

Hawaii Protea Growers Newsletter

An e-Newsletter for the Hawaii Protea Grower, to Promote Communication,
Cooperation and the use of Science and Technology to Improve and Increase
the Cultivation and Marketing of Proteaceae Plants and Flowers

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New Tropical *Leucospermum* hybrids from the University of Hawaii

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INTRODUCTION

The original objectives of the *Leucospermum* breeding program at the University of Hawaii included improved horticultural characteristics, such as earliness to flower, an extended flowering season, vertical plant growth habit with long, straight, lightweight stems with small leaves and reduced leaf pubescence, ease of propagation, high yields, good postharvest characteristics, and improved colors. Emphasis on resistance or tolerance to root and foliar diseases was soon added (Leonhardt et. al., 2005).

Leucospermum species, being from South Africa, are temperate climate plants and they and their hybrids must be grown at elevations of approximately 2,500 feet or higher in Hawaii for optimum flowering. Agricultural lands at that elevation are limited and expensive, while lowland

agricultural lands, formerly used for sugar and pineapple production, or lava fields on Hawaii island, are more abundant and less expensive. Accordingly, since 2001, the breeding program has refocused on developing cultivars that will meet commercial standards for plant growth, bloom yield and quality at or near sea level in Hawaii. Most recently selection work has included cultivars suitable for use as flowering bushes in resort, commercial, and residential landscapes at or near sea level and for use as flowering potted plants (Leonhardt and Wright, 2020).

MATERIALS AND METHODS

The selection of species and hybrids for warm temperature tolerance began in 2001 at a 50 foot elevation location at Maui Community College (MCC) in Kahului, Maui, Hawaii. Six species and 32 hybrids were grown in pots and evaluated for two years. The small-flowering species *L. muirii*, *L. mundii* and *L. oleifolium* flowered normally at 50 feet, but the larger-flowering species *L. cuneiforme* and *L. saxosum* did not flower reliably. The small flowered *L. praecox* also did not flower. Some of the hybrids flowered but lost their upright stature and had many drooping branches. The hybrid *L. 'Spider'* (*L. formosum* × *L. tottum*) and three of the four progeny of *L. 'Spider'* grew and flowered normally at 50 feet (Leonhardt et al., 2005).



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We started making more use of *L. 'Spider'* in breeding. Expanded trials were established at the UH Waimanalo Experiment Station at 50 feet elevation and at the Hawaii Agricultural Research Center (HARC) in Kunia at about 200 feet in elevation, both locations on Oahu, Hawaii and it was determined that species in the Section *Cardinistylus*, which includes *L. formosum*, *L. grandiflorum* and *L. reflexum*, were the most promising for breeding for warm temperature tolerance (Leonhardt et al., 2008). The results of our continued use of these species in breeding were reported at later ISHS Protea Research Symposia (Leonhardt, 2013, 2022a, b).

As a foliar disease management strategy, we bred for small leaves with minimum pubescens to facilitate rapid drying of the foliage following rain events. Fungal spore germination and bacterial infections require wet leaf surfaces, so if plants dry quickly, infections can be reduced. Trade winds can flow more easily through a plant with small leaves, allowing it to dry more quickly than a plant with large leaves. The species *L. lineare* and *L. reflexum* have been used successfully to reduce leaf size in their hybrid progeny. Leaf area measurements are provided in Table 1.

Since leaf pubescence (the presence of hairs) generally increases the adhesion of water droplets and particle sedimentation on leaf surfaces, it can also create a physical environment conducive to fungal and bacterial infections. Our selection of *L. lineare* 'Starlight' has extremely narrow leaves free of leaf and stem pubescence and has been successfully used to reduce pubescence in its hybrid progeny. Leaf and stem pubescens arbitrary values (none, light, medium, heavy) are provided in Table 1.

RESULTS AND DISCUSSION

The new selections described here are all adapted to low elevation temperatures in Hawaii and will flower without the stimulus of cold night temperatures. They do not require warm temperatures, but they are tolerant of them. They will flower equally well in the traditional high elevation protea production areas of Maui and Hawaii Island and wherever else pincushion proteas are grown.

A long flowering season is desirable, and 7 of the new introductions have flowered for 8 or more months in a calendar year (Table 1).

The introduction of 'Tropical' *Leucospermum* hybrids to Hawaii growers began in 2021 and continued through 2024 (Leonhardt, 2022a, b, 2023; Leonhardt and Galanti, 2023).

Registration applications for 18 new Tropical *Leucospermum* hybrids were submitted to the International Cultivar Registration Authority for Proteaceae in Stellenbosch, South Africa, in November 2025. In the descriptions of the new cultivars below are statements of percentages of the species in the genealogy of that hybrid cultivar. These percentages were arithmetically derived. See Table 2.

Brief descriptions of the new tropical *Leucospermum* hybrids from the University of Hawaii

'Linda Gutierrez' (UH hybrid 181)

A large apricot yellow flower at 5.6 inches. The stem length is 18 to 24 inches and is thin at only 0.4 inches in diameter. Begins flowering in May. The seven species in its genealogy are *L. reflexum* and *L. saxosum* (25% each), *L. lineare* (22%), *L. glabrum* (12%), *L. conocarpodendron* (9%), and *L. cordifolium* and *L. cuneiforme* (3% each).

'Erin Torres' (UH hybrid 191)

A medium-sized yellow flower at 4.9 inches. The stem length is long at 24 to 30 inches and is thin at only 0.4 inches in diameter. Flowers December through July. The three species in its genealogy are *L. formosum* (50%), *L. cordifolium* and *L. patersonii* (25% each).

