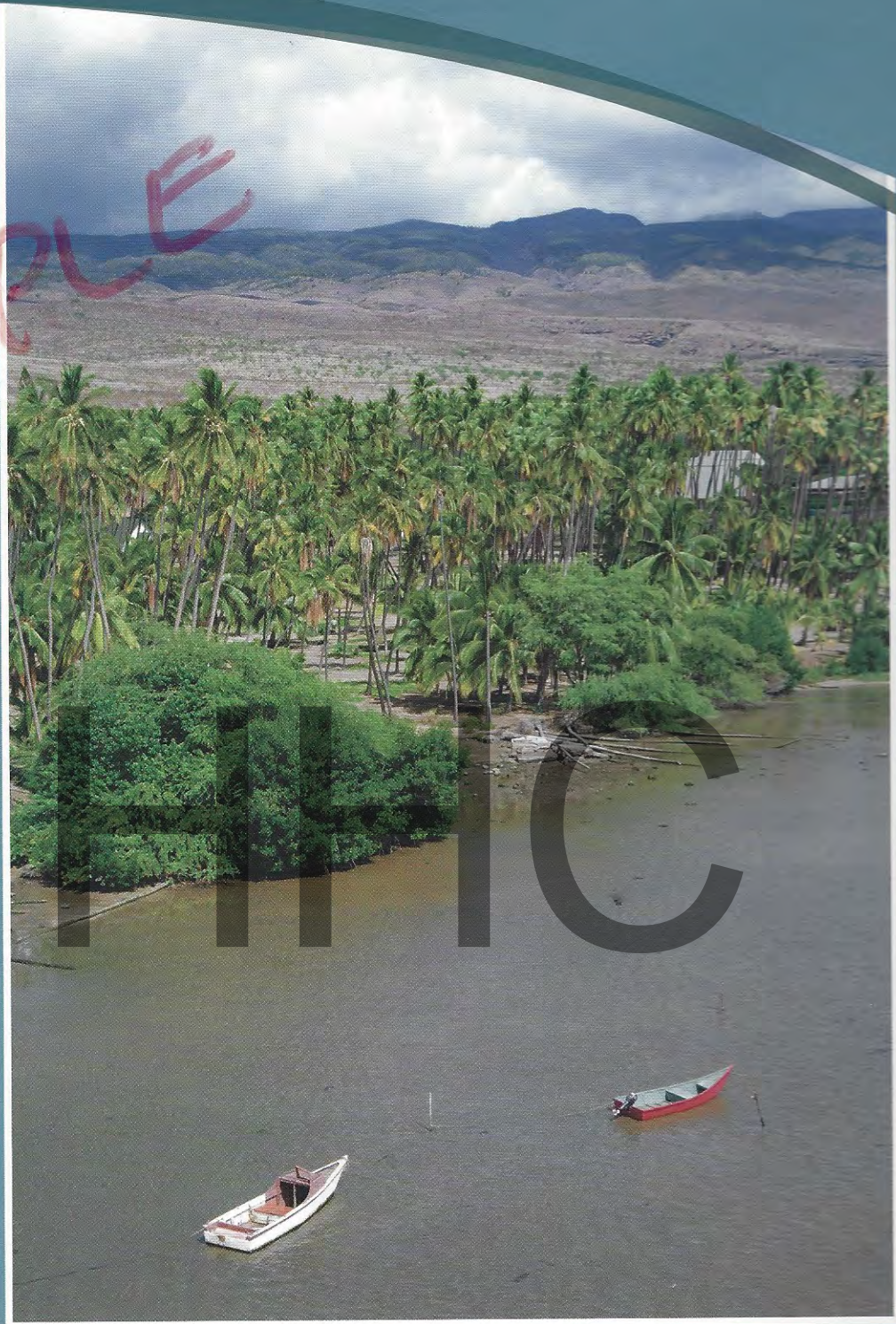


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SAMPLE



# PLANTS & PLACES

## THE FLORA OF HAWAII

STATE OF HAWAII · DEPARTMENT OF LAND AND NATURAL RESOURCES

2009  
SAMPLE  
Gallert





THE HONORABLE  
LINDA LINGLE  
GOVERNOR OF HAWAII

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Anyone wishing to obtain more calendars  
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## TIDE CORRECTIONS

The tidal predictions are based on the high and low tides at Honolulu Harbor, O'ahu. To find the correct times and heights for other locations, use the chart below to adjust the times and heights.

