F it can be infested and is very good breeding material for CRB.


Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island Invasive Species Committee.



CRB begin to die around 115° F but 131° F core temp is a good target to ensure that even the colder spots, or edges and areas touching soil are at least 115° F.



Farmers stand to lose much from CRB: crop losses, costly infrastructure changes and control costs, and even decreased ability to feed our communities. But they also hold the power to detect CRB early and use integrated pest management strategies, leading the fight against this pest.

Key messages & actions for

FARMERS

FARMERS

Key Messages/Actions

INFESTED ISLAND

Inspect and Report



Inspect host plants for damage and any high-risk materials for presence for CRB. Kill any CRB found.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.



Monitor mulch & compost regularly. Inspect every 4 months by turning over thoroughly using hand tools or equipment.



Don't stockpile green waste or high-risk materials for more than 4 months (unless in a sealed, CRB-proof container).

- If this is not possible, keep green waste material whole and inspect for CRB before chipping, grinding, or processing for use or transport.

Prevent the Spread



Don't import host plants, soil, compost, or mulch from infested areas.



Source compost, mulch, steer manure, and other gardening materials from as local as possible.

Stay Informed



Receive staff training and updates on CRB and Best Management Practices (BMPs) from either CRB Response or your island ISC.



Reducing the amount of high-risk material is important, Weed mats are a mulch alternative for weed suppression.

FARMERS

Key Messages/Actions

NON-INFESTED ISLAND

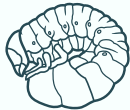
Inspect and Report



Regularly inspect host plants for damage and high-risk materials for presence for CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg. 55 for more info.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Monitor mulch & compost regularly. Inspect mulch every 4 months. Turn it over thoroughly using hand tools or equipment.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.

- If this is not possible, keep wood mulch layer to 2 inches or less.

Prevent the Spread



Don't import host plants, soil, compost, or mulch from infested areas.



Install and regularly check CRB traps around the farm's perimeter for early detection.



Source plants and gardening materials from as local as possible.

- Consider a designated quarantine area for new plants and materials.
- Always inspect material while using.

