European Journal of Taxonomy 828: 75–108
https://doi.org/10.5852/ejt.2022.828.1859
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2022 · Vilela L. & de Carvalho Lopes J.

Research article

Hornschuchia (Annonaceae), an endemic and threatened genus from the Brazilian Atlantic Forest

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Abstract. The South American Atlantic Forest is a biodiversity hotspot, and a relevant area for conservation due to its high level of endemism and great loss of habitat. One of its endemic taxa is the genus *Hornschuchia* (Annonaceae), including 12 species that occur from the State of Rio de Janeiro to Pernambuco in Brazil. The last taxonomic treatment of *Hornschuchia* was carried out 27 years ago. Since that time, two new species have been described and new specimens of known species have been collected, expanding our knowledge about the morphology and distribution of the genus. *Hornschuchia*, as an endemic genus in a threatened environment, deserves special attention. For this reason, we updated the taxonomic treatment of *Hornschuchia*, including the recently described species in the key, preparing illustrations, updating the descriptions of the species, clarifying and correcting information regarding the historical and type collections, providing preliminary conservation statuses, and analyzing patterns of endemism and richness for the genus. One species is preliminarily assessed as Critically Endangered, nine are Endangered, one is Vulnerable and one is of Least Concern. The coast of Bahia is a priority place for conservation for *Hornschuchia* as its center of species diversity.

Keywords. Biodiversity hotspot, cauliflory, conservation, endangered species.

Vilela L. & de Carvalho Lopes J. 2022. *Hornschuchia* (Annonaceae), an endemic and threatened genus from the Brazilian Atlantic Forest. *European Journal of Taxonomy* 828: 75–108. https://doi.org/10.5852/ejt.2022.828.1859

Introduction

The South American Atlantic Forest is a biodiversity hotspot, and a relevant area for conservation due to its high level of endemism and great loss of habitat (Myers *et al.* 2000). The Atlantic Forest includes different vegetation types, mainly forests, such as moist forest, seasonal semideciduous and deciduous forests and savanna (Brasil 2006; IBGE 2012). It spans three countries, Argentina, Paraguay and Brazil, in a broad latitudinal range from 5° to 30° S and in a densely populated area (Galindo-Leal & Camara 2005). In Brazil, the Atlantic Forest is defined and protected by law (Brasil 2006). In the past, the area has undergone progressive deforestation, currently with only 8% of its original vegetation area remaining (Galindo-Leal & Camara 2005). More recently, the Atlantic Forest has lost 14 502 ha of forests between 2018 and 2019, an increase of 27.2% when compared with the previous year (Fundação SOS Mata Atlântica 2020).

Hornschuchia Nees (1821), belonging to the family Annonaceae Juss., is one of the endemic taxa from the Atlantic Forest that occurs from Rio de Janeiro to Pernambuco States in Brazil (Johnson & Murray 1995). It includes 12 species, two of which have recently been published (Johnson & Murray 1995; Lopes *et al.* 2021; Mello-Silva *et al.* 2021). *Hornschuchia* is a unique genus among the Annonaceae, distinguished from other genera by its white flowers with linear petals and few carpels, 2–6, and stamens, 3–18, and cauliflory in various species, displayed in different types such as flagelliflory and trunciflory (Johnson & Murray 1995). Because of this, *Hornschuchia* was not initially recognized as belonging to Annonaceae. It was initially classified in the Sapindaceae Juss. ex Bercht. & J.Presl (Nees 1821), after which it was transferred to the Sapotaceae Juss. (Nees 1822). The genus was later classified in the Lardizabalaceae R.Br. (Sprengel 1827), Ebenaceae Gürke (Miquel 1856) and Aristolochiaceae Juss. (Agargh 1858). *Hornschuchia* was placed in Annonaceae only 90 years after its original description based on features such as alternate leaves, trimerous flowers, apocarpous fruits and seeds with ruminate endosperm (Hallier 1903).

Hornschuchia is classified in the tribe Bocageeae Endl. of the subfamily Annonoideae Raf. (Johnson & Murray 1995; Chatrou *et al.* 2012). Bocageeae includes seven other genera: *Bocagea* A.St.-Hil., *Cardiopetalum* Schltdl., *Cymbopetalum* Benth., *Froesiodendron* R.E.Fr., *Mkilua* Verdc., *Porcelia* Ruiz & Pav. and *Trigynaea* Schltdl., with 66 species in total (Verdcourt 1970; Murray 1993; Johnson & Murray 1995; Chatrou *et al.* 2012; Lobão 2017; Mello-Silva & Lopes 2020; Lopes *et al.* 2021; Mello-Silva *et al.* 2021). Bocageeae is distributed in the Neotropics, with the exception of the African monotypic genus *Mkilua* (Verdcourt 1970; Murray 1993; Johnson & Murray 1995; Chatrou *et al.* 2012). The tribe is recognized by the combination of the following features: trees to shrubs, with simple trichomes; flowers solitary and terminal in a developmental sense, appearing as supra-axillary or leaf-opposed without bracts in the pedicel; carpels free, placentation lateral, uni- or biseriate; pollen inaperturate, in polyads of 4 or more grains, pollen grains large (100–120 µm long) with tectate-columellate exine, anther with transverse septa (Tsou & Johnson 2003); fruit apocarpous, seed with bilobed aril, rumination lamelliform (Murray 1993; Chatrou *et al.* 2012).

The Bocageeae include the only two genera of Annonaceae that are endemic to the Atlantic Forest, *Hornschuchia* and *Bocagea*. The latter was revised recently with the description of two new species (Mello-Silva & Lopes 2020). The last taxonomic treatment of *Hornschuchia* was carried out 27 years ago (Johnson & Murray 1995). Since that time, two new species have been described and new specimens of known species have been collected, expanding our knowledge about the morphology and distribution of the genus and making it possible to produce assessments about the conservation status of the species. *Hornschuchia* is an endemic genus in a threatened environment and deserves special attention due to conservation purposes. For this reason, we updated the taxonomic treatment of *Hornschuchia*, including the recently described species in the key, preparing illustrations of the main features of the genus, updating the descriptions of the species with the morphological information from the new specimens, clarifying and correcting information regarding the historical and type collections, providing the conservation status and distribution maps for all the species, and analyzing patterns of endemism, abundance and richness for the genus.

Material and methods

Morphological descriptions are based on specimens deposited at the following herbaria: 14 Brazilian herbaria (ALCB, CEPEC, ECT, HEPH, HUEFS, IAN, ICN, MBM, MBML, RB, SAMES, SPF, UFRN, VIES) and 11 international herbaria (B, BR, K, M, MEL, MO, NY, P, S, U, US), acronyms according to Thiers (continuously updated). In total, 341 specimens were measured and analyzed. An exclamation mark indicates that the material was analyzed either by image or personally. Images of the specimens were accessed online, mainly in REFLORA (2021), and are indicated by the barcode inside square brackets. Images of nomenclatural types were accessed online by Global Plants in JSTOR (2021), except

those deposited in the SPF herbarium, which were observed personally. Locality data are cited verbatim from the specimen labels (between double quotation marks). Specimens from the same locality are abbreviated as ibid. We used an Olympus SZ-STB stereo microscope for analyzing the morphology, and measurements were taken with a pachymeter. The morphological terminology follows Johnson & Murray (1995), Hickey (1979), Lopes & Mello-Silva (2014), Murray (1993), Setten & Koek-Noorman (1992) and Theobald *et al.* (1979).

Vegetation types are in accordance with the following literature: Gouvêa *et al.* (1976), Peixoto *et al.* (2008) and Thomas & Barbosa (2008). The delimitation of the Atlantic Forest is in accordance with Brazilian law (Brasil 2006). Phenology and distribution were extracted from specimen labels. Geographic coordinates inside square brackets were inferred from information on labels using Google Maps, the municipalities inside parentheses with asterisk were corrected following the geographic coordinates. Conservation status is in accordance with *IUCN Red List Categories and Criteria* (IUCN 2012). Extent of occurrence (EOO) and the area of occupancy (AOO) were inferred using the Geospatial Conservation Assessment Tool (GeoCat, Bachman *et al.* 2011). A default cell size of 2 km^2 was used for the AOO. To analyze richness and abundance we used the R packages (R Core Team 2021) "coordinatecleaner" (Zizka *et al.* 2019), "speciesgeocodeR" (Topel *et al.* 2016) and "raster" (Hijmans & Van Etten 2012), and saved the results in a shapefile format. We used Infomap Bioregions to identify biogeographical regions (bioregions) for *Hornschuchia*, using points of occurrence (Edler *et al.* 2017). The cell size was set to the maximum 4° because of the sparsity of the data. The cell capacity, i.e., number of records per cell, was defined to range from eight to 20, based on the results of the abundance analysis. Distribution maps were prepared using the QGIS software (QGIS Development Team 2021), shapefiles for Atlantic Forest were downloaded from SOS Mata Atlântica (available on http://mapas.sosma.org.br/dados/), vegetation types in South America were based on Hasenack *et al.* (2017).

Results

Taxonomic treatments

Class Equisetopsida C.Agardh
Subclass Magnoliidae Novák ex Takht.
Order Magnoliales Bromhead
Family Annonaceae Juss.
Subfamily Annonoideae Raf.
Tribe Bocageeae Endl.

Genus ***Hornschuchia*** Nees

Flora 4 (1): 302 (Nees 1821). − Type species: *Hornschuchia bryotrophe* Nees.

Mosenodendron R.E.Fr., *Kongliga Svenska Vetenskaps Akademiens Handlingar, ser. 3* 34 (5): 8 (Fries 1900). – Type species: *Mosenodendron insigne* R.E.Fr.

Description

Trees to shrubs. Leaves chartaceous to coriaceous with primary vein impressed adaxially. Inflorescence 1-flowered or 2–22-flowered; axillary, supra-axillary, terminal or cauliflorous, i.e., ramiflory, trunciflory, flagelliflory. Flowers white, rarely pinkish, trimerous; three sepals and six petals in two whorls; calyx with sepals completely connate, rarely connate at the base; corolla with linear petals; stamens 3–18; carpels 2–9. Fruit with 1–5 monocarps, monocarps obovate, globose, ellipsoid, obloid, fusiform; stipe 1.5–9 mm long, subsessile to sessile. Seed 1–8, globose, obovoid, obloid-ellipsoid, ellipsoid, flattened-ellipsoid, with aril, rarely without aril.

Hornschuchia is recognized by its small and white flowers, with linear petals and cupuliform calyx. It is similar to *Trigynaea* and *Bocagea*; however, the petals in these two genera are ovate, elliptic or lanceolate (Johnson & Murray 1995).

Key to the species of *Hornschuchia* Nees

1. Leaves with commissural veins evident ..... ***H. bryotrophe*** Nees
− Leaves without commissural veins 2

2. Inflorescence axillary, supra-axillary to terminal or ramiflorous 3
− Cauliflorous, except ramiflorous 11

3. Inflorescence 1-flowered 4
− Inflorescence 2–22-flowered 10

4. Calyx connate at the base with triangular apex .....***H. citriodora*** D.M.Johnson
− Calyx completely connate (cupuliform) with truncate apex 5

5. Calyx 3–8 mm long 6
− Calyx 1–2(–3) mm long 8

6. Stamens 10, 4 mm long, carpels 5.5 mm long. Monocarp obloid with acute apex, 20–24 × 9–12 mm, stipe 1–2 mm long .....***H. mellosilvae*** L.Vilela & J.C.Lopes
− Stamens 3–6, 2–3 mm long, carpels 2–3 mm long. Monocarp globose to ellipsoid with rounded apex, 8–13 × 5–9 mm, sessile 7

7. Floral bud cylindrical with obtuse apex. Fruit 1 monocarp with persistent calyx .... ***H. lianarum*** D.M.Johnson
− Floral bud globose to ovoid to conical with acute apex. Fruit 2–5 monocarps with caducous calyx ... .***H. mediterranea*** Mello-Silva & D.M.Johnson

8. Calyx glabrescent. Monocarp sessile ..... ***H. polyantha*** Maas
− Calyx densely covered in trichomes. Monocarp stipe 1.5–3 mm long 9

9. Leaves narrowly elliptic to elliptic, oblanceolate to narrowly oblong, obovate or rarely lanceolate. Pedicel 7–37 mm long .....***H. myrtillus*** Nees
− Leaves narrowly ovate to ovate or lanceolate. Pedicel 1–7 mm long ..... ***H. alba*** (A.St.-Hil.) R.E.Fr.

10. Floral bud cylindrical. Monocarp fusiform, 5–8 mm wide, densely covered in trichomes, whitish in vivo ..... ***H. obliqua*** Maas & Setten
− Floral bud conical. Monocarp globose, 16–19 mm wide, glabrous, green in vivo .... ***H. santosii*** D.M.Johnson

11. Trunciflory 12
− Flagelliflory, i.e., inflorescence branches 4.5–100 cm long, emerging from the basal part of the trunk and running near the soil 13

12. Inflorescence branches 6–19 cm long .....***H. leptandra*** D.M.Johnson
− Inflorescence emerging close to the trunk .....***H. cauliflora*** Maas & Setten

13. Calyx glabrescent. Bracts caducous ..... ***H. polyantha*** Maas
− Calyx densely covered in trichomes. Bracts persistent .....***H. myrtillus*** Nees

Hornschuchia alba (A.St.-Hil.) R.E.Fr.
Fig. 1

Acta Horti Bergiani 10 (2): 137 (Fries 1931).

Basionym

Bocagea alba A.St.-Hil., *Flora Brasiliae meridionalis* 1 (2): 42 (Saint-Hilaire 1825). **Type**: BRAZIL – **Rio de Janeiro** • "Cabo Frio, Ponta de l'Est au Cap Frio, Prov. Rio de Janeiro"; *A. Saint-Hilaire 366*; holotype: P[P032535]!; isotypes: MPU[MPU026907]!, S[S-R-7077]! (fragment).

Material examined

BRAZIL – **Rio de Janeiro** • "Armação dos Búzios, Praia Brava. Mata de Encosta Sul voltada para o costão da Praia Brava"; 24 May 2001; *C. Farney 4371*; RB[RB00451923]!, SPF! • "Costão para João Fernandes. Mata de encosta Praia Brava- Costão para João Fernandes"; [22°44′38.5″ S, 41°52′17.8″ W]; 23 Aug. 2001; *C. Farney 4397*; RB[RB00452010]!, SPF! • "Encosta da Praia Brava"; 22°44′92″ S, 41°52′40″ W; 18 Feb. 2004; *H.G. Dantas 620*; RB[RB00086462]! • ibid.; 22°44′92″ S, 41°52′40″ W; 18 Feb. 2004; *H.G. Dantas 156*; RB[RB00086467]! • "Rancho Dez"; Jun. 1997; *C. Farney s.n.*; RB[RB00372099]! • "Fazenda Caravelas"; alt. 80 m; 20 Oct. 1999; *C. Farney 3930*; SPF!, RB[00452151]! • "Estrada Cabo Frio- Búzios, entre a Serra das Esmerencias e a Praia de José Gonçalves"; [22°48′32.8″ S, 41°56′37.8″ W]; 5 Jun. 1998; *J.M.A. Braga 4871*; RB[RB00042085]! • "Fazenda of José Gonçalves"; 22°47′ S, 41°57′ W; alt. 120 m; 8 Feb. 1999; *P.J. Maas 8818*; NY[NY02699049]!, RB[RB00042092]!, SPF! • "Estrada antiga para Búzios, próximo ao centrinho, ramal da lixeira"; 28 Jun. 1995; *D. Araújo 10320*; RB[RB00417332]! • "Cabo Frio, Morro da Piaçava"; 9 Oct. 2002; *C. Farney 4487*; SPF!, RB[RB00451944]! • "Morro do Mico"; [22°51′45.4″ S, 42°00′38.5″ W]; 22 Jun. 2002; *C. Farney 4463*; RB[RB00451806]!, SPF! • 27 Aug. 1997; *C. Farney 3587*; CEPEC[CEPEC00118741]!, MBM[MBM325079]!, R[RB00043047]!, SPF!. – **Locality unknown** • "E Brasilia"; *Freyreis s.n.*; S n.v.

