



Help the Plant Heroes protect our forests
by slowing the spread of pests and diseases!

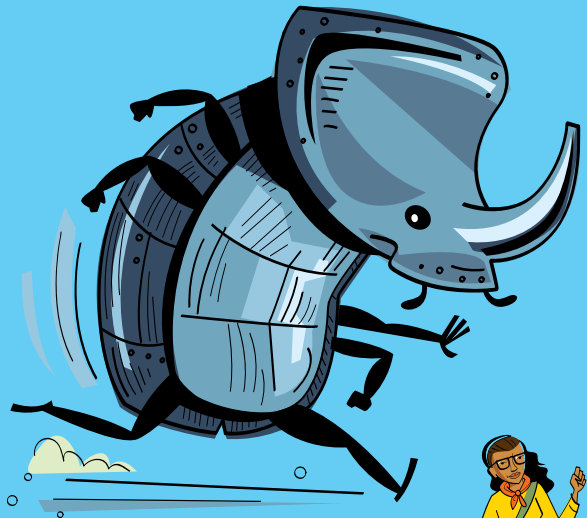
INSECT | COCONUT RHINOCEROS BEETLE

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ADVANCED
ACTIVITY
BOOK

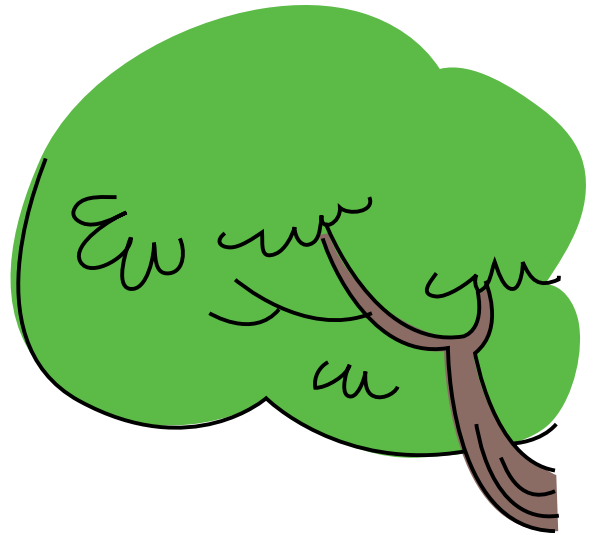
Aponi Star



BE A PLANT HERO!
Help Aponi slow the
spread of the Coconut
Rhinoceros Beetle!



Meet the PLANT HEROES!



LAURA WILKINS

From: Athens, Georgia
Hobbies: playing the trumpet,
gardening, studying ecology

FRANKIE BARKER

From: Shrewsbury, Massachusetts
Hobbies: climbing trees, camping

NATE GREEN

From: Tacoma,
Washington
Hobbies: going on
adventures, learning
about fungi

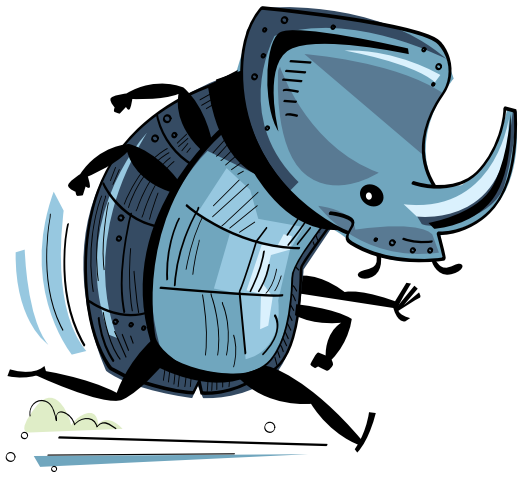
APONI STAR

From: Southeast
Illinois
Hobbies:
learning
more about
entomology (the
study of insects)



