**agapanthus**

*OTHER COMMON NAMES:* African lily, blue lily, lily of the Nile

*SCIENTIFIC NAME:* *Agapanthus africanus*

*FAMILY:* Liliaceae (lily family)

*NATURAL SETTING/LOCATION:* native to South Africa

*CURRENT STATUS IN THE WILD IN HAWAI‘I:* introduced garden plant

*CULTIVARS:* ‘Albus’, ‘Flore Pleno’

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### Growing your own

#### PROPAGATION

**FORM:** division (easiest and fastest; use 6” clumps); seeds (seedlings take longer to flower than plants from divisions)

**PREPLANTING TREATMENT:** soak seeds in water for 24 hours

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

**GERMINATION TIME:** slow and erratic

#### PREFERRED PRODUCTION CONDITIONS

**GENERAL SOIL CHARACTERISTICS:** well drained, moisture-retentive

**SOIL pH:** 5.0–6.5

**LIGHT:** full sun to partial shade

**WATER:** moderate; tolerates drought once established

**TEMPERATURE:** tolerates temperatures down to 25°F, but prefers temperatures above 50°F

**ELEVATION:** 10–4500’

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** moderate

#### MANAGEMENT

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 12–18” apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 12” pots or larger (prefers crowded conditions)

**SPECIAL CULTURAL HINTS:** divide every 5–6 years
**agapanthus**

### Plant characteristics

**HEIGHT:** foliage 1½–2’ tall; flower stalks 2–5’ tall; dwarf cultivars are available

**SPREAD:** 2’

**GROWTH RATE:** moderate

**GROWTH HABIT:** clumps of arching, evergreen leaves

**FLOWERS**

**SIZE:** 1½–3”

**COLOR:** dark blue to pale blue to white

**SHAPE:** tubular

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes, if propagated from large divisions

**FLOWERING PERIOD:** summer

**TIME TO FLOWERING:** 2–3 years from seed, less if from division

**INDUCING AND MAINTAINING FLOWERING:** not known

### Pests

**COMMON DISEASES:** none serious

**OTHER PESTS:** slugs, snails

### Harvesting considerations

**WHAT IS HARVESTED:** flowers, buds with 1–2” stem

**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

**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

**VASE LIFE:** to 7 days

**CLEANING OF PLANT MATERIALS:** place stems in water

**STORING RAW LEI MATERIALS:** refrigerate at 40°F for up to 7 days

**PREPARING FOR USE IN LEI:** if sewing, cut flower with ⅛” of stem

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

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

### References and further reading


Growing Plants for Hawaiian Lei

‘ākulikuli-lei

OTHER COMMON NAMES: ‘ākulikuli, ice plant, noon flower

SCIENTIFIC NAME: Lampranthus glomeratus (magenta), Lampranthus sp.

FAMILY: Aizoaceae (fig-marigold family)

NATURAL SETTING/LOCATION: native to coasts of South Africa along the Sahara

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found

Growing your own

PROPAGATION

FORM: cuttings from stems with spent flowers

PREPLANTING TREATMENT: allow cut end to air-dry 1–2 days, treat with mild rooting hormone

PLANTING DEPTH: insert base of cutting 1–1½” into medium

CUTTING ROOTING TIME: 1 month

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

SOIL pH: 5.5–6.5

LIGHT: full sun

WATER: sparingly; tolerates drought

TEMPERATURE: 40–70°F

ELEVATION: common magenta form 300–3200’, orange form 3000–4000’

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium; apply after flowering and in late summer

RECOMMENDED SPACING: 18–24” apart

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: not necessary

SPECIAL CULTURAL HINTS: likes hot days and cold nights (Kula, Waimea climates are ideal); do not overwater

Plant characteristics

HEIGHT: to 18”

SPREAD: to 36”

GROWTH RATE: moderate

GROWTH HABIT: low groundcover
ʻākulikuli-lei

FLOWERS

SIZE: 1½–2½”
COLOR: magenta, white, orange to brownish orange
SHAPE: daisy-like
FRAGRANCE: very light
FLOWERS IN FIRST YEAR: yes
FLOWERING PERIOD: depends on transplanting time
TIME TO FLOWERING: cuttings flower in less than 9 months
INDUCING AND MAINTAINING FLOWERING: if attempting to produce flowers for graduation time (May–June), transplant or make cuttings for planting in August through October (depending on elevation); flowers will emerge starting in early May; natural flowering will be later by 1 month

PESTS

COMMON DISEASES: nematodes, root rot, southern blight
OTHER PESTS: scales

Harvesting considerations

WHAT IS HARVESTED: flower buds with 1–2" stem
HARVESTING TECHNIQUES: cut or break by hand
BEST TIME OF DAY TO HARVEST: early morning before flowers open
BEST WAY TO TRANSPORT FROM PICKING AREA: metal can

The lei shown also contains cymbidium orchid and anthurium.

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, horse
CLEANING OF PLANT MATERIALS: no water
STORING RAW LEI MATERIALS: store in paper box and refrigerate at 40°F for up to 10 days
PREPARING FOR USE IN LEI: clip stems at different sizes, then sew; for poepoe (circular) style, sew closed flowers—open flowers not usually used; no water

References and further reading

**Growing Plants for Hawaiian Lei**

**asparagus fern**

**OTHER COMMON NAMES:** asparagus

**SCIENTIFIC NAME:** Asparagus setaceus var. plumosus; Asparagus densiflorus var. sprengeri, myersii

**FAMILY:** Liliaceae (lily family)

**NATURAL SETTING/LOCATION:** southern and eastern Africa

**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

**CULTIVARS:** A. densiflorus var. sprengeri is light yellow-green, coarse, and has recurving spines; A. densiflorus var. myersii has elongated, foxtail-like shoots; A. setaceous var. plumosus has dark green, finely divided branches and looks fern-like

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**Growing your own**

**HANDLING CAUTIONS:** some have thorns

**PROPAGATION**

**FORM:** seeds; division

**PREPLANTING TREATMENT:** remove seeds from fleshy pulp, plant fresh, germinate at 85/70°F (day/night)

**PLANTING DEPTH:** sow seeds on surface of medium or slightly below (¼”); keep division root crown just below soil level

**GERMINATION TIME:** 60–90 days

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained, light, sandy; in pots, 1:1 peat:perlite

**SOIL pH:** 6.0–7.0

**LIGHT:** full sun to partial shade (best quality with up to 50% shade)

**WATER:** high quality best, though tolerant of slightly brackish water. Irrigate deeply about once a week—more frequently in light soils during dry weather.

**TEMPERATURE:** 70–80°F (day), 60–70°F (night)

**ELEVATION:** 10–1000’

**SALT TOLERANCE:** avoid direct salt spray; tolerates slightly brackish water

**WIND RESISTANCE:** tolerant, but S. setaceus varieties develop brown leaf tips when dehydrated by wind

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** A. densiflorus: 3’ apart; A. setaceus: 1–2’ apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, pots or planter boxes, container size 8” or larger and 8–12” deep; plants can split plastic and cement containers as they grow

**PRUNING:** harvest recently matured shoots twice a week; old shoots lose their leaves quickly after harvest, and young shoots wilt; experience will determine the best stage to cut; allow at least 6–8 developing shoots per plant to remain

**SPECIAL CULTURAL HINTS:** may become weedy if left unchecked

**SUGGESTED COMPANION PLANTINGS:** could be used as an underplanting or border plant in landscape; sprengeri and myersii varieties are useful accent plants in the landscape
**Plant characteristics**

**HEIGHT:** *A. setaceus* to 8–10", *A. densiflorus* to 36"

**SPREAD:** *A. setaceus* to 6–8", *A. densiflorus* to 5–6'

**GROWTH RATE:** fast

**GROWTH HABIT:** erect, climbing, or trailing woody herb

**FOLIAGE**

**TEXTURE:** fine

**COLOR:** green

**SHAPE:** needle-like

**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** leaf spot and root rot

**OTHER PESTS:** mites, scales, thrips

**Harvesting considerations**

**WHAT IS HARVESTED:** mature stems

**HARVESTING TECHNIQUES:** break or cut; leave 6–8 shoots per plant

**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:** 16 days, depending on cultivar

**CLEANING OF PLANT MATERIALS:** cold water soak

**STORING RAW LEI MATERIALS:** place stems in water immediately after harvesting, refrigerate at 45°F for up to 10 days

**PREPARING FOR USE IN LEI:** clip off wrinkled, limp, or poor-quality areas before adding to lei; stem length should be 3–4"

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

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

**References and further reading**


**ALERT:** Asparagus setaceus and *A. densiflorus* could be invasive species and cause problems in agricultural and natural areas in Hawai‘i. *A. setaceus* scores a rating of 13 and *A. densiflorus* scores a rating of 15 on the Hawai‘i–Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai‘i or similar Pacific islands and is about 95% accurate. Any score above 6 indicates the potential for invasiveness, though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but *A. setaceus* and *A. densiflorus* should not be introduced to areas where they are not already growing. *A. densiflorus* has already naturalized in some places on Kaua‘i, Maui, and Hawai‘i Island. Birds can spread the seeds of both species. If used in lei, seeds should be removed first if possible. If fertile material is used, lei should not be discarded in areas where *A. setaceus* and *A. densiflorus* are not naturalized and where the seeds can germinate and grow. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: [http://www.plantpono.org](http://www.plantpono.org).
Growing your own

PROPAGATION

FORM: division or cuttings (most growers purchase rooted cuttings from plant propagators)

PLANTING DEPTH: insert base of cutting 1–2” into medium, use mild rooting hormone; keep division root crown just below soil level

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: adapted to most soils

SOIL pH: 5.5–7.0

LIGHT: full sun to light shade

WATER: moist

TEMPERATURE: 68–70°F

MANAGEMENT

FERTILIZER NEEDS: medium; do not fertilize once flowers begin to open

RECOMMENDED SPACING: 12–18”

ADAPTATION TO GROWING IN CONTAINERS: yes, 1- to 2-gallon pots

PRUNING: remove dead and old flowers to promote development of new ones

SPECIAL CULTURAL HINTS: plants spread through underground rhizomes; often self-sown; does not reproduce true from seed

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found

aster

**Plant characteristics**

**HEIGHT:** 1–3’

**SPREAD:** 12”

**GROWTH RATE:** fast

**GROWTH HABIT:** short shrub

**FLOWERS**

**SIZE:** 12”

**COLOR:** red, pink, purple, white, and mixtures

**SHAPE:** round, daisy-like

**FRAGRANCE:** none

**TIME TO FLOWERING:** 16–18 weeks

**INDUCING AND MAINTAINING FLOWERING:** requires short days (less than 12 hours) for consistent and abundant flowering

**PESTS**

**COMMON DISEASES:** *Botrytis*, leaf spots, powdery and downy mildew, *Rhi-zoctonia* foliage blight

**OTHER PESTS:** aphids, mites, thrips, and whiteflies

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers and buds

**HARVESTING TECHNIQUES:** cut

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** cooler or plastic container with water

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

The lei shown also contains bleeding heart, bougainvillea, and globe amaranth.

**Notes on lei making**

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

**VAKE LIFE:** 5–7 days

**CLEANING OF PLANT MATERIALS:** cold water soak for 2 minutes to get dust off; foliage wilts quickly so should be removed

**STORING RAW LEI MATERIALS:** store in plastic container with water and refrigerate at 35–40°F for up to 7 days

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

**STORING A COMPLETED LEI BEFORE WEARING:** sprinkle with water, drip dry, wrap in newspaper, and place in plastic container

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

**References and further reading**


### Baby’s Breath

**Scientific Name**: *Gypsophila paniculata*

**Family**: Caryophyllaceae (pink family)

**Natural Setting/Location**: native to central Asia, central and eastern Europe

**Current Status in the Wild in Hawai‘i**: not found


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### Growing Your Own

**Propagation**

**Form**: cuttings; seeds of named cultivars

**Preplanting Treatment**: none

**Planting Depth**: sow seeds on surface or slightly below (1⁄8”); use medium rooting hormone on cutting and insert base 1–2” into medium

**Germination Time**: 5–10 days

**Cutting Rooting Time**: 10–14 days during summer

**Preferred Production Conditions**

**General Soil Characteristics**: well drained; in fields, loam to sandy soils; in pots, 1:1 peat:perlite

**Soil pH**: 7.0

**Light**: full sun, long daylength

**Water**: keep moist

**Temperature**: requires 55°F nights followed by long days (14–16 hours); preferred daytime temperature range is 60–70°F

**Elevation**: 500–3500'

**Salt Tolerance**: poor

**Wind Resistance**: poor

**Fertilizer Needs**: medium; amend field soils with Ca and Mg if analysis is low

**Recommended Spacing**: 18–24” apart

**Adaptation to Growing in Containers**: yes, 3-gallon tubs, but planting in the ground is better

**Pruning**: remove old flower stalks

**Management**

**Special Cultural Hints**: most cultivars propagated vegetatively due to variability of seedlings; seed is used for only a few cultivars; better production in 2nd year; don’t overwater

**Suggested Companion Plantings**: statice or sweet william (*Dianthus barbadus*)
Baby’s Breath

**Plant characteristics**

**Height:** 2–4’  
**Spread:** 36”  
**Growth Rate:** slow to moderate  
**Growth Habit:** short, mound-like  

**Flowers**

**Size:** ¼–3⁄8”  
**Color:** white, pink  
**Shape:** round, flat  
**Fragrance:** none  
**Flowers in First Year:** requires cool temperatures before flowering  
**Flowering Period:** natural flowering occurs in late spring to late summer; lights are needed for winter production; can be treated as perennial or annual  
**Time to Flowering:** once flowering has started, wait about another 10 weeks to harvest  
**Inducing and Maintaining Flowering:** lighting may be necessary during summer months in Hawai’i and is necessary during winter months for good flower production, as it requires 14–16 hours of light  

**Pests**

**Common Diseases:** damping off, root rot, nematodes, crown gall, Botrytis (on flowers)  
**Other Pests:** spider mites, thrips  

**Harvesting considerations**

**What is Harvested:** flowering branches  
**Harvesting Techniques:** for fresh flowers, cut 1–2” stems when 60–70% of flowers are open; for drying, cut when 80–90% are open  

**Best Time of Day to Harvest:** early morning  
**Best Way to Transport from Picking Area:** paper box  
**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, horse  
**Vase Life:** 57 days  
**Cleaning of Plant Materials:** none; do not wet flower heads  
**Storing Raw Lei Materials:** place stems in water and refrigerate at 40°F for up to 7 days  
**Preparing for Use in Lei:** clip off wrinkled, limp, or poor-quality areas before adding to lei; boil water and place cut stems in hot water to force flowering if not all have bloomed  

**Storing a Completed Lei Before Wearing:** mist lei, shake off excess water, place on damp paper towel, place in sealed plastic container, and refrigerate  
**Preserving a Lei for Long-Term Storage or Display:** air-dry  

**References and further reading**

bleeding heart

OTHER COMMON NAMES: clerodendrum, glorybower, hō‘ehapu‘uwai

SCIENTIFIC NAME: Clerodendrum thomsoniae and Clerodendrum x speciosum

FAMILY: Verbenaceae (verbena family)

NATURAL SETTING/LOCATION: native to tropical West Africa

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found

Growing your own

PROPAGATION

FORM: soft wood or semi-ripe cuttings under mist; commercially propagated from single-node cuttings; also grown from root cuttings and rooted suckers

PRETREATMENT: treat cutting with medium rooting hormone

PLANTING DEPTH: insert base of cutting 1–1½" into medium

CUTTING ROOTING TIME: 6–8 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: rich, well drained

SOIL pH: 5.5–6.5 (avoid high-pH soils)

LIGHT: full sun for best bloom

WATER: keep moist; over-watering can cause leaf drop

TEMPERATURE: tolerates temperatures down to 35°F, but temperatures below 60°F inhibit growth

ELEVATION: 10–2000'

SALT TOLERANCE: moderate

WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 36" apart

ADAPTATION TO GROWING IN CONTAINERS: yes, will flower in 6" pot, but larger containers are easier to maintain

PRUNING: prune after flowering; can be maintained as a shrub or high ground cover 24–36" high (6–7 nodes above the roots); pruning shorter than this will delay flowering

SPECIAL CULTURAL HINTS: provide support if vining is desired
**bleeding heart**

**Plant characteristics**

<table>
<thead>
<tr>
<th>Height:</th>
<th>10–15’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spread:</td>
<td>36”</td>
</tr>
<tr>
<td>Growth Rate:</td>
<td>fast</td>
</tr>
<tr>
<td>Growth Habit:</td>
<td>evergreen, twining shrub</td>
</tr>
</tbody>
</table>

**Flowers**

<table>
<thead>
<tr>
<th>Size:</th>
<th>calyx (leafy base of flower)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>½–¾”</td>
</tr>
<tr>
<td>Color:</td>
<td><em>C. thomsoniae</em> calyx is white with red corolla; <em>C. x speciosum</em> calyx is pink, corolla deep rose to red</td>
</tr>
<tr>
<td>Shape:</td>
<td>flowers consist of bell-shaped calyx and narrow tubular corolla; the calyx stands out and is used in lei</td>
</tr>
<tr>
<td>Fragrance:</td>
<td>none</td>
</tr>
</tbody>
</table>

**Flowers in First Year:** Yes

**Flowering Period:** Year-round under high-light conditions, heaviest in winter through spring

**Time to Flowering:** 3–5 months; terminal cuttings flower soonest, and seed-propagated plants take at least 1 month longer than cuttings to flower

**Inducing and Maintaining Flowering:** Both types are short-day plants; nights longer than 10 hours promote flowering; high light intensity also promotes flowering and can minimize the need for long nights

**Pests**

<table>
<thead>
<tr>
<th>Common Diseases:</th>
<th>none serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Pests:</td>
<td>none serious</td>
</tr>
</tbody>
</table>

**Harvesting considerations**

**What is Harvested:** Flower calyx (leafy base)

**Harvesting Techniques:** Plant has long internodes; cut close to nodes to avoid leaving long pieces of dying stem

**Best Time of Day to Harvest:** Early morning

**Best Way to Transport from Picking Area:** Paper or cloth bag

**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, horse

**Vase Life:** 2 days

**Cleaning of Plant Materials:** Cold water soak

**Storing Raw Lei Materials:** Store in sealed container and refrigerate at 40°F for up to 14 days

**Preparation for Use in Lei:** Clip off wrinkled, limp, or poor-quality areas before adding to lei; true flowers are most often removed, as well as the leaves

**Storing a Completed Lei Before Wearing:** Soak lei in water for 5 minutes, drip dry, place in sealed container, and refrigerate

**Preserving a Lei for Long-Term Storage or Display:** Cannot be preserved

**References and further reading**


blue jade vine

**OTHER COMMON NAMES:** green jade vine, jade vine  
**SCIENTIFIC NAME:** Strongylodon macrobotrys  
**FAMILY:** Fabaceae (pea family)  
**NATURAL SETTING/LLOCATION:** Philippines  
**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

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**Growing your own**

**HANDLING CAUTIONS:** may stain some fabrics

**PROPAGATION**

**FORM:** air layering; semi-woody cuttings 9" long; fresh seeds

**PREPLANTING TREATMENT:** use fresh seeds, plant immediately upon opening of capsule, scarify seeds by scratching seedcoat or put in water that has been brought to a boil and removed from heat and soak for about 24 hours; use strong rooting hormone on cuttings

**PLANTING DEPTH:** sow seeds ½–1” deep in medium; insert cutting ½ its length into medium

**GERMINATION TIME:** 10–14 days at 80–85°F

**AIR LAYERING ROOTING TIME:** 4–8 months

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, moist, well drained  
**SOIL pH:** 6.0–7.0  
**LIGHT:** full sun to partial shade  
**WATER:** moderate  
**TEMPERATURE:** 60–90°F  
**ELEVATION:** 10–800'  
**SALT TOLERANCE:** poor  
**WIND RESISTANCE:** moderate

**MANAGEMENT**

**FERTILIZER NEEDS:** medium; apply after flowering and in spring

**RECOMMENDED SPACING:** 8' apart

**ADAPTATION TO GROWING IN CONTAINERS:** not recommended

**PRUNING:** prune to manage spread of plant

**SPECIAL CULTURAL HINTS:** provide strong arbor, trellis, or other support; stem is too weak to support itself in an upright position
**blue jade vine**

**Plant characteristics**

**HEIGHT:** twining vine to 40'
**SPREAD:** 20–30'
**GROWTH RATE:** fast
**GROWTH HABIT:** perennial, evergreen, woody, flowering vine

**FLOWERS**

**SIZE:** 2½–3” clusters to 36” long
**COLOR:** aquamarine to jade green
**SHAPE:** beak-like
**FRAGRANCE:** none
**FLOWERS IN FIRST YEAR:** no
**FLOWERING PERIOD:** late summer, fall
**TIME TO FLOWERING:** air layering quicker than seed-propagated plants, with first flowering in 3 years
**INDUCING AND MAINTAINING FLOWERING:** remove old flowers and seed pods

**PESTS**

**COMMON DISEASES:** root rot, leaf spot, root-knot nematodes
**OTHER PESTS:** black stink bugs, mealy-bugs, scales

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers
**HARVESTING TECHNIQUES:** snap
**BEST TIME OF DAY TO HARVEST:** early morning
**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper or cloth bag
**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers

The lei shown also contains tuberose.

