

- Cowie, R.H. and B.S. Holland. 2006. Dispersal is fundamental to biogeography and the evolution of biodiversity on oceanic islands. *J. Biogeogr.* 33: 193–198.
- Cronk, Q.C.B., M. Kiehn, W.L. Wagner, and J.F. Smith. 2005. Evolution of *Cyrtandra* (Gesneriaceae) in the Pacific Ocean: The origin of a supertramp clade. *Amer. J. Bot.* 92: 1017–1024.
- Edgar, R.C. 2004. MUSCLE: multiple sequence alignment with high accuracy and high throughput. *Nucleic Acids Res.* 32: 1792–97.
- Emerson, B.C. 2002. Evolution on oceanic islands: molecular phylogenetic approaches to understanding pattern process. *Mol. Ecol.* 11: 951–966.
- Evenhuis, N.L. and D.L. Bickel. 2005. The NSF–Fiji terrestrial arthropod survey: overview. *Bishop Museum Occasional Papers* 82: 3–25.
- Fosberg, F.R. and M. Sachet. 1981. Polynesian plant studies 6–18. In *Smithsonian Contributions to Botany*, No. 47. Smithsonian Institution Press, Washington, DC.
- Gillett, G.W. 1967. The genus *Cyrtandra* in Fiji. *Contr. U.S. Natl. Herb.* 37: 107–159.
- . 1973. The Genus *Cyrtandra* (Gesneriaceae) in the South Pacific. In *University of California Publications in Botany*, Volume 66. University of California Press, Berkeley.
- . 1974. New Records for *Cyrtandra* (Gesneriaceae) in the New Hebrides. *Kew Bulletin* 29: 699–709.
- . 1975. *Cyrtandra* (Gesneriaceae) in the Bismarck Archipelago and Solomon Islands. *Kew Bulletin* 30: 371–412.
- Gouy M, S. Guindon, and O. Gascuel. 2010. SeaView version 4: a multiplatform graphical user interface for sequence alignment and phylogenetic tree building. *Mol. Biol. Evol.* 27: 221–224.
- Grant, P.R. 1998. Patterns in islands and microevolution. Pp. 1–17 in P.R. Grant ed., *Evolution on Islands*. Oxford University Press, Oxford.
- Hemsley, H.B. 1895. CCCCXXI. – Flora of the Solomon Islands. *Bull. Misc. Inform. Kew*: 132–139.
- Hillebrand, W. 1888. *Flora of the Hawaiian Islands: a description of their phanerogams and vascular cryptogams*. Lubrecht & Cramer, Monticello, N.Y. (Facsimile ed., 1981).
- Hillis, D.M. and J.J. Bull. 1993. An empirical test of bootstrapping as a method for assessing confidence in phylogenetic analysis. *Syst. Biol.* 42: 182–192.
- Hilliard, O.M., B.L. Burtt, and M.H. Bokhari. 2003. *Pleuroschisma*, a new section of *Cyrtandra* (Gesneriaceae) from Borneo. *Gard. Bull. Sing.* 55: 35–60.
- Hopper, S.D. 2000. How well do phylogenetic studies inform the conservation of Australian plants? *Aust. J. Bot.* 48: 321–328.
- Huelsenbeck, J.P. and F. Ronquist. 2001. MrBayes: Bayesian inference of phylogeny. *Bioinformatics* 17: 754–755.
- Kiehn, M. 2001. South Pacific and Hawaiian *Cyrtandra*: molecular and micromorphological studies. *Malayan Nat. J.* 55: 21–27.
- Krupnick, G.A. and W.J. Kress. 2005. *Plant conservation: a natural history approach*. University of Chicago Press, Chicago.
- Minin, V., Z. Abdo, P. Joyce, and J. Sullivan. 2003. Performance based selection of likelihood models for phylogeny estimation. *Syst. Biol.* 52: 674–683.
- Möller, M.J. and J.L. Clark. 2013. The state of molecular phylogenetic work in the family Gesneriaceae: a review. Pp. 95–125 in: J.R. Clark, ed. *Proceedings of the World Gesneriad Research Conference 2010*. Selbyana 31: 65–253.
- Muller-Dombois, D. and F.R. Fosberg. 1998. *Vegetation of the tropical Pacific islands*. Pp. 1–733 in M.M. Caldwell et al, eds., *Ecological Studies Vol. 132*. Springer, New York.
- Pence, V.C. 2002. In vitro collecting – tool for wild and endangered species conservation. Pp. 26–29 in V.C. Pence, J.A. Sandoval, V.M. Villalobos, and F. Engelmann, eds. *In Vitro Collecting Techniques for Germplasm Conservation*. IPGRI Technical Bulletin No. 7. International Plant Genetic Resources Institute, Rome, Italy.
- Pillion, Y., J.B. Johansen, T. Sakishima, E.H. Roalson, D.K. Price, and E.A. Stacy. 2013. Gene discordance in phylogenomics of recent plant radiations, an example from Hawaiian *Cyrtandra* (Gesneriaceae). *Mol. Phylo. Evol.* 69: 293–298.
- Samuel, R., W. Pinsker, and M. Kiehn. 1997. Phylogeny of some species of *Cyrtandra* (Gesneriaceae) inferred from *atpB/rbcL* cpDNA intergene region. *Bot. Act.* 110: 503–510.
- Schlag-Edler, B. and M. Kiehn. 2001. Palynology of South Pacific *Cyrtandra* (Gesneriaceae) with notes on some Hawaiian taxa. *Grana* 40: 192–196.
- Skog, L.E. and J.K. Boggan. 2007. *World Checklist of Gesneriaceae*. Washington, DC: Dept. of Botany, Smithsonian Institution. <http://botany.si.edu/Gesneriaceae/Checklist>
- Smith, A.C. 1991. *Flora Vitiensis Nova: A new flora of Fiji*, Vol. 5. National Tropical Botanical Garden, Kauai, Hawaii.
- Swofford, D.L. 2002. PAUP*: Phylogenetic analysis using parsimony, (*and other methods) version 4.0b10. Sinauer Associates, Sunderland, Mass.
- Takhtajan, A.L. 1969. Flowering plants: origin and dispersal. Oliver and Boyd, Edinburgh.
- . 1986. Floristic regions of the world. (A. Cronquist, ed.). University of California Press, Berkeley.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Gesneriaceae, *Cyrtandra*. Pp. 735–781 in S.W. Mill, ed. *Manual of the Flowering Plants of Hawai'i*. Volume 1. University of Hawaii Press, Honolulu.
- . 1999. *Manual of the flowering plants of Hawaii, USA*. Revised edition. Bishop Museum, Honolulu.
- Wagner, W.L., A.J. Wagner, and D.L. Lorence. Revision of *Cyrtandra* (Gesneriaceae) in the Marquesas Islands. *Phytokeys: accepted*.
- Wagner, W.L., J.R. Clark, and E.H. Roalson. A synopsis of Hawaiian *Cyrtandra* (Gesneriaceae). *In prep*.
- Weber, A. 2004. Gesneriaceae. Pp. 63–158 in K. Kubitzki ed. *The families of flowering plants*. Vol. 7. Dicotyledons. Lamiales.
- Weber, A., J.L. Clark, and M. Möller. 2013. A new formal classification of Gesneriaceae. Pp. 68–94 in: J.R. Clark, ed. *Proceedings of the World Gesneriad Research Conference 2010*. Selbyana 31: 65–253.
- Wiehler, H. 1983. A synopsis of Neotropical Gesneriaceae. *Selbyana* 6: 1–219.

