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Taxonomic Revision of *Tynanthus* (Bignoniaceae, Bignoniaceae)

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Abstract

Tynanthus is a genus of Neotropical lianas that are distributed from southern Mexico to southern Brazil. Extensive herbarium work, field studies and new molecular phylogenetic data were used as the basis to recognize 14 species in the genus. Here, we provide a detailed treatment of the group, including an identification key to all species recognized, as well as morphological descriptions, a complete list of synonymy, nomenclatural information, taxonomic notes, phenological data, information on habitat and distribution, and illustrations. Two species are circumscribed differently from earlier classifications, in particular *Tynanthus elegans* is synonymized with *Tynanthus cognatus*, while *Tynanthus villosus* is synonymized with *Tynanthus polyanthus*. In addition, *Tynanthus goudotianus* is treated as a doubtful name, and two recently described species are recognized, *Tynanthus densiflorus* and *Tynanthus espiritosantensis*. One species name is neotypified, *Tynanthus caryophylleus*, and nine species names are lectotypified, namely *Cuspidaria ovalis*, *Tynanthus cognatus*, *Tynanthus elegans*, *Tynanthus guatemalensis*, *Tynanthus lindmanii*, *Tynanthus myrianthus*, *Tynanthus panurensis*, *Schizopsis chimonantha*, and *Schizopsis regnelliana*. A complete list of doubtful and excluded names is presented.

Resumo

Tynanthus é um gênero de lianas Neotropicais distribuídas desde o sul do México até o sul do Brasil. Trabalho extenso em herbário, estudos de campo e novos dados moleculares foram utilizados como base para reconhecer 14 espécies no gênero. Aqui, nós fornecemos um tratamento detalhado do grupo, incluindo uma chave de identificação de todas as espécies reconhecidas, bem como descrições morfológicas, uma lista completa de sinônias, informações nomenclaturais, comentários taxonômicos, dados fenológicos, informações sobre habitat e distribuição e ilustrações. Duas espécies são circunscritas diferentemente de classificações anteriores, em particular *Tynanthus elegans* é sinonimizado em *Tynanthus cognatus*, enquanto *Tynanthus villosus* é sinonimizado em *Tynanthus polyanthus*. Adicionalmente, *Tynanthus goudotianus* é tratado como nome duvidoso, e duas espécies descritas recentemente são reconhecidas, *Tynanthus densiflorus* e *Tynanthus espiritosantensis*. Um nome de espécie é neotipificado, *Tynanthus caryophylleus*, e nove nomes de espécies são lectotipificados, a saber: *Cuspidaria ovalis*, *Tynanthus cognatus*, *Tynanthus elegans*, *Tynanthus guatemalensis*, *Tynanthus lindmanii*, *Tynanthus myrianthus*, *Tynanthus panurensis*, *Schizopsis chimonantha* e *Schizopsis regnelliana*. Uma lista completa de nomes duvidosos e excluídos é apresentada.

Key words: “cipó-cravo”, “clavo huasca”, Neotropical flora

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Introduction

Tynanthus Miers (1863: 193) includes 14 species, and consists on a small genus of Neotropical lianas. The genus is distributed from southern Mexico to southern Brazil, where it predominates in humid forests, although few representatives are also found in dry areas. Species of *Tynanthus* generally present restricted geographic distribution, occurring in Western South America, Central America, Amazonia or Atlantic Forest exclusively (Lohmann & Taylor 2014).

The genus was described ca. 150 years ago by Miers (1863), who originally included nine species in the genus. From those, only four names were validly published, *T. cognatus* (Chamisso 1832: 703) Miers (1863: 193), *T. elegans* Miers (1863: 193), *T. fasciculatus* (Vellozo 1825: 247; 1827: tab. 25) Miers (1863: 193), and *T. labiatus* (Chamisso 1832: 701) Miers (1863: 193). One year after the description of the genus, Bureau (1864), without noticing the earlier publication of *Tynanthus*, described the new genus *Schizopsis* Bureau (1864: 44) in which he subsequently included seven species (Bureau 1865). Three years later, Bureau (1868) had already noticed the overlap between *Tynanthus* and *Schizopsis*, and published a taxonomic revision of *Tynanthus* in which he proposed the appropriate synonymizations and combinations [e.g., *T. goudotianus* (Bureau 1865: 374) Bureau (1868: 274)]. Three new species were included in *Tynanthus* within the next years, *T. igneus* (Vellozo 1825: 244; 1827: tab. 15) Rodrigues (1891: 50), *T. guatemalensis* Smith (1893: 6) and *T. micranthus* Mello ex Schumann (1894: 221), until the genus was treated in the monograph for the Flora Brasiliensis (Bureau & Schumann 1896). In this treatment, two new species were described, *T. lindmanii* Schumann (in Bureau & Schumann 1896: 409) and *T. myrianthus* Bureau & Schumann (1896: 197), totalizing eight species of *Tynanthus* recognized for Brazil (Bureau & Schumann 1896). Since then, the genus has never been treated comprehensively. Instead, three new combinations were made by various authors, i.e., *T. caryophylleus* (Bello 1881: 293) Alain (1965: 352), *T. panurensis* (Bureau 1865: 373) Sandwith (1953: 465), and *T. polyanthus* (Bureau 1865: 378) Sandwith (1953: 465), while three others were newly described, i.e., *T. hyacinthinus* Standley (1935: 87), *T. macranthus* Williams (1967: 250), and *T. weberbaueri* Sprague (1908: 176). Furthermore, Alwyn Gentry described four new species [i.e., *T. croatianus* Gentry (1971: 93), *T. pubescens* Gentry (1978: 275), *T. sastrei* Gentry (1980: 214) and *T. villosus* Gentry (1976: 60)], and transferred *T. schumannianus* (Kuntze 1898: 243) Gentry (1974: 874) into the genus. More recently, a synopsis of tribe Bignonieae recognized 15 species in *Tynanthus* (Lohmann & Taylor 2014).

Tynanthus is clearly circumscribed and characterized by three morphological synapomorphies: a smell of cloves on the vegetative organs, small flowers with bilabiate corollas, and fruits with raised margins (Lohmann 2006, Lohmann & Taylor 2014). The strong smell of cloves on the vegetative organs has led to the popular name “cipó-cravo” (Brazil) or “clavo huasca” (e.g., Colombia, Peru and Ecuador). Other morphological features that are not exclusive to *Tynanthus*, also being found in other genera are also useful features to recognize the genus, namely the inflorescences in thyrses or compound thyrses, the densely pubescent corolla, thecae curved forward, densely pubescent or velutinous ovary, and a poorly developed nectar disk (Lohmann & Taylor 2014). In addition, the presence of trifid tendrils and lack of interpetiolar gland fields are also useful to identify species, although these traits are variable in some species of the genus.

Although *Tynanthus* is strongly supported as monophyletic (Lohmann 2006, Medeiros & Lohmann 2015) and well characterized morphologically, the delimitation of species and patterns of morphological variation within the genus have remained unclear (Lohmann & Taylor 2014). This is in part because several of its species are only known from few herbarium collections and also because a detailed account for the species of *Tynanthus* has not been conducted since the monograph of Bureau and Schumann for the Flora Brasiliensis (1896). Extensive herbarium studies in association with fieldwork and new molecular phylogenetic data (Medeiros & Lohmann 2015) provide new morphological, ecological, evolutionary and biogeographical information about *Tynanthus*, and an excellent foundation for a new comprehensive taxonomic treatment of all species in the genus.

Material and methods

The taxonomic treatment of *Tynanthus* is based on new morphological observations, and novel molecular phylogenetic data (Medeiros & Lohmann 2015). Protologues and type collections of all species names, including the recognized taxa and respective synonyms were examined. All accepted names are listed alphabetically, with nomenclatural discussions and citations following McNeill *et al.* (2012).

Morphological characters, phenological and distributional data were collected from collections obtained during fieldwork and specimens deposited in the following herbaria: A, BHCB, BM, BR, C, CAY, CVRD, E, ESA, F, FUEL, G (incl. G-DC), GH, HAL, HRCB, IAC, IAN, INPA, K, LE, M, MBM, MG, MO, MPU, NY, OKL, P, R, RB, S, SCZ, SP, SPF, SPSF, STRI, TCD, UEC, UFACPZ, UPCB, UPS, US, VEN, VIC, W (acronyms follow Thiers, continuously updated). Morphological descriptions follow the terminology of Radford (1986), as well as Weberling (1989) for inflorescence morphology, the Leaf Architecture Working Group (1999) for leaf venation, Gomes-Silva (2009) for leaflet mite-domatia, Nogueira *et al.* (2013) for trichomes, and Lohmann & Taylor (2014) for prophyll morphology.

A dataset with ca. 650 geo-referenced localities was compiled for all species in *Tynanthus*. These data were then inserted into ArcGIS 10.2.1 (ESRI) for the preparation of distribution maps for all species recognized. Examined specimens are ordered alphabetically, and by date within localities; question marks indicate dubious or ambiguous information.

Results

Taxonomic treatment

Tynanthus Miers (1863: 193). *Tynanthus*, *orth. var.* Lectotype (designated by Sandwith 1962a: 454): *Tynanthus fasciculatus* (Vellozo) Miers.

Schizopsis Bureau (1864: 44). Type: *Schizopsis labiata* (Chamisso 1832: 701) Bureau (1865: 373) [= *Tynanthus labiatus* (Chamisso 1832: 701) Miers (1863: 193)].

Lianas. Branchlets with four phloem wedges in cross section, strong clove odour, conspicuously tetragonal to terete (in general, somewhat flattened when young), with or without ritidome, finely striated or not, few to densely lenticled (sometimes without lenticels), villous, tomentose, pubescent, puberulent or glabrescent, with simple, peltate or patelliform trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands absent or present; prophylls of the axillary buds minute, foliaceous or bromeliad-like, triangular, elliptic, ovate or obovate, villous, tomentose, pubescent, puberulent or glabrescent throughout, with simple, peltate or patelliform trichomes. *Leaves* 2–3 foliolated; terminal leaflets often modified into simple or trifid tendrils (rarely bifid, when very young), with or without adhesive-disks on tips; petioles and petiolules with a more or less conspicuous canalicule on the upper side, villous, tomentose, pubescent, puberulent or glabrescent throughout the surface or only at the upper canalicule, with simple, peltate or patelliform trichomes; lateral petiolules with equal lengths and the terminal one longer, when present; leaflets membranous to coriaceous, discolor or concolor, elliptic, ovate or obovate; apex acuminate, caudate, mucronate or obtuse; base cuneate, obtuse, truncate or subcordate, symmetrical or asymmetrical; margin entire (rarely dentate); the abaxial surface villous, tomentose, pubescent, puberulent or glabrescent throughout or only on and near the veins, with simple, peltate or patelliform trichomes; the adaxial surface villous, tomentose, pubescent, puberulent, or glabrescent throughout or only on and near the veins, with simple, peltate or patelliform trichomes; glandular trichomes evenly distributed throughout both surfaces or especially on one surface; first venation pinnate; second venation weak brochidodromous or brochidodromous; third venation alternate percurrent (sometimes random reticulate); pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyse or a compound thyse, lax, with conical aspect, or dense, with corymbose, subcorymbose or conical aspect; axis villous, tomentose or pubescent, with simple, peltate or patelliform trichomes; bracts of the inflorescence caducous or persistent, triangular to linear triangular, villous to pubescent or glabrescent throughout or only at margins; floral bracts triangular. *Calyx* green to yellowish, grayish or reddish, campanulate, membranous to chartaceous, with transversal or oblique aperture, truncate, denticulate or laciniate,

tomentose, pubescent, puberulent or glabrescent outside, with simple and peltate trichomes, with or without patelliform glands, glabrous inside. *Corolla* white, cream or pale yellow (sometimes pale lilac, pale green, pale pink, pale red or pale blue), bilabiate, with two (almost totally fused) upper lobes and three lower lobes, densely pubescent outside, with simple and peltate trichomes, internally glabrous at the top of the tube, tomentose to pubescent or glabrescent at the base, with simple and/or long and short stipitate trichomes; nectar guides present or absent, with long and short stipitate trichomes; lobes entire, densely pubescent to pubescent throughout or only at margins, with simple and peltate trichomes, acute, obtuse or rounded. *Androecium* with fertile stamens inserted at the same position; filaments with long and short stipitate trichomes at the base; anthers thecae cream, obovate to elliptic, divergent and reflexed forward, glabrous, inserted or subexserted; staminode glabrous, glabrescent or with long and short stipitate trichomes. *Gynoeceum* with ovary conical to oblong, densely pubescent or velutinous, with simple trichomes, with a ring of longer trichomes at the base, with 2 or 4 series of ovules per locule; nectar disc not evident; style tomentose to pubescent at the base, with simple trichomes; stigma with lamellae lanceolate, glabrous. *Fruit* a linear flattened to subtetragonal capsule, with extremities acuminate, acute or obtuse, coriaceous to woody, smooth or granular throughout, without lenticels to densely lenticeled, villous, tomentose, pubescent, puberulent or glabrescent, with simple, peltate or patelliform trichomes; central ridge double or single, prominent or not; margins slightly or prominently raised. *Seeds* thin, bialatae, more or less oblong, finely striated; body brown; wings hyaline-membranaceous, sharply demarcated from the body.

Key to species of *Tynanthus*

- 1 Lax thyrses, with conical aspect..... 2
- Dense thyrses, with corymbose or subcorymbose aspect (or conical in *T. densiflorus*)..... 11
- 2 Tendrils simple 3
- Tendrils trifid (rarely bifid, in young individuals of *T. cognatus*)..... 4
- 3 Leaflets with apex caudate-mucronate; calyx with patelliform glands; fruits winged, with margins prominently raised
..... *T. guatemalensis*
- Leaflets with apex acuminate-mucronate; calyx without patelliform glands; fruits unwinged, with margins slightly raised
..... *T. polyanthus*
- 4 Prophylls foliaceous 5
- Prophylls minute, triangular to shallowly triangular, or bromeliad-like 6
- 5 Leaflets discolor; corolla 1.2–1.7 cm long..... *T. panurensis*
- Leaflets concolor; corolla 0.6–0.8 cm long..... *T. sastrei*
- 6 Prophylls bromeliad-like 7
- Prophylls minute, triangular to shallowly triangular..... 8
- 7 Leaflet domatia pubescent; inflorescence axis without patelliform trichomes; Atlantic forest, Brazil (SE).....
..... *T. espiritosantensis*
- Leaflet domatia glabrous; inflorescence axis with patelliform trichomes; Amazon forest, Bolivia, Brazil (N) and Peru
..... *T. schumannianus*
- 8 Interpetiolar patelliform glands present; fruits with double central ridge *T. pubescens*
- Interpetiolar patelliform glands absent; fruits with single central ridge 9
- 9 Branchlets tomentose to pubescent throughout; calyx without patelliform glands; fruits unwinged, with margins slightly raised *T. cognatus*
- Branchlets glabrescent (if pubescent, only at nodes); calyx with patelliform glands; fruits winged, with margins prominently raised 10
- 10 Petioles and petiolules with patelliform trichomes; corolla 1–1.4 cm long, with nectar guides..... *T. labiatus*
- Petioles and petiolules without patelliform trichomes; corolla 0.5–0.9 cm long, without nectar guides *T. micranthus*
- 11 Interpetiolar patelliform glands present 12
- Interpetiolar patelliform glands absent..... 13
- 12 Tendrils trifid; corolla 0.8–1.5 cm long..... *T. densiflorus*
- Tendrils simple; corolla 2–3.8 cm long..... *T. macranthus*
- 13 Young branchlets pubescent; calyx minutely denticulate (sometimes truncate); fruits unwinged, with margins slightly raised *T. croatianus*
- Young branchlets tomentose; calyx lacinate; fruits winged, with margins prominently raised..... *T. fasciculatus*

1. *Tynanthus cognatus* (Cham.) Miers (1863: 193). *Bignonia cognata* Chamisso (1832: 703). Lectotype (designated here):—BRAZIL. "Brasil aequinoct.", s.d., *F. Sellow s.n.* (US! (barcode 125821)).

Tynanthus elegans Miers (1863: 193). *Bignonia elegans* Chamisso (1832: 702), *nom. illeg.*, *non Bignonia elegans* Vellozo 1825; 1827. Lectotype (designated here):—BRAZIL. Sin loc., s. d., *F. Sellow s.n.* (US! (barcode 125825)). *syn. nov.*

Schizopsis chimonantha Bureau (1865: 375). Lectotype (designated here):—BRAZIL. Bahia: "Prope Ilheos", 1838, *B. Luschnath s.n.* (BR!; isolectotype BR!). Syntype: BRAZIL. Rio de Janeiro: "Bords de la rivière d'Hytu, près la fazenda de Bemfica", 1816–1821, *A. St.-Hilaire Catal. D, N° 25* (P! (barcodes 3606733, 3606734), K!).

Schizopsis regnelliana Bureau (1865: 376). Lectotype (designated here):—BRAZIL. Minas Gerais: "Caldas", 28 December 1859, *A. F. Regnel III-52* (S (14-19845) photo!; isolectotype K!). Syntypes:—BRAZIL. São Paulo: "Prés de la Paranapitany", 1816–1821, *A. St.-Hilaire Catal. C2, N° 1342* (P! (barcodes 3606735, 3606736)). Minas Gerais: Sin. loc., 1845, *Widgren 743* (BR!).

Fig. 1: A–E

Lianas. Branchlets tetragonal to terete, with or without ritidome, finely striated, lenticled to densely lenticled, tomentose to pubescent, with simple and peltate trichomes; interpetiolar ridge present (sometimes absent); interpetiolar patelliform glands absent; prophylls of the axillary buds 0.7–1.7 mm long, 0.6–1.5 mm wide, minute, shallowly triangular to triangular, tomentose to pubescent or glabrescent throughout, with simple and peltate trichomes. *Leaves* 2–3 foliolated; terminal leaflets often modified into trifid tendrils (rarely bifid, when very young), sometimes with adhesive-disks on tips; petioles and petiolules tomentose to puberulent throughout the surface, with simple and peltate trichomes; petioles (0.2–)0.5–3.6 cm long; petiolules (0.3–)0.5–2.3 cm long; leaflets (1.6–)4–10.6 cm long, (0.6–)1.8–6.2 cm wide, chartaceous to coriaceous, discolor, obovate to elliptic; apex acuminate or obtuse, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface tomentose to pubescent throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent throughout or only on and near the veins, with simple, peltate and patelliform trichomes; glandular trichomes evenly distributed throughout both surfaces; second venation weak brochidodromous or brochidodromous; pocket domatia with (sometimes without) trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order (2.5–)3–13 cm long, second order 2.5–5.5 cm long; axis tomentose to densely puberulent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, tomentose to pubescent throughout, 0.5–1.9 mm long; floral bracts 0.3–0.7 mm long; floral pedicels 1–7.5 mm long. *Calyx* green, 1.3–2.7 mm long, 1.3–2.3 mm wide, with transversal (sometimes oblique) aperture, truncate or minutely 5-denticulate, tomentose to puberulent throughout outside, without patelliform glands; lobes 0.1–0.4 mm long. *Corolla* white, cream or pale yellow (sometimes pale lilac), 0.5–1.1 cm long, 2.3–3.7 mm wide at the tube opening; tube 3–4.9 mm long, internally pubescent to glabrescent at the base, with simple and long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.3–1.7 mm long, 0.6–1.9 mm wide, acute to obtuse; lower ones 1.6–3.6 mm long, 1.2–3.1 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 1–1.5 mm from the base of the corolla; shorter ones 2.5–3.5 mm long; longer ones 3.5–4.5 mm long; anthers thecae 0.7–0.8 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.2 mm beyond anther attachment; staminode 1.3–1.7 mm long, glabrous. *Gynoecium* 4.5–8.9 mm long; ovary 1–1.3 mm long, 0.7–0.9 mm wide, conical, velutinous; style 3.5–7.5 mm long, tomentose at the base. *Fruit* a linear flattened capsule, (6.5–)10–25 cm long, 0.5–1.1 cm wide, coriaceous, smooth to granular near the midvein and granular near the margins, without lenticels to densely lenticled, tomentose to pubescent, with simple and peltate trichomes; central ridge single, slightly or not prominent; margins slightly raised (unwinged), 0.1–0.2 cm wide. *Seeds* body (0.7–)0.9–1.7 cm long, (0.3–)0.5–0.7 cm wide; wings (0.3–)0.5–1 cm long.

Phenology:—Flowers from October to March and produces fruits from February to September.

Distribution and habitat:—Occurs in moist broadleaf forests of Brazil (Bahia, Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo) (Fig. 2).

Additional specimens examined:—BRAZIL. Sin loc., s.d., *A. Glaziou s.n.* (F 539388). Sin loc., s.d., *J.C. Mello 8yt* (P barcode 3606711). Sin loc., s.d., *A.F. Regnell s.n.* (K). Sin loc., s.d., *L. Riedel s.n.* (NY). Sin loc., s.d., *F. Sellow 1074* (BM). Sin loc., 1814–1817, *J. Bowie & A. Cunningham s.n.* (BM). Sin loc., 1823, *L. Riedel? s.n.* (LE). **Bahia:** Rio Gongogi Basin, 100–500 m, 1 October–30 November 1915, *H.M. Curran 213* (US); Rodovia Itabuna–Camacan, 12 km L de Itabuna, 8 April 1965, *R.P. Belém & M. Magalhães 719* (IAN, K, NY).

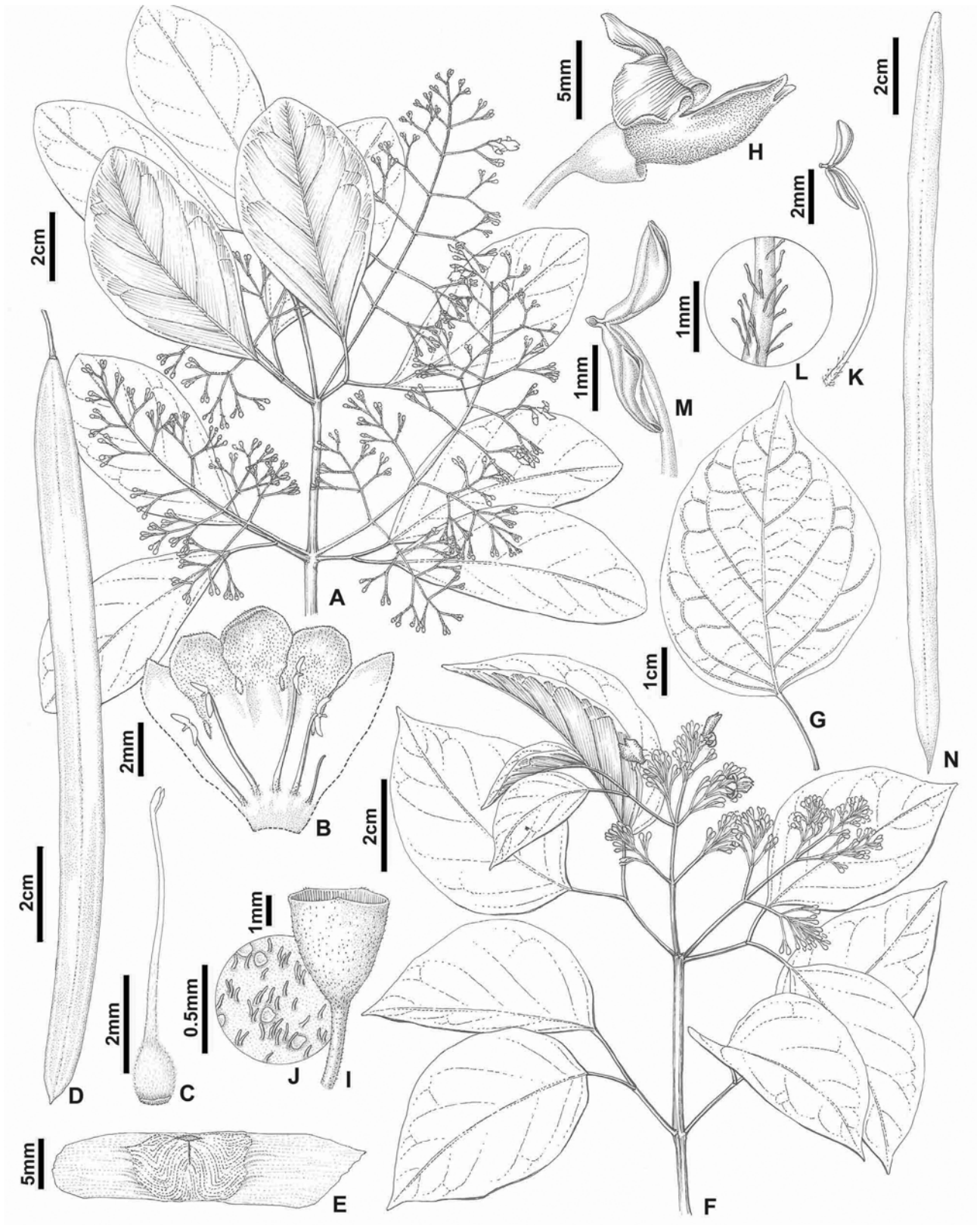


FIGURE 1. A–E. *Tynanthus cognatus*: A. Flowering branch; B. Open corolla showing the androecium; C. Gynoecium (D.A. Folli 1795, SPF); D. Fruit; E. Seed (J.S. Carneiro 161, FUEL). F–N. *T. croatianus*: F. Flowering branch; G. Leaflet; H. Flower; I–J. Calyx with patelliform glands; K–M. Stamen with stipitate trichomes at the base of filaments and curved thecae (S. Knapp 1053, NY); N. Fruit (A.H. Gentry 6696, NY). Illustration by Klei Sousa.

Rodovia Banco Central a Gongogi, 17 March 1971, *Raimundo S.P. 1163* (RB). Ilhéus, Área do CEPEC (Centro de Pesquisas do Cacau), km 22 da Rodovia Ilhéus–Itabuna (BR-415)?, 50 m, 17 February 1982, *J.L. Hage 1641* (K, MO); CEPLAC, Quadra “D”, Matinha das Preguiças, 1 August 2007, *R.O. Perdiz et al. 84* (SPF). Jussari, RPPN Serra Teimoso, entrada 7.5 km da Rodovia Jussari–Palmira, Fazenda Teimoso, 1.7 km da entrada, 26 January 2006, *J.L. Paixão et al. 684* (SPF). Marauá, 13 January 1967, *R.P. Belém & R.S. Pinheiro 3129* (K, MO, NY). Una, Rodovia São José–Una, ca. 9 km da rodovia BR-101, 18 March 1999, *J.G. Jardim et al. 2063* (SPF). **Espírito Santo:** Conceição do Castelo, Alto Bananal, 6 November 1986, *G. Hatschbach & J.M. Silva 50691* (MBM, MO). Itapemerim, Fazenda do Ouvidor, Usina Paineiras, acesso pela Rodovia ES-490, entrada à esquerda, 2.5 km após o trevo da SAFRA, em direção a Marataízes, 29 December 2007, *A.M. Assis et al. 1292* (SPF). Linhares, Reserva Natural da Companhia Vale do Rio Doce, Estrada 243, 31 January 1985, *A. Peixoto et al. 3037* (MO); *Ibid.*, 2 February 1985, *A. Peixoto et al. 3404* (MO, NY); *Ibid.*, 2 February 1985, *A. Peixoto et al. 3406* (F photo, K, MO, NY); *Ibid.*, 20 m, 14 September 1987, *A.H. Gentry et al. 59208* (MO); *Ibid.*, Aceiro com a LASA, próximo à estrada Gonçalo Alves, 18 January 1993, *D.A. Folli 1795* (CVRD, SPF, US); *Ibid.*, Próximo ao aceiro com a Lasa, 14 June 1993, *D.A. Folli 1898* (CVRD, SPF); *Ibid.*, 150 m, 15 July 2001, *L.G. Lohmann & B. Whitney 663* (CVRD, MO); *Ibid.*, at the end of the road “Peroba Amarela”, 150 m, 17 July 2001, *L.G. Lohmann et al. 680* (CVRD, MO); *Ibid.*, Aceiro com Catelã Jueirana, Estrada Orelha de Macaco, km 2.4, 17 December 2001, *D.A. Folli 4148* (CVRD, SPF); *Ibid.*, Estrada Municipal do Canto Grande, próximo à entrada da cabana Martinelli, 32 m, 2 May 2008, *A.R. Zuntini et al. 241* (CVRD, MO, RB); *Ibid.*, Estrada Municipal Canto Grande, 36 m, 6 January 2009, *D.A. Folli 6274* (CVRD); *Ibid.*, Estrada Flamengo, após o cruzamento com a Gonçalo Alves, 40 m, 28 January 2014, *M.C. Medeiros & R.B. Louzada 42* (CVRD, SPF); próximo à Reserva Natural da Companhia Vale do Rio Doce, Projeto 1, córrego da Jacutinga, APP da Aracruz, 37 m, 2 May 2008, *A.R. Zuntini et al. 240* (MO, RB). Pinheiros, Reserva Biológica Córrego do Veado, 9 May 2008, *D.A. Folli 6021* (CVRD). Santa Leopoldina, Distrito de Mangaraí, Cachoeira do Retiro, 2 October 2005, *M.O.S. Crepaldi 54* (RB). Santa Teresa, Vale do Canaã, 800–850 m, 1 February 1969, *D. Sucre & P.I.S. Braga 4576* (MO, RB); Várzea Alegre, Cachoeira do Magdalon, 26 October 2000, *V. Demuner et al. 1510* (SPF). Sooretama, Estrada Municipal Canto Grande, próximo à Reserva Natural da Companhia Vale do Rio Doce (“Reserva de Linhares”), 34 m, 13 December 2007, *A.R. Zuntini et al. 147* (CVRD, SPF). **Minas Gerais:** Sin loc., 1845, *Widgren s.n.* (BR, P barcode 3606716). Sin loc., Campos da Mantiqueira, perto do vale do Rio Verde, January 1885, *J. Saldanha s.n.* (R 128076). Caldas, 1868, *S. Henschen s.n.* (US 201385). Coronel Pacheco, 3 March 1943, *E.P. Heringer 1176* (RB); Água Limpa, 10 December 1946, *E.P. Heringer 2519* (SP). Faria Lemos, Fazenda Santa Rita, 600 m, 6 February 2000, *L.S. Leoni & A.E. Silva 4366* (MO). Monte Belo, Fazenda Lagoa, 800 m, 6 September 1987, *A.H. Gentry et al. 59095* (MO, UEC); *Ibid.*, 6 September 1987, *A.H. Gentry et al. 59101* (MO, UEC); *Ibid.*, 6 September 1987, *M.C.W. Vieira 1235* (RB). Poços de Caldas, Fazenda Chiqueirão, 3 December 1981, *H.F. Leitão Filho et al. 1583* (BHCB, FUEL, UEC). Tombos, Fazenda da Cachoeira, 12 July 1935, *M. Barreto 1563* (MO, R). **Paraná:** Antonina, Sapitanduva, 18 January 1974, *G. Hatschbach 33671* (M, MO, SPF, UEC, US). Apucarana, Parque da Raposa, 22 February 2005, *J.S. Carneiro et al. 297* (FUEL). Arapongas, Fazenda do Bule, 22 June 1999, *D.A. Estevan et al. 89* (FUEL, VIC). Cerro Azul, Cabeceira do Ribeirão do Tigre, 8 December 1983, *G. Hatschbach 48829* (MO, US). Fênix, Parque Estadual Vila Rica do Espírito Santo, 11 December 1998, *M. Borgo & S.M. Silva 349* (NY, UPCB). Ibioporã, Chácara Alcides Pelisson, Água Tucano, 28 May 1989, *A. Pelisson & F.M.E. Longhi s.n.* (FUEL 7382); Fazenda Doralice, 1 December 1995, *M.C. Dias et al. 21* (FUEL). Jaguariaíva, 740 m, 13 January 1915, *P. Dusén 16341* (F, K, NY). Jundiá do Sul, Fazenda Monte Verde, 16 December 1999, *J. Carneiro 848* (SPF); *Ibid.*, Mata do Cruzeiro, 14 January 2000, *G. Hatschbach et al. 69944* (SPF); Mata do Cruzeiro, 3 March 2003, *J. Carneiro 1393* (MBM). Londrina, Parque Municipal Arthur Thomas, 19 December 1984, *M.I.O.J. Neves et al. s.n.* (FUEL 523); *Ibid.*, 13 March 1986, *A.C. Amorin s.n.* (MO 3386506); *Ibid.*, Trilha da Capivara, 520 m, 13 October 2011, *M.C. Medeiros & E.F. Rossetto 33* (SPF); Floresta dos Irmãos Godoy, 21 August 1985, *L.A.C. Rodas et al. 8* (FUEL); *Ibid.*, 28 November 1985, *F.C. Silva et al. 950* (FUEL); *Ibid.*, 20 March 1986, *L.N. Pizzaia et al. 45* (FUEL, MO); *Ibid.*, 14 January 1989, *L.H.S. Silva & F.C. Silva 170* (FUEL, K, MBM, UPCB); *Ibid.*, 9 July 1997, *R. Iríó & L. Lima 194* (UFACPZ); *Ibid.*, 16 July 1997, *V.F. Kinupp et al. 1630* (FUEL); Mata do IAPAR, 30 June 1988, *L.A. Volpato s.n.* (FUEL 6375, HRCB 34681); Paiquerê, 6 February 1997, *V.F. Kinupp et al. 230* (FUEL); Fazenda Figueira-Paiquerê, Fragmento 16, 19 February 2003, *M.C. Lovato et al. 388* (FUEL, R); *Ibid.*, Fragmento 16, 19 February 2003, *M.C. Lovato et al. 400* (ESA, FUEL, MBM); *Ibid.*, 19 February 2003, *D.A. Estevan s.n.* (HRCB 44200, 44201); *Ibid.*, 2004, *J.S. Carneiro et al. 164* (FUEL, HRCB); *Ibid.*, Fragmento 2, 2 April 2004, *J.S. Carneiro et al.*

162 (FUEL); *Ibid.*, Fragmento 2, 13 April 2004, *J.S. Carneiro* 163 (FUEL, R); *Ibid.*, Fragmento 19, 15 June 2004, *J.S. Carneiro et al.* 161 (FUEL); *Ibid.*, Fragmento 2, 22 June 2004, *J.S. Carneiro et al.* 173 (FUEL); *Ibid.*, Fragmento 1, 1 July 2004, *J.S. Carneiro et al.* 167 (FUEL). Ortigueira, Futuro eixo da Barragem, margem esquerda do Rio Tibagi, 30 October 2008, *M. Kaehler* 338 (MBM, UPCB). Ribeirão do Pinhal, Fazenda São Pedro, 11 February 2001, *J. Carneiro* 1068 (SPF). Rolândia, December 1936, *G. Tessmann* 6001 (MBM, SP). São Jerônimo da Serra, 22 December 1999, *C. Medri et al.* 305? (FUEL 29356). São Pedro do Ivaí, 23 January 1991, *F. Barros* 2112 (SP); Fazenda Santa Bárbara?, 18 December 2003, *O.S. Ribas et al.* 5668 (G, K, MBM, MO, RB, SPF). Telêmaco Borba, Rio Tibagi, próximo à ponte, 12 December 1996, *V.F. Kinupp et al.* 75 (FUEL, HRCB, SPF); Margem da estrada de acesso ao eixo da Barragem, 680 m, 22 September 2008, *M. Kaehler* 276 (MBM). Tereza Cristina (“Theresina”), 27 November 1911, *P. Dusén* 11172 (BM, K, US). Ventania, Fazenda Santo Expedito, 4 May 2004, *D.A. Estevan et al.* 498 (FUEL). **Rio de Janeiro:** Serra Tingua, 1780, *H.W. Schott* 5971 (F). Sin loc., 1830, *L. Riedel s.n.* (BM, G, K, P barcode 3606732). Sin loc., 1831–1833, *Gaudichaud* 559? (P barcode 3606674). Sin loc., 1832, *L. Riedel* 231 (LE). Fazenda do Sobral, 8 September 1881, *A. Glaziou et al.* 12973 (LE, P). Pr. Sumidouro, na Rodovia BR-3, entre Itaipava e Pedro do Rio, 600 m, 10 December 1956, *G.F.J. Pabst* 10319 (RB). E of Rio Bonito, between Niteroi and Silva Jardim, 100 m, 19 January 1985, *A.H. Gentry & E. Zardini* 49709 (MO); *Ibid.*, *A.H. Gentry & E. Zardini* 49727 (MO). Cabo Frio, Parque Ecológico Municipal do Mico-Leão-Dourado, 13 June 2003, *G.S.Z. Rezende et al.* 162 (RB); Casemiro de Abreu, Monte São João, 3 February 1970, *S.P.S. s.n.* (RB barcode 58285). Guapimirim, Parque Nacional da Serra dos Órgãos, trilha do Poço da Preguiça, 410 m, 6 January 2011, *M.C. Medeiros et al.* 28 (SPF). Nova Iguaçu (“Iguassú”), s.d., *Sin col.* 8061 (P barcode 3606667). Petrópolis, Mandioca, 1821–1824, *L. Riedel s.n.* (MO 4618844, NY barcode 483757, NY barcode 1032824); February–March 1823, *L. Riedel s.n.* (LE). Rio de Janeiro, Floresta da Tijuca, Gávea, Caminho do Macaco, 1865?, *A. Glaziou* 2638 (BR, C photo in F, K, P); 8 March 1871, *A. Glaziou* 4719 (P, US); *Ibid.*, Corcovado, 22 May 1870, *A. Glaziou* 4124 (P); 22 May 1870, *A. Glaziou* 4683 (P, US); *Ibid.*, Grande cascade, 24 June 1870, *A. Glaziou* 4692 (P); *Ibid.*, 21 January 1871, *A. Glaziou* 4709 (BM, K, NY, P, US); *Ibid.*, Estrada de Sumare, km 5, 300 m, 19 January 1975, *W. Benson* 45 (MO); Prope hort. bot., 29 November 1888, *W. Schwacke s.n.* (K, R 23784); Mundo Novo, Botafogo, May 1921, *J.G. Kuhlmann s.n.* (R 23803; RB barcode 58297); Gávea, Mesa do Imperador, 10 March 1950, *J.G. Kuhlmann s.n.* (RB barcode 58293; RB barcode 58341; NY barcode 483758); Jardim Botânico do Rio de Janeiro, orla do parque, 13 September 1991, *A.F. Vaz et al.* 949 (RB). Santa Maria Madalena, Mata do Laureano Vicente, 7 March 1934, *S. Lima & Brade* 13194 (R, RB). Teresópolis, Próximo à Fazenda Boa Vista, 12 January 1943, *H.P. Velloso s.n.* (MO 2286403). **Rio Grande do Sul:** Vila Manresa p. Porto Alegre, 25 July 1949, *B. Rambo* 42705 (MO). Caxias do Sul, Santa Lucia do Piaí, 780 m, 27 January 1999, *A. Kegler* 158 (M, MBM, US). Vale do Sol, Linha XV de Novembro, 23 January 1993, *J.A. Jarenkow & D.B. Falkenberg* 2281 (MBM). **Santa Catarina:** Sin loc., June 1868, *F. Müller* 166 (K). Blumenau, Bom Retiro, Mata da Companhia Hering, 350 m, 17 September 1959, *P.R. Reitz & R.M. Klein* 9102 (K, US). Florianópolis, Morro Costa da Lagoa, 300 m, 15 February 1967, *R.M. Klein* 7238 (K, R); Morro da Cutia, Tapera, Ribeirão, 150 m, 20 January 1970, *R.M. Klein & Bresolin* 8542 (K, R). Itajaí, s.d., *F. Müller* 298 (R). Jacinto Machado, Sanga da Areia, 200 m, 13 July 1959, *P.R. Reitz & R.M. Klein* 8936 (K, US); *Ibid.*, 250 m, 27 January 1960, *P.R. Reitz & R.M. Klein* 9424 (BR, F photo, G, K, M, NY, UPCB, US). Lauro Müller, Novo Horizonte, 450 m, 15 January 1959, *P.R. Reitz & R.M. Klein* 8245 (BR, F, G, K, M, NY, SP, US). Luis Alves, Braço Joaquim, 250 m, 13 January 1955, *R.M. Klein* 1054 (K, NY, US). Palhoça, Morro do Cambirela, 300 m, 18 January 1972, *R.M. Klein & Bresolin* 10008 (K). Rio do Sul, 350 m, 31 December 1958, *P.R. Reitz* 6147 (BR, K, NY, US); Serra do Matador, 550 m, 12 March 1959, *P.R. Reitz & R.M. Klein* 8537 (K, US). São Bento do Sul, Braço esquerdo, 417 m, 21 November 2009, *T.J. Cadorin et al.* 799 (SPF). **São Paulo:** Sin loc., 27 November 1871, *J.C. Mello* 51 (US). Sin loc., 25 December 1873, *H. Mosén* 1488 (P). Barretos, Margem do Rio Pardo, November 1917, *A. Sampaio s.n.* (R 23545, RB barcode 66737). Campinas, Barão Geraldo, Santa Genebra Forest Reserve, Transect 3, 550 m, 27 August 1987, *A.H. Gentry & A. Silva* 58727 (MO, UEC); *Ibid.*, Transect 4, 550 m, 27 August 1987, *A.H. Gentry* 58752 (MO, UEC). Ipeúna, Ribeirão Passa-Cinco, 26 January 1984, *A. Furlan* 175 (HRCB). Marília, Estação Experimental, 14 January 1993, *G. Durigan* 30691 (UEC). Rio Claro, Fazenda São José, 15 November 2000, *R. Udulutsch & M.A. Assis* 101 (HRCB); *Ibid.*, trilha que atravessa o fragmento, 20 December 2000, *R. Udulutsch & M.A. Assis* 134 (HRCB). São Paulo, Bosque da Avenida, 17 December 1933, *J.G. Kuhlmann s.n.* (RB barcode 58318); Jardim Botânico, 15 January 1938, *O. Handro s.n.* (SP 43041); *Ibid.*, Trilha Fontes do Ipiranga, 24 October 2006, *B.L.P. Villagra* 225 (SP); Cidade Jardim, 4 January 1944, *W. Hoehne* 1184 (MO, SPF); Serra da Cantareira, Picada Dom Bento, Pedra Grande, 1000 m, 6 January 1953, *F. Markgraf s.n.* (SPSF 4061).