**Notes on lei making**

**BEST FOR WHICH TYPE OF LEI:** neck, head
**VASE LIFE:** 4 days
**CLEANING OF PLANT MATERIALS:** spray with water
**STORING RAW LEI MATERIALS:** place in a sealed plastic container and refrigerate at 40°F for up to 4 days
**PREPARING FOR USE IN LEI:** clip off wrinkled, limp, or poor-quality areas before adding to lei
**STORING A COMPLETED LEI BEFORE WEARING:** mist lei, place in sealed plastic container, and refrigerate
**PRESEVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** cannot be preserved

**References and further reading**


bougainvillea

**OTHER COMMON NAMES:** kepalō, pu-kanawila

**SCIENTIFIC NAME:** Bougainvillea cultivars

**FAMILY:** Nyctaginaceae (four-o’clock family)

**NATURAL SETTING/LOCATION:** native to Brazil

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**CURRENT STATUS IN THE WILD IN HAWAI’I:** not naturalized but often found in public areas

**CULTIVARS:** many, including “double-bract” forms that are particularly useful in lei making

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**Growing your own**

**HANDLING CAUTIONS:** most cultivars have thorny stems

**PROPAGATION**

**FORM:** cuttings (semi-soft wood, 1/8” thick)

**PREPLANTING TREATMENT:** treat cuttings with strong rooting hormone

**PLANTING DEPTH:** insert cutting 1–2” into medium

**CUTTING ROOTING TIME:** semi-soft cuttings root in 4 weeks, woody cuttings root in 4–8 weeks, depending on variety and rooting treatment

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**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well-drained soil is best; tolerates many soil types

**SOIL pH:** 5.5–6.0

**LIGHT:** full sun

**WATER:** keep relatively dry after plant is established

**TEMPERATURE:** 50–90°F

**ELEVATION:** 10–2500’

**SALT TOLERANCE:** good

**WIND RESISTANCE:** good

**MANAGEMENT**

**FERTILIZER NEEDS:** light

**RECOMMENDED SPACING:** 5’ apart or more

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 3-gallon tubs or larger

**PRUNING:** prune back vigorous, vining growth and allow shorter side branches to develop

**SPECIAL CULTURAL HINTS:** provide trellis or other support; variety of growth habits possible
**bougainvillea**

**Plant characteristics**

**HEIGHT:** to 20'

**SPREAD:** to 20'

**GROWTH RATE:** fast

**GROWTH HABIT:** vine, sprawling shrub

**FLOWERS**

**SIZE:** bracts: ½–2”

**COLOR:** magenta, rose, pink, red, orange, gold, white, bicolor

**SHAPE:** bracts are triangular to almost round

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** heaviest from September through April

**TIME TO FLOWERING:** rooted cuttings flower in 7–10 weeks

**INDUCING AND MAINTAINING FLOWERING:** flowers occur on new growth; short daylengths enhance flowering; keep N and water on the low side; plants in heavy shade or pruned too frequently will not flower

**PESTS**

**COMMON DISEASES:** Phytophora foliar blight, leaf spots, Pythium root rot, reniform nematodes

**OTHER PESTS:** aphids, caterpillars, grasshoppers, mites, soft scales, whiteflies

The lei shown also contains mock orange leaves.

**Harvesting considerations**

**WHAT IS HARVESTED:** clusters of bracts with or without flowers

**HARVESTING TECHNIQUES:** clip

**BEST TIME OF DAY TO HARVEST:** early morning

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

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

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

**STORING A COMPLETED LEI BEFORE WEARING:** mist lei, shake off excess water, wrap in damp newspaper in plastic container or paper box, and refrigerate

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

**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:** wrap in damp newspaper in plastic container or paper box and refrigerate at 40°F for up to 14 days

**References and further reading**


carnation

**OTHER COMMON NAMES:** pink, ponimōʻī

**SCIENTIFIC NAME:**
_Dianthus caryophyllus_

**FAMILY:** Caryophyllaceae (pink family)

**NATURAL SETTING/LOCATION:** native to the Mediterranean

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**Growing your own**

**PROPAGATION**

**FORM:** tip cuttings (most growers purchase rooted cuttings); seeds (purchase from seed source)

**PRETREATMENT:** treat cutting with mild rooting hormone; chill seeds for 1–2 weeks at 30–35°F before sowing

**PLANTING DEPTH:** sow seeds on surface with a light covering; insert base of cutting 1" into medium

**GERMINATION TIME:** 1–2 weeks

**CUTTING ROOTING TIME:** 2–4 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well-drained, loamy soil

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun to partial shade

**WATER:** keep moist

**TEMPERATURE:** 80°F days, 50–60°F nights

**ELEVATION:** 10–3000'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

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**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 4–8" apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 6" pots or larger

**PRUNING:** many different techniques used; pinching or pruning is a strategy used to time flowering around periods of high demand; spray types for lei production are usually not pruned

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**SPECIAL CULTURAL HINTS:** good planting time is at the end of summer; flowering will first occur in mid-December and then continuously; calyx (green, leafy base) splitting is a major problem, particularly for single-stem flower types; nonsplitting types are available; requires soil free of disease and nematodes where carnation hasn’t been grown before; container culture will avoid soil-borne problems; mostly grown under cover

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**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

**CULTIVARS:** many; some pot types available from seed
carnation

**Plant characteristics**

**HEIGHT:** 36”

**SPREAD:** 1’

**GROWTH RATE:** relatively fast

**GROWTH HABIT:** sprawling herb

**FLOWERS**

**SIZE:** large-flowered types 2½–4” in diameter, smaller-flowered (spray types) 1½–3” in diameter, miniature-flowered 1½–2” in diameter

**COLOR:** red, white, pink, yellow, orange, white, purple

**SHAPE:** round

**FRAGRANCE:** varies from nonfragrant to spicy

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** year-round; more flowers in summer

**TIME TO FLOWERING:** plants flower 3–4 months after transplanting; peak production in 6 months

**INDUCING AND MAINTAINING FLOWERING:** remove first flower; remove spent flowers, and harvest flowers regularly

**PESTS**

**COMMON DISEASES:** rootknot nematodes, *Botrytis* on flowers; fungal problems including *Fusarium* rust, stem rot (*Rhizoctonia*), *Alternaria* blight, leaf spot, or branch rot; at least four viruses are found in carnation; bacterial diseases include bacterial and *Fusarium* wilt, both of which can persist in the soil for several years

**OTHER PESTS:** caterpillars, Hawaiian flower thrips (infest flowers), spider mites

**Harvesting considerations**

**WHAT IS HARVESTED:** open flowers plus 1–2” of stem

**HARVESTING TECHNIQUES:** cut

**BEST TIME OF DAY TO HARVEST:** early morning while flowers are turgid

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

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

**Preparing for use in lei:** for single lei, cut flower close to the clayx (green, leafy base), leaving little or no stem; for double lei, remove calyx of each blossom or split open

**Storing a completed lei before wearing:** soak lei, shake off excess water, place on dry newspaper in paper box, and refrigerate

**Preserving a lei for long-term storage or display:** cannot be preserved

**Notes on lei making**

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

**VASE LIFE:** 6–9 days

**CLEANING OF PLANT MATERIALS:** no water

**STORING RAW LEI MATERIALS:** refrigerate at 40–48°F for up to 14 days; don’t wet flowers; store in covered box, lay flowers on dry newspaper (to absorb moisture) over polyethylene liner, put layers of newspaper between layers of flowers, and don’t allow flowers to contact the plastic; boxes should have vents to prevent ethylene build-up and should be spaced away from each other to allow for circulation around box

**References and further reading**


cigar flower

OTHER COMMON NAMES: pua kikā
SCIENTIFIC NAME: Cuphea ignea
FAMILY: Lythraceae (loosestrife family)
NATURAL SETTING/LOCATION: native to Mexico

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found
CULTIVARS: other species and cultivars available.

Growing your own

PROPAGATION

FORM: cuttings or seeds (purchase from seed source)
PREPLANTING TREATMENT: treat cuttings with mild rooting hormone.
PLANTING DEPTH: sow seed ¼” deep in medium; insert base of cutting 1–2” into medium
GERMINATION TIME: 2 weeks at 70°F; temperature-sensitive
CUTTING ROOTING TIME: 3–4 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: silty loam, or soil with a high organic matter content
SOIL pH: 6.0–6.5
LIGHT: full sun
WATER: drought tolerant
TEMPERATURE: 60–95°F
ELEVATION: 10–2000’
SALT TOLERANCE: moderate
WIND RESISTANCE: moderate

MANAGEMENT

FERTILIZER NEEDS: medium
RECOMMENDED SPACING: 1’ apart within rows, 4–6’ between rows
ADAPTATION TO GROWING IN CONTAINERS: yes, 3-gallon tubs
PRUNING: prune to reduce size, maintain shape, and keep full and bushy

SPECIAL CULTURAL HINTS: plant in a well-drained area to avoid root rot problems
SUGGESTED COMPANION PLANTINGS: mixed border or mixed bedding planting
cigar flower

**Plant characteristics**

- **Height:** 1–3’
- **Spread:** 2–5’
- **Growth Rate:** moderate
- **Growth Habit:** low, dense, evergreen shrub

**Flowers**

- **Size:** 1” long
- **Color:** orange, red (other types available in purple and pink)
- **Shape:** tubular
- **Fragrance:** none
- **Flowers in First Year:** yes
- **Flowering Period:** year-round
- **Time to Flowering:** seedlings flower about 3½ months after germination; cuttings produce flowers 6–8 weeks after rooting
- **Inducing and Maintaining Flowering:** avoid drastic pruning and excessive N fertilizer

**Pests**

- **Common Diseases:** fungal root rots, foliar blights
- **Other Pests:** aphids, beetles, grasshoppers, sunflower spittle bug

**Harvesting considerations**

- **What is Harvested:** flowers with ½” of stem
- **Harvesting Techniques:** pluck flowers
- **Best Time of Day to Harvest:** early morning or evening
- **Best Way to Transport from Picking Area:** paper bag
- **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:** cold water soak
- **Storing Raw Lei Materials:** place in sealed container and refrigerate at 40°F for up to 7 days
- **Preparing for Use in Lei:** clip off stem then sew; for other styles of lei, remove leaves from stem before using
- **Storing a Completed Lei Before Wearing:** soak lei, shake off excess water, place in sealed container, and refrigerate; lei may be revived by soaking in water and placing in plastic bag in refrigerator for 3 hours
- **Preserving a Lei for Long-Term Storage or Display:** air-dry

**References and further reading**


Growing Plants for Hawaiian Lei

**crown flower**

**OTHER COMMON NAMES:** giant milkweed, pua kalaunu  
**SCIENTIFIC NAME:** Calotropis gigantea  
**FAMILY:** Asclepiadaceae (milkweed family)  
**NATURAL SETTING/LOCATION:** native to India and the East Indies

**CURRENT STATUS IN THE WILD IN HAWAI'I:** typically not found  
**CULTIVARS:** small-flowered type available (*Calotropis procera*)

**Growing your own**

**HANDLING CAUTIONS:** all plant parts are poisonous; milky sap in eyes may cause blindness, on skin may cause considerable irritation

**PROPAGATION**

**FORM:** seeds; cuttings  
**PREPLANTING TREATMENT:** soak seeds in water for 4–6 hours; use medium rooting hormone on cuttings  
**PLANTING DEPTH:** sow seeds ¼" in medium; insert base of cutting 1–2" into medium  
**GERMINATION TIME:** 1–2 weeks  
**CUTTING ROOTING TIME:** 6–8 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained  
**SOIL pH:** 6.0–6.5  
**LIGHT:** full sun  
**WATER:** requires irrigation during dry periods  
**TEMPERATURE:** >70°F  
**ELEVATION:** 10–1000'  
**SALT TOLERANCE:** moderate  
**WIND RESISTANCE:** moderate

**MANAGEMENT**

**FERTILIZER NEEDS:** light  
**RECOMMENDED SPACING:** 8–12' apart  
**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2- to 5-gallon tubs  
**PRUNING:** pruning to keep within picking height will temporarily reduce flower production; thinning out old branches induces vigorous new growth  
**SPECIAL CULTURAL HINTS:** grow in dry and hot areas; keep low for harvesting  
**SUGGESTED COMPANION PLANTINGS:** low annuals

**Plant characteristics**

**HEIGHT:** to 12'  
**SPREAD:** 15'  
**GROWTH RATE:** fast  
**GROWTH HABIT:** erect, evergreen, rounded shrub

**FLOWERS**

**SIZE:** 1" diameter  
**COLOR:** pale lavender, pink, or white  
**SHAPE:** five curled-back petals and a prominent crown  
**FRAGRANCE:** faint
**Growing Plants for Hawaiian Lei**

**ALERT:** *Calotropis gigantea* can be an invasive species and cause problems in agricultural and natural areas in Hawai‘i, especially in pastures. It scores a rating of 15 on the Hawai‘i–Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai‘i or similar Pacific islands, and is about 95% accurate. Any score above 6 indicates the potential for invasiveness, though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but *C. gigantea* should not be introduced to areas where it is not already growing. *C. gigantea* has already naturalized in some places on Kaua‘i, Moloka‘i, and Maui. Wind and birds can spread the seeds and the plant can reproduce by suckers. If used in lei, seeds should be removed first if possible. If fertile material is used, lei should not be discarded in areas where *C. gigantea* is not naturalized and where the seeds can germinate and grow. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: [http://www.plantpono.org](http://www.plantpono.org).

**crown flower**

**FLOWERS IN FIRST YEAR:** yes, from cuttings  
**FLOWERING PERIOD:** year-round  
**TIME TO FLOWERING:** maturity after 3–4 years (from seed)  
**INDUCING AND MAINTAINING FLOWERING:** not known  

**PESTS**

**COMMON DISEASES:** none  
**OTHER PESTS:** caterpillars (monarch butterfly)

### Harvesting considerations

**WHAT IS HARVESTED:** flowers  
**HARVESTING TECHNIQUES:** break off; gloves and eye protection advised to avoid contact with sap while harvesting  
**BEST TIME OF DAY TO HARVEST:** early morning  
**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper or cloth bag  
**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers

### References and further reading


### Notes on lei making

**BEST FOR WHICH TYPE OF LEI:** neck, head, wrist, ankle, horse  
**VASE LIFE:** 3 days for purple flowers, 2 days for white flowers  
**CLEANING OF PLANT MATERIALS:** cold water soak for 5 minutes  
**STORING RAW LEI MATERIALS:** store purple flowers for up to 5 days in refrigerator at 40°F; white flowers for up to 4 days  
**PREPARING FOR USE IN LEI:** for crown lei, separate blossoms and buds; for bud lei, use buds of same size; for whole crown lei, use all of the newly opened and fully developed blossoms; for crown flower petal lei, use petals in best condition  

**STORING A COMPLETED LEI BEFORE WEARING:** mist lei, shake off excess water, place on dry paper towel in sealed plastic container, and refrigerate  
**PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** air-dry
**cup-and-saucer plant**

**OTHER COMMON NAMES:** Chinaman’s hat, parasol flower  
**SCIENTIFIC NAME:** Holmskioldia sanguinea, H. sanguinea f. citrina, H. tettensis  
**FAMILY:** Lamiaceae (mint family)

**NATURAL SETTING/LOCATION:** foothills of Indian Himalayas (H. sanguinea); southeast Africa (H. tettensis)  
**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

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**Growing your own**

**PROPAGATION**

**FORM:** woody cuttings  
**PREPLANTING TREATMENT:** treat cuttings with medium rooting hormone  
**PLANTING DEPTH:** insert base of cutting 1–1½" into medium  
**CUTTING ROOTING TIME:** 6–8 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well-drained loam  
**SOIL pH:** 6.0–6.5  
**LIGHT:** full sun  
**WATER:** keep dry  
**TEMPERATURE:** 55–90°F  
**ELEVATION:** 10–3200’  
**SALT TOLERANCE:** moderate  
**WIND RESISTANCE:** moderate

**MANAGEMENT**

**FERTILIZER NEEDS:** medium  
**RECOMMENDED SPACING:** 4–6’ apart  
**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2-gallon tubs or larger  
**PRUNING:** vigorous pruning recommended to manage shape and induce new growth and flowering; H. tettensis best pruned to tall, linear form during the winter after main flowering period
cup-and-saucer plant

**Plant characteristics**

HEIGHT: *H. sanguinea* to 10',
*H. tettensis* to 15'

SPREAD: *H. sanguinea* to 6',
*H. tettensis* up to 4'

GROWTH RATE: *H. sanguinea* fast,
*H. tettensis* moderate

GROWTH HABIT: *H. sanguinea*, rounded shrub; *H. tettensis*, upright shrub

**FLOWERS**

SIZE: ¾–1”

COLOR: orange to red (*H. sanguinea*),
yellow-green (*H. sanguinea* f. *citrina*), purplish (*H. tettensis*)

SHAPE: round, funnel-shaped

FRAGRANCE: none

FLOWERS IN FIRST YEAR: yes

FLOWERING PERIOD: year-round, heaviest in winter and spring

TIME TO FLOWERING: 6–8 months, but 2–3 years for full maturity

INDUCING AND MAINTAINING FLOWERING: flowers on new wood, so pruning is essential to stimulate new growth

**PESTS**

COMMON DISEASES: *Pythium* root rot,
nematodes

OTHER PESTS: ants, mealybugs, scales, thrips

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The lei shown also contains baby’s breath, globe amaranth, dusty miller, feverfew, and galphimia.

