

Lectotypifications and nomenclatural notes in *Copaifera* L. (Leguminosae-Caesalpinioideae-Detarieae)

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Summary. Recent studies of extra-Amazonian species of *Copaifera* revealed several nomenclatural problems. We choose lectotypes for *C. cearensis* Huber ex Ducke and *C. cearensis* var. *arenicola* Ducke from amongst the available syntypes, and propose the lectotypification of *C. langsdorffii* Desf. with its original plate. Comments are made about the correct spelling of the specific epithet of *C. langsdorffii* and the typifications of *C. elliptica* Mart. and *C. luetzelburgii* Harms are clarified.

Key Words. *Copaifera*, lectotypifications, Leguminosae, nomenclature, taxonomic notes.

Introduction

Copaifera L. (Leguminosae, Caesalpinioideae, Detarieae) is a relatively small pantropical genus. Since Jacquin (1760) described *Copaiva officinalis* and Linnaeus (1762) first proposed the genus *Copaifera*, more than 100 taxa have been described (Costa 2007). The genus *Copaifera* is currently considered to contain 33 species in the Neotropics, four in Africa and one in Malesia (Lewis *et al.* 2005).

This work was carried out as part of the PhD studies of extra-Amazonian *Copaifera* species by the first author. Costa (2007) accepted 17 species and eight varieties of extra-Amazonian *Copaifera*, but a number of names need nomenclatural updating. This paper presents nomenclatural updates and taxonomic notes for the appropriate taxa.

Lectotypification

***Copaifera cearensis* Huber ex Ducke (1959: 85).** Type: Brazil, Ceará, Fortaleza, 19 Feb. 1955, Ducke 2446 (lectotype RB; isolectotype K!, photo. HUEFS!).

NOTES. Ducke (1959) described *Copaifera cearensis* based on an unpublished name proposed by Huber for plants collected by Ducke in Ceará State, Brazil. In the protologue, Ducke (1959) cited, among other specimens, “Ducke 2446 floribus 19-II-1955, fructibus maturis 7-VI-1955, speciei typus”, but this collection corresponds to two different gatherings made nearly

four months apart. We propose the lectotypification of *Copaifera cearensis* with the flowering specimen because it has better preserved leaves that best fit Ducke’s (1959) protologue since he diagnosed *C. cearensis* as “A specie affini *C. langsdorffii* differt praesartim foliolis 2 – 3-jugis”.

***Copaifera cearensis* Huber ex Ducke var. *arenicola* Ducke (1959: 87).** Type: Brazil, Ceará, Fortaleza, 14 Nov. 1954, Ducke 2368 (lectotype RB, selected here; isolectotype K!, photo. HUEFS!).

NOTES. In describing *Copaifera cearensis* var. *arenicola*, Ducke (1959) cited five specimens, but did not designate a type. Based on Arts. 9.2 and 9.10 of the International Code of Botanical Nomenclature (McNeill *et al.* 2006), we choose Ducke 2368 as the lectotype of *Copaifera cearensis* var. *arenicola*.

***Copaifera langsdorffii* Desf. (Desfontaines 1821: 14).** Type: Desfontaines’ original drawing (Plate 14) in the Library of the Muséum National d’Histoire Naturelle, Paris (lectotype, selected here). Reproduction printed in *Mém. Mus. Hist. Nat.* 7: 377 – 378, Pl. 14 (1821).

NOTES. *Copaifera langsdorffii* was originally described by M. Desfontaines (1821) without designation of a type. After searching through material from B, BM, BR, G,

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K, M, MO, NY, P, U, and US we did not find any specimen that could be considered as original material, nor any material determined by Desfontaines, nor any collection by Langsdorff, after whom the species was named. We therefore designate the original illustration housed in the Library of the Muséum National d'Histoire Naturelle, Paris, as the lectotype of the name *Copaifera langsdorffii* Desf., based on the recommendations in McNeill *et al.* (2006), Arts. 9.2 and 9.10.

