

# WE NEED YOUR HELP!

We are glad to provide these materials for free. In order for us to continue receiving funding for new materials, we need to collect information on how they are used.

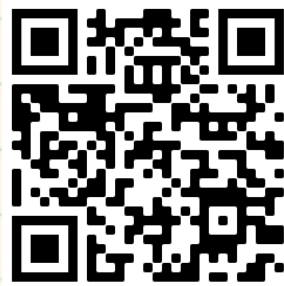
**Thank you for taking the time to answer the following one-minute survey.**



## There are three ways to complete the survey:

**1**

Scan this code with your smartphone camera



**2**

Type the following link into your web browser:  
<https://plantheroes.org/educator-survey>

**3**

Email your answers to:  
[plantheroes@publicgardens.org](mailto:plantheroes@publicgardens.org)



- 1) Job title
- 2) Name of organization you belong to
- 3) What kind of educator are you?
  - Teacher
  - Summer camp counselor
  - Home schooler
  - Public garden educator
  - Informal educator
  - Other (please describe)
- 4) What grade level do you teach?
  - Elementary (K-5)
  - Middle School (6-8)
  - High School (9-12)
  - Other (please describe)
- 5) Specify what subject area you teach:
  - Science
  - Math
  - Language Arts
  - Social Studies
  - Other (please describe)
- 6) How many students do you teach in a school year?



# Field Guide:

## Coconut Rhinoceros Beetle

*Coconut rhinoceros beetle adults affect palm trees by chewing big holes through their growing leaves to feed on soft tissue in the heart of the palm.*



