

Vol XL No. 1

SPRING 2024

the bulletin

of the National Tropical Botanical Garden





Cultivate a beautiful tomorrow with a legacy gift plan today



Provide a flourishing future for generations of plants and people. To learn more about including NTBG in your legacy plans, please contact Heather George, Director of Philanthropy. (808) 762-1499 or hgeorge@ntbg.org

ntbg.org/planned-giving



contents

3 MESSAGE FROM THE PRESIDENT AND CEO

features

6 COMMON THREADS
by Kapi'olani Ching

10 NTBG AT 60: THE FIRST SIX DECADES ON THE GROUND
by Jon Letman

24 REVIVING THE ROOTS OF LAHAINA
by Mike Opgenorth

in every issue

4 NEW MEMBERS

21 WISH LIST

22 PLANT PEOPLE
Exploring people's relationships with plants

29 RED LISTED

30 GARDEN SPROUTS
News from around the Garden

32 EYE ON PLANTS
Select species in focus



ON THE COVER

While conducting a botanical survey on the sea cliffs of Moloka'i in partnership with the Plant Extinction Prevention Program in October 2023, NTBG drone operator Ben Nyberg photographed the Critically Endangered pua 'ala (*Brighamia rockii*). Read about more NTBG's decades of groundbreaking field work on page 10. Photo by Ben Nyberg





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.

National Tropical Botanical Garden
3530 Papalina Road, Kalāheo
Hawai'i 96741 USA
Tel. (808) 332-7324
Fax (808) 332-9765
members@ntbg.org
ntbg.org

©2024 National Tropical Botanical Garden
ISSN 1057-3968
All rights reserved. Photographs are the property of NTBG unless otherwise noted.

Editor: Jon Letman
Graphic Design: Merriam Fontanilla

-  www.facebook.com/saveplants
-  twitter.com/ntbg
-  instagram.com/ntbg
-  www.youtube.com/ntbgsaveplants



We are the National Tropical Botanical Garden

We work across five botanical gardens and throughout the tropics to grow a brighter tomorrow for plants and all they sustain. We do so through a biocultural approach, where Indigenous knowledge, community priorities, and scientific research guide our path forward. Together, we will restore flourishing relationships between plants, people, and places.

Limahuli Garden & Preserve

Kahanu Garden & Preserve

Allerton Garden
McBryde Garden

The Kampong



Vision

A sustainable future where flourishing relationships are restored between plants, people, and places

Mission

To enrich life by perpetuating tropical plants, ecosystems, and cultural heritage

BOARD OF TRUSTEES

CHAIR

Mr. Gordon L. Deane

SENIOR VICE CHAIR

Mrs. Wayne Richardson, III

VICE CHAIR

Ms. Anne G. Earhart

SECRETARY

Ms. Jan D. Elliott

SENIOR PRIOR CHAIR

Mr. Thomas D. Hewitt

PRIOR CHAIR

Mr. Merrill L. Magowan

Mrs. Devon Angelini
Mrs. Martin Dickinson
Mrs. Eric P. Fraunfelner
Ms. Adaline H. Frelinghuysen
Mr. Peter C. Gardner
Sam 'Olu Gon, III, Ph.D.
Mr. Emerson T. Knowles
Linford L. Lougheed, Ed.D.
Ms. Elizabeth E. Matthews
Mr. David W. Pratt
David Rae, Ph.D., OBE
Professor John H. Rashford, Ph.D.
Mr. Thomas L. Reveley
Dr. Michael N. Rosenberg
Mrs. Raymond L. Salley
Ms. Anita Seipp
Ms. Patricia W. Sheehan
Mrs. Phyllis Evans Swindells
Mrs. Catherine Topham
Mrs. Judy C. Webb
Mr. Robert D. Weist
Mrs. Reed C. Wilson

TRUSTEES EMERITI

Mrs. Martha W. Cox
Mr. Patrick Henry
Mrs. Sally O. Hewitt
Mr. Thomas S. Kenan, III
Mrs. Betsy K. Matthews
Mr. David G. Meissner
Professor Sir Ghilleen Prance, FRS
Mr. Charles R. Wichman

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

Message from the President and CEO



Over six decades, the National Tropical Botanical Garden, established as the Pacific Tropical Botanical Garden, has earned a reputation for its expertise in botanical research, conservation, and education. Chartered by the United States Congress as a not-for-profit institution, NTBG has always been dedicated to the preservation of tropical plants. As the organization approaches its 60th anniversary on August 19, 2024, it's essential to reflect on its origins and purpose.

NTBG was founded by a dedicated group of visionaries who had the foresight to recognize the paramount importance of tropical plant research, conservation, and education. NTBG's congressionally chartered status reinforces our unique position as the sole tropical botanical garden distinguished with such recognition. (Read more about NTBG's history on page 10.)

Ever since NTBG was founded, we've been an organization supported by individuals of unwavering commitment. In recognition and celebration of our 60th year, I'd like to honor the vision that has ensured NTBG's longevity and commitment to this vital cause.

At a time of great global environmental consequence, NTBG is focused on biocultural conservation and fostering relationships between people and plants. We understand the central role of healthy, diverse plant life for our planet. To ensure that we can contribute to the preservation and perpetuation of tropical plants, NTBG is leveraging all available resources. This includes drawing from historical sources and making the best use of contemporary knowledge shared between us and our partners, collaborators, and the communities in which we live and work.

Benefitting from centuries of empirical scientific and cultural knowledge and the wisdom of Indigenous communities, integrated with cutting-edge technology and a highly skilled and committed staff, NTBG is crafting and implementing strategies that can help ensure plants and their ecosystems will flourish for generations to come. One example of how NTBG is helping redefine rare plant conservation is our adoption of the use of drones and robotics for finding and collecting critically endangered cliff-dwelling plants like the *Brighamia rockii* featured on the cover of this issue.

NTBG's pursuit of biocultural conservation defines the season before us. Each one of us has an impact on our environment, just as the environment has an impact on us. Today NTBG is poised to continue as a leader in the perpetuation of cultural plant knowledge and irreplaceable plant diversity. Based on NTBG's founders' dedication to collecting, protecting, studying, and appreciating the world's tropical floral diversity, and with the support of all who have come before us, all who are with us now, and those yet to come, we move forward with a sense of gratitude, commitment, and purpose.

Mahalo for helping us get here and for joining us as we move forward into the future.

Janet Mayfield
President and CEO

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 \$90 to \$500 with a level to fit everyone from individuals to families. **Contact: members@ntbg.org**

NEW FELLOWS JULY-DEC 2023

David S. Baskin
E. Courtney Berry
Norma J. Craig
Mary Daschner
Cindy and Walter Deane
James Guerber
Jay Handelman
Wendy Hollender and Will Tolland
David LaChapelle
Joni and Erik Larson
Mark Levine and John Keppeler
Dot and Steve Long
The McCaslin Family
David Marquez
Nancy and Christopher Oddleifson
Corina and Rhone Scoggins
Catherine and Paul Spevetz
Edward Todeschini and John Ferrante

Jeannie Bellsmith
Bev Daniels and Brian Bennett
Elaine and Roger Berke
Margrit and Roger M. Bernstein
Roger Bessey
Molly Anne Birkholm
Jake Blaker
Cheryl and James Bloom
Lydia Borgatta
Katie Lindeman and Hugh Boyd
Kathleen and William Bradley
Juliet Briggs
Andrew Britton
Darlene Brosamer
Deena and Glenn Brown
Karen Brown
Bradford Bryant
David Bryant
Kurt Bubuis
Chelsea Buchanan
Carole Buffum and Kenneth Davis
Alejandra Bunster
Delia Bustamante
Lawrence Butler
Marijke Cadenelli
Ron Caird
Amy Call and Reave Finkel
Elissa Callman
Kevin Campbell
Judy Caporuscio
Charles Carlson
Candace and Kevin Carlson
Sydney Cappel
Jaime and Brian Carter
Kane Casillas
Janice Mori and Jon Castor
Linda and Adam Caswell
Catherine Cathers
Kyle Charron
Lynn Charton
Adam Ciotola
Conrad Clemson
Anne and Alan Clopine
Jeanette M. Clough

Pamela W. Cole
Eileen Comeaux
Barbara Cooper
P. Emery Covington and William G. Tucker
Eileen Crane and Gregory Groth
Sheri Hamersley and Frank Czerwiec
Kristine Davis
Mary Day
Thomas Daye
Jerome Dean
Magalie and Carlos Del Angel
Beverly and Greg Dela Cruz
Kira Dell and John Messenger
Nancy DeLuca
Simon Dermer
Heather Dewar
Rebecca Didomenico
Darian Dimoff
Clifford Dizon
Robert Douglas
MaryAnn Duchene
Janet and Al Dunnell
Andy Dworkin
Susan Dziedzic and Rob Kuehnle
Leanne Eaton
Ibeth Echepeleacu
Jane Edwards
Tanya Enriquez and Barry Livingston
Orlando Estrada
George and Claudia Evanoff
Elinore Evans
Chris Farmer
David Fell and Sandy Kasman
Rob Ferrante
Tina Ferrato
Michelle and Holde Fink
Jill Finn
Betty and Joe Fleming
Kerry Flener
Kerry and Hal Floyd
Jessica and Brennus Fogarty