'Lorita Stepien' (UH hybrid 229)

A large apricot yellow flower at 6.6 inches. The stem length is 18 to 24 inches and is thin at only 0.3 inches in diameter. Begins flowering in July. The five species in its genealogy are *L. grandiflorum* (50%), *L. reflexum* (25%), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

'Esther Grace Trinidad' (UH hybrid 561)

A large reddish orange bloom at 5.5 inches. The stem length is 18 to 24 inches and is thin at only 0.4 inches in diameter. Flowers November through August. The three species in its genealogy are *L. formosum* (50%), *L. lineare* and *L. glabrum* (25% each).

'Miri Leach' (UH hybrid 563)

A medium-sized yellow bloom at 5.3 inches. The stem length is 18 to 24 inches and is thin at only 0.4 inches in diameter. Flowers throughout the year, and more heavily in the fall and winter months. The four species in its genealogy are *L. grandiflorum* (50%), *L. conocarpodendron* (25%) and *L. lineare* and *L. cordifolium* (12% each).

'Diana Roy' (UH hybrid 576)

A large peach pink flower at 5.9 inches. The stem length is 18 to 24 inches and is thin at 0.3 inches in diameter. Flowers in December through October. The six species in its genealogy are *L. formosum*, *L. reflexum* and *L. tottum* (25% each), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

'Rosella Leonhardt-Wicker' (UH hybrid 583)

A medium-sized orange bloom at 4.7 inches. The stem length is less than 18 inches and is thin at only 0.3 inches in diameter. Flowers February through June. It is a complex hybrid with nine species in its genealogy including *L. saxosum* (25%), *L. formosum*, *L. glabrum*, *L. cordifolium* and *L. tottum* (12% each), *L. lineare* (16%) and *L. conocarpodendron*, *L. cuneiforme* and *L. vestitum* (3% each).

‘Dr. Laura Fletcher’ (UH hybrid 590)

A medium-sized orange bloom at 4.7 inches. The stem length is less than 18 inches and is thin at only 0.3 inches in diameter. Flowers in July through October. The five species in its genealogy are *L. glabrum* (50%), *L. reflexum* (25%), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

‘Lita Leonhardt’ (UH hybrid 602)

A large dark orange flower at 5.7 inches. The most productive cultivar in the R. Galanti trial (Galanti and Leonhardt, 2026). The stem length is 18 to 24 inches and is thin at only 0.4 inches in diameter. Flowers November through July. The four species in its genealogy are *L. grandiflorum* (50%), *L. lineare* and *L. glabrum* (19% each), and *L. cordifolium* (12%).

‘Sharon Hurd’ (UH hybrid 619)

A large reddish yellow light textured bloom at 5.5 inches. The stem length is 24 to 30 inches and is thin at only 0.3 inches in diameter. Flowers December through July. A primary hybrid of *L. lineare* × *L. reflexum*.

‘Sophia Stepien’ (UH hybrid 620)

A medium-sized salmon-colored flower at 4.7 inches. One of the most productive cultivars in the R. Galanti trial (Galanti and Leonhardt, 2026). The stem length is greater than 30 inches and is thin at only 0.5 inches in diameter. Flowers December through April. The four species in its genealogy are *L. lineare* (56%), *L. reflexum* (25%), *L. glabrum* (12%) and *L. vestitum* (6%).

‘Vera Wicker’ (UH hybrid 626)

A large orange flower at 5.5 inches. One of the most productive cultivars in the R. Galanti trial (Galanti and Leonhardt, 2026). The stem length is less than 18 inches and is thin at only 0.2 inches in diameter. Flowers December through March. The six species in its genealogy are *L. formosum*, *L. reflexum* and *L. tottum* (25% each), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

‘Jo Ann Stepien’ (UH hybrid 633)

A large apricot flower at 6.3 inches. The stem length is 24 to 30 inches and is thin at only 0.3 inches in diameter. Flowers January through September. The five species in its genealogy are *L. grandiflorum* (50%), *L. reflexum* (25%), *L. glabrum* (12%) and *L. lineare* and *L. vestitum* (6% each).

‘Marianne Yoshida’ (UH hybrid 634)

A medium-sized dark orange bloom at 4.9 inches. The stem length is 18 to 24 inches and is thin at only 0.4 inches in diameter. Flowering begins in January. The six species in its genealogy are *L. reflexum*, *L. glabrum* and *L. cuneiforme* (25% each), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

‘Johnette Wicker’ (UH hybrid 635).

A medium-sized red orange flower at 4.5 inches. The stem length is 24 to 30 inches and is thin at only 0.4 inches in diameter. Flowers January through March. The

five species in its genealogy are *L. glabrum* (38%) and *L. reflexum* and *L. cuneiforme* (25% each), and *L. lineare* and *L. vestitum* (6% each).

‘Lori Leach’ (UH hybrid 647).

A large apricot yellow flower at 6.6 inches. The stem length is 18 to 24 inches and is thin at only 0.3 inches in diameter. The five species in its genealogy are *L. grandiflorum* (50%), *L. reflexum* (25%), *L. lineare* (16%), *L. conocarpodendron* (6%) and *L. cordifolium* (3%).

‘Lydia Trinidad’ (UH hybrid 674).

A medium-sized orange flower. The stem length is 24 to 30 inches and is thin at only 0.4 inches in diameter. The month in which flowering began was not recorded but flowering continued through July. The four species in its genealogy are *L. lineare* (34%), *L. cordifolium* (31%), *L. conocarpodendron* (25%) and *L. glabrum* (9%).

‘Rhody Abrahano’ (UH hybrid 679).

Red orange color. This cultivar yielded only 10 blooms during the R. Galanti trial (Galanti and Leonhardt, 2026) but it is a beautiful, firm-textured flower with a pleasing shape. We do not have complete data on this cultivar, but it flowers most heavily in January and continues through July. It is a complex hybrid with eight species in its genealogy including *L. formosum* and *L. tottum* (25% each), *L. cuneiforme*, *L. glabrum* and *L. reflexum* (12% each), *L. lineare* (8%), *L. conocarpodendron* (3%) and *L. cordifolium* (<2%). *L. ‘Spider’* is a grandparent on both sides.