TRANSFER OF *CYRTANDRA* (GESNERIACEAE) VOUCHERS FROM SEL TO PTBG

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ABSTRACT. Thirty seven voucher specimens of the Paleotropical genus *Cyrtandra*, documented in two molecular-based studies by John R. Clark, have been transferred from Selby Gardens' herbarium (SEL) to the National Tropical Botanical Garden herbarium (PTBG) to make these collections more accessible to researchers of the Pacific Ocean islands.

Key words: *Cyrtandra*, Gesneriaceae, herbarium specimen, Pacific floras

Voucher specimens of *Cyrtandra* (Gesneriaceae) cited in two publications (Clark et al. 2008, 2009) were originally deposited at the Marie Selby Botanical Gardens herbarium (SEL). However, we believe the collections would be better located at a herbarium specializing in Pacific island floras where researchers interested in the genus are more likely to visit or request loans for study, specifically, the National Tropical Botanical Garden (PTBG). PTBG, in Kauai, Hawaii, has a collection of approximately 70,000 specimens with a focus on Pacific island floras. With over 1100 existing specimens of *Cyrtandra* (T. Flynn pers. comm.) PTBG represents an appropriate repository for the Clark vouchers. TABLE 1 (see next page) summarizes all 37 of these transfers.

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LITERATURE CITED

- Clark, J.R., R.H. Ree, M.E. Alfaro, M.G. King, W.L. Wagner, and E.H. Roalson. 2008. A comparative study in ancestral range reconstruction methods: retracing the uncertain histories of insular lineages. *Syst. Biol.* 57: 693–707.
- Clark, J.R., E.H. Roalson, and W.L. Wagner. 2009. Patterns of diversification and ancestral range reconstruction in the Southeast Asian-Pacific angiosperm lineage *Cyrtandra* (Gesneriaceae). *Mole. Phylo. Evol.* 53: 982–994.

