



New Protea Cultivars for Hawai'i Growers from the University of Hawai'i Protea Research Project—1999 to 2004

K. W. Leonhardt, P. Shingaki, P. Nakao, T. Jewell, T. Miguel, and D. Oka
Department of Tropical Plant and Soil Sciences

The rich diversity of the Proteaceae family has infused the floriculture industry worldwide with unique, dramatic new products. With more than 1400 species in 60 genera, the protea family is still largely unexploited in terms of commercial use, and the potential for developing new products through genetic recombination is huge.

The major focus of the University of Hawai'i's Protea Research Project has been the development of improved cultivars of *Leucospermum* (pincushion) for commercial growers in Hawaii. This program has created 102 new cultivars that have been released to Hawai'i growers in the past five years. These hybrids were selected from more than 6000 hybrid progeny that were bred and evaluated since 1995. Below we provide the genetic backgrounds and some characteristics of the hybrid pincushion proteas. This information was initially presented at the Hawaii Floriculture Conference in March 2004; it was updated for the conference proceedings published this year, and it describes new protea introductions made after the conference date.

Another aspect of this project has been the importation of germplasm to support current breeding efforts, and the introduction of unexploited cultivars for evaluation, selection, and potential release to Hawai'i growers. Since 2000, the project has imported more than 200 species and cultivars from 34 genera. A list of the recently imported germplasm is presented (Table 8).

***Leucospermum* breeding program**

The protea industry in Hawaii was founded on the development of a few improved cultivars of *Leuco-*

spermum at the University of Hawai'i's Maui Agriculture Research Center (M.A.R.C.) in the 1970s using germplasm imported from Africa. In 1995, funding from a federal floriculture research grant revitalized the *Leucospermum* breeding program at M.A.R.C. The goal of this program has been to develop *Leucospermum* hybrids with improved horticultural characteristics. Hybrids have been bred and selected for desirable floral, foliar, and plant structural traits such as earliness to flower; an extended flowering season; long, slender, straight stems; slender leaves; reduced leaf and stem pubescence; ease of propagation; high yields; good postharvest characteristics; and improved colors. Tolerance of foliar fungal diseases was an early objective, and progress was made toward identifying genetic sources of such tolerance. Emphasis has since shifted toward breeding and selecting hybrids with tolerance of the root pathogen *Phytophthora cinnamomi*. Specific details on disease tolerance and other characteristics of our hybrid introductions can be found in several publications listed in the references section.

Tables 1 through 6 identify the hybrids, and their species backgrounds, that were introduced to Hawai'i growers in 2004 (Table 1) and annually back to 1999 (Tables 2 to 6). Percentages of species genomes in progeny hybrids listed in the tables are arithmetically derived and are somewhat arbitrary. It is not possible, without DNA analysis, to determine the influence of artificial selection for desired characteristics on species genome compositions of the hybrids. This is true particularly for advanced hybrids for which several species are involved and several generations of breeding and selec-

Table 1. Genome composition of 17 new *Leucospermum* hybrids released in 2004.

Hybrid No.	Parents	Parent species involved, by relative genome percentage*										
		lin.	gla.	cor.	con.	cun.	for.	tot.	ref.	ves.	other	
68	24 x T751124	25	25		25	25						
85	15 x 34	12	25	12	25				12	12		
112	29 x T880902	12	50			25					12	
141	49 x T880902	6	25	31	12	25						
226	129 x 93	12	25		3	3	12	12	25	6		
227	20 x 93	19	12	12	25				25	6		
232	78 x ref	12	12	6	12				50	6		
234	104 x 130	28	12	12	3	3	12	25		3		
245	HiG x 93	6	12		25	25			25	6		
247	139 x CB	34	9	31	25							
248	89 x 87	25	31	12	3	3						25 sax.
256	139 x CB	34	9	31	25							
262	87 x 130	15	12	12	3	3	12	12		3		25 sax.
264	194 x 193	9	6	19	25	12			12	3		12 pat.
265	194 x 193	9	6	19	25	12			12	3		12 pat.
272	194 x 145	6		6	38	25			25			
275	164 x 191	19	12	14	11	2	6	6	16	2		12 sax.

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, cun. = *L. cuneiforme*, for. = *L. formosum*, tot. = *L. tottum*, ref. = *L. reflexum*, ves. = *L. vestitum*, pat. = *L. patersonii*, sax. = *L. saxosum*.

Hybrid parents: CB = *L. Cloud Bank* (*L. cordifolium* x *L. conocarpodendron*); HiG = *L. Hawaii Gold* (*L. conocarpodendron* x *L. cuneiforme*); T751124 = (*L. conocarpodendron* x *L. cuneiforme*); T880902 = (*L. glabrum* x *L. cuneiforme*).

tion has taken place. Most (61) of the recent introductions involve five or more species in their genealogy (e.g., Hybrid 275 has 10 species ancestors).

