ʻaʻaliʻi

OTHER COMMON NAMES: ʻaʻaliʻi kū makani, ʻaʻaliʻi kū ma kua, kū-makani, hop bush, hopseed bush

SCIENTIFIC NAME: *Dodonaea viscosa*

FAMILY: Sapindaceae (soapberry family)

NATURAL SETTING/LOCATION: indigenous, pantropical species, found on all the main Hawaiian Islands except Kahoʻolawe; grows in a wide range of habitats from dunes at sea level up through leeward and dry forests and to the highest peaks

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

CULTIVARS: female cultivars such as 'Purpurea' and 'Saratoga' have been selected for good fruit color

Growing your own

PROPAGATION

FORM: seeds; semi-hardwood cuttings or air layering for selected color forms

PREPLANTING TREATMENT: step on seed capsule to release small, round, black seeds, or use heavy gloves and rub capsules vigorously between hands; put seeds in water that has been brought to a boil and removed from heat, soak for about 24 hours; if seeds start to swell, sow immediately; discard floating, nonviable seeds; use strong rooting hormone on cuttings

PLANTING DEPTH: sow seeds ¼" deep in medium; insert base of cutting 1–2" into medium

GERMINATION TIME: 2–4 weeks

CUTTING ROOTING TIME: 1½–3 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained is best; tolerant of dry conditions

SOIL PH: 5.5–6.5

LIGHT: full sun

WATER: moderately drought tolerant

TEMPERATURE: tolerates dry heat; temperature 32–90°F

ELEVATION: 10–7700'

SALT TOLERANCE: good (moderate at higher elevations)

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 6–8' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 2-gallon tubs or larger

PRUNING: responds well to pruning; do not cut back into old wood; prune after fruiting period to shape or keep short; can be shaped into a small tree or maintained as a shrub, hedge, or espalier (on a trellis)

SPECIAL CULTURAL HINTS: male and female plants are separate, although bisexual plants can also be found; males produce no seed capsules; if a certain "variety" (i.e., leaf size, capsule color, etc.) is desired, it is probably best to grow from cuttings or air layering; although drought tolerant, it will shed leaves during extreme drought conditions

SUGGESTED COMPANION PLANTINGS: low native shrubs from dry to moist habitats, such as ferns, ʻilima, ʻākia, kupukupu, pōhinahina, ilieʻe, ʻūlei, kuluʻī

ʻaʻaliʻi

Plant characteristics

HEIGHT: 6–24'

SPREAD: 6–15'

GROWTH RATE: moderate to fast

GROWTH HABIT: spreading shrub to small tree

SEED CAPSULES

(flowers are insignificant)

SIZE: ¼–⅝"

COLOR: ranges from white/tan to pink and deep burgundy

SHAPE: 2- to 5-winged

TIME TO FRUITING: fruits produced in 2nd year after outplanting

FOLIAGE

TEXTURE: leathery, shiny

COLOR: native forms have green foliage, cultivars have bronzy green to purplish-red foliage

SHAPE: spatula shaped with blunt or pointed tips

FRAGRANCE: none

PESTS

COMMON DISEASES: mycoplasma-dodonaea yellow disease (virus-like), nematodes, powdery mildew, root rot

OTHER PESTS: ants, aphids, caterpillars, mealybugs, scales, slugs, spider mites

Harvesting considerations

WHAT IS HARVESTED: fruit (winged papery capsules) and leaves

HARVESTING TECHNIQUES: cut plant tips only

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cloth bag or cardboard box

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: store in cardboard box and refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak in water for 5 minutes, drip dry, wrap in 3 sheets of damp newspaper, place in cardboard box or ti leaf pūʻolo (package), and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry; capsules keep their color if kept out of the sun

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ʻākia

OTHER COMMON NAMES: kauhi, Molokaʻi osmanthus

SCIENTIFIC NAME: *Wikstroemia uva-ursi*

FAMILY: Thymelaeaceae (ʻākia family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands; rare to scattered on clay flats, ʻaʻā lava, dry low elevations on Kauaʻi, Oʻahu, Molokaʻi, and Maui

CURRENT STATUS IN THE WILD IN HAWAIʻI: uncommon to rare in the wild; most commonly used in landscaping

CULTIVARS: prostrate and upright forms are available

Growing your own

HANDLING CAUTIONS: ʻākia bark and fruits may be poisonous; sap burns skin and eyes

PROPAGATION

FORM: seeds; semi-hardwood tip cuttings; air layering

PREPLANTING TREATMENT: remove seeds from pulp, soak in water for 24 hours, discard nonviable floating seeds, and start in full sun with 1–2 seeds per container; select semi-mature tip cuttings and treat with medium rooting hormone

PLANTING DEPTH: sow seed ¼–½" deep in medium; insert base of cutting 1–2" into medium

GERMINATION TIME: 1–12 months

CUTTING ROOTING TIME: 7–8 weeks under periodic mist

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5

LIGHT: full sun

WATER: keep dry

TEMPERATURE: 65–90°F

ELEVATION: 10–1500'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: a minimum of 12" apart in rows such that a person can reach middle of plants

ADAPTATION TO GROWING IN CONTAINERS: yes, from 6" pots to large display pots and planter boxes

PRUNING: can be kept shaped but drastic pruning may cause dieback; light heading back may be necessary

SPECIAL CULTURAL HINTS: avoid waterlogged soils; once established, keep on the dry side; not all plants produce fruits; propagate ripe fruits (red ones); plants from seed vary in growth form

SUGGESTED COMPANION PLANTINGS: low native shrubs from dry to moist habitats such as ferns, ʻilima, ʻaʻaliʻi, kupukupu, pōhinahina, ilieʻe, ʻūlei, kului

ʻākia

Plant characteristics

HEIGHT: 2–5'

SPREAD: 2–5'

GROWTH RATE: slow to establish

GROWTH HABIT: dense, spreading or sprawling shrub

FLOWERS

SIZE: to ½"

COLOR: yellow-green

SHAPE: tubular, four-part

FRAGRANCE: yes, resembling honeysuckle

FLOWERS IN FIRST YEAR: no; plants from cuttings will flower faster than seedlings (2–3 years)

FLOWERING PERIOD: year-round

TIME TO FLOWERING: 12–18 months to flowering and 2–3 years to harvestable size

INDUCING AND MAINTAINING FLOWERING: not known; flowering can occur year-round without special treatment if plant is not under stress

FOLIAGE

TEXTURE: waxy

COLOR: pale green; selected forms are dense with blue-green foliage

SHAPE: small, oval, short-stemmed

FRAGRANCE: none

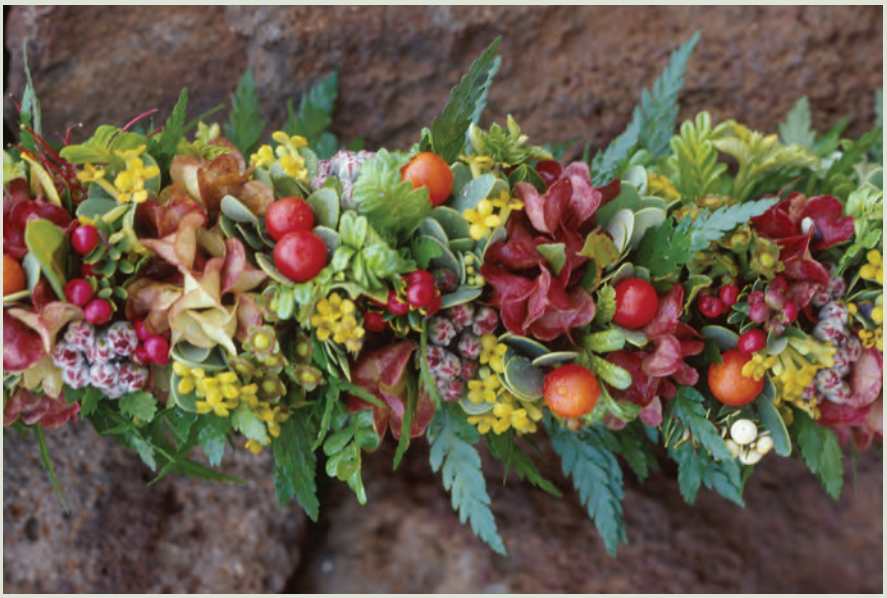
PESTS

COMMON DISEASES: root rot, root-knot nematode

OTHER PESTS: scales, snails, slugs

Harvesting considerations

WHAT IS HARVESTED: branch tips, flowers, fruit



The lei shown also contains ʻaʻaliʻi, pūkiawe, ʻūlei, palapalai, and ʻōhiʻa lehua.

