

ageratum

OTHER COMMON NAMES: floss flower, maile-hohono

SCIENTIFIC NAME:
Ageratum houstonianum

FAMILY: Asteraceae (formerly Compositae) (aster family)

NATURAL SETTING/LOCATION:
Central America



CURRENT STATUS IN THE WILD IN HAWAII: naturalized in some areas, but its rangy form of growth in the wild generally precludes wild-collected flowers being used in lei

CULTIVARS: 'Blue Blazer', 'Blue Bouquet', 'Blue Chip', 'Blue Mink', 'Fairy Pink', 'Florist's Blue', 'Violet Cloud', 'Pinky Improved', 'Hawaii Royal'

Growing your own

HANDLING CAUTIONS: the plant contains coumarin and is toxic if eaten; contact can irritate mucous membranes in people sensitive to it

PROPAGATION

FORM: seeds

PLANTING DEPTH: broadcast seeds; do not cover with any soil or medium; light aids germination

GERMINATION TIME: 7–10 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: best in rich, moist, well-drained media; generally produced in pots

LIGHT: full sun to partial shade

WATER: irrigate abundantly

SOIL TEMPERATURE: 75–82°F

SALT TOLERANCE: poor

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 6–10"

ADAPTATION TO GROWING IN CONTAINERS: yes, 3–4" pots

SPECIAL CULTURAL HINTS: liberally reseeds itself and may become a pest



ageratum

Plant characteristics

HEIGHT: 6–9" (dwarf); 2–2½' (other varieties)

SPREAD: 6–20"

GROWTH HABIT: loose, spreading, herbaceous

FLOWERS

SIZE: ¼–½"

COLOR: shades of blue, light purple, pink, white

SHAPE: tassel-like flowers in dense clusters

FRAGRANCE: none

TIME TO FLOWERING: 12–13 weeks for dwarf varieties; others take several weeks longer

INDUCING AND MAINTAINING FLOWERING:

remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: powdery mildew, root rot

OTHER PESTS: aphids, slugs, snails, spider mites, whiteflies

Harvesting considerations

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

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning



The lei shown also contains agapanthus and hydrangea.

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic bag

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

Notes on lei making

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

VASE LIFE: 1 day

CLEANING OF PLANT MATERIALS: cut stem, remove old foliage; avoid wetting flower heads

STORING RAW LEI MATERIALS: put stems in water with flower heads above water; flower heads tend to blacken with overwatering and being covered with paper; refrigerate at 40°F for up to 5 days

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

STORING A COMPLETED LEI BEFORE WEARING: spray lightly, store in sealed plastic container, and refrigerate

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

References and further reading

- Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.
- Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.
- Nau, Jim. 1998. "Ageratum." In: *The Ball RedDook*. 16th ed., p. 339–340. Batavia, Illinois: Ball Publishing.
- Ortho Books. 1999. *Ortho's All About Annuals*. Des Moines, Iowa: Meredith Publishing Group.
- Smith and Hawken. 1996. *The Book Of Outdoor Gardening*. New York: Workman Publishing Company, Inc.
- Sunset. 1998. *Western Garden Book*. Menlo Park, California: Sunset Publishing Corp.

alyssum

OTHER COMMON NAMES: sweet alyssum, sweet alison

SCIENTIFIC NAME: *Lobularia maritima* (L.) Desv.

FAMILY: Brassicaceae (mustard family)

NATURAL SETTING/LOCATION: Mediterranean



CURRENT STATUS IN THE WILD IN HAWAII: naturalized in Kula, Maui

CULTIVARS: 'Apricot Shades', 'Rosie O'Day', 'Wonderland', 'Oriental Night', 'Carpet of Snow', 'Snow Crystals', 'Basket-of-Gold'

Growing your own

PROPAGATION

FORM: primarily seeds; has a low level of self-sowing from one year to the next

PLANTING DEPTH: broadcast seeds; do not cover with any soil or medium; light aids germination; best to water seeds with warm water

GERMINATION TIME: 7–10 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, average fertility; will grow in poor soils

LIGHT: full sun to partial shade

WATER: moderately

SOIL TEMPERATURES: 78–80°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 8"

ADAPTATION TO GROWING IN CONTAINERS: yes, 5" pots



SPECIAL CULTURAL HINTS: can be cut back repeatedly and fertilized lightly after each cut; may stop flowering in periods of extreme heat; can be produced in pots

Plant characteristics

HEIGHT: 4–8"

SPREAD: 10–15"

GROWTH RATE: medium

GROWTH HABIT: low, branching, trailing

FLOWERS

SIZE: tiny

COLOR: white, pink, lavender, yellow

SHAPE: 4-petaled (with the petals of equal size)