**Harvesting considerations**

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

HARVESTING TECHNIQUES: pinch

BEST TIME OF DAY TO HARVEST: early morning

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

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, horse

VASE LIFE: 3–5 days

CLEANING OF PLANT MATERIALS: cold water soak for 5 minutes

STORING RAW LEI MATERIALS: place on damp newspaper in paper or plastic container and refrigerate at 40°F for up to 10 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 paper or plastic container, and refrigerator

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

**References and further reading**


**Growing Plants for Hawaiian Lei**

**Other Common Names:** money tree

**Scientific Name:** *Dracaena marginata* var. *tricolor*

**Family:** Agavaceae (agave family)

**Natural Setting/Location:**
*D. marginata* is from tropical West Africa; var. *tricolor* is only found in cultivation

**Current Status in the Wild in Hawai‘i:** not found

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## Growing your own

### Propagation

**Form:** cuttings (minimum 6" long)

**Preplanting Treatment:** treat with medium rooting hormone

**Planting Depth:** insert base of cutting 3–4" into medium

**Cutting Rooting Time:** 1–3 months

### Preferred Production Conditions

**General Soil Characteristics:** well drained; tolerant of various soil types

**Soil pH:** 5.5–6.5

**Light:** full sun to partial shade

**Water:** moderate

**Temperature:** 65–90°F

**Elevation:** 10–2000'

**Salt Tolerance:** moderate

**Wind Resistance:** moderate

### Management

**Fertilizer Needs:** heavy

**Recommended Spacing:** 2–4' apart

**Adaptation to Growing in Containers:** yes, 1- to 5-gallon tubs

**Pruning:** prune tips back to induce new, thin shoots with smaller leaves and to control size

**Suggested Companion Plantings:** low-growing plants
**dracaena tricolor**

**Plant characteristics**

**Height:** to 15’

**Spread:** 3–5’

**Growth Rate:** fast

**Growth Habit:** erect, angular, woody, evergreen

**Foliage**

**Texture:** leathery, pliable

**Color:** from emerald to gray-green, sometimes variegated

**Shape:** lance-shaped

**Fragrance:** none

**Pests**

**Common Diseases:** Fusarium and other leaf-spot fungi, root rot, bacterial soft rot, nematodes (root-knot, reniform, spiral)

**Other Pests:** caterpillar (banana moth), mealybugs, scales

**Harvesting considerations**

**What is harvested:** leaves

**Harvesting Techniques:** pull or snap leaf off of stem; don’t cut

**Best Time of Day to Harvest:** early morning

**Best Way to Transport from Picking Area:** plastic bag

The lei shown also contains dusty miller.

**Notes on lei making**

**Best for which type of lei:** neck, head, wrist, ankle, horse

**Cleaning of Plant Materials:** hand wash under cold, running water

**Storing Raw Lei Materials:** place 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:** mist lei, shake off excess water, wrap in paper towels, place in sealed plastic container, and refrigerate

**Preserving a Lei for Long-Term Storage or Display:** air-dry

**References and further reading**


### Growing Plants for Hawaiian Lei

**dusty miller**

**Scientific Name:** Senecio cineraria; Centaurea cineraria  
**Family:** Asteraceae (formerly Compositae) (aster family)  
**Natural Setting/Location:** Western and southern Mediterranean  
**Current Status in the Wild in Hawai‘i:** Not found  
**Cultivars:** ‘Silver Lace’, ‘Silver Dust’, ‘Silver Storm’

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### Growing your own

**Propagation**

**Form:** Tip cuttings; seeds (purchase from seed source)  
**Preplanting Treatment:** Treat cuttings with mild rooting hormone  
**Planting Depth:** Sow seeds ¼” deep in medium; insert base of cutting 1–2” into medium  
**Germination Time:** 2–3 weeks  
**Cutting Rooting Time:** 3 weeks

**Preferred Production Conditions**

**General Soil Characteristics:** Well drained, rich soil  
**Soil pH:** 6.0–7.0  
**Light:** Full sun  
**Water:** Moderate  
**Temperature:** 50–90°F  
**Elevation:** 10–4000’  
**Salt Tolerance:** Moderate  
**Wind Resistance:** Moderate

**Management**

**Fertilizer Needs:** Light; amend field soils with Ca and Mg if analysis is low  
**Recommended Spacing:** 15” apart  
**Adaptation to Growing in Containers:** Yes, 6–8” pots  
**Pruning:** Pinch flower buds as they appear in order to maintain foliage quality  
**Special Cultural Hints:** Treat as an annual in Hawai‘i; avoid waterlogged and poorly drained soils
**dusty miller**

**Plant characteristics**

**HEIGHT:** 1–2’

**SPREAD:** 1–2’

**GROWTH RATE:** fast

**GROWTH HABIT:** compact, mounding herb

**FOLIAGE**

**TEXTURE:** fuzzy

**COLOR:** gray-green to silvery

**SHAPE:** feathery lobes

**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** *Phytophthora* blight, root rot, root-knot nematodes

**OTHER PESTS:** caterpillars

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**Harvesting considerations**

**WHAT IS HARVESTED:** leaves

**HARVESTING TECHNIQUES:** cut or pinch off

**BEST TIME OF DAY TO HARVEST:** early morning

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

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The lei shown also contains rose, ʻōhiʻa lehua, paʻiniu, and palapalai.

**Notes on lei making**

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

**CLEANING OF PLANT MATERIALS:** hand wash under cold running water

**STORING RAW LEI MATERIALS:** 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

**STORING A COMPLETED LEI BEFORE WEARING:** soak lei, shake off excess water, wrap in damp newspaper, place in plastic or paper box, and refrigerate

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

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**References and further reading**


**feverfew**

**SCIENTIFIC NAME:** *Tanacetum parthenium*  
**FAMILY:** Asteraceae (formerly Compositae) (aster family)

**NATURAL SETTING/LOCATION:** native to southeast Europe and Caucasus mountains  
**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

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### Growing your own

**PROPAGATION**

**FORM:** seeds (purchase from seed source); division; cuttings  
**PREPLANTING TREATMENT:** use mild rooting hormone on cuttings  
**PLANTING DEPTH:** sow seeds on surface of medium or slightly below (¼”); for divisions, keep root crown just below soil level; insert base of cutting 1–2” into medium  
**GERMINATION TIME:** 10–15 days at 70°F  
**CUTTING ROOTING TIME:** 3–4 weeks

**PREFERRED PRODUCTION CONDITIONS**

- **GENERAL SOIL CHARACTERISTICS:** sandy, loamy  
- **SOIL pH:** 6.0–6.5  
- **LIGHT:** full sun  
- **WATER:** moderate to light  
- **TEMPERATURE:** 60–70°F (day), 55°F (night)  
- **ELEVATION:** 500–3500'  
- **SALT TOLERANCE:** moderate  
- **WIND RESISTANCE:** moderate

**MANAGEMENT**

- **FERTILIZER NEEDS:** medium  
- **RECOMMENDED SPACING:** 1’ apart  
- **ADAPTATION TO GROWING IN CONTAINERS:** yes, 1- to 2-gallon tubs  
- **PRUNING:** prune to generate new shoots from crown; pinching generally not needed for branching  

**SPECIAL CULTURAL HINTS:** cuttings from vegetative shoots result in a more uniform plant; avoid wet growing conditions, as plants die out from root rot in wet soils  
**SUGGESTED COMPANION PLANTINGS:** baby’s breath
feverfew

**Plant characteristics**

**HEIGHT:** 15–24”

**SPREAD:** clump size 10–15”

**GROWTH RATE:** fast

**GROWTH HABIT:** clumping herb

**FLOWERS**

**SIZE:** ¾” diameter

**COLOR:** white, cream, yellow

**SHAPE:** round, flat (daisy-type flower) singles, doubles

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** from division, yes; from seed, yes; from cutting, yes (if propagated in spring)

**FLOWERING PERIOD:** late spring, summer; provide lights for better year-round flowering

**TIME TO FLOWERING:** 10–12 weeks from established seedling during spring or summer; 10 weeks after start of light treatment

**INDUCING AND MAINTAINING FLOWERING:** flowering duration is 8 weeks; can be pruned and renewed

**PESTS**

**COMMON DISEASES:** Botrytis on flowers, mildew on foliage, root rot; may be susceptible to aster yellows

**OTHER PESTS:** aphids, spider mites, thrips

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**Harvesting considerations**

**WHAT IS HARVESTED:** flowers

**HARVESTING TECHNIQUES:** cut stems low to encourage branching from crown of the plant

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** brown paper bag

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

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**Notes on lei making**

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

**VASE LIFE:** 4 days

**CLEANING OF PLANT MATERIALS:** put stem bases in water; do not wet flower heads

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**Storing raw lei materials:** store in sealed plastic container and refrigerate at 40°F for up to 10 days

**Preparing for use in lei:** clip off wrinkled, limp, or poor-quality areas before adding to lei; remove leaves

**Storing a completed lei before wearing:** mist lei, shake off excess water, wrap in damp newspaper, place in sealed plastic container, and refrigerate

**Preserving a lei for long-term storage or display:** air-dry

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**References and further reading**


gardenia

**OTHER COMMON NAMES:** kiele

**SCIENTIFIC NAME:** Gardenia augusta

**FAMILY:** Rubiaceae (coffee family)

**NATURAL SETTING/LOCATION:** native to China

**CURRENT STATUS IN THE WILD IN HAWAI’I:**

*G. augusta* not found in the wild; three native species (*G. brighamii, G. remyi, G. mannii*) are either rare or endangered

**CULTIVARS:** there are many, but only a few are available with a consistently used name: ‘Enchantress’, ‘Mystery’, ‘Amy Yoshioka’, ‘Veitchii’

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**Growing your own**

**PROPAGATION**

**FORM:** seeds; cuttings 6–7" long; air layering; grafting

**PREPLANTING TREATMENT:** soak seeds in water for 24 hours; treat cuttings with medium rooting hormone

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

**GERMINATION TIME:** 3 months

**CUTTING ROOTING TIME:** 3–6 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL pH:** 5.0–5.5 (avoid high pH)

**LIGHT:** sunny location

**WATER:** heavy soaking

**TEMPERATURE:** 60–75°F

**ELEVATION:** 10–2500'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** moderate (wind damages fragile flowers)

**MANAGEMENT**

**FERTILIZER NEEDS:** medium; to correct chlorosis, apply acidifying fertilizer such as iron sulfate

**RECOMMENDED spacing:** 5' apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2- to 5-gallon tubs, but growing in the ground is best

**PRUNING:** remove weak wood; head back (cut back) vigorous stems; avoid pruning late in the year; prune to keep within picking height and to produce new shoots for flowering

**SPECIAL CULTURAL HINTS:** under high-pH conditions, new growth will turn yellow; give iron; remove spent flowers; regular irrigation important to keep plant strong and healthy

**SUGGESTED COMPANION PLANTINGS:** low herbs or annuals requiring partial sun or shade
Plant characteristics

**Height:** 2–6’

**Spread:** 4–5’

**Growth Rate:** moderate

**Growth Habit:** upright, oval shrub

**Flowers**

**Size:** 2–5”

**Color:** white to cream

**Shape:** round

**Fragrance:** highly scented

**Flowers in First Year:** yes, from cuttings or air layering

**Flowering Period:** late spring, early summer

**Time to Flowering:** less than 1 year from cutting and air layering, 2–3 years from seed

**Inducing and Maintaining Flowering:** can induce by pruning

**Pests**

**Common Diseases:** leaf spots, stem canker, root-knot nematode, sooty mold (a problem when ants, aphids, and scales are not controlled)

**Other Pests:** ants, aphids, mealybugs, mites, scales, thrips

Harvesting considerations

**What is Harvested:** flowers and calyx (green, leafy base); harvesting only from cultivated plants is recommended due to scarcity of the native Gardenia species

**Harvesting Techniques:** cut, don’t pull

**Best Time of Day to Harvest:** morning for buds, afternoon for open flowers

Notes on lei making

**Best for Which Type of Lei:** neck, head, wrist, ankle

**Vase Life:** 2 days

**Cleaning of Plant Materials:** spray with water

**Storing Raw Lei Materials:** place on wet paper towel in a bowl and refrigerate at 40°F for up to 1 day for flowers and 3 days for buds

**Preparing for Use in Lei:** for flower lei, remove calyx, then sew; if calyx is sewn into lei, clip bottom; for wili (twisting pattern) lei, remove calyx

**Storing a Completed Lei Before Wearing:** soak lei, shake off excess water, place in sealed container, and refrigerate

**Preserving a Lei for Long-Term Storage or Display:** cannot be preserved

References and further reading


Growing Plants for Hawaiian Lei

**ginger (white and yellow)**

**OTHER COMMON NAMES:** ‘awapuhi ke’oke’o (white ginger), ‘awapuhi melemele (yellow ginger)

**SCIENTIFIC NAME:** Hedychium coronarium, *H. flavescens* and other species

**FAMILY:** Zingiberaceae (ginger family)

**NATURAL SETTING/LOCATION:** southwest China and northeast India

**CURRENT STATUS IN THE WILD IN HAWAII:** has potential to be invasive in wet areas

**CULTIVARS:** a number of hybrids exist with different colors and flower sizes; few are readily available

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**Growing your own**

**PROPAGATION**

**FORM:** division of rhizomes is best; seeds

**PREPLANTING TREATMENT:** remove any diseased portion of the division and dust the cuts with fungicide before planting

**PLANTING DEPTH:** sow seeds on surface or slightly below (¼”); keep root crown of division just below soil level

**GERMINATION TIME:** 1 month

**RHIZOME ROOTING TIME:** 3–4 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** high organic matter

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun to partial shade

**WATER:** heavy watering

**TEMPERATURE:** 50–75°F

**ELEVATION:** 10–6000’

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

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**MANAGEMENT**

**FERTILIZER NEEDS:** heavy

**RECOMMENDED SPACING:** 3–5’ apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2- to 5-gallon tubs

**PRUNING:** remove old canes after flowering

**SPECIAL CULTURAL HINTS:** divide and replant after 5 years

**SUGGESTED COMPANION PLANTINGS:** can be grown under light shade of tall trees

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**Plant characteristics**

**COLOR:** white, yellow, orange

**SHAPE:** tubular

**FRAGRANCE:** yes, strong

**FLOWERS IN FIRST YEAR:** from divisions, yes; seeds take 2–3 years

**FLOWERING PERIOD:** white forms flower in late summer, yellow forms flower year-round

**TIME TO FLOWERING:** 3 months minimum, depending on size of division and time of year the division is taken; spring is the best time to make divisions
**Inducing and Maintaining Flowering:** In winter, use of flood lamps to interrupt dark period causes mature plants to flower 8–10 weeks later.

**Pests**

**Common Diseases:** bacterial leaf spots, root rot, nematodes (root-knot, burrowing, lesion, reniform)

**Other Pests:** ants, aphids, mealybugs, scales, thrips

**Harvesting Considerations**

**What is Harvested:** Flower buds

**Harvesting Techniques:** Pull buds from stalk

**Best Way to Transport from Picking Area:** Brown paper bag, or wrap in ti leaf and put in sealed container

**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:** Cold water soak

**Storing Raw Lei Materials:** Depends on lei pattern; for single or double, place buds in water to slightly open flowers; for Micronesian pattern, do not place in water, keep in bud form, and place on ti leaf sealed in cellophane; refrigerate at 40°F for up to 3 days

**Preparing for Use in Lei:** Depends on lei pattern; for single or double, gently open up flowers; for Micronesian, leave bud covering on until lei is completed

**Storing a Completed Lei Before Wearing:** Mist lei, place in sealed plastic container, and refrigerate

**Preserving a Lei for Long-Term Storage or Display:** Cannot be preserved

**References and Further Reading**


**Alert:** *Hedychium coronarium* and *H. flavescens* could be invasive species and cause problems in forests and natural areas in Hawai‘i. *H. coronarium* scores a rating of 14 and *H. flavescens* scores a rating of 11 on the Hawai‘i-Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai‘i or similar Pacific islands and is about 95% accurate. Any score above 6 indicates the potential for invasiveness, though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but *H. coronarium* and *H. flavescens* should not be introduced to areas where they are not already growing. *H. coronarium* has already naturalized in some places on O‘ahu, Molokai, Maui, Lana‘i, and Hawai‘i Island, and *H. flavescens* has already naturalized in some places on Kaua‘i, O‘ahu, Molokai, Maui, Lana‘i, and Hawai‘i Island. The plants spread via rhizomes and stolons. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: http://www.plantpono.org.
Growing Plants for Hawaiian Lei

hoya

**OTHER COMMON NAMES:** honey plant, pua-hōkū-hihi, star flower, wax plant

**SCIENTIFIC NAME:** *Hoya* species

**FAMILY:** Asclepiadaceae (milkweed family)

**NATURAL SETTING/LOCATION:** Asia, Oceania

**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

**CULTIVARS:** many cultivars and species available: ‘Exotica’, ‘Krinkle Kurl’, ‘Variegata’

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**Growing your own**

**PROPAGATION**

**FORM:** cuttings; seeds (seeds rarely available)

**PREPLANTING TREATMENT:** allow cuttings to dry for 7 days before planting, treat with medium rooting hormone

**PLANTING DEPTH:** insert base of cutting 1” into medium

**GERMINATION TIME:** unknown

**CUTTING ROOTING TIME:** 2–3 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained, loose

**SOIL pH:** 6.0–6.5

**LIGHT:** full sun to partial shade

**WATER:** keep dry

**TEMPERATURE:** 45–105°F

**ELEVATION:** 10–2000’

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** good

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 2’ in rows

**ADAPTATION TO GROWING IN CONTAINERS:** yes, with a well-drained and nematode-free medium; hanging baskets preferred; support needed when grown in pots

**SPECIAL CULTURAL HINTS:** spray whole plant when watering; highly susceptible to burrowing nematodes; provide trellis or other support
Growing Plants for Hawaiian Lei

hoya

Plant characteristics

HEIGHT: 10′, depending on support height
SPREAD: 36"
GROWTH RATE: fast to slow, depending on species
GROWTH HABIT: moderately compact vine

FLOWERS
SIZE: ¼–¾”
COLOR: white, pink, peach
SHAPE: flat with fleshy crown, star-shaped
FRAGRANCE: sweet
FLOWERS IN FIRST YEAR: possibly 3 clusters of flowers with stalks of nearly equal length
FLOWERING PERIOD: year-round
TIME TO FLOWERING: 6 months
INDUCING AND MAINTAINING FLOWERING: continual, minimal fertilizer

PESTS
COMMON DISEASES: fungal root rot, root-knot and burrowing nematodes
OTHER PESTS: mealybugs, scales

The lei shown also contains aster, rose, bleeding heart, globe amaranth, ageratum, bougainvillea, and ‘ākia.

