

Universidade Federal de Pernambuco

Programa de Pós-Graduação em Biologia Vegetal

Bruno Sampaio Amorim

**FILOGENIA E ESTUDOS TAXONÔMICOS DO CLADO
GOMIDESIA (MYRTACEAE, *MYRCIA S.L.*) NA
FLORESTA ATLÂNTICA DO BRASIL**

Recife, 2017

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Tese apresentada ao Programa de Pós-Graduação em
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do título de Doutor em Biologia Vegetal.

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RESUMO

O clado *Gomidesia* é composto pelas espécies anteriormente tratadas como o gênero *Gomidesia* O. Berg. Em estudos filogenéticos recentes, observou-se que as espécies pertencentes a este gênero formavam um grupo monofilético fazendo parte de um clado maior constituído também por espécies dos gêneros *Calyptanthus* Swartz, *Gomidesia*, *Marlierea* Cambessèdes e *Myrcia* DC. A este grande clado, deu-se o nome de *Myrcia s.l.* O clado *Gomidesia* é um grupo com elevada riqueza e aproximadamente 50 espécies e possui distribuição predominantemente na Floresta Atlântica, onde a maior parte das espécies é endêmica e apenas uma espécie [ie. *Myrcia barituensis* (Legname) B. Holst in Jørgensen *et al.* (2014: 1272)] não ocorre neste domínio, sendo restrita ao noroeste da Argentina e à Bolívia. Com o objetivo de delimitar morfologicamente as espécies do clado *Gomidesia*, avaliando assim a riqueza deste grupo, e de testar o monofiletismo do mesmo e entender as relações filogenéticas entre as suas espécies, foi proposto um tratamento taxonômico para as espécies do clado *Gomidesia* da Floresta Atlântica do Brasil e um estudo filogenético baseado em dados moleculares (ETS, ITS, *matK*, *ndhF*, *psbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF*). Quarenta e quatro espécies do clado *Gomidesia* foram registradas para a Floresta Atlântica, nas quais cinco novas espécies foram descritas como parte deste trabalho. O monofiletismo do clado *Gomidesia* foi corroborado e as relações filogenéticas do referido clado mostra o grupo dividido em duas principais linhagens, cada uma composta por dois subclados. O agrupamento das espécies obedece um padrão geográfico e independente da morfologia, contrariando classificações morfológicas propostas anteriormente.

Palavras-Chave: América do Sul. Região neotropical. Sistemática. Taxonomia. Tribo Myrteae.

ABSTRACT

The Gomidesia clade is composed by species previously treated as the genus *Gomidesia* O. Berg. Recent molecular phylogenetic studies indicated that species which belonged to this group formed a monophyletic group along with species of the genus *Calypttranthes* Swartz, *Gomidesia*, *Marlierea* Cambessèdes and *Myrcia* DC. This large clade was called *Myrcia s.l.* The Gomidesia clade comprises ca. 50 species mainly distributed in the Brazilian Atlantic Forest, and most of them are endemics. Only one Gomidesia clade species [ie. *Myrcia barituensis* (Legname) B. Holst in Jørgensen *et al.* (2014: 1272)] is not recorded for this biome and has a narrow distribution restricted to northwestern Argentina and Bolivia. The aims of this study are to identify and recognize the morphological patterns of the Gomidesia clade species with the purpose of evaluating the richness of this group, and to test its monophyly and establish its phylogenetic relationships based on molecular data (ETS, ITS, *matK*, *ndhF*, *psbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF*). Forty-four species of the Gomidesia clade were recognised for the Atlantic Forest, and five new species were described as the result of morphological studies. The monophyly was confirmed and phylogenetic relationships were established in the Gomidesia clade. Within this clade, two main lineages and four subclades were recognized. The phylogenetic relationships follow a geographic pattern, which is not related to any previous morphological classification.

Key-words: Neotropics. South America. Systematics. Taxonomy. Tribe Myrteae.

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1 INTRODUÇÃO

A presente Tese está dividida em três capítulos, os quais são precedidos por uma seção introdutória onde são apresentadas a fundamentação teórica, delimitações morfológicas, e as relações filogenéticas que serviram de base para a realização deste estudo.