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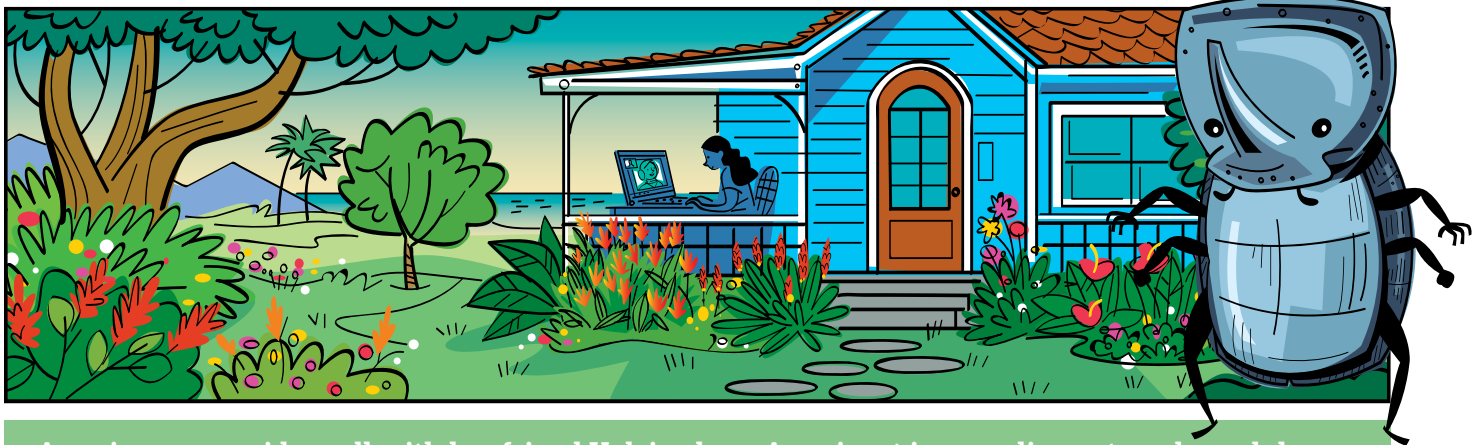
The Plant Heroes are four friends who love spending time in nature more than anything else! They enjoy climbing trees, walking trails, and camping.

The heroes are learning about why our forests are in danger. There are insects and fungi that can impact trees, sometimes affecting the health of whole forests. Trees may become sick or die when they are weakened by an invasive species, a living thing that is introduced to a new environment where it can cause damage to existing organisms.

Follow Aponi to learn the story of how her friend Kalei helped slow the spread of the coconut rhinoceros beetle...



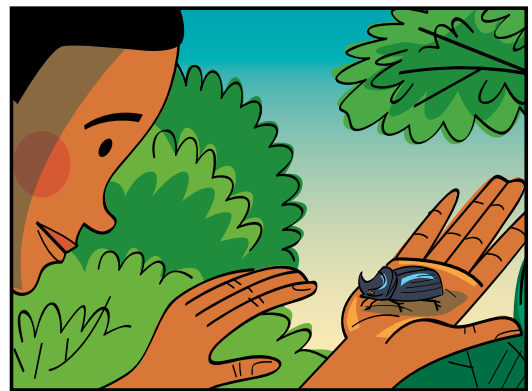
Catching the Coconut Rhinoceros Beetle



Aponi was on a video call with her friend Kalei, whom Aponi met in an online entomology club. Kalei lives on the island of O’ahu and told Aponi about an insect she found...



Kalei had been exploring her backyard, looking under logs for insects, and found a large black beetle with a horn that filled most of the palm of her hand! Surprised by its size, she took a picture to share at the next entomology club meeting.