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Table 1. Descriptions of 18 new Tropical *Leucospermum* hybrids from the University of Hawaii

UH Cross No.	Name	Flower Color	Flowering Season in Hawaii	Flower Diam. inches	Leaf Color	Leaf area sq. inches	Stem length (in)	Pubescence*	
								Leaf	Stem
181	Linda Gutierrez	Apricot yellow	May-?	5.6	Green	3.1	18-24	M	L
191	Erin Torres	Yellow	Dec-July	4.9	Green	3.9	24-30	L	H
229	Lorita Stepien	Apricot yellow	July-?	6.6	Gray-green	2.4	18-24	H	M-H
561	Esther Grace Trinidad	Reddish orange	Nov-Aug	5.5	Blue-green	4.2	18-24	L	H
563	Miri Leach	Yellow	year round	5.3	Green	4.3	18-24	L	H
576	Diana Roy	Peach pink	Dec-Oct	5.9	Blue-gray-green	2.5	18-24	L	H
583	Rosella Leonhardt-Wicker	Orange	Feb-June	4.7	Green	9.6	<18	L	H
590	Dr. Laura Fletcher	Orange	July-Oct	4.7	Blue-green	2.9	<18	L	L
602	Lita Leonhardt	Orange	Nov-July	5.7	Dark green	2.8	18-24	L	H
619	Sharon Hurd	Reddish yellow	Dec-July	5.5	Green	1.3	24-30	M	M
620	Sophia Stepien	Salmon	Dec-April	4.7	Green	1.4	>30	none	L-N
626	Vera Wicker	Orange	Dec-March	5.5	Olive green	1.4	<18	L	H
633	Jo Ann Stepien	Apricot	?-Sept	6.3	Gray-green	2.6	24-30	H	H
634	Marianne Yoshida	Orange	Jan-?	4.9	Green	2.4	18-24	L	M
635	Johnette Wicker	Reddish orange	Jan-Mar	4.5	Blue-gray-green	3.3	24-30	L	M
647	Lori Leach	Apricot yellow	?-July	6.6	Gray-green	3.3	18-24	M	M-H
674	Lydia Trinidad	Orange	?-July		Green	1.9	24-30	L	L
679	Rhody Abrahano	Reddish orange							

* Pubescence: L = light, M = medium, H = heavy

Figure 1. Images of the New University of Hawaii Tropical *Leucospermum* Hybrids



Hyb. 181, 'Linda Gutierrez'



Hyb. 191, 'Erin Torres'



Hyb. 229, 'Lorita Stepien'



Hyb. 561, 'Esther Grace Trinidad'



Hybrid 563, 'Miri Leach'



Hyb. 576, 'Diana Roy'



Hyb. 583, 'Rosella Leonhardt-Wicker'



Hyb. 590, 'Dr. Laura Fletcher'



Hyb. 602, 'Lita Leonhardt'



Hyb. 619, 'Sharon Hurd'



Hyb. 626, 'Vera Wicker'



Hyb. 633, 'Jo Ann Stepien'



Hyb. 634, 'Marianne Yoshida'



Hyb. 647, 'Lori Leach'



Hyb. 679, 'Rhody Abrahano'

Table 2.**Percentages of the species in the genealogy, arithmetically derived, of each hybrid, by taxonomic section**

UH Cross		Section Cardinistylus			Section Brevifilamentum				Section Conocarpodendron		Other	
No.	Name	ref	gra	for	lin	cor	tot	ves	gla	con	%	spp
181	Linda Gutierrez	25			22	3			12	9	(2) 28	7
191	Erin Torres			50		25					25	3
229	Lorita Stepien	25	50		16	3				6		5
561	Esther Grace Trinidad			50	25				25			3
563	Miri Leach		50		12	12				25		4
576	Diana Roy	25		25	16	3	25			6		6
583	Rosella Leonhardt-Wicker			12	16	12	12	3	12	3	(2) 28	9
590	Dr. Laura Fletcher	25			16	3			50	6		5
602	Lita Leonhardt		50		19	12			19			4
619	Sharon Hurd	50			50							2
620	Sophia Stepien	25			56			6	12			4
626	Vera Wicker	25		25	16	3	25			6		6
633	Jo Ann Stepien	25	50		6			6	12			5
634	Marianne Yoshida	25			16	3			25	6	25	6
635	Johnette Wicker	25			6			6	38		25	5
647	Lori Leach	25	50		16	3				6		5
674	Lydia Trinidad				34	31			9	25		4
679	Rhody Abrahano	12		25	8	1.5	25		12	3	12	8

Species abbreviations in this table: ref = *L. reflexum*; gra = *L. grandiflorum*; for = *L. formosum*; lin = *L. lineare*;cor = *L. cordifolium*; tot = *L. tottum*; ves = *L. vestitum*; gla = *L. glabrum*; con = *L. conocarpodendron*

Expansion of *Leucospermum* and Proteaceae Crop Production on Hawai'i Island: Recent Progress in A Specialty Cut Flower Industry

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Hawaii

(Editor's note: In September 2023 two of my graduate students and I shipped 15,000 cuttings of 11 newly released UH Tropical *Leucospermum* hybrid cultivars to 17 Hawaii growers on 5 islands, of which 8,600 cuttings went to 8 growers on Hawaii Island. See Hawaii Protea Growers Newsletter Vol. 2, No. 2., Dec. 2023, by hitting this link:

https://drive.google.com/file/d/1007V_WvwqsG0Z9ktvxzXvM9c_ys4c_it/view?usp=drive_link

Recently I asked Russell if he would provide us with an update on the progress with establishing tropical *Leucospermum* hybrids at low elevation farms on Hawaii Island. This is his report. Thank you, Russell).

