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The D.T. Fleming Arboretum

The D.T. Fleming Arboretum is one of Hawaii's oldest and largest native arboretums. It was planted in the Pu'u Mahoe cinder cone on Maui's southern slopes of Ulupalakua to preserve species from the dying forest of Auwahi.



Pu'u Mahoe was a gift to D.T. Fleming from Ed Baldwin of Ulupalakua Ranch. It was a reward for introducing a wasp to parasitize the Pamakani weed that was taking over the grazing lands.

After years of introducing trees to Maui from around the world "to make Maui a better place to live," D.T. Fleming's dream for retirement was to plant an arboretum for native species. Throughout his life on Maui he witnessed the dry-land forest of Auwahi going extinct due to cattle and drought. Fleming chose Pu'u Mahoe's cinder cone as a perfect place to preserve these species at the 2,600-foot elevation on the edge of the Auwahi Forest.

It took two years to prepare the area by building a caretaker's cottage, fences and a water system. In 1952 propagated seedlings and air-layers from the Auwahi Forest were planted into the Arboretum. Fleming was able to enjoy the young trees flourish until his death in 1955.

Over the next 45 years the Arboretum was cared for by Fleming's daughter Euphence and her husband Jack Vockrodt. For this dedication they received the Historic Preservation Award in 2001.

Today, of the 150 species of native flora planted in the Arboretum, 33 of these are on Hawaii's endangered list. It is almost a complete collection of Auwahi Forest species and a valuable seed bank for their preservation.

This 50-year-old Arboretum needs a lot of work to keep the trees healthy and to maximize its potential for preservation of these species. Fifty-year-old infrastructure needs to be restored and updated.

The charitable foundation Friends of the Fleming Arboretum (FOFA) was created to support the Arboretum goals. FOFA is qualified to apply for foundation grants and accept 100% tax-deductible donations.

This newsletter shares the activities and successes of FOFA's first year and its future goals.

Dedicated to Preservation through Protection, Propagation & Distribu

DTF. Arboretum (808) 878-3240 • Office (808) 572-1097

P.O. Box 101 • Makawao, Maui, HI 96768 • email: info@flemingarboretum.org



D.T. Fleming (circa 1945) was a community-minded man with great vision. His wish for the gift of Pu'u Mahoe was for "arboretum purposes." This wish has protected the arboretum from being inundated by the effects of tourism, which is more for profit and entertainment than for "the trees." He created an arboretum for Hawaii and its people.

Mission Statement

The Friends of the D.T. Fleming Arboretum at Pu'u Mahoe, Inc. (FOFA) exists to sponsor, fund and assist in the protection and preservation of the Fleming Arboretum and its mission to preserve Hawaiian native plants through protection, propagation and distribution.

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FOFA Board of Directors 2003

- Martha Vockrodt-Moran.** Arboretum Manager. Profession in Landscape Maintenance and Fine Arts.
- Judy White.** Non-profit consultant and educator, currently involved in opening a new independent school in Kapolei.
- Karen Ella Levy.** Retired commercial property manager. Former president and co-founder of two non-profits in Seattle area.
- Kathleen Platt.** Retired emergency medical technician. Founder and past president of women helping women. Currently works as an architectural draftsman.
- Ernest H. Rezens.** Agricultural Professor Emeritus of U of Hawaii/MCC. Now a registered consulting arborist and certified arborist.
- Richard Nakagawa.** Nursery worker at State of Hawaii's Forestry/Wildlife nursery. Native Hawaiian Plant Society project leader and past president.
- Dr. Fern Duvall.** Wildlife Biologist, DLNR Division of Forest and Wildlife, Maui. Responsibilities include invasive species of Maui Nui.
- Jack & Euphence Vockrodt.** Emeritus Directors and long-time caretakers of the Arboretum, Daughter and son-in-law of founder, D.T. Fleming.



Support Flourishes for D.T. Fleming Arboretum

The newly formed non-profit, Friends of the D.T. Fleming Arboretum, has received generous support from foundations, volunteers and individual donors to help care for the Fleming Arboretum in Ulupalakua.

The Fred Baldwin Memorial Foundation has granted \$3,500 to pay a certified arborist to prune trees. Soil aeration and irrigation is also being addressed under this grant. This work will greatly enhance health and viability of the trees for their preservation.

