

## TYPIIFICATION OF NAMES IN *ERIOCAULON* IN THE *FLORA OF THAILAND* AND *FLORA OF* *CAMBODIA, LAOS AND VIETNAM*

P. SOULADETH<sup>1,2</sup>, A. PRAJAKSOOD<sup>3,4</sup>, J. A. N. PARNELL<sup>4</sup>  
& M. F. NEWMAN<sup>2</sup>

Lectotypes are designated for eight names in *Eriocaulon* in tropical Asia, namely *E. alatum*, *E. hamiltonianum*, *E. hookerianum*, *E. infirmum*, *E. lanigerum*, *E. nautiliforme*, *E. nigrum* and *E. ubonense*. Additional information on the lectotype of *Eriocaulon quinquangulare* is given.

*Keywords.* *Eriocaulon*, nomenclature, Southeast Asia, typification.

### INTRODUCTION

*Eriocaulon* L. is a large genus of c.400 species distributed widely in the tropics and subtropics (Stützel, 1998; Mabberley, 2008). It is the only genus of Eriocaulaceae that occurs in Southeast Asia. The plants are usually small, rosulate herbs that may be annual or perennial. Most are found in open areas that are permanently or seasonally damp.

Lecomte (1912) recognised 27 species of *Eriocaulon* from Cambodia, Laos and Vietnam. More recently, Zhang's monograph of the species of East Asia (1999) recognised 28 species and 1 variety of *Eriocaulon* in Thailand and 10 species in Cambodia, Laos and Vietnam. Neither of these works addressed questions of typification in detail. During preparation of revisions of *Eriocaulon* for the *Flora of Thailand* and the *Flora of Cambodia, Laos and Vietnam*, a number of names have been treated for which lectotypes are required.

Five names requiring typification were coined by Lecomte in *J. Bot. (Morot)*, sér. 2, 1 (1908a,b), namely, *Eriocaulon alatum* Lecomte (1908b, p. 104), *Eriocaulon lanigerum* Lecomte (1908b, p. 109), *Eriocaulon nautiliforme* Lecomte (1908a, p. 89), *Eriocaulon nigrum* Lecomte (1908b, p. 107) and *Eriocaulon ubonense* Lecomte (1908b, p. 109).

<sup>1</sup> Department of Forest Management, Faculty of Forestry Science, National University of Laos, PO Box 7322, Laos. E-mail: [p.souladeth@nuol.edu.la](mailto:p.souladeth@nuol.edu.la)

<sup>2</sup> Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, Scotland, UK.

<sup>3</sup> Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Thailand.

<sup>4</sup> Herbarium, Department of Botany and Trinity Centre for Biodiversity Research, School of Natural Sciences, Trinity College Dublin, Dublin 2, Ireland

Lecomte (1908a,b) published two papers on *Eriocaulon* in série 2, volume 1, of the *Journal de Botanique*.

The first paper, *Eriocaulacées de Chine et d'Indo-Chine de l'Herbier du Muséum*, appeared on pp. 86–94 in part 4 of the volume in April 1908, and the second, *Espèces nouvelles d'Eriocaulon de l'Indo-Chine*, came out on pp. 101–109 in part 5, dated May 1908. On p. 89 of the earlier paper, there is a key to species that includes the names *Eriocaulon nautiliforme*, *E. nigrum* and *E. ubonense*. Of these, only *Eriocaulon nautiliforme* can be considered to be validly published, because the characters given in the key clearly and uniquely separate this species from all others (Art. 32.1(d) in McNeill *et al.*, 2012). *Eriocaulon nigrum*, by contrast, comes out in two places in the key, each time in a group of species, and is not separated from these others. *Eriocaulon ubonense* likewise keys out with other species. This key also includes a reference to *Eriocaulon australe*, but in Lecomte's second paper of 1908, he described this taxon as *E. lanigerum* without mentioning that he had previously called it *E. australe*. Although *Eriocaulon nautiliforme* is validly published on p. 89, no type is cited.

Lecomte clearly intended to publish his new species in the second paper. The valid publication of *Eriocaulon nautiliforme* in the first paper is incidental although correct. Syntypes are cited in the second paper, on p. 106. The place of valid publication of *Eriocaulon alatum*, *E. lanigerum*, *E. nigrum* and *E. ubonense* is the second paper, where syntypes are cited.