The recent expansion of *Leucospermum* and other Proteaceae crop production on Hawai'i Island represents a turning point for the state's floriculture industry and demonstrates the potential for collaborative efforts between growers, industry organizations, and the University of Hawai'i College of Tropical Agriculture and Human Resilience. Over the past several years, coordinated investments in plant propagation and release, especially of "low elevation" tolerant varieties, as well as grower education and technical assistance, have led to increased interest in this crop. The most influential driver in the movement of this crop though has been the efforts of individual growers, who recognize the need for more production and the opportunity therein. These growers have worked to expand their own production and collaborate with others to increase statewide production. Through the combined efforts of progressive farmers, the Hawaii Floriculture and Nursery Association and Hawaii Tropical Flower Council (HTFC), University of Hawai'i Cooperative Extension, and numerous industry partners, thousands of new Proteaceae plants have been established across Hawai'i Island. These plantings represent more than an increase in acreage. They reflect the development of grower expertise and a shared commitment to strengthening the state's agricultural economy through import replacement.

Plant Release and Outreach Efforts

University of Hawai'i researchers began focusing on "low elevation" tolerant *Leucospermum* varieties in the 1990's, through Dr. Ken Leonhardt's breeding program. This work continued through the 2000's with development of trials in 2005. The germplasm trialing was renewed in 2019, with the establishment of several trials to revisit the performance of this plant material, a project funded by Hawaii Department of Agriculture and Biosecurity's Specialty Crop Block Grant. Since then, 11,312 plants have been released to 33 growers on Hawai'i Island alone. A majority of this released material has been in collaboration with the Hawaii Tropical Flower Council through their Import Replacement Program, a grant-supported program through the Hawaii Department of Agriculture and Biosecurity. This program focuses on reducing the amount of imported plant material into the state to reduce pest and disease entry as well as to support local production and economy.



Growers attend the 2026 HTFC and CTAHR Import Replacement Conference and tour the *Leucospermum* trial at Greenpoint Nurseries in Hilo at ~290 ft elevation, and participate in the pruning workshop at the event.

In recent years, outreach efforts on island have primarily focused on extension outreach with growers to address individual-specific hurdles. Most recently, a collaboration between Hawaii Tropical Flower Council and the University of Hawai'i College of Tropical Agriculture and Human Resilience led to the 2026 Import Replacement Conference hosted at Komohana Research and Extension Center in Hilo, HI. Grower Experts Troy Conner (of Kendall Farms: Temecula, CA), Jeremy Smith (of Wildflower Farms: Somersby, Australia), and Paige Minney (of Iolana Farms: Maui, HI) as well as UH-CTAHR extension agent Hannah Lutgen reviewed detailed production of Proteaceae and Myrtaceae plants over a 2-day conference, including farm tours to the low-elevation *Leucospermum* plot at Greenpoint Nurseries (Hilo, HI) and eucalyptus farm at Eucalyptus Heaven (Pahoa, HI). A highlight was growers getting to see the low-elevation plot at Greenpoint Nurseries and marvel at *Leucospermum* being grown at ~290 ft. elevation in an area that on average receives up to ~147 inches of rain a year. Paige Minney and Hannah Lutgen held a pruning workshop for growers at this location as well, reviewing important pruning techniques to maintain healthy plants.



CTAHR faculty and staff at the Volcano Research Station propagation house working on plant material being prepared for release.

Grower Profiles

A reported 36 individual farms have participated in plant releases, extension outreach, or other collaborative efforts on Hawai'i Island. Below are some of the farms that are focused on increasing production across the island.

Protea MyLife LLC

Located in Ocean View in the Ka'u District of Hawai'i Island, Protea MyLife LLC is a family-owned and operated farm managed by Patrick and Alicia Nelson and their four children. Over the past 12 years, the farm has expanded from three acres to approximately 12 acres of diversified Proteaceae production at an elevation of approximately 3,000 feet. Building on Hawai'i's rich *Protea*-growing legacy, the farm cultivates more than 100 varieties of *Protea*, *Leucadendron*, and *Leucospermum*, including King *Protea* selections, Pink Ice, Pink Mink, Ruby, Safari Sunset, Jester, Gold Strike, Top Movers, High Gold, Scarlet Ribbon, and Blanche Ito. In addition to cut flowers, the farm produces *Eucalyptus* foliage, waxflower, and specialty greenery for local and mainland markets. With 10,000 plants in ground and 100+ varieties, Protea MyLife is one of the larger farms in production. Protea MyLife has played an active role in evaluating low-elevation *Leucospermum* selections and production practices in collaboration with researchers and industry partners. Through continued expansion, research participation, and grower outreach, the Nelson family remains committed to strengthening Hawai'i's Proteaceae industry and supporting future generations of growers.



Patio and his children tour a portion of their 12-acre farm at Protea MyLife LLC in Ocean View.



Protea MyLife has a large propagation greenhouse dedicated to propagation and pot production of their different varieties.

Pua Mae'ole Farms

Pua Mae'ole Farms is a family-owned agricultural enterprise founded by JP and Kira Kaloi in Ka'ū, Hawai'i Island. Established in 2023 on acreage located at approximately 3,000 feet elevation, the farm specializes in *Protea*, *Leucospermum*, and *Leucadendron* production for both plant material and cut-flower markets. Building upon more than 15 years of commercial agricultural experience, the Kalois have focused on importing, propagating, breeding, and evaluating unique Proteaceae genetics sourced from Hawai'i, South Africa, and Australia. The farm is currently expanding its collection of cultivars while establishing commercial plantings for future flower production. In addition to supplying rooted cuttings, seeds, and plants to Hawai'i growers and nurseries, Pua Mae'ole Farms aims to become a leading source of high-quality protea genetics for both domestic and international markets. Their long-term vision includes increasing acreage, expanding propagation capacity, and contributing to the continued growth and diversification of Hawai'i's specialty cut-flower industry.



