

An Overview of Hawai'i's Cultivated Trees and How to Identify Them



Dr. Matt Ritter



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Urban & Community Forestry Program



<https://www.fs.usda.gov/detail/r5/communityforests/>

Supports the planning and management of healthy trees and forests in our communities where we live, work, and play.

By partnering with states, cities, communities and nonprofit organizations, we can invest from the ground up in activities, information, tools, and public outreach to restore and sustain our community trees and forests.

Save the Date: July 8th @ 1 PM
Pacific Island Select Tree Workshop

Email me at Miranda.L.Hutten@usda.gov to sign up for informal newsletter

KAULUNANI Urban & Community Forestry Program Request for Proposals

Foci: 1) Health & Wellbeing as supported by trees/forests
2) Equity & Access to healthy, well-maintained trees/forests

Due: July 12th
Awards: up to \$7,500
Webinar: Friday 6/4 noon - 1pm
RSVP: info@kaulunani.org

www.kaulunani.org
info@kaulunani.org

Follow Us!
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SMART TREES PACIFIC

History

- Urban and Community Forestry (UCF) since 1992, became a foundation in 1998 and a 501c(3) in 2014
- Administered the USFS Kaulunani program with the State of Hawaii, the program funded >400 projects close to \$4M since 2002.
- Urban Tree Canopy Assessment gave us a three prong strategy
 - Comm. organizational level - Kaulunani
 - Individual level - Citizen Forester engagement
 - Knowledge base support - Deep Learning and SelecTree



Partial Citizen Forester class of 2021

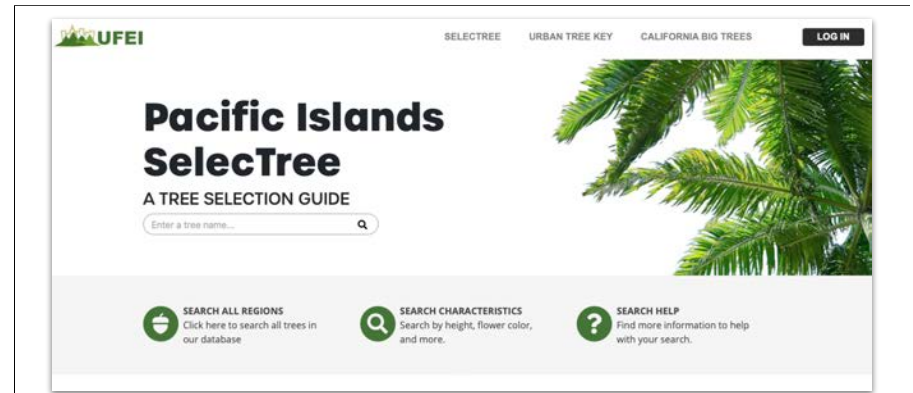
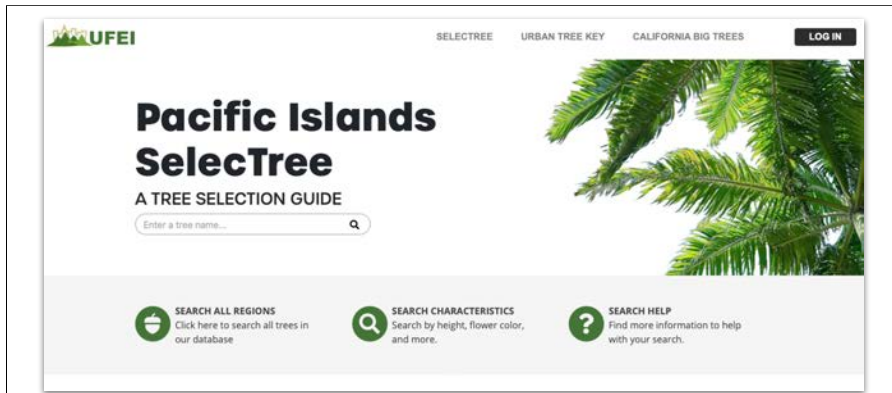
Next year

- Geographic expansion
 - Citizen foresters, UCF
- Technology expansion (AI and may be SelecTree)

