
Panicum tepuianum (Poaceae: Paniceae), a New Species from Cerro Aracamuni in the Venezuelan Guayana

Gerrit Davidse

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

Fernando Zuloaga

Instituto de Botánica Darwinion, Casilla de Correo 22, Isidro (1642), Argentina

Recently, 27 new taxa were described from Cerro Aracamuni, a sandstone table mountain (tepui) in southern Venezuela (Steyermark et al., 1989). Most of the new taxa were based on the collections made by R. Liesner, G. Carnevali, and F. Delascio. The present report adds an additional endemic species to the already impressive list known from this mountain massif.

Panicum tepuianum Davidse & Zuloaga, sp. nov.

TYPE: Venezuela. Territorio Federal Amazonas: Depto. Río Negro, Cerro Aracamuni, summit, Proa Camp, savanna with small to large patches of forest, especially among streams, in ravines and near the edge of tepui, in savanna, 01°32'N, 65°49'W, 1,400 m, 30 Oct. 1987, R. Liesner & G. Carnevali 22645 (holotype, MO; isotype, VEN). Figures 1, 2.

Gramen perenne. Folia plicata et amplectia basin versus; collum non manifesta abaxiale; ligula 0.3–0.6 mm longa, arcuata, membranacea. Panícula ovoidea, 16–18 cm longa. Spiculæ 1.8–2.4 mm longae; gluma inferna ca. $\frac{1}{2}$ longitudinis spiculæ æquans, 3-nervia; gluma superna et lemma infernum 5-nervia; flosculus infernus staminatus; flosculus supernus bisexualis; lemma supernum et palea superna pubescens.

Caespitose perennial to ca. 90 cm tall. Culms erect, unbranched (except when injured), with 5–19 elongated internodes; internodes glabrous, hollow, mostly covered by leaf sheaths; nodes dark, appressed-pubescent with hairs to 1.5 mm long. Sheaths strongly distichous, abaxially glabrous, ciliate with hairs to 4.5 mm long, especially on the overlapping margin, weakly auricled, the auricles to 2 mm long, membranous, pilose. Ligule 0.3–0.6 mm long, membranous, strongly arcuate; collar not evident abaxially. Blades lanceolate, 18–21 mm long, 6–8.5 cm wide, stiff, diverging from the culm at an acute angle, basally nearly as broad as the sheath, folded and clasping the culm, apically sharply acute, flattened, abaxially glabrous, adaxially with a few long hairs toward the base, marginally ciliate

at the base. Inflorescence terminal, exserted; peduncle glabrous, up to 25 cm long; panicle ovoid, open, 16–18 cm long, ca. 10 cm wide; main axis wavy, glabrous, the pulvini glabrous; first-order branches solitary, ascending to spreading, scabrous or glabrous, the lowest to 10 cm long; pedicels much longer than the spikelets, 3–15 mm long, scabrous or glabrous, claviform. Spikelets elliptic, 1.8–2.4 mm long, 2-flowered, disarticulating below the lower glume, falling as a unit, dorsally compressed, prominently nerved; glumes and lower lemma glabrous or with a few hairs near the apex. Lower glume 1.4–1.9 mm long, $\frac{1}{2}$ as long as the spikelet, 3-nerved, acute. Upper glume 1.5–2.1 mm long, 5-nerved, obtuse. Lower floret staminate; lower lemma as long as the spikelet, 5-nerved, obtuse or acute, the internerve between the midnerve and the first pairs of lateral nerves widest; lower palea 2-nerved, 2-keeled, shallowly sulcate to nearly flat on the back, 0.1–0.2 mm shorter than the lower lemma; stamens 3, the anthers 1–1.1 mm long, purple; lodicules 2. Upper floret 1.5–1.6 mm long, 0.7–0.8 mm wide, bisexual, indurate, sparsely pilose, especially along the margins of the lemma with hairs to 0.3 mm long, otherwise shiny, smooth, with bicellular microhairs all over its surface, apically obtuse; lodicules 2; stamens 3, the anthers ca. 1 mm, purple; styles 2, separate; stigmas plumose, purple. Caryopsis unknown.

