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Ornamentals and Flowers
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Producing Potted Ornamental ʻŌhelo

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Potted ʻohelo in a nursery

ʻŌhelo plants, *Vaccinium reticulatum* (Smith), can be propagated from seed or vegetatively and grown in nurseries either to be transplanted for berry production or for sale as potted ornamentals. The young plants must be trimmed and trained to induce optimal branching and shape. With measured irrigation and fertilizers, ʻōhelo can be maintained in 6-inch or 1-gallon pots for at least 2 years. Only actively growing, young ʻōhelo plants should be transplanted for field production. Older plants, especially root-bound transplants, are more difficult to establish in soil. For the first 2 weeks after field planting, ample watering is needed. Water stress is the most frequent cause of plant loss in both the field and nursery. Excessive watering in the nursery during cool and cloudy weather can cause "torching," an abnormal growth of the young shoots where the stem appears to be elongated and the young leaves fail to expand. This condition can be corrected by cutting back the deformed growth and reducing the frequency and amount of watering.

This publication summarizes preliminary observations on ʻōhelo growth from seed and from a vegetatively propagated clone, 'Kīlauea', from germination to fruiting, at the UH-CTAHR Volcano Research Station on the island of Hawai'i. The site is at 4000 ft elevation with average annual maximum temperature of 73°F, range 68–78°F, average minimum temperature of 47°F, range 36–53°F, and average annual rainfall of 84 inches. For observation in different environments, additional nursery plantings of seedling ʻōhelo were made at the Lalamilo and Mealani Research Stations. More information about the ʻōhelo project can be found in the 2008 CTAHR publication *Propagation and Cultivation of ʻŌhelo*, www.ctahr.hawaii.edu/oc/freepubs/pdf/F_N-13.pdf.

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ʻŌhelo berries (left) and seeds (photos are at different scales; units of measure are centimeters)

Seed preparation

ʻŌhelo seeds can be separated and cleaned from the pulp using a household blender containing a large volume of water and set at medium speed. The seeds are very small, and the viable ones will sink to the bottom of the container; they can be collected using a fine-mesh screen. Decant, or pour off, any chaff and seeds that float—the "floaters" are not viable.

Air-dry the cleaned seeds on a paper towel for 2 days at ambient temperature. They can be stored for 6 months at 77°F when kept dry. Seed weight per 100 dry seeds is approximately 0.1 gram.

Germination

ʻŌhelo seeds germinate 3–6 weeks after planting; the preferred medium is a mixture of 1 part peat, 1 part perlite (Pahroc® Giant size #3), and 1 part vermiculite (Therm-o-rock® size #2).

Fill a 6-inch pot with moistened medium, and sprinkle approximately 100 ʻōhelo seeds on the surface. Water gently and thoroughly.

Place community pots in full sun after the first true leaves emerge. In areas with intense sunlight, such as Kona, it is safer to have the community pots in a greenhouse with 60% shade and good air circulation. The community pots should be irrigated daily with an overhead mist for 5 minutes (¼ gallon per pot per day).

Seedlings in community pots

Pay close attention to avoid over-watering or allowing the medium to become too dry.

Beginning 8–10 weeks after germination, apply 4-41-27 foliar fertilizer diluted at ¼ teaspoon per gallon of water every month.

At 4 months after germination, fertilize each community pot with ½ tsp Nutricote® 13-13-13 controlled-release (100-day) fertilizer. Transplant seedlings into in 3½ cubic inch pots in seedling trays 6–7 months after germination.

Square cells in trays each hold a seedling.

Pinching is necessary to induce branching. The seedling at left, just under 3 inches tall, is ready to pinch; the older seedling at right, which was not pinched, shows the plant's propensity toward prostrate growth.

Seedling squares

Use the same mixed medium as for germination. Moisten the medium adequately and fill each seedling square halfway. Separate the seedlings in the community pots, keeping as much of their roots intact as possible. Place each seedling into an individual cell and loosely cover the root ball with medium. Water evenly, and gently compact the medium.

