Quiina maracaensis J. V. Schneid. & Zizka and Quiina zamorensis J. V. Schneid. & Zizka (Quiinaceae), two new species of Quiina Aubl. from the Neotropics

Julio V. Schneider & Georg Zizka

Abstract

SCHNEIDER, J. V. & G. ZIZKA (2012). Quiina maracaensis J. V. Schneid. & Zizka and Quiina zamorensis J. V. Schneid. & Zizka (Quiinaceae), two new species from the Neotropics. *Candollea* 67: 261-267. In English, English and French abstracts.

Quiina maracaensis J. V. Schneid. & Zizka and *Quiina zamorensis* J. V. Schneid. & Zizka *(Quiinaceae)* are described and illustrated and their geographical distributions are provided in the Neotropics. *Quiina maracaensis* J. V. Schneid. & Zizka is a species from southern Venezuela and northern Brazil, while *Quiina zamorensis* J. V. Schneid. & Zizka is confined to the montane rain forest of the Ecuadorian Andes. A detailed description and illustrations are provided for each taxon.

Key-words

QUIINACEAE – *Quiina* – Neotropics – Taxonomy

Résumé

SCHNEIDER, J. V. & G. ZIZKA (2012). Quiina maracaensis J. V. Schneid. & Zizka et Quiina zamorensis J. V. Schneid. & Zizka (Quiinaceae), deux espèces nouvelles des néotropiques. *Candollea* 67: 261-267. En anglais, résumés anglais et français.

Quiina maracaensis J. V. Schneid. & Zizka et *Quiina zamorensis* J. V. Schneid. & Zizka *(Quiinaceae)* sont décrites et illustrées et leurs distributions géographiques sont indiquées pour les néotropiques. *Quiina maracaensis* J. V. Schneid. & Zizka est une espèce du sud du Vénézuela et du nord du Brésil, tandis que *Quiina zamorensis* J. V. Schneid. & Zizka est confinée à la forêt tropicale montagneuse des Andes équatoriennes. Une description détaillée et des illustrations sont fournies pour chaque taxon.

Address of the authors: Department of Botany and Molecular Evolution, Senckenberg Gesellschaft für Naturforschung, Biodiversity and Climate Research Center (BiK-F) and Goethe University Frankfurt am Main, Senckenberganlage 25, 60325 Frankfurt am Main, Germany. Email (JVS): **Julio.Schneider@senckenberg.de**

Submitted on April 26, 2011. Accepted on June 27, 2012. Edited by P. Bungener

 © CONSERVATOIRE ET JARDIN BOTANIQUES DE GENÈVE 2012

Introduction

The Neotropical *Quiinaceae* is a family of 4 genera (*Froesia* Pires, *Lacunaria* Ducke, *Quiina* Aubl., *Touroulia* Aubl.) and 46 species according to the most recent taxonomic revision. It is distributed from Belize and Jamaica to Bolivia and southern Brazil and consists of trees and shrubs predominantly found in tropical lowland rainforests; only few species are observed at elevations above 1000 m. The centers of diversity are in the Amazon region and the adjacent Guayana region. Molecular phylogenetic studies provided strong evidence that *Quiinaceae* is a member of the *Malpighiales* and forms a clade with the pantropical *Ochnaceae* and the monotypic *Medusagynaceae*, an endemic family of the Seychelles (e.g. Savolainen & al., 2000; Korotkova & al., 2009). In the most recent classification of the APG (APG III, 2009), *Quiinaceae* were merged with the other two families into an expanded concept of *Ochnaceae*.

Quiina is the largest genus with currently 30 accepted species. Phylogenetic studies have shown that *Quiina* is most likely sister to *Lacunaria* (Schneider & al., 2002; Schneider & al., 2006). *Quiina* is easily distinguishable from the other genera by the combination of the following characters: leaves simple, opposite, with intersecondary veins and the tertiary veins displaying a plumose-reticulate pattern; stipules two between adjacent petioles, plants androdioecious, gynoecium syncarpous, the ovary with 2(-5) locules, fruits berry-like (Schneider & Zizka, 1997; Schneider, 1998; Schneider & al., 2002; Schneider & Zizka, 2003; Schneider, 2004).

