

A New Species and a New Record of *Varronia* (Cordiaceae) from Brazil

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Abstract—Herein a new species, *Varronia xinguana*, is described and illustrated. In addition, *Varronia polystachya*, a species previously known only from Venezuela, is reported for the first time for Brazil. Both species are restricted to the phytogeographic domain of Amazonia, northern Brazil. A distribution map and a conservation assessment are provided. An identification key is also provided for the species of *Varronia* with spike inflorescence from Northern of Brazil.

Keywords—Amazonia, Boraginales, conservation, *Cordia*, Neotropics.

Resumo—Aqui uma nova espécie, *Varronia xinguana*, é descrita e ilustrada. Além disso, *Varronia polystachya*, uma espécie anteriormente conhecida apenas para Venezuela, é reportada pela primeira vez para o Brasil. Ambas as espécies são restritas ao domínio fitogeográfico da Amazônia, norte do Brasil. Um mapa de distribuição e status de conservação são fornecidos. Uma chave de identificação é também apresentada para as espécies de *Varronia* com inflorescência em espiga do Norte do Brasil.

Palavras-chave—Amazônia, Boraginales, conservação, *Cordia*, Neotrópicos.

The genus *Varronia* P.Browne was recently reestablished as a segregated genus of *Cordia* and belongs to the family Cordiaceae, order Boraginales (Miller and Gottschling 2007; BWG 2016). It is a Neotropical genus that includes ca. 125 species distributed mainly in Brazil, Mexico, and the northern Andes (Sánchez 1995; Miller 2013), of which 33 species occur in Brazil (BFG 2018). In Brazil, it occurs in the Amazonia, Caatinga, Atlantic Forest, and Cerrado and Pampa with some species having very restricted distributions such as *Varronia johnstoniana* J. I. M. Melo & D. D. Vieira, endemic to north-eastern Brazil (Melo and Vieira 2015), while other species such as *V. curassavica* Jacq. and *V. multispicata* (Cham.) Borhidi have broader distributions (BFG 2018). The species of *Varronia* are characterized by being exclusively multibranched subshrubs or shrubs, with distinctly serrated leaf margins, craspedodromous venation, and for presenting three basic types of inflorescences: capitate, spicate, or cymose (Miller and Gottschling 2007).

Varronia is currently under revision in South America and the analysis of herbarium vouchers has revealed a new species, *Varronia xinguana*, and a first record of *Varronia polystachya* (Kunth) Borhidi for the Flora of Brazil. *Varronia xinguana* is readily distinguished from its congeners in Brazil by the combination of the following characters: terminal, short-cylindrical spikes up to 2 cm long; a densely hirsutulous calyx, acuminate, with lacinias transversely rhombic; and corolla with lobes slightly reflexed. A morphological description, illustrations, information on conservation status and distribution are presented, as well as an identification key for species with spike inflorescence from northern Brazil.

MATERIALS AND METHODS

Our morphological analyses and species description were based on personal examination and online observations of herbarium material (MG, INPA, and NY). All acronyms follow Thiers (2018). Protologues and type specimens (photographs deposited in the JSTOR Global plants or herbaria websites) of *Varronia* species recorded for South America were revised and

compared with available materials of the new species. Morphological terminology for the taxonomic description was taken from Radford et al. (1974). The specialized literature for Boraginaceae s. l. was consulted (Johnston 1930), including the most recent revision of Brazilian *Varronia* (Taroda and Gibbs 1986), the Flora de Colombia (Sánchez 1995), and treatments for Venezuela (Gaviria 1987) and Guyana (Feuillet 2008). In addition to the analysis of specimens of the mentioned herbaria, and evaluation of protologues and type specimens, morphological features used to construct the identification key were obtained in part from Taroda and Gibbs (1986). The conservation status assessment is based on the guidelines of the IUCN red list categories and criteria (IUCN 2017). The extent of occurrence (EOO) and area of occupancy (AOO) were evaluated by GeoCat software (Bachman et al. 2011).