Description

Shrubs, rarely treelets, 2–7 m tall. Leaves chartaceous; petiole 1–3 mm long; lamina 3.8–9.3 × 1.9–4.9 cm, narrowly ovate to ovate or lanceolate, both surfaces glabrous, base acute to obtuse, apex acuminate to acute, obtuse or rounded; primary vein impressed adaxially and raised abaxially, 6–12 pairs of secondary veins, angles between primary and secondary veins 50–60°. Inflorescence one-flowered; supra-axillary, terminal or leaf-opposed, bracts absent. Flowers with pedicel 1–7 mm long; flower buds conical to cylindrical with obtuse apex, 2–8 × 1–3 mm, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 2 × 2–3 mm, densely covered in trichomes. Petals linear, white, 11–14 mm long, covered in trichomes; stamens 6, ca 2 × 0.5 mm; carpels 3, ca 3 × 0.5 mm. Monocarps 2, immature monocarps fusiform, 4–9 × 3 mm, densely covered in trichomes, mature monocarps obovate, ca 2 cm long (Saint-Hilaire 1825); stipe ca 1.5 mm long, calyx persistent. Seed ca 6 mm long, ellipsoid, reddish, with fleshy aril (Saint-Hilaire 1825).

Distribution and habitat

Hornschuchia alba is endemic to Rio de Janeiro State. It is known from only two municipalities, Armação de Búzios and Cabo Frio, occurring in seasonal semideciduous lowland forest (Mello-Silva *et al.* 2021; Fig. 1).

Phenology

Flowering from February to October, fruiting from September to October.

Preliminary conservation status

Critically Endangered, CR B1ab(i,ii,iii) (Amaro 2016). At the time of the last revision of the genus (Johnson & Murray 1995), only two historical collections of *H. alba*, including the type, were available. The species was only known with certainty from Cabo Frio. Nowadays there are eight localities, in Armação de Búzios and Cabo Frio, where the species is known to occur. However, *H. alba* has not been collected in 18 years.

Notes

Johnson & Murray (1995) indicated the holotype as *Saint-Hilaire 99*. However, this collection number has been assigned to a species of Amaranthaceae Juss. The holotype of *Bocagea alba* is in fact *Saint-Hilaire 366* (Saint-Hilaire's field notebooks are available at http://hvsh.cria.org.br/works).

There are only immature fruits available (*Farney 3930* and *4487*), the fruit and seed descriptions have been complemented with the information in Saint-Hilaire (1825). With the new collections of *H. alba*, the description of the species has been updated (Johnson & Murray 1995) with new information about the habit and plant size, inflorescence position and flower dimension.

Hornschuchia alba has a single-flowered inflorescence, supra-axillary, terminal or leaf-opposed. It is similar to the specimens of *H. myrtillus* with this type of inflorescence. However, *H. alba* is different from *H. myrtillus* in the leaves that are narrowly ovate to ovate or lanceolate (vs narrowly elliptic to

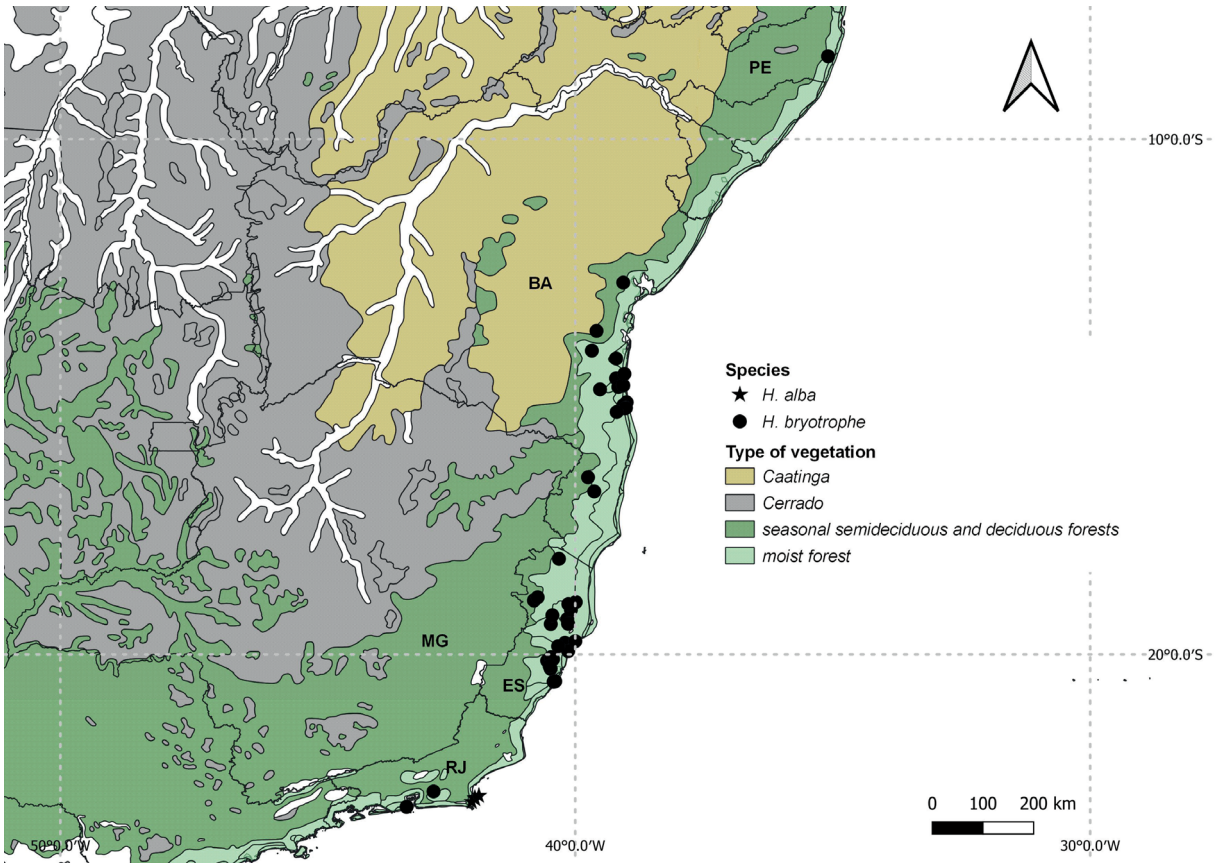

Fig. 1. Geographical distribution of *Hornschuchia alba* (A.St.-Hil.) R.E.Fr. and *H. bryotrophe* Nees. Abbreviations: BA = Bahia; ES = Espírito Santo; MG = Minas Gerais; PE = Pernambuco; RJ = Rio de Janeiro.

elliptic, oblanceolate to narrowly oblong, obovate or rarely lanceolate) and the pedicel 1–7 mm long (vs 10–28 mm long).

Hornschuchia bryotrophe Nees
Figs 1–2

Flora 4 (1): 302 (Nees 1821). **Type**: BRAZIL – **Bahia** • "Ilhéus" , "Strasse des Capitains Filisberto" [via Felisbertia]; Dec. 1816; *M.A.P. zu Wied s.n.* (*34, Nees von Esenbeck nr. 34*); holotype: BR[BR0000006593025]!; isotypes: BR[BR0000006593353]!, M[M0240081]!, MEL[MEL2123975]!, NY[NY00008358]!.

Heterotypic synonym

Mosenodendron insigne R.E.Fr., *Kongliga Svenska Vetenskaps Akademiens Handlingar, ser. 3* 34 (5): 8 (Fries 1900). **Type**: BRAZIL – **Bahia** • "Vittoria" ; *F. Sellow s.n.*; holotype: B[B 10 0243155]!.

Selected material examined

BRAZIL – **Bahia** • "Gandú, Estrada a Itamari"; [13°43′24.9″ S, 39°35′13.3″ W]; 22 Dec. 1970; *T.S. Santos 1168*; CEPEC[CEPEC00006203]!, NY[NY00395782]! • "Guaratinga, ca 2.5 Km na estrada Itabela-Guaratinga, saindo da BR-101. Entrada em estrada de terra à direita, no sentido Itabela-Guaratinga"; 16°33′48.2″ S, 39°45′09.5″ W; alt. 145 m; 24 Jan. 2009; *M. Groppo et al. 1808*; SPF! • "Ibicaraí, Rodovia BR-415, 40 km Oeste de Itabuna. Região de Mata Higrográfila Sul Baiana"; [14°51′27.7″ S, 39°31′09.8″ W]; alt. 300 m; *S.A. Mori s.n. et al.*; RB[RB00042146]! • "Ilhéus"; Jan. 1837; *B. Luschnath s.n.*; BR[BR0000006592691]! • "Castelnovo" [Castelo Novo]; [14°38′34.6″ S, 39°12′28.0″ W]; *Riedel 711*; M[M0240082]! • "Ipiaú, Rodovia Ipiaú-Ibirataia"; [14°06′21.4″ S, 39°40′39.8″ W]; 13 Nov. 1971; *T.S. Santos 2133*; CEPEC[CEPEC00008059]!, NY[NY00395783]! • "Itamaraju, Assentamento Pedra Bonita, aproximadamente 20 Km da rodovia vicinal de Itamaraju sentido Jucuruçu";16°50′19″ S, 39°37′53″ W; alt. 500 m; 13 Feb. 2007; *R.A.X. Borges 769*; CEPEC[CEPEC00116346]! • "Maraú, Rod. BR 030, trecho Ubaitaba/Marau, km 15. Vegetação perturbada em Região de Mata Hidrográfica Sul baiana. Folha SD 24 (14-39c)"; [14°15′29.0″ S, 39°12′28.0″ W]; *S.A. Mori s.n. et al.*; RB[RB00042161]! • "Una, Reserva Biológica de Una; REBIO de Una, Entrada no km 46 da rodovia BA 001 Ilhéus-Una"; [15°06′34.5″ S, 39°00′11.5″ W]; 23 Jan. 2006; *J.L. Paixão 661 et al.*; RB[RB00495855]! • "São Felipe, Recôncavo Sul, Serra da Capioba"; 12°47′05.7″ S, 39°04′06.7″ W; 1956; *R.P. Lôrdelo 56-333*; ALCB[ALCB004360]!. – **Espírito Santo** • "Águia Branca, Rochedo, Trilha do Córrego, proprietário Ailton Corteleti"; 18º57′21″ S, 40º48′5″ W; alt. 300–400 m; 19 Dec. 2007; *V. Demuner et al. 4816*; MBML[MBML032572]! • "Águas Claras, Escola Agroecológica"; 18º53′32″ S, 40º43′48″ W; alt. 300–500 m; 1 Feb. 2006; *L.F.S. Magnago et al. 531*; MBML[MBML027865]!, SPF! • "Aracruz, Aldeia Candeias"; [19°46′38.6″ S, 40°12′02.8″ W]; 26 Mar. 1997; *M.A. de Assis et al. 903*; SPF! • "Comboios"; [19°44′40.1″ S, 40°00′00.7″ W]; 27 Jul. 1992; *O.J. Pereira 3692*; VIES[VIES008830]! • "Picuã"; [19°50′31.4″ S 40°19′58.0″ W]; 4 Jun. 2011; *C.L. Dalmonech et al. 50*; MBML[MBML044614]! • "Cariacica, Reserva Biológica Duas Bocas Localidade de Duas Bocas, Trilha do Pescador"; 20°16′44″ S, 40°28′42″ W; alt. 135 m; 20 Oct. 2008; *P.H. Labiak et al. 5000*; CEPEC[CEPEC00129318]!, MBM[MBML037745]!, RB[RB00544259]! • "Guarapari, estrada ES-477, que liga a BR-101 à rodovia do Sol (ES-060), Ca de 6 km da BR 101, Mata ao lado da estrada, entrada pela Fazenda Bonanza"; 20°31′48″ S, 40°25′12″ W; alt. 30–50 m; 17 Feb. 1999; *R. Mello-Silva et al. 1596*; CEPEC[CEPEC00083584]!, MBM[MBM235550]!, NY[NY01145439]!, NY[NY01145438]!, RB[RB00042129]!, RB[RB00042117]!, SPF! • "Linhares" (Jaguaré*), "Barra Seca, Fazenda São Carlos, propriedade do Sr. Aleixo Barnabé, ca 1.4 km E da BR 101"; [18°59′09.8″ S, 39°59′24.4″ W]; 20 Feb. 1995; *J.R. Pirani et al. 3579*; RB[RB00042105]!, SPF!, VIES[VIES037620]! • "Reserva Natural da Companhia Vale do Rio Doce"; 19.0069° S, 40.1661° W; 2 Mar. 2010; *A.Q. Lobão 1532*; SPF!, SAMES[SAMES00216]!, VIES[VIES024740]! • "Marilândia, Estrada não

pavimentada para São Rafael. Mata de encosta, ao lado direito da estrada"; 19°24′42.5″ S, 40°28′34.2″ W; alt. 200 m; 19 Jan. 2011; *P. Fiaschi et al. 3478*; MBML[MBML042352]!, RB[RB00681608]!, SPF! • "Montanha, Fazenda Luis Siqueira - distrito da Penha"; 18°8′45.14″ S, 40°19′1.8″ W; alt. 140 m; 15 Nov. 2012; *A.M. Assis et al. 3515*; MBML[MBML047032]! • (Governador Lindenberg*) Fazenda São Jorge, 18 km from church in Bananal on paved road from Bananal to Novo Brazil, behind house; [19°14′29.8″ S, 40°26′41.7″ W]; 21 Apr 1995; *J.A. Kallunki et al. 707*; NY[NY00227611]!, SPF! • "Santa Leopoldina, Bragança, Rancho Chapadão, proprietário: João Emilio"; 20°7′22.8″ S, 40°32′46.8″ W; alt. 280–550 m; 30 Mar. 2006; *V. Demuner et al. 2101*; MBML[MBML026395]!, SPF! • "Sooretama, Reserva Biológica de Sooretama. Porção Oeste, trilha do Barro Roxo. Floresta de Tabuleiro"; [19°01′29.2″ S, 40°08′05.4″ W]; 18 Jan. 2010; *A.Q. Lobão et al. 1542*; SAMES[SAMES00217]! • "Vitória, Junção BR-101/ES-060, Rod. para Praia do Sol, 6Km BR-101, 3Km ES-060"; [20°31′19.0″ S, 40°23′25.2″ W]; 31 Jul. 1991; *D.M. Johnson et al. 1847*; CEPEC[CEPEC00064494]!, SPF!. – **Minas Gerais** • "Serra do Cipó. Serra do Cipó"; [19°20′32.6″ S 43°35′54.1″ W]; 16 Jan. 1951; *J.G Kuhlmann et al. s.n.*; RB[RB00042164]!. – **Pernambuco** • "Ipojuca, Engenho de Conceição Velha, Mata das Três Passagens, à direita da PE-60, em direção a Barreiras, após a tubulação que cruza a estrada para a Usina Ipojuca"; [8°23′31.7″ S, 35°05′26.3″ W]; 9 Dec. 1997; *S. Tavares et al. 51*; NY[NY01017923]!. – **Rio de Janeiro** • "Rio de Janeiro"; *J.G. Kuhlmann s.n.*; RB[RB00042140]! • "Taunay, Morro de mata baixa"; [22°57′31.6″ S, 43°16′37.8″ W]; 27 Feb. 1951; *G.A. Black et al. 51-11753*; IAN[IAN069581]! • "Estrada do Tanguá, perto de Rio Bonito. Rio Bonito" (Cachoeiras de Macacu*); [22°39′37.5″ S, 42°45′10.7″ W]; 26 Feb. 1951; *J.G Kuhlmann et al. s.n.*; RB[RB00042134]!, RB[RB150900]!, US[US01346584]! • "Cultivada no Jardim Botânico do Rio de Janeiro"; RB[RB00042137]!. – **Locality unknown** • *C.F.P. von Martius, Herb. Fl. Bras. n. 858*; M[M0240084]!.