Kaulunani, an urban forestry program of the DLNR Division of Forestry and Wildlife and the USDA Forest Service, is funding plant identification. Bob Hobdy and Dr. Fern Duvall made the first big step by completing plant identification. The seven-acre Arboretum will be labeled uniformly with engraved plaques on galvanized steel stakes.



Neneleau (*Rhus sandwicensis*) planted at the Arboretum in 1952.

The A & B Foundation has provided funding for administrative costs in 2003. This funding will help with plant identification and create an updated species inventory and Arboretum map.

In August 2003, 16 prominent nurseries, botanists and research laboratories in Hawaii received seeds from the Fleming Arboretum. They have enthusiastically volunteered their time and nursery space for propagation. Propagation research will be collaborated on the Alani *Melicope knudsenii*, the only viable tree in existence found in the Fleming Arboretum.

With support from individual donors, Friends of Fleming Arboretum has been able to provide additional funding for educational workshops, some basic maintenance, as well as progressive projects. The Maui Sierra Club, the Maui Garden Club and the Kihei-Wailea Citizen Beach Patrol have provided regular volunteer workdays to carry out these projects.

Donations from nurseries and botanists have supplied rare and valuable seedlings to help the Arboretum toward its goal of having a complete collection of the Auwahi Forest species.

It's been a progressive year thanks to all our supporters. With such strong inertia forward and continued support, this next year will flaunt even more successes.

Thank You,

Martha Vockrodt-Moran, President



Hula Halau under Ka Imi Na'auao O Hawaii Nei performed the opening ceremony August 30th, 2003 for the exhibit of endangered plants native to Hawaii at the U.S. Botanic Garden Conservatory in Washington, D.C. The Fleming Arboretum provided specimens of native species for the offering to the altar.



Arboretum History from 1959 . . .

Excerpts from "Hawaiian Holiday's Sunday
Advertiser" May 31, 1959

By **Jeanne Booth Johnson**



From the *Hawaiian Today* feature article (1959), Euphence Fleming Vockrodt holds a successfully rooted, air-layered branch from a Mahoe (twin) tree named after its double seed.

"There are many vari-hued cinder cones on the beautiful island of Maui to delight and intrigue. A special one is found on the most southwestern slopes of Haleakala, about halfway between Ulupalakua and Kanaio. It's called Pu'u Mahoe.

A mellowed type of cinder cone, it is filled with lush vegetation and magnificent trees. The latter make Pu'u Mahoe unique in the Hawaiian chain.

In Pu'u Mahoe, sheltered and protected, grows the largest collection of trees indigenous to Hawaii that can be found anywhere in the islands. Here is the Pu'u Mahoe Arboretum, more affectionately known as the Fleming Arboretum in honor of its founder, the late David T. Fleming.

Long ago, when strangers to the shores of Paradise first set foot on its soil, there were forests of many kinds which have now either perished from disease, the onslaught of insects or a greed for trade. Now these trees are scarce and face extinction, except for the foresight of David Fleming, who painstakingly began the collection of the indigenous trees of Hawaii.

Pu'u Mahoe's arboretum is now tended by younger Flemings, especially Euphence Fleming

Vockrodt, and her husband Jack, who make a pilgrimage there most every week to tend the plantings and enjoy the pleasures of their cottage on the very edge of the crater.

Taking care of an arboretum is hardly dull, and among other things, includes exciting seed trips to Haleakala and all of Maui to find specimens.

Collecting trees is not a matter of planting seeds and watching them grow—provided you can find the seeds and live that long. Some seeds just don't seem to want to reproduce any more.

A quicker way is the air-layer method, an involved process to the uninitiated, which produces roots on the branch of an existing tree. It's tedious work, often disappointing, but the reward is great when another specialty is brought home to Pu'u Mahoe.

The owners hope some day that the little cinder cone of Pu'u Mahoe may harbor all of the trees indigenous to Hawaii, and provide pleasure and education for visitors."

. . . 2003

The Friends of the D.T. Fleming Arboretum work parallels the efforts of D.T. Fleming and his successors. The Arboretum continues to progress in its mission of protecting species from the Auwahi forest and other dryland areas. The Arboretum has become a plant material and seed source for propagation and out-planting back into Auwahi.



Euphence Fleming Vockrodt. Euphence and her husband Jack Vockrodt have maintained the Arboretum for 45 years. They are now Emeritus Directors of FOFA.

2003 Preservation Efforts Of the Alani



Alani, *Melicope knudsenii*.

