Native Hawaiian Plant Society

Nanea Nā Pua O Ka ʻĀina Aloha

NHPS Newsletter **February 2018**

ROD Seed Banking Initiative: Saving Hawai'i's Ōhi'a Seeds for the Future

By Matthew Keir (Laukahi) & Marian Chau (Lyon Arboretum)

Rapid ʻŌhiʻa Death (ROD) is causing widespread death of ʻōhiʻa lehua (*Metrosideros* spp.), Hawaiʻi's most abundant and important native forest tree. Infections by two new species of *Ceratocystis* fungus cause the rapid decline and demise of otherwise healthy trees, threatening the stability of ecosystems that provide habitat for countless other native organisms. ʻŌhiʻa forests blanket our watersheds, providing abundant fresh water and protecting reefs from damaging erosion. ʻŌhiʻa is also fundamental to Hawaiian culture, being the most frequently mentioned plant in moʻolelo and mele. Although currently confined to Hawaiʻi Island, the disease has spread quickly, expanding over 75,000 acres and moving closer to the other islands.

ʻŌhiʻa trees are found from sea to summit on all the main Hawaiian Islands. The geologic history and incredible variety of habitats has driven the evolution and diversification of ʻōhiʻa for millennia. Repeated isolation, hybridization, and adaptation into new environments has produced at least fourteen types of ʻōhiʻa, with most occurring on just a single island. With seven types on Oʻahu, three being endemic, that island is the center of diversity. However, nearly every island has its own endemic type of ʻōhiʻa. On Maui, *Metrosideros polymorpha* var. *pseudorugosa* is found only at the summit of the West Maui Mountains. Both Kauaʻi and Hawaiʻi have two types found only on those islands. Because of their narrow distributions, these types are more vulnerable to extinction. Guides to the types of ʻōhiʻa on each island are available here: Laukahi.org/ohia-taxa. While preliminary evidence indicates some types might be more resistant to *Ceratocystis*, it is still too early to tell, and we simply cannot afford to lose any one of them.

Ten thousand ʻōhiʻa seeds (Photo: Marian Chau)

While threats from invasive species to Hawaiʻi's native plants are nothing new, pathogens like *Ceratocystis* are extremely difficult to detect, prevent, and control, making this crisis potentially catastrophic for our precious natural resources. In the short time since it was first detected, a dedicated team of scientists and land-managers have identified the pathogens, enacted quarantine measures, raised funds, conducted extensive monitoring, and begun research on how to limit its spread. As part of this comprehensive response to Rapid ʻŌhiʻa Death (ROD), ʻōhiʻa seed collections are

Continued next page

Continued from Page 1 — *Saving Hawai'i's Ōhi'a Seeds*

urgently needed statewide. An important step in preventing extinction of threatened flora is to secure and maintain viable seeds using *ex situ* or "off-site" storage at seed banks. This approach is especially important when the threat is poorly understood or cannot yet be mitigated, as is the case with ROD – essentially buying time for future restoration. To address this need, the ROD Seed Banking Initiative was launched in 2017 by the University of Hawai'i's Lyon Arboretum and Laukahi: the Hawai'i Plant Conservation Network.

Seed banking is the most efficient method to preserve plant material, protecting the most genetic variation using the least resources. When seeds are properly dried, packaged, and cooled in a freezer, they can be stored for years, or even decades. Research conducted at the Lyon Arboretum Hawaiian Rare Plant Program's Seed Conservation Laboratory has shown that 'ōhi'a seeds can be stored for at least eighteen years without loss in viability. 'Ōhi'a seeds are also tiny, abundant, and relatively easy to collect. This gives us an important tool in preserving the genetic diversity of 'ōhi'a for research and recovery. Once secured, well-maintained *ex situ* collections of the many types of 'ōhi'a will be available for future testing for resistance or tolerance of ROD. *Ex situ* collections also provide a genetically diverse and representative pool of propagules for future reintroduction and recovery efforts. Only wild, naturally-occurring trees are targeted for this project. Trees that have been selected for cultivation may not be suitable for restoration as they may originate from another island or be adapted to conditions in cultivation. If you want to save seeds from trees planted in your yard, Lyon Arboretum has developed a guide for storing the seeds yourself, available here: http://friendsoflyon.com/wp-content/uploads/2017/06/OhiaLove-LandownersGuideToStoringOhiaSeeds.pdf.