Additional material examined

BRAZIL • *V. Demuner 3220*; MBML[MBML09241]!, SPF! • *V. Demuner 4412*; MBML[MBML032022]!, SPF! • *J.H.L. El Ottra 131*; SPF! • *D.A. Folli 1699*; SPF! • *2917*; RB[RB00484637]!, SPF! • *C.N. Fraga 2480*; CEPEC[CEPEC00130062]!, MBML[MBML038885]!, RB[RB00557920]! • *F.S. Gomes 1539*; ALCB[ALCB049674]! • *E. Guimarães 182*; RB[RB00042094]! • *J.G. Jardim 262*; NY[NY00395787]! • *J.G. Jardim 623*; CEPEC[CEPEC00064214]!; *J.G. Jardim 8852*; RB[RB00852603]!, SPF! • *J.A. Kallunki 589*; K[K001191170]!, NY[NY00395780]!, SPF! • *J.A. Kallunki 696*; NY[NY00227526]!, SPF! • *J.G. Kuhlmann s.n.*; NY[NY00395784]! • *J.C. Lopes 111*; SPF! • *J.C. Lopes 151*; SPF! • *P.J.M. Maas 8829*; MBML[MBML009585]!, NY[NY02699059]!, RB[RB00484639]! • *P.J.M. Maas 9811*; NY[NY02699058]!, SPF! • *L.F.S. Magnago 489*; MBML[MBML030986]! • *L.F.S. Magnago 1646*; MBML[MBML027722]!, SPF! • *R. Mello-Silva 1174*; NY[NY NY00395781]!, NY[NY00395777]!, RB[RB00042117]!, SPF! • *R. Mello-Silva 3141*; SPF! • *R.F. Monteiro 329*; RB[RB00516860]!, SPF! • *S.A. Mori 9292*; CEPEC[CEPEC00013256]! • *S.A. Mori 9368*; NY[NY00395785]! • *S.A. Mori 11348*; CEPEC[CEPEC00015681]!, NY[NY00395786]! • *O.J. Pereira 4019*; VIES[VIES008836]! • *O.J. Pereira 2472*; VIES[VIES006348]! • *J.R. Pirani 3074*; K[K001191168]!, K[K001191167]!, MBM[MBM181229]!, NY[NY00395778]!, SPF! • *Without collector's information*; RB[RB00042137]! • *C. Rocini 7*; SPF! • *L.A.M. Silva 1555*; CEPEC[CEPEC00029042]! • *W.W. Thomas 3720*; CEPEC[CEPEC00090940]!, NY[NY00684336]! • *W.W. Thomas 10742*; CEPEC[CEPEC00064423]!, MBM[MBM187065]!, NY[NY00095141]! • *W.W. Thomas 11069*; CEPEC[CEPEC00069957]! • *W.W. Thomas 12654*; CEPEC[CEPEC00091555]!.

Description

Shrubs or trees, 0.5–5 m tall. Leaves chartaceous; petiole 0.5–7 mm long; lamina 5.6–35 × 1.9–9.5 cm, narrowly oblong to elliptic, narrowly obovate to oblanceolate, both surfaces glabrous, base asymmetric, acute to obtuse, apex acuminate to acute, obtuse or rarely emarginate; primary vein impressed adaxially and raised abaxially, 6–22 pairs of secondary veins, commissural veins evident on both sides, impressed

adaxially and raised abaxially, angles between primary and secondary veins 50–60°. Inflorescence 6–22-flowered; flagelliflorous, inflorescence branched into axes 12–60 cm long, running near the soil, rarely trunciflorous, ramiflorous or terminal inflorescence; bracts persistent, 5.5–9(–13) × (1–)1.5–3(–3.5) mm. Flowers with pedicel 1–40 mm long; flower buds 1–12 × 1–3 mm, conical to ellipsoid, densely covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 1–4 × 1–6 mm, glabrescent. Petals linear, white, rarely pinkish, 11–19 mm long, densely covered in trichomes at the base and glabrous to glabrescent towards the apex; stamens 6, 3–6 × 0.5 mm; carpels 3, 4–9 × 0.5 mm. Monocarps 1–3, fusiform, 1.3–7 × 0.1–0.9 cm, glabrous, green in vivo; stipe 3–5 mm long, calyx caducous. Seeds 2–6, oblong-ellipsoid, 11–20 × 3.5–6 mm, brownish, rugose, with aril.

Distribution and habitat

Hornschuchia bryotrophe has the widest distribution, occurring from the States of Pernambuco, Bahia, Espírito Santo to Rio de Janeiro (Fig. 1). The species has been collected only once in Pernambuco State, close to the coast in the Atlantic Forest (Bazante & Alves 2021, *Tavares et al. 51*; NY[NY01017923]). There is a single collection that has been made in Serra do Cipó, Cerrado biome (Mello-Silva *et al.* 2012). However, this is the only record in the whole genus outside the Atlantic Forest and it is possible that this was a mistake in the label annotation (Mello-Silva *et al.* 2012, *Kuhlmann et al. s.n.*; RB[RB00042164]!). *Hornschuchia bryotrophe* occurs mainly in moist forest, but also in seasonal semideciduous forest (Fig. 1). In Bahia, it inhabits lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008) that occurs near the coast up to 70 km inland (Mori & Silva 1979). In Espírito Santo, it occurs in the northern portion of the state, in tabuleiro ('tableland') forest, a seasonal semideciduous forest (Peixoto *et al.* 2008).

Phenology

Flowering from January to December and fruiting from December to July.

Conservation status

Least Concern (BGCI & IUCN 2019).

Notes

There are two type collections of *Hornschuchia bryotrophe* at BR, for one of them, the holotype, Nees von Esenbeck annotated the number 34 ([BR0000006593025], Moraes *et al.* 2016), the same annotation is also on the isotypes at the M and MEL herbaria. The type localities of both *H. bryotrophe* and *H. myrtillus*, "Strasse des Capitains Filisberto", known as via Felisbertia, was a road linking Ilhéus with Minas Gerais whose construction was ordered and paid for by Marechal Felisberto Caldeira Brant (Moraes *et al.* 2016). The work of Gallagher & Moraes (2014) explains how the specimens collected by Wied in Brazil, such as the type collections of *H. bryotrophe* and *H. myrtillus*, arrived in an Australian herbarium, MEL.

Hornschuchia bryotrophe is one of the species with cauliflory. The development of cauliflory begins in the axil of the leaf. However, it remains active even after the abscission of the spent inflorescence branch due to the presence of dormant buds that repeatedly produce new inflorescences (Endress 2010). Cauliflory is classified into different types: (i) ramiflory refers to the inflorescence emerging in leafless portions of the branch; (ii) trunciflory to inflorescences borne on the main trunk; (iii) basiflory to inflorescences produced at the base of the trunk that could either be sessile or on perennial brachyblasts (Mildbraed 1922). In basiflory, the flower axis may elongate, which is called idiocladanthy (Mildbraed 1922). In cases in which the flower-bearing axis in idiocladanthy further elongates, allowing the inflorescence branches to reach the soil and grow along the ground, the term flagelliflory is applied (Mildbraed 1922). In such cases, the inflorescence emerges from the base of the trunk in long compound branches close to the soil. In *H. bryotrophe*, three types of cauliflory have been observed: flagelliflory, ramiflory and trunciflory.

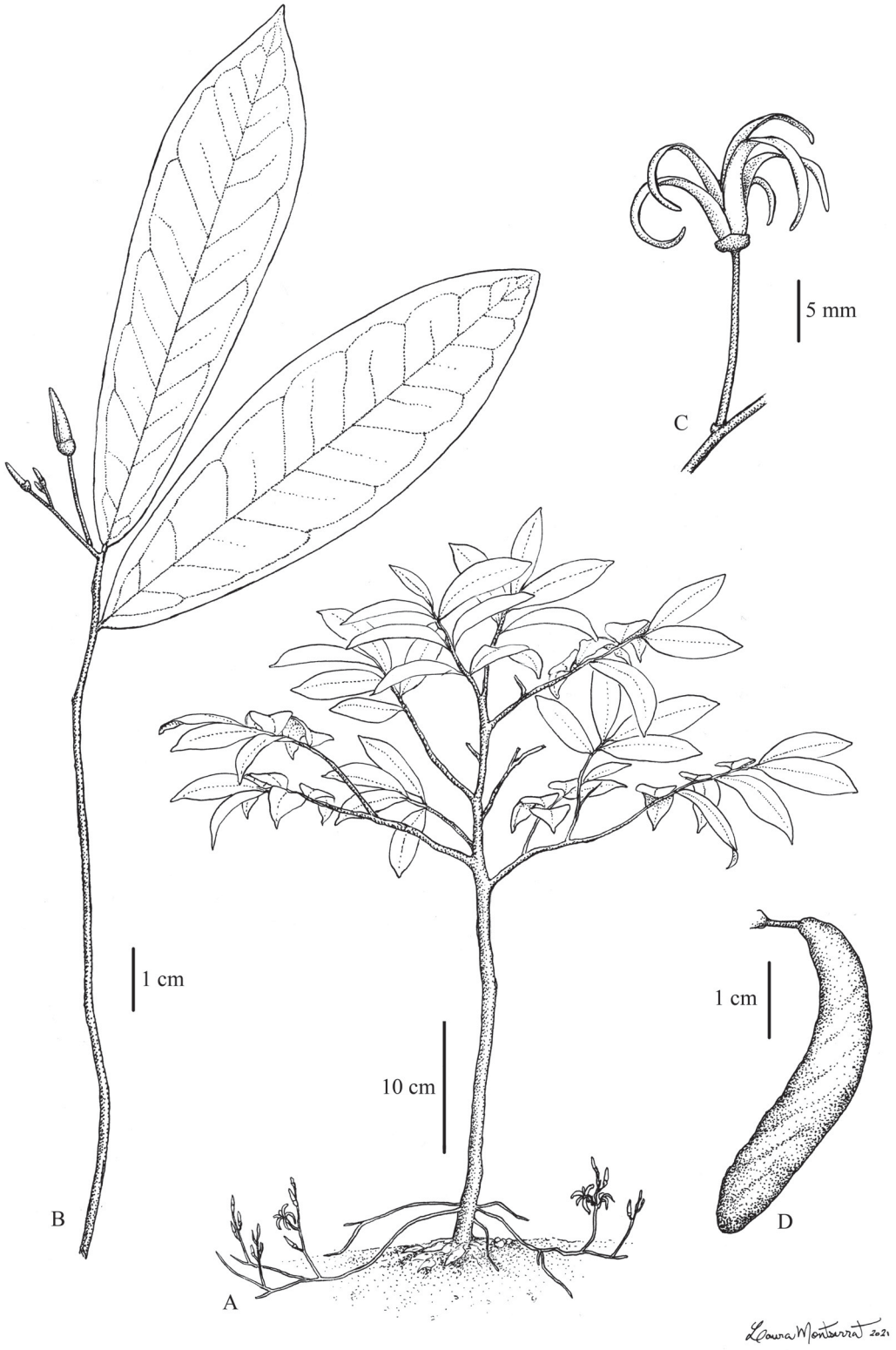

Fig. 2. Morphological characters of *Hornschuchia bryotrophe* Nees. **A**. Habit, showing the cauliflorous inflorescence emerging from the base of the trunk with inflorescence branches highly ramified (*J.C. Lopes 111*, SPF). **B**. Inflorescence branch with floral buds (*J.R. Pirani 3074*, SPF). **C**. Flower *(L.F.S. Magnago 1646*, SPF). **D**. Monocarp (*C. Roccini 7*, SPF). Drawing by Laura Montserrat.

However, the term flagelliflory is also adopted for flowers or inflorescences that are exposed from the canopy of the tree in long rope-like branches associated with bat pollination (Weberling 1989: 233–234).

Hornschuchia bryotrophe is distinct from the other species of the genus by its leaves with an evident commissural vein (Fig. 2B). *Hornschuchia bryotrophe*, *H. polyantha* and *H. myrtillus* present flagelliflory (Fig. 2A). Nevertheless, in addition to the leaves, *H. bryotrophe* also differs from these species by the conical flower buds with acute apex (Fig. 2B) (vs cylindrical with obtuse apex).

Hornschuchia cauliflora Maas & Setten
Fig. 3

Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series C: Biological and Medical Sciences 91 (3): 259, figs 16–17 (Maas *et al.* 1988). **Type**: BRAZIL – **Bahia** • (Aurelino Leal*) "Km 5 a 15 da BR-101, ao sul de Ubaitaba"; [14°20′26.8″ S, 39°19′07.2″ W]; 18 Nov. 1971; *T.S. Santos 2193*; holotype: CEPEC[CEPEC00008090]!; isotype: NY[NY00008359]!.

Material examined

BRAZIL – **Bahia** • "Camamu, Fazenda Exílio, entrada no km 10.7 da BA 650 Camamú-Travessão, ca 2 km L da sede da fazenda"; 14°0′7″ S, 39°10′7″ W; 21 Feb. 2000; *J.G. Jardim 2716*; ALCB[ALCB004361]!, CEPEC[CEPEC00088387]!, HUEFS[HUEFS062877]!, SPF! • "Dom Macedo Costa, Fazenda Limeira"; 12°54′35″ S, 39°9′10″ W; 18 Oct. 2015; *G. Costa 1515*; ALCB[ALCB030994]! • "Itacaré, Entre Taboquinhas e Itacaré. BA-654. Interior de mata à beira da estrada"; [14°16′55.2″ S, 38°59′47.3″ W]; 1 Jan. 1988; *M. Sobral 5749*; CEPEC[CEPEC00044273]!, ECT[ECT0003694]!, ICN[ICN00027827]!, NY[NY00395774]!, SPF! • "Ubaitaba, Trecho da BR 101 Ubaitaba ao Porto Santo Antonio ao Sul"; 22 Jun. 1972; *T.S. dos Santos 2336*; CEPEC[CEPEC00008836]!; NY[NY00395775]! • "Uruçuca, Rodovia Uruçuca- Ubaitaba"; [14°34′46.5″ S, 39°17′59.0″ W]; 20 Apr. 1970; *T.S. dos Santos 752*; CEPEC[CEPEC00005734]!, NY[NY00395776]!.

Description

Shrubs or trees, 3–8 m tall. Leaves subcoriaceous, petiole 3–9 mm long, lamina 14.9–32 × 3.5–15 cm, narrowly elliptic to elliptic, narrowly oblong to oblanceolate or lorate, both surfaces glabrous, base asymmetric, decurrent, acute to obtuse, apex acuminate to acute, attenuate to obtuse or rarely emarginate, primary vein impressed adaxially and raised abaxially, 13–22 pairs of secondary veins, angles between primary and secondary veins 50–60°. Inflorescence 2–22-flowered, trunciflorous, bracts absent. Flowers with pedicel 2–7 mm long, flower buds 3–7 × 1–2 mm, conical, densely covered in trichomes at the base and glabrescent towards the apex. Sepals completely connate, calyx cupuliform, apex truncate, 1–2 × 1–3 mm, glabrescent. Petals linear, white, 7–10 mm long, covered in trichomes, stamens (3–)6, 1.5–3.0 × 0.5 mm, carpels 3, 2–5 × 0.5 mm. Monocarps 1–3, fusiform, 1–6.3 × 0.3–0.6 cm, glabrous, green in vivo, stipe 2–5 mm long, calyx persistent. Seeds 4–6, ellipsoid, 13–19 × 4–7 mm, brownish, rugose, with aril.

