

Generic Transfers in Malagasy Boraginales

James S. Miller & Marc Gottschling

Abstract

MILLER, J.S. & M. GOTTSCHLING (2017). Generic transfers in Malagasy Boraginales. *Candollea* 72: 329-332. In English, English and French abstracts. DOI: <http://dx.doi.org/10.15553/c2017v722a9>

Recent molecular data have demonstrated convincingly that the Old World genus *Hilsenbergia* Tausch ex Meisn. (*Ebretiaceae*) is nested within the New World genus *Bourreria* P. Browne. Thus, 13 new combinations are required to accommodate the endemic Malagasy species in *Bourreria*. Additional studies have demonstrated that *Heliotropium* sect. *Orthostachys* R. Br. (*Heliotropiaceae*) is not closely related to the rest of the genus and should be segregated as *Euploca* Nutt. Three species that occur in Madagascar fall into this group, including one endemic that requires a new combination.

Résumé

MILLER, J.S. & M. GOTTSCHLING (2017). Transferts de genre dans les Boraginales malgaches. *Candollea* 72: 329-332. En anglais, résumé anglais et français. DOI: <http://dx.doi.org/10.15553/c2017v722a9>

Des études moléculaires récentes ont démontré de façon convaincante que le genre *Hilsenbergia* Tausch ex Meisn. (*Ebretiaceae*) de l'Ancien Monde est inclus dans le genre *Bourreria* P. Browne du Nouveau Monde. En conséquence, 13 nouvelles combinaisons sont nécessaires pour y transférer les espèces malgaches. D'autres travaux ont démontré que la sect. *Orthostachys* R. Br. du genre *Heliotropium* (*Heliotropiaceae*) n'est pas étroitement apparentée au reste du genre et devrait être séparée au niveau générique en tant que *Euploca* Nutt. Trois espèces malgaches font partie de ce groupe, dont une endémique qui nécessite une nouvelle combinaison.

Keywords

BORAGINALES – *Ebretiaceae* – *Heliotropiaceae* – *Bourreria* – *Euploca* – *Heliotropium* – *Hilsenbergia* –
New combination – Madagascar

Addresses of the authors:

JSM: Missouri Botanical Garden, P.O. Box 299, St. Louis, MO, 63166, U.S.A. E-mail: james.miller@mobot.org

MG: Department Biologie, Systematische Botanik und Mykologie, GeoBio-Center, Ludwig-Maximilians-Universität München, Menzinger Str. 67, 80638 Munich, Germany.

First published online on July 20, 2017.

Introduction

THULIN (1987) recognized five species from eastern Africa and the Mascarenes as differing from other African species of *Ehretia* P. Browne (*Ehretiaceae*) in having valvate calyx lobes and pyrenes (i.e., fruit parts) with overlapping lamellae, features shared with the circum-Caribbean genus *Bourreria* P. Browne. He described one of the five species as new to science and created new nomenclatural combinations for the other four in *Bourreria*. MILLER (2003) described an additional 13 species of Ehretiaceae, all endemic to Madagascar, and resurrected the genus *Hilsenbergia* Tausch. ex Meisen. to accommodate them, based on their much smaller urceolate corollas (New World *Bourreria* species have rotate to salveriform corollas), their distinct geographic distribution, and ITS sequence data for a very limited subset of the species (GOTTSCHLING & HILGER, 2001).

More recent studies of sequence data from both nuclear and chloroplast genes and based on a much larger sample of species (GOTTSCHLING et al., 2014) indicate that *Hilsenbergia* species are nested within *Bourreria* rather than being its sister group. This confirms the assumption of close relationship proposed by THULIN (1987) but is in conflict with their segregation from the New World species. *Bourreria*, also in this broader and morphologically more heterogeneous circumscription, remains distinct – the combination of the valvate calyx aestivation, the extensive disc in the flower and an additional sterile chamber in each pyrene is not found in any other member of the *Ehretiaceae* (GOTTSCHLING, 2004). In preparing a treatment of Boraginales (in the sense of LUEBERT et al., 2016) for the *Flore de Madagascar et des Comores*, it is necessary to make new nomenclatural combinations for the endemic species.

Recent studies of members of the *Heliotropiaceae* (HILGER & DIANE, 2003) show that one of the major clades of *Heliotropium* is not related to the core group of species and is sister group to two other genera of the family. The authors conclude that it should be recognized as a distinct genus, *Euploca*. Three species found in Madagascar fall within the clade, including one endemic species which requires a new nomenclatural combination.

