

Native Hawaiian Plant Society

Nanea Nā Pua O Ka 'Āina Aloha

NHPS Newsletter

February 2020

The Pollinator Issue

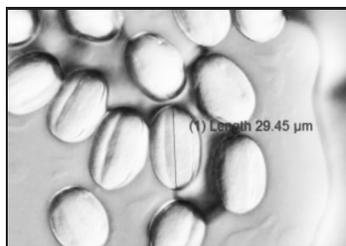
Although many plants exhibit some level of self-compatibility, pollinators can permit flowers to outcross, maintaining gene flow that can introduce new genetic variation into populations (Loveless and Hamrick, 1984; Ward et al., 2005). The following is a brief summary of two recent research articles that provide us with a glimpse into the relationships between Hawaiian plants and their pollinators.

“Seasonality and Prevalence of Pollen Collected from Hawaiian Nectarivorous Birds” by Kathryn N. van Dyk, Kristina L. Paxton, Patrick J. Hart & Eben H. Paxton

Pollen samples were collected from the 'iwi (*Drepanis coccinea*), 'apapane (*Himatione sanguinea*), Hawai'i 'amakihi (*Chlorodrepanis virens*) and a non native Japanese white-eye (*Zosterops japonica*) in the Hakalau forest on Hawai'i Island. The canopy at the study site is dominated by ōhi'a and koa whereas the mid-story has a diverse selection of both native and non native plant species. Samples of pollen were taken directly from flowering plants in order to create a reference library for comparison to what was collected from the birds.

One of the most important nectar resources in the study is Ōhi'a, which was found in 98% of all pollen samples taken, making it the most prevalent pollen collected. On another interesting note, the 'iwi and Hawai'i 'amakihi had a more diverse pollen collection and pollen samples showed a correlation with flowering phenology. For example, māmane (*Sophora chrysophylla*) and gorse (*Ulex europaeus*) were collected in the winter while 'ōhelo (*Vaccinium reticulatum*) and blackberry (*Rubus argutus*) were collected in the summer. It was noted that given the apparent lack of nectar in gorse flowers (Zouhar 2005), the birds are most likely foraging on the abundant insects attracted to the gorse flowers. Dr. Paxton et. al. provided the NHPS some photos of the pollen samples collected during the study. This article is located in the journal Pacific Science (Volume 73, Number 2, April 2019).

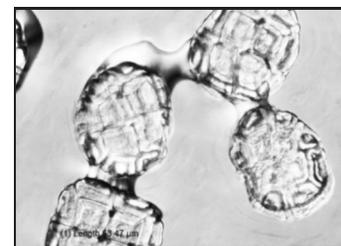
Māmane *Sophora chrysophylla*



'Ōhia *Metrosideros polymorpha*



Koa *Acacia Koa*



“Non–native insects dominate daytime pollination in a high elevation Hawaiian dryland ecosystem” by Clare E. Aslan, Aaron B. Shiels, William Haines & Christina T. Liang

This research article focuses on insect visitation through observation, pollen load analysis and flower treatments. The study site at Pōhakuloa Training Area (PTA) on Hawai'i Island is located within a fenced māmane—naio tract. Native Pua kala (*Argemone glauca*), kokolau (*Bidens menziesii*), yellow 'ilima (*Sida fallax*); the endangered honohono (*Haplostachys haplostachya*) and four other native species were selected based on the diversity of plant families, flower variety and phenology.

Bees made a big impression. The majority of flower visitors were made by non native insects (85%) with *Apis Mellifera* being the most common species observed. *Apis Mellifera* was also deemed the biggest pollen transporter with over 10,000 grains found on 7 (of 19) bees collected. *Hylaeus* was the most common native species observed with *Orthomecyna* sp. (a crambid moth) and *Udara blackburni* (the Hawaiian blue butterfly) being other native pollinators recorded. The results from the flower treatments indicate that although these plant species are self compatible, there was a significant increase in seed production when outcrossing in the majority of species including 3 of the plants listed as endangered. This article was published in American Journal of Botany 106(2): 313–324, 2019



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JANUARY - Members attended The Nature Conservancy's (TNC) service trip to lovely Waikamoi Preserve. Numerous native plants and animals, many of which are rare or endangered are located in this high elevation rain forest and alpine shrubland. TNC manages the area by removing invasive animals and weeds such as Himalayan ginger. Kerri Fay can be contacted kfay@tnc.org

FEBRUARY — NHPS went to Hawaii Nature Center in Iao Valley, where Irene Newhouse manages the native landscaping. HNC's mission is to offer a hands-on environmental science education for pre-school through fifth grade. Students learn about a variety of subjects including what plants need to grow, stream life, wetlands and the water cycle. Members on this year's trip, helped prepare an area for transplanting Palapalai Fern.

