

A New Species of *Maytenus* (Celastraceae) with Fleshy Fruits from Eastern Brazil, with Notes on the Delimitation of *Maytenus*

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Abstract—A new species of Celastraceae, *Maytenus megalocarpa*, is described and illustrated. The species is known from only a small number of collections from eastern Brazil, in the Atlantic Rainforest of Bahia and Minas Gerais states. It is considered endangered given the rapid deforestation of this biome. The species is readily distinguished from its congeners by its large, tardily dehiscent fruit that does not open by reflexed valves and by the seeds enveloped by thick arils. Given its remarkable fruits and the consequent initial doubt about the generic position of the new species in Celastraceae, a phylogenetic analysis using molecular data from plastid and nuclear rDNA gene regions, together with morphological characters, was performed. The new species was consistently resolved as nested within *Maytenus*, which itself is paraphyletic. Incongruence between the nuclear and plastid gene regions was identified for *Fraunhoferia*, *Maytenus texana*, and *Plenckia*. Future taxonomic changes are necessary to rigorously delimit *Maytenus* as a natural genus. Additional comments on geographical distribution, phenology and conservation status of the new species are also provided, as well as a key to the species of Neotropical *Maytenus* with spinose leaves.

Keywords—Atlantic Rainforest, Celastrales, phylogeny, taxonomy.

Maytenus Molina s.l. (including *Gymnosporia* (Wight & Arn.) Hook. f.) had traditionally been treated as a large genus of about 300 species that is widely distributed in the tropics and subtropics of both the Old and New Worlds (McKenna et al. 2011). The circumscription of the genus has been extensively debated (e.g. Loesener 1942; Sebsebe Demissew 1985). Recent phylogenetic analyses demonstrated that *Maytenus* (with *Moya* Griseb. and *Tricerna* Liebm. as synonyms) should be restricted to the Neotropical species (*Maytenus* sensu stricto; Simmons et al. 2008; McKenna et al. 2011). Yet even *Maytenus* sensu stricto is not a monophyletic group; rather, it is paraphyletic with *Fraunhoferia* Mart. and *Plenckia* Reissek nested within it (McKenna et al. 2011). Furthermore, the sections in *Maytenus* proposed by Loesener (1942) are non-monophyletic (McKenna et al. 2011) and more systematic study is needed to rigorously define the genus and identify its intrageneric relationships.

There are approximately 160 species of *Maytenus* in the New World (as circumscribed by Simmons et al. (2008) and McKenna et al. (2011)), ranging from the southern United States (*M. phyllantoides* Benth. and *M. texana* Lundell) south to Tierra del Fuego in Argentina (*M. boaria* Molina and *M. disticha* (Hook. f.) Urb.). Nearly 50 species are known from Brazil; they are distributed in many vegetation types, including Amazonian forests, the Atlantic Rainforest (including “restinga” (coastal sand-dune), ombrophylous dense forest, and semi-deciduous forest), caatinga and cerrado, including “campos rupestres” (rocky grasslands; Groppo 2008; Lombardi and Groppo 2010; Lombardi et al. 2012).

Maytenus is usually recognized by its flattened or carinate young twigs, alternate leaves with crenate, spinose, or entire margins, and flowers with a conspicuous intrastaminal disc. The fruit is perhaps the character most relied upon to identify the genus, being a capsule with two (or three) reflexing valves and one or two (up to four) arillate, erect seeds. Because *Maytenus* species have rather uniform floral and inflorescence structures, vegetative characters are heavily relied upon for species identification (Steyermark 1988).

In the course of taxonomic studies on Neotropical Celastraceae, a new species of the family was recognized from specimens in some Brazilian herbaria. Although similar to *Maytenus* in vegetative and floral characteristics, the fruit of the new species is unique in the genus, being larger and tardily dehiscent, with no reflexing valves when open, and larger seeds (Fig. S1). The unique fruit and seed morphology led us to perform a phylogenetic analysis using molecular and morphological data to identify the species’ closest relatives within Celastraceae. The phylogenetic analysis demonstrated that the new species is a member of *Maytenus* and is described herein as *M. megalocarpa*. In addition to the phylogenetic analysis and the new species description, we comment on the need for re-delimitation of *Maytenus*, and provide a key to the species of Neotropical *Maytenus* with spinose leaves.