FRAGRANCE: honey-like

TIME TO FLOWERING: 10–11 weeks

INDUCING AND MAINTAINING BLOOMING: to prolong flowering season, cut them down by half after the first flush of flowers and they will bloom again; flowers profusely under cool (60–68°F) temperature

alyssum

PESTS

COMMON DISEASES: sensitive to damping off, powdery and downy mildew

COMMON INSECT PESTS: aphids, thrips

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cooler or wet newspaper

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

Notes on lei making

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

VASE LIFE: 1 day

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: refrigerate at 40°F for up to 10 days

PREPARING FOR USE IN LEI: clean leaves and old seed pods, cut 2", place stem in water

STORING A COMPLETED LEI BEFORE WEARING: immerse whole lei in water and drip dry; place in wet tissue, then place in sealed plastic container and refrigerate

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



The lei shown also contains asparagus fern, ageratum, dusty miller, and 'ōhi'a lehua.

References and further reading

Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.

Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.

Nau, Jim. 1998. "Lobularia." In: *The Ball RedBook*. 16th ed., p. 635–636. Batavia, Illinois: Ball Publishing.

Smith and Hawken. 1996. *The Book Of Outdoor Gardening*. New York: Workman Publishing Company, Inc.

ALERT: *Lobularia maritima* can be an invasive species and cause problems in natural areas in Hawai'i. It scores a rating of 8 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 *L. maritima* should not be introduced to areas where it is not already growing. *L. maritima* has already naturalized in some places on O'ahu, Moloka'i, and Maui and Hawai'i Island. The plant can be spread by seeds. If fertile material is used, lei should not be discarded in areas where *L. maritima* 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>.

celosia

OTHER COMMON NAMES: cockscomb, lepe-a-moa

SCIENTIFIC NAME: *Celosia argentea* var. *cristata* and var. *plumosa*

FAMILY: Amaranthaceae (amaranth family)

NATURAL SETTING/LOCATION: tropical Africa



CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: *C. argentea* var. *cristata*: Chief hybrids, Coral Garden hybrids, 'Fireglow', 'Toreador'; var. *plumosa*: Castle hybrids, Kimono hybrids, 'Apricot Brandy', 'Fiery Feather'

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: broadcast; do not cover with any soil or medium; light aids germination

GERMINATION TIME: 11–12 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: rich, well drained, high in organic matter; tolerates dry soil

LIGHT: full sun to partial shade

WATER: abundantly

SOIL TEMPERATURE: 75–78°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 8–18" (8" for single harvests, 18" for continual harvests)

ADAPTATION TO GROWING IN CONTAINERS: yes, 6" pots

PRUNING: cut off spent flowers regularly

SPECIAL CULTURAL HINTS: control damping off by limiting moisture and applying preventative fungicides; both types of celosia are extremely sensitive to high soluble-salt levels in media; symptoms of salt damage include reduced leaf size and plant height, leaf chlorosis at tips or margins, and increased variability among the plants



celosia

Plant characteristics

HEIGHT: 6–20"

SPREAD: 8–12"

GROWTH RATE: fast

GROWTH HABIT: erect, branching, herbaceous

FLOWERS

SIZE: large if they are at the apex of the plant, smaller if they arise from the axillary shoots

COLOR: solid colors of red, yellow, orange, gold, pink

SHAPE: either spire-like plumes of flowers (var. *cristata*) or Y-shaped, convoluted, flat-topped flowers resembling a “rooster’s comb” (var. *plumosa*)

FRAGRANCE: none

TIME TO FLOWERING: 12–15 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: damping off, leaf spots, nematodes

OTHER PESTS: aphids, spider mites

Harvesting considerations

WHAT IS HARVESTED: half-open flower spike

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cooler

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



The lei shown also contains pa‘iniu, strawflower, globe amaranth, and rose.

Notes on lei making

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

VASE LIFE: to 6 days

CLEANING OF PLANT MATERIALS: cut stem, remove all foliage; avoid wetting flower heads

STORING RAW LEI MATERIALS: store in container with water and refrigerate at 40°F for up to 6 days

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

STORING A COMPLETED LEI BEFORE WEARING: place in sealed plastic container and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: place on hat and let dry naturally in cool, dark area; red flowers give the best results

References and further reading

Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron’s Educational Series, Inc.

Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.

Nau, Jim. 1993. *Ball Culture Guide, The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.

Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower’s Guide*. Batavia, Illinois: Ball Publishing.

chrysanthemum

OTHER COMMON NAMES: mum (florist mum, garden mum), feverfew, pua pākē

SCIENTIFIC NAME: *Chrysanthemum* species and hybrids

FAMILY: Asteraceae (formerly Compositae) (aster family)

NATURAL SETTING/LOCATION: China, Japan, Europe



CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: many cultivars are available from commercial sources; new ones are developed frequently

Growing your own

HANDLING CAUTIONS: flowers of certain types contain pollen to which some people are allergic

PROPAGATION

FORM: cuttings; seeds (takes longer); division (runner plants)

PLANTING DEPTH: keep runner root crown just below soil level

GERMINATION TIME: 5–14 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, all-purpose

LIGHT: full sun

WATER: keep damp

SOIL TEMPERATURE: 60–70°F



MANAGEMENT

FERTILIZER NEEDS: light to medium

RECOMMENDED SPACING: 8–12" apart

ADAPTATION TO GROWING IN CONTAINERS: yes, 6" pots

PRUNING: cut off spent flowers regularly

SPECIAL CULTURAL HINTS: blooms with short days; there are specific budding and flowering times for various mums; colors differ in the second blooming, so a variety of colors can be obtained by allowing a second crop to flower after cutting back the fall crop

chrysanthemum

Plant characteristics

HEIGHT: 8–12"

SPREAD: 10–12"

GROWTH RATE: moderate to fast

GROWTH HABIT: erect, branching, herbaceous

FLOWERS

SIZE: small-flowered types (1–2") best for use in lei

COLOR: pink, orange-bronze, yellow, cream

SHAPE: pompon, daisy, button

FRAGRANCE: yes, but not sweet

TIME TO FLOWERING: 11–12 weeks

INDUCING AND MAINTAINING BLOOMING: short-day types require covering to shorten long summer days; covering must completely block light

PESTS

COMMON DISEASES: foliar diseases, petal blight, stunt virus

OTHER PESTS: aphids, spider mites, thrips

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: cut when flower is open but center is still tight

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, wilting flowers



The lei shown also contains moa, kīkānia, and rondeletia.

Notes on lei making

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

VASE LIFE: 7–10 days, depending on the cultivar

CLEANING OF PLANT MATERIALS: remove all leaves; cut above base of stem where hard and woody to assist water uptake

STORING RAW LEI MATERIALS: store in container with water and refrigerate at 40°F for up to 10 days

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

STORING A COMPLETED LEI BEFORE WEARING: soak in water, drip dry, wrap in dry paper towel, and refrigerate in sealed plastic container

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: *C. parthenium* is suitable for drying

References and further reading

Ball, Vic. 1998. "Chrysanthemum." In: *The Ball RedBook*. 16th ed, p. 425–426. Batavia, Illinois: Ball Publishing.

Halpin, Anne Moyer. 1990. *Foolproof Planting*. New York: Roundtable Press, Inc.

Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.

Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.

Hodge, Peggy Hicock. 1996. *Gardening in Hawaii*. Honolulu: Mutual Publishing.

Sascalis, John N. 1993. *Cut Flowers, Prolonging Freshness*. Batavia, Illinois: Ball Publishing.

Sturdivant, Lee. 1992. *Flowers for Sale*. Friday Harbor, Washington: San Juan Naturals.

cornflower

OTHER COMMON NAMES: bachelor's button

SCIENTIFIC NAME: *Centaurea cyanus*

FAMILY: Asteraceae (formerly Compositae) (aster family)

NATURAL SETTING/LOCATION: native to Europe



CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: 'Florence Pink', 'Pink Ball', 'Blue Diadem', 'Ultra Dwarf Blue'

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: cover seeds ¼" deep with fine medium

GERMINATION TIME: 12–14 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: dry to moist

LIGHT: full sun

WATER: moderate

SOIL TEMPERATURES: 65–70°F



MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 6–9"

ADAPTATION TO GROWING IN CONTAINERS: yes, dwarf cultivars in 3- to 5-gallon tubs

SPECIAL CULTURAL HINTS: very sensitive to being root-bound; does not transplant well and is best seeded directly into the garden; grows best by starting under short days, followed by long days; acts as a perennial by reseeding itself; provide supplementary lighting to increase daylength during short winter days

cornflower

Plant characteristics

HEIGHT: 12–36"

SPREAD: 6–12"

GROWTH HABIT: erect, branching, herbaceous

FLOWERS

SIZE: 1–1½" wide flowerheads

COLOR: blue, white, pink, purple

SHAPE: long-stalked

FRAGRANCE: none

TIME TO FLOWERING: 5–6 months

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: *Botrytis*, aster yellows, downy mildew

COMMON INSECT PESTS: leafhoppers, aphids

Harvesting considerations

WHAT IS HARVESTED: flowers beginning to open

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: cooler

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



The lei shown also contains hydrangea, baby's breath, asparagus fern, and pa'iniu.