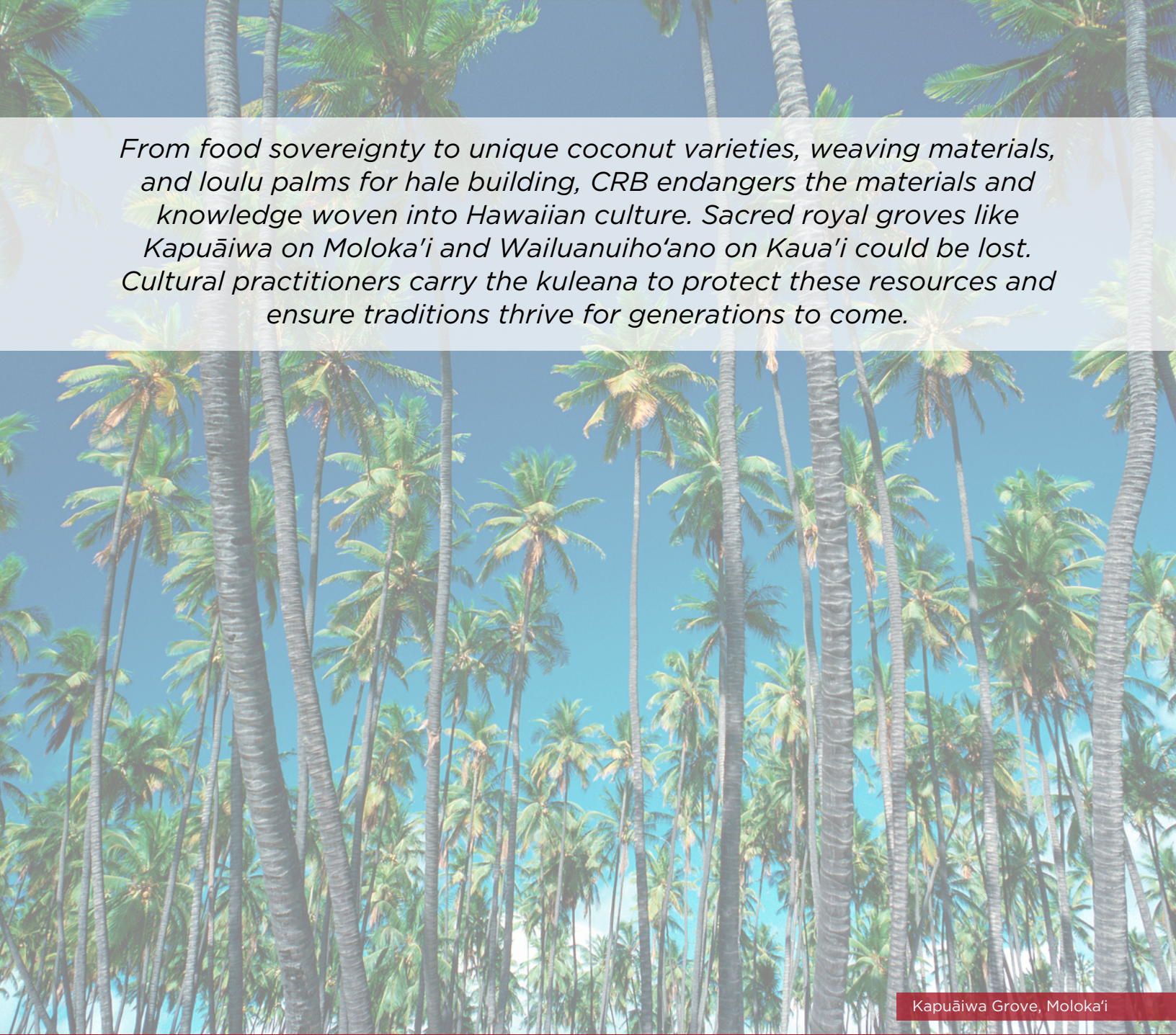
Stay Informed



Train staff to identify and report CRB and damage to plants and bagged gardening materials.



Larvae are being transported via bagged soil and mulch. Always inspect your gardening materials for signs of CRB!



From food sovereignty to unique coconut varieties, weaving materials, and loulu palms for hale building, CRB endangers the materials and knowledge woven into Hawaiian culture. Sacred royal groves like Kapuāiwa on Moloka'i and Wailuanuiho'ano on Kaua'i could be lost. Cultural practitioners carry the kuleana to protect these resources and ensure traditions thrive for generations to come.

Kapuāiwa Grove, Moloka'i

Key messages & actions for

CULTURAL PRACTITIONERS

CULTURAL PRACTITIONERS

Key Messages/Actions

INFESTED ISLAND

Inspect and Report



Inspect host plants and materials for damage and any high-risk materials for presence of CRB. Kill any CRB found. See pg. 55 for methods.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile fronds, weaving materials, or other palm parts and coconuts outdoors in susceptible areas.



Inquire with land owners or managers of collection sites about pesticide use to prevent unintentional contact.

Prevent the Spread



Source materials from non-infested areas and as local as possible. Always inspect for damage before use.



Process and store materials as soon as possible. Keep carvings and other materials for carving and weaving dry and indoors to prevent decomposition.



Contact the CRB Response or your local ISC to set up traps around groves or plantings for early detection.

Stay Informed



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your local ISC.



Weaving connects us to our heritage. Let's protect these resources from CRB, ensuring this tradition thrives for generations.

CULTURAL PRACTITIONERS

Key Messages/Actions

NON-INFESTED ISLAND

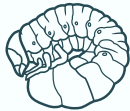
Inspect and Report



To protect culturally important areas and palm groves, regularly inspect plants for damage and high-risk materials for presence of CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg 55 for more info.

Prevent the Spread



Source materials from non-infested areas and as local as possible. Always inspect for damage before use.



Contact the CRB Response or your island ISC to set up traps for early detection.



Process and store materials as soon as possible. Keep carvings and other materials for carving and weaving dry and indoors to prevent decomposition.

Manage High-Risk Materials



Don't stockpile fronds, weaving materials, or other palm parts in susceptible areas.



For guidance on protecting individual trees and groves, refer to the CRB Early Detection & Management Tools section, pgs. 47-55.

Stay Informed



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your island ISC.

CRB makes securing suitable materials harder, putting traditions at risk.



Golf courses have been ground zero for CRB infestations across the state. Irrigated landscapes and abundant palms create ideal breeding conditions for this destructive pest. CRB threatens not only the visual appeal of courses but also their usability and economic viability, as the recent palm devastation at O'ahu golf courses demonstrates.



Key messages & actions for

GOLF COURSES

GOLF COURSES

Key Messages/Actions

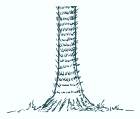
INFESTED ISLAND

Inspect



Inspect host plants for CRB damage and high-risk materials for the presence of CRB every 4 months. Kill any CRB found.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.

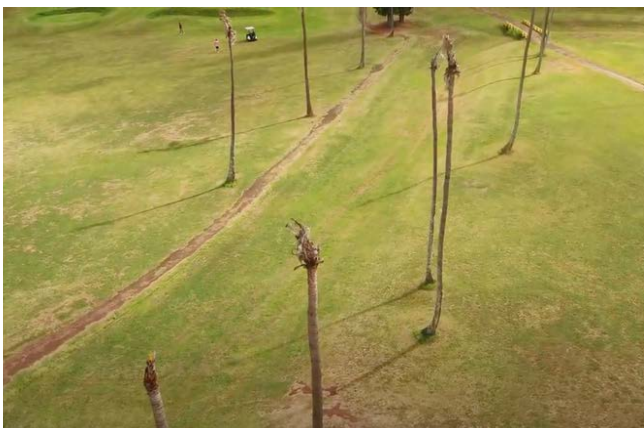


Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.



Don't stockpile high-risk materials for more than 4 months (unless in a sealed, CRB-proof container)

- If this is not possible, keep green waste material whole and inspect for CRB before chipping, grinding, or processing for use or transport.



Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from infested areas.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Deliver greenwaste to an official processing facility in a timely manner.



Protect palms with treatments.

Require CRB BMPs for contracted landscaping services.



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your island ISC.



If an active infestation is present, use recommended pesticides and stay up-to-date on treatment strategies.