HARVESTING TECHNIQUES: pull and twist or cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: place branch tips and flowers in water for 5 minutes before storing in ti leaf pūʻolo (package) or cardboard box for up to 7 days; place fruit in plastic container and store for up to 14 days; refrigerate at 40°F

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei; if sewing fruit, clip all stems; flowers and fruits can be used together or separately

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry and refrigerate; lei can be stored in ti leaf pūʻolo or cardboard box; fruit can be stored in plastic container

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

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hala

OTHER COMMON NAMES: pandanus, pū hala, screw pine, walking fences

SCIENTIFIC NAME: *Pandanus tectorius*

FAMILY: Pandanaceae (screw pine family)

NATURAL SETTING/LOCATION: indigenous to the Hawaiian Islands; found in the lower forest areas and along the wetter shorelines on all main islands except Kaho‘olawe; also native throughout Polynesia and Oceania

CURRENT STATUS IN THE WILD IN HAWAI‘I: common

CULTIVARS: mostly variegated forms used in landscaping; smooth-leaf variety recommended for ease of harvesting

Growing your own

HANDLING CAUTIONS: most green forms have sharp, saw-toothed leaves

PROPAGATION

FORM: seeds; cuttings (large stem cuttings may be used)

PREPLANTING TREATMENT: separate the fruit segments, soak seeds in water for 24 hours; no rooting hormone needed for cuttings

PLANTING DEPTH: sow seeds on surface; plant base of cutting vertically 3–4" into medium or place cutting into medium at a nearly horizontal angle, leaving the top exposed

GERMINATION TIME: 3–5 months

CUTTING ROOTING TIME: 3 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained best; tolerant of a wide range of soils including coral sands

SOIL PH: 6.5–7.0

LIGHT: full sun

WATER: drought tolerant but thrives in areas where groundwater is present

TEMPERATURE: 60–90°F

ELEVATION: 10–2000'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: heavy

RECOMMENDED SPACING: 20–30' apart in landscape, 4–5' apart if managed for foliage

ADAPTATION TO GROWING IN CONTAINERS: yes, will grow in just about any container, but quickly develops into a large plant

PRUNING: head back (cut back) to keep within picking height; remove yellow and brown leaves

SPECIAL CULTURAL HINTS: male and female flowers are produced on different trees (dioecious); male trees have drooping clusters of very fragrant male flowers called hinano; female trees have compact greenish heads of female flowers that mature into the pineapple-shaped composite fruit

SUGGESTED COMPANION PLANTINGS: ‘ūlei, ‘ākia, ‘ilima, ma‘o, loulu, naupaka kahakai, ‘ōhi‘a lehua, ferns

hala

Plant characteristics

HEIGHT: to 30'

SPREAD: to 20' (wide-branched)

GROWTH RATE: moderate

GROWTH HABIT: open, round-headed tree with stilt-like props

FLOWERS

SIZE: male inflorescence 1' long surrounded by narrow bracts, female flower insignificant

COLOR: white

SHAPE: male flower spikes oblong, female spherical

FRAGRANCE: yes, male flowers

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: male trees flower about every 60 days, female trees flower about 1–3 times per year

TIME TO FLOWERING: ~7 years from seed, 1 year from cutting

FOLIAGE

TEXTURE: leathery, tough, with saw-toothed edges

COLOR: dark green to variegated yellow and green

SHAPE: sword-shaped leaves up to 6' long, prickles on margins and midrib

FRUIT

SIZE: fruit ~8", fruitlets 1–2" long

COLOR: green to yellow, orange, red

SHAPE: fruitlets wedge-shaped

FRAGRANCE: woodsy

PESTS

COMMON DISEASES: none

OTHER PESTS: ants, mealybugs, mosquitoes, rats, scales, whiteflies

Harvesting considerations

WHAT IS HARVESTED: fruits, leaves, male flowers

HARVESTING TECHNIQUES: pull leaves, do not cut; cut fruits; wear gloves

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 1 month for leaves, 3 weeks for fruits, 4 days for flowers

CLEANING OF PLANT MATERIALS: spray flowers and leaves with water; soak fruits in lemon (or lime) water for 5 minutes

STORING RAW LEI MATERIALS: flowers and fruits can be refrigerated at 40°F for up to 7 days, leaves for up to 30 days

PREPARING FOR USE IN LEI: clip flowers and leaves before sewing; break fruitlets from fruit, pierce, and sew

STORING A COMPLETED LEI BEFORE WEARING: mist flowers and leaves with water and store in paper box; place fruits in sealed plastic container or bag without misting; refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

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hinahina

OTHER COMMON NAMES: beach heliotrope, hinahina kūkahakai

SCIENTIFIC NAME: *Heliotropium anomalum* var. *argenteum*

FAMILY: Boraginaceae (borage family)

NATURAL SETTING/LOCATION: shoreline areas; *H. anomalum* is widely distributed throughout Polynesia; *H. anomalum* var. *argenteum* is endemic, occurs in sandy coastal sites on Niʻihau, Kauaʻi, Oʻahu, and Molokaʻi but is apparently rare on Maui and Hawaiʻi

CURRENT STATUS IN THE WILD IN HAWAIʻI: scattered to locally common

Growing your own

PROPAGATION

FORM: seeds; tip or hard stem cuttings 2–3" long

PREPLANTING TREATMENT: no seed treatment needed; no rooting hormone needed for cuttings, but misting helps

PLANTING DEPTH: sow seeds on surface of medium; insert base of cutting 1–2" into medium

GERMINATION TIME: 1–3 months

CUTTING ROOTING TIME: 2–4 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: sandy, porous

SOIL PH: 6.0–7.5

LIGHT: sunny location

WATER: moderate to light

TEMPERATURE: 60–90°F

ELEVATION: 10–900'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 3–5' on center

ADAPTATION TO GROWING IN CONTAINERS: yes, 6–8" plastic pots

PRUNING: will improve appearance, but not required for production purposes

SPECIAL CULTURAL HINTS: keep on well-lit, dry side; too much shade or water makes plant leggy and not as silvery; root rot usually results from overwatering and waterlogged soil

SUGGESTED COMPANION PLANTINGS: native coastal plants such as ʻilima, maʻo, naupaka kahakai, nehe, pōhinahina, ʻākia, hala

hinahina

Plant characteristics

HEIGHT: 6–18"

SPREAD: 3–5'

GROWTH RATE: moderate

GROWTH HABIT: low, mat-like

FOLIAGE

TEXTURE: silky and soft with flat-lying hairs

COLOR: gray green to silver

SHAPE: semi-succulent, sword-shaped; wider near the tip than the base

FRAGRANCE: mild

PESTS

COMMON DISEASES: root rot, nematodes

OTHER PESTS: ants, aphids, mealybugs, thrips

The bottom lei shown also contains ti.

Harvesting considerations

WHAT IS HARVESTED: leaves, flowers

HARVESTING TECHNIQUES: pick carefully or cut

BEST TIME OF DAY TO HARVEST: any time

BEST WAY TO TRANSPORT FROM PICKING AREA: brown paper bag

AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, wilting flowers

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water dip

STORING RAW LEI MATERIALS: wrap in dry newspaper, place in a sealed plastic container, and refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: wrap lei in dry newspaper, place in a sealed plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

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ʻilima

OTHER COMMON NAMES: ʻilima papa

SCIENTIFIC NAME: *Sida fallax*

FAMILY: Malvaceae (mallow family)

NATURAL SETTING/LOCATION: indigenous to Hawaiian Islands and widespread throughout Pacific islands to China; found in coastal areas, arid lava fields, and dry to mesic (medium-wet) forests; the official flower of the City and County of Honolulu

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

CULTIVARS: ʻilima-lei; ʻilima-ku-kula; ʻilima-ku-kahakai (ʻilima papa); ʻilima-koli-kukui

Growing your own

PROPAGATION

FORM: seeds; cuttings

PREPLANTING TREATMENT: soak seeds in water that has been brought to a boil and removed from heat, let sit for about 8–24 hours; use medium rooting hormone on cuttings

PLANTING DEPTH: sow seeds ¼" deep in medium; insert base of cuttings 1–2" into medium

GERMINATION TIME: 1–3 months

CUTTING ROOTING TIME: 1–3 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: to 7.5

LIGHT: sunny location

WATER: dry (beach form) to moderate (upland form)

TEMPERATURE: 60–90°F

ELEVATION: 10–2000'

SALT TOLERANCE: good (moderate for higher elevations)

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 2–4' apart, depending on growth form

ADAPTATION TO GROWING IN CONTAINERS: yes, 1-gallon pots or large planters

PRUNING: head back (cut back) to maintain size and shape and induce more flowering branches, but not too severely; prune dead wood

SPECIAL CULTURAL HINTS: requires good drainage, high sunlight, and minimal fertilization, especially with N; plants grown from seed will have leaf, flower, and habit variations; many variations naturally occur, therefore care should be taken to select the correct type to meet specific needs

SUGGESTED COMPANION PLANTINGS: ʻākia, hinahina, pōhinahina, maʻo

‘ilima

Plant characteristics

HEIGHT: 6"–7'

SPREAD: depends on type; upright 3–6'

GROWTH RATE: fast

GROWTH HABIT: many plant and flower forms; shrub shapes vary from low growing and sprawling to erect, dense to sparse

FLOWERS

SIZE: ¼–¾"

COLOR: yellow-orange, reddish brown

SHAPE: round, cup-shaped; rotate, petals broadly obovate

FRAGRANCE: none

FLOWERS IN FIRST YEAR: yes

FLOWERING PERIOD: year-round

TIME TO FLOWERING: 3–4 months

INDUCING AND MAINTAINING FLOWERING: remove spent flowers

PESTS

COMMON DISEASES: root rot, leaf spot (rust fungus), lesion and reniform nematodes, damping off of seedlings

OTHER PESTS: ants, aphids, scales, slugs, snails (in wet areas), thrips, whiteflies

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUE: pull carefully to avoid bruising

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cardboard box

AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, wilting flowers

The lei shown also contains ti.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle

CLEANING OF PLANT MATERIALS: no water

STORING RAW LEI MATERIALS: wrap in dry tissue paper, place in cardboard box, and refrigerate at 40°F for up to 2 days; no water

PREPARING FOR USE IN LEI: take calyx (green, leafy base) off, then sew; if using calyx and flowers, remove lower leaves, leaving 4 or 5 with flower buds