Panicum tepuianum is only known from the type collection. The epithet is derived from the Arekunan Indian word for the characteristic sandstone table mountains of the Venezuelan Guayana.

The perennial, caespitose habit, 3-nerved lower glume, 5-nerved upper glume and lower lemma, open panicle, and lack of a collar at the juncture of the leaf blade and sheath indicate a relationship of *P. tepuianum* with sections *Lorea* and *Parvifolia* (Renvoize & Zuloaga, 1984; Zuloaga, 1987). Both sections have a large number of species in the Venezuelan Guayana.

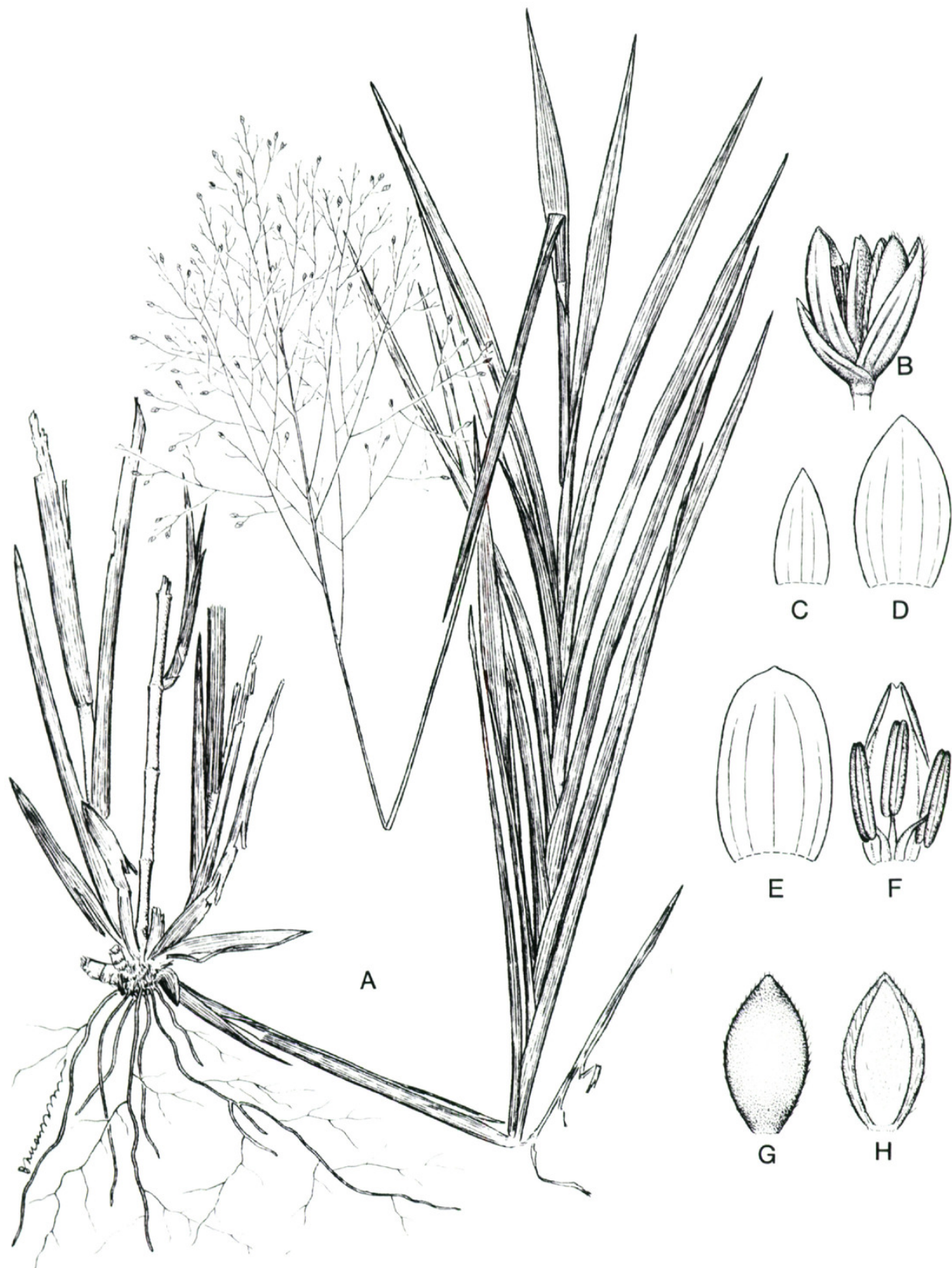


Figure 1. *Panicum tepuianum* (Liesner & Carnevali 22645, MO). — A. Habit; note branch developing on injured main culm. — B. Spikelet. — C. Lower glume. — D. Upper glume. — E. Lower lemma. — F. Lower palea and lower staminate flower. — G. Upper floret, lemma view. — H. Upper floret, palea view.