Henry Fort
Alan Foster
Jessica Frabotta
Deborah and Daniel Freund
Marlene Jordan and Samuel Friend
Jula Galvin
Soli Garvey
Terri and Lee Gately
Katie and John Gates
Ashleigh and Thomas Gay
John Geiger
Kris Giron
Jon Gleman
Sandraa Glista
Peggy Goldwyn
Michael Gonella
Sarah Good
Douglas Gordon
Vishal Goyal
Kaila and Bronson Griep
Margot Halpin and Joseph Martone
Christopher Hansen and Nicholas Hansen
Travis Hansen
Faatima and Kasimu Richard Harley
Mary Hartmann
Diane and Timothy Hayes
Elizabeth Hearey
James Heasley
Jackie and Gary Heinen
Kapiolani Ching and James Henriques
Jillian and Edward Herczog
Margaret Hoeveler
Aaron Hoisington
Georgia and Gery Hsu
Virginia Hude
Daniel and Brenda Humphries
Lynda and Walter Hundleby
Janine and V. Stephen Hunt
Jared Isozaki
Teresa and Stephen Jackson
Fran Lotery and Carl Jacobs
Ronnie Jackowitz Jacobson

Michele Jacquin
Patrick Jarquo
Tracie and Jim Johannessen
Becky and Kenneth Johnson
Gail Johnson
Marian Johnson
Charlene Johnston
Debbie and Mark Jongeward
Inga Joseph
Patricia Jurkovich
Barbara Kaaumoana
Fran Kalb
Terry Kaplan
David Kass
Janet and Robert Kass
Terri Kass
Freddie Kaufman
Sue Keating
Harry Kelley
Analiese Kennedy
Barbara and Jon Kenney
Charlie King
Tia and Caleb Kinser
Henry Klein
Melodye and Leonard Kleinman
Jason Koh
Kathryn Koslow
Ralph Kridner
Stefanie Krueger
Heather Kuhlken
Mary Lalomia
Daina Landeza
Anthony Lanzarone
Cameron Largusa
Erin Auble and Simon Lassel
Robert Laven
Sharon and Donald Lawson
Dawn Butcher and Layne Leach
Lilly Lee
Grace Lehman and Alex Lehman
Lizette Lim and Ben Barcklay
Evan Lloyd
Kelly Bruner and Callen Lockett
Janis Lord
Debra Lovejoy-Bland and Joan Gugliotta
Thomas MacKerricher
Judy MacMulkin-Byfield
Laura Magyar
Ipo Mailou
Sunnie Makua
Mary Mallavarapu
Carol A. Marcotte
Kalei Marston
Kristin and Wayne Martin
Sherry and Chuck Marx
Sandra and Robert Mauceli
Anneliese Mauch and Robert Hainer
Melissa McCarthy
Jewell and Brendan McDaniels
Tracy Medeiros
Karen and Paul Memrick
Monica Mendez and Ravi Rrishnamorthy
Margaret Merryman
Evangelina Meza and Margarita Ruiz

Martha Michalek
Xon Mikolajcik
Heather and Brilliant Miller
Tanner Miller
Linda and Peter Milovsoroff
Barbara Moller
Jeanne Monahan and Mark Lovington
Heidi Morgan
Jane Morgan
Lindsey Morin
Susan Vinlan and Hontly Morrison
Dale Moses
Alyssa and Jonathan Murata
Doria Cook-Nelson and Craig T. Nelson
Lana and Robert Newlander
Mary Neudorffer
Stefanie Ng and David Minor
Kameko Nichols
Jessy Nite
Greg Nowell
Margaret Nugent
Deanna and Brendan R. O'Donnell
Amy Oliver
Sonja Seaberg and Erik Olson
Wendy and Thomas O'Malley
June and Richard Onder
Danielle Osborn
Jake Ozaki
Constance Pappas
Elaine Orsini and Robert Pellegrini
Cisco Peru
Deidre Pistoichini
Rebecca Plunkett
Nancy and Larry Podolsky
Camille Polk
Karen Beattie and Mike Powell
Barbara Prince
Anne B. Pringle
AJ Pucci
Carol Purdy
Jena Ramirez
Jaywant Rao and John Richard
Allison Reak
Kerry Reeves
Caris Reid
Laureen Relyea
Caroline Rhodes
Theo Richter
Heidi Riedesel
Sarah Riling
Jennifer Rivkind
Glen Robert
Mary Roberts
Roberta Robinson and Brian Basset
Jeong and Ron Rodarte
Ms. Shannon Rome
Patricia Johnson and Sean Rositano
Leola C. and Russell K. Rosendaal
Robin T. Russell
Debbie and Bob Saling
Evelyn Sanchez and Rachel Segovia
Janet and Joaquin Sanchez
Abigail Santos
Dylan Santos-Balisan

Evelyn and Lamberto D. Sazon
Claudia Scalise
Janis Haag and Richard Schmidt
Jane E. Schmitt
Kohl Schonsee
Susan and Roger Schow
Mary Seabrook
Kay Sexton
Susan Sherman
Stephanie Shih
Ellen Shimakawa
Karen Silva
Anna Skaya
Deborah Small
Heidi and Marty Smith
Karen Smith and Margaret Musmon
Hgnieszka Geroch and Rafal Sokolowski
Jackson Solari
Mindy Solomon
Monika Sorondo
Steve Spitzer
Jami Steele
Karol Stevens
Mark Stevenson
Christian Styeben
Elizabeth Swindells
Anna Tabke Dual
Russell Tagavilla
Hunter Takahama
Melodie Tancon
Amy Butler and John Taylor
Patti Thiele
Janice Tierney and Jonathan Epstein
Lesley and Michael Tierra
Trang Truong
Margaret R. and John W. Ueleke
Neal Uno
Libor Vanc
Elisa VonBehren
Susan and John Wagner
Gayle and Stan Wai
Alison Walker
Dana Wallace
Kirk Webb
Mat Welch
Jacob Wells
Kathleen A. West-Hurd and Steven Hurd
Jane Whillock
Julia and Stephen Whitney
Judy and Fred Williams
Donna and Vance Wolfson
Lia and Jeff Wollmer
Kyle Woo
Jamie Wood and Robert Frink
Barbara Woods
Patricia Woodson
Antonia Wright
Lisa Yero
Lynn Yieh and Holger Roehl
Sarah R. and Carl N. Zaremba
Kathryn Zeidner
Marsha Zorich



KEALOPIKO'S 'ULU (BREADFRUIT)
DESIGN PHOTOGRAPHED AT KAHANU
GARDEN. PHOTO BY KEALOPIKO

COMMON THREADS:

Threading People and Plants Together through Storied Clothing

BY KAPI'OLANI CHING, COMMUNICATIONS COORDINATOR

In Hawai'i where aloha shirts are a familiar sight, one cannot help but notice the abundance of prints depicting tropical plants. At NTBG, our commitment to understanding and celebrating the inherent relationships between humanity and nature inspired me to explore the aloha shirt on a deeper level. What plants are depicted on aloha shirts? What stories and connections do these plants hold? And perhaps most importantly, what's the significance of wearing plant-inspired prints?

To gain some insight, I spoke with Ane Bakutis, co-owner of Kealopiko. On the surface, Kealopiko is a clothing and lifestyle brand, but they represent so much more. Ane, along with friends Hina Kneubuhl and Jamie Makasobe, founded Kealopiko in 2006 with a desire to bring Hawai'i's stories and connections into focus through clothing. Prior to creating Kealopiko each of them has had various experiences in conservation-related work in Hawai'i. Ane, for instance, brings a wealth of knowledge from her years with the Plant Extinction Prevention Program (PEPP), one of NTBG's valued partners in plant conservation. Through the lens of their experiences they've designed numerous prints that showcase that

which makes Hawai'i truly unique: its plants and animals, Hawaiian language and practices, Hawai'i's ali'i (royalty), kūpuna (elders and ancestors), and the mo'olelo (stories and history) that thread these elements together.

Kealopiko's "All Aloha" collection – their signature line of aloha wear crafted entirely in Hawai'i – features hand-dyed fabric adorned with intricate designs that breathe life into the relationships shared between plants and people. For example, a piece printed with their olonā (*Touchardia latifolia*) design not only illustrates the beauty and craftsmanship of olonā cordage, but includes a mo'olelo (story) tag that explains how Hawaiians learned to cultivate and extract olonā fibers to create one of the strongest cords known to man. The tag details how olonā was used as lashing and binding for a wide range of tools and items as well as an 'ōlelo no'ēau (proverbial saying) that metaphorically describes olonā's sheer strength.

For Ane, Hina, and Jamie, aloha wear is a platform for sharing the stories and relationships that have sustained Hawai'i for countless generations. Woven into the essence of each piece is a clear call to action: In wearing plant-inspired prints, we have the opportunity to help keep their stories alive.

“...we should mālama (care for) these organisms and connections because that is what perpetuates our culture. That is what makes us Hawaiian. It is the essence of the Hawaiian world view.”



ANE BAKUTIS DOING FIELD WORK. PHOTO BY ED MISAKI

Kapi’olani Ching: Each of you have had various experiences in conservation-related work. How did those experiences influence the creation of Kealopiko?

