



## Checklist and typification of *Heterostemma* (Apocynaceae, Asclepiadoideae, Ceropegieae)

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### Abstract

All names in *Heterostemma* and their known synonyms are listed. Lectotypes are designated for 33 names and a neotype is designated for *Stapelia quadrangula*. *Dittoceras* is synonymised with *Heterostemma* and three new combinations are validated.

**Key words:** *Dittoceras*, lectotypification, neotypification, *Oianthus*

### Introduction

*Heterostemma* Wight (1834: 42) is the only genus in subtribe Heterostemminae (Endress *et al.* 2014). Heterostemminae is sister to the three other subtribes of Ceropegieae (Meve & Liede 2004). The genus comprises of 30 to 40 species found in Australia, Bangladesh, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam and Western Pacific Islands (Swarupanandan *et al.* 1989, Forster 1992). The species of *Heterostemma* are characterised by terrestrial twining habit, thin (non-succulent) lanceolate to orbicular leaves, extra-axillary pseudo-umbelliform to raceme-like inflorescences, rotate to urceolate corollas, staminal corona with five basally connate lobes spreading or sub-erect, with or without an adaxial horned appendage, poorly developed terminal anther appendages, erect subquadrate to oblong pollinia with a germinating mouth on the inner margin, slender single or paired follicles, winged seeds with a long coma (Swarupanandan *et al.* 1989, Forster 1992, Li *et al.* 1995, Jagtap & Singh 1999).

The genus has been revised in various regional accounts (e.g. Hooker 1883b, Costantin, 1912, Backer & Bakhuizen van den Brink 1965, Swarupanandan *et al.* 1989, Forster 1992, Gilbert *et al.* 1995, Jagtap & Singh 1999), two new species have been published in recent years (Lin *et al.* 2010, Tran & Kim 2010) and a generic revision is in preparation (Rodda in prep.).

The genus *Symphysicarpus* Hasskarl (1857: 101) was transferred to *Heterostemma* by Boerlage (1899: 438) without presenting any motivation to do so, however the synonymy has not been questioned in any later treatments. *Oianthus* Bentham (1876: 79, t. 1191) was synonymised with *Heterostemma* by Swarupanandan *et al.* (1989) and *Heterostemma* sect. *Oianthus* Swarup. & Sasidh. in Swarupanandan *et al.* (1989: 253) was created to accommodate its four species. *Oianthus* was originally considered separated from *Heterostemma* based on its urceolate-globose flowers and on the lack of an adaxial horned appendage on the corona lobes. The discovery of an intermediate species, *Heterostemma vasudevani* Swarup. & Sasidh. in Swarupanandan *et al.* (1989: 257), with a discoid-urceolate corolla and corona lobes with an appendage led to the inclusion of *Oianthus* in *Heterostemma* the was therefore re-circumscribed. *Heterostemma* sect. *Oianthus* was indicated as endemic to South Asia (Swarupanandan *et al.* 1989), however also *Heterostemma fimbriatum* King & Gamble (1908: 558) from Peninsular Malaysia has urceolate corollas and may belong to the section.

*Dittoceras* Hooker (1883a: 17, t. 1422) is a genus of three species, which was still accepted by Endress & Bruyns (2000), but has since been considered congeneric with *Heterostemma* (Meve & Liede 2002, 2004, Endress *et al.* 2014). *Dittoceras* was separated from *Heterostemma* based on its ‘singular follicles’ (much thicker than the follicles of other *Heterostemma* species known in 1883) and larger seeds (Hooker 1883a). Other characters commonly associated with *Dittoceras* are the vigorous growth, dense pilose indumentum, large and fleshy corolla pubescent outside, and

pubescent ovary (Kerr 1939). Meve & Liede (2004) in considering *Dittoceras* conspecific with *Heterostemma* noted that *Heterostemma herbertii* Elmer (1919: 3074), with its large leaves, flowers and seeds is *Dittoceras*-like, despite lacking the dense indumentum. Another species, *Heterostemma menghaiense* M.G.Gilbert & P.T.Li in Gilbert *et al.* (1995: 9) is even more *Dittoceras*-like as it is pubescent throughout, excluding the inside of the corolla and the corona. Seeds of *Heterostemma alatum* Wight (1834: 42) and *H. samoense* Forster (1992: 78) are also larger than those of most *Heterostemma* species. Since *Dittoceras* is generally considered conspecific with *Heterostemma* new combinations for three species of *Dittoceras* are published. A fourth species, *Dittoceras stellaris* (Ridley) Bullock (1957: 513) is not combined in *Heterostemma* because upon examination of the type it is clear that the taxon belongs to *Dregea* Meyer (1838: 199) and the correct name is *Dregea stellaris* (Ridley) Ridely (1923: 387).

The present paper is a precursor to a revision of *Heterostemma*. Its aim is to present an annotated checklist of *Heterostemma*, clarify type citations, select lectotypes when necessary and provide an extensive list of isotypes and syntypes.

## Materials and Methods

This paper is based on the critical review of the protologues of all *Heterostemma* names and their synonyms and on the search for types at the following herbaria: B, BK, BKF, BM, BO, BR, CAL, CGE, G, HITBC, HN, IBSC, K, KIEL, KUN, L, LIV, OXF, P, SAN, SAR, SING, TI, US, VNM and Z, and online on the Chinese Virtual Herbarium portal (<http://www.cvh.ac.cn> accessed on 15 April 2016) and on Jstor Global Plants (<https://plants.jstor.org/> accessed on 15 April 2016).

A lectotype, if a suitable specimen was available, has been selected for taxa whose protologue did not explicitly mention a single type specimen with a direct reference to the institution it was deposited in, strictly applying Art 9.1 & 9.2 of the ICN (McNeill *et al.* 2012). References to single specimens indicated as ‘type’ or ‘holotype’ in treatments is considered effective lectotypification under Art. 9.9 of the ICN (McNeill *et al.* 2012). In the absence of original material, a neotype is not selected (excluding *Stapelia quadrangula* Blanco [1837: 202]) as this is best effected once the genus is revised.

Noltie (2006) clarified the type citations of taxa published by Wight. These usually bear a Wallich Catalogue number, a Wight Catalogue number or a Wallich Asclepiadaceae number (Noltie 2006). Different sheets may bear all three identifiers, only one or any combination of the three. All these variants are here listed as possible isotypes. Examination of specimens at K however resulted in finding numerous specimens from Wight’s personal working herbarium, often bearing extensive annotations by Wight himself (Fig. 1). These specimens are here preferred over other duplicates in the selection of a lectotype. Synonymies are only indicated if previously published and a reference to the place of synonymisation is provided.

Publication dates have been verified using the online version of Stafleu & Cowan (1976–) (<http://www.sil.si.edu/digitalcollections/tl-2/index.cfm>) and when available indicated in square brackets after the publication year.

## The checklist

***Heterostemma*** Wight & Arn. in Wight (1834: 42) [Dec 1834]

=*Dittoceras* Hook.f. *syn nov.*

=*Glossostelma nom. nud.* (Hooker 1883: 47)

=*Oianthus* Benth.

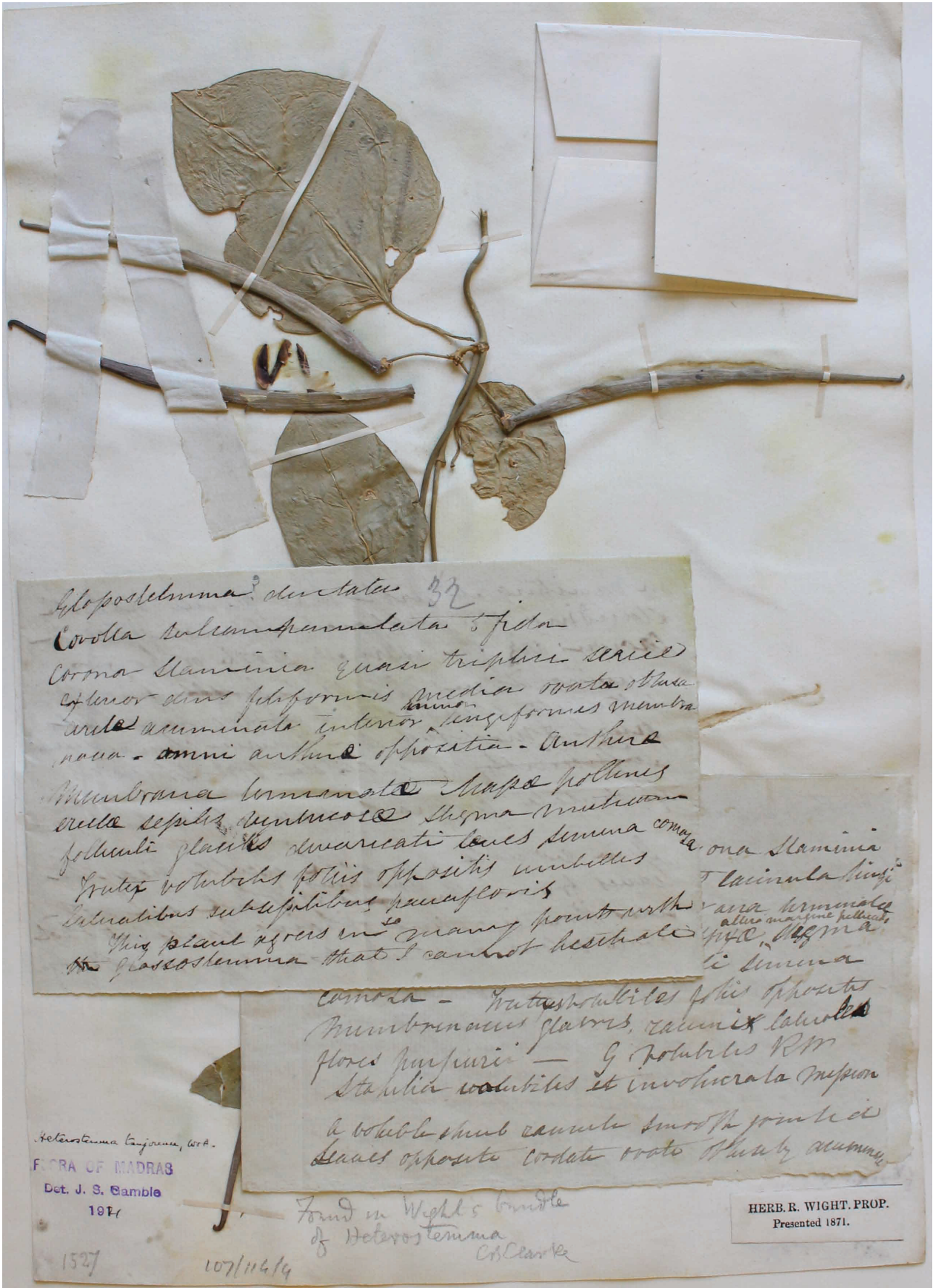
=*Phyllastemma nom. nud.* Blume *mss* on sheet [L2720373]

=*Symphysicarpus* Hassk. (Boerlage 1899: 438)

Type: ***Heterostemma tanjorensis*** Wight & Arn.