There is also some confusion regarding the correct spelling of the species epithet. Desfontaines (1821) clearly stated that the species was named after the 'Consul General of the Russian Emperor at Rio de Janeiro' (at that time, Georg Heinrich von Langsdorff). However, the spelling used in the heading in Desfontaines' (1821) original publication was "Lansdorff", this probably being a typographical error. Conversely, in the legend to the accompanying plate the epithet is correctly spelled "*langsdorffii*". The two spellings are orthographic variants (Art. 60 and Art. 61; McNeill *et al.* 2006). In this situation, according to Art. 61.3, the name to be retained is that which better agrees with Art. 60 or that which was first explicitly adopted in a subsequent effectively published paper. After Desfontaines' (1821) publication, Sprengel (1825) adopted the spelling "*langsdorffii*" without explicitly rejecting its orthographic variant (Art. 61.3, McNeill *et al.* 2006), and, in the same year, de Candolle (1825) used the name *C. langsdorffii*, introducing this new variant of the epithet. Later, Hayne (1827) and Bentham (1870) adopted *Copaifera langsdorffii* for Desfontaines' species. Lloyd (1898) was the first to discuss the spelling "*lansdorffii*", which he considered as "an error of print in Desfontaines original memoir" and which "was erroneously spelled" since "the species named by Desfontaines in 1821 was in honour of Mr Langsdorff, the Russian consul general at Rio Janeiro, from whom the specimens were obtained".

Dwyer (1951) adopted the spelling, "*langsdorffii*" following de Candolle. He commented on the several misspellings of the epithet in the literature citing "*lansdorffii*", and "*langdorffii*", but without commenting on the correct orthographic variant used by Lloyd (1898). Some other authors used the spelling "*langsdorffii*", such as Kuntze (1891); Dwyer (1951, 1954); Feibert & Langenheim (1988); Ohsaki *et al.* (1994) and Richter & Dallwitz (2000 onwards). Conversely, in agreement with Lloyd (1898), several other authors adopted the name *C. langsdorffii*, e.g. Luetzelburg (1923), Lewis (1987); Harley (1995); Oliveira-Filho & Ratter (1995); Meguro *et al.* (1996); Mendonça *et al.* (2000); Queiroz (2002); Veiga-Jr. & Pinto (2002); Souza *et al.* (2003);

Zappi *et al.* (2003); Oliveira-Filho *et al.* (2004), and we follow this usage.

Taxonomic notes

***Copaifera elliptica* Mart.** (Martius 1837: 127). Type: Brazil, Mato Grosso, Cuiabá, *Riedel* 205 (holotype M!; isotypes A, P, photo. F, NY!).

NOTES. *Copaifera elliptica* was originally described by Martius (1837) based on the material "Herb. Fl. Brasil. 205". This is probably a plant collected by L. Riedel in Mato Grosso and housed at the Munich Herbarium (M). Dwyer (1951) considered *Riedel* 205 preserved at A (photo at F) as the type. Later, Dwyer (1954) cited the specimens *Riedel* 204 and *Riedel* 205 preserved in P as syntypes of *C. elliptica*. However, we disagree since *Riedel* 204 was not referred to in Martius' (1837) original publication and careful examination of the original description and the label of the material housed at M indicates that *Riedel* 205 is the type collection. Therefore we recognise *Riedel* 205 (M), as the holotype and the materials of *Riedel* 205 housed in A and P as isotypes.

***Copaifera luetzelburgii* Harms** (1924: 713). Type: Brazil, Piauí (*non* Bahia), Zapata de Bom Jesus do Rio Gurgéia, June – July 1912, *Luetzelburg* 201 (lectotype M!, selected by Ducke 1959: 88).