"Repeated isolation, hybridization, and adaptation into new environments has produced at least fourteen types of 'ōhi'a, with most occurring on just a single island."

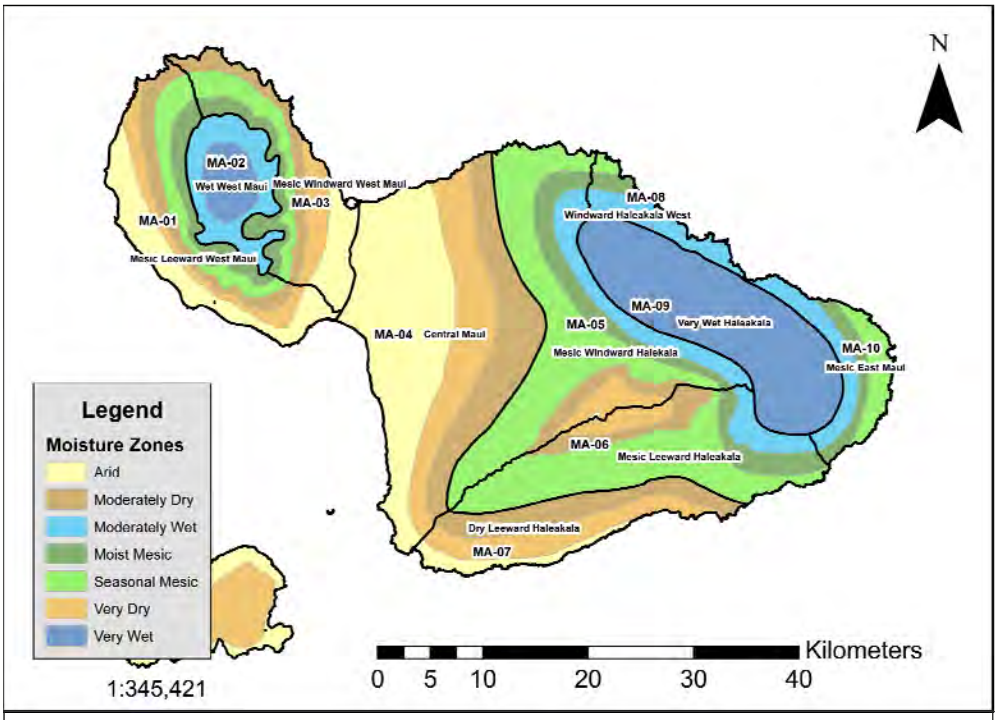
When seed collections arrive at a seed bank, they are logged into a database with the correct species name, location, and other important information. Next, the collection is cleaned to separate debris from seeds. Then seeds are counted and weighed to estimate numbers and placed in a drying chamber to decrease moisture. Once seeds are dry enough, they are transferred to a sealed packet and frozen, where they will stay until they are needed. Seeds remain the property of the landowner where source trees are located, but are preserved as a service by local seed banks.

Metrosideros polymorpha var. *macropus*, endemic to 'O'ahu (Photo: Matthew Garma)