MATERIALS AND METHODS

The description of the new species was based exclusively on specimens collected from mature individuals. Morphological studies were based on herbarium specimens from BHCB, CEPEC, HRCB, RB, SPF, and SPFR (acronyms according to Thiers (2012)), complemented by field work carried out in areas of the Brazilian Atlantic Rainforest in Ilhéus (Bahia), and Salto da Divisa (Minas Gerais). Flowers and fruits of herbarium specimens were rehydrated before being measured and drawn. These observations were supplemented with fluid-preserved material. Terminology used for leaf and general morphology follows Ellis et al. (2009) and Radford et al. (1974), respectively, while inflorescence terminology follows Weberling (1989). Fruit type was defined based on Spuji (1994). Data on geographical distribution, habitat preferences and phenology were taken directly from the exsiccatae.

Molecular Methods—Total genomic DNA was extracted from silica gel-preserved (Chase and Hills 1991) leaves of specimens J.A. Lombardi et al. 8883a and 8883b (HRCB) using the protocol described by Alexander et al. (2006). New sequences for two loci from the plastid genome (maturase K [*matK*] and *trnL-F*) and two gene regions from the nuclear genome (26S rDNA and the internal transcribed spacers [ITS] of rDNA) were generated for this project using the same protocols described by Simmons et al. (2012). All eight new sequences generated in this study have been deposited in GenBank under accession numbers JQ812681 through JQ812688.

Taxon Sampling—Nucleotide-based BLAST searches (Altschul et al. 1997) of GenBank were conducted using sequences from all five loci

clade of *Fraunhoferia* + *Maytenus texana* (26S rDNA: 51% JK; Fig. S2) or as sister to the upper *Maytenus* clade (ITS: 64% JK; rDNA: 77% JK; Figs. S3, S4). In contrast, *Fraunhoferia* + *Plenckia* were resolved as a clade in the reduced-taxon-sampling *matK* gene tree (94% JK; Fig. S6), the *trnL-F* gene tree (91% JK; Fig. S7), and the reduced-taxon-sampling plastid tree (100% JK; Fig. S9). *Maytenus texana* was alternately in a four-way polytomy (*trnL-F*; Fig. S7) or sister to the clade of *Fraunhoferia* + *Plenckia* (reduced-taxon-sampling *matK* and plastid trees; 58% JK, 63% JK; Figs. S6, S9).

As in Simmons et al. (2012), our complete-taxon-sampling (i.e. all terminals for which sequences were sampled are included) *matK* and plastid trees were unresolved for these three taxa (Figs. S5, S8). The lack of resolution in the complete-taxon-sampling *matK* gene tree was caused by three terminals missing the 5' end of the gene and two terminals missing the 3' end of the gene, with as little as 30 bp of sequence overlap between these five terminals (Fig. S5 legend). The lack of resolution in the complete-taxon-sampling plastid tree was caused by differential sampling between the gene regions included (Fig. S9 legend).

In this case morphological characters may be used to infer which of the two coalescent genes is not tracking the primary phylogenetic history of *Fraunhoferia*, *Maytenus texana*, and *Plenckia*. In our preliminary analysis we were able to identify only a single morphological synapomorphy (having cupular or columnar floral nectar discs) to support the plastid-based clade of *Fraunhoferia* + *Plenckia* and no potential morphological synapomorphies to support the rDNA-based clade of *Fraunhoferia* + *Maytenus texana*. But JAL double-checked the coding of *Plenckia populnea* on several specimens at HRCB and found that the discs are actually annular. Based on JAL's observations, we re-scored *P. populnea* Reissek in the morphological matrix and re-ran the morphological and simultaneous analyses. Given that we have no morphological synapomorphies to select between the plastid and rDNA-based hypotheses, we consider the phylogenetic relationship between *Fraunhoferia*, *Maytenus texana*, and *Plenckia* to be ambiguous, irrespective of the resolution provided in the simultaneous analysis, which favors the plastid topology (Fig. 1).

Resolution of *Maytenus megalocarpa*—*Maytenus megalocarpa* was consistently resolved as a member of the upper clade of *Maytenus* in the individual gene trees (Figs. S2, S3, S6, S7), the rDNA and plastid trees (Figs. S4, S9), and the simultaneous analysis (Fig. 1). In none of these cases, however, was another species of *Maytenus* well supported as its closest relative. Rather, in the simultaneous analysis, *M. megalocarpa* was resolved as part of a four-way polytomy together with the other 15 species in the upper *Maytenus* clade with 100% JK (Fig. 1). Synapomorphies for this clade of 16 species include a 1-bp deletion at position 111 in ITS and a 2-bp deletion at positions 295–296 of the *trnL* intron.