There is one viable Alani, *Melicope knudsenii*, in existence. It is growing in the D.T. Fleming Arboretum. There are ten seedlings from 2002 propagation efforts, five from micro-propagation and five from natural mature seed propagation. Nellie Sugi, of Lyon Arboretum's Micro-propagation Lab, has received shipments of green seeds this year at different stages of development, experimenting with the best age for micro-propagation. Nellie has reported that the seeds this year are especially strong and viable.

There should be some success stories in propagation efforts with three times last year's harvest at approximately 1200 mature seeds. Mature seeds have been mailed to 16 nurseries throughout the Hawaiian Islands, as well as to the University of Kentucky for germination experiments and to the USDA Seed Storage Lab in Fort Collins, Colorado for seed storage research. Propagation methods will be documented and information on successes, as well as failures, shared. This information will help guide future propagation efforts.



David Moran harvesting Alani seeds with pole picker

Lyon Arboretum Rare Hawaiian Plant Program

By *Nellie Sugi'i*

Lyon Arboretum's Micro-propagation Laboratory has been the fortunate recipient of many of the healthy seeds produced by Fleming Arboretum's rare Alani (*Melicope knudsenii*). With only a single wild individual barely surviving on East Maui left, the seed production collected from Fleming's carefully cultivated tree will be invaluable in providing seedling stock for the recovery of this species.

With very little prior knowledge about the propagation of this species, we attempted to germinate the valuable seeds in the laboratory utilizing sterile tissue culture techniques. The quality and quantity of the seeds submitted from Fleming has given us a rare opportunity to experiment with different culture media, sterilizing regimes, and germination enhancing pre-treatment, for the sole purpose of optimizing the conditions for germination and seedling production in the laboratory.

We have developed a pretty reliable basic proto-

col for the germination of *Melicope knudsenii* and currently have approximately 20-25 seedlings of *Melicope knudsenii* growing in the lab. We plan to establish most of these seedlings in our greenhouse and send them back to Fleming Arboretum and their collaborators. We will keep a few in the laboratory and continue to improve on what we have established as well as develop a cloning protocol for multiplication of Alani plants.

Acknowledgement

I would like to thank Fleming Arboretum for their wonderful kokua and generous provisions of Alani seeds. And, the U.S. Fish and Wildlife Service, the State of Hawaii Dept. of Land and Natural Resources, and the Institute for Museum and Library Services for their generous funding for propagation research.

— *Nellie Sugi'i* (signed)

Lyon Arboretum Micro-propagation Laboratory



Foundation Grants & Volunteers Provide Support

A grant from the Fred Baldwin Memorial Foundation provided funding to prune Arboretum trees.



Arlene Taus, a certified arborist, provided pruning services under the grant.



Cathy Hobson of Maui Garden Club hauls tree prunings to chipper site.



Neola Caveny "digging trail" at Sierra Club Workday.



A grant from Kaulunani, an urban forestry program of the DLNR and USDA, funded tree identification with engraved labels on galvanized steel stakes. A&B Foundation funded operating expenses that will create an updated the species inventory and Arboretum map.



Maui Garden Club placed stakes throughout the Arboretum (L-R) Kathy Collins, Marjorie Bonar, Dwayne Bower.



Kihei Waieka Citizen Beach patrol volunteers (L-R) Don Schneider, Nobuo Suda and Jack Crow with post pounders to pound in new tree label stakes.



Projects Paid For By Individual Donations

Thanks to generous donations by individuals, FOFA sponsored several projects, including new luau tables, urgent tree trimming, propagation workshops, new plantings and some basic Arboretum maintenance. (Pages 7 through 9)



Brandt Gonzales of Branch Out Tree Services secures ropes to prune a large Neneleau threatening to fall on nearby trees.



Dead limbs of 50-year-old Koa trees were removed in March for safety reasons.



Jack Crow paints "luau" tables at Maui Sierra Club Volunteer Workday. Tables were acquired in a cost-share agreement with Pacific Equipment.



Jean Gagnon has helped with the Arboretum maintenance for 8 years. Jean is in charge of all mowing, weed-eating and irrigation.



Propagation Workshops

Two propagation workshops were sponsored by FOFA this year. The classes included students from the Maui Association of Landscape Professionals, as well as interested individuals. Richard Nakagawa, of the DLNR Nursery, taught air-layer and grafting techniques on two different native Hibiscus, the large fragrant white *Hibiscus waimeae* and the endangered *Hibiscus waimeae* subsp. *hannerae*.



