

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.

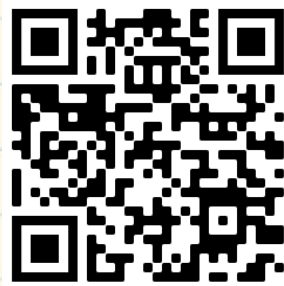
Thank you for taking the time to answer the following one-minute survey.



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



- 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:

Rapid 'Ōhi'a Death

Rapid 'ōhi'a death is a fungal disease that is taking Hawai'i by storm. It attacks the 'ohi'a tree—an important species in Hawaiian forests and culture.



**Plant
Protection
Program**

AMERICAN PUBLIC GARDENS ASSOCIATION



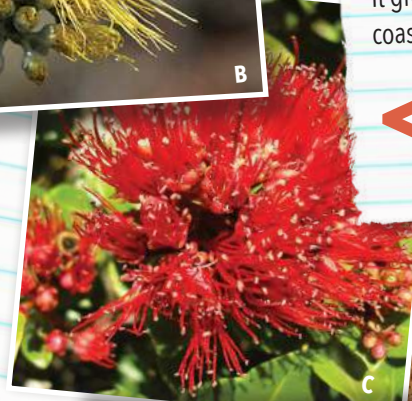
Photo: Forest and Kim Starr, Starr Environmental, Bugwood.org

RAPID 'ŌHI'A DEATH

Host Plants

Host plants are plants that the fungus affects.

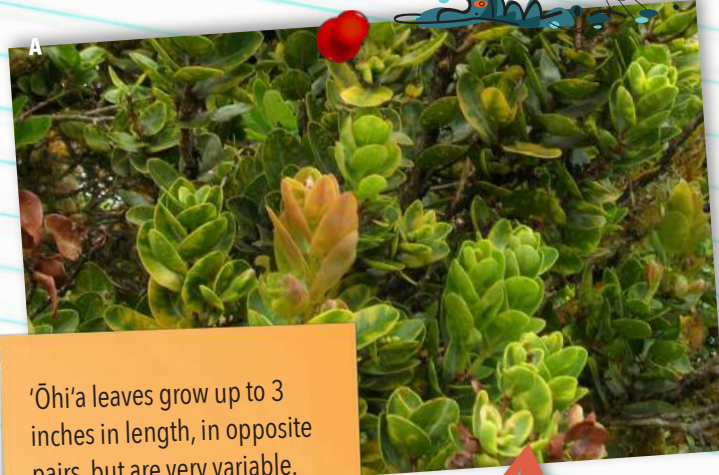
'Ōhi'a lehua, or *Metrosideros polymorpha*, is a dominant forest tree and shrub found on all the main forested islands of Hawai'i. It can grow in many soil types—in rich forests, rocky scrub, and new lava flows.



'Ōhi'a lehua (oh-hee-uh leh-hoo-uh)

The genus name "polymorpha" means "many forms." This refers to the various different shapes, sizes, and flower colors of the 'Ōhi'a tree. It grows in many different habitats on the Hawaiian islands—from the coast all the way up to the mountains.

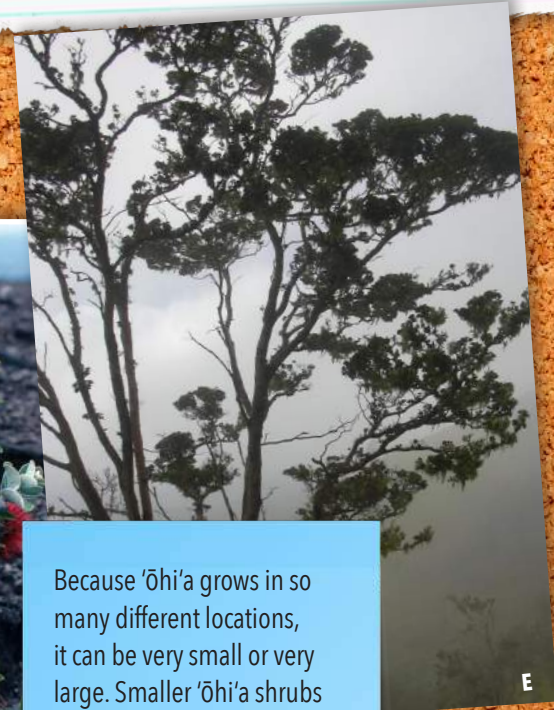
<< The flowers are typically red but can be pink, yellow, orange, and anywhere in between.