Tidal corrections are listed in hours and minutes. A plus (+) sign means that the tide will occur later than in Honolulu, therefore, add this number to Honolulu time. A minus (-) sign indicates that a tide will occur earlier than in Honolulu, therefore, subtract this number from Honolulu time.

For tide times at the following places, add or subtract from Honolulu time.

PORTS	HIGH WATER HR/MIN	LOW WATER HR/MIN
<b>KAUAI</b>		
Waimea Bay	-0 20	-0 07
Port Allen,		
Hanapēpē Bay	-0 36	-0 22
Nāwiliwili Bay	-0 27	-0 25
Hanama'ūlu Bay	-0 17	-0 21
Hanalei Bay	-1 28	-1 47
<b>O'AHU</b>		
Hale'iwa, Waialua Bay	-1 02	-2 05
Wai'anae	+0 20	+0 18
Hanauma Bay	-0 59	-0 45
Waimānalo	-1 15	-1 09
Moku o Lo'e	-1 24	-1 14
Waikāne, Kāneohe Bay	-1 46	-1 18
Lā'ie Bay	-1 45	-1 46

PORTS	HIGH WATER HR/MIN	LOW WATER HR/MIN
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#### MOLOKA'I

Kolo	+0 05	+0 01
Kaunakakai	-0 05	-0 08
Kamalō Harbor	-0 37	-0 16
Pūko'o Harbor	-1 03	-0 48

#### LĀNA'I

Kaūmalapau	+0 02	+0 03
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#### MAUI

Kahului	-1 53	-1 41
Hāna	-1 13	-1 23
Mākena	-0 32	-0 32
Kihei, Mā'alaea Bay	-0 01	-0 22
Lahaina	-0 35	-0 40

#### KAHO'OLAWÉ

Kūheia Bay	-0 09	-0 09
Smuggler Cove	-0 15	+0 03

#### HAWAII

Māhukona	-0 26	-0 17
Kawaihae	-0 04	-0 03
Kailua Kona	-0 26	-0 22
Nāpō'opo'o		
Kealahou Bay	-0 16	-0 12
Honu'apo	-0 26	-0 16
Hilo	-1 04	-0 59

**PU'UOKALI, MAUI.** (above photo) The pungent smelling *Maiapilo* (*Capparis sandwichiana*) blossoms at night. It can be observed growing along beaches and on lava flows on all major islands; however, it is getting more difficult to locate. It is traditionally used medicinally by Hawaiians to help heal broken bones.



# PLANTS & PLACES

## THE FLORA OF HAWAI'I

A small excerpt (see bottom right) taken from the *kumulipo*, a genealogical chant over 2,000 lines long explains the creation of the world from the source of darkness, of light and of the earth to the birthing of all living things — mammals that fly, swim, walk, and crawl; flowering plants, grasses, and ferns; mollusks and arthropods; and eventually on to the *taro* and *kanaka maoli* (Native Hawaiians). A familial relationship between *kanaka maoli* and everything that exists in the Hawaiian environment is revealed, with the land and its organisms being the *kua'ana* (elder sibling) and people being the *kaikaina* (younger sibling). This intricate relationship is also a reciprocal one where *kanaka maoli* have the responsibility to care for and respect our elders, the land and its resources, so that they will continue to take care of us and our children. Examples of this respect is shown through our prayers and chants asking permission to move a stone or pluck a flower, the practice of naming of personal possessions such as canoes, fishing supplies, weapons, poi pounders, and surfboards, the traditional system of land stewardship instead of land ownership, and the composition of *mele* (chants/songs) and hula for a specific rain, wind, or mountain.

The scientific community offers another explanation for the creation of the Hawaiian Islands and their inhabitation. The common understanding is that the Hawaiian Islands were created as a result of a "hot spot" of volcanic activity starting at least 70 million years ago. From the time the islands first broke through the surface of the ocean, different species began arriving and colonizing them. Whether they were blown here by the wind, carried here by the ocean currents, or brought here by accident by other organisms, it is estimated that a new plant species arrived in Hawai'i at a rate of about one introduction every 100,000 years. From these very few immigrants, thousands of new species evolved and adapted to the diverse climates of Hawai'i. In the case of the *'ahinahina* (*Argyroxiphium sandwicense*), for example, a single settler arrived in Hawai'i, morphed, and adapted into three different genera and about 28 different species from the coastal and desert climates all the way up to the Alpine region. Another example of such a spectacular coloniza-



*Kauila* (*Alphitonia ponderosa*) (above) is significantly important to *kanaka maoli*. According to the *kumulipo*, this plant is the guardian of the *puihi kauila* (kauila eel) of the ocean.

