



Hibiscus tiliaceus (beach hibiscus)

Malvaceae (mallow family)

'au (Cook Islands); *ayiwo, fa'alo, fa'ola, fakasu, kwara'ae* (Solomon Islands); beach hibiscus, sea hibiscus, mahoe, linden hibiscus (English); *bourao* (French); *burao* (Vanuatu); coast cottonwood, Cuban bast (Trade Names); *emajagua* (Spanish); *ermall* (Palau); *fau* (Samoa, Tonga); *fau, fautu'u* (Tuvalu); *fou* (Niue); *gaal'* (Yap); *hau* (Hawai'i); *kalau* (Pohnpei); *kilife* (Chuuk); *lo* (Kosrae, Marshall Islands); *pago* (Guam); *purau* (French Polynesia); *te kiaiai, te rau* (Kiribati); *vau, vau ndamu, vau ndamundamu, vau ndina, vauleka, vaundra* (Fiji); *vo, vole* (New Caledonia)

Craig R. Elevitch and Lex A.J. Thomson



Trees along shoreline, Uafato, Samoa.

IN BRIEF

Distribution Found throughout the tropics.

Size Typically reaches 3–10 m (10–33 ft) in height, with a crooked, tangled, sprawling form.

Habitat Usually found in coastal and low-elevation habitats, but can be found up to elevations of 800 m (2600 ft) with annual rainfall of 900–2500 mm (35–100 in).

Vegetation Grows together with coastal, near-coastal, and riverine flora.

Soils Adapted to a wide range of well drained to poorly drained, acid to alkaline soils.

Growth rate Annual growth rate is estimated at 0.75–1.5 m/yr (2.5–5 ft/yr) in height.

Main agroforestry uses Soil stabilization, coastal protection, living trellis, hedge.

Main products Craft wood, fuelwood, fiber, medicinal.

Yields Data unavailable.

Intercropping Planted as boundary and windbreak around food crops or as a living fence around pastures.

Invasive potential Has some potential to invade undisturbed native plant communities, particularly when introduced into moist environments.

INTRODUCTION

Beach hibiscus (*Hibiscus tiliaceus*) is an evergreen, sprawling tree that typically grows to 3–10 m (10–33 ft) in height with a sprawling form. It is indigenous to many parts of the tropics and has been introduced to new regions by people. It is most at home in coastal and near-coastal environments, but it has been introduced into agricultural environments up to 800 m (2600 ft) elevation. Once established, the tree often persists and spreads, especially in moist gullies, streambeds, and other wet areas.

The tree can grow in a wide range of soils, including inhospitable brackish swamps, waterlogged soils, and limestone. It stands up well to salty ocean winds. High winds can cause trees to fall over, contributing to its tangled and intertwined form. Beach hibiscus is highly variable in form, leaf and flower color, etc., and several taxonomic varieties have been recognized. The tree serves as a coastal wind-break, hedge or boundary plant, and as a living trellis or fence post. The wood is used for canoe parts, crafts, short-term utility, and for fuel wood. The fibrous inner bark is utilized for cordage, and parts of the plant are used medicinally. Beach hibiscus is culturally significant throughout the Pacific.

DISTRIBUTION

Native range

The species is indigenous throughout the tropics and subtropics. It is not known if the species originated in the Americas or tropical Asia. The seeds can remain viable after floating in seawater for several months, which partially accounts for the tree's wide dispersal. Due to its many traditional uses, beach hibiscus has doubtless been spread by humans. It is possibly an aboriginal introduction to some isolated islands, such as Hawai'i, and to atolls, where it does not grow well (Thaman and Whistler 1996).

Current distribution

The tree is now found in tropical and subtropical America, Africa, Asia, Australia, and throughout the Pacific islands.

Threats to the species

The near-sea level habitats that it mainly frequents are threatened by climate change and sea level rise and accompanying land inundation.

BOTANICAL DESCRIPTION

Preferred scientific name

Hibiscus tiliaceus L.

Family

Malvaceae (mallow family)

Non-preferred scientific names

Hibiscus celebicus Koord.

Hibiscus hastatus L. f.

Hibiscus similis Blume

Paritium tiliaceum (L.) St.-Hil., Juss. & Camb.