TAXONOMIC TREATMENT

Varronia xinguana T.S. Silva & J.I.M. Melo, sp. nov. TYPE: BRAZIL. Pará: Altamira, rio Xingu, Largo do Passari, [-4.3220195°, -527416277°], 31 January 1987, fl., S.A.M. Souza 953 (holotype: MG!; isotype: NY!).

Varronia xinguana is morphologically similar to *Varronia cylindrostachya* Ruiz & Pav. for the cylindrical spike inflorescence, but differs by elliptical leaves up to 4 cm long (5.5–15 cm long in *V. cylindrostachya*), exclusively terminal inflorescences up to 2 cm long (terminal and axillary, up to 12 cm long in *V. cylindrostachya*), and corolla lobes slightly reflexed (vs. corolla with shallow erect lobes in *V. cylindrostachya*).

Subshrubs; branches tomentose to densely hirsute. Leaves alternate, petiolate; petiole 0.1–0.3 cm long; leaf blade 2.5–4 × 1–2.5 cm, chartaceous, discolored, elliptical or slightly trullate; abaxial surface villosulous or tomentose (mainly on the veins); adaxial surface densely strigose, bullate; base cuneate or slightly attenuate; margins serrate or serrulate, slightly revolute; apex cuneate; craspedodromous, midrib impressed on adaxial surface and prominent on abaxial surface. **Inflorescences** 0.8–2 × 0.6–1 cm, spike, terminal, short-cylindrical, congested; peduncle 1–1.8 cm long, densely hirsute. **Flowers** ca. 7 mm long, sessile; monoclinal, dichlamydeous, actinomorphic; calyx 4–5 mm long, gamosepalous, conic-

campanulate, densely hirsutulous, lacinas transversely rhombic, ca. 1 mm long, apex acuminate; corolla 4–5 mm long, infundibuliform to salverform, externally glabrous, internally villous at the insertion of the stamens, lobes up to 1 mm long, slightly reflexed, apex obtuse. Stamens 5, epipetalous, homodynamous, filaments ca. 0.6 mm long, inserted above the base of the corolla lobe; anthers ca. 0.8 mm long. Ovary

2–2.3 mm long, pyriform, 4-locular by intrusion of a false septum, with 1 ovule per locule, axillary placentation; style 2–2.8 mm long, stigmatic branches 0.8–1.2 mm long, erect. Drupe not seen. Figures 1 and 2.

Distribution and Habitat—The species is recorded for the Northern region of Brazil in the state of Pará, throughout the Amazonia, mainly near the Xingu River (Fig. 3).