Harvesting considerations

WHAT IS HARVESTED: individual flowers and flower clusters
HARVESTING TECHNIQUES: do not remove persistent stalk (that which remains attached to the plant)
BEST TIME OF DAY TO HARVEST: early morning
BEST WAY TO TRANSPORT FROM PICKING AREA: paper bag
AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, and wilting flowers

Preparing for use in lei: clip off the wrinkled, limp, or poor-quality areas before adding to lei. Stem length should be ¼”

Storing a completed lei before wearing: soak lei, drip dry, wrap in damp paper towel in sealed plastic container, and refrigerate

Preserving a lei for long-term storage or display: air-dry

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: keep damp with wet paper towels and refrigerate at 40°F for up to 10 days

References and further reading


References and further reading
Growing Plants for Hawaiian Lei

**hydrangea**

**OTHER COMMON NAMES:** ajisai, hortensia, mil flores, pópohau

**SCIENTIFIC NAME:** *Hydrangea macrophylla*

**FAMILY:** Hydrangeaceae (hydrangea family)

**NATURAL SETTING/LOCATION:** native to Japan

**CURRENT STATUS IN THE WILD IN HAWAI’I:** occasionally found but not naturalized

**CULTIVARS:** ‘Bottstein’, ‘Jennifer’, ‘Rose Supreme’, ‘Sister Therese’

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**Growing your own**

**HANDLING CAUTIONS:** all parts of the plant are poisonous if eaten

**PROPAGATION**

**FORM:** cuttings

**PREPLANTING TREATMENT:** treat with medium rooting hormone

**PLANTING DEPTH:** plant base 1–2” into medium

**CUTTING ROOTING TIME:** 3–5 weeks with mist and bottom heat (72°F)

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well-drained loam or sandy loam

**SOIL pH:** pink flowers are produced at pH >6.0–6.5, blue flowers are produced with the addition of aluminum sulfate and a lower pH of 5.0–5.5

**LIGHT:** full sun to partial shade

**WATER:** keep moist

**TEMPERATURE:** for flower initiation, night temperature in the 65–70°F range is necessary; an exposure to 52°F for a period of 6–8 weeks will improve flowering

**ELEVATION:** 500–3500’ (flowering is erratic at lower elevations)

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 3–5’ apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 3- to 5-gallon tubs or large planter boxes

**PRUNING:** pinch shoots back to 2 nodes in late May and early July; thin out weak growth early in the year; don’t prune late in the year or you may lose next year’s flowers

**SPECIAL CULTURAL HINTS:** pinch through early summer to produce many branches; plants under long-day conditions remain vegetative, while short-day conditions encourage flower initiation; for pink flowers, avoid acidic soils high in aluminum (Al); for blue flowers, high-Al soils are good, or aluminum sulfate can be added to lower pH; if Al is added to pots with pink flowers, they may gradually turn to a mauve-blue color; some cultivars have stable flower color

**SUGGESTED COMPANION PLANTINGS:** azalea
The lei shown also contains feverfew, baby’s breath, rose, ageratum, statice, and chrysanthemum.

**Plant characteristics**

**HEIGHT:** to 10’
**SPREAD:** to 5–6’
**GROWTH RATE:** fast
**GROWTH HABIT:** spreading shrub

**FLOWERS**

**SIZE:** inflorescences are 4–8” in diameter
**COLOR:** white, pink, red, blue, lavender, mauve
**SHAPE:** inflorescence spherical, individual florets squarish
**FRAGRANCE:** none
**FLOWERS IN FIRST YEAR:** yes if forced, but normally flowering occurs during the second year
**FLOWERING PERIOD:** spring
**TIME TO FLOWERING:** floral development requires 8–10 weeks from initiation

**INDUCING AND MAINTAINING FLOWERING:** for plants grown in covered areas, 6–10 weeks of short days (8–12 hours) and 65°F nights in late summer are needed to stimulate flower initiation; for potted plants, provide 6 weeks of temperature below 55°F and force at 60–65°F; no good control system for open field-grown plants

**FOLIAGE**

**TEXTURE:** coarse
**COLOR:** dark green
**SHAPE:** ovate with serrated margins and acuminate tip
**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** powdery mildew, root rot, various leaf spots, viruses
**OTHER PESTS:** aphids, mites, scales, slugs, snails, thrips, whiteflies

**Harvesting considerations**

**WHAT IS HARVESTED:** inflorescence or parts of one
**HARVESTING TECHNIQUES:** pluck individual inflorescence
**BEST TIME OF DAY TO HARVEST:** early morning
**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper bag
**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, horse
**VASE LIFE:** 4 days

**STORING RAW LEI MATERIALS:** wrap individual flowers in wet paper towel, place in plastic or paper container, and refrigerate 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, drip dry, wrap in wet paper towel, place in plastic or paper container, and refrigerate

**REFERENCES AND FURTHER READING**


ixora

OTHER COMMON NAMES: pōpōlehua

SCIENTIFIC NAME: *Ixora coccinea; I. chinensis; I. casei*

FAMILY: Rubiaceae (coffee family)

NATURAL SETTING/LOCATION: Southeast Asia and China

CURRENT STATUS IN THE WILD IN HAWAI’I: not found

CULTIVARS: many cultivars are available, in dwarf and standard sizes; ‘Nora Grant’ is very popular

Growing your own

PROPAGATION

FORM: terminal cuttings; air layering

PREPLANTING TREATMENT: treat cuttings with medium rooting hormone

PLANTING DEPTH: insert base of cutting 1–2" into medium

CUTTING ROOTING TIME: 2–3 months

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, loamy to sandy loam; in pots, 1:2:2 soil:peat:perlite or volcanic cinders

SOIL pH: 5.0–5.5; considerable chlorosis develops at higher pH

LIGHT: full sun (tolerates partial shade but does not flower as profusely)

WATER: keep moist

TEMPERATURE: 55–90°F

ELEVATION: 10–1000'

SALT TOLERANCE: moderate

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium; to correct chlorosis, apply acidifying fertilizer such as iron sulfate

RECOMMENDED SPACING: larger type should be planted about 5’ on center unless grown as a hedge, in which case 8–36”, depending on type

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

PRUNING: cut back to leave 3–4 leaf pairs on a branch; thin out weak branches
ixora

**Plant characteristics**

**Height:** 2–12’

**Spread:** 2–5’

**Growth Rate:** moderate

**Growth Habit:** spreading to erect, evergreen, woody shrub

**Flowers**

**Size:** terminal clusters up to 10” across; a double red form exists

**Color:** white, red, pink, orange, yellow

**Shape:** individual flowers with long tube and 4-lobed petals

**Fragrance:** none

**Flowers in First Year:** yes

**Flowering Period:** year-round, heaviest in summer

**Time to Flowering:** from transplanted cuttings, allow 4–6 months; seedlings have a juvenility period and take longer to flower than do cuttings

**Inducing and Maintaining Flowering:** flowers occur on new growth; prune as needed to produce new shoots; pruning back to old wood stimulates small axillary flower clusters; use of a growth retardant stimulates flowering

**Pests**

**Common Diseases:** root rot in wet soils, Botrytis on flowers in wet weather, leaf spots, nematodes, sooty mold with high insect populations, susceptible to nutrient imbalances

**Other Pests:** ants, aphids, mealybugs, scales, whiteflies

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The lei shown also contains bougainvillea, epidendrum orchid, panax, aster, moa, and ti.

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**Harvesting considerations**

**What is harvested:** flowers

**Harvesting Techniques:** pluck individual flowers

**Best Time of Day to Harvest:** early morning

**Best Way to Transport from Picking Area:** paper or cloth bag

**Avoid Contact with These Products:** smoke, car exhaust, ripening fruits, and wilting flowers

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**Notes on lei making**

**Best for Which Type of Lei:** neck, head, wrist, ankle

**Vase Life:** 2 days

**Cleaning of Plant Materials:** cold water soak

**Storing Raw Lei Materials:** store in water and refrigerate at 40°F for up to 4 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 on wet paper towel in sealed plastic container, and refrigerate

**Preserving a Lei for Long-Term Storage or Display:** cannot be preserved

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**References and further reading**


joyweed

**Other Common Names**: Joseph’s coat, palewāwae

**Scientific Name**: *Alternanthera tenella*

**Family**: Amaranthaceae (amaranth family)

**Natural Setting/Location**: tropical and subtropical America

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**Growing your own**

**Propagation**

**Form**: cuttings (2–3” cuttings root rapidly); division

**Preplanting Treatment**: rooting hormone not needed

**Planting Depth**: insert base of cutting 1” into medium; keep division root crown just below soil level

**Cutting Rooting Time**: 7–14 days

**Preferred Production Conditions**

**General Soil Characteristics**: well drained, moisture retentive

**Soil pH**: 5.5–6.5

**Light**: full sun produces the best leaf color; tolerates partial shade

**Water**: moderate

**Temperature**: frost-tender; low temperatures reduce foliage color

**Elevation**: 10–2000’

**Salt Tolerance**: poor

**Wind Resistance**: poor

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**Management**

**Fertilizer Needs**: medium; fertilize lightly after shearing

**Recommended Spacing**: 4–6” apart

**Adaptation to Growing in Containers**: yes, ½- to 1-gallon pots, but planting in the ground is better

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**Pruning**: responds well to clipping and shearing and can be maintained at 4–6” height; plants become weak and thin when allowed to grow too tall

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**Current Status in the Wild in Hawai‘i**: not found

**Cultivars**: other species of the genus *Alternanthera* can be used; review seed catalogs for available color forms and leaf varieties
joyweed

**Plant characteristics**

**HEIGHT:** 6–12"

**SPREAD:** 10–12"

**GROWTH RATE:** fast

**GROWTH HABIT:** low, creeping, mat-like shrub

**FOLIAGE**

**TEXTURE:** smooth

**COLOR:** multicolored in yellow, red, orange, green, and white

**SHAPE:** spoon shaped or ovoid

**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** root rot, foliar blights, southern blight, rootknot nematodes

**OTHER PESTS:** broad mite, mealybugs, slugs, snails

**Harvesting considerations**

**WHAT IS HARVESTED:** branch tips

**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

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

The lei shown also contains crown flower, liriope, moa, baby’s breath, and pentas.

**Notes on lei making**

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

**VASE LIFE:** 3 days

**CLEANING OF PLANT MATERIALS:** cold water soak

**STORING RAW LEI MATERIALS:** refrigerate in plastic container 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 for 5 minutes, drip dry, wrap in damp newspaper, place in sealed plastic container, and refrigerate

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

**References and further reading**


**kalanchoe**

**Scientific Name:** *Kalanchoe* species, and cultivars of *K. blossfeldiana*  
**Family:** Crassulaceae (orpine family)  
**Natural Setting/Location:** native to Madagascar

**Current Status in the Wild in Hawai‘i:** not found  
**Cultivars:** many available from commercial sources: ‘Pumila’, ‘Tetra Vulcan’

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**Growing your own**

**Propagation**

**Form:** stem cuttings 2–3 nodes long; leaf cuttings used for some species; preferred propagation material varies among species; seeds available from some seed sources  
**Preplanting Treatment:** cuttings can be dried for 3–4 days before propagating; use mild rooting hormone  
**Planting Depth:** insert base of cutting 1–2” into medium; sow seeds on surface of medium, do not cover  
**Germination Time:** 15 days  
**Cutting Rooting Time:** 3 weeks for stem cuttings; leaf cuttings may require 8–10 weeks to generate roots and shoots

**Preferred Production Conditions**

**General Soil Characteristics:** well drained; in pots, 2:1:1 peat:perlite: sand; plant has fine root system and needs a fine medium, so commercial mixes that are mostly peat and perlite are satisfactory  
**Soil pH:** 5.8–6.5  
**Light:** 50–60% shade to full sun; plants are photoperiod-sensitive: long days promote vegetative growth, while short days (9–10 hours of light) are required for flowering  
**Water:** drought tolerant; do not over-water; allow the soil to dry slightly before watering  
**Temperature:** flowering delayed below 65°F or above 75°F  
**Elevation:** 1000–3500'; some cultivars adapted to low elevations  
**Salt Tolerance:** moderate  
**Wind Resistance:** good

**Management**

**Fertilizer Needs:** medium  
**Recommended Spacing:** a 6” potted plant would require 12–15” space from its center to the center of the adjacent plant  
**Adaptation to Growing in Containers:** yes, 4–8” plastic or clay pots  
**Pruning:** about 3 weeks after potting, pinch out one set of leaves from tip of plant to induce more branches; pinching delays flower development by 4 weeks  
**Special Cultural Hints:** avoid oil-based or emulsifiable sprays  
**Suggested Companion Plantings:** begonia
kalanchoe

**Plant characteristics**

**HEIGHT:** to 40" (depending on species)

**SPREAD:** to 12" (depending on species)

**GROWTH RATE:** slow to moderate

**GROWTH HABIT:** compact, succulent herb

**FLOWERS**

**SIZE:** clusters to 4" in diameter

**COLOR:** red, yellow, orange, pink, rose, white (some species with two-tone flowers)

**SHAPE:** round to irregular cluster of 4-petalled flowers

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** during and following the short-day period of the year

**TIME TO FLOWERING:** from seed: about 10–11 months; from cuttings: 12–16 weeks, depending on variety and daylength treatments

**INDUCING AND MAINTAINING FLOWERING:** provide rooted transplants with 2–4 weeks of long days (minimum 12 hours of light) both before and after pinching; to time of flowering, provide 3–6 weeks of short days (11–11½ hours of light); flower development requires 5–8 weeks from the end of short days, depending on the variety

**PESTS**

**COMMON DISEASES:** bacterial soft rot, *Botrytis* on the flowers, mildew on the foliage, fungal leafspot, crown rot, rootknot nematodes

**OTHER PESTS:** aphids, caterpillars, mealybugs, thrips, whiteflies

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**Harvesting considerations**

**WHAT IS HARVESTED:** flower spikes

**BEST TIME OF DAY TO HARVEST:** pinch flowers off early morning

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

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

**Preparing for use in lei:** haku (mounting against a background) pattern requires about 3–4" of stem with a cluster tied together; clip off wrinkled, limp, or poor-quality areas before adding to lei

**Storing a completed lei before wearing:** soak lei, shake off excess water, place in sealed plastic container, and refrigerate

**Preserving a lei for long-term storage or display:** cannot be preserved

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**Notes on lei making**

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

**CLEANING OF PLANT MATERIALS:** stick stems in water

**STORING RAW LEI MATERIALS:** store in sealed plastic container and refrigerate at 40–45°F for up to 7 days

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**References and further reading**


kīkānia lei

**OTHER COMMON NAMES:** cockroach berry, polohauai‘i

**SCIENTIFIC NAME:** Solanum capsicoides

**FAMILY:** Solanaceae (nightshade family)

**NATURAL SETTING/LOCATION:** native to Brazil

**CURRENT STATUS IN THE WILD IN HAWAI‘I:** common weed in disturbed areas such as pastures, trails, and pond banks

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**Growing your own**

**HANDLING CAUTIONS:** fruits are used in lei but are poisonous if eaten; stems and foliage have thorns

**PROPAGATION**

**FORM:** seeds

**PRETREATMENT:** remove seeds from pulp, soak in water for 24 hours

**PLANTING DEPTH:** sow ¼" deep in medium

**GERMINATION TIME:** 2 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained

**SOIL pH:** 5.5–6.5

**LIGHT:** sunny location

**WATER:** keep dry

**TEMPERATURE:** 60–80°F

**ELEVATION:** 10–2500'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** moderate

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 4' apart

**ADAPTATION TO GROWING IN CONTAINERS:** not recommended

**SPECIAL CULTURAL HINTS:** pick spent flowers; for larger fruits, remove new flowers after first fruits have set

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**Plant characteristics**

**HEIGHT:** to 36"

**SPREAD:** to 36"

**GROWTH RATE:** fast

**GROWTH HABIT:** short-lived shrub

**FRUIT**

**SIZE:** ¾–1"

**COLOR:** orange at maturity
kīkānia lei

**SHAPE:** round

**TYPE:** smooth, hard berry

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** year-round

**TIME TO FLOWERING:** 4 months

**INDUCING AND MAINTAINING FLOWERING:** plant is always flowering

**PESTS**

**COMMON DISEASES:** alternaria and other foliar diseases affecting nightshade plants

**OTHER PESTS:** mealybugs, mites, white-flies

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**Harvesting considerations**

**WHAT IS HARVESTED:** mature fruits

**HARVESTING TECHNIQUES:** pick fruit by hand; gloves advised due to thorns on stems and foliage

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** glass jar

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**Notes on lei making**

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

**CLEANING OF PLANT MATERIALS:** no water

**STORING RAW LEI MATERIALS:** store in glass or plastic container and refrigerate at 40°F for up to 20 days; no water

**PREPARING FOR USE IN LEI:** remove calyx (green, leafy base) and stem before sewing

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**STORING A COMPLETED LEI BEFORE WEARING:** place in glass or plastic container and refrigerate; no water

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

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**References and further reading**


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**ALERT:** *Solanum capsicoides* can be an invasive species and cause problems in agricultural areas in Hawai‘i. It scores a rating of 15 on the Hawai‘i-Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai‘i or similar Pacific islands, and is about 95% accurate. Any score above 6 indicates the potential for invasiveness, though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but *S. capsicoides* should not be introduced to areas where it is not already growing. *S. capsicoides* has already naturalized in some places on Kaua‘i, O‘ahu, Moloka‘i, Maui, Lana‘i, and Hawai‘i Island. Birds can spread the seeds. If fertile material is used, lei should not be discarded in areas where *S. capsicoides* is not naturalized and where the seeds can germinate and grow. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: http://www.plantpono.org.
Growing Plants for Hawaiian Lei

**lantern ‘ilima and royal ‘ilima**

**Other Common Names:** abutilon, ma'o (lantern ‘ilima); triple ‘ilima (royal ‘ilima)

**Scientific Name:** Abutilon pictum (lantern ‘ilima); A. grandiflorum (royal ‘ilima)

**Family:** Malvaceae (mallow family)

**Natural Setting/Location:** Brazil, Uruguay, and Argentina

**Current Status in the Wild in Hawai‘i:**
A. pictum not found; A. grandiflorum naturalized in dry areas

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**Growing your own**

**Propagation**

**Form:** cuttings; seeds

**Preplanting Treatment:** soak seeds in water for 24 hours; treat cuttings with medium rooting hormone, place under mist

**Planting Depth:** sow seeds ¼" deep in medium; insert base of cutting 1–2" into medium

**Germination Time:** 1–3 months

**Cutting Rooting Time:** 3–5 weeks

**Preferred Production Conditions**

**General Soil Characteristics:** well drained

**Soil pH:** 6.0–7.5

**Light:** full sun

**Water:** apply ½" every other day in dry areas once established

**Temperature:** 45–90°F

**Elevation:** 10–2500'

**Salt Tolerance:** poor

**Wind Resistance:** very poor

**Management**

**Fertilizer Needs:** medium

**Recommended Spacing:** 4' apart

**Adaptation to Growing in Containers:** yes, 10-gallon tubs

**Pruning:** prune to manage size and shape and keep full and bushy

**Special Cultural Hints:** plant in raised beds or mounds in areas with poor drainage; stake in areas where winds are strong; a beneficial virus (abutilon mosaic virus) causes leaves to be mottled and rugose (bumpy); plants without the virus have smooth leaves and grow vigorously but produce flowers that are not desirable and are few in number; royal ‘ilima grown from seed varies in size, shape, and growing characteristics.
lantern ‘ilima and royal ‘ilima

**Plant characteristics**

**HEIGHT:** 8'

**SPREAD:** 4'

**GROWTH RATE:** fast

**GROWTH HABIT:** sprawling shrub

**FLOWERS**

**SIZE:** 1”

**COLOR:** yellow with red veins and stamens *(A. pictum)*; yellow-orange *(A. grandiflorum)*

**SHAPE:** bell-shaped *(A. pictum)*; tight cluster, roundish *(A. grandiflorum)*

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** year-round

**TIME TO FLOWERING:** some flower at 4–6 months; maturity after 12–18 months

**PESTS**

**COMMON DISEASES:** root rot, rust fungi *(A. grandiflorum)*; *A. pictum* is affected by abutilon mosaic virus (causing mottled leaves), but it is not a problem; nematodes