Some golf courses on O'ahu are seeing widespread palm death and a decline in the aesthetic of surviving palms. Damage to palms is unsightly and eventually the palms will die. If you want to maintain the aesthetic, it may require removal and replanting which is costly.

GOLF COURSES

Key Messages/Actions

NON-INFESTED ISLAND

Inspect and Report



Regularly inspect plants for damage and high-risk materials for presence of CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg. 55 for more info.

Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from infested areas.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Install, maintain, and regularly check CRB traps around perimeter. Request from your island ISC.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.

- If this is not possible, keep wood mulch layer to 2 inches or less.



Don't stockpile high-risk materials for more than 4 months (unless in a sealed, CRB-proof container).

- If this is not possible, inspect materials every 4 months.

Stay Informed



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your local Invasive Species Committee.

- Require landscaping contractors to also complete training



Provide customers pamphlets and other resources on CRB. Contact CRB Response or your island ISC for materials.



Always exercise caution when importing CRB host palms from infested areas, like O'ahu.

Maintenance crews on large properties play a vital role in CRB control. These lands are often connected to broader ecosystems, extending their kuleana beyond property boundaries. Through regular landscaping work, they have direct contact with potential breeding sites and host plants. By developing and implementing site-specific CRB plans, managers and crews can work together to protect these vital resources.



Key messages & actions for

MAINTENANCE STAFF

Parks & Recreation, DOE, Kamehameha Schools,
Solid Waste Division, State Parks, Universities

MAINTENANCE STAFF

Parks & Recreation, DOE, Kamehameha Schools, Solid Waste Division, State Parks, Universities

Key Messages/Actions

INFESTED ISLAND

Inspect



Inspect host plants for CRB damage and high-risk materials for presence of CRB. Kill any CRB found.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.

- If this is not possible, keep wood mulch layer to 2 inches or less.



Don't stockpile high-risk materials for more than 4 months (unless in a sealed, CRB-proof container).

- If this is not possible, inspect materials every 4 months.

Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from highly infested areas.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Deliver greenwaste to an official processing facility in a timely manner.

Stay Informed



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your island ISC.

- Require landscaping contractors to also complete training.



Create and implement a CRB management plan. CRB Response can assist with creation.



Maintenance staff regularly work with CRB host plants and high-risk materials and have a higher potential to encounter CRB

MAINTENANCE STAFF

Parks & Recreation, DOE, Kamehameha Schools,
Solid Waste Division, State Parks, Universities

Key Messages/Actions

NON-INFESTED ISLAND

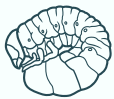
Inspect and Report



Inspect host plants for CRB damage and high-risk materials for presence of CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg. 55 for more info.

Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from infested areas.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Install, maintain, and regularly check CRB traps around perimeter. Request from your island ISC.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Use wood mulch alternatives such as weed mats, gravel, rubber chips, etc.

- If this is not possible, keep wood mulch layer to 2 inches or less.



Don't stockpile high-risk materials for more than 4 months (unless in a sealed, CRB-proof container).

- If this is not possible, inspect materials every 4 months.

Stay Informed



Receive training and updates on CRB identification, infestation status, and Best Management Practices (BMPs) from CRB Response or your island ISC.

- Require landscaping contractors to also complete training.



Create and implement a CRB management plan. CRB Response can assist with creation.

Staff should stay informed about the status of CRB in and around their work areas and employ BMPs.

Botanical gardens serve as sanctuaries for endangered native palms and hubs of plant knowledge. These spaces face unique CRB threats due to dense plantings and the vulnerability of loulu to CRB. Safeguarding these treasures demands proactive CRB practices and fostering awareness among docents, visitors, plant enthusiasts, and conservation partners. Shared knowledge and action will protect these vital collections.



Key messages & actions for

BOTANICAL GARDENS

Arboretums and Loulu collections

BOTANICAL GARDENS

Arboretums and Loulu Collections

Key Messages/Actions

INFESTED ISLAND

Inspect and Report



Inspect host plants for CRB damage and high-risk materials for presence of CRB. Kill all CRB found.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile high-risk materials for more than 4 months (unless in a sealed, CRB-proof container).

- If this is not possible, inspect materials every 4 months.



Collect and store seeds from endangered palms as a safeguard from extinction.

Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from infested areas.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



When possible, generate green waste and mulch onsite.

Stay Informed



Receive training on best practices by CRB Response or your island ISC.

- Require and enforce CRB BMPs for contracted landscaping services.



Stay up-to-date on the latest treatment recommendations for palms.



Photo: CTAHR

Loulu, a preferred CRB host, are especially vulnerable to rapid decline and death from CRB infestations. Protecting loulu from CRB is crucial to prevent potential extinctions. Other endemic plants, like hapu'u tree ferns, could be vulnerable in certain settings.

BOTANICAL GARDENS

Arboretums and Loulu Collections

Key Messages/Actions

NON-INFESTED ISLAND

Inspect and Report



Inspect host plants for CRB damage and high-risk materials for presence of CRB.



Report CRB or damage to 643PEST.org or (808) 643-PEST (7378) and take clear photos/video.



Hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg 55 for more info.

Prevent the Spread



Don't import palms, soil, compost, mulch, and plants from infested areas.



Ensure all materials brought on-site are CRB-free. Inspect thoroughly and purchase from trusted sources.