Among the collections recently studied from international herbaria (A, AAU, B, BM, BR, BRIT, CAY, CEN, COAH, COL, F, FR, FRP, G, GH, HOXA, IAN, K, L, LPB, M, MEDEL, MO, NY, P, PORT, R, RB, S, SP, U, UB, ULM, US, USM, VEN, W, WAG, WU) within the framework of the revision of the *Quiinaceae*, two new species were detected and are described here using the terminology of Stearn (1992). One species is from the Guayana region in Venezuela and northern Brazil, the other from southern Ecuador in montane rain forest.

Descriptions

Quiina maracaensis J. V. Schneid. & Zizka, **spec. nova** (Fig. 1, 3).

Typus: Brazil. Roraima: SEMA Ecological Reserve, Ilha de Maracá, riverine vegetation bordering the Igarapé Pedra Sentada, 3°30'N 61°43'W, 30.III.1987, *Milliken & Lima 35* (holo-: NY!; iso-: E, K!).

Arbor parva, ramulis terminalis puberulentis vel pilosis. Nonnulli pili longior quam 0,8 mm. Lamina subcoriacea, elliptica, rarius ovato-elliptica, (2,8-)4,8-14,1 × (1,1-)2,2-4,6 cm. Inflorescentia masculina 11-32-flora, hermaphrodita 5-11-flora. Fructus 0,6-0,9 × 0,55-0,8 cm.

Small *trees* or *shrubs* to 12 m tall. Terminal *internodes* laterally compressed or subterete, longitudinally striate, 0.8-2 mm in diameter, densely puberulent to pilose, with trichomes 0.1-0.4 mm long, erect, 0.2-1.5 mm long (at least some hairs > 0.8 mm long), curved, multicellular. *Leaves* petiolate; stipules caducous, elliptical, subulate, or narrowly ovate, (0.45-)0.9-3.2 × (0.06-)0.1-0.6 cm, apex acute, abaxially pilose, the adjacent stipules 0.1-0.4 mm distant at base, scars transversely elliptical to orbicular, 0.3-0.6 × 0.4-1 mm; petiole subterete, inconspicuously canaliculate or even, ± equally thickened, 0.1-0.5 cm long, 0.8-2 mm in diameter; lamina subcoriaceous, elliptical (or ovate-elliptical), (2.8-)4.8-14.1 × (1.1-)2.2-4.6 cm, base attenuate, cuneate, or acute, apex (sub-)acuminate, adaxially glabrous or pilose at base, abaxially pilose along midvein (or covering the whole surface when juvenile); margin inconspicuously revolute, minutely serrulate or entire; secondary veins 7-14 per side, adaxially slightly impressed or prominulous, abaxially prominulous, 0.25-1.7 cm distant at middle of lamina, interspersed by 0-2(-4) conspicuous intersecondary veins. Male *inflorescence* thyrsoid, 11-32-flowered, with flowers in fascicles of (1-)3, hermaphroditic inflorescence botryoid, 5-11-flowered, with flowers solitary, not in fascicles; rachis 1 per axile, laterally compressed (or subterete), longitudinally furrowed, inconspicuously thickened in fruit, 0.8-1.7(-2.7) cm long, 0.5-1 mm in diameter, densely pilose; bracts (sub-)opposite, ovate to elliptical, (0.9-)1.4-2.5 × 0.7-1.3 mm, apex acute, glabrous or sparsely hairy; bracteoles subulate to ovate, 0.4-1.3 × 0.2-0.4 mm, apex acuminate; pedicel below articulation to (0.3-)0.7-2.4 mm long, above articulation (sub-)terete, (1.5-)3-5 mm long, 0.3-0.7 mm in diameter, inconspicuously puberulent or glabrous. *Flowers* 2.5-3 mm in diameter; sepals 4, coriaceous, elliptical to ovate (to suborbicular), 1.4-1.7(-2.3) × 1.1-1.6 mm, apex rounded or obtuse; petals 4, yellow, elliptical to obovate, c. 2 × 1.6 mm, apex rounded, glabrous, rarely ciliolate; stamens in male flowers 21-26, in hermaphroditic flowers c. 12, filaments to 1.8 mm long, free or in hermaphroditic flowers sometimes adnate to petals; ovary 2-locular, styles 2, 1.8-1.9 mm long. *Fruit* subglobose, ellipsoid or obovoid, longitudinally striate, 0.6-0.9 × 0.55-0.8 cm, apex rounded, glabrous; seeds 1 per fruit, ellipsoid to subglobose, 0.55 × 0.5 cm, densely villous (trichomes 0.3-0.7 mm long).