The Hawai'i Seed Bank Partnership (HSBP) is coordinating efforts to collect and store 'ōhi'a seeds across the state. With generous support from the Hawai'i Tourism Authority, UH Mānoa, Friends of Lyon Arboretum, and public contributions to the #OhiaLove campaign, the HSBP has developed a statewide strategy for collecting 'ōhi'a seeds, led workshops to train collectors, and provides long-term storage at seed banks. In the last five months, over 300 people from six islands have participated in workshops, and millions of 'ōhi'a seeds have been collected and stored. 'Ōhi'a seeds are being stored at the following partner facilities: On Kaua'i, the Division of Forestry and Wildlife and National Tropical Botanical Garden; on O'ahu, Lyon Arboretum and O'ahu Army Natural Resources Program; on Maui, the Maui Nui Botanical Garden; and on Hawai'i, Hawai'i Island Seed Bank in Kona and Ulu Lehulehu Seed Bank at the U.S. Forest Service in Hilo. No material collected from Hawai'i Island is being sent off-island to prevent the spread of ROD. The majority of 'ōhi'a seeds are collected from public state lands, but many other government and private landowners are also participating in this collaborative effort.

One of the tools developed to inform the statewide collection strategy is a series of seed zone maps (Laukahi.org/ohiamaps), describing areas where climate and ecosystems are most similar on each island. By collecting 'ōhi'a seeds from within each seed zone, we will ensure that appropriate plant material is secured from across the entire range of

each type. That way, future reforestation efforts will have seeds that are adapted to each seed zone, making them more likely to be successful under local conditions, instead of needing to rely on seeds from another area. In order to preserve the conservation value of seed collections, information about where they came from is needed. Gathering this data while in the field can be difficult, and it is important this is done consistently across the state. A mobile collection form (Laukahi.org/ohiaform) was developed to facilitate this and transfer the information to the seeds banks.



Seed Zones for Maui (Map by Alex Loomis/Laukahi)

Conservation programs across Hawai‘i are already engaged in collecting and propagating native plants for rare species protection, habitat restoration, and watershed reforestation. All these programs now also recognize the threat of ROD, and have already started to respond by enacting sanitation protocols and preparing for eventual restoration. What is needed now is an organized effort to communicate and collaborate across the islands to secure *ex situ* collections that can expedite research and be an adequate resource for seeds when they are needed. With sufficient funding support, seeds of ‘ōhi‘a can be held by the Hawai‘i Seed Bank Partnership for future use. Without it, we stand to lose the very things that make Hawai‘i special. For more information and to contribute to this effort, please visit Laukahi.org and OhiaLove.com.

“Seed banking is the most efficient method to preserve plant material, protecting the most genetic variation using the least resources.”

West Maui’s endemic Metrosideros polymorpha var. pseudorugosa (Photo: Hank Oppenheimer)

Metrosideros polymorpha var. glaberrima from Molokai (Photo: Patty Pali)

Haʻikū School Project Update
By Becky Lau, NHPS Project Leader

Haʻikū School parking lot is looking a lot better now than a year ago thanks to many hands. Mahalo to the staff of the School, particularly Principal Deseree and her mom, Napua, who did some major pruning and clearing. We had a couple of NHPS work days with several helpers each time. I really appreciate my regular helpers, Martha Martin and Anna Mae Shishido. Weʻve had many plants donated by the Maui Nui Botanical Garden and kupukupu from Irene Newhouse. There are hundreds of keiki ʻaʻaliʻi. Weʻre gradually reclaiming the area outside the fence.

Call me at 575-2369 to come and help. We work most Monday afternoons from 3:30 to 6:00 pm.

Kanahā Pond
By Anna Mae Shishido, Assistant Project Leader

The NHPS volunteers headed by Becky Lau, meet at the Pond every first and third Thursday of each month to assist the Department of Land and Natural Resources, Wildlife Division with weed control and planting native plants to improve the habitat for the native birds. In 2017 ʻakiʻaki and ʻohai were planted near the Amala Road fence. To protect some of the endangered ʻohai from the hungry deer, hog wire and chicken wire fences were erected around the plants. Becky Lau, Martha Martin, Jennifer Rose, Diane Carr, Debbie Brown, Linda Cullen, Miki Clark and Anna Mae Shishido are the usual work crew. Many, many thanks to Sasha Smith, the Wildlife Field Technician we work with.

Please contact Becky at 575-2369 to participate in this project. Kanahā Pond is open daily from sunrise to sunset during the non-nesting season (September 1 to March 31) for bird watching. Enter through the walk-in gate on Amala Street.