'Ōhi'a leaves grow up to 3 inches in length, in opposite pairs, but are very variable. They are often shiny and oval-shaped with an obvious central vein and slightly arched smaller veins.



Because 'Ōhi'a grows in so many different locations, it can be very small or very large. Smaller 'Ōhi'a shrubs sometimes grow less than 2 feet, while forest trees can grow to 80 or 90 feet!



RAPID 'ŌHI'A DEATH

Impact

'Ōhi'a is one of the most common plants of the Hawaiian Islands. Some forests are 80% 'ōhi'a! Losing such a common species would have a wide range of impact. One of the biggest problems would be that wherever 'ōhi'a used to be, invasive weeds would have more room to move in.



'Ōhi'a is a food source for lots of Hawaiian wildlife. Several species of birds feed on the nectar of the 'ōhi'a tree, including an endangered species—the Hawai'i 'akepa.



Because 'ōhi'a is so common in Hawaiian forests, it is considered a very important species in riparian zones—zones/areas around rivers and streams. Having healthy forests in these areas is crucial for filtering water and preventing erosion. Without 'ōhi'a, some of Hawai'i's streams and rivers could be at risk.

RAPID 'ŌHI'A DEATH

Cultural Connections



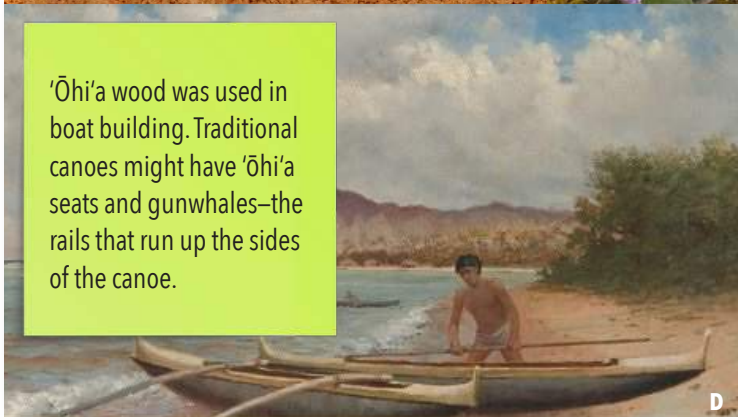
'Ōhi'a is used medicinally by native Hawaiians. The bark and flowers can be mixed together and given to women during childbirth. The leaves are also used to stimulate appetite and to treat sore throats.



A traditional Hawaiian building or house is called a "hale." 'Ōhi'a was sometimes used for the beams and poles that support the hale—if they were straight enough!



Until very recently, 'ōhi'a lehua flowers were used in leis and as part of traditional hula ceremonies. The Hawaiian people have stopped using them in some events because of the risk of spreading rapid 'ōhi'a death.



'Ōhi'a wood was used in boat building. Traditional canoes might have 'ōhi'a seats and gunwhales—the rails that run up the sides of the canoe.



'Ōhi'a lehua is an important plant in the traditional culture of Hawai'i. There is a Hawaiian legend all about the tree:

Pele, the goddess of fire and creator of the Hawaiian Islands, once fell in love with a warrior named 'Ōhi'a, but he had already pledged his love to a woman named Lehua. Pele became so angry that she turned 'Ōhi'a into a crooked and stunted tree. The other Gods felt sorry for Lehua, so they turned her into a beautiful red flower. They placed the Lehua flower on the 'Ōhi'a tree, so the two would be together forever.