Morphological Affinities—*Maytenus megalocarpa* is vegetatively similar to other species of Neotropical *Maytenus* because its leaves have spinose margins and semi-craspedrodromous venation, which are also present in *M. aquifolia*, *M. horrida*, *M. ilicifolia*, *M. quadrangulata*, and *M. rigida*, among others. The Neotropical species of *Maytenus* with spinose leaves also have fasciculate inflorescences and were grouped into *Maytenus* section *Oxyphylla* according the treatment of Carvalho-Okano (1992). However, this section does not correspond to a monophyletic group, as can be seen in Fig. 1, where the three sampled species of section *Oxyphylla*

(*M. aquifolia*, *M. ilicifolia*, and *M. rigida*) do not form a clade with *M. megalocarpa*. Thus, spinose leaves with semi-craspedrodromous venation are homoplasious within *Maytenus*. Still, these characteristics are useful for field and herbarium identification; a key to the Neotropical species of *Maytenus* with spinose leaves is provided below.

The large and tardily dehiscent fruit of *Maytenus megalocarpa*, with two to four large seeds, is quite different from those found in all other species of the genus, whose two (rarely three) valves are reflexed on dehiscence, broadly exposing the arillate seeds. The fruits of the new species are similar to the indehiscent fruits of Celastraceae subfamily Salacioideae (represented by *Cheiloclinium*, *Peritassa*, *Salacia* and *Tontelea* in the Neotropics). But the thick aril of *M. megalocarpa* is loosely attached to the seeds whereas the putative aril or sarcotesta of Salacioideae is firmly attached to the seed testa.

The capsular fruits of all other *Maytenus* species are adapted to bird dispersal, with their black, shiny, erect seeds that are exposed by the reflexing valves and surrounded by a white, orange or reddish aril. In contrast, the larger seeds of *M. megalocarpa* are not directly exposed, and the creamy-white aril is barely visible when the fruit opens (Fig. S1). Therefore, probably neither the seed testa nor the aril act as a visual attractant to dispersers. Still, birds or arboreal primates could eat the thick aril and then disperse the seeds. Given that many ripe (both closed and opened) fruits were observed fallen on the ground it is also possible that terrestrial animals such as agoutis (*Dasyprocta* spp.), pacas (*Cuniculus paca* L.) or coatis (*Nasua* species) could act as dispersers.

Delimitation of *Maytenus*—In our phylogeny of *Maytenus* and its closely related genera (Fig. 1), *Fraunhoferia* and *Plenckia*, two genera that are highly supported as nested within *Maytenus*, have indehiscent capsules (Lorenzi 2009, p. 73) and wind-dispersed samaras (Grosso and Pirani 2003), respectively. Species of both *Fraunhoferia* and *Plenckia* are native to drier environments with open vegetation (the savannahs from central Brazil and Paraguay or semi-desert Brazilian caatinga), where biotic dispersers are less abundant than in forested areas.

The most parsimonious optimization (Fitch 1971) of fruit dehiscence onto the most parsimonious trees that were used to create the strict consensus in Fig. 1 is that capsular fruits are ancestral within *Maytenus*, that indehiscent fruits are a synapomorphy for the clade of *Fraunhoferia* + *Plenckia*, and there is an independent autapomorphy to a tardily dehiscent fruit in *M. megalocarpa*. Ongoing study of *Maytenus*, with the goal of identifying morphological synapomorphies for infra-generic clades, is necessary to determine whether *Maytenus* should be expanded to include *Fraunhoferia* and *Plenckia* or whether those taxa should be retained as genera and the name *Maytenus* restricted to the least inclusive clade that includes the type species (*M. boaria*) and *M. woodsonii* Lundell (Fig. 1).

TAXONOMIC TREATMENT

Maytenus megalocarpa Groppo & Lombardi, sp. nov.—

TYPE: BRAZIL. Bahia: Mun. Ilhéus, Rodovia Itabuna-Ilhéus, área do CEPLAC (Comissão Executiva do Plano da Lavoura Cacaueira), Quadra I, a ca. 100 metros do Herbário, 14°45'30.1" S, 39°13'50.7" W, 78 m alt., 18 Mar. 2011 (fr), *M. Groppo* (with C. P. Bruniera & L. C. J. Gomes) 2001 (holotype: SPFR!; isotypes: BHCBI, CEPEC!, CSI, FI, HRCBI, KI, MBMI, MO!, NY!, RBI, SPFI!).