Distribution and habitat

Hornschuchia cauliflora is endemic to Bahia, occurring in a small area from the municipalities of Uruçuca southward to Camamu, a distance of only 100 km. *Hornschuchia cauliflora* inhabits lowland tropical moist forest, but it is also found along the border with seasonal semideciduous forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 3).

Phenology

Flowering from October to January and fruiting from February to June.

Preliminary conservation status

Endangered, EN B1ab(i,ii,iii)+2ab(i,ii,iii) (Amorim *et al.* 2020a). There are only six preserved specimens of *H. cauliflora.* Since the last revision, 27 years ago (Johnson & Murray 1995), the species has been collected only twice, with a hiatus of 15 years between each collection, and has not been recollected in the last seven years.

Notes

The updated description includes more information about plant size and leaf morphology and dimensions (Johnson & Murray 1995). *Hornschuchia cauliflora* presents trunciflory, which is also found in some individuals of *H. bryotrophe.* However, *H. bryotrophe* is the only species in the genus with an evident commissural vein.

Hornschuchia citriodora D.M.Johnson
Figs 3, 4A

Contributions from the University of Michigan Herbarium 19: 259, fig. 1 (Johnson & Mello-Silva 1993). **Type**: BRAZIL – **Espírito Santo** • "Guarapari, Rodovia do Sol, estrada que liga a BR-101 à Praia Setibana, ES-060, a 6 Km da BR-101"; [20°36′36.0″ S, 40°29′03.1″ W]; 23 Feb. 1988; *J.R. Pirani 2435*; holotype: SPF[SPF00060814]!; isotypes: CEPEC[CEPEC00075532]!,

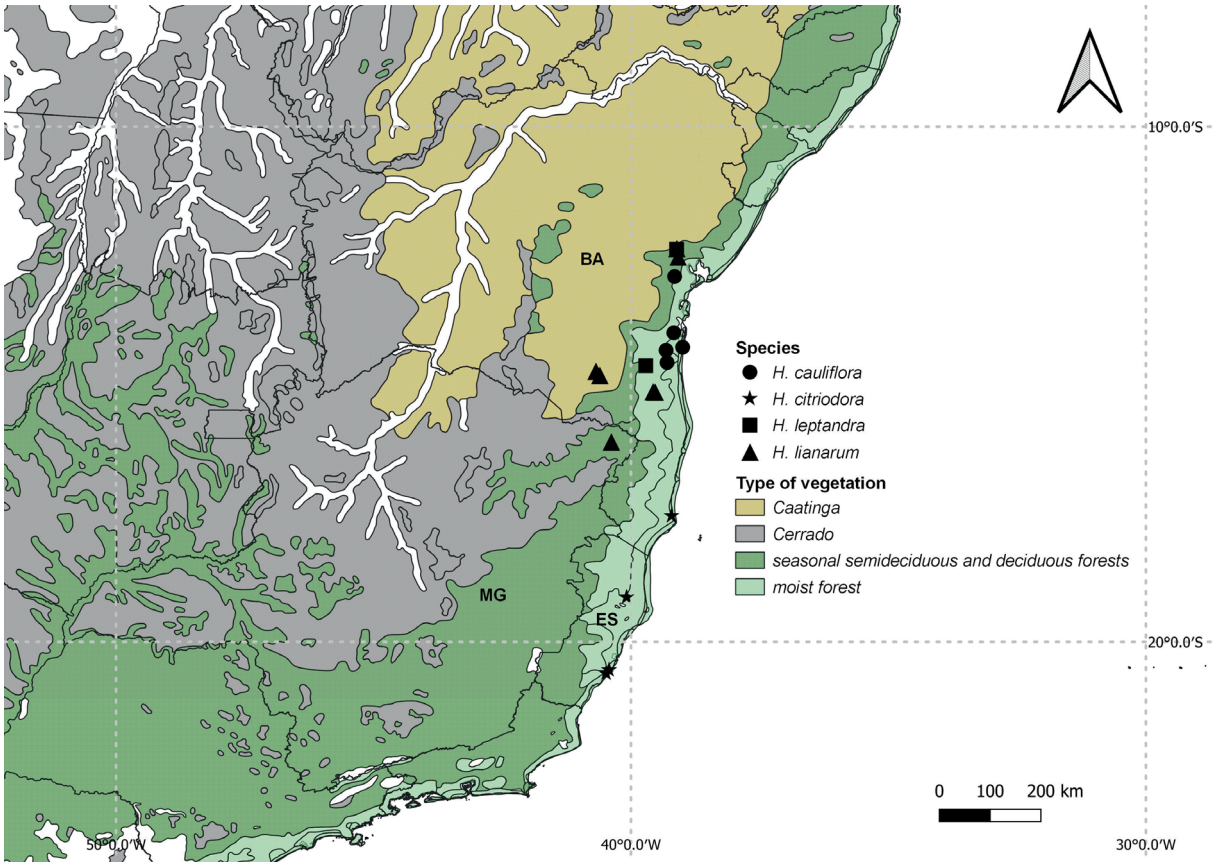

Fig. 3. Geographical distribution of *Hornschuchia cauliflora* Maas & Setten, *H. citriodora* D.M.Johnson, *H. leptandra* D.M.Johnson and *H. lianarum* D.M.Johnson. Abbreviations: BA = Bahia; ES = Espírito Santo; MG = Minas Gerais.

K[K000485526]!, MBM[MBM161035]!, MO[MO216927]!, NY[NY00008363]!, NY[NY00008364]!, RB[RB00534142]!, U[U0000331]!, US[US00478941]!.

Material examined

BRAZIL – **Bahia** • "Alcobaça, km 6–8 da rodovia BA 001, trecho Alcobaça-Caravelas"; [17°33′15.1″ S, 39°12′46.0″ W]; alt. 20 m; 16 Sep. 1978; *T.S. Santos 3328*; CEPEC[CEPEC00014498]!. – **Espírito Santo** • "Guarapari; Rodovia do Sol, road linking BR-101 to the Praia Setibana, ES-060, at 6 Km E of BR-101"; 20°33′S, 40°27′W; 18 Jan. 1993; *J.A. Kallunki 342*; MBM[MBM262718]!, NY[NY00395800]!, NY[NY00395799]!, SPF! • ibid., "along road connecting BR-101 and ES-060, (marked on BR-101 as road for Praia do Sol), 6 km from BR-101, 3 km from ES-060"; [20°32′41.4″ S, 40°25′36.1″ W]; 31 Jul. 1991; *D.M. Johnson 1848*; CEPEC[CEPEC00064459]! • "Linhares, Reserva Natural da Vale, Estrada Municipal do M.M.E"; alt. 64 m; 7 May 2009; *P.M.J. Maas 9810*; NY[NY02699055]!, SPF! • ibid., "1 km from BR-101"; 19°7′ S, 40°2′ W; 13 Feb. 1999; *P.M.J. Maas 8828*; NY[NY02699057]!, NY[NY02699056]! • ibid.; 19°07′59.3″ S, 40°05′07.5″ W; alt. 68 m; 25 Nov. 2009; *A.Q. Lobão 1533*; SAMES[SAMES00218]!, SPF!, VIES[VIES024742]! • ibid., R.F.L 0089/86; 19°07′57.8″ S, 40°05′05.9″ W; alt. 48 m; 2 Dec. 2010; *J.C. Lopes 110 et al.*; MBML[MBML049035]!, SPF! • ibid.; alt. 64 m; 14 Dec. 2007; *G.S. Siqueira 377*; SPF! • ibid.; 10 Feb. 2008; *D.A. Folli 5862*; SPF! • ibid.; 24 Mar. 1998; *D.A. Folli 3130*; RB[RB00484633]!.

Description

Shrubs or trees, 1–11 m tall. Leaves chartaceous, petiole 1–8 mm long, lamina 9.8–16.5 × 3.2–8 cm, narrowly elliptic to elliptic, narrowly oblong to oblanceolate or narrowly obovate, both surfaces glabrous, base acute to decurrent, apex acuminate to acute, attenuate to obtuse or rarely emarginate, primary vein impressed adaxially and raised abaxially, 8–18 pairs of secondary veins, angles between primary and secondary veins 40–55°. Inflorescence one-flowered, axillary to supra-axillary or terminal, bracts absent. Flowers with pedicel 3–14 mm long, flower buds 6–17 × 1–4 mm, conical, glabrescent to densely covered in trichomes or glabrescent at the base and glabrous towards the apex. Sepals connate at the base with triangular apex, (1–)2–3(–4) × 1–3 mm, glabrous to glabrescent. Petals linear, white, 10–21 mm long, covered in trichomes, stamens (5–)6, 4–4.5 × 0.5 mm, carpels 3–5, 5–7 × 0.5 mm. Monocarps 1–2, globose, 16–43 × 11–28 mm, glabrous, green in vivo, stipe subsessile, calyx caducous. Seeds 2–8, globose to ellipsoid, 9–19 × 6–10 mm, brownish, smooth, without aril.

Distribution and habitat

Hornschuchia citriodora is distributed from Bahia to Espírito Santo. There is only one record from the northern extreme of its distribution, in Alcoçoba, Bahia. *Hornschuchia citriodora* inhabits both lowland tropical moist forest, in Bahia (Gouvêa *et al.* 1976; Thomas & Barbosa 2008), and tabuleiro forest, a seasonal semideciduous forest, in northern Espírito Santo (Peixoto *et al.* 2008; Fig. 3).

Phenology

Flowering from December to May and fruiting from February to March.

Preliminary conservation status

The inferred EOO was 4499 km^2 and AOO was 16 km^2. In Espírito Santo, *H. citriodora* occurs in a conservation unit (Lopes & Mello-Silva 2014) and close to the main roads at other localities. As such, *H. citriodora* should be considered Endangered, EN B1ab(iii)+2ab(iii) according to the IUCN (2012) criteria.

Notes

Hornschuchia citriodora is the only species in the genus with sepals connate at the base with triangular apex (Fig. 4A). In the other species of *Hornschuchia* sepals are completely connate, forming a cupuliform

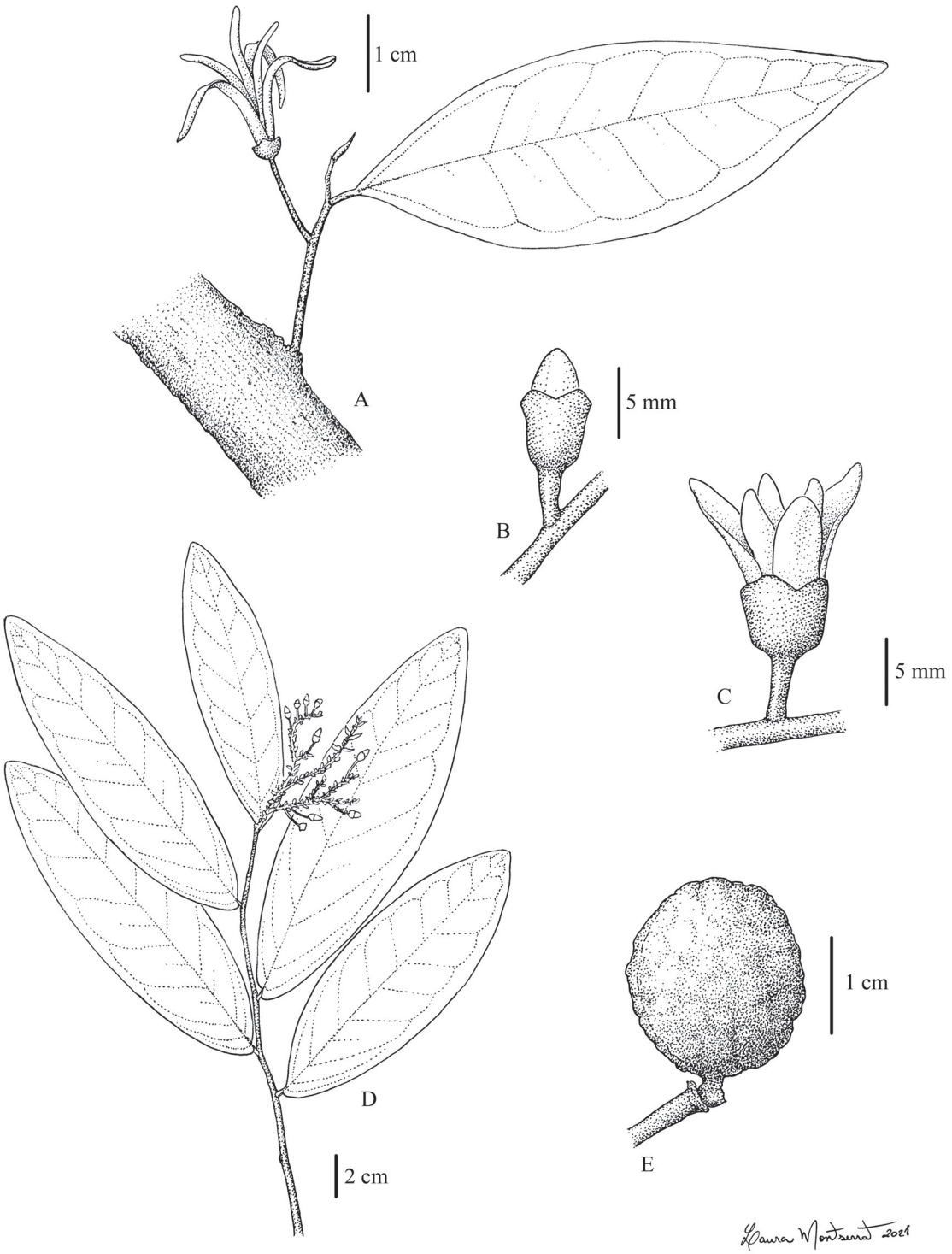

Fig. 4. Morphological characters of some species of *Hornschuchia* Nees. **A**. *H. citriodora* D.M.Johnson, branch with flower (*J. Kallunki 342*, SPF). **B–C**. *H. mediterranea* Mello-Silva & D.M.Johnson (*W. Thomas 12313*, NY). **B**. Floral bud. **C**. Flower. **D**. *H. obliqua* Maas & Setten, branch with terminal ramified inflorescence (*A.M. Carvalho 798*, NY). **E**. *H. santosii* D.M.Johnson, monocarp (*P. Fiaschi 1226*, SPF). Drawing by Laura Montserrat.

calyx with truncate apex. In Lopes & Mello-Silva (2014) the monocarp shape was described incorrectly as fusiform instead of globose. The description of *H. citriodora* has been updated (Johnson & Murray 1995) with the data from the new collections such as leaf dimensions and morphology and inflorescence position.

Hornschuchia leptandra D.M.Johnson
Fig. 3

Brittonia 47 (3): 310, figs 25C–D, 27 (Johnson & Murray 1995). **Type**: BRAZIL – **Bahia** • "Ilhéus, área do CEPEC (Centro de Pesquisas do Cacau), km 22 da rodovia Ilhéus/Itabuna (BR-415)"; 13 Oct. 1981; *J.L. Hage 1447*; holotype: CEPEC[CEPEC00025025]!; isotype: U[U0000332]!.

