



A synopsis of the neotropical genus *Schnella* (Cercideae: Caesalpinioideae: Leguminosae) including 12 new combinations

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Abstract

The genus *Bauhinia sens. lat.* formerly accommodated numerous species that have now been transferred to one of several segregate genera. One of those genera, *Schnella*, includes all neotropical liana species with tendrils. This study comprises a summary of the taxonomic and nomenclatural history of *Schnella*, and presents a list of names accepted under *Schnella*, including 12 new combinations. We recognise here a total of 53 taxa including 47 species. Distribution details for each taxon are given, illustrated with a map showing numbers of taxa within the TDWG regions of the neotropics. Within *Schnella*, there exist two morphologically and palynologically distinguishable groups of species. Further work, including a molecular-based study, will be needed to discover whether those two species groups are congeneric.

Key Words: Fabaceae, *Bauhinia*, *Phanera*, lianas

Context of the tribe Cercideae

The family Leguminosae consists of c. 19, 500 species (LPWG 2013a), in c. 750 genera, of which a few species provide some of the world's most important cash crops, such as *Arachis hypogaea* Linnaeus (1753: 741) (peanut), *Cicer arietinum* Linnaeus (1753: 738) (chickpea), *Glycine max* Merrill (1917: 274) (soya bean) and *Medicago sativa* Linnaeus (1753: 778) (alfalfa). The Legume family encompasses all major biomes (Schrire *et al.* 2005), and the ability of many of these species to fix atmospheric nitrogen into a form in the soil that is accessible to plants, via symbiotic associations with soil-living bacteria (Sprent *et al.* 2013), ensures that legumes are an integral part of many natural and agricultural ecosystems (LPWG 2013a).

Historically the legume family has been understood to consist of three subfamilies; Caesalpinioideae, Mimosoideae and Papilionoideae. Recent molecular evidence, however, indicates that the Mimosoideae and Papilionoideae are nested within a paraphyletic Caesalpinioideae and therefore the number of subfamilies recognised is set to increase (LPWG 2013b). Recent phylogenies have suggested that tribe Cercideae is the sister group to the rest of the Leguminosae, whereas previously there has been uncertainty as to whether this position belonged to the Cercideae, Detarieae or *Duparquetia* Baillon (1865: 189) (LPWG 2013a).

Wunderlin *et al.* (1987) circumscribed the Cercideae to include 5 genera; *Cercis* Linnaeus (1753: 374), *Adenolobus* (Harvey ex Bentham & Hooker f. 1865: 576) Torre and Hillcoat (1955: 37), *Griffonia* Baillon (1865: 188), *Brenierea* Humbert (1959: 1599) and a pantropical and diverse *Bauhinia* Linnaeus (1753: 374) *sens. lat.*, which had previously been segregated into as many as 26 genera (Wunderlin 1976a). One of those genera, *Schnella* Raddi (1820: 32), accommodated all of the neotropical liana species of *Bauhinia sens. lat.*

A history of *Schnella*

Schnella has a complex history, its generic circumscription having been redefined many times by various authors.

Schnella was described by Raddi (1820) to accommodate two species, *S. macrostachya* Raddi (1820: 32) and *S. microstachya* Raddi (1820: 33). The genus was widely accepted at that time and several botanists (Don 1832, Bentham 1840, 1844 & 1845, Grisebach 1860) proceeded to describe new species within *Schnella*. Subsequently however, when *Schnella* had expanded to contain 16 species, Bentham (1865) reduced the genus to a section of *Bauhinia*.

In *Flora Brasiliensis*, Bentham (1870) also recognised *Bauhinia* sect. *Tylotea* Vogel (1839: 312), which was characterised as having conspicuously striate calyces and dehiscent fruit. Bentham proceeded to transfer the majority of the species previously placed in sect. *Schnella* to sect. *Tylotea*, leaving a more narrowly circumscribed sect. *Schnella* for species with inconspicuously striate calyces and indehiscent fruit, only six species in total. His decision to include *Bauhinia uruguayensis* Bentham (1870: 209) within section *Tylotea* was later questioned by Fortunato (1986) and Vaz *et al.* (2010) who considered it better placed within *Bauhinia sens. str.* sect. *Benthamia* Fortunato & Wunderlin (1985: 319).

In their account of Central American and Caribbean (excluding Trinidad & Tobago) *Bauhinia sens. lat.* Britton and Rose (1930) reinstated *Schnella* at the generic level on morphological grounds, to include nine species, two of which they described as new. Their description of the genus inadequately covered the full range of morphological variation of the species they recognised within the genus; for instance they described the fruit of *Schnella* species as dehiscent yet included *S. herrerae* Britton & Rose (1930: 206) in their circumscription, which has indehiscent fruit. In an account of the Caesalpinioideae of Colombia, Britton & Killip (1936) enumerated 10 species of *Schnella* including four which they described as new.

Ducke (1949), however, in his study of Brazilian Amazonian legumes, did not uphold *Schnella* at generic rank. Instead, he recognised it as a section of *Bauhinia* to which he referred only a single species from the Brazilian Amazon, placing 20 other liana species within sect. *Tylotea*. In his account of the Leguminosae of Peru, J.F. Macbride (1943) placed *Schnella* as a synonym of *Bauhinia*.

Following a detailed study of the morphological variation of pollen within *Bauhinia sens. lat.*, Schmitz (1973) recommended that both *Schnella* and the genus *Binaria* Rafinesque (1838: 122) be reinstated at generic rank. *Binaria*, originally described by Rafinesque (1838) to accommodate a single species, had been synonymised under *Schnella* by Britton & Rose (1930). Schmitz (1973, 1977), however, proposed a broad circumscription for *Binaria* which accommodated c. 20 species of neotropical lianas including almost all of the species that Bentham (1870) had previously assigned to *Bauhinia* sect. *Tylotea*. Schmitz synonymised sect. *Tylotea* under *Binaria*. Under Schmitz' classification, *Schnella* comprised six species.