***Heterostemma*** sect. ***Oianthus*** Swarupan. & Sasidh. in Swarupanandan *et al.* (1989: 253) ≡ *Oianthus* Bentham (1876: 79, t. 1191) [Apr 1876]

Type: ***Heterostemma urceolatum*** Dalzell



**FIGURE 1.** Photograph of possible isolectotype of *Heterostemma tanjorensis* from Wight's personal working herbarium (K). The sheet bears an *Herb. R. Wight propr.* label in the lower right corner, is pencilled [Wight cat. n.] 1527 in the lower left corner and has extensive notes about the taxon in Wight's hand. A pencilled note by C.B. Clarke reads 'found in Wight's bundle of *Heterostemma*'. Reproduced with the consent of the Royal Botanic Gardens, Kew.



***Heterostemma acuminatum*** Decaisne (1838: 268)

TYPE:—INDONESIA. Java, ‘*Goudo-san*’, *s.d.*, *J.B.L.T. Leschenault 228* (lectotype P [P00607325], here designated)  
=*Heterostemma papuanum* Schlechter (1905: 369) [November 1905] (synonymised by Forster 1992) TYPE:—PAPUA NEW GUINEA,  
Madang Province, Ramu, January 1902, *R. Schlechter 14110* (lectotype BO, designated by Forster & Liddle (1994))  
=*Tylophora calcarata* Bentham (1869: 335) (synonymised by Forster 1992)  
TYPE:—AUSTRALIA, Queensland, Rockhampton, 1868, *A. Thozet s.n.* (lectotype K [K000894685] designated by Forster & Liddle  
(1994), possible isotype at MEL [MEL113588])

**Notes:**—The only original material cited in the protologue of *H. acuminatum* is a specimen collected by Leschenault in Java bearing the common name ‘*Goudo-san*’, ‘Hab. in insula Javae (*Leschenault*) vulgo *Goudo-san*’. Forster (1992) mentioned the holotype of *H. acuminatum* as *Leschenault s.n.*. I have not found that specimen but instead *Leschenault 228* in P is annotated with ‘*Goudo-san*’ and is therefore selected as lectotype for *H. acuminatum*.

Two syntypes are mentioned in the protologue of *H. papuanum* (Schlechter 1905: 369), *Schlechter 14110* and *Schlechter 18877*. *Schlechter 14110* (BO) was designated as lectotype by Forster & Liddle (1994). Duplicates of *Schlechter 18877* are present at K [K000894689] and P [P03899067].

Forster (1992) indicated the holotype of *T. calcarata* as *Thozet 501* (K), with a duplicate in MEL. This would be an effective lectotypification under Art. 9.9 of the ICN (McNeill *et al.* 2012). However upon examination of specimens at K I could not locate *Thozet 501* but only *Thozet s.n.* [K000894685]. The lectotype citation is therefore amended. The MEL isotype cited by Forster (1992) [MEL113588] is instead *Thozet 501* and its isotype status is therefore uncertain.

***Heterostemma alatum*** Wight (1834: 42) [Dec 1834] (as ‘*alata*’)

TYPE:—NEPAL, Chundragherry?, Herb. R. Wight. propr., *Wight Asclep 136* [=Wall. Cat. 8180] (lectotype K [K000895032], here designated, isotypes, E [E00179594], K, *ex parte* [as Wall. Cat. 8180, K000974160])  
=*Hoya alata* *nom. nud.* on sheet [K000974160]  
=*Heterostemma dentatum* W. T Wang *nom. nud.* on sheet [KUN0267852 and numerous other specimens in KUN]

**Notes:**—The materials mentioned in the protologue of *H. alatum* were clarified by Noltie (2006) as ‘Nepal, Wallich, Wall Asclep 136 [=Wall. Cat. 8180]. Massooree, [J.F.] Royle’. Kambale *et al.* (2015), selected sheet [K000974160] as the lectotype of *H. alatum*. This sheet however contains two gatherings, the first from Naglerquhn, bearing date July 1821, the other from Chundragherry?. It is impossible to separate which part of the specimen belongs to which collection and therefore select part of the sheet as lectotype of *H. alatum*.

In Linn Soc. MS SP 1284 the entry under under No. 136 is ‘*Hoya alata* Wall, 1 sh. Nepalia’. This means that only a single sheet from Wallich herbarium was in Wight’s hand when describing *H. alatum*. This can be identified as [K000895032], a well-preserved specimen with an attached description of the species and a sketch of a dissected flower in Wight’s hand. This sheet is instead here selected as lectotype for *H. alatum*. If this was the only specimen mentioned in the protologue it would be a holotype following Noltie (2006: 134). Another specimen at LIV was collected by Royle in Massooree and bears a note in Wight’s hand and it is a syntype [acc. no. LIV1952.121.4425].

***Heterostemma andersonii*** (Hook.f.) Rodda *comb. nov.* ≡ *Dittoceras andersonii* Hooker (1883a: 18, t. 1422) [Mar 1883] (as ‘*andersoni*’)

TYPE:—INDIA, Sikkim, Tanlioke?, 25 June 1862, *T. Anderson 838* (Lectotype K [K000894723], here designated, isotypes M [M0175244], photo at E [E00288726])

**Notes:**—Syntypes for *D. andersonii* are mentioned by Hooker (1883a: 18) as ‘Sikkim Himalaya, in the tropical region alt. 2–4000 feet, *J. D. H* (Hooker), *T. Anderson*’. At Kew duplicates of both specimens are present and the *Anderson* duplicate is selected as lectotype for *D. andersonii*. Hooker’s syntypes are labelled ‘*Heterostemma* (6)’, and are available at CGE, 3 duplicates, K [K000894724, K000894725, one not barcoded], L [L2727218], M [M0175245], photo at E [E00288724, E00288725].

***Heterostemma angustilobum*** Schlechter (1915: 565)

TYPE:—PHILIPPINES, Davao, Mindanao, Mt Apo, June 1909, *A.D.E. Elmer 10814* (lectotype GH [GH00076406], here designated, isotypes BM [BM001125305], G, 2 duplicates, NY [NY00546772], K, L [L2720403], US [US00111076])

**Notes:**—The only specimen mentioned by Schlechter (1915: 565) in the protologue of *H. angustilobum* is *Elmer 10814*.

Schlechter likely based his description on a B duplicate that is now lost (Hiepko 1978, Nicholas 1992). Eight duplicates of *Elmer 10814* have been located. Among these, the GH specimen is selected as lectotype of *H. angustilobum* as it is a fertile and well-preserved specimen.

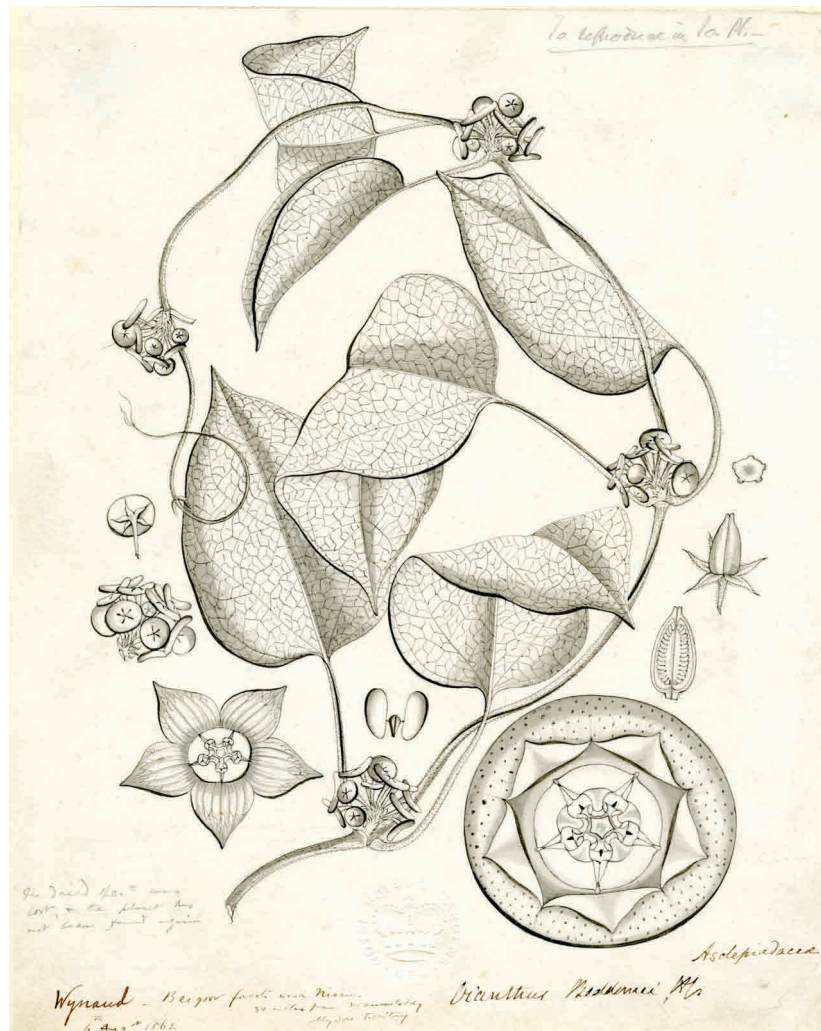
***Heterostemma balansae*** Costantin (1912: 120)

TYPE:—VIETNAM, Hanoi, 1 May 1886, ‘dans les haies’ B. Balansa 2110 (lectotype P [P00645985], here designated, isotype P [P03899022])

**Notes:**—The only specimen of *H. balansae* is indicated by Costantin (1912: 120) as ‘Tonkin: Hanoi; dans les haies (Balansa)’. In P there are two *Heterostemma* specimens collected by Balansa in Hanoi both annotated ‘dans les haies’. The first, *Balansa 2111* [P00645984] is a fruiting specimen and may not belong to *H. balansae*. The second, *Balansa 2110* is a well-preserved fertile specimen and is therefore selected as lectotype for *H. balansae*.