STORING A COMPLETED LEI BEFORE WEARING: wrap lei in dry tissue paper, place in cardboard box, and refrigerate; no water

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

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kauna‘oa

OTHER COMMON NAMES: kauna‘oa, kauna‘oa kahakai, kauna‘oa lei (endemic); kauna‘oa-pehu (indigenous); western field dodder (introduced); dodder

SCIENTIFIC NAME: *Cuscuta sandwichiana* (endemic); *Cassytha filiformis* (indigenous); *Cuscuta campestris* (introduced)

FAMILY: Cuscutaceae (dodder family) (*Cuscuta*); Lauraceae (laurel family) (*Cassytha*)

NATURAL SETTING/LOCATION: kauna‘oa kahakai is found in coastal areas on all the main Hawaiian Islands; kauna‘oa-pehu is found in lowlands

CURRENT STATUS IN THE WILD IN HAWAI‘I: scattered to locally common

Growing your own

HANDLING CAUTIONS: may irritate eyes

PROPAGATION

FORM: seeds; stem segments placed on plants will attach to and parasitize them

PREPLANTING TREATMENT: remove seeds from pulp and rinse

PLANTING DEPTH: surface-sow seeds

CUTTING ROOTING TIME: plant is rootless

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: sandy or rocky soil, cinders, or tree bark of host plant

LIGHT: full sun

WATER: keep moist

TEMPERATURE: heat tolerant, 75–90°F

ELEVATION: 10–300'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: fertilize host plant; spray parasite with weak foliar formulation

ADAPTATION TO GROWING IN CONTAINERS: can parasitize a container-grown host

PRUNING: break off unwanted growth

SPECIAL CULTURAL HINTS: needs host plant; may kill host plant if left unchecked

SUGGESTED COMPANION PLANTINGS: grows on many native and introduced plants; legumes are good hosts; *C. sandwichiana* may prefer woody shrubs or trees with bushy growth habit, such as noni

kauna‘oa

Plant characteristics

HEIGHT: will layer upon itself up to 4" thick

SPREAD: unlimited

GROWTH RATE: rapid

GROWTH HABIT: parasitic vine

FOLIAGE

TEXTURE: filamentous stems (no leaves)

COLOR: stems slender, yellow to orange, lack chlorophyl

SHAPE: stringy

FRAGRANCE: none

PESTS

COMMON DISEASES: none known; can transmit viruses to host plants

OTHER PESTS: none known

Harvesting considerations

WHAT IS HARVESTED: vines

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: any time

BEST WAY TO TRANSPORT FROM PICKING AREA: brown paper bag

AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, wilting flowers

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak, drip dry

The lei shown also contains maile.

STORING RAW LEI MATERIALS: wrap in dry newspaper, store in plastic container, and refrigerate at 40°F for up to 10 days for *Cassytha filiformis* and 2 days for *Cuscuta sandwichiana*; no water

PREPARING FOR USE IN LEI: remove other plant material that it was growing on; *Cuscuta sandwichiana* tends to be more woody so harder to work with than *Cassytha filiformis*

STORING A COMPLETED LEI BEFORE WEARING: wrap lei in dry newspaper, store in plastic container, and refrigerate. no water

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Ide, Laurie S. 1998. *Hawaiian Lei Making: Step-by-Step Guide*. Honolulu: Mutual Publishing.

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kou

OTHER COMMON NAMES: cordia

SCIENTIFIC NAME: *Cordia subcordata*

FAMILY: Boraginaceae (borage family)

NATURAL SETTING/LOCATION: Polynesian introduction, native of Malaysia; found on Kaua‘i, O‘ahu, Maui, and Hawai‘i

CURRENT STATUS IN THE WILD IN HAWAI‘I: naturalized in a few dry coastal areas; commonly used in landscaping

Growing your own

PROPAGATION

FORM: seeds (almost always seed-propagated); cuttings

PREPLANTING TREATMENT: soak fruits in water for 48 hours; use medium rooting hormone on cuttings

PLANTING DEPTH: sow seeds on surface to ½" deep; plant base of cutting 1–2" into medium

GERMINATION TIME: 20–50 days, ready to plant in the garden in 8 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.0–7.5

LIGHT: full sun

WATER: drought tolerant, tolerates semi-moist conditions

TEMPERATURE: 60–90°F

ELEVATION: 10–2000'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: heavy

RECOMMENDED SPACING: 10–15' apart minimum

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: prune to reduce size and induce lower branches

SPECIAL CULTURAL HINTS: its hardwood is highly valued; may hybridize with geiger tree (*Cordia sebestana*), producing intermediate fruits, foliage, and flowers

SUGGESTED COMPANION PLANTINGS: low-growing plants such as ferns, kupukupu, ‘ilima, ‘ākia, naupaka kahakai, hinahina, and hala

kou

Plant characteristics

HEIGHT: 15–25'

SPREAD: 6–20'

GROWTH RATE: fast

GROWTH HABIT: small, erect, evergreen tree

FLOWERS

SIZE: 1–2" in diameter

COLOR: apricot-orange

SHAPE: funnel-shaped

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: year-round

TIME TO FLOWERING: 2–3 years

INDUCING AND MAINTAINING FLOWERING: flowers throughout the period of vegetative growth

PESTS

COMMON DISEASES: none serious

OTHER PESTS: kou was once very common along the shorelines of Hawai‘i; it became very rare in the late 1800s due to the impact of introduced pests such as the kou leafworm (*Ethmia nigroapicella*); isolated trees can be seriously defoliated by this caterpillar, especially along windy coastal areas; seed-attacking weevils can also be a problem

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: pick flowers that have fallen to the ground

BEST TIME OF DAY TO HARVEST: morning, when flowers have freshly fallen

The lei shown also contains kauna‘oa.

BEST WAY TO TRANSPORT FROM PICKING AREA: brown paper bag or cooler

AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, and wilting flowers

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle

CLEANING OF PLANT MATERIALS: no water

STORING RAW LEI MATERIALS: place in cardboard container and refrigerate at 40°F for up to 2 days; no water

PREPARING FOR USE IN LEI: choose flowers that are fully open

STORING A COMPLETED LEI BEFORE WEARING: wrap lei in tissue paper, place in cardboard container, and refrigerate; no water

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Borchert, Rolf. 1986. “Cordia.” In: *CRC Handbook of Flowering*. vol. V, edited by A. H. Halevy, p. 76–83. Boca Raton, Florida: CRC Press.

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kukui

OTHER COMMON NAMES: candlenut tree (the official state tree of Hawai‘i and flower of Moloka‘i)

SCIENTIFIC NAME: *Aleurites moluccana*

FAMILY: Euphorbiaceae (spurge family)

NATURAL SETTING/LOCATION: native to Malaysia; Polynesian introduction, widespread on all main Hawaiian Islands except Kaho‘olawe

CURRENT STATUS IN THE WILD IN HAWAI‘I: common in mesic (medium-wet) valleys

CULTIVARS: many plant types, varying in seed and leaf type and shape and tree size

Growing your own

HANDLING CAUTIONS: sap may cause irritation

PROPAGATION

FORM: seeds; volunteer seedlings can easily be transplanted

PREPLANTING TREATMENT: scarify seed (scratch seedcoat with file), soak in water for 24 hours

PLANTING DEPTH: sow 1" deep in medium

GERMINATION TIME: 1 month

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 5.0–7.5

LIGHT: semi-shady to full sun

WATER: keep moist

TEMPERATURE: 50–90°F

ELEVATION: 10–2000'

SALT TOLERANCE: good (moderate at higher elevations)

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: heavy

RECOMMENDED SPACING: 25–30' apart

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: prune to reduce size; tree will naturally shed lower branches while growing, most likely in response to shading

SPECIAL CULTURAL HINTS: allow plenty of space between plants; extra maintenance required during season when abundant fruits drop

SUGGESTED COMPANION PLANTINGS: plant shade-loving species underneath (palapalai and maile)

kukui

Plant characteristics

HEIGHT: 30–60'

SPREAD: to 25'

GROWTH RATE: moderate to fast

GROWTH HABIT: tree with round canopy

FLOWERS

SIZE: clusters to 10"

COLOR: white

SHAPE: tubular in clusters

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: seasonal to year-round

TIME TO FLOWERING: 3–4 years

FOLIAGE

TEXTURE: smooth on top, fuzzy underneath, and covered with whitish down

COLOR: pale green to green

SHAPE: variable, broadly pointed to narrow, maple-leaf shaped

FRAGRANCE: none

PESTS

COMMON DISEASES: fungal leaf spots and root-knot nematodes

OTHER PESTS: ants, mealybugs, scales

Harvesting considerations

WHAT IS HARVESTED: flowers and leaves with 1–2" stem (seeds also are used in lei, but this is not covered here)

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic bag or container

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 3 days for flowers, 7 days for leaves

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: place leaves on a damp paper towel and store in a plastic container; pick partially open flowers, soak in water for 5 minutes, wrap in paper towels, and place in sealed plastic container; refrigerate at 40°F, 7–14 days

PREPARING FOR USE IN LEI: choose small leaves and buds

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water, drip dry, wrap in damp newspaper, place in cardboard or plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

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kuluʻī

OTHER COMMON NAMES: none

SCIENTIFIC NAME: *Nototrichium sandwicense*

FAMILY: Amaranthaceae (amaranth family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands; found in dry forest and lava fields on all main islands; rare on Oʻahu

CURRENT STATUS IN THE WILD IN HAWAIʻI: scattered to sometimes common

CULTIVARS: there is typically only one cultivar found in nurseries, but over 20 varieties have been described