*Hāhā* (*Cyanea* spp.) (below) is an excellent example of evolution. Out of just one original arrival in Hawai'i, this plant evolved into three different endemic genera that consists of more than 83 recognized species found nowhere else in the world.



tion was when a founder from the bellflower family *Campanulaceae* arrived on our shores. Out of just one original arrival in Hawai'i, this plant evolved into three different endemic genera that consists of more than 83 recognized species found nowhere else in the world. This dramatic evolution and adaptation occurred as a result of Hawai'i's unique geographic isolation in the middle of the Pacific Ocean. But this separation is what also led to the creation of a very fragile natural environment whose balance could easily be disrupted. It is this natural history of Hawai'i and its resulting vulnerable condition that requires careful stewardship on behalf of us all.

We need not choose between the Hawaiian and scientific explanations of the creation of Hawai'i and its natural environment; they can coexist, even within a single individual, since the core lesson of *Mālama 'Āina* is reflected in both, that is, the responsibility we all share to take care of the land and its resources so that they can continue to take care of us. It does not matter whether a genealogical connection or a scientific understanding leads you to *Mālama 'Āina*; the most important thing is that we all do our part.

Although there are literally thousands of native plants in Hawai'i that could have been selected to produce a visually stunning calendar, the plants that were selected for this 2009 calendar are all famously connected to a specific area. Some have been traditionally tied to a place for centuries before the arrival of Captain Cook in 1778, while others have more recently become significant to an area because of current, modern environmental issues. This calendar will hopefully encourage everyone in Hawai'i to become more deeply connected to the places we call home and the unique flora that make these places so special. And as a result, we anticipate that a sense of pride and responsibility will be fostered within each of us to *Mālama Hawai'i* for the benefit of future generations.

COVER: **KALAMAULA, MOLOKA'I.**

—*"Ka ulu niu o Kapuāiwa,"*

—*"The coconut grove of Kapuāiwa."*

The *nui* (*Cocos nucifera*) was extensively used by Hawaiians in traditional times and remains an important plant in this modern era. Among many other uses, its trunk can be crafted into drums; its husk can be used to make rope and ignite fires; its hard shell can be fashioned into cups and hula implements; its leaves can be woven into baskets and crab snares; its meat eaten and its water drunk. A sign of royalty and a manifestation of the god *Kū*, this particular grove on Moloka'i was planted by Kamehameha V, Lot Kapuāiwa, in the 1860's.




*'O ke au i kahuli wela ka honua  
'O ke au i kahuli lole ka lani  
'O ke au i kuka'īaka ka lā  
E ho'omālamalama i ka malama  
'O ke au o Makali'i ka pō  
'O ka walewale ho'okumu honua ia  
'O ke kumu o ka lipo i lipo ai  
'O ke kumu o ka pō i pō ai  
'O ka lipilipo, 'o ka lipilipo  
'O ka lipo o ka lā, 'o ka lipo o ka pō  
Pō wale ho'i  
Hānau ka pō  
Hānau Kumulipo i ka pō, he kāne  
Hānau Pō'ele i ka pō, he wahine*

At the time when the earth became hot  
At the time when the heavens turned about  
At the time when the sun was darkened  
To cause the moon to shine  
At the time of the rise of Pleiades  
The slime, this was the source of the earth  
The source of darkness that made darkness  
The source of the night that made night  
The intense darkness, the deep darkness  
The darkness of the sun, darkness of the night  
Nothing but night  
The night gave birth  
Born was Kumulipo in the night, a male  
Born was Pō'ele in the night a female

—Translation taken from Beckwith





**KEAUHOU, HAWAII**

—“E ola koa.”

—“Live long like a koa tree.”

Koa (*Acacia koa*) is a common tree on all main Hawaiian Islands except Ni‘ihau and Kaho‘olawe, however, it is on the island of Hawai‘i where they grow the tallest, and therefore can produce the largest canoes.



**KAPOLEI, O'AHU.** *Ko'oloa'ula* (*Abutilon menziesii*) is an endemic plant that was assumed extinct on O'ahu until it was rediscovered in Kapolei in 1996, having miraculously survived in a sugar cane field for decades. Since then, a new population was discovered in Lualualei, and few wild populations still exist on Lāna'i, Maui, and Hawai'i.