Depending on the environment, season, and sun intensity at the location, transplants can be placed in full sun or in 60% shade for 2 weeks before transfer to full sun. Mist-irrigate overhead for 5 minutes daily. Adjust the amount of watering and shade according to location conditions.

Do not allow the medium to dry out or become constantly saturated. Most young ʻōhelo plant losses are due to inadequate or excessive watering in the nursery.

Care and training

Add ½ teaspoon of 14-14-14 controlled-release Nutricote fertilizer to each 3½-inch square. Apply a foliar fertilizer (10-30-20) at ⅓ tsp per gallon on the plants every 2 weeks.

When seedlings are about 4 months old, pinch off the terminal about 3/16 inch below the growing point to induce branching. Pinching is a necessary step to create a multi-branched plant canopy.

Transplant into larger pots

Young ʻōhelo plants should be transplanted into 6-inch or 1-gallon pots using the same medium mix and maintenance procedures as were used with the seedling squares. These pot sizes will support plants for up to 2 years in the nursery for berry production. Plants in 6-inch pots can be marketed as ornamentals in 8–10 months.

Tissue-cultured ʻōhelo plants are highly uniform and can be managed with the same procedures as seedlings. Proper pinching and training are also required to produce a high-quality, marketable potted ornamental.

Only young, actively growing plants should be used in field plantings to ensure good root development into the surrounding soil. For a short period after field planting (about 2 weeks), ample water should be provided through irrigation if rainfall is inadequate.

Water-stress symptoms in ʻōhelo include dulling and yellowing of leaves with necrosis (scorching) of leaf tips and margins, followed by leaf drop and rapid dying of the entire plant. Frequently the wilting is so rapid that dried leaves are retained on the branches.

Torching

Over-watered ʻōhelo plants may have abnormal growth during cool and cloudy weather. The symptoms include elongated shoots, necrosis of shoot tips, and failure of young leaves to fully expand. The bunched shoot and

The "torching" symptom: bunched shoot and leaf whorls

This well-shaped, multi-branched, potted 'Kīlauea' ʻōhelo resulted from repeated pinching back of terminals.

leaf whorls look like a torch, and we call this symptom "torching."

The torching symptom can be corrected by cutting back the damaged shoots, reducing watering, and applying a foliar fertilizer. New buds will be visible within 3–4 weeks after cut-back, and the new shoots will be normal when properly managed.

Cultivar

In 2006, an ʻōhelo cultivar was selected for its ornamental and berry-production potentials from among 200 seedlings of accession N06-7 grown in pots in the nursery at Volcano Research Station. Named 'Kīlauea', it was propagated and maintained in vitro at the Pacific Basin Agricultural Research Center (see *Propagation and Cultivation of ʻŌhelo*).

'Kīlauea' has a low, spreading growth with small leaves* (average length 5/8 inch, range 1/3–3/4 inch, average width 7/16 inch, range 1/4–1/2 inch), compact internodes (average 1/8 inch), and dense branching. The mature leaves are light green, but new, growing buds and shoots are bright crimson. 'Kīlauea' flowers in about 10 months in 6-inch pots. Multiple flower buds (about 1/8–1/3 inch) are produced at each leaf axis. Each flower bud has a fused, crimson calyx and a white-edged, fluorescent-pink corolla. Each floret is a "perfect" flower, containing both male and female parts and capable of setting fruit without insect pollination. Normal ʻōhelo flowering is in November–December and July–August. 'Kīlauea' has speckled, salmon-pink berries approximately 3/8 inch in diameter. The bland-flavored berries are edible.

With proper trimming, fertilizer applications, and training, the young, growing shoots of 'Kīlauea' can be groomed into a vibrant, colorful ornamental potted plant. Its advantage for seasonal ornamental foliage plant markets is that it is not seasonal, and its readiness for market can be scheduled by trimming and fertilizing.

*Dimensions given in inches are approximate; actual metric units as measured are: leaf length 16.4 mm, range 9–21 mm; leaf width 11.1 mm, range 5.7–12.6 mm; internode length 2.8 mm; bud size 9.2 x 3.6 mm; 'Kīlauea' berries 0.8–1 cm diameter.

