

# NOTES ON AMERICAN LOGANIACEAE III<sup>1</sup>) REVISION OF BONYUNIA RICH. SCHOMB.\*

A. J. M. LEEUWENBERG

Laboratorium voor Plantensystematiek en -geografie, Wageningen

## HISTORY OF THE GENUS

The genus was described by RICHARD SCHOMBURGK (1848) with one species in a very brief, in his opinion unofficial or informal, but nevertheless valid description. A more ample description with an excellent plate was given by PROGEL (1868). BENTHAM & HOOKER (1876) therefore regarded PROGEL as the true author of the genus and the species. Four species were described afterwards, one of which, *B. cinchonioides*, is here reduced to a synonym.

## DISTRIBUTION

*B. superba* is only known from Mt. Roraima and the nearby Cerro Arepuchi in Venezuela, *B. antoniifolia* only by a few collections from Brazil. The two other species, *B. aquatica* and *B. minor*, are more widely distributed. They both occur in the mountains of southern Venezuela and adjacent Brazil, the latter also on Mt. Roraima; the former species does not grow above an altitude of 250 m, the latter only rarely below 800 m, as far as our present knowledge goes. The distribution of *B. antoniifolia* is very incompletely known, as might be concluded from the widely separated stations. That may also be true for the other species, especially *B. superba*.

*Bonyunia* Rich. Schomb., Reisen Br. Guian. 3: 1082. 1848; Progel in Martius, Fl. Bras. 6 (1): 267. 1868; Bentham & J. D. Hooker, Gen. Pl. 2: 796. 1876; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 36. 1892.

Unarmed shrubs or small trees. *Branches* very dark brown to black or greyish, with finely fissured bark. *Leaves* opposite, those of a pair equal, shortly petiole; petiole caniculate above; blades in all species variable in shape and size, often on a single branch, coriaceous also when fresh; secondary veins anastomosing rather far from the margin; tertiary venation laxly reticulate. *Inflorescence* terminal, thyrsoid, few-flowered, 2–3 × branched, mostly wider than long. Peduncle, branches, and pedicels short. Lower bracts leafy, the others very small, hairy like the pedicels, without colleters. *Flowers* 5-merous, except for the unequal calyx lobes actinomorphic, subsessile. *Calyx* purple (always ?), campanulate, glabrous inside, torn when fruiting; lobes unequal, mostly triangular,

<sup>1</sup> Continued from Acta Bot. Neerl. 16: 56–61, 143–146. 1967.

\* Dedicated to Professor Dr. C. E. B. Bremekamp.

acute at the apex, entire, ciliate or not. *Corolla* in the mature bud at least twice as long as the calyx, slender, long-tapering at the apex, creamy, pale pink, violet, or purple, turning purple or violet at anthesis (not yet known for *B. superba*), shortly pubescent outside, inside minutely pubescent in the tube except near its apex, tube of variable length, elongating at anthesis, usually about as long as the lobes, nearly cylindrical, often slightly contracted above the slender base and gradually widened towards the throat; lobes narrowly oblong, valvate in bud, rather thick, acute, entire, still erect when the pollen is shed, recurved when the pistil matures. *Stamens* not or hardly exerted; filaments very short, about half as long as the anthers, glabrous, inserted at the mouth of the corolla tube; anthers introrse, narrowly ovate or narrowly triangular, about 2–3 × as long as wide and 1.5–2 mm long, narrower and oblong after the pollen is shed, sagittate at the base, acute and apiculate at the apex, basifixed, glabrous; cells 2, parallel or slightly divergent at the base, discrete, dehiscent throughout by a longitudinal split. *Ovary* superior (pedicel thickened below the calyx, therefore the ovary seemingly semi-inferior), globose or nearly so, hirtio-pubescent, abruptly narrowed into the style, 2-celled; style pubescent, included, deciduous; stigma bilobed or mouth-shaped, minutely pubescent with glandular hairs. In each cell one large peltate placenta with about 30–80 ovules on the outside, attached to the middle of the septum. *Capsule* oblong, 2–3 × as long as wide, medium brown, pubescent outside, acute at the apex, septicidal, bivalved; valves paler and glabrous inside, with an often torn apex and broadly revolute margins meeting in the middle, formed by the torn septum. Placentae dry and covered by some seeds. *Seed* oblong or narrowly oblong, winged all around; grain small, elliptic, medium brown; wing pale brown, more or less golden-shining, brittle, diaphanous, minutely reticulate; hilum at one side in the middle. Embryo surrounded by mealy endosperm. Sometimes colleters present in the axils of the leaves (*B. minor* and *B. superba*).