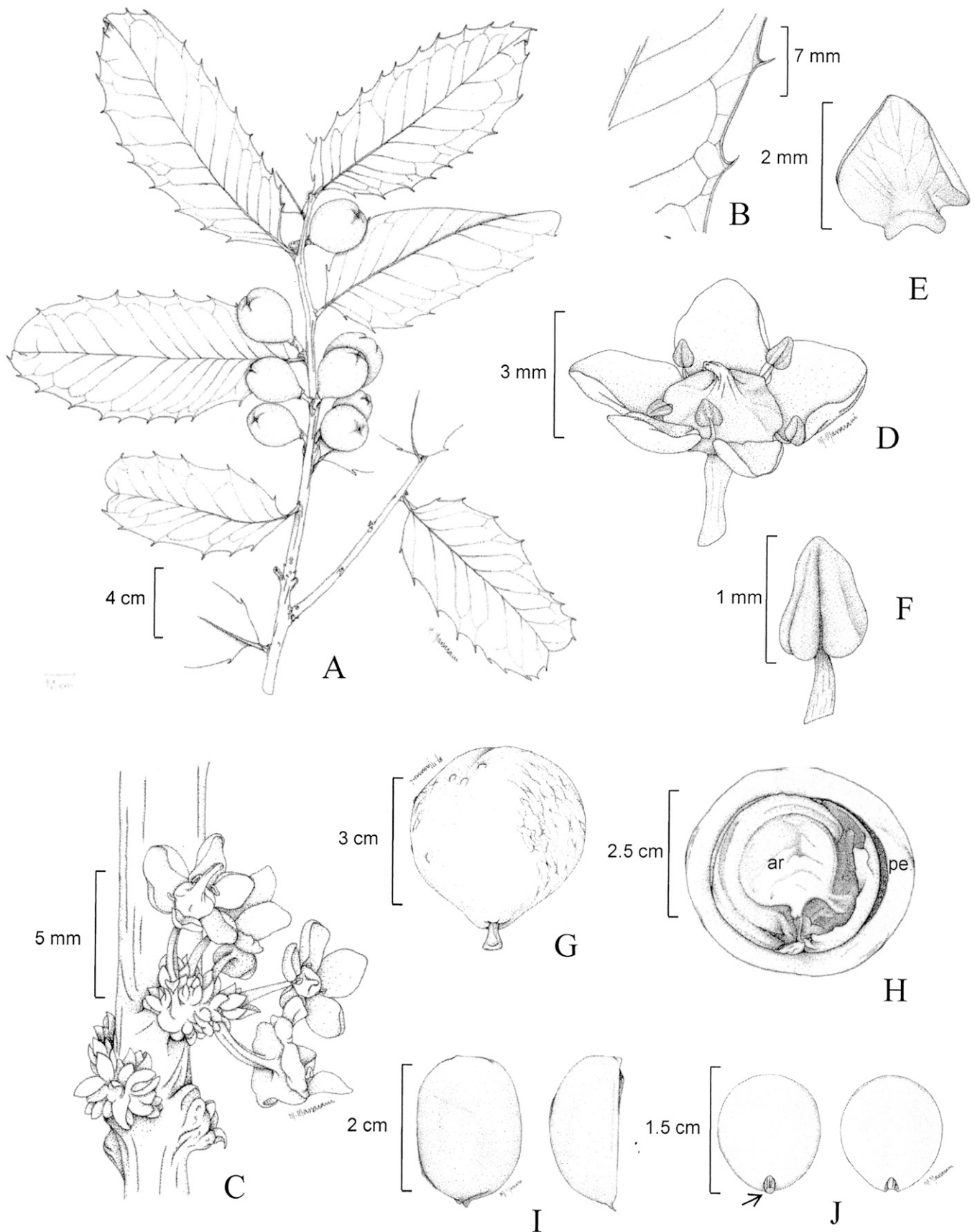


FIG. 2. *Maytenus megalocarpa* Groppo & Lombardi. A. Branch with immature fruits. B. Details of leaf margin. C. Inflorescence. D. Flower. E. Petal. F. Stamen. G. Fruit. H. Section of fruit showing pericarp (pe) and aril (ar). I. Seed. J. Embryo in longitudinal section, the two large cotyledons are separated showing the radicle and hypocotyl-epicotyl axis (arrow). All drawings are from Groppo *et al.* 2001 (holotype, SPFR), except C–F from Thomas *et al.* 12366.