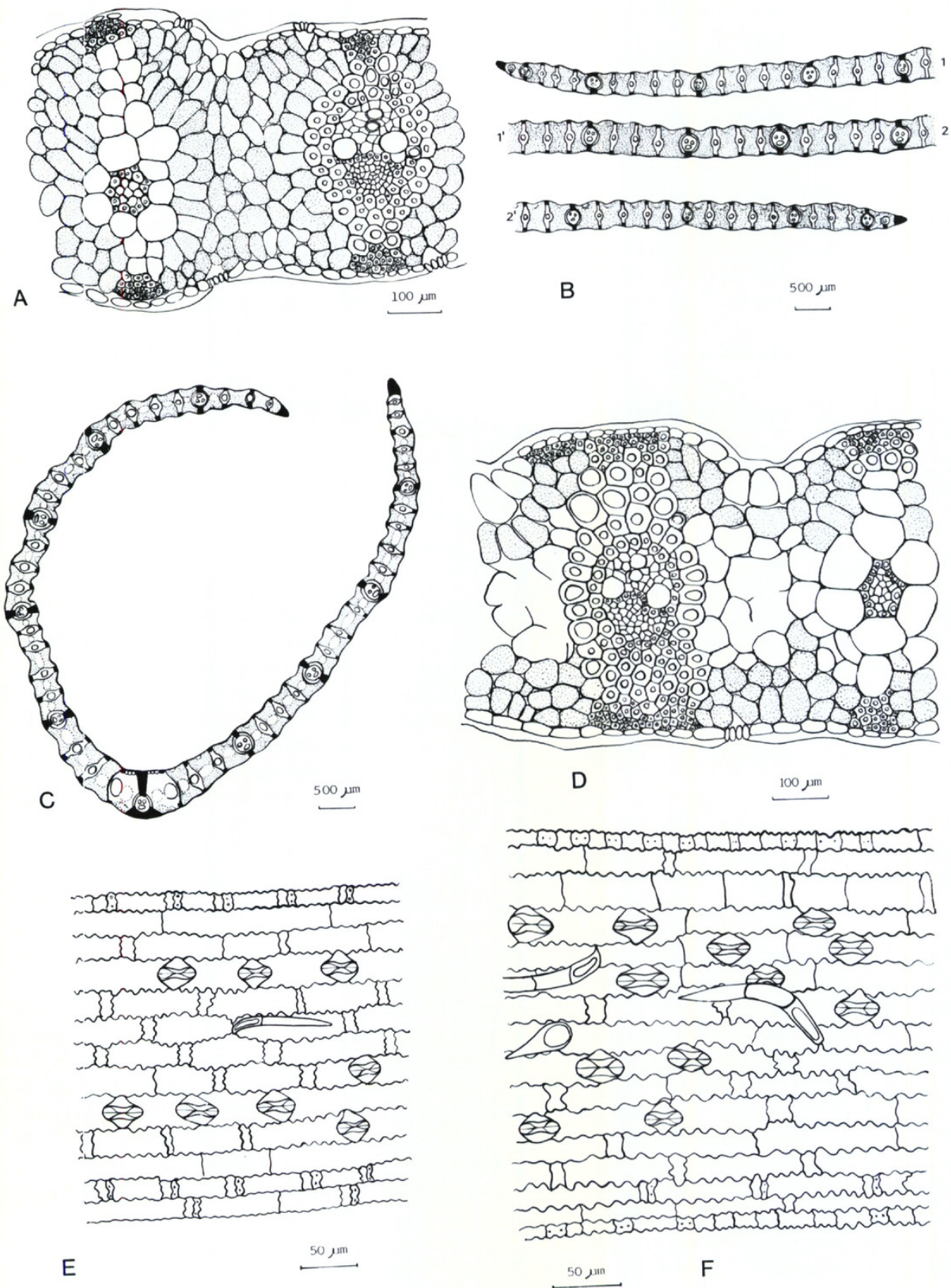


Figure 2. Leaf blade anatomy. A, B, F. *Panicum nervosum*. —A. Transverse section detail showing first- and second-order vascular bundles. —B. Outline of the leaf. —F. Abaxial epidermis showing 3-celled microhairs. C–E. *Panicum tepuianum*. —C. Outline of the leaf showing the keel and air cavities. —D. Transverse section detail showing first- and second-order vascular bundles and air cavities. —E. Abaxial epidermis showing 2-celled microhairs (A, B, F based on Zuloaga et al. 4424, SI; C–E based on Liesner & Carnevali 22645, MO.)

Panicum tepuianum differs from species of section *Lorea* in its completely membranous ligule, which has no trace of hairs, and the pubescent upper lemma and palea, which also have numerous bottle-like bicellular microhairs.

Within section *Parvifolia*, *P. tepuianum* is related to other caespitose, perennial species, especially *P. cyanescens* Nees ex Trin. and *P. nervosum* Lam. However, in both of these species the upper floret lacks macrohairs. In addition, *P. cyanescens* lacks overlapping sheaths and has spikelets 1.1–2 mm long, whereas *P. nervosum* has blades 8–15 mm wide, with the base amplexicaulous and wider than the sheath, and has subglobose spikelets 1.1–1.7 mm long.

An indumentum of macrohairs on the upper floret is unusual in the genus *Panicum* but occurs in a number of other unrelated species. Especially notable are: *P. chloroleucum* Griseb., *P. racemosum* (P. Beauv.) Sprengel, and *P. urvilleanum* Kunth of section *Urvilleana*; *P. discrepans* Doell