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Aculeatae, a New Series in *Bauhinia* Section *Pauletia* (Leguminosae, Caesalpinioideae, Cercideae)

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ABSTRACT. *Bauhinia* ser. *Aculeatae* Vaz & A. M. G. Azevedo, a new series in section *Pauletia*, is established as separate from *Bauhinia* ser. *Cansenia* (Rafinesque) Wunderlin, K. Larsen & S. S. Larsen. A description of the new series is presented together with a description of series *Cansenia* newly circumscribed.

Key words: *Bauhinia* sect. *Pauletia*, Brazil, Caesalpinioideae, Cercideae, Leguminosae.

Bauhinia L. is a pantropical genus of tribe Cercideae (Leguminosae, Caesalpinioideae). Wunderlin's (1976) and Wunderlin et al.'s (1981, 1987) studies led to a classification of the Cercideae, including 4 subgenera, 22 sections, and 30 series for *Bauhinia*. *Bauhinia* sect. *Pauletia* (Cavanilles) DC. is characterized by the presence of 10 fertile stamens or by 5 fertile stamens alternating with 5 stamens with reduced anthers or, rarely, with 6 to 8 fertile stamens and 2 to 4 staminodes. In all cases, filaments are connate at the base and generally have pollen grains with a reticulated sexine and with a supracteal gemoid process. Section *Pauletia* encompasses ca. 70 species in tropical America and 2 species in southern Asia, South China, and the Malesian Area, according to Wunderlin et al. (1987). In tropical America, its distribution ranges from Mexico to Argentina, encompassing 53 species of *Bauhinia* in Brazil (Vaz, 2001).

Bentham (1870) divided *Bauhinia* sect. *Pauletia* into three informal groups of species based on the attributes of petals and stamens: (1) narrow petals, 10 perfect stamens, without prickles; (2) narrow petals, alternate (antepetalous) filaments with smaller or deficient anthers or anantheriferous, prickles robust-growing; (3) obtuse petals, 10 perfect stamens, prickles robust-growing. Wunderlin et al. (1987) divided *Bauhinia* sect. *Pauletia* into five series, including also features of the calyx, pollen, and fruits: *Bauhinia* ser. *Cansenia* (Rafinesque)

Wunderlin, K. Larsen & S. S. Larsen, *B. ser. Acuminatae* Wunderlin, K. Larsen & S. S. Larsen, *B. ser. Perlebia* (Martius) Wunderlin, K. Larsen & S. S. Larsen, *B. ser. Pentandrae* Wunderlin, K. Larsen & S. S. Larsen, and *B. ser. Ariaria* (Cuervo Marquez) Wunderlin, K. Larsen & S. S. Larsen. Here, the first and third groups proposed by Bentham (1870) whose species have 10 perfect anthers were merged into series *Cansenia*. Nevertheless, Wunderlin's *Cansenia* comprises two distinct groups in *Bauhinia* and should therefore be divided into series corresponding roughly to the first and third informal groups proposed by Bentham (1870).

This paper, which is part of a more extensive taxonomic study of *Bauhinia* sect. *Pauletia* (Vaz, 2001), emends the taxonomic circumscription of its inclusive series *Cansenia* and proposes a new separate series. To circumscribe both series, we have added the following new diagnostic characters: inflorescence type, the presence/absence of prickles, and the presence/absence of the extrafloral nectaries. The inflorescences in Neotropical *Bauhinia* sect. *Pauletia* are terminal pseudoracemes, which always have successively geminate pedicels. The sympodium is leafy at base, or the leaves are replaced by foliaceous bracts (series *Cansenia* and *Ariaria*). In another group of species (series *Aculeatae*, *Pentandrae*, *Perlebia*), flowers are arranged in 2(3–6) leaf-opposed clusters (cymoids). These inflorescences are of terminal origin, although referred to as axillary or supra-axillary by most authors. Both types of inflorescence (pseudoracemes and cymoids) have already been recognized in *Bauhinia* by Urban (1885). Structures described by Bentham (1870) as “aculei” (= prickles) are in fact prickles in some species and extrafloral nectaries in others. The extrafloral nectaries, as recognized here, were first detected for *B. curvula* Bentham (Resende et al., 1994, see fig. 1), although

NOVON 13: 141–144. 2003.

a “nectar secreting thread” has already been recorded by van der Pijl (1952: 292) for an American species not identified. The extrafloral nectaries are smaller, not pungent, intrastipular projections, 1–2 mm long, subulate or ovoid in shape. They are also presented in pseudoracemes as paired projections from foliaceous bracts. In some species extrafloral nectaries may be rudimentary or obsolete. Adpeticular prickles are always pungent, straight or hook-shaped, 1–10 mm long. They are positioned below or beside the adjacent stipules. In some species, the alternate prickle may be rudimentary or obsolete.

