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# the bulletin

of the National Tropical Botanical Garden





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GORDON DEANE**

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### ON THE COVER

Both *Clermontia drepanomorpha* ('Ōha Wai) on this issue's front cover and *Dryopteris tetrapinnata* (black and white fern on the inside cover opposite) are among the portraits featured in photographers David Liittschwager and Susan Middleton's 2001 book *Remains of a Rainbow: Rare Plants and Animals of Hawai'i*. Twenty years after its publication, read how this highly influential collection of portraits was photographed and the impact it has had. Story and photos on page 10.

The Bulletin is a publication for supporters of the National Tropical Botanical Garden, a not-for-profit institution dedicated to tropical plant conservation, scientific research, and education.

We encourage you to share this publication with your family and friends. If your household is receiving more than one copy and you wish to receive only one, please inform our Development Office at our national headquarters at: [members@ntbg.org](mailto:members@ntbg.org).

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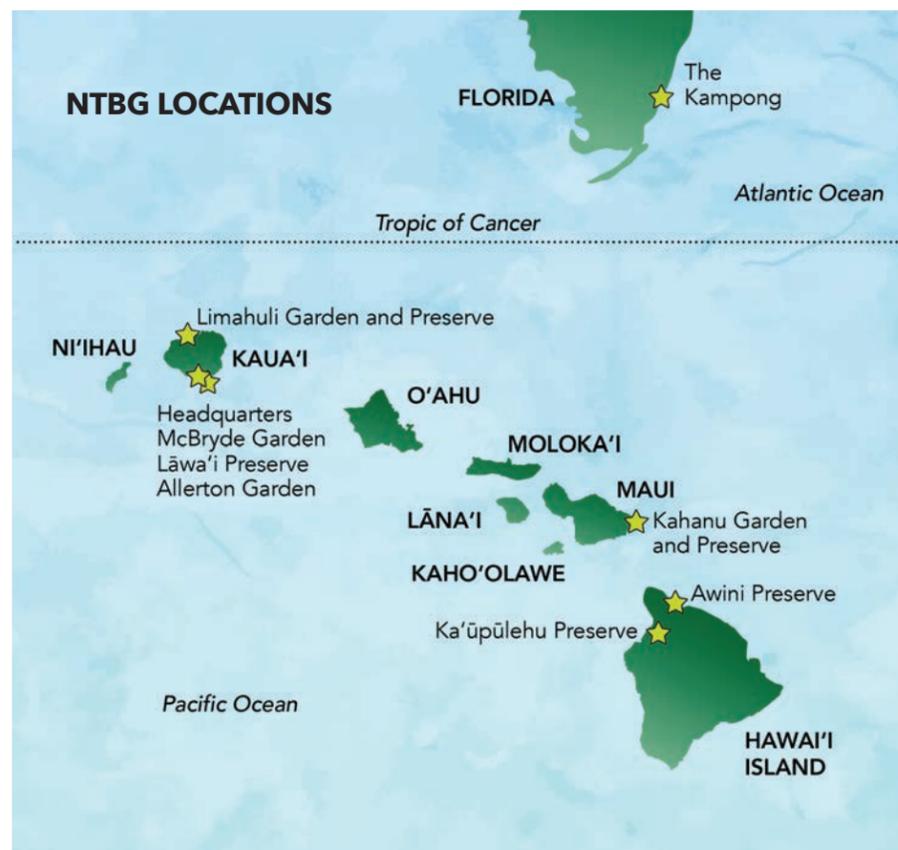


## OUR MISSION

To enrich life through discovery, scientific research, conservation, and education by perpetuating the survival of plants, ecosystems, and cultural knowledge of tropical regions.

The National Tropical Botanical Garden was chartered by an Act of United States Congress in 1964. The objectives of the institution were set forth in the Charter:

- to establish, develop, operate and maintain an educational and scientific center, with libraries, herbaria, laboratories, and museums...to encourage and conduct research in basic and applied botany;
- to foster and encourage fundamental research in tropical plant life and study the uses of tropical flora in agriculture, forestry, horticulture, medicine, and other sciences;
- to share knowledge acquired relative to basic and applied tropical botany through publications and other media;
- to collect and cultivate tropical flora and to preserve for the people of the United States species of tropical plant life threatened with extinction;
- to provide a facility which contributes to the education, instruction, and recreation of the people of the United States.



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**National Tropical Botanical Garden  
Chartered by Congress as a not-for-profit, non-governmental institution**



## Message from the CEO and Director

Now in the spring of my third year as NTBG's CEO and Director, I pause to reflect on our history and the vision of our founders. Originally chartered by the U.S. Congress in August 1964 as the Pacific Tropical Botanical Garden<sup>1</sup> (PTBG), it was in January 1971 that the Garden was formally dedicated in the Lāwa'i Valley on Kaua'i. The event is documented in *The Bulletin of the Pacific Tropical Botanical Garden*, first published that same month, 50 years ago.

In reading the first issue of *The Bulletin*, I am impressed by the foresight of our founders and their vision for the budding organization. In those early days, they spoke of the urgency of the Garden's mission to preserve Hawai'i's endangered plants. In 1971, Horace M. Albright, President (Chair) of the Board of Trustees,

wrote: "The significance of the scientific work we are setting out to accomplish at the Pacific Garden is heightened by its urgency. We are dealing here with matters directly concerned with survival."

At the time, defining what was endangered wasn't easy. They struggled to articulate an objective standard for the term "rarity" owing to the lack of information on rare species.

Just one year earlier, in 1970, our nascent organization joined the Smithsonian Institution for a colloquium on "The Endangered Species of Hawaii – Plant and Animal" where botanists determined that nearly 300 of some 2,000 plant species endemic to Hawai'i were extinct or nearly so. That journey to discover, study, and save endangered plants continues to this day.

It is fitting that PTBG came into existence in 1964, the same year the International Union for Conservation of Nature (IUCN) established the Red List of Threatened Species, the world's most comprehensive barometer of threatened species. You can read more about how NTBG is contributing to the Red List in this issue of *The Bulletin* on page 20-21.

At this time of global reckoning, I am buoyed to know that over the course of more than half a century, NTBG has remained true to the original vision of our founders. In their words, the Garden was established to "foster and encourage fundamental research with respect to tropical plant life and to encourage [their] research and study..." and to "disseminate through publications and other media the knowledge acquired at the gardens..."

Under the steadfast leadership of our Board of Trustees and Fellows, this objective is executed unwaveringly by NTBG's dedicated staff with the indispensable contributions of volunteers, interns, visiting scholars and instructors, and our many collaborations and partnerships, all committed to saving plants.

I am certain our founders would be proud if they could see how much the Garden has accomplished over 56 years. NTBG's mission is more relevant than ever as we save endangered plants from extinction. I want to thank all who have joined us in fulfilling our mission, today and in the years ahead.

With gratitude and aloha,

Janet Mayfield  
Chief Executive Officer and Director

<sup>1</sup> Congressional legislation passed to change the name of the institution from Pacific Tropical Botanical Garden to National Tropical Botanical Garden following the acquisition of The Kampong in Coconut Grove, Florida



## Message from NTBG Chair Gordon Deane

Aloha to our Trustees, Fellows, Members, and all Bulletin readers. On what clearly was my lucky day last November, in the midst of the worst pandemic in over 100 years, a global recession, travel restrictions affecting our visitor programs, and on Friday the 13th no less, I was elevated to become the Chair of the Board of Trustees for NTBG. As *Mad Magazine's* Alfred E. Neuman would say, "What, me worry?"