Two other names, *Eriocaulon hamiltonianum* Mart. in Wall., Pl. Asiat. Rar. 3: 29 (1832) and *Eriocaulon infirmum* Steud., Syn. Pl. Glumac. 2: 271 (1855), involve Karl Friedrich Philipp von Martius and Nathaniel Wallich. Wallich distributed specimens collected by a number of workers on behalf of the East India Company; many collections are known from a number of duplicates that are now located in different herbaria. The 'top' set of the East India Company Herbarium was kept in London and is now at the Royal Botanic Gardens, Kew, where it is held as a separate collection (K-W).

Wallich's *Numerical List* (1829–1849) was originally designed to be cut up and used as specimen labels for the specimens he distributed (Wallich Catalogue Online, 2008–). It contains 9148 entries, usually 'species', and gives the collecting details of 20,897 'collections' (Wallich Catalogue Online, 2008–). It includes material collected by Francis Hamilton (= Francis Buchanan-Hamilton), although there are unlikely to be many duplicates of material collected by Buchanan-Hamilton, because Wallich noted in his *Numerical List* (1829–1849) that the Buchanan-Hamilton herbarium had very few duplicates. Buchanan-Hamilton's own herbarium was given to the University of Edinburgh on his death and is now at the Royal Botanic Garden Edinburgh (E).

Von Martius was likely responsible for deciding on the grouping of Eriocaulaceae collections in Wallich's *Numerical List* (1829–1849) into species and for providing their names, so he was sent the material before the collection was numbered. Therefore, relevant material from his personal herbarium is embossed 'HERBARIUM C. F. Ph. Martii' but does not include the Wallich *Numerical List* number. Martius's private

herbarium was sold on his death, and all his Wallich specimens went to Meise, Belgium (BR; H.-J. Esser, pers. comm. and M. F. Watson, pers. comm.).

Specimens were studied at the Natural History Museum, London (BM), including the Hermann collection; the Botanic Garden Meise (BR); the Royal Botanic Gardens, Kew (K), including the Wallich Herbarium (K-W); the Linnean Society (LINN); the Muséum National d'Histoire Naturelle, Paris (P); and the herbarium of the Institute of Tropical Biology, Ho Chi Minh City (VNM). Unless otherwise indicated, all specimens have been seen. Our methods follow the International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) (McNeill *et al.*, 2012).

#### LECTOTYPIIFICATION

*Eriocaulon alatum* Lecomte, J. Bot. (Morot) sér. 2, 1: 104 (1908b) & Fl. Indo-Chine 7(1): 17 (1912); Merr., Fl. Manila: 136 (1912); P.H. Hô, Ill. Fl. Vietnam 3(1): 480 (1993). – Type: COCHINCHINE. *L. Pierre s.n.* (lectotype, P [P01721442], designated here; isolectotypes K [K000960552]; P [P01721443, P01721444 (pro parte), P01721445]).

*Eriocaulon alatum* is a synonym of *Eriocaulon zollingerianum* Körn. (Royen, 1959), but no lectotype of *E. alatum* has been designated. Lecomte cited two collections in the protologue, namely *Thorel s.n.* from Laos (Bassac) and *Pierre s.n.* from southern Vietnam (Cochinchine). We have located specimens of *Pierre s.n.* at P and K, but we have found no specimens of *Thorel s.n.* from Bassac. The specimen of *Pierre s.n.* at P [P01721442] is the best preserved of the materials seen, is the most appropriate choice as lectotype and is therefore chosen as the lectotype. There are four isolectotypes, one at K [K000960552, which was cited as a syntype by Zhang (1999: 187)], and three at P [P01721443, P01721444 & P01721445]. *Pierre s.n.* [P01721444] is a mixed collection, the lower right-hand specimen being *Eriocaulon nepalense* Prescott ex Bong. and the rest of the material isolectotypes of *E. alatum*. We note that Zhang (1999: 187) also cited *Pierre s.n.* (G) as a syntype of *Eriocaulon alatum*. We have only seen images of two such sheets annotated by Zhang [G00191983 & G00191984] and cannot confirm that they are part of the same gathering as the lectotype.