Wunderlin *et al.* (1987) reinstated a broadly circumscribed *Bauhinia*. The neotropical lianas were placed within subgenus *Phanera* (Loureiro 1790: 37) Wunderlin, K. Larsen & S. S. Larsen (1987: 18) and divided among sections *Schnella* (Raddi) Bentham (1865: 576) and *Caulotretus* de Candolle (1825: 516). Sect. *Schnella* contained eight species with indehiscent fruit and inconspicuously veined calyces. Sect. *Caulotretus* was further divided into subsections *Binaria* (Raf.) Wunderlin, K. Larsen & S. S. Larsen (1987: 25) and *Latisiliquae* Wunderlin, K. Larsen & S. S. Larsen (1987: 25), the c. 30 species in the former having dehiscent fruit, and the single species *B. herrerae* (Britton & Rose) Standley & Steyermark (1943: 10) [= *S. herrerae*] in the latter having indehiscent fruit.

In a phylogenetic study based on ITS of the genus *Phanera*, set in the wider context of *Bauhinia sens. lat.*, Hao *et al.* (2003) included three *Bauhinia sens. str.* species which were strongly resolved as a monophyletic group. *Bauhinia sens. str.* was also recovered as a monophyletic taxon by Meng *et al.* (2014) who expanded the sampling to 34 species. In the study of Hao *et al.*, the sole representative of *Schnella* was placed outside *Bauhinia sens. str.* on a separate lineage, but not sister to the *Bauhinia sens. str.* clade nor to a larger clade containing accessions of *Phanera* and the genus *Lasiobema*. The sampling was very small but the placement is congruent with the recognition of *Schnella* as a distinct genus. Another phylogenetic study, based on the *trnL-trnF* plastid region (Sinou *et al.* 2009) which sampled nine accessions representing five *Schnella* species also placed those on a separate lineage, albeit with low support.

Queiroz (2006) and Vaz (2010) published a total of 31 new combinations for species of *Phanera* that they understood to occur in Brazil. Subsequently, Wunderlin (2010a), based on the study by Sinou *et al.*, (2009), formally reinstated *Schnella* at the generic level to include the two sections *Schnella* and *Caulotretus*. He distinguished *Schnella* from the now entirely old world genus *Phanera* primarily on the difference in stamen number and published 28 new combinations in *Schnella* (Wunderlin 2010b). Based on striation of the calyx, the two *Schnella* sections can be separated morphologically: sect. *Caulotretus* contains species with conspicuous calyx striation and sect. *Schnella* species lack conspicuous calyx striation. Recent palynological studies by Banks *et al.* (2013, 2014) indicate that within the Cercideae, *Schnella* forms a distinct group but contains two different pollen types that appear to be consistent with the sections within *Schnella*, suggesting that a degree of heterogeneity is still present within the genus, but that the infra-generic taxa are supported as palynologically diagnosable entities. Indeed, the decision to include the species

of sect. *Caulotretus* within the genus *Schnella* (Wunderlin 2010) may prove premature since a recent well-sampled phylogenetic analysis of the species of *Bauhinia sens. lat.* based on several chloroplast and nuclear regions did not resolve species sampled from the two sections as a monophyletic group (Li *et al.* unpublished data). An exploration of this taxonomic question is outside the scope of this paper, but warrants further investigation in the future.

TABLE 1. A list of publications used in this study to determine the species level taxonomy of *Schnella* including the status of a name (accepted or synonym). References were also used to report country distributions. References are numbered, and the relevant number is cited in the synopsis for each country reported in that reference.

