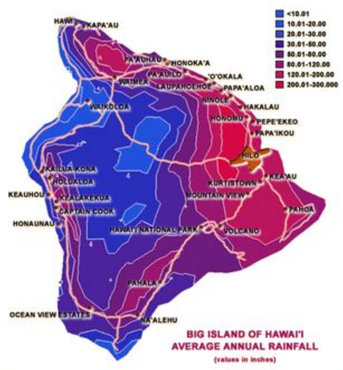
Dry Forest Trees and Shrubs of Hawai'i

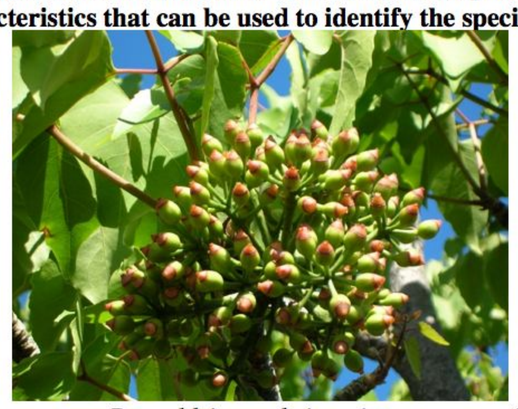
Tropical dry forests used to be the most common of all tropical forest types, but today they are one of the most endangered ecosystems in the world. Since the Hawaiian Islands contain highly diverse and unique groups of species, failure to protect and restore tropical dry forests will result in significant biodiversity losses. The Big Island of Hawai'i has 65 different types of dry forest trees of which 85% are endemic, and 31% are considered "at risk" by the IUCN.

Dark areas are the extent of dry forests



Identification of Dry Forest Trees and Shrubs

All plants can be identified as either having simple or compound leaves that are arranged oppositely or alternately on a branch. The plants are identified by their bark (color, texture), leaves (shape, veins, and structure), and smell. Below are 12 common and important trees and shrubs found in the Big Island of Hawai'i dry forest. Provided are information on their scientific name, botanical family, Hawaiian name, and characteristics that can be used to identify the species, local uses, and conservation status.



Araliaceae *Reynoldsia sandwicensis* Ohe'

Identified by its leaves, which are 8 to 12 inches long, green or yellow, and with 5 to 15 leaflets. The leaflets are oval shaped and 3 to 4 inches long. Its small flowers are greenish-yellow, often with orange or purple edges, and grow in loose bunches. Fruit is dark purple, about 1/4 inch in diameter, and cone-shaped. The biggest threat to the ohe' is habitat loss, cutting to be used as stilts (which also impedes seed germination), and fire.

Fabaceae *Caesalpinia kavaiensis* Uhiuhi

Tree may grow up to 33 feet tall. Trunk of dark grey bark with rectangular plates. Leaves are doubly compound with 1-5 pairs of small branches per leaf, each with 4-8 pairs of leaflets. Flowers include both male and female organs with pink calyx and red anthers. Pink seedpods are winged on one side. Found only in dry or mesic forests. Wood valued for its color, grain and density. Used by natives to make both spears and fishing rods. Less than 20 remain due to the introduction of grazing animals such as cattle, sheep and goats.

Agavaceae *Pleomele hawaiiensis* Hala pepe

Identified by its large leaves (up to 15 inches long), which cluster spirally at branch tip, as well as large yellow flowers (3 petals each), which are used for leis. Fruit appear as small red berries. Tree may grow up to 20 feet tall. Found primarily in dry forest on leeward side of Hawaii. Hala pepe are frequently chopped down for woodcarvings and hula offerings. Threatened by habitat destruction, fires, foreign invasive species, and unsuccessful reproduction in most remaining populations.

Pictures from Hawaii Ecosystems At Risk project(www.hear.org). Other images provided by Hawaiian Native Plant Propagation Database Online at: http://www2.hawaii.edu/~eherring/hawnprop/sap-oahu.htm, Dr. Gerald Carr's Web site "Hawaiian Native Plants" at http://www.botany.hawaii.edu/faculty/carr/natives.htm

Climate map retrieved from Real Estate Hawaii. http://www.realestatehawaii.com/maps_data/rainfall_temp.htm 2/20/2009

Dry Forest Map reproduced from: Pau, Stephanie, Thomas W. Gillespie, and Jonathan P. Price. Natural History, Biogeography and Endangerment of Hawaiian Dry Forest Trees

Satellite image from: NASA: Visible Earth. http://veimages.gsfc.nasa.gov/2712/landsat_hawaii_mosaic.jpg 2/20/2009

Interior and exterior forest views from: Miura, Tomoaki. Large-Scale Assessment of Hawaiian Dry Forest Decline and Restoration Potential with Remote Sensing and GIS.