The tables identifying the complex background of the 102 *Leucospermum* hybrids are depicted in annual sequence so growers can relate the year of introduction to the age of their field plantings from cuttings they purchased upon the first release of a new cultivar. Table 7 depicts some commercially important characteristics of these hybrids. It is organized in the order of accession numbers assigned to the hybrids by the authors. Growers can refer to this table to see data accumulated on these hybrids at M.A.R.C. The data are relative to the environmental and edaphic conditions at M.A.R.C., and the cultivars may perform differently at other locations. Growers were invited to examine the plantings at M.A.R.C. and make their own determinations on plant materials to purchase.

Importation of new plant materials since 2000

M.A.R.C. has an extensive collection of the Proteaceae, which was started with the importation of various seeds in 1964. Good working relationships with foreign industries and governments for more than 30 years have

facilitated the importation and exchange of Proteaceae species and hybrids from around the world. The acquisition of this rich germplasm has made possible the creation of this project's 102 new hybrid *Leucospermum* cultivars. We continue to rely on foreign sources to exchange germplasm to continue project activities.

Since 2000, at least 214 new accessions in 34 genera were imported from nine sources in California, Australia, New Zealand, South Africa, and Zimbabwe. Imported vegetative materials comprised 2,577 propagation units, including 624 tissue-cultured plantlets, 1855 cuttings, and 98 potted plants. These clonal materials represented 120 selections in 22 genera. Seed imports included 103 accessions of 92 species in 22 genera. These plant materials are being evaluated at M.A.R.C. and other UH research stations for possible release to Hawai'i protea growers (a few have already been released), and for use in breeding improved cultivars.

Table 8 lists 214 Proteaceae and non-Proteaceae species, hybrids and cultivars that have been imported since 2000 from California, Australia, New Zealand, South Africa, and Zimbabwe and are being evaluated at UH research stations. Growers can visit these stations to make observations and provide input on the selection process.

Table 2. Genome composition of 27 new *Leucospermum* hybrids released in 2003.

Hybrid No.	Parent species involved, by relative genome percentage*											
		lin.	gla.	cor.	con.	cun.	for.	tot.	ref.	ves.	other	
115	24 x lin.	75	25									
126	34 x 31	12	50	12	6	6			12			
151	Spd. x 74	16		3	6		25	25	25			
155	95 x gra.	6	12						25	6		50 gra.
160	82 x 89	25	31	12						6		25 sax.
162	89 x 74	34	19	16	6				25			
163	29 x T751124	12	25		25	25					12	
165	20 x 93	19	12	12	25				25	6		
177	Spd. x 93	6	12				25	25	25	6		
186	74 x 89	34	19	16	6				25			
190	89 x cor.	19	19	62								
195	87 x 74	22	12	3	9	3			25			25 sax.
197	114 x 93	44	25						25	6		
202	89 x 87	25	31	12	3	3						25 sax.
209	129 x 131	16	12	12	3	3	25	25		3		
221	87 x 95	12	25		3	3			25	6		25 sax.
223	HiG x 93	6	12		25	25			25	6		
235	74 x T751124	16		3	31	25			25			
239	139 x 138	69	19	12								
242	140 x 144	41	9	12	12							25 gra.
243	87 x 95	12	25		3	3			25	6		25 sax.
244	HiG x ref.				25	25			50			
249	139 x 131	44	9	19			12	12		3		
255	139 x CB	34	9	31	25							
257	124 x 136	31	12				25	25		6		
259	(T751124 x 74) 16		3	31	25			25				
261	145 x 83		12		12	25			25			25 sax.

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, cun. = *L. cuneiforme*, for. = *L. formosum*, tot. = *L. tottum*, ref. = *L. reflexum*, ves. = *L. vestitum*, pat. = *L. patersonii*, sax. = *L. saxosum*.
 Hybrid parents: HG = *L. High Gold* (*L. cordifolium* x *L. patersonii*); HiG = *L. Hawaii Gold* (*L. conocarpodendron* x *L. cuneiforme*); Spd. = *L. Spider* (*L. formosum* x *L. tottum*); T751124 = (*L. conocarpodendron* x *L. cuneiforme*).

Table 3. Genome composition of four new *Leucospermum* hybrids released in 2002.