No.	Reference
1	Vaz, da Fonseca, A.M.S. (1979). Considerações sobre a taxonomia do gênero <i>Bauhinia</i> L. sect. <i>Tylotaea</i> Vogel (Leguminosae—Caesalpinioideae) do Brasil. <i>Rodriguésia</i> 31: 127–234
2	Vaz, da Fonseca, A.M.S. (1993). Trepadeiras do gênero <i>Bauhinia</i> (Caesalpinaceae) no estado do Rio de Janeiro. <i>Pesquisas, Botânica</i> 44: 95–114
3	Zarucchi, J.L. (1993). <i>Bauhinia</i> . In: Brako, L. & Zarucchi J.L. (Eds.) Catalogue of the Flowering Plants and Gymnosperms of Peru. <i>Monographs in systematic botany from the Missouri Botanical Garden</i> 45: 515
4	Vaz, da Fonseca, A.M.S. (1995a) Padrões de distribuição de <i>Bauhinia</i> subg. <i>Phanera</i> (Fabaceae: Cercideae) no Brasil. <i>Revista Brasileira de Geografia</i> 57: 63–72
5	Vaz, da Fonseca, A.M.S. (1995b). <i>Bauhinia</i> (Leguminosae—Caesalpinioideae) da Reserva Florestal da Vista Chinesa, Rio de Janeiro. <i>Albertoia</i> 4 (5): 53–59
6	Vaz, da Fonseca, A.M.S. (1995c) Two New Taxa of <i>Bauhinia</i> Sect. <i>Caulotretus</i> from Bahia, Brazil. <i>Brittonia</i> 47 (4): 376–378
7	Neill, D.A., Klitgaard, B.B., Lewis, G.P. & Zarucchi, J.L. (1999) <i>Caesalpinaceae</i> . In: Jørgensen, P. M. & León-Yáñez S. (Eds.) Catalogue of the Vascular Plants of Ecuador. <i>Monographs in systematic botany from the Missouri Botanical Garden</i> 75: 368–369
8	Queiroz, L.P. de (2006). New species and new combinations in <i>Phanera</i> Lour. (Caesalpinioideae: Cercideae) from the Caatinga Biome. <i>Neodiversity</i> 1 (1): 6–10
9	Ayamard, G.A.C., Barneby, R.C., Berry, P.E., Cowan, R.S., da Silva, M.F., Kearns, D.M., Sprada Tavares, A., Stergios, B., Velázquez, D., Wunderlin, R.P., Xena, N. & Zarucchi, J.L. (2007) Caesalpinioideae. In: Funk, V.A., Berry, P.E., Alexander, S., Hollowell, T.H. & Kelloff, C.L. (Eds.) Checklist of the Plants of the Guiana Shield (Venezuela: Amazonas, Bolívar, Delta Amacuro; Guyana, Surinam, French Guiana). <i>Contributions from the United States National Herbarium</i> 55: 333–346
10	Wingfield, P. & Stergios, B. (2007) Caesalpinaceae. In: Duno de Stefano, R., Aymard, G. & Huber, O. (Eds.) <i>Catálogo anotado e ilustrado de la Flora Vasculare de los Llanos de Venezuela</i> : 414–425
11	Costa Bartoluzzi, R.L. (2009) <i>Bauhinia</i> . In: Zuloaga, F.O., Morrone, O.N., Belgrano, M.J., Marticorena, C. & Marchesi, E. (Eds.) Catálogo de las plantas vasculares del Cono Sur. v. 2. <i>Monographs in systematic botany from the Missouri Botanical Garden</i> 107: 2132–2135
12	Wunderlin, R.P. & Eilers, R.M. (2009). Revision of <i>Bauhinia</i> subgenus <i>Phanera</i> section <i>Schnella</i> (Cercideae: Caesalpinioideae: Fabaceae). <i>Journal of the Botanical Research Institute of Texas</i> 3: 619–628
13	Vaz, da Fonseca, A.M.S. (2010). New combinations in <i>Phanera</i> (Leguminosae: Cercideae) from Brazil. <i>Rodriguésia</i> 6: 33–40
14	Lewis, G.P. & Acevedo-Rodríguez, P. (2012). Leguminosae (Fabaceae). In: Acevedo-Rodríguez, P. & Strong, M.T. (Eds.) Catalogue of Seed Plants of the West Indies. <i>Smithsonian Contributions to Botany</i> 98: 392–471
15	Zamora, N.A. (2013) Una nueva especie de <i>Schnella</i> (Leguminosae, Caesalpinioideae: Cercideae) para Costa Rica. <i>Phytoneuron</i> 12: 1–6
16	Torres Colin, R. (1999). El Genero <i>Bauhinia</i> (Leguminosae, Caesalpinioideae: Cercideae) en Mesoamérica. <i>Tesis de maestría, Facultad de Ciencias, Universidad Nacional Autónoma de México, México D.F.</i>
17	Gradstein, S.R. (in prep.) Caesalpinioideae in Colombia.
18	Jørgensen, P.M., Nee, M.H. & Beck, S.G. (Eds.) (in press). Catálogo de las plantas vasculares de Bolivia. <i>Monographs in systematic botany from the Missouri Botanical Garden</i> .
19	Wunderlin, R. (1976) The Panamanian Species of <i>Bauhinia</i> (Leguminosae). <i>Annals of the Missouri Botanical Garden</i> 63 (2): 346–354

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TABLE 1. (Continued)

No.	Reference
20	Wunderlin, R. (1998) <i>Bauhinia</i> . In: Steyermark, J.A., Berry, P.E. & Holst, B.K. (Ed.) <i>Flora of Venezuelan Guayana</i> . Vol. 4. Missouri Botanical Garden Press, St. Louis, pp. 5–13.
21	Vaz, da Fonseca, A.M.S. (2003). Leguminosae Caesalpinioideae: Cercideae: <i>Bauhinia</i> . In: Flora dos estados de Goiás e Tocantins. Coleção Rizzo. <i>Goiania</i> 30: 1–121

How the list of names was assembled

An initial list of previously published *Schnella* binomials and trinomials was compiled from web resources, The Plant List (2013), and Index Kewensis via IPNI (2013).

Flora treatments, checklists, revisions, new combination papers and descriptions of new taxa (as listed in Table 1) were studied to ascertain the taxonomic and nomenclatural history of the group, including all currently accepted names and synonyms. This enabled identification of any taxa for which a combination did not already exist within *Schnella*. Taxonomic discrepancies for species that occur in Brazil were resolved primarily by following the work of Vaz (1979, 1993, 1995a, b, c, 2003, 2010). Outside Brazil, the most recently published regional accounts were consulted.

Distributions

Distribution data was derived from floras, checklists, revisions, new combination papers and descriptions of new taxa (See Table 1). The International Working Group on Taxonomic Databases for Plant Sciences (TDWG) level 3 geographical areas were followed (Brummitt 2001). The native distributions for species with infraspecific taxa are reported for the lowest individual taxonomic ranks and also collectively for the whole species. The numbers associated with the given distributions in the list of names refer to the publications within the table. The * given after a publication number denotes when a publication uses an alternative specific epithet rather than the accepted species, the alternative epithet will feature in the list of synonyms for that species. ** denotes when the accepted epithet is used in addition to a synonymised epithet. (Fig. 1)

Synopsis of *Schnella*

Schnella accrescens (Killip & J.F. Macbride) Trethowan & R. Clark *comb. nov.*

Bauhinia accrescens Killip & J.F. Macbr. *Publ. Field Mus. Nat. Hist., Bot. Ser.* 13(3): 209. 1943. Type:—Peru. Loreto: Mishuyacu, Klug 528 (holotype US).

Distribution:—Endemic to Peru (3).

Schnella alata (Ducke) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia alata Ducke, *Arch. Jard. Bot. Rio de Janeiro* 4: 55–6. 1925.
Phanera alata (Ducke) Vaz, *Rodriguésia* 61(Sup): S34. 2010.

Distribution:—Endemic to Brazil, North (1, 4, 13).