***Heterostemma beddomei*** (Hooker) Swarupan. & Mangaly in Swarupanandan *et al.* (1989: 254) ≡ *Oianthus beddomei* Hooker (1883b: 49) [Jun 1883]

TYPE:—INDIA, Karnataka, Mysore, Beigoor forests, 4 August 1862, Wynaad, ex *Beddome s.n.* (drawing, K, lectotype here designated) (Fig. 2)



**FIGURE 2.** Lectotype (Iconotype) of *Heterostemma beddomei* (K). This is just a drawing as the original specimen was lost before the taxon was described (Hooker 1883b: 49). Reproduced with the consent of the Royal Botanic Gardens, Kew.

**Notes:**—Hooker (1883: 49) indicated that *O. beddomei* was described based on a drawing, as the original specimen collected by Beddome was lost. Swarupanandan *et al.* (1989) indicated the type as ‘A drawing by Beddome (K, not seen)’. Jagtap & Singh (1999) indicated the type as Plate 1466 in Hooker’s *Icones Plantarum* (Hooker 1884) [September 1884]. The plate was published one year after the description of *O. beddomei* and cannot be safely considered original

material. A preparatory drawing for the illustration published as plate 1466 of Hooker's *Icones Plantarum* was found in the *H. beddomei* folder at K. The original drawing by Beddome (or after Beddome) (Fig. 2) was found in the K Archives and is here selected as lectotype for *H. beddomei*.

***Heterostemma brownii*** Hayata (1911: 199) (as '*brownii*')

TYPE:—TAIWAN, Shintiku, Taitoga. June 1905, *T. Kawakumi & U. Mori 1373* (syntypes not found); TAIWAN, Taiko, August 1908, *B. Hayata & U. Mori 41* (syntype not found).

**Notes:**—Two specimens, *Kawakumi & Mori 1373*, *Hayata & Mori 41* were indicated in the protologue of *H. brownii* (Hayata 1911: 199). No duplicates of the two syntypes have been found at TI or in Taiwanese herbaria (Tetsuo Ohitoma pers. comm.). Collection *Kawakumi & Mori 1347* (TI) is the only material collected by Hayata of *H. brownii* before the publication of the taxon, however it is sterile and a neotype of *H. brownii* should be carefully selected among more recent fertile collections once the genus is revised.

***Heterostemma chrysanthum*** (Hasskarl) Boerlage (1899: 438) [Jan 1899] ≡ *Symphysicarpus chrysanthus* Hasskarl (1857: 102)

TYPE:—INDONESIA, Java, Banjuwangi, 1854, *J.E. Teysmann* (not found)

**Notes:**—Hasskarl (1857: 438) indicated that *Symphysicarpus* was based on a specimen from Java collected by Teysmann in 1854. No suitable specimen has been found and a neotype will have to be selected when *Heterostemma* is revised.

***Heterostemma collinum*** Schlechter (1913: 156) [15 Apr 1913]

TYPE:—PAPUA NEW GUINEA, 'zwischen Gebüsch an Waldrändern bei der Kaulo-Etappe', February 1908, *R. Schlechter 17272* (B, destroyed); Schlechter (1913: 157), Fig. 11 A–K (lectotype here designated) (Fig. 3)

Notes. *Heterostemma collinum* was described based on specimen 'Nordöstl Neu-Guinea: zwischen Gebüsch an Waldrändern bei der Kaulo-Etappe, ca. 180 m ü. M. (Schlechter n. 17272.—Blühend im Februar 1908)'. The B duplicate is lost (Hiepko 1978, Nicholas 1992) and no duplicates have been located. The illustration that accompanied the publication of *H. collinum* (Schlechter 1913: 157 Fig. 11 A–K) is to be considered as original material and is here selected as lectotype.

***Heterostemma cuspidatum*** Decaisne. (1844: 630) [mid Mar 1844]

TYPE:—PHILIPPINES, Batangas, Luzon, 1841, *H. Cuming 1449* (lectotype P [P03899078], here designated, isotypes BM [BM001125304], CGE, 2 duplicates, G, 2 duplicates, K [K000894691, K000894692], OXF, P [P03899073])

= *Stapelia quadrangula* Blanco (1837: 202) *nom. illeg.* non *Stapelia quadrangula* Forssk. in Forsskål & Niebuhr (1775: 51), Ditto *Glossostelma* Hook., *nom. nud.*, "non *Glossostelma* Schlechter (1895: 321)".

TYPE:—PHILIPPINES, Luzon, Batangas, February 1915, *A.D. Merrill species Blancoanae 807* (neotype K, here designated, isotype L [L2720409], BM)

**Notes:**—*Heterostemma cuspidatum* is based on *Cuming 1449* in P (Decaisne 1844). P houses two duplicates of *Cuming 1449* [P03899073, P03899078]. The best-preserved sheet, [P03899078] is selected as lectotype of *H. cuspidatum*.

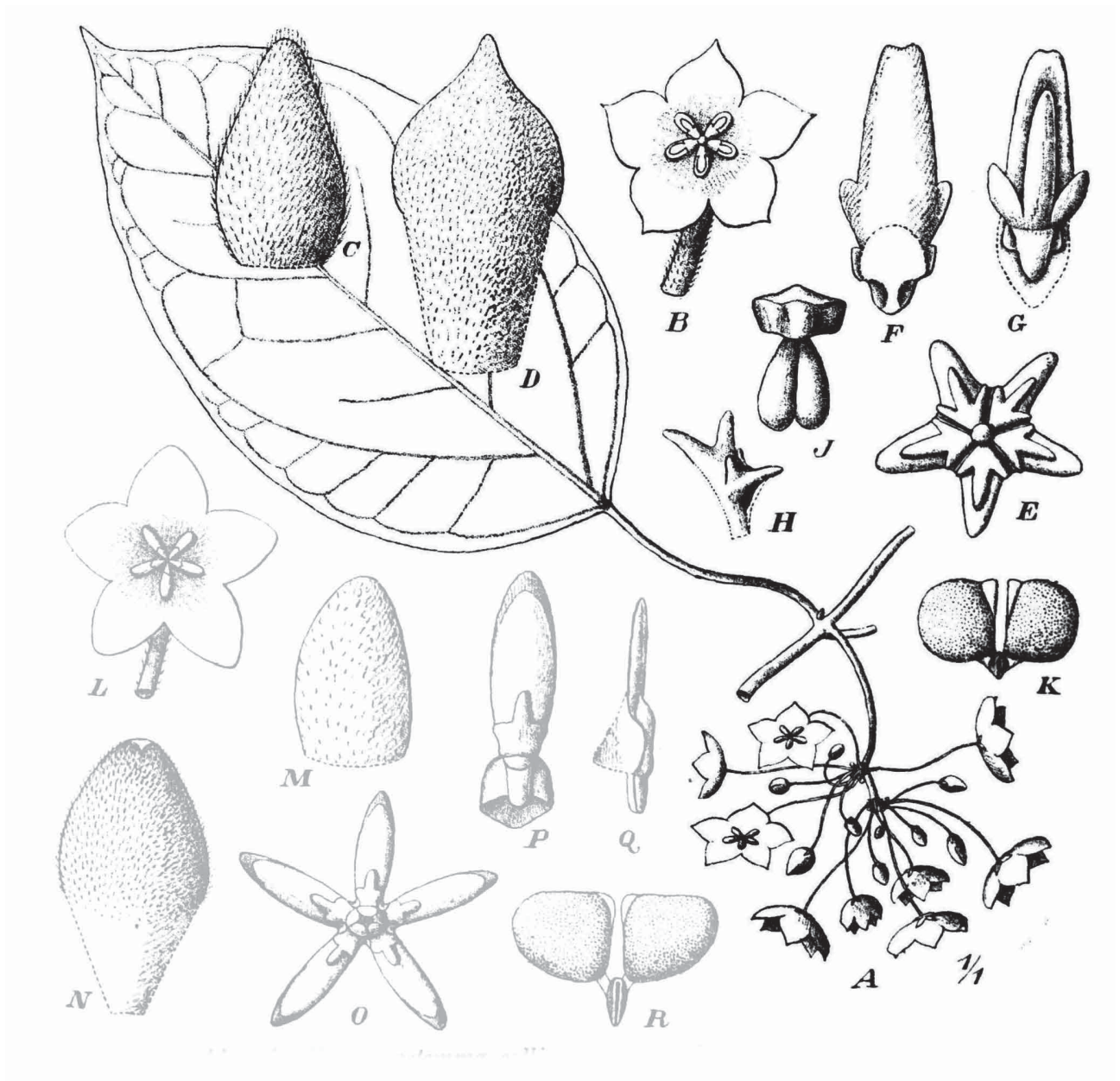
Blanco collected very few specimens and none are available for *S. quadrangula* (Merrill 1918). Merrill's interpretation of *S. quadrangula* as a synonym of *H. cuspidatum* is accepted and Merrill's specimen (*Merrill species Blancoanae 807* (K)) is selected as neotype for *S. quadrangula*.