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Rhamnaceae *Colubrina oppositifolia* Kauila

Tree grows between 15 and 40 feet tall. Bark ranges in color from brown to gray. Leaves are thin, ovate to ovate- elliptic, flexible, darkly pigmented (dull green on topside and olive green beneath) with smooth edges. Leaves grow opposite each other on stem, with the next pair of opposing leaves growing at right angles from the first. 10 to 12 flowers per cluster, each with five green-yellow petals. Fruits are brown and rounded. Threats: loss of habitat by intrusive introduced plants, fire and the coffee twig borer insect. Valued for extremely hard wood; used to make poles, spears, cloth beaters (kapa) and weapons.

Myrtaceae *Metrosideros polymorpha* Ohi'a lehua

One of the larger trees of the island growing to be 24 meters tall. The leaves are opposite, simple, and small. The most distinctive characteristic of this tree is the striking cluster of pink flowers it produces. Now commonly used as flooring, fencing, and in irrigation. The flowers are also commonly used in leis, as the 'Ohi'a lehua flowers are seen as sacred to the Hawaiian goddess Pele. The young leaves of the tree can also be used to make tea. One of the newest threats to this tree is a rust fungus that affects the bark of the tree and eventually kills it.

Oleaceae *Nestegis sandwicensis* Olopua

Part of the olive family, this tree can grow up to 8 meters in height, and can be distinguished by its simple, opposite, and elliptic leaves. It has small yellow-white flowers that later turn to plum-colored fruits. The durable wood of the tree was often used for tool handles, fish hooks, as well as firewood. This tree's main threats include overgrazing by cattle in surrounding areas as well as fires.

Malvaceae *Kokia drynarioides* Koki'o

This shrub can grow up to 27 feet tall, endemic to dry forests on the island. Its leaves are shallowly-lobed, with large scarlet flowers. Overgrazing by livestock, competition from invasive weeds, habitat disturbances caused by development, and forest fires have reduced this species. There are now less than ten trees known to exist in the wild. Used for red dyes ad the treatment of thrush.

Ebenaceae *Diospyros sandwicensis* Lama

The tree grows to a height of 6-12 meters, with simple, alternating, elliptical or oblong leaves. The bark of the tree is also very dark, as it is a part of the ebony family. The flowers are small and white, and the resultant fruit is yellow and egg/acorn shaped. The wood was once used traditionally in sacred altars and fences, as it symbolized the goddess Laka. This tree is threatened by fire and non-native species.

Sapotaceae *Pouteria sandwicensis* 'Ala'a

Shrub or tree. It may reach heights between 45-75 feet. Wood is yellow with black streaks, hard, straight-grained with delicate growth rings. Leaves are simple, thick, green, shiny, oval, rust colored on the underside with a prominent center vein and plentiful lateral veins. Flowers and fruits are in leaf axils. Fruits are pear shaped and orange in color, black when mature. Flowers are pale green. Occur in dry, mid-elevation habitats. Former uses: milky sap to catch small birds, wood to construct houses, and gunwales of canoes. Pests: black twig borer, scale, ants, mealybugs, thrips, aphids.

Rubiaceae *Psydrax odorata* Alahe'e

These shrubs/small trees that grow from 3-6 meters tall can be set apart by their small, white flowers and juicy, black fruit. They have opposite, simple, elliptical leaves. Growing in dry shrubland, the flowers of the psydrax are used in leis, while the wood was once used in tool handles, specifically axes and adzes, due to its inherent sturdiness. These shrubs/trees are chiefly endangered by fire dangers and foreign invasive species.

Malvaceae *Hibiscus brackenridgei* Ma'o hau hele

Also known as the ma'o hau hele tree, the *brackenridgei* is the state flower of Hawaii. Can grow up to 30 feet in the wild, with diameters of 8-15 feet. Can be identified by its leaves, which are 6 inches long, fuzzy with toothed edges, and have 3, 5, or 7 lobes. Flowers appear as large (4-6 inches), and are yellow with maroon centers. Threats such as development, overgrazing by livestock and feral animals, and competition from invasive weeds have significantly reduced the number of this popular plant surviving in the wild to less than 60 individuals.