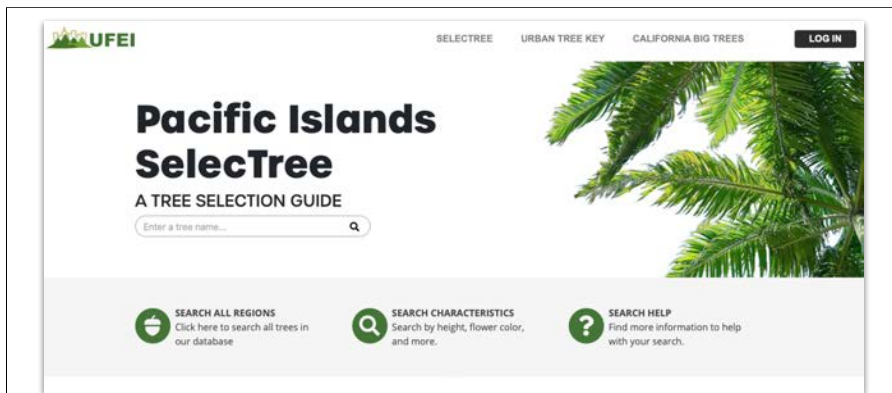
Future

- Community Forestry - working and planting trees with communities

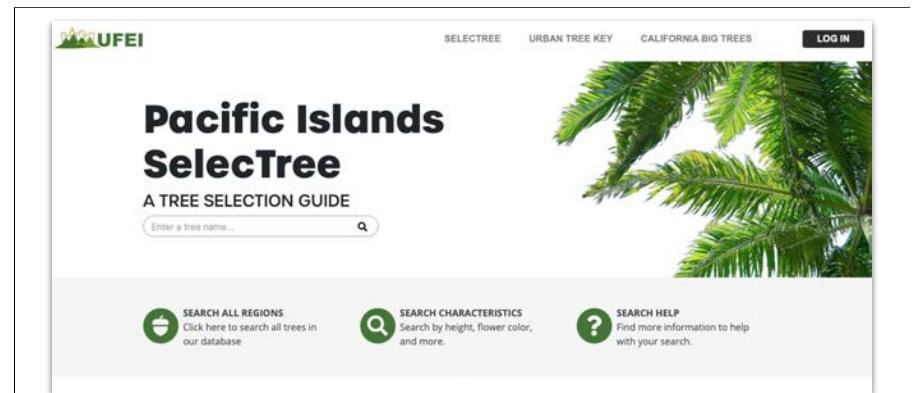




- Database of municipal trees and their characters
 - Selecting the right tree - character searching
 - Identifying trees
 - Learning more about trees



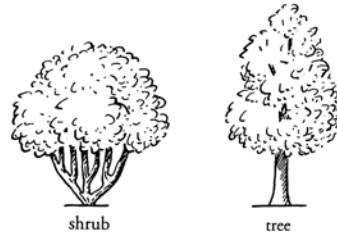
- Includes:
 - Commonly cultivated trees
 - Trees around people, both weedy and native
 - New and interesting trees that might do well in the urban forest



- ~200 species right now
- Over 3,000 photos
- > 50 characters for each species

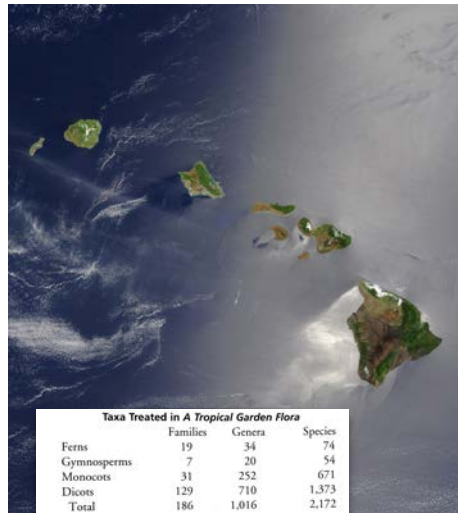
Really Common Hedges / Shrubs

- *Morinda citrifolia* NONI
- *Cascabela thevetia* BEESTILL TREE
- *Gardenia taitensis* TAHITIAN GARDENIA
- *Murraya paniculata* MOCK ORANGE
- *Polyscias guilfoylei* PANAX



Plants In Hawai'i

- Many native, naturalized, and cultivated plants
- ~10,000 species are grown in horticulture, agriculture, forestry, pasture grasses, etc.
- ~1,000 native species (89% endemic)

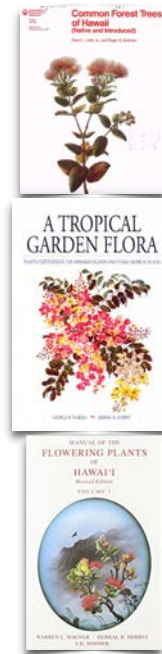


Taxa Treated in <i>A Tropical Garden Flora</i>			
	Families	Genera	Species
Ferns	19	34	74
Gymnosperms	7	20	54
Monocots	31	252	671
Dicots	129	710	1,373
Total	186	1,016	2,172

Known Taxa in the Hawaiian Islands			
	Families	Genera	Species
Ferns	31	82	259
Gymnosperms	11	40	197
Monocots	41	610	2,990
Dicots	178	1,525	4,688
Total	261	2,257	8,134