Taxonomic notes:—The morphological similarity between *Tynanthus cognatus* and *T. elegans* has long been noted. Indeed, Chamisso (1832) commented on their overall similarity when those taxa were originally described as *Bignonia cognata* and *B. elegans*, respectively. On the other hand, Chamisso (1832) also noted differences in the type and density of the indumentum encountered in the vegetative and reproductive organs of these taxa, which he considered sufficient to maintain the taxa as separate. However, a detailed analysis of the indumentum of these species along the entire range of distribution of these taxa showed that indumentum density varies geographically. More specifically, the collections from the northern portion of the range (states of Bahia and Espírito Santo) were shown to have glabrescent branches and leaves, while the specimens from the southern portion (states of Paraná and Rio Grande do Sul) are generally densely pubescent to pubescent. Therefore, indumentum variation is not a diagnostic trait and not sufficient to keep those taxa as separate. Furthermore, molecular phylogenetic data (Medeiros & Lohmann 2015) indicated that *T. elegans* is nested within *T. cognatus*, corroborating the synonymization of *T. elegans* in *T. cognatus*.

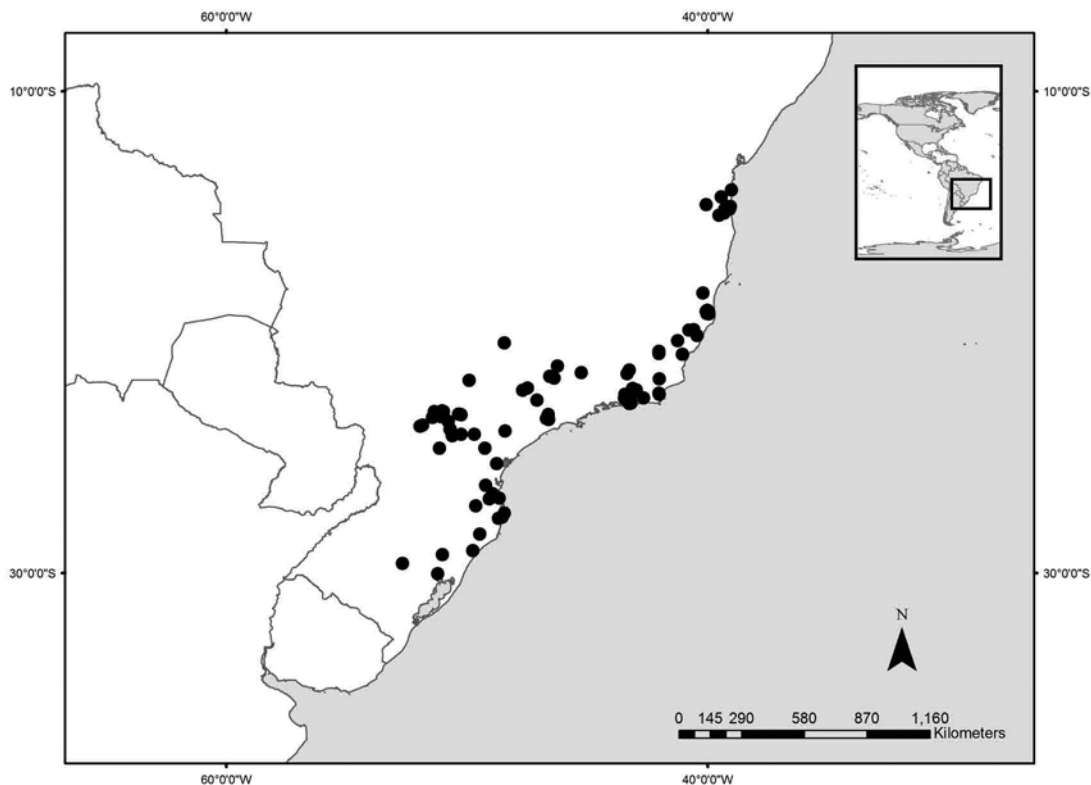


FIGURE 2. Distribution of *Tynanthus cognatus*.

Tynanthus cognatus can be easily recognized by its obovate to elliptic leaflets. *Tynanthus pubescens* is the only other species of *Tynanthus* to present this feature; however, these species can be separated by the winged fruits of *T. pubescens* (versus unwinged in *T. cognatus*) and Amazonian distribution (versus Atlantic Forest in *T. cognatus*). *Tynanthus cognatus* shares lax inflorescences and unwinged fruits with its sister species *T. polyanthus* (Medeiros & Lohmann 2015). Nevertheless, *T. cognatus* is easily distinguished from *T. polyanthus* by the minute prophylls (versus foliaceous prophylls in *T. polyanthus*) and the inconspicuously tetragonal young branchlets (versus conspicuously tetragonal in *T. polyanthus*).

Nomenclatural notes:—Chamisso (1832) described *T. cognatus* and *T. elegans* based on Sellow's collections. Chamisso's types are deposited at LE (Stafleu & Cowan 1976: 482), but we were not able to locate those materials during two visits to the LE herbarium. The types of *T. cognatus* and *T. elegans* deposited at B were destroyed during the World War II (Hiepko 1987) and are no longer available. Despite that, we were able to access photos of the B types from the F website. The photographed collection of *T. cognatus* was labelled as *Sellow 166* while the photographed collection of *T. elegans* was labelled *Sellow 5596*. Unfortunately, we were unable to locate any duplicates of the *Sellow 166* and *5596* collections in any of the herbaria visited. Instead, we were able to locate a

Sellow unnumbered collection at K that matches the identifications of *T. cognatus* (K barcode 449541). In addition, we were also able to locate two Sellow unnumbered collections at US that had been correctly identified as *Bignonia cognata* (US barcode 125821) and *B. elegans* (US barcode 125825), respectively; these materials are here selected as lectotypes. The calligraphy of the collection US barcode 125821 matches Chamisso's hand writing. The identification of the US barcode 125825 collection was made by Schumann, who worked at B and accessed Chamisso's types kept in that herbarium.

Two syntypes were cited by Bureau (1865) in the protologue of *Schizopsis chimonanthe* (*Luschnath s.n.* and *St. Hilaire Catal. D N° 25*) and four syntypes in the protologue of *S. regnelliana* (*Regnell III-52*, *St. Hilaire Catal. C2 N° 1342*, *Widgren 743*, and *Martius s.n.*). For *S. chimonanthe*, four sheets of the collection *Luschnath s.n.* were located at BR. The duplicate that has a hand-written label with calligraphy that matches Bureau's hand writing, with the identification of *Tynanthus cognatus* is here selected as a lectotype; this material also represents the best quality material from the four duplicates. For *S. regnelliana*, three duplicates of the *Regnell III-52* were located in the S herbarium (cited in the protologue), one dated from 1859 (S 14-19845), one from 1867 (S 14-19860) and one from 1868 (S 14-19863). The only material whose date predates the publication of the protologue of *S. regnelliana* (S 14-19845) is here selected as a lectotype. Additional duplicates of the *Regnell III-52* collection were located in other herbaria (i.e., K!, LE!, MO!, P!, R!, US!); however, Regnell's collection numbering system often reflect individual species and not collections from a single individual and thus, do not represent duplicates of the holotype. We chose one of the Regnell's collections as lectotype because of the good conditions of the material and because the epithet "regnelliana" suggests that this material was described based on a Regnell collection. It is also important to note that a Martius collection, presumably kept at M, was also cited in the protologue of *S. regnelliana*. Unfortunately, we were unable to locate this material. Furthermore, this collection is also cited in the protologue of *Arrabidaea fasciculata* [= *T. fasciculatus* (Vell.) Miers], complicating its identity. This material was thus excluded from the list of syntypes of *T. regnelliana*.

2. *Tynanthus croatianus* Gentry (1971: 93) (as "*Tynnanthus*"). Type:—PANAMA. Panama: Shoreline of broad-mouthed cove NE of Drayton House on Barro Colorado Island, 28 August 1970, *T.B. Croat 11927* (holotype MO! (2016962); isotypes F! (1697804), GH! (barcode 93264) photo, K! (barcode 449552), MO! (2039180, 2042197, 2042198), NY! (barcode 328978), SCZ! (barcode 4087) photo, STRI! (759) photo, US! (barcode 125784)).

Fig. 1: F–N

Lianas. Branchlets tetragonal to terete, without ritidome, finely striated, lenticled to densely lenticled, pubescent to glabrescent, with simple and peltate trichomes; interpetiolar ridge absent (sometimes present); interpetiolar patelliform glands absent; prophylls of the axillary buds 1.3–2.5 mm long, 1–2.5 mm wide, minute, shallowly triangular, pubescent or puberulent to glabrescent throughout, with simple and peltate trichomes. *Leaves* 2–3 foliolated (more commonly 2); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules pubescent throughout surface or only at the upper canalicule, with simple, peltate and patelliform trichomes; petioles (1.4–)1.8–7.5 cm long; petiolules (0.5–)1.1–3.8 cm long; leaflets (3.5–)5–11.4 cm long, (1.4–)3–9 cm wide, membranous to chartaceous (sometimes subcoriaceous), discolor, ovate to elliptic; apex acuminate or caudate, mucronate; base cuneate, obtuse, truncate or subcordate, symmetrical or asymmetrical; margin entire (rarely dentate); the abaxial surface pubescent to glabrescent on and near the veins (sometimes throughout), with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent throughout or only on and near the veins, with simple, peltate and patelliform trichomes; glandular trichomes evenly distributed throughout both surfaces; second venation weak brochidodromous; pocket domatia without trichomes. *Inflorescence* axilar or terminal, a thyse, dense, with corymbose or subcorymbose aspect, (2.3–)3.3–6.5 cm long; axis densely pubescent to pubescent, with simple, peltate and patelliform trichomes; bracts of the inflorescence predominantly caducous, densely pubescent to pubescent throughout, 0.5–1.5 mm long; floral bracts 0.4–0.6 mm long; floral pedicels 1–5 mm long. *Calyx* green, 3–4 mm long, 3–4 mm wide, with transversal aperture, minutely 5-denticulate (sometimes truncate), densely pubescent to puberulent throughout outside, with patelliform glands; lobes 0.1–0.3 mm long. *Corolla* white, 1.2–2 cm long, 4–7 mm wide at the tube opening; tube 5–9 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 1–3 mm long, 1–4 mm wide, acute to obtuse; lower ones 3–7 mm long, 3–5.5 mm wide, obtuse to

rounded. *Androecium* with fertile stamens inserted ca. 2 mm from the base of the corolla; shorter ones 7–9(–10) mm long; longer ones 8–10(–12) mm long; anthers thecae 1.4–1.9 mm long, obovate to elliptic, subexserted; connective extending 0.2–0.3 mm beyond anther attachment; staminode 4–5 mm long, glabrous. *Gynoecium* 13–15(–17) mm long; ovary 1.5–2 mm long, 0.8–1.1 mm wide, conical, densely pubescent; style 11–13 mm long, tomentose to pubescent at the base. *Fruit* a linear flattened capsule, 16–37 cm long, 0.7–1.2 cm wide, coriaceous to woody, smooth to granular near the midvein and granular near the margins, without lenticels to densely lenticelled, densely pubescent to pubescent, with simple and peltate trichomes; central ridge single, slightly or not prominent; margins slightly raised (unwinged), 0.1–0.3 cm wide. *Seeds* body 1.1–1.9 cm long, 0.4–0.8 cm wide; wings 0.6–1.1 cm long.

Phenology:—Flowers from July to September and fruits from October to March.

Distribution and habitat:—Occurs in moist broadleaf forests from Colombia (Chocó), Costa Rica (Puntarenas) and Panama (Colón, Darién and Panamá) (Fig. 3).

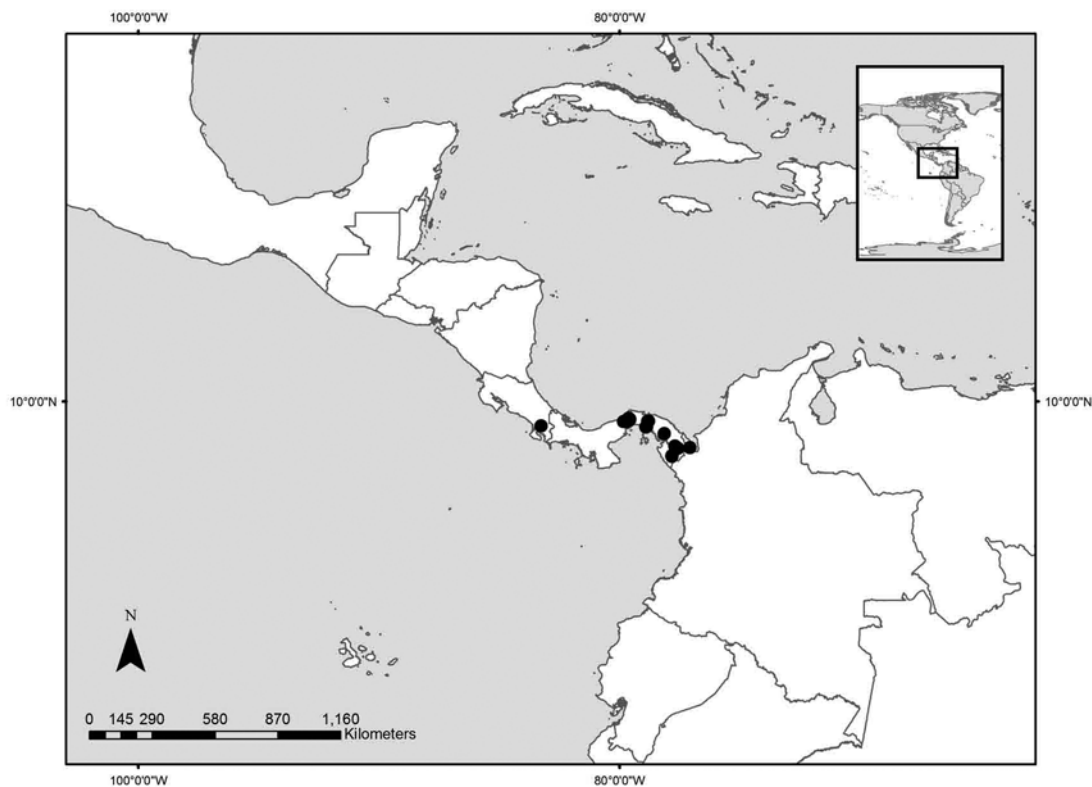


FIGURE 3. Distribution of *Tynanthus croatianus*.

Additional specimens examined:—**COLOMBIA. Chocó:** Trail from Unguia along Rio Tigre toward base of Serrania del Darién, 200–300 m, 16 July 1975, *A.H. Gentry & L.E. Aguirre 15209* (MO). **COSTA RICA. Puntarenas:** Buenos Aires, Rey Curré, Camino a Sabana Mamey, 200–400 m, 16 October 1992, *S. Rojas & L.M. Rojas 102* (F, MO). **PANAMA. Colón:** Ca. 2–3 miles on Pipeline road, north of Gamboa, 0–10 m, 1 September 1981, *S. Knapp 1053* (NY, MO). **Darién:** Rio Balsa, between Manene and Tusijuanda, 26 July 1967, *J.A. Ducke 13544* (3) (MO); 26 July 1967, *J.A. Ducke 13579* (3) (MO). El Real, 3 March 1972, *A.H. Gentry 4538* (BM, MO). Rio Tuira between Boca de Cupe and mouth of Rio Pucro, 12 January 1975, *A.H. Gentry & S. Mori 13527* (F, MO). Santa Fe, s.d., *J.A. Ducke 8396* (1) (MO). **Panamá:** Barro Colorado Island, Gigant Bay, 2 August 1934, *O. Shattuck 1108* (F, MO, US); Shore, east side of Barrunga Peninsula, 27 July 1969, *R. Foster 1178* (F, MO); Drayton House Clearing, 23 November 1970, *T.B. Croat 12681* (F photo, MO, NY); North shore of Gigant Bay, 8 March 1971, *T.B. Croat 13975* (F, MO, NY); Gigant Bay, 5 April 1971, *A.H. Gentry 708* (MO); Vicinity of Laboratory Clearing, fairchild ridge above boatman's house, 19 October 1973, *G. Montgomery 195* (MO); *Ibid.*, near butterfly cage on east bank of Allee Stream in treefall, 24 October 1973, *G. Montgomery 199* (MO). Alhajueta, July 1961, *J.D. Dwyer 1144* (MO). Madden Forest Road at entrance to Boy Scout Road Vine, 27 December 1970, *T.B. Croat 12904* (MO). Boy Scout Camp Road near Madden Lake, 13 October 1971, *A.H. Gentry 2058* (F, MO); 12 July

1972, *A.H. Gentry 5502* (F photo, MO); 100 m, 19 December 1972, *A.H. Gentry 6696* (MO, NY). Mouth of Rio Pasiga near coast in cutover forest, 26 October 1971, *A.H. Gentry 2203* (F, MO). Rio Pasiga to above waterfall on second main fork, 29 October 1971, *A.H. Gentry 2271* (F, MO). First bend of Rio Pasiga, edges of clearing around Indian's house, 1 November 1971, *A.H. Gentry 2365* (MO, NY). 0 to 4 km from Río Bayano crossing on road to Santa Fé, 26 January 1972, *A.H. Gentry 3875* (MO). Near archeological site at edge of Madden Lake, 9 April 1972, *A.H. Gentry 5024* (MO). Along stream ca. 3 miles E of Transisthmian highway on road to Salamanca, 100 m, 19 December 1972, *A.H. Gentry 6723* (MO). Bordeando el Majé, campamento del G.M.I. isla Bayano, 22 August 1976, *C. Garibaldi 225* (MO).

Taxonomic notes:—*Tynanthus croatianus* can be recognized by its ovate to elliptic leaflets and dense inflorescences. These features are also found in *T. densiflorus*, but the occurrence of interpetiolar patelliform glands (versus absent in *T. croatianus*) differentiate these species. *Tynanthus croatianus* is morphologically very distinct from its sister species, *T. guatemalensis*, another species from Central America (Medeiros & Lohmann 2015). Both species share pubescent to glabrescent leaflets but *T. croatianus* can be easily separated by the trifid tendril (versus simple in *T. guatemalensis*), minute prophylls of the axillary buds (versus foliaceous in *T. guatemalensis*), corolla 1.2–2 cm long, 4–7 mm wide (versus 0.5–0.9 cm long, 1.9–3.5 mm wide in *T. guatemalensis*), and unwinged fruit margins (versus winged in *T. guatemalensis*).

3. *Tynanthus densiflorus* M.C. Medeiros & L.G. Lohmann (2014: 79) Type:—BRAZIL. Amazonas: Reserva Florestal Adolpho Ducke, Manaus–Itacoatiara, km 26, 16 August 1996, *L.C. Procópio et al. 14* (holotype INPA! (189631); isotypes G!, K!, MO! (6223709), NY!, RB! (barcode 58359), SP! (341845)).

Fig. 4: A–I

Lianas. Branchlets subtetragonal to terete, without ritidome, finely striated, lenticled to densely lenticled, pubescent to puberulent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands present; prophylls of the axillary buds 0.5–0.8 mm long, 1–2.5 mm wide, minute, shallowly triangular, puberulent throughout, with simple and peltate trichomes. *Leaves* 2–3 foliolated; terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules puberulent to glabrescent throughout surface, with simple and peltate trichomes; petioles 1.8–5.6 cm long; petiolules (0.6–)1.4–3.8 cm long; leaflets (3.2–)5–16.1 cm long, (1.3–)2–9.5 cm wide, membranous to chartaceous (sometimes subcoriaceous), discolor or concolor, ovate; apex caudate, mucronate; base cuneate to truncate or subcordate, symmetrical or asymmetrical; margin entire; the abaxial surface pubescent to puberulent throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; glandular trichomes evenly distributed throughout both surfaces; second venation weak brochidodromous; pocket domatia with (sometimes without) trichomes. *Inflorescence* axilar, a thyrse, dense, with corymbose, subcorymbose or conical aspect, 3–9.5 cm long; axis densely pubescent to puberulent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, densely pubescent to pubescent throughout, 0.5–2.5 mm long; floral bracts 0.4–0.6 mm long; floral pedicels 1–7 mm long. *Calyx* green to grayish, 1.5–2.2 mm long, 1.4–1.9 mm wide, with transversal aperture, truncate or minutely 5-denticulate, densely pubescent to pubescent throughout outside, without patelliform glands; lobes 0.1–0.2 mm long. *Corolla* cream or pale yellow, 0.8–1.5 cm long, 3–5 mm wide at the tube opening; tube 3–5 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at margins of or throughout upper ones; upper ones 0.4–1.4(–2.9) mm long, 0.7–1.5(–2.4) mm wide, acute to obtuse; lower ones 2.1–4 mm long, 2–3.6 mm wide, obtuse to rounded. *Androeceium* with fertile stamens inserted 1.5–2.5 mm from the base of the corolla; shorter ones 3.5–5.5 mm long; longer ones 4.5–7 mm long; anthers thecae 1.1–1.4 mm long, obovate to elliptic, subexserted; connective extending 0.2–0.3 mm beyond anther attachment; staminode 1.5–2.7 mm long, with long and short stipitate trichomes. *Gynoeceium* 7–9 mm long; ovary 1.3–1.5 mm long, 0.7–0.8 mm wide, conical, velutinous; style 5–7 mm long, tomentose at the base. *Fruit* not seen. *Seeds* not seen.

Phenology:—Flowers in August; the fruiting season is unknown.

Distribution and habitat:—Occurs in moist broadleaf forests from Brazil (Amazonas) (Fig. 5).

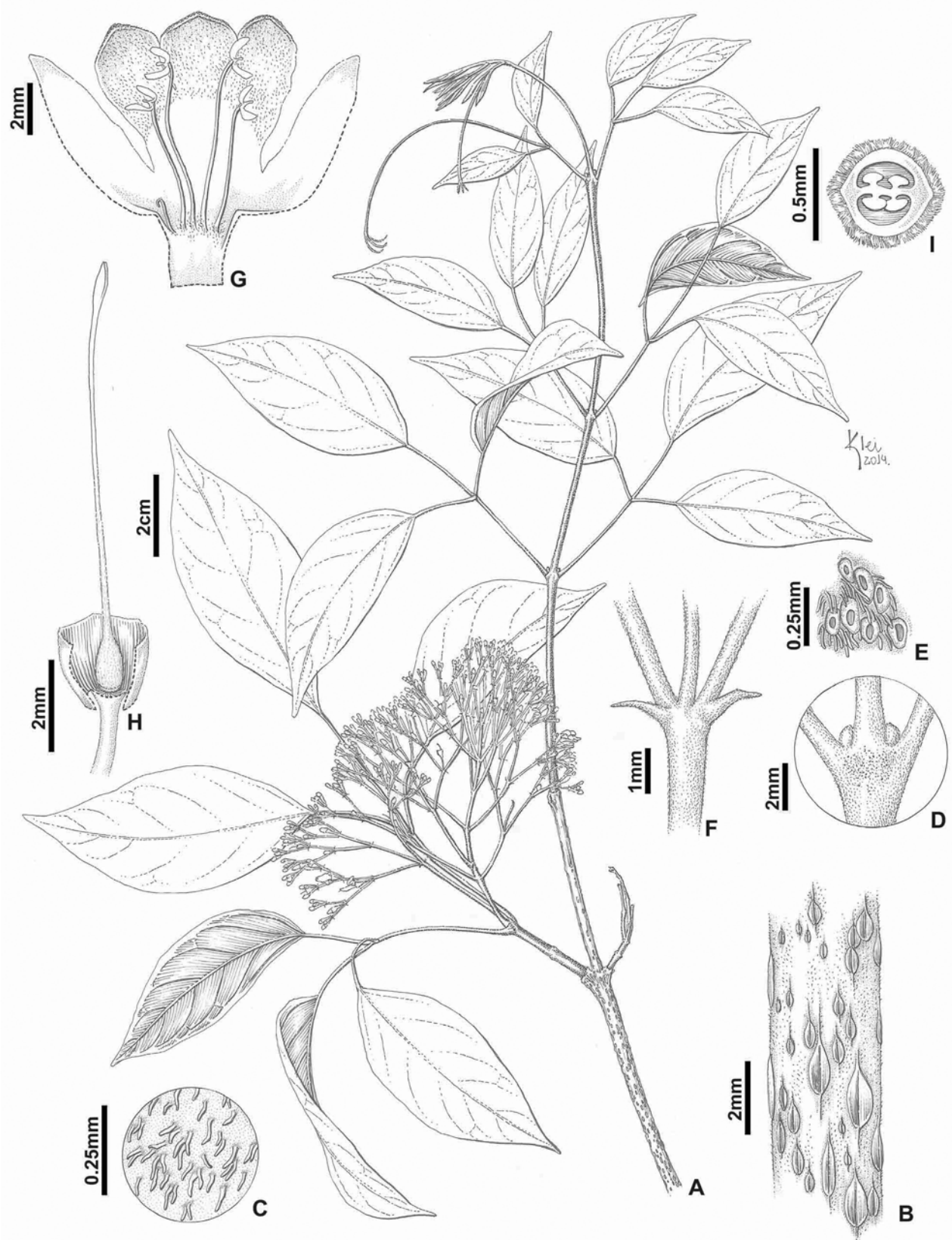


FIGURE 4. *Tynanthus densiflorus*: A. Flowering branch; B. Detail of lenticels in the oldest portion of branchlet; C. Detail of pubescent indumentum in the youngest portion of branchlet; D–E. Interpetiolar glands; F. Detail of inflorescence axis with bracts; G. Open corolla showing the androecium; H. Open calyx showing the gynoecium; I. Ovary cross section showing ovules (L.C. Procópio 14, NY). Illustration by Klei Sousa. Figure from Medeiros & Lohmann (2014).

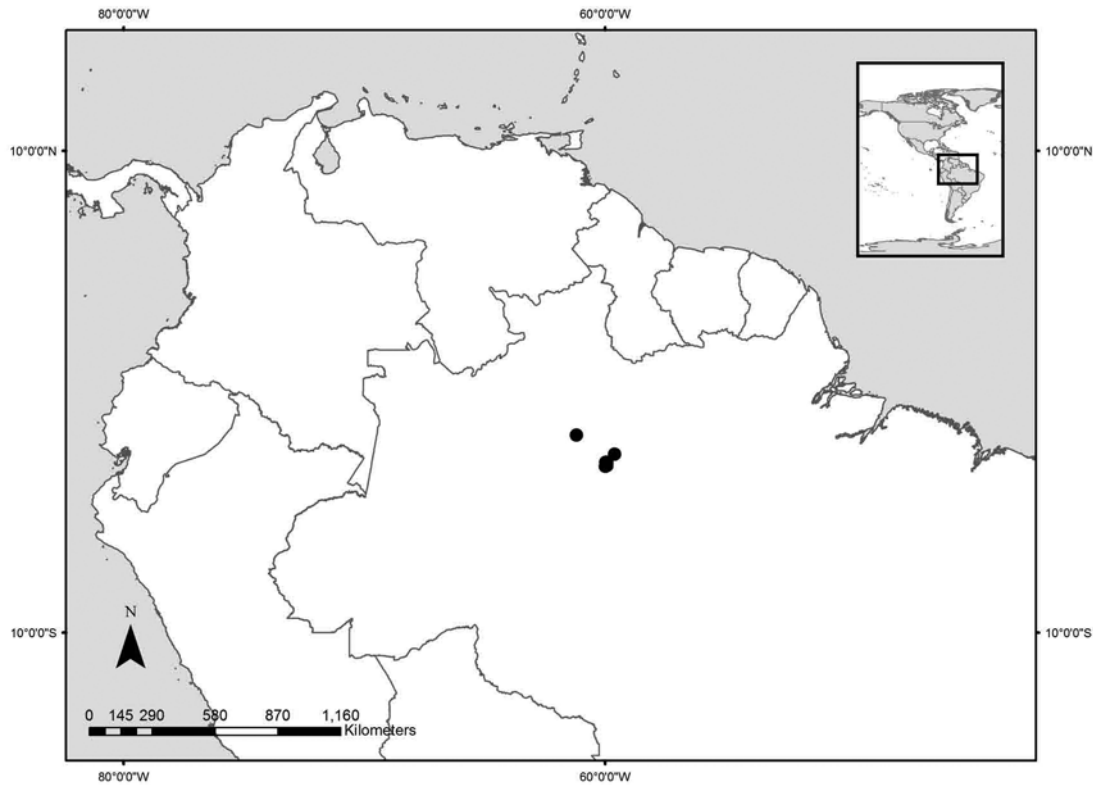


FIGURE 5. Distribution of *Tynanthus densiflorus*.

Additional specimens examined:—BRAZIL. **Amazonas:** 2–5 km N of Manaus–Itacoatiara Road at km 79 near Rio Preto da Eva, 100–200 m, 24 November 1974, *A.H. Gentry 12849* (INPA photo, MG, MO). Rio Camanau, 28 June 1987, *P. Grenand et al. 2787* (INPA). Manaus, Campus of INPA, Estrada do Aleixo, 22 November 1974, *A.H. Gentry 12792* (INPA photo); 30 November 1974, *A.H. Gentry 13018* (INPA, MO); *Ibid.*, Transect vouchers, Line 1, 11 December 1974, *A.H. Gentry 13181* (INPA, MO); Estrada do Aleixo near Manaus, km 6–7 past INPA, 2 December 1974, *A.H. Gentry 13040* (INPA photo, MO); Reserva Florestal Ducke, Parcela PPBio (L03 1000 m), 100 m, 14 December 2010, *M.C. Medeiros et al. 21* (SPF); *Ibid.*, próximo à estação meteorológica, 120 m, 15 December 2010, *M.C. Medeiros et al. 22* (SPF); *Ibid.*, proximidades do refeitório da base da reserva, na beira da estrada, 110 m, 16 December 2010, *M.C. Medeiros et al. 25* (SPF).

Taxonomic notes:—*Tynanthus densiflorus* is characterized by interpetiolar patelliform glands and dense inflorescences, with corymbose, subcorymbose or conical aspect (Medeiros & Lohmann 2014). *Tynanthus densiflorus* is closely related to *T. panurensis* and *T. pubescens* (Medeiros & Lohmann 2015). It shares ovate leaflets and an internally tomentose corolla tube at the base with *T. panurensis*; however, *T. densiflorus* is easily identified by the presence of interpetiolar glands (versus absent in *T. panurensis*), minute prophylls of the axillary buds (versus foliaceous in *T. panurensis*) and dense inflorescences (versus lax in *T. panurensis*) (Medeiros & Lohmann 2014). On the other hand, *T. densiflorus* shares interpetiolar patelliform glands and similar corolla length with *T. pubescens* (i.e., 1–1.6 cm in *T. pubescens* and 0.8–1.5 cm in *T. densiflorus*), but differs by the caudate-mucronate leaflet apices (versus acuminate or obtuse-mucronate in *T. pubescens*) and dense inflorescences (versus lax in *T. pubescens*) (Medeiros & Lohmann 2014).

4. *Tynanthus espiritosantensis* M.C. Medeiros & L.G. Lohmann (2014: 82) Type:—BRAZIL. Espírito Santo: Linhares, Reserva Natural da CVRD, Estrada Oiticica, km 2.3, 6 February 2008, *D.A. Folli 5931* (holotype CVRD! (11073); isotype SPF! (barcode 199170)).

Fig. 6: A–I

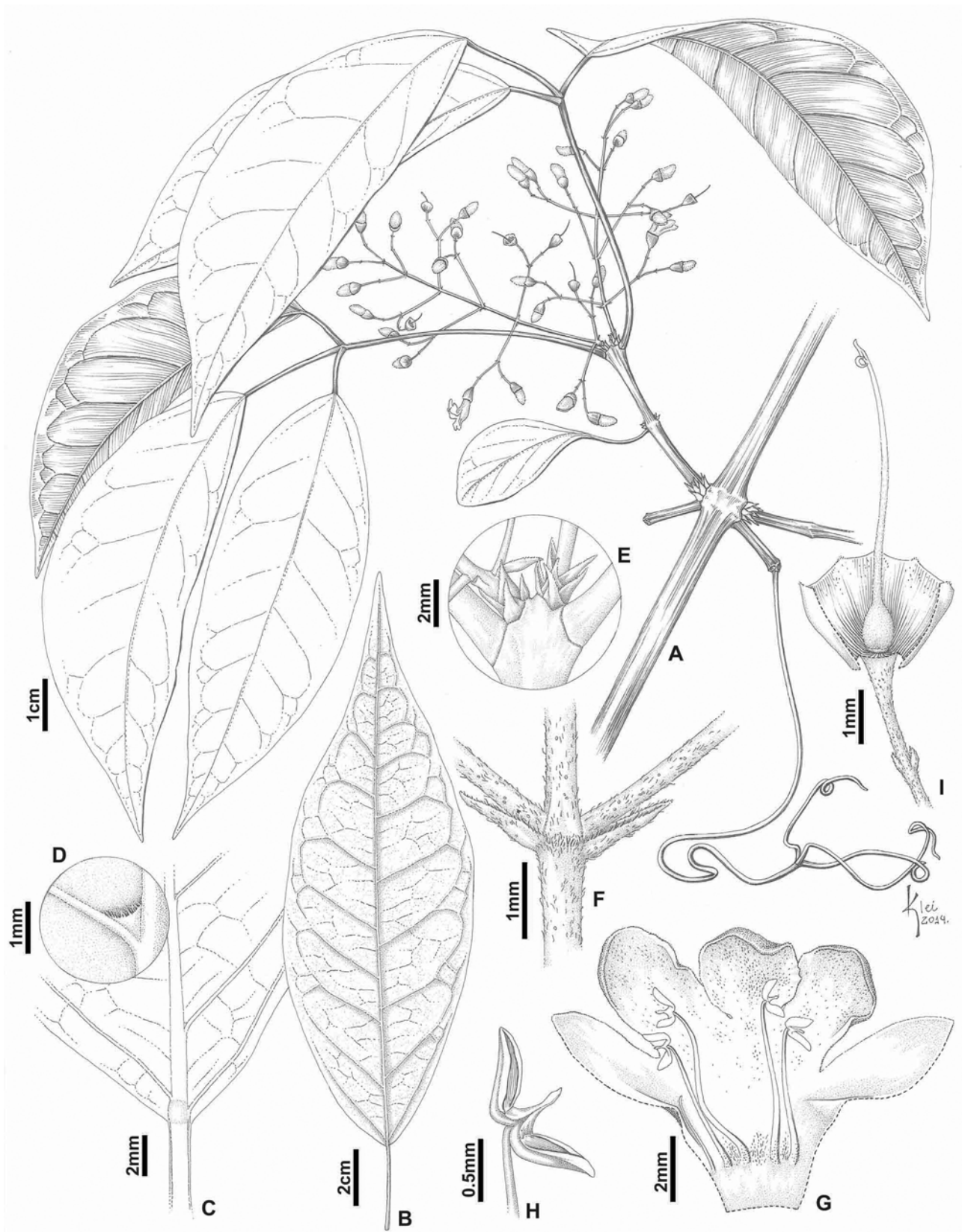


FIGURE 6. *Tynanthus espiritosantensis*: A. Flowering branch; B–D. Leaflet with pubescent domatia in the abaxial surface; E. Interpetiolar region with bromeliad-like prophylls of the axillary buds; F. Detail of the inflorescence axis, showing bracts, simple and peltate trichomes; G. Open corolla showing the androecium; H. Anther; I. Open calyx showing the gynoecium (D.A. Folli 5931, SPF). Illustration by Klei Sousa. Figure from Medeiros & Lohmann (2014).