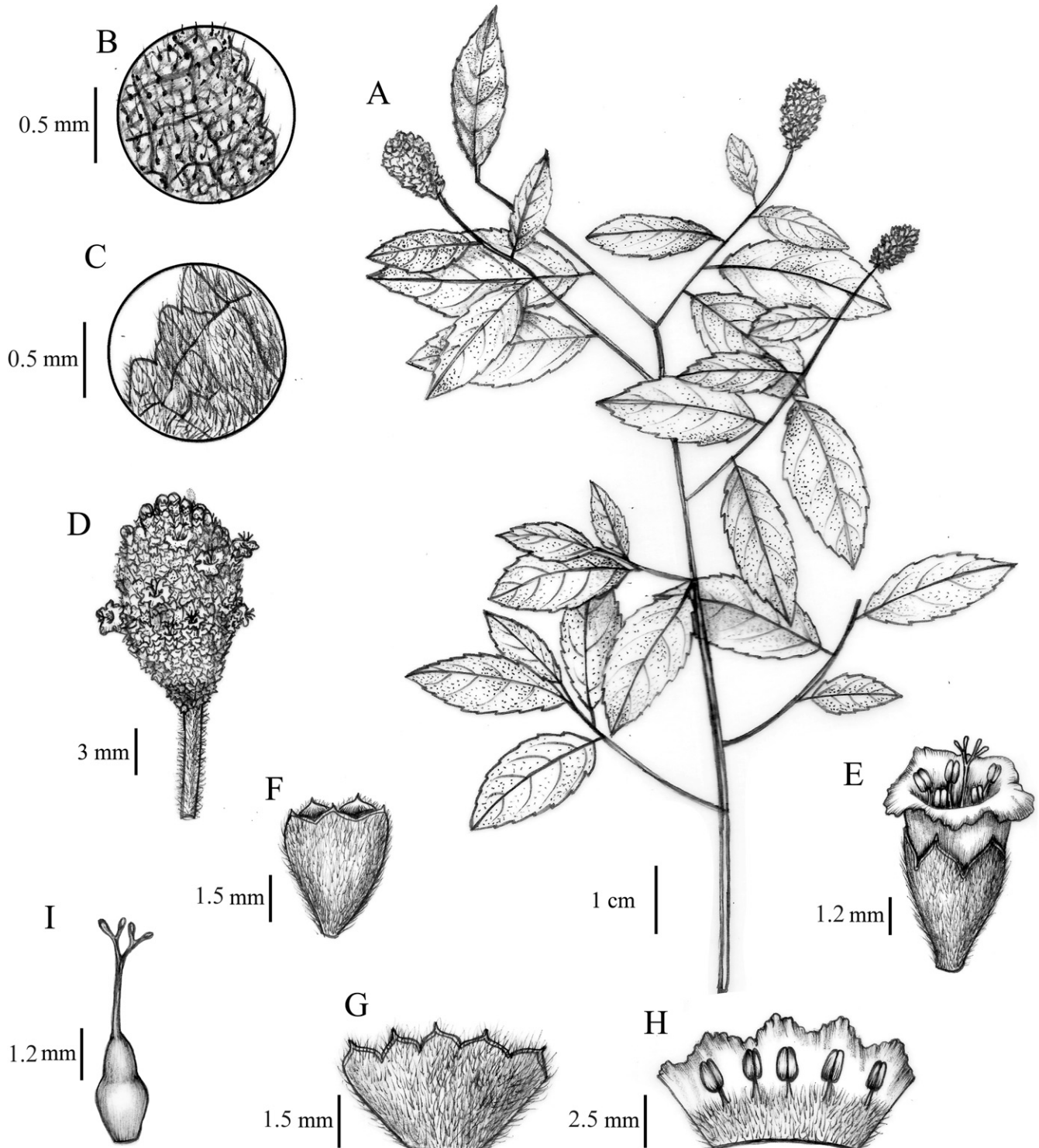


FIG. 1. *Varronia xinguana*. A. Flowering branch. B. Detail of adaxial surface of leaf. C. Detail of abaxial surface of leaf. D. Detail of inflorescence. E. Flower. F. Closed calyx. G. Opened calyx. H. Opened corolla showing the androecium. I. Gynoecium. From A.T.G. Dias et al. 863. Line drawings by R. Carvalho.



FIG. 2. *Varronia xinguana*. A. Holotype. B. Detail of inflorescence.

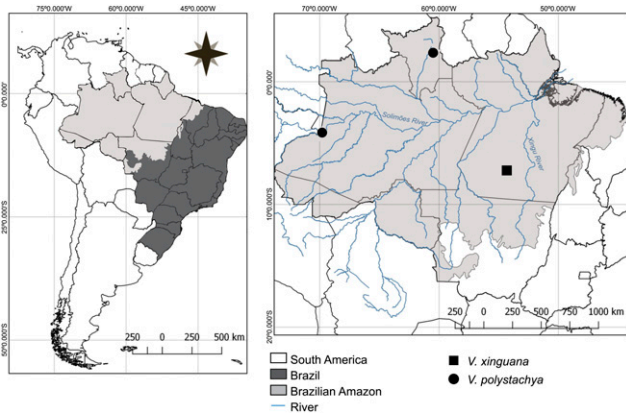


FIG. 3. Distribution map of *V. xinguana* and *V. polystachya* in Brazilian Amazonia.