Maʻo Hau Hele (*Hibiscus brackenridgei*) Exclosure
By Hank Oppenheimer, Project Leader

With the recent wet weather, we had to cancel our regular NHPS volunteer service trip as it was raining pretty hard the day we had scheduled. Mahalo for the hardcore folks who showed up anyway, ready to get wet and dirty! Plant Extinction Prevention Program staff visited the exclosure three times in 2017 in order to spray invasive grasses and other weeds. Maui Fire Department has requested that vegetation be controlled around the perimeter in case of wild fire (which fortunately has not occurred in a few years). The plants are thriving, with many seedlings noted in November, and the more recent rain is sure to give them a boost. We've rescheduled, and the next volunteer day is in February. Space is extremely limited due to the sensitive nature of the site, and the steep slope with loose rocks, as well as seating in high-clearance 4-wheel drive. Contact Irene Newhouse at einew@hotmail.com to reserve a space on this trip.

Mahalo Nui to the Ting Family and Flyin' Hawaiian Zipline for continued access and support.

President's Message

This newsletter describes projects where our members continue to manage and preserve Hawaiian native plants on both private and public lands.

Our officers, Irene Newhouse, Secretary; Becky Lau, Treasurer; Lorna Hazen, Board Member; Shannon Paapanen, Newsletter Editor; Tammy Sanches, Board Member; and Martha Martin, President, are all volunteers, with busy professional and personal lives.

There is a dangerous current environmental threat besides habitat loss and invasive plants and animals. It is global warming and climate change, which are raising air and sea temperatures. Hotter temperatures seem to be killing coral reefs,causing ice to melt, and raising ocean levels. This increases beach erosion and magnifies the destructive powers of wind and rain storms.

Our own lives depend on the condition of the air, water, and soil. Also, we depend on the vigor of plants and animals, which sustain our very lives. All of us can act to slow these global warming threats. My goals are to carry my own reusable water bottle, eat less meat, and carpool or use public transportation when possible. I hope all of us will work to protect our awesome Hawaiian environment.

Happy New Year!
Martha Martin, President, Native Hawaiian Plant Society

Kahului Library Courtyard Garden
By Lorna Hazen, NHPS Project Leader

We have done a good deal of pruning in the Kahului Library Courtyard Garden lately. The naupaka and ʻūlei needed some heavy duty cutting back.

We are interested in getting more flowering ground cover plants in between the *Fimbristylis*, mainly Schiedea and nehe. An ʻieʻie vine would be nice, too.

Martha Martin and Anna Mae Shishido have been working every second Thursday of the month, and Irene Newhouse has been working whenever she can. We certainly welcome anyone to help.

We generally start at 9:00 am and wind up at 11:30. For more information, call Lorna at 572-6338.

Awikiwiki (*Canavalia pubescens*) Exclosure
By Hank Oppenheimer

Since NHPS repaired and improved the fence last year, there has been no sign of goats inside the exclosure, which is great news. The awikiwiki are doing really well! Also, there is very little in the way of weeds now, with a few Natal redtop grass clumps, and *koa haole*, both of which were controlled. There is regeneration of the awikiwiki as well as maiapilo (*Capparis sandwichiana*). With the recent rains, it's time to go back and follow up so none of the weeds gain a foothold again.

Mahalo to all the volunteers, to the Natural Area Reserve at Ahihi-Kinau NAR, and Ulupalakua Ranch for continued access.

In Memoriam

NHPS honors the passing of these members, last year and before, who, each, in their own unique and special way, loved, cared for and labored to protect native plants. They made a difference.