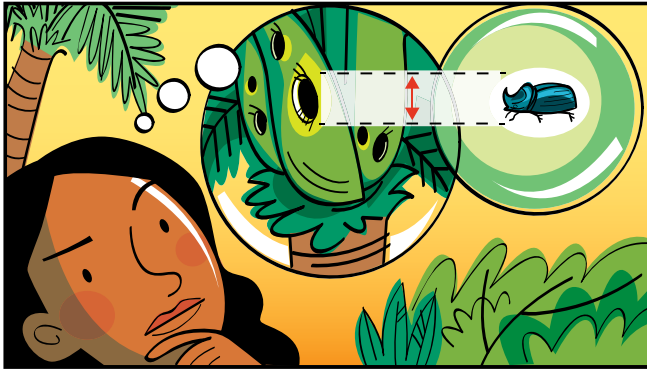
Later that evening, Kalei, her brother, and her tūtū (grandmother) went out to gather niu (coconut) near their house in preparation for a baby lū’au (party) to celebrate her cousin’s first birthday.

While harvesting the coconut, they noticed large holes in the base of the coconut palm fronds.



The Plant Heroes are brought to you by the American Public Gardens Association. This comic was developed with financial support from the USDA – Animal and Plant Health Inspection Service and reproduced with financial support from the USDA – Forest Service. Play games and learn how you can protect plants at plantheroes.org.





Kalei took a closer look and noticed that the holes were almost the same size as the beetle she had seen earlier that day. Kalei wondered, “Could it have been the beetle that made these holes?”

Concerned for the coconut palms they often harvest from, she and her tūtū contacted (808) 643-PEST, Hawai'i's statewide pest-reporting hotline. Kalei sent the photo of the beetle she took to the hotline and an expert told her it was a coconut rhinoceros beetle, a pest to the coconut, loulu (fan palm), kalo (taro), and other important plants.



The hotline put them in touch with the Coconut Rhinoceros Beetle Response team, which came out and collected the coconut rhinoceros beetle Kalei discovered and shared more information about the beetle and where else it has been found.



“Wow,” said Aponi. “Good thinking to call the pest-reporting hotline! Is there anything you can do to keep the coconut rhinoceros beetle from spreading?”

Kalei explained, “We are cleaning up our yard waste so that it doesn't become a breeding site for the beetles,

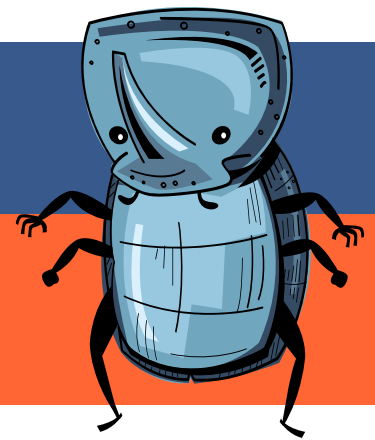
and I was able to tell my family and friends at the baby lū'au to be on the lookout for the beetles.”

Aponi and Kalei ended their video call by agreeing that Kalei should share her story at the next entomology club meeting!



Meet the Beetle

The coconut rhinoceros beetle is an impressive beetle with a horn sticking out of its head. Unfortunately, just as impressive is its ability to cause damage to palms, bananas, and other plants. Use the guide below to learn how to identify a coconut rhinoceros beetle.



The beetle is big, shiny, and black!

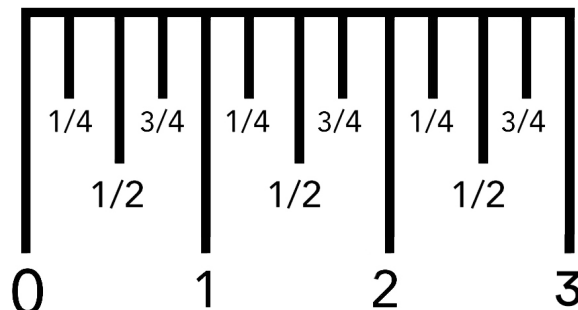
The beetle is named for the horn on its head!

They have rusty-colored hairs around their faces!



Coconut rhinoceros beetles are BIG insects and can be between 1.2 to 2.5 inches long.

See if you can draw the size of a beetle next to the ruler. →



NOT THIS BUG!

The coconut rhinoceros beetle looks a little like these insects—don't get them confused!