JP and Kira Kaloi at their farm Pua Mae'ole Farms in Ka'ū.



A portion of Pua Mae'ole Farms being newly planted in 2025, highlighting the volcanic rock substrate found commonly on Hawai'i Island.

Mauka Floral Co.

Located in Pa‘auilo on the Hāmākua Coast at an elevation of 2800 ft, with around 1 acre of production Mauka Floral Co. combines specialty cut-flower production with a floral design business serving weddings, events, and seasonal markets throughout Hawai‘i Island. The farm currently grows a diverse collection of Proteaceae, including King Protea, Pink Ice, Pink Mink, Susara, multiple *Leucospermum* cultivars, and several *Leucadendron* varieties. Many of these flowers are incorporated directly into the company’s floral designs, creating a unique connection between local flower production and value-added floral services. Over the past year, Mauka Floral Co. has expanded its *Protea* and *Leucospermum* plantings through on-farm propagation and variety trials aimed at identifying selections well suited to Hāmākua growing conditions. As production increases, with plans for 2 acres, the farm plans to further integrate locally grown specialty flowers into its floral design operations while contributing to the growing market for Hawai‘i-grown Proteaceae.



Lisa Salazar of Mauka Floral Co., managing her crop in the Ohi‘a forested Ahualoa farmlands.



Mauka Floral Co. farms supplies primarily their floral business, this image highlights the use of Proteaceae crops in floral arrangements, the primary end product of this crop.

Moe'uhane Nui

Moe'uhane Nui is a small specialty flower farm operated by Alison Higgins and Nick Civitano in lower Ahualoa at an elevation of approximately 1,700 ft and provide cut flowers for Alison's full-service flower shop Grace Flowers Hawaii. Situated on five acres, the farm began exploring *Leucospermum* production in 2022 after observing the strong performance of established pincushion flowers already growing on the property. Through the University of Hawai‘i CTAHR *Leucospermum* expansion effort, the farm established approximately 20 plants representing at least five different *Leucospermum* varieties and currently maintains a dozen plants in both landscape and row-production settings. Early results have been highly encouraging, with plants producing abundant blooms within a year of planting. The farm has been particularly interested in evaluating lower-elevation *Leucospermum* selections and their potential for commercial flower production in Hawai‘i. Participation in the project has allowed Grace Flowers to diversify its specialty flower offerings while contributing valuable observations on cultivar performance under Hāmākua growing conditions.



Above, Alison Higgins at her farm, Moe'uhane Nui, in lower Ahualoa posing with one of the low elevation pincushion varieties.



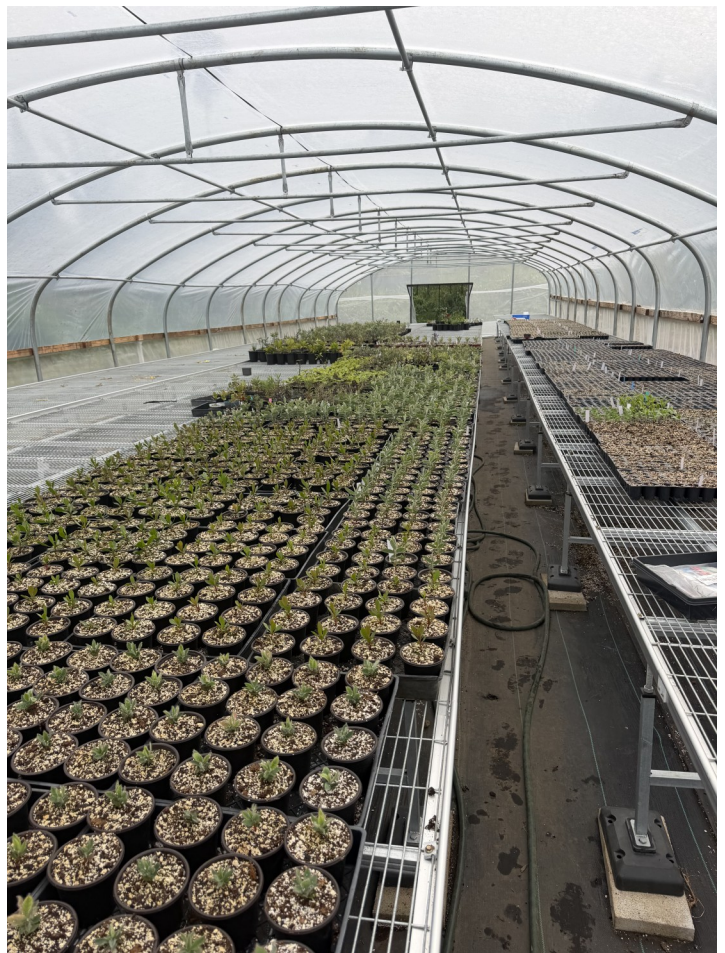
At left, Grace Flowers Hawaii incorporates Proteaceae crops into their floral arrangements often destined for high-end resorts and events like Kona's booming wedding industry.

Lelie Fields

Lelie Fields was established during the COVID-19 pandemic and initially focused on the propagation of mānaki for research and commercial sales. As interest in Proteaceae expanded throughout Hawai‘i, the farm shifted toward propagating and producing low-elevation *Leucospermum* hybrids developed by the University of Hawai‘i. Today, the operation includes a 30-by-100-foot greenhouse nursery and approximately three acres of field-grown Proteaceae production. Current plantings include all of Ken Leonhardt’s hybrid selections, *Protea cynaroides*, *Protea magnifica*, numerous *Protea* hybrids, and expanding *Leucospermum* production. The farm supplies potted plants, liners, and cut flowers to wholesale growers, retail nurseries, and customers throughout Hawai‘i and the continental United States, with California serving as its largest mainland market. Looking ahead, Lelie Fields plans to expand from three acres to ten acres of production by 2027 while increasing nursery capacity to meet growing demand for high-quality Proteaceae plant material and cut flowers.



