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Lectotypification of *Pentagonia macrophylla* (Rubiaceae) revisited

JOHAN ROVA[1,2*], CLAES PERSSON[1,2], ERIK LJUNGSTRAND[2] & ALEXANDRE ANTONELLI[1,2,3]
[1]*Gothenburg Global Biodiversity Centre, P.O. Box 461, SE-405 30 Göteborg, Sweden.*
[2]*Department of Biological and Environmental Sciences, University of Gothenburg, P.O. Box 461, SE-405 30 Göteborg, Sweden.*
[3]*Gothenburg Botanical Garden, Carl Skottsbergs gata 22A, SE-413 19 Göteborg, Sweden.*
[*]*Corresponding author: jorova@telia.com*

In this work, we argue that the "lectotypification" of *Pentagonia macrophylla* Benth. made by Andersson & Rova in Flora of Ecuador (2004) was in fact a neotypification, because the designated type was not original material. Original material of this species, collected by Andrew Sinclair, has now been located in the K herbarium at Kew Gardens, and is here designated as the lectotype of this name.

Key words: Condamineeae, Hippotideae, Ixoroideae, Panama.

The neotropical genus *Pentagonia* Bentham (1845: 105) *nom. cons*. comprises about 40 small to medium sized tree species, which are distributed from Guatemala to Peru (Standley & Williams 1975, Burger & Taylor 1993, Andersson & Rova 2004, Taylor 2012).

Delimitation of several species in the genus has not been settled. Circumscription of the type species, *P. macrophylla* Bentham (1845: 105–106), has been particularly problematic, and various views have been put forward over which species should be synonymized (or not) with *P. macrophylla.* In Flora of Guatemala, Standley & Williams (1975) considered *P. donnell-smithii* (Standley 1914: 442) Standley (1927: 170) to be synonymous with *P. macrophylla*, which would extend the distribution range of the species to the northern frontier of the genus. This view was contradicted by Burger & Taylor (1993) in Flora Costaricensis, and by Taylor (2012) in Flora Mesoamericana, who kept the two species separate, but instead regarded *P. pubescens* (Standley 1914: 441–442) Standley (1927: 170) from Panama as synonymous to *P. macrophylla*. Moreover, Dwyer (1980) considered a rather small individual with small leaves from the province of Veraguas, Panama, as a separate species, *P. veraguensis* Dwyer (1980: 328–329), but this name was later synonymized with *P. macrophylla* by Taylor (2012). In Flora of Ecuador, Andersson & Rova (2004) treated *P. cuatrecasasii* Standley ex Steyermark (1964: 84–87), *P. orthoneura* Standley (1931: 212), and *P. sprucei* Standley (1931: 212–213) as synonymous with *P. macrophylla*, thus extending the distributional range southwards to at least southern Ecuador. The distribution of *P. macrophylla* in its broadest sense would thus range from Guatemala to Ecuador (and possibly northern Peru), while a more restricted circumscription would delimit it to an area closer to its type locality. In addition to (or because of) this taxonomic debate, the name "*P. macrophylla*" has also been used in a routine fashion for the identifications of numerous specimens of *Pentagonia*, including small-leaved and lobed-leaved ones (Rova, pers. obs.).

To a large extent, the confusion described above derives from uncertainties about the interpretation of the original material that Bentham (1845) used for his description of *P. macrophylla* in "The Botany of the Voyage of H.M.S. Sulphur". Both present day Colombia and Panama have been discussed as possible collection localities (Andersson & Rova 2004) and at least three collectors have been suggested: Richard Brinsley Hinds, George Barclay, and Carl Berthold Seemann (Standley 1914; Lorence 1999; Andersson & Rova 2004). Here we aim at settling this issue by a careful revision of the specimens underlying the description of the species.

In the protologue of *P. macrophylla*, Bentham (1845) only states "Panama" as origin, and gives no references to dates, collectors, or exact localities of any collected specimens. However, the journey of H.M.S. Sulphur in Western tropical America (between Mexico and Guayaquil in Ecuador) is described in detail by Hinds (1844: 58–63), who states that "Panama received several visits" during 1836–1839. If the herbarium material used by Bentham was to be found, it should thus ideally be annotated as collected in Panama in 1836–1839.

Although Bentham himself did not participate in the H.M.S. Sulphur expedition, he was responsible for the botanical descriptions based on the collected material (Bentham 1846: 182). The principal collection on the expedition was made by Richard Brinsley Hinds, but collections were also made by George Barclay and the surgeon Andrew Sinclair (Bentham 1846: 182; Stafleu & Cowan 1985: 612). Hinds' collection was the only one that originally was deposited in Bentham's herbarium,

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while Barclay's and Sinclair's collections were deposited in William Hooker's herbarium (Bentham 1846: 182). Nevertheless, Bentham clearly states that he had access to material collected by all three collectors for his botanical descriptions (Bentham 1846: 182). Thus, material used by Bentham could have been collected by either Hinds, Barclay, or Sinclair, and it would most likely be deposited at K (Hooker's collection; Stafleu & Cowan 1979: 283) or at BM (Bentham's original material of the Sulphur expedition; Stafleu & Cowan 1976: 173). We have searched for *P. macrophylla* material collected by Barclay, Hinds and Sinclair at BM and K. No such material was found at BM, but at K we found two specimens (K000648265 and K000648266) annotated "Dr. Sinclair" and stamped "Herbarium Hookerianum 1867". Therefore, we argue that Sinclair's specimens at K should be considered original material of *P. macrophylla*, and that the "lectotypification" made by Andersson & Rova (2004), on a Seemann collection in K (K000173103, stamped "Herbarium Benthamianum 1854" [Rova, pers. obs.] and annotated "Gorgona Seemann Hooker 1849"), is erroneous. We base these conclusions on the arguments below.