Pariti tiliaceum (L.) Britton

Common names

Pacific islands

'au (Cook Islands)

ayiwo, fa'alo, fa'ola, fakasu, kwara'ae (Solomon Islands)

beach hibiscus, sea hibiscus, mahoe, linden hibiscus (English)

burao (Vanuatu)

ermall (Palau)

fau (Samoa, Tonga)

fau, fautu'u (Tuvalu)

fou (Niue)

gaal' (Yap)

hau (Hawai'i)

kalau (Pohnpei)

kilife (Chuuk)

lo (Kosrae, Marshall Islands)

pago (Guam)

purau (French Polynesia)

te kiai'ai, te rau (Kiribati)

vau, vau ndamu (purple variant), vau ndamundamu (purple variant), vau ndina, vauleka, vaundra (Fiji)

vo, vole (New Caledonia)

Other languages

bourao (French)

coast cottonwood, Cuban bast (Trade Names)

emajagua (Spanish)

Size and form

Beach hibiscus typically reaches 3–10 m (10–33 ft) in height, and attains 20 m (66 ft) in rare cases, with a maximum stem diameter of 50 cm (20 in). The tree often has a short trunk with numerous crooked, sprawling, intertwined branches forming an impenetrable thicket. It can also have a shrub-like form, with prostrate branches. Usually the canopy is

much wider than the height of the tree, although erect forms with upright branches are also known.

Flowers

The flowers are typical of the *Hibiscus* genus, showy, fragile, and short-lived, falling the same day that they open. They are borne in terminal or axillary, few-flowered cymes (3–6 flowers), or else solitary. Individual flowers are cup-shaped, with the corolla consisting of five radiating, obovate, lemon-yellow petals (4–6 cm [1.6–2.4 in] long), dark maroon at the base. The central staminal column is covered in yellow anthers with a terminal, red, five-parted style. The five sepals are elongated-triangular and light greenish-pink. The flowers fade to pink prior to falling. Flowering and fruiting may occur at any time of the year. The time to first flowering and fruiting is typically 2–3 years from seed.



Typical tangled, sprawling branches. PHOTO: C. ELEVITCH

Leaves

The leaves are simple, heart shaped, rather large (8–20 cm long by 6–15 cm across [3–8 x 2.4–6 in]), often wavy, discolorous, bright green on the upper surface, and grayish-green and hairy below. In some Pacific islands there is a variant with bronze–reddish-green shoots and new leaves.

Fruit

The fruits are a light brown, ovoid, dry capsule, about 2 cm [0.8 in] long, splitting into 5 segments and 10 cells of seeds at maturity. Fruiting may occur throughout the year. Vegetatively propagated plants may flower in less than a year, while seedlings first produce mature fruits at about 2–3 years of age.

Seeds

There are about 5–7 kidney-shaped seeds per cell. The seeds are rich brown to brown-black in color, roughened, and hairy.

Rooting habit

The plant has a highly spreading, near-surface, lateral root system, often comprised of only a few main roots.

Bark

The bark is gray to light brown, smooth to slightly longitudinally fissured with horizontal cracks, becoming thick and rough with age.

Similar species

In the Pacific, beach hibiscus is most commonly confused with the related *Thespesia populnea*, which also occupies similar, coastal strand habitats. *Thespesia* is distinguished by its glossy green, sparsely or non-hairy foliage, pale yellow flowers that have an undivided style and quickly turn dark pink-reddish, and its large, round, indehiscent, green fruits (resembling small apples) that turn black and wrinkled at maturity.

GENETICS

Variability

Hibiscus tiliaceus in a broad taxonomic sense is a highly variable species with seven distinctive subspecies (see below), some of which are regarded as worthy of classification as a species. There is considerable variation for many morphological traits. Vegetative characters are especially variable, although much of this variation is likely due to environmental factors.

Known varieties

The seven commonly accepted subspecies are:

- *Hibiscus tiliaceus* subsp. *celebicus* (Koord.) Borss. Waalk. (only known from Sulawesi, Indonesia)
- *Hibiscus tiliaceus* subsp. *crestaensis* Borss. Waalk. (only known from the island of Luzon, Philippines)



Top left: Flower. PHOTO: L. THOMSON **Top right: Fruit capsules.** PHOTO: L. THOMSON **Bottom left: Leaves.** PHOTO: C. ELEVITCH
Bottom right: Bark of older branch. PHOTO: L. THOMSON

- *Hibiscus tiliaceus* subsp. *elatus* (Hochr.) Borss. Waalk. (stout habit and large flowers native to tropical east American and West African coastal regions)
- *Hibiscus tiliaceus* subsp. *genuinus* (Hochr.) Borss. Waalk.
- *Hibiscus tiliaceus* subsp. *hastatus* (L. f.) Borss. Waalk. (found in Pacific islands; distinctive in its three-lobed leaves)
- *Hibiscus tiliaceus* subsp. *similis* (Blume) Borss. Waalk. (native to Southeast Asia. Rarely develops mature capsules; may have evolved as a hybrid with *H. macrophyllus*)

- *Hibiscus tiliaceus* subsp. *tiliaceus* (widespread)

Many forms are found that are not formally recognized as taxonomic subspecies or varieties. A rare upright form grown for its stem fiber is known in Hawai'i, called hau oheohe. This form was present before European contact in Hawai'i (Staples and Herbst 2005).