Notes on lei making

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

VASE LIFE: 6–10 days

CLEANING OF PLANT MATERIALS: cut stem off at 2"

STORING RAW LEI MATERIALS: store in container with water and refrigerate at 40°F for up to 3 days; do not cover flower heads

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

STORING A COMPLETED LEI BEFORE WEARING: sprinkle with water, drip dry, place in sealed plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: cannot be air dried; sand and borax methods used

References and further reading

- Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.
- Halpin, Anne Moyer. 1990. *Foolproof Planting*. New York: Roundtable Press, Inc.
- Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.
- Nowack, Joanna, and Ryszard M. Rudnicki. 1990. *Postharvest Handling and Storage of Cut Flowers, Florist Greens, and Potted Plants*. Portland, Oregon: Timber Press.
- Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower's Guide*. Batavia, Illinois: Ball Publishing.

dianthus

OTHER COMMON NAMES: sweet william, ponimo'i-li'ili'i

SCIENTIFIC NAME: *Dianthus* species and hybrids

FAMILY: Caryophyllaceae (carnation family)



NATURAL SETTING/LOCATION: Europe

CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: 'Wee Willie', 'Round-about', 'Summer Beauty', 'Indian Carpet'

Growing your own

PROPAGATION

FORM: seeds; stem cuttings; division; air layering

PLANTING DEPTH: sow seeds 1/8" deep; keep division root crown just below soil level

GERMINATION TIME: 7–12 days

CUTTING ROOTING TIME: 10–15 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: best in well-drained, preferably sandy soil

LIGHT: full sun to partial shade

WATER: moderate

SOIL TEMPERATURE: 70–75°F



MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 10–12" in the ground

ADAPTATION TO GROWING IN CONTAINERS: yes, 6" pots

SPECIAL CULTURAL HINTS: very sensitive to salt; for early flowering, increase light; acts as a perennial by reseeding itself; avoid standing water

dianthus

Plant characteristics

HEIGHT: 6–18"

SPREAD: 10–12"

GROWTH RATE: fast

GROWTH HABIT: upright, herbaceous

FLOWERS

SIZE: ½–1" across

COLOR: red, white, pink, purple, bicolors

SHAPE: fringed or toothed petals

FRAGRANCE: sweetly scented

TIME TO FLOWERING: 15–16 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: bacterial spot, fasciation, stem rot, leaf spot, branch blight, *Fusarium* wilt

OTHER PESTS: aphids, mites

Harvesting considerations

WHAT IS HARVESTED: half-open flowers

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, wilting flowers



The lei shown also contains rose, statice, Peruvian lily, moa, agapanthus, shinobu, and 'ōhi'a lehua.

Notes on lei making

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

VASE LIFE: 5–9 days

CLEANING OF PLANT MATERIALS: cold water soak; clip all leaves and cut stem 2" below base of calyx

STORING RAW LEI MATERIALS: refrigerate at 45°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 in water, drip dry, wrap in newspaper, place in plastic bag, and refrigerate

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

References and further reading

- Halpin, Anne Moyer. 1990. *Foolproof Planting*. New York: Roundtable Press, Inc.
- Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.
- Nowack, Joanna, and Ryszard M. Rudnicki. 1990. *Postharvest Handling and Storage of Cut Flowers, Florist Greens, and Potted Plants*. Portland, Oregon: Timber Press.

globe amaranth

OTHER COMMON NAMES: bozu, clover, lehua-pepe, lei-hua; also sometimes called by the misnomer “bachelor button”

SCIENTIFIC NAME: *Gomphrena globosa*

FAMILY: Amaranthaceae
(amaranth family)



NATURAL SETTING/LOCATION: tropics of the Eastern Hemisphere

CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: ‘Buddy’, ‘Cissy’, ‘Strawberry Fields’

Growing your own

PROPAGATION

FORM: seeds

PRETREATMENT: soak seeds in water overnight.

PLANTING DEPTH: sow 1/16 to 1/8" deep (barely covered with medium)

GERMINATION TIME: 10–14 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL

CHARACTERISTICS: light, well drained

LIGHT: full sun

WATER: lightly

SOIL TEMPERATURE: 72–75°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 6–9"

ADAPTATION TO GROWING IN CONTAINERS: yes, 6–10" pots

SPECIAL CULTURAL HINTS: taller varieties may need to be staked; avoid overwatering for best germination, root growth, and control of disease; very sensitive to most pesticides



globe amaranth

Plant characteristics

HEIGHT: 24–36"

SPREAD: 12–15"

GROWTH RATE: fast, once established

GROWTH HABIT: upright, herbaceous

FLOWERS

SIZE: ¾"

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

SHAPE: clover-like

FRAGRANCE: none

TIME TO FLOWERING: 10–14 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote production of new ones

PESTS

COMMON DISEASES: mildew

OTHER PESTS: few, if any

Harvesting considerations

WHAT IS HARVESTED: flowers

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, wilting flowers

Notes on lei making

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

VASE LIFE: 7–10 days

CLEANING OF PLANT MATERIALS: cold water soak; clip stems to 2" and place in water



The lei shown also contains crownflower and epidendrum orchid.

STORING RAW LEI MATERIALS: 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 in water, drip dry, place in paper bag or paper box, and refrigerate

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

References and further reading

Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.