NOTES. *Copaifera luetzelburgii* was originally described by Harms (1924) without designation of a type. Ducke (1959) explicitly referred to *Luetzelburg* 201 as the type of the species. However, the original label of this specimen indicates that it was collected in Bahia State, information that was retained in Harms' (1924) publication. This reference to Bahia was corrected by a later addition on the same label, replacing "Bahia" with "Piauí" and adding the information "Zapata de Bom Jesus de Rio Gurgéia, Agreste".

The itinerary of Luetzelburg's travels favours the interpretation that his material was not collected in Bahia. Luetzelburg travelled to the outskirts of Alvorada do Gurgéia between the towns of Colônia do Gurgéia and Alvorada do Gurgéia, near to the Anda Só stream in the middle Gurgéia River valley, Piauí, where he probably collected his first specimen of *Copaifera luetzelburgii*. He went on to Bom Jesus where he made a second collection of the species. Thus his *Luetzelburg* 201, and the collection from "Pussá" (*Luetzelburg* 1383 (M!, U!)) are from the "Chapada" of the Bom Jesus of the Gurgéia River.

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References

- Bentham, G. (1870). Leguminosae II et III. Swartzieae, Caesalpinieae, Mimoseae—tribus XVII. Cynometreae. In: C. F. P. von Martius (ed.), *Flora Brasiliensis* 15: 239 – 248. R. Oldenbourg, Munich & Leipzig.
- Candolle, A. P. De. (1825). *Prodromus systematis naturalis regni vegetabilis*. Treuttel & Würtz, Paris.
- Costa, J. A. S. (2007). *Estudos Taxonômicos, Biossistemáticos e Filogenéticos em Copaifera L. (Leguminosae, Detarieae) com ênfase nas espécies do Brasil extra-Amazônico*. Unpublished PhD Thesis. UEFS, Feira de Santana, Brazil.
- Desfontaines, M. (1821). Observations sur le genre *Copaifera*, description de deux nouvelles espèces qui lui appartiennent. *Mém. Mus. Hist. Nat.* 7: 377 – 378.
- Ducke, A. (1959). Estudos botânicos no Ceará. Notas sobre sistemática. *Anais Acad. Brasil. Ci.* 31: 85 – 88.
- Dwyer, J. D. (1951). The Central American, West Indian and South American species of *Copaifera* (Caesalpinioideae). *Brittonia* 7: 143 – 172.
- (1954). Further studies on the New World species of *Copaifera*. *Bull. Torrey Bot. Club* 81: 179 – 187.
- Feibert, E. B. & Langenheim, J. H. (1988). Leaf resin variation in *Copaifera langsdorffii*. Relation to irradiance and herbivory. *Phytochemistry* 27: 2527 – 2532.
- Harley, R. M. (1995). Introduction. In: B. Stannard (ed.), *Flora of the Pico das Almas, Chapada Diamantina, Bahia, Brazil*, pp. 1 – 42. Royal Botanic Gardens, Kew.
- Harms, H. (1924). Plantae Luetzelburgianae brasilienses III — Leguminosae. *Notizbl. Bot. Gart. Berlin-Dahlem* 8: 713.
- Hayne, F. C. (1827). *Getreue Darstellung und Beschreibung der in der Arzneykunde Gebrauchlichen Gewächse*. Auf kosten des verfassers, Berlin.
- Jacquin, N. J. (1760). *Enumeratio Systematica Plantarum*. Apud Theodorum Haak, Lugduni Batavorum.
- Kuntze, O. (1891). *Revisio Genera Plantarum* 1. A. Felix, Leipzig.
- Lewis, G. P. (1987). *Legumes of Bahia*. Royal Botanic Gardens, Kew.
- , Schrire, B., Mackinder, B. & Lock, M. (eds) (2005). *Legumes of the World*. Royal Botanic Gardens, Kew.