Distribution. – Known from southern Venezuela and northern Brazil. Occurs in terra firme and riverine forests, in campina or capoeira, on sandy or bauxitic (lateritic) soils; up to 800 m.

Phenology. – Flowering in February and August (few data available), fruiting from February to August.

Etymology. – The species epithet refers to the type locality, the Ilha de Maracá.

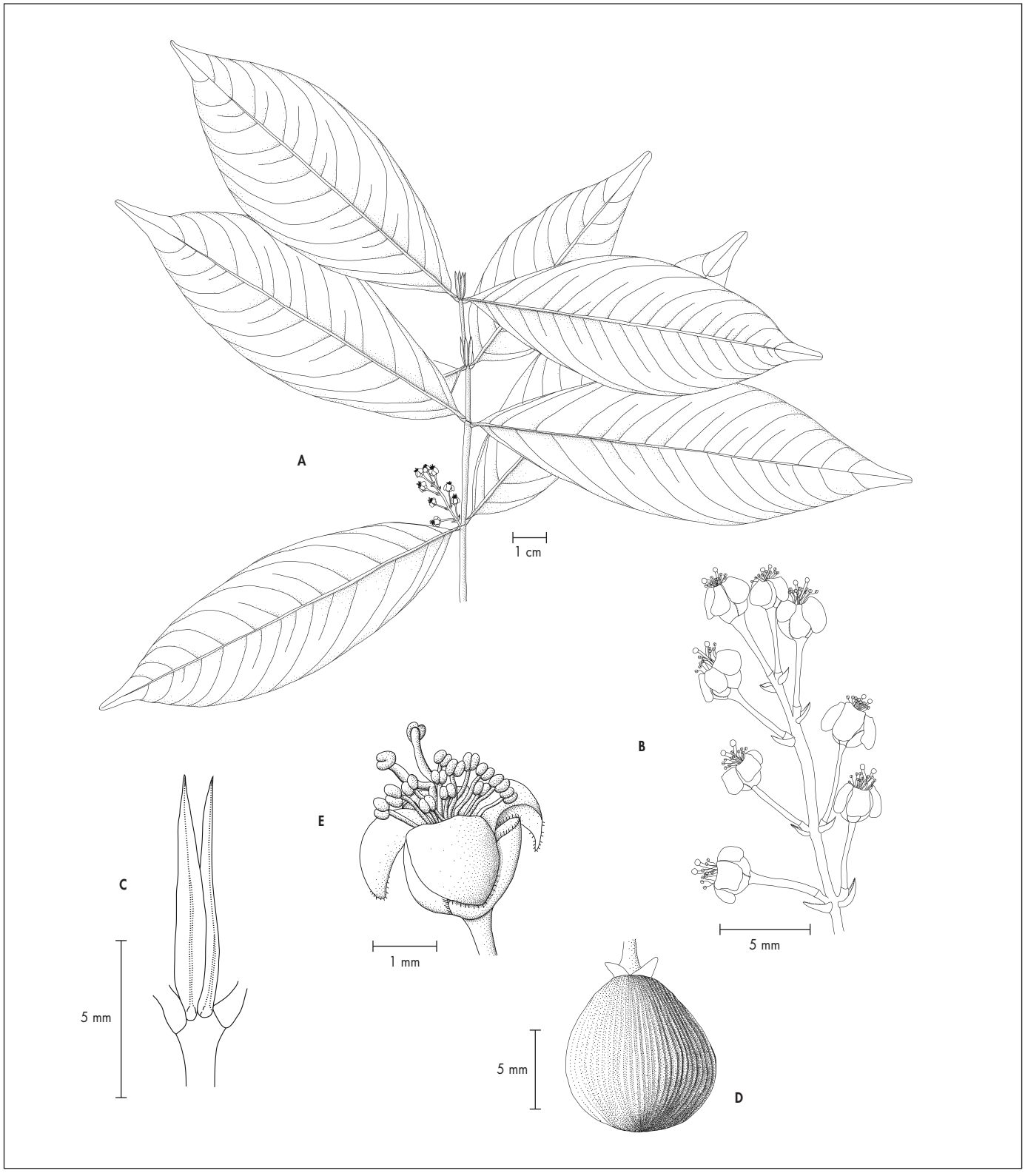


Fig. 1. – *Quiina maracaensis* J. V. Schneid. & Zizka. **A.** Flowering branch; **B.** Hermaphroditic inflorescence; **C.** Interpetiolar stipules at terminal node; **D.** Fruit; **E.** Hermaphroditic flower.

[**A-C, E:** *Milliken & Lima 35*, NY; **D:** *Rosa 3121*, NY] [Drawings: Anna Becker and Julio Schneider]