Material examined

BRAZIL – **Bahia** • "Ilhéus, Área do CEPEC, km 22 da Rodovia Ilhéus/Itabuna (BR-415)"; [14°46′23″ S, 39°13′22″ W]; alt. 50 m; 18 Feb. 1992; *S.C. Sant'Ana 201*; CEPEC[CEPEC00054434]! • ibid.; 24 Jul. 1991; *T.S. Santos 4576*; CEPEC[CEPEC00050662]! • ibid.; *D.M. Johnson et al. 1840A*; OWU n.v. • "Itabuna, Reserva Florestal da CEPLAC, Quadra D, km 22 da Rodovia Ilhéus/Itabuna"; 9 Oct. 1992; *A.M. Amorim 858*; CEPEC[CEPEC00056574]!, NY[NY00395808]!, NY[NY00395809]!, US[US01346585]! • "Santo Antônio de Jesus: Rodovia para São Miguel das Matas e Amargosa, a 7 Km do trevo com a BR 101"; 13º00′ S, 39º20′ W [12°58′40″ S, 39°19′52″ W]; 30 Jan. 1993; *J.R. Pirani 2714*; NY[NY00395810]!, SPF! • "Una, Km 9 da BR-101, Rodovia São José/Una"; [15°14′53″ S, 39°9′34″ W]; alt. 400 m, 18 Oct. 1983; *T.S. Santos 3918*; CEPEC[CEPEC00075409]!.

Description

Shrubs or trees, 1–4 m tall. Leaves chartaceous, petiole 1–5 mm long, lamina 18.2–40 × 3.5–9.6 cm, narrowly elliptic to oblanceolate, narrowly oblong to lorate, both surfaces glabrous, base slightly asymmetric to asymmetric, acute to obtuse, apex attenuate to obtuse, primary vein impressed adaxially and raised abaxially, 10–20 pairs of secondary veins, angles between primary and secondary veins 50–60°. Inflorescence 3–12-flowered, trunciflorous with idiocladanthy, inflorescence branched into axes 6–19 cm long, bracts absent. Flowers with pedicel 2–7 mm long, flower buds 4–6 × 1–2 mm, conical, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 1–3 × 2–5 mm, glabrescent. Petals linear, white or yellowish, 10–17 mm long, covered in trichomes, stamens 6–7, 5–7.4 × 0.5 mm, carpels 3, 5–6 × 0.5 mm. Monocarps 1–2, ellipsoid, 5–6 × 1–1.7 cm, glabrescent, stipe 8–9 mm long. Seeds 4, obloid-ellipsoid, 19–20 × 9–10 mm, with aril.

Distribution and habitat

Hornschuchia leptandra occurs in a narrow area along the coast of Bahia, between the municipalities of Santo Antônio de Jesus and Una, 320 km distant from each other. It inhabits both lowland tropical moist forest and seasonal semideciduous forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 3).

Phenology

Flowering from October to April and fruiting in August.

Preliminary conservation status

The inferred EOO was 366 km^2 and AOO was 12 km^2. In addition to its restricted area of occurrence, *Hornschuchia leptandra* has not been collected in almost 30 years and it is only known from three localities. The region where it occurs has been suffering continued decline of its original vegetation due

to anthropic pressure (Landau *et al.* 2008). Therefore, *H. leptandra* should be considered Endangered, EN B1ab(iii)+2ab(iii) according to the IUCN (2012) criteria.

Notes

Hornschuchia leptandra is the only species in the genus with trunciflory with idiocladanthy, in which the inflorescence emerges from the upper part of the trunk with inflorescence branches ramified and 6–19 cm long (Schatz & Wendt 2004). See the note under *H. bryotrophe* for more details about different types of cauliflory in the genus.

Hornschuchia lianarum D.M.Johnson
Fig. 3

Brittonia 47: 300, figs 4E, 21C–D, 22A–G (Johnson & Murray 1995). **Type**: BRAZIL – **Bahia** • "Barra do Choça, Estrada que liga a Rod. BR-116 a São Sebastião, 4Km a W da cidade"; [14°49′49″ S, 40°36′14″ W]; 21 Nov. 1978, *S.A. Mori 11254*; holotype: CEPEC[CEPEC00015054]!; isotypes: K[K000485527]!, NY[NY00312030]!, NY[NY00312031]!, U[U0000333]!.

Material examined

BRAZIL – **Bahia** • "Antônio Cardoso, Fazenda Sossego"; 11°52′35″ S, 40°27′9″ W [12°22′5″ S, 39°6′31″ W]; alt. 465 m; 11 Aug. 1999; *E. de Melo 2774*; HUEFS[HUEFS039004]!, RB[RB00434949]! • ibid.; 14 Apr. 1995; *E. de Melo 1143*; HUEFS[HUEFS019942]! • "Cachoeira, Vale dos Rios Paraguaçu e Jacuípe"; 12°32′ S, 39°05′ W [12°31′59″ S, 39°4′59″ W]; Sep. 1980; *Grupo Pedra do Cavalo 747*; CEPEC[CEPEC00036791]! • "Jussari, Ca 2.5km N of Palmira on road connecting Palmira to the Itaju do Colônia-Itapé Road, Fazenda São Roque, owner Luis Fernando Verde"; 15°8′48″ S, 39°34′8″ W; alt. 250 m; 14 Mar. 2001; *W.W. Thomas 12313*; CEPEC[CEPEC00088237]!, HUEFS[HUEFS184309]!, MBML[MBML042597]!, NY[NY01282053]!, RB[RB00484198]!, UFRN[UFRN00013825]! • "Fazenda Teimoso, Reserva Serra do Teimoso, a N. do portão da reserva"; 15°9′12″ S, 39°31′50″ W; alt. 275 m; 16 Mar. 2003; *W.W. Thomas 13393*; CEPEC[CEPEC00098362]!, RB[RB00485209]! • "Vitória da Conquista, Área ao S. da BR-106, ca 25 km a E. da cidade, ao longo da Rodovia 4 km a W. de São Sebastião"; [14°45′4″ S, 40°40′47″ W]; 16 Jul. 1991; *D.M. Johnson 1838*; CEPEC[CEPEC00064458]!. – **Minas Gerais** • "Jacinto, estrada Jacinto-Almenara, 10 km de Jacinto. Encosta suave ao norte da estrada, ao lado da antiga estrada de terra"; 16°07′15.4″ S, 40°22′51.2″ W; 29 Oct. 2008; *R. Mello-Silva 3140*; SPF! • "Estrada Almenara-Jacinto, ca 50 km de Almenara. Lado esquerdo da estrada"; 16°7′25″ S, 40°22′51″ W; 23 Jan. 2004; *J. Costa 459*; HUEFS[HUEFS077729]!, SPF!.

Description

Shrubs or trees, 1–8 m tall. Leaves chartaceous, petiole 1–4 mm long, lamina 4.2–10 × 2–5 cm, narrowly elliptic to elliptic, wide elliptic or lanceolate to oblanceolate, abaxial surface glabrous to glabrescent or densely covered in trichomes, adaxial surface glabrous, base asymmetric, acute to decurrent or obtuse to rounded, apex acuminate to acute, attenuate to obtuse, primary vein impressed adaxially and raised abaxially, 7–14 pairs of secondary veins, angles between primary and secondary veins 45–60°. Inflorescence one-flowered, supra-axillary or terminal, bracts absent. Flowers with pedicel 1–6 mm long, flower buds 4–6 × 1–2 mm, cylindrical with obtuse apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 3–6 × 2–7 mm, densely covered in trichomes. Petals linear, white or yellowish, 9–15 mm long, glabrous to glabrescent, stamens 6, ca 3 × 0.5 mm, carpels 2–4, ca 2.5–3 × 0.5 mm. Monocarp 1, globose to ellipsoid, 1 cm long, glabrescent, sessile, calyx persistent. Seeds 2, 9–10 × 6–7 mm, with aril.

Distribution and habitat

Hornschuchia lianarum occurs mainly inland in Bahia, with only one location in the north of Minas Gerais, close to the border with Bahia. The species is found in seasonal semideciduous forest, seasonal deciduous forest, also known as 'liana' forest, and in lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 3). In both the seasonal semideciduous and deciduous forests, the dry season is between June and September (Mori & Silva 1979).

Phenology

Flowering from January to November and fruiting from March to August.

Preliminary conservation status

The inferred EOO was 29 760 km^2 and AOO was 28 km^2. *Hornschuchia lianarum* is only known from four localities and the region it inhabits has been suffering with progressive loss of habitat (Landau *et al.* 2008; Mori & Silva 1979). The species should be considered Endangered, EN B2ab(iii), according to the IUCN (2012) criteria.

Notes

The specimen *Noblick 3274* from Feira de Santana, Bahia, is one of the paratypes of *H. lianarum* (Johnson & Murray 1995), but it is, in fact, *Oxandra saxicola* Maas & Junikka, a species that occurs in the Cerrado, Brazil, and in the chiquitano, Bolivia (Junikka *et al.* 2016). *Oxandra saxicola* shares with *H. lianarum* the one-flowered inflorescence, small, whitish flowers and globose monocarps. However, *O. saxicola* has 3–5 bracts (vs ebracteate) and flowers with ca 20 stamens (vs 6) and 5–10 carpels (vs 3).

Hornschuchia lianarum, together with *H. mediterranea* and *H. mellosilvae*, inhabits semideciduous forest of Bahia. Moreover, the three species have in common the largest calyces in the genus (3–8 × 2–7 mm). *Hornschuchia lianarum* is different from the other two by the cylindrical bud (vs globose to rounded to conical). In addition, *H. lianarum* can be differentiated from *H. mellosilvae* by the smaller, 9–10 × 6–7 mm, globose to ellipsoid and sessile monocarps with rounded apex (vs 20–24 × 9–12 mm, obloid monocarps with acute apex, with a stipe 1–2 mm long). *Hornschuchia lianarum* differs from *H. mediterranea* by its cylindrical floral bud with obtuse apex and fruit with 1 monocarp with persistent calyx (vs floral bud globose to ovoid to conical with acute apex and fruit with 2–5 monocarps with caducous calyx).

Hornschuchia mediterranea Mello-Silva & D.M.Johnson
Figs 4B–C, 5

Phytotaxa 483 (3): 286, figs 1–2 (Mello-Silva *et al.* 2021). **Type**: BRAZIL – **Bahia** • "Jussari. Fazenda São Roque, 2.8 km em estrada vicinal à direita da estrada Jussari-Palmira, entrada a 13.8 km além da ponte sobre o rio Piabanha, na saída de Jussari (entrada à esquerda a 2 km de Palmira no sentido Palmira – Jussari), mata semidecidual de encosta, antropizada"; 15°08′17.4″ S 39°34′16.8″ W; alt. 211 m; 28 Oct. 2008; *R. Mello-Silva 3138*; holotype: SPF[SPF00220462]!; isotypes: CEPEC!, K!, NY!, OWU!, RB!, W!.

Material examined

BRAZIL – **Bahia** • "Antônio Cardoso, 20 km de Feira de Santana, na BR-116, Fazenda Sossego"; 12°21′56″ S, 39°06′33″ W; 11 Aug. 1999; *E. Mello et al. 2774*; SPF! • "Jussari, ca 2.5 km N of Palmira on road connecting Palmira to the Itaju do Colonia-Itapé road, Fazenda São Roque (owner Luis Fernando Verde)"; 15°08.3′ S, 39°34.3′ W; alt. 300–450 m; 2 Feb 1999; *W.W. Thomas 11935*; SPF! • ibid.; 15°08.476′ S, 39°34.749′ W; alt. 250–300 m; 14 Mar. 2001; *W.W. Thomas 12313*; SPF! • "Fazenda Serra do Teimoso, Reserva Serra do Teimoso"; 15°09′12″ S, 39°31′50″ W; 16 Mar. 2003; *W.W. Thomas*

13393; SPF! • "Mundo Novo, entrada para a cidade próximo a BA-052 (Estrada do Feijão)"; 11°52′35″ S, 40°27′9″ W; alt. 465 m; 11 Aug. 1999; *E. Mello et al. 2784*; SPF!.

Description

Shrubs or trees, 1.5–8 m tall. Leaves chartaceous to coriaceous, petiole 2–6 mm long, lamina 4.4–15.5 × 2.3–5.8 cm, narrowly elliptic to elliptic, narrowly ovate or lanceolate to oblanceolate, adaxial surface glabrous and abaxial surface glabrous to glabrescent, base cuneate to acute, apex attenuate to acute, slightly acuminate or obtuse, primary vein impressed adaxially and raised abaxially, 7–12 pairs of secondary veins, angles between primary and secondary veins 40–60°. Inflorescence one-flowered, axillary, supra-axillary, terminal or leaf-opposed, bracts absent. Flowers with pedicel 4–6 mm long, flower buds 3–6 × 1–3 mm, globose to ovoid to conical with acute apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate to triangular, 3–6 × 4–7 mm, densely covered in trichomes. Petals linear, white, rarely yellowish, 6–9 mm long, covered in trichomes, stamens 3–6, 2–3 × ca 1 mm long, carpels 5–8, 2–3 mm long. Monocarps 2–5, globose to ellipsoid, 8–13 × 5–9 mm, densely covered in trichomes, sessile, calyx caducous. Seeds 3–4, wide obovoid to ellipsoid, 7–7.2 × 4 mm, obovoid to ellipsoid, brownish, rugose, with aril.

Distribution and habitat

Hornschuchia mediterranea occurs inland in Bahia. It inhabits seasonal semideciduous forest, seasonal deciduous forest and lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008), with

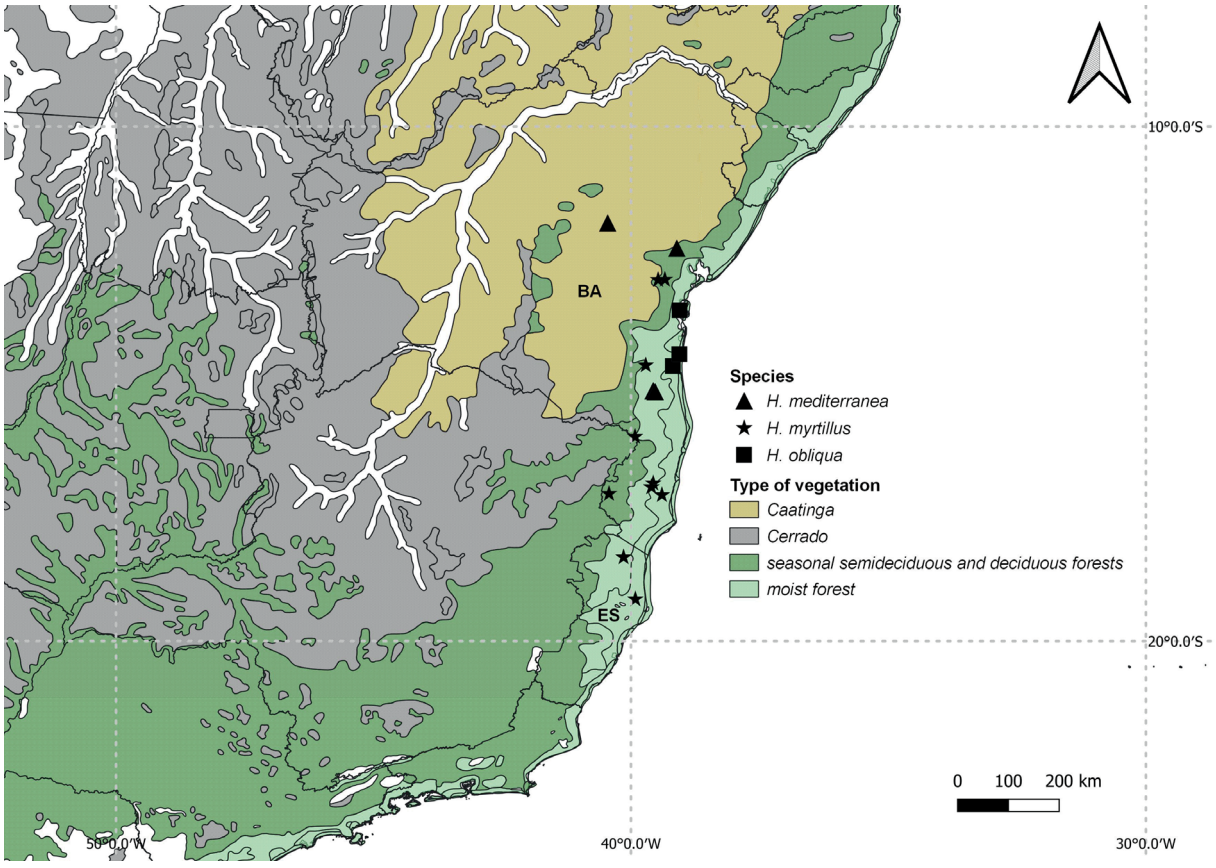

Fig. 5. Geographical distribution of *Hornschuchia mediterranea* Mello-Silva & D.M.Johnson, *H. myrtillus* Nees and *H. obliqua* Maas & Setten. Abbreviations: BA = Bahia; ES = Espírito Santo.

one occurrence near the Caatinga domain, a xeric vegetation type, in the municipality of Mundo Novo (Figs 5, 7A).