Hybrid No.	Parents	Parent species involved, by relative genome percentage*							
		lin.	gla.	cor.	con.	ref.	ves.	gra.	pat.
92	CB x 58	12	12	50	25				
172	29 x 74	28	25	3	6	25	12		
193	HG x 93	6	12	25		25	6		25
224	HG x gra.			25				50	25

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, ref. = *L. reflexum*, ves. = *L. vestitum*, gra. = *L. grandiflorum*, pat. = *L. patersonii*.
 Hybrid parents: CB = *L. Cloud Bank* (*L. cordifolium* x *L. conocarpodendron*); HG = *L. High Gold* (*L. cordifolium* x *L. patersonii*).

Table 4. Genome composition of 37 new *Leucospermum* hybrids released in 2001.

Hybrid No.	Parents	Parent species involved, by relative genome percentage*										
		lin.	gla.	cor.	con.	cun.	for.	tot.	ref.	ves.	other	
77	29 x 20	25	25	12	25						12	
78	29 x 20	25	25	12	25						12	
81	47 x 20	25		31	37						6	
86	20 x 31	25	25	12	31	6						
87	31 x sax.	12	25		6	6						50 sax.
88	36 x 20	44		19	37							
98	20 x 34	12	25	25	25					12		
99	20 x 34	12	25	25	25					12		
100	Spd x SR		25				25	50				
101	Tan x Bal	50	25					25				
102	Tan x lin.	75	25									
107	Tan x (24 x 57)	47	37	12						3		
109	24 x T880902	25	50			25						
116	29 x Bal	37	25					25			12	
117	29 x Bal	37	25					25			12	
119	29 x lin.	62	25								12	
123	29 x cor.	25	25	25							25	
128	Spd x 31	12	25		6	6	25	25				
129	Spd x 31	12	25		6	6	25	25				
131	Spd x (3 x 7)	19		25			25	25			6	
132	Spd x T751124			25	25	25	25					
138	89 x lin.	69	19	12								
139	89 x lin.	69	19	12								
140	89 x lin.	69	19	12								
143	20 x gra.	12		12	25							50 gra.
146	HiG x sax.				25	25						50 sax.
147	Tan x 74	41	25	3	6					25		
149	SR x T861102		25		25	25		25				
152	Spd x 74	16		3	6		25	25	25			
153	SR x 93	6	37					25	25		6	
154	SR x Tan	25	50					25				
156	95 x gra.	6	12						25	6		50 gra.
166	20 x ref.	12		12	25					50		
167	20 x ref.	12		12	25					50		
185	74 x 101	41	12	3	6			12	25			
192	sax. x pra.											50 sax.50 pra.
204	98 x 74	22	12	16	19					31		

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, cun. = *L. cuneiforme*, for. = *L. formosum*, tot. = *L. tottum*, ref. = *L. reflexum*, ves. = *L. vestitum*, sax. = *L. saxosum*, gra. = *L. grandiflorum*, pra. = *L. praecox*. Hybrid parents: Bal = *L. Ballerina* (*L. lineare* x *L. tottum*), Spd = *L. Spider* (*L. formosum* x *L. tottum*), SR = *L. Scarlet Ribbon* (*L. glabrum* x *L. tottum*), Tan = *L. Tango* (*L. lineare* x *L. glabrum*), T751124 = (*L. conocarpodendron* x *L. cuneiforme*), T861102 = (*L. conocarpodendron* x *L. cuneiforme*), T880902 = (*L. glabrum* x *L. cuneiforme*).

Selected publications with additional project results and information for Hawai'i growers

Leonhardt, K.W., P. Shingaki, P. Nakao, and D. Oka. 2003. New *Leucospermum* hybrid selections for 2001 from the University of Hawaii. Acta Hort. 602:75–80. UH, CTAHR J. Ser. no. 4635.

Nakao, P., K.W. Leonhardt, N.M. Nagata, and P. Shingaki. 2003. Screening *Leucospermum* hybrids for tolerance to

Phytophthora cinnamomi. Acta Hort. 602:113–117. UH, CTAHR J. Ser. no. 4636.

Leonhardt, K.W., P. Shingaki, and D. Oka. 2001. New *Leucospermum* hybrids from the University of Hawaii. Acta Hort. 545:55–60. UH, CTAHR J. Ser. no. 4518.

Leonhardt, K., P. Shingaki, D. Oka, S. Ferreira, and N. Nagata. 2000. CTAHR releases seven new hybrid pincushion protea (*Leucospermum*) cultivars. UH, CTAHR. Landscape,

Table 5. Genome composition of 11 new *Leucospermum* hybrids released in 2000.