*Eriocaulon hamiltonianum* Mart. in Wall., Pl. Asiat. Rar. 3: 29 (1832); Kunth, Enum. Pl. 3: 552 (1841); Steud., Syn. Pl. Glumac. 2: 270 (1855); Körn., Linnaea 27: 679 (1856); Ruhland in Engl., Pflanzenr. IV, 30 (Heft 13): 107 (1903); Z.X.Zhang in U.Kück, Diss. Bot. 313: 169–172 (1999); R.Ansari & N.P.Balakr., Fam. Eriocaul. India: 122 (2009). – Type: INDIA. Gualpara, *F. Hamilton, s.n.* (lectotype BR [BR000000918773], designated here; isolectotypes, E [E00027135]; K-W [K001122954]).

*Eriocaulon hamiltonianum* is based on a collection made by Buchanan-Hamilton from Gualpara [Goalpara], Assam, North India, appearing in Wallich's *Numerical List* under entry 6075 (p. 207). There are three potential lectotypes.

- Martius's private herbarium in BR includes one specimen of *Eriocaulon hamiltonianum*. This specimen bears a label that reads, '*Eriocaulon cinereum* Herb. Hamilt. e Gualpara' in Wallich's hand, and 'Hamiltonianum Mart.' in Martius's hand. The label is embossed 'HERBARIUM C.F.Ph. Martii' but does not include the Wallich *Numerical List* number 6075.
- Both Martius and Wallich recorded that the Buchanan-Hamilton collection was given to the East India Company Herbarium under Buchanan-Hamilton's field name *Eriocaulon cinereum*. There is also one specimen in K-W, number 6075, bearing Buchanan-Hamilton's label '*E. cinereum* Gualpara 4<sup>th</sup> Nov. 1808' at the top left, and '6075. *E. hamiltonianum* Mart. *E. cinereum* H. Ham. e Gualpara' at the top right.
- The other specimen in Buchanan-Hamilton's own herbarium at the Royal Botanic Garden Edinburgh (E [E00027135]) bears Buchanan-Hamilton's field ticket, which reads, '*Eriocaulon cinereum*, Gualpara, 4<sup>th</sup> Nov. 1808', and a printed herbarium label with Buchanan-Hamilton's Bengal Survey Catalogue number '348' and a transcription of the information from this Catalogue.

Because Martius did not specify which herbarium he was using, a lectotype must be selected from the three known elements that comprise the original material listed above. Martius would not have seen the specimen in Buchanan-Hamilton's herbarium, which cannot, therefore, be considered. As an 'Assignee', Martius may have been sent all the material of this collection in the East India Company by Wallich, and so he may have seen the material in K-W, returning most of it after identification and keeping one part for himself. Because the duplicate at BR is the only one bearing the name *Eriocaulon hamiltonianum* in Martius's hand, we choose this one.

***Eriocaulon hookerianum*** Stapf, Trans. Linn. Soc. London, Bot. 4: 243 (1894); Ruhland in Engl., Pflanzenr. IV, 30 (Heft 13): 83 (1903); Lecomte Fl. Indo-Chine 7(1): 10 (1912); P.H. Hô, Ill. Fl. Vietnam 3(1): 392 (1993); Beaman & R.S. Beaman (1998: 137); Z.X.Zhang in U.Kück, Diss. Bot. 313: 143 (1999); R.Ansari & N.P.Balacr., Fam. Eriocaul. India: 28 (2009). – Type: BORNEO. Mount Kinabalu, Temburungo, 7700 ft, C.D. Haviland 1204, excluding attached line drawing made from Haviland 1153, individual at top right of sheet (lectotype K [K000291319], designated here).