Yes, I worry, but I also have hope because I see the steady progress that NTBG has made in my 21 years as a member, over 16 of which I have served on the Board. This includes:

- Competent, dedicated management that cares about our staff, our gardens, and our mission.
- Progress with the International Center for Tropical Botany at The Kampong (our garden in Miami) where future tropical botanists will be trained.
- Groundbreaking and impactful projects that include our Breadfruit Institute's Regenerative Organic Breadfruit Agroforest and collaborations with organizations such as Patagonia Provisions which recently launched three delicious breadfruit crackers (be sure to try all of them!).

These are undeniably challenging times but NTBG has weathered countless hurricanes and storms, economic recessions, and other challenges in its 56-year history. After each challenge, the Garden has come back stronger and more resilient, and we will do so again. This is due in large part to the leadership of previous Chairs Merrill Magowan and Thomas Hewitt who continue to serve on our team. It's thanks to the support and leadership of Chair Emeritus Douglas McBryde Kinney, my business partner and mentor for almost 40 years, who also assumed this position during difficult times and, along with his family, have been the most generous financial contributors to NTBG.

It's mainly due to all of you who have shared your talents and provided support to NTBG over the years. In my opening remarks to the Board, I talked about 'ohana (family) which is the feeling one gets when involved with NTBG. When times are tough, 'ohana comes together. I encourage each of you to rise to the challenge and support all that NTBG does to enrich life by saving plants.

Finally, I would like to add that for at least the next six months, our Board meetings will be online. I've asked management to open these meetings to anyone that is truly interested to learn more and participate. In addition to a broader outreach, my goals include greater diversity on the Board, a closer alignment of our investments with our environmental, social, and governance standards, and ensuring that NTBG is on a sustainable path for the future.

I look forward to working with the Board, management, and our members to continue this progress.

Mahalo,

Gordon Deane  
National Tropical Botanical Garden, Chair

## A special thank you to our new Fellows and Members!

### Become an NTBG Fellow and join a special group of tropical plant enthusiasts

The Council of Fellows was established in 1985 as NTBG's leadership membership group to advance NTBG's core programs in tropical plant conservation, research, and education. This exceptional group of philanthropists has been instrumental in helping NTBG to become one of the most important tropical botanical gardens in the world. Annual membership dues begin at the \$1,500 level and continue up to the \$20,000 Chairman's Circle level. In addition to enjoying general membership benefits, Fellows are invited to NTBG's bi-annual Board of Trustees meetings and also have the opportunity to participate in specially arranged travel programs, which include visits to private and public gardens and explorations of botanical hotspots around the world.

### Become a Member of NTBG and support tropical plant conservation

Your membership dues directly support tropical plant conservation and research, provide the resources to protect and cultivate our living collections, and educate the public about the importance of tropical plants at NTBG's five gardens and preserves. Membership levels range from \$75 to \$500 with a level to fit everyone from individuals to families. **Contact: [members@ntbg.org](mailto:members@ntbg.org)**

#### NEW FELLOWS SEPT-DEC 2020

Anthony Evans  
Klee Irwin  
Kyle Rasmussen  
Mary and Federico J. Sánchez  
Paige Searle and John May

Judith and John Dykstra  
Ellen and Michael Egesdal  
Susanne Fairclough  
Xiaoning Fan and  
Abhishek Sharma  
Keyshawn Felton  
Walter Finkelstein  
Patricia and Richard Fitchen  
Danielle Fowler  
Judy Franzen and Edward Franzen  
Ms. Linda B. Fuller  
Julie Volgas and Jimmy Gafford  
Kathy Mayer and Barney Gerber  
Margaret J. Gill  
Judith and Samuel Glassenberg  
Linda Goldberg  
Liz Goldwyn  
Sariah Bebe and Dylan Goodale  
Laurie and John Gosch  
Alessandra Gubeissi and  
Joanna Binetter  
Karen Gutierrez  
Grace Guynn  
Catherine and Giles Harrison  
Katrina and Joel Hart  
Laura and Kenik Hassel  
Sondra Hauge  
Ann Hawkins  
Mary and Robert Hawkins  
Karen Gally and Frank O. Hay, Jr.  
Leah and Ryan Hayek  
Jennifer Hill and Michael Moule  
Charles Hinger and Jay Beatty  
Becky and Kenneth Johnson  
Kathleen and Michael Johnson  
Sylvia Jordan and Luke Ferster  
Phillip Kali  
Jennifer Kessel and Noah Blair  
Ann Killeen and Joanie Wings  
Janet and Adam Killerman  
Fran and Jerry Kocmich  
Mary Kopitzke and Robert Kolosky  
Rhonda Kulhanek  
James Langworthy  
Anna Larsen  
Ginger Lavender  
Cathy Lekven

Suzanne Wiggins and  
David Littman  
Felice Lu and Wade Sunada  
Maria Dolores and  
Lawrence M. Lundbom  
Alessandra Marchitelli-Hess and  
Cliff Denato Crouch  
Julie Bergholz Markowitz  
Jenny Martinez and  
Mikkel Michelson  
Clyan Maruyama  
Barbara and Laureston McLellan  
Jenia Mehrabians and  
Robert Khayat  
Jared Miller  
Kayla Rondeau and  
Benjamin Mock  
David Moore  
Jason E. Morey  
Ronald E. Mossman  
Judith and Jim Munro  
Judine Nishiguchi and  
Mike Muramoto  
Doria Cook-Nelson and  
Craig T. Nelson  
Grazyna Nowak  
Deanna and Brendan  
R. O'Donnell  
Shannon Brennan Olrich  
Dorothy and Richard O'Reilly  
Steve Oster and Gano Butcher  
Jeanette and Jerry Ostrowski  
Amanda Paley  
Constance Pappas  
Zandrea Penn  
Jenny and Greg Pobst  
Karyn and Howard Poulton  
Mary Poxon and Tom Cole  
Helen Preston  
Randa and Mark Privett  
Ann and James Proud  
Darney Proudfoot  
Ms. Elizabeth Purnell  
Mary Purnell  
Alyssa Ransbury and  
Spencer Taylor  
Mariko Reed and  
Kanoa Zimmerman

Patrick Reichenberger  
Maria and Rudy Riamos  
Allison Rich and Dan Frome  
Jennifer Richards and  
George Bonari  
Rafael Rico and Kyle Colby  
Denise Ringpfeil  
Mariah Robinson  
Raul R. Rodriguez  
Gabriella Salerno and  
Paul Hignum  
Stacey and Shane Satta  
Molly Schneder  
Lynn Schuman  
Isabelle B. and Michael A. Scott  
Dr. Andrew Shaffer  
Sandy and Donald Shapiro  
Lee Pharis and Walter Shaw  
Keani Shimabukuro  
Dawn and Shawn Silva  
Jeffrey Slivko  
Liane Smith  
Joan and Daniel Smyth  
Ramya Srinivasan  
Mary and Ronald Stacey  
Allison Stanley  
Portia Peebles and Jason Stein  
Heidi and Kevin Stern  
Karen Stomberg and  
Gary Westcott  
Marissa and Adam Tabalno  
Sandra Takaezu  
Moses Timbal  
Gabriella Touzard  
Alexsis Valdez  
Cheryl Vasconcellos  
Tass and Don Vorous  
Peter Warner  
Ruth Wilbanks  
Tanya Willard and Natalia Willard  
Brenda Williamson  
Carla Wilson and Adam Quick  
Scott Worner  
Tim Yandel  
Shirley and Manho Yeung  
Karen Zethmayr