Type species: *B. superba* Rich. Schomb.

Distribution: Columbia, Venezuela, (British) Guiana, and Brazil.

NOTE

The species of the genus are markedly uniform in their inflorescences, flowers, fruits, and seeds. For the key almost only characters of the foliage could be used.

KEY TO THE SPECIES

1. Leaves obovate or elliptic, rounded or retuse at the apex, glabrous
  2. *B. aquatica*  
Leaves not obovate, if elliptic rounded at the apex and hairy . . . . . 2
2. Leaves mostly more than 5 cm long, more or less obtusely acuminate or acute, not rounded at the apex; calyx lobes often narrowly oblong
  4. *B. superba*  
Leaves mostly less than 5 cm long, not acuminate, obtusely acute or rounded

- at the apex; calyx lobes triangular . . . . . 3
3. Leaves elliptic, rounded at the apex, rarely subcordate at the base, thinner than in the following species, pubescent, especially on the main veins beneath; tertiary venation not prominent . . . . . 1. **B. antoniifolia**  
 Leaves ovate or orbicular, obtusely acute or rounded at the apex, subcordate or rounded at the base, glabrous or with a few hairs on the costa beneath; tertiary venation prominent on both sides . . . . . 3. **B. minor**

1. **B. antoniifolia** Progel in Martius, Fl. Bras. 6(1): 288. 1868; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 36. 1892 (both as *antoniaefolia*).

Fig. 4. An

Type: Brazil: Minas Gerais, Serra da Chapada, Riedel 1149 (BR, isotype).

Small tree. *Branchlets* pubescent to glabrous. *Leaves*: petiole 1.5–3 mm long; blade when dry slightly shining, especially above, elliptic (often some obovate or ovate), (1.2) 1.5–2 × as long as wide, 23–50 × 13–40 mm, rounded at the apex, cuneate, rounded or occasionally (Riedel 1149, not all leaves) subcordate at the base, glabrous or with a few minute hairs on the costa above, pubescent, especially on the main veins beneath; 4–5 pairs of secondary veins; tertiary venation not or slightly prominent on both sides. *Inflorescence* rather lax, about 2.5–4 × 2–3 cm, in fruit up to 5 × 4 cm. Peduncle, branches, and pedicels pubescent. Calyx 2–3 × 2–2.5 mm, pubescent outside; lobes triangular or broadly triangular, 0.4 × 0.4–1.5 × 1 mm, not ciliate. Corolla in the mature bud 5–8 × as long as the calyx, 12–22 mm long, white, turning violet at anthesis; tube 6–14 mm long, at the base 1.7–2 mm wide, at the throat 2.2 mm; lobes 6–8 × 1–1.7 mm. Anthers 1.4 × 0.5–0.6 mm. Ovary 1 × 1.2 mm; style 6–6.5 mm long. Capsule 8 × 4–15 × 8 mm. Colleters none.

Distribution: Brazil (Amazonas, Minas Gerais).

Ecology: Savannas, often(?) on rocks. Elevation rather high.

BRAZIL: Amazonas: Manaus, Ponta Negra (June, Oct., Nov.) *Ducke* H.J.B.R. 11184 (BM), 11534 (BM, G), 12197 (BM, F, G, P, S, U, US); Lower Rio Negro, Bahia Boiassú, Campo Amelia (fl., fr. March) *Ducke* 680 (F, MO, NY, UC); Coari (Dec.) *Ducke* H.J.B.R. 12384 (BM, G, US). Minas Gerais: Serra da Chapada (Sept.) *Riedel* 1149 (BR, isotype).

2. **B. aquatica** A. Ducke, Arq. Inst. Biol. Veg. Rio de Janeiro 1(3): 211. 1935.