O primeiro capítulo traz uma hipótese filogenética de *Myrcia s.l.*, com enfoque nas espécies do clado Gomidesia, baseada em regiões de DNA nucleares e plastidiais. Considerações a respeito do monofiletismo e sinapomorfias morfológicas do clado Gomidesia são discutidas, assim como as relações filogenéticas entre as espécies do clado Gomidesia e entre este e os demais clados em *Myrcia s.l.* Evolução de caracteres relevantes à circunscrição morfológica dos clados em *Myrcia s.l.* e do clado Gomidesia são também discutidos, assim como a evolução da ocupação dos habitats destas espécies.

O segundo capítulo é dividido em duas seções e trata dos avanços taxonômicos, baseados na morfologia, para o reconhecimento de novos táxons. Quatro espécies inéditas para a ciência foram publicadas em dois artigos distintos. Todas as espécies são restritas à Floresta Atlântica e em sua maioria ocorrem em áreas montanas e submontanas das regiões Nordeste e Sudeste do Brasil. Além da descrição das espécies, ilustrações, imagens, comentários taxonômicos, período fenológico, e status de conservação também são informados.

O terceiro capítulo traz uma sinopse taxonômica para as espécies do clado Gomidesia ocorrentes na Floresta Atlântica do Brasil. A sinopse é composta por descrições e chave de identificação para as 44 espécies do clado Gomidesia, reconhecidas para este ecossistema no Brasil. Além das descrições, chave de identificação, comentários taxonômicos, ilustrações, imagens, dados fenológicos, status de conservação das espécies, lectotipificações e sinonimizações informados, duas espécies novas são descritas.

Os manuscritos desta Tese estão formatados de acordo com as normas das revistas para as quais serão submetidas. Os artigos já publicados estão com a paginação referente ao volume da revista na qual foram publicados.

2 FUNDAMENTAÇÃO TEÓRICA

O gênero *Gomidesia* O. Berg foi descrito no final do século XIX (Berg 1856) baseado em algumas espécies de *Myrcia* DC. que apresentavam uma característica diferenciada na abertura de suas anteras. O fato de as anteras serem assimétricas e manterem sua curvatura mesmo após a antese levou a Otto Von Berg a elevar este grupo de espécies à categoria de gênero. Desde então muitos estudiosos do gênero *Myrcia* e da família Myrtaceae têm aceitado (Berg 1857, 1859; Niedenzu 1893; Legrand 1958; Legrand & Klein 1967; Legrand & Mattos 1975; Nic Lughadha 1997), questionado (McVaugh 1968; Landrum & Kawasaki 1997), ou negado (De Candolle 1828; Cambessedes 1832; Kiaerskov 1893; Sobral 2003; Sobral *et al.* 2010; Caliari 2013; BFG 2015; World Checklist of Selected Plant Families [WCSP 2016]) a circunscrição de *Gomidesia* como um gênero à parte.

Apenas com as primeiras hipóteses filogenéticas para as Myrtaceae da região neotropical (Lucas *et al.* 2005, 2007) e posteriormente com um estudo mais específico para o gênero *Myrcia*, ficou evidenciado que os gêneros *Myrcia* DC. e *Marlierea* Cambessedes não formavam grupos naturais baseados em suas circunscrições morfológicas que eram aceitas até aquele momento (Lucas *et al.* 2011). Com base nisso, ficou comprovado que as espécies dos gêneros *Calypttranthes* Swartz e *Gomidesia* O. Berg formavam grupos monofiléticos e junto com as espécies de *Myrcia* e *Marlierea*, também faziam parte de um grande grupo natural, sendo proposta uma ampla circunscrição do gênero *Myrcia*, ou *Myrcia sensu lato* (Lucas *et al.* 2011).

De acordo com o que foi exposto, esta tese tem como objetivo geral confirmar o monofiletismo do clado *Gomidesia*, inferir as relações filogenéticas entre as espécies deste clado e avaliar as relações filogenéticas entre o clado *Gomidesia* e os demais clados em *Myrcia s.l.* Comparar classificações morfológicas para classificações infra-taxonômicas no clado *Gomidesia*, avaliar a evolução de caracteres morfológicos relevantes previamente utilizados para o agrupamento das espécies e avaliar a evolução da ocupação de habitats no grupo também fazem parte dos nossos objetivos.