Generate green waste and mulch on-site to minimize the risk of accidental introductions.



Install, maintain, and regularly check CRB traps around perimeter. Request from your island ISC.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile compost, mulch, potting medium for more than 4 months (unless in a sealed, CRB-proof container).



Collect and store seeds from endangered palms as a safeguard for the future.

Stay Informed



Receive training on best practices by CRB Response or your island ISC.

- Require and enforce CRB BMPs for contracted landscaping services.

Guarding loulu palms from CRB infestation is key to averting extinctions. Loulu, a preferred CRB host, are especially vulnerable to rapid decline and death from CRB. CRB threaten these and other native species, such as hala trees and hapu'u tree ferns.

The military's extensive land holdings and control over regional transport networks require exceptional biosecurity leadership. To protect Hawai'i and the Pacific from CRB, enhanced protocols and collaborative efforts are essential.



Key messages & actions for

MILITARY

MILITARY

CRB's initial detection on Joint Base Pearl Harbor-Hickam highlighted the importance of military biosecurity. To safeguard Hawai'i and the Pacific, CRB prevention is now a critical focus, demanding rigorous protocols and cross-sector collaboration.

Key Messages/Actions

INFESTED ISLAND

Inspect



Inspect all vehicles, boats, planes, and materials moving from infested to non-infested areas for signs of CRB or damage. Kill all CRB found.

Prevent the Spread



Don't transport high-risk material without proper inspection and treatment.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Prevent breeding by managing or removing breeding materials (green/brown waste, compost, amended soils, mulches).

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile compost, mulch, potting medium for more than 4 months (unless in a sealed, CRB-proof container).

Stay Informed



Receive training on best practices by CRB Response or your island ISC.

- Require and enforce CRB BMPs for contracted landscaping services.



Create and implement a CRB management plan. CRB Response can assist with creation.



Joint Base Pearl Harbor-Hickam spends millions of dollars annually controlling CRB.

MILITARY

Key Messages/Actions

NON-INFESTED ISLAND

Inspect and Report



Inspect incoming vehicles, boats, planes, and materials arriving from infested areas for any signs of CRB.



If you see suspicious palm damage, beetles, or grubs, take photos and report it to 643PEST.org or (808) 643-PEST (7378).



Contain and hold onto specimen until ID'ed. Take clear pictures and short videos of larvae on a flat surface. See pg 55 for more info.

Prevent the Spread



Don't transport high-risk material without proper inspection and treatment.



Source plants, compost, mulch, steer manure, and gardening material from as local as possible.



Prevent breeding by managing or removing breeding materials (green/brown waste, compost, amended soils, mulches).



Install, maintain, and regularly check CRB traps, especially around any ports of entry.

Manage High-Risk Materials



Remove dead standing palms, stumps, and snags including roots.



Don't stockpile compost, mulch, potting medium for more than 4 months (unless in a sealed, CRB-proof container).

Stay Informed



Receive training on best practices by CRB Response or your island ISC.

- Require and enforce CRB BMPs for contracted landscaping services.



Maintain CRB-free status. Implement a CRB management plan. Contact CRB Response for assistance with plan creation.



Regular and thorough inspections of vehicles, boats, planes, and materials are vital for early detection.



Resources for

CRB EARLY DETECTION & MANAGEMENT TOOLS

CRB Traps, Community Trapping Programs,
Prevention, and Management Resources

TRAPS FOR EARLY DETECTION & MONITORING

CRB traps are the best tool available for early detection in non-infested areas. It can take months for "V" cuts and bore holes to show up on trees, whereas traps will catch a percentage of the beetles in an area in much less time. Traps are not an effective tool for control.

Why use detection traps?

- Best available tool for detecting new infestations
- Ease of checking compared with searching through green waste
- Allow for monitoring across a large area
- Complement other detection methods



TRAPS FOR EARLY DETECTION & MONITORING



One of the most common questions we get asked is if hanging a trap will attract CRB over to your property. The pheromone lure lasts around 3 months and will attract adult CRB from around 5-50 feet away, depending on wind conditions. CRB traps don't have a far range and will only detect beetles already in the area.

In choice tests, CRB are most attracted to palm crowns, then high-risk materials like mulch or compost, then traps. Green waste was 26 times more attractive than the trap lure in a field comparison. Coconut palms are even more attractive.

So why use traps? Though CRB frond damage eventually becomes visible, traps offer much earlier detection compared to relying on visual inspections alone. This head-start gives us the best chance for successful management.

What's more attractive to CRB?



Palms



Greenwaste



CRB traps



**Estimated based on field observations*

CRB COMMUNITY TRAPPING PROGRAMS

What are the community trapping programs?

Early detection on all islands is increasingly important as the risk for transporting CRB grows. Community members and organizations in non-infested areas are able to maintain a CRB trap where more coverage is needed and be proactive in early detection efforts. Community trapping programs distribute traps and support trap checks and maintenance.

Can I get my own trap? What are the requirements/commitments if I get a trap?