Transfers to Bourreria

Bourreria angustifolia (J.S. Mill.) J.S. Mill. & Gottschling, **comb. nov.**

= *Hilsenbergia angustifolia* J.S. Mill. in *Adansonia* ser 3, 25: 158. 2003.

Typus : MADAGASCAR. **Prov. Toliara :** près d'Andrenialamahitsy, au N du Lac Ihotry, [21°50'S 43°40'E], 27.V.1965, *Service Forestier 24122* (holo- : P [P00417673]!; iso- : G, K, MO-5582595!, P [P00417674]!, TEF [TEF000088]!).

Bourreria apetala (J.S. Mill.) J.S. Mill. & Gottschling, **comb. nov.**

= *Hilsenbergia apetala* J.S. Mill. in *Adansonia* ser 3, 25: 160. 2003.

Typus : MADAGASCAR. **Prov. Mahajanga :** Ambongo, au S d'Antsakomanera, baie de Marambitsy, 16°30'S 44°40'E, 20.XI.1965, *Service Forestier 24232* (holo- : P [P00417675]!; iso- : G, GH, K, MO-5582603!, P [P00298699]!, TEF [TEF000089]!, WAG [WAG0248972] image seen).

Bourreria bosseri (J.S. Mill.) J.S. Mill. & Gottschling, **comb. nov.**

= *Hilsenbergia bosseri* J.S. Mill. in *Adansonia* ser 3, 25: 162. 2003.

Typus : MADAGASCAR. **Prov. Toliara :** 95 km W of Fort Dauphin, on RN 13, at Andalitany, 200 m, 25°08'S 46°12'E, 29.III.1991, *Miller & Randrianasolo 6182* (holo- : MO-3801522!; iso- : G [G00341684] image seen, K, MO-3801523!, P, TAN [TAN000457]!, WAG [WAG0304635] image seen).

Bourreria capuronii (J.S. Mill.) J.S. Mill. & Gottschling, **comb. nov.**

= *Hilsenbergia capuronii* J.S. Mill. in *Adansonia* ser 3, 25: 164. 2003.

Typus : MADAGASCAR. **Prov. Toliara :** forêt d'Analalava, c. 14 km N of RN 7, W of Isalo NP, E of the Malio River, 670 m, 22°35'26"S 45°08'16"E, 27.I.2003, *Miller et al. 10737* (holo- : MO-04876342!; iso- : CAS [CAS1164451] image seen, G [G00386540] image seen, K [001081859] image seen, P, TAN).

Bourreria comorensis (J.S. Mill.) J.S. Mill. & Gottschling, **comb. nov.**

= *Hilsenbergia comorensis* J.S. Mill. in *Adansonia* 25: 167. 2003.

Typus : COMORES. **Mayotte :** Hachiroungour, 450 m, 16.IV.1996, *Pascal 504* (holo- : P [P00144492]!; iso- : K).

***Bourreria croatii* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nova.**

= *Hilsenbergia croatii* J.S. Mill. in *Adansonia* ser 3, 25: 168. 2003.

Typus : MADAGASCAR. Prov. Toliara : Tsivonoakely, 20-30 km N of Tuléar on the road to Morombe, 5-10 m, 23°12'S 43°37'E, 11.XI.1989, *Miller & Keating 4514* (holo- : MO-3765989)!; iso- : G [G00341685] image seen, P, TAN).

***Bourreria darcyana* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia darcyana* J.S. Mill. in *Adansonia* ser 3, 25: 170. 2003.

Typus : MADAGASCAR. Prov. Toliara : env. d'Ampandrandava, entre Bekily et Tsivory, 1000-1100 m, [24°05'S 45°42'E], s.d., *Seyrig 5404* (holo- : P [P00298612]!; iso- : MO-5582605!).

***Bourreria labatii* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia labatii* J.S. Mill. in *Adansonia* ser 3, 25: 173. 2003.

Typus : MADAGASCAR. Prov. Antsiranana : collines et plateau calcaires de l'Ankarana, 300 m, [12°54'S 49°08'E], XII.1937-I.1938, *Humbert 18924* (holo- : P [P00853280]!; iso- : G [G00341681], K, MO-5613311!, P [P00417677]!, TEF, WAG [WAG0248971] image seen).

***Bourreria leslieae* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia leslieae* J.S. Mill. in *Adansonia* ser. 3, 25: 174. 2003.

Typus : MADAGASCAR. Prov. Toliara : 14 km SE of Tuléar on the road to Sakaraha, 100 m, 23°21'S 43°42'E, 26.XII.1988, *Miller & Miller 3787* (holo- : MO-3667627!; iso- : K, MO-3667628!, P [P00417678]!; TAN [TAN000458] image seen, WAG [WAG0247494] image seen).