Otto Stapf worked on Dr Haviland's collections from Sabah soon after his appointment to the herbarium at Kew (Anonymous, 1933). Stapf, in the protologue (1894), cited five collections from two locations under *Eriocaulon hookerianum*: *Burbidge s.n.*, *Low s.n.* and *Haviland 1153* from Maripari Spur, Sabah, and *Haviland 1153 bis* and *1204* from Temburungo, Sabah. Beaman & Beaman (1998) listed these syntypes as follows, "Type: Kemburongoh, 2300 m, *Haviland 1153 bis* (syntype K n.v.), *1204* (syntype K n.v.); Marai Parai, *Low s.n.* (syntype fragment L!); Marai Parai Spur, 1500–1700 m, *Burbidge s.n.* (syntype K n.v.) 1500–1700 m, *Low s.n.* (syntype K n.v.; syntype fragment L!). The Kew specimens apparently have been misplaced." Beaman & Beaman (1998) use the modern place name spellings Kemburongoh and

Marai Parai, whereas the original labels give Temburungo and Maripari, or Marie Parie. The collector Low is written Lowe on the original labels, but according to van Steenis (1950), the collector was Hugh Low (1824–1905) and Lowe is a misspelling. We have seen all these collections at K except *Haviland 1153 bis*, but neither of the fragments at L cited by Beaman & Beaman (1998). Among the specimens now at K, which would have been seen by Stapf, *Haviland 1204* clearly shows the characters of the species and is better preserved than the remaining specimens. Therefore, we select it as the most appropriate choice of lectotype. All the plants attached to this sheet are of *Eriocaulon hookerianum*, but in order to avoid any further doubt, we select one individual as the lectotype.

Ansari & Balakrishnan (2009) treated *Eriocaulon hookerianum*, citing the type as follows: “Type: *Haviland 1153*, Maripari Spur, N. Borneo, 5000–5500 ft. (K)”. They also noted that, “*E. hookerianum* is originally a Bornean species. We could not examine the type.” There is no suggestion that Ansari & Balakrishnan intended to select a lectotype, nor did they use the phrase “designated here” or the equivalent, as demanded by the International Code of Nomenclature since 1 January 2001.

***Eriocaulon infirmum*** Steudel (1855: 271); P.Royen, Nova Guinea 10(1–2): 38 (1959).  
 ≡ *Eriocaulon gracile* Mart. in Wall., Pl. Asiat. Rar. 3: 29 (1832), non *Eriocaulon gracile* Bong., Mém. Acad. Imp. Sci. St.-Petersbourg, Sér. 6, Sci. Math. 1: 634 (1831).  
 – Type: BURMA. Mountains of Prome, Irawaddi, 1826 [1827], *N. Wallich s.n.*, Numerical List number 6079 (lectotype BR [BR0000008570581], designated here; isolectotype K [K000433038]; K-W [K001122959]).

Steudel (1855) published the name *Eriocaulon infirmum* for *Eriocaulon gracile* Martius (1832). Although Steudel did not say so explicitly, his name *Eriocaulon infirmum* is a replacement name, because *Eriocaulon gracile* Bongard (1831) had already been published, based on a different type. Bongard’s species is from Brazil and is now called *Syngonanthus gracilis* (Bong.) Ruhland.

Martius (1832: 29) cited “Wallich 1827” as the type, but no specimen marked with this year of collection has been found by us. Probably, a typographic error occurred in publication. Wallich’s *Numerical List* refers to this collection under entry 6079 and gives the year of collection as 1826. The specimen selected as the lectotype of *Eriocaulon gracile* is held at BR and bears a label, “Herbarium Martii” with the date 1828. Above this is a smaller label in Wallich’s hand with the collection date 1826. The reason for preferring the specimen at BR over the one at K-W is given under *Eriocaulon hamiltonianum* above.

***Eriocaulon lanigerum*** Lecomte, J. Bot. (Morot) sér. 2, 1: 109 (1908b); Fl. Indo-Chine 7(1): 8 (1912). – Type: COCHINCHINE. 1862, *C. Thorel 1493* (lectotype P [P00224173], designated here; isolectotype P [P00745124]).

Lecomte cited two collections in the protologue, namely *Thorel 1493* and *Pierre s.n.*, both from Cochinchine. Of these, only the first can be found at P. There are two duplicates, P00224173 & P00745124; of these, P00224173 is the better preserved and is

chosen as the lectotype. P00745124 is, therefore, an isolectotype. As mentioned above, *Eriocaulon lanigerum* was treated as *Eriocaulon australe* in Lecomte's first paper, but *E. lanigerum* is a very small annual plant with soft heads of pilose bracts whereas *E. australe* is a more robust perennial plant with hard heads of glabrous bracts. Note that *Eriocaulon australe* is now treated as *Eriocaulon sexangulare* var. *australe* (R.Br.) Praj. & J.Parn. (Prajaksod *et al.*, 2012).