Lianas. Branchlets tetragonal to terete, with or without ritidome, finely striated, lenticled to densely lenticled, glabrescent (sometimes pubescent at the nodes), with peltate and patelliform trichomes (sometimes also with simple); interpetiolar ridge absent; interpetiolar patelliform glands absent; prophylls of the axillary buds 1.2–2.5 mm long, 0.7–1.1 mm wide, bromeliad-like, glabrescent (rarely puberulent) throughout, with peltate trichomes (rarely also with simple). *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules puberulent throughout surface, with simple and peltate trichomes; petioles 1–6 cm long; petiolules 0.5–3.5 cm long; leaflets (4–)5–11.9 cm long, (1.5–)1.9–5.4 cm wide, membranous to chartaceous, discolor, elliptic; apex acuminate or caudate, mucronate; base cuneate, symmetrical; margin entire; the abaxial surface glabrescent (sometimes pubescent) on and near the veins, with peltate and patelliform trichomes (sometimes also simple); the adaxial surface glabrescent on and near the veins, with peltate and patelliform trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia with trichomes. *Inflorescence* axilar, a thyse, lax, with conical aspect, 3.6–7 cm long; axis pubescent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, pubescent throughout or only at margins, 0.7–3.9(–9) mm long; floral bracts 0.5–0.7 mm long; floral pedicels 3.5–9 mm long. *Calyx* green, 2.3–2.7 mm long, 1.8–2.5 mm wide, with transversal (sometimes oblique) aperture, minutely 5-denticulate, glabrescent (sometimes pubescent at teeth) outside, with patelliform glands; lobes 0.1–0.4 mm long. *Corolla* white, 0.7–0.8 cm long, 2.5–3.4 mm wide at the tube opening; tube 2.5–4 mm long, internally tomentose to pubescent at the base or glabrescent, with simple and long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.4–1.1 mm long, 1–1.5 mm wide, acute to obtuse; lower ones 1.8–3.2 mm long, 2.1–2.5 mm wide, obtuse to rounded (sometimes acute). *Androecium* with fertile stamens inserted 1–1.5 mm from the base of the corolla; shorter ones 2.5–3.5 mm long; longer ones 4.5–5 mm long; anthers thecae 0.8–1.1 mm long, obovate to elliptic, subexserted; connective extending 0.2–0.3 mm beyond anther attachment; staminode ca. 2.4 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 4.5–6 mm long; ovary 0.8–1 mm long, 0.7–0.9 mm wide, conical, velutinous; style 3.3–5 mm long, tomentose at the base. *Fruit* not seen. *Seeds* not seen.

Phenology:—Flowers from December to February; the fruiting season is unknown.

Distribution and habitat:—Occurs in moist broadleaf forests from Brazil (Espírito Santo) (Fig. 7).

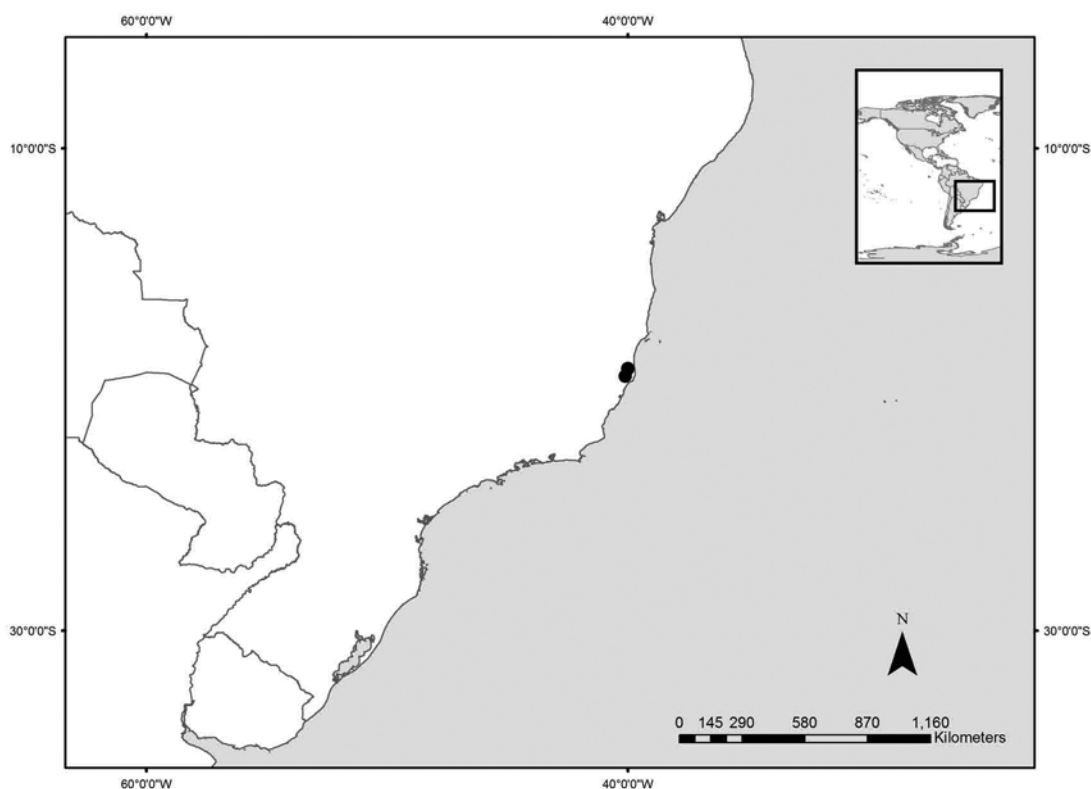


FIGURE 7. Distribution of *Tynanthus espiritosantensis*.

Additional specimens examined:—BRAZIL. **Espírito Santo:** Linhares, Rancho Alto, 7 December 1984, *G. Hatschbach & J.M. Silva 48693* (MBM, MO, US); Reserva Natural da CVRD, Estrada Oiticica, próximo à porteira, antes do cruzamento com a estrada municipal, 53 m, 27 January 2014, *M.C. Medeiros & R.B. Louzada 41* (CVRD, SPF).

Taxonomic notes:—*Tynanthus espiritosantensis* shares bromeliad-like prophylls of the axillary buds, glabrescent elliptic leaflets, corolla tube internally tomentose at base and lax inflorescences with *T. schumannianus*. Nevertheless, *T. espiritosantensis* is easily separated by the pubescent leaflet domatia (versus glabrous domatia in *T. schumannianus*), lack of patelliform glands in the petioles, petiolules and inflorescence axis (versus presence of patelliform glands in *T. schumannianus*) and larger calyx, with $2.3\text{--}2.7 \times 1.8\text{--}2.5$ mm (versus smaller calyx, with $1\text{--}2 \times 1.1\text{--}1.9$ mm in *T. schumannianus*) (Medeiros & Lohmann 2014). Additionally, *T. espiritosantensis* occurs in the Atlantic Forest of Espírito Santo, while *T. schumannianus* is an Amazonian species. Apart from their morphological similarity, *T. espiritosantensis* and *T. schumannianus* are also closely related, belonging to a clade that also contains *T. fasciculatus*, *T. labiatus* and *T. micranthus*, all distributed through the Atlantic Forest (Medeiros & Lohmann 2015).

5. *Tynanthus fasciculatus* (Vell.) Miers (1863: 193). *Bignonia fasciculata* Vellozo (1825: 247; 1827: tab. 25). *Arrabidaea fasciculata* (Vell.) de Candolle (1845: 185). *Cuspidaria fasciculata* (Vell.) Sonder (1849: 560). *Schizopsis fasciculata* (Vell.) Bureau (1865: 379). Lectotype (designated by Lohmann, in Lohmann & Taylor 2014: 468):—Fl. Flumin. Icones 6: tab. 25. 1827.

Fig. 8: A–F

Lianas. Branchlets tetragonal to terete, with or without ritidome, finely striated, densely lenticled, tomentose to pubescent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands absent; prophylls of the axillary buds 0.7–1.5(–2.2) mm long, 0.5–1.2(–1.5) mm wide, minute, shallowly triangular to triangular, tomentose to pubescent throughout, with simple and peltate trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules tomentose to pubescent throughout surface, with simple and peltate trichomes; petioles (0.5–)1.2–5.5 cm long; petiolules (0.4–)0.6–3.4 cm long; leaflets (3.3–)4.3–11.7 cm long, (1.2–)2–7.5 cm wide, membranous to chartaceous (sometimes subcoriaceous), discolor or concolor, elliptic; apex acuminate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface tomentose to pubescent throughout or only on and near the veins, with simple and peltate trichomes; the adaxial surface tomentose to pubescent throughout or only on and near the veins, with simple and peltate trichomes; glandular trichomes evenly distributed throughout both surfaces; second venation weak brochidodromous; pocket domatia with trichomes. *Inflorescence* axilar or terminal, a thyrse, dense, with corymbose or subcorymbose aspect, (2–)3.1–4.5 cm long; axis tomentose, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, tomentose throughout, 1–3.5 mm long; floral bracts 0.6–1.4 mm long; floral pedicels 1.5–6 mm long. *Calyx* green to reddish, 2.5–4 mm long, 2–3.5 mm wide, with transversal (sometimes oblique) aperture, 5-laciniate, tomentose or densely pubescent throughout outside, with patelliform glands; lobes 0.6–3 mm long. *Corolla* white, cream or pale yellow, 1.2–2.2 cm long, 4–7 mm wide at the tube opening; tube 5–11 mm long, internally tomentose to pubescent at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.7–2.8 mm long, 1–3.3 mm wide, acute to obtuse; lower ones 4–5.2 mm long, 2.5–5.2 mm wide, acute, obtuse or rounded. *Androecium* with fertile stamens inserted 2.5–3 mm from the base of the corolla; shorter ones 7.5–8.5 mm long; longer ones 9–10 mm long; anthers thecae 1.4–1.7 mm long, obovate to elliptic, subexserted; connective extending 0.4–0.6 mm beyond anther attachment; staminode 2.3–2.8 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 12–13 mm long; ovary 1.5–2 mm long, 0.9–1.3 mm wide, conical, velutinous; style 10–12 mm long, tomentose at the base. *Fruit* a linear flattened to subtetragonal capsule, 11–39.5 cm long, (0.5–)0.8–2 cm wide, woody, smooth to granular near the midvein and granular near the margins, without lenticels to densely lenticled, tomentose to pubescent, with simple, peltate and patelliform trichomes; central ridge single, prominent (sometimes not); margins prominently raised (winged), 0.2–0.7 cm wide. *Seeds* body (0.7–)1–2 cm long, (0.4–)0.6–1 cm wide; wings (0.3–)0.5–1.2 cm long.

Phenology:—Flowers from September to December and produces fruits from February to October.

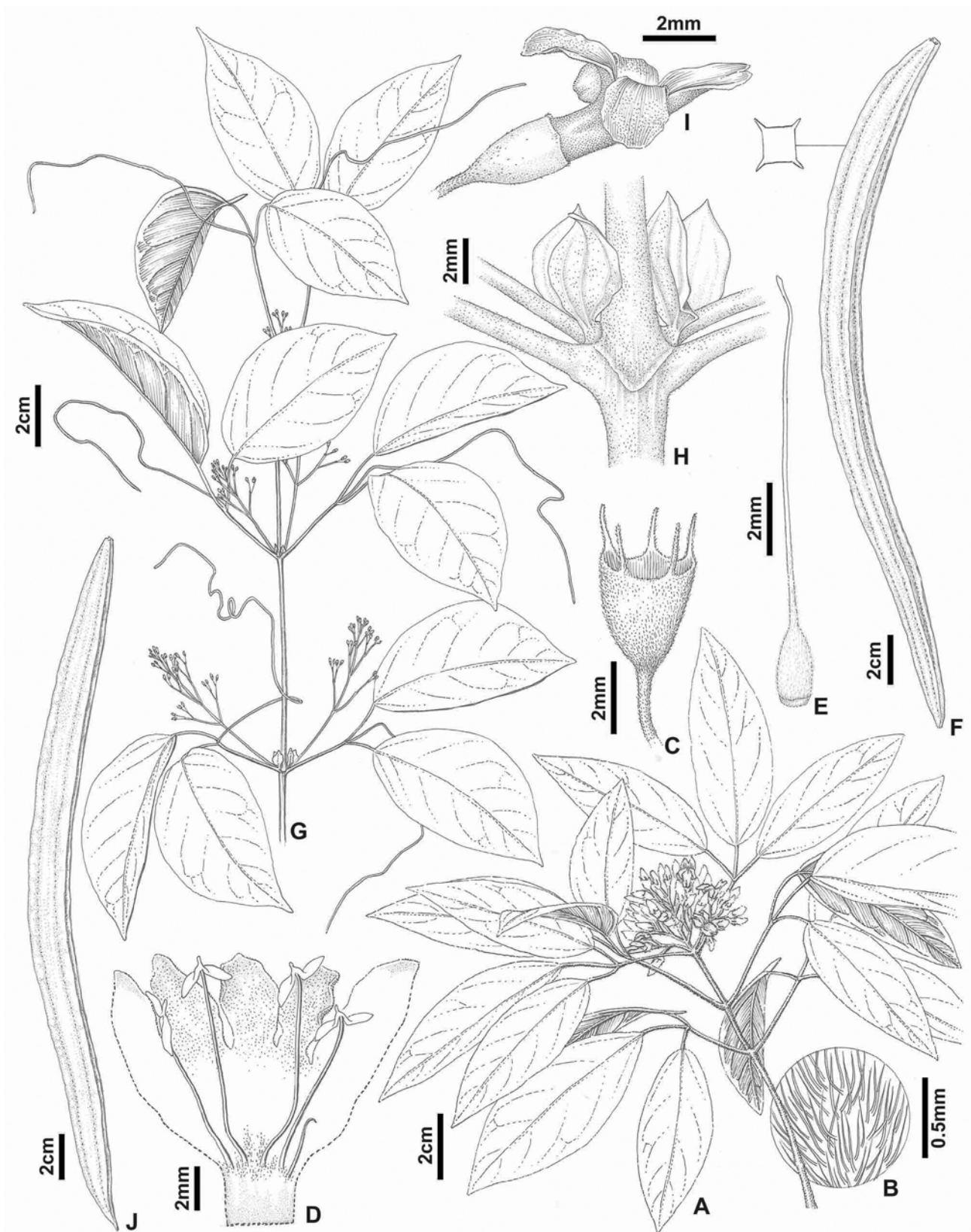


FIGURE 8. A–F. *Tynanthus fasciculatus*: A. Flowering branch; B. Detail of tomentose indumentum in branchlets; C. Calyx with lacinate apex; D. Open corolla showing the androecium; E. Gynoecium (G. Edwall s.n., F 896072); F. Fruit showing the subtetragonal cross section (M. Barreto 1824, F). G–J. *T. guatemalensis*: G. Flowering branch; H. Interpetiolar region showing the foliaceous prophylls of the axillary buds; I. Flower (E. Contreras 8517, F); J. Fruit (P.H. Gentle 7775, F). Illustration by Klei Sousa.

Distribution and habitats:—Occurs mainly in moist broadleaf forests, although a few populations are known to occur in savanna areas from Eastern Brazil (Minas Gerais and São Paulo) (Fig. 9).

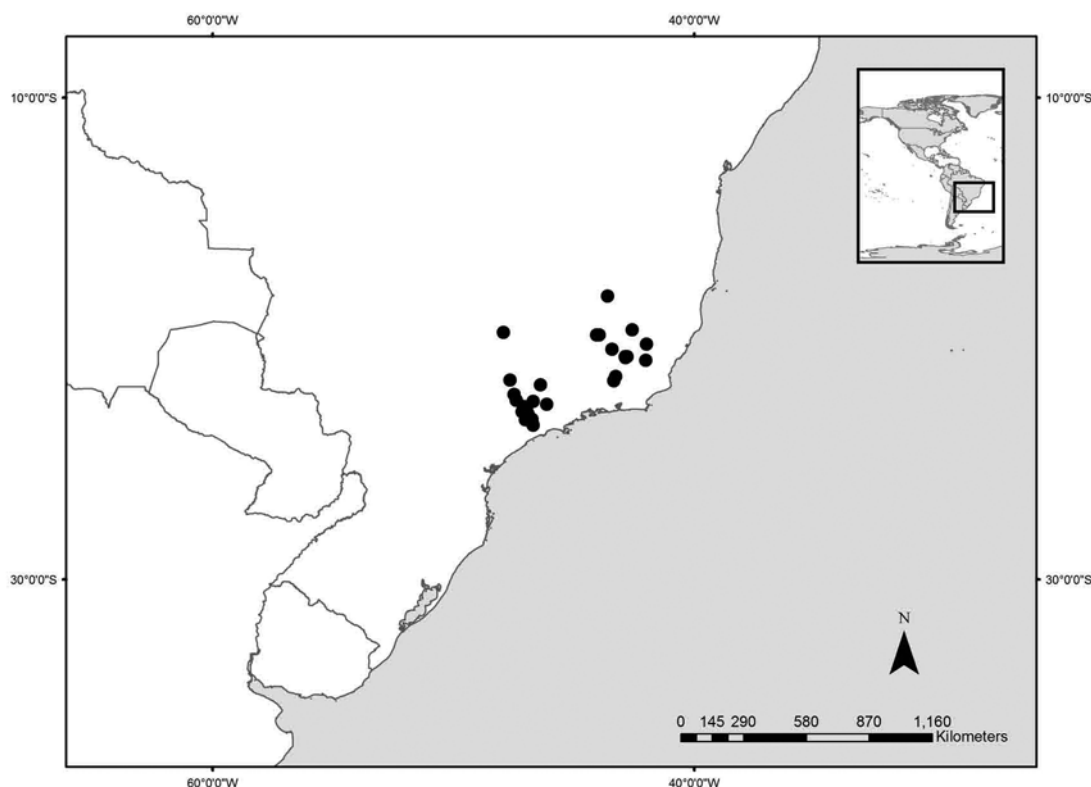


FIGURE 9. Distribution of *Tynanthus fasciculatus*.

Additional specimens examined:—BRAZIL. Sin loc., s.d., *Araujo?* 11364 (P barcode 3606710). Sin loc., s.d., *J.S. Blanchet s.n.* (BM). Sin loc., s.d., *J.C. Mello s.n.* (NY barcode 483766, US 2515368). Sin loc., s.d., *Widgren 243* (BM). Sin loc., 1 September 1866, *J.C. Mello 8a* (K, P barcode 3606703). Sin loc., 18 October 1866, *J.C. Mello 8β* (P barcode 3606704). Sin loc., 1 October 1867, *J.C. Mello 8γ* (K, MO 3395613, P barcode 3606705, US 2515615). **Minas Gerais:** Sin loc., s.d., *A.F. Regnell II-198* (MO 3395612). Sin loc., 1845, *Widgren s.n.* (BR, MO 2698894, MO 3395608, P barcode 3606700). Jardim, 20 November 1845, *Widgren 49* (BR). Sin loc., 1845, *Widgren 94* (BR). Sin loc., 18 October 1847, *A.F. Regnell II-198* (K, LE). Sin loc., 19 October 1861, *A.F. Regnell II-198* (R 23787, US 201375). Rio Pardo, 7 July 1866, *A.F. Regnell II-198* (K). Sin loc., 9 September 1866, *A.F. Regnell II-198* (P barcode 3606695). Serra da Concha, 21 September 1867, *A.F. Regnell II-198* (P barcode 3606699); 29 September 1867, *A.F. Regnell II-198* (P barcode 3606698). Campos da Bocaina, 8 September 1879, *A. Glaziou 4692a* (P, US). Perpetua, pres Diamantina, 11 April 1892, *A. Glaziou 19664* (P). Mineração da Itaú, Rodovia Belo Horizonte a Paraopeba, 13 September 1957, *E.P. Heringer s.n.* (RB barcode 58281; RB barcode 58305; MO 2609963). Belo Horizonte, Estação Ecológica UFMG, Trilha J, 6 June 1990, *E.M. Santos et al. s.n.* (F 2170556); 6 June 1990, *E.M. Santos et al. 76* (BHCB); *Ibid.*, 2a. Estação de coleta, trilha J, 10 October 1990, *E. Tameirão Neto 215* (BHCB, F). Caldas, s.d., *A.F. Regnell II-198* (K, MO 2305639, P barcode 3606697, R 23786, US 2515367); 8 September 1845, *A.F. Regnell II-198* (P barcode 3606701); 19 October 1861, *A.F. Regnell II-198* (P barcode 3606694); 21 September 1867, *A.F. Regnell II-198* (BR, M); 1869, *A.F. Regnell II-198* (BR). Camanducaia, Mata dos Mota, 1000 m, 12 October 1999, *R.B. Torres et al. 756* (IAC). Coronel Pacheco, s.d., *E.P. Heringer s.n.* (RB barcode 58310); Estação Experimental, 28 October 1940, *E.P. Heringer 352* (RB, SP, VIC). Juiz de Fora, Serra do 12° RI, 11 November 1964, *S.V. Monteiro 2627* (VIC). Marliérea, Parque Estadual do Rio Doce, Salão Dourado, junto à saída, 15 June 1995, *J.A. Lombardi & L.G. Temponi 793* (BHCB). Mercês, 1840?, *G. Gardner 5030* (BM, K, G, P). Ouro Preto, Parque Estadual do Itacolomi, Trilha da Mata do sibrão, 11 December 2006, *R.S. Araújo et al. 44* (VIC). Reduto, Reduto E.F.L., 12 October 1950, *E.P. Heringer 2656* (NY, RB). Tombos, Fazenda da Cachoeira, 9 August 1935, *M. Barreto 1824* (F, MO, R). Uberaba, 7 July 1860, *A.F. Regnell II-198* (US 1322404). Viçosa, Direction of São Miguel, km 8, Fazenda A. Cocerro, 900 m, 26 June 1930, *Y. Mexia 4802* (BM,

F, G, K, MO, NY, P, US); Mata do Paraíso, 5 December 1935, *J.G. Kuhlmann s.n.* (RB barcode 58468; VIC 2672); *Ibid.*, aceiro, em baixada ca. de 100 m depois da segunda cerca, subindo à esquerda da cancela, 23 October 2002, *M.M.M. Lopes 158* (VIC); 17 February 2003, *M.M.M. Lopes 174* (VIC); UFV, 23 February 1959, *H.S. Irwin 2714* (F photo, K, US); *Ibid.*, Jardim Botânico, 7 October 1962, *M.R.R. Vidal 199* (VIC); 15 October 1979, *A.J. Filho s.n.* (VIC 6393); 15 October 1979, *R.S. Ramalho 1621* (RB); 11 November 2010, *M.C. Medeiros & R.B. Louzada 19* (SPF). **São Paulo:** Sin loc., September 1868, *S. Henschen s.n.* (US 201374). Estrada de Pirapora a Cabreúva, 4 December 1924, *A. Gehrt s.n.* (NY barcode 483765, SP 12903, US 1543120). Caieiras, Terrenos da Cia. Melhoramentos de São Paulo, 27 October 1936, *M. Kuhlmann s.n.* (SP 36635). Campinas, Souza, s.d., *H.M. Souza s.n.* (IAC 20158); 4 May 1866, *J.C. Mello 8* (K, P barcode 3606702); 20 July 1875, *H. Mosén 3960* (MO, P); Barão Geraldo, Santa Genebra Forest Reserve, Betel, Transect 1, 600 m, 4 January 1985, *A.H. Gentry & E. Zardini 49163* (MO); 4 January 1985, *A.H. Gentry & E. Zardini 49173* (MO); *Ibid.*, Transect 2, 550 m, 26 August 1987, *A.H. Gentry & A. Silva 58692* (MO, UEC); *Ibid.*, 550 m, 27 August 1987, *A.H. Gentry & A. Silva 58713* (MO, UEC); *Ibid.*, Transect 5, 550 m, 31 August 1987, *A.H. Gentry 58780* (MO, UEC); *Ibid.*, 550 m, 5 September 1987, *A.H. Gentry 59067* (K, MO, NY, UEC); *Ibid.*, 550 m, 5 September 1987, *A.H. Gentry 59077* (UEC); Sítio São Francisco, 31 January 2000, *T. Spinelli et al. 219* (UEC). Helvetia, 3 November 1943, *D.B.J. Pickel s.n.* (SPF barcode 200750, SPSF 948, US 1564384); *Ibid.*, 10 November 1943, *D.I. Stehle s.n.* (SPSF 1012). Jundiá, E.E. Jundiá, 12 April 1994, *L.C. Bernacci et al. 1* (HRCB, SPF). Limeira, Orla da mata da S.A.F.B, 10 October 1946, *M. Kuhlmann 1278* (US). Rio Claro, Fazenda São José, 24 August 2000, *M.A. Assis et al. 1367* (HRCB); *Ibid.*, 4 October 2000, *R. Udulutsch & V.T. Rampin 57* (HRCB); *Ibid.*, 15 November 2000, *R. Udulutsch & M.A. Assis 112* (HRCB); *Ibid.*, 11 January 2001, *R. Udulutsch & M.A. Assis 169* (HRCB); *Ibid.*, 24 March 2001, *R. Udulutsch et al. 232* (HRCB); *Ibid.*, 24 March 2001, *R. Udulutsch et al. 245* (HRCB); *Ibid.*, 7 October 2001, *M.A. Assis & A.G. Manzatto 1595* (HRCB); *Ibid.*, 30 October 2001, *R. Udulutsch et al. 429* (HRCB); *Ibid.*, 3 October 2003, *M.A. Assis et al. 1666* (HRCB). Santa Rita do Passa Quatro, Parque Estadual de Vassununga, Gleba Maravilha, 17 December 2002, *Y.J.A. Tibiriçá & L.F. Coelho 70* (HRCB). São Paulo, Cidade Jardim, 13 November 1941, *W. Hoehne 804* (G, RB). Serra Negra, October–November 1901, *G. Edwall s.n.* (F 896072, SP 15045).

Taxonomic notes:—*Tynanthus fasciculatus* can be easily recognized by the lacinate calyx that contrasts with the denticulate or truncate calyx apices found in the remaining species of the genus. This species is the only Southern Brazilian species to bear dense inflorescences, with a corymbose or subcorymbose aspect. *Tynanthus fasciculatus* is sister to *T. labiatus*, another Atlantic Forest species (Medeiros & Lohmann 2015), with which it shares winged fruits. However, *T. fasciculatus* can be easily separated by the dense inflorescences (versus lax inflorescences in *T. labiatus*) and the dense indumentum on young branchlets (versus glabrescent branchlets in *T. labiatus*).

6. *Tynanthus guatemalensis* Smith (1893: 6). Lectotype (designated here):—GUATEMALA. Quezaltenango: Banks of Rio Ocosito, April 1892, *J. Donnell Smith 1488* (US! (barcode 125785); isolectotypes GH! (barcode 93265) photo, K! (barcode 449544), M!, NY! (barcode 328979), P! (barcode 468599), US! (barcode 125786)).

Fig. 8: G–J

Lianas. Branchlets tetragonal to terete, with or without ritidome, finely striated, lenticeled to densely lenticeled, pubescent to glabrescent, with simple and peltate trichomes; interpetiolar ridge present; interpetiolar patelliform glands absent; prophylls of the axillary buds 3.5–20 mm long, 2.1–14 mm wide, foliaceous, ovate to elliptic, pubescent or puberulent to glabrescent throughout, with simple, peltate and patelliform trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into simple tendrils, without adhesive-disks on tip; petioles and petiolules pubescent throughout surface, with simple and peltate trichomes; petioles (0.9–)1.5–5.6 cm long; petiolules (0.4–)0.6–3.4 cm long; leaflets (2.5–)3.5–12.2 cm long, (1.2–)1.9–7.9 cm wide, membranous to chartaceous (sometimes subcoriaceous), discolor or concolor, elliptic; apex caudate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface pubescent to glabrescent on and near the veins, with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent on and near the veins, with simple, peltate and patelliform trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia without (sometimes with) trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order (1.5–)2.6–10.5 cm long, second order 0.5–2.1 cm long; axis pubescent, with simple and peltate (sometimes also with patelliform) trichomes; bracts of the

inflorescence caducous or persistent, pubescent throughout (sometimes only at margins), 0.4–3.3 mm long; floral bracts 0.3–0.5 mm long; floral pedicels 1–4 mm long. *Calyx* green, 1.5–2.5 mm long, 1.3–2.5 mm wide, with transversal aperture, truncate or minutely 5-denticulate, pubescent to puberulent (sometimes glabrescent) throughout outside, with patelliform glands; lobes 0.1–0.4(–0.5) mm long. *Corolla* white, cream or pale yellow, 0.5–0.9 cm long, 1.9–3.5 mm wide at the tube opening; tube 2–5 mm long, internally pubescent at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of (sometimes throughout) upper ones; upper ones 0.3–1.8 mm long, 0.6–1.9 mm wide, acute to obtuse; lower ones 1.4–3.1 mm long, 1.6–3.2 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted ca. 1 mm from the base of the corolla; shorter ones 2–4 mm long; longer ones 3–5 mm long; anthers thecae 0.6–1 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.3 mm beyond anther attachment; staminode 1.7–2 mm long, glabrous. *Gynoeceium* 4–6.5 mm long; ovary 1–1.4 mm long, 0.6–0.8 mm wide, conical, densely pubescent; style 3–5 mm long, tomentose to pubescent at the base. *Fruit* a linear flattened capsule, (12.7–)14–38 cm long, 0.8–2.4 cm wide, woody, smooth or granular throughout, without lenticels to densely lenticelled, glabrescent (sometimes pubescent at extremities), with peltate and patelliform trichomes (sometimes also with simple); central ridge single, slightly or not prominent; margins prominently raised (winged), 0.3–0.9 cm wide. *Seeds* body 0.8–2 cm long, 0.5–0.9 cm wide; wings 0.6–1.8 cm long.

Phenology:—Flowers from April to July and produces fruits from August to April.

Distribution and habitat:—Occurs in moist broadleaf forests from Belize (Belize, Cayo, Orange Walk, Stann Creek and Toledo), Guatemala (Alta Verapaz, El Petén, Izabal and Quetzaltenango) and Mexico (Campeche, Chiapas, Quintana Roo, Tabasco and Veracruz-Llave) (Fig. 10).

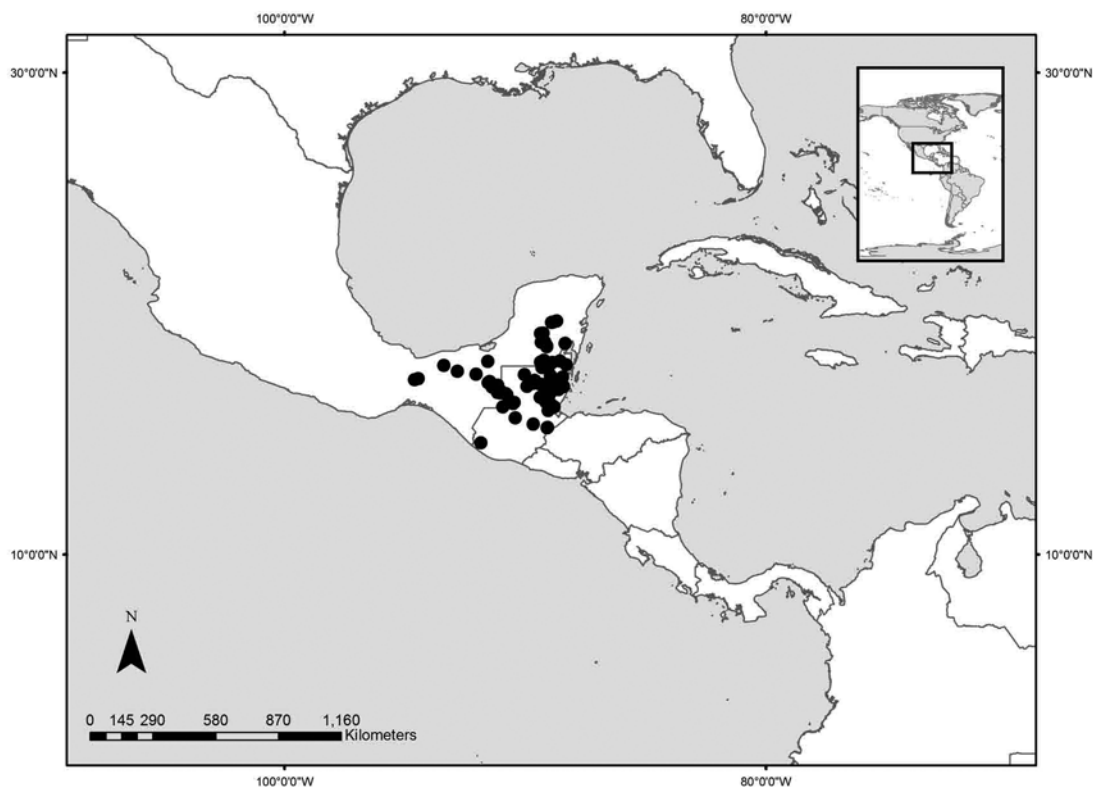


FIGURE 10. Distribution of *Tynanthus guatemalensis*.