***Bourreria lowryana* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia lowryana* J.S. Mill. in *Adansonia* ser 3, 25: 177. 2003.

Typus : MADAGASCAR. Prov. Fianarantsoa : dans la vallée de la Manarahaka, à l'E d'Ihosal, [22°19'S 46°16'E], 19.XII.1968, *Service Forestier 28492* (holo- : P [P00417679]!; iso- : G [G00014853] image seen, K [K000418833] image seen, MO-5613318!, P [P00417680]!, TEF).

***Bourreria moratiana* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia moratiana* J.S. Mill. in *Adansonia* ser 3, 25: 182. 2003.

Typus : MADAGASCAR. Prov. Antsiranana : forêt d'Orangéa, à l'E de Diégo-Suarez, [12°15'S 49°24'E], 25.I.1966, *Service Forestier 24435* (holo- : P [P00446404]!; iso- : MO-5613322]!, P [P00417681]!, TEF [TEF000087]).

***Bourreria randrianasoloana* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia randrianasoloana* J.S. Mill. in *Adansonia* ser 3, 25: 184. 2003.

Typus : MADAGASCAR. Prov. Toliara : Morondava, forêt d'Antanambao, [20°17'S 44°17'E], 8.II.1956, *Service Forestier 15554* (holo- : P [P00298610]!; iso- : K [K000975969], MO-6513325!, P [P00298611]!, TEF [TEF000179] image seen).

***Bourreria schatziana* (J.S. Mill.) J.S. Mill. & Gottschling, comb. nov.**

= *Hilsenbergia schatziana* J.S. Mill. in *Adansonia* ser 3, 25: 185. 2003.

Typus : Madagascar. Prov. Antsiranana : massif de la Montagne d'Ambre, bassin de la rivière des Makis, 600 m, [12°37'S 49°09'E], 13.X.1954, *Service Forestier 11302* (holo- : P [P00298609]!; iso- : MO-5613330!; P [P00446405]!, TEF).

Transfer to *Euploca*

Euploca perrieri (J.S. Mill.) J.S. Mill., **comb. nov.**

= *Heliotropium perrieri* J.S. Mill. in *Adansonia* ser. 3, 25 : 116. 2003.

Typus : MADAGASCAR. **Prov. Mahajanga** : plaine de Marovoay, I.1910, *Perrier de la Bathie 4420* (holo- : P [P00608272]!; iso- : MO-5727638!, P [P00608273]!).

References

- GOTTSCHLING, M. (2004). Floral ontogeny in *Bourreria* (Ehretiaceae, Boraginales). *Flora* 199 : 409-423.
- GOTTSCHLING, M. & H. HILGER (2001). Phylogenetic analysis and character evolution of *Ehretia* and *Bourreria* (Ehretiaceae, Boraginales) and their allies based on ITS1 sequences. *Bot. Jahrb. Syst.* 123 : 249-268.
- GOTTSCHLING, M, F. LUEBERT, H.H. HILGER & J.S. MILLER (2014). Molecular delimitations in the Ehretiaceae (Boraginales). *Mol. Phylogenet. Evol.* 72 : 1-6.
- HILGER, H. & N. DIANE (2003). A systematic analysis of *Heliotropiaceae* (Boraginales) based on trnL and ITS1 sequence data. *Bot. Jahrb. Syst.* 125 : 19-51.
- LEUBERT, F., L. CECCHI, M.W. FROLICH, M. GOTTSCHLING, C.M. GUILLIAMS, K.E. HASENSTAB-LEHMAN, H.H. HILGER, J.S. MILLER, M. MITTELBACH, M. NAZAIRE, M. NEPI, D. NOCENTINI, D. OBER, R.G. OLMSTEAD, F. SELVI, M.G. SIMPSON, K. SUTORY, B. VALDES, G.K. WALDEN & M. WEIGEND (2016). Familial classification of the Boraginales. *Taxon* 65 : 502-522.
- MILLER, J.S. (2003a). A new species of *Heliotropium* L. (Boraginaceae) from Madagascar. *Adansonia* ser. 3, 25 : 115-118.
- MILLER, J.S. (2003b). Classification of Boraginaceae subfam. Ehretioideae : Resurrection of the genus *Hilsenbergia* Tausch ex Meisn. *Adansonia* ser. 3, 25 : 151-189.
- THULIN, M. (1987). *Bourreria* (Boraginaceae) in Tropical Africa. *Nord. J. Bot.* 7 : 413-417.