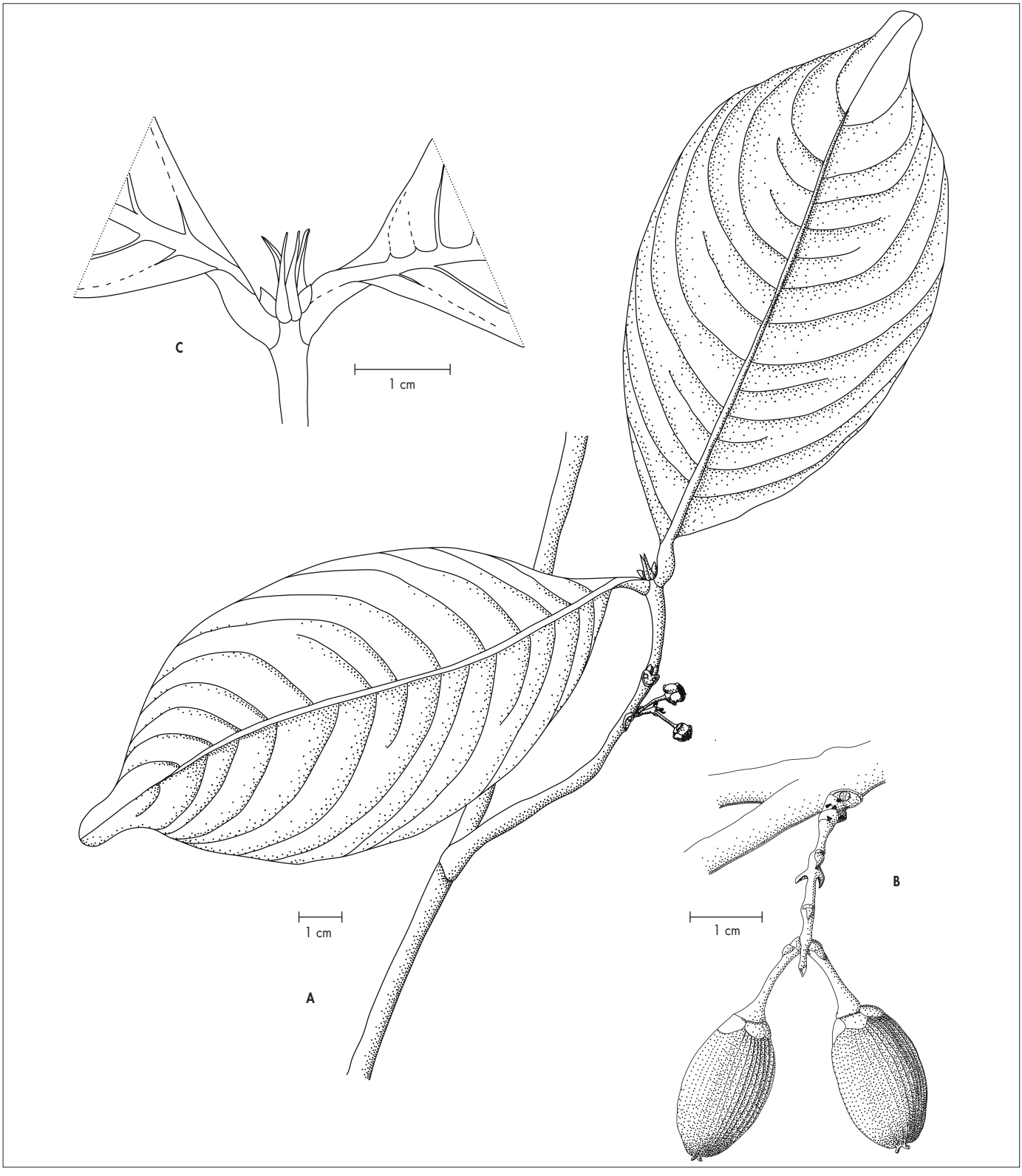


Fig. 2. – *Quiina zamorensis* J. V. Schneid. & Zizka. **A.** Branchlet with leaves and hermaphroditic inflorescence; **B.** Infructescence with immature fruits; **C.** Interpetiolar stipules at terminal node.

[*Homeier 333*, BIEL] [Drawings: Anna Becker]

Notes. – This species is characterized by the combination of small ellipsoid to subglobose fruits, small ± lanceolate stipules, pedicels with basal articulation, and especially the long multicellular trichomes (at least in some parts > 0.8 mm long) at terminal internodes, leaves and inflorescences. *Quiina florida* Tul. is similar in leaf shape, but differs in larger fruits and inflorescences, the usually broader stipules, and shorter trichomes. *Quiina wurdackii* Pires differs in shorter inflorescences and few, rather obscure secondary veins, while *Q. parvifolia* Lanj. & Heerdt is distinguished by broader stipules, broader leaf blades, and longer pedicels.

Additional material examined. – **Venezuela. Bolívar:** Municipio Cedeño, Cabeceras del río Túriba y Caño La Miel, 45 km E de Los Pijiguaos, VIII.1989, *Sanoja & Fernández 2904* (MO); Municipio Cedeño, headwaters of río Túriba and Caño La Miel, 45 km E of Pijiguaos, 6°34'N 66°23'W, VIII.1989, *Fernández & Sanoja 5892* (MO, NY, PORT); Municipio Raúl Leoni, headwaters of río Túriba and Caño La Miel, 45 km E of Pijiguaos, 6°34'N 66°23'W, VI.1989, *Fernández & Delgado 5813* (MO, NY, PORT). **Amazonas:** Alto Orinoco, Salto Salas, 18.VIII.1951, *Croizat 536* (NY); Dept. Atabapo, Caño Jayuwapuey, tributary of the Ocamo River, 3°4'N 64°40'W, I.1990, *Fernández 6789* (PORT).