Fig. 4. Aq

Type: Brazil: Amazonas, Curicuriari R., Rio Negro, A. Ducke H. J. B. R. 23760 (G, K, P, S, U, US, isotypes).

Shrub or small tree, 3–9 m high. *Branchlets* glabrous or with scattered hairs. *Leaves*: petiole glabrous or with scattered hairs, 1.5–5 mm long; blade when dry shining, especially above, elliptic to obovate, 1.5–2 (2.5) × as long as wide, 30–67 × 18–45 mm, rounded or retuse at the apex, cuneate to rounded at the base, entire, glabrous on both sides; 4–6 pairs of secondary veins; tertiary

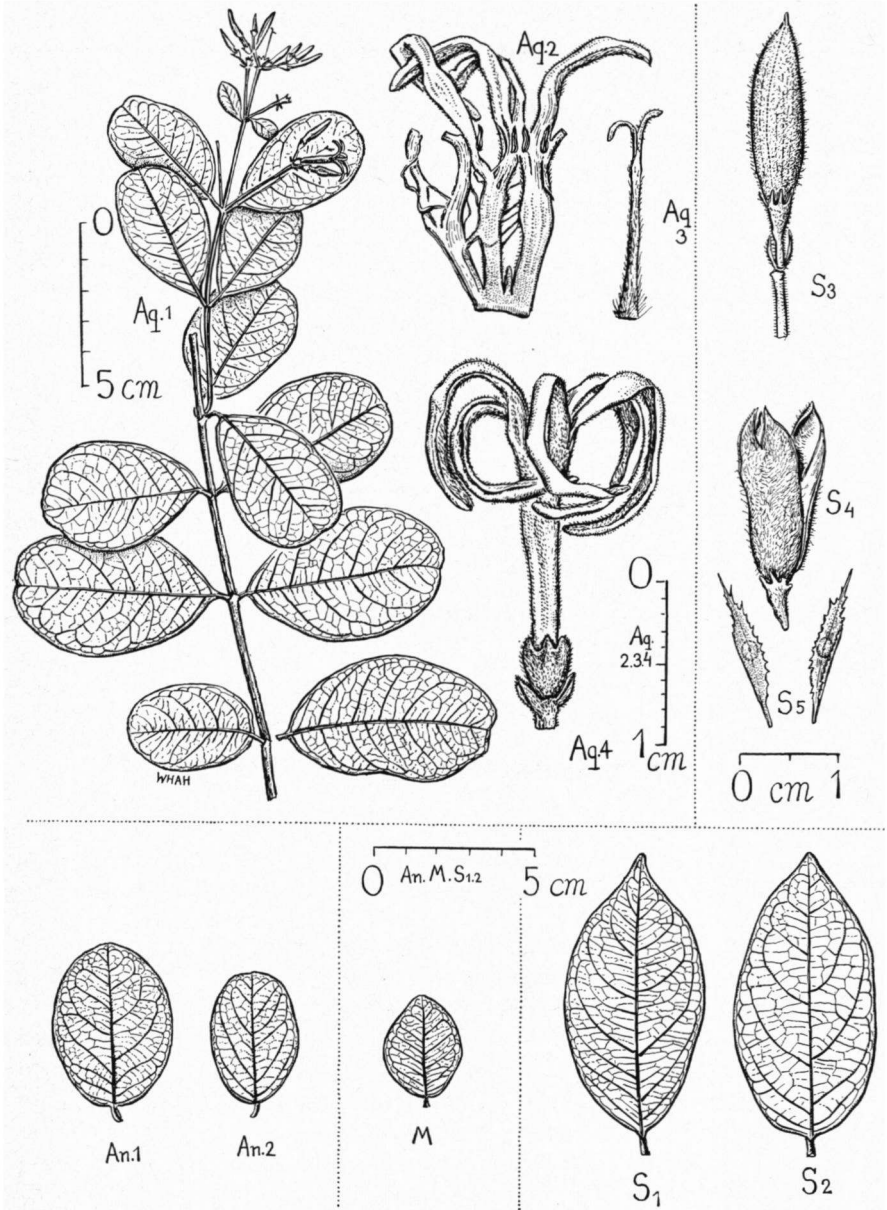


Fig. 4. An. *Bonyunia antoniifolia*, leaves. (An 1. Riedel 1149, An 2. Ducke H.J.B.R. 12197). Aq. *B. aquatica*. Aq 1. branch; Aq 2. opened torn corolla; Aq 3. style with stigma; Aq 4. flower (Aq 1. Ducke H.J.B.R. 23760, Aq 2-4. Wurdack & Adderley 42814). M. *B. minor*, leaf (Schomburgk 966). S. *B. superba*. S 1-2. leaves; S 3. fruit; S 4. open fruit; S 5. seeds (S 1. Schomburgk 614, S 2-5. Pinkus 270).

venation prominent on both sides. *Inflorescence* occasionally axillary, rather lax, about  $4 \times 3-7 \times 7$  cm. Peduncle and branches minutely pubescent, often glabrescent with age. Calyx  $2-3 \times 2-2.5$  mm (with pedicel up to 4 mm long), pubescent outside; lobes triangular or broadly triangular,  $0.4 \times 0.4-1 \times 1$  mm, not ciliate. Corolla in the mature bud about  $5-8 \times$  as long as the calyx, (10) 15-23 mm long, pinkish-white, turning dark violet with age; tube  $3-3.5 \times$  as long as the calyx, 6-14 mm long, 1.6-2 mm wide at the