Hybrid No.	Parents	Parent species involved, by relative genome percentage*								
		lin.	gla.	cor.	con.	cun.	for.	tot.	ref.	ves.
71	24 x T880902	25	50			25				
74	36 x ref.	31		6	12				50	
75	29 x 20	25	25	12	25					12
79	31 x 20	25	25	12	31	6				
84	15 x 31	25	25		31	6			12	
93	29 x ref.	12	25						50	12
106	Tan x (24 x 57)	47	38	12						3
124	29 x Spd	12	25				25	25		12
130	(3 x 7) x Spd	19		25			25	25		6
137	34 x (24 x 57)	22	38	25					12	3
145	HiG x ref.				25	25			50	

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, cun. = *L. cuneiforme*, for. = *L. formosum*, tot. = *L. tottum*, ref. = *L. reflexum*, ves. = *L. vestitum*.

Hybrid parents: HiG = *L. Hawaii Gold* (*L. conocarpodendron* x *L. cuneiforme*), Spd = *L. Spider* (*L. formosum* x *L. tottum*); Tan = *L. Tango* (*L. lineare* x *L. glabrum*); T880902 = (*L. glabrum* x *L. cuneiforme*).

Table 6. Genome composition of six new *Leucospermum* hybrids released in 1999.

Hybrid No.	Parents	Parent species involved, by relative genome percentage*						
		lin.	gla.	cor.	con.	cun.	for.	tot.
72	Spd x T880902		25			25	25	25
89	58 x Tan	38	38	25				
104	Bal x 31	38	25		6	6		25
105	Bal x 31	38	25		6	6		25
133	T880902 x 49	6	25	31	12	25		
135	T880902 x Spd		25			25	25	25

*lin. = *L. lineare*, gla. = *L. glabrum*, cor. = *L. cordifolium*, con. = *L. conocarpodendron*, cun. = *L. cuneiforme*, for. = *L. formosum*, tot. = *L. tottum*.

Hybrid parents: Bal = *L. Ballerina* (*L. lineare* x *L. tottum*), Spd = *L. Spider* (*L. formosum* x *L. tottum*), Tan = *L. Tango* (*L. lineare* x *L. glabrum*), T880902 = (*L. glabrum* x *L. cuneiforme*).

Floriculture, and Ornamentals News 7:2–3.

Nagata, N.M., and K.W. Leonhardt. 2000. Management of protea diseases: Breeding for resistance; sanitation, and sound cultural practices. Proc. Fourth Hawaii Floriculture Industry Conf. UH, CTAHR. p. 32–35.

Leonhardt, K.W., and R.A. Criley. 1999. Proteaceae floral crops; Cultivar development and under-exploited uses. Proc. Fourth National Symposium on New Crops and New Uses. Perspectives on New Crops and New Uses (and optical version in the New Crops Compendium CD-ROM). Purdue University. UH, CTAHR J. Ser. no. 4431.

Leonhardt, K., P. Shingaki, D. Oka, S. Ferreira, and N. Nagata. 1999. New *Leucospermum* introductions from the University of Hawaii. Protea Growers Association of Hawaii Newsletter 1(2):2.

Nagata, N.M., S.J. Ferreira, K.W. Leonhardt, and C.S. Hashimoto. 1997. Fungicide control of *Sphaceloma* (Elsinoe) scab disease on pincushion protea (*Leucospermum*). UH, CTAHR. Landscape, Floriculture, and Ornamentals News 1(1):6–7.

Nagata, N.M., S.J. Ferreira, K.W. Leonhardt, and C.S. Hashimoto. 1997. Evaluating *Leucospermum* for *Sphaceloma* (Elsinoe) scab resistance. UH, CTAHR. Landscape, Floriculture, and Ornamentals News 1(1):7.

Leonhardt, K.W., S. Ferreira, N. Nagata, D. Oka, J. Kunisaki, P. Ito, and P. Shingaki. 1995. Hybridizing *Leucospermum* (Proteaceae) for disease resistance and improved horticultural characteristics. Proc. Third Multi-Commodity Cutflower Industry Conference. UH, HITAHR. p. 76–77.

Table 7. Some characteristics of the University of Hawaii *Leucospermum* introductions.