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TABLE 1. List of 37 voucher specimens transferred from SEL to PTBG, organized alphabetically by species. ID numbers are J.R. Clark's DNA extraction numbers and are those referenced in the two papers. GenBank accession numbers are included for all vouchers for each of the three genetic regions analyzed. C. = *Cyrtandra*; ITS = internal transcribed spacer regions 1 and 2, including the 5.8S subunit; ETS = external transcribed spacer region; *psbA-trnH* = chloroplast sequence data.

Species of <i>Cyrtandra</i>	ID no.	Collector and no.	Origin	ITS	ETS	<i>psbA-trnH</i>	Publication(s) of Clark et al.
<i>C. anthropogonum</i> Seem. ex A.Gray	C0114	Clark 688	Fiji, Viti Levu	EU919987	EU919926	EU920042	2008, 2009
<i>C. aurantiicarpa</i> G.W.Gillett	C0076	Clark 655	Samoa, Savai'i	EU919971	EU919910	EU920030	2008, 2009
<i>C. aurantiicarpa</i> G.W.Gillett	C0075	Clark 655	Samoa, Sava'i	EU919971	EU919910	EU920030	2008
<i>C. calpidicarpa</i> (Rock) H.St.John & Storey	C0063	Clark 584	Hawai'i, O'ahu	GQ475168	GQ475080	GQ475123	2009
<i>C. calpidicarpa</i> (Rock) H.St.John & Storey	C0040	Clark 571	Hawai'i, O'ahu	EU919951	EU919890	EU920010	2008
<i>C. cf. occulta</i> A.C.Smith	C0119	Clark 702	Fiji, Viti Levu	EU919990	EU919929	GQ475138	2008, 2009
<i>C. cf. pogonantha</i> A.Gray	C0067	Clark 645	Samoa, U'polu	GQ475170	GQ475082	GQ475126	2009
<i>C. cf. richii</i> A.Gray	C0068	Clark 646	Samoa, U'polu	EU919967	EU919906	EU920026	2008, 2009
<i>C. compressa</i> C.B.Clarke	C0074	Clark 652	Samoa, Sava'i	EU919970	EU919909	EU920029	2008, 2009
<i>C. compressa</i> C.B.Clarke	C0075	Clark 653	Samoa, Savai'i	GQ475172	GQ475085	GQ475128	2009
<i>C. cordifolia</i> Gaudich.	C0048	Clark 579	Hawai'i, O'ahu	EU919955	EU919894	EU920014	2008, 2009
<i>C. grandiflora</i> Gaudich.	C0046	Clark 577	Hawai'i, O'ahu	EU919954	EU920013	EU920013	2008, 2009
<i>C. grayana</i> Hillebr.	C0103	Clark 666	Hawai'i, Maui	EU919982	EU919921	EU920039	2008, 2009
<i>C. grayi</i> C.B.Clarke	C0105	Clark 676	Hawai'i, Maui	EU919984	EU919923	EU920040	2008, 2009
<i>C. hawaiiensis</i> C.B.Clarke	C0038	Clark 569	Hawai'i, O'ahu	EU919949	EU919888	EU920008	2008
<i>C. hawaiiensis</i> C.B.Clarke	C0101	Clark 661	Hawai'i, Maui	GQ475175	GQ475088	GQ475133	2009
<i>C. kauaiensis</i> Wawra	C0026	Clark 556A	Hawai'i, Kauai'i	EU919940	EU919879	EU919999	2008, 2009
<i>C. kauaiensis</i> Wawra	C0028	Clark 558	Hawai'i, Kauai'i	GQ475167	GQ475079	GQ475121	2009
<i>C. kaulanaha</i> H.St.John & Storey	C0041	Clark 572	Hawai'i, O'ahu	EU919952	EU919891	EU920011	2008
<i>C. kealii</i> Wawra	C0035	Clark 566	Hawai'i, Kauai'i	EU919947	EU919886	EU920006	2008
<i>C. laxiflora</i> H.Mann	C0037	Clark 568	Hawai'i, O'ahu	EU919948	EU919887	EU920007	2008
<i>C. leucantha</i> A.C.Smith	C0116	Clark 693	Fiji, Viti Levu	EU919988	EU919927	GQ475136	2008, 2009
<i>C. longifolia</i> (Wawra) Hillebr. ex C.B.Clarke	C0023	Clark 551	Hawai'i, Kauai'i	EU919998	EU919878	EU919988	2008, 2009
<i>C. milnei</i> Seem. ex A.Gray	C0113	Clark 687	Fiji, Viti Levu	EU919986	EU919925	GQ475135	2008, 2009
<i>C. munroi</i> C.N.Forbes	C0104	Clark 675	Hawai'i, Maui	EU919983	EU919922	GQ475134	2008, 2009
<i>C. occulta</i> A.C.Smith	C0117	Clark 694	Fiji, Viti Levu	EU919989	EU919928	GQ475137	2008, 2009
<i>C. pogonantha</i> A.Gray	C0071	Clark 649	Samoa, U'polu	EU919968	EU919907	EU920027	2008
<i>C. pogonantha</i> A.Gray	C0066	Clark 644	Samoa, U'polu	GQ475169	GQ475081	GQ475125	2009
<i>C. pogonantha</i> A.Gray	C0081	Clark 660	Samoa, U'polu	GQ475173	GQ475086	GQ475129	2009
<i>C. propinqua</i> C.Forbes	C0039	Clark 570	Hawai'i, O'ahu	EU919950	EU919889	EU920009	2008, 2009
<i>C. richii</i> A.Gray	C0072	Clark 650	Samoa, Sava'i	EU919969	EU919908	EU920028	2008, 2009
<i>C. richii</i> A.Gray	C0073	Clark 651	Samoa, Savai'i	GQ475171	GQ475084	GQ475127	2009
<i>C. sandwicensis</i> (H.Lév.) H.St.John & Storey	C0045	Clark 576	Hawai'i, O'ahu	EU919953	EU919892	EU920012	2008, 2009
<i>C. sp.</i>	C0050	Clark 581	Hawai'i, O'ahu	EU919956	EU919895	EU920015	2008
<i>C. spathulata</i> H.St.John	C0102	Clark 664	Hawai'i, Maui	EU919981	EU919920	EU920038	2008, 2009
<i>C. waihihaensis</i> H.Lév.	C0021	Clark 549	Hawai'i, Kauai'i	EU919937	EU919876	EU919996	2008, 2009
<i>C. wawrae</i> C.B.Clarke	C0022	Clark 550	Hawai'i, Kauai'i	EU919938	EU919877	EU919997	2008, 2009