#### NEW MEMBERS SEPT-DEC 2020

Michal Abramovitz  
Jackie Agu  
Barbara Assadi  
Noel and Edward Altman  
Jeff Benca  
Laura Lee and David Bickham  
Sarah Blodgett  
Paula and Robert Borsody  
Fred Bove  
Marian and Michael Bowman  
Karen Leonard and  
Roger Bredeson  
Elaine and Michael Brennan  
Laura and Chris Brown  
Laurie and Drew Brown  
Sarah Brown  
Kate and Bert Bunnell  
Hugo Cabrera  
Nancy and Tom Callahan  
Sasha and Kevin Celebrado  
Mary Cohen  
Rhonda and Glenn Collier  
Victoria Coon  
Ileen and Alex Conn  
Laurie Craise and Jerry Pouse  
Tim Paul Cronley  
Rebecca C. and Philip H. Curtis  
W. Bowman Cutter, III  
Sheri Hamersley and  
Frank Czerwiec  
Karen Davidson  
Stefani Bittner and Jerome Dean  
Alix DeSeife and Daniel Small  
Janae Dresser  
Kirstin Dunu  
Timothy Dwight, Jr.  
Zanthia Dwight



# ‘UALA

## Hawaiian Sweet Potato

BY MIKE DEMOTTA, CURATOR OF LIVING COLLECTIONS

# *He ‘uala ka ‘ai ho’ola koke i ka wī*

*(Sweet potato is the food that quickly restores health after famine)*

The first Hawaiian voyagers arrived in the Hawaiian Islands with approximately two dozen plants that were important enough to earn space on the crowded outrigger canoes used to cross the ocean. These ‘canoe plants,’ as they are known, were vital for providing food, fiber, medicine, and more. Many of these plants had multiple uses. Three were essential staple food crops — kalo (taro), ‘ulu (breadfruit), and ‘uala (sweet potato).

Easily propagated and grown from live cuttings or slips, ‘uala (*Ipomoea batatas*) was widely cultivated on all the islands. Many communities in Hawai‘i’s driest areas placed great value on ‘uala and were able to produce enough of the starchy vegetable to sustain large populations by strategically planting it during the rainy winter months and keeping it stored underground for some time after the rains had ended.

Over many generations, mahi‘ai (Hawaiian farmers), who understood the importance of crop diversity, developed many different varieties. They cultivated these hardy, tuberous roots, protecting against total loss of any given variety and building resilience in the event of changing weather patterns or other environmental instability.

As a staple food, ‘uala is an excellent source of vitamin C, beta carotene, potassium, protein, and minerals. This unevenly-shaped tuber is valued as a life-preserving crop, but the shoots and young leaves (called palula in Hawaiian), are also cooked and eaten. Offering great flexibility in its preparation, ‘uala can be cooked in the same ways as other potatoes. My favorite way to enjoy ‘uala is steamed in an imu (traditional Hawaiian underground oven). Like kalo, ‘uala can also be mashed into a soft poi which has the consistency of thick pudding and is eaten with fish. ‘Uala poi ferments quickly and so it must be consumed within a day or two. Grated ‘uala cooked with coconut milk is called palau and enjoyed as a special treat.

Today there are about 24 different varieties of Hawaiian ‘uala. Each has a distinctive leaf shape and colors of skin and flesh that range from orange and red to white. The variety ‘Ele‘ele literally means ‘black’ and is named for its very dark stems. Huamoa (‘chicken egg’) is a smallish, egg-shaped tuber. Inside, its darker yellow center is reminiscent of an egg yolk. Pala‘ai (literally: ‘fat’) refers to the size of the large tubers. Piko (‘navel’) is recognized by its deeply-lobed leaves.

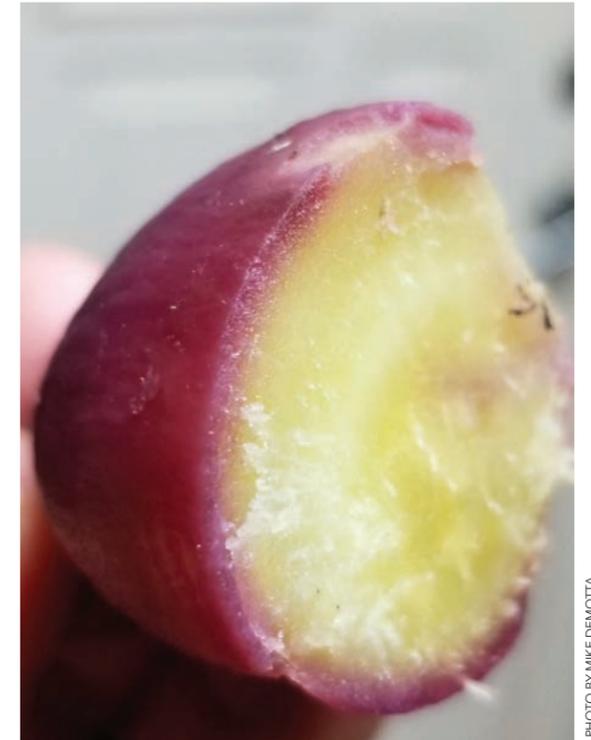


PHOTO BY MIKE DEMOTTA



PHOTO BY JON LETMAN



MIKE DEMOTTA INSPECTS 'UALA VARIETY PAPA'A KOWAHI GROWING OUTSIDE THE NURSERY. PHOTO BY RHIAN CAMPBELL

Like other multi-use edible canoe plants, many 'uala have medicinal value. One example of 'uala's medicinal use was in the concoction 'apu, a drink with many ingredients, but primarily made with 'uala. 'Apu has been traditionally prepared for women to be taken soon after childbirth to facilitate healing.

NTBG currently has about 20 'uala varieties in our collections growing at our south shore Conservation and Horticulture Center and at Limahuli Garden on Kaua'i's north shore and Kahanu Garden on Maui. We maintain all varieties within our nursery because of the challenges of growing 'uala in the field, namely the tenacious feral pigs who always seem to know when 'uala is ready to harvest. If we don't get to them first, the pigs will complete their own harvest and never fail to eat everything, destroying all stems and leaves as they go. Growing a backup collection safely inside our nursery, helps us ensure we preserve these irreplaceable varieties.

At NTBG, we have a strategic objective to maintain collections of important Hawaiian canoe plants

within our gardens. Heirloom or heritage varieties of canoe plants that are not grown commercially tend to become less common. Each named variety of canoe plant holds great importance in Hawaiian culture, whether identified in ancient legends or for its value as food and medicine. Preserving these varieties, cultivated over many generations, and the names ascribed to each, is equally important. As a key component of Hawaiian language and culture, we must remember these names which provide connections to Hawai'i's ancestors. The same 'uala we grow today can be traced back many generations to Hawaiian farmers of long ago, providing us with essential sources of food, medicine, and beauty, and living links to an ancient past.

*The UN General Assembly has designated 2021 as the International Year of Fruits and Vegetables. The campaign provides an opportunity to increase awareness of the importance of fruits and vegetables to health, nutrition, food security, and UN Sustainable Development Goals.* 🌱

# wish list

Would you like to make a difference today? Purchase an item from our wish list and your donation will go directly to meet immediate program needs. Please send your contribution with the enclosed envelope, including a specific description of the item. If you have any questions or would like to make your donation by phone, call Chelsey Aki at (808) 332-7324 Ext. 209. To make your donation online, go to [ntbg.org/support/donate](https://ntbg.org/support/donate). Mahalo for your support!