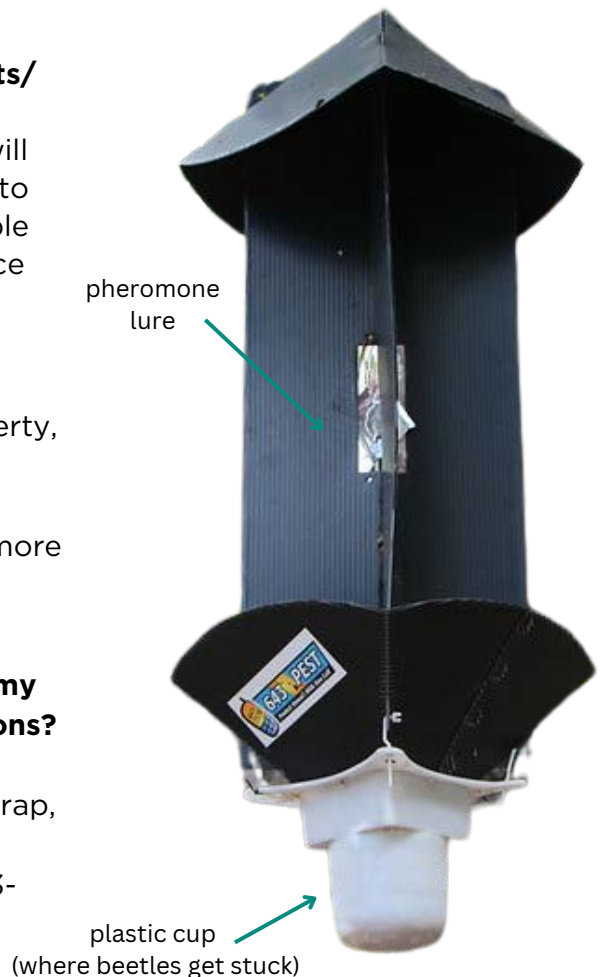
Not everyone will get a trap and trap distribution will be determined based on the proximity of your site to existing traps. To participate in the programs, people must first take a simple training on trap maintenance and data recording.

Where should I place my trap?

Traps should be hung in a secure place on the property, where beetles can fly in from any direction. It's not recommended to hang on or next to a host plant or next to breeding material, as these would likely be more attractive than the trap.

How do I maintain my trap? How often do I check my trap? How do I submit my trap checks and detections?

Participants will be given a simple training on trap checks and data recording. If CRB are found in the trap, immediately remove and store in a glass jar in the freezer and report to 643PEST.org or call (808) 643-PEST (7378).



Contact the CRB Response or your island ISC to join the early detection trapping effort:

- Kaua'i: kisc@hawaii.edu
- Maui: miscpr@hawaii.edu
- Moloka'i: molokaimisc@gmail.com
- Hawai'i: biisc@hawaii.edu
- General Inquiries: info@crbhawaii.org

CRB MANAGEMENT TOOLS

Treatments known to kill CRB

There is no single treatment currently available to completely rid an area of CRB but there are several treatments and practices that can reduce the impacts of CRB. Here is a list of methods known to kill all life stages of CRB in infested material. If the high-risk material is subjected to a kill treatment every four months, the CRB growing in the material will be killed before they have a chance to mature and fly away.



Chipping: The cutting action kills all life stages. Chips can be infested immediately after processing so storage or transport should be done on the same day. **Use this method for tree and palm waste (logs, branches, stumps, fronds, leaves).**



Hot compost: CRB begin to die around 115° F but 131° F core temp is a good target to ensure that even the colder spots, or edges and areas touching soil are at least 115° F. **Use this method for mulch (chipped wood and plant material) and non-woody plant waste (grass clippings, leaves, fruits, veggies).**



Submerge: Complete submersion of high-risk material underwater for at least 48 hours. Adults may escape but all immatures should die. **Use this method for finished compost and gardening materials such as soil, mulch, peat, coconut coir.**



Steam: Steam takes a long time to penetrate deep and fine material. You must measure the core of the material to ensure that all material reaches 120° F for at least 1 hour. Use of a sealed container, vacuum system, and perforated piping can speed up the process. **Use this method for tree and palm waste, mulch, finished compost, soil, and non-woody plants.**



Fumigate: Sulfuryl fluoride (Profume, Vikane) can be applied by a certified applicator. This is the same chemical used to fumigate homes for termites. Other fumigants may work but have not been tested on CRB yet. **Method effective on tree and palm waste, mulch, finished compost, soil, and non-woody plants.**

CRB MANAGEMENT TOOLS

Treatments known to slow CRB growth

CRB breed in decaying plant material (not just palm). Mulch and compost are ideal but stumps, leaves, lawn thatch, rich soil and leaf/frond debris and rotting areas in palm crowns are also suitable. CRB adults burrow into the heart of host plants to feed. Use these methods to slow the growth of CRB populations. Treatment recommendations may change with new research. Refer to crbhawaii.org for the latest recommendations.



Grind: Grinding will kill some CRB but kill rates have not been tested. Finer (smaller particle size) grinding is more likely to kill more CRB. Use this method for tree and palm waste (logs, branches, stumps, fronds, leaves).



Burial: CRB are very good diggers but burial will probably mask the smell of decomposing materials and requires more work for CRB to reach. Use this method for mulch (chipped wood and plant material), finished compost, soil or planting media, and non-woody plant waste.



Till in: Tilling material into soil reduces the scent, access, and calories per volume available to CRB. The smaller the organic component of the soil is, the lower the attractiveness will be to CRB. Use this method on mulch, finished compost, soil or potting media.