Maytenus megalocarpa is similar to some other species of *Maytenus* from the Neotropics because its leaves have spinose margins and semi-craspedodromous venation, as in *M. acanthophylla*, *M. aquifolia*, *M. comocladiformis*, *M. horrida*, *M. ilicifolia*, *M. quadrangulata*, *M. rigida*, and *M. truncata*. It is readily distinguished from all other species of *Maytenus* by its very large (relative to other species of the genus), tardily dehiscent fruits that lack reflexive valves when mature, its thick aril, and its larger seeds, which number 2–4 instead of 1–2(3) in other species of *Maytenus*.

Tree ≤ 8 m tall, trunk ≤ 30 cm diam, bole ca. 3 m tall, straight; outer bark transversely fissured, grayish to brownish, lenticellate, inner bark pinkish; branches patent to descending (in lower part of tree) to ascending (upper part of tree); old twigs cylindrical, young twigs flattened with 4 longitudinal striations with or without lenticels, in sicco light green, glabrous. Leaves alternate, patent to ascending, petiolate; lamina $9.5\text{--}18 \times 3.5\text{--}7.5$ cm, planar, lustrous and deep green on adaxial surface, dull and paler beneath, coriaceous to chartaceous, glabrous to slightly pruinose, oblong to elliptic, apex acute, obtuse or seldom retuse; margin thickened, spinose, 6–12 spines per side, these ≤ 2 mm long; base obtuse to truncate, slightly asymmetric; venation semicraspedodromous; secondary veins in 11–16 pairs, diverging from midrib at $43^\circ\text{--}62^\circ$, prominent and visible on both faces; petiole 0.4–0.9 cm long, canaliculate. Stipules deltoid, 0.7 mm long, caducous. Inflorescences axillary, congested, fasciculate, 7–10-flowered, bracts of the inflorescence like the stipules. Flowers 5-merous, pedicellate, glabrous, 7 mm diam., buds unknown; sepals deltoid, 1 mm long, margin ciliate; petals free, cream to greenish, oval but constricted at base, 2.5 mm long, margin entire to undulate, reflexed at anthesis; stamens 5, alternate to the petals, 2.2 mm long, filaments flattened, attenuate at apex, broadened toward base, inserted on the outer base of the intrastaminal disc, reflexed at anthesis, anthers ovoid to cordiform, 1.1 mm long; intrastaminal disc fleshy, green, 2 mm thick, margin slightly undulate; gynoecium of 2 fused carpels, the base of the ovary fused to the disc, stigma 2-lobed on a short style; pedicel 4–5 mm long. Fruit tardily dehiscent, when dehiscent capsule opening in two halves, one-celled (no inner divisions observed), globose to pyriform, $3.3\text{--}4 \times 3.1\text{--}3.8$ cm, light ochre when mature, pericarp 3–5 mm thick, epicarp leathery, scurfy. Seeds 2–4 per fruit, $1.8\text{--}2.2 \times 1.6\text{--}1.8$ cm, ellipsoid, brownish when mature, testa smooth, each seed completely enveloped by a thick aril; aril lamellate and creamy-white, pressed together in a gelatinous mass filling the inner part of the fruit. Embryo with two cotyledons, completely filling the seed, the endosperm restricted to a thin membrane enveloping the embryo; cotyledons round and complanate, $1.3\text{--}1.7 \times 0.9\text{--}1.1$ cm, radicular-hypocotyl axis embedded between cotyledons, germination epigeal. Figures 2, S1.

Common Names—Common names reported for this species are “Pau-de-formão” (Hage 1753, CEPEC), and “Cabode-formão” (Santos 642, SPF), both in Portuguese and roughly translated as “wood for chisel”. These names suggest the wood may be used carpentry. No further information on economic uses is reported.

Etymology—The species epithet “*megalocarpa*” comes after the Greek words “*megalo*” (large, great) and “*carpus*” (fruit) because the fruits are much larger than the other species of *Maytenus*.