Brazil. Amazonas: Vicinity of Pico Rondon, Perimetral Norte, Highway Km 211, 3 km from Km 211, lower slopes of Pico Rondon, 1°32'N 62°48'W, 2.II.1984, *Prance & al. 28761* (F, GH, K, NY, UB). **Pará:** Sete Varas airstrip on Rio Curua, 0°95'S 54°92'W, 4.VIII.1981, *Strudwick & al. 4083* (F, K, NY, UEC). **Roraima:** Município Alto Alegre, Ilha de Maracá, SEMA Estação, forest trails close to Estação, 3°22'N 61°20'W, 6.VI.1986, *Hopkins & al. 515* (FR, NY); Município Alto Alegre, Ilha de Maracá, SEMA Estação, Furo Pananá de Firmino of Rio Uraricuera on S side of island, forest near Casa Maracá, 3°24'N 61°26'W, 10.VI.1986, *Hopkins & al. 634* (FR, NY); Município de Boa Vista, Estação Ecológica de Maracá, 21.V.1987, *Lima 804* (K); SEMA Ecological Reserve, Ilha de Maracá, 3°22'N 61°26'W, 21.IV.1987, *Milliken 77* (E, K, NY); Serrinha, Rio Mucajaí, 31.I.1967, *Prance & al. 4198* (COL, F, GH, IAN, K, NY, R, S, U); Posto Mucajaí, Rio Mucajaí, Vicinity of Mucajaí airstrip, 13.III.1971, *Prance & al. 10928* (F, IAN, K, M, NY, P, R, S, U); SEMA Ecological Station, Ilha de Maracá, in forest at Santa Rosa, 3°22'N 61°25'W, 7.III.1987, *Ratter & al. 5587* (E, K); SEMA Ecological Station, Ilha de Maracá, 3°22'N 61°25'W, 11.III.1987 (st), *Ratter & al. 5679* (K); SEMA Ecological Sation, Ilha de Maracá, 3°22'N 61°25'W, 18.III.1987, *Ratter & al. 5748* (E, K); Surroundings of Ecological Station of Maracá, 3°22'N 61°25'W, 9.II.1979, *Rosa 3121* (F, NY).

Quiina zamorensis J. V. Schneid. & Zizka, **spec. nova** (Fig. 2, 3).

Typus: Ecuador. Zamora-Chinchipe: road Loja-Zamora, c. 35 km from Loja, Estación Científica San Francisco, 3°58'S 79°04'W, 1800 m, 16.III.2000, *Homeier 333* (holo-: BIEL!; iso-: QCNE, MO, LOJA).

Folia rigida. Inflorescentia hermaphrodita solum visa racemiforma, 1-11-flora, rhachidi 0,3-0,7 cm longa.

Trees. Terminal *internodes* terete, longitudinally furrowed, 2-3 mm in diameter, glabrous. *Leaves* petiolate; stipules caducous, (narrowly) triangular-ovate, 0.3-0.9 × 0.08-0.15 cm, apex acute, glabrous or adaxially puberulent, the adjacent stipules joint at base or to 0.3 mm distant; petiole canaliculate, 0.3-0.65 cm long, 1.5-3 mm in diameter; lamina coriaceous, rigid, elliptical, 7-16 × 3.2-6.9 cm, base shortly attenuate to broadly cuneate, apex shortly (sub-)acuminate, the very apex rounded or obtuse, adaxially glabrous, abaxially sparsely hairy along midvein, the hairs red-brown, 0.3-1.1 mm long; margin not or minutely revolute, entire or very inconspicuously serrulate; secondary veins 8-16 per side, adaxially impressed to prominulous, abaxially prominent, 0.7-1.7 cm distant at middle of lamina, interspersed by 0-1(-4) intersecondary veins. Hermaphroditic *inflorescence* botryoid, 1-11-flowered, male inflorescence not seen; rachis 1(-3) per axile, subterete to inconspicuously quadrangular, longitudinally furrowed, 0.3-0.7 cm long, c. 1 mm in diameter, ± glabrous or sparsely puberulent with brownish hairs to 0.3 mm long; bracts subopposite, ovate, 0.6-1.3 × 0.6-1 mm, apex acute, puberulent, bracteoles not seen; pedicel below articulation to 2 mm long, above articulation subterete, apically inconspicuously widened, 5-10 mm long (in male flowers to 12 mm long), 0.7-0.8 mm in diameter, glabrous. *Flowers* subglobose in bud; sepals 4, coriaceous, elliptical to suborbicular, strongly concave, 2-3 × 1.3-4 mm, rounded, abaxially glabrous, margin ciliate; petals 5, obovate, reflexed, 4-5 × 2-4 mm, rounded, margin ciliolate; stamens in hermaphroditic flowers c. 17, in male flowers c. 65 (see remarks), filaments c. 5 mm long, anthers c. 0.4-0.7 × 0.3-0.6 mm, in male flowers larger; ovary 2-locular, styles 2, 2.5-3 mm long, stigma inconspicuously broadened. *Fruit* ellipsoid, longitudinally striate, 2-3 × 1.2-1.5 cm, apically obtuse to subacute, glabrous; seeds not seen.