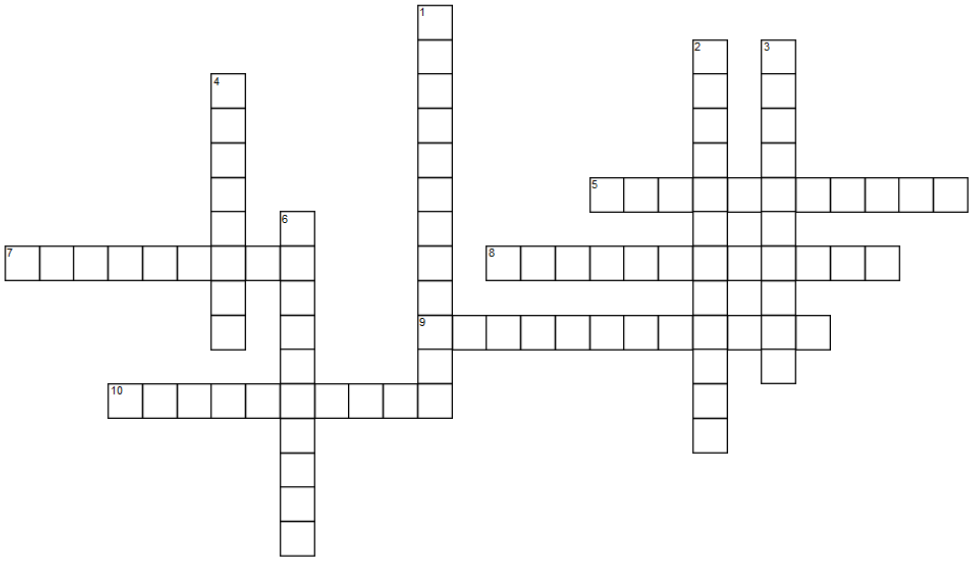
Richard Nakagawa

Edward Tamayose

Muffie Davis

Plant Puzzles by Chuck Chimera

Everything you (n)ever wanted to know about...SEED DISPERSAL!



ACROSS

5 Seed dispersal on the outside of vertebrate animals using a variety of adaptations,including adhesive mucus, hooks, spines, or barbs. The sticky fruit of pāpala kēpau (Pisonia) adhere to pets, farm animals, clothing, shoes, skin, hair, and most anything else they touch, and aid in dispersal of the seeds.

7 Dispersal by gravity. Examples include large avocado fruits falling from trees.

8 Seed dispersal by mammals. Feral pigs eat the fruit of the invasive strawberry guava and spread the seeds into native forests.

9 Seed dispersal by birds. The Hawaiian crow (‘alalā) eats the fruit of a many Hawaiian plants and disperse the seeds through the forest.

10 Dispersal in which explosive dehiscence of the fruit forcefully ejects the seed. 'Akoko seeds are forcefully ejected from the fruiting capsule in this way.

DOWN

1 Seed dispersal by ants. Such seeds often have elaisomes, or structures that attract ants because they are high in lipid content, providing important nutrients for the ant.

2 Seed dispersal via ingestion by vertebrate animals. The seeds of weeds like Miconia and Clidemia are dispersed after white-eyes and other birds eat the berries.

3 Wind dispersal. The small seeds of 'ōhi'a are wind-dispersed.

4 Seed dispersal by animals. Fruit and seeds can be eaten or attach to the animal on the outside.

6 Seed dispersal by water. The spongy white fruit of Naupaka kahakai (beach naupaka) float and aid in dispersal by ocean currents.

Answers on next page

NHPS Events & Announcements

Annual NHPS Membership Meeting & Guest Speaker
February 23rd (Friday) 2018 at 7:00 pm
Speaker: Paul Higashino, Restoration Manager for the Restoration Program with State of Hawai'i, Kaho'olawe Island Reserve Commission (KIRC).
Location: Hannibal Tavares Community Center, 91 Puklani St., Pukalani (in the Poolside Room)

The Annual NHPS Membership Meeting to elect the 2018 Board of Directors will be held at 6:45 pm, just prior to the lecture.