Hutson, J., and B. Ward. 1995. *Annual Gardening*. New York: Pantheon Books.

Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.

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

Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower's Guide*. Batavia, Illinois: Ball Publishing.

ALERT: *Gomphrena globosa* can be an invasive species and cause problems in agricultural areas in Hawai'i. It scores a rating of 8 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 *G. globosa* should not be introduced to areas where it is not already growing. *G. globosa* has already naturalized in some places on Kaua'i and O'ahu. The plant spreads by seed. If fertile material is used, lei should not be discarded in areas where *G. globosa* 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>.

marguerite daisy

OTHER COMMON NAMES: 'okika

SCIENTIFIC NAME:
Argyranthemum frutescens

FAMILY: Asteraceae (formerly Compositae) (aster family)

NATURAL SETTING/LOCATION:
found worldwide



CURRENT STATUS IN THE WILD IN HAWAII:
not found

CULTIVARS: many are available

Growing your own

PROPAGATION

FORM: cuttings (non-flowering side shoots) or purchased liners

PREPLANTING TREATMENT: use a medium rooting hormone

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

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained; use peat-perlite medium when growing in containers

LIGHT: full sun

WATER: keep evenly damp

SOIL TEMPERATURE: 45–85°F



MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 3–4'

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

PRUNING: pinching will cause more branching and more flowers but will delay flowering period

SPECIAL CULTURAL HINTS: drench with broad-spectrum fungicide when planting liners

marguerite daisy

Plant characteristics

HEIGHT: 40–48", new dwarf varieties are 14–18"

SPREAD: 48–60", new dwarf varieties, 18–24"

GROWTH RATE: moderate

GROWTH HABIT: bushy, herbaceous

FLOWERS

SIZE: 1–1½"

COLOR: large yellow disc with white or yellow petals; also, new cultivars with pink hues are available

SHAPE: daisy-like; new cultivars with double flowers are available

FRAGRANCE: none

TIME TO FLOWERING: 5 months from liners

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote production of new ones

PESTS

COMMON DISEASES: root rots in wet soils, several viruses

OTHER PESTS: aphids, thrips, whiteflies

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: cut individual flowers at the base

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: plastic bags

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



The lei shown also contains Mexican creeper, 'ākia, palapalai, crown flower, bleeding heart, and moa.

Notes on lei making

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

VASE LIFE: 4–7 days

CLEANING OF PLANT MATERIALS: cut stems, strip leaves, and place in water; do not cover heads.

STORING RAW LEI MATERIALS: store dry in a plastic container and refrigerate at 40°F for up to 8 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: sprinkle with water, drip dry, wrap in dry tissue, store in plastic container, and refrigerate

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

References and further reading

Ball, Vic. 1998. "Argeranthemum." In: *The Ball RedBook*. 16th ed., p. 370–371. Batavia, Illinois: Ball Publishing.

Sascalis, John N. 1993. *Cut Flowers, Prolonging Freshness*. Batavia, Illinois: Ball Publishing.

marigold

OTHER COMMON NAMES: French marigold (*Tagetes patula*) or American marigold (sometimes listed as African) (*Tagetes erecta*), ‘ōkole-‘oi‘oi

SCIENTIFIC NAME: *Tagetes* cultivars

FAMILY: Asteraceae (formerly Compositae) (aster family)



NATURAL SETTING/LOCATION: Mexico and Guatemala

CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: *T. patula*: Aurora series, Bonanza series, Safari series, ‘Bolero’; *T. erecta*: Antigua series, ‘Apollo’, ‘Snowdrift’

Growing your own

HANDLING CAUTIONS: the plant contains substances that may induce photo-dermatitis

PROPAGATION

FORM: seeds

PLANTING DEPTH: sow ¼–½" deep in medium

GERMINATION TIME: 9–12 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained, moist, fertile

LIGHT: full sun to partial shade

WATER: keep evenly damp

SOIL TEMPERATURE: 70–75°F



MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 6–12", depending on variety

ADAPTATION TO GROWING IN CONTAINERS: yes, 6–10" pots

SPECIAL CULTURAL HINTS: mulching between plants helps conserve soil moisture; keep soil pH above 6.0 to avoid micronutrient toxicities

marigold

Plant characteristics

HEIGHT: 12–36"

SPREAD: 12"

GROWTH RATE: fast

GROWTH HABIT: branching, herbaceous

FLOWERS

SIZE: ½–4"

COLOR: yellow, gold shades, crimson, orange

SHAPE: flat to globular

FRAGRANCE: pungent

TIME TO FLOWERING: 8–12 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: *Botrytis*, powdery mildew, wilt and stem rots, leaf spot

COMMON INSECT PESTS: aphids, slugs, spider mites, whiteflies

Harvesting considerations

WHAT IS HARVESTED: fully open flowers

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, wilting flowers



The lei shown also contains bougainvillea and epidendrum orchid.