David Buck, Dot Buck and Judy Mancini (L-R) practice removing a cambium layer on Hibiscus branches preparing area for an air-layer.



Students select their branches for air-layering.



Terry Nutt wraps scion onto rootstock, careful to match their cambium layers.



Richard observes students attempting grafts. (L-R) Richard Nakagawa, Ed McBarnett, Mark Potter and Will McBarnett.

Upcoming Propagation Workshops

The next FOFA Propagation Workshops will be held in April and June, 2004. If you are interested in learning how to air-layer or graft, please call 572-1097 to make a reservation.



Kokio keokeo, the large white fragrant Hibiscus, is used in FOFA's propagation workshops.



Plant & Seed Distribution

FOFA sponsored Anna Palomino of Hoolawa Farms to the “Seed Dormancy Master Workshop” at the University of Hawaii, Manoa . . . to show gratitude for all the work Anna has done for native plants, as well as the Fleming Arboretum. Following is her sharing of information from the workshop.

The Seed Dormancy Master Workshop

This past May, D.T. Fleming Arboretum sponsored my attendance to a two day workshop on Seed Dormancy at the University of Hawaii. The workshop was put on by the U.H. Botany Department and The Center for Conservation and Training; Drs. Carol and Jerry Baskin from the University of Kentucky conducted the workshop. Attendance was high and included propagation specialists from all the islands, it was a great opportunity to learn and share information among the attendees.

A classification system of dormancy was covered in the workshop, five classes are recognized, these were further broken down into various levels and types. Techniques for dormancy release and germination were covered for each class. For example, in physical dormancy the seed embryo is fully developed and the seed coat is not permeable to water. When working with seeds in this class germination occurs when the seed coat is scarified. In comparison, seeds with morphological dormancy (undeveloped embryos) require about 30 days

of simulated autumn, spring or summer habitat temperatures before they will germinate.

The Baskins have been studying dormancy and germination of seeds of Hawaiian montane plants, and some non-montane plants as well. As mentioned above, one of the methods they have been using is temperature cycling to bring about good germination results in some seeds. This method subjects seeds to alternating temperature regimes over varying length of time in a lab, somewhat duplicating seasonal conditions outdoors. Drs. Carol and Jerry Baskin have recently produced a table summarizing what is known about dormancy in some Hawaiian seeds, more data will be added as time goes on.

For many Hawaiian plants, seed dormancy is an important consideration in conservation and management. A 93 page booklet was printed for the workshop, if you would like information from this booklet or about other work pertaining to seed conservation, please contact: hoolawa@hawaii.rr.com.

— Anna Palomino

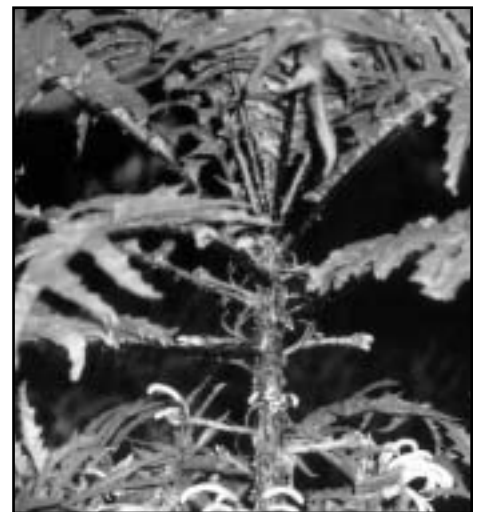
FOFA makes a concerted effort to harvest & distribute seeds for propagation



From Auwahi, Akoko (*Chamaesyce celastroides* var. *celastroides*). Seedlings are propagated and distributed for planting back into Auwahi enclosures.



Ohe Ohe (*Tetraplasandra hawaiiensis*). Seeds are collected annually for distribution.



Haha (*Cyanea asplenifolia*) endemic to Maui, found in the Makawao-Koolau Forest. This rare *Cyanea* is now producing seed for distribution.

Donations & Volunteers

There has been overwhelming support for the D.T. Fleming Arboretum and its newly formed non-profit foundation. To be all it can be, the Arboretum needs this support. In acknowledgement and appreciation, FOFA would like to thank our donors.