MARCH — This service trip was to the *Hibiscus brackenridgei* enclosure however, as the area received a substantial amount of rain the night before the trip was cancelled.



Into the forest I go, to lose my mind and find my soul

John Muir

APRIL – At the Haiku Ho'olaulea Flower Festival, at least 15 NHPS amazing members and volunteers helped educate the Maui community about our lovely native plants and their uses. Over 200 beautiful lei were created which meant two hundred smiling, happy people left our educational booth. Materials were provided by Pat Bily, Fleming Arboretum at Pu'u Mahoe (Martha Vockrodt-Moran), Haiku School native garden (Becky Lau), Lorna Hazen, Haleakala Ranch (Jordan Jokiel), Maui Nui Botanical Garden, Maui Ocean Center (Elyssa Farmer), Dustin Palos, Forest and Kim Starr, and UH/Maui College (Ann Emmsley). Save the date!!! This event will be held on Saturday April 25, 2020.



'A 'ohe hana nui ke alu ia

No task is too big when done together by all

MAY - Martin Frye and Jay Penniman from the Maui Seabird Recovery Project (MSRP) led our service to Ho'okipa. Tasks included weeding around the native plants, planting and watering 'Aki'aki and 'Akulikuli cuttings, monitoring the 120+ naupaka that were recently outplanted, and stringing visibility tape on the fence protecting the ua'u kane (Hawaiian Petrel) colony from ungulates and dogs. Ho'okipa may become an important refuge for seabirds displaced by rising sea levels. This restoration area may also help provide habitat for Hawaii's now-rare endemic yellow-faced bees.



JUNE— Our trip was to the Olinda Rare Plant Facility. This facility is focused on propagation of threatened and endangered Hawaiian plants. This is always an exciting trip for members as we get to see many of rare and interesting native plants! After a tour of the shade houses, we weeded the slope above the parking area. Members were happy to see one of the 'opelu (*Lobelia grayana*) planted last year was flowering.



My garden is my most beautiful masterpiece

Claude Monet

JULY - A few members gathered at the Haiku Elementary School to weed along the fence facing Hana Highway and plant some 'uki 'uki, ma'o and nehe donated by the Maui Nui Botanical Garden (MNBG). The various areas NHPS members have been working on over the past year are flourishing. After every plant found a new home, some thoughtful members provided the group with plantains, bananas and some refreshing mango for a job well done.





AUGUST — Hōkūnui Maui and Hōkūnui Farms goal is to create an accessible forest resource for cultural practitioners, contribute to a healthy watershed, provide food for our community and create native habitat for native fauna. The project organizers have obtained funding for several blocks of native planting and for several blocks of fruit and nut trees with profits potentially to be used to purchase additional native plants. This was our first trip to the project.

SEPTEMBER — This trip was also a first for us. Tamara Sherrill led an ōhi‘a seed gathering workshop for anyone interested in gathering properly labeled seeds for banking. The workshop took place on member Katie Romanchuk’s Ohialani, where we gathered large numbers of seeds, from a small fraction of her trees. Fifteen participants attended.

OCTOBER — We worked at MNBG where we trimmed spreading plants like ‘ilima and ilie‘e off the shrubs in the area between the garden fence and the street. Check the MNBG website for all of their upcoming events and join their Weed and Pot Club on Wednesdays from 8:30-10:30. Save the date! November 7th, 2020 for the MNBG Arbor Day Event

NOVEMBER—Members once again managed to educate the Maui ‘ohana about Hawaiian native plants at the MNBG Arbor Day event. We assisted over 150 people create beautiful lei, which made them look and feel special. A wonderful day for the Maui Community.

DECEMBER — Our trip was to the Hawaii Nature Center, where we did our best to decimate a patch of glycine, and rearrange a brush pile to look neater.

To see additional photos of these wonderful adventures, please visit us at nhps.smugmug.com



In the Spotlight



Keālia Pond

Volunteers at Kealia Pond National Wildlife Refuge have been growing test plots in the dry shrubland since 2015. The hardest 40’ by 40’ sections are a diverse mixture of shrubs: ilie‘e ‘ilima, naio papa, uhaloa, a‘alii and aweoweo. These fragments of resilient native plants are meant to suppress buffel grass and guinea grass, attract pollinators, and provide a compatible growing environment for native trees such as wili wili, sandalwood and hala. A combination of irrigation systems are used to establish young outplantings: 2-gallon bottles with drip emitters, 5 gallon buckets with soaker hoses, and 44-gallon rain barrels with drip lines.