Sources and Collaborations

Kevin Eckert, Jeff Reimer, Don Hodel, J.B. and Kathleen Friday, Miranda Hutton, Heather McMillen, Wai Lee, Pia Ruisi-Besares, Chuck Chimera, Wilds Brawner, Brian Yamamoto, Tamara Ticktin, Rich Criley, and Chipper Wichman



Categorizing Tree Diversity

- **Native and culturally important trees**
 - Polynesian introductions
- **Common street and horticultural trees**
 - Widely used in municipalities
- **Occasional cultivated trees**
 - Specimen trees, park trees, rarer
- **Common household and garden trees**
 - Edible, fruit and ethnobotanical important trees
- **Special Groups: Palms, Figs, Legumes, Araucarias**
- **Weedy trees**
 - Widely grown naturalized trees
 - Prevalent non-cultivated trees

Commonly Grown Native Trees

- Endemic Tree Species
 - *Acacia koa* KOA
 - *Metrosideros polymorpha* OHIA
 - *Pritchardia hillebrandii* LOULU PALM
 - *Erythrina sandwicensis* WILIWILI
 - *Polyscias sandwicensis* 'OHE
 - *Sapindus oahuensis* ĀULU
- Indigenous Species
 - *Hibiscus tiliaceus* HAU
 - *Pandanus tectorius* HALA
 - *Pritchardia maideniana* KONA PALM

Trees	
<i>Acacia koa</i>	<i>koa</i>
<i>Diospyros sandwicensis</i>	<i>lama</i>
<i>Erythrina sandwicensis</i>	<i>wiliwili</i>
<i>Metrosideros polymorpha</i>	<i>'ōhi'a lehua</i>
* <i>Munroidendron racemosum</i>	
<i>Myoporum sandwicense</i>	<i>naio</i>
<i>Pittosporum bosmeri</i>	<i>hō'aua</i>
* <i>Pritchardia affinis</i>	
<i>P. beccariana</i> , <i>P. hillebrandii</i>	<i>loulū</i>
<i>Reynoldsia sandwicensis</i>	<i>'ōhe makai</i>
<i>Sapindus saponaria</i>	<i>mānele</i>

*Federally listed as endangered.



KOA

Acacia koa

FAMILY Fabaceae

See all *Acacia*

SYNONYMS

Acacia kauaiensis
Racosperma kauaiense

ADDITIONAL COMMON NAMES



GENERAL INFO

Koa is endemic to the Hawaiian Islands and makes one of the most valuable hardwoods in the world. Its wood was traditionally used for many applications, including musical instruments (ukuleles), surfboards, fishing hooks, and outrigger canoes. The young leaves are feathery and divided but quickly develop into single, curved, leathery simple leaves (called phyllodes). Many acacias, especially the species native to Australia and the Pacific Islands make leaves that mature into simple, undivided phyllodes. This is thought to be a drought adaptation. Koa is a large tree that can become nearly 100 feet tall in its native stands. *Acacia koa* has no HPWRA (Hawaii's Pacific Weed Risk Assessment) score, and the Plant Pono link is: <https://plantpono.org/pono-plants/acacia-koa/>

Native range: Hawaii

Horticultural use: Pollarding



TREE CHARACTERISTICS

Tree shape: Conical or Rounded
Foliage type: Evergreen

Maximum tree height: 60 feet
Canopy width: 30 feet
Growth Rate: ~36-127 in/year

Leaf arrangement and form: Alternate, Simple
Leaf/leaflet shape: Spear-shaped
Leaf color: Bluish Green or Silver or Gray Green

Flowers: Showy,
Flower color: Cream or Yellow.
Flower type: Has male and female reproductive parts in each flower (perfect)
Flowering time: Spring or Summer

Fruit: Brown or Purple Legume
Fruiting time: Winter or Summer

Bark: Black or Dark Brown, Fissured

Litter: Dry Fruit

OHIA

Metrosideros polymorpha



LOULU PALM

Pritchardia hillebrandii



KONA PALM

Pritchardia maideniana



WILIWILI

Erythrina sandwicensis



Widely Grown Polynesian-Introduced Trees

- *Aleurites moluccanus* KUKUI
- *Artocarpus altilis* ULU
- *Broussonetia papyrifera* WAUKE
- *Calophyllum inophyllum* KAMANI
- *Hibiscus tiliaceus* HAU
- *Morinda citrifolia* NONI
- *Thespesia populnea* MILO