***Heterostemma dalzellii*** Hooker (1883b: 48) [Jun 1883]

TYPE:—INDIA, Vingorla, July 1852, *N.A. Dalzell s.n.* (lectotype K [K000895026], designated by Kambale *et al.* (2015))

**Notes:**—*Heterostemma dalzellii* was based on specimens '*Heterostemma* sp. 2, The Concan; at Vingorla and Malwan, *Dalzell, Stocks*'. *Dalzell s.n.* [K000895026] was selected as lectotype for the name by Kambale *et al.* (2015). A syntype of *Stocks s.n.* is present at P [P03899001]. Despite Hooker (1883b) cited the *Stocks* specimens as '*Heterostemma* sp. 2' it is likely that *Stocks s.n.* labelled as '*Heterostemma* (3)' at CAL [CAL17963] and K [K000895027, one not barcoded] are syntypes of *H. dalzellii* as Hookers' *Heterostemma* sheets appear to be misnumbered (see also *H. stellatum*).





**FIGURE 3.** Lectotype (Iconotype) of *Heterostemma collinum* adapted from Fig. 11 in Schlechter (1913: 157 A–K). Parts L–R, here shaded, represent instead *H. montanum*.

***Heterostemma deccanense*** (Talbot) Swarupanandan & Mangaly in Swarupanandan *et al.* (1989: 255) (as ‘*decanense*’)  $\equiv$  *Oianthus deccanensis* Talbot (1911: 260) [1911]

TYPE:—INDIA, Maharashtra, Deccan Ghats, 18 miles west of Poona, August, *W.A. Talbot s.n.* (not found)

**Notes:**—No Talbot material was located at BLAT, BM or K by Swarupanandan *et al.* (1989) and I confirm that there is no suitable lectotype of *H. deccanense* at BM or K. A neotype for *H. deccanense* will have to be selected when *Heterostemma* is revised.

***Heterostemma disciflorum*** (Hooker) Swarupanandan & Mangaly in Swarupanandan *et al.* (1989: 256)  $\equiv$  *Oianthus disciflorus* Hooker (1883b: 49)

TYPE:—INDIA, Karnataka, Concan; ‘*Heterostemma* (2)’ *Stocks s.n.* (lectotype K [K000895024], designated by Kambale *et al.* (2015), isotype K [K000895023])

**Notes:**—The description of *H. disciflorum* was based on a specimen cited as ‘Western Peninsula, the Concan? *Herb. Law. and Stocks*’. Swarupanandan *et al.* (1989) indicated the type of *H. disciflorum* as ‘*Law & Stocks s.n.* (K, photo seen), India, Karnataka, Concan and Mysore’. I have located two sheets at K both bearing two labels, one is a *Herb. Ind. Or. Hook. fil. & Thomson* printed label, bearing locality as Concan, and collector *Stocks s.n.*, the other from Canara & Mysore *Mr Law? s.n.* Since the attribution of the specimens to Law is doubtful I refer to these as *Stocks s.n.* Both specimens are well preserved, fertile and bear a manuscript dissection of the flowers. The duplicate [K000895024] was selected by Kambale *et al.* (2015) as lectotype for *H. disciflorum*.

***Heterostemma esquirolii*** (Léveillé) Tsiang (1936: 189) ≡ *Pentasachme esquirolii* Léveillé (1914: 43) [1914]

TYPE:—CHINA, Kouy-Tcheou, Trou du hoeu hay tse, 9 August 1909, *J. Esquirol 716* (lectotype E [E00275187], here designated, isotype K [K000895034])

**Notes:**—The description of *P. esquirolii* was based on ‘Trou du Hœu Hay Be, *J. Esquirol 716*. Can Chouen, *J. Cavalerie 3973*, Aout 1905.12’.

The *Esquirol 716* duplicate located at E is a complete and well-preserved specimen and is designated as lectotype for *H. esquirolii*. A syntype *Cavalerie 3973* is present at E [E00275188] and P [P03899037].

***Heterostemma fimbriatum*** King & Gamble (1908: 558) [20 Feb 1908]

TYPE:—MALAYSIA, Perak, Gunung Ijub, *B. Scortechini 1220* (lectotype CAL [CAL17964], here designated, isotype K)

**Notes:**—*Heterostemma fimbriatum* was based on *Scortechini 1220*. The only complete duplicate I found is at CAL, while the K duplicate is only a dissection by Gamble.

***Heterostemma gracile*** Kerr (1939: 458)

TYPE:—THAILAND, Chiang Mai, Doi Chiang Dao, 3 November 1922, *A.F.G. Kerr 6535* (lectotype BM [BM001014266], here designated, isotype E, K [K000894702], BM [BM001014266], BK [BK257729], L [L2720412], P [P00645988])

**Notes:**—The only material indicated for *H. gracile* by Kerr (1939) was *Kerr 6536*. Among the various duplicates available the BM specimen [BM001014266] is fertile, well preserved and bears a drawing of dissected flowers of the plant in Kerr’s hand and is therefore selected as lectotype.

***Heterostemma garrettii*** (Kerr) Rodda *comb. nov.* ≡ *Dittoceras garrettii* Kerr (1939: 459)

TYPE:—THAILAND, Doi Angka, 2 June 1928, *H.B.G. Garrett 534* (lectotype K [K000894722], here designated, isotype P [P03876173], drawing at BM)

**Notes:**—The only material indicated for *D. garrettii* by Kerr (1939) was *Garrett 534*. Among the various duplicates available the K specimen [K000894722] is fertile and well preserved and is therefore selected as lectotype.

***Heterostemma grandiflorum*** Costantin (1912: 122)

TYPE:—VIETNAM, Kiên Khê, 20 April 1885, *H.F. Bon 2886* (lectotype P [P00645986], here designated, isotype P [P00645987])

**Notes:**—*Heterostemma grandiflorum* was based on materials indicated as ‘Khien-khé, pres Ninh-binh (*Bon*)’. Two specimens collected by Bon in Kiên Khê and identified as *H. grandiflorum* in Costantin’s hand are present in P. The duplicate in P [P00645986] is a well-preserved fertile specimen and is selected as lectotype here.

***Heterostemma herbertii*** Elmer (1919: 3074)

=*Heterostemma lucbanensis* Elmer *nom. nud.* (Elmer 1938)

TYPE:—PHILIPPINES, Luzon, Los Baños (Mt Makiling), Province of Laguna, June 1917, *A.D.E. Elmer 17661* (Lectotype BO, designated by Forster & Liddle (1994), isotypes, A [A00076410], BM [BM000547171], C [C10006709], GH [GH00076411], K [K000894687], L, [L2720404], NY [NY00546775], P [P03899071], S [S12-12330], U [U0094915], US [US00111077], Z [Z1657])

**Notes:**—The lectotype for *H. herbertii* was designated by Forster & Liddle (1994).

A second syntype, *Elmer 18247* was mentioned by Elmer (1919). Duplicates of *Elmer 18247* are found at A [A00076409], BM [BM000547170], C [C10006708], G, GH [GH00076408], K [K000894688], L, [L2720405], NY, [NY00546773], P [P03899072] S [S12-12329], U [U0094916], US [US00516759].



***Heterostemma javanicum*** Hasskarl (1857: 101)

TYPE:—INDONESIA, Java [sylvas montosas Salak ad 1000-1500 m. s. m. altitudinem] (not found)

**Notes:**—No suitable lectotype has been found among the materials examined. A neotype will be selected once the genus is revised.

***Heterostemma kaniense*** Schlechter (1913: 158) [15 Apr 1913]

TYPE:—PAPUA NEW GUINEA, Kani, 18 Jan 1908, *R. Schlechter 17213* (P lectotype [P03899070], here designated, isotype P [P03899069])

**Notes:**—The type of *H. kaniense* was indicated by Schlechter (1913) as ‘Nordöstl. Neu-Guinea: Liane in den Wäldern des Kani-Gebirges, ca. 800 m ü. M. (*Schlechter n. 17213*.—Blühend im Januar 1908)’. The B sheet is lost (Hiepko 1978; Nicholas 1992) and the P duplicate [P03899070] is selected as lectotype.

***Heterostemma lobulatum*** Li & Konta in Li *et al.* (2002: 93)

TYPE:—CHINA, Yunnan, Xishuangbanna, Mung La County, Meng Xing Ho Hoiwa, 11 October 1988, *Y.H. Li, F. Konta, J. Kitagawa 40*, (holotype KUN [KUN0833170], isotypes KUN [KUN0833171, KUN0833172])

***Heterostemma luteum*** Costantin (1912: 123)

TYPE:—VIETNAM, Kien-khé in rupib. Đông Bàu, 19 May 1884, *R.P. Bon 2602*, (lectotype P [P00476452], here designated, isotype P [P00507826])

**Notes:**—*Heterostemma luteum* was described based on ‘Tonkin: Kien-khé, rochers de Dông-bàú (*Bon*); Hanoi, haies (en fruit) (*Balansa*)’. Two duplicates of *Bon 2602* from Kien-khé and annotated in Costantin’s handwriting as *H. luteum* and ‘in rupibus Đông Bàu’ are present in P herbarium and [P00476452] is here selected as lectotype for the name.