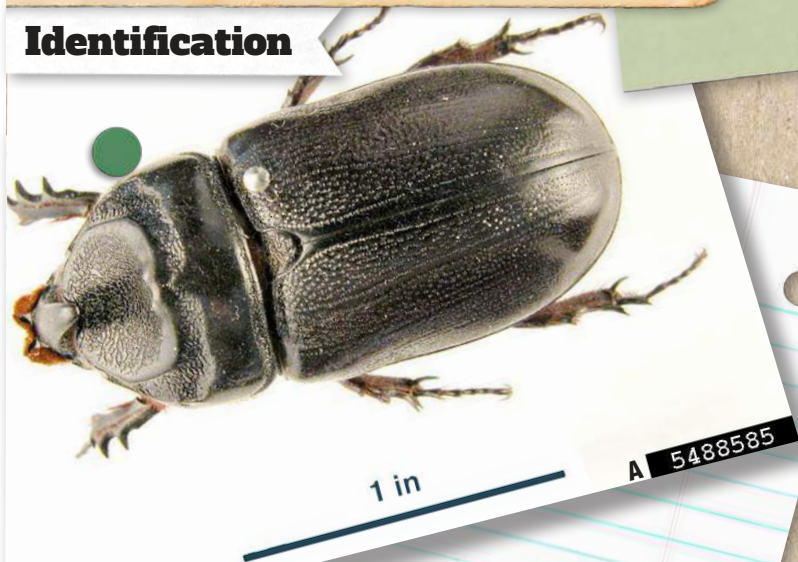
**Plant  
Protection  
Program**

AMERICAN PUBLIC GARDENS ASSOCIATION

Photo: Hawaii Department of Agriculture

# COCONUT RHINOCEROS BEETLE

## Identification



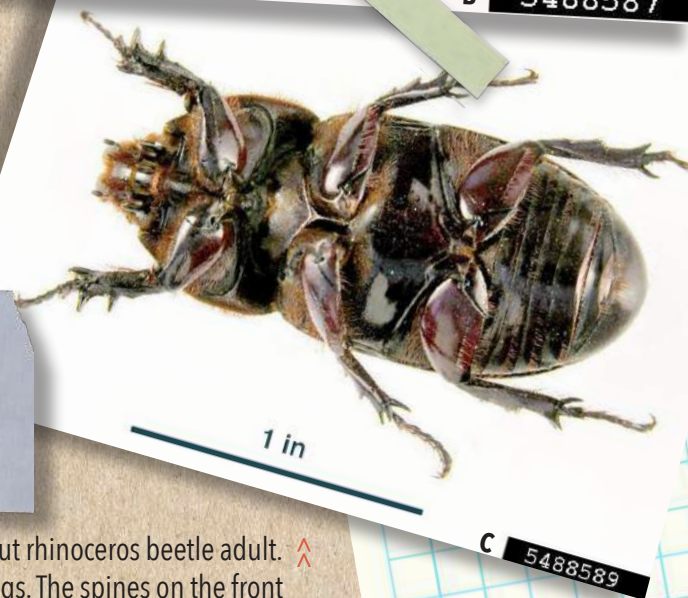
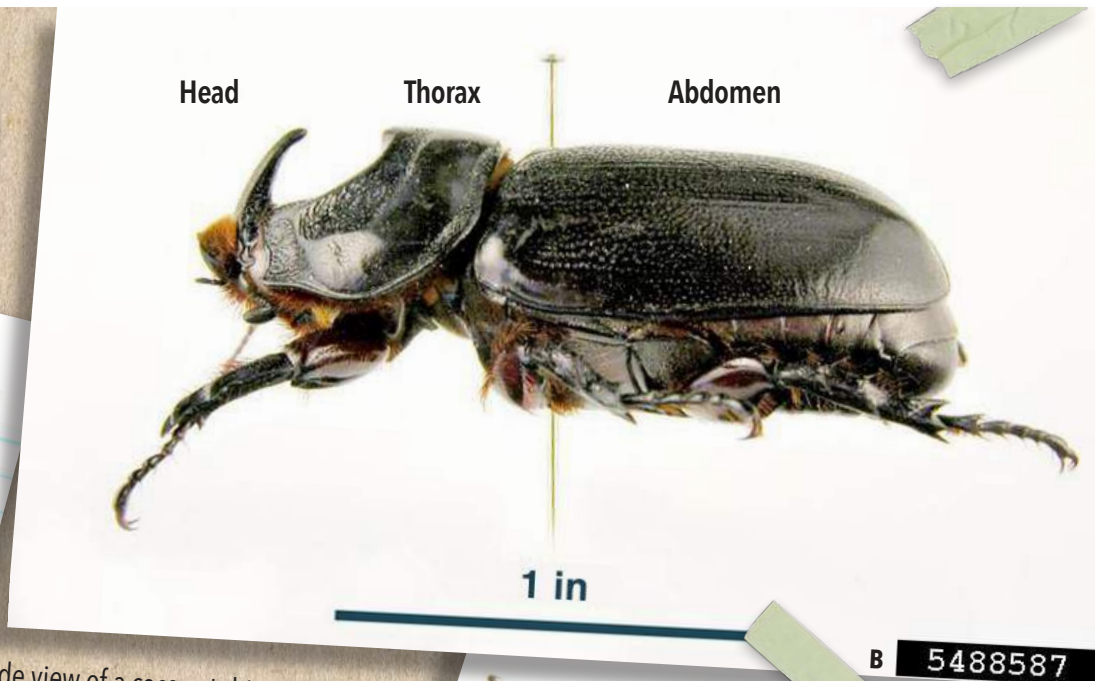
⤴ Top view of a coconut rhinoceros beetle (*Oryctes rhinoceros*) adult. The beetle is named for the horn on its head! They are large (about 2 inches long) and shiny black with rusty-colored hairs around their faces. Females have similar hairs on their back ends but shorter horns.



D

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

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



# COCONUT RHINOCEROS BEETLE

A coconut rhinoceros beetle has six distinct life stages.

## Life Cycle

A coconut rhinoceros beetle adult. That's one big beetle!