Distribution, Habitat, and Phenology—*Maytenus megalocarpa* is known from a small number of collections from the Brazil-

ian states of Bahia (in the region of the southern Bahia forest) and in Minas Gerais (on the border with Bahia state, in xerophilous vegetation; Fig. 3). In Bahia, only two collections (Thomas et al. 12366 and Santos 1907) were made in the natural habitat of the species, in areas of semi-deciduous forest in the municipality of Itaju do Colônia. The only collection from Minas Gerais is from another natural area (Salto da Divisa). All other collections (including the type) were made from cultivated specimens collected in arboreta in the CEPLAC area, Ilhéus, and in the Pau-Brasil Ecological Station, in Santa Cruz Cabrália. In the CEPEC arboretum there are at least six adult individuals, up to 8 m tall but shaded by taller species, cultivated in an area reserved for native species. According to colleagues from CEPLAC, seeds of species found in natural areas around CEPLAC were brought and cultivated there decades ago. Only three flowering collections are known, from August and December; all other specimens are fruiting, in February (immature), July, August (immature), October (immature), and December and March (mature).

Conservation Status—*Maytenus megalocarpa* may be treated as an endangered species (EN) according to the IUCN red list categories and criteria (IUCN 2001). This species is known in the wild from only two localities in semideciduous forests of the Brazilian Atlantic Forest domain (IUCN criterion B1a), which has been suffering rapid deforestation (Thomas et al. 1998).

Additional Specimens Examined—BRAZIL. Bahia: Mun. Ilhéus, Rodovia Itabuna-Ilhéus, área do CEPLAC (Comissão Executiva do Plano da Lavoura Cacaueira), Quadra I, a ca. 100 metros do Herbário, $14^\circ 45' 30.1''$ S, $39^\circ 13' 50.7''$ W, 78m alt., 18 Mar 2011 (st), Groppo et al. 2000 (SPFR); ibidem, 12 Dec 2011 (fl, fr), Lombardi 8883 et al. (BHCB, CEPEC, CS, F, HRCB, IP, K, MBM, MO, NY, RB, SP, SPF, SPFR); ibidem, área do CEPEC, km 22 da Rodovia Ilhéus/Itabuna (BR 415), 30 Oct 1984 (fr), Hage 1753 (CEPEC, UEC); ibidem, 08 Feb 1988 (fr), Hage 2236 (SPF); Itaju do Colônia, 7.5km southeast of Itaju do Colônia on Road to Palmira, $15^\circ 09' 13.1''$ S, $39^\circ 39' 27.6''$ W, c. 250m, 19.III.2001 (fr), Thomas et al. 12366 (CEPEC, SPFR); ibidem, Rodovia para Santa Cruz da Vitória, 28 Aug 1971 (fl), Santos 1907 (CEPEC, SPF, UEC); Santa Cruz Cabrália, área da Estação Ecológica do Pau-Brasil (ESPAB), cerca de 16km a W de Porto Seguro,

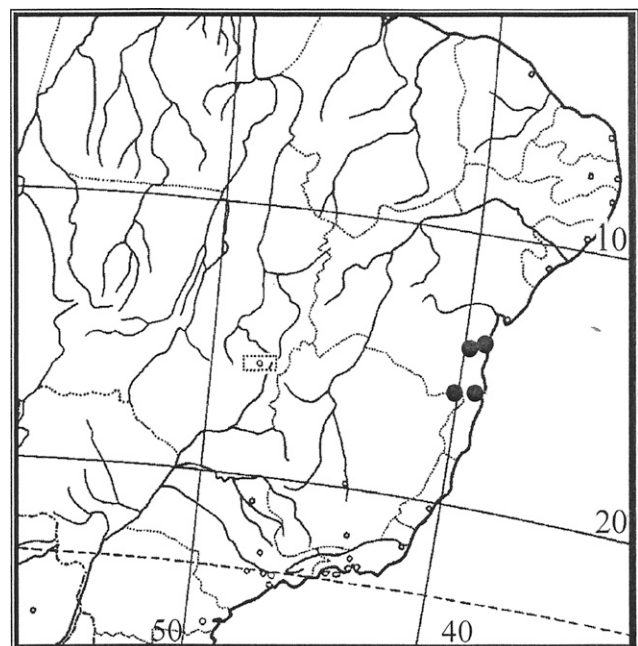


FIG. 3. Geographic distribution of *Maytenus megalocarpa*.