- Linnaeus, C. (1762). *Species Plantarum*. Ed. 2. Laurentii Salvii, Holmiae.
- Lloyd, J. U. (1898). *Copaifera officinalis*: botanical description and historical notes. Reprinted from *The Western Druggist*, Chicago.
- Luetzelburg, P. von. (1923). Estudo Botânico do Nordeste. *Inspetoria Federal de Obras contra as Seccas* sér. I-A, 57: 1 – 108.
- Martius, C. F. P. von. (1837). *Herbarium Florae Brasiliensis*. Monachii.
- McNeill, C. J., Barrie, F. R., Burdet, H. M., Demoulin, V., Hawksworth, D. L., Marhold, K., Nicolson, D. H., Prado, J., Silva, P. C., Skog, J. E., Wiersema, J. H. & Turland, N. J. (eds) (2006). International Code of Botanical Nomenclature (Vienna Code). *Regnum Veg.* 146.
- Meguro, M., Pirani, J. R., Mello-Silva, R. de & Giulietti, A. M. (1996). Caracterização Florística e Estrutural de Matas Ripárias e Capões de Altitude da Serra do Cipó, Minas Gerais. *Bol. Bot. Univ. São Paulo* 15: 13 – 29.
- Mendonça, R. C., Felfili, J. M. de, Fagg, C. W., Silva, M. A., Filgueiras, T. S. da & Walter, B. M. T. (2000). Florística da Região do Espigão Mestre do São Francisco, Bahia e Minas Gerais. *B. Herb. Ezechias Heringer, Brasília* 6: 38 – 94.
- Ohsaki, A., Yan, L. T., Ito, S., Edatsugi, H., Iwata, D. & Komoda, Y. (1994). The isolation and in vivo potent antitumor activity of clerodane diterpenoid from the oleoresin of the Brazilian medicinal plant, *Copaifera langsdorffii* Desf. *Bioorganic & Medicinal Chemistry Letters* 4: 2889 – 2892.
- Oliveira-Filho, A. T. & Ratter, J. A. (1995). A study of the origin of Central Brazilian forests by the analysis of plant species distribution patterns. *Edinburgh J. Bot.* 52: 141 – 194.
- , Carvalho, D. A., Vilela, E. A., Curi, N. & Fontes, M. A. L. (2004). Diversity and structure of the tree community of a fragment of tropical secondary forest of the Brazilian Atlantic Forest domain 15 and 40 years after logging. *Revista Brasil. Bot.* 24: 685 – 701.
- Queiroz, L. P. (2002). Distribuição das espécies de Leguminosae na Caatinga. In: E. V. S. B. Sampaio, A. M. Giulietti, J. Virgínio & C. F. L. Gamarra-Rojas, (eds), *Vegetação e flora da Caatinga*. Associação Plantas do Nordeste (APNE) and Centro Nordestino de Informações sobre Plantas (CNIP), Recife, Brazil.
- Richter, H. G. & Dallwitz, M. J. (2000 onwards). Commercial timbers: descriptions, illustrations, identification, and information retrieval. In English, French, German, Portuguese and Spanish. Version: 25 June 2009. <http://delta-intkey.com>
- Souza, J. S., Espírito-Santo, F. D. B., Fontes, M. A. L., Oliveira-Filho, A. T. & Botazelli, L. (2003). Análise das variações florísticas e estruturais da comunidade arbórea de um fragmento de floresta semidecídua às

- margens do Rio Capivari, Lavras-MG. *Revista Árvore* 27: 185 – 206.
- Sprengel, C. (1825). *Systema vegetabilium* 2. Sumtibus Librariae Dieterichianae, Gottingae.
- Veiga-Jr., V. F. & Pinto, A. C. (2002). O gênero *Copaifera* L. *Quim. Nova* 25: 273 – 286.
- Zappi, D. C., Lucas, E., Stannard, B. L., Lughadha, E. N., Pirani, J. R., Queiroz, L. P. de, Atkins, S., Hind, D. J. N., Giuliatti, A. M., Harley, R. M. & Carvalho, A. M. de (2003). Lista das Plantas Vasculares de Catolés, Chapada Diamantina, Bahia, Brasil. *Bol. Bot. Univ. São Paulo* 21: 345 – 398.