

Bertiera sinoensis Jongkind (Rubiaceae), a new forest liana from Liberia

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Background: Fieldwork in Liberia in recent years has improved our knowledge of the local endemic species.

Objectives: To describe a new species in *Bertiera* to accommodate material from the south-east of Liberia that cannot be included in any known species.

Methods: Existing herbarium collections were studied, the new species was studied in the field and the relevant published literature was consulted.

Results: The new species *Bertiera sinoensis* is described and illustrated here based on six specimens.

Conclusions: The new species adds one more species to the botanical hotspot in south-east Liberia. It is assigned a preliminary conservation status of 'Endangered' (IUCN).

Introduction

Bertiera Aubl. (Rubiaceae) is a genus of ca. 55 species from Africa, including Madagascar and the Mascarenes, and from America (World Checklist of Selected Plant Families [WCSP] 2016). Recently, several new African species have been published, as well as the taxonomic revisions for Cameroon and Madagascar (Nguembou et al. 2003, 2006, 2009; Sonké et al. 2005; Wittle & Davis 2010). Recent phylogenetic research suggests that the genus is monophyletic, although less than 10% of its species have been sampled (Tosh et al. 2009).

Until now, there were only two climbing *Bertiera* species known, *B. bracteolata* Hiern and *B. chevalieri* Hutch. & Dalziel, and a third climbing species, *B. sinoensis*, is described here. The new species was first discovered in the herbarium by William Hawthorne when we were working on a guide to the forest trees, shrubs and lianes from Senegal to Ghana (Hawthorne & Jongkind 2006). Recently, several more specimens have been studied and collected in the field by the author and his team.

The area in south-east Liberia, where the new species is found is a biodiversity hotspot known to be home to several other local endemic species, most of them discovered only recently, including *Napoleonaea sapoensis* Jongkind (Prance & Jongkind 2015), *Pauridiantha liberiensis* Ntore (Ntore 2008), *Pavetta sapoensis* Hawthorne (Hawthorne 2013), *Psychotria tetragonopus* O.Lachenaud & Jongkind (Lachenaud & Jongkind 2013) and *Soyauxia kwevonii* Breteler & Jongkind (Breteler, Bakker & Jongkind 2015). At the moment, an important part of the forest in this area being replaced by oil palm plantations.

Research method and design

All relevant herbarium collections at the BR, K, P and WAG herbaria were examined. *Bertiera sinoensis* has recently been studied in the field on several occasions. Preliminary assessment of the International Union for the Conservation of Nature (IUCN) Red List categories was performed and species according to the criteria through the RBG Kew website (<http://geocat.kew.org>).