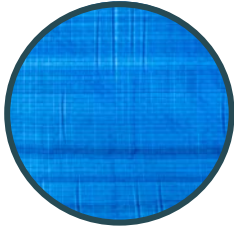


Spread thin: Spreading mulch and compost thinner than 2 inches dries out the material faster and allows predators (chickens and mongoose) to find CRB. If material stays moist or is irrigated this is not a treatment for CRB. Use this method on mulch, finished compost, soil or potting media.

Green waste management has proven to be the most effective method for reducing beetle populations. In areas where beetle populations have been significantly reduced and tree recovery has been successful, green waste management was a crucial factor. Homeowners on O'ahu are encouraged to dispose of their green waste in the city and county's designated green waste bins, as it is then transferred to a treatment facility.

CRB MANAGEMENT TOOLS

Treatments known to slow CRB growth



Tarping: Tarps can reduce the available scent but they can also keep material moist which promotes growth. CRB can burrow under or through most tarps. **Use this method for mulch, finished compost).**



Netting: Netting can entangle and prevent CRB from accessing or escaping the crown of the tree, decaying palm stumps, and piles of high-risk material. **Use this method for tree and palm waste, mulch, finished compost, soil or potting media, non-woody plant waste, and crowns of living palms.**

Note: Gill netting with this size mesh is not legal for use near water areas or for fishing. It is also not legal to sell in Hawai'i (HAR 13-75).



Pesticides: Pesticides are applied as sprays, granules, systemic injections, or systemic root drench. Since systemic pesticides require CRB to feed on the plant to die, damage will still occur but will be reduced when there is a reduction in the local CRB population. **Can be used on live host plants, tree and palm waste, mulch, finished compost, and soil or potting media.**

Note: When applying systemic pesticides to trees, remove palm flowers and fruits before treatment and every 6 months during treatment to safeguard pollinators and prevent human exposure. Consult the product label for legal application sites.

- **Injection:** Imidacloprid (e.g. ImaJet) and Acephate (e.g. AceJet) kill CRB in lab trials and have reduced populations when applied to most palms in a broad area.
- **Soil drench:** Imidacloprid (e.g. Imidacloprid 75 WSP) can be applied as a soil drench for systemic treatment of palms. Fully trimmed palms can be treated as “shrubs” when consulting the label for application instructions.
- **Foliar spray:** Spraying of palm crowns with pyrethrin (e.g. Oneguard, MustangMaxx, Evergreen, Demon Max) has been shown to kill CRB in the lab and field.
- **Breeding material:** Granules and sprays containing pyrethrins, may be applied to mulch, soil, and waste in some cases. This may require the area to be planted or near a structure.

METHODS FOR CRB CONTROL

Treatments for CRB

	Tree/Palm waste branches, logs, stumps, fronds, leaves	Mulch chipped wood, sawdust, chopped plant material	Finished compost plant material composted and cooled to under 120 F	Soil any planting media that contains organic material, like peat, coir, wood chips, compost, or humus.	Non-woody plant waste grass clippings, leaves, vegetables, fruits
Kills all CRB in material					
Chipping	<input checked="" type="checkbox"/>				
Hot composting		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Submersion			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Steam	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fumigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

	Tree or palm waste branches, logs, stumps, fronds, leaves	Mulch chipped wood, sawdust, chopped plant material	Finished compost plant material composted and cooled to under 120 F	Soil any planting media that contains organic material, like peat, coir, wood chips, compost, or humus.	Non-woody plant waste grass clippings, leaves, vegetables, fruits	Living host plant palms, hala, sugarcane, banana, etc.
Slows population growth						
Grind	<input checked="" type="checkbox"/>					
Bury		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Till in		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Spread thin		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Tarp		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Net	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pesticides	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

CRB MANAGEMENT TOOLS

What to do with CRB specimens for identification and disposal

If you've found or collected live CRB from traps, breeding sites, or trees, it's crucial to prevent their escape. Securely store them in a container such as a glass jar, 5-gallon bucket, or metal can with a lid. CRBs can escape from bags, thin plastic cups, tarps, thin wood, and most types of cloth.



If you are on an **uninfested** island or in an area where CRBs have not been found, please keep them in a sturdy container until identification is verified and reported. Take clear photos of both the top and bottom of larvae and beetles, including a ruler for scale. Clean dirt off larvae before taking photos. Additionally, take a short video of the larvae crawling on a flat surface. Report to 643PEST.org or call (808) 643-PEST (7378).



If you are on an **infested** island or an area where CRB are common, killing and disposal is recommended. See below for suggestions. If you are opposed to killing CRB, please keep them contained for the remainder of their life or turn them in to your local CRB authority.

CRB specimens can be killed by a number of methods. Below we present several that are common and cause minimal distress.



- Place in a sturdy plastic or glass jar and freeze for 24 hours or more.
- Pour 1-2 tablespoons of $\geq 90\%$ isopropanol, acetone, or ethyl acetate into a jar and seal the CRB inside for 24 hours or more.