Additional specimens examined:—BELIZE. **Belize:** Gracy Rock Bank (“Gracie Rock”), Sibun River, 27 May 1935, *P.H. Gentle 1652* (K, MO, NY, P). Maskall, 25 May 1934, *P.H. Gentle 1324* (F, K, MO, NY, US). South of Yalbac Hills, Terra Nova Medicinal Plant Reserve, 40 m, 11 June 1993, *J.B. Walker & L. Romero 138* (NY). **Cayo:** Cayo village, May 1907, *E. Campbell 112* (K). Arenal–Valentin road, June–August 1936, *C.L. Lundell 6168* (F, NY, US). 53 Miles Section, Humming Bird Highway, 18 June 1956, *P.H. Gentle 9132* (F, K, MO). Maccal River, bridge between Augustine and Cuevas, 7 October 1972, *J.D. Dwyer & R. Pippin 10189* (MO). Vicinity of

Cuevas south of Millionario, 29–30 May 1973, *T.B. Croat 23599* (F, MO, NY). South of Millionario, 1900 ft, 29 May 1973, *A.H. Gentry 7661* (F, INPA, MO, NY, US). Vicinity of Millionario, 1800 ft, 30 May 1973, *A.H. Gentry 7689* (MO, NY); 30 May 1973, *A.H. Gentry 7730* (F, MO, NY). Between Cuevas & Millionario, 30 May 1973, *J.D. Dwyer 10814* (MO, US). Vicinity of Millionario between the McCal River and Cuevas, 1900 ft, 30 May–3 June 1973, *T.B. Croat 23715* (F, K, MO, NY, US). 3 miles S of Grano de Oro, 1700 ft, 2 June 1973, *A.H. Gentry 7755* (F, MO, NY). Vicinity of Grano de Oro lumber camp south of Millionario, 1700 ft, 2 June 1973, *A.H. Gentry 7768* (F, MO, NY). 4 miles south of Grano de Oro on road to La Flor, 2 June 1973, *J.D. Dwyer 10923* (MO, US). Vicinity of La Flor at Rio de La Flor, 6 mi. south of Grano de Oro, 1700–2000 ft, 3 June 1973, *T.B. Croat 23812* (F, MO). Western Highway, near Belmopan, 3 June 1981, *C. Whitefoord 3115* (BM, MO). Monkey Tail track, 450 m, 29 May 1995, *C. Whitefoord 9499* (BM, F, MO). Chiquibul Forest Reserve, San Pastor track, c. 1 km from Las Cuevas, 560 m, 10 June 1996, *A.I. Garcia A68* (BM, MO). Augustine, Rio Frio Caves road, Mountain Pine Ridge Forest Reserve, 460 m, 3 July 1989, *J. Meave & A. Howe 1433* (BM, MO). Valentin, June–July 1936, *C.L. Lundell 6354* (F, NY, US). **Orange Walk:** Mile 58 on Northern Highway, ca. 4 miles south of Tower Hill, 23 June 1973, *A.H. Gentry 8489* (MO). 1.5 km S of Program for Belize Camp, 13 May 1991, *R. Arvigo et al. 502* (NY). Programme for Belize Rio Bravo Research Station, 150 m, 28 May 1997, *D. Lentz et al. 2744* (NY). **Stann Creek:** Stann Creek Valley, Mountain Cow Ridge, 25 March 1940, *P.H. Gentle 3275* (MO, NY, US). Cockscomb Mountains, tributary of Cocoa Branch of Sittee River, 2 km due north of Victoria Peak, 300–500 ft, 5–6 June 1973, *A.H. Gentry 8014* (MO). **Toledo:** Temash River, 200 ft, 7 May 1935, *W.A. Schipp 8910* (F photo); 5 June 1944, *P.H. Gentle 4654* (MO, NY). Near Agua Caliente, near San Antonio, 18 April 1945, *P.H. Gentle 5335* (F, K, MO). Beyond Central Camp, Edwards Road beyond Columbia, 21 May 1951, *P.H. Gentle 7339* (F, K, MO, NY). Broken ridge, Joe Taylor creek, 2 October 1952, *P.H. Gentle 7775* (F, K, MO). 1.5 miles from Maya village of San Jose on road to Columbia Forestry Station, 12 June 1973, *A.H. Gentry 8119* (MO). Mile 13 on road west from Punta Gorda, near junction of Southern Highway and road to San Antonio, 100 ft, 14 June 1973, *A.H. Gentry 8222* (MO). Southwestern Maya Mountains, Columbia River Forest Reserve, Trail between Gloria Camp and Edwards Camp to the South, 15 April 1992, *B.K. Holst 4468* (MO). GUATEMALA. **Alta Verapaz:** Along Río Icvolay between Río Apia and Río Soctelá, 8–10 miles northwest of Cubilgüitz, 200–210 m, 14 March 1942, *J.A. Steyermark 45058* (F). Panzós, Finca Mercedes, Teleman, 70 m, 3 September 1988, *E. Martínez S. et al. 23472* (MO). **El Petén:** Fallabón–Yaxha Road, 22 March 1933, *C.L. Lundell 2193* (F). Carmelita, 1 m south of village, on trail to Flores, 24 June 1942, *F.E. Egler 42-227* (F). Tikal National Park, Tikal, in ramonal on Remate road, 19 May 1959, *C.L. Lundell 15999* (US); *Ibid.*, in zapotal on Remate road, 3 July 1959, *C.L. Lundell 16142* (F, G, NY, US); *Ibid.*, in ramonal covering the ruins, 27 August 1960, *E. Contreras 1467* (F, K, MO, NY). Remate, on Tikal Road, in zapotal, about 12 km NE of the village, 14 May 1960, *E. Contreras 942* (US). Dos lagunas, Ixcantio, on Aguas Turbias Road, 12 km E, in zapotal, 11 May 1969, *E. Contreras 8517* (F). Laguna Yaxja, Banks of Laguna Yaxja and dry wooded hills of limestone to north and south, 160–250 m, 28 June 1970, *W.E. Harmon & J.D. Dwyer 2772* (MO). Dolores, Rio Mopan, 21 February 1971, *E. Contreras 10583* (MO, NY). Santa Elena, en la orilla del camino para San Andrés, a km 17, lado noreste, 25 May 1971, *R.T. Ortíz 1782* (F, MO, NY, US). Ca. 5 miles S of Tikal, logging road 0–4 miles W of road to Tikal, 19 June 1973, *A.H. Gentry 8346* (MO, US). **Izabal:** Trail from Los Amates to Izabal, 31 May 1919, *S.F. Blake 7802* (US). Vicinity of Quiriguá, 75–225 m, 15–31 May 1922, *P.C. Standley 24535* (MO, NY, US). MEXICO. Yucatán, September 1935, *R.S. Flores s.n.* (F 782747). **Campeche:** Calakmul, A 500 m al NW de Dos Naciones, 190 m, 23 October 1997, *E. Martínez S. et al. 29324* (NY); A 5 km al E de La Mancolona, 200 m, 17 November 1997, *E. Martínez S. et al. 29720* (NY); 6.5 km al O de Flores Magón, 153 m, 12 March 2002, *J.C. Soto et al. 22687* (MBM); A 6.7 km al E de La Nueva Vida, 302 m, 13 May 2003, *D. Álvarez 5026* (MO, SPF); A 4.3 km al O del poblado Flores Magón, 182 m, 3 June 2003, *D. Álvarez 5219* (MBM, MO); A 7.6 km al E del poblado "Unión 20 de Junio" (antes la Mancolona), 160 m, 2 August 2003, *D. Álvarez & C. Jiménez J. 6140* (MO). Hopelchén, A 4 km al O del ejido Santa Rosa, sobre el camino al ejido Carlos A. Madrazo, 100 m, 25 September 1996, *P. Alvaro M. 605* (BM, MO); A 2.7 km al S de Chan Chen, 12 June 2004, *D. Álvarez et al. 8957* (MO); A 6.64 km al S de Xmejia, 164 m, 15 June 2004, *D. Álvarez et al. 9199* (MBM, MO). **Chiapas:** Ocosingo, Ruins of Bonampak, 14 March 1975, *W.S. Hoover 244* (MO, US); En el viejo poblado de Jalisco (Selva Lacandona), 350 m, 1 December 1976, *J.I. Calzada et al. 2907* (MO); South of Santo Domingo on road to Bonampak and Echeverria from Chancala, 455 m, 25 January 1982, *D.E. Breedlove & F. Almeida 57938* (MO); Siria, a 62 Km al SE de Palenque, 400 m, 12 May 1982, *M. Sousa et al. 12397* (BM, MO); A 9 km al NW de Boca Lacantum, camino a Crucero Corozal–Palenque, 160 m, 16 October 1984, *E. Martínez S. 8301* (MO); A 5 km al

NO de Crucero Corozal, 170 m, 14 June 1985, *E. Martínez S. & G. Aguilar 15000bis* (MO); Camino a las ruinas de Bonampak, reserva Montes Azules, 10 km NE del poblado de Lacanjá, 200 m, 26 October 1985, *S.S. Colín & G.I. Manriquez 319* (MO); En Ejido Roberto Bárrrios a 60 km al S de Boca Lacantum, camino a Chajul, 200 m, 18 April 1986, *E. Martínez S. 18357* (F, MO); A 15 km al NW de Boca Lacantum, camino a Palenque, 220 m, 12 June 1986, *E. Martínez S. & M.A. Soto A. 18582* (F photo, MO); En Nuevo Chihuahua a 70 km al S de Boca Lacantum, 200 m, 23 June 1986, *E. Martínez S. 18966* (F, MO); Borde del río Lacantún, Estación Biológica de Chajul, 150 m, 2 August 1996, *G.I. Marínquez et al. 4035* (MO); Nuevo Guerrero, 200 m, 11 April 2002, *G. Aguilar M. 472* (MBM, MO); A 0.2 km de Nuevo Jerusalem camino a Nuevo Francisco León, 12 m, 4 May 2002, *G. Aguilar M. et al. 630* (MBM, MO); 4 May 2002, *G. Aguilar M. et al. 685* (MO); A 6.5 km al S de Nuevo Guerrero sobre el camino a Santo Domingo, 400 m, 6 May 2002, *D. Álvarez et al. 961* (M, RB); 0.5 km al S de Nuevo Francisco León (Restaurante El Paraíso), 177 m, 10 May 2002, *J.C. Soto et al. 23490* (M, MO); A 1 km al S de El Paraíso, 325 m, 22 May 2002, *G. Aguilar M. 992* (MO); A 600 m al SO de Nuevo Jerusalém, 340 m, 31 May 2002, *G. Aguilar M. et al. 1286* (MO); A 200 m de Nuevo Francisco León, restaurante El Paraíso, 174 m, 16 June 2002, *G. Aguilar M. et al. 1399* (M, MBM, MO); A 2 km al N de Nuevo Guerrero, 190 m, 22 June 2002, *G. Aguilar M. et al. 1561* (M, MO, NY); A 1 km de Nuevo México, al Norte del Poblado, 176 m, 9 July 2002, *G. Aguilar M. & F. Aguilar 1805* (M, MO); A 3.8 km al SE del paraíso, 385 m, 14 October 2002, *G. Aguilar M. & D. Álvarez 3449* (MBM, MO, NY); A 4 km al S de San Javier, 350 m, 26 January 2003, *G. Aguilar M. et al. 5206* (MBM, MO, NY, SPF); A 2.1 km al SE de la comunidad Lacanjá Chansayab, 320 m, 17 June 2003, *D. Álvarez 5378* (MO); A 1 km de al NO del poblado "El limonar", 521 m, 30 August 2003, *D. Álvarez & A. Chambor 6297* (MO); A 0.57 km al SO del cruceo de Bonampak, 340 m, 15 October 2003, *G. Aguilar M. et al. 8178* (MO); A 0.64 km al O del cruceo de Bonampak, 313 m, 13 December 2003, *G. Aguilar M. et al. 8908* (MBM). Palenque, Ruinas de Palenque, 160 m, 11 May 1982, *M. Sousa et al. 12382* (BM, MBM, MO). **Quintana Roo:** A 15 km al Sur de Ejido Laguna OM, 8 June 1980, *O. Téllez & E. Cabrera 2423* (BM, MO, NY). A 8 km al Norte de La Unión, 9 June 1980, *O. Téllez & E. Cabrera 2456* (MO, NY). A 12 km al Sur del Ejido Laguna OM, sobre el camino a Tomas Garrido, 7 August 1980, *O. Téllez & E. Cabrera 3054* (MO, NY). A 7 km al norte de Bacalar, 21 December 1982, *E. Cabrera & H. de Cabrera 4139* (MO). 4 km al NO de Estero Franco, sobre el camino en construccion a Tomas Garrido, lugar llamado El Danto, 17 May 1985, *E. Cabrera et al. 8349* (BM, MO). Adolfo de la Huerta, A 4.2 km al ESE de San Carlos, camino a Pozo Pirata, 102 m, 20 June 2004, *D. Álvarez et al. 9517* (MBM, MO). Othón P. Blanco, A 1.5 km al N de Dos Aguadas, 66 m, 21 June 2004, *D. Álvarez et al. 9560* (MO). A 1.8 km al O de El Martirio, camino a Pozo Pirata, 97 m, 9 September 2004, *D. Álvarez et al. 10585* (BM). **Tabasco:** Balancán, La Palma, 1–6 June 1939, *E. Matuda 3277* (F, K, MO, NY). Huimanguillo, El 32 rumbo a Díaz Ordaz, 150 m, 15 May 1985, *F. Ventura A. 21496* (MO, NY). Tacotalpa, Disperso a la orilla de la selva Milpa em el cerro cerca del Ejido Lázaro Cárdenas al este del ejido, 50 m, 7 June 1979, *A. Orozco et al. 2208* (MO). **Veracruz-Llave:** Hidalgotitlán, Hermanos Cedillo, La escuadra por el Rio Soloxuchil, 150 m, 17 August 1974, *M. Vasquez 927* (M). Minatitlán, 2.5 km al N de Poblado 10 por el camino a Pob. 9, 180 m, 9 May 1986, *T. Wendt et al. 5280* (MO).

Taxonomic notes:—*Tynanthus guatemalensis* is morphologically similar to the Atlantic Forest species *T. micranthus*, with which it shares elliptic leaflets with caudate-mucronate apices, lax and conical inflorescences, a similar corolla length (0.5–0.9 mm in both species), and winged fruits. However, *T. guatemalensis* presents simple tendrils (versus trifold in *T. micranthus*), foliaceous prophylls of the axillary buds (versus minute in *T. micranthus*) and a pubescent inflorescence axis (versus glabrescent in *T. micranthus*). Despite the morphological similarities between those two species, *T. guatemalensis* is more closely related to *T. croatianus*, another Central American species but morphologically very distinct from *T. guatemalensis* (see notes under *T. croatianus*).

Nomenclatural notes:—In the protologue of *T. guatemalensis*, Donnell Smith (1893) did not clearly indicate which of the materials examined was the holotype. Two duplicates of the *J. Donnell Smith 1488* collection were located at US, where Donnell Smith worked (Stafleu & Cowan 1985: 698), and the best quality material is here selected as the lectotype.

7. *Tynanthus labiatus* (Cham.) Miers (1863: 193). *Bignonia labiata* Chamisso (1832: 701). *Schizopsis labiata* (Cham.) Bureau (1865: 373). Type:—BRAZIL. "Brasil aequinoct.," s.d., *F. Sellow s.n.* (holotype LE!; isotypes B destroyed, G-DC! (barcode 133274), HAL! (barcode 98689) photo, K! (barcode 449547), K! (barcode 449547) as photocopy at MO (2904326), NY! (barcode 579087), US! (barcode 125831)).

Fig. 11: A–E

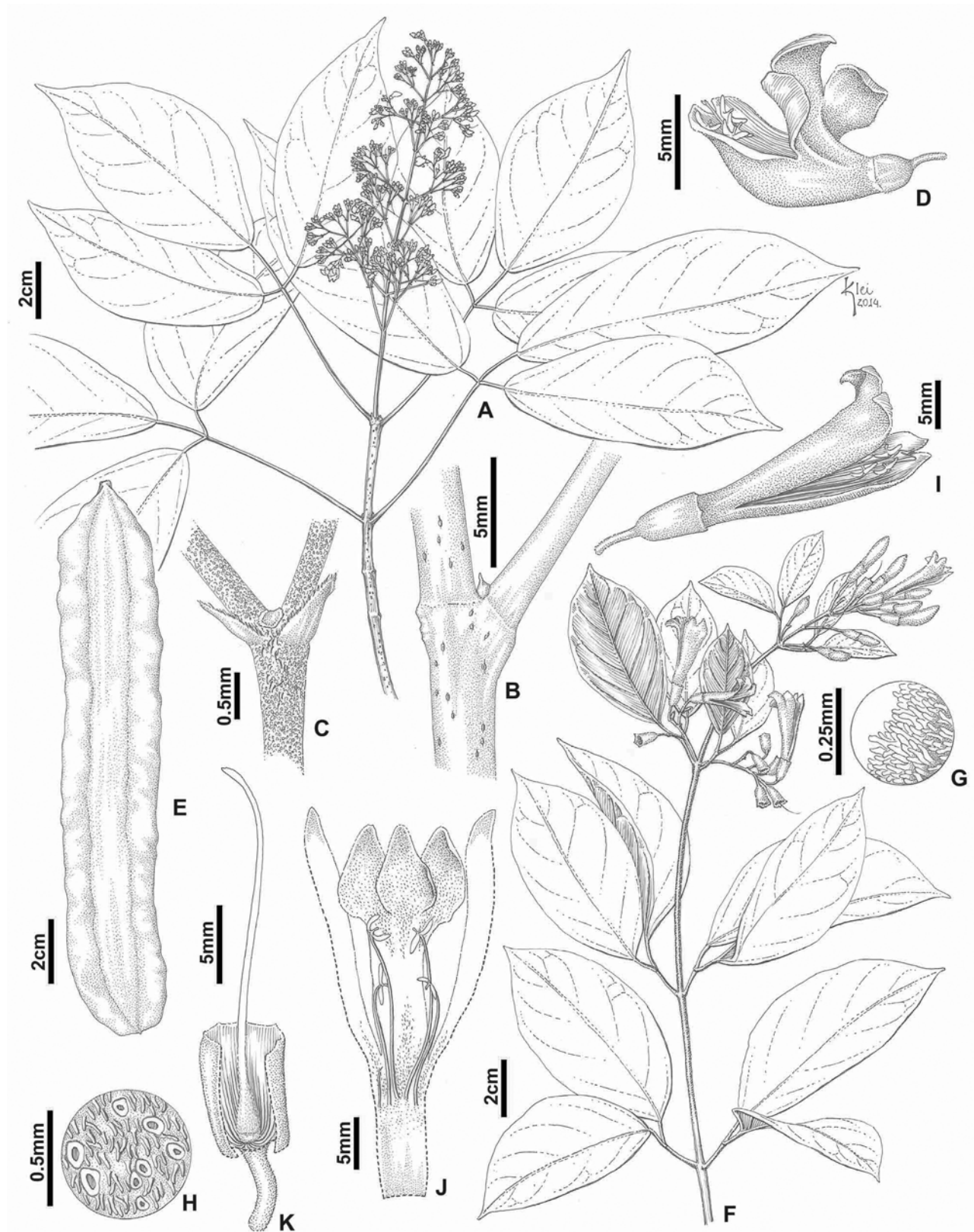


FIGURE 11. A–E. *Tynanthus labiatus*: A. Flowering branch; B. Petiolar region showing minute prophylls of the axillary buds; C. Detail of inflorescence axis showing the indumentum and bracts; D. Flower; E. Fruit (J.R. Pirani 3900, SPF). F–K. *T. macranthus*: F. Flowering branch; G. Detail of the densely pubescent indumentum in branchlet; H. Interpetiolar glands (R. Lent 42, NY isotype); I. Flower; J. Open corolla showing the androecium; K. Open calyx showing the gynoecium (A. Jiménez M. 2044, NY). Illustration by Klei Sousa.

Lianas. Branchlets tetragonal to terete, with ritidome (conspicuous when old), finely striated, lenticled to densely lenticled, glabrescent (sometimes pubescent at the nodes), with peltate and patelliform trichomes (sometimes also with simple); interpetiolar ridge absent or present; interpetiolar patelliform glands absent; prophylls of the axillary buds 0.8–2.2 mm long, 0.8–1.9 mm wide, minute, shallowly triangular to triangular, pubescent or puberulent to glabrescent throughout, with simple, peltate and patelliform trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules glabrescent (sometimes pubescent) throughout surface, with peltate and patelliform trichomes (sometimes also simple); petioles (0.7–)1.3–6.5 cm long; petiolules 0.6–3.8 cm long; leaflets (3.1–)5.3–13.5 cm long, (1.3–)2.5–7.4 cm wide, membranous to chartaceous, discolor, elliptic; apex acuminate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface glabrescent (sometimes pubescent) on and near the veins, with peltate and patelliform trichomes (sometimes also simple); the adaxial surface glabrescent (sometimes pubescent) on and near the veins, with peltate and patelliform trichomes (sometimes also simple); glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order 5.5–14 cm long, second order 1.5–4 cm long; axis pubescent (at some axis nodes), with simple, peltate and patelliform trichomes; bracts of the inflorescence predominantly caducous, tomentose to pubescent only at margins, 0.5–2 mm long; floral bracts 0.4–1.1 mm long; floral pedicels 1–3 mm long. *Calyx* green to yellowish, 1.6–2.4 mm long, 1.7–2.5 mm wide, with transversal aperture, minutely 5-denticulate (sometimes truncate), pubescent at teeth to glabrescent outside, with patelliform glands; lobes 0.1–0.3 mm long. *Corolla* white, cream or pale yellow (sometimes pale pink), 1–1.4 cm long, 3.5–6 mm wide at the tube opening; tube 4–7 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.4–1.4 mm long, 0.9–2.4 mm wide, acute to obtuse; lower ones 1.5–4 mm long, 2.4–4 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 1.1–2.5 mm from the base of the corolla; shorter ones 2.5–7 mm long; longer ones 3.5–9 mm long; anthers thecae 1–1.4 mm long, obovate to elliptic, subexserted; connective extending 0.2–0.3 mm beyond anther attachment; staminode 1.1–2.5 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 4–12 mm long; ovary 1–1.2 mm long, 0.7–0.8 mm wide, conical, velutinous; style 3–10 mm long, tomentose to pubescent at the base. *Fruit* a linear flattened capsule, 10–27 cm long, 2.4–3.1 cm wide, woody, smooth to granular near the midvein and granular near the margins, without lenticels, glabrescent, with peltate and patelliform trichomes; central ridge single, slightly or not prominent; margins prominently raised (winged), 0.6–1.2 cm wide. *Seeds* body 0.9–1 cm long, 0.7–0.8 cm wide; wings not seen.

Phenology:—Flowers and produces fruits from January to May.

Distribution and habitats:—Occurs mainly in moist broadleaf forests, although some populations also reach dry forests from Brazil (Bahia, Minas Gerais and Rio de Janeiro) (Fig. 12).

Additional specimens examined:—BRAZIL. Sin loc., s.d., *A. Glaziou 16269* (P). **Bahia:** Igreja Velha, 1841, *J.S. Blanchet 3267* (BM, BR, F, G, G-DC, LE, M, NY, P). Caetité, Café Baiano, 9 km E de Caetité em direção a Brumado, 800 m, 7 March 1994, *V.C. Souza et al. 5334* (SPF 108378, fruit attached to an *Adenocalymma* Mart. ex Meisn. specimen). Rui Barbosa, Serra do Orobó, Fazenda Bom Jardim, 426 m, 26 May 2005, *L.P. de Queiroz et al. 10661* (SPF). **Minas Gerais:** Sin loc., s.d., *E.P. Heringer s.n.* (RB barcode 58263). Catas Altas?, 1882?, *A. Glaziou 14108* (BR, F, G, K, LE, MO, P, US). Coronel Pacheco, Fazenda Companhia, 29 February 1944, *E.P. Heringer 1331* (RB). Monjolos, Estrada Corinto–Conselheiro Mata, margem esquerda do Rio Pardo Pequeno, 540 m, 19 February 2011, *M.C. Medeiros & R.B. Louzada 31* (SPF). Santo Hipólito, Estrada Corinto–Conselheiro Mata, a 6 km de Santo Hipólito, 550 m, 4 April 1996, *J.R. Pirani et al. 3775* (SPF); 12 January 1998, *J.R. Pirani et al. 3900* (SPF); 19 February 2011, *M.C. Medeiros & R.B. Louzada 30* (SPF); Cerca de 5 km além de Santo Hipólito em direção a Monjolos, no antigo leito da estrada de ferro, afloramento de calcáreo à margem esquerda do Rio Pardo Pequeno, 500 m, 24 March 1997, *R. Mello-Silva et al. 1317* (SPF). Volta Grande, Foz do rio angu, January 2007, *L.C.S. Viana & G.M. Maciel s.n.* (BHC B 109098). **Rio de Janeiro:** Sin loc., 1832, *L. Riedel 88* (LE, NY). Vallée du Rio Comprido, 18 February 1871, *A. Glaziou 4703* (P). Itaguaí, Rio Mazomba, 12 January 1950, *L.E.M. Filho 1029* (R); 12 January 1950, *A.C. Brade & A. Duarte 20165* (MO, NY, RB). Rio de Janeiro, Parque do Jardim Botânico do Rio de Janeiro, Pedra do Marinheiro, 25 January 1989, *R. Marquete et al. 202* (RB); *Ibid.*, trecho entre a caixa d'água do Caminho do Boi até Pedra do Marinheiro, 5 March 1991, *M. Madruz et al. 678* (K).

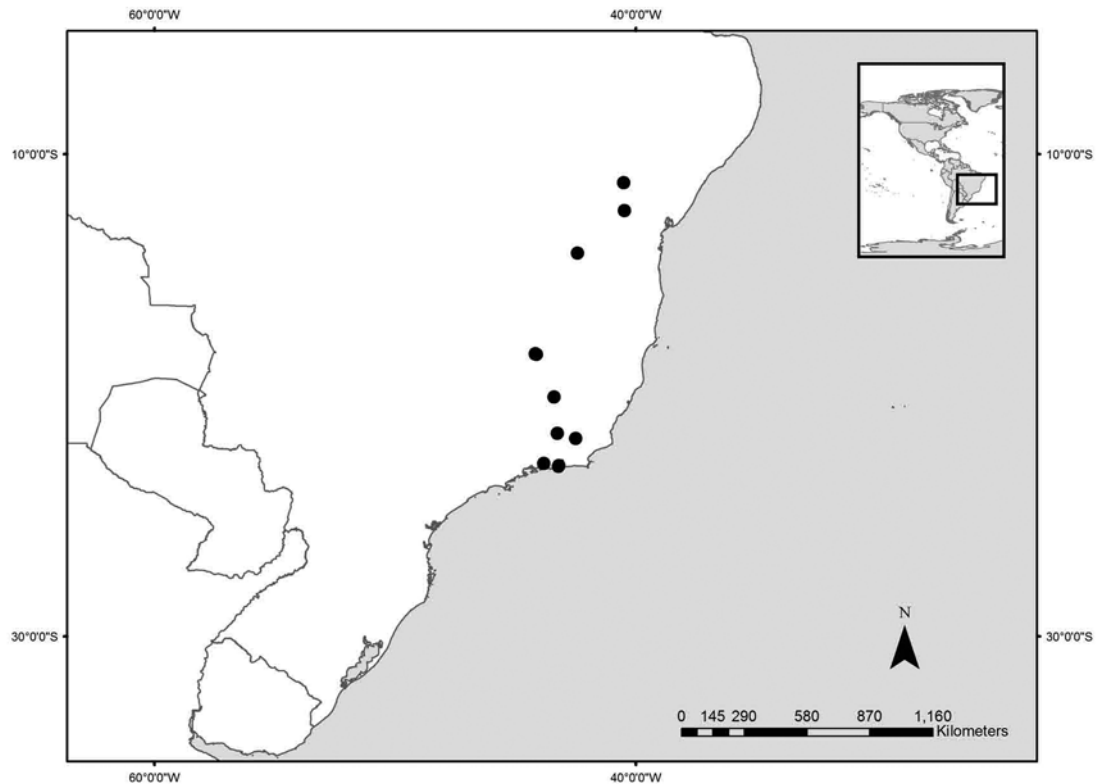


FIGURE 12. Distribution of *Tynanthus labiatus*.

Taxonomic notes:—*Tynanthus labiatus* can be easily recognized in the field by the conspicuous ritidome encountered in old branches and stem. Apart from that, *T. labiatus* is characterized by the glabrescent elliptic leaflets, conical inflorescences and winged fruits, all of which are also shared with the Amazonian *T. schumannianus*. However, *T. labiatus* has glabrous inflorescences axes, pubescent only at nodes (versus densely pubescent to pubescent inflorescences axes throughout in *T. schumannianus*) and larger corollas, 1–1.4 cm (versus smaller corollas, 0.4–0.9 cm in *T. schumannianus*). *Tynanthus labiatus* is a close relative of *T. fasciculatus* (Medeiros & Lohmann 2015; see *T. fasciculatus* notes).

8. *Tynanthus macranthus* Williams (1967: 250) (as “*Tynnanthus*”). Type:—COSTA RICA. Heredia: Roadside 8 km south of San Miguel, 9 July 1964, *R.W. Lent* 42 (holotype F! (1622130); isotypes NY! (barcode 328981), OKL! (barcode 01 0097215) photo, US! (barcode 125787)).

Fig. 11: F–K

Lianas. Branchlets terete, without ritidome, finely striated, densely lenticled, densely puberulent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands present; prophylls of the axillary buds 1–3 mm long, 1–2.5 mm wide, minute, shallowly triangular, densely puberulent throughout, with simple and peltate trichomes. *Leaves* 2 foliolated; terminal leaflets often modified into simple tendrils, without adhesive-disks on tip; petioles and petiolules densely puberulent throughout surface, with simple, peltate and patelliform trichomes; petioles (0.6–)0.8–2.3 cm long; petiolules (0.3–)0.7–2 cm long; leaflets (2.6–)4.5–14.9 cm long, (1–)2.7–6.4 cm wide, chartaceous to coriaceous, discolor, elliptic; apex acuminate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface densely puberulent to puberulent throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; the adaxial surface puberulent to glabrescent on and near the veins, with simple and peltate trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyrses, dense, with corymbose or subcorymbose aspect, 2.5–3–6 cm long; axis densely puberulent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, densely puberulent throughout, 1–2 mm long; floral bracts 0.8–1.2 mm long; floral pedicels 2–6 mm long. *Calyx*

green, 5–9(–10) mm long, 4–5 mm wide, with transversal aperture, minutely 5-denticulate (sometimes truncate), densely puberulent throughout outside, without patelliform glands; lobes 0.2–0.5 mm long. *Corolla* white, 2–3.8 cm long, 2.5–4 mm wide at the tube opening; tube 5–11 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of (sometimes throughout) upper ones; upper ones 2–8 mm long, 1.5–4 mm wide, obtuse to rounded (sometimes acute); lower ones 4–8(–10) mm long, 3–7 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted ca. 3 mm from the base of the corolla; shorter ones 7–13 mm long; longer ones 9–18 mm long; anthers thecae 1.7–2.5 mm long, elliptic, inserted; connective extending 0.2–0.4 mm beyond anther attachment; staminode 4–7 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 14–22 mm long; ovary 1.8–2.5 mm long, 0.9–1.1 mm wide, conical to oblong, densely pubescent; style 12–19 mm long, densely pubescent throughout. *Fruit* not seen. *Seeds* not seen.

Phenology:—Flowers from April to November; the fruiting season is unknown.

Distribution and habitat:—Occurs in moist broadleaf forests from Costa Rica (Heredia and Limón) and Panama (Veraguas) (Fig. 13).

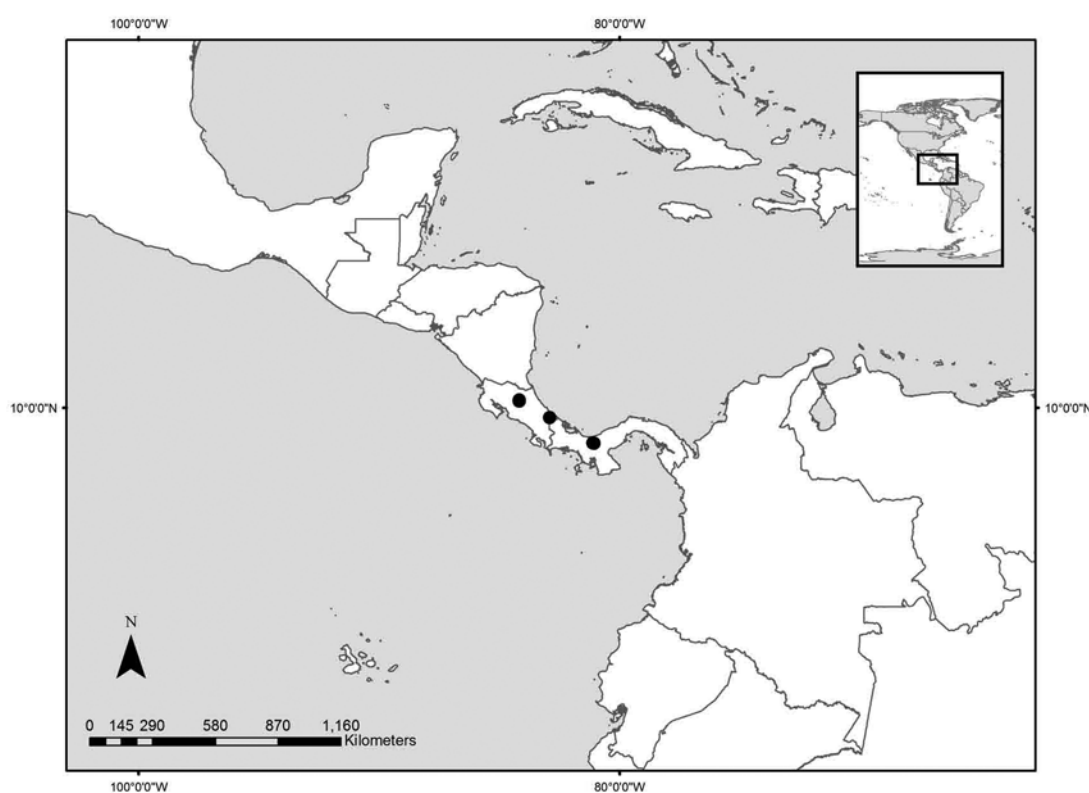


FIGURE 13. Distribution of *Tynanthus macranthus*.

Additional specimens examined:—COSTA RICA. **Heredia:** Entre San Miguel y Cariblanco de Sarapiquí, 725 m, 10 July 1964, *A. Jiménez M. 2044* (F photo, NY). **Limón:** Talamanca, Between Cahuita and the oil drilling platforms beyond Suretka, 100–300 m, 23–25 April 1982, *K. Barringer et al. 2671* (F, MO). PANAMA. **Veraguas:** Vicinity of Continental Divide, third branch of Rio Santa Maria to drop-off to lowlands, 12–15 km NW of Santa Fe, 650–750 m, 16–17 November 1974, *R. Dressler 4846* (MO). NW of Santa Fe, 8.8 km from Escuela Agricola Alto de Piedra, 17 May 1975, *R. Dressler et al. 6191* (MO, US).

Taxonomic notes:—*Tynanthus macranthus* is easily distinguished from the other species of the genus by the large flowers (2–3.8 cm), with conspicuously bilabiate corolla due to the short corolla tube (0.5–1.1 cm). Apart from that, *T. macranthus* is also characterized by the densely puberulent branchlets, simple tendrils, interpetiolar patelliform glands and corymbose to subcorymbose inflorescences. *Tynanthus macranthus* was the first species to diverge in *Tynanthus* (Medeiros & Lohmann 2015) and is sister to the remaining species of the genus.

9. *Tynnanthus micranthus* Mello ex Schumann (1894: 221) (as "*Tynnanthus micrantha*"). Lectotype (designated by Lohmann, in Lohmann & Taylor 2014: 469):—BRAZIL. São Paulo: Campinas, 30 September 1867, *J.C. de Mello* 26 (P! (barcode 481491); isolectotypes F! (999019), K! (barcode 449546), NY!, P! (barcodes 481488, 481489, 481490), P! (barcode 481489) as photocopy at MO, UPS! as photocopy at K, US! (2515396)).
 Fig. 14: A–D

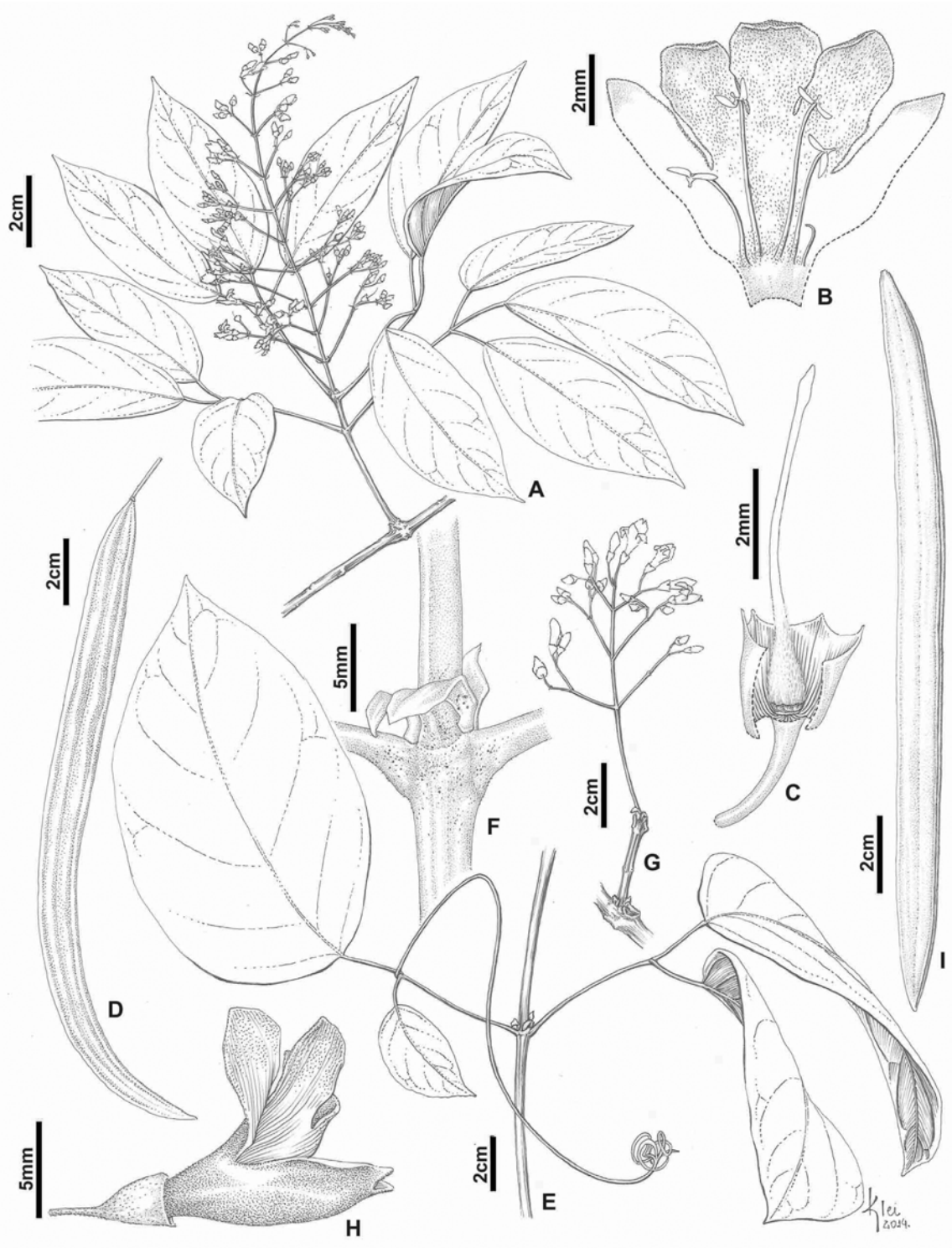


FIGURE 14. A–D. *Tynnanthus micranthus*: A. Flowering branch; B. Open corolla showing the androecium; C. Open calyx showing the gynoecium (M.C. Medeiros 32, SPF); D. Fruit (J.S. Carneiro 300, FUEL). E–I. *T. panurensis*: E. Branch; F. Interpetiolar region showing the foliaceous prophylls of the axillary buds; G. Inflorescence; H. Flower; I. Fruit (E–F and I: A.H. Gentry 21066, MO)(G–H: G. Klug 1972, NY). Illustration by Klei Sousa.