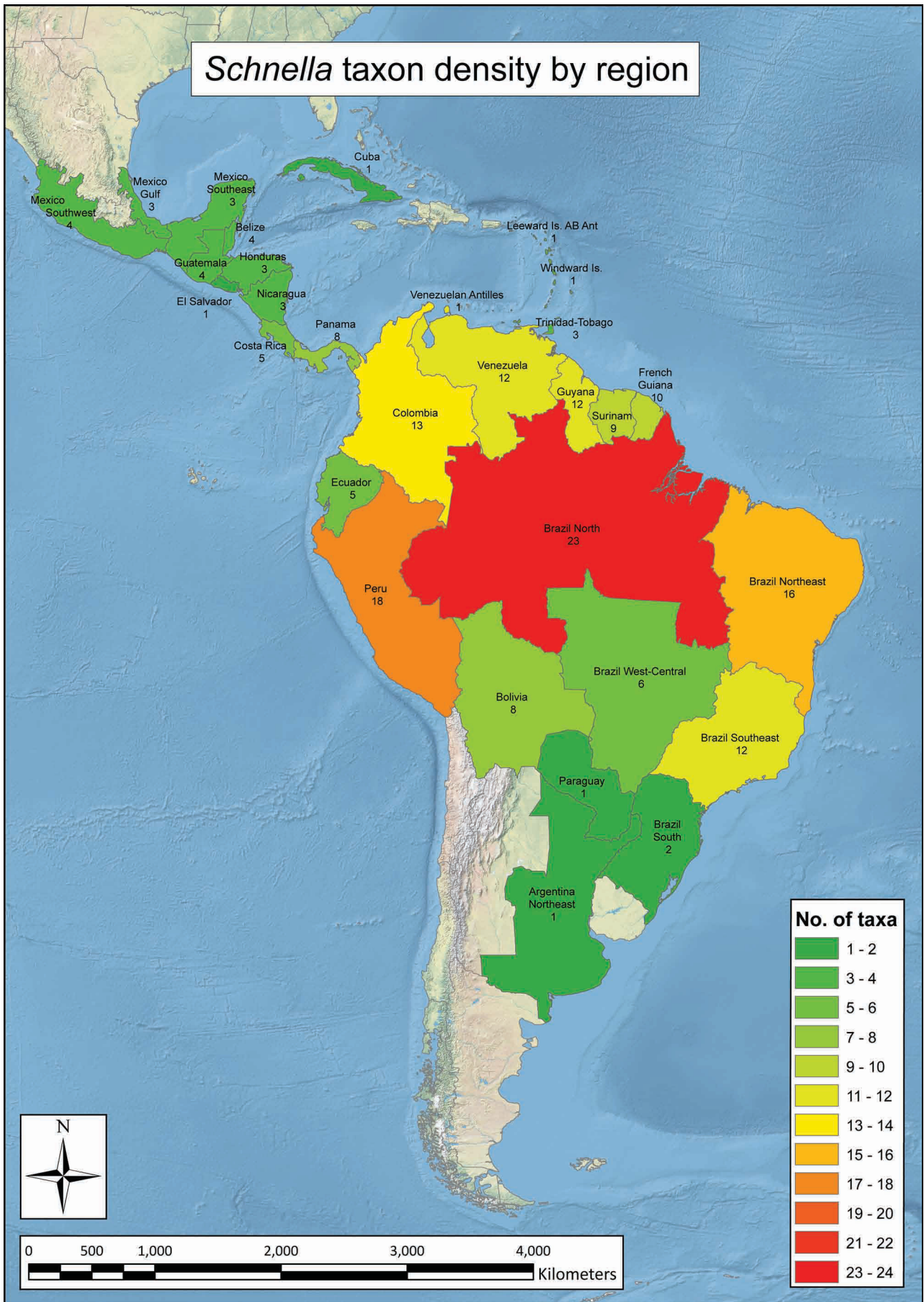


FIGURE 1. Distribution densities of *Schnella* infrageneric taxa at TDWG level 3.

Schnella altiscandens (Ducke) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia altiscandens Ducke, *Biol. Tecn. Inst. Agron. N.* 2: 17. 1944.

Phanera altiscandens (Ducke) Vaz, *Rodriguésia* 61(Sup): S34. 2010.

Bauhinia stenopetala Ducke, *Bol. Técn. Inst. Agron. N.* 36: 70. 1959.

Schnella stenopetala (Ducke) Wunderlin, *Phytoneuron* 49: 4. 2010.

Notes: Wunderlin (2010b) accepted *S. stenopetala*; however, following personal communication with Angela Maria Studart da Fonseca Vaz, a leading expert in *Bauhinia sens. lat.* in Brazil, it is here placed in synonymy with *S. altiscandens*.

Distribution:—Endemic to Brazil, North (1, 4, 13).

Schnella anamesa (J.F. Macbride) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia anamesa J.F. Macbr., *Contr. Gray Herb.* 59: 22. 1919.

Phanera anamesa (J.F. Macbr.) Vaz, *Rodriguésia* 61(Sup): S34. 2010.

Distribution:—Endemic to Brazil, West Central (1, 13).

Schnella angulosa (Vogel) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia angulosa Vogel, *Linnaea* 13: 312–313. 1839.

Phanera angulosa (Vogel) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Endemic to Brazil, Northeast (4, 6, 13), Southeast (1, 4, 5, 13), & South (1, 4, 13).

a. *Schnella angulosa* var. *angulosa*

Distribution:—Endemic to Brazil, Northeast (4, 13), Southeast (1, 4, 13), & South (1, 4, 13).

b. *Schnella angulosa* var. *bahiana* (Vaz) Trethowan & R. Clark, *comb. nov.*

Bauhinia angulosa Vogel var. *bahiana* Vaz, *Brittonia* 47(4): 378. 1995. Type:—Brazil, Bahia, *S. A. Mori & F. Benton 12884* (holotype RB, isotypes CEPEC, K, NY).