## BREADFRUIT INSTITUTE

(2) Ceiling fans/lights for Field Station at Kahanu - \$400  
Organic fertilizer for breadfruit trees in McBryde - \$40/50lb. bag  
Membership for International Society for Horticulture Science - \$120

## DEVELOPMENT DEPARTMENT

Filing cabinets (2) - \$400

## FINANCE DEPARTMENT

Shred financial records - \$500

## KAHANU GARDEN

Stihl chainsaw - \$400  
Irrigation components for drip lines - \$250  
Gravel for road improvements - \$450

## LIMAHULI GARDEN

Medify air purifier - \$350  
Hand radios (10) - \$290 each

## LIVING COLLECTIONS & HORTICULTURE

Shade house structure - \$400

## MCBRYDE AND ALLERTON GARDEN

Tire Warehouse Kauai gift cards - \$500  
Napa Auto Parts gift cards - \$500

## SCIENCE & CONSERVATION

Sets of 3500 barcodes for herbarium specimens (4) - \$400  
Climate data loggers for collection preservation in the BRC (3) - \$375

## THE KAMPONG

Computer for Senior Horticulturist - \$500  
Monitor for security system - \$250  
Monitor for Operations Manager - \$250

To see complete Wish List, please visit: <https://ntbg.org/support/wishlist>



PHOTO BY KEVIN HOUCK

## the green thumb

Spring in the northern hemisphere is that rare time of year when we can plant the same vegetables in both Hawai'i and the continental U.S.. During this season, I love to plant salad veggies: lettuces, radishes, arugula, carrots, sugar snap peas, cucumbers, and cherry tomatoes. The biggest challenge is getting the timing right so that you can enjoy the whole salad at once, rather than spread over half the year! While Mother Nature ultimately has the last word on the timing of your harvests, with a little planning you can enjoy a full salad plate all summer long.

Begin by planting carrots and tomatoes, as they take the longest: 65-100 days to harvest. Start your first seeds just before the last frost of spring by planting your tomatoes indoors in small pots and your first batch of carrot seed in a deep planter that can be moved outside once temperatures allow. Later, carrots can be sown directly into the ground every two to three weeks until mid-summer. Indeterminate (vining) cherry tomato plants will produce for many weeks, so a second planting in early summer should keep you well-stocked.

About two weeks after your first planting, start head lettuces, cucumbers, and sugar snap peas which take between 55-75 days to harvest. Pick cucumbers and peas as soon as they're ripe to keep your vines productive longer. Two weeks later, plant arugula and leaf lettuces (approximately 40 days to harvest), and finally, about ten days after that, you can plant radishes (roughly 30 days to harvest). Keep planting lettuces and radishes every two weeks to keep your salad bowl brimming. As the weather warms, give your lettuce more shade, more water, and pick your crop younger to keep them from growing bitter. With these simple steps, you can enjoy a delicious, bountiful harvest of home grown vegetables throughout the spring and summer.

—South Shore Nursery Manager, Rhian Campbell

# REMAINS OF A RAINBOW *at 20*



TEXT BY JON LETMAN, EDITOR  
PHOTOGRAPHY BY DAVID LIITTSCHWAGER & SUSAN MIDDLETON

*Twenty years after the publication of this highly influential book, The Bulletin looks back at how the monumental photo collection was made and what it has meant to conservation.*

Reading about extinction is one thing, but to stare it in the face is something else entirely. To look into the eyes of the last remaining nukupu'u (a Hawaiian honeycreeper) or gaze upon the only known Kanaloa shrub, is to marvel at the remains of a rainbow.

That phrase — *remains of a rainbow* — was first uttered by celebrated poet and writer William S. Merwin in a whisper to photographer Susan Middleton after a slide presentation in Honolulu in which she and her creative partner and fellow photographer David Liittschwager offered a preview of photos from their forthcoming, yet-to-be-titled book documenting the rare flora and fauna of Hawai'i.

"As we were walking off stage, I caught William's eye and he caught mine," Susan recalled. "He signaled for me to come over to his table. I leaned down — it was like he wanted to tell me a secret."

"I think I have your title," William whispered. "It's Remains of a Rainbow."

Twenty years after its publication, *Remains of a Rainbow: Rare Plants and Animals of Hawai'i* still tells the story of creation, preservation, and extinction in the Hawaiian Islands.

Before they had ever snapped a single shot in Hawai'i, Susan and David had already earned accolades for their book *Here Today: Portraits of Our Vanishing Species* which was followed by *Witness: Endangered Species of North America*. After entomologist E. O. Wilson (known as the 'Father of biodiversity') suggested they go next to Hawai'i, Susan and David turned their lenses on the islands' rare and endangered species.

What they had expected to be a two-week trip was extended to three, then four, then five weeks. It was a turning point for the photographers. Years later, Susan recalled being captivated by the "proliferation of exuberant biodiversity." She said, "it felt like eavesdropping on the miracle of creation at its best," but that also included "the devastation of its loss."

## INTO THE FIELD

One of their goals in photographing Hawai'i's rare life forms was to convey the diversity and the urgency of efforts to save it. Susan and David spent months (more than 100 days, David recalled) in the field, lugging heavy camera equipment into Hawai'i's most pristine habitats along mud-slicked forest trails, spongy green bogs, and distant coastlines chiseled by waves and wind. Throughout, they were guided by the scientists who knew the islands and their inhabitants best. Much of that time was spent guided by NTBG field biologists Steve Perlman and Ken Wood.

Soon after Susan asked Steve about working together, he devised a plan which was supported and facilitated by NTBG. At the outset, Steve understood the value of a portrait book of plants and animals that few people had seen, let alone understood the threats they were facing.

"These photographs, I hoped, would help us get funding to protect the species that we're losing," Steve said. By the late 1990s, there were nearly 300 Hawaiian plant species listed as threatened by extinction. Since 2000, roughly one Hawaiian plant species is lost each year.

Steve knew the intrinsic value of saving biodiversity, but also recognized the harsh reality that without institutional and financial support, the labor-intensive conservation efforts — collecting cuttings and seeds, removing harmful invasive plants and animals, building protective fencing, and restoring degraded habitat — could not continue and many more endangered species would be lost. He believed that a large format portrait book would help generate interest in supporting conservation.

Ken said that guiding Susan and David in the field so they could document what remained was "supremely important to raising awareness and understanding of what exists." Their photos, he believed, could counter what he called a "poverty of compassion for other life forms."

MELANTHERA WAIMEAENSIS (NEHE) (CURRENTLY ACCEPTED AS WOLLASTONIA WAIMEAENSIS), PAGE 10

“There was a proliferation of exuberant biodiversity...it felt like eavesdropping on the miracle of creation at its best, but also the devastation of its loss.”

– SUSAN MIDDLETON



#### NOT JUST A PRETTY PICTURE

Those field trips yielded much more than photos. While Susan and David took pictures, the botanists were free to explore their surroundings and, on many occasions, they found rare plants that may have otherwise gone undiscovered.

Over eighteen months, Susan and David spent hundreds of hours photographing everything from bugs, birds, spiders, and bats to seals, stilts, snails and fish. Their book brought together little-known creatures such as the ‘ūhini (Kaua’i’s flightless cone head katydid) and the ‘o’opu ‘akupa (a carnivorous Hawaiian goby fish found in the Limahuli Stream) with palm, ferns, vines, sedges, and shrubs.

Recalling the experience, Susan observed, “Suddenly it was like 70 million years of evolution began to make sense to me.” David said the experience has affected him ever since. “It changed the way I thought of plants and also conservation priorities.”

David thanked NTBG for playing a critical role in the project’s success by providing logistical support, access to gardens and preserves, and sharing staff expertise and time. “Our ability to be really thorough and sharing these plants that are incredibly difficult to find in the wild was a huge contribution by the Garden to help us make *Remains of a Rainbow*,” he said.