2.1 Caracterização e sistemática da família Myrtaceae

Myrtaceae pertence à Ordem Myrtales, a qual é uma de suas famílias “core” (Dahlgren & Torne 1984). De acordo com Dahlgren & Torne (1984), esta Ordem sofreu diferentes circunscrições e é definida pela combinação de dois caracteres anatômicos do lenho: o tipo de perfuração dos elementos de vaso e os feixes vasculares bicollaterais (Van Vliet & Bass 1984). Quando combinados com caracteres morfológicos do embrião (Tobe & Raven 1983), a ordem reúne 14 famílias - Onagraceae, Trapaceae, Lythraceae, Oliniaceae, Combretaceae, Alzateaceae, Penaeaceae, Rhynchocalycaee, Crypteroniaceae, Memecylaceae, Melastomataceae, Psiloxylaceae, Heteropyxidaceae e Myrtaceae. Quando comparada com classificações mais recentes baseadas em filogenia molecular (APG IV 2016), Myrtales apresenta uma circunscrição mais ampla, porém preservando a maior parte das famílias consideradas como “core” em classificações anteriores e que tinham por base apenas caracteres morfológicos: Combretaceae, Myrtaceae (*incl.* Heteropyxidaceae e Psiloxylaceae), Penaeaceae (*incl.* Oliniaceae), Lythraceae (*incl.* Punicaceae, Sonneratiaceae e Trapaceae), Melastomataceae (*incl.* Memecylaceae), Onagraceae e Vochysiaceae.

Myrtaceae é uma família com distribuição pantropical, sendo a nona mais rica em número de espécies dentre as Angiospermas, apresentando 133 gêneros e entre 5.500 a 5.800 espécies (Wilson *et al.* 2001; Wilson 2011; WCSP 2016). As regiões da Austrália, do sudeste asiático e da América tropical são seus principais centros de diversidade (Wilson *et al.* 2001, WCSP 2016). Em sua circunscrição atual (Wilson *et al.* 2005), a família é dividida em duas sub-famílias, Psiloxylodeae, restrita ao velho mundo, e Myrtoideae, com representantes pan-tropicais. Esta última é dividida em 15 tribos, onde duas destas ocorrem na região neotropical. A tribo Metrosidereae é representada pela única espécie de fruto seco no continente Americano, do gênero *Metrosideros* Banks ex Gaertn., restrita ao Chile e Argentina. A tribo Myrteae é formada por 33 gêneros e cerca de 2.500 espécies (McVaugh 1968; Wilson *et al.* 2005, WCSP 2016). Os representantes desta tribo apresentam frutos carnosos (Wilson *et al.* 2005). São arbustos ou árvores, com ritidoma esfoliante e glândulas oleíferas presentes nas folhas, que são opostas e simples, com superfície glandular-punctada, margem inteira e venação marginal presente. As inflorescências são axilares ou terminais, de diferentes tipos e as flores são actinomorfas e bissexuais com 4-5 sépalas, abertas no botão floral ou formando uma caliptra com abertura regular ou irregular e 4-5 pétalas de coloração, em geral, branca. Os estames são numerosos e o ovário é ínfero com lóculos iguais ao número de carpelos

e a placentação é axilar com 2 ou mais óvulos por lóculo. Os frutos são carnosos com as sépalas persistentes ou decíduas e as sementes de 1 a várias, com endosperma ausente e embrião diferenciado (Kawasaki & Holst 2004).

Na América do Sul, Chile, Argentina e Brasil apresentam a maior ocorrência de gêneros endêmicos de Myrtaceae (WCSP 2016). Para o Brasil, são listadas 1025 espécies da família, onde mais de 75% são endêmicas e tem como centros de diversidade a Floresta Atlântica, Cerrado e Floresta Amazônica (BFG 2015). No Brasil, Myrtaceae apresenta 42 espécies na Lista Vermelha de Espécies Ameaçadas e todas elas têm ocorrência na Floresta Atlântica (IUCN 2016).