base, 1.8-3 mm at the throat; lobes  $10-12 \times 1-1.5$  mm. Anthers  $1.4-1.8 \times 0.5-0.6$  mm. Ovary  $1.8 \times 1.3$  mm; style 5.5-7 mm long. Capsule  $13 \times 5-25 \times 10$  mm. Seed  $6 \times 2.5-8 \times 3.5$  mm; grain  $1.5 \times 1.5-3 \times 2$  mm. Colleters none.

Distribution: Colombia (Vaupés), Venezuela (Amazonas), Brazil (Amazonas). Ecology: On river banks on savannas. Alt. about 100-250 m.

COLOMBIA: Vaupés: Raudal Sapo, Río Guainía, Puerto Colombia, opposite Venezuelan town of Maroa (Nov.) *Schultes, Baker & Cabrera* 18240 (US).

VENEZUELA: Amazonas: Cerro Moriche, Río Ventuari (fl., fr. Jan.) *Maguire, Cowan & Wurdack* 31012 (WAG); Cano Cupaven, right bank of Río Orinoco opposite mouth of Río Atabapo (June) *Wurdack & Adderley* 42814 (WAG); Río Guainía, between Cano San Miguel and Maroa (June) *Wurdack & Adderley* 43261 (WAG).

BRAZIL: Amazonas: Río Negro, Içana (Apr.) *Froes* 22260 (U); *ibid.*, Cach. Tunuhu (fr. May) *Froes* 22278 (U); Río Curicuriari, Upper Río Negro (fl., fr. Oct. Dec.) *Ducke* H.J.B.R. 23760 (G, K, P, S, U, US, type), 224 = H.J.B.R. 31951 (NY), 354 (A, F, K, MO, NY, S, US).

3. *B. minor* N. E. Brown, Trans. Linn. Soc. Ser. 2: 6: 49, pl. 9. f. 1-5. 1901.

Fig. 4. M

Type: (British) Guiana: Kotinga Valley, Quelch & McConnell 161 (K, lectotype).

Heterotypic synonym: *B. cinchonoides* Gleason et Standley, Bull. Torrey Bot. Cl. 58: 448. 1931. Type: Venezuela: Amazonas, summit of Cerro Duida, Tate 770 (NY, holotype; isotype: F; photographs of holotype in F and K).