Rodovia BR 367 (Porto Seguro/Eunápolis), 15 July 1987 (fr), Santos 620 (CEPEC, SPFR); ibidem, 29 Sep 1987 (fl), Santos 642 (SPF); Minas Gerais:

Salto da Divisa, Fazenda Jabuti, 16°02'13"8"S, 40°03'31"4"W, 171 m, 20 Aug 2003 (fr), Lombardi 5318 (BHCB, HRCB).

KEY TO THE SPECIES OF *MAYTENUS* WITH SPINOSE LEAVES FROM THE NEOTROPICS

1. Leaves cleft (incisions cut ¼–½ distance to midrib); dry areas with xeric shrubland and thorn forest ("caatingas") in Bahia, Brazil *M. truncata* (Nees) Reissek
1. Leaves not cleft; various types of vegetation in Brazil, Chile, Paraguay, Uruguay, Bolivia and Argentina 2
 2. Leaves with spines concentrated at the leaf apex or base, or with only one apical spine, occasionally (*M. macrophylla*) the leaves entire 3
 3. Leaves 2–9 cm long, spinose, spines concentrated at the apex of lamina or with only one apical spine; young twigs flattened, with 4 longitudinal striations; Southern Brazil (states of Mato Grosso do Sul, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul), Chile, Paraguay, Uruguay, Bolivia and Argentina, in interior semi-deciduous forests and *Araucaria* forests *M. ilicifolia* Mart. ex Reissek
 3. Leaves 13–30 cm long, spinose or denticulate, occasionally leaves entire; young twigs slender. Brazilian Atlantic Rainforest (Bahia to Rio de Janeiro) 4
 4. Leaves spinose; spines ≤ 4 mm long, present only on the lower 1/3 of the lamina; Rio de Janeiro *M. basidentata* Reissek
 4. Leaves irregularly denticulate to entire; teeth (when present), ≤ 2 mm long; Bahia and Espírito Santo *M. macrophylla* Mart.
 2. Leaves regularly spinose, serrulate or denticulate all along the leaf margin 5
 5. Young twigs conspicuously lenticellate; leaves subsessile (petiole ≤ 1 mm long); open vegetation in dry areas ("caatinga") in northeastern and central Brazil (Alagoas, Bahia, Ceará, Goiás, Minas Gerais, Paraíba, Pernambuco, Rio Grande do Norte and Sergipe) *M. rigida* Mart.
 5. Young twigs without lenticels, or if lenticels present then leaves petiolate with petiole ≥ 4 mm long 6
 6. Young twigs 4-angled, (sub)winged or not 7
 7. Capsules tetragonal, orbiculate; semi-deciduous forests and in dry areas ("caatingas") in Minas Gerais and interior of Bahia *M. acanthophylla* Reissek
 7. Capsules smooth, orbiculate to turbinate 8
 8. Petioles ≤ 3mm long; lamina 4.5–6.5 cm long; dry forests on calcareous outcrops from northern Minas Gerais *M. comocladiaeformis* Reissek
 8. Petioles 5–6 mm long; lamina 6.5–14 cm long; dry areas (caatinga) and semi-deciduous forests in Bahia *M. quadrangulata* (Schrad.) Loes.
 6. Young twigs smooth or with 4–6 striations, not winged 9
 9. Fruit a tardily dehiscent, globose to pyriform capsule lacking reflexing valves, seeds 2–4, weakly exposed; semi-deciduous forests in southern Bahia *M. megalocarpa* Groppo & Lombardi
 9. Fruit a capsule with two reflexing valves, seeds 1–2, erect and exposed by the valves 10
 10. Fruit tetragonal, orbiculate; caatingas and semi-deciduous forests in northern Minas Gerais and Espírito Santo *M. horrida* Reissek
 10. Fruit not angled, orbiculate to turbinate 11
 11. Young twigs flattened with 4–6 longitudinal striations; southern Brazil (Mato Grosso do Sul, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul), Chile, Paraguay, Uruguay, Bolivia and Argentina, in interior semi-deciduous forests and *Araucaria* forest *M. ilicifolia* Mart. ex Reissek
 11. Young twigs slender or flattened, without striations 12
 12. Leaf lamina 18–30 cm long, with teeth irregularly distributed along the leaf margin; Atlantic Rainforest (Espírito Santo and Bahia) *M. macrophylla* Mart.
 12. Leaf lamina 5.4–20.9 cm long; teeth regularly distributed along the leaf margin (margins serrulate); semi-deciduous forest in interior of Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul *M. aquifolia* Mart.

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