AN ANNOTATED SPECIES LIST FOR THE GESNERIACEAE OF CUBA

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ABSTRACT. This checklist includes all type locality information, nomenclature (including synonyms), habit, regional and political distribution for all of the Gesneriaceae reported from Cuba. Additional details are provided for species circumscriptions that differ from previous studies. Discussions are accompanied by figures outlining pertinent details for new circumscriptions. This checklist recognizes 38 species of Gesneriaceae that include the following genera: *Bellonia* (1 species), *Besleria* (1 species), *Columnea* (2 species), *Gesneria* (22 species), *Gloxinia* (1 species), *Pheidonocarpa* (1 species), *Phinaea* (1 species) and *Rhytidophyllum* (9 species). There are 30 endemics and 1 introduced species of Gesneriaceae in Cuba. Lectotypifications are provided for seven taxa. A look-up table is provided to facilitate referencing currently recognized species circumscriptions with previous treatments.

Key words: *Bellonia*, *Besleria*, *Columnea*, Cuba, *Gesneria*, Gesneriaceae, *Pheidonocarpa*, *Phinaea*, *Rhytidophyllum*, taxonomy

INTRODUCTION

A revised circumscription of the Gesneriaceae species in Cuba is provided based on recent field expeditions, visits to herbaria, and a thorough review of original literature. Recent expeditions have resulted in an improved understanding of the taxonomy and geographic distribution of the Gesneriaceae in Cuba. The results presented here will facilitate the preparation of a treatment of the Gesneriaceae for the Flora of Cuba.

Cuba is recognized as one of the significant biodiversity hotspots in the New World owing to its biological species richness and exceptionally high percentage of endemics (Santiago-Valentín & Olmstead 2004; Acevedo-Rodríguez & Strong 2008, 2012). The Caribbean region is the third most important biodiversity hotspot on the planet (Myers et al. 2000, Mittermeier et al. 2004). Cuba is the largest island in the Caribbean and represents the richest flora with the highest proportion of endemics for the region. Of the

more than 6500 species of plants in Cuba, over half (>3300) are endemic, with 65 endemic genera (Santiago-Valentín & Olmstead 2004; Acevedo-Rodríguez & Strong 2008, 2012). After Cuba, the next largest Caribbean island is Hispaniola with more than 5400 species of plants, of which about 2200 are endemic and with 31 endemic genera (Acevedo-Rodríguez & Strong 2008, 2012).

The remarkably high percentage of endemic plants in Cuba has been attributed to the complex geological history of the island relative to neighboring islands (Draper et al. 1994). Similarly, within Cuba, the highest concentration of endemic plants is located in the eastern region as a result of extreme variation in climate, geologic history, and diversity of habitats. For example, it is possible to visit the region with the highest precipitation (Baracoa) and the driest region (Guantánamo) in an afternoon.

As recently discussed by Santiago-Valentín and Olmstead (2004), knowledge of Caribbean and