Lianas. *Branchlets* tetragonal to terete, with or without ritidome, finely striated, lenticeled to densely lenticeled, glabrescent, with peltate trichomes; interpetiolar ridge absent (sometimes present); interpetiolar patelliform glands absent; prophylls of the axillary buds 0.8–1.6 mm long, 0.5–1.2 mm wide, minute, triangular to shallowly triangular, glabrous. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules glabrescent throughout surface (sometimes pubescent at the junction of petiolules), with peltate trichomes (sometimes also with simple); petioles (0.5–)1.5–5.3 cm long; petiolules (0.3–)0.6–2.7 cm long; leaflets (2.3–)4.1–9.1 cm long, (0.7–)1.3–4.2 cm wide, membranous to chartaceous, discolor or concolor, elliptic; apex caudate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface glabrescent, with peltate and patelliform trichomes; the adaxial surface glabrescent, with peltate trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia with (sometimes without) trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order 3.5–5–13.5 cm long, second order 1.5–3 cm long; axis glabrescent, with peltate trichomes; bracts of the inflorescence predominantly caducous, glabrescent (sometimes pubescent only at margins), 0.7–6(–9) mm long; floral bracts 0.5–1 mm long; floral pedicels 1–4 mm long. *Calyx* green, 1.2–2 mm long, 1.5–2.3 mm wide, with transversal aperture, minutely 5-denticulate (sometimes truncate), glabrescent (sometimes pubescent at teeth) outside, with patelliform glands; lobes 0.1–0.6 mm long. *Corolla* white, cream or pale yellow (sometimes pale green), 0.5–0.9 cm long, 2–3.5 mm wide at the tube opening; tube 2.5–3.5 mm long, internally tomentose to pubescent at the base or glabrescent, with simple and long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.4–1.3 mm long, 0.7–1.4 mm wide, acute to obtuse; lower ones 2–3.1 mm long, 1.5–2.7 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 0.8–1 mm from the base of the corolla; shorter ones 2.1–3.1 mm long; longer ones 2.6–4.5 mm long; anthers thecae 0.6–0.8 mm long, obovate to elliptic, subexserted; connective extending ca. 0.2 mm beyond anther attachment; staminode 1–1.2 mm long, with long and short stipitate trichomes. *Gynoecium* 4.1–4.6 mm long; ovary 0.9–1 mm long, 0.5–0.6 mm wide, conical, velutinous; style 3–3.7 mm long, tomentose at the base. *Fruit* a linear flattened capsule, 7.2–16.5 cm long, 0.9–1.3 cm wide, coriaceous to woody, smooth to granular near the midvein and granular near the margins, without lenticels to densely lenticeled, glabrescent (sometimes pubescent at extremities), with peltate and patelliform trichomes (sometimes also with simple); central ridge single, not prominent; margins prominently raised (winged), 0.1–0.4 cm wide. *Seeds* body 1.2–1.4 cm long, 0.6–0.8 cm wide; wings 0.4–1 cm long.

Phenology:—Flowers from September to December and produces fruits from December to May.

Distribution and habitat:—Occurs in moist broadleaf forests from Brazil (Mato Grosso do Sul, Paraná and São Paulo) and Paraguay (Alto Paraná and Canindeyú) (Fig. 15).

Additional specimens examined:—BRAZIL. Reserva Florestal II, 21 October 2005, *Adriana et al. s.n.* (HRCB 42809). **Mato Grosso do Sul:** Iguatemi, Arredores, 400 m, 21 October 1987, *G. Hatschbach & J.M. Silva 51518* (BR, MO, US). **Paraná:** Parque Nacional do Iguaçu, N border, 2 1/2 km W of road to Capanema, S of Jardinópolis, 23 November 1966, *J.C. Lindeman & J.H. de Haas 3354* (MO, US); *Ibid.*, by forest road near Aranha, SE of Jardinópolis, 24 November 1966, *J.C. Lindeman & J.H. de Haas 3409* (F photo, K, MO, NY, P, RB, US). Alvorada do Sul, Fazenda Ingá, 19 May 2000, *O.C. Pavão s.n.* (FUEL 29345). Arapongas, Fazenda Solana, 26 April 2004, *J.S. Carneiro et al. 300* (FUEL, HRCB). Califórnia, Sítio Ogido, 9 November 1986, *S.N. Ogido 7* (FUEL); Rio Água do Oito, 19 October 2000, *O.C. Pavão 5* (FUEL). Cambé, Mata da Morada do Sol, 8 October 1999, *C.A. Avanzi et al. s.n.* (FUEL 29323). Campo Mourão, Rio da Várzea, 515 m, 14 October 1965, *G. Hatschbach 13033* (F, K, NY, P, UPCB, US). Céu Azul, Boa Vista, 22 October 1969, *G. Hatschbach 22593* (F, K, MO, NY, UPCB); Parque Nacional do Iguaçu, trilha da Jacutinga, 658 m, 12 October 2011, *J.A. Lombardi et al. 8739* (HRCB). Congonhinhas, Fazenda Planalto, beira da represa, 21 October 1998, *A.L. Cavalheiro et al. s.n.* (FUEL 23840, RB barcode 535433, SPF barcode 197643, SPSF 40442). Dois Vizinhos, Região compreendida entre os municípios de Dois Vizinhos e Pato Branco, proximidades do rio Chopim, 500 m, 8 December 2001, *P.H. Labiak & M. Kaehler 2016* (BHCB). Douradina, Fazenda Santa Rosa?, 2 November 1959, *R. Braga & R. Lange 80* (UPCB, US). Fênix, Fazenda Água Azul, 1 November 1998, *J.M. Silva et al. 2587* (ESA, FUEL, G, INPA, K, R, RB, SP, SPF, UPCB). Goioerê, Parque Municipal Antônio Sestak, 25 September 2007, *E.M. Silva s.n.* (RB barcode 527993). Ibioporã, Sítio São José, Água das Abóboras, 19 October 1997, *E.M. Nakano & I.M. Medri s.n.* (FUEL 24556). Londrina, Floresta dos Irmãos Godoy, 2 October 1985, *F.C. Silva et al. 901* (FUEL, MO); *Ibid.*, borda do

extremo norte do Parque, próximo ao rio, 600 m, 12 October 2011, *M.C. Medeiros & E.F. Rossetto* 32 (SPF); Fazenda Santa Ana, 24 October 1985, *A.O.S. Vieira et al. s.n.* (FUEL 1661); *Ibid.*, 24 October 1985, *A.O.S. Vieira et al. 41* (MO); Rio 3 Bocas, Sítio do Gasparino, 22 October 1986, *C. Zampieri et al. 41* (FUEL, HRCB, R); Proximidades do EMAUS, 27 September 1997, *M.C.B. Azevedo et al. s.n.* (FUEL 22931); Estância Cabral, 10 October 1999, *S.F. Andrade et al. s.n.* (HRCB 55991); Fazenda Figueira-Paiquerê, Fragmento 1, December 2002, *M.C. Lovato et al. 381* (FUEL); Fazenda Escola, 3 March 2009, *G.F. Santos 7* (FUEL); Parque Municipal Arthur Thomas, trilha da Capivara, 520 m, 14 October 2011, *M.C. Medeiros & E.F. Rossetto* 34 (SPF). Lupionópolis, Mata São Pedro, 6 May 2005, *J.S. Carneiro et al. 382* (FUEL). Matelândia, 13 October 1962, *G. Hatschbach* 9342 (K). Nova Prata do Iguaçu, Rodovia Nova Prata a Cruzeiro do Iguaçu, Rio Jacaratiá, 15 October 1997, *J.M. Silva et al. 2214* (ESA, G, HRCB, SPF). Rolândia, Sítio Jevy, Contorno Norte, 15 October 1996, *R. Losi et al. s.n.* (FUEL 25345). São Pedro do Ivaí, Fazenda Barbacena, 16 October 2003, *O.S. Ribas et al. 5527* (ESA, FUEL, G, MO, RB). Telêmaco Borba, margem da estrada de acesso ao eixo da barragem, 680 m, 22 September 2008, *M. Kaehler* 277 (UPCB); Desmatamento para construção do Eixo da Barragem da UH Mauá, 680 m, 23 September 2008, *M. Kaehler* 310 (UPCB). **São Paulo:** Adamantina, Sítio São Paulo estrada 6, 7 September 1995, *E.Y. Sasaki s.n.* (ESA 103223, FUEL 29302, SPF barcode 201517, VIC 31746). Gália, Estação Ecológica dos Caetetus, 12 February 2003, *R. Udulutsch & R. Tsuji* 1619 (HRCB). Jundiá, Reserva Biológica Municipal da Serra do Japi, Base–Mirante–estrada para DAE–Base, 850–985 m, 23 October 2007, *J.A. Lombardi & S.M. Hieda* 6990 (HRCB). Monte Alegre do Sul, Fazenda Benati, 17 March 1995, *L.C. Bernacci et al. 1366* (HRCB, SPF). Piracicaba, Mata da Pedreira, ESALQ, Beira do Ribeirão Piracicamirim, 2 October 1985, *E.L.M. Catharino* 444 (ESA, SP). Rio Claro, Fazenda São José, 30 October 2001, *R. Udulutsch et al. 423* (HRCB); *Ibid.*, 7 October 2002, *M.A. Assis & A.G. Manzatto* 1599 (HRCB). **PARAGUAY. Alto Paraná:** Reserva Biológica Limoy, cerca del río Limoy y Embalse de la Represa Itaipú em el río Paraná, 14 October 1996, *A. Schinini et al. 31364* (G, MO). **Canindeyú:** Circa Guadelupe, Canendiyu, 27 October 1978, *L. Bernardi* 18227 (BM, F, G, MO, NY).

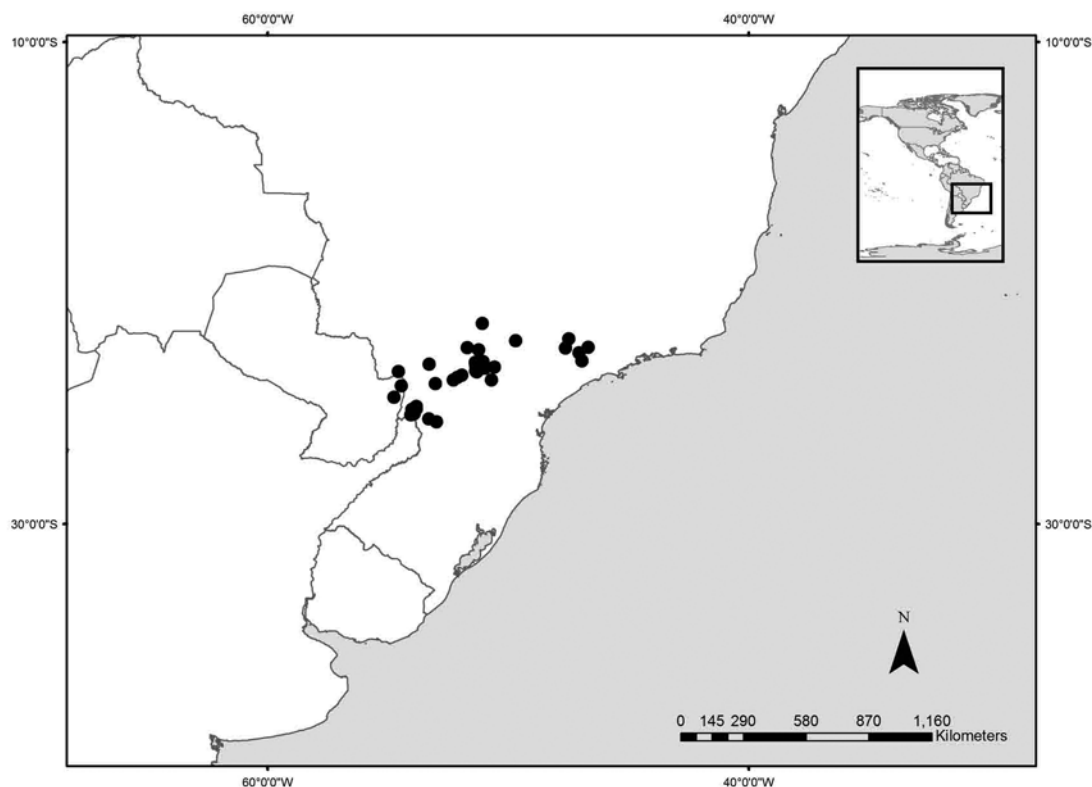


FIGURE 15. Distribution of *Tynanthus micranthus*.

Taxonomic notes:—*Tynanthus micranthus* is characterized by the glabrescent branchlets and leaflets, lax inflorescences, small corollas (0.5–0.9 cm), and winged fruits. This species is morphologically similar to the Central American *T. guatemalensis*, from which it differs on some morphological features (see taxonomic notes

under *T. guatemalensis*). *Tynanthus micranthus* is sister to a clade that includes two other Atlantic Forest species, *T. fasciculatus* and *T. labiatus* (Medeiros & Lohmann 2015). Morphologically, *T. micranthus* is most similar to *T. labiatus*, with which it shares glabrescent branchlets and leaflets; however, these two species can be separated by the smaller flowers of *T. micranthus* (0.5–0.9 cm versus 1–1.4 cm in *T. labiatus*).

10. *Tynanthus panurensis* (Bureau) Sandwith (1953: 465) (as “*Tynnanthus*”). *Schizopsis panurensis* Bureau (1865: 373). Lectotype (designated here):—BRAZIL. Amazonas: “Prope Panuré ad Rio Uaupés”, October 1852–January 1853, *R. Spruce 2626* (P! (barcode 468600); isolectotypes BM! (barcode 992358), BM! (barcode 992358) as photocopy at MO (2300302), BR! (barcode 876218), E! (barcode 394578) photo, G!, G! as photocopy at F (785147), G! as photocopy at MO (1693115), G! as photocopy at NY, G! as photocopy at US, K! (barcode 449548), LE!, P! (barcodes 3606843, 608100), TCD! (barcode 550) photo).

Fig. 14: E–I

Lianas. *Branchlets* tetragonal to terete, without ritidome, finely striated, lenticled to densely lenticled, puberulent to glabrescent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands absent; prophylls of the axillary buds 2.5–5 mm long, 1.5–3.5 mm wide, foliaceous, obovate, puberulent throughout, with simple, peltate and patelliform trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules puberulent to glabrescent throughout surface, with simple and peltate trichomes; petioles 3–12 cm long; petiolules 0.7–7.8 cm long; leaflets (3.7–)6.5–20.4 cm long, (2–)4.1–13.7 cm wide, membranous to chartaceous or coriaceous, discolor, elliptic to ovate; apex acuminate, mucronate; base cuneate or obtuse, symmetrical or asymmetrical; margin entire; the abaxial surface pubescent to glabrescent on and near the veins, with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent on and near the veins, with simple and peltate trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia without trichomes. *Inflorescence* axilar or terminal, a thyse, lax, with conical aspect, (3–)5–13 cm long; axis pubescent to puberulent, with simple and peltate trichomes; bracts of the inflorescence caducous or persistent, pubescent throughout, 1–2.1 mm long; floral bracts 0.6–0.9 mm long; floral pedicels (0.5–)1–9 mm long. *Calyx* green, 2.5–4 mm long, 1.9–3 mm wide, with transversal aperture, truncate or minutely 5-denticulate, puberulent throughout outside, without patelliform glands; lobes 0.1–0.3(–0.6) mm long. *Corolla* cream or pale yellow (sometimes pale lilac), 1.2–1.7 cm long, 4–6 mm wide at the tube opening; tube 6–7 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.6–1.4 mm long, 0.9–1.9 mm wide, acute to obtuse; lower ones 3.2–5.1 mm long, 3.1–4.2 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 1.5–3 mm from the base of the corolla; shorter ones 3.5–6 mm long; longer ones 4–8 mm long; anthers thecae 1–1.2 mm long, obovate to elliptic, subexserted; connective extending 0.2–0.4 mm beyond anther attachment; staminode 3–3.3 mm long, glabrous. *Gynoecium* 7–13 mm long; ovary 1.5–2 mm long, 0.7–0.9 mm wide, conical, densely pubescent; style 5–12 mm long, tomentose to pubescent at the base. *Fruit* a linear flattened capsule, 22–25 cm long, (0.5–)0.9–1.4 cm wide, coriaceous to woody, smooth to granular near the midvein and granular near the margins, densely lenticled, pubescent, with simple, peltate and patelliform trichomes; central ridge single, not prominent; margins slightly raised (unwinged), 0.1–0.2 cm wide. *Seeds* not seen.

Phenology:—Flowers from October to April. Two fruiting collections were observed, one made in December and the other in May (fallen fruits).

Distribution and habitat:—Occurs in moist broadleaf forests from Brazil (Amazonas), Colombia (Amazonas and Caquetá), Ecuador (Orellana) and Peru (Loreto, Pasco and San Martín) (Fig. 16).

Additional specimens examined:—BRAZIL. **Amazonas:** SEPLAC, km 60 on Manaus–Caracarai Road (BR 174), 1 December 1974, *A.H. Gentry 12997* (INPA photo, MG, MO, R). COLOMBIA. **Amazonas:** Araracuara, Villa Azul, Rio Caquetá, margen izquierda frente isla Sumaeta, 12 May 1989, *C. Londoño et al. 625* (MO); *Ibid.*, 200–300 m, 22 November 1989, *C. Londoño et al. 1449* (MO). **Caquetá:** 10 km S of San Jose de Fragua, 320 m, 11 January 1974, *A.H. Gentry et al. 9144* (MO). Araracuara, 28 January 1989, *A.H. Gentry et al. 65294* (MO). ECUADOR. **Orellana:** Tiputini Biodiversity Station, Río Tiputini, about 20 km (via air) east of confluence with Río Tivacuno, Near Erwin Plot #1 off Sendero Harpia, 250 m, October 1998, *R.J. Burnham et al. 2307* (MO).

PERU. **Loreto:** Alto Amazonas, Capihuari, 5 km NE of Andoas on Río Capihuari, near Ecuador border, Along oil pipeline, 240 m, 17 November 1979, *A.H. Gentry & C. Díaz 28174* (F, MO, NY); Few km W of Shucushayacu on Río Huallaga above Yurimaguas, 180 m, 11 October 1985, *A.H. Gentry et al. 52229* (SPF). Mariscal Ramón Castilla, Pebas, Bora Native community of Brillo Nuevo, Yaguasyacu River (affluent of Ampiyacu River), ca. 150 km ENE of Iquitos, 106 m, 31 October 1981, *J. Treacy & J.B. Alcorn 259* (F); 4 November 1981, *J. Treacy & J.B. Alcorn 333* (F). Maynas, Florida, Río Putumayo, at mouth of Río Zubineta, 200 m, March–April 1931, *G. Klug 1972* (BM, F, MO, NY, US); Nanay to (ad) Iquitos, 200 m, 10 December 1958, *F. Woytkowski 5151* (K, MO); Río Ampiyacu, Pebas and vicinity, Trail north from town, 10 April 1977, *T. Plowman et al. 6706* (F photo, MO); Near Brilla Nueva, Borro Indian village on upper Río Yaguasyacu, tributary of Río Ampiyacu, 8 November 1977, *A.H. Gentry & J. Revilla 20476* (F); Mishana, Río Nanay, 130 m, 3 December 1977, *A.H. Gentry et al. 21066* (F, MO, NY); *Ibid.*, Río Nanay halfway between Iquitos and Santa María de Nanay, Cerca del campamento No. 1, 140 m, 19 May 1979, *C. Díaz et al. 1105* (F, MO); Ecuador border, 1–2 km from Puerto Peru (military post 8 km from mouth of Río Gueppi, tributary of Río Putumayo), 200 m, 18 May 1978, *A.H. Gentry et al. 22055* (MO); Pucuarquillo, Trail behind Bora villiage towards mounte, 18 August 1981, *R. Hahn & R. Tredwell 3I?* (MO 2927651); Río Ampiyacu, Pucuarquillo, Path to Witoto central forest, behind Pucuarquillo, 21 September 1981, *R. Hahn et al. 145* (MO); Iquitos, Allpahuayo, Estación Experimental del Instituto de Investigaciones de la Amazonia Peruana (IIAP), Muestreo de 1000 m², Transecto No 9, 150–180 m, 26 May 1991, *R. Vásquez & N. Jaramillo 16543* (MO); *Ibid.*, Línea F de la parcela de 25 ha, subparcela 5, 150 m, 20 March 1992, *R. Vásquez et al. 17806* (MO); San Francisco de Orellana, Río Napo, trail of Pue San Pedro below caserío of Juancho Playa, 9 November 1978, *M. Rimachi Y. 4064* (F photo, MO, NY). Requena, Jenaro Herrera, Río Ucayali below Requena, 9 December 1977, *A.H. Gentry et al. 21323* (F, MO); *Ibid.*, Río Ucayali, 19 February 1987, *A.H. Gentry et al. 56126* (F, MO); Sapuena, Basin of Río Ucayali, Arboretum Jenaro Herrera, 21 April 1987, *D.C. Daly et al. 5122* (MO, NY). **Pasco:** Oxapampa, Cabeza de Mono, Río Iscozacin, 10 km SW of Iscozasin, Palcazu Valley, 320 m, 9 June 1983, *A.H. Gentry et al. 41745* (MO); Shiringamazu, ca 20 km S of Iscozacin, Río Palcazu Valley, 300 m, 6 July 1988, *A.H. Gentry et al. 63339A* (MO). **San Martín:** San Martín, Near km 50 Yurimaguas–Tarpoto road, 200 m, 12 October 1985, *A.H. Gentry et al. 52280* (F, MO).

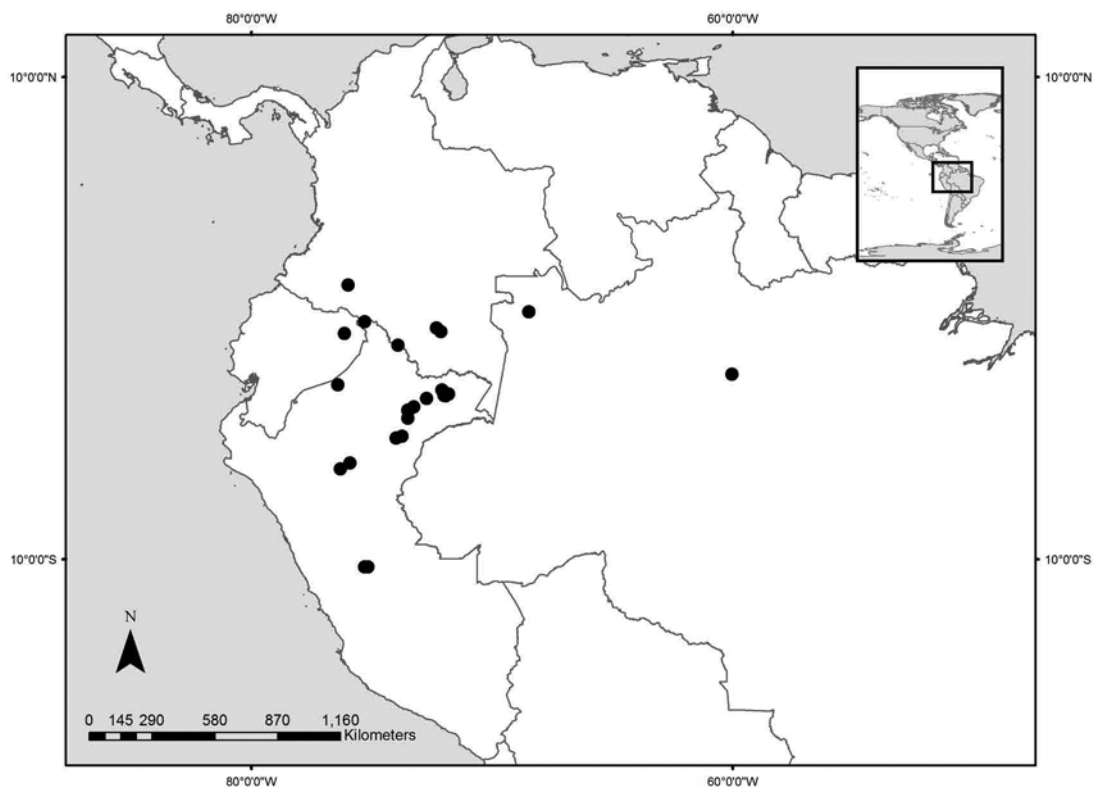


FIGURE 16. Distribution of *Tynanthus panurensis*.

Taxonomic notes:—*Tynanthus panurensis* is characterized by the foliaceous prophylls of the axillary buds, unusually long petioles (up to ca. 12 cm) and petiolules (up to ca. 7.8 cm), lax inflorescences, corollas 1.2–1.7 cm long and fruits with slightly raised margins. This species is closely related to *T. pubescens* (Medeiros & Lohmann 2015), with which it shares lax inflorescences and a similar corolla length (1.2–1.7 cm in *T. panurensis* and 1–1.6 cm in *T. pubescens*); however, *T. panurensis* can be separated by the foliaceous prophylls of the axillary buds (versus minute prophylls in *T. pubescens*), and only slightly raised fruit margins (versus prominently raised in *T. pubescens*). Despite the phylogenetic proximity between these species, *T. panurensis* is morphologically most similar to *T. densiflorus*, with which it shares some morphological features (see taxonomic notes under *T. densiflorus*).

Nomenclatural notes:—Three duplicates of the collection *Spruce 2626* were located at P, and the best quality flowering material is here selected as the lectotype.

11. *Tynanthus polyanthus* (Bureau) Sandwith (1953: 465) (as “*Tynnanthus*”). *Schizopsis polyantha* Bureau (1865: 378). Lectotype (designated by Lohmann, in Lohmann & Taylor 2014: 469):—PERU. San Martín: “Prope Tarapoto”, 1855–1856, *R. Spruce 4895* (P! (barcode 481492); isolectotypes BM! (barcode 603754), BR! (barcode 876198), C! photo, C! as photocopy at F (718222), C! as photocopy at MO (1693114), E! (barcode 259199) photo, F! (1012196) (fragments), F! (875569) photo, G!, G! as photocopy at F (785146), G! as photocopy at MO (1693113), G! as photocopy at NY, G! as photocopy at US, K! (barcodes 202056, 202057, 202058, 202059), LE!, MPU! (barcode 16048) photo, NY! (barcode 328924), P! (barcode 481493, 481494), S! (04-3493) photo, TCD! (barcode 549) photo).

Schizopsis polyantha var. *boliviana* Bureau (1865: 379). Type:—BOLIVIA. La Paz: “Environs de Mururata”, 1839, *J.B. Pentland 33* (holotype P! (barcode 608099)).

Tynanthus myrianthus Bureau & Schumann (1896: 197) (as “*Tynnanthus*”). Lectotype (designated here):—PERU. Loreto: “Ad Yurimaguas”, April 1831, *E.F. Poeppig 2388* (W, W! as photocopy at F (956391), W! as photocopy at K, W! as photocopy at MO (1693116), W! as photocopy at US; isolectotypes F! (875526), LE!).

Tynanthus lindmanii Schumann (in Bureau & Schumann 1896: 409) (as “*Tynnanthus*”). Lectotype (designated here):—BRAZIL. Mato Grosso: “Barra do Rio dos Bugres” (Barra do Bugres), 26 February 1894, *C.A.M. Lindman A2967* (S! (09-21559) photo; isolectotypes UPS! photo, S! (09-21560) photo, S! (09-21560) as photocopy at K).

Tynanthus caryophylleus (Bello) Alain (1965: 352) (as “*Tynnanthus*”). *Bignonia? caryophyllea* Bello (1881: 293). Neotype (designated here):—PORTO RICO: “Forest near Humacao”, 28 February 1926, *N.L. Britton 8614* (NY! (barcode 874601); isoneotype US! (barcode 477379)).

Tynanthus villosus Gentry (1976: 60) (as “*Tynnanthus*”). Type:—PERU. San Martín: Tocache Nuevo, Quebrada de Canuto, 18 August 1973, *J. Schunke Vigo 6852* (holotype MO! (2175155); isotypes F! (1763392), K! (barcode 449538), RB! (barcodes 536855, 536925)). *syn nov.*

Fig. 17: A–F

Lianas. *Branchlets* conspicuously tetragonal (with salient extremities) to terete, with or without ritidome, finely striated (sometimes not evident, when young), few to densely lenticled (sometimes without lenticels), villous to puberulent or glabrescent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands absent; prophylls of the axillary buds 4–19(–25) mm long, 3–18(–23) mm wide, foliaceous, ovate or obovate to elliptic, villous to puberulent throughout, with simple, peltate and patelliform trichomes. *Leaves* 2–3 foliolated (more commonly 2); terminal leaflets often modified into simple tendrils, without adhesive-disks on tip; petioles and petiolules villous to puberulent throughout surface, with simple and peltate trichomes; petioles (0.9–)1.4–5 cm long; petiolules (0.2–)0.6–4.6 cm long; leaflets (2.5–)4–16.5 cm long, (1.6–)2.5–12.6 cm wide, membranous to chartaceous (sometimes subcoriaceous), discolor or concolor, elliptic to ovate; apex acuminate, mucronate; base cuneate, obtuse, truncate or subcordate, symmetrical or asymmetrical; margin entire (rarely dentate); the abaxial surface villous to puberulent (sometimes glabrescent) throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; the adaxial surface villous to pubescent (sometimes glabrescent) throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; glandular trichomes distributed especially on the adaxial surface (sometimes evenly distributed throughout both surfaces); second venation weak brochidodromous; pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order 3.5–15 cm long, second order 1.5–8 cm long; axis villous to pubescent, with simple and peltate trichomes; bracts of the inflorescence caducous or persistent, villous to pubescent throughout, 0.5–3.3(–6) mm long; floral bracts 0.4–0.7

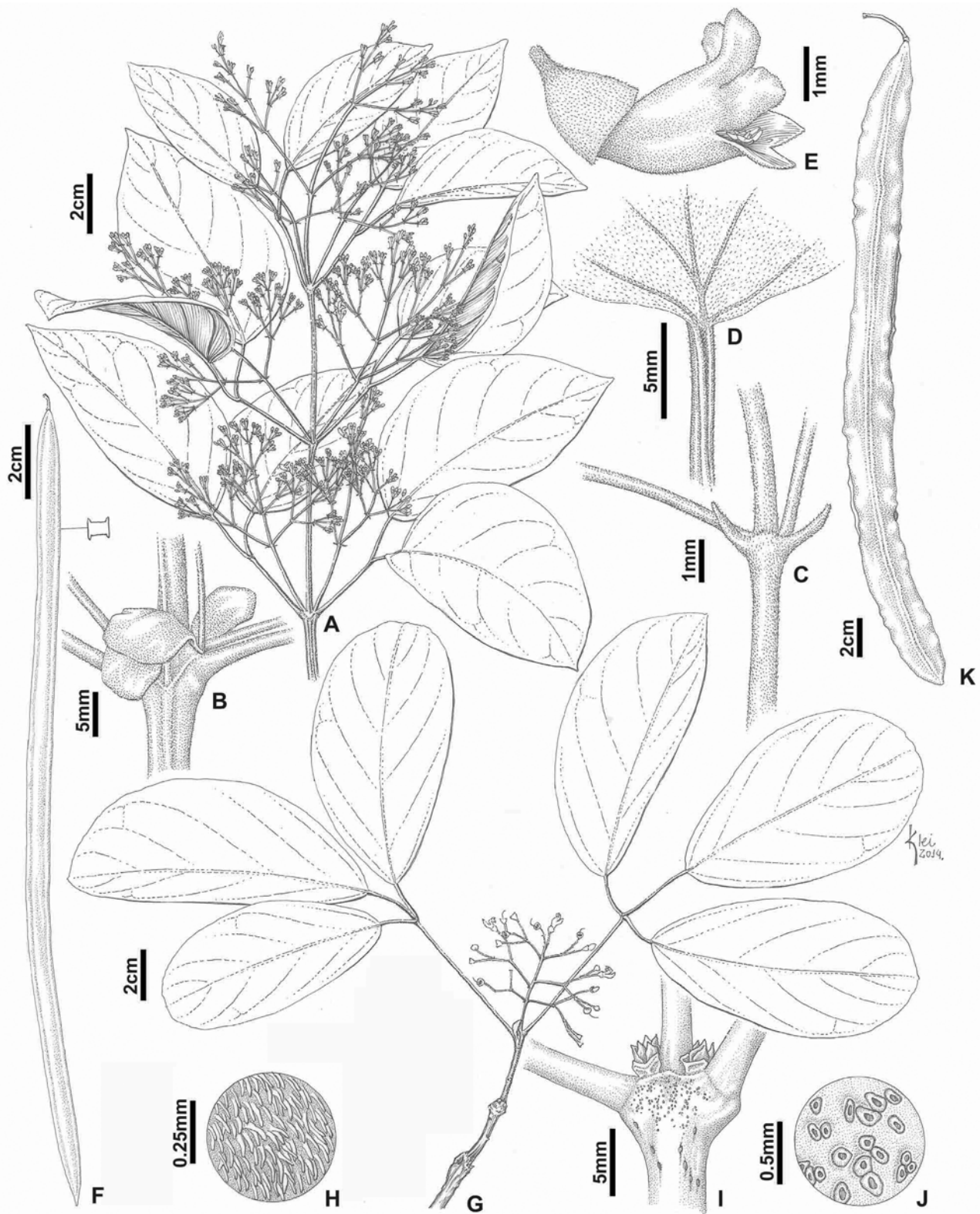


FIGURE 17. A–F. *Tynanthus polyanthus*: A. Flowering branch; B. Interpetiolar region showing the foliaceous prophylls of the axillary buds; C. Detail of inflorescence axis showing bracts; D. Detail of petiolule showing the upper canalicule; E. Flower (M.C. Medeiros 40, SPF); F. Fruit showing the flattened cross section (P. Núñez 11199, MO). G–K. *T. pubescens*: G. Flowering branch; H. Detail of pubescent indumentum in branchlet (S. Mori 23971, NY); I–J. Interpetiolar glands; K. Fruit (A.H. Gentry 25579, F). Illustration by Klei Sousa.

mm long; floral pedicels 0.5–7.3(–10.5) mm long. *Calyx* green to yellowish, 1–2.7 mm long, 1.2–2.2 mm wide, with transversal (sometimes oblique) aperture, minutely 5-denticulate (sometimes truncate), tomentose to puberulent throughout outside, without patelliform glands; lobes 0.1–0.3(–0.6) mm long. *Corolla* white, cream or pale yellow (sometimes pale lilac, pale red or pale blue), 0.4–0.8 cm long, 1.2–3.5 mm wide at the tube opening; tube 2–4.5 mm long, internally glabrescent, with long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout (sometimes only at margins of) lower ones and at margins of or throughout upper ones; upper ones 0.4–1.6 mm long, 0.5–1.5 mm wide, acute to obtuse; lower ones 1.3–3 mm long, 1.2–2.8 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 0.7–1.3 mm from the base of the corolla; shorter ones 2–3 mm long; longer ones 2.5–4 mm long; anthers thecae 0.6–0.8 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.3 mm beyond anther attachment; staminode 0.9–1.2 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 3.2–5.1 mm long; ovary 0.7–1.3 mm long, 0.5–1 mm wide, conical, velutinous; style 2–3.9 mm long, tomentose at the base. *Fruit* a linear flattened capsule, 10.5–25 cm long, 0.4–0.9 cm wide, coriaceous to woody, granular throughout (sometimes smooth near the midvein), without lenticels to densely lenticled, villous to puberulent or glabrescent, with simple and peltate trichomes; central ridge single, slightly or not prominent; margins slightly raised (unwinged), ca. 0.1 cm wide. *Seeds* body 0.7–1.5 cm long, 0.3–0.9 cm wide; wings (0.2–)0.4–1.2 cm long.

Phenology:—Flowers throughout the year and produces fruits from March to August.

Distribution and habitat:—Occurs in moist broadleaf forests from Bolivia (Beni, Cochabamba, La Paz, Pando and Santa Cruz), Brazil (Acre, Amazonas, Mato Grosso, Pará and Rondônia), Colombia (Antioquia, Chocó and Meta), Dominican Republic (El Seybo, Monte Cristi and Samaná), Ecuador (Morona-Santiago, Napo and Zamora-Chinchipe), Guiana (Upper-Essequibo), Peru (Amazonas, Cusco, Huánuco, Junín, Loreto, Madre de Dios, Pasco, Puno, San Martín and Ucayali), Porto Rico and Venezuela (Amazonas) (Fig. 18).

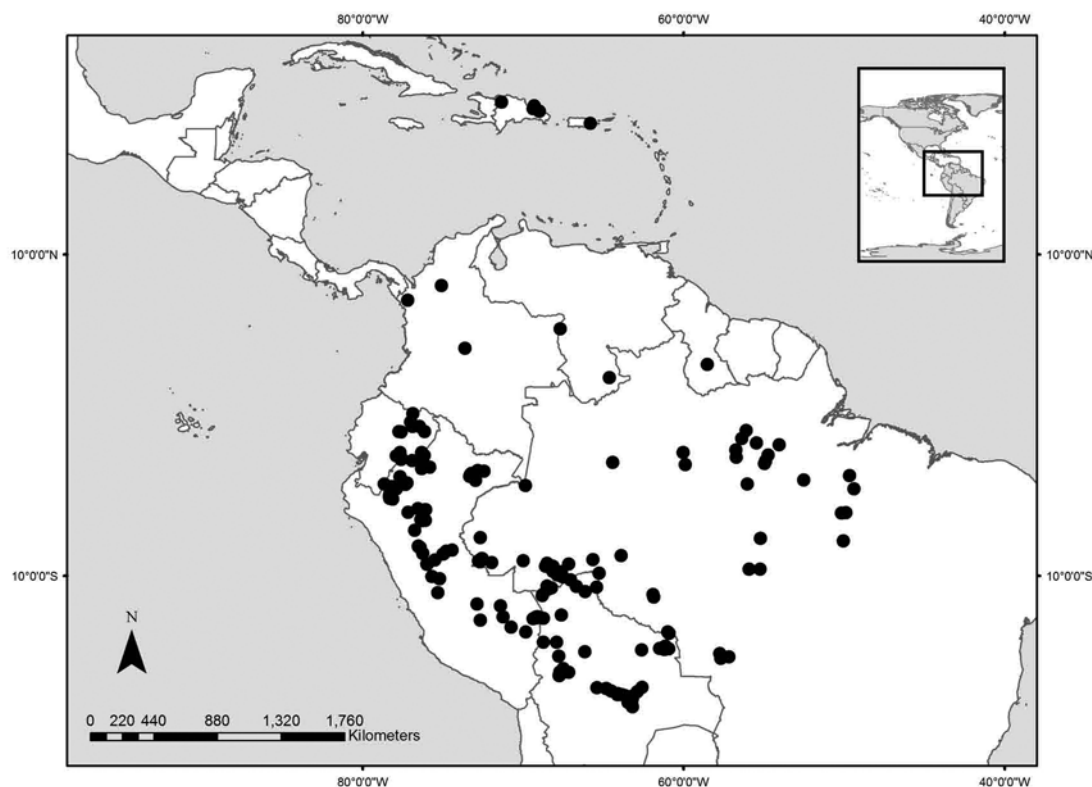


FIGURE 18. Distribution of *Tynanthus polyanthus*.