Growing your own

PROPAGATION

FORM: seeds; cuttings 4–6" long are generally easier and faster than seeds

PREPLANTING TREATMENT: treat cutting with medium rooting hormone

PLANTING DEPTH: sow seeds on surface or slightly (¼") below; plant base of cutting 1–2" deep in medium (perlite and vermiculite)

GERMINATION TIME: 1–3 months

CUTTING ROOTING TIME: 2–4 weeks, 2–3 weeks with rooting hormone under mist

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, rocky

SOIL PH: 6.5–7.0

LIGHT: from shade to sunny location (depends on biotype)

WATER: keep dry, tolerates moisture

TEMPERATURE: 50–90°F

ELEVATION: 10–2500' or more

SALT TOLERANCE: moderate to poor

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 5–6' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, plastic pots or large planters

PRUNING: older plants may become straggly; prune to manage size and shape and stimulate vigorous new shoots

SPECIAL CULTURAL HINTS: additional careful fertilizing will create larger leaves and longer petioles

SUGGESTED COMPANION PLANTINGS: ʻākia, maʻo

kuluʻī

Plant characteristics

HEIGHT: 3–15'

SPREAD: 5–10'

GROWTH RATE: moderate

GROWTH HABIT: spreading, multi-stemmed shrub to small tree

FLOWERS

SIZE: spikes ½–3" long (to 5"), ⅛–¼" diameter

COLOR: white

SHAPE: spikes with many flowers

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: summer

TIME TO FLOWERING: 2 years

FOLIAGE

TEXTURE: densely hairy

COLOR: silvery to green

SHAPE: elliptic to lance-shaped

FRAGRANCE: none

PESTS

COMMON DISEASES: root rot

OTHER PESTS: ants, mealybugs, scales

Harvesting considerations

WHAT IS HARVESTED: leaves, flower spikes

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: brown paper bag

The lei shown also contains ʻaʻaliʻi, ʻōhiʻa lehua, palaʻā, and cup-and-saucer plant.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak in water for 5 minutes, drip dry, wrap in dry newspaper, and refrigerate in paper box at 40°F for up to 10 days

PREPARING FOR USE IN LEI: clip off the wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water, drip dry, place in paper box, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

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kupukupu / sword fern

OTHER COMMON NAMES: ʻōkupukupu, niʻaniʻau

SCIENTIFIC NAME: *Nephrolepis cordifolia*

FAMILY: Nephrolepidaceae (sword fern family)

NATURAL SETTING/LOCATION: tropics; indigenous to Hawaiian Islands in dry to wet forests and lava fields

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

Growing your own

PROPAGATION

FORM: divisions; spores; tissue culture

PREPLANTING TREATMENT: remove old leaves and bulbs from division

PLANTING DEPTH: sow spores on surface; with divisions, keep root crown just below soil level

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: moist, well drained; tolerates a range of soil and climatic conditions but generally likes cool, moist, shady locations; can grow in the soil or on lava, tree trunks, or hāpuʻu

SOIL PH: 5.5–6.5

LIGHT: full sun to partial shade

WATER: keep moist, tolerates occasional drought

TEMPERATURE: 40–90°F

ELEVATION: 10–4000'

SALT TOLERANCE: poor

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: light; supplemental N may be beneficial

RECOMMENDED SPACING: 8–12" on center

ADAPTATION TO GROWING IN CONTAINERS: yes, 5-gallon tubs

SPECIAL CULTURAL HINTS: remove old fronds

SUGGESTED COMPANION PLANTINGS: ʻōhiʻa lehua, koa, wiliwili

kupukupu / sword fern

Plant characteristics

HEIGHT: 24"

SPREAD: 24–36"; may spread indefinitely

GROWTH RATE: slow to establish, then moderate

GROWTH HABIT: upright fern, spreading groundcover

FOLIAGE

TEXTURE: stiff

COLOR: yellowish green to dark green, glossy

SHAPE: pinnately (once) divided and sword-shaped

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: ants, mealybugs, scales, slugs

Harvesting considerations

WHAT IS HARVESTED: fronds

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cloth bag

The lei shown also contains kulu‘ī.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 5–7 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: wrap in several sheets of wet newspaper and store in plastic container in refrigerator at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off the wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water for 5 minutes, shake off excess water, wrap in wet newspaper, place in plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

Bornhorst, Heidi L. 1996. *Growing Native Hawaiian Plants: A How-to Guide for the Gardener*. Honolulu: Bess Press.

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ma‘o

OTHER COMMON NAMES: Hawaiian cotton, huluhulu

SCIENTIFIC NAME: *Gossypium tomentosum*

FAMILY: Malvaceae (mallow family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands; found in arid, rocky, or clay coastal plains on all main islands except Hawai‘i

CURRENT STATUS IN THE WILD IN HAWAI‘I: uncommon to rare; most commonly used in landscaping

Growing your own

PROPAGATION

FORM: seeds; cuttings 6–7" long, ¼" diameter

PREPLANTING TREATMENT: remove seeds from lint; scarify seeds by scratching the seedcoat, or put them in water that has been brought to a boil and removed from heat, and soak for 24 hours; use medium rooting hormone on cuttings

PLANTING DEPTH: sow seeds ¼–½" deep in medium; insert base of cutting 1–2” into medium

GERMINATION TIME: 2 weeks or longer

CUTTING ROOTING TIME: 1–2 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5–7.5

LIGHT: full sun

WATER: keep dry

TEMPERATURE: 60–90°F

ELEVATION: 10–400'

SALT TOLERANCE: moderate to good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium; do not overfertilize with N

RECOMMENDED SPACING: 6–10' in rows

ADAPTATION TO GROWING IN CONTAINERS: yes, 2- to 5-gallon tubs, but grows better in the ground

PRUNING: plants may become straggly, therefore prune to manage size and shape and stimulate vigorous new shoots

SPECIAL CULTURAL HINTS: avoid waterlogged soils

SUGGESTED COMPANION PLANTINGS: kulu‘ī, ‘ilima, other dry-forest or coastal scrubland plants

ma‘o

Plant characteristics

HEIGHT: 2–5'

SPREAD: 5–7'

GROWTH RATE: moderate

GROWTH HABIT: sprawling shrub

FLOWERS

SIZE: 2–3" diameter

COLOR: bright yellow

SHAPE: cup-shaped

FRAGRANCE: none

FLOWERS IN FIRST YEAR: from cutting, yes; from seed, no

FLOWERING PERIOD: summer

TIME TO FLOWERING: 1–2 years (depending on culture)

INDUCING AND MAINTAINING FLOWERING: not known

FOLIAGE

TEXTURE: smooth to slight fuzz

COLOR: silvery-green to gray-green

SHAPE: deeply lobed leaves are wider than they are long

FRAGRANCE: none

PESTS

COMMON DISEASES: root rot, leaf spots, root-knot nematodes

OTHER PESTS: ants, aphids, mealybugs, rose beetle, whitefly, scales

Harvesting considerations

WHAT IS HARVESTED: leaves and flowers

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cloth bag

The lei shown also contains kupukupu.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak, except flowers, which need no water

STORING RAW LEI MATERIALS: refrigerate at 40°F for up to 10 days (leaves), 2 days (flowers)

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei; also remove calyx (green, leafy base) from bud being sewn

STORING A COMPLETED LEI BEFORE WEARING: soak leaves, drip dry, and refrigerate in plastic container; place flowers dry in sealed plastic container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry leaves; flowers cannot be preserved

References and further reading

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maile

OTHER COMMON NAMES: none

SCIENTIFIC NAME: *Alyxia oliviformis*

FAMILY: Apocynaceae (dogbane family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands; found in most vegetation zones on all main islands except Niʻihau and Kahoʻolawe

CURRENT STATUS IN THE WILD IN HAWAIʻI: occasional to common

Growing your own

HANDLING CAUTIONS: milky, sticky sap may cause allergic reaction, stain clothes

PROPAGATION

FORM: fresh seeds; hardwood cuttings 3" long with at least one node

PREPLANTING TREATMENT: remove seeds from pulp, soak in water for 12 hours or refrigerate in water for 3 days; use medium rooting hormone on cuttings

PLANTING DEPTH: sow seeds ¼–½" deep in medium; insert base of cutting 1–2" into medium, keeping node beneath surface of medium

GERMINATION TIME: 1–3 months

CUTTING ROOTING TIME: 8 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5–7.5

LIGHT: shade

WATER: keep moist

TEMPERATURE: 40–90°F

ELEVATION: 10–6000'

SALT TOLERANCE: poor

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 2–3' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 5-gallon tubs or larger

PRUNING: not necessary

SPECIAL CULTURAL HINTS: may be cultivated on arbor, trellis, or other support; can grow in lowlands if care is taken to provide shade

SUGGESTED COMPANION PLANTINGS: tree for climbing

maile

Plant characteristics

HEIGHT: to 15'

SPREAD: 6–8'

GROWTH RATE: moderate

GROWTH HABIT: vine to shrub; extremely variable, depending on variety

FOLIAGE

TEXTURE: glossy

COLOR: dark green

SHAPE: variable, sword-shaped to oval

FRAGRANCE: yes

PESTS

COMMON DISEASES: fungal leaf spots, rust spots, root-knot nematodes, damping off (seedlings)

OTHER PESTS: ants, aphids, scales

Harvesting considerations

WHAT IS HARVESTED: leaves with pliable bark of young stems

HARVESTING TECHNIQUES: ʻuʻu—strip the bark from the woody stem

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic bag

AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, and wilting flowers

The lei shown also contains kukui.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: quick cold water dip