Bauhinia ser. **Cansenia** (Rafinesque) Wunderlin, K. Larsen & S. S. Larsen, Biol. Skr. 28: 12. 1987, hic emendavit. Basionym: *Cansenia* Rafinesque, Sylva Tellur. 122. 1838. TYPE: *Cansenia ungulata* (L.) Rafinesque (lectotype, designated by Wunderlin (1976)).

Plant with terminal branches ascendent, prickles absent; extrafloral nectaries present or rudimentary. Inflorescence a terminal pseudoraceme, leafless, with foliaceous bracts or sometimes with scattered reduced leaves toward the apex, partial inflorescence adnate to the main axis by geminate pedicels, (1)–2(–3)-flowered; calyx at anthesis irregularly connate at the apex and splitting into 2 to 5 lobes; petals narrow, acute or acuminate or obtuse (only in *B. cheilantha*); 10 fertile stamens, connate at the inner internal face, but without ligular appendix.

Suffrutescent, about 0.5–2 m high, when growing in “campo” open formations or Brazilian savannas, with a conspicuous xylopodium—a subterranean organ adapted for vegetative propagation during rainy periods, after a long-lasting dry season and periodical burning of the aerial portion of plant cover (Rizzini & Heringer, 1961, 1962). Also found growing as trees or treelets, 4–15 m tall in forest, including gallery forests. The multi-stemmed shrubby habit is found in Brazilian savannas (burned periodically with scattered trees and a herbaceous ground cover), secondary forests, and disturbed areas in Brazil.

Pollen triangular-shaped in polar view, angulaperturate 3(4) colpi short, covered with a colpus membrane (figs. 10–14 in Ferguson & Pearce, 1986; Melhem & Labouriau, 1963; Vaz, 2001, part 1, fig. 16D).

This series, here newly circumscribed, corresponds to the first group of *Bauhinia* sect. *Pauletia* (Bentham, 1870), except for *Bauhinia marginata* (Bongard) Steudel and *Bauhinia hirsuta* (Bongard)

Vogel (= *B. hirsutiflora* Vaz), both species belonging to series *Pentandrae*.

SPECIES INCLUDED

1. *Bauhinia acuruana* Moricand, Pl. Nouv. Amér. 6, p. 77, tab. 5. 1840.
2. *Bauhinia aureopunctata* Ducke, Arch. Jard. Bot. Rio de Janeiro 4: 53. 1925.
3. *Bauhinia bombaciflora* Ducke, Arch. Jard. Bot. Rio de Janeiro 3: 104, fig. 5. 1922.
4. *Bauhinia brevipes* Vogel, Linnaea 13: 307. 1839.
5. *Bauhinia burchellii* Bentham, in Martius, Fl. Bras. 15(2): 186. 1870.
6. *Bauhinia caloneura* Malme, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25 (3, n° 11): 29. pl. 2. 1900.
7. *Bauhinia campestris* Malme, Ark. Bot. 5(5): 10. 1905.
8. *Bauhinia candelabrifformis* R. S. Cowan, Contr. Sci. Los Angeles County Mus. 13: 4, fig. 1. 1957.
9. *Bauhinia cheilantha* (Bongard) Steudel, Nom. Bot., ed. 2, v. 1, p. 191 sphalm. 291. 1840.
10. *Bauhinia cinnamomea* DC., Prodr. p. 517. 1825.
11. *Bauhinia conwayi* Rusby, Bull. New York Bot. Gard. 8(28): 92. 1912.
12. *Bauhinia cupulata* Bentham, in Martius, Fl. Bras. 15(2): 188. 1870.
13. *Bauhinia curvula* Bentham, in Martius, Fl. Bras. 15(2): 194. 1870.
14. *Bauhinia dubia* G. Don, Gen. Syst. 2, p. 463. 1832, non *B. dubia* Vogel.
15. *Bauhinia dumosa* Bentham, in Martius, Fl. Bras. 15(2): 194. 1870.
16. *Bauhinia fusconervis* (Bongard) Steudel, Nom. Bot. ed. 2, v. 1, p. 191 sphalm. 291. 1840.
17. *Bauhinia gardneri* Bentham, in Martius, Fl. Bras. 15(2): 186. 1870.
18. *Bauhinia goyazensis* Harms, Bot. Jahrb. Syst. 33(72): 21. 1903.
19. *Bauhinia grandifolia* (Bongard) Steudel, Nom. Bot. ed. 2, v. 1, p. 191 sphalm. 291. 1840.
20. *Bauhinia holophylla* (Bongard) Steudel, Nom. Bot. ed. 2, v. 1, p. 191 sphalm. 291. 1840.
21. *Bauhinia leptantha* Malme, Ark. Bot. 5(5): 11. 1905.
22. *Bauhinia longicuspis* Bentham, in Martius, Fl. Bras. 15(2): 185. 1870.
23. *Bauhinia longifolia* (Bongard) Steudel, Nom. Bot. ed. 2, v. 1, p. 191 sphalm. 291. 1840.
24. *Bauhinia longipedicellata* Ducke, Arch. Jard. Bot. Rio de Janeiro 4: 105. 1922.