Firstly, the material collected by Seemann is more recent than Bentham's (1845) description of *P. macrophylla*. Seemann did not start exploring the Isthmus of Panama until September 1846, just before he joined the H.M.S. Herald's expedition in January 1847 (Seemann 1852: 6). The expedition made several visits to Panama during 1847–1849 (Seemann 1852: 61), and Seemann explicitly made a journey "in the western districts of the Isthmus of Panama" in the beginning of 1849 (Seemann 1852: 7). The number "1849" on the K specimen could be interpreted as the collection year, the year when Hooker received the material, or the year when it was filed in the K herbarium. In either case, the material collected by Seemann could not have been studied by Bentham before the plate of *P. macrophylla* was published in 1844, and should not have been selected as "lectotype" by Andersson & Rova (2004).

Secondly, the nomenclatural note in Andersson & Rova (2004) reads that there are three specimens ascribed to Seemann at K (one from Bentham's herbarium and two from Hooker's). Instead, a closer examination of the material at K shows that only the specimen from Bentham's herbarium is ascribed to Seemann, while (as mentioned above) the two specimens from Hooker's herbarium are clearly ascribed to "Dr. Sinclair". The fact that two of the specimens were collected by Sinclair is important, because it strongly indicates that they are from the H.M.S. Sulphur expedition, and thus belong to the material used by Bentham for preparing "The Botany of the Voyage of H.M.S. Sulphur". One of the specimens, K000648265, also has pencil drawings of flower details that are very similar to those of the illustration in Bentham's work (1844).

An additional misinterpretation in Andersson & Rova (2004) is that only one (not two) of the three K specimens (i.e. only Seemann's collection from Bentham's herbarium) is labelled "Gorgona". Sinclair's two collections (from Hooker's herbarium) are both labelled "Panama". Furthermore, Andersson & Rova assumed that "Gorgona" is the Island of Gorgona, off Colombia's Pacific coast. We argue instead that Gorgona should be interpreted as the former town of Gorgona on the Chagres River in Panama. It is now flooded by the Gatun Lake of the Panama Canal, but in the 19th century it was a stop on the Panama railroad (Otis 1862: map on p. 5), close to the present town of Gamboa. This interpretation matches well with Seemann's journey in Panama in 1849 (Seemann 1852: 7).

In his revision of *Watsonamra*, Standley (1914) wrote that Bentham applied *Pentagonia* to "a Rubiaceous plant collected by Hinds in Panama", and repeats this under *Watsonamra macrophylla* by stating "Type locality: Panama. Type collected by Hinds." Unfortunately, Standley did not state whether he actually saw material of *P. macrophylla* that was collected by Hinds, or if he rather just assumed Hinds to be the collector, as it was mainly Hinds' material that was used for Bentham's work (Bentham 1846: 182, Seemann 1852: 61). Because no *Pentagonia* specimens collected by Hinds could be found at K or BM, we consider the latter option to be the most likely.

Lorence (1999), in his "A nomenclator of Mexican and Central American Rubiaceae", stated "Type: Panama: Panama, forests between Panama and Cruces, *Barclay s.n.* (Holotype BM, n.v.)." No explanation is given why he considers Barclay to be the collector of the (unseen) type. The statement may be based on a note by Seemann (1854: 134) in which it says that *Pentagonia* "is composed of three species, one with entire leaves (discovered by Barclay), and two with pinnatifid ones (discovered by myself)". As no *Pentagonia* specimens collected by Barclay were found at K or BM, we argue that Seemann's note about the species with entire leaves (meaning *P. macrophylla*) does not necessarily refer to any specific (type) specimen.

According to Article 9.9 of the ICNafp (McNeill *et al.* 2012), a "lectotypification" on non-original material, as done by Andersson & Rova (2004), should be treated as an error to be corrected. We argue that the original material of *P. macrophylla* consists of: (1) the two specimens at K, collected by Andrew Sinclair in Panama, and very likely the material used by Bentham when he illustrated and described *P. macrophylla*; (2) the illustration published by Bentham (1844); and (3) the original drawing for this published illustration (if it still exists). Consequently, we designate the specimen with barcode K000648265, collected by Sinclair, as lectotype (Fig. 1).

FIGURE 1. Lectotype (designated here) of *Pentagonia macrophylla* Bentham. *A. Sinclair s.n.*; K, http://specimens.kew.org/herbarium/K000648265. © The Board of Trustees of the Royal Botanic Gardens, Kew. Reproduced with the consent of the Royal Botanic Gardens, Kew.

Typification

Pentagonia macrophylla Bentham (1845: 105) [Illustration in Bentham 1844: plate 39]

Lectotype (designated here):—PANAMA. Without locality, s.d. [1836–1839], *A. Sinclair s.n.* (K barcode K000648265! http://specimens.kew.org/herbarium/K000648265). (Fig. 1).

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