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



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

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



Pupa  
~ 20 days



3rd instar grub  
~ 32 days



2nd instar grub  
~ 21 days

Egg  
~ 12 days

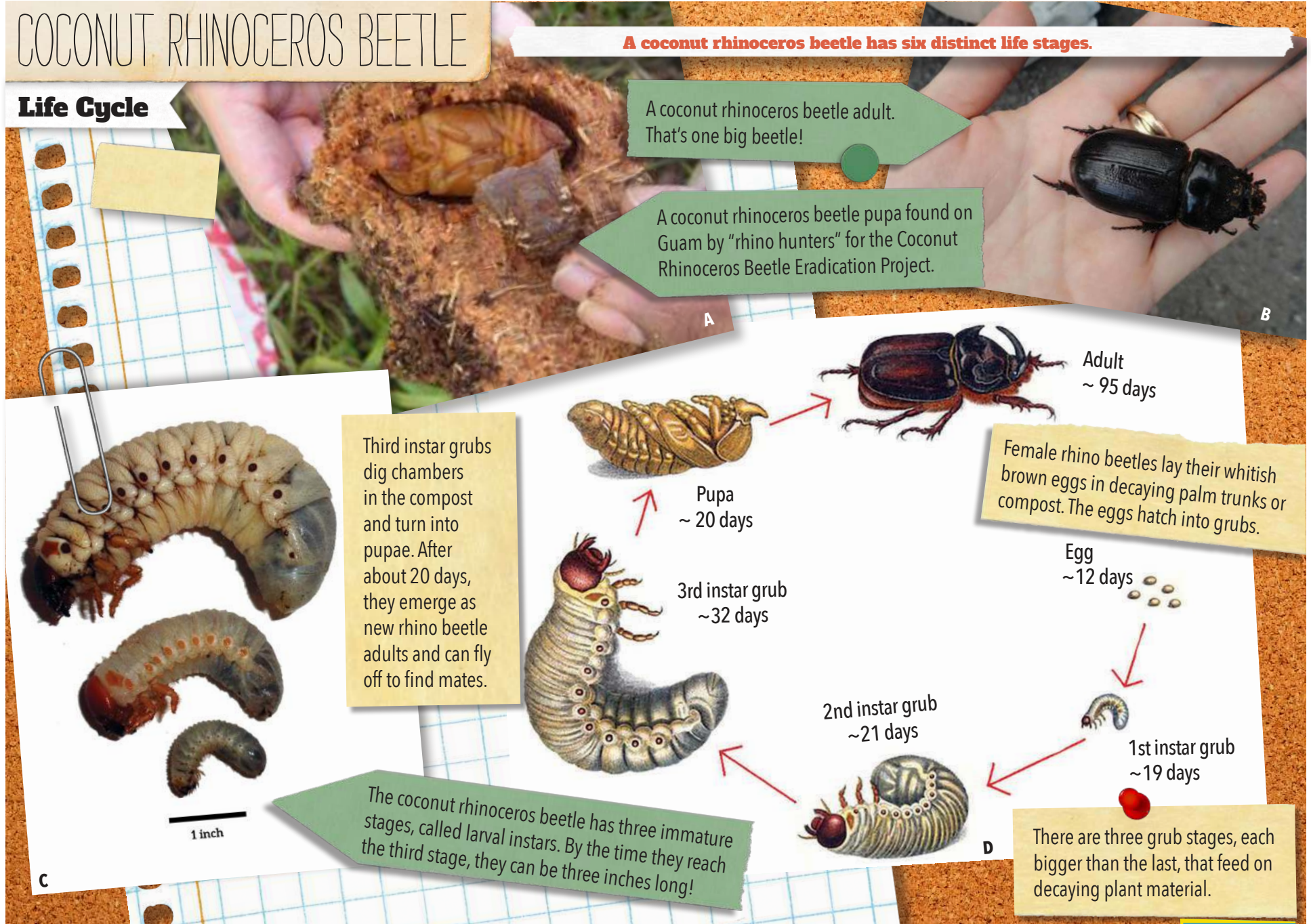


1st instar grub  
~ 19 days

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

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

Adult  
~ 95 days



# COCONUT RHINOCEROS BEETLE

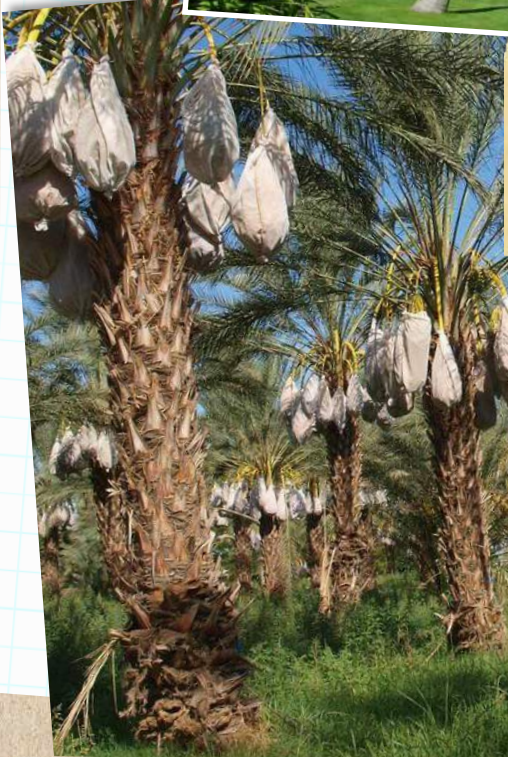
## Host Trees

Host trees are trees that the coconut rhinoceros beetle feeds on.