Hybrid No.	Cultivar name	Flower color	Market yield	Flower diameter (inches)	Vase life (days)	Flowering season	Stem length (inches)
68	Margo Lowe	yellow-red	high	4.0	14	Dec–Apr	18
71	Marlo Torres	orange-red	medium	4.7	23	Feb–Apr	20
72	Naomi	red-orange	high	4.7	17	Sept–June	24
74	Brandi Dela Cruz	orange	high	5.9	20	Dec–Apr	30
75	Queen Kathleen	yellow	medium	4.1	19	Jan–June	48
77	Hi'ilei	orange	high	4.1	13	Dec–Apr	18
78	Kula Sunrise	yellow	high	4.0	13	Dec–Apr	24
79	Shannon	deep yellow	high	4.0	22	Jan–Apr	16
81	Makaleka	yellow	high	4.0	21	Feb–May	26
84	(unnamed)	deep orange	high	4.7	18	Feb–Apr	16
85	Toni Torres	orange	high	4.3	14	Mar–May	20
86	Rhody Ann Umali	orange	high	4.0	14	Feb–May	22
87	Gisela	red	medium	4.0	23	Feb–June	18
88	Jacqueline Louise	yellow	medium	4.7	18	Jan–Apr	16
89	Frosty	deep red	high	4.3	19	Nov–June	24
92	Carl Teichen	orange-red	medium	3.5	19	Jan–Apr	14
93	Blanche Ito	red	high	6.3	16	Dec–Apr	30
98	Estrellita	yellow	high	4.3	24	Mar–May	26
99	Yih-mei Teng	orange	high	4.7	18	Feb–May	16
100	Maui Magic	pink	high	4.7	19	Dec–Sept	16
101	Preciosa	red	high	4.3	20	Jan–June	18
102	Carmen	red	medium	3.3	22	Jan–June	30
104	Metallica	orange-red	high	4.1	24	Jan–Apr	20
105	Lani	orange-red	high	4.7	16	Jan–Apr	16
106	First Prize	red	high	3.3	29	? –June	16
107	Gloria Ann	deep orange	high	4.0	17	Jan–Mar	16
109	Amy Singleton	deep orange	high	3.5	13	Feb–June	12
112	Royal Pride	orange-red	medium	4.0	18	Jan–June	22
115	Ruby Jewell	orange-red	high	3.8	19	Feb–July	22
116	Tessie Amore	apricot	high	4.0	17	Feb–June	18
117	Koana	orange	high	4.3	23	Mar–June	16
119	Susan Takahashi	orange	high	3.7	14	Mar–June	18
123	Kevin Halbrendt	orange	high	3.3	18	Feb–June	14
124	Leilani	pale peach	high	4.5	17	Jan–Aug	22
126	Larry	orange	high	4.0	23	Mar–May	20
128	Shirley Ishihara	orange-red	high	5.1	15	Feb–June	16
129	Apricot Brandy	coral-orange	high	4.0	21	Feb–June	20
130	Mitsy	coral-orange	high	4.3	15	Jan–June	18
131	Cinnamon	salmon	high	3.5	17	Feb–June	16
132	Jacqueline Halbrendt	yellow	high	4.0	15	Jan–June	10
133	Henny's Torch	yellow	high	4.0	23	Dec–July	24
135	Sharon	yellow	high	4.3	23	Nov–Sept	18
137	Mandarin Doll	orange	medium	3.8	15	Feb–June	26
138	Allan Kazutoshi Ikawa	red	high	4.1	17	Jan–Aug	28
139	Sapphire	red	high	4.1	22	Jan–Oct	20
140	Sarah-Sue	red	high	4.3	20	Jan–June	24
141	Nikki Umali	deep orange	high	4.5	23	Dec–May	22
143	Cliff's Delight	yellow	medium-high	5.1	16	Dec–July	26
145	Norman	apricot	high	4.9	16	Mar–July	10
146	Tsuruo Murakami	yellow	high	3.7	7	Apr–June	12
147	Dawna	orange	high	4.9	23	Nov–Sept	20
149	Luz Miguel	yellow	high	4.7	23	Nov–Sept	22
151	Debbie Hamrick	pale apricot	high	4.9	17	Dec–July	28

Table 7. (continued)