The legend says that when a flower is picked from the 'ōhi'a tree, it will rain—the tears of 'Ōhi'a and Lehua separated again.



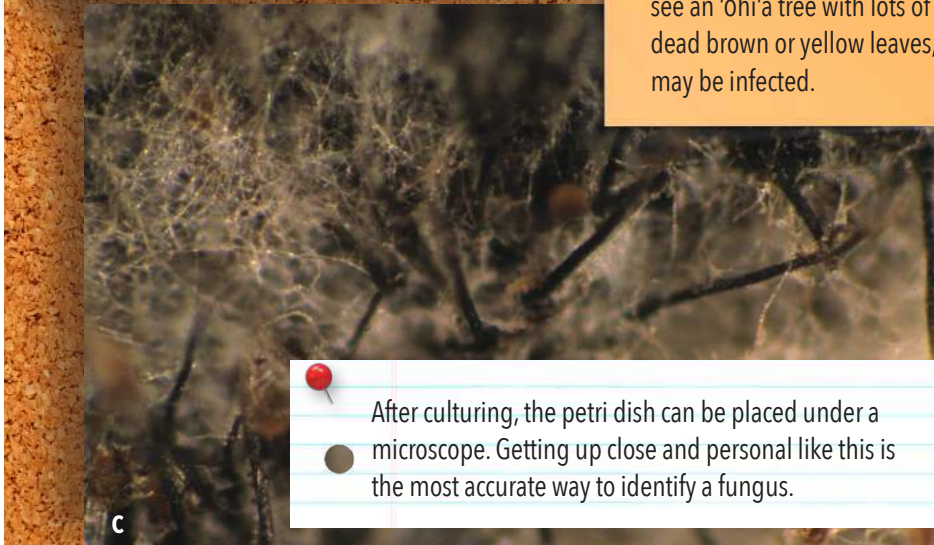
RAPID 'ŌHI'A DEATH

Signs and Symptoms

Symptoms are visible clues that a tree may be suffering from a pest or disease issue. Signs are the presence of the pest or disease itself.

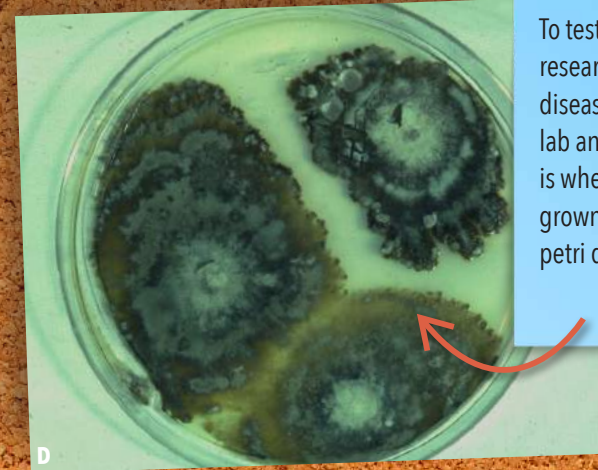


Once rapid 'ōhi'a death has infected a tree, it will quickly begin to show signs of the disease. This fast moving fungus causes leaves and whole branches to die. If you see an 'ōhi'a tree with lots of dead brown or yellow leaves, it may be infected.



After culturing, the petri dish can be placed under a microscope. Getting up close and personal like this is the most accurate way to identify a fungus.

Researchers and foresters may strip off some bark, cut off branches, or cut down the whole tree to check for rapid 'ōhi'a death. These photos show the trunk of an 'ōhi'a tree with the bark stripped off, and a cross section of a piece of 'ōhi'a wood. Both are showing typical symptoms of rapid 'ōhi'a death—black staining of the trunk where the fungus has moved through the tree, blocking off its supply of nutrients and water.