Phenology

Flowering from February to April and fruiting from February to August.

Preliminary conservation status

Endangered, EN B2ab(iii) (Mello-Silva *et al.* 2021).

Notes

Hornschuchia mediterranea is similar to *H. mellosilvae* in its larger calyx and globose, rounded or conical floral bud (Fig. 4B–C). However, *H. mediterranea* has smaller petals (6–9 mm long vs 9–24 mm long) fewer stamens (3–6 vs 10), more carpels (5–8 vs 4) and globose to ellipsoid monocarps, 6–11 × 3–9 mm, with rounded apex and densely covered in trichomes (vs obloid with acute apex, 20–24 × 9–12 mm, glabrous).

Hornschuchia mellosilvae L.Vilela & J.C.Lopes
Fig. 6

Phytotaxa 520 (3): 274, figs 1–2 (Lopes *et al.* 2021). **Type**: BRAZIL – **Bahia** • "Almadina, Rodovia de Almadina para Ibitupã ca 20 km. Fazenda São Roque, ca 10 km da entrada do ramal à esquerda"; 14°38′27″ S, 39°42′47″ W; 12 Mar. 2005; *P. Fiaschi 2784*; holotype: SPF[SPF00168936]!; isotypes: CEPEC[CEPEC00104268]!, NY[NY01282018]!.

Material examined

BRAZIL – **Bahia** • "Antônio Cardoso, 20 km de Feira de Santana, na BR-116, Fazenda Sossego"; [12°22′50.9″ S, 39°06′49.5″ W]; 14 Apr. 1995; *E. Mello 1143*; SPF[SPF00146918]!, SPF[SPF00133100]!.

Description

Shrubs or treelets. Leaves chartaceous to subcoriaceous, petiole 2–7 mm long, lamina 6–11.6 × 2.4–5.3 cm, narrowly elliptic to elliptic or lanceolate, both surfaces glabrous, base cuneate to acute or obtuse, apex acuminate to acute or obtuse, primary vein impressed adaxially and raised abaxially, 8–12 secondary veins, angles between primary and secondary veins 50–60°. Inflorescence one-flowered, supra-axillary or terminal or ramiflorous, bracts absent. Flowers with pedicel 2–4 mm long, flower buds 5–7 × 2–3 mm, conical, densely to sparsely covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 3–8 × 2–5 mm, densely covered in trichomes. Petals linear, white, outer petals (9–)20–24 × (1.5–)2–3 mm, inner petals 15 × 3 mm, densely covered in trichomes, stamens 10, ca 4 × 0.5 mm, carpels 4, ca 5.5 × 1 mm, densely covered in trichomes. Monocarp 1, obloid with acute apex, rugose, 20–24 × 9–12 mm, glabrous, green in vivo, stipe 1–2 mm long, calyx persistent. Seeds 4, obloid-flattened, 15–18 × 8 mm, with aril.

Distribution and habitat

Hornschuchia mellosilvae occurs inland in Bahia. It inhabits semideciduous seasonal forest and lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 6).

Phenology

Flowering from March to April, fruiting in March.

Preliminary conservation status

Endangered, EN B2ab(iii) (Lopes *et al.* 2021).

Notes

Hornschuchia mellosilvae and *H. bryotrophe* are the only species in the genus with ramiflory. However, *H. bryotrophe* is easily recognized by its leaves with evident commissural veins (Fig. 2B), absent in *H. mellosilvae*. Some individuals of *H. mellosilvae* also present supra-axillary or terminal inflorescence, features shared with *H. mediterranea*. See note under *H. mediterranea* to differentiate the two species.

Hornschuchia myrtillus Nees
Fig. 5

Flora 4 (1): 302 (Nees 1821). **Type**: BRAZIL – **Bahia•** "Ilhéus", "Str. v. C. F. B." ["Strasse des Capitains Filisberto", via Felisbertia]; Nov. 1816; *M.A.P. z. Wied-Neuwied s.n.*; holotype: BR[BR0000006592400]!; isotypes: BR[BR0000006593711]! (specimen from the herbarium collection of Martius), MEL[MEL2123974]!, NY[NY00026101]! (fragment).

Material examined

BRAZIL – **Bahia •** "Almadina: Rodovia de Almadina para Ibitupã, ca 20 km. Fazenda São Roque, ca 10 km da entrada do ramal"; 14°38′27″ S, 39°42′47″ W; 12 Mar. 2005; *P. Fiaschi 2743*; CEPEC[CEPEC00104051]!,

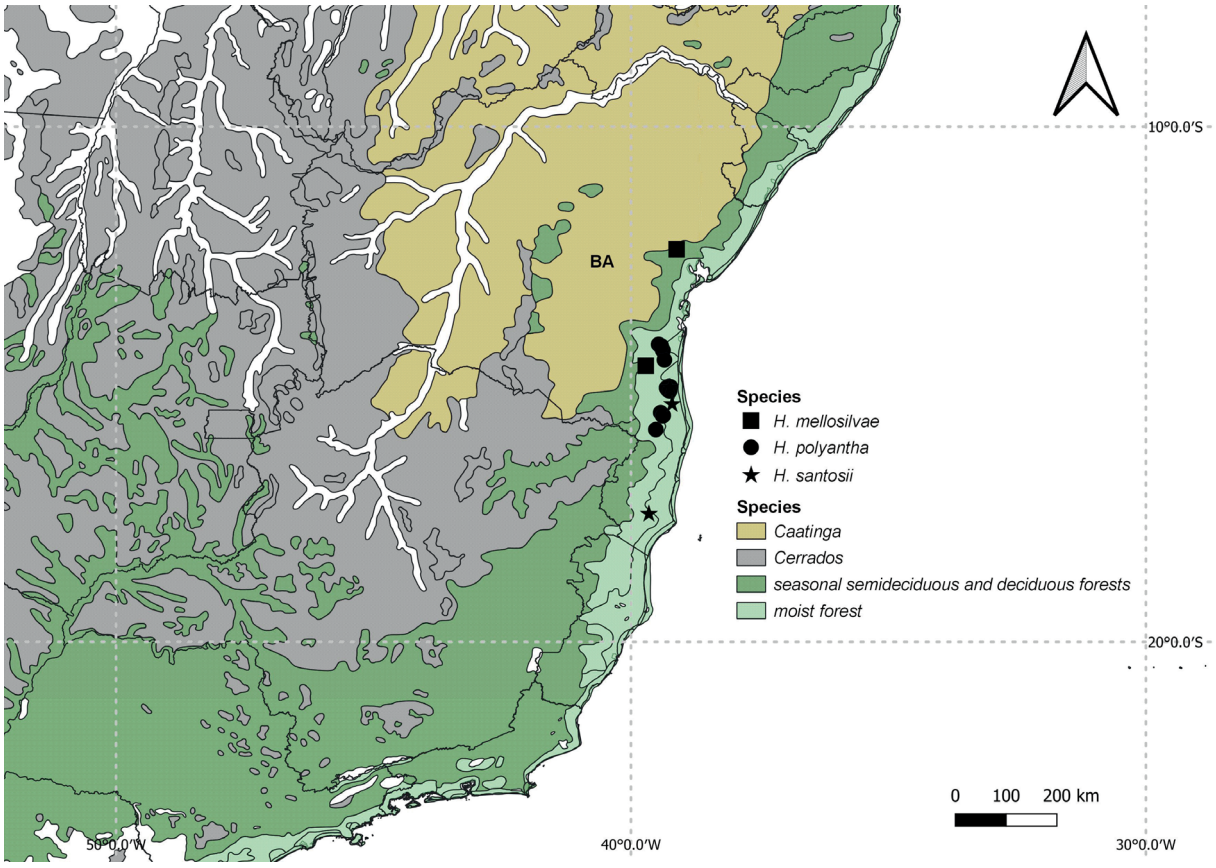

Fig. 6. Geographical distribution of *Hornschuchia mellosilvae* L.Vilela & J.C.Lopes, *H. polyantha* Maas and *H. santosii* D.M.Johnson. Abbreviations: BA = Bahia.

MBM[MBM321118]!, NY[NY00886759]!, RB[RB00484207]!, SPF! • ibid.; 14°38′28″ S, 39°42′47″ W; 1 Feb. 2005; *J.G. Jardim 4508*; CEPEC[CEPEC00112902]!, RB[RB00495869]! • "Ilhéus", "In sylvis udis ad fl. da Caxoeira et Ferradas in Ilheos. Provinciae Bahiensis"; Dec. 1818; *C.F.P. von Martius s.n.*; M[M0240085]!, M[M0240087]!, M[M0240086]! (label "Provinciae Rio d. J." probably an error, see Johnson & Murray (1995)) • "Itamarajú, Rodovia para São Paulinho"; [16°56′03.2″ S, 39°34′05.6″ W]; 6 Apr. 1971; *T.S. Santos 1569*; CEPEC[CEPEC00006771]!, NY[NY00395814]! • "Itanhém, Estrada Itanhaém a Batinga, ca 16 km. Ramal a direita, dando acesso à Fazenda Pedra Grande, de Prop. de Etevaldo Rezende da Silva"; 17°8′17″ S, 40°25′34″ W; 29 Dec. 2004; *A.M. Amorim 4611*; SPF!, CEPEC[CEPEC00106981]!, NY[NY01873567]! • "Prado, Km 21 da Rodovia Itamaraju-Prado"; 17 Feb. 1994; *J.R Pirani 2988*; SPF!, NY[NY00395815]! • ibid.; 17°10′ S, 39°24′ W; 9 Feb. 1994; *J.A. Kallunki et al. 465*; CEPEC[CEPEC00060979]!, K[K001191165]!, NY[NY00395779]!, SPF! • ibid.; 17°9′41″ S, 39°23′57″ W; alt. 50 m; 19 Jul. 1996; *R. Mello-Silva et al. 1171*; SPF! • "Rodovia BA-284, trecho Prado/Itamaraju, ca 65 Km a NW de Prado"; [17°00′29.8″ S, 39°36′18.2″ W]; 18 Oct. 1978; *S.A. Mori 10658*; CEPEC[CEPEC00014741]! • "Santo Antônio de Jesus" (Varzedo*), "Rodovia para São Miguel das Matas e Amargosa, 7km do trevo com a BR 101"; [12°58′32.1″ S, 39°20′30.4″]; alt. 40 m; 30 Jan. 1993; *J.R. Pirani et al. 2701*; NY[NY00395812]!, NY[NY00395811]!, SPF! • "São Miguel das Matas, Fazenda Rio Vermelho"; [12°58′55.9″ S, 39°28′22.0″ W]; 25 Jun. 2003; *G. Hatschbach 75700*; MBM[MBM284437]! • "Minas Gerais" (Bahia*), "Salto da Divisa" (Itagimirim*), "Estação Repetidora de Salto da Divisa, 1.9 km a S de Salto da Divisa/Itagimirim, 7.1Km a E de Salto da Divisa"; 16°01′43″ S, 39°55′17″ W; alt. 495 m; 31 Jan. 2004; *W.W. Thomas 13723*; CEPEC[CEPEC00103254]!, NY[NY01091758]!. – **Espírito Santo** • "Linhares, BR-101, Km. 122, N of Linhares, Reserva Florestal do CVRD, Estrada Farinha Seca, Km 3, S side of road."; ca 19°20′ S, 40°3′ W; 20 Jan. 1993; *J.A. Kallunki 356*; MBM[MBM181236]!, NY[NY00395813]!, SPF! • ibid., "RFL-001/80 bloco E, trat.02"; 14 Feb. 2007; *G.S. Siqueira 307*; SPF! • ibid.; 19°11′ S, 39°54′ W; alt. 30 m; 8 May 2009; *P.J.M. Maas 9853*; NY[NY02699054]!, SPF! • ibid.; 19°11′07.3″ S, 39°55′23.8″ W; alt. 23 m; 25 Nov. 2009; *A. Lobão et al. 1531*; SAMES[SAMES00219]!, SPF!, VIES[VIES024741]! • ibid.; 27 Dec. 1999; *D.A. Folli 3540*; SPF!, RB[RB00484652]! • ibid.; 19°11′10.9″ S, 39°54′50.3″ W; alt. 16 m; 3 Dec. 2010; *J.C. Lopes et al. 122*; MBML[MBML049129]!, RB[RB00755525]!, SPF! • ibid.; 19°11′12.1″ S, 39°54′53.4″ W; alt. 32 m; 3 Dec. 2010; *J.C. Lopes et al. 147*; RB[RB00755518]!, SPF! • ibid.; 19°11′13.3″ S, 39°54′49.6″ W; alt. 44 m; 3 Dec. 2010; *J.C. Lopes et al. 364*; SPF! • "Pinheiros, Reserva Biológica Córrego do Veado"; 18°22′12″ S, 40°8′39″ W; 24 Jan. 2011; *A.O. Giaretta 916*; SAMES[SAMES01774]! • ibid.; 18°22′12″ S, 40°8′39″ W; 18 Dec. 2010; *T.L. Rocha 93*; SAMES[SAMES00220]! • ibid., "Ponte do Paraju"; alt. 72 m; 17 Jun. 2002; *L.S. Leoni 5846*; RB[RB01178314]!, SPF!.

Description

Shrubs or trees, 0.3–6 m tall. Leaves chartaceous, petiole 0.5–4 mm long, lamina 4.9–12.5 × 2–5 cm, narrowly elliptic to elliptic, oblanceolate to narrowly oblong, obovate or rarely lanceolate, adaxial surface glabrous, abaxial surface glabrous to glabrescent, adaxial surface glabrous, base asymmetric, acute, decurrent or cuneate, apex acuminate, acute, attenuate or obtuse, primary vein impressed adaxially and raised abaxially, 7–12 pairs of secondary veins, angles between primary and secondary veins 40–60°. Inflorescence one-flowered, axillary, supra-axillary, terminal or 2–12-flowered, flagelliflorous, inflorescence branches ramified, 10–100 cm long, running near the soil, bracts persistent, 1.5–6.9 × 0.6–2.8 cm. Flowers with pedicel 7–37 mm long, flower buds 3–8 × 1–3 mm, cylindrical with obtuse apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 1–3 × 1–4 mm, densely covered in trichomes. Petals linear, white, 7–14 mm long, glabrous to glabrescent at the apex and densely covered at the base in trichomes, stamens 6, 2–3.5 × 0.5 mm, carpels 3–4, 3.5–4 × 0.5 mm. Monocarps 1–2, fusiform to ellipsoid, 14–40 × 3–5 mm, glabrous to glabrescent, green in vivo, stipe 2–3 mm long, calyx persistent. Seeds 1–2, set of seeds with the same shape as the monocarp, fitting obliquely, 9–12 × 4–5.5 mm, with aril.