STORING RAW LEI MATERIALS: soak, drip dry, place leaves and skin of young stems in plastic container, refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: if hīpuʻu (tying together in the knotted pattern), strip bark and leaves from woody stem close to tip, then tie

STORING A COMPLETED LEI BEFORE WEARING: mist lei, shake excess water off, then place in plastic bag or container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

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māmane

OTHER COMMON NAMES: mamani

SCIENTIFIC NAME: *Sophora chrysophylla*

FAMILY: Fabaceae (pea family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands, scattered in dry shrublands and forests to mesic (medium-wet) forests; dominant element of vegetation in the high peaks of east Maui and Hawai‘i; not found on Ni‘ihau and Kaho‘olawe; rare on O‘ahu

CURRENT STATUS IN THE WILD IN HAWAI‘I: rare to common

Growing your own

PROPAGATION

FORM: seeds

PREPLANTING TREATMENT: scarify seeds by scraping seedcoat or soak in water for 24 hours or until swelling occurs

PLANTING DEPTH: sow ¼–½" deep in medium

GERMINATION TIME: 2–14 weeks; if no preplanting treatment, can take 1–6 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.0–6.5

LIGHT: full sun

WATER: keep dry

TEMPERATURE: 40–80°F

ELEVATION: 500–8000'

SALT TOLERANCE: poor

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 3–5' (shrubs), 10–15' (trees)

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: not necessary

SPECIAL CULTURAL HINTS: propagate from seeds collected at elevation similar to the one where plant materials will be grown; numerous varieties and subspecies have been proposed; because there are island-specific varieties, it would be prudent not to grow different island stock without consideration of potential genetic effects (e.g., inadvertently crossing Hawai‘i stock with Maui stock)

SUGGESTED COMPANION PLANTINGS: low-growing plants, ground cover

māmane

Plant characteristics

HEIGHT: to 45'

SPREAD: 3–20'

GROWTH RATE: slow

GROWTH HABIT: shrub to medium tree, depending on seed source and growing conditions

FLOWERS

SIZE: ¼–1" long, ⅓–¾" wide

COLOR: yellow or pale yellow

SHAPE: pea-flower shape, borne in small clusters

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: spring, summer

TIME TO FLOWERING: 2–5 years

INDUCING AND MAINTAINING FLOWERING: not known

PESTS

COMMON DISEASES: none

OTHER PESTS: ants, spider mites, thrips, Chinese rose beetle

Harvesting considerations

WHAT IS HARVESTED: flowers with 1–2" of stem

HARVESTING TECHNIQUES: snap

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic container

The lei shown also contains yarrow and protea.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: place stems in water after picking, then place in sealed plastic container and refrigerate at 40°F for up to 3 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: optional to soak and drip dry before placing lei on damp newspaper or paper towel in a sealed plastic container and refrigerating

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

Culliney, John L., and Bruce P. Koebele. 1999. *A Native Hawaiian Garden: How to Grow and Care for Island Plants*. Honolulu: University of Hawai'i Press.

Degener, O. 1973. *Plants of Hawaii National Parks Illustrative of Plants and Customs of the South Seas*. Ann Arbor, Michigan: Braun-Brumfield, Inc.

Little, Elbert L., Jr., and Roger G. Skolmen. 1989. *Common Forest Trees of Hawai'i (Native and Introduced)*. Agriculture Handbook No. 679. Washingtron, D.C.: U.S. Department of Agriculture, Forest Service.

Scowcroft, Paul G. 1978. "Germination of *Sophora Chrysophylla* Increased by Presowing Treatment." Research Note PSW–327. Berkeley, California: Pacific Southwest Forest and Range Experiment Station, Forest Service, United States Department of Agriculture.

Wagner, Warren L., Derral R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i*. 2 vols. Bishop Museum Special Publication 83. Honolulu: University of Hawai'i Press and Bishop Museum Press.

moa

OTHER COMMON NAMES: whisk fern

SCIENTIFIC NAME: *Psilotum nudum*

FAMILY: Psilotaceae (whisk fern family)

NATURAL SETTING/LOCATION: indigenous to Hawaiian Islands, found in moderately dry to wet environments in rock crevices, on trees, and on the ground

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

Growing your own

PROPAGATION

FORM: spores or divisions

PREPLANTING TREATMENT: sow spores as soon as they are ripe; to tell if they are ripe, place a frond in a paper bag and hang it for 24 hours; the spores that fall to the bottom of the bag are ready for sowing; keep moist or use vermiculite and peat covered with moist paper towel to germinate spores

PLANTING DEPTH: surface-sow spores on black cinder or hāpuʻu; keep root crown of division just below soil level

SPORE GERMINATION TIME: 3–6 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, moist, rocky soil, or on hāpuʻu trunks

SOIL PH: 6.0–7.5

LIGHT: full sun to shade

WATER: keep moist

TEMPERATURE: 60–90°F

ELEVATION: 10–4000'

SALT TOLERANCE: poor

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 6" apart

ADAPTATION TO GROWING IN CONTAINERS: yes, pots with (or without) other plants, hāpuʻu trunks, or rocks

PRUNING: remove older, dead stems

SPECIAL CULTURAL HINTS: keep divisions in moist shade for first 2 weeks; greener and more lush in humid areas and at specific times of year

SUGGESTED COMPANION PLANTINGS: trees and hāpuʻu

moa

Plant characteristics

HEIGHT: to 24"

SPREAD: clumps up to 24"

GROWTH RATE: moderate

GROWTH HABIT: clusters of slender, erect, bright green stalks

FOLIAGE

(no leaves; "naked," bright green, branching stems)

TEXTURE: coarse

COLOR: green to yellow-orange

SHAPE: thin branches

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: none known

The top lei shown also contains bougainvillea, palapalai, and dusty miller. The bottom lei shown also contains palapalai.

Harvesting considerations

WHAT IS HARVESTED: branches (stems)

HARVESTING TECHNIQUES: cut, don't pull

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 7–14 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak stems in water for 5 minutes, drip dry, wrap in damp paper towel and store in a sealed plastic container, refrigerate at 40°F for up to 30 days

PREPARING FOR USE IN LEI: clip off the wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water for 5 minutes, drip dry, wrap in damp paper towel, store in a sealed plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Neal, Marie C. 1965. *In Gardens of Hawaii*. Bernice P. Bishop Museum Special Publication 50. Honolulu: Bishop Museum Press.

Valier, Kathy. 1995. *Ferns of Hawai'i*. Honolulu: University of Hawai'i Press.

ʻōhiʻa lehua

OTHER COMMON NAMES: lehua, ʻōhiʻa

SCIENTIFIC NAME: *Metrosideros polymorpha*

FAMILY: Myrtaceae (myrtle family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands in a wide range of habitats: lava fields, dry to wet forests, and bogs; found on all islands except Niʻihau and Kahoʻolawe

CURRENT STATUS IN THE WILD IN HAWAIʻI: common in the rainforest

CULTIVARS: many plant forms (polymorphic); also, other species can be used, such as *M. tremaloides*, *M. macropus*, *M. rugosa*

Growing your own

PROPAGATION

FORM: seeds, cuttings, or air layering (varies in ability to be propagated by cuttings; some types are harder to root than others)

PREPLANTING TREATMENT: seeds will keep if refrigerated, but fresh ones are best; no seed treatment needed; use medium or strong rooting hormone on cuttings

PLANTING DEPTH: scatter seeds on surface and cover with ¼" of medium; insert base of cutting 1–2" into medium

GERMINATION TIME: 1 week to 3 months

CUTTING ROOTING TIME: 2–4 months, or 4–6 weeks with rooting hormone under mist); air layers take 3–7 months to root, but using 3% IBA on girdled area wrapped with sphagnum moss will produce roots in about 2 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5–7.5 (slightly acid)

LIGHT: sunny location

WATER: keep moist but well drained; do not allow to completely dry out

TEMPERATURE: 40–90°F

ELEVATION: 100–7000'

SALT TOLERANCE: poor (slight tolerance in coastal varieties); plant its relative pohutukawa instead in low-elevation saline conditions

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: depends on type, generally 5' apart or more

ADAPTATION TO GROWING IN CONTAINERS: yes, 2- to 3-gallon plastic tubs

PRUNING: prune to reduce size, induce lower branches, and stimulate vigorous new shoots; prune after flowering

SPECIAL CULTURAL HINTS: young seedlings are very sensitive to transplanting; keep root disturbance to a minimum; best germination is in 50% shade; plant in fields when 1½–2 years old; fuzzy-leaf variety resists Chinese rose beetle; plants grown from seed vary in leaf size and shape, flower color, etc.; some growers plant seeds on hāpuʻu log

SUGGESTED COMPANION PLANTINGS: low-growing plants such as maile, palapalai, ferns

ʻōhiʻa lehua

Plant characteristics

HEIGHT: 3–80'

SPREAD: 10–30'

GROWTH RATE: slow

GROWTH HABIT: low shrub to tall tree

FLOWERS

SIZE: 1–2" clusters

COLOR: red, yellow, salmon, pink

SHAPE: pom-pom

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: year-round

TIME TO FLOWERING: takes 4–5 years to flower from seed; flowers faster from air layer and cutting

FOLIAGE

TEXTURE: extremely variable, from smooth and waxy to fuzzy

COLOR: reddish-gray to shiny green, silvery underneath, dull green to bright green

SHAPE: simple, oval to ovate

FRAGRANCE: none

PESTS

COMMON DISEASES: root rot, collar rot, leafspots, nematodes, damping off (seedling), rapid ʻōhiʻa death

OTHER PESTS: ants, aphids, mealybugs, scales, twig borer, two-spotted leafhopper, ambrosia beetle

Harvesting considerations

WHAT IS HARVESTED: young leaves at tips (liko), flowers, buds, seed pods

HARVESTING TECHNIQUES: cut

The lei shown also contains ʻaʻaliʻi, moa, pūkiawe, and wāwaeʻiole.