Aleurites moluccanus KUKUI



Artocarpus altilis ULU



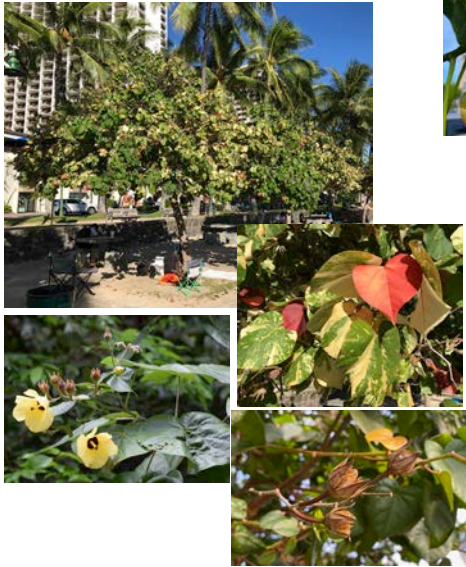
Broussonetia papyrifera WAUKE



Calophyllum inophyllum KAMANI



Hibiscus tiliaceus
HAU

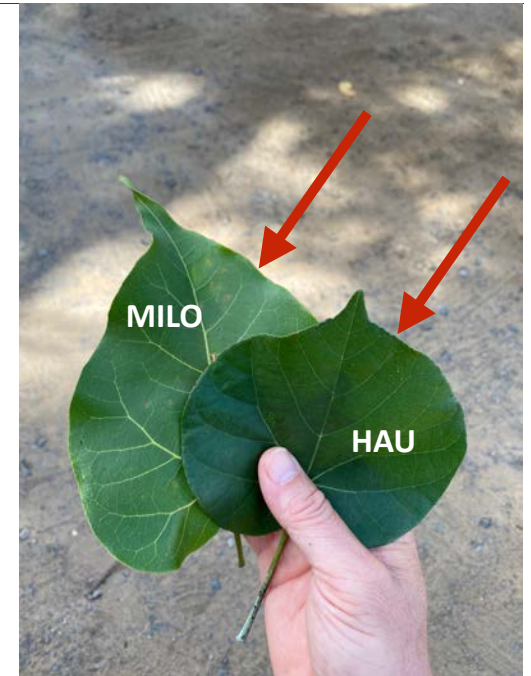
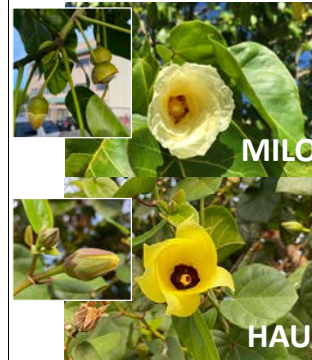


Thespesia populnea
MILO



Hau vs. Milo

- *Hibiscus tiliaceus* HAU—
Leaf edges with minute teeth
- *Thespesia populnea* MILO
—Leaf edges smooth



Commonly Grown Trees

- The five most widely grown trees in no particular order
 - *Cassia x nealiae* RAINBOW SHOWER TREE
 - *Tabebuia heterophylla* PINK TECOMA
 - *Samanea saman* MONKEYPOD
 - *Delonix regia* ROYAL POINCIANA
 - *Clusia rosea* AUTOGRAPH TREE



Tabebuia heterophylla PINK TECOMA



***Samanea saman* MONKEYPOD**



***Delonix regia* ROYAL POINCIANA**



***Cassia x nealiae* RAINBOW SHOWER TREE**



***Clusia rosea* AUTOGRAPH TREE**



Common Small to Medium Sized Street Trees

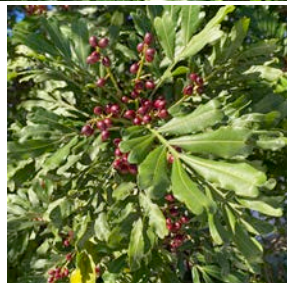
- *Harpullia pendula* TULIPWOOD
- *Filicium decipiens* FERN TREE
- *Cordia sebestena* HAOLE KOU
- *Lagerstroemia speciosa* CRAPE MYRTLE
- *Pimenta dioica* ALLSPICE
- *Tabebuia berteroi* ROSY TRUMPET TREE
- *Tabebuia aurea* SILVER TRUMPET TREE



Harpullia pendula TULIPWOOD



Filicium decipiens FERN TREE



Cordia sebestena HAOLE KOU



Pimenta dioica ALLSPICE



Lagerstroemia speciosa GIANT CRAPE MYRTLE



Occasional and Interesting Trees

- *Adansonia digitata*
BAOBAB
- *Couroupita guianensis*
CANNONBALL TREE
- *Kigelia africana*
SAUSAGE TREE
- *Polyalthia longifolia*
FALSE ASHOKA