***Eriocaulon nautiliforme*** Lecomte, J. Bot. (Morot) sér. 2, 1: 89 (1908a); J. Bot. (Morot) sér. 2, 1: 105–106 (1908b); Fl. Indo-Chine 7(1): 7 (1912). – Type: CAMBODIA. Kampot, 6 December 1903, C. Geoffray 215 (lectotype P [P00224175], designated here).

Lecomte (1908a) referred to three collections under this name: *Thorel 1593*, collected from “Bassac, dans le Me-Kong”; *Pierre s.n.*, from Vietnam, Chaudoc; and *Geoffray 215*, from fallow rice fields. We have located the following sheets of these collections:

- *Geoffray 215* [P00224175], collected at Kampot, Cambodia
- *Pierre s.n.* [P00224176], collected at Chaudoc, Vietnam
- *Thorel 1593* [B 10 0086998], collected at Bassac, Laos [image seen at the Virtual Herbarium Berolinense (Botanischer Garten und Botanisches Museum Berlin-Dahlem, no date)]
- *Thorel 1593* [K, without barcode number], collected at Bassac, Laos
- *Thorel 1593* [P00224177], collected at Bassac, Laos

Of the three type collections seen, *Geoffray 215* is the best preserved and is the most appropriate choice as lectotype.

*Pierre s.n.* [P00224176] is a syntype of *Eriocaulon nautiliforme*.

*Thorel 1593* (B) is a syntype of *Eriocaulon nautiliforme*. Zhang (1999) states, under the title *Untersuchte Belege*, “THOREL s.n. Laos: Bassac, 1893, **Syntypus B**”. This indicates that he knew of other type specimens but had not studied them and did not intend to select a lectotype. His use of the term *syntype* confirms this. A high-resolution image of this sheet may now be seen at the Virtual Herbarium Berolinense. Examination of this image reveals that it is a duplicate of *Thorel 1593*. The number 5 in late 19th century handwriting is very easy to mistake for an 8. We believe that Zhang misread the collection number, thinking that it might be a collection date.

There are four sheets of *Thorel 1593* at P. [P00224183] is a syntype of *Eriocaulon ubonense*. Lecomte clearly recognised that *Thorel 1593* was a mixed collection (see below). The sheets with barcodes P01729272 & P01729278 have been determined to *Eriocaulon odoratum* Dalzell (P. Souladeth, 19 May 2014) and have been annotated *Thorel 1593a*. The sheet with barcode P01729276 is a mixed collection and has been annotated *Thorel 1593b* (P. Souladeth, 19 May 2014). Most of the material on sheet P01729276 is *Eriocaulon siamense* Moldenke var. *macrophyllum* Praj. & J.Parn., whereas one scape is *E. zollingerianum* (P. Souladeth, 19 May 2014).

Finally, there is a duplicate of *Thorel 1593* at K, without a barcode number. This is a syntype of *Eriocaulon nautiliforme*.

***Eriocaulon nigrum*** Lecomte, J. Bot. (Morot) sér. 2, 1: 107 (1908b); Fl. Indo-Chine 7(1): 16 (1912). – Type: VIETNAM. Western Tonkin, “*In arenosis agris Minh Chinh*”, 16 December 1881, *H. Bon 1136* (lectotype P [P00224179], designated here; isolectotype P [P00745125]).

Two specimens collected from Vietnam were cited under this name: *Bon 1136* [P00224179 & P00745125], collected in 1881, and *Balansa 243* [P00224178 & K000959944], collected in 1885. *Bon 1136* clearly shows the characters of the species described in the protologue and is better preserved than *Balansa 243*. Therefore, *Bon 1136* is the more appropriate choice as the lectotype; *Balansa 243* remains a syntype.

***Eriocaulon ubonense*** Lecomte, J. Bot. (Morot) sér. 2, 1: 109 (1908b); Fl. Indo-Chine 7(1): 11 (1912); P.H. Hô, Ill. Fl. Vietnam 3(1): 398 (1993); Koyama, Philipp. J. Sci. 84(3): 373 (1955). – Type: CAMBODIA. October, 1874 *L. Pierre s.n.* (lectotype P [P00224182], designated here).