Ane Bakutis: Hina and I worked together while I was completing my master’s thesis in botany and then again at PEPP on O’ahu. During that time, we would carry the puke wehewehe (Hawaiian language dictionary) into the forest with us and look up different terms for phenomena we were seeing and experiencing. For example, a lehua flower saturated with dew or mist. We thought it would be great to share these experiences and knowledge of our kūpuna with the public, who at the time was not as aware as they are now about native plant and animal species and Hawaiian language. We thought we should start a magazine, or blog, but then we thought about using clothing as our platform for sharing this knowledge and mo’olelo. Our other business partner Jamie was working at a Hawaiian fishpond and was more focused on marine conservation. Through all these experiences, Kealopiko was born.

The mo’olelo behind Kealopiko’s designs beautifully illustrate the relationships between people, plants, places, and lifeforms. Why is this focus on mo’olelo and relationships important for Kealopiko?

Through the colonization of the Hawaiian islands and people, we have lost so much of our connection and understanding of the relationships between Hawaiian organisms, environments, ourselves, and our kūpuna. Our ancestral stories provide that direct connection and understanding. They tell us that we should mālama (care for) these organisms and connections because that is what perpetuates our culture. That is what makes us Hawaiian. It is the essence of the Hawaiian world view.

Can you describe your process for creating new designs and bringing those mo’olelo into focus?

It is a collaboration between the three of us. Sometimes a new design idea just comes to us in our thoughts, dreams, experiences; like our kūpuna are reaching out to us saying,

“draw me, showcase me.” For seventeen years we have kept a running list of organisms or concepts we want to design. Some things have never come off that list, some are never on the list because we design them right away. We often review the list and pick designs that jump out at us. We have designed for pairings as seen in the Kumulipo¹. We have designed an entire year for an akua (deity) based on her kinolau². We are currently creating a new design inspired by an old Hawaiian epic.

Based on your own experiences, what does successful conservation look like? What are the key elements of a successful long-term project?

Long term success needs commitment, a strong po’o (head), clear morals, standards, and goals. I have been with PEPP on Moloka’i for 15 years, conserving 32 endangered plant species. Some species we have had great success in outplanting and years later watched as those very same outplantings died due to drought. But we continue and don’t give up hope. We create back up plans to our back up plans.

What are your hopes for the future of Hawai’i’s native plants?

I hope that more of Hawai’i’s population will understand that our native plants will only survive if each one of us care, if each one of us makes a concerted effort to mālama ‘āina (care for the land), keep out the invasive species and continue to protect the native habitats we have left. I hope the state legislature will give as much money to conservation as they do to tourism, and that more local people will pursue careers in conservation and aloha ‘āina. Also, every business and organization can do their part to mālama ‘āina in their daily practices. 🌿

This interview was edited for length.

¹ A Hawaiian chant of creation. Comprising 2,102 lines, the Kumulipo articulates the connections across various realms through pairings. For example, the ‘ekaha kū moana, or black coral, is paired with ‘ekahakaha, or bird’s nest fern on land. Such pairings illustrate the importance of balance and interconnectedness.

² Hawaiian deities are believed to have the ability to take on multiple forms known as kinolau. For example, hau (*Hibiscus tiliaceus*) is a kinolau of the deity Haumea.



SCREEN PRINTING FABRIC BY HAND. PHOTO BY KEALOPIKO

READ AND SHARE ONLINE





NTBG AT 60



The First Six Decades on the Ground

BY JON LETMAN, BULLETIN EDITOR

PHOTOS BY NTBG STAFF AND ARCHIVES

Long before there was a National Tropical Botanical Garden, a growing number of people in Hawai'i recognized the need to collect, preserve, and study tropical plants. These far-sighted individuals identified Hawai'i as having the optimal climate and environmental conditions to create a large and diverse botanical garden.

In the early 1900s, ongoing conversations between two noted botanical explorers – David Fairchild and Joseph Rock – evolved into a broader series of discussions about how to establish a national garden in the tropical regions of the United States. Following a decades-long and circuitous route, dozens of local and national civic organizations¹ and hundreds of impassioned plant conservation advocates including botanists, academics, and garden devotees² took up the cause of advocating for such a garden. Their tireless commitment of time, energy, and financial resources culminated with the signing of Public Law 88-449, the congressional charter³ that created the Pacific Tropical Botanical Garden (PTBG) on August 19, 1964.

PTBG's founding mission was mighty: to develop, operate, and maintain an educational and scientific center in the form of tropical botanical gardens. Its primary purpose was to conduct tropical botanical research, disseminate knowledge, collect and cultivate tropical flora, and contribute to the "education, instruction, and recreation of the people of the United States."

Key to PTBG's establishment was the support of Robert Allerton, one of the Garden's founding Trustees who in 1938, together with his partner John Gregg Allerton, built a home and garden in Kaua'i's Lāwa'i Valley beside a stream that flowed into the sea. Quoted in LIFE magazine in 1958, Robert said, "So much of the world's natural beauty is being destroyed that it is my purpose to preserve – and frequently create – natural tropical beauty." Although Robert Allerton died⁴ just four months after PTBG was founded, his gift of one million dollars ensured that the Garden would continue to grow.

¹ As described in PTBG's dedication address by then-PTBG member-at-large Colin Lennox, Bulletin Vol. 1, No. 2 (April 1971)

² Botanists Dr. Harold Lyon, Dr. Harold St. John, W.W. Goodale Moir, as well as influential individuals including Elizabeth "Loy" Marks, Juliet Wichman, Edith Plews, along with members of The Garden Club of America and the Hawaiian Botanical Gardens Foundation, and many others played an instrumental role in the establishment of PTBG. For a detailed account of the founding of PTBG, see Bulletin Vol. XXX, No. 4 (Winter 2013-2014), pg. 1-7

³ PTBG (later renamed NTBG) was chartered by the U.S. Congress as a Title 36 national organization. The charter can be found at <https://ntbg.org/about/story>

⁴ Robert Allerton died on December 22, 1964. John Gregg Allerton died on May 1, 1986.



NTBG STAFF WORKING IN THE
UPPER LIMAHULI PRESERVE

PUTTING DOWN ROOTS

And grow it did. In the Garden's earliest years, however, there were no living collections, no research or education facilities, not even a physical location. Passionate plant enthusiasts committed to its mission, lobbied for PTBG to be based in various locations around Hawai'i. Ultimately, after much spirited debate and deliberation, it was the gift of 172 acres of McBryde Sugar Company property in the Lāwa'i Valley purchased by John Gregg Allerton that became PTBG's first physical location on Kaua'i.

William S. Stewart was recruited from Los Angeles County Arboretum and Botanic Garden as PTBG's first scientific director. Stewart was fond of recalling how he dashed into the valley on the final day of 1969 to ensure the Lāwa'i Garden had its first live plant in the ground at the dawn of the new decade. After more than a century of intensive sugarcane production in the Lāwa'i Valley, transforming the land into a botanical garden required tremendous effort and an audacious sense of optimism.



NTBG REDISCOVERED
HIBISCADELPHUS WOODII
USING A DRONE IN 2019

From January 1971, PTBG began documenting its earliest work in *The Bulletin of the Pacific Tropical Botanical Garden* edited by the director's wife Maria Stewart. In that first issue, William Stewart wrote that "the first goal of the Garden is the preservation of these native Hawaiian endangered species."

The Garden's first decade was lean and rife with obstacles, but PTBG's small staff began mapping the grounds, building roads and a nursery, and working from a temporary office above the valley rim. In 1971, the

Garden established a herbarium to preserve collected plant specimens. The following year, work began on PTBG's first satellite location, Kahanu Garden after it received a 60-acre gift of land outside Hāna, Maui encompassing Pi'ilanihale Heiau, Hawai'i's largest archeological structure⁵.

By the autumn of 1973, "land clearing, planning, building, and first plantings at [PTBG]'s Lāwa'i Valley" was nearing completion. That same year PTBG published its first book *List and Summary of the Flowering Plants of the Hawaiian Islands* by Dr. Harold St. John. PTBG later reprinted Joseph Rock's *The Indigenous Trees of the Hawaiian Islands* (1974) and introduced *Allertonia*, a series of occasional scientific papers in 1975.

In subsequent years, Garden publishing partnerships have included: *Flora Vitiensis Nova: A New Flora of Fiji*, Vol 1-5 (Albert Smith, 1979-91); *Flora of the Cook Islands* (Bill Sykes, 2016); *Flora of the Marquesas*, Vol. 1 and 2 (2019-2020); *Flora of Samoa* (a project started by former PTBG ethnobotanist Arthur Whistler, 2022), and the online *Flora of Hawai'i* in collaboration with the Smithsonian Institution. Research for a *Flora of Micronesia* is ongoing. These scientific publications provide a fundamental baseline for species conservation.

WORTHY OF STUDY AND EVALUATION

The Garden's Science Advisory Committee identified breadfruit as a significant Pacific Island tree "worthy of study and evaluation in the field and in cultivation" in 1974, the same year PTBG adopted its now familiar circular breadfruit logo.

In 1976, one of the Garden's earliest supporters, Juliet Rice Wichman, gifted an initial 13 acres of property on Kaua'i's north shore which eventually resulted in establishing the Limahuli Valley Special Sub-zone which today includes the nearly one-thousand-acre Limahuli Garden and Preserve. The same year, the McBryde Sugar Co. donated a 9.5-acre parcel of land above the Lāwa'i Valley's western rim which became the Garden's permanent headquarters, today home to administrative, education, and research facilities.