Forms with variegated leaves, double flowers, white petals with maroon spots at the base, and pure yellow flowers are known.

ASSOCIATED PLANT SPECIES

In the Pacific islands the species is mainly found in strand and near-coastal plant communities, but it has been widely planted, especially as live boundary fences in inland, low elevation areas. Its natural habitats are mainly low, rather open, coastal thickets, and open to closed forest.

Associated native species commonly found

Commonly associated species are the typical Pacific islands strand and coastal species including *Acacia simplex*, *Barringtonia asiatica*, *Casuarina equisetifolia*, *Cerbera* spp., *Cocos nucifera*, *Cordia subcordata*, *Guettarda speciosa*, *Hernandia nymphaeifolia*, *Neisosperma oppositifolium*, *Pandanus tectorius*, *Scaevola taccada*, *Schleinitizia insularum*, *Sophora tomentosa*, *Terminalia catappa*, *Terminalia littoralis*, *Thespesia populnea*, *Tournefortia argentea*, and *Vitex trifoliata*.

Species commonly associated as aboriginal introductions in Pacific islands

Beach hibiscus is planted with many Polynesian tree introductions to the Pacific islands, including *Abelmoschus manihot*, *Aleurites moluccana*, *Artocarpus altilis*, *Musa* spp., *Spondias dulcis*, and *Syzygium malaccense*.

Species commonly associated in modern times or as recent Pacific island introduction

The species may be grown with a wide range of exotic tree species and is not exclusively planted or associated with particular exotics, other than those which are also used in live fences, e.g., *Gliricidia sepium*, *Pterocarpus indicus*, and *Cinnamomum* sp.

ENVIRONMENTAL PREFERENCES AND TOLERANCES

Beach hibiscus thrives in coastal habitats, near brackish coastal swamps, along inland watercourses, and along the inner margins of mangroves. It is commonly naturalized in disturbed forest areas, fallow or degraded cultivated lands, grazing lands, and around villages.

Climate

Elevation range

0–800 m (0–2600 ft). It is found inland to 800 m (2600 ft), in cultivation or naturalized after cultivation.

Mean annual rainfall

900–2500 mm (35–100 in)

Rainfall pattern

It favors environments with summer and uniform rainfall patterns.

Dry season duration (consecutive months with <40 mm [1.6 in] rainfall)

0–6 months

Mean annual temperature

12–32°C (54–90°F)

Mean maximum temperature of hottest month

24–41°C (75–106°F)

Mean minimum temperature of coldest month

5–24°C (41–75°F)

Minimum temperature tolerated

0–14°C (32–57°F)

Soils

The tree tolerates a broad range of soil types including various coastal and riverine soils such as coralline sands, skeletal soils on raised limestone terraces, and waterlogged swamp soils of medium to heavy texture. It occurs over a broad pH range, typically from 5 to 8.5, and is tolerant of brackish conditions and shallow flooding for many months.

Soil texture

It can grow in light- to heavy-textured soils (sands, sandy loams, loams, sandy clay loams, sandy clays, clay loams, and clays).

Soil drainage

It grows in soils with free or impeded drainage.

Soil acidity

The tree tolerates acid to alkaline soils (pH 5.0–8.5).

Other

The tree can grow in waterlogged soils, marl, sand, and limestone (Allen 2003).

Tolerances

Drought

Once established, the tree handles drought very well.

Full sun

The tree grows best in full sun.

Shade

It tolerates moderately high levels of shade, up to about 50–75%, but grows much more slowly under shade and has characteristically larger leaves.

Fire

The species has an intermediate tolerance of fire, being killed by severe fire, but is able to regenerate from mild fire damage.

Waterlogging

Beach hibiscus can grow in waterlogged soils, including shallow swamps.

Salt spray

It tolerates ocean spray very well and is often found growing adjacent to the seashore.

Wind

The tree can handle high winds but may suffer high levels of branch breakage during major storms.