MYADESTES PALMERI; PUAIOHI; SMALL KAUA’I THRUSH; PALMER’S THRUSH (ABOVE); PSEUDOGNAPHALIUM SANDWICENSIS VAR. MOLOKAIENSE; CUDWEED, ‘ENA’ENA (PAGE 13). STEVE PERLMAN, END OF WAIKAMOI FLUME, EAST MAUI (CENTER SPREAD)







*TETRAPLASANDRA FLYNNII* (CURRENTLY ACCEPTED AS *POLYSCIAS FLYNNII*)

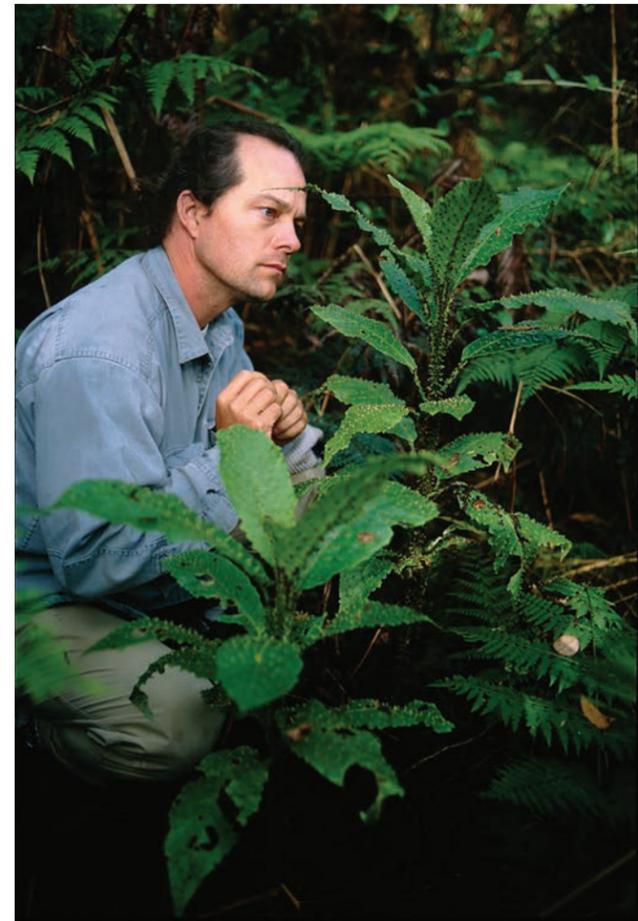


*GERANIUM HILLEBRANDI* (NOHOANU; HINAHINA)

After a year and a half of searching for some of the rarest life forms on Earth, Susan and David faced another challenge: searching for someone willing to publish a book of obscure plants and animals. One publisher called their subject “too local.” Another told them bluntly, “plants don’t sell.” Fortunately, the National Geographic Society recognized the importance of their work and published the book in October 2001. In subsequent years, the book sold 12,000 hard cover and at least 5,000 soft cover copies, inspiring countless people including many students and future scientists. Today *Remains of a Rainbow* is out of print, but resourceful readers may find copies online.

### BEARING WITNESS

Since its publication, *Remains of a Rainbow's* 130 detailed portraits have borne witness to species that, even 20 years ago, teetered on the brink of extinction. Today, more have been lost or are perilously close with more than 550 plant and animal species federally listed<sup>1</sup> as threatened and endangered in Hawai'i and the Pacific.



At the same time, public awareness of the threats and understanding of the importance of conservation is greater than ever as non-profits and non-governmental organizations like National Tropical Botanical Garden, collaborate with state and federal agencies to save threatened species. New technologies in mapping, drones, and genetic sequencing have helped save endangered species.

Even as best practices and conservation programs continue to advance, the threats to living creatures — habitat loss, invasive species, diseases such as avian malaria and fungal pathogens, and mounting climate change-related disruptions continue unabated.

Two decades after its publication, the portrait book with the four-word poetic title continues to excite readers with images that are still irresistible and inspiring. The collection feels timeless and fresh, resonating in the mind's eye, reminding us of what we're fighting to save, and why we hold it so dear. 🐸

<sup>1</sup>According to U.S. Fish and Wildlife Service Pacific Islands Fish and Wildlife Office

SUSAN MIDDLETON AT NTBG NURSERY (TOP);  
DAVID LIITTSCHWAGER IN THE FIELD (BOTTOM).

# supporting roots

Q & A with Marsha and Larry Nager



CONTRIBUTED PHOTO

*Long before they moved from Nashville to Kaua'i, Marsha and Larry and Nager enjoyed gardening and hiking in the Great Smoky Mountains of eastern Tennessee. Marsha, a retired nurse anesthetist and accomplished photographer and videographer, and Larry, an award-winning musician and journalist, were also avid supporters of the local arts and culture scene. Larry worked with the GRAMMY Foundation for 15 years, and both were active with Cheekwood Estate & Gardens.*

*After relocating to Kaua'i in 2018, Marsha and Larry knew they wanted to get involved with NTBG. Soon after becoming members, they started volunteering — fitting for a couple from the “Volunteer State.” Marsha and Larry have done everything from weeding and transplanting to working in the seed bank and assist with events. They spoke to the Bulletin from their home on Kaua'i.*

### You are members and volunteers, yes?

Larry: It doesn't feel strange to be a member and volunteer at the same time. That's just a natural thing. NTBG is wonderful and we want to do all we can to support it, whether financially or hauling out weeds.

Marsha: There are wonderful events you get invited to as a member. Even the Zoom events are incredible. As a member and volunteer, there are just so many things that you always get more than you give.

### What do you enjoy most about visiting the garden?

Marsha: If you're stressed out, time spent in the garden lets you get away. One magic moment for me was first

seeing the waterfall in McBryde Garden. Walking down that path, you almost feel like Alice in Wonderland with all the sounds of the garden. Then you take a corner and there's a waterfall out of nowhere. It gives you goosebumps.

Larry: I like just wandering in McBryde Garden. They wrist band you and set you loose in the wild. With so many different plants, we discover something new every time. Visiting the Garden is a very powerful experience. It's like Kaua'i to the nth power — Hawai'i boiled down to its gorgeous essence.

### What would you say to someone who is thinking about supporting NTBG?

Marsha: Once you get a taste of the Garden, you just can't get enough because you realize how important it is, not only for Kaua'i, but for the world.

Larry: At every level — if you just visit as a tourist for the beautiful plants and flowers, that's still a great experience. But you can go as deeply as you want. For us, it's been an evolution, learning more about NTBG's many programs — the Breadfruit Institute, the research, and more. And on climate change, anything you can do to keep the lungs of the planet happening is important.

### How would you describe the people at NTBG?

Larry: There's a family feeling to it — a multi-generational, multi-cultural aspect. I think it's a very inviting place, the way people deal with folks makes it very special.

Marsha: I always know the tram ride from the Visitors Center into the Lawa'i Valley is going to be special. When else do you get a bus driver that is almost a botanist?

### How has your involvement with the Garden affected you personally?

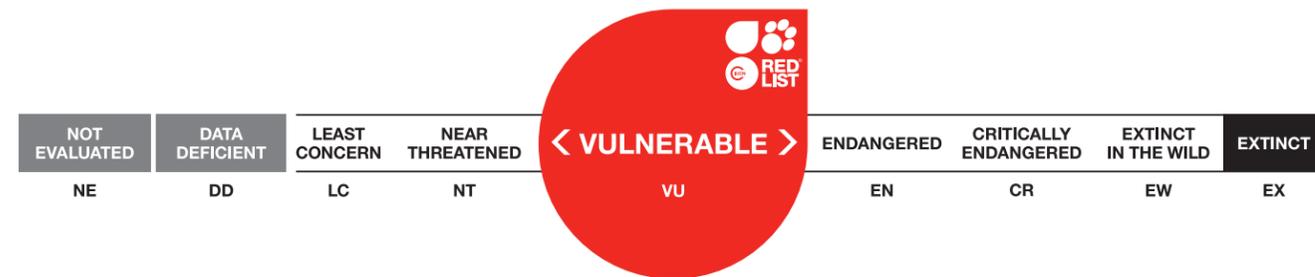
Larry: I think there's never been a time that we have visited the Garden and not felt better afterwards. It's a peaceful, healing experience — it's magical.