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 2 days for flowers; 14 days for leaves and seed pods

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak flowers for 5 minutes and place face up in paper box or sealed plastic container; refrigerate at 40°F for up to 7 days; green liko can be placed in plastic container or paper box; red liko needs to be in paper box; seed pod can be placed in plastic or paper container; refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water, drip dry, wrap in wet newspaper, place in paper box, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Bornhorst, Heidi L. 1996. *Growing Native Hawaiian Plants: A How-to Guide for the Gardener*. Honolulu: Bess Press.

Degener, O. 1973. *Plants of Hawaii National Parks Illustrative of Plants and Customs of the South Seas*. Ann Arbor, Michigan: Braun-Brumfield, Inc.

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Rauch, Fred D., and David Hensley. 1997. "Ohia lehua." University of Hawai'i, CTAHR, OF-11.

Rauch, F.D., K. Ninno and J. McEwen. 1997. "Vegetative Propagation of Yellow Ohia Lehua." University of Hawai'i, CTAHR, Horticulture Research Note HRN-3. <http://www2.ctahr.hawaii.edu/freepubs>.

Wagner, Warren L., Derral R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i*. 2 vols. Bishop Museum Special Publication 83. Honolulu: University of Hawai'i Press and Bishop Museum Press.

pa‘iniu

OTHER COMMON NAMES: astelia, kaluaha

SCIENTIFIC NAME: *Astelia menziesiana*

FAMILY: Liliaceae (lily family)

NATURAL SETTING/LOCATION: endemic to Hawaiian Islands in moist to wet forests and bogs on all main islands except Ni‘ihau and Kaho‘olawe; epiphytic or terrestrial

CURRENT STATUS IN THE WILD IN HAWAI‘I: common (rare on O‘ahu)

Growing your own

PROPAGATION

FORM: seeds, division

PREPLANTING TREATMENT: remove seeds from pulp, put in water that has been brought to a boil and removed from heat, let soak for about 24 hours

PLANTING DEPTH: sow seeds ¼" deep in medium; for divisions, keep root crown just below soil level

GERMINATION TIME: 3–5 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, potting soil, orchid mix, or hāpu‘u

SOIL PH: epiphytic; terrestrial forms grow in bog conditions; preferred soil pH is not known, but likely acidic

LIGHT: part to full shade

WATER: keep moist

TEMPERATURE: 40–50°F

ELEVATION: 2000–5000'

SALT TOLERANCE: poor

WIND RESISTANCE: poor

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 2–3' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 5-gallon tubs

PRUNING: not necessary

SPECIAL CULTURAL HINTS: treat like an epiphytic orchid or bromeliad; male and female flowers occur on separate plants

SUGGESTED COMPANION PLANTINGS: hāpu‘u

pa‘iniu

Plant characteristics

HEIGHT: to 36"

SPREAD: to 36"

GROWTH RATE: slow to moderate

GROWTH HABIT: herbaceous, succulent

FOLIAGE

TEXTURE: waxy on top, sometimes fuzzy underneath

COLOR: green on top, sometimes white, golden, or silver underneath

SHAPE: long and tapered

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: mealybugs, spider mites

Harvesting considerations

WHAT IS HARVESTED: leaves

HARVESTING TECHNIQUES: cut the bottom leaves and leave the top ones

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

The lei shown also contains pūkiawe, ‘ōhi‘a lehua, wāwae‘iole, and palapalai.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 7 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: refrigerate at 40°F for up to 14 days or longer

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei in water for 5 minutes, drip dry, wrap in damp newspaper, place in any type of container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Bornhorst, Heidi L. 1998. “Hawai‘i Gardens: *Pa‘iniu* Grows Nicely in Home Gardens.” *The Honolulu Advertiser*, Sunday, 31 May 1998, D3.

Stone, Charles P., and Linda W. Pratt. 1994. *Hawai‘i’s Plants and Animals: Biological Sketches of Hawaii Volcanoes National Park*. Honolulu: Hawaii Natural History Association and University of Hawai‘i Press.

Wagner, Warren L., Derral R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai‘i*. 2 vols. Bishop Museum Special Publication 83. Honolulu: University of Hawai‘i Press and Bishop Museum Press.

palaʻā

OTHER COMMON NAMES: lace fern, palae, palapalaʻā

SCIENTIFIC NAME: *Sphenomeris chinensis*

FAMILY: Lindsaeaceae (lace fern family)

NATURAL SETTING/LOCATION: indigenous to tropics, subtropics, and Hawaiian Islands, where it is likely to be found in road cuts and clearings on all main islands

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

Growing your own

PROPAGATION

FORM: division

PREPLANTING TREATMENT: remove old leaves

PLANTING DEPTH: keep root crown just below soil level

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.0–7.0

LIGHT: can be grown in sun, but prefers shady areas

WATER: keep moist, tolerates some drought

TEMPERATURE: 60–90°F

ELEVATION: 10–4000'

SALT TOLERANCE: poor

WIND RESISTANCE: poor

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 1–2' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 5-gallon tubs

PRUNING: remove dead fronds

SPECIAL CULTURAL HINTS: plant close together to keep weeds out

SUGGESTED COMPANION PLANTINGS: other forest plants that provide shade

palaʻā

Plant characteristics

HEIGHT: 3–4'

SPREAD: 3–4'

GROWTH RATE: fast

GROWTH HABIT: fern, groundcover

FOLIAGE

TEXTURE: smooth

COLOR: green

SHAPE: pointed lacy fronds

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: caterpillars, scales

Harvesting considerations

WHAT IS HARVESTED: mature fronds (fully expanded)

HARVESTING TECHNIQUES: cut, don't pull

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

The lei shown also contains ʻōhiʻa lehua, wāwaeʻiole, and kuluʻī.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 5 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: place in sealed plastic container and refrigerate at 40°F for up to 30 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry, wrap in damp newspaper, place in sealed plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

Bornhorst, Heidi L. 1996. *Growing Native Hawaiian Plants: A How-to Guide for the Gardener*. Honolulu: Bess Press.

Hoshizaki, Barbara J. 1976. *Fern Growers Manual*. New York: Alfred A. Knopf.

Neal, Marie C. 1965. *In Gardens of Hawaii*. Bernice P. Bishop Museum Special Publication 50. Honolulu: Bishop Museum Press.

Valier, Kathy. 1995. *Ferns of Hawaiʻi*. Honolulu: University of Hawaiʻi Press.

palapalai

OTHER COMMON NAMES: palai

SCIENTIFIC NAME: *Microlepia strigosa*

FAMILY: Dennstaedtiaceae (dicksoniaceae family)

NATURAL SETTING/LOCATION: indigenous to the Hawaiian Islands in the understory of rain forests on all main islands; also native to India, Malaysia, Taiwan, Japan, and South Pacific islands

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

Growing your own

PROPAGATION

FORM: division of clumps

PREPLANTING TREATMENT: remove old foliage

PLANTING DEPTH: keep root crown just below soil level

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5–7.5

LIGHT: can be grown in sun, but prefers shady areas

WATER: keep moist

TEMPERATURE: 40–90°F

ELEVATION: 750–6000'

SALT TOLERANCE: poor

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 2–4' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 5-gallon tubs

PRUNING: remove dead fronds

SPECIAL CULTURAL HINTS: plant close together to keep weeds out; fronds resemble those of the leatherleaf fern

SUGGESTED COMPANION PLANTINGS: other forest plants that provide shade

palapalai

Plant characteristics

HEIGHT: 2–5'

SPREAD: fronds grow to almost 5' long

GROWTH RATE: moderate to fast

GROWTH HABIT: clumping, trunkless fern

FOLIAGE

TEXTURE: delicate hairy fronds

COLOR: light green to dark green, depending on maturity

SHAPE: pointed, lacy fronds

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: none known

Harvesting considerations

WHAT IS HARVESTED: fronds

HARVESTING TECHNIQUES: cut, don't pull the mature fronds

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 5 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak for 5 minutes, drip dry; either place whole fronds between paper in sealed plastic container or break fronds down, wrap in newspaper, then place in sealed plastic container and refrigerate at 40°F for up to 30 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry, store in sheets of damp newspaper, place in sealed container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

Bornhorst, Heidi L. 1996. *Growing Native Hawaiian Plants: A How-to Guide for the Gardener*. Honolulu: Bess Press.

Hoshizaki, Barbara J. 1976. *Fern Growers Manual*. New York: Alfred A. Knopf.

Nagata, Kenneth M. 1992. *How to Plant a Native Hawaiian Garden*. Honolulu: State of Hawai'i, Office of Environmental Quality Control.

Neal, Marie C. 1965. *In Gardens of Hawaii*. Bernice P. Bishop Museum Special Publication 50. Honolulu: Bishop Museum Press.

Stone, Charles P., and Linda W. Pratt. 1994. *Hawai'i's Plants and Animals: Biological Sketches of Hawaii Volcanoes National Park*. Honolulu: Hawaii Natural History Association and University of Hawai'i Press.