**OTHER PESTS:** Chinese rose beetle, mealybugs, thrips, whiteflies

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers

**HARVESTING TECHNIQUES:** pull or snap

**BEST TIME OF DAY TO HARVEST:** early morning

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

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

**STORING RAW LEI MATERIALS:** store in shallow, stackable open trays until flowers open. Don’t pack in boxes; refrigerator temperature should be less than 40°F (38°F is good); no water

**PREPARING FOR USE IN LEI:** remove calyx (green, leafy base) before stringing

**STORING A COMPLETED LEI BEFORE WEARING:** place lei in sealed container and refrigerate; no water

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

**Notes on lei making**

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

**VASE LIFE:** 8–24 hours

**CLEANING OF PLANT MATERIALS:** no water

**References and further reading**


**laua‘e**

**OTHER COMMON NAMES:** lauwa‘e, maile-scented fern

**SCIENTIFIC NAME:** *Phymatosorus grossus* (*Microsorum scolopendria*)

**FAMILY:** Polypodiaceae

**POLYPODY FAMILY**

**NATURAL SETTING/LOCATION:** Old World tropics, Polynesia

**CURRENT STATUS IN THE WILD IN HAWAI‘I:** common; naturalized, especially in disturbed areas, from coastal to shaded moist lowland forests and windswept ridges

**CULTIVARS:** lau’a‘e iki (dwarf cultivar)

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**Growing your own**

**HANDLING CAUTIONS:** may cause skin irritation

**PROPAGATION**

**FORM:** spores; division; rhizome cuttings (with at least one node)

**PREPLANTING TREATMENT:** rooting hormone not needed for cuttings

**PLANTING DEPTH:** sow spores on surface of medium; keep division root crown just below soil level; insert base of cutting 1–2" into medium

**CUTTING ROOTING TIME:** 6–8 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun to light shade

**WATER:** moderate to wet

**TEMPERATURE:** 55–90°F

**ELEVATION:** 10–1500’

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** poor to moderate

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 1’ apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 3-gallon tubs or larger

**PRUNING:** remove old fronds

**SPECIAL CULTURAL HINTS:** keep in contained area to keep it from taking over unplanted areas; full sun will cause fronds to be lighter green

**SUGGESTED COMPANION PLANTINGS:** plants that provide shade
**laua‘e**

**Plant characteristics**

**HEIGHT:** 2–3’

**SPREAD:** 6–10’

**GROWTH RATE:** slow at first, fast when established

**GROWTH HABIT:** fern, groundcover

**FOLIAGE**

**TEXTURE:** smooth

**COLOR:** green to black

**SHAPE:** large, pinnately lobed

**FRAGRANCE:** spicy, maile-like

**PESTS**

**COMMON DISEASES:** fungal root rot, root-knot and lesion nematodes

**OTHER PESTS:** fern weevil, mites, scales, slugs, snails

**Harvesting considerations**

**WHAT IS HARVESTED:** leaves

**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 asparagus fern and dusty miller.

**Notes on lei making**

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

**VASE LIFE:** 14 days

**CLEANING OF PLANT MATERIALS:** cold water soak

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

**PREPARING FOR USE IN LEI:** leave fronds out overnight to soften, then braid with ti leaf

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

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

**References and further reading**


maunaloa

**Scientific Name:**
*Canavalia cathartica*

**Family:** Fabaceae (pea family)

**Natural Setting/Location:** East Africa, India, Malaysia, Polynesia

**Current Status in the Wild in Hawaii:**
naturalized in dry to mesic (medium-wet) disturbed sites

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### Growing your own

**Propagation**

**Form:** seeds

**Planting Depth:** sow seeds ½" deep in medium

**Germination Time:** 7 days

**Preferred Production Conditions**

**General Soil Characteristics:** tolerant of many soil types

**Soil pH:** 6.0–7.0

**Light:** sunny location

**Water:** drought tolerant

**Temperature:** 50–90°F

**Elevation:** 10–1000'

**Salt Tolerance:** moderate

**Wind Resistance:** moderate

**Management**

**Fertilizer Needs:** light

**Recommended Spacing:** 4' apart

**Adaptation to Growing in Containers:** not recommended

**Pruning:** prune to keep plant manageable for easy harvesting

**Special Cultural Hints:** provide a trellis or other support; may become weedy if left unchecked
maunaloa

**Plant characteristics**

**HEIGHT:** limited to height of support  
**SPREAD:** 20'  
**GROWTH RATE:** fast  
**GROWTH HABIT:** rampant vine

**FLOWERS**

**SIZE:** 1½"  
**COLOR:** lavender, pink, purple  
**SHAPE:** bilaterally symmetrical, like a pea flower  
**FRAGRANCE:** none  
**FLOWERS IN FIRST YEAR:** yes  
**FLOWERING PERIOD:** year-round, heaviest in spring and summer  
**TIME TO FLOWERING:** 3 months  
**INDUCING AND MAINTAINING FLOWERING:** remove spent flowers and pods

**PESTS**

**COMMON DISEASES:** fungal root rot  
**OTHER PESTS:** black stink bug

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers  
**HARVESTING TECHNIQUES:** pinch flowers off  
**BEST TIME OF DAY TO HARVEST:** early morning  
**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper or cloth container  
**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:** spray with water.  
**STORING RAW LEI MATERIALS:** store in sealed plastic bag or container and refrigerate at 40°F for up to 3 days; no water  
**PREPARING FOR USE IN LEI:** clip off wrinkled, limp, or poor-quality areas before adding to lei  
**STORING A COMPLETED LEI BEFORE WEARING:** place lei on wax paper in sealed plastic bag or container and refrigerate; no water  
**PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** cannot be preserved

**References and further reading**


**Growing your own**

**HANDLING CAUTIONS:** thorns on stems

**PROPAGATION**

**FORM:** seeds

**PREPLANTING TREATMENT:** soak seeds in water for 24 hours

**PLANTING DEPTH:** sow in well-drained medium (1 seed per container, ¼" deep in medium) and put in full sun

**GERMINATION TIME:** 7 days

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL pH:** 5.5–6.5

**LIGHT:** sunny location

**WATER:** drought tolerant

**TEMPERATURE:** 50–90°F

**ELEVATION:** 10–1500' or more

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** good

**MANAGEMENT**

**FERTILIZER NEEDS:** light

**RECOMMENDED SPACING:** 6–8' apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 3-gallon tubs or larger

**PRUNING:** thin out weak growth and head back (cut back) vigorous shoots to induce branching; prune branch tips to old wood after flowering

**SPECIAL CULTURAL HINTS:** plants can be variable when grown from seed; may become weedy if left unchecked

**SUGGESTED COMPANION PLANTINGS:** ferns
'ohai ali‘i

**Plant characteristics**

- **Height:** 10'
- **Spread:** 10'
- **Growth Rate:** fast
- **Growth Habit:** rounded shrub or small tree

**Flowers**

- **Size:** 1" diameter, 2" long
- **Color:** red-orange, yellow, pink, rose, cream
- **Shape:** round, with long stamens
- **Fragrance:** none
- **Flowers in First Year:** yes
- **Flowering Period:** year-round
- **Time to Flowering:** 6–12 months
- **Inducing and Maintaining Flowering:** remove seed pods as they form to maintain flowering

**Pests**

- **Common Diseases:** fungal stem rot, root rot
- **Other Pests:** caterpillars, scales

**Harvesting considerations**

- **What is Harvested:** flowers with 1–2" of stem
- **Harvesting Techniques:** pinch flowers
- **Best Time of Day to Harvest:** early morning
- **Best Way to Transport from Picking Area:** paper or cloth container
- **Avoid Contact with These Products:** smoke, car exhaust, ripening fruits, and wilting flowers

The lei shown also contains *Dracaena tricolor* and Mexican creeper.

**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:** store in sealed plastic container in refrigerator at 40°F for up to 4 days
- **Preparing for Use in Lei:** for sewing, clip stem when picking; for haku (mounting against a background) or wili (twisting pattern), leave stem; mist with water frequently while making lei
- **Storing a Completed Lei Before Wearing:** mist lei, place on dry tissue paper in sealed plastic container, and refrigerate
- **Preserving a Lei for Long-Term Storage or Display:** cannot be preserved

**References and further reading**


**orchid: cymbidium**

**OTHER COMMON NAMES:** 'okika  
**SCIENTIFIC NAME:** *Cymbidium* species  
**FAMILY:** Orchidaceae  
(orchid family)  
**NATURAL SETTING/LOCATION:** Southeast Asia to India

**CURRENT STATUS IN THE WILD IN HAWAI'I:** not found  
**CULTIVARS:** many large and miniature species and varieties

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**Growing your own**

**PROPAGATION**

**FORM:** seeds; mericloning (commercial growers purchase tissue-cultured plantlets in sterile flasks); division  
**PREPLANTING TREATMENT:** pods are sterilized before aseptic culture; remove old foliage and bulbs from divisions  
**PLANTING DEPTH:** sow seeds on surface of aseptic medium; keep division root crown just below soil level  
**GERMINATION TIME:** 2–3 months

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** soilless media, gravel, cinder, hāpu'u, wood bark  
**SOIL pH:** 5.5–6.5  
**LIGHT:** full sun to partial shade  
**WATER:** keep moist  
**TEMPERATURE:** 55°F at night during summer  
**ELEVATION:** 1500–4000'  
**SALT TOLERANCE:** poor  
**WIND RESISTANCE:** poor

**MANAGEMENT**

**FERTILIZER NEEDS:** light to medium; varies among types  
**RECOMMENDED SPACING:** 2 ft² per plant  
**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2-gallon plastic pots or larger  
**PRUNING:** not necessary; remove old flower stalks and yellow or dead leaves

**SPECIAL CULTURAL HINTS:** sterilize tools between cuttings and remove old medium when deflasking; sanitation is important  
**SUGGESTED COMPANION PLANTINGS:** other orchids
orchid: cymbidium

**Plant characteristics**

**HEIGHT:** 3–4'

**SPREAD:** gets large if left undivided

**GROWTH RATE:** moderate

**GROWTH HABIT:** vertical, epiphytic

**FLOWERS**

**SIZE:** 2–4”

**COLOR:** white, green, red, yellow, pink, orange

**SHAPE:** star-shaped

**FRAGRANCE:** faint, sweet

**FLOWERS IN FIRST YEAR:** yes, but flowers are small until the following season, when they become larger and more numerous

**FLOWERING PERIOD:** spring through early summer

**TIME TO FLOWERING:** 8 months from divisions, about 2–3 years from seed

**INDUCING AND MAINTAINING FLOWERING:** summer night temperature must remain at or below 55°F for consistent flower initiation for most varieties; miniature types can flower with warmer temperatures

**PESTS**

**COMMON DISEASES:** Pythium and Phytophthora root rot, black rot, Colletotrichum leaf spot (fungus), petal and blossom spot (fungi), bacterial stem rot, cymbidium mosaic and odontoglossum ringspot viruses

**OTHER PESTS:** aphids, mice, mites, slugs, snails, thrips

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The lei shown also contains cup-and-saucer plant, kangaroo paw, kalanchoe, Peruvian lily, and ‘ōhi’a lehua.

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**Harvesting considerations**

**WHAT IS HARVESTED:** spray (raceme with flowers) or individual flower on 2” of stem

**HARVESTING TECHNIQUES:** cut or snap spray close to the base

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** place cut end of spray in a container with water; individual flower stems can be placed in water in a plastic tube sealed with a rubber band or plastic cover

**AVOID MIXING WITH THESE MATERIALS:** smoke, car exhaust, ripening fruits, and wilting flowers; avoid extremes of heat and cold

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**Cleaning of plant materials:** soak flowers in clean water for 5 minutes after harvesting; check for insects in throat of flower

**Storing raw lei materials:** spray can be stored for up to 14 days in water; individual flower can be stored for up to 14 days if stem is wrapped with a piece of moist paper in a plastic bag; refrigerate both at 40°F

**Preparing for use in lei:** clip stem if sewing lei, keep stem if using in other lei patterns

**Storing a completed lei before wearing:** mist lei, shake off excess water, place in sealed plastic container or bag, and refrigerate

**Preserving a lei for long-term storage or display:** cannot be preserved

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**Notes on lei making**

**Best for which type of lei:** neck, head, wrist, ankle, horse

**Vase life:** 14 days

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**References and further reading**


Growing Plants for Hawaiian Lei

**orchid: dendrobium**

OTHER COMMON NAMES: ‘okika

**SCIENTIFIC NAME:** *Dendrobium* species

**FAMILY:** Orchidaceae (orchid family)

**NATURAL SETTING/LOCATION:** found worldwide

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found

**CULTIVARS:** many UH-CTAHR cultivars available; some recent ones are ‘Splendor’ and ‘White Cascade’

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**Growing your own**

**PROPAGATION**

**FORM:** seeds; aerial offshoots; division; mericloning (commercial growers purchase tissue-cultured plantlets in sterile flasks)

**PREPLANTING TREATMENT:** green pods or seeds are sterilized before aseptic culture; remove old foliage and bulbs from divisions

**PLANTING DEPTH:** sow seeds on surface of aseptic medium; keep division root crown just below soil level

**GERMINATION TIME:** 2–4 months

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** soilless media, gravel, cinder, wood bark, hāpu‘u

**SOIL pH:** 5.5–6.5

**LIGHT:** 30% shade

**WATER:** prefers high humidity; water 3–4 times per week

**TEMPERATURE:** 75–85°F (day) / 65°F (night)

**ELEVATION:** 10–1000’

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

**MANAGEMENT**

**FERTILIZER NEEDS:** light to medium; varies among types

**RECOMMENDED SPACING:** 1 ft² per plant

**ADAPTATION TO GROWING IN CONTAINERS:** yes; plastic, clay, or cement pots; polybags

**PRUNING:** not necessary; remove old flower stalks and yellow or dead leaves

**SPECIAL CULTURAL HINTS:** sterilize tools between cuts and remove old medium when deflasking; sanitation is important

**SUGGESTED COMPANION PLANTINGS:** other orchids
orchid: dendrobium

**Plant characteristics**

**HEIGHT:** to 6’

**SPREAD:** 24”

**GROWTH RATE:** fast

**GROWTH HABIT:** upright, epiphytic

**FLOWERS**

**SIZE:** 2–4”

**COLOR:** white, purple, blush-pink, yellow

**SHAPE:** star-shaped, 3 petals, 3 sepals

**FRAGRANCE:** yes, varies

**FLOWERS IN FIRST YEAR:** no

**FLOWERING PERIOD:** heaviest during summer

**TIME TO FLOWERING:** 18 months from flask

**INDUCING AND MAINTAINING FLOWERING:** maintain good plant health and provide adequate fertilizer

**PESTS**

**COMMON DISEASES:** Pythium and Phytophthora root rot, black rot, Colletotrichum leaf spot (fungus), petal and blossom spot (fungi), bacterial stem rot, cymbidium mosaic and odontoglossum ringspot viruses

**OTHER PESTS:** aphids, blossom midge, mealybugs, mice, mites, orchid weevil, scales, slugs, snails, thrips

**Harvesting considerations**

**WHAT IS HARVESTED:** spray (raceme with flowers), or individual flower on 2” of stem

**HARVESTING TECHNIQUES:** cut or snap spray close to the stem

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** cut end of spray under water in a plastic container or pick flowers and carry in plastic, paper, or cloth bag

**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers; avoid extremes of heat and cold

**NOTES ON LEI MAKING**

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

**VASE LIFE:** to 7 days

**CLEANING OF PLANT MATERIALS:** soak flowers in clean water for 5 minutes after harvesting; check for insects inside throat of flower

**STORING RAW LEI MATERIALS:** spray can be stored for up to 14 days with cut end in water; individual flower can be stored for up to 14 days if stem is wrapped with a piece of moist paper in a plastic bag; refrigerate both at 40°F

**PREPARING FOR USE IN LEI:** clip stem if sewing lei, keep stem if using other lei patterns

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

**AVOIDING HARMFUL PRODUCTS:** cannot be preserved

**REFERENCES AND FURTHER READING**


**orchid: epidendrum**

**OTHER COMMON NAMES:** baby orchid, butterfly orchid, buttonhole orchid, epis, ‘okika, reed orchid  

**SCIENTIFIC NAME:** Epidendrum species  

**FAMILY:** Orchidaceae (orchid family)  

**NATURAL SETTING/LOCATION:** tropical America and tropical West Africa

**CURRENT STATUS IN THE WILD IN HAWAI’I:** only one species has become naturalized in Hawai’i: Epidendrum x obrienianum

**CULTIVARS:** over 1,000 species and numerous hybrids and cultivars

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**Growing your own**

**PROPAGATION**

**FORM:** aerial offshoot; seeds; division; mericloning (commercial growers purchase tissue-cultured plantlets in sterile flasks)

**PRETREATMENT:** pods are sterilized before aseptic culture; remove old leaves and bulbs from divisions

**PLANTING DEPTH:** sow seeds on surface of aseptic medium; keep division root crown just below soil level

**GERMINATION TIME:** 2–4 months

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rock, orchid bark, hāpuʻu, cinder

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun

**WATER:** most prefer high humidity and daily irrigation

**TEMPERATURE:** 55–90°F

**ELEVATION:** 10–1000'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** moderate to poor

**MANAGEMENT**

**FERTILIZER NEEDS:** light to medium; varies among types

**RECOMMENDED SPACING:** varies with plant size; generally 6–18” apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes; beds, bags, plastic or clay pots

**PRUNING:** not necessary; remove old flower stalks and yellow or dead leaves

**SPECIAL CULTURAL HINTS:** if grown in a pot, repot every 1–2 years; sterilize tools between cuttings and remove old medium; sanitation is important

**SUGGESTED COMPANION PLANTINGS:** other orchids and bromeliads
orchid: epidendrum

**Growing Plants for Hawaiian Lei**

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**Plant characteristics**

**HEIGHT:** to 4'

**SPREAD:** 8"

**GROWTH RATE:** fast

**GROWTH HABIT:** upright, epiphytic

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**FLOWERS**

**SIZE:** 1–2½"

**COLOR:** white, pink, purple, yellow, green, red, orange

**SHAPE:** star-shaped, 3 petals and 3 sepals

**FRAGRANCE:** varies

**FLOWERS IN FIRST YEAR:** yes, from cuttings and divisions

**FLOWERING PERIOD:** year-round

**TIME TO FLOWERING:** 18–24 months from flask for some

**INDUCING AND MAINTAINING FLOWERING:** keep healthy and give adequate light

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**PESTS**

**COMMON DISEASES:** *Pythium* and *Phytophthora* root rot, black rot, *Colletotrichum* leaf spot (fungus), petal and blossom spot (fungi), bacterial stem rot, *cymbidium* mosaic and *odontoglossum* ringspot viruses

**OTHER PESTS:** blossom midge, mites, orchid weevil, thrips

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**Harvesting considerations**

**WHAT IS HARVESTED:** flower with 1–2" of stem

**HARVESTING TECHNIQUES:** pluck flower heads

**BEST TIME OF DAY TO HARVEST:** early morning

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**Notes on lei making**

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

**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers; avoid extremes of heat and cold

**STORING A COMPLETED LEI BEFORE WEARING:** soak lei, shake off excess water, place in sealed plastic container, and refrigerate

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

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**Best for which type of lei:** neck, head, wrist, ankle, horse

**VASE LIFE:** 7 days

**CLEANING OF PLANT MATERIALS:** soak flowers in clean water for 5 minutes after harvesting; check for insects stuck in lip