The 1970s saw the first public tours (1971), an intern program (1972), and the Garden's first breadfruit collecting expeditions to Kiribati, Samoa, and French Polynesia (1977). That same year, PTBG conducted surveys and field trips across Hawai'i and the first



60 YEARS BUILDING RELATIONSHIPS
BETWEEN PEOPLE AND PLANTS



successful collection and ex situ cultivation of the Kaua'i endemic cliff-dwelling 'ālua (*Brighamia insignis*).

By the 1980s, PTBG staff was increasing its rough terrain fieldwork with successes discovering and rediscovering rare and endangered plants. The Garden's herbarium and living collections continued to grow as staff embarked on new partnerships and collaborations with conservation scientists in Hawai'i and across the Pacific from New Caledonia and Fiji to Samoa, Tonga, Micronesia, the Marquesas Islands, and beyond.

In 1981, PTBG employed just over two dozen people, but as the staff grew, so did its collections of Zingiberales, Rubiaceae, *Erythrina*, pandanus, palms, cycads, and endangered Hawaiian plants. Kahanu Garden built its collection of Pacific heritage crops and gained the Mary Wishard Memorial Coconut Grove while The Kampong maintained a striking variety of tropical fruiting and flowering trees, many collected by David Fairchild. In 1986, PTBG was designated one of four official Heliconia Society International repositories.

A TIME OF CHANGE

In 1984, Catherine "Kay" Hauberg Sweeney donated her Coconut Grove, Florida property – previously the home and garden of David Fairchild – to PTBG, two years before John Gregg Allerton purchased additional tracts of

land in the Lāwa'i Valley which he left to the Garden upon his death in May 1986. In 1988, PTBG's congressional charter was amended, renaming the organization National Tropical Botanical Garden (NTBG).

By the end of the 1980s, NTBG had proven itself as an institution dedicated to rare plant discovery, collection, and conservation, as well as its significant contributions to systematics and taxonomy through its herbarium. Increasingly, scientists and educators sought out the Garden's expertise and resources. In 1990, NTBG assumed management of Allerton Garden on behalf of the Allerton Trust, two years before Hurricane Andrew pounded The Kampong (August 1992) and Hurricane 'Iniki (September 1992) devastated the gardens on Kaua'i.

NTBG also established the Hawai'i Plant Conservation Center (1989-1994) which eventually became NTBG's Conservation Program and the State of Hawai'i Plant Extinction Prevention Program, one of NTBG's ongoing partners in conservation.

NTBG's final decade of the twentieth century saw the opening of the Bill and Jean Lane Visitor Center on Kaua'i's south shore (1997) and increased collaboration with scientific, educational, and cultural institutions, state and federal agencies, private and non-governmental organizations and nonprofits, and grassroots community groups.

⁵ Pi'ilanihale Heiau was designated a National Historic Landmark in 1964



PHOTOS BY NTBG STAFF, SHANDELLE NAKANELUA, AND ERICA TANIGUCHI



KAHANU GARDEN (TOP); ALLERTON GARDEN (CENTER LEFT); MCBRYDE GARDEN (CENTER RIGHT); LIMAHULI GARDEN (BOTTOM LEFT); THE KAMPONG (BOTTOM RIGHT). PHOTOS BY NTBG STAFF

NTBG 60 Years at a Glance



1938

Robert and John Gregg Allerton make their home at Lāwa'i-kai on April 1



1954

Hawaii Botanical Garden Foundation passes a resolution promoting the establishment of a botanical garden in Hawai'i

1964

Hawai'i Sen. Daniel Inouye's first piece of legislation, Public Law 88-449, is signed as a Congressional Charter, establishing the Pacific Tropical Botanical Garden on August 19

1965

Mateo Lettunich is appointed executive director and president of PTBG



1969

John Gregg Allerton purchases 172 acres in the Lāwa'i Valley on Kaua'i, gifting the property to establish PTBG's first garden site



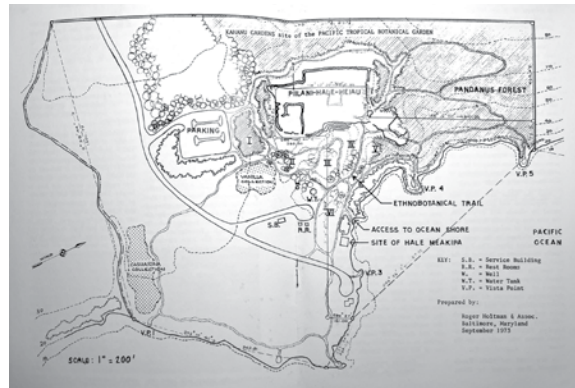
1970

William Stewart is appointed PTBG's scientific director (1970-75)



1972

A 60-acre gift of land from the Kahanu-Matsuda family and Hāna Ranch, Inc. establishes Kahanu Garden on Maui; first meeting of PTBG volunteers on Kaua'i who later adopt the name Na Lima Kokua (The Helping Hands)



1975

William Theobald is appointed director (1975-92); PTBG begins using a computer for its data base

1976

Early Garden supporter Juliet Rice Wichman gifts 13 acres of land to establish the Limahuli Garden on Kaua'i's north shore; William Theobald announces plans to create a "definitive collection of breadfruit"



1977

PTBG leads multiple breadfruit collecting expeditions to Kiribati, Samoa, and the Society Islands

1980

New PTBG headquarters and research facility is dedicated above the Lāwa'i Valley on 10 acres gifted by McBryde Sugar, Co.

1981

PTBG employees a total of 26 staff



1982

Powerful Hurricane 'Iwa causes extensive damage in both the Lāwa'i and Limahuli valleys on November 23

1989

NTBG and Bishop Museum staff begin restoration of the Pi'ilanihale Heiau at Kahanu Garden in June



1990

NTBG assumes management of Allerton Garden on behalf of the Allerton Trust

1992

Marc Code and Diane Ragone are appointed acting directors; successive destructive storms hit NTBG gardens (Hurricane Andrew pounds The Kampong in August followed by Hurricane 'Iniki on Kauai in September)



1993

The Harrison Chandler Education Center at NTBG headquarters is dedicated for classes, lectures, and meetings; Diane Ragone is appointed acting director

1986

John Gregg Allerton dies on May 1, leaving his Lāwa'i-kai property to the Allerton Trust

1988

PTBG's congressional charter is amended, changing Pacific Tropical Botanical Garden to National Tropical Botanical Garden; public tours begin in Allerton Garden and Kahanu Garden

2000

Lāwa'i Garden is renamed McBryde Garden to honor the support of the family that formerly farmed sugar in the valley

2003

Charles "Chipper" Wichman is appointed director and CEO (2003-2019); NTBG establishes the Breadfruit Institute, headed by Diane Ragone

2008

The Juliet Rice Wichman Botanical Research Center, a 20,000 sq. ft. LEED Gold certified facility, is dedicated at NTBG headquarters

2016

NTBG plays a central role in hosting the International Union for Conservation of Nature's World Conservation Congress in Hawai'i

2017

The Breadfruit Institute establishes the Regenerative Organic Breadfruit Agroforest (ROBA) in July; NTBG begins using drones for plant conservation

2019

Janet Mayfield is appointed CEO and director/president (2019 - present)

2021

NTBG completes an assessment of all 255 Kaua'i single-island endemic plant species for the IUCN Red List of Threatened Species

2022

In collaboration with Florida International University, NTBG establishes the International Center for Tropical Botany at The Kampong; NTBG botanists and partners conduct a four-week botanical survey in Palau

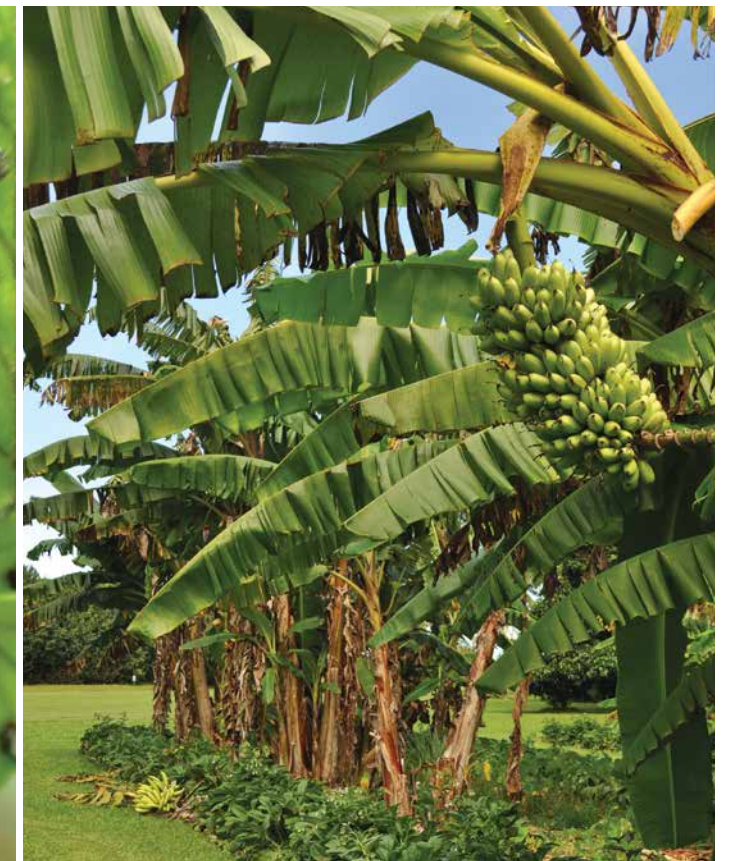
1998

Paul Cox is appointed director and CEO (1998-2002); NTBG receives philanthropist Loy McCandless Marks' collection of rare botanical and horticultural books