Distribution:—Endemic to Brazil, Northeast (6).

c. *Schnella angulosa* var. *meridionalis* (Hoehne) Trethowan & R. Clark, *comb. nov.*

Bauhinia splendens Kunth f. *meridionalis* Hoehne, *Revista Mus. Palu. Univ. São Paulo* 10: 677. 1918. Type:—Brazil, São Paulo, *Loefgren & Edwall 1863* (holotype SP).

Bauhinia angulosa Vogel var. *meridionalis* (Hoehne) Vaz, *Albertoa* 4(5): 55. 1995.

Distribution:—Endemic to Brazil, Southeast (5).

Schnella bahiachalensis Zamora, *Phytoneuron* 12: 1–6. 2013.

Distribution:—Endemic to Costa Rica (15).

Schnella carvalhoi (Vaz) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia carvalhoi Vaz, *Brittonia* 47(4): 376. 1995.

Phanera carvalhoi (Vaz) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Endemic to Brazil, Northeast (6, 13).

Schnella confertiflora (Benth) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia confertiflora Benth. in *Mart. Fl. Bras.* 15(2): 205. 1870.

Phanera confertiflora (Benth.) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Brazil, North (1, 4) & Guyana (9).

Schnella coronata (Benth) Pittier, *Cat. Fl. Venez.* 1: 362. 1945.

Bauhinia coronata Benth., in *Mart. Flora Bras.* 15(2): 209. 1870.

Bauhinia dubia Vogel, *Linnaea* 13: 314. 1839.

Distribution:—Bolivia (1, 4, 13*); Brazil, West-Central (4, 13*), Northeast (1) & North (1, 4, 13*); French Guiana (13*, 1) & Venezuela (4).

Schnella cupreonitens (Ducke) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia cupreonitens Ducke, *Arch. Jard. Bot. Rio de Janeiro* 4: 56. 1925.

Phanera cupreonitens (Ducke) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Brazil, North (1, 4, 13); French Guiana; Guyana; Surinam Venezuela (9) & Peru (4, 13).

Schnella erythrantha (Ducke) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia erythrantha Ducke, *Arg. Inst. Biol. Veg.* 4: 14. 1938.

Phanera erythrantha (Ducke) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Endemic to Brazil, North (1, 4, 13).

Schnella excisa Grisebach, *Fl. Brit. West Indies*: 214–5. 1864.

Bauhinia excisa (Griseb.) Hemsl., *Biol. Cent.-Amer., Bot.* 1: 337. 1880.

Distribution:—Panama & Trinidad-Tobago (18).

Schnella flexuosa (Moricand) Walpers, *Repert. Bot. Syst.* 5: 572. 1846.

Bauhinia flexuosa Moric., *Pl. Nouv. Am.* 6: 80, tab. 53. 1840.

Phanera flexuosa (Moric.) L. P. Queiroz, *Neodiversity* 1:6.2006.

Distribution:—Endemic to Brazil, Northeast (4, 8, 12) & Southeast (8, 12).

Schnella glabra (Jacquin) Dugand, *Revista Acad. Colomb. Ci. Exact.* 4: 137. 1941.

Bauhinia glabra Jacq., *Enum. Syst. Pl.* 20. 1760.

Schnella brachystachya Benth., *J. Bot. (Hooker)* 2: 98. 1840.

Schnella longipetala Benth., *J. Bot. (Hooker)* 2: 98. 1840.

Schnella columbiensis (Vogel) Benth., *Bot. Voy. Sulphur* 89. 1844.

Schnella heterophylla (Kunth) Benth., *Cat. Pl. Cub.* 81: 1866.

Schnella storkii Rose, *N. Amer. Fl.* 23(4): 206. 1930.

Schnella cumanensis (Kunth) Britton & Rose, *N. Amer. Fl.* 23(4): 206. 1930.

Schnella standleyi (Rose) Britton & Rose, *N. Amer. Fl.* 23(4): 206. 1930.

Phanera glabra (Ducke) Vaz, *Rodriguésia* 61(Sup): S36. 2010.

Distribution:—Belize (16); Bolivia (18); Brazil, West Central, Northeast (1*, 4*, 13) & North (1**, 4**, 13); Colombia (1*, 4**, 17); Costa Rica (4*, 16); Cuba (4*, 21); Ecuador (7); El Salvador (16); Guatemala (16); Guyana (1**, 4**, 9); Honduras; Mexico, Gulf, Southwest and Southeast; Nicaragua (16); Panama (4, 23); Peru (1*, 3, 4*); Surinam (9, 4); Trinidad & Tobago (14); Venezuela, (1*, 4, 9, 10), the Venezuelan Antilles (14).

Schnella grazielae (Vaz) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia grazielae Vaz, *Atas Soc. Bot. Brasil, Secç. Rio de Janeiro* 2(9): 74. 1984.

Phanera grazielae (Vaz) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Endemic to Brazil, Southeast (4, 13).

Schnella guentheri (Harms) Trethowan & R. Clark *comb. nov.*

Bauhinia guentheri Harms, *Notizbl. Bot. Gart. Berlin-Dahlem* 9: 969. 1926. Type:—Peru, *Tessman 4375*, (holotype B, photo F).

Distribution:—Endemic to Peru (3).

Schnella guianensis (Aubl.) Wunderlin, *Phytoneuron* 49: 3. 2010.

Bauhinia guianensis Aubl., *Hist. Pl. Guiane* 1: 377. 1775.

Schnella bicomata Pittier, *Bol. Soc. Venez. Ci. Nat.* 6: 6. 1940.

Phanera guianensis (Aubl.) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Bolivia (18); Colombia (17); Costa Rica (16); French Guiana (9); Guatemala (16); Guyana (9); Honduras (16); Leeward Is. (14); Mexico Southwest; Nicaragua; Panama (16); Peru (3); Surinam (9); Trinidad & Tobago (14); Venezuela (9, 10) & the Windward Is. (14).