Abilities

Regenerate rapidly

The species regenerates very rapidly, especially from branches that bend over to ground level and take root. Such regeneration often occurs from trees partially flattened by cyclones and can quickly lead to almost impenetrable thickets.

Self-prune

Beach hibiscus does not self-prune, instead holding on to its lower, older branches, which contributes to its sprawling, branched habit.

Coppice

It tolerates heavy pruning and regrows well.

Pollard

Pollarding is the pruning back of all branches to a framework on a regular basis (usually every 1–3 years). Beach hibiscus is tolerant of pollarding, which would normally be done when the tree is used as a living fence post.

GROWTH AND DEVELOPMENT

In its early years, beach hibiscus is a very fast growing tree, both from seed and from branch cuttings, the latter of which is the main method of propagation. After about 5–7



Beach hibiscus (far left and near right) growing in near-shore, brackish soils together with red mangrove (*Rhizophora samoensis*, center), 'Upolu, Samoa. PHOTO: C. ELEVITCH

years, height growth slows, and most of the plant's energy is directed to diameter growth (up to about 50 cm [20 in] dbh) and lateral spreading.

Growth rate

Annual growth rate is estimated at 0.75–1.5 m/yr (2.5–5 ft/yr) in height.

Reaction to competition

Beach hibiscus is a highly competitive species and resistant to competition from grasses and other plants, especially if propagated from branch cuttings.

PROPAGATION

Beach hibiscus is easily propagated both from seed and stem or branch cuttings.

Seedlings (after Wilkinson and Elevitch 2004a)

Seed collection

The tree flowers and bears mature fruits throughout the year. Capsules ripen 5–7 weeks after pollination. Capsules should be collected from the tree just prior to turning brown, because at maturity capsules dry, split open, and release most of their seeds. Each capsule contains 5–15 seeds.

Seed processing

Capsules should be air dried in a paper bag or other breathable container to prevent seeds from being lost when the



Mature seed capsule showing exposed seeds. PHOTO: L. THOMSON

capsules split. After a few days, the seeds can easily be removed from capsules by shaking.

Seed storage

Dried seeds of other *Hibiscus* species have lost viability when stored for 2 years in a refrigerator (Allen 2003). Immediate preparation for sowing is therefore recommended.

Seed pretreatment

Seeds are 3–5 mm (0.12–0.2 in) long. They can be scarified by lightly nicking the seed coat with a knife or nail clippers. Other growers report scarifying seeds by rubbing them on 400 grit sandpaper. Others soak the seeds in water to remove any inhibitors and to allow them to fully swell with water (Liyagel 2005).

Growing area

A rain- and wind-protected but sunlit area (such as a cold-frame with translucent film roof) is recommended for germination in trays.

Germination

Seeds can be germinated in trays filled with one part peat to three parts perlite or vermiculite. Warm, moist, and light conditions are beneficial for optimum germination. After the germination and early establishment phase, full sun is used for growing out the individual seedlings in containers. Scarified seeds will begin germinating in 2–4 weeks. Emergents are transplanted once they reach about 5 cm (2 in) in height. When transplanted into their individual containers, they can be mulched with a thin layer of medium-size poultry grit, coarse sand, or fine cinder. Germination is usually around 50%.

Media

Forestry tubes of 150 cm³ (9 in³) or larger volume can be used, as can small polyethylene bags 0.5–5 l (0.5–5 qt) in volume. A well drained medium is recommended such as 1/3 peat moss, 1/3 perlite, and 1/3 vermiculite, amended with a little compost, dolomite lime, gypsum, and a slow-release, balanced-nutrient fertilizer with minor elements.

Approximate size at outplanting

Seedlings are ready to plant out in 5–6 months at a target height of 25 cm (10 in) and stem diameter 10 mm (0.4 in).

Guidelines for outplanting

Seedlings need to be planted into thoroughly weeded and maintained areas, preferably with light to moderate shade to encourage apical dominance and better stem form.

Cuttings (after Wilkinson and Elevitch 2004b)

The most common method of propagation is branch cuttings for living fences. Typically this involves taking cuttings of fairly straight branches sections, about 2–3 m (6.6–10 ft) long. These cuttings are buried to about 1/3 of their length during the rainy season or wet weather.

Collection of propagation material

Cuttings can be collected any time of year. It is best to make a clean cut with a sharp lopper or saw. Remove all leaves. On moist sites, branches may bend down and take root; if desired, cuttings with roots attached can be collect-



Collecting branch cuttings for use in live fences, 'Eua, Tonga. PHOTO: L. THOMSON

ed from such branches. As beach hibiscus is highly variable in form, select cuttings from trees with the desired form for the intended use (e.g., prostrate for soil stabilization or upright for living fence posts).