Lelie Fields produces *Leucospermum* among other Proteaceae crops, many of which are the low elevation tolerant varieties that Ashley Lelie helped distribute alongside Ken Leonhardt.



Lelie Fields also focuses on nursery production for retail and wholesale.



Ken Leonhardt and Ashley Lelie preparing cuttings of the new UH Tropical *Leucospermum* hybrids for distribution to local growers in October 2023.

Moving Forward

Growers and industry groups see the current need to move the needle on production. While it has expanded, this plant material is still not produced in large enough quantities to cover the needs of the floriculture industry, exhibiting an opportunity for local producers. Local industry groups and growers are partnering with CTAHR's Cooperative Extension agents to conduct grant programs looking to expand production through plant propagation and release, grower education workshops, and establishment of commercial farm operations funded through HDAB grant funding focused on increasing import replacement products in the State. Local growers are also working with agents to propose trialing and outreach through a recently submitted Western Sustainable Agriculture Research and Education Farm/Rancher Grant Program application.

Summary

Recent expansion of *Leucospermum* and other Proteaceae crops on Hawai'i Island highlights the momentum of this crop. Through collaboration among growers, industry organizations, and the University of Hawai'i College of Tropical Agriculture and Human Resilience, more than 11,000 plants have been distributed to growers while research and extension programs have supported increased commercial production across the island. The farms featured in this article demonstrate how innovation, collaboration, and grower investment are laying the foundation for a stronger Proteaceae industry in Hawai'i.

When the Volcano Breathes: A Grower's Account of Vog, Loss and Resilience

Patio Nelson, Hawai'i Delegate, International Protea Association

This season changed the way many of us grow protea on Hawai'i Island. Since December 2024, repeated eruptive episodes from Kilauea have carried sulfur dioxide and vog across our production areas. Ocean View received some of the most persistent exposure. What began as bronzed leaf tips and stalled buds developed into dead growing points, declining plants, and entire blocks that could no longer produce marketable stems. Two commercial growers experienced major losses. At Kona Protea Farm (not the real name), approximately three acres of established production were ruined, with an estimated 80 percent crop loss. For a grower, those numbers represent far more than plants. They represent years of pruning, feeding, weed control, labor, investment, and patience that cannot be replaced in a single season.

What Vog does, and why Protea feels it first

Vog forms when sulfur dioxide turns into acidic droplets and sulfate aerosols. These particles cling to leaves and enter through stomata, causing a surface burn and internal toxicity at once. *Protea* and *Leucadendron* clearly demonstrate this: crisped margins, bronzing, shortened internodes, and windward canopies that appear scorched. Cuticles roughen, stomata misfire, and plants wilt even with

surface pH and can mobilize metals that aggravate proteoid roots, inviting dieback and disease. Flower development takes the first hit: buds stall or abort, bracts bronze early, colors dull, stems finish shorter, and bloom timing turns uneven—fewer, smaller, less market-ready stems until clean-air windows return.

Where impacts concentrated

Ocean View (Ka'ū): The most serious field losses were concentrated in exposed production areas. Two growers reported substantial damage. Kona Protea Farm lost approximately three acres of established production and estimated an 80 percent crop loss. Pink Mink protea, Safari Sunset leucadendron, other protea selections, and *Leucospermum* pincushions were among the plantings severely damaged or completely lost.

Kona: Intermittent pulses accumulated into chronic stress—reduced yields, browned bracts, tip dieback on sensitive cultivars.

Hilo (exposed slopes): On reversal days, symptoms appeared fast—bronzed flushes, tip burn, and uneven opening.

What worked on the ground

Timely rinses: Freshwater washes right after high-SO₂ days reduced surface acidity and protected cuticles.

Gentle buffering: Low-rate bicarbonate or calcium sprays moderated leaf-surface pH without adding burn.

Exposure management: Windbreaks, strategic shade, and selective pruning softened plume-facing scorch.

Soil steadiness: Suitable pH, sharp drainage, moderated nutrition (especially phosphorus), and strict Phytophthora hygiene curtailed secondary losses.

No single tactic was a cure. During persistent high SO₂, even best practices bent. But they bought time, preserved framework wood, and protected future flushes.

Reading the canopy scouting remained essential. Look for a crisp brown band on windward tips, bronzed or puckered new growth, shortened internodes, and bracts that open dull, as if smoked. Outer canopies take the brunt; inner foliage can mask whole-plant stress. Side-by-side photos—wide for context, close for detail—paired with dates, wind, and cultivar created a shared language for action across farms. Market reality, and a path forward paradoxically, the same vog that cut yields lifted demand. With South African and Australian supplies seasonally tight and logistics still uneven, wholesalers chased clean Hawai'i stems, and prices firmed for premium grades. For growers worldwide, this is the signal: resilience pays. Protect framework wood now to capitalize when clean-air windows return. Sequence pruning to stagger flushes across risk periods. Diversify blocks by elevation and aspect; pair sensitive cultivars with more tolerant *Leucadendron* to keep boxes full. Invest in postharvest: hydrate fast, use anti-ethylene where appropriate, and grade hard—vog-

marked bracts won't hide in export light.

Collaboration became one of the most useful tools available to us. Growers compared photographs, wind direction, symptoms, cultivar performance, and the timing of sulfur dioxide events. Those conversations helped separate isolated plant problems from a larger regional pattern. A coordinated grower bulletin that combines air quality information with practical field observations could help farmers make faster decisions about rinsing, harvest timing, pruning, and protection during future events.