Notes on lei making

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

VASE LIFE: 5 days

CLEANING OF PLANT MATERIALS: cold water soak

STORING RAW LEI MATERIALS: 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: soak in water, drip dry, place in newspaper then in plastic bag, and refrigerate

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

References and further reading

- Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.
- Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.
- Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.
- Nau, Jim. 1998. "Tagetes (Marigold)." In: *The Ball RedBook*. 16th ed., p. 763–766. Batavia, Illinois: Ball Publishing.
- Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower's Guide*. Batavia, Illinois: Ball Publishing.

pansy

OTHER COMMON NAMES: r āneki, po‘onēpcnē

SCIENTIFIC NAME: *Viola x Wittrockiana*

FAMILY: Violaceae (violet family)

NATURAL SETTING/LOCATION: Europe, including Britain; North Africa



CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: ‘Imperial Antique Shades’, ‘Romeo and Juliet’, ‘Black Devil’, ‘Maxima Marina’, ‘Universal Melodys’, ‘Crystal Bowls’, ‘Rosy Cheeks’

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: sow ¼–¾" deep, barely covered with medium; light aids germination

GERMINATION TIME: 7–9 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: moist, fertile, well drained

LIGHT: full sun to partial shade

WATER: keep evenly damp; don't allow to dry out

SOIL TEMPERATURE: 65–75°F



MANAGEMENT

FERTILIZER NEEDS: very light

RECOMMENDED SPACING: 10–12" apart on raised bed

ADAPTATION TO GROWING IN CONTAINERS: yes, 6" pots

PRUNING: remove faded flowers to keep the plants blooming

SPECIAL CULTURAL HINTS: reduce moisture after about 5 days for best germination; control root rot by limiting moisture, lowering pH, and applying fungicides; often reseeds itself

pansy

Plant characteristics

HEIGHT: 6–8"

SPREAD: to 12"

GROWTH RATE: slow to moderate

GROWTH HABIT: low growing, herbaceous

FLOWERS

SIZE: 1–2"

COLOR: usually 2 or 3 colors with “smiling face” (yellow, gold shades, crimson, orange, blue, purple, white)

SHAPE: round

FRAGRANCE: sweet

TIME TO FLOWERING: 15–17 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: *Botrytis*, powdery and downy mildew, root rot

COMMON INSECT PESTS: aphids, brown caterpillar, cutworm

Harvesting considerations

WHAT IS HARVESTED: almost-open flowers

HARVESTING TECHNIQUES: cut

BEST TIME OF DAY TO HARVEST: early morning

BEST WAY TO TRANSPORT FROM PICKING AREA: coffee can

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



The lei shown also contains dusty miller.

Notes on lei making

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

VASE LIFE: 2 days

CLEANING OF PLANT MATERIALS: cut stems, place in water

STORING RAW LEI MATERIALS: 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: sprinkle with water, place in sealed container with ti leaf bottom, and refrigerate

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

References and further reading

- Healy, Will. 1998. “*Viola x Wittrockiana* (Pansy).” In: *The Ball RedBook*. 16th ed., p. 777–782. Batavia, Illinois: Ball Publishing.
- Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron’s Educational Series, Inc.
- Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.
- Hutson, J., and B. Ward. 1995. *Annual Gardening*. New York: Pantheon Books.
- Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.
- Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower’s Guide*. Batavia, Illinois: Ball Publishing.

salvia

OTHER COMMON NAMES: scarlet sage (*Salvia splendens*); blue sage, mealycup sage (*S. farinacea*)

SCIENTIFIC NAME: *Salvia splendens*, *S. farinacea*

FAMILY: Lamiaceae (mint family)

NATURAL SETTING/LOCATION: *S. splendens* native to South America, *S. farinacea* native to Texas



CURRENT STATUS IN THE WILD IN HAWAII: may be found in the wild

CULTIVARS: *S. farinacea*: 'Argent Blanche', 'Rhea Dark Blue', 'Signum'; *S. splendens*: 'Red Hot Sally', 'Scarlet Queen', 'Fuego', 'Victoria'

Growing your own

PROPAGATION

FORM: seeds; cuttings (soft wood taken from young shoots, 3–4" long)

PREPLANTING TREATMENT: use a mild rooting compound on cuttings, or none

PLANTING DEPTH: sow seeds on surface of medium, do not cover; light aids germination; insert base of cutting 1" into medium

GERMINATION TIME: 12–14 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: moist, well drained

LIGHT: full sun

WATER: keep evenly damp

SOIL TEMPERATURE: 70–78°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 10–12"

ADAPTATION TO GROWING IN CONTAINERS: yes, 4–8" pots

SPECIAL CULTURAL HINTS: sensitive to salts in early stages and if salt-injured will take longer to bloom (especially *S. farinacea*); avoid standing water



salvia

Plant characteristics

HEIGHT: 8–36"

SPREAD: 6–12"

GROWTH RATE: fast

GROWTH HABIT: erect, bushy, herbaceous

FLOWERS

SIZE: 1"

COLOR: *S. splendens*: red, lilac, salmon, burgundy;
S. farinacea: blue, purple, white

SHAPE: tubular

FRAGRANCE: none

TIME TO FLOWERING: 11–16 weeks, depending on variety

PESTS

COMMON DISEASES: *Botrytis*, damping-off of seedlings, powdery mildew, downy mildew

OTHER PESTS: aphids, slugs, spider mites, whiteflies

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: cut

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 cup-and-saucer plant, dusty miller, and asparagus fern.