Schnella herrerae Britton & Rose, *N. Amer. Fl.* 23(4): 206–7. 1930.

Bauhinia herrerae (Britton & Rose) Standl. & Steyerl., *Publ. Field Mus. Nat. Hist., Bot. Ser.* 23(1): 10. 1943.

Distribution:—Belize; Costa Rica; Guatemala; Honduras; Mexico, Gulf, Southwest & Southeast; Nicaragua (16); Colombia (17) & Peru (3).

Schnella hirsutissima (Wunderlin) Trethowan & R. Clark *comb. nov.*

Bauhinia hirsutissima Wunderlin, *Ann. Missouri Bot. Gard.* 64: 371–3. 1977. Type:—Peru, Loreto, *G. Klug 2800* (holotype US, isotypes F, MO, NY).

Distribution:—Endemic to Peru (3).

Schnella hymenaeifolia (Triana ex Hemsley) Britton & Rose, *N. Amer. Fl.* 23(4): 208. 1930.

Bauhinia hymenaeifolia Triana ex Hemsl., *Diagn. Pl. Nov. Mexic.* 3: 48–49. 1880.

Schnella eucosma (S.F. Blake) Britton & Rose, *N. Amer. Fl.* 23(4): 207. 1930.

Distribution:—Colombia (17) & Panama (16).

a. *Schnella hymenaeifolia* var. *hymenaeifolia*

Distribution:—Endemic to Panama (16).

b. *Schnella hymenaeifolia* (Triana ex Hemsl.) Britton & Rose var. *stuebeliana* (Harms) Trethowan & R. Clark *comb. nov.*

Bauhinia stuebeliana Harms, *Repert. Spec. Nov. Regni Veg.* 19: 65. 1923. Type:—Colombia, *Stuebel 87a* (holotype MO).

Schnella stuebeliana (Harms) Britton & Killip, *Ann. New York Acad. Sci.* 35: 163. 1936.

Bauhinia hymenaeifolia Triana ex Hemsl. var. *stuebeliana* (Harms) Wunderlin, *Ann. Missouri Bot. Gard.* 60(2): 571. 1973.

Distribution:—Endemic to Colombia (17).

***Schnella klugii* (Standley) Wunderlin, *Phytoneuron* 49: 3. 2010.**

Bauhinia klugii Standl., *Publ. Field Mus. Bot. Nat. Hist., Bot. Ser.* 22(3): 143. 1940.

Phanera klugii (Standl.) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Brazil, North & Peru (13).

***Schnella kunthiana* (Vogel) Wunderlin, *Phytoneuron* 49: 3. 2010.**

Bauhinia kunthiana Vogel, *Linnaea* 13: 312. 1839.

Schnella rosea (Miquel) Walpers, *Repert. Bot. Syst.* 5: 572. 1846.

Phanera kunthiana (Vogel) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Brazil, Northeast (4, 13) & North (1, 4, 13); Colombia (17); French Guiana (1, 9); Guyana (9); Peru (4); Surinam (1, 4, 9) & Venezuela (1, 9).

***Schnella lilacina* (Wunderlin & Eilers) Wunderlin, *Phytoneuron* 49: 2. 2010.**

Bauhinia lilacina Wunderlin & Eilers, *J. Bot. Res. Inst. Texas* 3(2): 621. 2009.

Distribution:—Endemic to Brazil, Northeast (12).

***Schnella longiseta* (Fróes) Wunderlin, *Phytoneuron* 49: 4. 2010.**

Bauhinia longiseta Fróes, *Bol. Técn. Inst. Agron. N.* 19: 25. 1951.

Phanera longiseta (Vogel) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Endemic to Brazil, North (1, 4, 13).

Schnella maximiliani (Bentham) Wunderlin, *Phytoneuron* 49: 2. 2010.

Bauhinia maximiliani Benth., in *Mart. Fl. Bras.* 15(2): 203. 1870.

Phanera maximiliani (Benth.) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Endemic to Brazil, Northeast & Southeast (4, 12, 13).

Schnella microstachya Raddi, *Quar. Piant. Nuov. Bras.* 33.: 1820.

Bauhinia microstachya (Raddi) J. F. Macbride, *Contr. Gray Herb.* 59: 22. 1919.

Phanera microstachya (Raddi) L. P. Queiroz, *Neodiversity* 1: 1. 2006.

Bauhinia acuminata Vellozo, *Fl. Flumin. Texto.* 171. 1825, *Icones* 4: tab. 85. 1831(1827).

Distribution:—Argentina, Northeast (11); Belize (4, 12, 16); Bolivia (4, 12, 18); Brazil, Northeast (4), Southeast (2, 4), North (4) & South (4, 11); Colombia (4, 17); Ecuador (7); Guatemala (4, 12, 16); Guyana (9); Mexico, Gulf, Southeast & Southwest (16); Panama (4, 12, 16); Paraguay (4, 11, 12) & Peru (3, 4, 12).

a. *Schnella microstachya* var. *microstachya*

Distribution:—Argentina, Northeast (11); Belize (4, 12, 16); Bolivia (4, 12, 18); Brazil, Northeast, Southeast, North (4) & South (4, 11); Colombia (4, 17); Ecuador (7); Guatemala (4, 12, 16); Guyana (9); Mexico, Gulf, Southeast & Southwest (16); Panama (4, 12, 16); Paraguay (4, 11, 12) & Peru (3, 4, 12).

b. *Schnella microstachya* var. *massambabensis* (Vaz) Trethowan & R. Clark *comb. nov.*

Bauhinia microstachya (Raddi) J.F. Macbr. var. *massambabensis* Vaz, *Pesquisas, Botânica* 44: 100. 1993. Type:—Brazil, Rio de Janeiro, *M. Gomes et al.* 201(holotype RB, isotype K).