2024

NTBG celebrates its 60th anniversary

plants



OPPOSITE PAGE, CLOCKWISE: 'ULU (*ARTOCARPUS ALTILIS*), KOKI'O 'ULA'ULA (*HIBISCUS KOKIO* SUBSP. *SAINTJOHNIANUS*), WAUKE (*BROUSSONETIA PAPYRIFERA*), 'ILIAHI (*SANTALUM HALEALALAE*), KOKI'O KE'OKE'O (*HIBISCUS WAIMEAE* SSP. *HANNERAE*). THIS PAGE, CLOCKWISE: KĪLAU (*DRYOPTERIS GLABRA* VAR. *PUSILLA*), MAI'A HĀPAI (*MUSA X PARADISIACA*), 'ŌHI'A (*METROSIDEROS POLYMORPHA*), ROYAL CUBAN PALMS (*ROYSTONEA REGIA*).PHOTOS BY NTBG STAFF



COLLECTING OLONĀ
(TOUCHARDIA LATIFOLIA)
SEEDS FOR CONSERVATION

The Garden continued making progress in the 2000s, playing an integral role in advancing the Global Strategy for Plant Conservation and later helping develop the Hawai'i Strategy for Plant Conservation. In 2003, NTBG founded the Breadfruit Institute, followed by the opening of the Lāwa'i Valley Conservation and Horticulture Center (2005) and the Juliet Rice Wichman Botanical Research Center on Kaua'i (2008). These facilities helped NTBG continue advances in botanical fieldwork, horticultural excellence, education, research and collaboration.

In 2016, a multi-year effort, in part spearheaded by NTBG's then director Chipper Wichman, successfully bid to host the first-ever International Union for Conservation of Nature's World Conservation Congress in the United States. The global gathering welcomed over 10,000 delegates from 192 countries to Hawai'i. With NTBG and its partners helping elevate Pacific Island environmental and conservation issues on the world stage, the time had come to reach further.

LOOKING TO THE FUTURE

In the twenty-first century, NTBG continues to partner, engage, and lead important plant science and conservation endeavors ranging from botanical surveys in Hawai'i, Micronesia, Samoa, and Palau to major breadfruit research and conservation efforts and distribution partnerships with collaborators in the Pacific, the Caribbean, Central America, Africa, Europe, and across Hawai'i and North America through the Global Breadfruit Initiative and Regenerative Organic Breadfruit Agroforest.

Looking to the future, NTBG's work is more consequential than ever. The compound crises of biodiversity and habitat loss, exacerbated by the climate crisis, along with industrial pollution, the spread of invasive species and disease, food insecurity, and global instability all underscore the importance of advancing tropical plant science, education, and public engagement on matters related to plants and the ecosystems that sustain them.

At the same time, NTBG recognizes the global movement to squarely face injustices of the past and acknowledge that Western models of science and discovery in the natural world have benefited immeasurably from – and too often – at the expense of Indigenous peoples. Indigenous cultures have, over millennia, developed their own systems, knowledge, and stewardship that have and continue to inform NTBG as it seeks to understand, explain, and preserve the natural world.

Inspired by the intrinsic ties between humans and nature everywhere, NTBG continues to look to the relationships between people and plants as exemplified by Hawaiian cultural practices. This appreciation of Indigenous knowledge complements our decades of plant exploration, discovery, taxonomy, systematics, and horticulture as components of biocultural conservation.

As outlined in NTBG's Strategic Plan 2023-2027, biocultural conservation, science, and stewardship of our living collections through horticultural excellence are being enhanced with new technologies such as drones, robotics, GIS mapping, data management, and communications. NTBG is pursuing our strategic priorities through advances in our seed and fern laboratories, conservation nurseries, in our gardens and in the field. Guided by our plan, we continue to advocate for tropical plants through public engagement, and in our own education and professional development programs. We recognize the importance of fostering deeper relationships between people and plants.

One of the best examples of how NTBG is helping people and plants flourish together is the recently completed International Center for Tropical Botany at The Kampong, a collaboration between Florida International University and NTBG where we are training the next generation of botanists.

NTBG continues to contribute to genetically diverse collections through collaborations with institutions like the Chicago Botanic Garden and the University of Hawai'i to name but two. NTBG has become a leader in plant taxonomy and floristics in the Pacific, committed to helping improve the understanding of plant distribution and documenting and describing tropical plant diversity, leveraging our staff and resources like our herbarium which, as of early 2024, houses nearly 96,000 specimens. This preserved material complements NTBG's living collections with over 120,000 accessioned plants, making it the largest curated scientific collection of tropical Pacific plants in the world.



Other strategic goals, such as reducing the threat of plant extinctions, are being achieved by NTBG's staff which to date has been associated with the discovery of at least 123 new plant taxa (species, varieties or subspecies). This includes 59 new taxa in Hawai'i as well as the rediscovery of at least 37 Hawaiian species previously thought to have gone extinct.

Alongside these concrete conservation and scientific goals, NTBG will continue to be a forward-looking organization, always seeking to build more interest and appreciation for preserving plant life, cultural heritage, and sustainable conservation behavior. Like those early advocates and founders of NTBG, we see endless value in protecting and understanding plant life with empathy and appreciation for nature.

NTBG CEO and president, Janet Mayfield, describes NTBG as a "forever organization" that will always have an important role to play in preserving the plant life that makes our planet habitable. She underscores the timeliness of NTBG's mission, emphasizing that today's pressing global challenges parallel the gratifying nature of the organization's work. Janet expresses a deep sense of honor and profound responsibility, stressing the imperative for NTBG to actively contribute to impactful solutions.

While much has changed in the six decades since NTBG was founded, the fundamental mandate to collect, conserve, and study plant life through the vehicle of a botanical garden remains as true today as it was then. We are still driven by the need to protect endangered plants and it is to the benefit of all humanity if we better understand and appreciate those plants. That basic truth will only become more relevant in the years ahead. 🌿



MYRSINE ADAMSONII

wish list

Make a difference today! Your purchased Wish List item will directly meet immediate program needs. Donate online at ntbg.org/support/donate or call Chelsey Aki at (808) 332-7324 Ext. 209. Mahalo for your support!

BREADFRUIT INSTITUTE

External hard drive - \$150

FINANCE

Office chairs - \$500

KAHANU GARDEN

Shovels and rakes - \$300

LIMAHULI GARDEN

Windshield for UTV - \$800

LIVING COLLECTIONS AND HORTICULTURE

Chainsaws - \$1,800

SCIENCE AND CONSERVATION

Logitech wireless ergonomic keyboard - \$130

SOUTH SHORE GARDEN

Air excavator - \$2,000

THE KAMPONG GARDEN

Bench for new pollinator garden - \$500

VOLUNTEER PROGRAM

Lanyards - \$150

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

EXPLORING PEOPLE'S RELATIONSHIPS WITH PLANTS

DR. JULIA VIEIRA DA CUNHA ÁVILA

Julia Vieira da Cunha Ávila was born and raised in São Paulo, Brazil's largest metropolis, but when her family moved to a house with a garden outside the city, she discovered her love for plants. Helping her parents grow fruits, vegetables, palms, and colorful climbing passiflora sparked Julia's interest in the connection between plants, animals, and people.

After studying biology and ecology at university on Florianópolis, an island off the coast of southern Brazil, Julia relocated to a small riverside town in Amazonas state in the far north. There, she began conducting field research on how climate change and flooding was impacting agricultural communities in the heart of the Amazon.

After three and a half years, Julia moved to Manaus to pursue her Ph.D in botany. While there, Julia discovered an opportunity to collaborate with a University of Hawai'i ethnoecologist which led to her first visit to O'ahu in 2019. In 2021, Julia turned her attention to the Pacific and in 2023, she joined NTBG's Breadfruit Institute as a tropical crop diversity scientist.

Julia speaks about her fascination with edible crops and her relationship with plants.



When did you first become a plant person?

When I was young, the plants my family managed at home called my attention to the connection between plants and animals – frogs, bugs, butterfly larvae, birds too. I think my trajectory to biology was related to my home garden.

What does an agroecologist do?

My focus is on crops – plants people manage for cultivation – and the cultural importance of it. Some agroecologists focus on animals or soil, but I wanted to more deeply understand the interaction between people and food plants.

Tell us about your research in the Amazon.

I was in Tefé, a city of about 75,000 people surrounded by forests of the central Amazon. I was researching how local communities in different ecosystems of the Amazon are impacted by climate change. I was working in three ecosystems that experience flooding. These are flood plains where part of the agroecosystems can flood in winter. It's a regular thing and with climate change floods are much more frequent and more extreme. In addition to the crops, I was looking at impacts on fish, ecosystems, and the economy. I was asking how flooding impacts people and how they are adapting. I could see they have specific adaptations that could be shared to help others.