Shrub or small tree, 1-10 m high. *Branchlets* brown-pubescent to glabrous. *Leaves*: petiole glabrous or occasionally with a few hairs, 1-3 mm long; blade when dry slightly shining, especially above, orbicular or ovate,  $1-1.5(2) \times$  as long as wide,  $2-5(6) \times 1.5-3.5$  cm, obtuse, rounded, or rarely acute at the apex, rounded or subcordate at the base, glabrous on both sides or sometimes with some hairs on the costa beneath; 5-7 pairs of secondary veins; tertiary venation often prominent on both sides. *Inflorescence*  $2-6 \times 3-4$  cm, usually rather congested. Peduncle, branches, and pedicels purple, more or less sparsely pubescent. Calyx purple, 2-3 mm (with pedicel 3.5-4 mm) long, hairy outside like the pedicels or glabrous; tube 1.5-2.5 mm long; lobes triangular, about as long as wide,  $0.5-1.5 \times 0.5-1.2$  mm, ciliate or not. Corolla in the mature bud  $3-5 \times$  as long as the calyx, 10-16 mm long, creamy or pale pink, turning purple at anthesis; tube  $1.5-3 \times$  as long as the calyx,  $1-2.3 \times$  as long as the lobes, 6-8 mm long, at the base 1.8-2.5 mm wide, at the throat 2-3.2 mm; lobes  $3-8 \times 1-1.8$  mm. Anthers  $1.5-2.2 \times 0.6-0.7$  mm. Ovary  $1.5 \times 1.2-1.6 \times 1.6$  mm;

style 3–4.5 mm long; stigma shortly bilobed. Capsule 10–20 × 4–8 mm. Seed narrowly oblong, 7–9 × 2–2.5 mm; grain 1.5 × 1 mm. Colleters in the axils of the leaves.

Distribution: Venezuela, (British) Guiana, Brazil (Rio Branco).

Ecology: On savannas, often along watercourses, and in gallery forests. Alt. (500) 800–1300 m.

VENEZUELA: Bolívar: Gran Sabana, Río Uari (bud, fr. Mar.) *Tamayo* 3132 (US, VEN); Río Uarama, below Uarama-Tepuí (fr. Apr.) *Steyermark & Nilsson* 643 (VEN); *ibid.*, N.E. of Luepa (fr. Mar.) *Steyermark & Aristeguita* 68 (VEN); Gran Sabana, Ilu-Tepuí, near Kavanayén (fl., fr. Mar.) *Maguire* 33685 (NY, VEN); Ilu-Tepuí, Gran Sabana, between Enemasic and San Rafael (fl., fr. Mar.) *Maguire* 33591 (NY, S, US, VEN); Ilu-Tepuí, Gran Sabana, at Kamarang Head (fl., fr. Mar.) *Maguire* 33296 (NY, VEN); near Mission Santa Teresita Kavanayén (fl., fr. Dec.) *Maguire & Wurdack* 33294 (G, NY, U, VEN); *ibid.* (fl., fr. Dec.) *Steyermark* 60919 (F, NY, VEN); Upper Caroní R., Sta. Elena de Uairen (Apr.) *Lasser* 1472 (US, VEN); Juairampai (Apr.) *Lasser* 1478 (VEN); near Uaiparú R. mouth, Ikabarú R., Caroní R. (fl., fr. Oct.) *Cardona* 1914 (US, VEN); Cerro Upuima, Caroní R. (bud, fr. Oct.) *Cardona* 2243 (US, VEN). Amazonas: Summit of Cerro Duida (fr. between Aug. and Apr.) *Tate* 770 (F, NY, type of *B. cinchonoides*); *ibid.* (Sept.) *Steyermark* 58291 (F, NY, VEN, topotype of *B. cinchonoides*); Cerro Yapacana, Río Orinoco (fr. Jan.) *Maguire, Cowan & Wurdack* 30525 (WAG, longest leaves seen in the species).

BRITISH GUIANA: Upper Mazaruni R., Samwarakna-tipu (fr. Nov.) *Maguire & Fanshawe* 32521 (GH, K, NY, P, UC); Imbaimadai, Upper Mazaruni District (Aug.) *Forest Department Br. Guiana* 7921 (K, NY); S. Pakaraima Mts., Chimapu savanna (Sept.) *Maguire, Maguire & Wilson-Browne* 46143 A (WAG), 46149 (WAG); Mt. Roraima (fl.) *Schomburgk* 966 (P); Mt. Roraima Exped., Ireng Valley (fl.) *Quelch & McConnell* 331 (K, paratype); Kotinga Valley (fl., fr.) *Quelch & McConnell* 161 (K, lectotype); *sin. loc.* (fl.) *Schomburgk* 21 (K).