Hybrid No.	Cultivar name	Flower color	Market yield	Flower diameter (inches)	Vase life (days)	Flowering season	Stem length (inches)
152	Joy	coral	high	5.1	36	Jan–June	16
153	Hester	red	high	4.9	15	Jan–July	28
154	Allene Chun	red	high	4.3	9	Nov–June	22
155	Bolero	deep yellow	high	6.9	20	Dec–Sept	22
156	Goldfinger	gold-yellow	medium	6.8	22	Nov–Sept	24
160	Emma Leilani	orange-red	high	5.5	23	Feb–Aug	22
162	Georgette	red	medium	5.1	21	Feb–Dec	18
163	Yellow Blush	yellow	high	4.1	19	Jan–June	18
165	Ali'i	deep orange	medium	5.5	14	Mar–June	16
166	Kheng	deep orange	medium	5.9	15	Feb–July	32
167	Kelsey	orange	high	5.6	15	Feb–Sept	26
172	Glenda Hensley	apricot	low	3.0	20	Dec–May	12
177	Lynne	apricot	medium	5.7	19	Dec–July	18
185	Harriet	apricot-red	high	2.6	26	Feb–Aug	14
186	Phil Parvin	red	medium	5.5	17	Nov–Aug	24
190	Zell	red	medium	4.3	24	May–July	30
192	Candlelight	orange	medium	3.7	23	Nov–Oct	16
193	Althea	orange	high	4.1	17	Jan–June	26
195	Kristen	red	medium	5.3	23	June–July	38
197	Dale Uno	red	medium	5.3	24	May–July	22
202	Ania	red	high	4.3	20	Feb–June	16
204	Iyla P	yellow	medium-high	4.9	23	Jan–June	20
209	Vanzie	salmon	medium-high	4.3	22	Feb–May	20
221	Puanani	red	high	5.7	19	Jan–Mar	30
223	Mikala	red and yellow	medium	5.7	15	Jan–Mar	22
224	Frieda	yellow	high	3.7	24	Feb– ?	18
226	Lillian's Peach	salmon	medium	5.3	20	Feb–Apr	18
227	Lynnet	apricot	high	4.6	23	Jan–Aug	38
232	June	orange-red	low	5.9	22	Mar–Aug	38
234	Maureen	apricot	medium	4.3	16	Feb–June	28
235	Mary Lou	yellow	high	4.3	30	Jan–Aug	22
239	Lita	red	high	4.0	15	Feb–July	26
242	Joanne	yellow	medium	4.0	15	? –July	20
243	Nora Leonhardt	red	medium	5.7	21	Dec–July	20
244	Nadine's Choice	yellow	medium	5.6	21	Feb–Aug	26
245	Forever Amai	yellow-orange	medium	4.9	16	Sept–Mar	20
247	Aurora Saulo	salmon-red	medium	3.6	16	Feb–Aug	18
248	Nancy	red	medium	4.3	23	Feb–June	22
249	Margaret Enomoto	deep yellow	medium-high	3.5	13	Feb–July	20
255	Wensi	orange	high	3.9	22	Jan–July	26
256	Bubby	deep orange	medium	3.7	15	Feb–Aug	18
257	Natsue Oka	peach	high	4.7	16	? –Aug	18
259	Lorita	yellow	high	5.1	29	Feb–June	24
261	Gette	yellow-gold	high		15	Feb–July	36
262	Peppermint	orange-red	high	4.5	16	? –May	16
264	Patty Nakao	apricot-yellow	medium	4.0	22	Jan– ?	22
265	Pua'ala	deep yellow	medium	4.3	17	Feb– ?	16
272	Starbright	yellow	high	4.0	16	Feb– ?	18
275	Jody Jewell	yellow	high	4.6	23	Feb– ?	24

Table 8. Imported plant materials since 2000.