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

**PREPARING FOR USE IN LEI:** clip stems if sewing lei, keep stem if using other lei patterns

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**References and further reading**


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The lei shown also contains Peruvian lily, oncidium orchid, and laua’e fern.
Growing Plants for Hawaiian Lei

**orcid: vanda**

**OTHER COMMON NAMES:** ‘Miss Joaquim’, ‘okika, vanda

**SCIENTIFIC NAME:** Vanda species

**FAMILY:** Orchidaceae (orchid family)

**NATURAL SETTING/LOCATION:** found worldwide

**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

**CULTIVARS:** many readily available: ‘Miss Joaquim’ varieties include Rose Marie, Josephine, John Laycoch; inbred cultivars include Diane, Atherton, Shimomishi

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**Growing your own**

**PROPAGATION**

**FORM:** cuttings; tissue culture; mericlone; seeds (seeded plants are not generally used in lei flower production)

**PREPLANTING TREATMENT:** pods are sterilized before aseptic culture

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

**GERMINATION TIME:** 1–4 months

**CUTTING ROOTING TIME:** 2–4 months

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** soilless media, hāpu‘u, gravel, cinder

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun

**WATER:** high humidity, daily irrigation

**TEMPERATURE:** 75–85°F (day), 65°F (night)

**ELEVATION:** 10–1000’

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

**MANAGEMENT**

**FERTILIZER NEEDS:** light to medium; varies among types

**RECOMMENDED SPACING:** 8–12 plants per ft²

**ADAPTATION TO GROWING IN CONTAINERS:** yes; hāpu‘u logs, plastic pots, polybags, or similar

**PRUNING:** as needed when plant becomes too tall for harvesting; some growers remove summer and fall flower spikes before they flower to encourage stronger winter flowering

**SPECIAL CULTURAL HINTS:** replant when 6’ tall; sterilize tools between cuttings and remove old medium; sanitation is important

**SUGGESTED COMPANION PLANTINGS:** other orchids
**orchid: vanda**

**Plant characteristics**

**HEIGHT:** indeterminate, but cut and replant when plant reaches 6’

**SPREAD:** very confined; grows straight upward

**GROWTH RATE:** fast

**GROWTH HABIT:** epiphytic

**FLOWERS**

**SIZE:** 2–3”

**COLOR:** purple

**SHAPE:** star-shaped, 3 petals and 3 sepals

**FRAGRANCE:** yes, light

**FLOWERS IN FIRST YEAR:** yes, from cuttings

**FLOWERING PERIOD:** summer

**TIME TO FLOWERING:** 8–12 months from cuttings

**INDUCING AND MAINTAINING FLOWERING:** provide full sun and keep healthy

**PESTS**

**COMMON DISEASES:** Pythium and Phytophthora root rot, black rot, Colletotrichum leaf spot (fungus), petal and blossom spot (fungi), bacterial stem rot, cymbidium mosaic and odontoglossum ringspot viruses, foliar nematodes

**OTHER PESTS:** mites, orchid weevil, scales, stink bugs, thrips

**Harvesting considerations**

**WHAT IS HARVESTED:** flower with 1–2” of stem

**HARVESTING TECHNIQUES:** don’t remove pollinia while hand picking; ethylene gas from detached pollinia, fruits, and exhaust from internal combustion engines can cause flowers to turn white prematurely

**BEST TIME OF DAY TO HARVEST:** early morning

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

**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers; avoid extremes of heat and cold

**Preparing for use in lei:** clip stem if sewing lei, keep stem if not; check to make sure pollinia are intact, otherwise discard flower if it is missing

**Storing a completed lei before wearing:** mist lei, shake off excess water, place on top of damp newspaper in paper box, and refrigerate

**Preserving a lei for long-term storage or display:** cannot be preserved

**Notes on lei making**

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

**CLEANING OF PLANT MATERIALS:** soak flowers in clean water for 5 minutes after harvesting; check for insects in throat of flower

**STORING RAW LEI MATERIALS:** lay flowers on top of damp newspaper and cover with dry tissue; place in paper box and refrigerate at 40°F for up to 5 days

**References and further reading**


**pakalana**

**OTHER COMMON NAMES:** Chinese violet

**SCIENTIFIC NAME:**
Telosma cordata

**FAMILY:** Asclepiadaceae (milkweed family)

**NATURAL SETTING/LOCATION:** native to Southeast Asia

**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

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**Growing your own**

**PROPAGATION**

**FORM:** cuttings with 2–3 nodes; seeds; air layering

**PREPLANTING TREATMENT:** treat cuttings with medium rooting hormone

**PLANTING DEPTH:** sow seeds on surface of medium or slightly ($\frac{1}{8}$") below; insert base of cutting 1–2" into medium

**GERMINATION TIME:** 1 month

**CUTTING ROOTING TIME:** 4–5 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL pH:** 6.0–6.5

**LIGHT:** sunny location

**WATER:** keep moist; water deeply twice a week

**TEMPERATURE:** 70–90°F for rapid flowering

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**ELEVATION:** 10–300'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** poor

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 24–36" apart

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 2- to 3-gallon tubs with support

**PRUNING:** thin out old shoots to induce new growth

**SPECIAL CULTURAL HINTS:**
provide a trellis or other support; can also be grown in a large pot raised above ground with room for vines to hang down around it to allow for easy flower picking; flowers occur on new growth

---

**SUGGESTED COMPANION PLANTINGS:** grows best without competition from other plants; in particular, it does not compete well with other vines
pakalana

## Plant characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
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<tr>
<td>Spread</td>
<td>will spread to 3–4' wide if not supported</td>
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<tr>
<td>Growth Rate</td>
<td>fast</td>
</tr>
<tr>
<td>Growth Habit</td>
<td>vine</td>
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</tbody>
</table>

### Flowers

- **Size:** about ½"
- **Color:** greenish yellow upon opening, turning orange with age
- **Shape:** 5-lobed corollas on short tubes
- **Fragrance:** similar to violets

### Foliage

- **Texture:** smooth
- **Color:** dark green
- **Shape:** broad, heart-shaped
- **Fragrance:** none

### Pests

- **Common Diseases:** root rots in wet soils, nematodes, mosaic virus
- **Other Pests:** mites, soft scales, stink bugs, thrips, whiteflies

## Harvesting considerations

### What is harvested:

Flowers and sometimes leaves (depending on lei type)

### Harvesting techniques:

Cut or pinch (don’t pull) individual flowers from cluster, leaving unopened buds

### Best time of day to harvest:

Early morning

### Best way to transport from picking area:

Glass jar

### 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:

Cold water soak

### Storing raw lei materials:

Wrap in a damp paper towel, place in plastic or glass container, and refrigerate at 40°F for up to 5 days

### Preparing for use in lei:

Clip stem and sew, unless making other styles, then leave flowers on cluster

### Storing a completed lei before wearing:

Soak lei, shake off excess water, wrap in a damp paper towel, place in plastic or glass container, and refrigerate

### Preserving a lei for long-term storage or display:

Cannot be preserved

## References and further reading


**panax**

**OTHER COMMON NAMES:** fern-leaf aralia, parsley panax

**SCIENTIFIC NAME:** *Polyscias* species

**FAMILY:** Araliaceae (ginseng family)

**NATURAL SETTING,LOCATION:** India to Polynesia

**CURRENT STATUS IN THE WILD IN HAWAI'I:** not found

**CULTIVARS:** ‘Golden Prince’, ‘Ming Aralia’

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**Growing your own**

**PROPAGATION**

**FORM:** cuttings; can also be grafted onto common hedge panax

**PREPLANTING TREATMENT:** treat with medium rooting hormone

**PLANTING DEPTH:** insert base 1–2" into medium

**CUTTING ROOTING TIME:** 4–6 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained; tolerates various soil types

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun to partial shade

**WATER:** moderate

**TEMPERATURE:** 45–90°F

**ELEVATION:** 10–3000’

**SALT TOLERANCE:** good

**WIND RESISTANCE:** good

**MANAGEMENT**

**FERTILIZER NEEDS:** heavy

**RECOMMENDED SPACING:** 24–36" apart

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

**PRUNING:** prune to reduce size, maintain shape, and keep full and bushy

**SPECIAL CULTURAL HINTS:** older plants can be habitats for termites

**SUGGESTED COMPANION PLANTINGS:** short, shade-loving plants
panax

Plant characteristics

HEIGHT: to 12’
SPREAD: to 3–4’
GROWTH RATE: fast
GROWTH HABIT: erect, evergreen, woody shrub

FOLIAGE

TEXTURE: smooth, bumpy, feathery
COLOR: dark green or variegated
SHAPE: finely divided, compound with leaflets; various sizes and shapes
FRAGRANCE: none

PESTS

COMMON DISEASES: fungal root and stem rots, bacterial leaf spots, root-knot and reniform nematodes
OTHER PESTS: borers, mealybugs, rats, scales, termites (in older plants)

Harvesting considerations

WHAT IS HARVESTED: foliage
HARVESTING TECHNIQUES: cut
BEST TIME OF DAY TO HARVEST: early morning
BEST WAY TO TRANSPORT FROM PICKING AREA: paper or cloth bag

The lei shown also contains *Dracaena tricolor* and a fern.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle, horse
VASE LIFE: 14 days
CLEANING OF PLANT MATERIALS: cold water soak
STORING RAW LEI MATERIALS: wrap in damp newspaper and place in sealed plastic container; 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: air-dry

References and further reading

pentes

**OTHER COMMON NAMES:** Egyptian star-flower  
**SCIENTIFIC NAME:** *Pentas lanceolata*  
**FAMILY:** Rubiaceae (coffee family)  
**NATURAL SETTING/LOCATION:** Madagascar, tropical South Africa

**CURRENT STATUS IN THE WILD IN HAWAI'I:** not found  
**CULTIVARS:** none named, but red, rose, violet, and pink types have been selected

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**Growing your own**

**PROPAGATION**

**FORM:** seeds (purchase from seed source); cuttings  
**PREPLANTING TREATMENT:** treat cuttings with mild rooting hormone  
**PLANTING DEPTH:** sow seeds on surface or slightly (1/8") below; insert base of cutting 1–2" into medium  
**GERMINATION TIME:** 5–12 days  
**CUTTING ROOTING TIME:** 3–4 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well-drained loam or sandy loam; in pots, 1:1 peat:perlite  
**SOIL pH:** 5.5–6.5  
**LIGHT:** full sun  
**WATER:** keep moist  
**TEMPERATURE:** 50–90°F  
**ELEVATION:** 10–2000'  
**SALT TOLERANCE:** poor  
**WIND RESISTANCE:** moderate–poor

**MANAGEMENT**

**FERTILIZER NEEDS:** medium  
**RECOMMENDED SPACING:** 12–18” apart  
**ADAPTATION TO GROWING IN CONTAINERS:** yes, 1- to 3-gallon tubs  
**PRUNING:** cut back to 12–18” but not back to hard wood

**SUGGESTED COMPANION PLANTINGS:** globe amaranth
pentas

**Plant characteristics**

**HEIGHT:** to 36”

**SPREAD:** to 36”

**GROWTH RATE:** fast

**GROWTH HABIT:** spreading, woody, evergreen shrub

**FLOWERS**

**SIZE:** clusters of about 30 flowers 2–4” across; individual flower about 3⁄8”

**COLOR:** white, pink, red, red and pink, lilac

**SHAPE:** 5-petalled, star-shaped

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** year-round, heaviest in summer

**TIME TO FLOWERING:** about 8–10 weeks from rooted cutting, about 4 months from seed

**INDUCING AND MAINTAINING FLOWERING:** to induce more flowering shoots, pinch the young shoots to leave 2 or 3 pairs of nodes; remove spent flowers

**PESTS**

**COMMON DISEASES:** Botrytis on the flowers, southern blight

**OTHER PESTS:** aphids, caterpillars, mites, whiteflies

---

The lei shown also contains ti, panax, and aster.

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**Harvesting considerations**

**WHAT IS HARVESTED:** flower cluster with 1–2” of stem

**HARVESTING TECHNIQUES:** pluck flowers

**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

---

**Notes on lei making**

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

**CLEANING OF PLANT MATERIALS:** stick stem in water.

**STORING RAW LEI MATERIALS:** store in sealed container and refrigerate at 40°F for up to 4 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 for 30 minutes, drip dry, store in sealed container, and refrigerate

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

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**Reference and further reading**

Growing Plants for Hawaiian Lei

**pikake**

**Other Common Names:** jasmine, lei-pikake, sampaguita (Philippines), single-flowered star jasmine

**Scientific Name:** *Jasminum sambac*

**Family:** Oleaceae (olive family)

**Natural Setting/Location:** native to tropical Asia

**Current Status in the Wild in Hawai‘i:** typically not found

**Cultivars:** ‘Grand Duke’ is a double form used in haku lei

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**Growing your own**

**Propagation**

**Form:** cuttings from 1-year-old wood

**Preplanting Treatment:** treat with mild rooting hormone

**Planting Depth:** insert base 1–2" into medium

**Cutting Rooting Time:** 2–3 weeks under mist

**Preferred Production Conditions**

**General Soil Characteristics:** well drained, silty clay loam

**Soil pH:** 6–6.5

**Light:** full sun; long days produce more flowers

**Water:** moderate irrigation (1"/week); allow to dry between waterings; water entire root system

**Temperature:** 80–90°F (days), 70–80°F (nights); if night temperatures drop below 70s, flower number and size will be adversely affected; temperatures in low 60s will cause plants to cease flowering until higher temperatures return; one night of low temperature may shut down flowering for as long as 1–2 weeks

**Elevation:** 10–25' ideal; cool night breezes in valleys may retard flowering and reduce amount and size of blossoms; can be grown at higher elevations (500')

**Salt Tolerance:** moderate

**Wind Resistance:** moderate (wind may damage flowers)

**Management**

**Fertilizer Needs:** medium

**Recommended Spacing:** 1–1½' within rows, 5–6' between rows; grown as a hedge

**Adaptation to Growing in Containers:** not recommended

**Pruning:** prune to increase branching and flowering (flowers emerge from terminal tips) and to facilitate easy harvesting; suckers should be pruned, because they are unproductive

**Special Cultural Hints:** long days and high temperature favor high production and large flowers, while short days and cold temperature reduce flower size and amount of flowering
pikake

Plant characteristics

**HEIGHT:** 6’
**SPREAD:** 24–36” wide
**GROWTH RATE:** moderate to slow in winter
**GROWTH HABIT:** shrub with some runners or suckers

**FLOWERS**
**SIZE:** ½–¾”
**COLOR:** cream-white
**SHAPE:** oval bud (unopened), star-shaped (open)
**FRAGRANCE:** distinctive, very strong, sweet; used for flavoring teas (jasmine tea) and as a perfume

**FLOWERS IN FIRST YEAR:** yes
**FLOWERING PERIOD:** under natural conditions, moderate flowering can be expected during the months of March–September; long days produce more flowers
**TIME TO FLOWERING:** bushes are pruned back with hedge trimmers to 1-year-old wood, or leaves are stripped by hand, causing plants to flower in 30 days during the hottest months and 45 days during spring and late summer; this flowering will continue for 7–12 days, and if plants are very healthy, it will continue for up to 20 days
**INDUCING AND MAINTAINING FLOWERING:** force flowering during winter months by enclosing plants in a plastic structure to increase temperature; warm air is captured in the structure, inducing flowering by increasing night temperatures; covering should be closed at least 1–2 hours before sunset; covering should be opened by early to mid-morning to avoid over-heating; flowers grown in covered area will be larger and whiter than open field-grown plants

**PESTS**
**COMMON DISEASES:** powdery mildew, mosaic virus, nematodes; root rot and southern blight can be a problem with clay soil, poor drainage, and high rainfall
**OTHER PESTS:** Hawaiian flower thrips, blossom midge, broad mite, carmine spider mite, whiteflies; because buds are produced at tips, broad mite damage can severely decrease the amount of flowers produced; flower thrips and blossom midge attack buds and can affect postharvest quality

**Harvesting considerations**
**WHAT IS HARVESTED:** flower buds (opened flowers are not usually sold for lei)
**HARVESTING TECHNIQUES:** pick at bud stage; avoid handling too much (the delicate flowers are easily bruised)
**BEST TIME OF DAY TO HARVEST:** early to mid-morning, depending on time of year
**BEST WAY TO TRANSPORT FROM PICKING AREA:** cloth, paper bag, or paper box
**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:** store in sealed plastic container and refrigerate at 40°F for up to 3 days
**PREPARING FOR USE IN LEI:** remove calyx (green, leafy base), then sew
**STORING A COMPLETED LEI BEFORE WEARING:** wrap lei in wax paper, place in sealed plastic container, and refrigerate; no water
**PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** cannot be preserved

**References and further reading**


pincushion protea

**OTHER COMMON NAMES:** sunburst, Hawaiian sunflower

**SCIENTIFIC NAME:** *Leucospermum saxosum, L. erubescens, L. bolusii, L. oleifolium, L. mundii, L. muirii, L. parile, L. rodolentum*

**FAMILY:** Proteaceae (protea family; includes macadamia)

**NATURAL SETTING/LOCATION:** South Africa; adapted to cool, dry areas of Maui and Hawai‘i above 1500 feet elevation

**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

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**Growing your own**

**PROPAgATION**

**FORM:** tip cuttings 6” long, taken in Sept.–Oct. after growth stops

**PREPLANTING TREATMENT:** use a medium-strength rooting hormone

**PLANTING DEPTH:** insert base of cuttings 1½–2” into medium

**CUTTING ROOTING TIME:** 2–3 months under mist

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well drained

**SOIL pH:** 5.5–6.5

**LIGHT:** sunny location

**WATER:** twice weekly for established plants, more often for new plantings

**TEMPERATURE:** 40–90°F

**ELEVATION:** 1500–4000’

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** moderate to good

**MANAGEMENT**

**FERTILIZER NEEDS:** light; fertilize sparingly; sensitive to P

**RECOMMENDED SPACING:** 4–6’ apart in field, depending on species

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

**PRUNING:** prune after flowering to maintain size, remove dead or diseased wood, and stimulate vigorous new shoots

**SPECIAL CULTURAL HINTS:** cuttings are slow to root, and intermittent mist is essential for successful propagation; rooted cuttings are moved to 4–6” pots and grown for 4–6 months before transplanting; in the field, specialized “proteoid” roots are matted near the soil surface and can be damaged by shallow cultivation

**SUGGESTED COMPANION PLANTINGS:** any low-growing, cool-climate perennials
Growing Plants for Hawaiian Lei

pincushion protea

**Plant characteristics**

**HEIGHT:** 2–3', depending on species  
**SPREAD:** 3–5', depending on species  
**GROWTH RATE:** reaches ideal production size 3 years after transplanting  
**GROWTH HABIT:** mounding shrub

**FLOWERS**

**SIZE:** single flowers up to 2½" for *L. saxosum*; other species have 1–1½" flowers singly or in clusters  
**COLOR:** much variation among species; yellow-orange, pink, red, yellow-green, and cream-white can occur  
**SHAPE:** most species have “pincushion” shape  
**FRAGRANCE:** in *L. bolusii, muirii, parile, rodolentum*

**FLOWERS IN FIRST YEAR:** under optimal conditions, flowers within 1 year after transplanting to the field  
**FLOWERING PERIOD:** fall–winter–spring  
**INDUCING AND MAINTAINING FLOWERING:** 3–4 weeks of 50°F winter night temperature results in best flowering

**PESTS**

**COMMON DISEASES:** root rot, collar rot, leaf spots, *Botrytis*, root-knot nematode  
**OTHER PESTS:** aphids and scales if plant is under stress, otherwise relatively free of insects and mites

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers  
**HARVESTING TECHNIQUE:** cut or pluck  
**BEST TIME OF DAY TO HARVEST:** early morning  
**BEST WAY TO TRANSPORT FROM PICKING AREA:** plastic bag

The protea used in the lei shown is *Leucospermum oleifolium*; the lei also contains flowers of *Grevillea wilsonii* and *Lambertia inermis*.