Marsha: When we have guests visit, I'm always so excited to see their reaction to the Garden. I know it's going to be good. When we get back, they never can stop talking about it.

# red listed

The International Union for Conservation of Nature (IUCN) publishes the online resource, The IUCN Red List of Threatened Species, ranking taxa (species, subspecies, or varieties) in one of nine categories from 'Not Evaluated' to 'Extinct'. The Red List is an invaluable tool for not only scientists, educators and policy makers, but for anyone seeking a better understanding of the conservation status of plants and animals around the world.

In recent years, conservation agencies, institutions, and organizations including NTBG have increased efforts to assess the more than 1,300 native plant taxa in Hawai'i. To date, nearly half have been assessed, reviewed, and published on the Red List, adding to the more than 43,000 plant taxa published through the latest update of the Red List worldwide.



## Species: *Cyanea fissa* (Campanulaceae)

**IUCN RED LIST CATEGORY: VULNERABLE (VU)**

*Cyanea fissa* is a Kaua'i single-island endemic lobeliad that occurs in wet forests. An estimated 5,000 individuals occur among 25 subpopulations. However, populations are severely fragmented and there is a continuing decline in the number of mature individuals, subpopulations, and habitat. Like most of Hawai'i's native plant species, persistent threats to *C. fissa* include habitat degradation by non-native animals and competition by non-native invasive plant species.

The Hawaiian Campanulaceae is one of the most spectacular examples of plant adaptive radiations. From a single colonist that arrived to the Hawaiian archipelago around 13 million years ago, over a hundred new species evolved. Unfortunately, most modern plant species extinctions in Hawai'i have occurred within this group.

Although not as threatened as most other Hawaiian lobeliads, an assessment as Vulnerable still places *C. fissa* in a Threatened category according to IUCN Red List criteria. NTBG staff make opportune seed collections when mature fruit are encountered and these seed collections are stored in our seed bank for future restoration projects. *Cyanea fissa* is also included as a focal species in a study investigating dormancy of Hawaiian endemic Campanulaceae, which is being undertaken by our seed bank and laboratory manager Dustin Wolkis, as part of his PhD research. – *Seana Walsh*

## NTBG Completes Kaua'i Red Listing Campaign

BY DR. NINA RØNSTED, DIRECTOR OF SCIENCE AND CONSERVATION AND SEANA WALSH, CONSERVATION BIOLOGIST

In 2020, NTBG completed a campaign to assess all of Kaua'i's single-island endemic vascular plants for the IUCN Red List of Threatened Species. In total, 127 new assessments were completed in 2020, resulting in updated listings for all of Kaua'i's 255 single-island endemic plants.

While five percent of the assessed plants were already extinct and another five percent are possibly extinct or extinct in the wild, all of the remaining plants were classified as threatened according to internationally recognized IUCN Red List criteria. The majority of these were placed in the highest Critically Endangered (46 percent) or Endangered (41 percent) categories with only three percent assessed as Vulnerable. At the same time, only 45 percent of these taxa are officially listed as Threatened or Endangered under the U.S. Endangered Species Act.

NTBG director of science and conservation, Dr. Nina Rønsted said, "as conservation advocates across the globe are calling for action to stop biodiversity and ecosystem loss, and obtain a more sustainable balance with nature, it is critically important that we bring the conservation challenge of the flora of Hawai'i to international attention." Because the IUCN Red List of Threatened Species is the most widely recognized standard for understanding which taxa and ecosystems most urgently need help and funding, she added, "completing Red List assessments for Hawai'i's unique flora is a necessity."

NTBG conservation biologist, Seana Walsh, said, "with more than 50 years of documenting our flora through fieldwork, collections and scientific study,



RESEARCH BIOLOGIST KEN WOOD COLLECTS RED LISTING DATA IN A REMOTE LOCATION ON KAUA'I. PHOTO BY SEANA WALSH

NTBG is well positioned to take a lead in providing the data and knowledge needed to conduct high quality and informative assessments."

Seana added that NTBG's conservation expertise enables the organization to help protect and restore species, so that Hawai'i's native plants can thrive where they evolved.

The Hawaiian Islands are recognized for having one of the most unique flora in the world. Hawai'i's plants evolved in isolation over millions of years with nearly 90 percent of the 1,360 taxa found nowhere else on earth. Many of these extremely rare plants are limited to a single island or even just one valley or on mountainside. By contributing to a more complete Red List, NTBG latest assessments are providing invaluable plant knowledge in the battle against the accelerating threat of widespread extinction.