of section *Discrepantia*; *P. incumbens* Swallen, *P. cayoense* Swallen, *P. guatemalense* Swallen, *P. trichidiachne* Doell, and *P. arundinariae* Trin. ex Fourn. of section *Parviglumia*, and *P. olyroides* Kunth not assigned to a section by Zuloaga (1987).

LEAF BLADE ANATOMY

TRANSVERSE SECTION

Outline: U-shaped, the margins involute; leaf 280–390 μm thick on ribs adjacent to the midnerve and 180–230 μm thick toward the margins; adaxial ribs and furrows $\pm$ conspicuous, the ribs truncate to rounded, the furrows $\frac{1}{2}$ or less the width of the blade; abaxial ribs and furrows slightly pronounced. **Keel** prominent, with a first-order vascular bundle structurally distinguishable from lateral first-order vascular bundles and associated with second-order vascular bundles; colorless parenchymatous cells and conspicuous air cavities present; adaxial surface flat; abaxial surface convex. **Vascular bundle arrangement:** 12 first-order vascular bundles and 36 second-order vascular bundles present, 3–4 second-order vascular bundles between contiguous first-order vascular bundles, (4–)5–8 mesophyll cells between adjacent vascular bundles, with a distance of 170–350 μm between contiguous vascular bundles. **First-order** vascular bundles situated in the center of the blade, circular in outline; outer parenchymatous sheath with globose, translucent cells, without specialized chloroplasts and smaller than the adjacent mesophyll cells, with their radial and inner tangential walls strongly thickened; outer sheath interrupted