25. *Bauhinia malacotricha* Harms, Bot. Jahrb. Syst. 33(72): 22. 1903.
26. *Bauhinia malacotrichoides* Cowan, Contr. Sci. Los Angeles County Mus. 13: 8, fig. 3. 1957.
27. *Bauhinia membranacea* Benth, in Martius, Fl. Bras. 15(2): 187. 1870.
28. *Bauhinia pulchella* Benth, in Martius, Fl. Bras. 15(2): 190, tab. 49. 1870.
29. *Bauhinia rufa* (Bongard) Steudel, Nom. Bot. ed. 2, v. 1, p. 192. 1840.
30. *Bauhinia smilacifolia* Benth, in Martius, Fl. Bras. 15(2): 183. 1870.
31. *Bauhinia subclavata* Benth, in Martius, Fl. Bras. 15(2): 188. 1870.
32. *Bauhinia tenella* Benth, in Martius, Fl. Bras. 15(2): 195. 1870.
33. *Bauhinia unguolata* L., Sp. Pl. ed. 1, p. 374. 1753.
34. *Bauhinia urocalyx* Harms, Notizbl. Königl. Bot. Gart. Berlin 6(59): 308. 1915.

Bauhinia* ser. *Aculeatae Vaz & A. M. G. Azevedo, ser. nov. TYPE: *Bauhinia aculeata* L.

Rami terminales vulgo subhorizontales, aculei gemini vel subsolitarii; nectaria extrafloralia nulla. Inflorescentiae foliosae, partiales unilaterales, 2(3–6)-florae; calyx per anthesin in spatham deflexam hinc fissus ad basin; petala lata, oblanceolata vel spatulata; stamina 10, omnia fertilia, base interne appendice ligulari praedita.

Plant with terminal branches subhorizontal, prickles paired or subsolitary; extrafloral nectaries absent. Inflorescence leafy, partial inflorescences unilateral, 2(3–6)-flowered, calyx spathaceous at anthesis and then splitting to the base, petals broad, oblanceolate or spatulate; stamens 10, all fertile, at inner base with ligular appendix.

Trees or treelets, ca. 4–15 m tall, found in forest formations in tropical America, including gallery forests of Brazilian cerrado, but never suffrutescent, although they may survive as multi-stemmed shrubs in secondary forest, including disturbed adjacent sites. In high-altitude grassland (“campos de altitude”) in southeastern Brazil, in Rio de Janeiro and São Paulo states, they may occur as treelets.

Pollen (4–)5–6-zonocolpate with colpi wide and short (= type 3 subtype b, in Gamero & Fortunato, 2001, figs. 5–7; Vaz, 2001, part 1, fig. 16B; see also Barth & Bousada, 1964, figs. 1, 2).

This series corresponds to the third group of *Bauhinia* sect. *Pauletia* (Benth, 1870), excluding *Bauhinia corniculata* Benth, which belongs to series *Pentandrae* and *B. cheilantha* cited above, under series *Cansenia*.

SPECIES INCLUDED

1. *Bauhinia acreana* Harms, Notizbl. Königl. Bot. Gart. Berlin 6: 307. 1915.
2. *Bauhinia aculeata* L., Sp. Pl. ed. 1, 374. 1753.
3. *Bauhinia affinis* Vogel, Linnaea 10: 594. 1836.
4. *Bauhinia albicans* Vogel, Linnaea 13: 304. 1839.
5. *Bauhinia caatingae* Harms, Bot. Jahrb. Syst. 42: 209. 1908. (from caatinga, a Brazilian vegetation type; sphalm. *caatingae*).
6. *Bauhinia forficata* Link, Enum. Hort. Berol. 1: 404. 1821.
7. *Bauhinia integerrima* Benth, in Martius, Fl. Bras. 15(2): 197. 1870.
8. *Bauhinia mollis* (Bongard) D. Dietrich, Syn. Pl. 2: 1475. 1840.
9. *Bauhinia ovata* (Bongard) Vogel, Linnaea 13: 300. 1839.
10. *Bauhinia platypetala* Benth, in Martius, Fl. Bras. 15(2): 198. 1870.

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