**Notes on lei making**

**BEST FOR WHICH TYPE OF LEI:** neck, head, wrist, ankle, horse, hat  
**CLEANING OF PLANT MATERIALS:** for single-strand lei, trim off stems close to flower head; for haku or wili style, remove stems if too thick or stiff  
**STORING RAW LEI MATERIALS:** cover flowers with moist paper towels or stick stems in water-soaked “oasis,” refrigerate at 40°F, store for 5–14 days, depending on species  
**PREPARING FOR USE IN LEI:** for single-strand lei, stringing can be easier after drilling through center of flowerhead; for haku or wili style, wire flowers together for easier handling  
**STORING A COMPLETED LEI BEFORE WEARING:** wrap in moist paper towels and refrigerate  
**PRESEVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** cannot be preserved

**References and further reading**

**Growing your own**

**Handling Cautions:** milky sap may irritate eyes and skin

**Propagation**

**Form:** tip cuttings 6–36” long; seeds (seedlings take longer to flower)

**Preplanting Treatment:** allow end of cutting to air-dry at least 24 hours; mild rooting hormone speeds rooting

**Planting Depth:** sow seeds ¼–½” deep in medium; insert base of cutting 2–4” into medium, or more if large

**Germination Time:** 2 weeks

**Cutting Rooting Time:** 2 months

**Preferred Production Conditions**

**General Soil Characteristics:** well drained

**Soil pH:** 6.0–6.5

**Light:** full sun

**Water:** keep moist

**Temperature:** 60–90°F

**Elevation:** 10–2000’

**Salt Tolerance:** moderate

**Wind Resistance:** good (if tree is healthy)

**Management**

**Fertilizer Needs:** medium to heavy; varies among cultivars

**Recommended Spacing:** 6–10’ within the row and 12–15’ between rows

**Adaptation to Growing in Containers:** yes, large containers

**Pruning:** easiest in winter, but it sacrifices spring flowering; prune back for easier flower harvest

**Special Cultural Hints:** keep on dry side, especially in container; in field, plant branched cuttings with axils set low to the ground for low branching and easier flower harvest; provide 5–7 gallons/day irrigation water per tree, covering whole root system

**Suggested Companion Plantings:** during the first few years, annuals can be planted between trees
Growing Plants for Hawaiian Lei

### Plumeria

**Plant characteristics**

**HEIGHT:** to 30’

**SPREAD:** 30’

**GROWTH RATE:** fast

**GROWTH HABIT:** round-headed, small tree

**FLOWERS**

**SIZE:** average 2–3” in diameter

**COLOR:** white, red, yellow, pink, multiple

**SHAPE:** tubular flower with 5 petals

**FRAGRANCE:** most varieties highly fragrant, with different scents

**FLOWERS IN FIRST YEAR:** from cutting: 1 year; from seed: 3 years

**FLOWERING PERIOD:** most cultivars flower March–October

**TIME TO FLOWERING:** maturity after about 5 years

**INDUCING AND MAINTAINING FLOWERING:** in dry areas, irrigation will promote flowering; defoliation in fall with ethephon will stimulate emergence of inflorescences as early as December

**PESTS**

**COMMON DISEASES:** plumeria rust, Colletotrichum leafspot and shoot blight, powdery mildew on leaves, fungal rots

**OTHER PESTS:** ants, blossom midge, long-horned beetles, mites, scales, thrips, whiteflies

**Harvesting considerations**

**WHAT IS HARVESTED:** open flowers

**HARVESTING TECHNIQUES:** grasp individual flowers at base and tug gently

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper box or bag

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

**CLEANING OF PLANT MATERIALS:** soak the flower in clean water for no more than 10 minutes

**STORING RAW LEI MATERIALS:** place flowers in a bowl or sink, cover container with a light-weight, damp towel; can be refrigerated or left at room temperature

**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, shake off all excess water, drip dry, then place in paper box; can be refrigerated for 2 days or left at room temperature for 1 day

**Notes on lei making**

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

**REFERENCES AND FURTHER READING**


pohutukawa (New Zealand Māori)

**Other Common Names:** New Zealand Christmas tree

**Scientific Name:** *Metrosideros excelsus*

**Family:** Myrtaceae (myrtle family)

**Natural Setting/Location:** coastal zones of New Zealand

**Current Status in the Wild in Hawai‘i:** not found

**Cultivars:** various

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### Growing your own

**Propagation**

**Form:** seeds; semi-hardwood cuttings; air layering

**Preplanting Treatment:** air-dry capsules, allow seeds to fall from them; use medium to strong rooting hormone on cuttings

**Planting Depth:** sow seeds on surface; insert base of cutting 1–2" into medium

**Germination Time:** 30–60 days at 60–70°F

**Cutting Rooting Time:** 9 months or more; best results with bottom heat

---

**Preferred Production Conditions**

**General Soil Characteristics:** tolerates most soil types

**Soil pH:** less than 6.5

**Light:** full sun

**Water:** keep moist; somewhat drought-tolerant once established

**Temperature:** 40–90°F

**Elevation:** 10–3000'; best along coast; sensitive to dry air

**Salt Tolerance:** good; will tolerate both salt spray and saline soil

**Wind Resistance:** good

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**Management**

**Fertilizer Needs:** medium

**Recommended Spacing:** 20' apart if tree form is desired

**Adaptation to Growing in Containers:** yes, when young, in large containers

**Pruning:** prune to reduce size and induce low branches; prune after flowering

**Suggested Companion Plantings:** low-growing plants
**pohutukawa (New Zealand Māori)**

### Plant characteristics

**HEIGHT:** more than 30'

**SPREAD:** 20–30'

**GROWTH RATE:** slow

**GROWTH HABIT:** broad, oval, evergreen tree or large shrub

#### FLOWERS

**SIZE:** 1½”

**COLOR:** dark crimson (rare yellow and white forms exist)

**SHAPE:** staminate, pompom-like

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** no

**FLOWERING PERIOD:** summer

**TIME TO FLOWERING:** from seed, 5–7 years; from air layer, 1 year; no information for cutting

#### FOLIAGE

**TEXTURE:** extremely variable, from smooth and waxy to fuzzy

**COLOR:** dark gray-green on top, silvery underneath

**SHAPE:** simple, oval to ovate

**FRAGRANCE:** none

#### PESTS

**COMMON DISEASES:** none serious

**OTHER PESTS:** none serious

### Harvesting considerations

**WHAT IS HARVESTED:** branch tips (liko), flowers, and bud clusters

**HARVESTING TECHNIQUES:** cut

**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

### References and further reading


pua kenikeni

**OTHER COMMON NAMES:** ten-cent flower

**SCIENTIFIC NAME:** *Fagraea berteriana*

**FAMILY:** Loganiaceae
(logania family)

**NATURAL SETTING/LOCATION:** native to South Pacific islands

**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found

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**Growing your own**

**PROPAGATION**

**FORM:** air layering (most commonly used); seeds

**PLANTING DEPTH:** sow seeds ½" deep in medium

**GERMINATION TIME:** 30–90 days

**AIR LAYERING ROOTING TIME:** 6–8 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL PH:** 5.5–6.5

**LIGHT:** full sun

**WATER:** keep moist

**TEMPERATURE:** 60–90°F

**ELEVATION:** 10–1000'

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** moderate

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**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 15' x 15'

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

**PRUNING:** prune to keep within picking height and to produce new shoots for flowering

**SPECIAL CULTURAL HINTS:** flowers on new growth; don’t overfertilize

**SUGGESTED COMPANION PLANTINGS:** low-growing shade plants
**Pua Kenikeni**

### Plant characteristics

**Height:** up to 25'  
**Spread:** 15'  
**Growth Rate:** fast  
**Growth Habit:** upright, small tree or shrub

**Flowers**  
**Size:** 2½" long to 1" wide  
**Color:** cream colored, changing to orange  
**Shape:** tubular  
**Fragrance:** sweet  
**Flowers in First Year:** yes, from air layering  
**Flowering Period:** year-round, heaviest in summer  
**Time to Flowering:** 9 months from air layering, at least 5 years from seed  
**Inducing and Maintaining Flowering:** withhold water to induce flowering

**Pests**  
**Common Diseases:** leaf spots, fungal root rots, root-knot nematode  
**Other Pests:** mealybugs, scales, thrips

### Harvesting considerations

**What is harvested:** flowers and calyx (green, leafy base)  
**Harvesting Techniques:** break stem with flower, leaving calyx on the blossom  
**Best Time of Day to Harvest:** early morning  
**Best Way to Transport from Picking Area:** basket lined with ti leaf  
**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:** store at room temperature for up to 1 day for orange flowers, 2 days for yellow, and 3 days for white; no water; to remove thrips from flowers, wrap in wet newspaper, then seal in plastic container and place in ice-cold water  
**Preparing for Use in Lei:** depends on style; clip bottom at 45° angle, then sew lei, or clip calyx and sew  
**Storing a Completed Lei Before Wearing:** lay wet cloth or paper towel over lei or put lei in plastic bag and float over cold water; do not refrigerate  
**Preserving a Lei for Long-Term Storage or Display:** cannot be preserved

### References and further reading

**Growing Plants for Hawaiian Lei**

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**rose**

**OTHER COMMON NAMES:** loke, lokelani, loke-lau (green rose), roselani (heavenly rose)

**SCIENTIFIC NAME:** *Rosa* cultivars

**FAMILY:** Rosaceae (rose family)

**NATURAL SETTING/LLOCATION:** Asia, Asia Minor

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**Growing your own**

**HANDLING CAUTIONS:** thorns on stems

**PROPAGATION**

**FORM:** cuttings; air layering; grafting

**PRETREATMENT:** treat cuttings with medium rooting hormone

**PLANTING DEPTH:** insert base of cutting 1–2" into medium; set grafted plants with graft union above soil level

**CUTTING ROOTING TIME:** 1 month or longer, depending on type

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich in organic matter, well drained, sandy to sandy loam; in pots, medium in 1:1:1 ratio of soil, sphagnum or peat moss, and perlite or coarse cinder

**SOIL pH:** 6.0–6.5

**LIGHT:** full sunlight to partial shade

**WATER:** keep moist

**TEMPERATURE:** 50–90°F

**ELEVATION:** 10–3500'

**SALT TOLERANCE:** poor

**WIND RESISTANCE:** moderate (strong winds dehydrate plants)

**MANAGEMENT**

**FERTILIZER NEEDS:** medium to heavy; varies among types

**RECOMMENDED SPACING:** 2' apart in rows

**ADAPTATION TO GROWING IN CONTAINERS:** yes, 3-gallon tubs or larger

**PRUNING:** as flowers are harvested, the stem usually is cut back to the second 5-leaflet leaf above its point of origin; when plants get too tall or aisles too narrow, renewal pruning is practiced by heading them back; pruning to keep the plant’s center open lets sunlight in and prevents black spot and other blights

**SPECIAL CULTURAL HINTS:** various production difficulties; a crop for the experienced grower

**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

**CULTIVARS:** many new cultivars can out-perform old-fashioned standards; choose from miniature roses, floribunda, shrub roses, polyantha, and landscape types for lei flower use; check commercial catalogs for available cultivars
Growing Plants for Hawaiian Lei

**Plant characteristics**

**HEIGHT:** to 6'

**SPREAD:** to 4'

**GROWTH RATE:** depends on cultivar

**GROWTH HABIT:** shrub

**FLOWERS**

**SIZE:** buds are from 3/8–1 1/4"; flowers borne 1 per stem or in clusters

**COLOR:** pink, white, red, yellow, lavender, green bi-color

**SHAPE:** bud pointed to urn-shaped

**FRAGRANCE:** yes, varies

**FLOWERS IN FIRST YEAR:** yes

**FLOWERING PERIOD:** year-round

**TIME TO FLOWERING:** from transplants and cuttings, flowers are produced on new shoots about 45–55 days after the shoot develops from a pruning cut

**INDUCING AND MAINTAINING FLOWERING:** approximately 55 days from pruning to flower

**PESTS**

**COMMON DISEASES:** powdery mildew, downy mildew, blackspot, root rot, rust, anthracnose, nematodes, viruses, Botrytis blight (flowers), stem canker

**OTHER PESTS:** aphids, caterpillars, Chinese rose beetle, flower thrips, grasshoppers, mealybugs, spider mites, scales

**Harvesting considerations**

**WHAT IS HARVESTED:** buds or partially open flowers, with or without stems

**HARVESTING TECHNIQUES:** cut

**Best time of day to harvest:** early morning

**Best way to transport from picking area:** paper bag

**Avoid mixing with these products/conditions:** smoke, car exhaust, ripening fruits, and wilting flowers; avoid excessive heat

**Notes on lei making**

**Best for which type of lei:** neck, head, wrist, ankle, horse

**Vase Life:** 6 days

**Cleaning of plant materials:** place in clean, warm water (105–110°F) after harvesting

**Storing raw lei materials:** place in sealed plastic bag or container and refrigerate at 32–35°F for up to 14 days

**Preparing for use in lei:** clip off wrinkled, limp, or poor-quality areas before adding to lei; pick off damaged outer petals

**Storing a completed lei before wearing:** soak lei, shake off excess water, store in sealed plastic bag or container, and refrigerate

**Preserving a lei for long-term storage or display:** air-dry buds only

**References and further reading**

There are many cultural guides for cut-rose production. The American Rose Society publishes a monthly magazine and annual yearbook, available in some libraries.


The lei shown also contains heliconia and ‘ōhi’a lehua.
Growing Plants for Hawaiian Lei

shinobu

**Other Common Names:** davallia, rabbit’s foot fern  
**Scientific Name:** Davallia species  
**Family:** Davalliaceae (fern family)

**Natural Setting/Location:** Eastern Hemisphere tropics  
**Current Status in the Wild in Hawai’i:** not found

Growing your own

**Propagation**

**Form:** rhizome cuttings  
**Preplanting Treatment:** rooting hormone not needed  
**Planting Depth:** place on surface  
**Cutting Rooting Time:** 8 weeks

**Preferred Production Conditions**

**General Soil Characteristics:** well drained, organic soil  
**Soil pH:** 5.5–6.5  
**Light:** partial shade  
**Water:** regular, deep watering  
**Temperature:** 50–90°F  
**Elevation:** 10–2000'  
**Salt Tolerance:** poor  
**Wind Resistance:** poor

**Management**

**Fertilizer Needs:** light  
**Recommended Spacing:** 2–3' apart  
**Adaptation to Growing in Containers:** yes, baskets with hāpu’u or sphagnum moss  
**Pruning:** remove old fronds  

**Special Cultural Hints:** mature fronds last longer than if the delicate, immature ones are used  
**Suggested Companion Plantings:** tall trees for shade
shinobu

**Plant characteristics**

**HEIGHT:** 20"

**SPREAD:** 5–8'

**GROWTH RATE:** moderate

**GROWTH HABIT:** running fern

**FOLIAGE**

**TEXTURE:** fine

**COLOR:** dark green

**SHAPE:** fern-like

**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** crown and foot rot, lesion nematodes

**OTHER PESTS:** fern caterpillar

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**Harvesting considerations**

**WHAT IS HARVESTED:** fronds

**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

**AVOID CONTACT WITH THESE PRODUCTS:** none known

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**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:** either refrigerate in sealed container at 40°F for up to 14 days or soak stems in water without refrigeration

**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 container, and refrigerate or place in damp newspaper and store in room temperature

**PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY:** air-dry (becomes brittle)

The lei shown also contains cup-and-saucer plant and statice.

**References and further reading**


### shrimp plant (white and yellow)

**Other common names:** squirrel’s tail

**Scientific name:** Justicia betonica (white); J. brandegeana (yellow and red)

**Family:** Acanthaceae (acanthus family)

**Natural setting/location:** Malaysia westward to Africa

**Current status in the wild in Hawai‘i:** J. betonica found naturalized along roadsides, J. brandegeana not found

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**Growing your own**

**Propagation**

**Form:** cuttings; seeds (only J. betonica)

**Pretreatment:** none

**Planting depth:** sow seeds on surface or slightly (1/8") below; insert base of cutting 1–2" into medium, use mild rooting hormone

**Germination time:** undetermined

**Cutting rooting time:** 10–21 days

**Preferred production conditions**

**General soil characteristics:** rich, well-drained soils; tolerant of many soil types

**Soil pH:** 6.0–7.0

**Light:** full sun to partial shade

**Water:** keep moist

**Temperature:** 60–90°F

**Elevation:** 10–500'

**Salt tolerance:** poor

**Wind resistance:** poor

**Management**

**Fertilizer needs:** medium

**Recommended spacing:** 2–3' apart

**Adaptation to growing in containers:** yes, 1-gallon tubs or larger

**Pruning:** established plants will tolerate severe cutback

**Special cultural hints:** white shrimp plant has potential of becoming a serious weed if left unchecked; do not plant near native landscapes
shrimp plant (white and yellow)

**Plant characteristics**

**HEIGHT:** 2–5'
**SPREAD:** 2–3'
**GROWTH RATE:** moderate
**GROWTH HABIT:** weak-stemmed shrub

**FLOWERS**

**SIZE:** flower spike to 6" long
**COLOR:** *J. betonica* has green and white bracts, *J. brandegeana* has red or yellow bracts
**SHAPE:** oval, pointed
**FRAGRANCE:** none
**FLOWERS IN FIRST YEAR:** yes
**FLOWERING PERIOD:** year-round, heaviest in summer
**TIME TO FLOWERING:** from cutting, 3–4 months
**INDUCING AND MAINTAINING FLOWERING:** flowers on terminals or new growth; prune to keep plants in bounds and encourage new growth

**PESTS**

**COMMON DISEASES:** none
**OTHER PESTS:** none serious

**Harvesting considerations**

**WHAT IS HARVESTED:** new, short inflorescences or tips of longer ones
**HARVESTING TECHNIQUES:** the plant is brittle; use snips to cut the flower spikes
**BEST TIME OF DAY TO HARVEST:** early morning
**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper bag
**AVOID CONTACT WITH THESE PRODUCTS:** smoke, car exhaust, ripening fruits, and wilting flowers

The lei shown also contains bougainvillea.