Taxonomic treatment

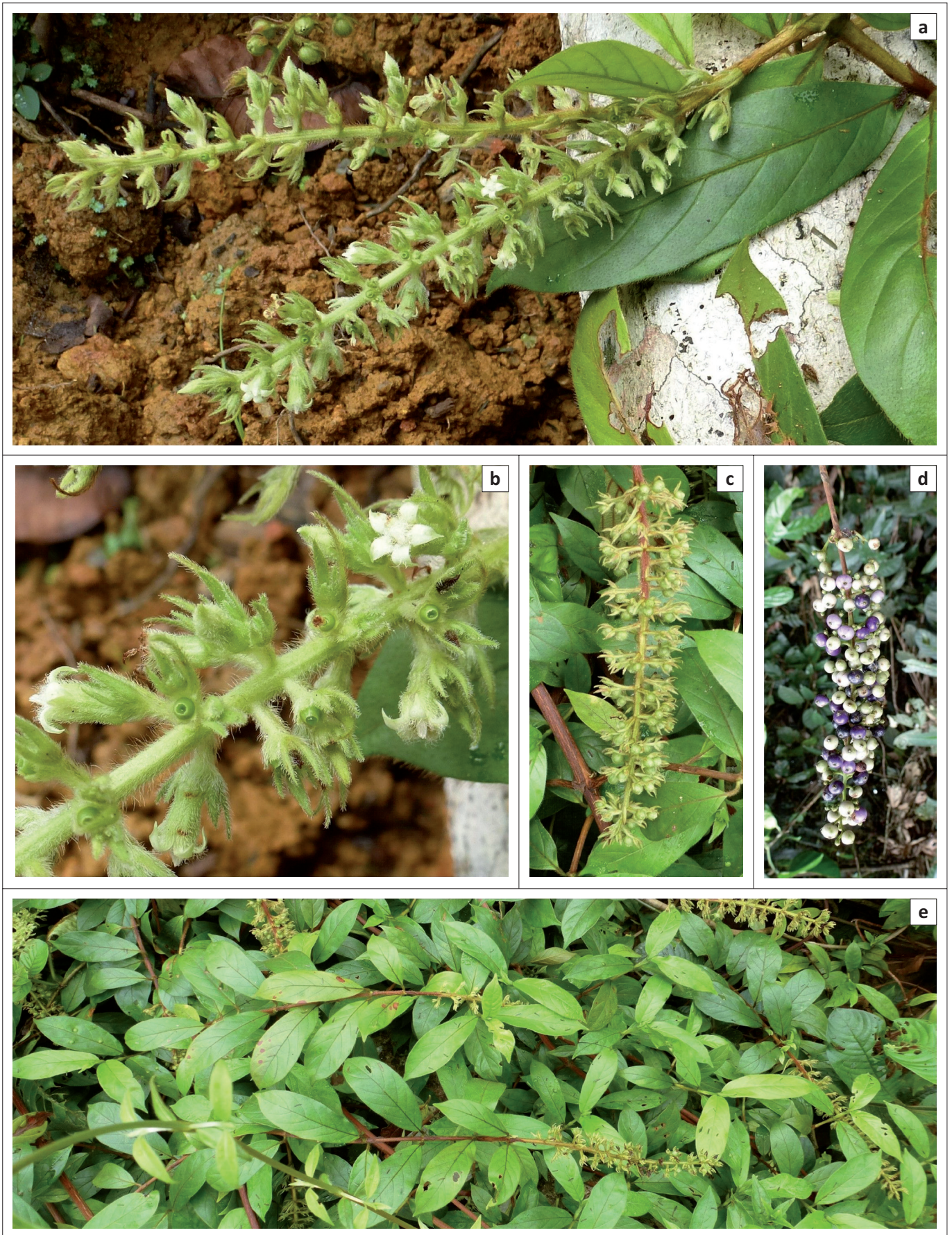
Bertiera sinoensis Jongkind, *sp. nov.*

Bertiera '*nimbae*', Hawthorne & Jongkind (2006:618, 619).

Type: Liberia. Sinoe County, east of Greenville-Zwedru road, 126 m, 5°30.50'N, 8°39.31'W; forest edge. fl., fr., 26 Sep. 2013, Jongkind, de Wet & Sambolah 12157 (WAG, holotype; BR, FHO, K, MO, P, iso.).

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Source: Photos by Jongkind

FIGURE 1: (a-c, e) *Bertiera sinoensis*. From *Jongkind 12157*. (a) Part of inflorescence, from several flowers, the corolla dropped and the green, glabrous disk became visible; (b) inflorescence; (c) infructescence with immature, green fruits; (d) *B. bracteolata*, infructescence. From *Jongkind 11845*; (e) leaves from *B. sinoensis*.

Description

Slender winding liana; twigs densely pubescent. *Stipules* 9–13 mm long, acuminate, sheathing for 3–4 mm, pubescent. *Leaves* opposite, petiole 3–4 mm long, pubescent, blade oblanceolate to narrowly elliptic, 6–10 cm × 2–3.3 cm, pubescent on both sides but hairs more densely and soft to the touch adaxially, with 5–7 pairs of lateral nerves, smaller nerves invisible on both sides, base cuneate, apex shortly acuminate. *Inflorescence* terminal, pedunculate, up to 160 mm long, with many short, cymose branches on a much longer, straight, bracteate axis, bracts 5–9 mm long, pubescent. *Flowers* sessile or shortly pedicellate, hermaphrodite, 5-merous; bracteoles 4–5 mm long, up to 1 mm wide, pubescent; calyx *ca.* 1 mm long, with short, triangular lobes, pubescent, green; corolla tube *ca.* 5 mm long, green to white, pubescent outside, lobes spreading, 1.5 × 1 mm, white, pubescent at both sides, hairs on corolla *ca.* 0.5 mm long, corolla in bud acutely pointed; anthers included, *ca.* 2 mm long, subsessile, linear, with an apical connective appendage; disk equalling the calyx, annular, glabrous, fleshy; ovary 2-celled with numerous ovules. *Fruit* subglobose, *ca.* 8 mm diameter, green to white to purplish, shiny, almost glabrous with many seeds. *Seeds* angular, *ca.* 1 mm, brown (Figure 1).