Cutting characteristics

For direct field outplanting, cutting size is usually 20–45 cm (8–18 in) in length, and 1–3 cm (0.4–1.2 in) in diameter. If plants are to be propagated from cuttings in the nursery, smaller cuttings may be used.

Cutting storage

Cuttings should be planted as soon as possible after collection. If immediate planting is not possible, cuttings should be placed upright in a bucket of water and kept moist and shaded.

Pretreatment

Medium-strength commercial rooting hormones may be applied as a pretreatment, but this is not required. At planting time, the lower 30–40 cm (12–16 in) of the cuttings should be “wounded” using a sharp knife to make several small incisions through the bark to promote side rooting. Without such cuts, roots usually only emerge from the base of the cutting, making for a potentially weak root structure and susceptibility to windthrow.

Growing area

It is usually most efficient and cost-effective to start cuttings directly in the field. However, smaller cuttings can be started in containers in partial shade or full sun, if container-grown plants are desired.

Starting cuttings

Cuttings are buried 1/2 to 2/3 of their length deep into moist soil. Make sure the soil is firm around the base of the cutting, i.e., that there are no air pockets next to the cutting that could inhibit root development.

Performance on typical sites

Survival is 50% or higher when cuttings are started directly in the field.

Other comments on propagation

Removing weeds from the base and rooting zone around cuttings is essential to establishment. A weed barrier such as a sheet of cardboard or other organic material can make weed control around trees easy. If conditions are dry, supplemental water should be supplied once or twice a week until cuttings are established (which should take place within about 4 months). Once established, very little maintenance is required.

DISADVANTAGES

The main disadvantage of beach hibiscus is that it is difficult to manage and to eradicate once it is well established. The tree also reportedly harbors several agricultural insect pests.

Potential for invasiveness

Although rarely considered a pest, it does have a tendency to naturalize when introduced into moist environments. Its usually tangled, sprawling habit with root suckering makes the tree somewhat difficult to remove.

Pests and diseases

The tree has few problems with pests or diseases. Occasional infestations of pink hibiscus mealybug (*Maconellia coccis hirsutus*) and Chinese rose beetle (*Adoretus sinicus*) have been reported in landscape situations.

Host to crop pests/pathogens

Planted near taro (*Colocasia esculenta*), the tree is thought to increase the incidence of infestations of *Pythium* corm rot. In Vanuatu it is reported to be a host plant for a leafhopper (*Myndus taffini*) that spreads a lethal viral disease of coconut known as foliar decay.

AGROFORESTRY/ENVIRONMENTAL PRACTICES

Mulch/organic matter

The species has a noted ability to improve soil organic matter and fertility, most likely through leaf drop and decomposition, which occurs at a moderately fast rate.

Soil stabilization

The long, spreading branches root where they touch the ground, enhancing the tree’s ability to stabilize soil on slopes, along riverbanks, swampy areas, and shores exposed to moderate coastal tides. The tree has also been used to stabilize sand dunes.

Crop shade/overstory

It has limited use as a crop shade. It is difficult to control its spread, and the shade is too heavy for most crop plants.

Alley cropping

Beach hibiscus is difficult to manage in alley cropping systems because frequent maintenance is required in order to restrict its rapid, spreading branching habit.



Left: Trellis stakes of beach hibiscus support pumpkin vines, ‘Upolu, Samoa. Right: Cattle grazing among beach hibiscus trees, ‘Upolu, Samoa. PHOTOS: C. ELEVITCH

Improved fallows

It is commonly cleared to make new garden areas, indicating that it is valued for its improvement of the soil of fallow areas (Thaman and Whistler 1996).

Living fences

A hedge of beach hibiscus planted on 1–2 m (3.3–6.6 ft) centers can be trimmed regularly to form a dense living fence.

Fence posts

As the tree easily grows from cuttings, branches can be started in the field as living fence posts for supporting wire fencing. Such living fence posts are pruned periodically to provide firewood, utility wood, and organic matter for mulch.

Boundary markers

Beach hibiscus is commonly used as a living boundary tree (e.g., in Fiji, Samoa, Solomon Islands, Tonga, and Vanuatu).

Windbreaks

Space permitting, it makes a useful low- to medium-height windbreak.

Host plant trellising

Branch cuttings can be used to support netting for vegetables. The trees are often ringbarked and dead trees used as support for growing yam.

Coastal protection

The tree is well suited for coastal area protection from salt spray and strong winds.