The lasting lesson from this season is not simply that vog can damage protea. It is that exposure is uneven, cultivar response matters, and careful observation has real value. At Protea MyLife Farm, located at approximately 3,000 feet elevation, only 15 plants were lost. Nearly all mortality occurred along the exposed edges of the lots, while plants farther inside the blocks remained substantially better protected. King protea also appeared more durable than several neighboring selections. These are grower observations rather than results from a controlled trial, but the contrast between farms was too significant to ignore. Elevation, prevailing wind, topography, edge exposure, plant age, cultivar tolerance, and block design all appear worthy of closer study. Hawai'i growers have always learned by watching the land closely. By documenting what failed, what survived, and where the differences occurred, we give the next season a better starting point.

Field Documentation

The following photographs were taken at Kona Protea Farm in Ocean View, Hawai'i, and document the progression of vog injury and plant loss within the affected production blocks. Plant identifications are based on established field records. Together, the images show how severely Page 2 injury can differ by species, plant age, wind position, elevation, and location within the same agricultural district.

Comparative field observation

The contrast between nearby farms was striking. At Kona Scent, approximately three acres of established production were ruined and the grower estimated an 80 percent crop loss. The affected blocks included total losses of Pink Mink protea, Safari Sunset *Leucadendron*, additional protea cultivars, and *Leucospermum* pincushions. At Protea MyLife Farm, located at approximately 3,000 feet elevation in Ocean View, only 15 plants were lost. Nearly all mortality occurred along the exposed outer edges of the lots, while plants farther inside the blocks remained substantially better protected. King protea appeared more durable than several other cultivars under the same general conditions. Although these observations were not produced through a controlled trial, the field pattern strongly suggests that elevation, prevailing wind, topography, edge exposure, plant age, and cultivar selection may all influence the severity of vog injury. For growers, this is more than an academic question. Understanding why one block survives while another fails could directly shape future planting decisions, wind protection, cultivar selection, and long term farm resilience.



Above left, Coastal banksia, *Banksia integrifolia*, at Kona Protea Farm showing extensive canopy scorch, bronzing, and terminal dieback after repeated vog exposure. The open crown and widespread foliar desiccation illustrate cumulative injury to exposed framework and growing points. Above right, A mature *Leucospermum* pincushion planting showing severe canopy injury and loss of productive wood. Browning throughout the shrub mass, reduced live foliage, and collapse of terminal growth indicate advanced injury after repeated exposure events.



Younger pincushions showing widespread foliar bronzing, desiccation, and whole plant decline. The uniform injury across adjacent plants demonstrates the intensity of exposure within the block of young plants after active growth is severely damaged.

A second block of younger pincushions showing variable survival after vog exposure. Differences among neighboring plants reflect the combined influence of plant age, cultivar response, wind exposure, canopy position, and microclimate. The overall condition of the block confirms substantial production loss.



Remembering Dr. Richard Criley, our friend and colleague

The College of Tropical Agriculture and Human Resilience (CTAHR) mourns the loss of Dr. Richard Criley, Professor Emeritus of Horticulture, who passed away recently at the age of 85. A cornerstone of the college for more than 50 years, Dr. Criley's career was dedicated to advancing horticulture in Hawai'i and uplifting generations of students.

His journey with CTAHR began in 1968, shortly after he earned his PhD from the University of California – Los Angeles. Over the next 57 years, Dr. Criley's passion for research and teaching became his life's work. He famously "failed retirement," remaining a constant and energetic presence in the Department of Tropical Plants and Soil Science long after his official retirement.

Colleagues recall that he was at the college every day, often tending to plants at the Magoon Research Station on Saturday mornings and serving on more graduate committees than many active faculty members.

As an educator, Dr. Criley left a lasting legacy, teaching courses ranging from the 100 to 600 level. He was known as a "walking plant encyclopedia," equipping generations of students for careers in the industry. While he was a professor with high standards and rigorous grading, his students recognized that his critiques were always intended to help them achieve their full potential.

Dr. Criley's scholarly contributions were equally remarkable, with research spanning the production and growth regulation of tropical flowers and foliage "from A to Z." His excellence was recognized with prestigious awards, including:

- Fellow of the American Society for Horticultural Science (ASHS).
- Alex Laurie Award for Research and Education (2002) from the Society of American Florists.
- ASHS Kenneth Post Award for outstanding ornamental publication.
- Distinguished service honors from the Hawai'i Floriculture and Nursery Association in 2025.

Beyond academics, he led an active life as a world traveler, gymnast, and surfer, catching waves until he was in his 70s. His dedication to his work was such that he even participated in graduate student proposals by Zoom during his final months.

Rich was a founding member of the International Protea Association. His presence in our halls and at our research stations will be greatly missed.



Dr. Criley with a bouquet of proteas

Some of Dr. Criley's Protea Publications:

Criley, R. A., K. W. Leonhardt, D. Oka, P. N. Shingaki. 2008. Extending the flowering period of *Leucospermum* hybrids through disbudding. *Acta Hort.* 766:183-186.

Criley, R. A. 2001. Proteaceae: Beyond the Big Three. *Acta Hort.* 545:79-85.

Criley, R. A. 1998. *Leucospermum*: Botany and horticulture. *Hort. Rev.* 22:27-90.

Criley, R. A. and P. E. Parvin. 1993. New cut foliages from Australia, New Zealand, and South Africa. *Acta Hort.* 337:95-98

Criley, R. A., P. E. Parvin and S. Lekawatana. 1990. Flower development in *Leucospermum cordifolium* 'Vlam.' *Acta Hort.* 264:61-70.

Criley, R. A. and P. E. Parvin. 1979. Promotive effects of auxin, ethephon, and daminozide on the rooting of *Protea neriifolia*. *J. Amer. Soc. Hort. Sci.* 105:592-596

Criley, R. A. and P. Parvin. 1978. A propagation cocktail for *Protea neriifolia*. *The Plant Propagator* 24(1):7

Leonhardt, K.W., and R. A. Criley. 1999. Proteaceae Floral Crops; Cultivar Development and Underexploited Uses. *Proc. Fourth National Symposium on New Crops and New Uses. Perspectives on New Crops and New Uses* Purdue University. CTAHR J. Ser. No. 4431.