‘Āhihi Kīna‘u

NHPS members have attended weeding trips at ‘Āhihi Kīna‘u for over the past 8 years. The battle with pickleweed in the Kauhioaiakini anchialine pond is ongoing but the weeds have been significantly reduced. Construction of a fence in 2014, enclosed 30 acres encompassing many of the reserves 21 species of native dry forest plants. Joe McDonald, a NARS ranger, has been monitoring the area for over 20 years, reported a significant difference in the vegetation since the removal of ungulates and planting of over 50,000 native plants. The enclosure has had so much natural recruitment of ‘Ilima, a‘ali‘i, naio, ‘aki‘aki, pōhuehue and wiliwili, NARS has stopped the majority of their out planting. A ‘o ia!



Lahaina Library

If you are venturing over to the west side, it will be worth your while to check out the new native Hawaiian plant garden at the Lahaina Library. With a grant provided by the Maui County Parks and Recreation Department, landscape architect Russel Y. Gushi (using input from the Lahaina community) designed the garden that will provide entities such as the Lahaina Restoration Foundation with an area to give cultural demonstrations and lectures. Pōhinahina, ‘ākia, koki‘o ke‘oke‘o, naupaka, ‘ilima and lau‘e ferns are incorporated into the borders of the garden and Kou, Loulu, Hala and a lovely Koai‘a tree provide shade. Mr. Gushi stated the highlight of the garden will be 3 large Kalo beds.



Ha'ikū School Project

Monday afternoon 3:30—5:30

The plantings at Ha'ikū Elementary School started about twenty years ago with a few plants in front of the office. The fence and parking lot projects were made possible by Marion Zajac who obtained grants from Foodland. Foliage from many of the plants on the property are used annually at our lei making stations at the Ha'ikū Ho'olaule'a and the MNBG Arbor Day events. For additional information, please contact Becky Lau at 575-2369.

Sometimes our projects reach out to people in unexpected ways:

Native Hawaiian Perpetuation is a senior research project created by 17 year old Lilia Wietecha-Davis. Her paper outlines many reasons why Hawaii's citizens should consider incorporating native Hawaiian plants in their landscaping. Lilia gained inspiration for her paper from the Haiku Elementary School native Hawaiian plant garden, created and cared for by NHPS members. Lilia wanted to pass down some of her plant knowledge and their connection to the Hawaiian culture as the schools cultural program was discontinued in 2018. With the help of her uncle, Lilia created plants signs focusing on a'alii, ōhi'a, ūlei, 'uki'uki and 'ilima. A bar code on each sign can be scanned on a smart phone or iPad, producing a description of that particular species and its cultural uses. The project received such good feedback from students, forth grade teachers at the school are planning to incorporate the project into their curriculum. Great job Lilia and all of our NHPS members who valiantly work on projects such as this!



Kanahā Pond

1st and 3rd Thursdays 8:30-11

In September 2008, the State DLNR began removing non-native trees from Kanahā Pond. Native Hawaiian plants such as 'Ilima-papa, 'ōhelo kai, 'ākulikuli and pōhuehue out-planted most of which have survived to date. Additional plantings have included popolo, ohai and a variety of native hibiscus. The pond is also home to a trio of endangered native birds: the ae'o (Hawaiian stilt), the 'alae (Hawaiian coot) and the koloa (Hawaiian duck). It was designated a National Natural Landmark in 1971. For additional information, please contact Becky Lau at 575-2369.



Ma'o Hau Hele (*Hibiscus brackenridgei*) Exclosure

Annual Trips

This is NHPS first exclosure. *Hibiscus brackenridgei* is an endangered Hawaiian endemic plant and it is the state flower of Hawai'i. Koa haole and guinea grass are the main invasive plants. Native insects such as Hawaiian yellow-faced bees (*Hylaeus* sp.), *Succinea caduca*, and the Blackburn butterfly, *Udara blackburnii*, one of only two native butterflies have been observed in this area. Trips are organized by project leader Hank Oppenheimer.