Ornamental

Beach hibiscus makes an interesting ornamental, especially the variegated or purple-tinged selections. Lower branches can be pruned away to provide open space underneath the canopy.

USES AND PRODUCTS

Vegetable

In times of famine, the leaves, bark, and roots have been eaten.

Honey

The plant is reputed to be a good forage plant for bees.

Medicinal

The flowers, roots, and bark have served as herbal medicines. Hawaiians used the slimy sap from the inner bark as a laxative or enema. The flowers were thought to aid in digestion. In Fiji, the leaves are wrapped around limb fractures, and the stem is used as part of a remedy for treating ulcers (Smith 1981).

Beautiful/fragrant flowers

The flowers are fairly showy and produced over a long period. In Hawai‘i and presumably elsewhere the flowers are made into colorful leis.

Timber

The wood can be used for utility timber, although due to its softness and low durability, it is used mainly for light and transient construction.



Left: Making a traditional cricket bat, Savai'i, Samoa. PHOTO: L. THOMSON **Right: Preparing fiber for kava strainers, Apia, Samoa. PHOTO: C. ELEVITCH**

Fuelwood

The wood makes acceptable firewood, especially for slow-smoking of food (Thaman and Whistler 1996). This is an important product in many countries (e.g., Vanuatu).

Craft wood/tools

The wood is moderately soft and porous, with a specific gravity of 0.6. The sapwood is white, while the heartwood is dark greenish-brown. The freshly cut wood has an odor reminiscent of coconut. The wood has been used occasionally for carved and turned bowls, bracelets, and other minor products such as swimming goggles. Carving such items from branches that are mostly sapwood gives the products a marbled appearance from the heartwood inclusions within the white sapwood. Presumably due to its strength combined with light weight, poles are used to make a breadfruit-picking tool in Samoa (Whistler 2000). The wood was also used by Hawaiians for spears for games and for kite sticks.

Canoe/boat/raft making

The wood is durable in seawater and was used by Hawaiians for canoe parts and fishing floats. The bast fiber is used as a canoe calking.

Fiber/weaving/clothing

Hawaiians fashioned the bark into sandals. The inner bark can also be beaten into inferior tapa cloth. A strainer made from the inner bark is used to strain kava (e.g., Fiji, Samoa). The leaves are used as toilet paper.

Rope/cordage/string

The tree is widely used for cordage and rope by braiding together several long strips of inner bark. The number of strips used depends on the strength required. The fiber is also used for such things as foot nooses for coconut palm climbing.

Wrapping/parcelization

The leaves are used to wrap food (especially seafood), as

plates, and to line earthen cooking ovens (Thaman and Whistler 1996).

Body ornamentation/garlands

Hawaiians made the leaves and plentiful flowers into leis. “Grass skirts” used in ceremonial occasions (e.g., in Fiji) and exported from Samoa and other Pacific islands are made from the bark fiber.

Tannin/dye

The leaves were pounded and boiled to make a dye.

Illumination/torches

Rubbing the pointed end of a hardwood stick in a groove in a piece of beach hibiscus wood was a preferred method of making fire in Hawai‘i.

URBAN AND COMMUNITY FORESTRY

Size in an urban environment

Along boundaries, within gullies, and in inaccessible areas such as rocky slopes, beach hibiscus can be allowed to grow to its full size, typically about 6–10 m (20–33 ft) tall with large, spreading side branches. When used as a specimen tree, hedge, or trained onto a trellis, size and shape can be controlled by pruning.

Rate of growth in a landscape

The rate of growth is fast, approximately 0.75–1.5 m (2.5–5 ft) of new growth per year. As trees grow older, increase in height tapers off and side growth continues.

Root system

The root system is classified as invasive, especially due to the tendency to sucker from the root. It is important to keep this plant away from fixed landscape and building



Trees can make a nice canopy in landscaping, but require regular pruning. Right: Hedges can be pruned back periodically to control their size, and leaves regrow quickly. PHOTOS: C. ELEVITCH



Left: A hedge of a variegated clone makes a dense privacy barrier. Right: Form with a purple leaf flush. PHOTOS: C. ELEVITCH

features such as walkways, fences and walls, sewer lines, foundations, and irrigation pipes.

Products commonly used in a Pacific island household

The bark is a ready source of rough cordage and rope. The flowers and leaves are plentiful and can be used in leis. The tree provides an abundant source of firewood.

Light requirements

Beach hibiscus prefers full sun. It does not grow well in shade.