Cash Donations

ALANI — \$2500 & Above

Fred Baldwin Foundation
Moran, Martha & Dave
Vockrodt, Jack
Pacific Equipment Co

LAMA — \$1000 to \$2499

Kaulunani Urban Forestry

ALIAHI— \$500 to \$999

A & B Foundation
Levy, Karen
Platt, Kathleen

ALAA— \$100 to \$499

Anderson, Jeanne
Bailey, John & Gordeene
Begal, Paul & Pam
Bisgard, Judy
Bolte, Jim & Lorie
Brown, Will & Natale
Coons, Fred & Mary
Elsen, Katherine
Fleming, Andrew
Fleming, Barbara
Fleming, Jim & Joanie
Fleming, John & Nancy
Fleming, Maggie
Gonsalves, Dennis & Carol
Higa, Julie M
Hills, John
Holley, Ray & Marian
Hughes, Edmund & Patricia
Jennings, Thomas & Virginia
Judson, Dan - Orchids of Olinda
Kermode, Harry & Millie
Lane, Ed & Diane
Lobianco, Jim & Mary Jo
Maui Garden Club
Maui Outdoor Circle
Mauna Ala Hike Club
Mc Carthy, Michael
Monroe, Cyrus and Jill
Mueller-Fitch, Heather
Native Plant Society
Niess, Jim & Stephanie Austin
Purcell, Nancy
Rezents, Ernest & Aleene
Reavis, Wayne & Jacqueline
Rice, Paul and Corine
Russell, Bill & Elizabeth
Schenk, Doug & Cindy
Shields, Rodney
Slipp, Jane
Sugar, Robert & Helen
Tavares, James & Helen

Wagner - Rixey, George & Randy
Warren, Charlotte
Watanabe, Vernroy (Rick)
White, Dan & Judy
Zabriskie, Margaret

WILIWILI— To \$99

Allan, George & Janet
Barr, George & Rusty
Bily, Pat and Macie
Brown, Frank & Susan
Burton, Cathy
Chang, Dr Jocelyn
Collins, Mark & Denyse
Cruikshank, Sally & Collen
D'Orange, Alice
Darling, David
Dellaport, Jane
Duey, John & Rose Marie
Echazabal, Dianne & Jim
Elliot, Marcia & Lew Mc Farland
Fahscholtz, Thomas
Fahsholtz, Chelsea
Fell, Diane
Fleming, Bridget & David
Gammie, Gay
Harada, Hatsuye
Hazen, Lorna
HI Growers Products
Hixon, Murray
Johnson, Ruth
Jones, Jim & Karen
Kaia, Joloyce
Kaufman, Buzzy & Gayle Gordon
Kawahele, Margaret
Kidston, Caird
Kurzmack, James & Roni
Lab, Jerry & Cynthia Conrad
Leckie, Jackie & Larry
Lyons, Camille
Martin, James & Jacqueline
Masters, Kamala & Steve
Matsuoka, Gunichi & Bess
Maui Frame Co
Maui Master Gardeners
Mayer, Dick & Rosily
Mc Elfresh, Keith & Cheryl
Mc Mahon, Scott & Ann
Milovina, Tom & Wendy
Moriyasu, James & Monica
Morris, Corrine & Spenser Feldman
Murray, Joanne
Nelson, Dick and Eleanor
Okumura, Kazuma
Orr, David
Pacheco, Lois (Cookie)
Raymond, Lisa

Rice, Martha - Ann
Roberts, Mark
Sawyer, Will & Kalima
Sentinella, Mildred
Smith, Joan (Koana)
Taylor, Elizabeth (Betsy)
Terada, Hatsue & Frank
Unger, George
Up Country Electric
Vail, John & Teresa
Waldow, Neil & Elaine
Wiese, Mimi
Wittbold, Elsa
Woods, Frank Mrs

Gifts In Kind

Ted Issacson - Photography
Linda Turnbull - Photography
Michelle Ritchie - Original art
Bob & Noella Murdock - Barbed wire
for fencing
Karen Levy - Answering machine
Marcie and Pat Biley - Photography
Pam Peterson - Photography

Services

Lucianne de Naie - Grant writing
Ernest Rezents - Consultation
Dona Lock - Graphic design
Judy White - Lawyer services, setting up
non-profit
David Moran - Chainsaw and tractor work
Karen Levy - Secretarial work