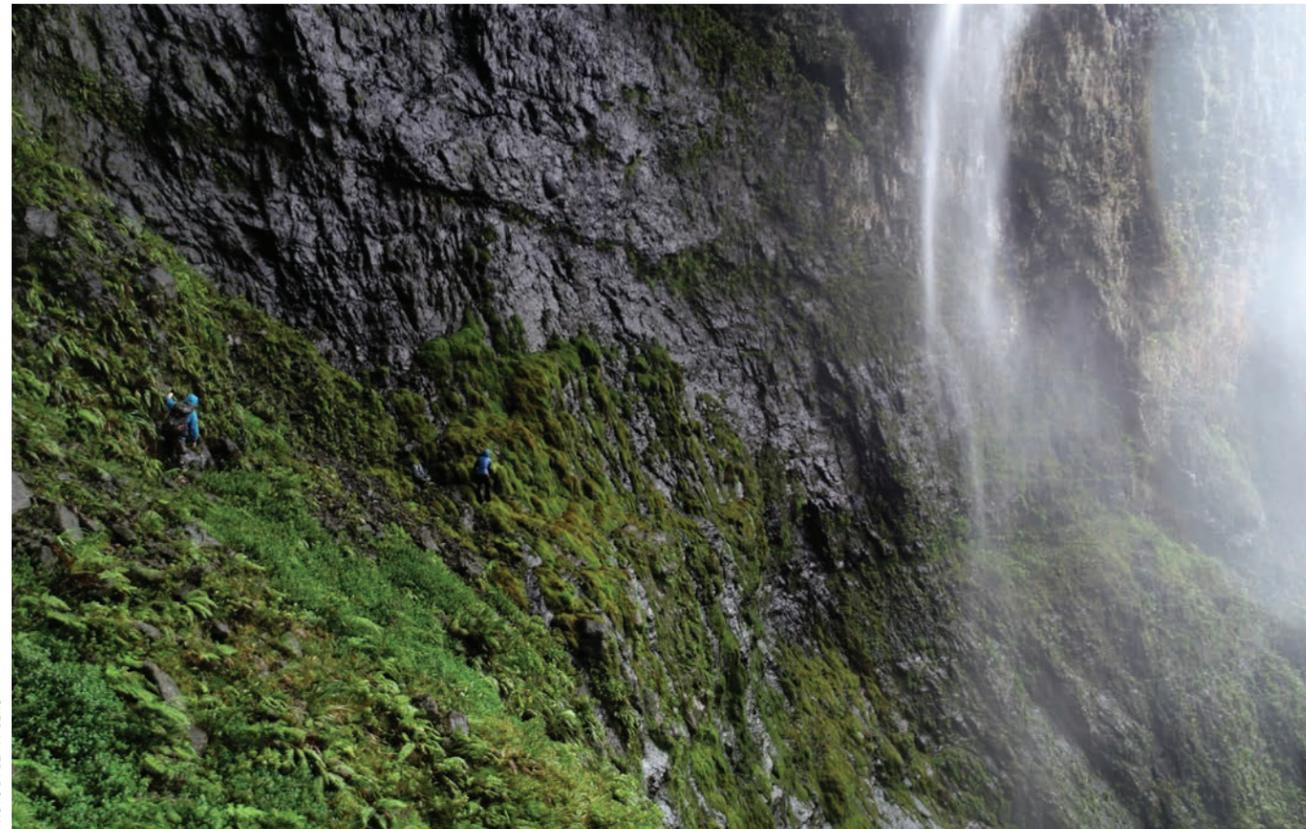


PHOTO BY BEN NYBERG

## LYSIMACHIA INIKI FOUND BELOW WAIALEALE

Named after Hurricane 'Iniki which devastated Kaua'i in 1992, *Lysimachia inki* (Primulaceae) is a single-island endemic, known only from the rain-soaked, mist and cloud-enshrouded 3,000-foot-high cliffs below Mt. Wai'ale'ale. Scientists believe that when 'Iniki ravaged the island, pieces of the then undescribed *Lysimachia* broke off and fell from the upper reaches of the cliffs that form the remains of an ancient volcano in central Kaua'i. In subsequent years, NTBG and its partners have focused on preserving the plant by collecting broken branches whenever found at the base of the cliff, hoping to secure seeds for conservation. In 2018, with the aid of drones, NTBG gained a close-up view of the plant in its native habitat and discovered a second colony on nearby cliffs. In January 2021, NTBG Science and Conservation staff found and collected a new branch and mature seed capsules with over 150 seeds, offering new hope for this rarely seen species.



PHOTO BY NTBG STAFF

Kaua'i has experienced several record breaking

## CLIMATE CRISIS VIDEO SERIES

When the Covid-19 pandemic upended plans for a four-part Climate Crisis Forum that was being hosted and co-organized by NTBG and community partners, NTBG's Science and Conservation Department, with support from the County of Kaua'i, produced five short videos. The videos highlight climate change threats relevant to Hawai'i and NTBG's work, focusing on four climate issues: coastlines, food security, mountains, and extreme weather. The subjects are presented in the context of Hawai'i's Aloha+ Challenge campaign, UN Sustainable Development Goals, and Hawai'i-based strategies for plant conservation. Find all five videos at: <https://ntbg.org/news/a-changing-climate/>



PHOTO BY MIKE O'CONNOR

## "OLD IS NEW" AT KAHANU GARDEN

More than 300 individual trees are conserved in NTBG's breadfruit conservation collection, including many accessions and varieties represented by a single tree. In managing a field genebank of clonal trees, it is important to vegetatively replicate trees as they mature, age, and eventually decline in health and vigor. One long-struggling tree, known as 'Samoan', was collected by NTBG's Breadfruit Institute's director Dr. Diane Ragone in 1987 in Vuaki Village of Fiji's Yasawa Islands. After 'Samoan' was air-layered in 2020, the resulting small tree was planted in an open area of Kahanu Garden in January 2021 where it is expected to thrive, perpetuating this important germplasm. It was one of 94 trees in an extensive study of nutritional composition by Dr. Susan Murch's lab at the University of British Columbia at Okanagan. 'Samoan' is ranked as one of the top four varieties – all from Fiji and Samoa – valued for flour protein level (4.5 percent) which ranged from 1.7 to 7.6 percent.



PHOTO BY LEI WANN

## HISTORICAL PARCEL DONATED TO NTBG

A 1.26-acre parcel of coastal land near Limahuli Garden has been generously donated to NTBG by the Faye family, long-time kama'āina (local) community members on Kaua'i. Popularly known as 'Kawaialoha', the historically significant site is mentioned in prayers and chants of Hā'ena district, noted for its freshwater spring. According to one legend, King Kamehameha hoped to conquer Kaua'i and drink from the spring. That never happened, but this place has been important in helping perpetuate Hawaiian cultural practices. The Faye family acquired the land in 1967 and, recognizing its beauty and importance, preserved it in a natural state. In early 2020, a representative of the Faye family offered to donate the parcel to NTBG with the understanding that the Garden was an appropriate entity to assume stewardship of the land and ensure its integrity would be preserved and protected from future development.



PHOTO BY CRAIG MORELL

## THE KAMPONG'S SEASON OF PREP

Staff at The Kampong spent part of early 2021 preparing for summer. With its south Florida coastal setting, staff are all too familiar with threats from tropical storms, flooding, and drought. Spring is the time for hurricane season preparation with staff checking metal shutters, water storage containers, portable generators, and perishable goods. At the same time, staff have begun propagating a wide variety of plants for an upcoming plant sale scheduled for November. Building on last year's successful plant sale, staff are growing members of the showy Acanthaceae or shrimp plant family, giant gingers, palm seedlings, and aroids. Follow The Kampong's social media this summer for updates.



# FIGS, WASPS, AND FIDELITY

BY JARED BERNARD

*FICUS RUBRA* (RED AFFOUCHE)  
GROWING IN MCBRYDE GARDEN.  
PHOTO BY JARED BERNARD



WASPS EVOLVED TO POLLINATE THE PORT JACKSON FIG INSTEAD OF EMERGING FROM THE WATKINS' FIG. PHOTO BY KELSEY BROCK

If you were a botanist, you might think NTBG's garden sites on Kaua'i are valuable because they allow for the study of Hawaiian and Polynesian plants. But NTBG also houses a multitude of plants from around the world, both living in the gardens and preserved in the herbarium. Having so many plants within reach presents a rare opportunity to delve into their stories.

Kelsey Brock, a research associate at NTBG, learned this when she spotted a fig sapling growing in the crotch of a Java plum tree in 2017. The sapling turned out to be a Watkins' fig (*Ficus watkinsiana*), a non-native species

not known to reproduce on Kaua'i. Kelsey focuses on non-native plants that establish wild populations (called *naturalization*), especially those that could imperil Hawaiian ecosystems.

For three years, Kelsey scoured the island as a botanist with the Kaua'i Invasive Species Committee, using NTBG's herbarium as a reference collection and to deposit vouchers of recently introduced non-native species. She was accustomed to coming across new things, but when she encountered the wild fig, she knew something was weird.

Figs are notorious for having unique pollinator wasp requirements. Generally, plants that can establish themselves in a new environment are receptive to whatever pollinators are present. But figs and their pollinators have a special relationship based on absolute fidelity or "mutualism" in which they're totally obligated to each other.

Viewing a fig tree's flowers requires a microscope. The flowers are minuscule and hidden inside what is typically referred to as a "fig." Pollination requires each fig species to release its own unique scent to lure its exclusive

tiny pollinator wasp. The wasp must then navigate through a pinprick-sized portal on the fig, aided by its specialized head shape, to reach the flowers inside. The wasp's goal is to put an egg in every flower so its young can get nourishment from the fig ovules. These flowers do not develop seeds, but instead tiny wasps. Some of a fig's flower stalks are too tall, and as the wasp struggles, they get pollinated. Those flowers develop seeds that eventually become new fig trees. The fig-wasp relationship is one of absolute dependency.

Kelsey knew there were only two explanations for figs growing in the wild. Either "the fig wasp pollinators have arrived," she said, "or the mutualism isn't as obligate as popularly thought." Were the figs finding new pollinators?

Solving this mystery required a closer look at the dozens of fig species on Kaua'i. The first step was to collect figs from as many of these species as possible, whether cultivated or wild. Fortunately, NTBG's gardens have representatives of almost all of these figs.

"NTBG's living collection, with at least 41 mature fig species in close proximity in the Lāwa'i Valley, provided a perfect test tube to investigate these relationships," Kelsey said. Specifically, the "living collection" includes a cornucopia of fig species in McBryde Garden, a few growing next to the Botanical Research Center, and the immense Moreton Bay fig trees (*Ficus macrophylla*) in Allerton Garden.