Valier, Kathy. 1995. *Ferns of Hawai'i*. Honolulu: University of Hawai'i Press.

pōhinahina

OTHER COMMON NAMES: beach vitex, kolokolo kahakai

SCIENTIFIC NAME: *Vitex rotundifolia*

FAMILY: Verbenaceae (verbena family)

NATURAL SETTING/LOCATION: indigenous throughout the Pacific including the Hawaiian Islands, where it occurs on sandy beaches, rocky shores, and dunes on all islands except Kaho‘olawe.

CURRENT STATUS IN THE WILD IN HAWAI‘I: common

Growing your own

PROPAGATION

FORM: seeds, cuttings (matured terminal or upper piece of leafy, matured stem)

PREPLANTING TREATMENT: scarify seeds by scraping the seedcoat; use medium rooting hormone on cutting

PLANTING DEPTH: sow seeds ½" deep in medium; insert base of cutting 1–2” into medium

GERMINATION TIME: 15–30 days if scarified, 36 months if not scarified

CUTTING ROOTING TIME: 3–4 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, rocky, sandy

SOIL PH: 6.0–7.0

LIGHT: sunny location

WATER: keep dry

TEMPERATURE: 60–90°F

ELEVATION: 10–1000'

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 2–3' in row, 4–6' between rows

ADAPTATION TO GROWING IN CONTAINERS: yes, 8" pots to 5-gallon tubs, but planting in the ground is better

PRUNING: prune to manage size and shape and to stimulate compactness

SPECIAL CULTURAL HINTS: plant close together to keep weeds out; thins out during winter months; can get leggy with too much water and fertilizer and not enough sun

SUGGESTED COMPANION PLANTINGS: dry-area plants or coastal plants (ma‘o, ‘ūlei, hinahina)

pōhinahina

Plant characteristics

HEIGHT: 1–4'

SPREAD: 3–6'

GROWTH RATE: fast

GROWTH HABIT: low-growing, mat-forming shrub

FLOWERS

SIZE: inflorescence 1–3" long, flower less than ½"

COLOR: bluish-purple

SHAPE: funnel-shaped flowers in spikes

FRAGRANCE: none

FLOWERS IN FIRST YEAR: yes, from cuttings

FLOWERING PERIOD: year-round

TIME TO FLOWERING: 1–2 years from seed, faster from cuttings

INDUCING AND MAINTAINING FLOWERING: flowering can occur year-round without special treatment if plant is not under stress

FOLIAGE

TEXTURE: downy, fuzzy

COLOR: pale green

SHAPE: oval

FRAGRANCE: spicy when crushed

PESTS

COMMON DISEASES: powdery mildew, leaf spots

OTHER PESTS: ants, mealybugs, scales, whiteflies

The lei shown also contains bougainvillea and palapalai.

Harvesting considerations

WHAT IS HARVESTED: branch tips with or without fruit and flowers

HARVESTING TECHNIQUES: cut stems

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: store in sealed plastic container and refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry, place in sealed plastic container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry (fruit and leaves only)

References and further reading

Bornhorst, H.L. and F.D. Rauch. 1994. *Native Hawaiian Plants for Landscaping, Conservation, and Reforestation*. University of Hawai‘i, CTAHR, Research Extension Series 142.

Nagata, Kenneth M. 1992. *How to Plant a Native Hawaiian Garden*. Honolulu: State of Hawai‘i, Office of Environmental Quality Control.

Wagner, Warren L., Derral R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai‘i*. 2 vols. Bishop Museum Special Publication 83. Honolulu: University of Hawai‘i Press and Bishop Museum Press.

pūkiawe

OTHER COMMON NAMES: maiele

SCIENTIFIC NAME: *Styphelia tameiameiae*

FAMILY: Epacridaceae (epacris family)

NATURAL SETTING/LOCATION: indigenous to Hawaiian Islands; scattered dominant vegetation in wind-swept coasts, deserts, rain forests, frost-prone mountain slopes, and bogs on all main islands except Niʻihau and Kahoʻolawe.

CURRENT STATUS IN THE WILD IN HAWAIʻI: scattered to common

Growing your own

PROPAGATION

FORM: seeds; air layering

PRETREATMENT: soak seeds in vinegar for several hours followed by hot-water (120°F) soak for several hours

PLANTING DEPTH: on surface of medium

GERMINATION TIME: 1–2 months

AIR LAYERING ROOTING TIME: 6–12 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 6.5–7.5

LIGHT: sunny location

WATER: keep moist

TEMPERATURE: 60–75°F

ELEVATION: 50–10,000'

SALT TOLERANCE: moderate (coastal types)

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 3–4' apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 1-gallon tub or larger

PRUNING: prune to maintain size and shape

SPECIAL CULTURAL HINTS: size, shape, and growing conditions depend on propagation source; water well in good drainage conditions

pūkiawe

Plant characteristics

HEIGHT: 2–12'

SPREAD: 3–6'

GROWTH RATE: slow to moderate

GROWTH HABIT: erect, spreading shrub

FRUIT (flowers inconspicuous)

SIZE: fruit ⅛–¼" wide

COLOR: dark red to pink, sometimes white

SHAPE: round

FRAGRANCE: none

FOLIAGE

TEXTURE: leathery

COLOR: green

SHAPE: small and variable

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: none known

Harvesting considerations

WHAT IS HARVESTED: branch tips, with or without fruit

HARVESTING TECHNIQUES: snap or cut tips

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

The lei shown also contains crown flower and dusty miller.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 5–7 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak in water for 5 minutes, wrap in damp newspaper, then place in plastic container and refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei; make sure leaves are removed from lower stem so that when you wili (twist) it, it doesn't jab you or the wearer

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry, wrap in damp newspaper, place in paper or plastic container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry

References and further reading

Stone, Charles P., and Linda W. Pratt. 1994. *Hawai'i's Plants and Animals: Biological Sketches of Hawaii Volcanoes National Park*. Honolulu: Hawaii Natural History Association and University of Hawai'i Press.

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ti

OTHER COMMON NAMES: kī, laʻi

SCIENTIFIC NAME: *Cordyline fruticosa*

FAMILY: Agavaceae (agave family)

NATURAL SETTING/LOCATION: Polynesian introduction; extensively cultivated and common in mesic (medium-wet) valleys and mesic forests on all Hawaiian Islands except Kahoʻolawe

CURRENT STATUS IN THE WILD IN HAWAIʻI: common

CULTIVARS: tremendous variation in color and form, such as variegated, red, orange, pink, yellow

Growing your own

PROPAGATION

FORM: cuttings preferred (large stem pieces may be used); air layering; seeds (growing from seeds results in great variation in plant size and leaf color and shape)

PREPLANTING TREATMENT: use medium rooting hormone on cuttings, or none

PLANTING DEPTH: sow seeds ¼" deep in medium; insert base of cutting 3–5" into medium

GERMINATION TIME: 2–6 weeks

CUTTING ROOTING TIME: 2–4 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: will grow in just about any soil as long as pH and salt levels are not too high.

SOIL PH: 5.5–6.5

LIGHT: green ti can be grown in full sun to partial shade

WATER: irrigation required in dry areas

TEMPERATURE: 60–90°F

ELEVATION: 10–2000'

SALT TOLERANCE: poor

WIND RESISTANCE: requires windbreaks in windy areas to prevent shredding

MANAGEMENT

FERTILIZER NEEDS: heavy

RECOMMENDED SPACING: 18–24" in rows, 18–24" between rows, with a larger 36" aisle every 3–6 rows

ADAPTATION TO GROWING IN CONTAINERS: yes, large containers

PRUNING: prune to about 1' height when main stem grows to point where harvesting becomes difficult; leave 3 new shoots to grow, and remove all smaller shoots

SPECIAL CULTURAL HINTS: plants can be cut back and 2 or 3 new shoots per stem allowed to grow; best grown in drier climates with irrigation to avoid fungus and bacterial leaf spots; remove inflorescences as they emerge to direct energy toward new leaves; the common green ti rarely if ever produces seeds; leaves can be harvested in first year

SUGGESTED COMPANION PLANTINGS: tall plants for shade and windbreak

ti

Plant characteristics

HEIGHT: to 20'

SPREAD: 3–4'

GROWTH RATE: moderately fast

GROWTH HABIT: upright shrub

FOLIAGE

TEXTURE: smooth and glossy

COLOR: green most common; red, pink, and orange variants occur

SHAPE: long and narrow

FRAGRANCE: none

PESTS

COMMON DISEASES: *Cercospora* fungus, *Pseudomonas* bacteria, leaf spots

OTHER PESTS: caterpillars, mites, pigs, rodents, rose beetles, scales, slugs, snails, stem borers, thrips, two-spotted leafhopper

Harvesting considerations

WHAT IS HARVESTED: leaves

HARVESTING TECHNIQUES: pull or snap leaf off stem; at least 3 leaves should be left on plant to produce energy for further growth

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: large plastic bag

The lei shown also contains Geraldton waxflower.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

VASE LIFE: 14 days

CLEANING OF PLANT MATERIALS: hand-wash under cold, running water; soapy water may be needed

STORING RAW LEI MATERIALS: fresh leaves can be stored in a plastic container with water and refrigerated at 40°F for 30 days or frozen for much longer

PREPARING FOR USE IN LEI: if traditional ti lei, then clean, tie, and strip leaves; if done in wili (twisting) or hilo (braiding) pattern, you need to freeze, boil, microwave, iron, or pūlehu the leaf to soften it

STORING A COMPLETED LEI BEFORE WEARING: if traditional ti lei, place in sealed container and refrigerate; if wili or hilo pattern, wipe down with cloth, wrap in dry newspaper, and store in freezer

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry or freeze

References and further reading

Brown, Frank. 1994. *The Cordyline: King of Tropical Foliage*. Valkaria, Florida: Valkaria Tropical Garden.