Arboretum Volunteer Work

Nobuo Suda
Don Schnieder
Jack Crow
Maui Sierra Club
Will McBarnet
Maui Garden Club
Kihei / Wailea Citizen Beach Patrol
David & Martha Moran

Plant Gifts

Maukanani Nursery
Art Mederios & Tracy Erwin from Auwahi
Reforestation Project
Dr. Fern Duvall
Richard Nakagawa
DLNR
Anna Palomino / Hoolawa Farms
Kua Rogoff
Mark Roberts



D.T. Fleming Arboretum at Pu'u Mahoe 2004

USDA Whip Grant Approved

The USDA has approved a \$22,000 grant to re-fence the 7-acre Arboretum with hog wire, replacing the 50-year-old rotten fence. Tree clearing for the project will begin in January. When the job is complete, the Arboretum will have new pig fencing, 3 new gates and an additional area for out-planting. The USDA pays only 75% of the project cost. FOFA will be seeking funds to cover the remaining \$5,600.

2004 Wish List

- \$5,600 (25% USDA Whip Grant requirement) to re-fence the Arboretum.
- \$5,000 matching funds to double the existing maintenance for the Arboretum. This will allow for progressive projects as well as basic maintenance.
- A toolshed and lua (bathroom with flush toilet) at the Arboretum.
- Trail reinforcement supplies.
- Water tank
- A chipper to make mulch for Pu'u Mahoe prunings and tree clearing.
- Arborist work to prune the large Arboretum trees, as well as the large Eucalyptus threatening the Arboretum.



An Alani seedling at the Ulupalakua Agricultural Fair 2003 won First Place for "rare and unusual." The Alani seedling was displayed amongst the remains of an Ohia tree draped with a lei of flowers and foliage of the dryland forest, a memorial to Auwahi and its past.

Vision for the Future

Restore Pu'u Mahoe cinder cone to the original rolling hills, free of wattles, allowing more land for reforestation with native plants endemic to the area. At this time only 7 of the 16.2 acres are planted with native species. Approximately 8 acres are covered in wattle, wasting valuable area for conservation, as well as a fire hazard to the existing Arboretum.



The D.T. Fleming Arboretum is planted within the southern slopes of the Pu'u Mahoe cinder cone.

In Memorium

Mr. Zenjiro Higa

"I wish I had been aware of the Fleming Arboretum before my dad passed away. He would have loved and appreciated it."

Aloha,
Julie Higa
Makawao, HI

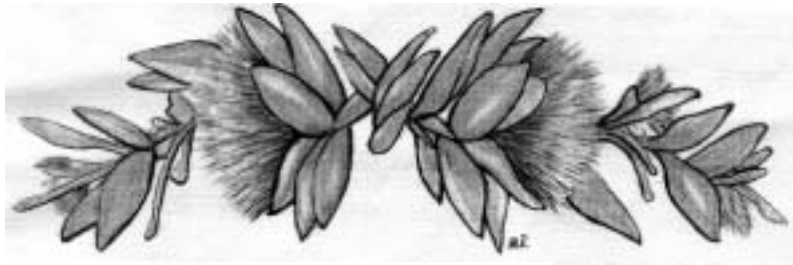
Mrs. Vernie Elsen

"In memory of my mother Vernie Elsen and David T. Fleming."

Aloha,
Kay Elsen
Kihei, Maui

Mrs. Alice Fleming

"In memory of my dearest friend."
From Alice L'Orange
Medford, Oregon



Ohia Lehua by Michelle Ritchie

PLACE
STAMP
HERE

The Friends of D.T. Fleming Arboretum at Pu`u Mahoe

*Dedicated to Preservation through Protection,
Propagation & Distribution*

Name: _____

Address: _____

Phone: _____

I would like to help the D.T. Fleming Arboretum and its mission in the following manner.

- I would like to volunteer in the Arboretum.
- Enclosed is my tax-deductible donation payable to FOFA (Friends of the D.T. Fleming Arboretum).

Thank you. Please mail to:

**Friends of D.T. Fleming Arboretum
P.O. Box 101.
Makawao, HI 96768**

FOFA is an equal opportunity provider.

Tours are available to interested people on the last weekend of each month. Come check on our exciting new projects. Call 808-572-1097.



*D.T. Fleming
Arboretum
2625A Olinia Road at Pu`u Mahoe, HI
Makawao, HI. 96768*



Halapepe (*Pleomele auwahiensis*)