My role, as an entomologist with the University of Hawai'i-Mānoa, was to dissect the figs under a microscope to identify any wasps I found and collect any seeds. Most of the figs had nothing in them. But

some fig species were astonishing, and every time I opened a fig, unknown things poured out. Several wasp species were not previously known to be in the Hawaiian archipelago. Emerging wasps meant they were reproducing, but what about the figs?

For the interaction to be mutual, the figs also needed to be pollinated and produce seeds. This part of the investigation required NTBG's seed laboratory managed by Dustin Wolkis. Along with NTBG's conservation biologist Seana Walsh, Dustin took the seeds I found and used a hi-tech germination chamber to see if they were viable. Dustin and Seana watched carefully for the seeds to sprout.

We also wanted to know whether figs were naturalizing. This was largely based on Kelsey's island-wide surveys, but to finalize our fig collection Tim Flynn, NTBG's herbarium curator, guided us deep into the Lihue-Kōloa Forest Reserve. Tim knew a shortcut into the reserve using a trail behind his house which led us to an old road leading into the Wahiawā Mountains where we found that the Moreton Bay fig and Port Jackson fig (*Ficus rubiginosa*), both introduced for forestry a century ago, were starting to naturalize.



JARED BERNARD (LEFT) AND KELSEY BROCK COLLECT FIGS IN THE LIHU'E-KŌLOA FOREST RESERVE. PHOTO BY SEANA WALSH

Dustin exclaimed that the fig seeds were "very much alive!" He and Seana found that all the fig species containing pollinators had sprouted little seedlings, each capable of growing into a new tree, meaning the wasps were indeed pollinating them.

Don't forget about that initial Watkins' fig. It too may be in an early stage of naturalizing. But while the other naturalizing figs were pollinated by their normal specific wasps, we caught the Watkins' fig in a relationship with the pollinator of the Port Jackson fig. Both fig species are closely related and live together in their native range in Australia. No one ever found this wasp using the Watkins' fig before, which may mean that it can't compete with the Watkins' fig's normal pollinator. On Kaua'i, however, the Port Jackson wasp (*Pleistodontes imperialis*) doesn't need to contend with anyone.

We were shocked to find the Port Jackson wasp also interacting with another fig species that isn't closely related at all: the red affouche (*Ficus rubra*), native to islands near Madagascar. This was among the trees we surveyed at McBryde Garden. The red affouche isn't yet naturalizing, but with baby wasps and viable seeds, it has all the necessary ingredients. It could be only a matter of time.

To be sure these figs are sharing a pollinator, we teamed up with George Weiblen, a botanist at the University of Minnesota-Twin Cities who has studied figs for over 25 years. His lab analyzed the DNA of wasps and figs to be doubly certain of their identities.

Finding the Port Jackson wasp in the red affouche meant that it wasn't merely hopping to close relatives. We checked other relatives of the Port Jackson fig but the wasp was absent. Something else was enabling it to interact with different fig species. By scrutinizing various fig shape dimensions, we discovered that this wasp can interact with figs whose portals have a particular shape, like a lock to which they have the key. This would be like finding out that your house key opens doors on the other side of the world.

Last November, we published our discovery in the journal *Frontiers in Ecology and Evolution*. We concluded that the tactics species use to maintain their unique relationships, such as figs having special shapes or wasps outcompeting each other, can falter outside of their native ecosystems. The diversity of figs at NTBG's gardens helped us understand how strict mutual relationships form, and how easy it is for them to fall apart.

*Jared Bernard is an entomologist PhD candidate at the University of Hawai'i-Mānoa.* 🌿

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# an eye on plants

SELECT SPECIES IN FOCUS

## *Pogostemon guamensis*

Inherent in the notion of discovery is a sense of immediacy, but the truth is, quite often a plant unknown to science may be first collected many years before it is identified, recognized, and published as a “new species.” Take the *Pogostemon guamensis*, for instance.

First collected by botanist Derral Herbst on Guam in 1982, a second round of collections was made by NTBG botanists Steve Perlman and Ken Wood twelve years later while conducting a U.S. Fish and Wildlife Service-funded survey of the karstic limestone cliffs on Guam’s northeastern tip.

Known for their rappelling and cliff collecting skills, Steve and Ken were commissioned to spend part of spring and summer 1994 suspended by ropes exploring Guam’s jagged high cliff habitat. Steve recalls working in the blinding July heat, buzzed by Mariana crows and soaring fruit bats as they documented the then unidentified member of the Lamiaceae (mint family) in five separate sub-populations.

Upon their return to NTBG, senior research botanist Dr. David Lorence suspected the plant belonged to *Pogostemon*, a genus of nearly 80 accepted species with high diversity in the Indian subcontinent, but then unknown from Micronesia or other Pacific Islands. At the request of NTBG research associate

Dr. Warren Wagner, a specimen was sent for DNA analysis to the Smithsonian Institution where Warren also commissioned scientific illustrator Alice Tangerini to do a line drawing (opposite page).

The species holotype (representative specimen) collected by Steve and Ken is curated in the type cabinet at NTBG’s herbarium with its duplicates (called isotypes) shared with six other institutions including the University of Guam, the Bishop Museum in Honolulu, and the U.S. National Herbarium at the Smithsonian Institution.

Because of the low number of individuals (113 recorded) and its very restricted range, the species was given a preliminary IUCN assessment of Critically Endangered. The plant grows only on cliffs surrounding Andersen Air Force Base and is isolated from people, but it is thought to be threatened by invasive species, typhoons, and possibly animals such as feral pigs and deer.

Using molecular and morphological data, David Lorence, Warren Wagner, and collaborators determined the plant was in the genus *Pogostemon* (meaning ‘bearded stamen’) and appropriately named the species for its home island. Interestingly, unlike its relative *Pogostemon cablin* (patchouli) which is well-known for its pungent, musky

smell, *P. guamensis* is scentless, like other Lamiaceae found in Hawai‘i.

Finally, in December 2020 *Pogostemon guamensis* was published in the peer-reviewed open access journal PhytoKeys. Some might ask, why did it take so long?

In the words of Dave Lorence, “The wheels of taxonomy grind slowly but very finely.” Ironically, Steve points out that not all undescribed species are published so fast. This species, like many others, was a side project, and among the 500-1,000 species across the Pacific that NTBG scientists are studying at any given time. With stretched resources and a limited number of classically trained taxonomists and experts available, publication can take years.

*Pogostemon guamensis* is another example of the importance of conducting field work in remote and under-studied areas, says Dave. “There are still plants out there that we hadn’t known existed until the survey work was done. It’s really important to study and name the plants before they go extinct.”

Presently, there are no known *P. guamensis* in cultivation and so conserving the species would require returning to its known locations to collect seeds and/or cuttings. Ken says, “Having the publication will make more people aware that this species exists and hopefully they will start conserving it.”



ILLUSTRATION BY ALICE TANGERINI



## National Tropical Botanical Garden

3530 Papalina Road  
Kalāheo, Hawai'i 96741 USA

***Saving Plants, Saving People***



KANALOA KAHOOLAWENSIS (KANALOA; PALUPALU O KANALOA) WAS DISCOVERED BY NTBG RESEARCH BIOLOGIST KEN WOOD IN 1992 ON A SMALL SEASTACK OFF THE ISLAND OF KAHO'OLAWA. IDENTIFIED AS A NEW GENUS AND SPECIES IN THE FABACEAE (LEGUME FAMILY), THIS PORTRAIT WAS PHOTOGRAPHED BY DAVID LIITTSCHWAGER AND SUSAN MIDDLETON AT NTBG'S NURSERY ON KAUA'I. READ MORE ON PAGE 10.