***Heterostemma luteum*** Costantin var. ***nigro-punctatum*** Costantin (1912: 124) (as ‘*nigropunctata*’)

TYPE:—VIETNAM, Kien-khé, 14 May 1883, *R.P. Bon 2153*, (lectotype P [P00476453], here designated, isotype P [P00507827])

**Notes:**—The specimens mentioned by Costantin (1912) as *H. luteum* var. *nigro-punctatum* were indicated as ‘Tonkin: Kien-khé (*Bon*); Hanoi (*Balansa*)’. Two duplicates of *Bon 2153* from Kien-khé and annotated in Costantin’s handwriting as *H. luteum* var. *nigro-punctatum* are present in P herbarium and [P00476453] is here selected as lectotype for the name.

***Heterostemma maculatum*** (Kerr) Rodda *comb. nov.* ≡ *Dittoceras maculatum* Kerr (1939: 459)

TYPE:—THAILAND, Dan Sai, Pu Lom Lo. *A.F.G Kerr 5776* (lectotype BM [BM00101426], here designated, isotypes BK [BK257726], E, K [K000894720, K000894721], L [L2727223], P [P03876171])

**Notes:**—The only material indicated for *H. maculatum* by Kerr (1939) was *Kerr 5776*. Among the various duplicates available the BM specimen [BM00101426] is fertile, well preserved and bears a drawing of dissected flowers of the plant in Kerr’s hand and is therefore selected as lectotype.

***Heterostemma magnificum*** Forster (1992: 73)

TYPE:—AUSTRALIA, Northern Territory, SE Mt Howship, 18 February 1984, *C.R. Dunlop 6642 & J. Russell-Smith* (holotype DNA [DNA-D0023024], isotypes AD, BRI [BRI-AQ0412254], CANB, NSW)

***Heterostemma manillense*** Schauer in Walpers (1843: 365)

TYPE:—PHILIPPINES, [In insula Luçon circa praedium Hali-Hali, Septembri] (not found)

**Notes:**—The plants described in Walpers (1843) were collected by Meyen during his Voyage in the Prinzess Louis (1830-32). The first set of botanical collections was deposited in B (now destroyed), and duplicates from the Philippines were deposited at the Herbarium of the University of Kiel (KIEL; van Steenis-Kruseman 1950), where no Meyen material of *Heterostemma* has been found. A neotype will be selected once the genus is revised.

***Heterostemma membranifolium*** (Lauterbach & Schumann) Schlechter (1913: 158) [15 Apr 1913] ≡ *Gongronema membranifolium* Lauterbach & Schumann in Schumann (1898: 140)

TYPE:—PAPUA NEW GUINEA, [Bismarck-Archipel: Neu-Pommern, im Waldtale bei Ralum auf der Gazelle-Halbinsel (*F. Dahl*, blühend im Januar 1897)] (not found)

**Notes:**—The type of *H. membranifolium* in B is lost (Hiepko 1978; Nicholas 1992) and no duplicates have been found. A neotype will be selected once the genus is revised.

***Heterostemma menghaiense*** (Zhu & Wang) Gilbert & Li in Gilbert *et al.* (1995: 9) [27 March 1995] ≡ *Heterostemma villosum* var. *menghaiense* Zhu & Wang (1994: 27)

TYPE:—CHINA, Yunnan, Xishuangbanna, Menghai, Mengsong, 1000 m, 6 May 1989, *H. Zhu & H. Wang 2443* (lectotype HITBC [HITBC62875], here designated, isotypes HITBC [HITBC62876, HITBC62877, HITBC62878])

=*Heterostemma ferrugineum* C.Y.Wu *nom. nud.* (Name annotated by C. Y. Wu on numerous specimens in KUN)

=*Heterostemma ferruginevillosa* H.Chu & H.Wang *nom. nud.* (Name annotated on type collections of *Heterostemma menghaiense* in HITBC)

**Notes:**—Gilbert *et al.* (1995) mentioned the holotype of *Heterostemma menghaiense* as *Zhu & Wang 2443* (HITBC) collected on 14 May 1989. Upon examination of materials at HITBC I have found four duplicates of *Zhu & Wang 2443*, collected on 6 May 1989. Therefore the collection date needs to be corrected and a lectotype must be selected. The duplicate [HITBC62875] is a well-preserved fertile specimen with a drawing of the pollinia and is here selected as lectotype for *H. menghaiense*.

***Heterostemma montanum*** Schlechter (1913: 158) [15 Apr 1913]

TYPE:—PAPUA NEW GUINEA, Finisterre Range, 13 January 1909, *R. Schlechter 19057* (lectotype K [K000894690], here designated, isotype BR [BR0000005211401], P [P03899068])

**Notes:**—The original material of *H. montanum* was indicated by Schlechter (1913) as ‘Nordöstl. Neu-Guinea: Liane in Nebelwäldern des Finisterre-Gebirges, ca. 1300 m ü. M. (*Schlechter n. 19057* blühend im Januar 1907)’. The B material is lost (Hiepko 1978, Nicholas 1992) but duplicates are found at BR, K and P. Specimen [K000894690] is fertile and well-preserved and is therefore selected as lectotype of *H. montanum*.

***Heterostemma oblongifolium*** Costantin (1912: 120)

TYPE:—LAOS, Phon Thane, *s.d.*, *C.J Spire 31* (lectotype P [P00645990], here designated, isotype P [P00645989])

=*Heterostemma venosum* C.Y.Wu *nom. nud.* (name annotated on specimen KUN0267875 and others)

**Notes:**—Specimens of *H. oblongifolium* were indicated by Costantin (1912) as ‘Laos: Phon-thane (Spire) Nom Vulg. *Mak bouek pha*’. In P there are two specimen collected by Spire in Laos labelled as *H. oblongifolium* by Costantin. They are both fruiting. The first, [P00645989], does not bear any collection locality, while the second, [P00645990], was collected in Phon Thane and is annotated with the common name ‘Mak bouek pha’ This second specimen is matching the protologue and is therefore selected as lectotype of *H. oblongifolium*. A careful selection of a flowering epitype will be necessary for the correct application of the name.

***Heterostemma pingtaoi*** He & Lin in Lin *et al.* (2010: 60) [18 Mar 2010]

TYPE:—CHINA, Hainan, Jianfengling, 27 July 2006, *S.Y. He et al. 607271* (holotype, CANT, *n.v.*)

***Heterostemma piperifolium*** King & Gamble (1908: 557) [20 Feb 1908]

TYPE:—MALAYSIA, Perak, open jungle near B. P. River, August 1885, *King’s Collector 7973* (lectotype K [K000894706], here designated, isotypes CAL [CAL17965], CGE, K [K000894708], P [P03899027])

**Notes:**—The materials for *H. piperifolium* were cited as ‘Perak, at Kwala Dipang, *Ridley 9619*; at Larut, 200 to 500 ft., *King’s Collector 2338, 7973*, at Ijuk, *Scortechini 1097, 1150*. *King’s Collector 7973* (K) is a well-preserved fertile specimen bearing a dissection and drawings of flower parts in Gamble’s hand and is therefore selected as lectotype for *H. piperifolium*. The following syntypes have been localised: *King’s Collector 2338* [K000894705]; *Ridley 9619* [K000894709]; *Scortechini 1097* [K000894703]; *Scortechini 1150* [K000894704].

***Heterostemma piperifolium* var. *cordatum*** King & Gamble (1908: 558) [20 Feb 1908]

TYPE:—MALAYSIA, Perak, s.d., *B. Scortechini* s.n. (lectotype K [K000894704], here designated)

**Notes:**—The only material listed for this subspecies was ‘Perak, *Scortechini*’. Only one *Scortechini* s.n. specimen at K is annotated as *H. piperifolium* var. *cordatum* in possibly King’s hand and is here selected as lectotype for the name.

***Heterostemma renchangii*** Tsiang (1936: 187)

TYPE:—CHINA, Kwangsi, 15 li S. of Nee Bai, border of Kweichow, 29 June 1928, *R.C. Ching 6310* (holotype SYS, n.v., isotypes IBK [IBK00191445], NY [NY00546774], PE [PE00029513])

**Notes:**—Tsiang (1936: 122) noted that the types for the new species by him described are deposited at the herbarium of the Botanical Institute, Sun Yatsen University (SYS) unless otherwise indicated. I have not been able to locate the holotype of *H. renchangii* at SYS, and in case it is missing the PE duplicate [PE00029513] is to be intended as a lectotype, here designated under Art. 9.9 of the ICN (McNeill *et al.* 2012).

***Heterostemma samoense*** (Gray) Forster (1992: 78)

TYPE:—SAMOA, Savaii, 1838-1842, U.S. *Expl. Exped. B.C. Seemann* s.n. (lectotype US [US00112405], designated by Smith (1988), isotype NY [NY00318818]) ≡ *Tylophora samoensis* Gray (1862: 334)

=*Tylophora samoensis* Schlechter (1908: 4), *nom. illeg.* ≡ *Tylophora powellii* Hochreutiner (1936: 476) [January 1936] [*nom. nov.* for *T. samoensis* Schltr.] (synonymised by Forster 1992)

TYPE:—SAMOA, *T. Powell 33g* (lectotype K [K000894686], here designated, isotype K)

**Notes:**—According to Smith (1988: 113) and Forster (1992) the holotype of *H. samoense* is US sheet no. US62244 [US00112405]. The specimen is not a holotype as Gray (1862) did not provide any type information and only mentioned the collection locality as ‘Savaii, one of the Samoan islands’. However Smith (1988) counts as an effective lectotypification under Art. 9.9 of the ICN (McNeill *et al.* 2012).

Schlechter (1908) indicated two syntypes for *T. samoense*, *Betche 38* and *Powell 33g*. A fertile well-preserved duplicate of *Powell 33g* is present at K and is here selected as lectotype.