Genus	No.	Species or cultivars
Clonal sources		
<i>Anigozanthos</i>	12	A. Big Red, A. Bush Devil, A. Bush Games, A. Bush Garnet, A. Bush Gold, A. Bush Inferno, A. Orange Cross, A. Bush Spark, A. Bush Sunset, A. Bush Tango, A. Yellow Gem, and A. Bush Eclipse. (624 tissue-cultured plantlets). All cultivars are patent protected; local growers will be required to sign a license agreement and pay a royalty to the originator.
<i>Chamaelaucium</i>	2	<i>C. floriferum</i> and <i>C. Lady Stephanie</i>
<i>Erica</i>	2	<i>E. hybrida</i> and <i>E. sparsa</i> Autumn
<i>Grevillea</i>	4	<i>G. depauperata</i> Ember Glow, <i>G. L. Mt. Tamboritha</i> , <i>G. lanigera</i> , and <i>G. wilsonii</i>
<i>Isopogon</i>	2	<i>I. dubius</i> and <i>I. formosus</i>
<i>Leucadendron</i>	17	<i>L. Amy</i> (patent protected), <i>L. Bells Supreme</i> , <i>L. Rewa Gold</i> , <i>L. Jubilee Crown</i> , <i>L. Dragon Eyes</i> , <i>L. Highlights</i> , <i>L. Scented Petals</i> , <i>L. Tall Red</i> , <i>L. Yellow Devil</i> , <i>L. teretifolium</i> , <i>L. thymifolium</i> , <i>L. Maui Sunrise</i> , <i>L. Cloud Bank Ginny</i> , <i>L. salignum</i> Fireglow, <i>L. salignum</i> Late Yellow, <i>L. salignum</i> Summer Red, and <i>L. nobile</i>
<i>Leucospermum</i>	18	<i>L. Sunrise</i> , <i>L. Sean</i> , <i>L. Pickford</i> , <i>L. Firewheel</i> , <i>L. Big Mac</i> , <i>L. Sunscar</i> , <i>L. cordifolium</i> Red, <i>L. glabrum</i> hyb, <i>L. lineare</i> , <i>L. cuneiforme</i> Partridge No. 1, <i>L. cuneiforme</i> Partridge No. 2, <i>L. cuneiforme</i> Partridge No. 3, <i>L. cuneiforme</i> Goldie, <i>L. cuneiforme</i> Sunbird, <i>L. saxosum</i> Maryland, <i>L. saxosum</i> Melsetter, <i>L. saxosum</i> Late and <i>L. saxosum</i> Early. (<i>L. saxosum</i> is the most important species in the Hawaii breeding program for imparting disease resistance. These are the best selections from Zimbabwe, its native country, courtesy of Zimflora Ltd.)
<i>Paranomus</i>	2	<i>P. bracteolaris</i> , <i>P. reflexus</i>
<i>Protea</i>	32	<i>P. Candy</i> , <i>P. cynaroides</i> Arctic Ice, <i>P. Franciscan Hybrid</i> , <i>P. Green Ice</i> , <i>P. Margaret Watling</i> , <i>P. Thomas</i> , <i>P. Special Pink Ice</i> , <i>P. Baron</i> , <i>P. Frosted Fire</i> , <i>P. Joey</i> , <i>P. Pink Princess</i> , <i>P. Pixie</i> , <i>P. Possum Magic</i> , <i>P. White Ruby</i> , <i>P. Christine</i> , <i>P. Mini King</i> (Autumn), <i>P. Mini King</i> (Spring), <i>P. laurifolia</i> Pink Owl, <i>P. White Owl</i> , <i>P. neriifolia</i> Yellow Mink, <i>P. 7/11</i> , <i>P. Pink Mink #1</i> , <i>P. Late Mink</i> , <i>P. hyb Pink Duke</i> , <i>P. White Mink</i> , <i>P. Red</i> , <i>P. burchellii</i> hybrids (3), <i>P. Lorimink</i> , <i>P. laurifolia</i> , and <i>P. neriifolia</i> Pink Splash
<i>Serruria</i>	5	<i>S. aemula</i> , <i>S. barbigerata</i> , <i>S. pedunculata</i> , <i>S. glomerata</i> Lemon Honey, and <i>S. The Fairy</i>
<i>Teloepa</i>	12	<i>T. Brimstone Blush</i> , <i>T. Burgundy</i> , <i>T. Dawn Fire</i> , <i>T. Frosted Flame</i> No. 8, <i>T. Red Embers</i> , <i>T. Starburst</i> , <i>T. Braidwood Brilliant</i> , <i>T. Corrakee</i> , <i>T. speciosissima</i> hyb, <i>T. speciosissima</i> hyb Red, <i>T. speciosissima</i> hyb Pink, and <i>T. speciosissima</i> White
<i>Thryptomene</i>	2	<i>T. C. Taylors White</i> , and <i>T. calycina</i> Pink
Other genera	10	<i>Acmadenia obtusata</i> , <i>Agonis juniperina</i> Florida Star, <i>Banksia spinulosa</i> , <i>Bauera rubioides</i> Fairy Pink, <i>Brunia stokoeii</i> , <i>Diastella</i> Silver Orb, <i>Hibbertia serpyllifolia</i> , <i>Hebe buxifolia</i> , <i>Philotheca (Eriostemon) myoporoides</i> Profusion, and <i>Elegia capensis</i>
Seed sources		
<i>Berzelia</i>	2	<i>B. galpinii</i> and <i>B. languinosa</i>
<i>Banksia</i>	22	<i>B. ashbyi</i> , <i>B. attenuata</i> , <i>B. attenuata</i> dwarf, <i>B. brownii</i> , <i>B. burdettii</i> , <i>B. coccinea</i> , <i>B. ericifolia</i> var. <i>macrantha</i> , <i>B. media</i> , <i>B. hookerana</i> , <i>B. integrifolia</i> , <i>B. littoralis</i> , <i>B. oblongifolia</i> , <i>B. paludosa</i> , <i>B. praemorsa</i> , <i>B. quercifolia</i> , <i>B. robur</i> , <i>B. sceptrum</i> , <i>B. serrata</i> , <i>B. spinulosa</i> var. <i>collina</i> , <i>B. spinulosa</i> var. <i>spinulosa</i> , <i>B. victoriae</i> , and <i>B. violaceae</i>
<i>Erica</i>	9	<i>E. baccans</i> , <i>E. bauera</i> , <i>E. bergiana</i> var. <i>major</i> , <i>E. blandfordia</i> , <i>E. daphniflora</i> , <i>E. grandiflora</i> , <i>E. mamosa</i> , <i>E. speciosa</i> , and <i>E. vestita</i>
<i>Kunzea</i>	3	<i>K. parvifolia</i> , <i>K. pauciflora</i> , and <i>K. pulchella</i>
<i>Leucadendron</i>	21	<i>L. catherinae</i> , <i>L. coniferum</i> , <i>L. daphnoides</i> , <i>L. floridum</i> , <i>L. gandogeri</i> , <i>L. lanigerum</i> , <i>L. lauroleum</i> , <i>L. laxum</i> , <i>L. linifolium</i> (2), <i>L. macowanii</i> , <i>L. modestum</i> (2), <i>L. nobile</i> , <i>L. platyspermum</i> , <i>L. procerum</i> , <i>L. salicifolium</i> , <i>L. sessile</i> , <i>L. strobilinum</i> , <i>L. uglinosum</i> , and <i>L. uglinosum</i> ssp. <i>uglinosum</i>
<i>Leucospermum</i>	4	<i>L. formosum</i> , <i>L. gueinzii</i> , <i>L. platyspermum</i> , and <i>L. rubrum</i>
<i>Paranomus</i>	2	<i>P. reflexus</i> and <i>P. spicatus</i>
<i>Phyllica</i>	2	<i>P. plumose</i> and <i>P. pubescens</i>
<i>Protea</i>	22	<i>P. aurea</i> , <i>P. aurea</i> ssp. <i>aurea</i> , <i>P. aurea</i> ssp. <i>potbergensis</i> , <i>P. caffra</i> , <i>P. canaliculata</i> (3), <i>P. coronata</i> , <i>P. lacticolor</i> (3), <i>P. laurifolia</i> (2), <i>P. longifolia</i> , <i>P. mundii</i> (3), <i>P. pudens</i> , <i>P. punctata</i> , and <i>P. scolymocephala</i> (3)
<i>Serruria</i>	3	<i>S. aitonii</i> , <i>S. florida</i> , and <i>S. phyllicioides</i>
<i>Verticordia</i>	2	<i>V. grandiflora</i> and <i>V. nitens</i>
Other genera	11	<i>Aulax cancellata</i> , <i>Boronia megastigma</i> , <i>Brunia albiflora</i> , <i>Carpobrotus quadrifidus</i> , <i>Chamaelaucium uncinatum</i> , <i>Coleonema pulchellum</i> , <i>Conicosa pugioniformis</i> , <i>Darwinia diosmoides</i> , <i>Dryandra proteoides</i> , <i>Pelargonium radens</i> , and <i>Scholtzia oligandra</i>