Were these Indigenous communities?

They're what we call riverside communities. Much of their knowledge comes from interacting with Indigenous communities. It's a mix of knowledge for people in northwest Brazil.

How did you end up in Hawai'i?

University of Hawai'i professor Dr. Tamara Ticktin was working on a project to understand how climate change impacts agro-ecosystems in the Pacific. My work in the Amazon and hers shared similarities and she agreed to be my co-supervisor.

How has your fieldwork in the Amazon informed your work in Hawai'i?

There are so many similarities with the plants people grow. From things like the legends about how cassava and breadfruit originated to local food security. We can also compare how those plants are propagated and how much they represent cultural identification. In relation to conservation, there's the influence of climate change, urbanization, and market trends.

Can you talk about important food crops in Brazil? Do you have breadfruit?

Yes, we have breadfruit in the north and northwest of Brazil. Some people call it the 'aerial cassava.' You can find it in some northwest farmer's markets and Amazon agroecosystems. I would say it is an underutilized crop.

Other plants like manioc (*Manihot esculenta*), which is the same species as cassava, are largely used to make flour. Others include bananas, beans, mango, papayas, avocado, taro, cacao, squash, nuts, and people drink a lot of açaí. In the Amazon, children go to the açaí palms, bring the fruits back, and eat them the simple way. It's a common food everybody can eat.

So manioc, or cassava, is widely eaten in Brazil?

People like to eat it every day. They make flour from manioc but it's pretty particular in the Amazon. The appearance is reminiscent of caviar and is eaten with fish or meat. It's the principal carbohydrate source like breadfruit or taro in the Pacific.

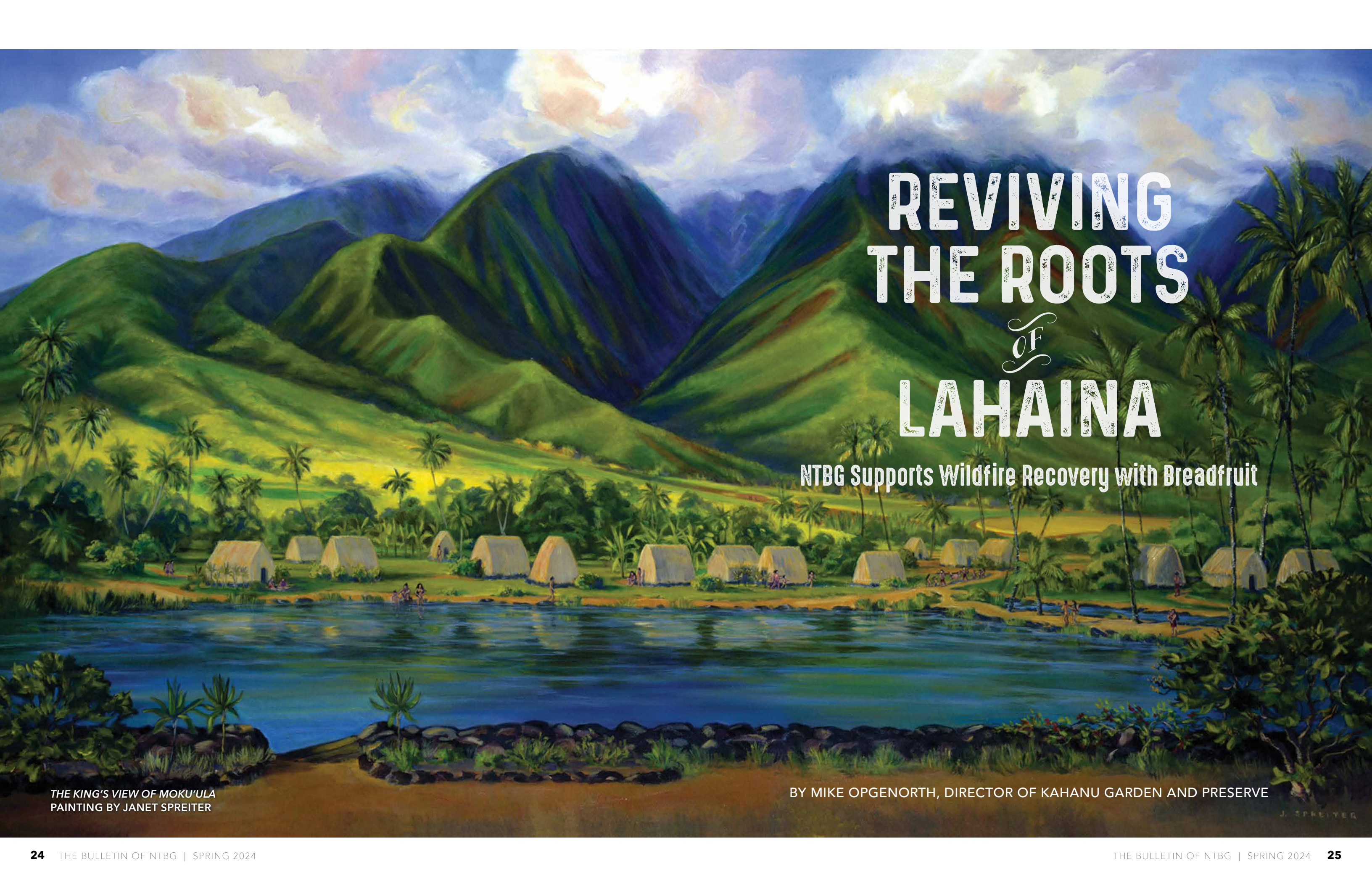
Do you have a favorite plant?

I think that manioc would probably be my choice. But as manioc requires a skill to prepare it, to remove the poison, I'm falling in love with breadfruit here and regularly trying new varieties.



PHOTO BY CLAUDIONEY GUIMARÃES

This interview was edited for length.



REVIVING THE ROOTS *OF* LAHAINA

NTBG Supports Wildfire Recovery with Breadfruit

THE KING'S VIEW OF MOKU'ULA
PAINTING BY JANET SPREITER

BY MIKE OPGENORTH, DIRECTOR OF KAHANU GARDEN AND PRESERVE

J. SPREITER

Ke Kukui Pio 'Ole Ke Kaua'ula

The light will not go out in spite of the Kaua'ula wind (MARY PUKUI, 'OLELO NO'EAU #1414)



KAUA'ULA VALLEY. PHOTO BY MIKE OPGENORTH

In the early days of August 2023, people across the Hawaiian Islands were bracing for the possible arrival of Dora, a powerful hurricane churning into the central Pacific. Dora grew in intensity but continued to track westward, hundreds of miles south of Hawai'i, sparing the islands from a direct hit. However, other meteorological forces were at play. To the north of the islands, a steep pressure gradient and an anticyclone conspired, birthing a wind vacuum that spiraled southward across the islands.

For Maui residents, strong winds are a normal part of life, but last August's unusual confluence of hot, dry conditions and ferocious winds gusting over 80 miles per hour through the Kaua'ula Valley led to disaster. Descending in what is called a "downslope windstorm," the winds funneled through Lahaina¹, in a scene reminiscent of what was vividly documented² in a May 1867 edition of the Hawaiian newspaper *Ke Au Okoa*:

"This wind, the Kaua'ula, blows from directly above Kaua'ula Valley...The roaring is heard from above like the crashing of the sea against the base of a cliff. When it blows, it is something truly terrifying – houses topple, coconut trees snap, all the breadfruit trees are hewn into pieces, and banana stalks are all pushed down by this angry wind."

When a fire caused by downed power lines broke out on August 8, the winds fueled a wildfire that razed Lahaina. Tragically, at least 101 lives were lost, over 2,200 structures were destroyed, and the community was left grappling with displacement, unemployment, and a starkly altered reality.

Six months later, Lahaina and west Maui residents find themselves on another leg of this journey – one moving toward healing, recovery, and renewal. What has been heartening for me as a resident of Hāna, on the east side of Maui, is that beyond adversity, a newfound sense of

communal strength is emerging. Families are coming together, sharing resources as they are bound by a collective spirit to strengthen their sense of place.

Revival is about more than just reconstruction. It is an opportunity to redefine this place from the ground up. It is encouraging to watch Lahaina's leaders and lineal descendants engage in dialogues about how to prevent future calamities and how to preserve the biocultural heritage of this storied place.

At the heart of these conversations is water which supported Maui's now defunct sugar cane industry for over a century at the expense of many traditional Hawaiian farmers. Decades of plantation agriculture, and more recently, commercial real estate development, led to the aridification of traditional crop lands that once sustained Lahaina, the first capital of the Hawaiian Kingdom.

Two historically iconic places in Lahaina – Moku'ula (reddish island), and Malu 'Ulu o Lele (shaded breadfruit grove of Lahaina), have become focal points of conversations about how to create a more symbiotic relationship with nature while honoring the abundance of this space prior to Western contact.

Moku'ula, once a regal abode for Hawaiian royalty, today lies dormant beneath layers of dirt and coral, covered by a ball field in 1914. Before last August's wildfire disaster, discussions around Moku'ula's resurrection centered on water usage. In the wake of the tragedy, the rebuilding of Lahaina opens a door to a possible revival of this rich heritage.