***Heterostemma siamicum*** Craib (1911: 418)

TYPE:—THAILAND, Chiang Mai, 14 August 1910, *A.F.G. Kerr 1324* (lectotype BM [awaiting digitisation], here designated, isotypes K [K000894700, K000894701])

**Notes:**—The only material indicated for *H. siamicum* by Kerr (1939) was *Kerr 1324*. Among the various duplicates available the BM specimen [awaiting digitisation] is fertile, well preserved and bears a drawing of dissected flowers of the plant in Kerr’s hand and is therefore selected as lectotype.

***Heterostemma sinicum*** Tsiang (1936: 190)

TYPE:—CHINA, Hainan, Boting, 24 June 1935, *F.C. How 72982* (holotype SYS, n.v., isotype A [A00016232], IBK [IBK00097647, IBK00097648])

**Notes:**—Tsiang (1936: 122) noted that the type specimens for the new species by him described are deposited at the herbarium of the Botanical Institute, Sun Yatsen University, (SYS) unless otherwise indicated. I have not been able to locate the holotype of *H. sinicum* at SYS, and in case it is missing [A00016232] is to be intended as a lectotype under Art. 9.9 of the ICN (McNeill *et al.* 2012). The two duplicates at IBK [IBK00097647, IBK00097648] are sterile and therefore not the preferred specimens for the selection of a lectotype.

***Heterostemma stellatum*** Hooker (1883b: 47) [Jun 1883]

TYPE:—INDIA, Meghalaya, Khasia Mountains, Myrung, ‘*Heterostemma* (5)’, *J.D. Hooker & J. Thomson* s.n. (lectotype K [K000895031], here designated, isotype K, [K000895030])

**Notes:**—Hooker indicated *H. stellatum* as ‘*Heterostemma 3*’ collected in Khasia Mountains, Myrung. However specimens labelled as ‘*Heterostemma 3*’ at K belong to *H. dalzellii*, collected by Stocks in Concan. It is therefore likely that the numbering of the *Heterostemma* sheets do not match with the numbers indicated in the descriptions (see also *H. dalzellii*).



***Heterostemma suberosum*** Costantin (1912: 124)

TYPE:—VIETNAM, ‘moï: Bú tac’, September 186(?)5, *Pierre s.n.* (lectotype P [P00645992], here designated)

**Notes:**—The type of *H. suberosum* was indicated by Costantin (1912) as ‘Cochinchine: Song-lu (*Pierre*), Nom moï: Bú tac’. In P I have found two sheets, the first [P00645991] identified as *H. suberosum* in Costantin’s handwriting, collected by Pierre in Song Lu in March 1877. The other [P00645992] collected by Pierre in September 186(?)5 and is annotated ‘moï: Bú tac’. Both are suitable lectotypes, however, since [P00645991] is a leafless sterile specimen, [P00645992] is instead selected as lectotype as despite being sterile it has two complete leaves. An epitype will have to be selected to allow correct application of the name when *Heterostemma* is revised.

***Heterostemma succosum*** Kerr (1939: 458)

TYPE:—THAILAND, Chiang Mai, South border Ban Tam Kaw, right border Me Lao Me Kok, 28 August 1924, *H.B.G. Garrett 191* (lectotype K [K000894698], here designated, isotypes, K [K000894699], L [L0004311], P [P03899002])

**Notes:**—The only material indicated for *H. succosum* by Kerr (1939) was *Garrett 191*. Among the various duplicates available the K specimen [K000894698] is fertile, well preserved and bears a drawing of dissected flowers of the plant in Kerr’s hand and is therefore selected as lectotype

***Heterostemma tanjorensis*** Wight & Arnott in Wight (1834: 42) [Dec 1834] (as ‘*tanjorensis*’)

TYPE:—INDIA, Sandy places in Tanjore, Porto Novo, 22 November 1810, *J. G. Klein, s.n.*, [*Herb. R. Wight propr. 1527*] [=Wall. Cat. 8178]. (lectotype K [K000895029], designated by Kambale *et al.* (2015), isotypes K [K000974157], LIV [sheet no. 1952.121.4426], possible isotypes A [A00076435], BM [BM001014269], BR [BR0000006962883], C [C10006711, C10006710], CGE (3 duplicates), E [E00179589, E00179590, E00179591, E00179592, E00775906, E00775907, E00775908], HAL [HAL0114443], K (3 duplicates), MPU [MPU019215], OXF, P [P03899125, P03899126, P03899131])

=*Heterostemma tanjorensis* Wight & Arnott var. *zeylanicum* Hooker (1883b: 48) [Jun 1883] (synonymised by Huber 1983)

TYPE:—SRI LANKA, 1856, *G.H.K Thwaites C.P. 1859* (lectotype K [K000895028], here designated, possible isotype P [P03899127])

=*Stapelia involucrata* nom. nud. (ex [K000895029], [E00179589])

=*Stapelia volubilis* nom. nud. (ex *Herb. R. Wight. Prop.*, K)

**Notes:**—The materials listed by Wight for *H. tanjorensis* are clarified by Noltie (2006) as ‘[Porto Novo], herb. Madras, Wall. Asclep 112. [=Wall. Cat. 8178]. Sandy places in Tanjore, *Wight, WC 1527*’. Huber (1983) indicated the type of *H. tanjorensis* as ‘Herb. Wight propr. 1527 (K)’. This would be an effective lectotypification under Art. 9.9 of the ICN (McNeill *et al.* 2012). However at K there are four specimens bearing *HRWP 1527*. Kambale *et al.* (2015) selected [K000895029] as lectotype for *H. tanjorensis*, a specimen also labelled ‘*Stapelia involucrata*, Porto Novo, Novb. 22, 1810’. In LIV there is a specimen labelled ‘*Stapelia involucrata*, Dr. Klein, Porto Nov. Nov 22 1810’ pencilled ‘*Heterostemma tanjorensis* Wall 8178’ in Wight’s hand. This is an isotype and the only one clarifying the name of the collector (J.G. Klein). Another K specimen (Fig. 1) bears a manuscript description of the taxon by Wight’s hand but does not bear any collection information.

Noltie (2006: 169) indicated that ‘The Wight number (1527) seems to include Missionary material and more than one of his own collections’ therefore sheets that only bear Wight’s number and no further data are here considered as possible isotypes.

Specimen [C10006712], labelled ‘1527’ does not belong to *Heterostemma* and can’t be considered an isotype.

The type of *H. tanjorensis* var. *zeylanicum* was indicated by Hooker (1883b) as ‘*H. tanjorensis*, *Thwaites Enum. 198*.-Ceylon Central Province, ascending to 4000 ft’. Hooker & Thwaites (1864) mentioned *C.P. 1856* (1859) as *H. tanjorensis*. One sheet of *C.P. 1859*, annotated *Thwaites Enum. n. 198*. is present at K and is here designated as lectotype for *H. tanjorensis* var. *zeylanicum*.

***Heterostemma tsoongii*** Tsiang (1936: 192)

TYPE:—CHINA, Guangdong, Ling-shan, 9 July 1908, *K.K. Tsoong 1840* (lectotype Herb Tsoong, now in PE [PE00029445], here designated, isotype IBSC [IBSC0005671])

**Notes:**—Tsiang (1936) indicated the type of *H. tsoongii* as *Tsoong 1840* in Tsoong’s personal herbarium. Specimen [PE00029445] is annotated by Tsiang as type for the name and it can be assumed that it originates from Tsoong’s herbarium. However it is impossible to establish if [PE00029445] was the only duplicate of *Tsoong 1840* in Tsoong’s personal herbarium therefore it is here designated as lectotype.

***Heterostemma urceolatum*** Dalzell (1852: 295) ≡ *Oianthus urceolatus* (Dalzell) Bentham (1876: 12 t.1191)

TYPE:—INDIA, Maharashtra, Karnataka, Belgaum, August, *Dr. Ritchie 1112* (lectotype K [K000895025], here designated, isotype E)

**Notes:**—Swarupanandan *et al.* (1989) indicated the type of *H. urceolatum* as ‘Dalzell *s.n.* India, Maharashtra, Belgaum Dt. Belgaum (K, photo seen)’ and Kambale *et al.* (2015) confirmed the lectotypification following Art. 9.9 of the ICN (McNeill *et al.* 2012). However, I could not find any specimen of *H. urceolatum* at K collected by Dalzell. Dalzell (1852) did not indicate any materials for *H. urceolatum* but stated that the species ‘Crescit rara in collibus prope Belagaum; fl. Julio’. This is likely a reference to *Ritchie 1112* [K000895025] from Belgaum and the only specimen of the taxon at K. The sheet has numerous sketches of dissected flowers drawn on the sheet mounting paper itself. The specimen is here confirmed as lectotype for *H. urceolatum*.

***Heterostemma vasudevanii*** Swarupanandan & Mangaly in Swarupanandan *et al.* (1989: 257), (as ‘vasudevani’)

TYPE:—INDIA, Kerala, Idukki distr., Sabrimala, 1976, *K. Swarupanandan 13716* (holotype MH n.v., isotypes CALI n.v., CAL n.v., KFRI n.v., K [K000895022], LD n.v.)

**Notes:**—The isotypes of *Swarupanandan 13716* are denoted by a letter added to the collector number. (Starting from A for the holotype, to F for the LD duplicate)

***Heterostemma villosum*** Costantin (1912: 122)

TYPE:—VIETNAM, ‘ad ripas fluminis Song Be’, November 1876, *Pierre s.n.* (lectotype P [P03899118], here designated, isotype P [P03899117])

**Notes:**—Numerous specimens are cited by Costantin (1912) in the protologue of *H. villosum* ‘Cambodge: (*Godefroy, Harmand*). Cochinchine: environs de Saigon; plaine des Tombeaux (*Lefevre*); chemins, bords de la riviere Songbe (*Pierre, Thorel*). Laos: (*Massie*)’.