Water/soil requirements

The tree prefers lowland coastal environments, especially along waterways. It can thrive in a wide variety of light- and medium-textured soils with either free or impeded drainage. Once the tree is established, it tolerates drought very well. The tree can tolerate saline conditions and presumably would do well even with brackish irrigation water.

Life span

The life span is estimated to be several decades.

Varieties favored for use in homegardens or public areas

There are a number of white, pink, or purple variegated selections that are favored for ornamental use (see “Known varieties” above).

Seasonality of leaf flush, flowering, fruiting

Beach hibiscus produces new leaves, flowers, and fruit throughout the year.

Exceptional ornamental values

Beach hibiscus has been planted throughout the tropics as an ornamental for its showy flowers and leaves. Highly ornamental forms with variegated leaves are propagated vegetatively.

Use as living fence, hedge, or visual/noise barrier

Beach hibiscus is frequently used in urban environments as a hedge or privacy screen. Regular pruning to maintain appropriate size and a groomed appearance is necessary.

Maintenance requirements

The unruly habit of the tree can be tamed by regular pruning 1–3 times per year into a hedge or specimen tree, or by training the branches on a trellis or pergola. Otherwise, the tree requires little attention once established.

Nuisance issues

The tangled habit of the tree can become a nuisance in public environments and almost always requires pruning along pathways, near structures, etc. The invasive roots can also cause problems in urban landscapes.

Other comments

As one of the most useful trees of the Pacific, planting this tree in urban environments forms a connection to traditional Pacific island cultures.

COMMERCIAL CULTIVATION

The tree is primarily used for its environmental services such as coastal protection and hedges and has little commercial value except in the landscaping industry in certain countries.

PUBLIC ASSISTANCE AND AGROFORESTRY EXTENSION

Extension offices for agroforestry and forestry in the Pacific: <<http://www.traditionaltree.org/extension.html>>.

BIBLIOGRAPHY

(☛ indicates recommended reading)

- Abbott, I.A. 1992. Lā'au Hawai'i—Traditional Hawaiian Uses of Plants. Bishop Museum Press, Honolulu.
- ☛ Allen, J.A. 2002. *Hibiscus tiliaceus*. In: Vozzo, J.A. (ed.). Tropical Tree Seed Manual. Agriculture Handbook 721. USDA Forest Service, Washington, DC.
- CAB International. 2003. Forestry Compendium, 2003 ed. CAB International, Wallingford, UK
- Cambie, R.C., and J. Ash. 1994. Fijian Medicinal Plants. Commonwealth Scientific and Industrial Research Organisation, Clayton, Australia.
- Christensen, B. 1997. Genetic resources to developing new ornamental plants—Exemplified by *Hibiscus tiliaceus* L. in Tahiti. Bachelor's thesis. The Royal Veterinary and Agricultural University, Copenhagen.
- Clark, W.C., and R.R. Thaman (eds.). 1993. Agroforestry in the Pacific Islands: Systems for Sustainability. United Nations University Press, New York.
- Elevitch, C.R., and K.M. Wilkinson (eds.). 2000. Agroforestry Guides for Pacific Islands. Permanent Agriculture Resources, Holualoa, Hawai'i.
- Handy, E.S.C., E.G. Handy, and M.K. Pukui. 1991. Native Planters in Old Hawaii: Their Life, Lore, and Environment, rev. ed. Bishop Museum Press, Honolulu.
- Hawaiian Electric Company. 2001. The Right Tree In The Right Place—Arbor Day in Hawaii 2001. Honolulu.
- Henderson, C.P., and I.R. Hancock. 1988. A Guide to the Useful Plants of Solomon Islands. Solomon Islands Research Department, Ministry of Agriculture and Lands, Honiara, Solomon Islands.
- Krauss, B.H. 1993. Plants in Hawaiian Culture. University of Hawai'i Press, Honolulu.
- ☛ Little, E.L., Jr., and R.G. Skolmen. 1989. Common Forest Trees of Hawaii (Native and Introduced). Agricultural Handbook 679. USDA Forest Service, Washington, DC.
- Liyagel, P. 2005. Propagation protocol for production of container *Hibiscus tiliaceus* L. plants (3 l [1 gal] polybag); Yap Forestry, Yap Islands, Federated States of Micronesia. In: Native Plant Network, University of Idaho, College of Natural Resources, Forest Research Nursery, Moscow, Idaho. <<http://www.nativeplantnetwork.org>>.
- McDonald, M.A., and P.R. Weissich. 2003. Nā Lei Makame—The Treasured Lei. University of Hawai'i Press, Honolulu.
- Mueller-Dombois, D., and F.R. Fosberg. 1998. Vegetation of the Tropical Pacific Islands. Springer, New York.
- Smith, A.C. 1981. Flora Vitiensis Nova: A New Flora of Fiji (Spermatophytes Only). Volume 2. Pacific Tropical Botanical Garden, Lāwa'i, Hawai'i.
- ☛ Staples, G.W., and D.R. Herbst. 2005. A Tropical Garden Flora: Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu.
- Sykes, W.R. 1970. Contributions to the flora of Niue. New Zealand Department of Scientific Industries Research Bulletin 200: 1–321.
- Van Borssum Waalkes, J. 1966. Malesian Malvaceae revisited. Blumea 14: 1.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999. Manual of the Flowering Plants of Hawai'i, rev. ed. University of Hawai'i Press and Bishop Museum Press, Honolulu.
- Wheatley J.I., 1992. A Guide to the Common Trees of Vanuatu. Department of Forestry, Port Vila, Vanuatu.
- Whistler, W.A. 1992. Flowers of the Pacific Island Seashore: A Guide to the Littoral Plants of Hawai'i, Tahiti, Samoa, Tonga, Cook Islands, Fiji, and Micronesia. Isle Botanica, Honolulu.
- White, L.D. 1994. Canoe Plants of Ancient Hawaii. <<http://www.canoeplants.com>>.
- Wilkinson, K.M., and Elevitch, C.R. 2004a. Propagation protocol for production of container *Hibiscus tiliaceus* L. plants. In: Native Plant Network, University of Idaho, College of Natural Resources, Forest Research Nursery, Moscow, Idaho. <<http://www.nativeplantnetwork.org>>.
- Wilkinson, K.M., and Elevitch, C.R. 2004b. Propagation protocol for vegetative production of container *Hibiscus tiliaceus* L. plants. In: Native Plant Network, University of Idaho, College of Natural Resources, Forest Research Nursery, Moscow, Idaho. <<http://www.nativeplantnetwork.org>>.