2.2 Histórico dos estudos de taxonomia e sistemática em Myrtaceae na região neotropical

Os primeiros estudos em sistemática de Myrtaceae foram propostos por Linnaeus em 1770 que posicionou as espécies conhecidas por ele em três gêneros principais (*Eugenia*, *Psidium* e *Myrtus*) baseado na morfologia do perianto, fruto e semente (McVaugh 1968). No histórico de classificação da família, De Candolle em 1826, incluiu os representantes americanos (exceto o gênero *Tepualia* (= *Metrosideros*)) na Tribo Myrteae com base na morfologia dos embriões, dividindo-a em três grupos que posteriormente foram tratados por Otto Von Berg, em 1855, como as subtribos Myrciinae, Eugeniinae e Pimentiinae (McVaugh 1968).

Otto Von Berg realizou as principais obras para as Myrtaceae neotropicais, incluindo o Brasil, Guianas, Antilhas e espécies Andinas, onde foram descritas cerca de 1.000 novas espécies e 30 novos gêneros. As obras foram: *Myrtaceae centroamericanae* (Berg 1856), a *Florae brasiliensis myrtographia* (Berg 1855-1859) e *Revisio myrtacearum americae* (Berg 1855-1861) (McVaugh 1968).

No século XX, os trabalhos taxonômicos em Myrtaceae americanas se intensificaram a partir da segunda metade, especialmente com os trabalhos de Rogers McVaugh. Seus estudos são focados na revisão taxonômica de gêneros e publicação de novas espécies (McVaugh 1956; 1963a), além de floras para as Guianas (McVaugh 1958a; 1969), Peru e Guatemala (McVaugh 1958b, 1963b) e propostas de arranjos sistemáticos para a subtribo Myrteae (McVaugh 1968), refutando as idéias de classificação das Myrtaceae de frutos carnosos originadas no século XIX e propondo

sua divisão em 13 possíveis linhagens evolutivas, baseado na morfologia das inflorescências, caracteres florais e embrião. Ainda nas décadas de 50 a 70, Diego Legrand revisou gêneros como *Gomidesia* para os trópicos (Legrand 1958) e as espécies brasileiras de *Marlierea* (Legrand 1962), além de flóculas locais (Legrand & Klein 1967-1978). Nas décadas de 80 e 90, as publicações ao nível neotropical seguiram com Leslie Landrum, com as revisões de *Myrceugenia* (Landrum 1981) e *Campomanesia*, *Pimenta*, *Blepharocalyx*, *Legrandia*, *Acca*, *Myrrhinium* e *Luma* (Landrum 1986). No início da década de 90, os estudos de Myrtaceae no Brasil se intensificaram com a sinopse dos gêneros *Paramyrciaria* Kausel e *Myrciaria* O. Berg (Sobral 1991; 1993), *Siphoneugena* O. Berg (Proença 1990) e estudos sistemáticos e morfológicos para família de maneira generalista, como visto em Barroso *et al.* (1991; 1999). A partir do final da década de 80, flóculas locais de Myrtaceae foram publicadas, a exemplo da Serra do Cipó (Kawasaki 1989) em Minas Gerais, do Pico das Almas (Nic Lughadha 1995) na Bahia, da Reserva Ecológica de Macaé de Cima, no Rio de Janeiro (Barroso & Peron 1994) e da Reserva Ducke, no Amazonas (Souza *et al.* 1999). Nos anos 90, Landrum & Kawasaki (1997) publicaram a sinopse dos gêneros de Myrtaceae ocorrentes no Brasil.

Na primeira década do século XXI, diversas publicações a nível regional foram realizadas, principalmente voltadas para as regiões Sudeste (Arantes & Monteiro 2002; Morais & Lombardi 2006; Souza *et al.* 2007; Mazine & Souza 2008; Souza & Morim 2008; Bungler *et al.* 2015; Silva & Mazine 2016) e Sul (Soares-Silva 2000; Sobral 2003; Romagnolo & Souza 2006; Lima *et al.* 2011). A região Nordeste do Brasil, até então negligenciada em estudos com foco em Myrtaceae também teve um forte crescimento nesta última década, com trabalhos direcionados às áreas de Floresta Atlântica (Landim & Landrum 2002; Oliveira *et al.* 2012; Amorim *et al.* 2013; Amorim *et al.* 2014; Amorim & Alves 2015a; Stadnik *et al.* 2016), especialmente ao norte do Rio São Francisco, incluindo as Restingas (Amorim & Alves 2011, 2012a, 2012b, 2012c, 2015b; Lourenço & Barbosa 2012; Lourenço *et al.* 2013; Silva 2009; Santos 2013).