Notes on lei making

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

VASE LIFE: 5 days

CLEANING OF PLANT MATERIALS: cut stem, remove all foliage; avoid wetting flower heads

STORING RAW LEI MATERIALS: 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: soak, drip dry, place in sealed plastic container, and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: some cultivars will preserve ('Empire Lilac')

References and further reading

- Halpin, Anne Moyer. 1990. *Foolproof Planting*. New York: Roundtable Press, Inc.
- Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.
- Hutson, J., and B. Ward. 1995. *Annual Gardening*. New York: Pantheon Books.
- Nau, Jim. 1998. "Salvia." In: *The Ball Red-Book*. 16th ed, p. 730–733. Batavia, Illinois: Ball Publishing.
- Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower's Guide*. Batavia, Illinois: Ball Publishing.

strawflower

OTHER COMMON NAMES: everlasting, pua-pepa

SCIENTIFIC NAME:
Helichrysum bracteatum

FAMILY: Asteraceae (formerly Compositae) (aster family)



NATURAL SETTING/LOCATION: Australia

CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: 'Hot Bikini', 'Bright Bikini', 'Swiss Giant Mix'

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: sow seeds 1/16" deep, barely covering with medium; light aids germination

GERMINATION TIME: 7–12 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: well drained

LIGHT: full sun

WATER: moderate

SOIL TEMPERATURE: 70–75°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 10–12"

ADAPTATION TO GROWING IN CONTAINERS: yes, 4–6" pots

PRUNING: pinch shoots of young plant when 6" tall to induce branching

SPECIAL CULTURAL HINTS: flowers appear dry, even when picked fresh from the plant; avoid high light and temperature, which promote premature flowering; needs some support (especially tetraploid types)



strawflower

Plant characteristics

HEIGHT: 18–36"

SPREAD: 10–12"

GROWTH RATE: fast

GROWTH HABIT: upright, herbaceous

FLOWERS

SIZE: 1–3"

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

SHAPE: round

FRAGRANCE: none

TIME TO FLOWERING: 3–4 months

PESTS

COMMON DISEASES: aster yellows, root rot, *Verticillium* wilt

OTHER PESTS: aphids, leafhoppers

Harvesting considerations

WHAT IS HARVESTED: flowers, before fully open, when bracts are unfolding and centers are visible (if picked when open, petals turn backward as they dry, resulting in an unattractive blossom)

HARVESTING TECHNIQUES: cut

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 ti.

Notes on lei making

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

VASE LIFE: 7–10 days for fresh flowers, 2 years for dry flowers

CLEANING OF PLANT MATERIALS: cut stem, remove old foilage; avoid wetting flower heads

STORING RAW LEI MATERIALS: 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: spray lightly and store in paper bag or box and refrigerate

PRESERVING A LEI FOR LONG-TERM STORAGE OR DISPLAY: air-dry; for an entire lei of strawflowers, first dry flowers in bunches by stripping leaves and hanging upside down in a warm, well-ventilated area; for single flowers, leave ½–1" stem and stand them straight up in a shallow container

References and further reading

Ball, Vic. 1998. "Strawflower." In: *The Ball RedBook*. 16th ed, p. 266–267. Batavia, Illinois: Ball Publishing.

Hessayon, D.G. 1995. *The Flower Expert*. London: Transworld Publishers.

Hutson, J., and B. Ward. 1995. *Annual Gardening*. New York: Pantheon Books.

torenia

OTHER COMMON NAMES: ōla‘a beauty, wishbone flower, bluewings

SCIENTIFIC NAME: *Torenia fournieri*

FAMILY: Scrophulariaceae (figwort family)



NATURAL SETTING/LOCATION: Southeast Asia

CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: Clown series

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: sow on surface of medium, do not cover; light aids germination

GERMINATION TIME: 7–15 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL CHARACTERISTICS: medium, well drained, compost enriched

LIGHT: shade to partial shade

WATER: keep moist

SOIL TEMPERATURE: 75–80°F



MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 10–12"