In P the available syntypes are *Lefevre 52*, Saigon, plaine des Tombeaux 1 September 1864, [P03899097], *Massie s.n.*, ‘Plantes du Laos, entrees le 30 Avril 1895’ [P03899098], *Harmand s.n.* dubiously from Cambodia or from Saigon [P03899101], *Harmand 957* [P03899099] and *Pierre s.n.* specimens collected near the Song Be river in November 1876 [P03899117 and P03899118]. All are identified as *H. villosum* in Costantin’s hand. The latter specimen [P03899118] is the best preserved and is selected as the lectotype for *H. villosum*.

A possible syntype labelled ‘environs de Saigon; plaine des Tombeaux *s. coll 4844*’ is present in L [L2720438].

***Heterostemma wallichii*** Wight (1834: 42) [Dec 1834]

TYPE:—Nepal, Sheopore, Herb. R. Wight. Prop., *Wallich Asclep. no. 154* [=Wall. Cat. 8179] (lectotype K [K000895033], here designated, isotypes CAL [CAL17966] (as Wall. Cat. 8179), E [E00179593], K (as Wall. Cat. 8179), [K000974159, K000974158] and four more duplicates)

=*Heterostemma yunnanense* W.T.Wang *nom. nud.* (from specimen KUN0267903)

**Notes:**—Wight (1832) mentioned ‘Wall. Asclep. n. 154 (absque nom.)—Sheopore; Wallich’ as the materials he based *H. wallichii* upon. Noltie (2006) clarified the type of *H. wallichii* as ‘Sheopore [Nepal], Wallich, Wall. Asclep. 154 [=Wall. Cat. 8179]. Isotype at E annotated with the locality Sheopore and ‘Wall. Ascl. n. 154’. Specimen [K000895033] belonged to Wight’s personal working herbarium and is a well-preserved specimen with an attached description of the species and a sketch of a dissected flower in Wight’s hand. It is therefore selected as lectotype of *H. wallichii*.

***Heterostemma xuansonense*** Tran & Kim (2010: 367) [13 Sep 2010]

TYPE:—VIETNAM. Phu Tho, Thanh Son, Xuan Son, 2 July 2003, *V.X. Phuong 6360* (holotype MO n.v.; isotype, HN, n.v.)

***Dregea stellaris*** (Ridley) Ridley (1923: 387) ≡ *Marsdenia stellaris* Ridley (1914: 40) ≡ *Dittoceras stellaris* (Ridley) Bullock (1957: 513) [23 Feb 1957]

TYPE:—MALAYSIA, Selangor, Gunong Mengkuang Lebah, Jan 1913, *Dyak collectors s.n.* (holotype K [K000894719])

**Notes:**—*Marsdenia stellaris* was described based on a single specimens collected on Gunong Mengkuang, Selangor, Malaysia and deposited at K. Specimen [K000894719] is annotated as ‘type’ in Ridley’s hand and is therefore the holotype for *D. stellaris*. The specimen has a label in Ridley’s hand that bears the name of N.C. Robinson. The specimen was not collected by Robinson but by local Dyak collector as indicated by Robinson himself (Ridley 1914: 28). The

taxon is here treated because it was combined in *Dittoceras* by Bullock (1957: 513), however a new combination in *Heterostemma* is not needed because the correct name is *Dregea stellaris* (Ridley) Ridley.

## Index to the names

*Dittoceras andersonii* Hook.f. ≡ ***Heterostemma andersonii*** (Hook.f.) Rodda  
*Dittoceras garrettii* Kerr ≡ ***Heterostemma garrettii*** (Kerr) Rodda  
*Dittoceras maculatum* Kerr ≡ ***Heterostemma maculatum*** (Kerr) Rodda  
*Dittoceras stellaris* (Ridl.) Bullock ≡ ***Dregea stellaris*** (Ridl.) Ridl.  
***Dregea stellaris*** (Ridl.) Ridl.  
*Gongronema membranifolium* Lauterb. & K.Schum. ≡ ***Heterostemma membranifolium*** Schltr.  
***Heterostemma acuminatum*** Decne  
***Heterostemma alatum*** Wight  
***Heterostemma andersonii*** (Hook.f.) Rodda  
***Heterostemma angustilobum*** Schltr.  
***Heterostemma balansae*** Cost.  
***Heterostemma beddomei*** (Hook.f.) Swarupan. & Mangaly  
***Heterostemma brownii*** Hayata  
***Heterostemma chrysanthum*** (Hassk.) Boerl.  
***Heterostemma collinum*** Schltr.  
***Heterostemma cuspidatum*** Decne  
***Heterostemma dalzellii*** Hook.f.  
***Heterostemma deccanense*** (Talbot) Swarupan. & Mangaly  
***Heterostemma disciflorum*** (Hook.f.) Swarupan. & Mangaly  
***Heterostemma esquirolii*** (H.Lév.) Tsiang  
***Heterostemma fimbriatum*** King & Gamble  
***Heterostemma gracile*** Kerr  
***Heterostemma grandiflorum*** Cost.  
***Heterostemma garrettii*** (Kerr) Rodda  
***Heterostemma herbertii*** Elmer  
***Heterostemma javanicum*** Hassk.  
***Heterostemma kaniense*** Schltr.  
***Heterostemma lobulatum*** Y.H.Li & Konta  
***Heterostemma luteum*** Cost.  
***Heterostemma luteum*** Cost. var. ***nigro-punctatum*** Cost.  
***Heterostemma maculatum*** (Kerr) Rodda  
***Heterostemma magnificum*** P.I.Forst.  
***Heterostemma manillense*** Schauer  
***Heterostemma membranifolium*** (Lauterb. & K.Schum.) Schltr.  
***Heterostemma menghaiense*** (H.Zhu & H.Wang) M.G.Gilbert & P.T.Li  
***Heterostemma montanum*** Schltr.  
***Heterostemma oblongifolium*** Cost.  
*Heterostemma papuanum* Schltr. = ***Heterostemma acuminatum*** Decne  
***Heterostemma pingtaoi*** S.Y.He & J.Y.Lin  
***Heterostemma piperifolium*** King & Gamble  
***Heterostemma piperifolium*** var. ***cordatum*** King & Gamble  
***Heterostemma renchangii*** Tsiang  
***Heterostemma samoense*** (A.Gray) P.I.Forst. (1992: 78)  
***Heterostemma siamicum*** Craib  
***Heterostemma sinicum*** Tsiang  
***Heterostemma stellatum*** Hook.f.  
***Heterostemma suberosum*** Cost.



*Heterostemma succosum* Kerr  
*Heterostemma tanjorensis* Wight & Arn.  
*Heterostemma tanjorensis* Wight & Arn. var. *zeylanicum* Hook.f. = *Heterostemma tanjorensis* Wight & Arn.  
*Heterostemma tsoongii* Tsiang  
*Heterostemma urceolatum* Dalzell  
*Heterostemma vasudevanii* Swarupan. & Mangaly  
*Heterostemma villosum* Cost.  
*Heterostemma villosum* var. *menghaiense* H.Zhu & H.Wang = *Heterostemma menghaiense* (H.Zhu & H.Wang) M.G.Gilbert & P.T.Li  
*Heterostemma wallichii* Wight  
*Heterostemma xuansonense* T.B. Tran & J.Hw.Kim  
*Marsdenia stellaris* Ridl. (1914: 40) = *Dregea stellaris* (Ridl.) Ridl.  
*Oianthus beddomei* Hook.f. = *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly  
*Oianthus deccanensis* Talbot = *Heterostemma deccanense* (Talbot) Swarupan. & Mangaly  
*Oianthus disciflorus* Hook.f. = *Heterostemma disciflorum* (Hook.f.) Swarupan. & Mangaly  
*Oianthus urceolatus* (Dalzell) Benth. = *Heterostemma urceolatum* Dalzell  
*Pentasachme esquirolii* H.Lév. = *Heterostemma esquirolii* (H.Lév.) Tsiang  
*Stapelia quadrangula* Blanco = *Heterostemma cuspidatum* Decne  
*Symphysicarpus chrysanthus* Hassk. = *Heterostemma chrysanthum* Boerl.  
*Tylophora calcarata* Benth. = *Heterostemma acuminatum* Decne  
*Tylophora samoensis* A.Gray = *Heterostemma samoense* (A.Gray) P.I.Forst.  
*Tylophora samoensis* Schltr. = *Heterostemma samoense* (A.Gray) P.I.Forst.  
*Tylophora powellii* Hochr. = *Heterostemma samoense* (A.Gray) P.I.Forst.

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## References

- Backer, C.A. & Bakhuizen van den Brink, R.C. (1965) Asclepiadaceae. In: Backer, C.A. & Bakhuizen van den Brink, R.C. (Eds.) *Flora of Java*. 2. N.V.P. Noordhoff, Groningen, pp. 244–274.
- Bentham, G. (1869) *Tylophora*. In: Bentham, G. & Mueller, F. von (Eds.) *Flora Australiensis*. 4. L. Reeve, London, pp. 333–336.
- Bentham, G. (1876) *Oianthus*. In: Hooker, J.D. (Ed.) *Icones plantarum* 12: 79–80.
- Blanco, F.M. (1837) *Flora de Filipinas*. Sto. Thomas, Manila, 887 pp.
- Boerlage, J.G. (1899) Asclepiadaceae. In: Boerlage, J.G. (Ed.) *Handleiding tot de Kennis der Flora van Nederlandsch Indië*. 3. E.J. Brill, Leiden, pp. 401–442.
- Bullock, A.A. (1957) Notes on African Asclepiadaceae VIII. *Kew Bulletin* 11: 503–522.  
<http://dx.doi.org/10.2307/4109137>
- Costantin, J. (1912) *Heterostemma*. In: Lecomte, P.H. (Ed.) *Flore Générale de l'Indo-Chine* 4 Masson & Co., Paris, pp. 119–125.
- Craib, W.G. (1911) Contributions to the Flora of Siam LIII(II) *Bulletin of Miscellaneous Information Kew* 1911: 385–474.
- Dalzell, N.A. (1852) Contributions to the Botany of Western India. *Hooker's Journal of Botany and Kew Garden Miscellany* 4: 289–295.
- Decaisne, J. (1838) Etudes sur quelques genres et especes de la famille des Asclepiadees. *Annales des Sciences Naturelles; Botanique* 9: 257–348.
- Decaisne, J. (1844) *Heterostemma*. In: Candolle, A.L.P.P. de (Ed.) *Prodromus Systematis Naturalis Regni Vegetabilis* 8 Fortin, Masson et

sociorum, Paris, p. 630.