Adansonia digitata BAOBAB



Kigelia africana SAUSAGE TREE

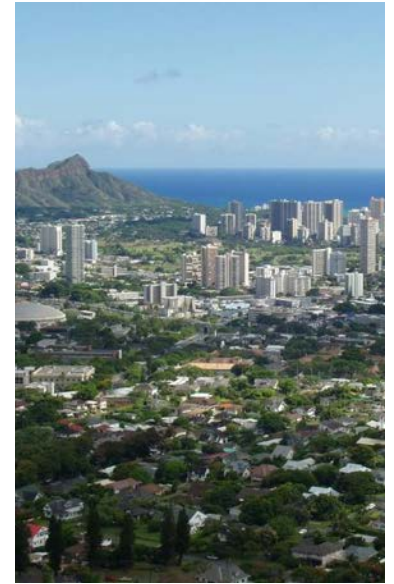


Polyalthia longifolia FALSE ASHOKA



Common Household / Yard / Garden Plants

- Fruit and edible trees
 - *Mangifera indica* MANGO
 - *Persea americana* MEXICAN AVOCADO
 - *Carica papaya* PAPAYA
 - *Moringa oleifera* HORSERADISH TREE
 - *Litchi chinensis* LYCHEE
- Leis and other plants
 - *Fagraea berteriana* PUA KENIKENI
 - *Platyclusus orientalis* ORIENTAL ARBORVITAE



Mangifera indica
MANGO

Persea americana MEXICAN
AVOCADO



Big Island Avocados



Carica papaya
PAPAYA



Moringa oleifera
HORSERADISH TREE



Fruit Trees



Fagraea berteriana
PUA KENIKENI



Platycladus orientalis
ORIENTAL ARBORVITAE



Plumerias

- *Plumeria obtusa* WHITE PLUMERIA
- *Plumeria rubra* PLUMERIA



Leaf tips tapering to a point; flowers variously colored including white.....*Plumeria rubra* (PLUMERIA)
Leaf tips rounded, sometimes notched; flowers white.....*Plumeria obtusa* (WHITE PLUMERIA)

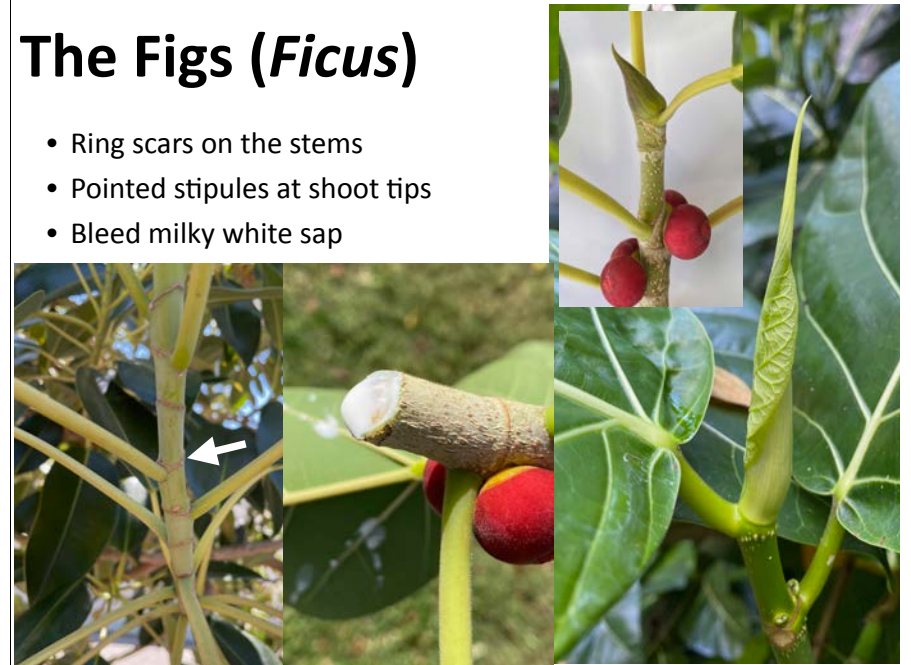
The Figs (*Ficus*)

- >800 species total
- >60 growing in Hawaii
- 8 species widely grown in Hawaii
- Several are naturalized



The Figs (*Ficus*)

- Ring scars on the stems
- Pointed stipules at shoot tips
- Bleed milky white sap