ADAPTATION TO GROWING IN CONTAINERS: yes, 4–6" pots

PRUNING: pinch shoots of young plants to encourage bushy form

SPECIAL CULTURAL HINTS: leggy plants indicate poor light; the plant likes moisture and should not be allowed to dry out

torenia

Plant characteristics

HEIGHT: 6–8"

SPREAD: 8"

GROWTH RATE: slow at first

GROWTH HABIT: erect, bushy, herbaceous

FLOWERS

SIZE: 1–1½"

COLOR: bright blue, burgundy, orchid, rose, violet

SHAPE: asymmetrical bell-shape

FRAGRANCE: none

TIME TO FLOWERING: 13–15 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: powdery mildew, Scrophulariaceae virus

OTHER PESTS: aphids, slugs, whiteflies

Harvesting considerations

WHAT IS HARVESTED: flowers

HARVESTING TECHNIQUES: cut

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 baby's breath, asparagus fern, and shinobu.

Notes on lei making

BEST FOR WHICH TYPE OF LEI: neck

VASE LIFE: 2–4 days

CLEANING OF PLANT MATERIALS: spray with water

STORING RAW LEI MATERIALS: refrigerate at 40°F for up to 2 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 and refrigerate in sealed plastic container

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

References and further reading

Ball, Vic. 1998. "Torenia." In: *The Ball Red-Book*. 16th ed, p. 767–769. Batavia, Illinois: Ball Publishing.

Hutson, J., and B. Ward. 1995. *Annual Gardening*. New York: Pantheon Books.

Nau, Jim. 1993. *Ball Culture Guide: The Encyclopedia of Seed Germination*. 2nd ed. Batavia, Illinois: Ball Publishing.

Styer, R.C., and D.S. Koranski. 1997. *Plug and Transplant Production, A Grower's Guide*. Batavia, Illinois: Ball Publishing.

zinnia

OTHER COMMON NAMES: pua-pihi, thumbelina

SCIENTIFIC NAME: *Zinnia elegans*, *Z. angustifolia*

FAMILY: Asteraceae (formerly Compositae) (aster family)

NATURAL SETTING/LOCATION: Southwest USA, Mexico, Central America



CURRENT STATUS IN THE WILD IN HAWAII: not found

CULTIVARS: *Z. elegans*: 'Big Red', 'Candy Cane', 'Persian Carpet', 'State Fair', Ruffles series; *Z. angustifolia*: 'Classic Golden Orange', 'Crystal White', Star series

Growing your own

PROPAGATION

FORM: seeds

PLANTING DEPTH: lightly cover with medium

GERMINATION TIME: 7–10 days

PREFERRED PRODUCTION CONDITIONS

GENERAL SOIL

CHARACTERISTICS:

well drained; tolerates dry conditions

LIGHT: full sun

WATER: keep evenly and slightly damp, never wet

SOIL TEMPERATURE:

68–70°F

MANAGEMENT

FERTILIZER NEEDS: light

RECOMMENDED SPACING: 9–12"

ADAPTATION TO GROWING IN CONTAINERS: yes, 4–6" pots

PRUNING: pinch the tops of young plants when they are 4–6" high to encourage branching

SPECIAL CULTURAL HINTS:

best germination if cool and dry; days of 12 hours or less stimulate flowering; seeds may be sown directly to the field or final growing container



zinnia

Plant characteristics

HEIGHT: 24–36"

SPREAD: 5–6"

GROWTH RATE: fast

GROWTH HABIT: upright, herbaceous

FLOWERS

SIZE: 1–3"

COLOR: any color except blue

SHAPE: classified according to flower type (single, double, cactus, dahlia type)

FRAGRANCE: none

TIME TO FLOWERING: 12–13 weeks

INDUCING AND MAINTAINING BLOOMING: remove dead and old flowers to promote development of new ones

PESTS

COMMON DISEASES: *Alternaria* blight, powdery mildew, bacterial leaf-spot

OTHER PESTS: aphids, beetles, slugs, spider mites

Harvesting considerations

WHAT IS HARVESTED: fully open flowers

HARVESTING TECHNIQUES: cut

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 moa, statice, bougainvillea, asparagus fern, and 'ōhi'a lehua.

Notes on lei making

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

VASE LIFE: 6–10 days in deionized water (without salts)

CLEANING OF PLANT MATERIALS: cut stem, remove all foliage; avoid wetting flower heads

STORING RAW LEI MATERIALS: 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: spray lightly, store in plastic container, and refrigerate

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

References and further reading

Ball, Vic. 1998. "Zinnia." In: *The Ball Red-Book*. 16th ed., p. 785–787. Batavia, Illinois: Ball Publishing.

Heitz, Halina. 1992. *Container Plants for Patios, Balconies, and Window Boxes*. Hauppauge, New York: Barron's Educational Series, Inc.

Sascalis, John N. 1993. *Cut Flowers, Prolonging Freshness*. Batavia, Illinois: Ball Publishing.