Distribution. – Only known from Ecuador. Occurs in tropical montane rain forest at about 1800 m.

Phenology. – Flowers in March.

Etymology. – The species epithet refers to the type locality near Zamora.

Additional material examined. – **Ecuador. Zamora-Chinchipe:** road Loja-Zamora, c. 35 km from Loja, Estación Científica San Francisco, 1830 m, 7 Apr 2004, *Homeier 1375* (BIEL, FR).

Notes. – This species is similar in leaf shape to *Q. florida*, but contrasts in a rigid-coriaceous leaf texture. The leaf texture is similar to *Q. integrifolia* Pulle, but this species has longer inflorescences with more flowers. The short inflorescences, in turn, are similar to *Q. blackii* Pires. However, *Q. blackii* differs in chartaceous to subcoriaceous leaves and subulate stipules. Male flowers were provided by J. Homeier (no specimen seen).

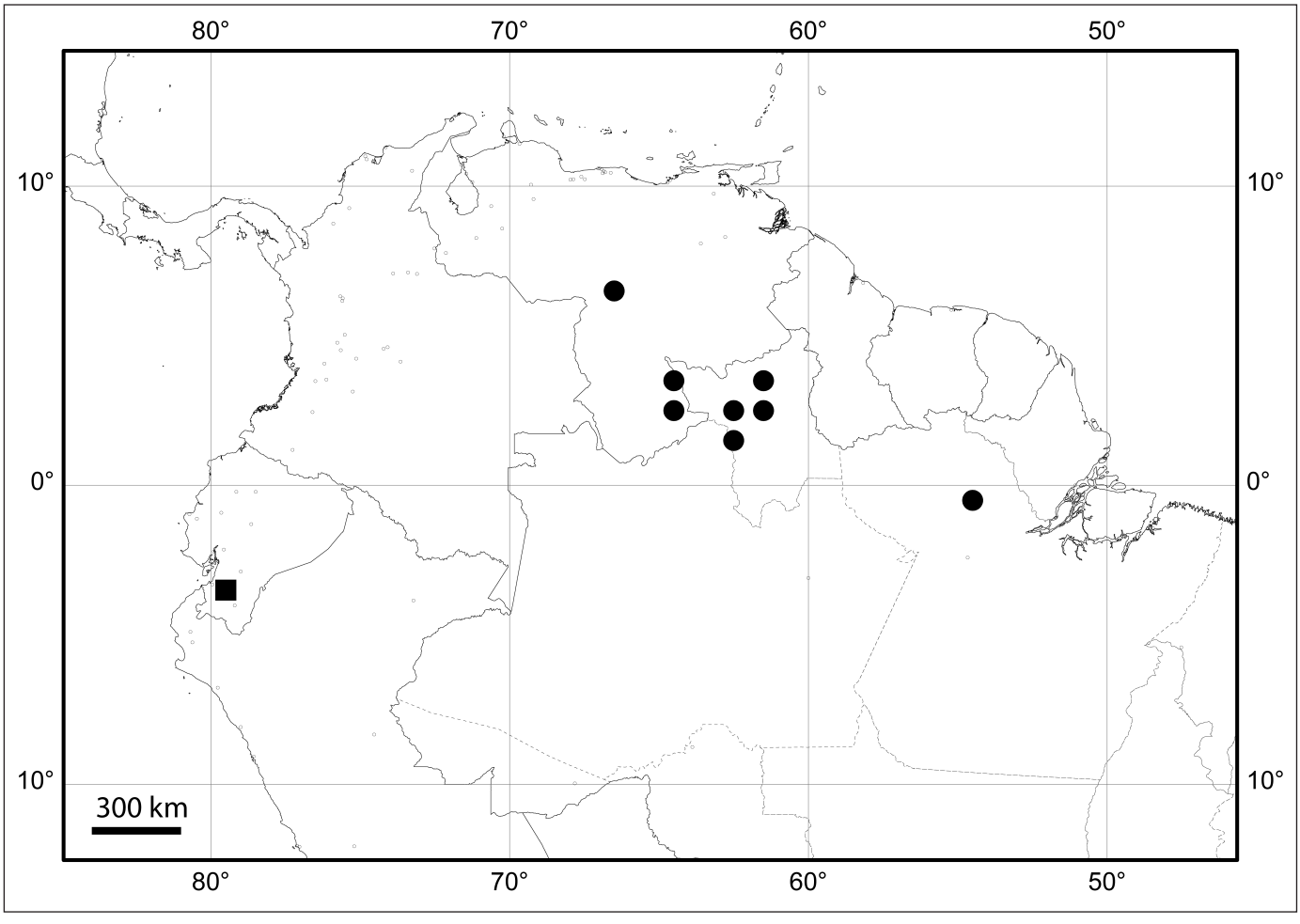


Fig. 3. – Distribution map of *Quiina maracaensis* J. V. Schneid. & Zizka (●) and *Quiina zamorensis* J. V. Schneid. & Zizka (■).

Acknowledgments

The study received financial support from the Biodiversity and Climate Research Centre (Bik-F). We thank the directors of the herbaria A, AAU, B, BM, BR, BRIT, CAY, CEN, COAH, COL, F, FR, FRP, G, GH, HOXA, IAN, K, L, LPB, M, MEDEL, MO, NY, P, PORT, R, RB, S, SP, U, UB, ULM, US, USM, VEN, W, WAG, WU for the loan of their specimens. Marco Schmidt is acknowledged for helping with the distribution map.

References

APG III (2009). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Bot. J. Linn. Soc*. 161: 105-121.