Oriental Flower Beetle



Black Dung Beetle



Queensland Longhorn Beetle



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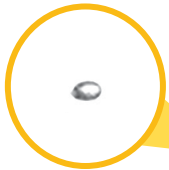
PHOTO CREDITS: A: LiCheng Shih, Flickr.com; B: Emmy Engasser, Bugwood.org; C: Donald Hobern, Flickr.com

Life Cycle Maze

The coconut rhinoceros beetle starts its life as a small egg laid in compost. The eggs hatch and larvae emerge, and they begin to feed on decaying plant material. Eventually, the larvae dig chambers in compost to pupate (or go through a "metamorphosis") and become adult beetles. Adult beetles can burrow into the growing tops of palm trees, damaging the fronds. Follow the stages of the beetle through the maze to learn more about its life cycle.



START →



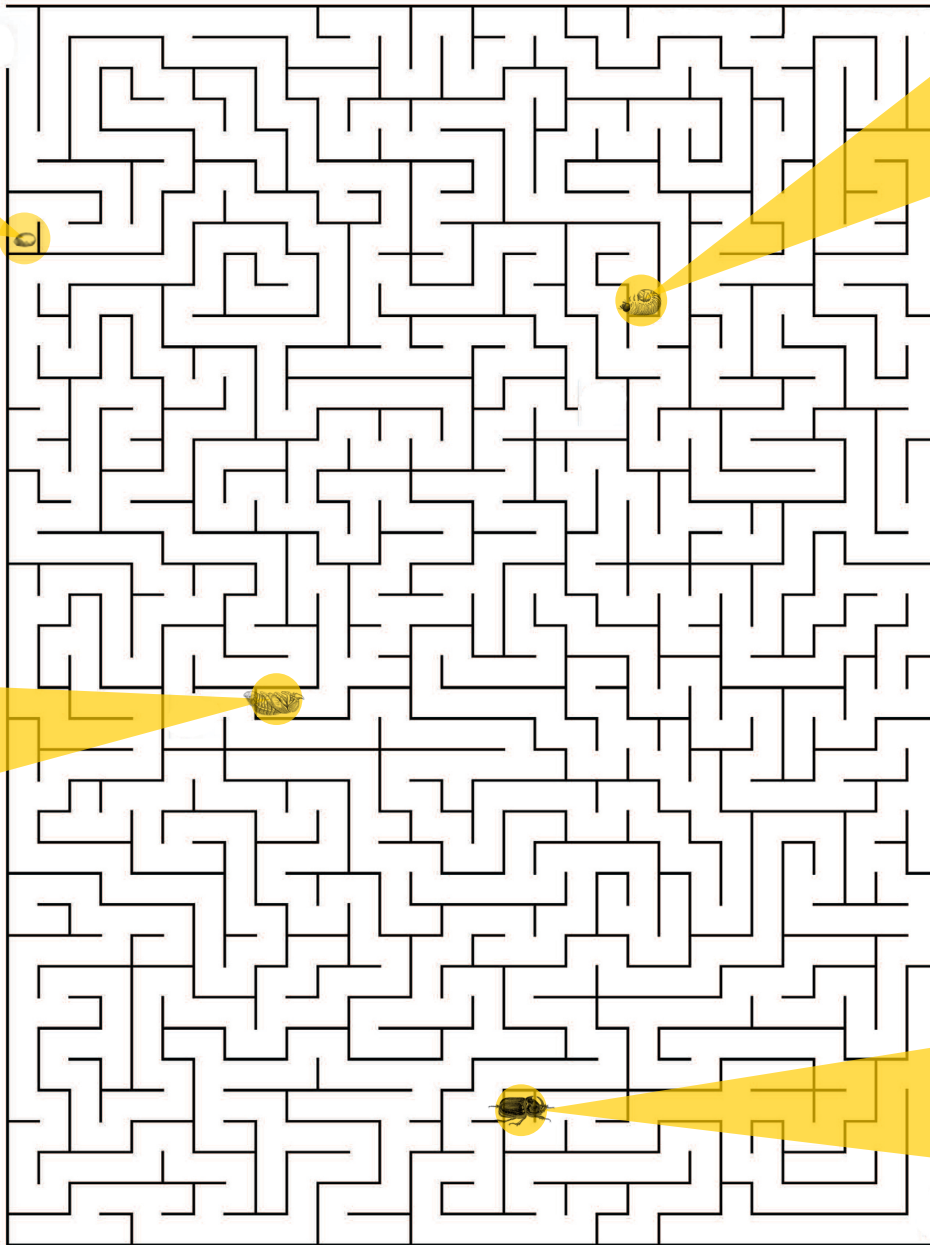
**Stage 1
EGG**

Eggs are whitish-brown and are laid in the trunks of decaying palms or compost.



**Stage 3
PUPA**

The larvae stop feeding and begin their resting stage. While they rest, they change into adult beetles. During this time of metamorphosis, they are called "pupae."



**Stage 2
LARVA**

Larvae, which look like white grubs, hatch from the eggs. These grubs go through 3 stages, called "instars," where each stage is bigger than the last.

HANDY TIP!
Add an "e" to the end of "larva" or "pupa" if you are talking about more than one larva or pupa!

**Stage 4
ADULT**

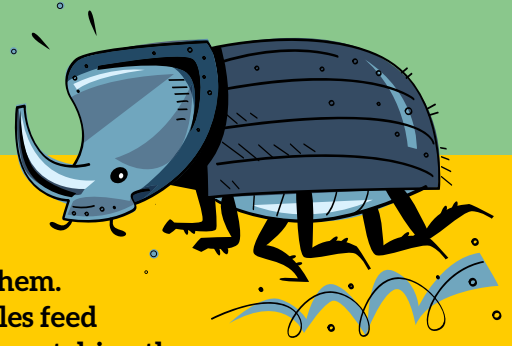
Adult beetles emerge as big, shiny beetles and can fly off to find mates.



FINISH



Meet the Palms!