Species Profiles for Pacific Island Agroforestry (www.traditionaltree.org)

Hibiscus tiliaceus (beach hibiscus)

Authors: Craig R. Elevitch¹ and Lex A.J. Thomson²

1. Permanent Agriculture Resources, PO Box 428, Hōlualoa, HI 96725 USA; Tel: 808-324-4427; Fax: 808-324-4129; E-mail: par@agroforestry.net; Web: <http://www.agroforestry.net>.

2. South Pacific Regional Initiative of Forest Genetic Resources (SPRIG) Project, SPC Forestry Program, Suva, Fiji (current contact info: IPGRI, Via dei Tre Denari 472/a, 00057 Maccarese (Fiumicino), Rome, Italy; E-mail: L.Thomson@cgiar.org).

Acknowledgments: The authors and publisher thank Dale Evans, Eileen Herring, and Diane Ragono for their input.

Recommended citation: Elevitch, C.R. and L.A.J. Thomson. 2006. *Hibiscus tiliaceus* (beach hibiscus), ver. 1.2. In: Elevitch, C.R. (ed.). Species Profiles for Pacific Island Agroforestry. Permanent Agriculture Resources (PAR), Hōlualoa, Hawai'i. <http://www.traditionaltree.org>.

Sponsors: Publication was made possible by generous support of the United States Department of Agriculture Western Region Sustainable Agriculture Research and Education (USDA-WSARE) Program; SPC/GTZ Pacific-German Regional Forestry Project; USDA Natural Resources Conservation Service (USDA NRCS); Kaulunani, an Urban Forestry Program of the DLNR Division of Forestry and Wildlife and the USDA Forest Service; State of Hawai'i Department of Land & Natural Resources Division of Forestry & Wildlife; USDA Forest Service Forest Lands Enhancement Program; and Muriel and Kent Lighter. This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, and Agricultural Experiment Station, Utah State University, under Cooperative Agreement 2002-47001-01327.

Series editor: Craig R. Elevitch

Publisher: Permanent Agriculture Resources (PAR), PO Box 428, Hōlualoa, Hawai'i 96725, USA; Tel: 808-324-4427; Fax: 808-324-4129; E-mail: par@agroforestry.net; Web: <http://www.agroforestry.net>. This institution is an equal opportunity provider.

Reproduction: Copies of this publication can be downloaded from <http://www.traditionaltree.org>. This publication may be reproduced for noncommercial educational purposes only, with credit given to the source. © 2006 Permanent Agriculture Resources. All rights reserved.