Estudos em filogenia molecular com objetivo de testar a circunscrição de Myrtaceae tiveram início com Gadek *et al.* (1996) utilizando a região *matK*. Os autores obtiveram resultados preliminares informativos com poucos gêneros da família e comprovaram o bom funcionamento desta região a nível genérico. Wilson *et al.* (2001) desenvolveram um trabalho amostrando vários gêneros de Myrtaceae utilizando esta mesma região e tiveram resultados promissores, que em seguida, agregando mais

gêneros que não haviam sido estudados anteriormente (Wilson *et al.* 2005), propuseram a circunscrição para a família que é adotada atualmente, com duas subfamílias: Psiloxylloideae (incluindo Psiloxylaceae e Heteropyxidaceae), e Myrtoideae (incluindo os gêneros de Myrtaceae em sua circunscrição anterior), divididas em 15 tribos.

Lucas *et al.* (2005), no primeiro estudo filogenético baseado em dados moleculares com objetivo de definição do arranjo entre os gêneros dos representantes neotropicais, utilizaram regiões de DNA nuclear (ITS) e plastidial (*psbA-trnH*). Posteriormente, em estudos complementares e agregando as regiões ETS e *matK* nas amostras previamente analisadas, Lucas *et al.* (2007) confirmaram a monofiletismo da tribo Myrteae e propuseram a divisão da mesma em seis grupos informais: “Grupo Plinia”, “Grupo Myrcia”, “Grupo Myrceugenia”, “Grupo Myrteola”, “Grupo Pimenta” e “Grupo Eugenia”. Posteriormente, com ênfase no gênero *Myrcia* e gêneros relacionados, Lucas *et al.* (2011) corroboraram o monofiletismo deste grupo e propuseram uma classificação infragenérica informal. A partir disto, diversos trabalhos com dados moleculares têm sido realizados com o enfoque em *Myrcia s.l.*, ampliando tanto a amostragem dos cladogramas, quando o número de regiões de DNA analisadas (Staggemeier *et al.* 2015; Santos *et al.* 2016; Wilson *et al.* 2016). Mesmo diante deste incremento no conhecimento das relações filogenéticas em *Myrcia s.l.*, a divisão informal proposta por Lucas *et al.* (2011) tem se mantido constante e cada vez recebe mais argumentos para oficializar *Myrcia s.l.* como um gênero formalmente reconhecido (Lucas & Sobral 2011, Staggemeier *et al.* 2015; Santos *et al.* 2016; Wilson *et al.* 2016).

2.3 Estudos de taxonomia e sistemática em *Myrcia* DC. e *Gomidesia* O. Berg

Na Flora Brasiliensis, classificações infra-genéricas para *Myrcia* DC. foram propostas por Berg (1857-1859), que transferiu as espécies do gênero com frutos globoides para o gênero *Aulomyrcia* O. Berg, enquanto as espécies que tinham como característica os frutos elipsoides foram mantidas em *Myrcia* (*sensu* De Candolle 1828), cada gênero com 18 e 11 categorias infra-genéticas, respectivamente.

Posteriormente, nas classificações infra-genéricas propostas por McVaugh (1968), *Myrcia* foi dividido em três seções: *Aulomyrcia*, *Armeriela* e *Myrcia*. A seção *Armeriela* McVaugh foi criada para comportar espécies consideradas morfologicamente relacionadas com o gênero *Marlierea*, próximo de *Myrcia* (*sensu* De Candolle 1828). Estudos em filogenia molecular foram realizados em *Myrcia* (*sensu* De Candolle 1828)

e gêneros relacionados, e que atualmente fazem parte de *Myrcia s.l.* (*sensu* Lucas *et al.* 2011), a exemplo de *Calyptranthes*, *Gomidesia* e *Marlierea*.