- Elmer, A.D.E. (1919) New woody plants from Mount Maquiling. *Leaflets of Philippine Botany* 8: 3069–3105.
- Elmer, A.D.E. (1938) Notes on Asclepiadaceae. *Leaflets of Philippine Botany* 10: 3543–3599.
- Endress, M.E. & Bruyns, P.V. (2000) A revised classification of the Apocynaceae s.l. *The Botanical Review* 66: 1–56.  
<http://dx.doi.org/10.1007/bf02857781>
- Endress, M.E., Liede-Schumann, S. & Meve, U. (2014) An updated classification for Apocynaceae. *Phytotaxa* 159 (3): 175–194.  
<http://doi.org/10.11646/phytotaxa.159.3.2>
- Forster, P.I. (1992) A taxonomic revision of *Heterostemma* Wight & Arn. (Asclepiadaceae: Stapelieae) in Australia and the Western Pacific. *Australian Systematic Botany* 5: 71–80.  
<http://dx.doi.org/10.1071/SB9920071>
- Forster, P.I. & Liddle, D.J. (1994) Type Collections of Asclepiadaceae at Herbarium Bogoriense (BO). *Australian Systematic Botany* 7: 507–519.  
<http://dx.doi.org/10.1071/SB9940507>
- Forsskål, P. & Niebuhr, C. (1775) *Flora Aegyptiaco-Arabica*. officina Mölleri, Copenhagen, 220 pp.
- Gilbert, M.G., Stevens, W.D., & Li, P.T. (1995) Notes on the Asclepiadaceae of China. *Novon* 5: 1–16.  
<http://dx.doi.org/10.2307/3391820>
- Gray, A. (1862) Notes upon a Portion of Dr. Seemann's recent Collection of dried Plants Gathered in the Feejee Islands. *Proceedings of the American Academy of Arts and Sciences* 5: 314–352.
- Hasskarl, J.K. (1857) Plantarum nonnullarum Javanicarum e familiis Asclepiadearum et Apocynearum adumbrationes. *Flora* 40: 97–106.
- Hayata, B. (1911) Materials for a Flora of Formosa. *Journal of the College of Science, Imperial University of Tokyo* 30: 1–47.1
- Hiepko, P. (1978) Die erhaltenen Teile der Sammlungen des Botanischen Museums Berlin-Dahlem (B) aus der Zeit vor 1943. *Willdenowia* 8: 389–400.
- Hochreutiner, B.P.G. (1936) Plantae Hochreutineranae. *Candollea* 6: 354–488.
- Hooker, J.D. (1883a) *Dittoceras*. In: Hooker, J.D. (Ed.) *Icones plantarum* 5: 17–18, t. 1422.
- Hooker, J.D. (1883b) *Asclepiadeae*. In: Hooker, J.D. (Ed.) *The Flora of British India* 4. L. Reeve, London, pp. 1–78.
- Hooker, J.D. (1884) *Oianthus beddomei*. In: Hooker, J.D. (Ed.) *Icones plantarum* 15: 52–53, t. 1466.
- Huber, H. (1983) *Heterostemma*. In: Dassanayake, M.D. & Fosberg F.R. (Eds.) *A revised handbook to the flora of Ceylon* 4. Smithsonian Institution Press, Washington, pp. 106–107.
- Jagtap, A.P. & Singh, N.P. (1999) *Asclepiadaceae*. In: *Fascicles of Flora of India* 24. Botanical Survey of India, pp. 1–284.
- Kambale, S.S., Kamble, M.Y. & Yadav, S.R. (2015) *Heterostemmas* of the Northern Western Ghats, India and their typifications. *Asklepios* 121: 3–10.
- Kerr, A.F.G. (1939) Contributions to the Flora of Siam. Additamentum LII. *Kew Bulletin* 1939: 556–465.
- King, G. & Gamble, J.S. (1908) *Heterostemma*. In: Materials for a Flora of the Malayan Peninsula. *The journal of the Asiatic Society of Bengal* 74: 556–558.
- Léveillé, H. (1914) *Flore du Kouy Tcheou*. H. Léveillé. Le Mans, 535 pp.
- Li, P.T., Gilbert, M.G. & Stevens, W.D. (1995). *Heterostemma*. In: Wu, Z.Y. & Raven, P.H. (Eds.) *Flora of China* 16. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. pp. 263–265.
- Li, Y.H., Konta, F. & Kitagawa, J. (2002) A new species of *Heterostemma lobulatum* in the family Asclepiadaceae. *Bulletin of the National Science Museum. Series B, Botany* 28: 93–98.
- Lin, J., He, S., Li, M. & Lin, G. (2010). *Heterostemma pingtaoi* (Apocynaceae, Asclepiadoideae), a New Species from Hainan, China. *Novon* 20: 60–62.  
<http://doi.org/10.3417/2008024>
- McNeill, J., 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. (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code)*. Regnum Vegetabile 154. Koeltz Scientific Books, Königstein, 205 pp.
- Merrill, E.D. (1918a) *Species Blancoanae*. Manila Bureau of Printing, Manila, 423 pp.
- Meve, U. & Liede, S. (2002) A molecular phylogeny and generic rearrangement of the stapelioid Ceropogonaceae (Apocynaceae-Asclepiadoideae). *Plant Systematics and Evolution* 234: 171–209.  
<http://dx.doi.org/10.1007/s00606-002-0220-2>
- Meve, U., & Liede, S. (2004). Subtribal division of Ceropogonaceae (Apocynaceae-Asclepiadoideae). *Taxon* 53: 61–72.
- Meyer, E.H.F. (1838) *Commentariorum de Plantis Africae Australioris* 199. Leipzig, Leopoldum Voss, 326 pp.
- Nicholas, A. (1992) The Asclepiadaceous works of Rudolf F. Schlechter (1872–1925). *Willdenowia* 22: 215–264.
- Noltie, H.J. (2006) *The Botany of Robert Wight*. Regnum Vegetabile 145. A.R.G. Gantner, Ruggell, 579 pp.

- Ridley, H.N. (1914) On a collection of plants from Guning Mengkuang Lebah, Selangor. *Journal of the Federated Malay States Museums. Kuala Lumpur* 5: 28–50.
- Ridley, H.N. (1923) *The Flora of the Malay Peninsula* vol. 2. London, Reeve & Co. 672 pp.
- Schlechter, R. (1895) Two new genera of Asclepiadeae. *Journal of botany, British and foreign* 33: 321–322.
- Schlechter, R. (1905) *Heterostemma*. In: Schumann, K. & Lauterbach, K. (Eds.) *Nachträge zur Flora der deutschen Schutzgebiete in der Südsee*. Gebrüder Borntraeger, Leipzig. 446 pp.
- Schlechter, R. (1908) Beiträge zur Kenntnis der Asclepiadaceen des Monsum-Gebietes. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 40 (Beibl. 92): 1–45.
- Schlechter, R. (1913) Die Asclepiadaceen von Deutsch-Neu-Guinea. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 50: 81–164.
- Schlechter, R. (1915) Asclepiadaceae Philippinenses II. *Repertorium Specierum Novarum Regni Vegetabilis* 13: 554–566.  
<http://dx.doi.org/10.1002/fedr.19150133604>
- Schumann, K., (1898) Die Flora von Neu-Pommern. *Notizblatt des Königl. Botanischen Gartens und Museums zu Berlin* 13: 1–158.
- Smith, A.C. (1988) *Flora Vitiensis Nova* 4. SB Printers Inc. Honolulu, 377 pp.
- Stafleu, F.A. & Cowan, R. (1976–) *Taxonomic Literature: A selective guide to botanical publications and collections with dates, commentaries and types*. Bohn, Scheltema & Holkema, Utrecht. Available from:<http://www.sil.si.edu/digitalcollections/tl-2/index.cfm>
- van Steenis-Kruseman, M.J. (1950) *Flora Malesiana* 1. Noordhoff-Kolff N.V. Jakarta, 639 pp.
- Swarupandan, K., Sasidharan, N. & Mangaly, J.K. (1989) A reconsideration of the generic circumscription of *Heterostemma* Wight & Arn. (Asclepiadaceae) and a new species from India. *Botanical Journal of the Linnean Society* 101: 249–259.  
<http://doi.org/10.1111/j.1095-8339.1989.tb00158.x>
- Talbot, W.A. (1911) *Forest Flora of the Bombay Presidency*, 2. Govt. at the Photozincographic Dept. Poona.
- Tran, T.B. & Kim, J.H. (2010) A New Species of *Heterostemma* (Apocynaceae, Asclepiadoideae) from Vietnam. *Novon: A Journal for Botanical Nomenclature* 20: 367–370.  
<http://doi.org/10.3417/2009002>
- Tsiang, Y. (1936) Notes on the Asiatic Apocynales III. *Sunyatsenia* 3: 121–239.
- Walpers, G. (1843) Cruciferas, Capparideas, Calycereae et Compositas quas Meyenius in orbis circumnavigatione collegit, enumerat novaque describit. *Nova acta physico-medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosum* 19 (Suppl. 1): 247–296.
- Wight, R. (1834) *Contributions to the Botany of India*. Parbury, Allen & Co., London, 136 pp.
- Zhu, H. & Wang, H. (1994) Contributions to the Flora of Xishuangbanna (2). *Acta Botanica Yunnanica* 16: 25–28.