Additional specimens examined:—Sin loc.. October 1831, *E.F. Poeppig* 2651 (LE, P). **BOLIVIA.** **Beni:** Moxos, 66 km de San Ignacio, San Borja, 200 m, 20 February 1995, *M. Moraes & E. Oviedo* 2074 (MO). Vaca Díez, 11–15 km NW of Guayaramerin on road to Cachuela Esperanza, 12 February 1978, *W.R. Anderson* 12047 (MO, NY, US); Riberalta, 160 m, 29 June 1992, *A.H. Gentry et al.* 77563 (MO). **Cochabamba:** Carrasco, Entre

Ríos, Dist. Tres, Sector Coop. Litoral, 280 m, 12 July 2005, *O. Colque & L. Mendoza* 262 (SPF); 6 February 2006, *O. Colque & L. Mendoza* 410 (SPF). Cercado, The road from Ivirgarsama, approximately 2 km towards Puerto Villarroel, 200 m, 24 February 1996, *N. Ritter* 2996 (MO). Chapare, Villa Tunari, Hotel El Puente, 300 m, 21 January 1996, *J.R.I. Wood* 10423 (K). **La Paz:** Sin loc., 1–22 July 1939, *B.A. Krukoff* 10456 (K). Abel Iturralde, Tumupasa, 540 m, 10 January 1902, *R.S. Williams* 508 (K, NY); Siete Cielos, Río Manupare, 180 m, 4 June 1987, *J.C. Solomon* 16919 (MO). Franz Tamayo, Parque Nacional Madidi, río Quendeque, 300 m, 7 February 2002, *A. Fuentes et al.* 3753 (MO); *Ibid.*, NW de Apolo, senda Azariamas–San Fermin, Parcela temporal (0.1 ha), 1326 m, 27 May 2006, *I. Loza et al.* 73 (SPF); 27 May 2006, *I. Loza et al.* 78 (SPF). Nor Yungas, Below San Pedro, Yolosa–Caranavi road, valley of Río Coroico, 760–950 m, 15 January 1984, *A.H. Gentry et al.* 44262 (M, MBM, MO, NY); Corocoro, 12 km NE of Caranavi, 1400–1500 m, 16 January 1984, *A.H. Gentry et al.* 44315 (MO, NY); 16 January 1984, *A.H. Gentry et al.* 44350 (MO); 1 km SW of Yolosa on road to Chuspipata, Ford of Río Cedro, 1400 m, 22 February 1984, *J.C. Solomon & J. Kuijt* 11594 (F photo, MO); 5.5 km below Coroico (towards Yolosa) (1.4 km above Yolosa), 1400 m, 16 May 1985, *J.C. Solomon* 13733 (MBM, MO, NY); 3.8 km below Coroico and Yolosa, 1500 m, 25 September 1986, *J.C. Solomon* 15665 (MO). Sud Yungas, Basin of Río Bopi, Asunta (near Evenay), 690–750 m, 27–31 July 1939, *B.A. Krukoff* 10695 (F, G, K, MO, NY, US); Valle del río Unduavi, entre Santa Rosa y Machacamarca expo. N-0, 1400 m, 4 February 1988, *R. Seidel & E. Richter* 1207 (MO). **Pando:** Abuná, Nuevo Mundo, 180 m, 29 June 1992, *A.H. Gentry et al.* 77573 (MO). Nicolás Suárez, Km 15 between Cobija and Porvenir, 300 m, s.d., *M. Cardenas* 4167 (US); En la zona de Campoana, junto a la barraca San José, 290 m, 14 January 1983, *F. Casas & Susanna* 8264 (G, MO, NY). **Santa Cruz:** Im Gebüsch des Waldes am Westufer des Río Pirai, unweit Santa Cruz, January 1911, *T. Herzog* 1460 (G). Andrés Ibáñez, 2 km W of center of La Belgica, 360 m, 24 January 1987, *M. Nee* 33781 (G, MO, NY); 4 km S of Pedro Lorenzo on old road from Santa Cruz to Abapó, 525 m, 21 January 1998, *M. Nee* 48058 (MO, NY); Along "old" highway to Cochabamba, vic. Turnoff of highway south to Abapó, 13 km SW of center of Santa Cruz, 450 m, 29 July 2003, *M. Nee* 52391a (NY); 6.4 km (by dirt roads) SE of Pedro Lorenzo on way to Peji, 4.5 km SW of Peji, 530 m, 29 June 2004, *M. Nee* 52633 (MO, NY); Camino entre Warnes y La Bélgica, 353 m, 18 February 2006, *D. Villarroel et al.* 347 (NY, SPF); Porongo, Localidad del Monumento Natural Espejillos, Precipicio del mirador, 1200 m, 16 January 2008, *I. Linneo & D. Galindo* 1326 (SPF). Cercado, Bosques del Piray, 450 m, 4 February 1917, *J. Steinbach* 3224 (BM, F photo, K); 20 January 1921, *J. Steinbach* 5253 (F, G, MO, NY). Cordillera, 2.5 km (by road) W of railroad and 3.5 km (by road) W of the Santa Cruz–Abapó highway and San Joaquín, along gravel road to "Pozo PCHX1001", the turnoff 5.5 km S of Basilio, 570 m, 24 May 2005, *M. Nee* 53129 (MO, NY, SPF). Ichilo, Santa Cruz 130 km NW línea recta, puente Río Yapacaní 35 kms hacia Puerto Grether, 250 m, 18 March 1981, *S.G. Beck* 6557 (M, MO); Vicinity of old buildings for highway construction, ca. 2 km W of Villa San Germán on highway from Buena Vista to Río Ichilo, 275 m, 22 February 1998, *M. Nee* 48385 (MBM, MO, NY); 3.5 km SW of turnoff at Villa San Isidro from new highway from Buena Vista to Río Ichilo, 360 m, 1 March 1998, *M. Nee* 48546 (MO, NY); Buena Vista, Orillas del camino entre Buena Vista y el Cairo, 320 m, 2 February 1990, *I.G. Vargas C.* 377 (MO, NY); Ignacio Warnes, E side of the village of Colonia Okinawa 1, 250 m, 28 January 1987, *M. Nee* 33837 (MO, NY). José Miguel de Velasco, Parque Nacional Noel Kempff Mercado, 14 km SE del Estancia Flor de Oro, cerca Río Itenez, 260 m, 9 March 1992, *A. Perry* 686 (MO); *Ibid.*, Comunidad Florida, 200 m, 2 July 1993, *M. Saldias et al.* 2928 (MO); *Ibid.*, Lago Caiman, 540 m, 19 January 1997, *M. Garvizu et al.* 336 (G, MO); *Ibid.*, Campamento Los Fierros, 200 m, 18 March 1997, *L. Sánchez et al.* 402 (G, MO); Carretera al Chore, Entre Arroyo Las Londras y Arroyo El Tigre, 150 m, 24 July 1996, *M. Peña-Chocarro & L. Arroyo* 167 (G, MO); 25 km al norte del aseradero Moira yendo al Chore, Bosque de lianas del "Proyecto Bejucal" de USZ, 160 m, 26 July 1996, *A. Jardim et al.* 3189 (MO); Camino de Florida hacia las Mechitas, 450 m, 24 January 1997, *J. Guillen et al.* 297 (G, MO). Ñuflo de Chávez, Perseverancia, NW of Santa Cruz on Río Negro, Transect 3, 100 m, 11 May 1991, *A.H. Gentry & M. Peña* 73697 (MO); Near San Julian (S), 274 m, 27 February 2003, *L. Rico et al.* 1406b (K, MO). Sara, Área natural de manejo integrado Amboró, camino a San Isidro, pasando el puente del río Moyle, 278 m, 20 February 2006, *D. Villarroel et al.* 367 (NY, SPF). **BRAZIL. Acre:** Jordão, Trails and roads 2–3 km SE of Foz de Jordão, 250–275 m, 7 February 2009, *F.A. Michelangeli et al.* 1356 (SPF). Acrelândia, BR-364, km 87, Ramal do Projeto 2, 13 February 2000, *I.S. Rivero et al.* 309 (SPF). Bujari, Basin of Río Purus, Riozinho do Andirá (tributary of Río Acre), Seringal Andirá, 24 March 1995, *D.C. Daly et al.* 8457 (MO, NY, UFACPZ); Riozinho do Andirá, Colocação Curitiba, 8 June 1995, *A.R.S. Oliveira et al.* 540 (SPF, UFACPZ); Río Antimari, Floresta Estadual do Antimari, right bank, Colocação Pé da Terra, 11 March 1997, *D.C. Daly et al.* 9474 (SPF, UFACPZ). Cruzeiro do Sul, Perto do entroncamento com o

ramal Pentecoste, 26 April 2001, *L.G. Lohmann et al.* 370 (MO, NY). Marechal Thaumaturgo, Reserva Extrativista do Alto Juruá, Rio Juruá, S of confluence with Rio Acuriá and N of São João do Breu, Colocação Tapaúna, 31 March 1993, *D.C. Daly et al.* 7653 (INPA, NY, UFACPZ); *Ibid.*, Fazenda Paraguay, 3 April 1993, *D.C. Daly et al.* 7728 (INPA, NY, UFACPZ); *Ibid.*, Foz do Bajé, Boa Vista da União, 30 April 2001, *L.G. Lohmann et al.* 413 (MO, NY); *Ibid.*, Foz do Bajé, Boa Vista da União, Colocação Horizonte, 1 May 2001, *L.G. Lohmann et al.* 421 (MO, NY); *Ibid.*, Margem direita do Rio Arara, 6 May 2001, *L.G. Lohmann et al.* 476 (MO, NY). Plácido de Castro, Porto Edith, arredores da casa do Sr. João, Margem esquerda do Rio Abunã, 14 May 2001, *L.G. Lohmann & E.C. Oliveira* 505 (MO, NY). Porto Acre, Reserva Florestal do Humaita, Beira do Rio Acre, 21 March 1995, *C. Figueiredo et al.* 741 (SPF, UFACPZ). Rio Branco, Parque Zoobotânico, Estrada Dias Martins, próximo à entrada do Herbário, s.d., *G. Claros & R. Ehrich* 315 (UFACPZ); *Ibid.*, 3 March 1993, *C.S. Figueiredo & H.B.N. Borges* 100 (UFACPZ); *Ibid.*, inside main gate, 25 March 2002, *D.C. Daly* 11565 (NY); *Ibid.*, estrada de acesso ao herbário, 160 m, 5 March 2012, *M.C. Medeiros et al.* 37 (SPF); Km 1 ao km 23 da Rodovia Rio Branco–Porto Velho, 21 February 1978, *J.U. Santos et al.* 69 (MG, MO, US); Rio Branco–Porto Velho Highway, between km 22–37, 8 February 1979, *B.W. Albuquerque et al.* 1345 (MO, NY, US). Santa Rosa, Rio Purus, left bank, Seringal Refúgio, S of Igarapé Extrema de Baixo, 25 March 1999, *D.C. Daly et al.* 10083 (SPF, UFACPZ). Sena Madureira, BR-364, entre km 245–246, Fazenda Liberdade, 140–150 m, 6 February 2002, *M. Alves et al.* 2734 (SPF); Basin of Rio Iaco (tributary of Rio Purus), Fazenda São Jorge I, property of Acre Brasil Verde, timber concession of Laminados Triunfo Ltda, 107 km NW of Rio Branco on BR-364, then ca. 22 km E on Toco Preto access road, 200 m, 7 July 2008, *D.C. Daly et al.* 13228 (RB). Xapuri, Fazenda Bomfim, 18 March 1995, *D.C. Daly et al.* 8365 (MO, NY, UFACPZ); 19 March 1995, *D.C. Daly et al.* 8386 (MO, NY, UFACPZ); Margem direita do Rio Xapuri, 18 May 2001, *L.G. Lohmann & E.C. Oliveira* 567 (NY); Estrada para Brasília (BR-317) km 243, ramal da Cachoeira, a aproximadamente 8 km da BR, em frente à fazenda Bom Jesus, 200 m, 9 March 2012, *M.C. Medeiros et al.* 40 (SPF). **Amazonas:** Along Rio Castanho, tributary of Rio Padauri, upper Rio Negro Basin, 100–140 m, 16–24 February 1946, *F. Cardona* 1419 (US). Esperança, Ad ostium fluminis Javary, 11 February? 1942, *A. Ducke* 866 (F, IAN, MG, MO, NY, R, RB, US). Lábrea, Rio Curuquetê, Cachoeira Republica, 24 July 1971, *G.T. Prance et al.* 14559 (INPA, K, MG, MO, NY, R, US). Manaus, Road to Rio Negro from km 12 of Estrada do Aleixo, vicinity of Manaus, 14 December 1974, *A.H. Gentry* 13303 (INPA, MG). Parintins?, 1 April 1946, *J.M. Pires & G.A. Black* 1211 (K, IAN). Presidente Figueiredo, Estrada Manaus–Caracará, Reserva Biológica do INPA, 1978, *A. Anderson s.n.* (INPA 142420). **Mato Grosso:** Salto do Sepotuba, March 1909, *F.C. Hoehne* 1568? (R); March 1909, *F.C. Hoehne* 1582 (R); March 1909, *F.C. Hoehne* 1583 (R). Novo Mundo, Reserva Particular do Patrimônio Natural Lote Cristalino, Trilha do Teles Pires, 172 m, 7 May 2007, *D. Sasaki et al.* 1625 (K); Parque Estadual Cristalino, Cachoeira do Escondido, entrada pela Fazenda AJJ, 28 January 2008, *D. Zappi et al.* 900 (K). Tapirapoan, January 1914, *F.C. Hoehne* 5852 (R); January 1914, *F.C. Hoehne* 5853 (R). **Pará:** Rio Branco de Óbidos, Castanhal grande, 11 December 1913, *A. Ducke s.n.* (MG 15122); 25 January 1918, *A. Ducke s.n.* (MG 16943). Roadside on BR 163, Cuiabá–Santarém road, km 879, 310 m, 14 February 1977, *J.H. Kirkbride Jr. & E. Lleras* 2787 (F photo, INPA, K, MG, MO, NY, RB, US). Altamira, Xingu River, Assurini Indians, 15 June 1986, *W. Balée* 2597 (NY). Faro, 19 August 1907, *A. Ducke s.n.* (K, MG 8392); 30 January 1910, *A. Ducke s.n.* (INPA 11254, K, MG 10565); 11 May 1911, *A. Ducke s.n.* (MG 11647). Itaituba, Rio Tapajós, s.d., *A. Ducke s.n.* (MO 2305625, R 23820, RB barcode 58413). Jacundá, Rio Tocantins, 14 May 1951, *R.L. Fróes* 27092 (IAN, K, RB). Marabá, Serra dos Carajás, estrada do estéril sul, às proximidades da Barragem, 6 February 1985, *O.C. Nascimento & R.P. Bahia* 1189 (MG). Monte Alegre, Colonia Itauajury, 6 March 1923, *A. Ducke s.n.* (R 23821, RB barcode 58425). Oriximiná, Rio Trombetas ao norte, ao longo do rio próximo à Mineração Rio Norte, 22 July 1980, *C.A. Cid et al.* 1710 (F, G, INPA, MG, MO, NY, US); Porto Trombetas, Mineração Rio do Norte, Entrada do Alter do chão, 20 November 1990, *O.H. Knowles* 1620 (INPA); *Ibid.*, 1991, *Evandro & Knowles* 424 (INPA); Comunidade Pancada, 22 June 2006, *D.R. Oliveira & Augusto* 98 (INPA). Parauapebas, Serra dos Carajás, Vila de N-5, final da rua Angelim, 29 March 1989, *J.A.A. Bastos* 161 (MG). Pau D'Arco, Marajoara, s.d., *J. Grogan* 51 (IAN); 16 February 1997, *J. Grogan* 50 (IAN, INPA). Santarém, Serra de Pequiutuba, 28 March 1924, *J.G. Kuhlmann* 1816 (MO, R, RB); Estrada Santarém–Cuiabá, km 67, Reserva florestal do IBDF, 6 March 1979, *M.R. Cordeiro et al.* 1610 (IAN); FLONA Tapajós, BR-163, km 83, estrada de acesso à torre do projeto LBA, 150 m, 21 November 2011, *M.C. Medeiros & T. André* 36 (SPF). Tucuruí, BR-423, 15 March 1981, *U.N. Maciel & C.S. Rosário* 552 (MG). **Rondônia:** Estrada Porto Velho–Cuiabá, BR-364, km 290, margem esquerda da estrada, 13 February 1983, *C.A.A. Freitas et al.* 98 (INPA, MO). Porto Velho, Campo da sub-estação, 18 November 1949, *N.T. Silva* 358 (IAN, INPA, K); Guajará-

Mirim–Abunã, trecho entre o km 12 ao km 36, 1 February 1983, *L. Carreira et al.* 414 (IAN, INPA, MG, NY). Presidente Médici, Picadão que confina a 7a. e 8a. linha, margem esquerda da BR 429, 24 March 1986, *N.A. Rosa et al.* 4984 (MG, MO). COLOMBIA. **Antioquia:** Caucasia, Hacienda "La Candelaria", Universidad de Antioquia, 150 m, 5 September 2000, *R. Fonnegra et al.* 7157 (MO). **Chocó:** Upper Río Truandó, La Teresita (INDERENA Camp.), 100–200 m, 19 January 1974, *A.H. Gentry* 9383 (MO). **Meta:** Villavicencio, 450 m, 1–2 September 1917, *F.W. Pennell* 1602 (NY). DOMINICAN REPUBLIC. **El Seybo:** El Jovero, wooded slope at La Pocilga, 150 m, 27 July 1930, *E.L. Ekman* H.15782 (K, NY, US). **Monte Cristi:** Sabaneta, La Cidra, In vicinity of Laguna, 5–600 m, 9 November 1930, *E.J. Valeur* 532 (K, MO, NY, US); *Ibid.*, 640 m, 7 April 1955, *J.J. Jimenez et al.* 2909 (K, US). **Samaná:** Vicinity of Laguna, Samaná Peninsula, chiefly on the Pílon de Azúcar, 100–500 m, 19 December 1920, *W.L. Abbott* 330 (US); Sabana de la Mar, in Loma del Bejuco-clavo, 7 July 1930, *E.L. Ekman* H.15590 (US); La Laguna, Península de Samaná, 75 m, 5 August 1930, *E.L. Ekman* H.15853 (F, MO). ECUADOR. **Morona-Santiago:** Basin of Río Morona, Río Mangosiza, Mission of Miazal, 45 km ESSE of Sucua (by air), at edge of cultivated field at Chumbee's house, 300 m, 19 February 1990, *C.F. Limbach & M.D.* 125 (MO). El Centro Shuar Pampants, Río Kankaim (Cangaima), 300 m, 13 September 1985, *A. Warush* RBAE99 (MO, NY). El Centro Shuar Kankaim (Cangaimine), Río Kankaim (Cangaima), 20 km WNW del Taisha, 500 m, 15 October 1985, *D. Shiki* RBAE216 (NY); 15 October 1985, *D. Shiki* RBAE218 (MO, NY). Morona, Cordillera de Cutucú, Centro Shuar Uunsuants/Transkutuku, Bosque intervenido junto al Río Mainpaimi, 600 m, 18 January 2002, *W. Palacios et al.* 15532 (MO). **Napo:** Road from Lago Agrio Airport, 250 m, 11 February 1974, *A.H. Gentry* 9836 (MO). 9–11 km S of Coca on road to Auca oil field, 5 November 1974, *A.H. Gentry* 12491 (MO). 43–47 km S of Coca, end of Aucas oil field near Río Tiputini, 300 m, 5 November 1974, *A.H. Gentry* 12512 (MO). 4 km sur de Puerto Napo em el Río Napo, 500 m, 4 August 1984, *C. Dodson et al.* 14934 (MO). Estación Experimental INIAP-Payamino, 5 km NE de Coca, 250 m, 16–26 February 1986, *D. Neill* 7151 (MO, NY). Reserva Etnica Huaorani, Carretera y oleoducto de Maxus, km 119–120, Carretera a Plataforma GINTA, 235 m, March 1995, *M. Aulestia et al.* 3586 (SPF). Yasuni Forest Reserve, road from PUCE Scientific Station to end of road towards Waoroni Territory, 240–310 m, 29 June 1995, *P. Acevedo-Rdgz. & J.A. Cedeño* 7572 (MO, P, US). Tena, Estación Biológica Jatun Sacha, Río Napo, 8 km al este de Misahualli, Parcela Permanente 02, 400 m, 14 December 1989, *W. Palacios* 4771 (G, K, MO, NY). **Zamora-Chinchipe:** Nangaritza, Míazi, along Río Nangaritza, Transect 3, 850 m, 28 July 1993, *A.H. Gentry* 80558 (MO). GUIANA. **Upper Essequibo:** Rewa River, near Camp 2 at foot of Spider Mountains, 200–250 m, 22 September 1999, *M.J. Jansen-Jacobs et al.* 6073 (F, K, MO, NY, P, US). PERU. **Amazonas:** Bagua, Quebrada shimpunts alto río Cenepa, Monte al lado shimpunts, 800–1100 ft, 22 February 1973, *E. Ancuash* 41 (F photo, MO, NY); Quebrada Huampami, Río Cenepa, Monte orilla de Huampami, 600 ft, 29 May 1973, *R. Kayap* 829 (F, MO); Marañon valley, between Oracusa and Sta. Maria del Nieva, 240 m, 11 February 1978, *D.C. Wasshausen & F. Encarnación* 884 (G, K, MO, US); 2–3 km SW of Chiriaco on road to Bagua Chica, Marañon Valley, valley of Río Chiriaco, 300–330 m, 17 June 1978, *A.H. Gentry et al.* 23123 (MO); Imaza, Comunidad Aguaruna Yamayakat, 240 m, 23 March 1995, *C. Diaz et al.* 7597 (F, MO); *Ibid.*, 320 m, 13 March 1996, *N. Jaramillo et al.* 1374 (F, MO); *Ibid.*, Quebrada Kusú, transecto 2 × 500 m, 380 m, 1 November 1996, *R. Vásquez et al.* 21375 (MO); 5 November 1996, *R. Vásquez et al.* 21497 (MO); 9 November 1996, *R. Vásquez et al.* 21706 (MO); 9 November 1996, *R. Vásquez et al.* 21772 (MO); *Ibid.*, 600 m, 6 June 1997, *R. Vásquez et al.* 23937 (F, MO, NY). Condorcanqui, Huambisa, Valle del Río Santiago, approx. 65 km N de Pinglo, Quebrada Caterpiza, 200 m, 10 March 1980, *V. Huashikat* 2218 (MO); El Cenepa, Comunidad Aguaruna Pagki-Suwa, Río Cenepa, 289 m, 21 January 1997, *R. Vásquez et al.* 22079 (F, MO). **Cusco:** La Convención, Río Manguriari (Manguyari), Alto Urubamba, upstream to Río Manguriari, 750 m, 2 February 1991, *P. Nuñez & G. Ortiz* 12758 (MO); 2 February 1991, *P. Nuñez & G. Ortiz* 12837 (MO); 2 February 1991, *P. Nuñez & G. Ortiz* 12845 (MO); Echarate, San Martin-3 Well Site, 400 m, 10 March 1997, *P. Nuñez et al.* 19720 (NY, US). Quispicanchi, Hills around Río Araza between Pande Azucar and Quince Mil Airport, 292 km from Cusco, 643 m, 10 August 1991, *P. Nuñez* V. 13905 (MO); 10 August 1991, *P. Nuñez* 14080 (MO); Camanti, 254 km from Cusco road to Maldonado, 15 Quince area, 643 m, 18 February 1991, *P. Nuñez* 13006 (MO). **Huánuco:** Leoncio Prado, Vicinity of Tingo María, East of Río Huallaga, 670 m, 9 March 1962, *J. Schunke Vigo* 5813 (F, K, MO, US); Hills east of Tingo Maria, 5 October 1972, *T.B. Croat* 21121 (MO); Across Río Huallaga from Tingo Maria, 650 m, 17 January 1976, *A.H. Gentry et al.* 15894 (F, MO, NY); Rupa Rupa, Tingo María, Limestone hills opposite airport, 700–780 m, 9 December 1981, *T. Plowman et al.* 11276 (F, K); Tingo Maria, 670 m, 22 August 1959, *F. Woytkowski* 5391 (K, MO). Marañon, Valley of Río Huallaga, 110–140 km N of Tingo Maria, near San Martin border, 550 m, 4 February 1984, *A.H. Gentry & D.N.*

Smith 44929 (MBM, MO, NY). Pampahuasi, January 1830, *E.F. Poeppig 1617* (G). **Junín:** La Merced, 700 m, 20 May–4 June 1929, *E.P. Killip & A.C. Smith 23670* (US). **Loreto:** Tarapoto, November 1902, *E. Ule 6577* (G, K, MG). Alto Amazonas, Fortaleza, near Yurimaguas, 140 m, December? 1932, *G. Klug 2778* (BM, F, G, K, MO, NY, US); Old Andoas, Río Pastaza, 190 m, 26 December 1985, *W.H. Lewis & M.C. Gnerre 10372* (MO); Washintsa and vicinity, Río Huasaga, Achual Jivaro, 185 m, 16–26 June 1986, *W.H. Lewis et al. 11125* (MO); Puranchim, Río Sinchiyacu, 200 m, 21–27 November 1986, *W.H. Lewis et al. 11849* (MO); Petro Estación Morona, río Morona, 160 m, 22 March 1987, *W.H. Lewis et al. 12934* (MO); Andoas, Río Pastaza near Ecuador border, near airport, 230 m, 16 November 1979, *A.H. Gentry & C. Diaz S. 28135* (F, MO); *Ibid.*, 210 m, 15 August 1980, *A.H. Gentry et al. 29814* (F, MO); Balsapuerto, 220 m, January 1933, *G. Klug 2836* (BM, F, G, K, MO, NY, US). Coronel Portillo, IVITA, km 59 from Pucallpa toward Tingo Maria, 250 m, 16 January 1976, *A.H. Gentry & J. Revilla 15888* (MO). Datem del Marañón, Tierra Blanca, on Río Morona?, s.d., *G. Tessmann 4914* (G, NY). Loreto, Nueva Jerusalem and vicinity, Río Macusari, 220–300 m, 29 December 1985–3 January 1986, *W.H. Lewis et al. 10421* (MO); *Ibid.*, 10–11 June 1986, *W.H. Lewis et al. 10987* (MO); Tigre, Río Corriente, Teniente López, Caserio Jíbaros, Bosque 1o, 26 November 1979, *F. Ayala et al. 2428* (MO); Pampa Hermosa and vicinity, Río Corrientes, 1 km al S of junction with Río Macusari, 160 m, 3–20 December 1985, *W.H. Lewis et al. 10184* (MO); Nueva Nazaret, Río Morona, 160 m, 3 December 1986, *W.H. Lewis et al. 12445* (MO). Maynas, Río Zumun, affluent du rio Yahuas-Yacu, affluent du rio Ampí-Yacu, affluent de l'Amazone à Pebas, commune de Colonia, territoire des Indiens Bora, 14 June 1978, *S. Barrier 1095* (F, G, NY, P); Caseria Alianza, Río Tamshiyacu, trail toward Río Manítí, 140 m, 1 August 1980, *A.H. Gentry et al. 29319* (MO); 1 August 1980, *A.H. Gentry et al. 29321* (MO); Yanamono, Explorama Tourist Camp, Río Amazonas halfway between Indiana and mouth of Río Napo, 130 m, 10 July 1983, *A.H. Gentry et al. 42873* (MO); Alto Nanay, Near Santa Maria de Nanay, 24 February 1968, *D.R. Simpson & J. Schunke Vigo 702* (G, NY, US); Iquitos, Manacamiri, Río Nanay, 130 m, 5 March 1995, *F. Ayala 6867* (M); Quistococha, Ca. 10 km of Iquitos, Arboretum of Universidad de Amazonas, 15 November 1974, *A.H. Gentry & F. Ayala 12689* (F, MO). **Madre de Dios:** Manu, Parque Nacional del Manu, Río Manu, Cocha Cashu Station, 400 m, 3 April 1977, *B. Bell & R.B. Foster 6262* (F photo); *Ibid.*, 380 m, 17 October 1979, *A.H. Gentry et al. 26862* (F, MO); Pantiacolla, Serrania across Río Alto Madre de Dios from Shintuya, 450–650 m, 28 October 1979, *A.H. Gentry et al. 27282* (F, MO). Tambopata, Ca. 5 km from Puerto Maldonado near Río Tambopata, 200 m, 24 January 1976, *A.H. Gentry & J. Revilla 16318* (F, MO); Road from Puerto Maldonado to Tambopata, 0–4 km from Puerto Maldonado, 220 m, 25 January 1976, *A.H. Gentry & J. Revilla 16354* (F, INPA, MO, NY); Ca. 20 km W of Puerto Maldonado, on road to Quince Mil, 250 m, 23 April 1977, *A.H. Gentry et al. 19698* (F, MO); Outskirts of Puerto Maldonado, 210 m, 27 February 1981, *A.H. Gentry & K. Young 31757* (F, G, MO); Cuzco Amazónico, Río Madre de Dios below Puerto Maldonado, 200 m, 20 February 1989, *A.H. Gentry & P. Núñez 66032* (MO); Lago Sandoval, 13 km NE of Puerto Maldonado, lake edge, trails, 200 m, 25 July 1989, *P. Núñez 11199* (MO); Cuzco Amazónico, trail to Lago Sandoval across Río Madre de Dios, ca. 12 km E of Puerto Maldonado, 200 m, 21 February 1990, *A.H. Gentry & P. Núñez 69375* (MO); Río Heath, Peru/Bolivia border, 200 m, 2 March 1990, *A.H. Gentry & P. Núñez 69786* (MO, NY); 2 March 1990, *A.H. Gentry & P. Núñez 69793* (MO, NY); Puerto Maldonado, 650 ft, 21 March 1944, *R.J. Seibert 1899* (MO, US). **Pasco:** Oxapampa, Palcazu valley, near the confluence of Río Palcazu and Río Iscosacin, Juan Frantzen property, 300 m, 23 April 1983, *D.N. Smith 3890* (MO). **Puno:** Carabaya, Ridge between Río Candamo and Río Guacamayo, 400–600 m, 22 May 1992, *A.H. Gentry et al. 76975* (MO, NY). **San Martín:** Yurimaguas a Huallaga, 1924, *G. Tessmann 5513* (G). Tingo Maria, Near 21810, 625–1100 m, 30 October 1949–19 February 1950, *H.A. Allard 21811* (US). Mariscal Cáceres, Juanjui, Alto Río Huallaga, 400–800 m, December 1935, *G. Klug 4160* (BM, F, K, MO, NY, US); December 1935, *G. Klug 4194* (BM, F, K, MO, NY, US); Tocache Nuevo, Camino al pueblo viejo de Tocache, 18 January 1970, *J. Schunke Vigo 3732* (F, NY, US); Aeropuerto de Tocache, 400 m, 26 January 1970, *J. Schunke Vigo 3771* (F, G, NY, US); Al Nor-Oeste del vivero del Instituto Agropecuario de Tocache, 18 April 1970, *J. Schunke Vigo 3943 A* (F photo); Almendras, camino a pueblo Viejo, 400 m, 5 April 1975, *J. Schunke Vigo 8216* (MO, NY); Quebrada de Cachiyacu, afluyente de la quebrada de Huaquisha, 500–600 m, 17 May 1975, *J. Schunke Vigo 8481* (MO, NY); Quebrada de Ishichimi, cerca a Tocache, 400 m, 11 March 1978, *J. Schunke Vigo 10004* (F, MO, NY); Farm of Don Roberto Aguillar, 450 m, 1 July 1978, *T. Plowman & J. Schunke Vigo 7509* (F, MO); Cerro de Sin Sin, cerca a Bambamarca, 600–630 m, 20 January 1979, *J. Schunke Vigo 10729* (MO); Trail up Río Huallaga Valley toward Limón, 500 m, 11 March 1979, *A.H. Gentry et al. 25519* (F, MO, NY); Río de la Plata, cerca a la chacra del Sr. Esteban Arévalo, al borde de la quebrada, 650 m, 14 September 1980, *J. Schunke Vigo 12280* (F, K, MBM, MO, NY, RB); Río de la Plata, cerca a la Chacra del Sr.

Esteban Arévalo, 650 m, 15 September 1980, *J. Schunke Vigo 12298* (MO). Fundo Jeroglífico, propiedad del Sr. Luis Ludeña, al Sur de Tocache, 400 m, 20 July 1988, *J. Schunke Vigo 14266* (MO). Rioja, Along road Yorongos–La Florida near Rioja, 1000 m, 31 March 2001, *H. van der Werff et al. 16551* (F, MO, NY). San Martín, Chazuta, Río Huallaga, 260 m, April 1935, *G. Klug 4065* (BM, F, K, MO, NY, US); *Ibid.*, Lluçanayacu, 300 m, 3 November 2004, *J.S. Biset 43* (SPF); *Ibid.*, 400 m, 23 May 2005, *J.S. Biset & J.C. de la Cruz 336* (SPF); *Ibid.*, 24 May 2005, *J.S. Biset & J.C. de la Cruz 370* (SPF); *Ibid.*, Lluçanayacu, 600 m, 26 May 2005, *J.S. Biset & J.C. de la Cruz 453* (SPF). West side of Río Huallaga, West of Shapaja 2–8 km on trail to Tarapoto in the Cerros de Estoraquí, 1300 ft, 4–7 August 1937, *C.M. Belshaw 3217* (K, MO). **Ucayali:** Coronel Portillo, Bosque Nacional Alexander von Humboldt, km 86 Pucallpa–Tingo María road, 300 m, 27 March 1977, *A.H. Gentry et al. 18697* (MO); 27 March 1977, *A.H. Gentry et al. 18739* (MO); *Ibid.*, 270 m, February 1978, *C. Froehner 182* (MO, NY); *Ibid.*, 250 m, 8 March 1979, *A.H. Gentry et al. 25475* (INPA, MO, NY); *Ibid.*, 270 m, 9 February 1981, *A.H. Gentry et al. 31133* (G, MO, NY); Aguaytia, Woods to north of house, Don Diogenes del Aguila, 30 June 1960, *M.E. Mathias & D. Taylor 5062* (MO, US); Campoverde, Km 36, CF Basadre, 250–270 m, 27 October 1988, *F. Chavez 3* (MO). VENEZUELA. **Amazonas:** Alto Orinoco, Raudal de los Guaharibos, 24 July 1951, *L. Croizat 335* (F, NY). 22–23 km N of Samariapo on road to Puerto Ayacucho, 100 m, 29 June 1975, *A.H. Gentry & P. Berry 14572* (MO, US).

Taxonomic notes:—*Tynanthus villosus* was described as a new species based on the “shaggy indumentum”, “narrow inflorescences” and “persistent prophylls” (Gentry 1976: 60). Nevertheless, analyses of the collections of *T. polyanthus* and *T. villosus* throughout their distribution ranges indicated a continuum in the patterns of variation in the indumentum and inflorescence morphology, with vegetative portions from both species varying from villous to pubescent or glabrescent, and the inflorescences varying from large, compound and multi-flowered to small, simple or bearing only a few flowers. A careful analysis of specimens collected at different developmental stages (e.g., vegetative, flowering and fruiting) indicated that the prophylls of the axillary buds are generally lost in older specimens. Apart from the morphological similarities between these taxa, *T. villosus* appeared nested within *T. polyanthus* in the molecular phylogeny of the genus (Medeiros & Lohmann 2015). Our morphological and molecular phylogenetic observations thus led us to accept a more broadly circumscribed *T. polyanthus* and to synonymize *T. villosus* in *T. polyanthus*. As circumscribed here, *T. polyanthus* is characterized by the conspicuously tetragonal and angular young branchlets, simple tendrils, foliaceous prophylls of the axillary buds, lax inflorescences, short corollas (0.4–0.8 cm long), and unwinged fruits. *Tynanthus polyanthus* is sister to *T. cognatus* (Medeiros & Lohmann 2015), with which it shares some morphological features (see taxonomic notes under *T. cognatus*).

Nomenclatural notes:—In the protologue of *Schizopsis polyantha*, Bureau cited a specimen deposited at G. However, no duplicates of *Spruce 4895* were located at G during a visit in 2006 during which time materials were analyzed for the recently published Bignoniaceae synopsis (Lohmann & Taylor 2014). Therefore, Lohmann, in Lohmann & Taylor (2014), designated the specimen *Spruce 4895* deposited at P, where most of Bureau’s types are located, as the lectotype of *T. polyanthus*. In 2013, however, two duplicates of the collection *Spruce 4895* were located at the G herbarium, indicating that the G collection cited in the protologue of *S. polyantha* was not lost or destroyed as previously thought. Despite that, we here follow the lectotypification proposed in Lohmann & Taylor (2014).