Bleeding Milky White Sap



INDIAN BANYAN

Ficus benghalensis



WEEPING FIG

Ficus benjamina



RUBBER TREE

Ficus elastica



FIDDLELEAF FIG

Ficus lyrata



MORETON BAY FIG

Ficus macrophylla



CHINESE BANYAN

Ficus microcarpa



PEEPUL OR BODHI TREE

Ficus religiosa



RUSTY-LEAF FIG

Ficus rubiginosa



Identifying Figs

1. Ring scar present at each node; stems often ending with a point (Moraceae)
2. Fruit > 6 inches in diameter, covered by small bumps; leaves often shallowly lobed toward tip, especially the juvenile leaves.....*Artocarpus heterophyllus* (JACKFRUIT)
- 2' Fruit < 2 inches diameter, smooth; leaves not lobed (*Ficus*)
3. Shoot tips covered by 1 (often reddish) sheath, > 6 inches long; leaf stalk shorter than leaf width; leaves often purple.....*Ficus elastica* (RUBBER TREE)
- 3' Shoot tips covered by 2 sheaths, usually 4 inches long or less; leaf stalk shorter or longer than leaf width; leaves green
4. Leaves covered with very fine rust-colored hairs (at least when young), usually on the undersides
5. Mature trees with large spreading roots; leaves 2.5 inches to 5 inches wide, figs ¼ inches to 1 inch wide.....*Ficus macrophylla* (MORETON BAY FIG)
- 5' Mature trees without large spreading roots, leaves 1.5 inches to 2.5 inches wide, figs ¼ inches to ½ inches wide.....*Ficus rubiginosa* (RUSTY-LEAF FIG)
- 4' Leaves hairless
- 6' Leaves heart-shaped or triangular; leaf tips long and pronounced.....*Ficus religiosa* (BODHI TREE)
6. Leaves oval; leaf tips variable
7. Largest leaves > 3 inches wide.....*Ficus benghalensis* (INDIAN BANYAN)
- 7' Largest leaves < 2 inches wide
8. Leaf veins inconspicuous, very numerous; leaves with a long, pointed tip.....*Ficus benjamina* (WEeping FIG)
- 8' Leaf veins conspicuous, usually < 10; leaves without a long tip.....*Ficus microcarpa* (INDIAN LAUREL FIG)

The Genus *Araucaria*

- *Araucaria columnaris* COOK PINE
- *Araucaria heterophylla* NORFOLK ISLAND PINE
- *Araucaria cunninghamii* HOOP PINE



Araucaria columnaris COOK PINE

Araucaria columnaris
Cook Pine

Araucaria heterophylla
Norfolk Island Pine

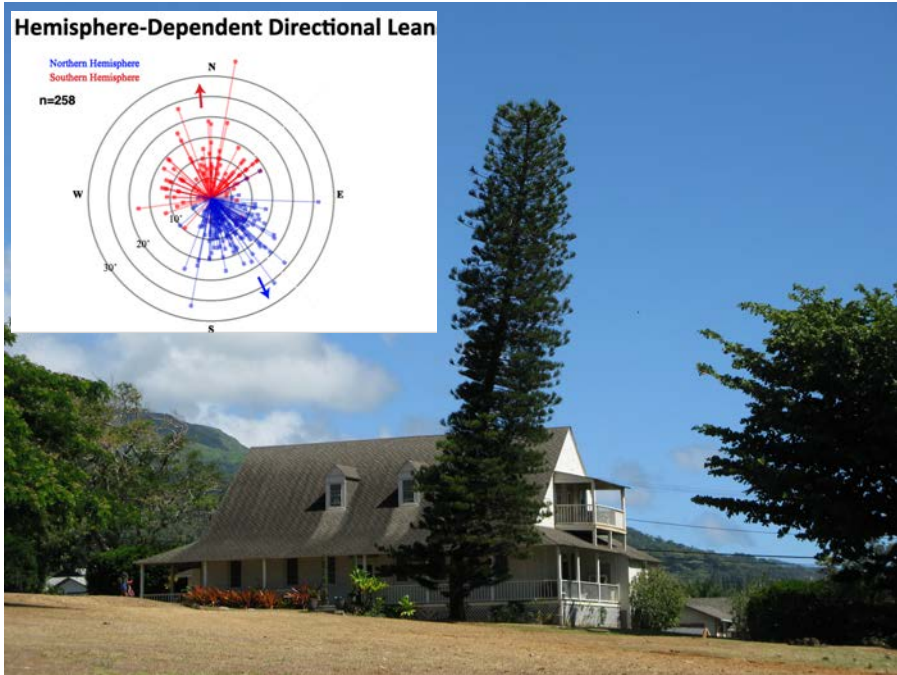
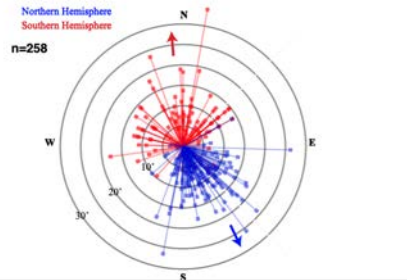


Araucaria columnaris
Cook Pine

Araucaria cunninghamii
Hoop Pine



Hemisphere-Dependent Directional Lean



Legumes (Fabaceae)