- Submerge them in one of the household chemicals below:
 - $\geq 70\%$ Alcohol (isopropanol or ethanol)
 - $\geq 10\%$ Bleach solution (1:10 dilution of household bleach)
 - Household ammonia



CRB RESOURCES

CRB Management Groups Contact Information,
Videos, Research Papers, & FAQs

RESOURCES

Information on CRB prevention and management is constantly evolving. Refer to these organizations to stay up-to-date on the latest information:

<p>CRB Response (info@crbhawaii.org)</p>	<p>The CRB Response can provide information on identifying CRB and damage, CRB population density, best management practices, treatments, and education resources. www.crbhawaii.org</p>
<p>CTAHR</p>	<p>Extension services can provide management advice and information. Extension Office Locations: cms.ctahr.hawaii.edu/ce/Find-Us</p>
<p>UH Master Gardener Helplines</p>	<p>Trained master gardeners can assist with general palm health questions. cms.ctahr.hawaii.edu/uhmprogram/Helplines</p>
<p>Kaua'i Invasive Species Committee (kisc@hawaii.edu)</p>	<p>KISC can provide information on identification, community trapping, updates on infested areas, and management information. www.kauaiisc.org/pests/coconut-rhinoceros-beetle/</p>
<p>O'ahu Invasive Species Committee (oisc@hawaii.edu)</p>	<p>OISC can provide information on identification, updates on infested areas, and management information. www.oahuisc.org/coconut-rhinoceros-beetle/</p>
<p>Maui Invasive Species Committee (miscpr@hawaii.edu)</p>	<p>MISC can provide information on identification, community trapping, updates on infested areas, and management information. mauiinvasive.org/coconut-rhinoceros-beetle/</p>
<p>Moloka'i Invasive Species Committee (molokaimisc@gmail.com)</p>	<p>MoMISC can provide information on identification, community trapping, updates on infested areas, and management information.</p>
<p>Big Island Invasive Species Committee (biisc@hawaii.edu)</p>	<p>BIISC can provide information on identification, community trapping, updates on infested areas, and management information. www.biisc.org/pest/coconut-rhinoceros-beetle/</p>

RESOURCES

Videos: Testimonials and Community



Coconut Rhinoceros Beetle - a Threat to the
Indigenous Hawaiian Culture (Malama
Learning Center)
vimeo.com/355793967

Coconut Rhinoceros Beetles in Hawai'i - A
Community Effort to Control it
(Malama Learning Center)
vimeo.com/228029638



Reconnecting with Niu: The Tree of Life
(Malama Learning Center)
vimeo.com/355793967

More testimonials and CRB videos from Malama Learning Center:
www.malamalearningcenter.org/coconut-rhinoceros-beetle.html

Videos: CRB Prevention and Management



Netting Dwarf Coconut Trees to Manage
Coconut Rhinoceros Beetle (CTAHR)
bit.ly/3OHwj5R

CRB Response YouTube Channel-
Presentations on a variety of topics including
treatment techniques, research, and palm damage
www.youtube.com/@coconutrhinocerosbeetleres2661



RESOURCES

CRB Trainings, Best Management Practices (BMPs), and Site-specific Management Plans

For more detailed BMPs or site-specific management strategies contact:

- Kaua'i: kisc@hawaii.edu
- O'ahu: info@crbhawaii.org
- Maui: miscpr@hawaii.edu
- Molokai'i: molokaimisc@gmail.com
- Hawai'i: biisc@hawaii.edu
- General Inquiries: info@crbhawaii.org

CRB Outreach Toolkit

CRB Response has curated a collection of communications resources, including photos, fact sheets, logos, and select social media post graphics, designed to serve as inspiration or to be directly modified for your outreach efforts. Access to the toolkit is provided on a case-by-case basis to ensure the most effective use of these materials. To request access and contribute to our collective effort in managing CRB, please send a message including the planned use of the materials to info@crbhawaii.org.

Frequently Asked Questions (FAQs)

CRB Response FAQ Page: www.crbhawaii.org/faq

Research Papers

Essential oil trials for CRB management

Preliminary Trials on Use of Essential Oils for IPM of Coconut Rhinoceros Beetle (2023). Alberto Ricordi and Joshua Silva. <https://bit.ly/3I0WKjc>

CRB radio tracking experiment in Guam

Moore, A., & Siderhurst, M. (2022). Proposal for detecting coconut rhinoceros beetle breeding sites using harmonic radar. Research Ideas and Outcomes, 8, e86422. <https://riojournal.com/article/86422/download/pdf/>

RESOURCES

Research Papers cont'd

Documentation of bagged mulch as a CRB vector

Moore, A., Quitugua, R., Iriarte, I., Melzer, M., Watanabe, S., Cheng, Z., & Barnes, J. M. (2016). Movement of packaged soil products as a dispersal pathway for coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae) and other invasive species. https://scholarspace.manoa.hawaii.edu/bitstream/10125/42743/1/PHES48_21-22.pdf

Breeding material preference tests and egg laying behavior

Manley, M., Melzer, M. J., & Spafford, H. (2018). Oviposition preferences and behavior of wild-caught and laboratory-reared coconut rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae), in relation to substrate particle size. *Insects*, 9(4), 141. <https://scholarspace.manoa.hawaii.edu/bitstream/10125/62429/1/2017-12-ms-manley.pdf>

Molecular identification to distinguish CRB from OFB through PCR (DNA ID)