Comments from friends, colleagues and students

Dear Ken,

I am sorry for the loss of your friend. I'm sorry for the loss of our HSI colleague. I am happy he came to the conference to see a room full of tropical plant enthusiasts who will keep the fire burning.

Thank you for everything you did for him these last three years. It must have been so tough for him, an active person trapped in a traitorous body. Every little bit you all did made a difference.

Here's a big hug for you. Love, Carla Black, Panama

Dear Ken,

Such sad news. I had Dr. Criley for plant growth regulators exactly 51 years ago at UH. He and I have kept in touch over the years and frequently ran into each other at horticulture meetings in HI, FL and CA. Such good memories.

Don Hodel

Emeritus Environmental and Landscape Horticulture Advisor, University of California, Los Angeles County

Thanks Ken for this information. Sad to lose a teacher whom I admired greatly since my graduate school. He will definitely be missed and shall remain in my memory. Kheng Cheah, Emeritus, TPSS, UH Manoa

Mahalo for this Ken.

Dr. Criley's decades-long contribution our department shaped the lives and careers of generations of students and professionals, including many of us. Mahalo, Ted Radovich, Chair, TPSS, UH Manoa

Aloha Ken,

I am very sorry for the passing of Dr. Criley. He was my connection to UH and coming to Hawaii; picked me up from the airport when I first arrived in 2008; and was always ready to provide candid and relevant feedback and mentorship throughout the years.

Aloha,

Alberto Ricordi, Extension Agent, TPSS, UH Manoa

Thank you, Dr. Leonhardt!

Dr. Criley's accomplishments will live forever. May he rest in peace!

Amjad Ahmad, Extension Agent, TPSS, UH Manoa

Ken:

Thank you so much for this perspective on Rich: gymnast, dancer, surfer, horticulturist, and lover of heliconia. He inspired me. Sorry to see him go. 85 ain't bad. -wjkw. John Kress, Ph.D.

Distinguished Scientist and Curator Emeritus
National Museum of Natural History
Smithsonian Institution

Aloha Ken

Thanks for letting me know. I always admired, respected and like Dr. Criley. He was one of my favorite profs. Tough grader and required excellence. He shall be missed. David Fell, former student, Honolulu, Hawaii

Aloha All,

This is truly sad news, but I personally feel so lucky to have known Rich! He picked me up for my job interview at the HNL airport (21+ years ago), and over the years he has been a colleague, mentor and friend.

His plant knowledge, passion, and excitement that he shared with me, as well as generations of students and colleagues is simply remarkable. As Ken pointed out, he was multi-talented and enjoyed life, people, and horticulture. It was truly an honor to have been in his orbit!

Mahalo,

Andy Kaufman, Extension Specialist, TPSS, UH Manoa

Thank you Ken for sharing, even though it is sad to know that such a steadfast contributor to the department has passed into the next realm. What a great man!

Me ke aloha -

Noa Lincoln, Researcher, TPSS, UH Manoa

Mi solidaridad y condolencias a la familia. Sus contribuciones seguirán siendo muy valiosas.

Maria del Pilar

Programa, Biologia, Universidad Del Quindio, Brazil

Thank you so much Ken and family for sharing. How sad, but may he from heaven help and inspire us to maintain science and our Heliconia Society.

My best regards

Atenciosamente

Vivian Loges

Laboratório de Floricultura, Departamento de Agronomia
Universidade Federal Rural de Pernambuco - Brasil

Dear Ken,

Thank you for sharing this sad news about Richard's passing. I will miss reaching out to him with various things within society. Condolences to his family and friends, both academic/professional and otherwise... his memory is an inspiration for the rest of us.

Regards,

Vinita

Dr. Vinita Gowda Fellow of the Linnean Society of London (FLS), Dept. of Biological Sciences, Bhopal, India.

Mahalo, Ken, for sharing! What a loss and what a legend! An excellent model for all faculty and all of us.

Parwinder Grewal, Dean, College of Tropical Agriculture and Human Resilience, UH Manoa

Mahalo for sharing this sad news with the informative and interesting biography. He never missed one May Day since he started volunteering. My condolences to you, his friends and family with his passing. Mahalo

Anita Lagundimao

City and County of Honolulu

Thank you Ken. What a life Rich had! Parkinson's is very hard, gee whiz. Take a moment to enjoy!

All the best,

Carver Wilson, Protea grower, Maui, Hawaii



Terryl Leong (acrobat), Rich, Ken & Lita Leonhardt, a few days before Rich passed



Rich, clowning around at Queen's Beach in Waikiki



Rich at luau at Leonhardt's place above in 2024 and at right with Lita in 2025.

At left, Rich as a member of the Penn State Gymnastics team in 1959 or 1960



XXI International Protea Association Conference & XVI International Protea Research Symposium

The XXI International Protea Association Conference & XVI International Protea Research Symposium will be held in and around Franschhoek, South Africa, from 18 to 22 September 2028.

The first day will be a botanical garden tour, followed by two days of technical talks and research presentations, followed by two days of farm visits.

Franschhoek is a town in South Africa's Western Cape with centuries-old vineyards and Cape Dutch architecture. Trails wind through flowers and wildlife at Mont Rochelle Nature Reserve to views over Franschhoek Valley. The Huguenot Memorial Museum and neighboring monument honor the area's French settlers, who arrived in the 17th and 18th centuries. Franschhoek Motor Museum displays vintage cars amid mountain farmland. — Google

It is a small town, and one of the oldest towns in South Africa, founded in 1688 by French Huguenot refugees. It is situated about 75 kilometers (47 miles) from Cape Town. The images of Franschhoek on this page were found on Google. No captions were provided.