**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:** wrap in damp newspaper and refrigerate at 40°F for up to 5 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, store in sealed plastic container, and refrigerate

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

**References and further reading**


**ALERT:** *Justicia betonica* can be an invasive species and cause problems in agricultural areas in Hawai’i. It scores a rating of 12 on the Hawai’i-Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai’i or similar Pacific islands, and is about 95% accurate. Any score above 6 indicates the potential for invasiveness, though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but *Justicia* species should not be introduced to areas where they are not already growing. *J. betonica* already naturalized in some places on all the major islands. The plant spreads by seed. If fertile material is used, lei should not be discarded in areas where *J. betonica* is not naturalized and where the seeds can germinate and grow. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: http://www.plantpono.org.
**Spanish moss**

**OTHER COMMON NAMES:** Dole’s beard, hinahina, ‘umi’umi-o-Dole  
**SCIENTIFIC NAME:** Tillandsia usneoides  
**FAMILY:** Bromeliaceae (pineapple family)  
**NATURAL SETTING/LOCATION:** Florida, Central and South America  
**CURRENT STATUS IN THE WILD IN HAWAI’I:** typically not found

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**Growing your own**

**PROPAGATION**

**FORM:** vegetative clump divisions  
**PLANTING DEPTH:** none; drape on tree branches or hangers

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** none; an epiphyte (air plant)  
**LIGHT:** full sun to partial shade  
**WATER:** daily misting  
**TEMPERATURE:** 40–90°F  
**ELEVATION:** 10–3000’  
**SALT TOLERANCE:** moderate  
**WIND RESISTANCE:** moderate

**MANAGEMENT**

**FERTILIZER NEEDS:** none required, but a very diluted liquid fertilizer can be applied occasionally as a foliar spray

**RECOMMENDED SPACING:** on hangers spaced 18” apart  
**ADAPTATION TO GROWING IN CONTAINERS:** can be grown on trees or hanging from artificial supports such as clothes hangers  
**SPECIAL CULTURAL HINTS:** provide good air movement and daily misting; can be harvested in 3–6 months  
**SUGGESTED COMPANION PLANTINGS:** can be hung on trees or grown above smaller plants

**Plant characteristics**

**HEIGHT:** hanging clusters up to 15’ long  
**SPREAD:** up to 1’ in diameter  
**GROWTH RATE:** fast  
**GROWTH HABIT:** mosslike, herbaceous

**FOLIAGE**

**TEXTURE:** fuzzy  
**COLOR:** silver with bluish cast  
**SHAPE:** short, needle-like  
**FRAGRANCE:** none

**PESTS**

**COMMON DISEASES:** rot can develop in thick bunches where there is poor air circulation; fungal root rot  
**OTHER PESTS:** none known
Spanish moss

Harvesting considerations

WHAT IS HARVESTED: clumps

HARVESTING TECHNIQUES: cut or pull

BEST TIME OF DAY TO HARVEST: any time

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

Notes on lei making

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

CLEANING OF PLANT MATERIALS: spray with water.

STORING RAW LEI MATERIALS: place clumps on damp newspaper in paper or 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, drip dry, place on damp newspaper in paper or plastic container, and refrigerate; or, leave hanging outside in well-ventilated area, spray with water

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

References and further reading


ALERT: Tillandsia usneoides could be an invasive species and cause problems in natural areas in Hawai‘i. It scores a rating of 12 on the Hawai‘i–Pacific Weed Risk Assessment (HPWRA). The HPWRA predicts whether any given plant is at low or high risk of becoming invasive in Hawai‘i or similar Pacific islands and is about 95% accurate. Any score above 6 indicates the potential for invasiveness though there are varying levels of concern. The HPWRA score does not necessarily mean you should remove established plants from urban landscapes or avoid planting them at all, but T. usneoides should not be introduced to areas where it is not already growing. Eight species of Tillandsia have already naturalized in some places on O‘ahu and Maui. Wind and birds can spread the seeds, and the plant can reproduce by runners. If T. usneoides is used in lei, seeds should be removed first if possible. If fertile material is used, lei should not be discarded in areas where T. usneoides is not naturalized and where the seeds can germinate and grow. Use of native plants or non-native, non-invasive species in lei will minimize the spread of weeds. See the Plant Pono website for more information about potentially invasive species: http://www.plantpono.org.
Growing Plants for Hawaiian Lei

statice

OTHER COMMON NAMES: sea lavender

SCIENTIFIC NAME: Limonium latifolium (perennial); L. sinuatum (annual)

FAMILY: Plumbaginaceae (plumbago family)

NATURAL SETTING/LOCATION: southeast and central Europe, Mediterranean

CURRENT STATUS IN THE WILD IN HAWAI‘I: not found

CULTIVARS: Fortress series, ‘Avignon’

Growing your own

PROPAGATION

FORM: seeds (purchase from a seed source); division (of perennial form)

PLANTING DEPTH: sow seeds on medium surface (or slightly below); keep division root crown just below soil level

GERMINATION TIME: 5–15 days at 65–70°F for L. latifolium and 60°F for L. sinuatum

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained and high in calcium

SOIL pH: 6.5–7.5

LIGHT: full sun

WATER: keep moist

TEMPERATURE: 60–90°F

ELEVATION: 10–3500’

SALT TOLERANCE: poor

WIND RESISTANCE: poor

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 14–18” apart

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

PRUNING: not necessary

SPECIAL CULTURAL HINTS: start with seedlings with 5–6 leaves; good drainage is critical; cool temperature will induce flowering in L. sinuatum

SUGGESTED COMPANION PLANTINGS: bedding plants
statice

**Growing Plants for Hawaiian Lei**

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**best time of day to harvest:** early morning

**way to transport from picking area:** plastic container with water

**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, horse

**cleaning of plant materials:** place stems in water; dust off field dust and clip off wrinkled, limp, or poor-quality areas before adding to lei

**storing raw lei materials:** refrigerate at 40°F for up to 14 days

**preparing for use in lei:** cut flowers with stems about 1–2" long and place in paper container with no water; do not wet heads

**storing a completed lei before wearing:** mist lei, shake off excess water, place on dry newspaper in paper box, and refrigerate

**preserving a lei for long-term storage or display:** air-dry

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**Plant characteristics**

**HEIGHT:** *L. latifolium* to 24", *L. sinuatum* to 24–36" at flowering

**SPREAD:** 12–24"

**GROWTH RATE:** *L. latifolium* slow, *L. sinuatum* fast

**GROWTH HABIT:** upright clumps

**FLOWERS**

**SIZE:** ¼", borne in 3–5" clusters

**COLOR:** *L. latifolium*: blue, white, pink; *L. sinuatum*: blue, lavender, white-pink

**SHAPE:** cup-shaped

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** *L. latifolium*, few flowers first year (3–4 years to maturity); *L. sinuatum* will flower in first year

**FLOWERING PERIOD:** *L. latifolium* summer; *L. sinuatum* April–October

**TIME TO FLOWERING:** *L. sinuatum* 3–5 months after sowing

**INDUCING AND MAINTAINING FLOWERING:** cool temperature required for young plants to flower

**PESTS**

**COMMON DISEASES:** root rot in wet soils; leaf spots (various diseases); *Botrytis* in flowers in wet areas

**OTHER PESTS:** aphids, chewing insects

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**Harvesting considerations**

**WHAT IS HARVESTED:** flowering stems from base of plant

**HARVESTING TECHNIQUES:** harvest when most flowers are open and showing color

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The lei shown also contains hydrangea, baby’s breath, panax, and bougainvillea.

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**References and further reading**


Growing Plants for Hawaiian Lei

**stephanotis**

**OTHER COMMON NAMES:** floradora, Madagascar jasmine, pua male, waxflower

**SCIENTIFIC NAME:** Marsdenia floribunda

**FAMILY:** Asclepiadaceae (milkweed family)

**NATURAL SETTING/LOCATION:** native to Madagascar

**CURRENT STATUS IN THE WILD IN HAWAI’I:** not found

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**Growing your own**

**PROPAGATION**

**FORM:** seeds; cuttings of semi-mature wood (roots form at nodes)

**PRETREATMENT:** remove fiber from seeds; treat cuttings with medium rooting hormone

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

**GERMINATION TIME:** 2 weeks

**CUTTING ROOTING TIME:** 4–6 weeks

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** rich, well drained

**SOIL pH:** 5.5–6.5

**LIGHT:** full sun

**WATER:** keep moist

**TEMPERATURE:** 65–90°F

**ELEVATION:** 10–1000'

**SALT TOLERANCE:** moderate

**WIND RESISTANCE:** good

**MANAGEMENT**

**FERTILIZER NEEDS:** medium

**RECOMMENDED SPACING:** 36" apart in rows

**ADAPTATION TO GROWING IN CONTAINERS:** yes, large containers

**PRUNING:** older plants may become straggly, therefore prune to manage size and shape and to induce flowering

**SPECIAL CULTURAL HINTS:** provide trellis or other support; let dry between waterings
**Plant characteristics**

**HEIGHT:** limited to height of support

**SPREAD:** 6–15', limited by length of support

**GROWTH RATE:** slow to establish, fast when established

**GROWTH HABIT:** vine

**FLOWERS**

**SIZE:** to 2" long

**COLOR:** white

**SHAPE:** tubular

**FRAGRANCE:** sweet, strong

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

**FLOWERING PERIOD:** April–July and sporadically during the rest of the year; flowering can be forced with lights

**TIME TO FLOWERING:** 10–12 weeks after pruning if night temperature remains above 72°F

**INDUCING AND MAINTAINING FLOWERING:** to induce winter flowering, provide light as a night-break interruption for 4–6 hours at 20 watts per square yard of vine for 8 weeks in October–November

**PESTS**

**COMMON DISEASES:** root-knot nematode

**OTHER PESTS:** aphids, mealybugs, spider mites, scale, thrips

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers

**HARVESTING TECHNIQUES:** pinch from vine

**BEST TIME OF DAY TO HARVEST:** early morning

**BEST WAY TO TRANSPORT FROM PICKING AREA:** paper bag

**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, 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 7 days

**PREPARING FOR USE IN LEI:** cut blossom stem to length desired for lei fullness

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

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

**References and further reading**


Growing your own

PROPAGATION

FORM: seeds; cuttings 6–12” long (hardened wood or green wood, but green wood is more prone to rotting); air layering

PREPLANTING TREATMENT: use medium rooting hormone on cuttings

PLANTING DEPTH: sow seeds ¼” deep in medium; insert base of cutting 2–4” into medium

GERMINATION TIME: 2–4 weeks

CUTTING ROOTING TIME: 3–6 weeks

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: sandy, well drained

SOIL pH: 6.0–7.5

LIGHT: full sun

WATER: drought tolerant

TEMPERATURE: 65–95°F

ELEVATION: 10–50’

SALT TOLERANCE: good

WIND RESISTANCE: good

MANAGEMENT

FERTILIZER NEEDS: medium

RECOMMENDED SPACING: 15’ apart

ADAPTATION TO GROWING IN CONTAINERS: not recommended

PRUNING: prune to keep within picking height and induce branching; do not prune into old wood

SPECIAL CULTURAL HINTS: do not overwater

SUGGESTED COMPANION PLANTINGS: low-growing beach plants
**tree heliotrope**

**Plant characteristics**

**HEIGHT:** 10–15’

**SPREAD:** 15’

**GROWTH RATE:** slow at maturity

**GROWTH HABIT:** round-headed, small tree

**FLOWERS**

**SIZE:** small (individually), forming clusters

**COLOR:** white

**SHAPE:** tubular

**FRAGRANCE:** none

**FLOWERS IN FIRST YEAR:** from cutting, yes; no information for seed or air layer

**FLOWERING PERIOD:** year-round

**TIME TO FLOWERING:** several years from seed, 1–2 years from cutting and air layer

**INDUCING AND MAINTAINING FLOWERING:** always flowering

**FRUITS**

**SIZE:** 1⁄5”

**COLOR:** pale green to brown

**SHAPE:** round

**FRAGRANCE:** none

**TIME TO FRUITING:** many years from seed

**FRUITING PERIOD:** late summer

**PESTS**

**COMMON DISEASES:** root rots if too wet, leaf and flower spots

**OTHER PESTS:** ants, mealybugs

The lei shown also contains aster, rose, and ‘ülei.

**Harvesting considerations**

**WHAT IS HARVESTED:** flowers and fruit clusters

**BEST TIME OF DAY TO HARVEST:** early morning

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

**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, horse

**VASE LIFE:** 7 days

**CLEANING OF PLANT MATERIALS:** cold water soak

**STORING RAW LEI MATERIALS:** put stems in water and refrigerate at 40°F for up to 10 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

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

**Reference and further reading**

Growing Plants for Hawaiian Lei

**tuberose**

**OTHER COMMON NAMES:** azucena, kupaloke, nardo  
**SCIENTIFIC NAME:** *Polianthes tuberosa*  
**FAMILY:** Agavaceae (agave family)

**NATURAL SETTING/LOCATION:** native to Mexico  
**CURRENT STATUS IN THE WILD IN HAWAI‘I:** not found  
**CULTIVARS:** ‘Excelsior’, ‘Pearl’

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### Growing your own

**PROPAGATION**

**FORM:** corms (1½–2” diameter)  
**PREPLANTING TREATMENT:** dip corms in insecticide for corm mealybugs  
**PLANTING DEPTH:** plant corm 1½” deep in medium  
**CORM ROOTING TIME:** 10 days

**PREFERRED PRODUCTION CONDITIONS**

**GENERAL SOIL CHARACTERISTICS:** well-drained, loamy soil to minimize incidence of soil-borne fungi and damping off organisms  
**SOIL pH:** 6.0–6.5  
**LIGHT:** full sun  
**WATER:** high water requirement; don’t allow corms to dry out  
**TEMPERATURE:** 68–90°F to develop flowers of large size, amount, and good keeping quality; for optimum root growth, average soil temperature should be above 68°F

**ELEVATION:** 10–1000’; prefers moderate elevations, such as conditions found on slopes of Haleakalā on Maui or in Waimea on Hawai‘i; has done well in lowlands, such as 300’ in Ho‘olehua during winter and spring months  
**SALT TOLERANCE:** poor  
**WIND RESISTANCE:** moderate (but flower stalks can be blown over in strong winds)

**MANAGEMENT**

**FERTILIZER NEEDS:** medium  
**RECOMMENDED SPACING:** 6–8” in rows, 8” between rows, or 1’ square or triangle; many different planting systems are used for production  
**ADAPTATION TO GROWING IN CONTAINERS:** yes, pots 8” or larger  
**PRUNING:** cut stalk to base after flowering  
**SPECIAL CULTURAL HINTS:** grow on mounds for good drainage to avoid root rot; sterilize soil to avoid nematodes; use corms 1” or larger in diameter
tuberose

Plant characteristics

HEIGHT: plant: up to 2’; flower stalk: 2–5’
SPREAD: 12”
GROWTH RATE: fast in summer, slow in winter
GROWTH HABIT: low growing, herbaceous

FLOWERS
SIZE: 2–3” long, 1–1½” diameter
COLOR: white
SHAPE: star-shaped tubular flower with rounded petals (only double-petalled flowers used for lei)
FRAGRANCE: very sweet
FLOWERS IN FIRST YEAR: yes
FLOWERING PERIOD: year-round, heaviest in spring and summer
TIME TO FLOWERING: 4–6 months, depending on temperature and time of year
INDUCING AND MAINTAINING FLOWERING: regular fertilizer and irrigation

PESTS
COMMON DISEASES: Pythium root rot fungus, bacterium, southern blight, Botrytis blossom rot, foliar and root-knot nematodes
OTHER PESTS: ants, aphids, blossom midge, carmine spider mite, mealybugs, slugs, thrips

Harvesting considerations

WHAT IS HARVESTED: majority of flowers open
HARVESTING TECHNIQUES: grasp individual flowers at base and give a gentle tug
BEST TIME OF DAY TO HARVEST: early morning

The lei shown also contains shinobu.

BEST WAY TO TRANSPORT FROM PICKING AREA: brown paper bag
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, horse
VAZE LIFE: 7 days if flowers on stalk
CLEANING OF PLANT MATERIALS: cold water soak
STORING RAW LEI MATERIALS: store flowers in paper box and refrigerate at 40°F for up to 4 days
PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei
STORING A COMPLETED LEI BEFORE WEARING: mist lei, wrap in damp paper towel, place in paper box, and refrigerate
PRESEVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading

**Violet**

**Other Common Names:** Australian violet (Viola hederacea), sweet violet (V. odorata), waioleka

**Scientific Name:** Viola hederacea, V. odorata

**Family:** Violaceae (violet family)

**Natural Setting/Location:** V. odorata: Eurasia and Africa; V. hederacea: Australia

**Current Status in the Wild in Hawai‘i:** V. odorata naturalized in some wet areas on Lāna‘i and Kaua‘i

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**Growing your own**

**Propagation**

**Form:** seeds (V. odorata); division; cuttings (taken in spring, rooted in sand)

**Preplanting Treatment:** none

**Planting Depth:** sow seeds 1/16–1/8" deep, barely covering with medium; keep division root crown just below soil level; insert base of cutting 1–2" into medium

**Germination Time:** 10–20 days at 70°F

**Cutting Rooting Time:** 3–4 weeks

**Preferred Production Conditions**

**General Soil Characteristics:** light, sandy soil, well drained

**Soil pH:** 6.0–7.0

**Light:** partial to heavy shade

**Water:** high-quality water, applied deeply once a week

**Temperature:** 60°F (day), 50°F (night); tolerates warmer

**Elevation:** 1000–3000' (V. odorata); 200–500' (V. hederacea)

**Salt Tolerance:** poor

**Wind Resistance:** poor

**Management**

**Fertilizer Needs:** very light

**Recommended Spacing:** 6–8" apart

**Adaptation to Growing in Containers:** yes, raised beds

**Pruning:** not necessary; remove old leaves

**Special Cultural Hints:** plants vegetate at high temperature, so keep cool; V. hederacea grows and flowers year-round in Hawai‘i, while V. odorata flowers in spring only; too much sunlight causes burning; mulch to keep soil cool and moist; becomes chlorotic at high soil pH; water from bottom rather than from top to protect fragile flowers

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**Plant Characteristics**

**Height:** 4–6"

**Spread:** 12–20"; forms mat or runners

**Growth Rate:** 6–10" a year

**Growth Habit:** low growing, herbaceous
violet

FLOWERS

SIZE: ½–1¼"  
COLOR: violet, white, yellow; *V. hederacea*: blue-violet and white  
SHAPE: 5-petalled  
FRAGRANCE: sweet (*V. odorata*), none (*V. hederacea*)  
FLOWERS IN FIRST YEAR: yes, depending on when propagated; *V. odorata* flowers in first year if started from seed in early spring  
FLOWERING PERIOD: *V. odorata*: 8–12 weeks in spring; *V. hederacea*: year-round  
TIME TO FLOWERING: perennial; less likely to flower in long days of summer and early fall

PESTS

COMMON DISEASES: root rot (*Phytophthora, Pythium, Rhizoctonia*), leaf spots (*Colletotrichum, Spaceloma*), black root (*Thielaviopsis basicola*), root-knot nematode  
OTHER PESTS: aphids, mealybugs, mites, slugs

Harvesting considerations

WHAT IS HARVESTED: flowers with 1–2" of stem  
HARVESTING TECHNIQUES: pinch stems  
BEST TIME OF DAY TO HARVEST: early morning  
BEST WAY TO TRANSPORT FROM PICKING AREA: plastic container  
AVOID CONTACT WITH THESE PRODUCTS: smoke, car exhaust, ripening fruits, wilting flowers

The lei shown also contains leatherleaf fern, goldenrod, German statice, baby’s breath, and statice.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck, head, wrist, ankle  
VASE LIFE: 3–7 days  
CLEANING OF PLANT MATERIALS: stick stems in water  
STORING RAW LEI MATERIALS: place in sealed plastic container or glass vase and refrigerate at 40°F for up to 7 days  
PREPARING FOR USE IN LEI: clip off wrinkled, limp, or poor-quality areas before adding to lei  
STORING A COMPLETED LEI BEFORE WEARING: mist lei, shake off excess water, place in sealed plastic container, and refrigerate  
PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be preserved

References and further reading