As far as *T. myrianthus* is concerned, Bureau & Schumann (1896) did not clearly indicate in the protologue which of the duplicates of the collection *Poeppig 2388* was the lectotype. We here select the duplicate deposited at W, which has been broadly photographed and distributed as the holotype of *T. myrianthus* as its lectotype. Similarly, the best quality material of the collection *C.A.M. Lindman A2967* from S is here selected as a lectotype for *T. lindmanii*.

A neotypification of *T. caryophylleus* was necessary given that all of Bello’s types kept at B (Stafleu & Cowan 1976: 170) were subsequently destroyed during World War II (Hiepko 1987). Since no duplicates of those specimens were distributed to any other collection, a specimen of *T. caryophylleus* from Porto Rico (where the original type was collected), identified by Alain (author of the combination of *T. caryophylleus*) is here selected as the neotype.

12. *Tynanthus pubescens* Gentry (1978: 275) (as "*Tynnanthus*"). Type:—GUYANA. "Upper Mazaruni River Basin, Kamarang River, Singh line from Akapai to Eboropu escarpment", 13 October 1960, *S.S. Tillett & C.L. Tillett 45643* (holotype MO! (2242100); isotypes K! (barcode 449550), NY! (barcode 328985), US! (barcode 125788), VEN! (barcode 194023) photo).

Fig. 17: G–K

Lianas. Branchlets tetragonal to terete, without ritidome, finely striated, densely lenticled, densely pubescent to puberulent, with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands present; prophylls of the axillary buds 1.4–2.3 mm long, 1.1–2.3 mm wide, minute, shallowly triangular to triangular, densely puberulent throughout, with simple and peltate trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules densely pubescent to puberulent throughout surface, with simple, peltate and patelliform trichomes; petioles 1.5–7.5 cm long; petiolules 0.4–4 cm long; leaflets 5.9–15.4 cm long, 3.1–11.3 cm wide, chartaceous to coriaceous, discolor, obovate to elliptic; apex acuminate or obtuse, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface densely pubescent to puberulent (sometimes glabrescent) throughout, with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent, throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous or brochidodromous; pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyse or a compound thyse, lax, with conical aspect, first order (1.8–)3.6–6.3 cm long, second order 1.5–3.5 cm long; axis densely pubescent or densely puberulent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, densely pubescent to pubescent throughout, 0.6–1.5 mm long; floral bracts 0.3–1 mm long; floral pedicels 1–10 mm long. *Calyx* green to yellowish, 3–4.5 mm long, 2.5–4 mm wide, with transversal aperture, minutely 5-denticulate (sometimes truncate), densely pubescent to puberulent throughout outside, without patelliform glands; lobes 0.1–0.4 mm long. *Corolla* white, cream or pale yellow (sometimes pale lilac), 1–1.6 cm long, 4–6 mm wide at the tube opening; tube 5–8 mm long, internally tomentose at the base, with simple and long and short stipitate trichomes; nectar guides present, yellow; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.6–1.4 mm long, 1.2–2.4 mm wide, acute to obtuse; lower ones 3–5.1 mm long, 3–6 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 2–3 mm from the base of the corolla; shorter ones 6–9 mm long; longer ones 7–10 mm long; anthers thecae 0.9–1.2 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.3 mm beyond anther attachment; staminode 2–2.6 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 11–12 mm long; ovary 1.5–1.7 mm long, 0.9–1.2 mm wide, conical, densely pubescent; style 8–11 mm long, tomentose to pubescent at the base. *Fruit* a linear flattened capsule, 20–55 cm long, (1.2–)2.3–4.2 cm wide, woody, granular throughout (sometimes smooth near the midvein), without lenticels to densely lenticled, densely pubescent to pubescent, with simple, peltate and patelliform trichomes; central ridge double, prominent to very prominent; margins prominently raised (winged), 0.5–1.4 cm wide. *Seeds* body 1.2–2.8 cm long, 0.9–1.3 cm wide; wings 1–1.8 cm long.

Phenology:—Flowers from August to December and produces fruits from February to July.

Distribution and habitat:—Occurs in moist broadleaf forests from Brazil (Acre, Amazonas, Pará and Rondônia), French Guiana, Peru (San Martín), Suriname (Brokopondo and Nickerie) and Venezuela (Amazonas) (Fig. 19).

Additional specimens examined:—BRAZIL. **Acre:** Sena Madureira, Anjo, 5 September 1997, *I. Miranda et al. 1657* (INPA). **Amazonas:** Presidente Figueiredo, Rebio Uatumã, grade do PPBio, 9 June 2007, *J.G. Carvalho-Sobrinho & J.R. Mesquita 1563* (INPA). **Pará:** Região do Rio Jari, Estrada entre Monte Dourado e Munguba, km 4, 15–16 May 1969, *N.T. Silva 1966* (IAN, MO, NY); *Ibid.*, Estrada do Munguba, km 7, 21 May 1969, *N.T. Silva 2023* (MO, NY); *Ibid.*, Estrada entre Planalto A e Tinguelim, Km 16, 11 July 1969, *N.T. Silva 2398* (MO, NY). Entre Acará e Moju, 2 September 1975, *R.R. Santos 398* (IAN). Belém, Mocambo, Embrapa Forest Reserve, ca. 10 km from Belém, Transect 6, near sea level, 14 November 1984, *A.H. Gentry 49049* (IAN, MO). Itaituba, Rio Tapajós, S. Luiz, 4 December 1919, *A. Ducke s.n.* (R 22493, RB barcode 58493). Monte Dourado, Rio Jari, atrás do aviário, 12 June 1968, *E. Oliveira 4491* (IAN, NY). Oriximiná, Rio Trombetas, margem esquerda ao lado do lago Muçura a 30 km de Porto Trombetas, 23 July 1980, *C.A. Cid et al. 1748* (INPA, MG, NY). Santarém, Estrada para o Rio Curuá Una, acampamento do Guaraná, 30 November 1966, *P. Cavalcante & M. Silva 1474* (MG photo, MO,

NY); Rio Curuá Una, acima da Cachoeira do Palhão, 8 December 1966, *P. Cavalcante & M. Silva 1636* (IAN). **Rondônia:** Eixo JP 14, 20 May 1987, *S. Romaniuc Neto et al. 686* (SP). Porto Velho, Instituto Agrônomo do Norte, 1952, *E. Cordeiro & J.F. da Silva 162* (MO, RB). FRENCH GUIANA: Station des Nouragues, Bassin de l'Arataye, 7 July 1989, *D. Sabatier & M.F. Prévost 2616* (P). Saül and vicinity, Route de Bélizon, N of Eaux Claires, 200–400 m, 10 August 1993, *S. Mori et al. 23213* (NY); *Ibid.*, less than 500 meters S of Eaux Claires, 230–300 m, 19 September 1994, *S. Mori et al. 23971* (NY, P, US). PERU. **San Martín:** Mariscal Cáceres, Tocache Nuevo, Trail up Río Huallaga Valley toward Limón, 500 m, 11 March 1979, *A.H. Gentry et al. 25566* (F photo, MO); 11 March 1979, *A.H. Gentry et al. 25579* (F, MO, NY). SURINAME. **Brokopondo:** NW Brokopondo Stuwmeer Lake (E of Brownsberg Nature Reserve), Tonka Island, trail west from main compound, 15 m, 11 February 1998, *M.J. Plotkin et al. 1293* (MO); *Ibid.*, 15 m, 4 February 1999, *B. Hoffman et al. 5282* (MO). **Nickerie:** Area of Kabalebo Dam project, ca. 4 km S of road camp, ca. 23 km SW of Avanavero dam site, 18 November 1976, *N.M. Heyde & J.C. Lindeman 164* (MO). VENEZUELA. **Amazonas:** Forest edge along Puerto Ayacucho–Samariapo highway 16–25 km S of Puerto Ayacucho, 100 m, 28 June 1975, *A.H. Gentry & P. Berry 14503* (MO). Parcela de estudio del mamure al E del Raudal Gavilán, 100 m, 1 February 1991, *G.A. Romero et al. 2289* (MO). Transecta entre Raudal Gavilancito, Río Gavilán, y la parcela de mamure, incluyendo zona al N del caño que bodea la parcela, 80–100 m, 9 February 1992, *G.A. Romero et al. 2331* (MO).

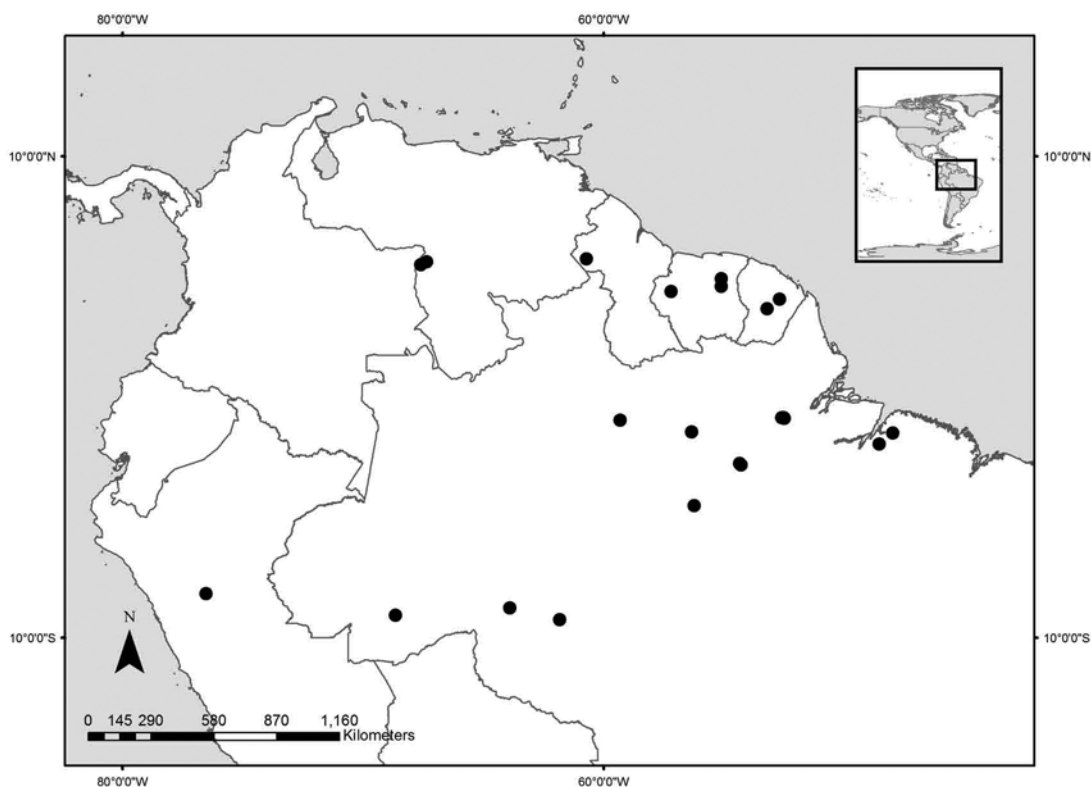


FIGURE 19. Distribution of *Tynanthus pubescens*.

Taxonomic notes:—*Tynanthus pubescens* is morphologically similar to *T. densiflorus* (see taxonomic notes under *T. densiflorus*), and also shares obovate to elliptic leaflets with *T. cognatus* (see taxonomic notes under *T. cognatus*). *Tynanthus pubescens* is sister to another Amazonian species, *T. panurensis* (Medeiros & Lohmann 2015), with which it also shares other morphological features (see taxonomic notes under *T. panurensis*). Despite those morphological similarities, *T. pubescens* can be easily recognized by the densely pubescent to puberulent branchlets, petioles and petiolules, interpetiolar patelliform glands, and fruits with double central ridge.

13. *Tynanthus sastrei* Gentry (1980: 214). Type:—FRENCH GUIANA. Sinnamary: “Route de Ste. Elie, 3 km avant la parcelle, ARBOCEL”, 23 September 1977, *C. Sastre 6015* (holotype MO! (2630185); isotypes CAY! photo, P! (barcodes 481495, 481496)).

Fig. 20: A–D

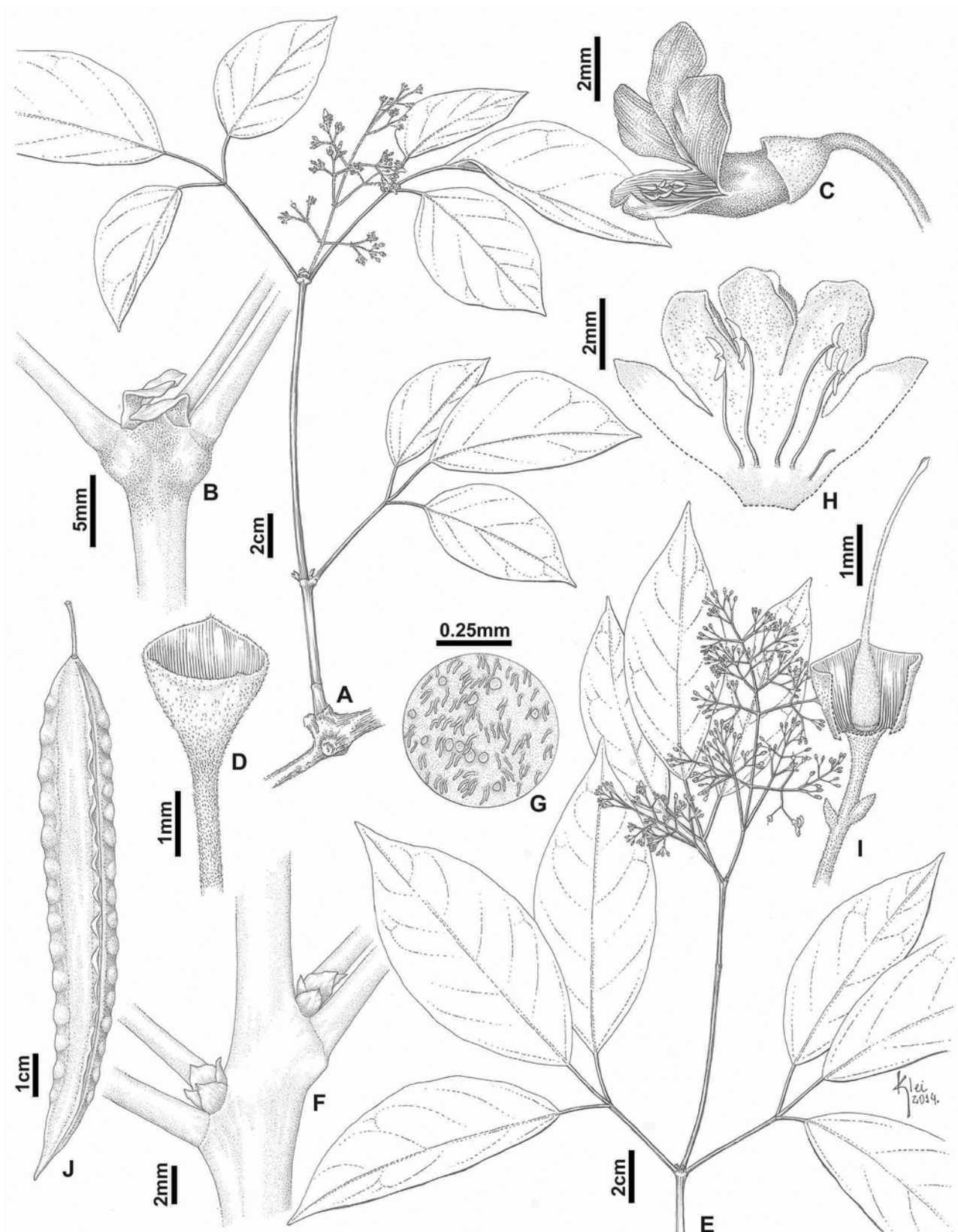


FIGURE 20. A–D. *Tynanthus sastrei*: A. Flowering branch; B. Interpetiolar region showing the foliaceous prophylls of the axillary buds; C. Flower; D. Calyx with denticulate apex (L. Skog 7043, NY). E–J. *T. schumannianus*: E. Flowering branch; F. Interpetiolar region showing the bromeliad-like prophylls; G. Detail of inflorescence axis indumentum, showing patelliform trichomes; H. Open corolla showing the androecium; I. Open calyx showing the gynoecium (M. Nee 38171, NY); J. Fruit (M. Lewis 37532, MO). Illustration by Klei Sousa.

Lianas. Branchlets subtetragonal to terete, without ritidome, finely striated or not, lenticled to densely lenticled, pubescent to puberulent (especially at the nodes), with simple and peltate trichomes; interpetiolar ridge absent or present; interpetiolar patelliform glands absent; prophylls of the axillary buds 3.5–6.5 mm long, 1.3–2 mm wide, foliaceous, elliptic to obovate, puberulent throughout, with simple, peltate and patelliform trichomes. *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules pubescent to puberulent throughout surface, with simple and peltate trichomes; petioles 2.3–6.6 cm long; petiolules 1.2–3.8 cm long; leaflets (4.8–)6–16.5 cm long, (2.1–)3.6–9.5 cm wide, chartaceous to coriaceous, concolor, elliptic; apex acuminate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface pubescent to puberulent on and near the veins (sometimes throughout), with simple, peltate and patelliform trichomes; the adaxial surface pubescent to glabrescent throughout (sometimes only on and near the veins), with simple, peltate and patelliform trichomes; glandular trichomes distributed especially on the adaxial surface; second venation weak brochidodromous; pocket domatia with or without trichomes. *Inflorescence* axilar or terminal, a thyrses or a compound thyrses, lax, with conical aspect, first order (4.5–)10–22.5 cm long, second order 6–7 cm long; axis densely pubescent to puberulent, with simple and peltate trichomes; bracts of the inflorescence predominantly caducous, densely pubescent to puberulent throughout, (0.3–)0.5–3.2 mm long; floral bracts 0.3–0.6 mm long; floral pedicels 2.5–6 mm long. *Calyx* green, 1.2–2 mm long, 1.8–2.5 mm wide, with transversal (sometimes oblique) aperture, truncate or minutely 5-denticulate, densely pubescent to puberulent throughout outside, without patelliform glands; lobes 0.1–0.4 mm long. *Corolla* white, cream or pale yellow, 0.6–0.8 cm long, 2.5–4 mm wide at the tube opening; tube 3–4 mm long, internally glabrescent, with long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.5–1.1 mm long, 0.8–1.9 mm wide, acute to obtuse; lower ones 1.5–3.3 mm long, 1.9–3.7 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 1–1.3 mm from the base of the corolla; shorter ones 3–4 mm long; longer ones 3.5–4.5 mm long; anthers thecae 0.5–0.6 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.2 mm beyond anther attachment; staminode 1.7–2.3 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 5–5.5 mm long; ovary 1–1.2 mm long, 0.8–0.9 mm wide, conical, velutinous; style 4–4.3 mm long, tomentose at the base. *Fruit* not seen. *Seeds* not seen.

Phenology:—Flowers from February to October; the fruiting season is unknown.

Distribution and habitat:—Occurs in moist broadleaf forests from French Guiana and Suriname (Brokopondo) (Fig. 21).

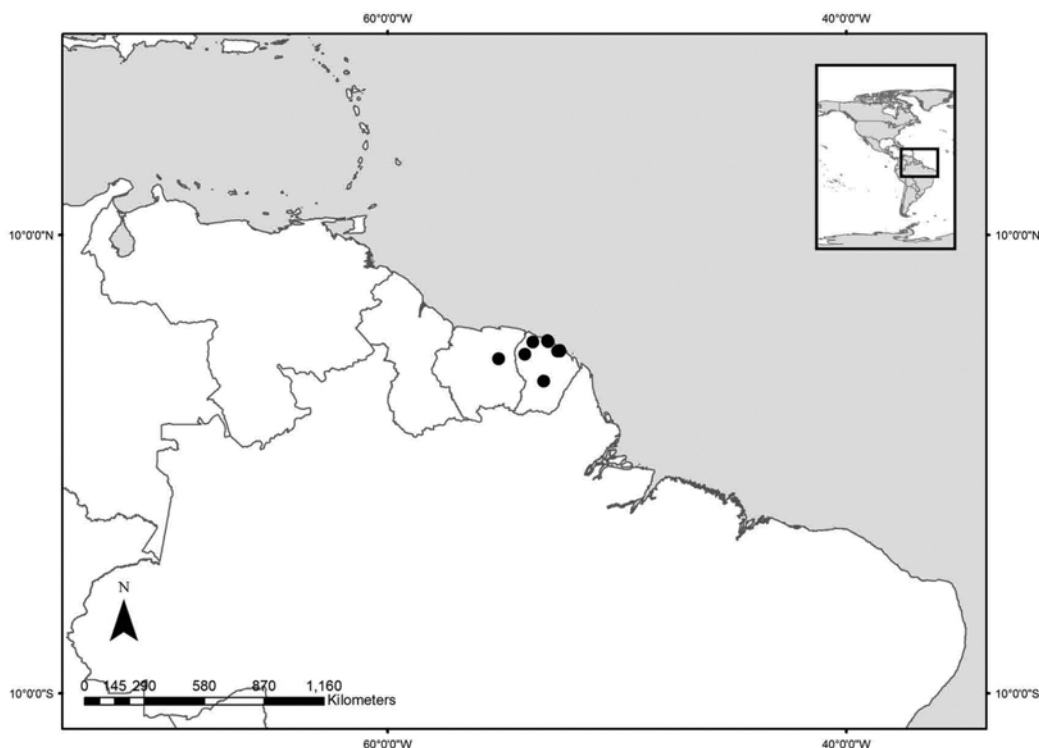


FIGURE 21. Distribution of *Tynanthus sastrei*.

Additional specimens examined:—FRENCH GUIANA. Sinnamary, route de St. Elie, 3 km avant la parcelle ARBOCEL, 12 September 1978, *C. Sastre 6103* (MO, NY, P). Bord de la piste de Ste. Elie, km 10.2, 18 April 1979, *M.F. Prévost 529* (MO, P). Région de Paul Isnard, SW de Citron vers le Mont Décou Décou, 8 September 1983, *G. Cremers 8164* (BR, MO, P). Piste de Saut Léodate, Région de Cayenne, 31 March 1986, *C. Feuillet 3683* (MO, P, US). Cayenne region, Along road in Forest Macouria, ca. 20 km in from highway D5 (Tonate–Montsinery), 1–30 m, 25 October 1986, *L. Skog et al. 7043* (MO, NY, US). Piste Forestière de Saut Léodate, Région de Cayenne, 40 m, 19 October 1991, *G. Cremers & C. Feuillet 12399* (K, MO, NY, P, US). Crique Valentin, 50 m, 29 October 1991, *G. Cremers et al. 12506* (NY, P, US). Saül and vicinity: Sentier Botanique, 200–400 m, 8 August 1993, *S. Mori et al. 23171* (NY). Piste de Saint-Elie, Interfluve Sinnamary/Counamama, Piste du km 22, 6 June 1995, *M.F. Prévost 3154* (MO). SURINAME. **Brokopondo:** Road to Brownsberg Nature Reserve, 5 km from Brownsberg village at old railroad grade, 50 m, 5 February 1999, *B. Hoffman et al. 5302* (MO).

Taxonomic notes:—*Tynanthus sastrei* shares a series of morphological features with *T. schumannianus*, namely the elliptic, chartaceous to coriaceous and acuminate-mucronate leaflets, similar leaflet dimensions (6–16.5 × 3.6–9.5 cm in *T. sastrei* and 4.4–14.2 × 2.2–9.1 cm in *T. schumannianus*), lax inflorescences, and a similar corolla length (0.6–0.8 cm in *T. sastrei* and 0.4–0.9 cm in *T. schumannianus*). Nevertheless, *T. sastrei* can be easily separated by the foliaceous prophylls of the axillary buds (versus bromeliad-like prophylls in *T. schumannianus*), absence of patelliform glands in the branchlets, petioles, petiolules and inflorescences axes (versus presence in *T. schumannianus*), and internally glabrescent corolla tube base (versus tomentose to pubescent or glabrescent in *T. schumannianus*). *Tynanthus sastrei* was recovered as sister to *T. pubescens* in the recent phylogeny of *Tynanthus* (Medeiros & Lohmann 2015); however, this species was sampled for only one molecular marker and further phylogenetic studies are still needed in order to confidently establish the phylogenetic position of *T. sastrei*.

14. *Tynanthus schumannianus* (Kuntze) Gentry (1974: 874) (as “*Tynnanthus*”). *Cuspidaria schumanniana* Kuntze (1898: 243). Type:—BOLIVIA. “Rio Yapacani”, June 1892, *C.E.O. Kuntze s.n.* (holotype NY! (barcode 328766); isotype US! (barcode 125768)).

Tynanthus weberbaueri Sprague (1908: 176) (as “*Tynnanthus*”). Type:—PERU. Junín: “Ad La Merced in valle Chanchamayo”, s. d., *A. Weberbauer 1896* (holotype K! (barcode 449551); isotype B destroyed).

Cuspidaria ovalis Rusby (1920: 120). Lectotype (designated here):—BOLIVIA. La Paz: Mapiri, July–August 1892, *M. Bang 1485* (NY! (barcode 328763) photo; isolectotypes A! (barcode 91978) photo, BM! (barcode 603779), E! (barcode 394580) photo, G! (barcode 25592), GH! (barcode 91977) photo, K! (barcode 449500) photo, LE!, M!, MO! (1998977), NY! (barcodes 328764, 328765) photo, US! (barcodes 603943, 125767)).

Fig. 20: E–J

Lianas. Branchlets tetragonal to terete, with or without ritidome, finely striated (sometimes not evident, when young), lenticled to densely lenticled, glabrescent (sometimes pubescent at the nodes), with peltate and patelliform trichomes (sometimes also with simple); interpetiolar ridge absent (sometimes present); interpetiolar patelliform glands absent; prophylls of the axillary buds 1.5–3.5(–4.5) mm long, 1–3.5 mm wide, bromeliad-like, glabrescent (rarely puberulent) throughout, with peltate trichomes (rarely also with simple). *Leaves* 2–3 foliolated (more commonly 3); terminal leaflets often modified into trifid tendrils, without adhesive-disks on tip; petioles and petiolules glabrescent (sometimes pubescent) throughout surface, with peltate and patelliform trichomes (sometimes also simple); petioles (0.6–)1.1–5.5 cm long; petiolules 0.4–3.8 cm long; leaflets (2.8–)4.4–14.2 cm long, (1.7–)2.2–9.1 cm wide, chartaceous to coriaceous, discolor, elliptic; apex acuminate, mucronate; base cuneate or obtuse, symmetrical; margin entire; the abaxial surface glabrescent on and near the veins, with peltate and patelliform trichomes; the adaxial surface glabrescent on and near the veins, with peltate and patelliform trichomes; glandular trichomes distributed especially on the abaxial surface; second venation weak brochidodromous; pocket domatia without trichomes. *Inflorescence* axilar or terminal, a thyrse or a compound thyrse, lax, with conical aspect, first order 4.1–14.5 cm long, second order 1.2–5 cm long; axis densely pubescent to pubescent, with simple, peltate and patelliform trichomes; bracts of the inflorescence predominantly caducous, densely pubescent to pubescent throughout or only at margins, 0.5–3 mm long; floral bracts 0.3–0.6 mm long; floral pedicels 0.5–4 mm long. *Calyx* green, 1–2 mm long, 1.1–1.9 mm wide, with transversal or oblique aperture, truncate or minutely 5-denticulate, pubescent or puberulent throughout or only on teeth outside, with patelliform glands; lobes 0.1–0.4(–0.5) mm long. *Corolla* white, cream or pale yellow (sometimes pale green), 0.4–0.9 cm long, 1.5–3.5 mm

wide at the tube opening; tube 2–4 mm long, internally tomentose to pubescent or glabrescent at the base, with simple and long and short stipitate trichomes; nectar guides absent, but with a path of long and short stipitate trichomes; lobes densely pubescent to pubescent throughout lower ones and at the margin of upper ones; upper ones 0.3–1.7 mm long, 0.7–1.5 mm wide, acute to obtuse; lower ones 1.5–2.9(–3.5) mm long, 1.3–2.6 mm wide, obtuse to rounded. *Androecium* with fertile stamens inserted 0.8–1.3 mm from the base of the corolla; shorter ones 1.5–5 mm long; longer ones 2–6 mm long; anthers thecae 0.5–0.9 mm long, obovate to elliptic, subexserted; connective extending 0.1–0.2 mm beyond anther attachment; staminode 0.8–1.7 mm long, glabrescent, with long and short stipitate trichomes. *Gynoecium* 3.3–6.3 mm long; ovary 0.8–1 mm long, 0.5–0.7 mm wide, conical, velutinous; style 2.5–5.3 mm long, tomentose at the base. *Fruit* a linear flattened capsule, (5.5–)8–29.5 cm long, (0.5–)1–2.5 cm wide, woody, smooth to granular near the midvein and granular near the margins, without lenticels to densely lenticelled, glabrescent, with peltate and patelliform trichomes; central ridge single, slightly or not prominent; margins prominently raised (winged), (0.2–)0.4–1 cm wide. *Seeds* body 0.7–1.5 cm long, 0.3–0.9 cm wide; wings 0.4–1.4 cm long.

Phenology:—Flowers and fruits throughout the year.

Distribution and habitat:—Occurs in moist broadleaf forests from Bolivia (Beni, La Paz and Santa Cruz), Brazil (Acre, Amazonas, Mato Grosso, Pará and Rondônia) and Peru (Cusco, Junín, Madre de Dios, Puno and Ucayali) (Fig. 22).

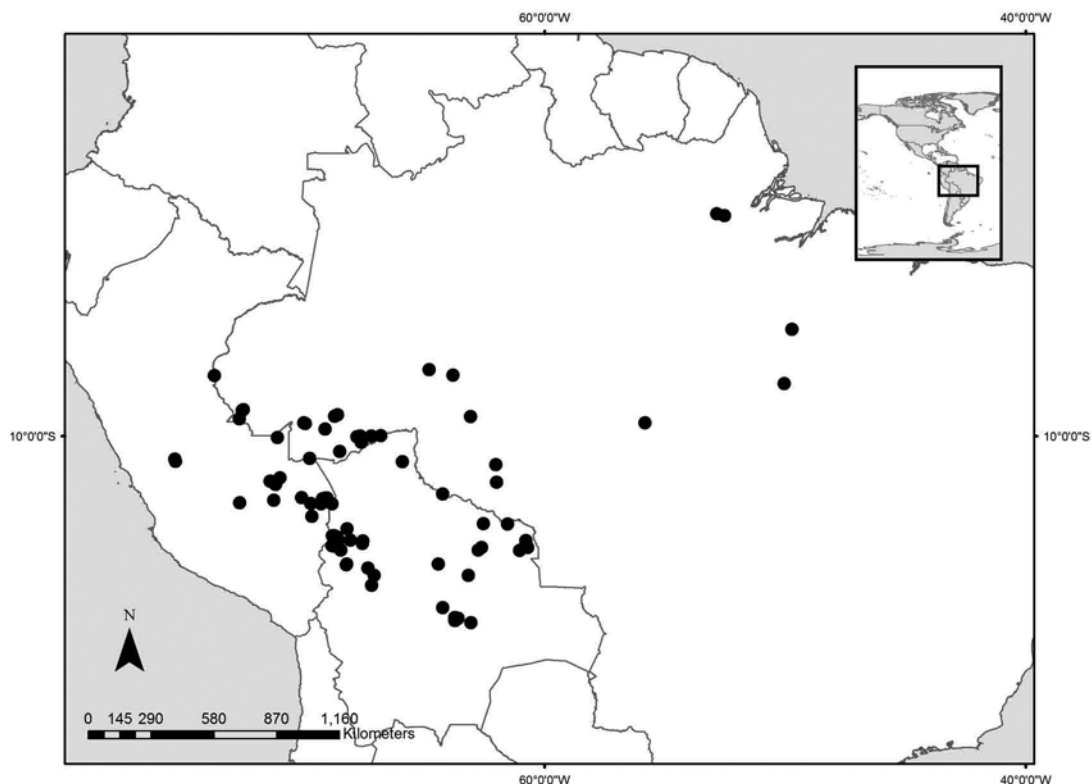


FIGURE 22. Distribution of *Tynanthus schumannianus*.

