



Four new species of *Lockhartia* (Orchidaceae, Oncidiinae)

MARIO A. BLANCO^{1,2}

¹ Escuela de Biología, Universidad de Costa Rica, Ciudad Universitaria Rodrigo Facio, Apdo. 11501–2060, San José, Costa Rica

² Research Associate, Jardín Botánico Lankester, Universidad de Costa Rica, Apdo. 1031–7050 Cartago, Costa Rica;

email: mario.blancocoto@ucr.ac.cr

Abstract

Four new species of *Lockhartia* are described and illustrated: *L. compacta* from Bolivia, *L. endresiana* from Costa Rica, *L. rugosifolia* from Ecuador and Peru, and *L. tenuiflora* from Ecuador and Colombia. Comments are given on their phenology, distribution, conservation status, and distinction from similar species.

Resumen

Se describen e ilustran cuatro nuevas especies de *Lockhartia*: *L. compacta* de Bolivia, *L. endresiana* de Costa Rica, *L. rugosifolia* de Ecuador y Perú, y *L. tenuiflora* de Ecuador y Colombia. Se brindan comentarios sobre su fenología, distribución, estado de conservación y distinción de especies semejantes.

Key words: Augustus Endrés, Bolivian-Tucuman Forest biome, Huancabamba Depression, Utcubamba River basin.

Introduction

Orchids of the genus *Lockhartia* Hooker (1827: t. 2715) are naturally distributed from central-western Mexico to southeastern Brazil. They are epiphytes that belong in the subtribe Oncidiinae, a group that contains ca. 1,600 exclusively Neotropical species (Chase 2009a, 2009b). Most species of *Lockhartia* have a very particular vegetative morphology, with elongate stems completely covered by imbricate, laterally flattened leaves. The shoots resemble hair braids, and for this reason species of *Lockhartia* are often called braided orchids. The morphologically diverse flowers have trichomal elaiophores, which produce oil as a putative reward for pollinators (Blanco *et al.* 2013).

Historically, the systematic position of this genus has been controversial (e.g., Chase 1986, Senghas 1995; summarized by Chase 2009a, 2009b, and Blanco *et al.* 2013), although phylogenetic studies based on molecular data have confirmed its relatively isolated position within subtribe Oncidiinae (Williams *et al.* 2001, Neubig *et al.* 2012).

William Jackson Hooker established the genus in 1827 when he described *Lockhartia elegans* (Hooker 1827: t. 2715). The generic name honors David Lockhart, first superintendent of the Royal Botanic Gardens in Trinidad, who sent plants of this species to Kew. Reichenbach (1855) published the first revision of the genus (reprinted in Reichenbach 1864), in which he recognized 10 species. Kränzlin (1923) published a second revision in which he recognized 29 species; he provided illustrations for most of them, although these are somewhat stylized and inaccurate, and thus not particularly useful for species-level identification (e.g., see Garay 1970). Senghas (1995) published a synopsis of *Lockhartia*, with only 19 species accepted.

All of these treatments are outdated; Senghas's (1995) synopsis misapplies several names, and ten new species were proposed between 1994 and 2012. Species circumscriptions in *Lockhartia* have thus remained confusing and inconsistent. To solve this situation, a taxonomic revision has been carried out as part of a monograph of the genus (to be published elsewhere). As a result, four species new to science have been detected and are described below.

for loaning or digitizing specimens cited here. Roberto Vásquez (LPB) and William Vargas (Universidad ICESI, Cali, Colombia) generously shared drawings and/or specimen images of their *Lockhartia* collections from Bolivia and Colombia, respectively. Mark W. Whitten (FLAS) generously allowed the use of his photos of *L. rugosifolia*. A Kew-Latin America Research Fellowship (KLARF), awarded by the Royal Botanic Gardens, Kew, allowed the author to visit several European herbaria. Suggestions by Cássio van den Berg (HUEFS) and an anonymous reviewer helped to improve the manuscript. This contribution represents part of the doctoral dissertation of the author, completed at the University of Florida, and partially funded by a Furniss Foundation Fellowship from the American Orchid Society.