Watanabe, S., & Melzer, M. J. (2017). A multiplex PCR assay for differentiating coconut Rhinoceros beetle (Coleoptera: Scarabaeidae) from oriental flower beetle (Coleoptera: Scarabaeidae) in early life stages and excrement. *Journal of economic entomology*, 110(2), 678-682. <https://academic.oup.com/jee/article-abstract/110/2/678/2929445>

Genetic Insights into CRB Populations and Biocontrol in the South Pacific

Etebari, K., Hereward, J., Sailo, A., Ahoafi, E. M., Tautua, R., Tsatsia, H., ... & Furlong, M. J. (2020). Genetic structure of the Coconut Rhinoceros Beetle (*Oryctes rhinoceros*) population and the incidence of its biocontrol agent (*Oryctes rhinoceros nudivirus*) in the South Pacific Islands. *bioRxiv*, 2020-07.

<https://www.biorxiv.org/content/10.1101/2020.07.30.229872v1.abstract>

Research on egg laying behaviors by CRB

Manley, M. E. (2017). Oviposition Behavior of the Female Coconut Rhinoceros Beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae) (Doctoral dissertation).

<https://scholarspace.manoa.hawaii.edu/bitstream/10125/62429/1/2017-12-ms-manley.pdf>

RESOURCES

Research Papers cont'd

Salt tolerance of CRB

Vowell, T., Manley, M. E., Ho, J. R., Watanabe, S., & Melzer, M. J. (2023). Impact of metal salts on the survival, development, and oviposition behavior of coconut rhinoceros beetle (Coleoptera: Scarabaeidae). *Frontiers in Insect Science*, 3, 1157769.

<https://www.frontiersin.org/articles/10.3389/finsc.2023.1157769/pdf>

Trap use to monitor & control CRB

Paudel, S., Jackson, T. A., Mansfield, S., Ero, M., Moore, A., & Marshall, S. D. (2023). Use of pheromones for monitoring and control strategies of coconut rhinoceros beetle (*Oryctes rhinoceros*): A review. *Crop Protection*, 106400.

<https://www.sciencedirect.com/science/article/pii/S0261219423002235>

Management tools for CRB

Adams, B. L. H. (2019). Analysis and development of management tools for *Oryctes rhinoceros* (Coleoptera: Scarabaeidae) (Doctoral dissertation, University of Hawai'i at Manoa).

<https://search.proquest.com/openview/a169aa7ab8d2a6b8c28d2fe72748f517/1.pdf?pq-origsite=gscholar&cbl=18750&diss=y>

Analyzing the Nutritional Profile of Coconut Rhinoceros Beetle

Omotoso, O. T. (2015). Nutrient composition, mineral analysis and anti-nutrient factors of *Oryctes rhinoceros* L.(Scarabaeidae: Coleoptera) and winged termites, *Marcrotermes nigeriensis* Sjostedt.(Termitidae: Isoptera). *British Journal of Applied Science & Technology*, 8(1), 97-106.

<http://publish.sub7journal.com/610/1/Omotoso812014BJAST15344.pdf>

Nematodes as biopesticides: trials of nematodes for CRB control

Manandhar, R., Kellar, M., & Cheng, Z. Survey of entomopathogenic nematodes on Oahu: potential for the biological control of coconut rhinoceros beetle.

https://www.researchgate.net/profile/Roshan-Manandhar-2/publication/301222198_Survey_of_entomopathogenic_nematodes_on_Oahu_potential_for_the_biological_control_of_coconut_rhinoceros_beetle/links/571582a008ae8ab56695b000/Survey-of-entomopathogenic-nematodes-on-Oahu-potential-for-the-biological-control-of-coconut-rhinoceros-beetle.pdf

RESOURCES

Research Papers cont'd

Pheromone trapping method review

Paudel, S., Jackson, T. A., Mansfield, S., Ero, M., Moore, A., & Marshall, S. D. (2023). Use of pheromones for monitoring and control strategies of coconut rhinoceros beetle (*Oryctes rhinoceros*): A review. *Crop Protection*, 106400.
<https://www.sciencedirect.com/science/article/pii/S0261219423002235>

CRB Management Materials Procurement Sources

The inclusion of companies and sources in this list does not constitute an endorsement or recommendation by us. This list is provided for informational purposes only, and users are encouraged to conduct their own research and exercise due diligence when selecting CRB management tools.

CRB Traps

Note: CRB traps are primarily used for monitoring and detection of CRB. We do not utilize traps as a control tool, since they are only estimated to catch a small percentage of beetles in the area, and do not have a significant impact on populations. See pg. 48-50 for more details on how traps are used.

Alpha Scents, Inc.

- Coconut rhinoceros beetle lure & Panel Trap Black (Complete): Contact Mark from Contemporary Landscaping, LLC.
markfukui@contemporarylandscapingllc.com, (808) 343-4624 for Hawai'i sales.
- Lure: <https://alphascents.com/products/coconut-rhinoceros-beetle-lure>
- Panel Trap: <https://alphascents.com/products/panel-trap-black-complete>

Photo Credits

Mahalo to the CRB Response and Forest & Kim Starr for the use of many of the images found in this document.

The Hawai'i Coconut Rhinoceros Beetle Communications Plan was produced through a collaborative effort:



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