HNCS







**HUELO, MOLOKA'I.** *Loulu* (*Pritchardia* spp.), also known as Hāwane and Wāhane, used to form forests in the lowlands across Hawai'i. The first steep decline of the *loulu* forests occurred when rats were brought to Hawai'i by Polynesians. This was later compounded when westerners brought the black rat, cattle, goats, and deer. The *loulu* forest on Huelo, an islet off of Moloka'i, is spared a similar fate due to its geographic isolation.





#### KOKE'E, KAUA'I.

— "He aha lā ia i ka maka o ku'u kauila ke pahu aku iā ia, lilo mai kona ola ia'u."

— "He is no match for my kauila spear which, when hurled, will easily take his life."

The small blossom of the *Kauila* (*Alphitonia ponderosa*) belies the strength of this native hardwood. *Kauila* is an endemic tree which was commonly used for weapons and digging sticks since its wood is so hard and dense. Once a common tree on all islands except Ni'ihau and Kaho'olawe, it is now rare everywhere except Kaua'i.



HHC



—“Ka poli laua’e o Makana.”

—“Makana, whose bosom is fragrant with laua’e.”

The laua’e (*Phymatosorus grossus*) everyone knows of today is believed to have only recently been introduced to Hawai‘i, the first documented on Maui in 1919. However, the name laua’e can be traced back prior to westerners’ arrival in Hawai‘i. It is not only mentioned in many traditional songs and chants, but is also commonly spoken of in ancient stories. These traditional references may very well be attributed to the now rare Pe’ahi (*Microsorium spectrum*) fern, pictured here.







**POLIHALE, KAUA'I.**

—“*E lei ana i ka pahapaha o Polihale.*”

—“*Adorned in a lei of Pahapaha from Polihale.*”

Although the *Pahapaha (Ulva fasciata)* is a type of seaweed that grows on all the Hawaiian Islands, it was famous from Polihale, Kaua'i, where it was made into lei.

HHHC





**HALEMA'UMA'U, KĪLAUEA, HAWAII**

— "Māi hahaki i ka 'ōhelo o punia i ka ua noe."

— "Don't pluck the 'ōhelo berries or you will be surrounded in rain and fog."

'Ōhelo (*Vaccinium* spp.) was considered sacred to Pele and if they were picked on the way to Kīlauea crater, rain and fog would cause the traveler to lose their way.



**KE'ANAE, MAUI.**

—“*I maika'i ke kalo i ka 'ohā.*”

—“*The taro can be judged by its offspring.*”

The older brother of the Hawaiian people and the main staple of the Hawaiian diet, *kalo* (*Colocasia esculenta*) is also the plant used to make *poi*. It was said that Ke'anae, Maui was originally a peninsula consisting of nothing but lava until people of Maui carried down soil so that *kalo* could be cultivated.





**NU'UANU, O'AHU.**

—“He lehua 'āhihi ia no Lanihuli.”

—“It is the lehua 'āhihi of Lanihuli.”

The lehua 'āhihi (*Metrosideros tremuloides*) is a type of lehua that is only found on O'ahu.

The peak of Lanihuli (in the background) is famous for this delicate lehua variety.





**PU'UOKALI, MAUI.**

—“Pua ka wiliwili, nanahu ka manō.”

—“When the wiliwili blooms, the sharks bite.”

At one time, wiliwili (*Erythrina sandwicensis*) forests were common throughout Hawai'i's lowland, dry forests. However, few forests still exist like this one located at Pu'uokali. Their dwindling numbers can be attributed mostly to habitat destruction, but more recently, ever increasing threats such as the *Erythrina* gall wasp have continued to devastate these trees.







PHOTO

**KAHO'OLAWE.** *Kanaloa* (*Kanaloa kahoolawensis*) is a federally listed endangered plant and among the rarest plants in the world, unknown to science until 1994 when only a few plants were discovered on an islet off Kaho'olawe.





**HALEAKALĀ, MAUI.** 'Āhinahina (*Argyroxiphium sandwicense*) is the name applied to the silversword-like plants that grow on the beach as well as the ones that grow in the uplands. This impressive 'āhinahina is the endangered mountain dwelling variety that is found on the summits of Maunakea, Maunaloa, and Haleakalā.