References

- Bennett, D.E. & Christenson, E.A. (2001) *Lockhartia lepticaula*. *Icones Orchidacearum Peruvianum* 2001: plate 678.
- Blanco, M.A., Davies, K.L., Stpicyńska, M., Carlswald, B.S., Ionta, G.M. & Gerlach, G. (2013) Floral elaiophores in *Lockhartia* Hook. (Orchidaceae: Oncidiinae): their distribution, diversity and anatomy. *Annals of Botany* 112: 1775–1791. <http://dx.doi.org/10.1093/aob/mct232>
- Brako, L. & Zarucchi, J.L. (1993) Catalogue of the flowering plants and gymnosperms of Peru. *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: i–xl, 1–1286.
- Chase, M.W. (1986) A reappraisal of the oncidoid orchids. *Systematic Botany* 11: 477–491. <http://dx.doi.org/10.2307/2419085>
- Chase, M.W. (2009a) Subtribe Oncidiinae. In: Pridgeon, A., Cribb, P.J., Chase, M.W. & Rasmussen, F.N. (eds.) *Genera Orchidacearum*, 5: Epidendroideae (Part Two). Oxford University Press, Oxford, pp. 211–225.
- Chase, M.W. (2009b) *Lockhartia*. In: Pridgeon, A., Cribb, P.J., Chase, M.W. & Rasmussen, F.N. (eds.) *Genera Orchidacearum*, 5: Epidendroideae (Part Two). Oxford University Press, Oxford, pp. 287–290.
- Christenson, E.A. (1996) Notes on Neotropical Orchidaceae - II. *Lindleyana* 11: 12–26.
- Dodson, C.H. (2002) *Native Ecuadorian Orchids, 3: Lepanthopsis–Oliveriana*. Dodson Trust, Sarasota, 231 pp.
- Dodson, C.H. & Bennett, D.E. (1989) *Lockhartia parthenocomos* Rchb.f. *Icones Plantarum Tropicarum*, 2, 1989: plate 0089.
- Dodson, C.H. & Vásquez, R. (1989) *Lockhartia ludibunda* Rchb.f. *Icones Plantarum Tropicarum*, 2, 1989: plate 0346.
- Dressler, R.L. (2003) Orchidaceae. In: Hammel, B.E., Grayum, M.H., Herrera, C. & Zamora, N. (eds.) *Manual de Plantas de Costa Rica Volumen III: Monocotiledóneas (Orchidaceae–Zingiberaceae)*. *Monographs in Systematic Botany from the Missouri Botanical Garden* 93: 1–595. Available from: <http://www.botanicus.org/item/31753003149553> (accessed 12 March 2014)
- Escobar, R. (1998) *Lockhartia* Hook. In: Escobar, R. (ed.) *Native Colombian Orchids, 6: Supplementary Volume, Part 2. Leucohyle–Zootrophion*. Editorial Colina, Medellín, pp. 248–249.
- Garay, L.A. (1970) A reappraisal of the genus *Oncidium* Sw. *Taxon* 19: 443–467. <http://dx.doi.org/10.2307/1219085>
- Hooker, W.J. (1827) *Lockhartia elegans*. Beautiful *Lockhartia*. *Botanical Magazine* 54: t. 2715. Available from: <http://www.botanicus.org/page/488345> (accessed 12 March 2014)
- Jørgensen, P.M. & León-Yáñez, S. (1999) Catalogue of the vascular plants of Ecuador. *Monographs in Systematic Botany from the Missouri Botanical Garden* 75: i–viii, 1–1181.
- Kränzlin, F. (1923) IV.50 Orchidaceae–Monandreae–Pseudomonopodiales. *Das Pflanzenreich (Engler)* 83: 1–66.
- Lindley, J. (1839) Miscellaneous notices. *Edwards's Botanical Register* 25: misc. 1–95. Available from: <http://www.botanicus.org/item/31753002748389> (accessed 12 March 2014)
- Lindley, J. (1846) *Orchidaceae Lindenianae, Notes upon a collection of orchids formed in Colombia and Cuba*. Bradbury & Evans, London, viii + 28 pp. <http://dx.doi.org/10.5962/bhl.title.66687>
- Neubig, K.M., Whitten, W.M., Williams, N.H., Blanco, M.A., Endara, L., Burleigh, G., Silvera, K., Cushman, J.C. & Chase, M.W. (2012) Generic recircumscriptions of Oncidiinae (Orchidaceae: Cymbidieae) based on maximum likelihood analysis of combined DNA datasets. *Botanical Journal of the Linnean Society* 168: 117–146. <http://dx.doi.org/10.1111/j.1095-8339.2011.01194.x>
- Ossenbach, C., Pupulin, F. & Jenny, R. (2010) Orchid itineraries of Augustus R. Endrés in Central America: a biographic and geographic sketch. *Lankesteriana* 10: 19–47. Available from: <http://www.epidendra.org/LITERATURE/Ossenbach%20et%20al%202010/lit.html> (accessed 12 March 2014)
- Pupulin, F. (2002) Catálogo revisado y anotado de las Orchidaceae de Costa Rica. *Lankesteriana* 4: 1–88. Available from: http://www.epidendra.org/LITERATURE/Lit_Pupulin_2002b_Catalogo/lit.html (accessed 12 March 2014)
- Reichenbach, H.G. (1852a) Gartenorchideen. *Botanische Zeitung* 10: 633–640.
- Reichenbach, H.G. (1852b) Gartenorchideen III. *Botanische Zeitung* 10: 761–772.
- Reichenbach, H.G. (1855) *Xenia Orchidacea - Beiträge zur Kenntniss der Orchideen. Erster Band*. F.A. Brockhaus, Leipzig, 246 pp. + 100 pl. Available from: <http://botanicus.org/page/696253> (accessed 12 March 2014)