Distribution and habitat

Hornschuchia myrtillus occurs in Bahia and Espírito Santo, with a single collection close to the border between Minas Gerais and Bahia. In Bahia, it occurs in lowland tropical moist forest and in seasonal semideciduous forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008), in Espírito Santo, in tabuleiro forest (Peixoto *et al.* 2008; Fig. 5).

Phenology

Flowering from January to December, fruiting from February to December.

Conservation status

Vulnerable, B2ab(ii,iii) (Moraes *et al.* 2020).

Notes

The type locality of *H. myrtillus* is the same as *H. bryotrophe*, see note under the latter.

The description of *H. myrtillus* has been updated (Johnson & Murray 1995) to include information from the several new collections made in the last 27 years, such as plant size, variation in the inflorescence and fruit dimensions. The inflorescence in *H. myrtillus* can be either axillary, supra-axillary to terminal with one flower or flagelliflorous, inflorescence branched into axes 10–100 cm long, running near the soil, and 2–12-flowered. These two types of inflorescences have been found in the same individual (Lopes & Mello-Silva 2014). When with single-flowered inflorescence, *H. myrtillus* is similar to *H. alba*, see note under the latter to differentiate the two species. The individuals with flagelliflory resemble *H. polyantha*. However, *H. myrtillus* has a calyx densely covered in trichomes (vs glabrescent) and inflorescence with persistent bracts (vs caducous bracts).

Hornschuchia obliqua Maas & Setten
Figs 4D, 5

Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series C: Biological and Medical Sciences 91 (3): 260, figs 18–19 (Maas *et al.* 1988). **Type**: BRAZIL – **Bahia** • "Cairu, Estrada Cairu-Ituberá, 8 km S de Cairu"; [13°34′22.4″ S, 39°03′22.6″ W]; 26 Jul. 1981; *A.M. Carvalho 798*; holotype: CEPEC[CEPEC00024357]!; isotypes: CEPEC[CEPEC00050811]!, NY[NY00008356]!, U[U0000334]!.

Material examined

BRAZIL – **Bahia** • "Ilhéus, Distrito de Castelo Novo, fazenda Almada, coletas no km 4 na estrada para estação experimental do Almada e o povoado de Ribeira das Pedras, entrada no km 20 da rodovia Ilhéus/Uruçuca"; [14°39′18.7″ S, 39°11′16.4″ W]; alt. 110 m; 8 Feb. 1996; *L.A.M. Silva 3355*; CEPEC[CEPEC00070901]! • "Uruçuca, Distrito de Serra Grande, 7.3 km na estrada Serra Grande/Itacaré, Fazenda Lagoa do Conjunto Fazenda Santa Cruz"; 14°25′23″ S, 39°3′42″ W; 11–21 Sep. 1991; *A.M. de Carvalho et al. 3602*; CEPEC[CEPEC00052187]!, HUEFS[HUEFS013892]!, MBM[MBM158839]!, NY[NY00395805]!, US[US01346587]! • ibid.; 14°25′24″ S, 39°3′38″ W; 15 Nov. 1995; *W.W. Thomas et al. 11019*; ALCB[ALCB004564]!, CEPEC[CEPEC00068119]!, MBM[MBM194749]! • ibid.; 14°25′ S, 39°01′ W; 7 Sep. 1991; *A.M. de Carvalho et al. 3649*; CEPEC[CEPEC00052143]!, HUEFS[HUEFS013893]!, MBM[MBM158840]!, NY[NY00395807]! • ibid.; 1–12 Jul. 1991; *W.W. Thomas 8041*; NY[NY00395804]! • ibid.; 1–12 Jul. 1991; *A.M. de Carvalho 3350*; ALCB[ALCB004359]!, CEPEC[CEPEC00052214]!, NY[NY00395806]!, RB[RB01351907]!, US[US01346588]! • ibid.; 6 Oct. 1992; *A.M. Amorim 794*; CEPEC[CEPEC00056662, NY[00395802]!, NY[NY00395803]!, RB[RB00042097]!, US[US01346586]!

• ibid.; 1–12 Jul. 1991; *W.W. Thomas 6933*; CEPEC[CEPEC0005328]! • ibid., "7 km na estrada Serra Grande/Itacaré, local do Inventário Florestal"; 10 Oct. 1995; *A.M. de Carvalho et al. 6132*; CEPEC[CEPEC00066687]!, MBM[MBM187066]!, NY[NY00395801]! • ibid., "rodovia BA-001 Ilhéus/Itacaré, ca 4.5 km do distrito de Serra Grande"; 5 Jul. 2001; *J.G. Jardim 3721*; NY[NY00684332]!.

Description

Shrubs or trees, 1.5–8 m tall. Leaves chartaceous, petiole 1–3 mm long, lamina 12–31.5 × 3.6–10.3 cm, oblanceolate to narrowly oblong or narrowly elliptic, both surfaces glabrous, base asymmetric or cuneate, apex acuminate, acute, attenuate, primary vein impressed adaxially and raised abaxially, 9–18 pairs of secondary veins, angles between primary and secondary veins 30–45°. Inflorescence 3–8-flowered, in shortened, highly ramified branches, terminal or supra-axillary, bracts rarely persistent, 1.0–1.3 × 0.4–0.5 cm. Flowers with pedicel 3–30 mm long, flower buds 3–6 × 1–2 mm, cylindrical with obtuse apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 2–4 × 1–4 mm, glabrescent. Petals linear, white, 7–7.5 mm long, glabrous, stamens 6, 2.5–3 × 0.5 mm, carpels 3, 2.4–3 × 0.5 mm. Monocarps 1–2, fusiform, 15–45 × 5–8 mm, densely covered in trichomes, immature monocarps whitish in vivo, sessile. Seeds 1–2.

Distribution and habitat

Hornschuchia obliqua is endemic to Bahia, where it occurs in lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 5).

Phenology

Flowering from February to October, fruiting from July to November.

Conservation status

Endangered, EN B1ab(i,ii,iii)+2ab(i,ii,iii) (Amorim *et al.* 2020b). *Hornschuchia obliqua* is only known from three localities. It has not been collected in 19 years.

Notes

Hornschuchia obliqua and *H. santosii* have 3–12-flowered inflorescences, which are axillary, terminal (Fig. 4D) or leaf-opposed. However, *H. obliqua* differs from *H. santosii* by its cylindrical floral bud (vs conical), fusiform monocarp, 1.3–6 mm wide, densely covered in trichomes and whitish in vivo (vs globose, 16–19 mm wide, glabrous, green in vivo; Fig. 4E). The description of *H. myrtillus* has been updated (Johnson & Murray 1995) with information regard the plant size and fruit dimensions.

Hornschuchia polyantha Maas
Fig. 6

Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series C: Biological and Medical Sciences 89 (3): 258, fig. 7 (Maas *et al.* 1986). **Type**: BRAZIL – **Bahia** • (Una*), "Km 9 da nova rodovia São José/Uma"; 21 Apr. 1976; *T.S. Santos 3099*; holotype: CEPEC[CEPEC00012625]!; isotypes: NY[NY00026102]!, MBM[MBM117085]!, U[U0000335]!.

Material examined

BRAZIL – **Bahia** • "Aurelino Leal, 10–11 km W of BR-101 on road from, Aurelino Leal to Lage do Banco"; [14°20′34.8″ S, 39°22′37.7″ W]; 16 Feb. 1994; *J.A. Kallunki et al. 547*; CEPEC[CEPEC00066789]!, NY[NY00395790]!, SPF! • ibid.; 3 May 1992; *W.W. Thomas 9086*; CEPEC[CEPEC00056483]!, MBM[MBM284834]!, NY[NY00395788]! • ibid.; [14°20′43.2″ S, 39°22′54.7″ W]; alt. 175–200 m; 30 Oct.

2001; *W.W. Thomas et al. 12675*; CEPEC[CEPEC00091105]!, NY[NY00684351]!, RB[RB00484693]!, SPF! • "Buerarema, Rodovia Buerarema- São José da Vitória (BR-101), ramal à esquerda, ca 15 km de Buerarema, ca 9.5 km da BR, Fazenda Sta. Rosa, entrada ca 500m à direita, proprietário: José Elias"; 15°06′19″ S, 39°17′20″ W; 5 Feb. 2003; *P. Fiaschi et al. 1287*; CEPEC[CEPEC00096080]!, NY[NY00821927]!, RB[RB00484690]!, SPF! • "Camacã, BR-101 ao Rio Pardo"; [15°33′04.7″ S, 39°25′24.6″ W]; 24 May 1971; *T.S. Santos 1690*; NY[NY00395792]! • "Gongogi, Barragem do funil"; [14°13′38.0″ S, 39°27′47.9″ W]; 16 Nov. 1971; *T.S. Santos 2157*; NY[NY00395793]! • "Itajuípe, rodovia Itajuípe/Ubaitaba, 12Km N Banco Central"; [14°31′42.7″ S, 39°21′04.0″ W]; 24 Apr. 1965; *R.P. Belém 879*; CEPEC[CEPEC00001279]! • "Itapebi, Fazenda Lombardia BR-101 a Fazenda Ventania"; [15°52′52.3″ S, 39°31′03.6″ W]; 19 Aug. 1971; *T.S. Santos 1859*; CEPEC[CEPEC00007096]! • "Mascote, Estrada de terra ao longo da encosta da margem norte do rio Pardo, em direção a jusante, 7 km da ponte da BR- 101 sobre o rio"; 15°36′50.3″ S, 39°22′57.0″ W; 26 Oct. 2008; *R. Mello-Silva et al. 3132*; SPF! • "Entrada na cabeceira da ponte do Rio Pardo BR-101, próximo de São João do Paraiso, Fazenda Ai Tais a ca 5.5 km da BR 101, área localizada depois do rio Pardo, travessia de canoa"; 15º36′24″ S, 39º22′21″ W; 27 Dec. 2004; *A.M. Amorim et al. 4572*; RB[RB00421327]!, SPF! • "Ubaitaba, rodovia Ubaitaba/Lages, 8 km de Ubaitaba"; [14°15′19.7″ S, 39°24′48.4″ W]; 25 Apr. 1965; *R.P. Belém 936*; CEPEC[CEPEC00001115]!, IAN[IAN119427]!, NY[NY00395795]!, NY[NY00395796]! • "Una, 9 km from São José and BR-101 on road to Una, on S side of road in forest"; 15º03′ S, 39º14′ W; 4 Feb. 1993; *J.A. Kallunki et al. 428*; CEPEC[CEPEC00060939]!, HUEFS[HUEFS017561]!, MBM[MBM181237]!, NY[NY00395791]!, SPF! • ibid.; 20 Jan. 1982; *T.S. Santos 3712*; CEPEC[CEPEC00028035]! • ibid.; 15º4′15″ S, 39º18′35″ W; 18 Mar. 1999; *J.G. Jardim et al. 2064*; CEPEC[CEPEC00087825]! NY[NY00583368]!, SPF! • "Estrada São José-Una. Coletas efetuadas no km 9 a partir da BR, Fazenda Santa Rosa"; 8 Oct. 1992; *A.M. Amorim 827*; CEPEC[CEPEC00056585]!, HUEFS[HUEFS013176]!, NY[NY00395798]!, NY[NY00395797]!, RB[RB00042107]!, US[US01346589]!, US[US01346590]! • "8.8 km a E BR-101, rodovia São José/Una"; 15°08′ S, 39°15′ W; 28 Oct. 1993; *W.W. Thomas 10176*; CEPEC[CEPEC 00059818]!, NY[NY00395789]!.

Description

Shrubs or trees, 0.5–6 m tall. Leaves chartaceous, petiole 1–5 mm long, lamina 6.3–19(–22) × 2.2–6.6 cm, narrowly elliptic to elliptic, lanceolate to oblanceolate, narrowly oblong or narrowly ovate, both surfaces glabrous, base cuneate to acute, apex acuminate to acute or attenuate, primary vein impressed adaxially and raised abaxially, 8–18 pairs of secondary veins, angles between primary and secondary veins 40–60°. Inflorescence 2–17-flowered in highly ramified branches, flagelliflorous, inflorescence branches 10–100 cm long or shortened branches ca 4.5 cm long, rarely one-flowered, terminal, bracts caducous, 2.0–7.4 × 0.3–2.8 cm. Flowers with pedicel 2–12 mm long, flower buds 2–8 × 1–2.5 mm, cylindrical with obtuse apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 1.5–4 × 1–4 mm, glabrescent. Petals linear, white, 5–11.5 mm long, densely covered in trichomes, stamens 6, 3–4 × 0.5 mm, carpels 3, 2.5–4 × 0.5 mm. Monocarps 1–3, ellipsoid to narrowly ellipsoid, 8–30 × 2–5 mm, glabrous, green in vivo, sessile, calyx persistent. Seeds 1–2, ellipsoid, 10 × 4–5 mm (Maas *et al.* 1986).

Distribution and habitat

Hornschuchia polyantha is endemic to Bahia, where it occurs in lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas & Barbosa 2008; Fig. 6).

Phenology

Flowering from February to December, fruiting from May to October.

Preliminary conservation status

Hornschuchia polyantha has an EOO of 3095 km^2 and an AOO of 48 km^2, its habitat is endangered due to deforestation (Landau *et al.* 2008). The conservation status is categorized as Endangered, EN B1ab(iii)+2ab(iii), according to *IUCN Red List Categories and Criteria* (IUCN 2012).

Notes

The description of *H. polyantha* has been updated (Johnson & Murray 1995) in plant habit and size, leaf morphology, flower morphology and dimensions, and fruit dimensions. *Hornschuchia polyantha* is similar to *H. myrtillus*, see the note under the latter to differentiate the two species.

Hornschuchia santosii D.M.Johnson
Figs 4E, 6

Brittonia 47 (3): 303, fig. 24 (Johnson & Murray 1995). **Type**: BRAZIL – **Bahia** • (Teixeira de Freitas*), "Km 6 da rod. Teixeira de Freitas a Alcobaça"; [17°31′05.6″ S, 39°39′07.3″ W]; 9 Oct. 1971; *T.S. dos Santos 2091*; holotype: CEPEC[CEPEC00007576]!; isotype: NY[NY00008357]!.

Material examined

BRAZIL – **Bahia** • "Buerarema, Rodovia que liga Buerarema a Vila Brasil, km 14"; [15°03′40.9″ S, 39°14′28.1″ W]; 9 Feb. 1982; *A.M. de Carvalho 1172*; CEPEC[CEPEC00028511]!, HEPH[HEPH00001089]!, NY[NY00395773]! • ibid.; 9 Feb. 1982; *A.M. de Carvalho 1175*; CEPEC n.v., HEPH[HEPH00001087]! • "Canavieiras" (Santa Luzia*); 15º22′ S, 39º11′ W; alt. 100 m; 15 Aug. 1984; *M.M. Santos 169*; CEPEC[CEPEC00037788]! • "Santa Luzia, Vila São João. Reserva de mata do CEPLAC, entrada em bifurcação à direita da estrada Santa Luzia-Vila São João, 18,5 km além do rio na saída de Santa Luzia, 4.6 km além da bifurcação e 1 km além de ponte de concreto da reserva"; 15º23′18.2″ S, 39º12′04.9″ W; alt. 97 m; 26 Oct. 2008; *R. Mello-Silva et al. 3134*; SPF! • "Una" (Santa Luzia*), "Estrada de Una para Santa Luzia, ca 1 km após a Vila São João, ca 20 km de Una, ramal à esquerda"; 15º23′ S, 39º12′ W; 4 Dec. 2002; *P. Fiaschi 1226*; CEPEC[CEPEC00094181]!, CEPEC00094205]!, NY[NY01806300]!, RB[RB00484635]!, SPF!.