The second historic place, Malu 'Ulu o Lele, is known for its pre-contact agroforestry system that provided abundance for Lahaina's population. Important crops like kalo (taro), 'awa (kava), and 'ulu (breadfruit) provided a cooling effect that created a buffer against torrential heat and drought. This agroforest, however, was largely removed during the sugar plantation era.

The vision to reincorporate aspects of Malu 'Ulu o Lele faces its own challenges in a world vastly different from the past. Scarcity of land, limited water resources, and the scars of multigenerational displacement all present hurdles. Fortunately, there is widespread agreement that incorporating fire-resistant planting through practices like agroforestry can also mitigate vulnerability to extreme weather events.

RETURN TO ROOTS

In recent months, there has been increased recognition of the important role breadfruit can play in the revival of landscapes that include Moku'ula and Malu 'Ulu o Lele. Along with those who are collectively preparing for the future, NTBG is honored to play a small part in returning the benefits of breadfruit to Lahaina. We continue to listen to important voices



CHARRED TRUNK OF 'ULU PŪLOA, A HISTORIC BREADFRUIT (TOP); KAHANU GARDEN'S BREADFRUIT COLLECTIONS MANAGER KAITU ERASITO WITH YOUNG 'ULU (MIDDLE, BOTTOM). PHOTOS BY MIKE OPGENORTH

¹Archaic pronunciation: Lāhainā, *Lit.*, cruel sun (said to be named for droughts)
²Translated by Bishop Museum and Awaiaulu



MAUI'S COMMUNITY CAME TOGETHER AFTER THE WILDFIRES OF 2023. PHOTO BY HOKUAO PELLEGRINO

like Kaliko Storer, a well-respected leader on west Maui who is on the mayor's five-person advisory committee. She said, "the kāhea (call) is going to come from the community for more 'ulu when the time is right." This encourages us to start preparing now and continue checking in with the 'ohana (family) from Lahaina. About ten trees have already been transferred, with dozens more at Kahanu Garden's nursery.

When cleanup from the fire began, there were concerns that fire-affected trees would be removed without ensuring their genetic and storied lineage was preserved. Conversations about how best to protect these irreplaceable trees took place between Lahaina community members and Noa Lincoln, an Indigenous crop researcher at the University of Hawai'i. When NTBG joined these conversations, we expressed interest in collecting breadfruit roots in order to preserve different varieties within the collection at Kahanu Garden. With Noa working to duplicate trees that could be returned to Lahaina and NTBG planning to preserve collected roots at Kahanu Garden, we saw hope for the future. Breadfruit material salvaged from the burn zone will require several years to reach a size suitable for replanting in Lahaina, but in the meantime, Kahanu Garden can offer breadfruit from our already well-established collection.

In December, Kahanu Garden's breadfruit collection manager Kaitu Erasito joined me on a trip to Lahaina to meet with multi-generation descendants and members of the community to collect advantageous roots and cuttings

from badly damaged breadfruit trees. In the weeks since that trip, Kaitu has watched tirelessly over the carefully harvested roots. Kaitu says, "It is important to conserve these historic breadfruit trees because of food security. For the people of Lahaina, breadfruit was part of their history, it was part of their 'ohana, and part of their diet. We want to support its return."

Going forward, we are preparing to plant 'ulu o lele (breadfruit of Lahaina) as part of Kahanu Garden's collection so that it will always be preserved. In the future, as root cuttings grow and propagules become available, we look forward to bringing those breadfruit saplings back to Lahaina. In the meantime, we have been collecting breadfruit root starts from large Hawaiian breadfruit trees near the Pi'ilanihale Heiau to share with our neighbors.

Kaipo Kekona, a lineal descendant of Lahaina, shared a vision of possibilities last year after the fires saying, "if we want to talk about food security, what if every property was required to plant an 'ulu tree, and maintain that tree in order to build? It would recreate that halau (house) of 'ulu trees."

These trees carry stories in their bark and their deep green leaves echo a time when breadfruit provided sustenance and shade to the people of Lahaina. As these saplings take root under our care, they will grow not just into trees, but living embodiments of hope and resilience, representing a physical link to the past, and a promise of a vibrant future. 🌿



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 nearly 1,400 native plant taxa in Hawai'i. To date, over half have been assessed, reviewed, and published on the Red List, adding to the more than 66,500 plant taxa published through the latest update of the Red List worldwide.

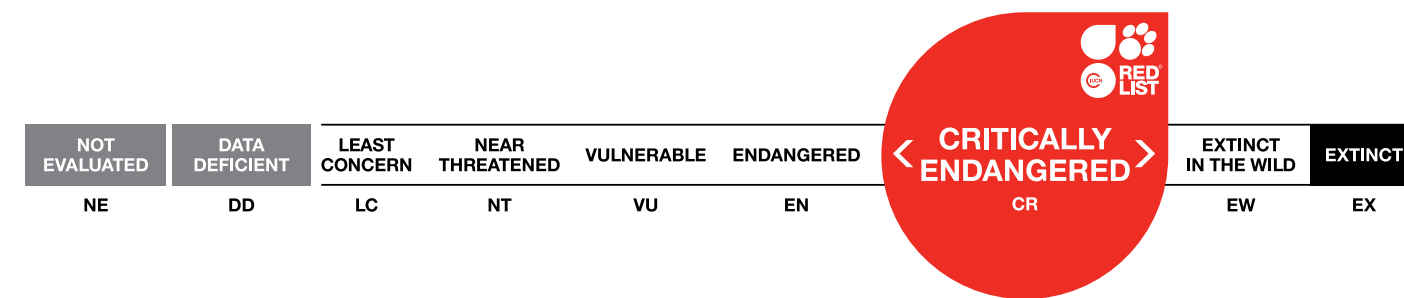


PHOTO BY KEN WOOD

Species: Alani (*Melicope nealae*) Rutaceae

IUCN RED LIST CATEGORY:
CRITICALLY ENDANGERED (CR)

Melicope nealae (alani refers to all *Melicope* in Hawaiian) is a Kaua'i single-island endemic shrub or small tree found in montane mesic and wet forests. The species was known from only two previous collections made in 1909 and 1960. This beautiful plant has never been cultivated and was considered possibly extinct until 2019 when a single individual was discovered by NTBG research staff who conducted a Red List assessment in 2020 based on the single known individual.

Major threats to alani include displacement by non-native plants and consumption by non-native animals. Suitable habitat for alani continues to decline. Surprisingly, it is not listed under the U.S. Endangered Species Act nor by the State of Hawai'i.

In late 2022, NTBG staff and partners from the Plant Extinction Prevention Program (PEPP) found a second colony of alani with approximately ten individuals very close to the site of the 1909 collection.

This extremely rare species needs to be safeguarded in ex situ collections, primarily on Kaua'i, but also backed up with collaborating partners on other islands. Further floristic surveys in the immediate surrounding areas of known colonies are also imperative for the possibility of discovering additional individuals. Work by NTBG and partners over the past year focused on scouting and collecting trips to make this possible (read more on page 32).

—Seana Walsh, Conservation Scientist and Curator of Living Collections



garden sprouts

News from around the Garden

ADVANCING SCIENCE EDUCATION AND RESEARCH

NTBG staff and facilities are a valuable resource for scientific research, education, and the mentorship of students from around the world. In recent months, conservation scientist and curator of living collections Dr. Seana Walsh and scientific curator of conservation Dr. Dustin Wolkis have been mentoring four University of Hawai'i - Mānoa students as they pursue master's degrees in botany and tropical plant and soil sciences. The students are:

- Natalie Blum who is investigating breeding systems and population fitness of the Hawaiian endemic *Hibiscus clayi*.
- John Steinhorst (also employed by NTBG) is studying the conservation horticulture of the Hawaiian caper, *Capparis sandwichiana*, with a focus on seed dormancy and desiccation tolerance.
- Makoa Elgin is studying breeding systems in the native Hawaiian palm genus *Pritchardia*. Both Makoa and Natalie are collecting pollen which NTBG will assist in pollen banking as an ex situ plant conservation tool.
- Shyla Kaninauali'i Villanueva (a former Kupu and Fall Intern program participant) is studying the ecology and conservation of desiccation and longevity in the life of endemic Hawaiian *Doryopteris* fern.

Seana is assisting Natalie and Makoa and serving on their master's committees, while Dustin will focus on pollen, seed, and spore-related investigations as well as serving on all four students' committees. Both Seana and Dustin are Affiliate Graduate Faculty in Botany at the University of Hawai'i.



PHOTOS BY NTBG STAFF

THE KAMPONG'S POLLINATION COLLABORATION

Since August 2023, The Kampong has proudly displayed new signs, maps, and guidebooks, thanks to the support of the Florida Department of State, Division of Historical Resources. As part of these enhancements, staff are revitalizing areas of the garden and buzzing with excitement about the upcoming project.



PHOTO BY KAMPONG STAFF

Currently, The Kampong is collaborating with community partners to establish a captivating pollinator garden that will enrich visitor experiences and serve as a dynamic educational platform. Kampong staff are working with Florida International University architecture associate professor Eric Goldemberg, his students from the Architecture Department, and Chris Cuesta from Studio

Cuesta, a local landscape architect, to redesign this high-impact area with permanent and functional structures built by the students.