New protea cultivars for Hawai'i growers (all photos by P. Shingaki.)





Kula Sunrise



Makaleka



Shannon



Toni Torres



Makaleka



Rhody Ann Umali







Lani



First Prize



Lani



Gloria Ann



First Prize



Gloria Ann



Amy Singleton



Tessie Amore



Royal Pride



Koana



Ruby Jewell



Susan Takahashi



Kevin Halbrendt



Larry



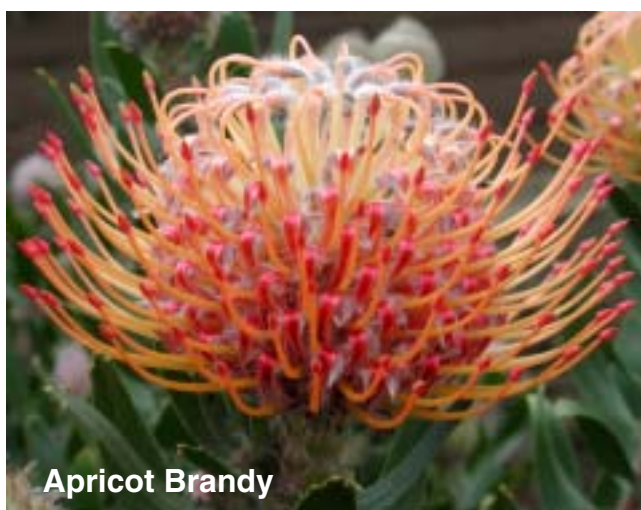
Leilani



Shirley Ishihara



Larry



Apricot Brandy



Mitsy



Jacqueline Halbrendt



Mitsy



Henny's Torch



Cinnamon



Sharon



Mandarin Doll



Sarah-Sue



Allan Kazutoshi Ikawa



Nikki Umali



Sapphire



Cliff's Delight





Hester



Goldfinger



Allene Chun



Emma Leilani



Bolero



Georgette



Yellow Blush



Kelsey



Ali'i



Glenda Hensley



Kheng



Lynne





Dale Uno



Vanzie



Ania



Puanani



Iyla P



Mikala



Frieda



June



Lillian's Peach



Maureen



Lynnet



Mary Lou



Lita



Nadine's Choice



Joanne



Nadine's Choice



Nora Leonhardt



Forever Amai





Natsue Oka



Gette



Lorita



Peppermint



Lorita



Patty Nakao





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