Distribution:—Endemic to Brazil Northeast (2).

Schnella obovata (S.F. Blake) Britton & Rose, *N. Amer. Fl.* 23(4): 207. 1930.

Bauhinia obovata S.F. Blake, *J. Wash. Acad. Sci.* 14: 286. 1924.

Distribution:—Endemic to Panama (16).

Schnella outimouta (Aublet) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia outimouta Aubl., *Hist. Pl. Guiane* 1: 375. 1775.

Schnella rubiginosa (Bongard) Benth, *J. Bot. (Hooker)* 2: 97. 1840.

Phanera outimouta (Aubl.) L. P. Queiroz, *Neodiversity* 1: 2. 2006.

Distribution:—Bolivia (18); Brazil, West-Central, Southeast, North (1*, 4) & Northeast (1*, 4, 8); Colombia (17); Costa Rica (16*); Ecuador (7); French Guiana; Guyana (9); Panama (16*); Peru (4); Surinam (1, 4, 9) & Venezuela (4, 9).

Schnella platycalyx (Bentham) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia platycalyx Benth. in *Mart. Fl. Bras.* 15(2): 207. 1870.
Phanera platycalyx (Benth.) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Endemic to Brazil, Northeast (1, 4, 13) & North (1).

Schnella poiteauana (Vogel) Wunderlin, *Phytoneuron* 49: 2. 2010.

Bauhinia poiteauana Vogel, *Linnaea* 13: 309–10. 1839.
Phanera poiteauana (Vogel) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Brazil North (4, 12, 13); French Guiana (4, 9, 12, 13) & Surinam (4).

Schnella porphyrotricha (Harms) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia porphyrotricha Harms, *Notizbl. Königl. Bot. Gart. Berlin* 6: 307. 1915.
Phanera porphyrotricha (Harms) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Brazil, North (4, 13) & Peru (3, 13).

a. *Schnella porphyrotricha* var. *porphyrotricha*

Distribution:—Brazil, North (4, 13) & Peru (3, 13).

b. *Schnella porphyrotricha* var. *killipiana* (J.F. Macbride) Trethowan & R. Clark *comb. nov.*

Bauhinia porphyrotricha Harms var. *killipiana* J.F. Macbr., *Publ. Field Mus. Nat. Hist., Bot. Ser.* 13(3): 215. 1943. Type:—Peru, Klug 4289 (holotype F).

Distribution:—Endemic to Peru (3).

c. *Schnella porphyrotricha* var. *smithiana* (Standley) Trethowan & R. Clark *comb. nov.*

Bauhinia porphyrotricha Harms var. *smithiana* Standl., *Publ. Field Mus. Nat. Hist., Bot. Ser.* 22(3): 143. 1940. Type:—Peru, Killip & Smith 26296 (holotype F).

Distribution:—Endemic to Peru (3).

Schnella pterocalyx (Ducke) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia pterocalyx Ducke, *Arch. Jard. Bot. Rio de Janeiro* 3: 109. 1922.
Phanera pterocalyx (Ducke) Vaz, *Rodriguésia* 61(Sup): S37. 2010.

Distribution:—Bolivia (18); Brazil, North (1, 4 & 13); Peru (3).

Schnella radiata (Vellozo) Trethowan & R. Clark *comb. nov.*

Bauhinia radiata Vell. *Fl. Flumin. Texto.* 170. 1825. Type:—*Fl. Flum., Icones* 4, tab. 81. 1831(1827).
Schnella macrostachya Raddi var. *macrostachya*, *Quar. Piant. Nuov. Bras.* 32. 1820.

Schnella macrostachya Raddi var. *brachystachya* (Benth.) A. Schmitz, *Bull. Jard. Bot. Natl. Belg.* 43(3–4): 402. 1973.
Phanera radiata (Vell.) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Brazil, West- Central, Northeast (4, 13), Southeast (4, 12, 13) & North (13).

Schnella reflexa (Schery) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia reflexa Schery, *Ann. Missouri Bot. Gard.* 38: 17. 1951.

Distribution:—Colombia (17) & Panama (16).

Schnella riedeliana (Bongard) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia riedeliana Bong., *Mém. Acad. Imp. Sci. Saint-Petersbourg, Ser. 6, Sci. Math. Second Pt. Sci. Nat.* 4(2): 113. 1836.
Phanera riedeliana (Bong.) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Brazil, West Central & Southeast (13) & Colombia (17).

Schnella rutilans (Spruce ex Benth.) Pittier, *Cat. Fl. Venez.* 1: 362. 1945.

Bauhinia rutilans Spruce ex Benth. in *Mart. Fl. Bras.* 15(2): 206. 1870.
Phanera rutilans (Spruce ex Benth.) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Brazil, North (1, 4, 13); Ecuador (7); Guyana (9—Reads ‘GU?’, in reference to Guyana); Peru (3, 4); Venezuela (4, 9).

Schnella scala-simiae (Sandwith) Trethowan & R. Clark *comb. nov.*

Bauhinia scala-simiae Sandwith, *Bull. Misc. Inform. Kew* 1931: 362. Type:—Guyana, *Sandwith 44* (holotype K).

Distribution:—Guyana & Venezuela (9).

Schnella siqueiraei (Ducke) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia siqueiraei Ducke, *Arch. Jard. Bot. Rio de Janeiro* 3: 108. 1922.
Phanera siqueiraei (Ducke) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Brazil, North (1, 4); French Guiana (9); Guyana (1, 9) & Venezuela (9).

Schnella smilacina (Schott ex Sprengel) G. Don, *Gen. Hist.* 2: 459. 1832.

Caulotretus smilacinus Schott ex Spreng., *Syst. Cur. Post.* 4(2): 406. 1827.
Phanera smilacina (Schott ex Spreng.) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Brazil, Northeast (4, 13) & Southeast (4, 12, 13); French Guiana & Surinam (9).