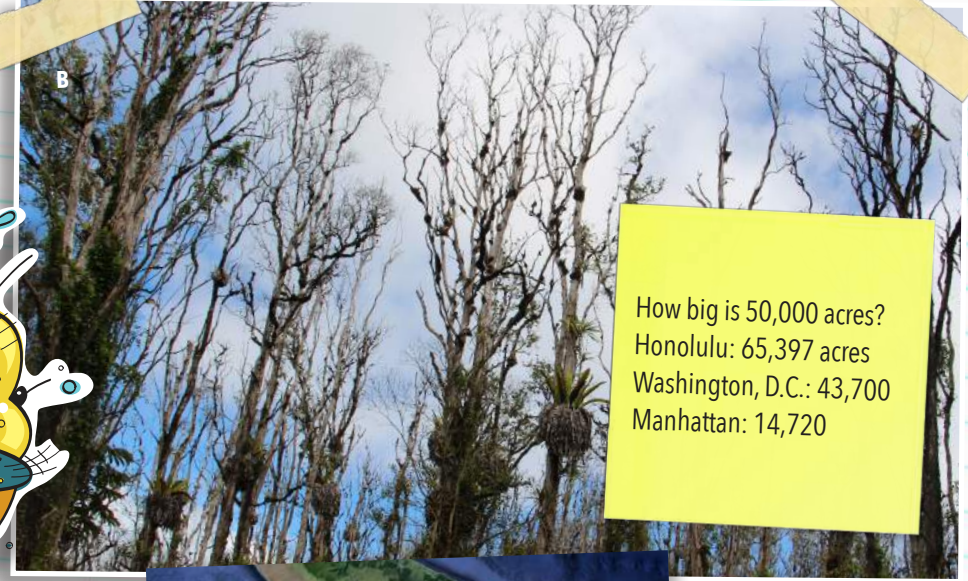


To test for rapid 'ōhi'a death, researchers will take samples of diseased portions of a tree to a lab and culture them. Culturing is when fungus or bacteria are grown on purpose, like in the petri dish pictured here.

RAPID 'ŌHI'A DEATH

Damage

Rapid 'ōhi'a death kills quickly! Once a tree is infected, it can be killed in only a matter of weeks. This short disease cycle makes it very difficult to control—once a tree has rapid 'ōhi'a death it will certainly die.



How big is 50,000 acres?
Honolulu: 65,397 acres
Washington, D.C.: 43,700
Manhattan: 14,720

Some forests have lost 90% of their 'ōhi'a trees in only 2–3 years.



Since 2014, researchers at the University of Hawai'i and the U.S. Forest Service have been tracking where rapid 'ōhi'a death has been found. They expect all forests on the big island now contain the disease.

RAPID 'ŌHI'A DEATH

Control

Moving plants around is a big problem! The Animal and Plant Health Inspection Service (part of the US Department of Agriculture) is on the lookout for invasive plants and pests like rapid 'ōhi'a death.



Slowing or stopping the spread of rapid 'ōhi'a death is the main control strategy now. The USDA has quarantined all of Hawai'i Island—nobody may take any of the following off the island:

X 'Ōhi'a plants

X 'Ōhi'a plant parts, including flowers, leaves, seeds, stems, twigs, cuttings, untreated wood, logs, mulch, green waste, or any insect frass

X Soil



The University of Hawai'i and the U.S. Forest Service have set up these boot brush stations. Rapid 'ōhi'a death can move around in the soil stuck on the bottom of your shoes! Anyone who has been in an area with rapid 'ōhi'a death should make sure to remove as much mud and soil as possible. This includes cleaning soil from car and bicycle tires.



Any tools used to cut or prune 'ōhi'a should also be cleaned. This can be done with 70% rubbing alcohol.

***** 'Ōhi'a firewood should not be moved around Hawai'i Island, or between islands. This is a good practice to keep in general. Many invasive insects and diseases have been spread across long distances by people moving firewood.





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 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

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