Awikiwiki(*Canavalia pubescens*) Exclosure

Annual Trips

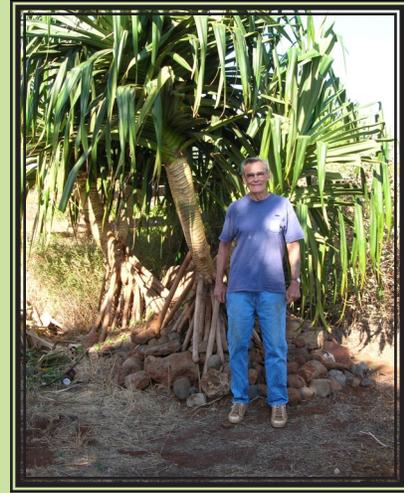
The 'awikiwiki exclosure fence was built in the 1980s on land owned by Ulupakakua Ranch. Visits to this unique site include checking the fence to make sure ungulates can't come in and pruning. The 'awikiwiki was in good shape on our last trip in December of 2018, with many seed pods, both ripe and immature. The comparatively few haole koa were dispatched quickly. Koali 'awa was trimmed from other less common native plants. Hank Oppenheimer is the project leader. We are grateful to Ulupalakua Ranch for hosting this exclosure.



Friendly Reminder: One of the simplest things you can do when going through a native plant area, is to clean your footwear and gear of any weed seeds or pests. If you are lucky enough to encounter rare species, please disable the GPS on your camera and phone, so the location is not revealed. This only leads to more impacts. The background in the images should also not reveal the location. **Mahalo!**

In Memoriam

Jack Hazen passed away this last December at the age of 97. Jack volunteered at Kealia Pond, putting in many hours and publishing manuals on propagating Hawaiian *kou*, re-establishing *'ōhelo kai* and outplanting *uki uki*. He documented his work in his “Kealia Pond Journal”. Jack cared for Native Hawaiian plant habitats and appreciated the people who did the same.



President's Message

The Native Hawaiian Plant Society mission is to protect, increase and promote growing native plants and share knowledge of their value. We are a non-profit group and our members donate their time and talents. Our Board of Directors have all worked together to realize these goals. Some of our activities are described in this newsletter.

The serious threats today from global warming include hotter temperatures, melting ice caps, higher sea levels and worse droughts, floods and storms. Stronger hurricanes are a real threat to Hawaii. If these changes wipe out our fringing coral reefs and spread invasive organisms to more places, Hawaii will be changed and lose more native plants and animals.

From my own amateur ways to combat climate change, I am driving my gasoline car less, air drying my laundry, using less air conditioning and taking fewer long trips dependent on fossil fuel.

In 2020 let's see how we all can do things to help save the aina for future generations.

Martha Martin, President, Native Hawaiian Plant Society



Kahului Library Courtyard Garden

Every second Thursday of the month at 9:00

In 1993, The NHPS began working on a demonstration garden in the Kahului library's courtyard showcasing native dryland and coastal species. On October 15, 1994, the garden officially opened. The day was commemorated with a plaque presented by Linda Nelson, the NHPS president at the time and is still on display. The centerpiece of the garden these days is a lovely, large naito tree with 'ahu'awa, 'uki'uki and naupaka guarding its base.

Somewhat overlooked in the library courtyard is a wonderful piece of art created by Tadashi Sato. Sato was born in Kaupakalua, Maui in 1923. By 1965, he was being honored at the White House Festival of Arts along with other American artists such as Georgia O'Keeffe and Jason Pollock. Today, his artwork is on display at the renowned Guggenheim Museum and the Honolulu Museum of Art. The floor of the atrium at the Hawaii State Capital also showcases one of Sato's most famous works, a 36' x 36' mosaic named *Aquarius (photo to the right)*. The masterpiece depicts the reflection of light through submerged rocks. If you have a moment to spare next time you are at the library, take some time to explore this lovely garden and perhaps read a book under the shade of the naito tree!



Shout Out!

Thank you to all of our Project Leaders who plan and organize all of these wonderful trips throughout the year. Members who have participated in a variety of ways on NHPS projects—your work does not go unnoticed. We appreciate your help and value your time. **Mahalo!**



Hylaeus anthracinus male on Naupaka



Hylaeus anthracinus male on Akoko

Similar to the Hawaiian honeycreepers, the 63 endemic Hawaiian Yellow-Faced Bees are thought to have evolved from one colonist of *Hylaeus*. Unfortunately, seven native bee species were recently placed on the endangered species list. Many of these bees have coevolved with and rely on the existence of native flowering plants such as Naupaka, 'Ākulikuli, 'Akoko 'Ōhai, Naio, and 'Ilima which provide food (pollen and nectar) and nesting areas.