Etymology—The specific epithet was chosen in honor of the Xingu River. It occupies about 24.5% of the territorial area of the state of Pará and is one of the main tributaries of the right bank of the Amazon River. In addition to its representative extent, the Xingu River was recognized by Brazilian legislation for hydroelectric power generation purposes, as well as strategic importance for the conservation of biological diversity and protection of indigenous culture (MME 2008).

Conservation Status—The records of *Varronia xinguana* are from collections made 30 yr ago by A. T. G. Dias and collaborators for the project “Flora do Rio Xingu.” In view of the intense human activity around the river, especially due to the construction of hydroelectric dams in the region, it is estimated that the populations of *V. xinguana* declined or disappeared, since no further collections have been made. However, there is still very little information known about *Varronia xinguana*. Therefore, this species may be classified as Data Deficient (DD).

Phenology—The species flowers in January.

Paratypes—Brazil.—PARÁ: Altamira, 24 January 1987, (fl.), A.T.G. Dias et al. 863 (SPF).

NEW RECORD FROM BRAZIL—*VARRONIA POLYSTACHYA* (Kunth) Borhidi, Acta Botanica Hungarica 34(3–4): 393. 1988. TYPE: VENEZUELA. Maypure: crescit in ripa fluminis Orinoci, prope catarractam Maypurensium, no date, fl., A.J.A. Bonpland & F.W.H.A. von Humboldt 1146 (holotype: P!).

Distribution and Habitat—*V. polystachya* has been recorded only for Venezuela. Gaviria 1987; Feuillet 2008), being the type specimen belonging to a riparian region. In this paper, *V. polystachya* is recorded for first time for Brazil, where it occurs in the Amazonia, in the states of Roraima and Amazonas. In Roraima, it occurs more specifically in a mountainous region known as “Serra da Lua,” located in the north-center of Roraima state, upper portion of the Branco River, municipality of Cantá. This area is characterized by the presence of a large complex of savannas, known as savannas of Roraima, the largest (ca. 41,000 km²) continuous area of savanna in the Brazilian Amazonia (Miranda et al. 2002). In Amazonas state, it was collected in the municipality of Tabatinga, on the banks of the Solimões River (Fig. 3).

Conservation Status—*V. polystachya* is recorded for the region Puerto Ayacucho, on the border between Venezuela and Colombia, and near to the Orinoco River, south center of Venezuela. In addition, it has been found in the states of Roraima and Amazonas, Brazilian territory. The collections date from the 1940s to the 1960s, with no collections in the past five decades. Based on these records, we suspect a reduction of certain subpopulations, with nonreversible causes, such as decline of suitable habitats and/or reduction of habitat quality. Therefore, according to the IUCN (IUCN 2017) and the results of GeoCat (Bachman et al. 2011), we recommend that this species be evaluated as Endangered (EN), Criterion B2iii.

Phenology—The species flowers in January and August.

Additional Specimens Examined—Brazil.—AMAZONAS: Tabatinga, 21 August 1946, G.A. Black 4654 (IAC, INPA). —RORAIMA: Cantá, Serra da Lua, 12 January 1969, G.T. Prance et al. 9247 (MG, INPA, NY).

KEY TO VARRONIA XINGUANA AND RELATED SPECIES IN NORTHERN BRAZIL

1. Spikes exclusively terminal, short-cylindrical up to 2 cm long, calyx with lacinas transversely rhombic, ca. 1 mm long *Varronia xinguana*
1. Spikes terminal and axillary, elongated-cylindrical longer than 2 cm long, calyx with lacinas triangular, ca. 2 mm long 2
2. Leaves obovate; calyx with resinous glands outside *Varronia polystachya*
2. Leaves oval-lanceolate; calyx without resinous glands outside 3
3. Branches tomentose-rusty; thin and lax spike; corolla with lobes very shallow *Varronia spinescens*
3. Branches puberulent; dense and robust spike; corolla with lobes evidently reflexed *Varronia multispicata*

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AUTHOR CONTRIBUTIONS

Both authors contributed to preparation of the manuscript, including providing data, and editing the text.

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