Ide, Laurie S. 1998. *Hawaiian Lei Making: Step-by-Step Guide*. Honolulu: Mutual Publishing.

Rauch, Fred D. 1996. *Tropical Landscape Plants*. 3rd ed. Battle Ground, Washington: Hawaii Floriculture.

Wagner, Warren L., Derral R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i*. 2 vols. Bishop Museum Special Publication 83. Honolulu: University of Hawai'i Press and Bishop Museum Press.

Warren, William. 1997. *Tropical Plants for Home and Garden*. London: Thames and Hudson.

Watson D.P., and W.J. Yee. 1973. *Hawai'i Ti*. University of Hawai'i, Cooperative Extension Service Circular 481.

ʻūlei

OTHER COMMON NAMES: uʻūlei

SCIENTIFIC NAME: *Osteomeles anthyllidifolia*

FAMILY: Rosaceae (rose family)

NATURAL SETTING/LOCATION: indigenous to Hawaiian Islands in a wide variety of habitats such as coastal cliffs, lava fields, dry shrublands, and semi-dry forests on all main islands except Niʻihau and Kahoʻolawe; also occurs in the Cook Islands and Tonga

CURRENT STATUS IN THE WILD IN HAWAIʻI: scattered to locally common

Growing your own

PROPAGATION

FORM: cuttings 3–6" long; seeds (plants from seed will have varying amounts of flowers and fruits)

PREPLANTING TREATMENT: soak seeds in water for 48 hours; use strong rooting hormone on cuttings; mist is helpful

PLANTING DEPTH: sow seeds ¼" deep in medium; insert base of cutting 1–2" into medium

GERMINATION TIME: 1–3 months

CUTTING ROOTING TIME: 1–3 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 5.5–6.5

LIGHT: sunny location

WATER: keep moist; tolerates drought once established

TEMPERATURE: 40–90°F

ELEVATION: 10–7600'

SALT TOLERANCE: moderate (coastal varieties)

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 3–5' apart in rows

ADAPTATION TO GROWING IN CONTAINERS: 2-gallon tubs or larger, but planting in the ground is better

PRUNING: prune to reduce size, maintain shape, and to keep full and bushy; avoid cutting old growth

SPECIAL CULTURAL HINTS: provide room to spread; seed-produced plants result in variable growth forms

ʻūlei

Plant characteristics

HEIGHT: 1–15'

SPREAD: 5–15'

GROWTH RATE: moderate

GROWTH HABIT: prostrate to slightly upright, spreading shrub

FLOWERS

SIZE: ½"

COLOR: white

SHAPE: round

FRAGRANCE: yes

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: winter through spring

TIME TO FLOWERING: typically 1 year from cutting and 2–3 years from seed

INDUCING AND MAINTAINING FLOWERING: can be maintained under good light conditions; under shaded conditions, flowering is sparse to non-existent; prune for new growth on which flowers are borne

FOLIAGE

TEXTURE: leathery leaflets, shiny, smooth, fine

COLOR: green

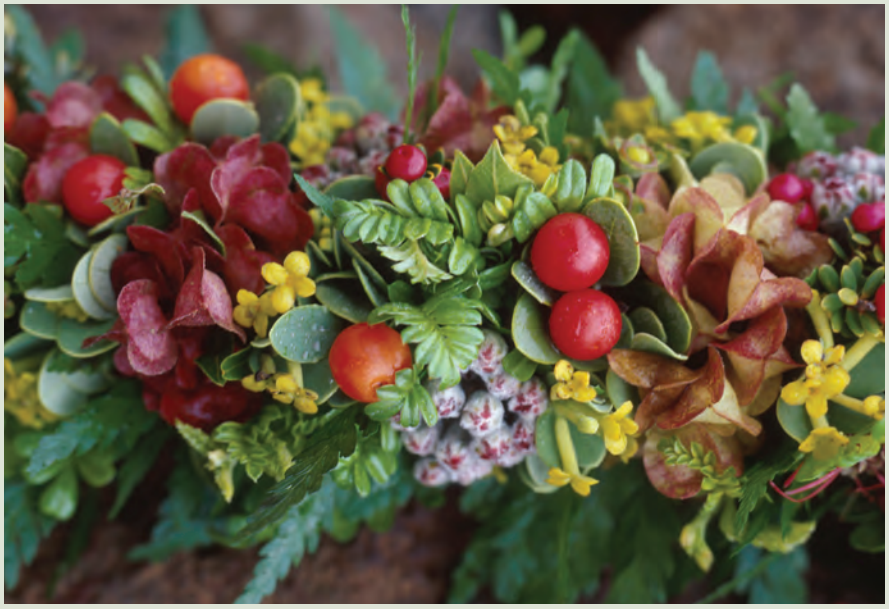
SHAPE: divided into leaflets

FRAGRANCE: none

PESTS

COMMON DISEASES: none known

OTHER PESTS: ants, aphids, mealybugs, scales, thrips, twig borer



The lei shown also contains ʻākia, ʻaʻaliʻi, pūkiawe, and ʻōhiʻa lehua.

Harvesting considerations

WHAT IS HARVESTED: fruit, flowers, leaves

HARVESTING TECHNIQUES: break or cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: soak in water for 5 minutes, wrap flowers in paper towel and place in plastic container, wrap leaves and fruit in damp newspaper and place in plastic container, refrigerate at 40°F for up to 14 days

PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei

STORING A COMPLETED LEI BEFORE WEARING: soak lei, drip dry, wrap in damp newspaper, place in plastic container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry leaves only

References and further reading

Bornhorst, Heidi L. 1996. *Growing Native Hawaiian Plants. A How-to Guide for the Gardener.* Honolulu: Bess Press.

Hawaiʻi Plant Conservation Center. 1992. *Plant Information Sheets on Native Plants of Hawaiʻi.* Lāwaʻi, Hawaiʻi: National Tropical Botanical Garden.

Nagata, Kenneth M. 1992. *How to Plant a Native Hawaiian Garden*. Honolulu: State of Hawaiʻi, Office of Environmental Quality Control.

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wiliwili

OTHER COMMON NAMES: coral tree, Hawaiian erythrina

SCIENTIFIC NAME: *Erythrina sandwicensis*

FAMILY: Fabaceae (pea family)

NATURAL SETTING/LOCATION: endemic to the Hawaiian Islands; found in arid lowlands and dry forests on leeward slopes of all main islands including Kaho‘olawe and Ni‘ihau

CURRENT STATUS IN THE WILD IN HAWAI‘I: formerly common; now population almost completely wiped out due to an invasive pest, the Erythrina gall wasp

Growing your own

HANDLING CAUTIONS: thorns on branches and trunks, but sometimes thornless; seeds reported to be poisonous

PROPAGATION

FORM: seeds; cuttings 2–4' long

PREPLANTING TREATMENT: put seeds in water that has been brought to a boil and removed from heat, let soak for 24 hours, discard floating, nonviable seeds; or, scarify seeds by scratching seedcoat

PLANTING DEPTH: sow seeds ½" deep in well-drained medium, place in full sun; amount of cutting inserted into medium varies with its length

GERMINATION TIME: 7 days

CUTTING ROOTING TIME: 1 month

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL PH: 5.5–7.5

LIGHT: sunny location

WATER: drought tolerant; deep and infrequent watering

TEMPERATURE: 50–90°F

ELEVATION: 10–1800'

SALT TOLERANCE: good

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 20' apart

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: prune when young to manage size and shape and direct growth

SPECIAL CULTURAL HINTS: give plenty of room, keep out of high-traffic areas, and keep dry; leaf drop usually coincides with flowering

SUGGESTED COMPANION PLANTINGS: low-growing, drought-tolerant plants

wiliwili

Plant characteristics

HEIGHT: 18–50'

SPREAD: 25–30'

GROWTH RATE: generally fast; rapid in winter, slow in summer after leaves fall

GROWTH HABIT: tree

FLOWERS

SIZE: 1½"

COLOR: red, orange, white, pale green, pale yellow

SHAPE: beak-like, in clusters

FRAGRANCE: none

FLOWERS IN FIRST YEAR: no

FLOWERING PERIOD: summer, right after leaves fall

TIME TO FLOWERING: more than 5 years from seeds; around 4 years from cuttings

INDUCING AND MAINTAINING FLOWERING: normally only flowers during the summer

FOLIAGE

TEXTURE: slightly hairy on underside

COLOR: green

SHAPE: compound leaf with large, triangular leaflets

FRAGRANCE: none

PESTS

COMMON DISEASES: powdery mildew

OTHER PESTS: ants, aphids, Chinese rose beetle, Erythrina gall wasp, leaf-eating caterpillars, mealybugs, root-knot nematodes, spider mites, scales, seed borers, stinkbug, twig borer

The lei shown also contains globe amaranth, ʻōhiʻa lehua, and bougainvillea.

Harvesting considerations

WHAT IS HARVESTED: flowers with 1–2" stem (seeds are not discussed here)

HARVESTING TECHNIQUES: cut or snap

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: paper bag

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck

CLEANING OF PLANT MATERIALS: no water

STORING RAW LEI MATERIALS: place in paper box and refrigerate at 40°F for up to 3 days; no water

PREPARING FOR USE IN LEI: clip stem off, then sew

STORING A COMPLETED LEI BEFORE WEARING: store lei in paper box without refrigeration or water

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

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