While coconut rhinoceros beetles are named after the coconuts they like to feed on, they also feed on other plants. These plants are called “hosts” because the beetles are the “guests” that feed on them. Below are some of the favorite plants that coconut rhinoceros beetles feed on. Learn about a couple of the most common plants they prefer by matching the descriptions to the images.



Coconut Palm or niu
(*Cocus nucifera*)



Palm
(*Pritchardia* spp.)



Date Palm
(*Phoenix dactylifera*)

1

- These plants are native to Hawai'i and some species are threatened or endangered.
- The leaves of this plant are large and fan-shaped.
- These plants produce clusters of small fruits near the top.

2

- These plants produce red or yellow oval-shaped fruits that are very sweet to eat.
- The feather-shaped leaves of this palm can be 12 to 18 feet in length.
- The trunks of these trees have a bumpy, diamond-shaped texture.

3

- These trees can grow in sandy or exposed areas where other plants cannot.
- The leaves of this tree are wide and are up to 10–20 feet long.
- These trees produce the largest seeds in the world in the fruits at the center of the tree.

For more images of host plants, see pages 4, 5, and 6 in your field guide.



Trees in Trouble

Coconut rhinoceros beetle adults feed on the leaves of their favorite plants and often leave obvious signs of damage. Learn more about the signs and symptoms by matching each photo with the right description.



1

When feeding on a coconut palm frond that has not emerged yet, the beetle will leave behind a pattern of V-cuts in the frond.

2

When adults feed, they burrow into the base of palm fronds, creating large holes.