by sclerenchyma girders toward both epidermises; metaxylem vessels slightly angular in outline; phloem adjacent to the mestome sheath; inner mestome sheath complete. **Second-order** vascular bundles angular in outline; outer sheath complete, with 6(–7) globose, translucent cells, larger than the adjacent mesophyll cells, without specialized chloroplasts; sclerenchyma girders present; extensions of the outer sheath present toward both surfaces, uni- or bis-eriate, occasionally with transitional cells in contact with the sclerenchyma; xylem and phloem distinct; inner mestome sheath complete. **Chlorenchyma** nonradiate; chlorenchyma cells isodiametric or less frequently tabular, with smooth walls, with a higher density of chloroplasts toward the abaxial surface; air spaces numerous. Air cavities present between vascular bundles, without aerenchyma cells. Groups of 3–4 fan-shaped *bulliform cells* regularly distributed on the adaxial furrows.

ABAXIAL EPIDERMIS

Costal zones with irregular silica bodies, alternating with rectangular cork cells, transversely elongated and with crenate walls; costal long cells similar to the ones of the intercostal zones; prickles not observed. **Intercostal zones** 7–15 cells wide, long cells rectangular in shape, with sinuous, thick walls, alternating with solitary short cells, less frequently paired; short cells rectangular in shape, transversely elongated, with crenate walls; silica bodies irregular in outline. **Stomatal complex** triangular, 31–39 μm long, in 1 to 3 rows on both sides of the costal zones. **Microhairs** 2-celled, isolated in the intercostal zones, the walls of the basal cell thicker than the walls of the distal cell; distal cell more than two times as long as the basal cell, rounded at the apex. Hooks and macrohairs not observed. Papillae absent.

Panicum tepuianum is related to other species of section *Parvifolia* with conspicuous extensions of the outer parenchymatous sheath, especially *P. nervosum*. *Panicum nervosum* shares the following anatomical characters with *P. tepuianum*: C_3 anatomy, with a similar leaf thickness in transverse section, the outer parenchymatous sheath of the first-order vascular bundles with manifest thick cells, extensions of the outer parenchymatous sheath toward both epidermises, the mesophyll not radiate but lax, with tabular or isodiametric cells, with smooth walls. *Panicum nervosum* differs from *P. tepuianum* by the absence of air cavities in transverse section, extensions of the outer parenchymatous sheath with a higher number of cells, and by the presence of three-celled microhairs on the abaxial epidermis.

Literature Cited

- Renvoize, S. A. & F. O. Zuloaga. 1984. The genus *Panicum* group *Lorea* (Gramineae). Kew Bull. 39: 185-202.
- Steyermark, J. A., B. K. Holst & Collaborators. 1989. Flora of the Venezuelan Guayana. VII. Contributions to the flora of the Cerro Aracamuni, Venezuela. Ann. Missouri Bot. Gard. 76: 945-992.
- Zuloaga, F. O. 1987. Systematics of New World species of *Panicum* (Poaceae: Paniceae). Pp. 287-306 in T. R. Soderstrom, K. W. Hilu, C. S. Campbell & M. E. Barkworth (editors), Grass Systematics and Evolution. Smithsonian Institution Press, Washington, D.C.



Davidse, Gerrit and Zuloaga, Fernando O. 1991. "Panicum tepuianum (Poaceae: Paniceae), a new species from Cerro Aracamuni in the Venezuelan Guayana." *Novon a journal of botanical nomenclature from the Missouri Botanical Garden* 1, 191–195.

View This Item Online: <https://www.biodiversitylibrary.org/item/14661>

Permalink: <https://www.biodiversitylibrary.org/partpdf/32031>

Holding Institution

Missouri Botanical Garden, Peter H. Raven Library

Sponsored by

Missouri Botanical Garden

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.