Schnella splendens (Kunth) Benth., *J. Bot. (Hooker)* 2: 97. 1840.

Bauhinia splendens Kunth, *Nov. Gen. Sp.* 6. 321. 1824.

Phanera splendens (Kunth) Vaz, *Rodriguésia* 61(Sup): S38. 2010.

Distribution:—Bolivia (1); Brazil, Northeast & North (1, 4**); Colombia (4, 17); French Guiana (13); Guyana; Surinam (4*) & Venezuela (4*, 13).

Schnella sprucei (Benth.) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia sprucei Benth., *Mart. Fl. Bras* 15(2): 205. 1870.

Phanera sprucei (Benth.) Vaz, *Rodriguésia* 61(Sup): S39. 2010.

Distribution:—Endemic to Brazil, North (1, 4, 13).

Schnella stenoloba Britton & Killip, *Ann. New York Acad. Sci.* 35: 163. 1936.

Bauhinia stenoloba (Britton & Killip) Wunderlin, *Ann. Missouri Bot. Gard.* 60: 571. 1973.

Distribution:—Endemic to Colombia (17).

Schnella surinamensis (Amshoff) Wunderlin, *Phytoneuron* 49: 4. 2010.

Bauhinia surinamensis Amshoff, *Meded. Bot. Mus. Herb. Rijks Univ. Utrecht* 52: 20. 1939.

Phanera surinamensis (Amshoff) Vaz, *Rodriguésia* 61(Sup): S39. 2010.

Distribution:—Brazil, North (1, 4, 13), French Guiana; Guyana (9); Surinam (1, 4, 9) & Venezuela (9).

Schnella trichosepala (Queiroz) Wunderlin, *Phytoneuron* 49: 2. 2010.

Phanera trichosepala Queiroz, *Neodiversity* 1(1): 7. 2006.

Distribution:—Brazil Northeast (4, 8, 12) & Southeast (8, 12).

Schnella uleana (Harms) Wunderlin, *Phytoneuron* 49: 5. 2010.

Bauhinia uleana Harms, *Verh. Bot. Vereins Prov. Brandenburg* 48: 166. 1907.

Phanera uleana (Harms) Vaz, *Rodriguésia* 61(Sup): S39. 2010.

Distribution:—Brazil North (4, 13); Colombia (17) & Peru (3, 4, 13).

Schnella vestita Benth. *Pl. Hartw.* 171–2. 1845.

Bauhinia vestita (Benth.) J. F. Macbride, *Contr. Gray Herb.* 59: 22. 1919.

Distribution:—Endemic to Colombia (17).

Schnella vulpina (Rusby) Trethowan & R. Clark *comb. nov.*

Bauhinia vulpina Rusby *Mem. New York Bot. Gard.* 7: 257. 1927. Type:—Bolivia, Huachi, O. E. White 956 (holotype NY, isotypes BKL, NY, US).

Distribution:—Endemic to Bolivia (18).

Excluded names

Schnella caudigera (S. F. Blake) Pittier, *Supl. Pl. Usual. Venez.* 37. 1939. = *Bauhinia petiolata* (de Candolle) Triana var. *caudigera* (S. F. Blake) Wunderlin, *Sida* 22(1): 115. 2006.

Doubtful or poorly known names

Schnella emarginata Klotzsch, *Faun. Fl. Brit.-Guian.*: 1210. 1848. The name has not been seen in any recent treatments since its publication, and cannot be confidently placed anywhere in the above list.

Schnella heterophylla (Kunth) Pittier, *Cat. Fl. Venez.* 1: 362. 1945. The name has not been seen in any recent treatments since its publication and thus cannot be confidently placed anywhere in the above list.

Schnella macrophylla (Poiret) Grisebach *Abh. Königl. Ges. Wiss. Göttingen* 7: 210. 1857. The name has not been seen in any recent treatments since its publication and thus cannot be confidently placed anywhere in the above list.

Schnella mutisii Britton & Killip, *Ann. New York Acad. Sci.* 35: 162. 1936. Described as a Colombian species, the name is not included in recent works from Colombia (Gradstein in prep., Quiñones 2005).

Schnella nigra Britton & Killip, *Ann. New York Acad. Sci.* 35: 162. 1936. Described as a Colombian species, the name is not included in recent works from Colombia (Gradstein in prep., Quiñones 2005).

Schnella nitida Britton & Killip, *Ann. New York Acad. Sci.* 35: 164. 1936. Described as a Colombian species, the name is not included in recent works from Colombia (Gradstein in prep., Quiñones 2005).

Schnella trinitensis Britton, *nom. ined.* R. O. Williams in *The Flora of Trinidad and Tobago* (1931) placed the name as a synonym of *Bauhinia cumanensis* [= *Schnella glabra* (Jacq.) Wunderlin] despite indicating that the name wasn't published correctly. IPNI incorrectly lists the name as *Schnella trinitensis* Britton ex R. O. Williams.

Schnella umbriana Britton & Killip, *Ann. New York Acad. Sci.* 35: 162. 1936. Described as a Colombian species, the name is not included in recent works from Colombia (Gradstein in prep., Quiñones 2005). Wunderlin (1976) suggested this name belongs within *S. guianensis*, although no formal synonymy has been published.

Schnella versicolor Britton, *nom. ined.* Name appears on two specimens labelled as 'type coll.' and 'Isotypus', from BC and COL respectively, from the collection E. P. Killip & J. Cuatrecasas 38969. The name was never validly published. The two specimens have subsequently been determined as '*Bauhinia* aff. *guianensis* Aubl.' by R.P. Wunderlin, 1973.

Acknowledgements

The authors would like to thank Dr Gwilym Lewis and Dr Angela Maria Studart da Fonseca Vaz for helpful additions and comments on earlier versions of the manuscript and also to Robert O'Sullivan for producing the map.

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