Lecomte (1908) cited two collections under this name: *Thorel 1593*, collected from Ubon Ratchathani, Thailand, and *Pierre s.n.*, collected from Cambodia. The following specimens have been seen only at P; no duplicates have been found.

- *Pierre s.n.* [P00224182]. The label states “[Cambodia 10/1874]” in a modern hand.
- *Thorel 1593* [P00224183]. The place name “Ubon” has been written in pencil on the label in an unknown hand.

*Pierre s.n.* is both better preserved than *Thorel 1593* and shows the characters of the species more clearly. Therefore, it is the more appropriate choice as lectotype. *Thorel 1593*, which was collected in Ubon Ratchathani, might have been a more satisfactory choice, because it would explain the epithet “*ubonense*”, but it is a mixed collection (see under *Eriocaulon nautiliforme* above), which makes it less suitable for lectotypification. *Thorel 1593* [P00224183] is a syntype of *Eriocaulon ubonense*.

ADDITIONAL NOTES ON THE LECTOTYPE OF *ERIOCAULON*  
*QUINQUANGULARE*

***Eriocaulon quinquangulare*** L., Sp. Pl. 87 (1753); Kunth, Enum. Pl. 3: 556 (1841); Hooker (1894: 582); Hooker in Trimen, Handb. Fl. Ceylon 5: 9 (1900); Ruhland in Engl., Pflanzenr. IV, 30 (Heft 13): 85 (1903); Lecomte, Fl. Indo-Chine 7(1): 12 (1912); Fyson, J. Indian Bot. 2(2–3): 31 (1923); P.H. Hô, Ill. Fl. Vietnam 3(1): 396 (1993); C.D.K. Cook, Aquatic Wetland Pl. India: 199 (1996); S.M. Phillips in Dassan. & Clayton, Revis. Handb. Fl. Ceylon 11: 68 (1997); Z.X. Zhang in U.Kück, Diss. Bot. 313: 111 (1999); R. Ansari & N.P. Balakr., Fam. Eriocaul. India: 97–100 (2009). – Type: CEYLON. *P. Hermann s.n.* (lectotype BM, Herb. Hermann 2: 21, no. 48, selected by Phillips, 1997).

Phillips (1997) cited the type of this species as follows: “Type: Ceylon, *Hermann s.n.* (BM-SL)”. Our investigations have shown that three elements of original material survive, so a lectotype was required. Phillips’s statement may be taken as a lectotypification, but because Hermann’s material may be found scattered through some 15 volumes of the Sloane herbarium, and in a further five bound Hermann volumes not in the Sloane herbarium, we give a more precise reference here.

It is now possible to be certain that this species does not match any specimens collected in Cambodia, Laos and Vietnam. *Eriocaulon quinquangulare* is therefore a species of Sri Lanka and India that reaches western and north-western Thailand (Chiang Mai and Tak provinces) but no further east.

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#### REFERENCES

- ANONYMOUS (1933). Dr. Otto Stapf, F. R. S. *Bull. Misc. Inform. Kew* 1933(8):369–378.
- ANSARI, R. & BALAKRISHNAN, N. P. (2009). *The Family Eriocaulaceae in India*, revised edition. Dehra Dun: Bishen Singh Mahendra Pal Singh.
- BEAMAN, J. H. & BEAMAN, R. S. (1998). *The Plants of Mount Kinabalu, 3: Gymnosperms and Non-orchid Monocotyledons*. Kota Kinabalu: Natural History Publications (Borneo).
- BONGARD, A. G. H. VON (1831). Essai monographique sur les espèces d’*Eriocaulon* du Brésil. *Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans, Sér 6, Sci. Math.* 1: 601–655.
- BOTANISCHER GARTEN UND BOTANISCHES MUSEUM BERLIN-DAHLEM (no date). *Herbarium Berolinense Virtual Herbarium*. Online. Available: <http://ww2.bgbm.org/herbarium/default.cfm>
- LECOMTE, H. (1908a). *Eriocaulacées de Chine et d’Indo-Chine de l’Herbier du Muséum. J. Bot. (Morot)*, sér. 2, 1(4): 86–94.
- LECOMTE, H. (1908b). Espèces nouvelles d’*Eriocaulon* de l’Indo-Chine. *J. Bot. (Morot)*, sér. 2, 1(5): 101–109.
- LECOMTE, H. (1912). *Eriocaulonacées*. In: LECOMTE, H. *Flore Générale de l’Indo-Chine*, vol. 7, pp. 1–18. Paris: Masson.
- LINNAEUS, C. (1753). *Species plantarum, exhibentes plantas rite cognitatas, ad genera relatas, cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas*, vol. 1. Holmiae: Laurentii Salvii [Stockholm: Laurentius Salvius]