Tissue-cultured ʻōhelo plants are highly uniform.

Development time from trimming to shoot initiation, flowering, and fruit harvest and from flowering to fruit harvest of 1-year-old ʻōhelo plants in 1-gallon pots.

		Days from trimming to:				Days from flowering to harvest
Location	Plant type	bud break	full flush	flowering	harvest	
Volcano	ʻKīlauea' clones	21	28	42	105	63
Mealani	seedlings	14	24	84	146	62
Lalamilo	seedlings	14	23	35	NA	NA

New shoot buds appear 3 weeks after trimming the shoots.

Flowering and fruiting

ʻŌhelo seedlings were observed to flower 10 months to 1 year after germination at the Volcano site. The flowering and growth of the clone were recorded from June, 2009 through February, 2010 (see table, previous page). The phenological stages are used as potential reference points for production and management timetables. For example, the clonal ʻōhelo ʻKīlauea' grown at the Volcano station trimmed on June 5, 2009, produced a full canopy of young, bright red shoots on July 13 (28 days later). This suggested that the desirable characteristic of a full, red canopy can potentially be timed and produced by trimming and fertilizing 3–4 weeks prior to the marketing date. Other observations collected included number of days from trimming to bloom and harvest. The genetic composition of the plants and the environment at each site interact to affect the time required between each growth stage; the durations given in the table are preliminary references to compare with site-specific timetables established for other production locations.

Variables

Management methods for ʻōhelo plants need to be flexible and modified according to needs and the following factors:

- Genetics: source of plants (clone or seeds); the environment where the seed was collected; whether the seeds were collected from an isolated group of plants; whether they were collected from a few selected plants or many plants. Clones are more uniform, and seedlings are more variable, with greater genetic diversity.
- Environment: an interaction of both the geographical origin of the original seed collection and the production location—island and district; climate (dry, wet, hot, cold); elevation; rainfall; biological challenges (diseases, insects, soil conditions)
- Available resources: irrigation; facilities (shelters, greenhouse, field areas, etc.)
- Purpose and goals: berry production, ornamental potted plant production, or both; commercial or hobby
- Feasibility: expectations regarding inputs and returns.

ʻŌhelo flowers

We observed that young ʻōhelo shoots and leaves developed the most intense and vibrant red color at temperatures around and below 60°F, but the red foliage gradually turned maroon and green in about 6 days when the plants were moved to warmer conditions (70–75°F).

Disease and insect problems

Powdery mildew

Powdery mildew is the most important pest problem for growing potted ʻōhelo, because this disease can severely affect the growth and appearance of the plant. The powdery mildew fungus produces a white growth on the leaves and sometimes the stems, flowers, and fruits. Powdery mildew often causes dark colored leaf spots and premature leaf drop. We suspect that powdery mildew can also cause flower and fruit drop. Cultural measures include maintaining the plant in a healthy and vigorous condition by planting in well-drained media, having all-day sunlight (or a minimum of 6 hours daily), and having adequate plant spacing and air ventilation. For a discussion of the form of this fungus that affects mango, see www.ctahr.hawaii.edu/oc/freepubs/pdf/PD-46.pdf.

Mexican leaf roller

The caterpillar of *Amorbia emigratella* rolls the young leaves at the shoot tips and lives and feeds within. Leaves from damaged shoots may have holes and chewed edges, and may be distorted. This pest can be a problem in both greenhouse and outside conditions. Newly hatched caterpillars are ⅛ inch long, reaching 1 inch long when fully grown. They have a brownish-yellow head, a light green body, and a black stripe behind the eyes. The adult moth is brown with a small, pointed head. The wingspan of female moths is 1–1⅛ inches; the males are slightly smaller and paler. This pest has a wide host range including avocado, blueberry, guava, and tea. *Bacillus thuringiensis* (Bt) sprays can be used to manage this pest. Good spray coverage is essential. This pesticide needs to be ingested by the caterpillar to be effective. Further information on the pest can be found at www.extento.hawaii.edu/kbase/crop/Type/amorbia.htm.

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