Regular Service Trips
Kanahā Pond (1st and 3rd Thursdays 8:30-11am)
Contact Becky Lau (808) 575-2369

Ha'ikū School
(Mondays afternoon 3:30 to 5:30) Contact Becky Lau (808) 575-2369

Kahului Library (2nd Thursday 9am-11:30am)
Contact Lorna Hazen (808) 572-6338 or lornajack34@gmail.com

Members, if you change your email address, please let Irene know so you can continue to get notices. Email einew@hotmail.com

NHPS Guest Speaker

Paul Higashino, Restoration Manager with the Kaho'olawe Island Reserve Commission will speak on the status of restoration projects on Kaho'olawe

Friday, February 23
7:00 pm
Tavares Community Center
91 Pukalani St, Pukalani
(Poolside Room)
This Event is Free and Open to the Public!

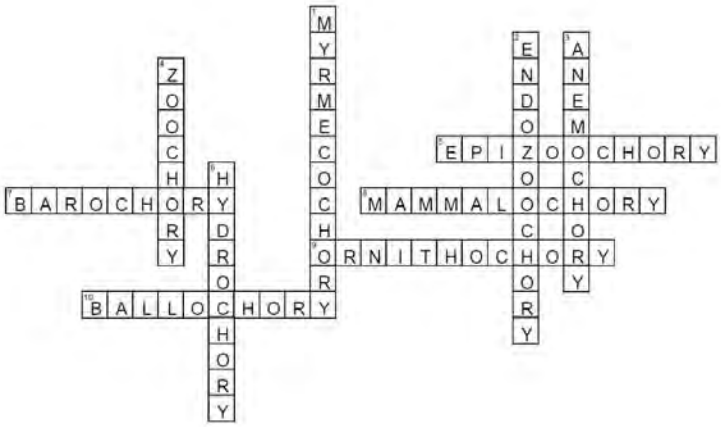
Mahalo Nui Loa to the following donors for their generous contributions in 2017

Individual Donors

Harold Appleton, Diane Carr,
The Czar Family (Steph, Greg, Rebecca & Ivan),
FARE, Isaac & Dana Hall, Lorna Hazen,
Frances Ort, Katie Romanchuk,
Joy Tamayose (in memory of Ed Tamayose),
David & Martha Vockrodt-Moran

Corporate , Government & Exclosure Partners

Maui County Parks and Recreation for the use of Hannibal Tavares Community Center Pool Room
Maui Nui Botanical Gardens for propagating plants
Haiku Elementary School
Kahului Public Library
Duane Ting and family and Flyin' Hawaiian Zipline
Hawai'i State Department of Land and Natural Resources
Ulupalakua Ranch



See photos for everying we've been up to at nhps.smugmug.com

Native Hawaiian Plant Society

P.O. Box 5021, Kahului, HI 96733-5021
Phone: (808) 875-0745
E-mail: info@nativehawaiianplantsociety.org
Website: www.nativehawaiianplantsociety.org

ʻAʻaliʻi
Photo by Irene Newhouse

2 for $10

4 for $20

NHPS Logo Shirts design by NHPS member Dr. George LeBouvier

All shirts must go!

While supplies last

***ʻĀwikiwiki* flower design by NHPS member Muffie Davis**

See flyer for details

DON'T FORGET TO RENEW!

Membership Form

Date_____

Name (please print)_____

Address_____

City_____ State_____ Zip_____

Telephone (Hm)_____ (Cell)_____

Email_____

(Please print carefully!)

Donation Categories: Individual $20_____ Family $25 _____ Other $_____

Native Hawaiian Plant Society, P.O. Box 5021 Kahului, Hawaiʻi 96733-5021

The Native Hawaiian Plant Society is a nonprofit 501(c)(3) organization founded in 1980

NHPS T-Shirt

All shirts must go!

- 2 for $10
- 4 for $20
- 1 Free T-Shirt for every current member who attends the NHPS Feb. 23rd general meeting!

NHPS Logo Shirts design by NHPS member Dr. George LeBouvier

'Āwikiwiki flower design
By NHPS member Muffie Davis

Lots of sizes, colors and styles!

Shirts will be available to purchase at the February 23rd NHPS Meeting - 7:00 PM - Tavares Community Center, Pukalani

Prices apply to long and short sleeve styles
Only while supplies last