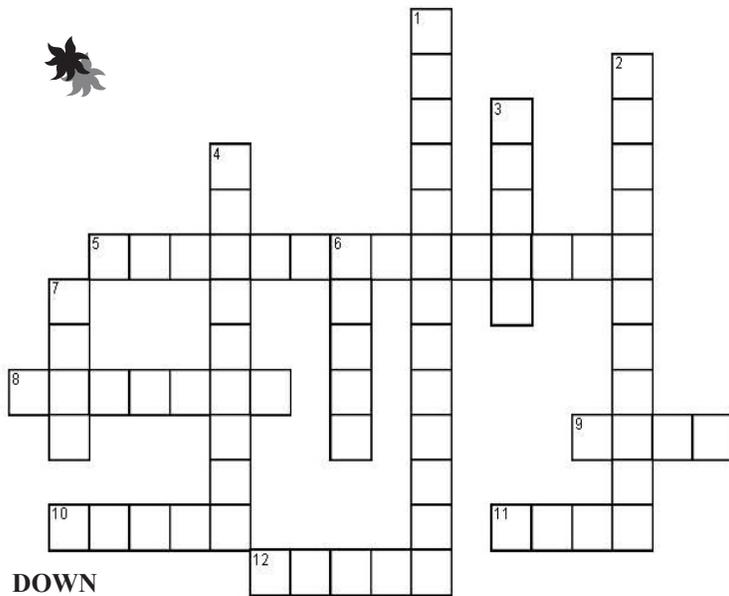
Dr. Jason Graham at UH Manoa has been working on protecting the existing native bee populations since 2014. Dr. Graham has developed artificial nests covered in a sticky material that prevent invasive ants from interfering with the eggs as unlike other bee species, a female Yellow-Faced Bee will only deposit one egg in their nest. Recently he assisted the Bishop Museum create their Hawaiian Yellow-Faced Bee exhibit.

NHPS members can assist Dr. Graham by spreading awareness about these native pollinators and assisting him with his research by locating, monitoring and recording where the bees have been observed. If you would like to participate in this project, contact buzzwatchers@gmail.com or you can download the free iNaturalist app and join the 'Pollinators in Paradise Project' (also on Facebook). Use the app to upload photos of pollinators in Hawaii to the 'Pollinators in Paradise

Hylaeus sp. photos by Dr. Jason Graham

Plant Puzzles by Chuck Chimera

Plants and Their Pollinators



- ACROSS**
- 5 Species of this solitary native insect, named for the color of the markings on their face. Are important pollinators of several native plant species, including the 'ahinahina or silversword.
 - 8 This very diverse group of insects are not as efficient as some pollinators, wandering between different species, and often dropping pollen as they go. They are attracted to plants with large, strong scented flowers and with their sexual organs exposed.
 - 9 Plants with flowers that are dull green, brown, or colorless and with petals absent or reduced are adapted for this method of pollination. Grasses and pines are two plant groups pollinated by this means.
 - 10 This unique looking Hawaiian plant has two native species with long, tubular flowers believed to be adapted for pollination by a now extinct species of hawk moth.
 - 11 Though Hawaii's lone native species is primarily an insect-eater, this group of mammals play an important role in pollination in the mainland southwest where they feed on agave and cactus nectar.
 - 12 These insects, generally less colorful than a look-alike group, are attracted to flowers that are strongly sweet smelling, open in late afternoon or night, and are typically white or pale colored.

- DOWN**
- 1 Several native species of this group are attracted to the bright red flowers and nectar of the 'ōhi'a tree and serve an important role in 'ōhi'a pollination.
 - 2 This group of pollinating insects tend to be eye-catching, as are the flowers that attract them.
 - 3 This group of vertebrate pollinators is important for many native species in the Hawaiian Islands. Odorless flowers that are scarlet, orange, red or white and with ample nectar. Are especially attractive to this pollinator group.
 - 4 This is the Hawaiian name for one of only two native species of this important group of pollinating insects. It was officially adopted as our State Insect in 2009.
 - 6 This large group of flying insects are generalist pollinators, typically visiting smaller flowers with pale and dull to dark brown or purple colors and flecked with translucent patches. Putrid odors may also attract these pollinators.
 - 7 These insects are well documented pollinators in the agricultural and natural systems of the Hawaiian Islands. A wide range of crops including crops including Macadamia nuts, watermelon, guava and coffee benefits from pollination by this insect.

Native Hawaiian Plant Society

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Alula

Brighamia insignis



NHPS Logo Shirts design by NHPS member Dr. George LeBouvier

*Nanea na pua o ka 'aina aloha.
An all-absorbing interest, or fascination with
native plants*



'Awikiwiki flower design
by NHPS member Muffie Davis

PLEASE DON'T FORGET TO RENEW!

Membership Form

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Address _____
City _____ State _____ Zip _____
Telephone (Hm) _____ (Cell) _____
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(Please print carefully!)

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

Native Hawaiian Plant Society, P.O. Box 5021 Kahului, Hawai'i 96733-5021

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