Scan this QR code or visit this website to learn how the coconut rhinoceros beetle damages palm fronds!
<https://bit.ly/2UpuzFg>



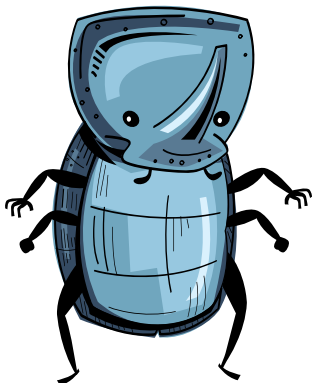
Time to Journal



1. What do you remember most about coconut rhinoceros beetles?

2. What is the most interesting thing you learned in this book?

3. Can you think of some signs that a plant is not healthy?
If you have plants near you, observe them carefully and write down what you notice.

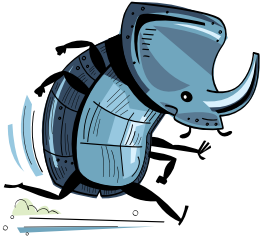


4. Do you have a favorite tree?
Write the name below. Describe why you love it.



Slow the Spread!

By being on the lookout for the coconut rhinoceros beetle, you can be a plant hero! Fill in the blanks below to learn tips and tricks for helping slow the spread of this beetle.



WORD BANK:
SPREAD, ADULT, DIAMOND, LARVA,
HOLES, PUPA, NEW, COMPOST

1. If you have a mulch or _____ pile in your backyard, look closely to see if there are any beetle larvae.
2. Do not move yard waste to a new location! Moving yard waste and mulch could accidentally _____ the coconut rhinoceros beetle to a _____ location.
3. Sometimes even when you can't spot the beetle, you will still see signs of the damage they cause. Be on the lookout for _____ in the base of fronds. Also, look for zigzag or _____-shaped cuts in the leaves.
4. If you spot a _____, _____, or _____ of coconut rhinoceros beetle or see signs of damage, ask an adult to call (808) 643-PEST (in Hawai'i) or a local expert for advice.



Did your sense of smell ever help alert you to something? Perhaps you smelled a rotten piece of fruit before you saw it? The CRB (coconut rhinoceros beetle) Response team in Hawai'i is using dogs's superior sense of smell to help them detect these beetles. Dogs have an excellent sense of smell and with training they can be used to find and locate scents, including the scent of the coconut rhinoceros beetle.

ANSWER KEY

Meet the Palms!

1. Fan Palm (*Pritchardia* spp.);
2. Date Palm (*Phoenix dactylifera*);
3. Coconut Palm or niu (*Cocos nucifera*)

Trees in Trouble: 1. b; 2. a

Stop the Spread! 1. compost;
2. spread, new; 3. holes, diamond;
4. larva, pupa, adult



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Join our team of Plant Heroes and learn about trees, forests, and the natural world around you!

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You can be a Plant Hero!

Are you curious about plants and animals? Do you like asking questions about nature? Do you enjoy being outdoors and having fun, climbing trees, balancing on logs, or finding a new butterfly or beetle? If so, you are already on your way to becoming a Plant Hero! We invite you to join forces with Nate, Laura, Aponi, and Frankie to protect the plants and ecosystems we all love.

How can you become a Plant Hero?

Join our team and go on a journey with Nate, Aponi, Laura, and Frankie. As a Plant Hero, you will learn to notice when plants are in trouble. You will also find out ways you can act quickly to help find solutions in your own neighborhood. Follow their adventures and learn how they help plants and ecosystems stay healthy.

On the Plant Heroes website, you will find materials to help you learn about plants, forest health, and ecosystem balance. The more you know, the more you can help protect plants and ecosystems in your own yard, neighborhood, and community!

Plant Heroes strives to spark curiosity about nature and science in all children. Our program provides hands-on, nature-based learning materials for educators to engage children in topics of plant health, ecosystem balance, and forest health. We also spotlight the amazing work our public gardens do in protecting the plants and ecosystems we all depend on through our website and printed materials. Visit plantheroes.org today to learn more!

Plant Heroes is brought to you by the American Public Gardens Association, founded in 1940. Over the last eight decades, the Association has supported the work of public gardens in North America and beyond. Our mission is to champion and advance public gardens as leaders, advocates, and innovators in the conservation and appreciation of plants. 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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