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



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



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

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

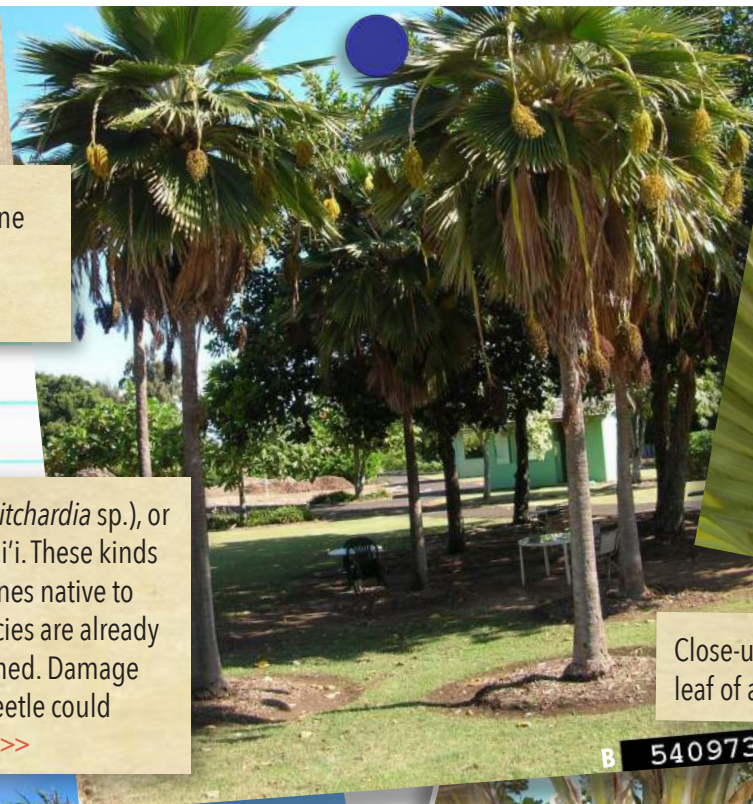
# COCONUT RHINOCEROS BEETLE

## Host Trees 2



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

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



Close-up of the fan-shaped leaf of a fan palm.



Screwpine trees are important salt-, drought-, and heat-tolerant species on many Pacific islands that can be attacked by the coconut rhinoceros beetle.



Fan palms have clusters of fruit located near the top. Some species of fan palms are only found on certain islands in Hawai'i!

# COCONUT RHINOCEROS BEETLE

## Host Trees 3

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

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



A UGA1197012



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

<< Fruit of an oil palm, which is used to make palm oil for cooking and industry. These palm trees are a very important agricultural species in many parts of the world.

PHOTO CREDITS: A: 1197012 Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org; B: 5369833 Whitney Cranshaw, Colorado State University, Bugwood.org; C: 1399156 Manfred Mielke, USDA Forest Service, Bugwood.org; D:1574345 Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org



# COCONUT RHINOCEROS BEETLE

## Damage

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

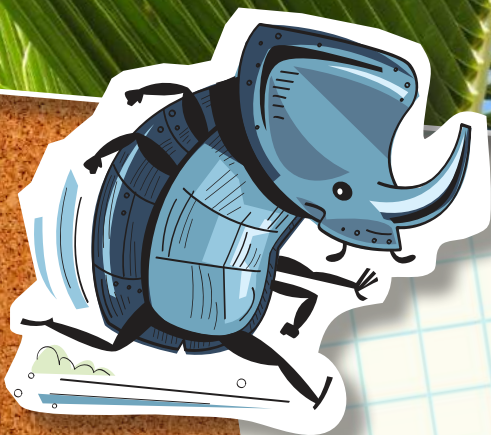


B

⚠ The large holes seen here at the base of the fronds on this palm are feeding damage caused by coconut rhinoceros beetle adults. They burrow into the growing top of the palm and feed on the soft tissue in the heart of the palm.



A



Diamond-shaped cuts into palm fronds mean that coconut rhinoceros beetles were here! >>

C





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

**PLANTHEROES.ORG**

**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](http://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.



**American  
Public Gardens  
Association**

[PublicGardens.org](http://PublicGardens.org)

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