Last fall, students researched the garden's species, ecological balance, and functionality of plants, pollinators (insects, birds, bats), and their habitats. Their findings led to the creation of non-permanent installations that have been on display at The Kampong since December. Moving forward, the spring semester will see the construction of permanent structures based on research findings and rigorous feedback.

Chris Cuesta will contribute by designing a pollinator garden using native and ornamental plants that attract pollinators through showy petals, fragrances, and rewards like pollen or nectar. The goal is to emphasize the crucial role pollinators play in ecosystem services. Recognizing that more than half of the world's plants require pollinators for reproduction, The Kampong aims to spotlight this significance. Watch for upgrades in the pollinator garden in the coming months as the project unfolds.

garden sprouts



FLORILEGIUM PLANTS IN PRINT

In celebration of NTBG's 60th anniversary, the Garden has published a 120-page color catalog featuring 108 works by NTBG's Florilegium Society. The society, a group of two dozen botanical artists, formed in 2015 as an offshoot of annual botanical illustration workshops which were started by artist Wendy Hollender in 2008.

Each winter, the Florilegium Society artists travel from Australia, Canada, Chile, Japan, and across the continental U.S. to spend two weeks at NTBG on Kaua'i where they sketch, draw, and paint native and exotic tropical plants found growing in the garden. The catalog features richly detailed renderings of plants representing the common (*Alpinia hainanensis*), the colorful (*Castanospermum australe*), the curious (*Aristolochia grandiflora*), and the Critically Endangered (*Hibiscus distans*), to name but a few.

These artists have worked closely with Garden staff and scientists to capture the wonder and beauty of the plants found at NTBG. This collection is a testament of the society's dedication to their craft and commitment to capturing and sharing the artistic and scientific value of botanical illustration.

The NTBG Florilegium catalog may be purchased at Amazon.com.



PHOTO BY WENDY HOLLENDER

an eye on plants

SELECT SPECIES IN FOCUS

Alani (*Melicope* spp.)

Remote volcanic islands are supremely unique in their species composition as a result of natural long distance dispersal events that brought random plants and animals across the great expanse of ocean from fringing continents. Isolation and time have greatly increased the diversity of species on Kaua'i with sublime plant and animal relationships and mysterious adaptive radiations. The extraordinary diversity of the Hawaiian flora lies close to my heart, and within this flora I have taken a keen interest in a group of species belonging to the genus *Melicope*, a member of the Rutaceae or orange family.

Melicope (called alani in Hawaiian) most likely arrived via migratory birds over five million years ago. It was William Hillebrand, author of the first Flora of the Hawaiian Islands (1888) whose writings introduced me to what was then called *Pelea*, a genus found only in Hawai'i and the Marquesas Islands. As the result of DNA research, the name *Pelea* was subsequently changed to the more widely distributed genus *Melicope*. Botanists in Hawai'i now recognize 54 species, making *Melicope* the largest radiation of woody plants in the Hawaiian Islands.

Many in Hawai'i are familiar with the mokihana (*Melicope anisata*) tree. With its enchanting anise scent, mokihana's cube-shaped fruit is strung together to form the treasured lei of Kaua'i, yet many of the other extraordinary species of *Melicope* are not well known. In the *Flora of the Hawaiian Islands*, published by Wagner et al. (1990), there were nine species of *Melicope* on Kaua'i that were thought to be possibly extinct. Many had not been documented for more than one hundred years.

Subsequently, NTBG scientists and their partners rediscovered, mapped and made conservation collections of eight of those species, which bodes

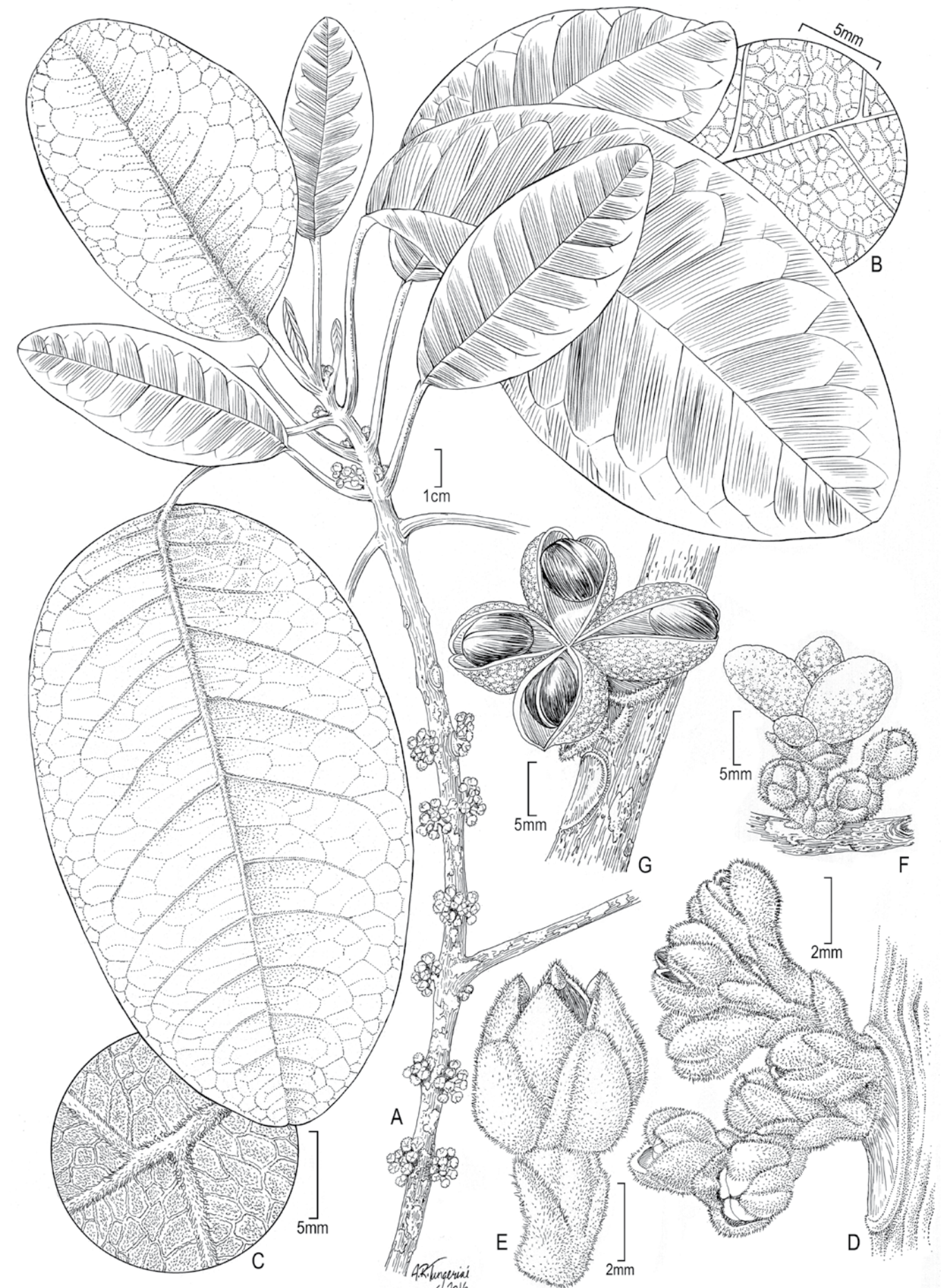
well for preventing their extinction, yet funding is continually needed to monitor and conserve them. One beautiful pubescent-leaved species, *Melicope nealae* (named after Marie C. Neal [1889-1965], a former botanist at Bishop Museum) remained elusive until a single individual was finally located by NTBG in 2019 (see Red Listed profile on page 29).

Prior to the rediscovery, NTBG had received several grants over the years to search for this missing species, but it took around thirty years to finally make the rediscovery. NTBG conservation scientist and curator of living collections Dr. Seana Walsh, who has acquired grants for making conservation collections of several *Melicope* species, secured funding from the Tree Gene Conservation Partnership to work with *M. nealae*, and in the process a second colony of ten trees was discovered by NTBG and our partners with the Plant Extinction Prevention Program.

To date, we have collected seeds from both colonies. Another species Seana acquired funds for was the tall and elegant *Melicope stonei*, discovered by NTBG senior research botanist Dr. David Lorence in the mesic forests of Kōke'e. We continue to monitor and conserve this taxa today.

When we consider the great floristic diversity of Kaua'i, with more than 250 unique plant species that occur nowhere else in the world, time is truly of the essence for their conservation, and we are continually in need of funding for this effort. Long live the forests of Kaua'i and those who support the diversity of life! After all, it was the forests from which we co-evolved and emerged, and the abundance of its species that nurtured us in need.

—Ken Wood, Senior Research Biologist



MELICOPE STONEI ILLUSTRATION BY ALICE TANGERINI

READ AND
SHARE ONLINE





National Tropical Botanical Garden

3530 Papalina Road
Kalāheo, Hawai'i 96741 USA



PUA 'ALA (*BRIGHAMIA ROCKII*) IS A CRITICALLY ENDANGERED MEMBER OF THE BELLFLOWER FAMILY ENDEMIC TO THE SEA CLIFFS OF MOLOKA'I (PICTURED ON FRONT COVER). READ HOW NTBG HAS BEEN SAVING RARE PLANTS FOR OVER 60 YEARS ON PAGE 10. PHOTO BY MIKE OPGENORTH