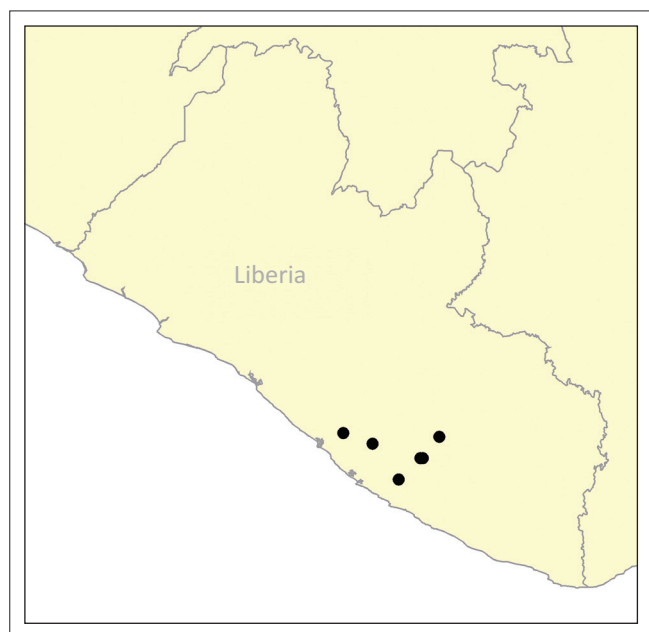


FIGURE 2: Map showing the geographic distribution of *B. sinoensis*.

Etymology

The species epithet refers to the Sinoe River that runs through the area where the new species is found.

Ecology and distribution

Bertiera sinoensis is only known from the evergreen forest in south-east Liberia (Figure 2).

Diagnosis

Bertiera sinoensis resembles *B. bracteolata* and *B. chevalieri*. All three are slender woody climbers with elongated inflorescences and are the only climbing species in the genus. The leaves of *B. sinoensis* are much more hairy and more slender than those of the other two species, the stipules and bracteoles are longer and more hairy, and the corolla is more conspicuously hairy. Both *B. bracteolata* and *B. chevalieri* are known from both Upper and Lower Guinea (sensu White 1979), but the new species is restricted to south-east Liberia. The important taxonomic differences between these three species are summarised in Table 1.

Apart from the inflorescence branching pattern, there is very little difference between *B. bracteolata* and *B. chevalieri*, and the relationship between the two taxa in Cameroon requires investigation. *Bertiera bracteolata* and *B. chevalieri* in Lower Guinea share the faint, closed pattern of very fine parallel veinlets on the lower side of the dried leaves, a pattern not seen on the leaves of the two taxa from Upper Guinea.

The fruits of *B. bracteolata* are often described as strongly ribbed (Hepper 1963:158), but this is only the case when they are dry and not when they are fresh (Figure 1c-d).

Additional specimens seen

Liberia: River Cess County – Cestos-Sanguin area, Logging Concession of the Cooper's. fr., 7 Dec. 2002, *Jongkind and staff & students of the University of Liberia* 5696 (BR, G, WAG). Sinoe County – African Fruit Company plantation. fl., 29 Jul. 1977, *de Gier & Goll* 52 (WAG); Sapu NP, buffer zone, on short distance of the Sinoe River. fl., 28 Nov. 2002, *Jongkind and staff & students of the University of Liberia* 5490 (WAG); South of Sayon Town. fr., 1 Dec. 2010, *Jongkind, Bilitoogui & Daniels* 9969 (BR, MO, K, WAG); Sinoe River bank east of Jalay's Town. ster., 8 Feb. 2016, *Jongkind & Sambolah* 13051 (BR).

TABLE 1: Comparison of important taxonomic differences between *B. sinoensis*, *B. bracteolata* and *B. chevalieri*.

Variable	<i>B. sinoensis</i>	<i>B. bracteolata</i>	<i>B. chevalieri</i>
Leaf blade, indumentum	Pubescent on both sides, on and in between the nerves	Pubescent on the midrib and main lateral nerves below, glabrous between them	Pubescent on the midrib and main lateral nerves below, glabrous between them
Leaf blade, size	60–100 mm × 20–33 mm	70–120 mm × 25–60 mm	60–100 mm × 25–55 mm
Stipule lengths	9–13 mm	5–8 mm	4–8 mm
Inflorescence: number of flowers on side branches	Two or more flowers	Two or more flowers	Only one flower
Inflorescence: bracteole length	4–5 mm	1.5–3.0 mm	1–2 mm
Corolla indumentum	<i>ca.</i> 0.5 mm long hairs on the outside	<i>ca.</i> 0.2 mm long hairs on the outside	<i>ca.</i> 0.2 mm long hairs on the outside
Distribution	South-east Liberia only	From Guinea to Gabon but not in Togo and Benin	From Guinea to Cameroon but not in Ghana, Togo and Benin

Conservation notes

Bertiera sinoensis is known from six locations. It is not known from protected areas but it is found close to Sapo National Park. Forest near some localities where it was previously collected has been transformed into oil palm plantations. With an extent of occurrence (EOO) of 1582 km² and an area of occupancy (AOO) of 24 km² (based on a cell width of 2 km), *B. sinoensis* is assigned a preliminary conservation status of 'Endangered' [EN B1b(i, ii, iii)+2b(i, ii, iii)] following IUCN Red List Categories and Criteria (IUCN 2015).