BRAZIL: Rio Branco: Surumu R., Serra de Mairari (Sept.) *Ule* 8469 (K); between Vista Geral and Serra Sabang (fr. Dec.) *Maguire & Maguire* 40281 (NY); Serra do Sol (fr. Dec.) *Maguire & Maguire* 40374 (NY); between Caju and Vista Geral (Jan.) *Maguire & Maguire* 40482 (NY). Rio Branco (?): Igarapé, Tesos (Sept.) *v. Luetzelburg* 21514 (M).

#### NOTES

After comparison of the types and all specimens cited the present author concluded that *B. minor* and *B. cinchonoides* should be united. The leaves of the holotype of the latter species are more acutish than those of most specimens with glabrous branchlets assigned to *B. minor* by Gleason & Standley which is in contradiction with their statement: 'The plant collected on Duida is nearest *B. minor* N.E. Brown, of Roraima, the latter differing in its glabrous branches, acutish leaves, and slightly smaller capsules.' The branchlets may be densely pubescent, sparsely so, or glabrous on specimens with rounded as well as on those with acutish leaves. The variation in size of the fruits is greater than was supposed. Some examples of variation are: *Maguire* 40482 has acutish leaves and pubescent branchlets. *Steyermark* 60919 has acutish and more obtuse leaves, glabrous or pubescent branchlets, and capsules 8–20 mm long. The leaves of *Maguire* 33994 are more rounded than those of *Tate* 770, the branchlets being pubescent and the capsules 10–18 mm long. The branchlets of the lecto- and paratypes of *B. minor* are minutely pubescent and glabrescent.

4. *B. superba* Rich. Schomb., Reisen Br. Guian. 3: 1082. 1848; Progel in Martius, Fl. Bras. 6(1): 268, t. 72. 1868; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 36, f. 12. E-F. 1892. **Fig. 4. S**

Type: (British) Guiana: Mt. Roraima, Schomburgk 614 (939) (K, lectotype; isotypes: BM, F, G, GH, K, P).

Small tree, 7–10 m high. *Branchlets* pubescent or with a longitudinal line of pubescence below the stipular line. *Leaves*: petiole sparsely pubescent or glabrous, 3–5 mm long; blade narrowly ovate to elliptic, 1.5–2.5 × as long as wide, 4–10 × 2–5 cm, obtusely acute to acuminate at the apex, cuneate to rounded at the base, glabrous on both sides or pubescent on the costa beneath; 5–7 pairs of secondary veins; tertiary venation prominent beneath, less so above. *Inflorescence* rather lax, 3.5 × 3–6 × 6 cm. Peduncle, branches, and pedicels glabrous, with a longitudinal line of pubescence, or pubescent. Calyx glabrous or with a few hairs outside; tube 2 × 2–3 × 2.5 mm; lobes very unequal, more so than in the other species, triangular to narrowly oblong (the latter only in Schomburgk's collections), 1–7 × as long as wide, 0.5–5 × 0.3–1 mm. Corolla in the mature bud 2–4 × as long as the calyx, 12–15 mm long; tube 7 mm long; lobes 7–11 × 1 mm. Ovary 1.2 × 1.2 mm; style 3.5 mm long. Capsule 2 × 0.5–3 × 0.7 mm. Seed narrowly oblong, 13 × 2.5 mm; grain 2.5 × 1.5 mm. Colleters in the axils of the leaves.

Distribution: Venezuela (Bolivar) and (British) Guiana.

Ecology: Savannas (?). Alt. 650–1250 m.

VENEZUELA: Bolívar: Cerro Arepuchi, Río Caroní (Nov.) Cardona 1946 (US, VEN); Mt. Roraima District, near Arabupu (fr. Jan.) Pinkus 270 (F, G, GH, NY, S, US).

(BRITISH) GUIANA: Mt. Roraima., Schomburgk 613 (BM, paratype), 614 (939) (BM, F, G, GH, K, P, lectotype), s.n. (BR, paratype).