“Cassia” Type

“Mimosa” Type

“Pea” Type



Bauhinia



Acacia



Erythrina



Cassia

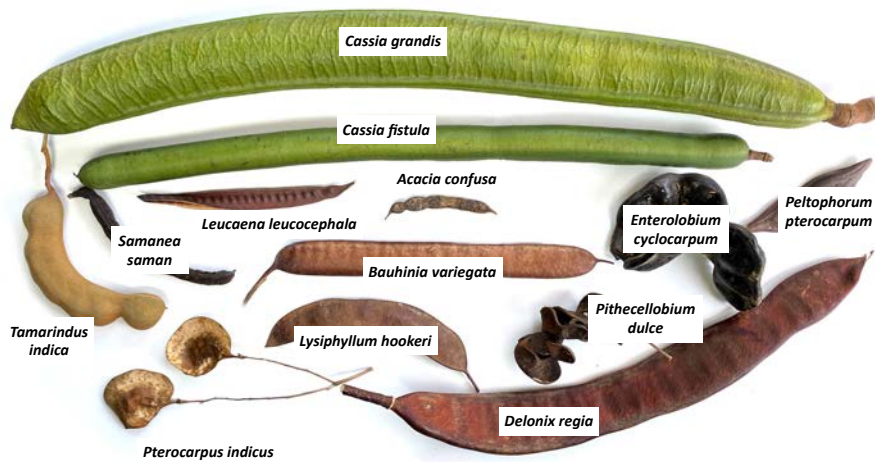


Samanea



Sophora

Legumes (Fabaceae)



Palms

- The Palm Family (Arecaceae)
 - 200 genera and 2,500 species
 - *Pritchardia* in Hawai'i
 - ~700 species grown in Hawai'i with ~15 species representing >80% of planted palms



Most Commonly Grown Palms

1. *Dypsis lutescens*
ARECA PALM
2. *Adonidia merrillii*
MANILA PALM
3. *Archontophoenix alexandrae*
ALEXANDRA PALM
4. *Roystonea regia*
ROYAL PALM
5. *Pritchardia pacifica*
FIJI FAN PALM



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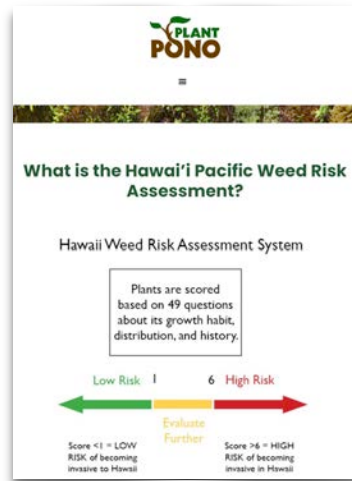
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PALM



Weedy Trees

- 44 species in SelecTree that have become naturalized weeds to some extent
- Hawai'i Pacific Weed Risk Assessment



Casuarina equisetifolia IRONWOOD

HPWRA Score 21: High risk



Psidium guajava COMMON GUAVA

HPWRA Score 21: High risk



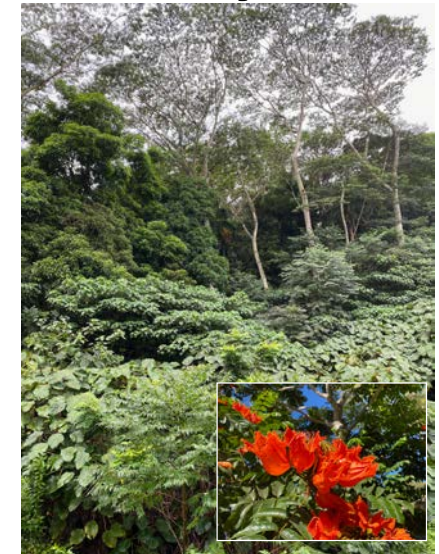
Acacia confusa FORMOSAN KOA

HPWRA Score 10: High risk



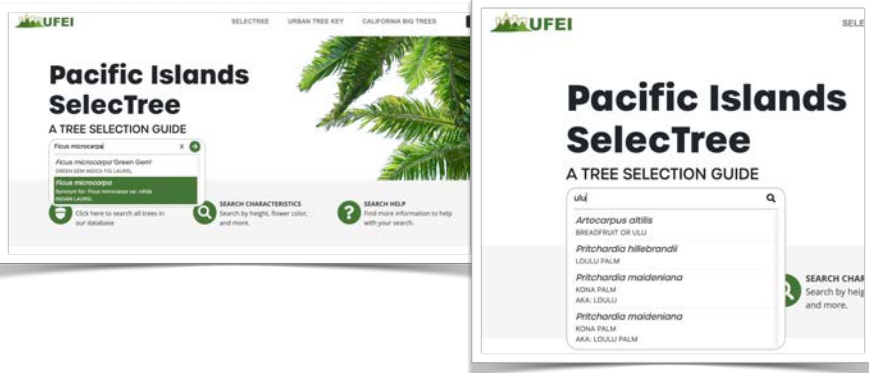
Non-Cultivated Weedy Trees

- *Ardisia elliptica* SHOE BUTTON ARDISIA
- *Cecropia obtusifolia* CECROPIA
- *Falcataria moluccana* ALBIZIA
- *Leucaena leucocephala* HAOLE KOA
- *Pithecellobium dulce* OPIUMA
- *Spathodea campanulata* AFRICAN TULIP TREE