Description

Shrubs or trees, 2–7 m tall. Leaves chartaceous, petiole 1–5 mm long, lamina 8.6–20.5(–25.7) × 2.8–9.8 cm, narrowly oblong to elliptic, narrowly obovate to oblanceolate or narrowly ovate, both surfaces glabrous, base cuneate, rounded to obtuse, apex attenuate to acute or obtuse, primary vein impressed adaxially and raised abaxially, 9–14 pairs of secondary veins, raised adaxially, angles between primary and secondary veins 40–60°. Inflorescence 4–12-flowered in highly ramified branches, axillary, terminal or leaf-opposed, bracts absent. Flowers with pedicel 2–25 mm long, flower buds 4–9 × 1.5–3 mm, conical with rounded apex, covered in trichomes. Sepals completely connate, calyx cupuliform, apex truncate, 1–3 × 3–5 mm, densely covered in trichomes. Petals linear, white, 9–22 mm long, covered in trichomes, stamens 6–18, 2–3.5 × 0.5 mm, carpels 2–9, 1–3 × 0.5 mm. Monocarps 1–3, globose to ovoid with rounded to acute apex, 21–22 × 16–19 mm, glabrous, stipe 1.5 mm long, calyx persistent. Seeds 6–8, 12–15 × 7–8 mm, flattened ellipsoid with aril.

Distribution and habitat

Hornschuchia santosii is endemic to Bahia, only known from three localities, the municipalities of Buerarema, Santa Luzia and Teixeira de Freitas. The only records in the municipalities of Canavieiras, *Santos 169*, and Una, *Fiaschi 1226*, have their geographic coordinates in Santa Luzia, in the same place of the collection *Mello-Silva 3134*. This region is close to the border of these three municipalities; therefore, it is possible that the collections *Santos 169* and *Fiaschi 1226* were made in Santa Luzia. The species inhabits lowland tropical moist forest (Gouvêa *et al.* 1976; Thomas& Barbosa 2008; Fig. 6).

Phenology

Flowering from February to December, fruiting in December.

Preliminary conservations status

Hornschuchia santosii has an EOO of 1378 km^2 and an AOO of 12 km^2. It has been found at three localities, one of them in a conservation unit. It has not been collected in 10 years. Moreover, as already mentioned, the region *H. santosii* inhabits is endangered due to deforestation (Landau *et al.* 2008). Therefore, it should be considered Endangered, EN B1ab(iii)+2ab(iii), according to *IUCN Red List Categories and Criteria* (IUCN 2012).

Notes

Hornschuchia santosii is the only species with up to 18 stamens and 9 carpels, it is similar to *H. obliqua*, the note under the latter describes the differences between them.

Distribution, endemism and conservation

Hornschuchia is a threatened genus, 11 of its 12 species are classified either as Critically Endangered, Endangered or Vulnerable. Only *H. bryothophe* is categorized as of Least Concern following the IUCN criteria (IUCN 2012) (Table 1). We have inferred the conservation status of five species: *H. citriodora*, *H. leptandra*, *H. linanarum*, *H. polyantha* and *H. santosii*, all classified as Endangered. The remaining species have already been classified. One species is Critically Endangered, *H. alba*, nine species are Endangered: *H. cauliflora*, *H. citriodora*, *H. leptandra*, *H. lianarum*, *H. mediterranea*, *H. mellosilvae*, *H. obliqua*, *H. polyantha* and *H. santosii*, while one is Vulnerable, *H. myrtillus* (Table 1).

Seven species are known from only five or fewer localities: *H. citriodora*, *H. leptandra*, *H. lianarum*, *H. mediterranea*, *H. mellosilvae*, *H. obliqua* and *H. santosii* (Table 1). Four species have not been collected in more than 17 years: *H. alba*, *H. leptandra*, *H. mellosilvae* and *H. obliqua*. Only four species are found in conservation units: *H. bryotrophe*, *H. citriodora*, *H. leptandra* and *H. myrtillus*.

Hornschuchia is endemic to the Brazilian Atlantic Forest, as defined by law (Brasil 2006), occurring from the State of Pernambuco to Rio de Janeiro (Fig. 7A). The species with the widest distribution is *H. bryotrophe* with a single collection in Pernambuco, its main distribution is from Bahia to Rio de Janeiro (Fig. 1). One species is endemic to Rio de Janeiro, *H. alba* (Fig. 1). Seven species are endemic to Bahia: *H. cauliflora*, *H. leptandra*, *H. mediterranea*, *H. mellosilvae*, *H. polyantha*, *H. obliqua* and *H. santosii* (Figs 3, 5–6). Most species occur in moist lowland tropical forest. Eight species also occur in seasonal semideciduous forest: *H. alba*, *H. bryotrophe*, *H. cauliflora*, *H. leptandra*, *H. lianarum*, *H. mediterranea*, *H. mellosilvae* and *H. myrtillus* (Figs 1, 3, 5–6). *Hornschuchia lianarum* and *H. mediterranea* reach the seasonal deciduous forest of Bahia and are the only species occurring in this type of vegetation (Figs 3, 5).

Southern Bahia is the centre of species richness for *Hornschuchia* (8 spp.); followed by northern Bahia (4 spp.) and northern Espírito Santo (3 spp.; Fig. 7B). Southern Bahia, the region close to Ilhéus, is also where most of the specimens have been collected, ranging from 13 to 18 records per cell (Fig. 7C). The second region where most of the species have been collected is Espírito Santo, close to Linhares, with eight records per cell (Fig. 7C).

The total points of occurrence for the species of *Hornschuchia* were 105. Two bioregions were identified, one including the coast of Bahia and northern Espírito Santo, bioregion 1; the other encompassing Rio de Janeiro and southern Espírito Santo, bioregion 2 (Fig. 7D, Table 2). Nine species are the most indicative for bioregion 1: *Hornschuchia bryotrophe*, *H. cauliflora*, *H. polyantha*, *H. leptandra*, *H. lianarum*, *H. mediterranea*, *H. mellosilvae*, *H. obliqua* and *H. santosii* (Table 2, Fig. 7D). In bioregion 2, the most indicative species are *H. alba*, *H. citriodora* and *H. bryotrophe* (Table 2, Fig. 7D).

Table 1. Conservation status and geographic range details of the species of *Hornschuchia* Nees.

Species	Conservation status	EOO (km^2)	AOO (km^2)	N. of localities	Reference
H. alba	Critically Endangered	39–99	–	8	Amaro 2016
H. bryotrophe	Least Concern	1 070 525	164	40	BGCI & IUCN 2019
H. cauliflora	Endangered	581	20	6	Amorim *et al.* 2020a
H. citriodora	Endangered	4499	16	3	This study
H. leptandra	Endangered	366	12	3	This study
H. linanarum	Endangered	29 760	28	4	This study
H. mediterranea	Endangered	24 664	16	5	Mello-Silva *et al.* 2021
H. mellosilvae	Endangered	0	32	2	Lopes *et al.* 2021
H. myrtillus	Vulnerable	46 895	72	11	Moraes *et al.* 2020
H. obliqua	Endangered	343	20	3	Amorim *et al.* 2020b
H. polyantha	Endangered	3095	48	10	This study
H. santosii	Endangered	1378	12	3	This study

Table 2. Summary of statistics of biogeographical region analysis. Score for the most indicative species for each bioregion. Abbreviations: BA = Bahia; ES = Espírito Santo; RJ = Rio de Janeiro.

Bioregion 1 (BA, North ES)	Score	Bioregion 2 (RJ, South ES)	Score
H. polyantha	1.78	*H. alba*	6.56
H. obliqua	1.63	*H. citriodora*	3.28
H. leptandra	1.48	*H. bryotrophe*	1.46
H. mellosilvae	1.48		
H. santosii	1.38		
H. cauliflora	1.19		
H. mediteranea	0.949		
H. lianarum	0.890		
H. bryotrophe	0.844		

Discussion

Distribution, endemism and conservation

The central region of the Atlantic Forest, from Rio de Janeiro to southern Bahia (12°−22° S latitude), is known to have a high species turnover (Peres *et al.* 2020). There are reported differences in the biota assemblage of the northern and the southern portions of the Atlantic Forest (Peres *et al.* 2020). The flora from the northern part of the Atlantic Forest has affinity with the Amazonian assemblage, while the southern Atlantic Forest shares several taxa with the subtropical Andes (Oliveira-Filho *et al.* 2000; Santos *et al.* 2007). Local climatic conditions drive the biogeographical shifts in the central region of the Atlantic Forest and not riverine barriers as previously supposed (Saiter *et al.* 2016). Three floristic regions were identified in the central Atlantic Forest: Bahia Interior Forest, Bahia Coastal Forests, and the Krenák-Waitaká Forests (Saiter *et al.* 2016). The Bahia Interior Forests include moist and dry forests

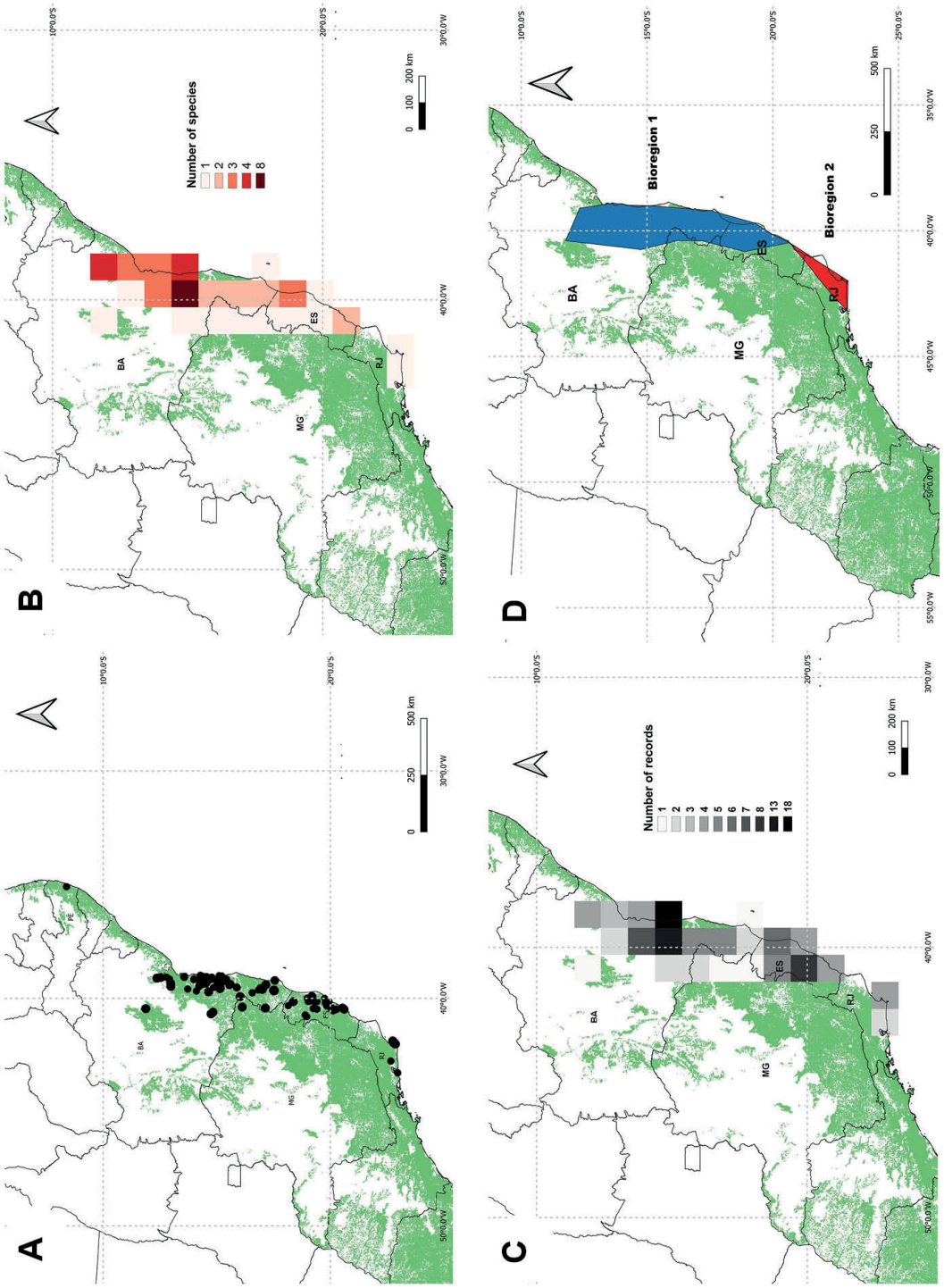

Fig. 7. Patterns of distribution, richness, abundance and endemism for *Hornschuchia* Nees. In green the legal delimitation of the Atlantic Forest and forest remnants. **A**. Distribution of *Hornschuchia*, 105 points of occurrence. **B**. Species richness of *Hornschuchia*. **C**. Species abundance of *Hornschuchia*. **D**. Bioregions found by InfoMap Bioregions for *Hornschuchia*. Abbreviations: BA = Bahia; ES = Espírito Santo; MG = Minas Gerais; RJ= Rio de Janeiro.

of northeastern Minas Gerais and inland Bahia; the Bahia Coastal Forests encompass moist forests about 50 km north of the River Doce in Espírito Santo, above 19° S; the Krenák-Waitaká Forests include moist forest south of River Doce up to the proximities of the River Paraíba do Sul in Rio de Janeiro (Saiter *et al.* 2016).

The central part of the Atlantic Forest is where most of the species of *Hornschuchia* are centred (Fig. 7A–C). We found that the species of *Hornschuchia* are distributed in two bioregions, the same patterns of distribution and endemism that have already been reported for the central Atlantic Forest. Bioregion 1, Bahia and northern Espírito Santo, corresponds to the Bahia Coastal Forests floristic region, and bioregion 2, Rio de Janeiro and southern Espírito Santo, encompasses the Krenák-Waitaká Forests floristic region (Saiter *et al.* 2016) (Fig. 7D). Five species of *Hornschuchia* have already been reported as endemic to the Coastal Bahia Forests: *H. cauliflora*, *H. leptandra*, *H. obliqua*, *H. polyantha* and *H. santosii* (Ostroski *et al.* 2018).

The coast of Bahia has been pointed out as a hot-point for conservation, inside the Atlantic Forest biodiversity hotspot, due to its high biodiversity and incidence of endemic and threatened species for both plants and animals (Thomas *et al.* 2003; Silva *et al.* 2004; Martini *et al.* 2007; Carnaval *et al.* 2009; Murray-Smith *et al.* 2009). For *Hornschuchia*, this area is also a priority place for conservation as well as the center of species diversity (Fig. 7D) and it presents high levels of endemism (Ostroski *et al.* 2018). Of the 12 species of *Hornschuchia*, six are endemic to the Coastal Bahia Forests floristic region. In addition to the five species already reported as endemic to this region (Ostroski *et al.* 2018), the recently described *H. mellosilvae* should also be included. Moreover, all these six species, *H. cauliflora*, *H. leptandra*, *H. mellosilvae*, *H. obliqua*, *H. polyantha* and *H. santosii*, are classified as endangered (Table 1).

Acknowledgments

The authors thank Laura Montserrat for the illustrations, Diego Gonzaga and Rafaela Forzza for helping to access the specimens at RB herbarium, the late Renato de Mello-Silva for giving us the opportunity to study Annonaceae, two anonymous reviewers for their suggestions on the manuscript, Scott V. Heald for a language revision on the manuscript and São Paulo Research Foundation (FAPESP 2018/ 11272-5, FAPESP 2019/24763-0) for the post-doctorate and Scientific Initiation fellowships. This paper is dedicated to Renato de Mello-Silva (in memoriam).

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Manuscript received: 6 October 2021
Manuscript accepted: 16 May 2022
Published on: 11 July 2022
Topic editor: Frederik Leliaert
Desk editor: Radka Rosenbaumová

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