Korotkova, N., J. V. Schneider, D. Quandt, A. Worberg, G. Zizka & T. Borsch (2009). Phylogeny of the eudicot order Malpighiales - Analysis of a recalcitrant clade with sequences of the petD group II intron. *Pl. Syst. Evol.* 282: 221-228.

Savolainen V., M. F. Fay, D. C. Albach, A. Backlund, M. van der Bank, K. M. Cameron, S. A. Johnson, M. D. Lledó, J.-C. Pintaud, M. Powell, M. C. Sheahan, D. E. Soltis, P. S. Soltis, P. Weston, W. M. Whitten, K. J. Wurdack & M. W. Chase (2000). Phylogeny of the eudicots: a nearly complete familial analysis based on *rbc*L gene sequences. *Kew Bull.* 55: 257-309.

Schneider, J. V. (1998). El género Quiina (Quiinaceae) con especial referencia a las especies de Venezuela. *Acta Bot. Venez*. 21(1): 1-74.

Schneider, J. V. (2004). Sinopsis del género Quiina Aubl. (Quiinaceae) para el Perú. *Arnaldoa* 11: 45-71.

SCHNEIDER, J. V., R. SAMUEL, T. F. STUESSY, U. SWENSON & G. ZIZKA (2006). Phylogeny of Quiinaceae (Malpighiales): evidence from trnL-trnF sequence data and morphology. *Pl. Syst. Evol.* 257: 189-203.

SCHNEIDER, J. V., U. SWENSON & G. ZIZKA (2002). Phylogenetic reconstruction of the neotropical family Quiinaceae (Malpighiales) based on morphology and some remarks on the evolution of an androdioecious sex distribution. *Ann. Missouri Bot. Gard.* 89: 64-76.

SCHNEIDER, J. V. & G. ZIZKA (1997). Two new species of Quiinaceae (Quiina, Froesia) from the Venezuelan Guayana and some remarks on the genus Froesia Pires. *Novon* 7: 406-412.

STEARN, W. T. (1992). *Botanical Latin.* 4th Edition. David & Charles, Newton Abbot.