- Reichenbach, H.G. (1857) Gartenorchideen VI. *Botanische Zeitung* 15: 157–159.
- Reichenbach, H.G. (1864) *Lockhartia* Hook. *Annales Botanicæ Systematicæ* 6: 818–822.
- Reichenbach, H.G. (1865) Ueber einigen Garten-Orchideen. *Hamburger Garten- und Blumenzeitung* 21: 293–301.
- Reichenbach f., H.G. (1872) New garden plants. *The Gardeners' Chronicle and Agricultural Gazette* 1872: 666–667. Available from: <http://www.biodiversitylibrary.org/item/84374 - page/684/mode/1up> (accessed 12 March 2014)
- Reichenbach f., H.G. (1888) Orchideae describuntur. *Flora* 71: 149–156. Available from: <http://www.botanicus.org/item/31753002307376> (accessed 12 March 2014)
- de Retana, D.E. (1991) *Lockhartia* Hook. In: Escobar, R. (ed.) *Native Colombian Orchids, 2: Elleanthus–Masdevallia*. Editorial Colina, Medellín, pp. 248–249.
- Richard, L.C.M. (1792) Catalogus plantarum, ad societatem, ineunte anno 1792, e Cayenna missarum a domino Le Blond. *Actes de la Société d'Histoire Naturelle de Paris* 1: 105–114.
- Schlechter, R. (1919) Die Orchideenfloren der südamerikanischen Kordillerenstaaten I. Venezuela. *Repertorium Specierum Novarum Regni Vegetabilis, Beihefte* 6: i–iv, 1–100.
- Senghas, K. (1995) 70. Subtribus: Lockhartiinae. In: Brieger, F.G., Maatsch, R. & Senghas, K. (eds.) *Rudolf Schlechter Die Orchideen. 3rd Edition*. Blackwell Wissenschafts-Verlag, Berlin, pp. 1929–1937. <http://dx.doi.org/10.1002/fedr.4910970717>
- Vásquez, R. & Ibsch, P.L. (2000) *Orquídeas de Bolivia / Orchids of Bolivia, 1. Subtribu Pleurothallidinae*. Editorial F.A.N., Santa Cruz de la Sierra, Bolivia, xiii + 550 pp.
- Weigend, M. (2002) Observations on the biogeography of the Amotape-Huancabamba Zone in northern Peru. *The Botanical Review* 68: 38–54. [http://dx.doi.org/10.1663/0006-8101\(2002\)068\[0038:ootbot\]2.0.co;2](http://dx.doi.org/10.1663/0006-8101(2002)068[0038:ootbot]2.0.co;2)
- Weigend, M. (2004) Additional observations on the biogeography of the Amotape-Huancabamba zone in northern Peru. *Revista Peruana de Biología* 11: 127–134.
- Williams, N.H., Chase, M.W., Fulcher, T. & Whitten, W.M. (2001) Molecular systematics of the Oncidiinae based on evidence from four DNA sequence regions: expanded circumscriptions of *Cyrtorchilum*, *Erycina*, *Otoglossum*, and *Trichocentrum*, and a new genus (Orchidaceae). *Lindleyana* 16: 113–139.
- Zelenko, H. & Bermúdez, P. (2009) *Orchids - Species of Peru*. ZAI Publications, Quito, 407 pp.