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Competing interests

The author declares that he has no financial or personal relationships that may have inappropriately influenced him in writing this article.

References

- Breteler, F.J., Bakker, F.T. & Jongkind, C.C.H., 2015, 'A synopsis of *Soyauxia* (Peridiscaceae, formerly Medusandraceae) with a new species from Liberia', *Plant Ecology and Evolution* 148, 409–419. <https://doi.org/10.5091/plecevo.2015.1040>
- Hawthorne, W.D., 2013, 'Six new *Pavetta* (Rubiaceae), including three "litter-bin" species from the evergreen forests of Western Africa', *Kew Bulletin* 68, 559–577. <https://doi.org/10.1007/S12225-013-9484-7>
- Hawthorne, W.D. & Jongkind, C.C.H., 2006, *Woody plants of Western African forests: A guide to the forest trees, shrubs and lianes from Senegal to Ghana*, Kew Publishing, Richmond.
- Hepper, F.N., 1963, 'Bertiera', in F.N. Hepper (ed.), *Flora of West Tropical Africa*, pp. 158–160, 2nd edn., vol. 2, Crown Agents for Overseas Governments, London.
- IUCN, 2015, *IUCN Red List categories and criteria: Version 3.1*, IUCN, Gland, Switzerland.
- Lachenaud, O. & Jongkind, C.C.H., 2013, 'New and little-known *Psychotria* (Rubiaceae) from West Africa, and notes on litter-gathering angiosperms', *Plant Ecology and Evolution* 146(2), 219–233. <https://doi.org/10.5091/plecevo.2013.765>
- Nguembou, K.C., Esono, P., Onana, J.M. & Sonké, B., 2006, 'Un *Bertiera* (Rubiaceae) nouveau heterophylle du Cameroun et du Gabon', *Systematics and Geography of Plants* 76, 211–216.
- Nguembou, K.C., Ewedje, E.-E.B.K., Droissart, V., Stévant, T. & Sonké, B., 2009, 'Une espèce nouvelle de *Bertiera* (sous-genre *Bertierella*, Rubiaceae) d'Afrique centrale atlantique', *Adansonia* 31(2), 397–406. <https://doi.org/10.5252/a2009n2a9>
- Nguembou, K.C., Sonké, B., Zapfack, L. & Lejoly, J., 2003, 'Les especes camerounaises du genre *Bertiera* (Rubiaceae)', *Systematics and Geography of Plants* 73, 237–280.
- Ntore, S., 2008, 'Révision du genre Afrotropical *Pauridiantha* (Rubiaceae)', *Opera Botanica Belgica* 15, 227 pp.
- Prance, G.T. & Jongkind, C.C.H., 2015, 'A revision of African Lecythydaceae', *Kew Bulletin* 70, 6. <https://doi.org/10.1007/s12225-014-9547-4>
- Sonké, B., Esono, P., Nguembou, K.C. & Stévant, T., 2005, 'Une nouvelle espèce de *Bertiera* Aubl. (Rubiaceae) du sous-genre *Bertierella* découverte en Guinée Equatoriale et au Cameroun', *Adansonia* 25(2), 309–315.
- Tosh, J., Davis, A.P., Dessein, S., De Block, P., Huysmans, S., Fay, M.F. et al. 2009, 'Phylogeny of *Tricalysia* (Rubiaceae) and its relationships with allied genera based on plastid DNA data: Resurrection of the genus *Empogona*', *Annals of the Missouri Botanical Garden* 96, 194–213. <https://doi.org/10.3417/2006202>
- White, F., 1979, 'The Guineo-Congolian Region and its relationships to other phytochoria', *Bulletin van den nationale plantentuin van België* 49, 11–55. <https://doi.org/10.2307/3667815>
- Wittle, P.M. & Davis, A.P., 2010, 'A revision of Madagascan *Bertiera* (Rubiaceae)', *Blumea* 55, 105–110. <https://doi.org/10.3767/000651910X525259>
- World Checklist of Selected Plant Families (WCSP), 2016, *Facilitated by the Royal Botanic Gardens, Kew*, viewed 27 July 2016, from <http://apps.kew.org/wcsp/>