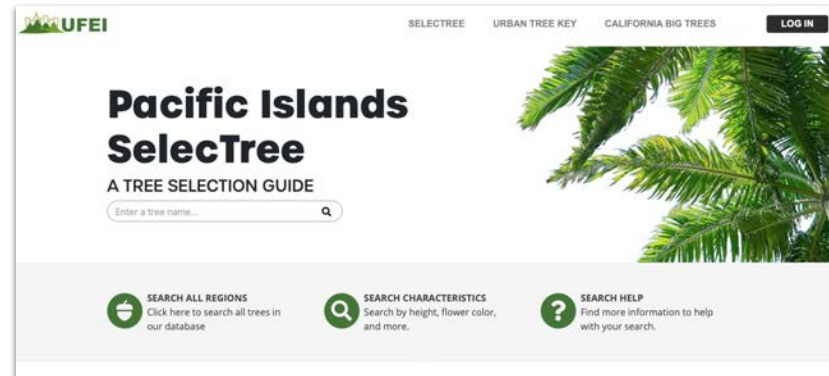


SelectTree Name Issues

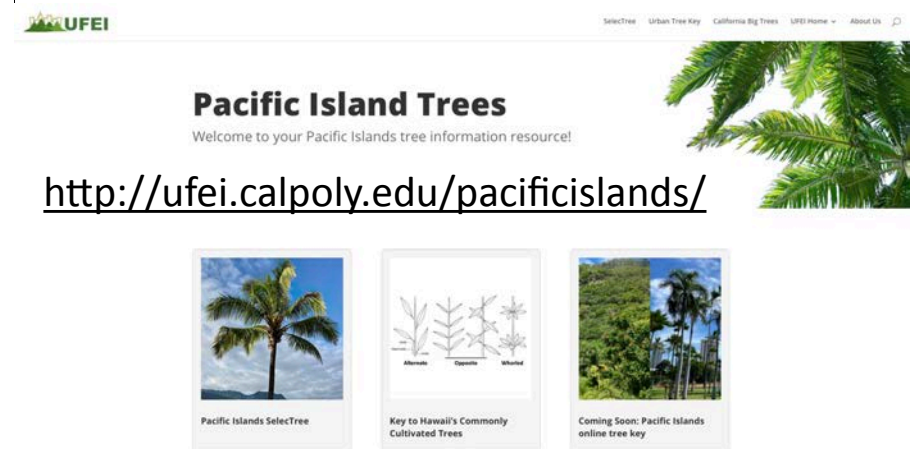
- **BEACH HELIOTROPE** (*Heliotropium foertherianum*, *Tournefortia argentea*, *Argusia argentea*, *Messerschmidia argentea*)
- **LECHOSO** (*Tabernaemontana litoralis*, *Stemmadenia galeottiana*, *S. litoralis*)
- **PODOCARPUS** (*A. falcatus*, *Podocarpus gracilior*, *Podocarpus falcatus*)
- **MONKEYPOD** (*Samanea saman*, *Albizia saman*, *Pithecellobium saman*)



- All scientific names are searchable
- Common names are searchable
 - Currently developing common names database for all Pacific Islands



- SelectTree is a work in progress
 - New species are being added
 - New traits are being compiled
 - New photos are being added
 - Living resource - we want your feedback!



- Pacific Islands SelectTree
- Key to Hawaii's cultivated trees
- Online tree key is coming soon

Thank You

Kevin Eckert, Jeff Reimer, Don Hodel, J.B. and Kathleen Friday, Miranda Hutton, Heather McMillen, Wai Lee, Pia Ruisi-Besares, Chuck Chimera, Wilds Brawner, Brian Yamamoto, Tamara Tickin, Chipper Wichman, and Rich Criley



UNIVERSITY
of HAWAII
MĀNOA



Hawaii Pacific Weed Risk Assessment (HPWRA)



UNIVERSITY OF HAWAII
KAUAI
COMMUNITY COLLEGE



Pacific Island SelecTree

- Feed Back: Matt Ritter (mritter@calpoly.edu)
- <http://ufei.calpoly.edu/pacificislands/>
- <https://selectree.calpoly.edu/pacificislands>