- MABBERLEY, D. J. (2008). *Mabberley's Plant-book: a Portable Dictionary of Plants, their Classification and Uses*, 3rd edition. Cambridge: Cambridge University Press.
- MARTIUS, C. P. F. (1832). Eriocaulaceae et Xyrideae Indiae Orientalis. In: WALLICH, N. *Plantae Asiaticae Rariores*, vol. 3, pp. 27–30. London: Treuttel and Würtz.
- MCNEILL, J., BARRIE, F. R., BUCK, W. R., DEMOULIN, V., GREUTER, W., HAWKSWORTH, D. L., HERENDEEN, P. S., KNAPP, S., MARHOLD, K., PRADO, J., PRUD'HOMME VAN REINE, W. F., SMITH, G. F., WIERSEMA, J. H. & TURLAND, N. J. (eds and comps) (2012). *International Code of Nomenclature for Algae, Fungi, and Plants (Melbourne Code), Adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. Regnum Vegetabile 154*. Oberreifenberg: Koeltz Botanical Books.
- PHILLIPS, S. M. (1997). Eriocaulaceae. In: DASSANAYAKE, M. D. & CLAYTON, W. D. (eds) *A Revised Handbook to the Flora of Ceylon*, vol. 11, pp. 47–79. Rotterdam: A. A. Balkema.
- PRAJAKSOOD, A., PARNELL, J. A. N. & CHANTARANOTHAI, P. (2012). New taxa and new combinations of Eriocaulaceae from Thailand. *Kew Bull.* 67(4): 655–685.
- ROYEN, P. VAN (1959). Eriocaulaceae. In: LAM, H. J. *Nova Guinea* 10: 21–44.
- RUHLAND, W. (1903). *Eriocaulaceae*. In: ENGLER, A. (ed.) *Das Pflanzenreich: Regni Vegetabilis Conspectus*, vol. IV, p. 30 (Heft 13). Leipzig: Wilhelm Engelmann.
- STAPF, O. (1894). On the flora of Mount Kinabalu in North Borneo. *Trans. Linn. Soc. London, Bot.*, ser. 2., 4: 60–263.
- STEENIS, C. G. G. J. VAN (1950). *Flora Malesiana. Series I, Spermatophyta*, vol. 1, p. 332. Djakarta [Jakarta]: Noordhoff-Kolff.
- STEUDEL, E. G. (1855). *Synopsis Plantarum Glumacearum*, vol. 2. Stuttgartiae [Stuttgart]: J. B. Metzler.
- STÜTZEL, T. (1998). Eriocaulaceae. In: KUBITZKI, K. (ed.) *The Families and Genera of Vascular Plants, Volume IV. Flowering Plants. Monocotyledons. Alismatanae and Commelinanae (except Gramineae)*, pp. 197–207. Heidelberg: Springer-Verlag.
- WALLICH, N. (1829 [as 1828]–1849). *A Numerical List of Dried Specimens of Plants in the East India Company's Museum, Collected Under the Superintendence of Dr. Wallich of the Company's Botanic Garden at Calcutta*. London.
- WALLICH CATALOGUE ONLINE (2008–). *The Wallich Catalogue*. Online. Available: <http://wallich.rbge.info> (accessed 7 January 2016).
- ZHANG, Z. X. (1999). Monographie der Gattung *Eriocaulon* in Ostasien. In: KÜCK, U. (ed.) *Dissertationes Botanicae*, vol. 313. Berlin: J. Cramer.

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