Additional specimens examined:—BOLIVIA. **Beni:** Iténez, Cantón Mateguá, Campamento móvil Cerro Azul ubicado a 30 km de la Comunidad de Tiquin, 697 m, 7 November 2006, *N.R. Ledezma et al. 1003* (SPF); 7 November 2006, *N.R. Ledezma et al. 1004* (SPF). José Ballivián, Vic. Rurrenabaque, 1000 ft, 25 November 1921, *M. Cardenas 1180* (NY); Estación Biológica Beni, 45 km E of the Río Maniqui on the road to Trinidad, then 6.5 km N to the Río Curiraba, then 2 hours by trail, passing Estancia Isla de Creta, to Arroyo Aguas Negras, 250 m, 15 November 1985, *J.C. Solomon 14733* (MO). Marbán, Estación Experimental Perotó, 97 km ESE of Trinidad on road to Santa Cruz, 230 m, 28 July 1982, *J.C. Solomon et al. 8177* (MO). Vaca Díez, 20.8 km E of Riberalta on road to Guayaramerin, 230 m, 25 September 1981, *J.C. Solomon 6419* (MO); 25 September 1981, *J.C. Solomon*

6429 (MO). **La Paz:** Abel Iturralde, Río Satariapo, 300 m, 1 June 1990, *A.H. Gentry & R. Foster 70824* (G, MO); Comunidad de Buena Vista, Senda a la Parcela Permanente de 1 ha de Estudio Etnobotánico, 3 km al NE de Buena Vista, 180 m, 14 April 1995?, *S. DeWalt et al. 130* (MO). Franz Tamayo, Serranía de Chepite, Campamento Scismico de Texaco, 15 km O del Río Tuichi, 700 m, 3–8 April 1992, *T. Killeen 3808* (MO); Parque Nacional y Area Natural de Manejo Integrado Madidi, NW de Apolo, Parcela temporal de muestreo (0.1 ha), 1175 m, 19 March 2005, *D. Choque et al. 213* (MO, NY); *Ibid.*, Azariamas, Resina, 700 m, 10 June 2005, *A. Araujo-M. et al. 1911* (MO, NY); *Ibid.*, rio Mojos, entre Mojos y Charopampa, Inventario fitossociológico Madidi 56, 1079 m, 4 July 2005, *A. Fuentes et al. 9405* (MO); *Ibid.*, Azariamas, Río San Juan, Bosque seco del sector Azariamas, Parcela Permanente de Muestreo 17, 1150 m, 15 November 2005, *S. Paredes et al. 168* (SPF); *Ibid.*, senda Azariamas–San Fermin, sector Monos PPM-1 (1 ha), 1100 m, 25 May 2006, *E. Ticona et al. 46* (SPF); *Ibid.*, senda Azariamas–San Fermin, Parcela temporal (0.1 ha), 1326 m, 27 May 2006, *I. Loza et al. 43* (SPF); *Ibid.*, 1248 m, 28 May 2006, *I. Loza et al. 85* (SPF); *Ibid.*, 1124 m, 10 June 2006, *I. Loza et al. 449* (SPF); *Ibid.*, Sumpulo, comunidad Virgen del Rosario, 939 m, 9 July 2008, *A. Araujo et al. 4222* (MO, SPF). Larecaja, Copacabana (about 10 km south of Mapiri), 850–950 m, 8 October–15 November 1939, *B.A. Krukoff 11245* (F, MO, NY). Sud Yungas, Basin of Río Bopi, San Bartolome (near Calisaya), 750–900 m, 1–22 July 1939, *B.A. Krukoff 10399* (G, MO, NY, US); Alto Beni, concesión de Sapecho, Yungas, Monte alto (-35 m), 550 m, 3 April 1989, *R. Seidel et al. 2678* (MO). Covendo, 2000 ft, 26 August 1921, *G.S. White 998* (NY, US). **Santa Cruz:** Andrés Ibáñez, Santa Cruz Botanical Garden, 12 km E of Santa Cruz. Transect 5, 375 m, 9 May 1991, *A.H. Gentry et al. 73634* (MO). Guarayos, 8 km N of Guarayos on road to Urubichá, 190 m, 13 July 1991, *M. Nee 41705* (K, MO, NY). Ichilo, Parque Nacional Amboró, Río Saguayo, 500 m, 19 January 1988, *M. Nee 35987* (MO, NY); *Ibid.*, 0.5 km upstream from last Andean foothills, Study site for native stand of *Bactris gassipaes*, 450 m, 20 December 1988, *M. Nee & M. Saldias P. 37297* (MO, NY); *Ibid.*, 0–2 km upstream from the Quebrada Yapoje, 350 m, 14 December 1989, *M. Nee 38171* (MO, NY); *Ibid.*, 1/2 km NE de El Chontal (Parcela estudiada) sobre el río Saguayo, 13.5 km SW de Huaytú, 450 m, 23 January 1990, *M. Saldias P. 972* (NY); *Ibid.*, Río Yapoje y Saguayo, 8 km SW de la Localidad El Carmen, Terraza antigua 30 m O del Río Saguayo, Parcela permanente de estudio, 360 m, 15–22 November 1991, *I. Vargas et al. 1143* (MO); 15–22 November 1991, *I. Vargas et al. 1173* (MO); 15 km SSE of Buena Vista, Estancia Rafael de Amboro, 400 m, 19 May 1991, *A.H. Gentry 74134* (MO). José Miguel de Velasco, El Encanto Camp, near El Encanto waterfall, edge of Huanchaco plateau, Transect 1, 280 m, 4 November 1991, *A.H. Gentry & B. Mostacedo 75539* (MO); *Ibid.*, Transect 7, 240 m, 5 November 1991, *A.H. Gentry & B. Mostacedo 75619* (MO); Campamento Los Fierros, camino al aserradero Moira, En el campo de la pista, 200 m, 18 October 1994, *R. Guillén & R. Choré 2401* (F, MO, NY); Alrededores del Parque Nacional "Noel Kempff M.", 131 km al N de Florida, 25 km antes de Bella Vista, 3 November 1994, *B. Mostacedo et al. 2469* (MO); Reserva Ecológica El Refugio, a 180 m al SW de la casa del campamento El Refugio, 750 m, 18 January 1995, *R. Guillén & V. Roca 2854* (K, MO, NY); *Ibid.*, a 2 km sobre la senda ecológica partiendo del campamento, 180 m, 30 January 1995, *R. Guillén & R. Choré 3130* (F, MO, NY); Parque Nacional Noel Kempff Mercado, Campamento Huanchaca I, Parcel Huanchaca I, 600 m, 5 November 1995, *P.F. Foster et al. 626* (MO, NY). Ñuflo de Chávez, Perseverancia, Vicinity of Perseverancia, on the banks of Río Negro, west bank of the river from the station to the brecha, and following the brecha ca. 2 km North of Santa Cruz 320 km, 250 m, 8 September 1990, *M. Lewis 37532* (MO); NW of Santa Cruz on Río Negro, Transect 10, 100 m, 13 May 1991, *A.H. Gentry et al. 73772* (MO). **BRAZIL. Acre:** Highway Abunã to Rio Branco, km 242–246, vicinity of Campinas, 18 July 1968, *E. Forero et al. 6336* (INPA, K, MG, MO, NY photo, R, US). 12 km from Rio Branco on Rio Branco–Porto Velho road, 30 September 1980, *S.R. Lowrie et al. 297* (INPA, MG, MO, NY, R, US). Acrelândia, Basin of Rio Madeira, Rio Abunã, Porto Dias, km 130 of BR-364, then 30 km on Ramal do Pelé, then Ramal do Gordo, colocação Bom Jardim, 131 m, 16 May 2005, *D.C. Daly et al. 13705* (RB, UFACPZ). Assis Brasil, Basin of Rio Purus, upper Rio Acre, left bank, Seringal São Francisco, Colocação Duretida, 26 March 1998, *D.C. Daly et al. 9798* (UFACPZ, SPF). Boca do Macauã, Basin of Rio Purus, Near mouth of Rio Macauhan (tributary of Rio Yaco), 11 August 1933, *B.A. Krukoff 5454* (G, K, MO, NY, RB, US). Manoel Urbano, Rio Chandless (tributary of Rio Purus), right bank, "Ananaí", 20 March 2002, *D.C. Daly et al. 11486* (SPF); 20 March 2002, *D.C. Daly et al. 11509* (SPF). Marechal Thaumaturgo, Reserva Extrativista do Alto Juruá, basin of Rio Juruá, Rio Bagé, near mouth of river, 12 March 1992, *D.C. Daly et al. 7363* (NY, UFACPZ); *Ibid.*, proximidades do Igarapé Caipora, Seringal Ceará, Fazenda Paraguaia, Rio Alto Juruá, 20 July 1992, *L.C. Ming & L.A. Ferreira 328* (UFACPZ); *Ibid.*, Colocação Terra Firme, Rio Tejo, 3 May 2001, *L.G. Lohmann & E.C. Oliveira 452* (NY). Plácido de Castro, AC 40, Km 20, no sentido Plácido/Rio Branco, Igarapé Visionário, 5 February 2000, *I.S. Rivero et al. 371* (UFACPZ, SPF). Rio Branco, Parque Municipal Chico Mendes, Rodovia AC-40 km 10, 150 m, 14 November

2006, *J.L.F. Junior et al.* 56 (RB). Sena Madureira, Rio Macauã, Seringal Riozinho, Colocação Provenir, 31 March 1994, *L. Lima et al.* 544 (MO, NY, UFACPZ). Serra do Moa, Vicinity of Serra da Moa village, 26 April 1971, *G.T. Prance et al.* 12484 (INPA, K, MG, MO, NY, R, US). Xapuri, Margem direita do Rio Xapuri, 17 May 2001, *L.G. Lohmann & E.C. Oliveira* 545 (MO, NY). **Amazonas:** Vicinity of Lábrea, 4 July 1971, *G.T. Prance et al.* 13954 (INPA, K, MO, NY, R, US). Estrada Humaitá–Lábrea, km 77, 11 June 1982, *L.O.A. Teixeira et al.* 1088 (MG, K, NY, US). **Mato Grosso:** Novo Mundo, Parque Estadual Cristalino, Serra à sudeste da pousada, à oeste da estrada de terra, 3 June 2007, *D. Sasaki et al.* 1752 (INPA, K). **Pará:** Rio Itacaiuna, mata da cachoeira Grande, 15 June 1949, *R.L. Fróes & G.A. Black* 24530 (K, RB). Almeirim, Pilão, estrada de Castanheiro, 24 January 1969, *N.T. Silva* 1679 (IAN, K, MO, NY). Monte Dourado, Rio Jarí, 1 February 1968, *E. Oliveira* 4064 (IAN, MO, NY); 4 February 1968, *E. Oliveira* 4105 (IAN, NY). Pau D'Arco, Marajoara, 12 February 1997, *J. Grogan* 49 (IAN, INPA). **Rondônia:** Porto Velho to Cuiabá highway, vicinity of Santa Bárbara, 15 km east of km 117, 14 August 1968, *G.T. Prance & J.F. Ramos* 6926 (F photo, INPA, K, MG, NY, P, R). RO-429, km 105, 6 July 1983, *M.G. Silva* 6556 (MG). Ca. 5 km NW of Costa Marques, 150 m, 29 March 1987, *M. Nee* 34568 (INPA, MO, NY). Alta Floresta d'Oeste, Serra dos Parecis, a 27 km de Alta Floresta, na linha 65 da Topografia BASEVI, 3 December 1982, *P. Lisboa et al.* 2748 (MG). PERU. **Cusco:** La Convención, Río Manguriari (Manguyari), Alto Urubamba, upstream to Río Manguriari, 750 m, 2 February 1991, *P. Núñez & G. Ortiz* 12795 (MO). **Junín:** Chanchamayo, Río Colorado, near jct. with Río Chanchamayo, 500–600 m, 7 February 1983, *A.H. Gentry et al.* 40128 (F, MO). **Madre de Dios:** Manu, Parque Nacional de Manu, Cocha Cashu Station, 380 m, 16 October 1979, *A.H. Gentry et al.* 26792 (F, MO); *Ibid.*, 350 m, 1 October 1980, *R.B. Foster* 5435 (F, G, MO, NY); *Ibid.*, Calpa guacamayas vicinity, 400 m, 7 September 1986, *P. Núñez* 5999 (MO, NY); *Ibid.*, 250 m, 24 June 2000, *R.J. Burnham* 2444 (F photo); *Ibid.*, 150 m, 5 June 2001, *L.G. Lohmann et al.* 613 (MO); *Ibid.*, 150 m, 11 June 2001, *L.G. Lohmann & C. Machaca* 631 (MO); Pantiacolla, Serrania across Río Alto Madre de Dios from Shintuya, 480–840 m, 29 October 1979, *A.H. Gentry et al.* 27352 (MO). Tambopata, Aeropuerto Maldonado, 350 m, 18 January 1967, *C. Vargas C.* 18798 (US); Ca. 5 km from Puerto Maldonado near Río Tambopata, 220 m, 24 January 1976, *A.H. Gentry* 16291 (F, MO, NY); Road from Puerto Maldonado to Tambopata, 0–4 km from Puerto Maldonado, 220 m, 25 January 1976, *A.H. Gentry & J. Reville* 16329 (F, MO, NY); Lago Tres Chimbadas, ca. 65–70 river km SSW Puerto Maldonado, ca. 10–15 air km NW effluence Río La Torre (Río D'Orbigny)/Río Tambopata, 260 m, 16 June 1980, *P.J. Barbour* 5749 (F, G, MO); Tambopata Tourist Camp at junction of Ríos Tambopata and La Torre, 280 m, 22 July 1985, *A.H. Gentry et al.* 51223 (MO); Trocha a la Colpa de Guacamayos en el riachuelo, Río Manu entre Cumerjali y Cocha Cashu, 350 m, 22 January 1987, *P. Núñez & L. Quiñones* 6912 (MO); Tambopata Nature Reserve, junction of Ríos La Torre and Tambopata, Swamp Tree Plot, 250 m, 1 June 1987, *A.H. Gentry & N. Jaramillo* 58012 (MO); Comunidad Nativa de Infierno, Hermosa Chica, Study plot 1, 260 m, 4 April 1989, *M. Alexiades & M. Arevalo* 579 (K, MO, NY, US); Cuzco Amazónico, 15 km ENE of Puerto Maldonado, 200 m, 17 December 1989, *A.H. Gentry et al.* 68930 (MO); *Ibid.*, TREE PLOT 2-U, 200 m, 3 March 1990, *A.H. Gentry & P. Núñez* 69848 (MO); Cuzco Amazónico, across Río Madre de Dios on road to Lago Sandoval, 200 m, 19 December 1989, *A.H. Gentry et al.* 68979 (MO); 19 December 1989, *A.H. Gentry et al.* 69002 (MO); Pampas de Heath, 200 m, 25 February 1990, *A.H. Gentry & P. Núñez* 69560 (MO); Cuzco Amazónico Lodge, Lago Sandobal and Río Madre de Dios, 200 m, 14 April 1990, *P. Núñez* 12065 (MO); 14 April 1990, *P. Núñez* 12068 (MO); *Ibid.*, TREEPLOTS, 200 m, 16 April 1990, *P. Núñez* 12117 (MO); Puerto Maldonado, Los Amigos Biological Station, Madre de Dios River, ca. 7.0 km upriver from mouth of Río Los Amigos, Trocha Playa 360 m, a 25 m a la derecha, 25 February 2004, *A.P. Maceda* 1214 (SPF). **Puno:** Carabaya, Río Távora base camp, Non-transect, 400 m, 16 May 1992, *A.H. Gentry et al.* 76673 (MO). **Ucayali:** Purús, Purús, Río Curanja, cerca la comunidad nativa de Colombiana, 250 m, 21 February 2000, *J.G. Graham & J.S. Vigo* 1054 (INPA, MO, US); 24 February 2000, *J.G. Graham & J. Schunke Vigo* 1113 (NY).

Taxonomic notes:—*Tynanthus schumannianus* is morphologically similar to *T. sastrei*, and shares morphological features also with *T. espiritosantensis* and *T. labiatus* (see *T. espiritosantensis*, *T. labiatus* and *T. sastrei* notes). This species is recognized by the bromeliad-like prophylls of the axillary buds, glabrescent vegetative organs, and winged fruits. *Tynanthus schumannianus* is closely related to *T. espiritosantensis*, *T. fasciculatus*, *T. labiatus* and *T. micranthus* (Medeiros & Lohmann 2015).

Nomenclatural notes:—Three duplicates of the collection *M. Bang* 1485 were located at NY, where great part of Rusby's collections were kept (Stafleu & Cowan 1976: 114). The best quality flowering material is here selected as lectotype of *Cuspidaria ovalis*.

Doubtful and excluded names

Bignonia laxiflora Poeppig in Bureau & Schumann (1896: 198), *pro syn.*

Bignonia myriantha Poeppig in Bureau & Schumann (1896: 198), *pro syn.*

Chasmia ochroleuca Schott (1827: 409), *nom. nud.* Listed as a synonym of *T. elegans* in Bureau & Schumann (1896: 197).

Cleosma octandra Urban & Ekman in Sandwith (1962b: 466), *pro syn.*

Tynanthus angosturanus K. Schum in Knuth (1927: 636) (as “*angosturana*”), *nom. nud.*

Tynanthus confertiflorus Miers (1863: 193), *nom. nud.*

Tynanthus gibbus Miers (1863: 193), *nom. nud.*

Tynanthus goudotianus (Bureau) Bureau (1868: 274) (as “*gondotiana*”). This species is only known from the fragmented type, which is deposited at P and F. None of the type fragments provide sufficient information to allow an adequate identification of this taxon. The morphological features described in the protologue of *T. goudotianus* and detailed study of the type suggest that this species is morphologically similar to *T. schumannianus*.

Tynanthus hyacinthinus Standley (1935: 87) = *Bignonia hyacinthina* (Standl.) L.G. Lohmann (2008: 272)

Tynanthus igneus (Vell.) Rodrigues (1891: 50) = *Pyrostegia venusta* (Ker Gawl.) Miers (1863: 188)

Tynanthus laxiflorus Miers (1863: 193), *nom. nud.*

Tynanthus petiolatus Miers (1863: 193), *nom. nud.*

Tynanthus strictus Miers (1863: 193), *nom. nud.*

Vasconcellia chimonantha Martius in Bureau (1865: 375), *pro syn.*

Vasconcellia fasciculata (Vell.) Martius ex de Candolle (1845: 185), *pro syn.*

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Appendix. Index to specimens examined

Specimens are listed by collector in alphabetical order, followed by the collector's number presented in increasing order and species number. Type specimens are in bold.

- Sin col. 8061 (1) (P barcode 3606667)
 S.P.S. s.n. (1) (RB barcode 58285)
 Abbott, W.L. 330 (11)
 Acevedo-Rdgz., P. 7572 (11)
 Adriana s.n. (9) (HRCB 42809)
 Aguilar M., G. 472 (6); 630 (6); 685 (6); 992 (6); 1286 (6); 1399 (6); 1561 (6); 1805 (6); 3449 (6); 5206 (6); 8178 (6); 8908 (6)
 Albuquerque, B.W. 1345 (11)
 Alexiades, M. 579 (14)
 Allard, H.A. 21811 (11)
 Álvarez, D. 961 (6); 5026 (6); 5219 (6); 5378 (6); 6140 (6); 6297 (6); 8957 (6); 9199 (6); 9517 (6); 9560 (6); 10585 (6)
 Alvaro M., P. 605 (6)
 Alves, M. 2734 (11)
 Amarin, A.C. s.n. (1) (MO 3386506)
 Ancuash, E. 41 (11)
 Anderson, A. s.n. (11) (INPA 142420)
 Anderson, W.R. 12047 (11)
 Andrade, S.F. s.n. (9) (HRCB 55991)
 Araujo? 11364 (5) (P barcode 3606710)
 Araujo, A. 4222 (14)
 Araujo-M., A. 1911 (14)
 Araújo, R.S. 44 (5)
 Arvigo, R. 502 (6)
 Assis, A.M. 1292 (1)
 Assis, M.A. 1367 (5); 1595 (5); 1599 (9); 1666 (5)
 Aulestia, M. 3586 (11)
 Avanzi, C.A. s.n. (9) (FUEL 29323)
 Ayala, F. 2428 (11); 6867 (11)
 Azevedo, M.C.B. s.n. (9) (FUEL 22931)
 Balée, W. 2597 (11)
Bang, M. 1485 (14)
 Barbour, P.J. 5749 (14)
 Barreto, M. 1563 (1); 1824 (5)
 Barrier, S. 1095 (11)
 Barringer, K. 2671 (8)
 Barros, F. 2112 (1)
 Bastos, J.A.A. 161 (11)
 Beck, S.G. 6557 (11)
 Belém, R.P. 719 (1); 3129 (1)
 Bell, B. 6262 (11)
 Belshaw, C.M. 3217 (11)
 Benson, W. 45 (1)
 Bernacci, L.C. 1 (5); 1366 (9)
 Bernardi, L. 18227 (9)

Biset, J.S. 43 (11); 336 (11); 370 (11); 453 (11)
 Blake, S.F. 7802 (6)
 Blanchet, J.S. s.n. (5) (BM); 3267 (7)
 Borgo, M. 349 (1)
 Bowie, J. s.n. (1) (BM)
 Brade, A.C. 20165 (7)
 Braga, R. 80 (9)
 Breedlove, D.E. 57938 (6)
Britton, N.L. 8614 (11)
 Burnham, R.J. 2307 (10); 2444 (14)
 Cabrera, E. 4139 (6); 8349 (6)
 Cadorin, T.J. 799 (1)
 Calzada, J.I. 2907 (6)
 Campbell, E. 112 (6)
 Cardenas, M. 1180 (14); 4167 (11)
 Cardona, F. 1419 (11)
 Carneiro, J. 848 (1); 1068 (1); 1393 (1)
 Carneiro, J.S. 161 (1); 162 (1); 163 (1); 164 (1); 167 (1); 173 (1); 297 (1); 300 (9); 382 (9)
 Carreira, L. 414 (11)
 Carvalho-Sobrinho, J.G. 1563 (12)
 Casas, F. 8264 (11)
 Catharino, E.L.M. 444 (9)
 Cavalcante, P. 1474 (12); 1636 (12)
 Cavaleiro, A.L. s.n. (9) (FUEL 23840; RB barcode 535433; SPF barcode 197643; SPSF 40442)
 Chavez, F. 3 (11)
 Choque, D. 213 (14)
 Cid, C.A. 1710 (11); 1748 (12)
 Claros, G. 315 (11)
 Colín, S.S. 319 (6)
 Colque, O. 262 (11); 410 (11)
 Contreras, E. 942 (6); 1467 (6); 8517 (6); 10583 (6)
 Cordeiro, E. 162 (12)
 Cordeiro, M.R. 1610 (11)
 Cremers, G. 8164 (13); 12399 (13); 12506 (13)
 Crepaldi, M.O.S. 54 (1)
 Croat, T.B. **11927 (2)**; 12681 (2); 12904 (2); 13975 (2); 21121 (11); 23812 (6); 23599 (6); 23715 (6)
 Croizat, L. 335 (11)
 Curran, H.M. 213 (1)
 Daly, D.C. 5122 (10); 7363 (14); 7653 (11); 7728 (11); 8365 (11); 8386 (11); 8457 (11); 9474 (11); 9798 (14);
 10083 (11); 11486 (14); 11509 (14); 11565 (11); 13228 (11); 13705 (14)
 Demuner, V. 1510 (1)
 DeWalt, S. 130 (14)
 Dias, M.C. 21 (1)
 Diaz, C. 1105 (10); 7597 (11)
 Dodson, C. 14934 (11)
Donnell Smith, J. 1488 (6)
 Dressler, R. 4846 (8); 6191 (8)
 Ducke, A. s.n. (11) (MG 15122); s.n. (11) (MG 16943); s.n. (11) (K; MG 8392); s.n. (11) (INPA 11254; K; MG
 10565); s.n. (11) (MG 11647); s.n. (11) (MO 2305625; R 23820; RB barcode 58413); s.n. (11) (R 23821; RB
 barcode 58425); s.n. (12) (R 22493; RB barcode 58493); 866 (11)
 Ducke, J.A. 8396 (1) (2); 13544 (3) (2); 13579 (3) (2)
 Durigan, G. 30691 (1)
 Dusén, P. 11172 (1); 16341 (1)
 Dwyer, J.D. 1144 (2); 10189 (6); 10814 (6); 10923 (6)
 Edwall, G. s.n. (5) (F 896072; SP 15045)
 Egler, F.E. 42-227 (6)

Ekman, E.L. H.15590 (11); H.15782 (11); H.15853 (11)
 Estevan, D.A. s.n. (1) (HRCB 44200; 44201); 89 (1); 498 (1)
 Evandro 424 (11)
 Feuillet, C. 3683 (13)
 Figueiredo, C.S. 100 (11); 741 (11)
 Filho, A.J. s.n. (5) (VIC 6393)
 Filho, L.E.M. 1029 (7)
 Flores, R.S. s.n. (6) (F 782747)
 Folli, D.A. 1795 (1); 1898 (1); 4148 (1); **5931 (4)**; 6021 (1); 6274 (1)
 Fonnegra, R. 7157 (11)
 Forero, E. 6336 (14)
 Foster, P.F. 626 (14)
 Foster, R. 1178 (2)
 Foster, R.B. 5435 (14)
 Freitas, C.A.A. 98 (11)
 Froehner, C. 182 (11)
 Fróes, R.L. 24530 (14); 27092 (11)
 Fuentes, A. 3753 (11); 9405 (14)
 Furlan, A. 175 (1)
 Garcia, A.I. A68 (6)
 Gardner, G. 5030 (5)
 Garibaldi, C. 225 (2)
 Garvizu, M. 336 (11)
 Gaudichaud 559? (1) (P barcode 3606674)
 Gehrt, A. s.n. (5) (NY barcode 483765; SP 12903; US 1543120)
 Gentle, P.H. 1324 (6); 1652 (6); 3275 (6); 4654 (6); 5335 (6); 7339 (6); 7775 (6); 9132 (6)
 Gentry, A.H. 708 (2); 2058 (2); 2203 (2); 2271 (2); 2365 (2); 3875 (2); 4538 (2); 5024 (2); 5502 (2); 6696 (2); 6723
 (2); 7661 (6); 7689 (6); 7730 (6); 7755 (6); 7768 (6); 8014 (6); 8119 (6); 8222 (6); 8346 (6); 8489 (6); 9144
 (10); 9383 (11); 9836 (11); 12491 (11); 12512 (11); 12689 (11); 12792 (3); 12849 (3); 12997 (10); 13018 (3);
 13040 (3); 13181 (3); 13303 (11); 13527 (2); 14503 (12); 14572 (11); 15209 (2); 15888 (11); 15894 (11);
 16291 (14); 16318 (11); 16329 (14); 16354 (11); 18697 (11); 18739 (11); 19698 (11); 20476 (10); 21066 (10);
 21323 (10); 22055 (10); 23123 (11); 25475 (11); 25519 (11); 25566 (12); 25579 (12); 26792 (14); 26862 (11);
 27282 (11); 27352 (14); 28135 (11); 28174 (10); 29319 (11); 29321 (11); 29814 (11); 31133 (11); 31757 (11);
 40128 (14); 41745 (10); 42873 (11); 44262 (11); 44315 (11); 44350 (11); 44929 (11); 49049 (12); 49163 (5);
 49173 (5); 49709 (1); 49727 (1); 51223 (14); 52229 (10); 52280 (10); 56126 (10); 58012 (14); 58692 (5);
 58713 (5); 58727 (1); 58752 (1); 58780 (5); 59067 (5); 59077 (5); 59095 (1); 59101 (1); 59208 (1); 63339A
 (10); 65294 (10); 66032 (11); 68930 (14); 68979 (14); 69002 (14); 69375 (11); 69560 (14); 69786 (11); 69793
 (11); 69848 (14); 70824 (14); 73634 (14); 73697 (11); 73772 (14); 74134 (14); 75539 (14); 75619 (14); 76673
 (14); 76975 (11); 77563 (11); 77573 (11); 80558 (11)
 Glaziou, A. s.n. (1) (F 539388); 2638 (1); 4124 (1); 4683 (1); 4692 (1); 4692a (5); 4703 (7); 4709 (1); 4719 (1);
 12973 (1); 14108 (7); 16269 (7); 19664 (5)
 Graham, J.G. 1054 (14); 1113 (14)
 Grenand, P. 2787 (3)
 Grogan, J. 49 (14); 50 (11); 51 (11)
 Guillen, J. 297 (11)
 Guillén, R. 2401 (14); 2854 (14); 3130 (14)
 Hage, J.L. 1641 (1)
 Hahn, R. 3I? (10) (MO 2927651); 145 (10)
 Handro, O. s.n. (1) (SP 43041)
 Harmon, W.E. 2772 (6)
 Hatschbach, G. 9342 (9); 13033 (9); 22593 (9); 33671 (1); 48693 (4); 48829 (1); 50691 (1); 51518 (9); 69944 (1)
 Henschen, S. s.n. (1) (US 201385); s.n. (5) (US 201374)
 Heringer, E.P. s.n. (5) (RB barcode 58281; RB barcode 58305; MO 2609963); (RB barcode 58310); s.n. (7) (RB
 barcode 58263); 352 (5); 1176 (1); 1331 (7); 2519 (1); 2656 (5)
 Herzog, T. 1460 (11)
 Heyde, N.M. 164 (12)

Hoehne, F.C. 1568? (11); 1582 (11); 1583 (11); 5852 (11); 5853 (11)
Hoehne, W. 804 (5); 1184 (1)
Hoffman, B. 5282 (12); 5302 (13)
Holst, B.K. 4468 (6)
Hoover, W.S. 244 (6)
Huashikat, V. 2218 (11)
Irió, R. 194 (1)
Irwin, H.S. 2714 (5)
Jansen-Jacobs, M.J. 6073 (11)
Jaramillo, N. 1374 (11)
Jardim, A. 3189 (11)
Jardim, J.G. 2063 (1)
Jarenkow, J.A. 2281 (1)
Jiménez M., A. 2044 (8)
Jimenez, J.J. 2909 (11)
Junior, J.L.F. 56 (14)
Kaehler, M. 276 (1); 277 (9); 310 (9); 338 (1)
Kayap, R. 829 (11)
Kegler, A. 158 (1)
Killeen, T. 3808 (14)
Killip, E.P. 23670 (11)
Kinupp, V.F. 75 (1); 230 (1); 1630 (1)
Kirkbride, J.H. 2787 (11)
Klein, R.M. 1054 (1); 7238 (1); 8542 (1); 10008 (1)
Klug, G. 1972 (10); 2778 (11); 2836 (11); 4065 (11); 4160 (11); 4194 (11)
Knapp, S. 1053 (2)
Knowles, O.H. 1620 (11)
Krukoff, B.A. 5454 (14); 10399 (14); 10456 (11); 10695 (11); 11245 (14)
Kuhlmann, J.G. s.n. (1) (R 23803; RB barcode 58297) (RB barcode 58293; RB barcode 58341; NY barcode 483758) (RB barcode 58318); s.n. (5) (RB barcode 58468; VIC 2672); 1816 (11)
Kuhlmann, M. s.n. (5) (SP 36635); 1278 (5)
Kuntze, C.E.O. s.n. (14) (NY barcode 328766; US barcode 125768)
Labiak, P.H. 2016 (9)
Ledezma, N.R. 1003 (14); 1004 (14)
Leitão Filho, H.F. 1583 (1)
Lent, R.W. 42 (8)
Lentz, D. 2744 (6)
Leoni, L.S. 4366 (1)
Lewis, M. 37532 (14)
Lewis, W.H. 10184 (11); 10372 (11); 10421 (11); 10987 (11); 11125 (11); 11849 (11); 12445 (11); 12934 (11)
Lima, L. 544 (14)
Lima, S. 13194 (1)
Limbach, C.F. 125 (11)
Lindman, C.A.M. A2967 (11)
Lindeman, J.C. 3354 (9); 3409 (9)
Linneo, I. 1326 (11)
Lisboa, P. 2748 (14)
Lohmann, L.G. 370 (11); 413 (11); 421 (11); 452 (14); 476 (11); 505 (11); 545 (14); 567 (11); 613 (14); 631 (14); 663 (1); 680 (1)
Lombardi, J.A. 793 (5); 6990 (9); 8739 (9)
Londoño, C. 625 (10); 1449 (10)
Lopes, M.M.M. 158 (5); 174 (5)
Losi, R. s.n. (9) (FUEL 25345)
Lovato, M.C. 381 (9); 388 (1); 400 (1)
Lowrie, S.R. 297 (14)
Loza, I. 43 (14); 73 (11); 78 (11); 85 (14); 449 (14)

Lundell, C.L. 2193 (6); 6168 (6); 6354 (6); 15999 (6); 16142 (6)
Luschnath, B. s.n. (1) (BR)
 Maceda, A.P. 1214 (14)
 Maciel, U.N. 552 (11)
 Madruz, M. 678 (7)
 Marínquez, G.I. 4035 (6)
 Markgraf, F. s.n. (1) (SPSF 4061)
 Marquete, R. 202 (7)
 Martínez S., E. 8301 (6); 15000bis (6); 18357 (6); 18582 (6); 18966 (6); 23472 (6); 29324 (6); 29720 (6)
 Mathias, M.E. 5062 (11)
 Matuda, E. 3277 (6)
 Meave, J. 1433 (6)
 Medeiros, M.C. 19 (5); 21 (3); 22 (3); 25 (3); 28 (1); 30 (7); 31 (7); 32 (9); 33 (1); 34 (9); 36 (11); 37 (11); 40 (11);
 41 (4); 42 (1)
 Medri, C. 305? (1) (FUEL 29356)
 Mello, J.C. s.n. (5) (NY barcode 483766; US 2515368); 8 (5) (K; P barcode 3606702); 8a (5) (K; P barcode
 3606703); 8β (5) (P barcode 3606704); 8y (5) (K; MO 3395613; P barcode 3606705; US 2515615); 8yt (1) (P
 barcode 3606711); **26 (9)**; 51 (1)
 Mello-Silva, R. 1317 (7)
 Mexia, Y. 4802 (5)
 Michelangeli, F.A. 1356 (11)
 Ming, L.C. 328 (14)
 Miranda, I. 1657 (12)
 Monteiro, S.V. 2627 (5)
 Montgomery, G. 195 (2); 199 (2)
 Moraes, M. 2074 (11)
 Mori, S. 23171 (13); 23213 (12); 23971 (12)
 Mosén, H. 1488 (1); 3960 (5)
 Mostacedo, B. 2469 (14)
 Müller, F. 166 (1); 298 (1)
 Nakano, E.M. s.n. (9) (FUEL 24556)
 Nascimento, O.C. 1189 (11)
 Nee, M. 33781 (11); 33837 (11); 34568 (14); 35987 (14); 37297 (14); 38171 (14); 41705 (14); 48058 (11); 48385
 (11); 48546 (11); 52391a (11); 52633 (11); 53129 (11)
 Neill, D. 7151 (11)
 Neves, M.I.O.J. s.n. (1) (FUEL 523)
 Nuñez, P. 5999 (14); 6912 (14); 11199 (11); 12065 (14); 12068 (14); 12117 (14); 12758 (11); 12795 (14); 12837
 (11); 12845 (11); 13006 (11); 13905 (11); 14080 (11); 19720 (11)
 Ogido, S.N. 7 (9)
 Oliveira, A.R.S. 540 (11)
 Oliveira, D.R. 98 (11)
 Oliveira, E. 4064 (14); 4105 (14); 4491 (12)
 Oliveira, R.S. 540 (11)
 Orozco, A.2208 (6)
 Ortíz, R.T. 1782 (6)
 Pabst, G.F.J. 10319 (1)
 Palacios, W. 4771 (11); 15532 (11)
 Paredes, S. 168 (14)
 Pavão, O.C. s.n. (9) (FUEL 29345); 5 (9)
 Peixoto, A. 3037 (1); 3404 (1); 3406 (1)
 Pelisson, A. s.n. (1) (FUEL 7382)
 Peña-Chocarro, M. 167 (11)
 Pennell, F.W. 1602 (11)
Pentland, J.B. 33 (11)
 Perdiz, R.O. 84 (1)
 Perry, A. 686 (11)

Pickel, D.B.J. s.n. (5) (SPF barcode 200750; SPSF 948; US 1564384)
 Pirani, J.R. 3775 (7); 3900 (7)
 Pires, J.M. 1211 (11)
 Pizzaia, L.N. 45 (1)
 Plotkin, M.J. 1293 (12)
 Plowman, T. 6706 (10); 7509 (11); 11276 (11)
 Poeppig, E.F. 1617 (11); **2388 (11)**; 2651 (11)
 Prance, G.T. 6926 (14); 12484 (14); 13954 (14); 14559 (11)
 Prévost, M.F. 529 (13); 3154 (13)
Procópio, L.C. 14 (3)
 Queiroz, L.P. de 10661 (7)
 Raimundo S.P. 1163 (1)
 Ramalho, R.S. 1621 (5)
 Rambo, B. 42705 (1)
 Regnell, A.F. s.n. (1) (K); II-198 (5) (MO 3395612) (K; LE) (R 23787; US 201375) (K) (P barcode 3606695) (P barcode 3606699) (P barcode 3606698) (K; MO 2305639; P barcode 3606697; R 23786; US 2515367) (P barcode 3606701) (P barcode 3606694) (BR; M) (BR) (US 1322404); **III-52 (1) (S 14-19845)**
 Reitz, P.R. 6147 (1); 8245 (1); 8537 (1); 8936 (1); 9102 (1); 9424 (1)
 Rezende, G.S.Z. 162 (1)
 Ribas, O.S. 5527 (9); 5668 (1)
 Rico, L. 1406b (11)
 Riedel, L.? s.n. (1) (NY) (LE)
 Riedel, L. s.n. (1) (BM; G; K; P barcode 3606732) (MO 4618844; NY barcode 483757; NY barcode 1032824); 88 (7); 231 (1)
 Rimachi Y., M. 4064 (10)
 Ritter, N. 2996 (11)
 Rivero, I.S. 309 (11); 371 (14)
 Rodas, L.A.C. 8 (1)
 Rojas, S. 102 (2)
 Romaniuc Neto, S. 686 (12)
 Romero, G.A. 2289 (12); 2331 (12)
 Rosa, N.A. 4984 (11)
 Sabatier, D. 2616 (12)
 Saldanha, J. s.n. (1) (R 128076)
 Saldias, M. 972 (14); 2928 (11)
 Sampaio, A. s.n. (1) (R 23545; RB barcode 66737)
 Sánchez, L. 402 (11)
 Santos, E.M. s.n. (5) (F 2170556); 76 (5)
 Santos, G.F. 7 (9)
 Santos, J.U. 69 (11)
 Santos, R.R. 398 (12)
 Sasaki, D. 1625 (11); 1752 (14)
 Sasaki, E.Y. s.n. (9) (ESA 103223; FUEL 29302; SPF barcode 201517; VIC 31746)
 Sastre, C. **6015 (13)**; 6103 (13)
 Schinini, A. 31364 (9)
 Schipp, W.A. 8910 (6)
 Schott, H.W. 5971 (1)
 Schunke Vigo, J. 3732 (11); 3771 (11); 3943 A (11); 5813 (11); **6852 (11)**; 8216 (11); 8481 (11); 10004 (11); 10729 (11); 12280 (11); 12298 (11); 14266 (11)
 Schwacke, W. s.n. (1) (K; R 23784)
 Seibert, R.J. 1899 (11)
 Seidel, R. 1207 (11); 2678 (14)
 Sellow, F. s.n. (1) (US barcode 125821) (US barcode 125825); s.n. (7) (LE; G-DC; HAL; K; NY; US); 1074 (1)
 Shattuck, O. 1108 (2)
 Shiki, D. RBAE216 (11); RBAE218 (11)
 Silva, E.M. s.n. (9) (RB barcode 527993)

Silva, F.C. 901 (9); 950 (1)
Silva, J.M. 2587 (9); 2214 (9)
Silva, L.H.S. 170 (1)
Silva, M.G. 6556 (14)
Silva, N.T. 358 (11); 1679 (14); 1966 (12); 2023 (12); 2398 (12)
Simpson, D.R. 702 (11)
Skog, L. 7043 (13)
Smith, D.N. 3890 (11)
Solomon, J.C. 6419 (14); 6429 (14); 8177 (14); 11594 (11); 13733 (11); 14733 (14); 15665 (11); 16919 (11)
Soto, J.C. 22687 (6); 23490 (6)
Sousa, M. 12382 (6); 12397 (6)
Souza, H.M. s.n. (5) (IAC 20158)
Souza, V.C. 5334 (7)
Spinelli, T. 219 (5)
Spruce, R. 2626 (10); 4895 (11)
St.-Hilaire, A. Catal. C2, N° 1342 (1); Catal. D, N° 25 (1)
Standley, P.C. 24535 (6)
Stehle, D.I. s.n. (5) (SPSF 1012)
Steinbach, J. 3224 (11); 5253 (11)
Steyermark, J.A. 45058 (6)
Sucre, D. 4576 (1)
Tameirão Neto, E. 215 (5)
Teixeira, L.O.A. 1088 (14)
Tellez, O. 2423 (6); 2456 (6); 3054 (6)
Tessmann, G. 4914 (11); 5513 (11); 6001 (1)
Tibiriçá, Y.J.A. 70 (5)
Ticona, E. 46 (14)
Tillett, S.S. 45643 (12)
Torres, R.B. 756 (5)
Treacy, J. 259 (10); 333 (10)
Udulutsch, R. 57 (5); 101 (1); 112 (5); 134 (1); 169 (5); 232 (5); 245 (5); 423 (9); 429 (5); 1619 (9)
Ule, E. 6577 (11)
Valeur, E.J. 532 (11)
Vargas C., C. 18798 (14)
Vargas C., I.G. 377 (11)
Vargas, I. 1143 (14); 1173 (14)
Vasquez, M. 927 (6)
Vásquez, R. 16543 (10); 17806 (10); 21375 (11); 21497 (11); 21706 (11); 21772 (11); 22079 (11); 23937 (11)
Vaz, A.F. 949 (1)
Velloso, H.P. s.n. (1) (MO 2286403)
Ventura A., F. 21496 (6)
Viana, L.C.S. s.n. (7) (BHCB 109098)
Vidal, M.R.R. 199 (5)
Vieira, A.O.S. s.n. (9) (FUEL 1661); 41 (9)
Vieira, M.C.W. 1235 (1)
Villagra, B.L.P. 225 (1)
Villarroel, D. 347 (11); 367 (11)
Volpato, L.A. s.n. (1) (FUEL 6375; HRCB 34681)
Walker, J.B. 138 (6)
Warush, A. RBAE99 (11)
Wasshausen, D.C. 884 (11)
Weberbauer, A. 1896 (14)
Wendt, T. 5280 (6)
van der Werff, H. 16551 (11)
White, G.S. 998 (14)
Whitefoord, C. 3115 (6); 9499 (6)

Widgren s.n. (1) (BR; P barcode 3606716); s.n. (5) (BR; MO 2698894; MO 3395608; P barcode 3606700); 49 (5);
94 (5); 243 (5); **743 (1)**
Williams, R.S. 508 (11)
Wood, J.R.I. 10423 (11)
Woytkowski, F. 5151 (10); 5391 (11)
Zampieri, C. 41 (9)
Zappi, D. 900 (11)
Zuntini, A.R. 147 (1); 240 (1); 241 (1)