Na circunscrição proposta por Lucas *et al.* (2011), *Myrcia s.l.* engloba os gêneros *Calyptranthes* Sw., *Gomidesia* O. Berg, *Marlierea* Cambess e *Myrcia* DC., com cerca de 770 espécies, tornando-se o segundo gênero de Myrtaceae com maior riqueza na região neotropical, possuindo distribuição desde o México ao Uruguai (WCSP 2016). No Brasil, *Myrcia s.l.* é representado por 400 espécies, onde 262 ocorrem na Floresta Atlântica e mais de 80% são endêmicas, sendo o gênero mais rico e entre os gêneros com maior número de espécies endêmicas para o Domínio Atlântico (BFG 2015, Stehmann *et al.* 2009).

As espécies de *Myrcia s.l.* são reconhecidas morfológicamente por serem glabras ou apresentarem tricomas simples ou dibráquiados, por suas inflorescências paniculadas, flores geralmente 5-meras, com cálice aberto ou fechado no botão floral, com deiscência irregular ou através de uma caliptra, ovário 2 (3) locular com 2 óvulos por lóculo, frutos com o cálice persistente no fruto e 1 a 2 (3) sementes (Landrum & Kawasaki 1997).

Na atual circunscrição de *Myrcia s.l.*, foram incorporadas espécies de outros gêneros morfológicamente relacionados a ele, a exemplo de *Gomidesia* O. Berg. O gênero *Gomidesia*, previamente tratado como um gênero distinto (Berg 1856), atualmente é considerado como um clado de *Myrcia s.l.* (Lucas *et al.* 2011), que é representado pelo clado 3 na classificação infragenérica informal do grupo (Lucas *et al.* 2011) (Fig. 1). Na amostragem realizada por Lucas *et al.* (2011) para a proposição dos cladogramas em *Myrcia s.l.*, o clado *Gomidesia* é composto por 10 espécies [ie. *Myrcia anacardiifolia* Cambess, *M. brasiliensis* Kiaersk., *M. flagellaris* (D. Legrand) Sobral, *M. hartwegiana* (O. Berg) Kiaersk., *M. hebepetala* DC., *M. mischophylla* Kiaersk., *M. pubescens* DC., *M. spectabilis* DC., *M. tijuacensis* Kiaersk., *M. vittoriana* Kiaersk.], porém estas amostras são morfológicamente relacionadas a outras 40 espécies, que no total fariam parte do clado *Gomidesia*, totalizando cerca de 50 espécies (Nic Lughadha 1997, Nic Lughadha *et al.* 2010, 2012a, 2012b; Sobral 2010; WCSP 2016). As espécies do clado *Gomidesia* possuem distribuição predominante na Floresta Atlântica do Brasil e com ocorrências de apenas quatro espécies na Argentina, Bolívia, Paraguai e Venezuela (WCSP 2016). As espécies tratadas neste clado (= *Gomidesia sensu* Berg 1856) são diagnosticadas por apresentarem anteras com tecas deslocadas ou flexionadas, que retêm sua curvatura após a antese, lobos do cálice truncados e

indumento avermelhado a amarronzado (McVaugh 1968; Lucas et al. 2011), sendo a morfologia das anteras importante para divisão de categorias infra-genéricas (Legrand 1958). *Myrcia s.l.* é conhecido por seu elevado número de espécies endêmicas e restritas, especialmente em áreas remanescentes no sul da Bahia e norte do Espírito Santo e nos estados do Rio de Janeiro, São Paulo e Santa Catarina (Murray-Smith *et al.* 2009). O centro de diversidade do clado Gomidesia (*Myrcia s.l.*) é a Floresta Atlântica da região Sudeste do Brasil com 41 espécies catalogadas (BFG 2015; Amorim & Alves 2016; Caliari et al. 2016; WCSP 2016). No Nordeste, 17 espécies são registradas, com a maior concentração para o estado da Bahia, onde 13 delas são restritas (Nic Lughadha *et al.* 2010, 2012a, 2012b; Sobral 2010; Amorim & Alves 2015; BFG 2015; WCSP 2016).

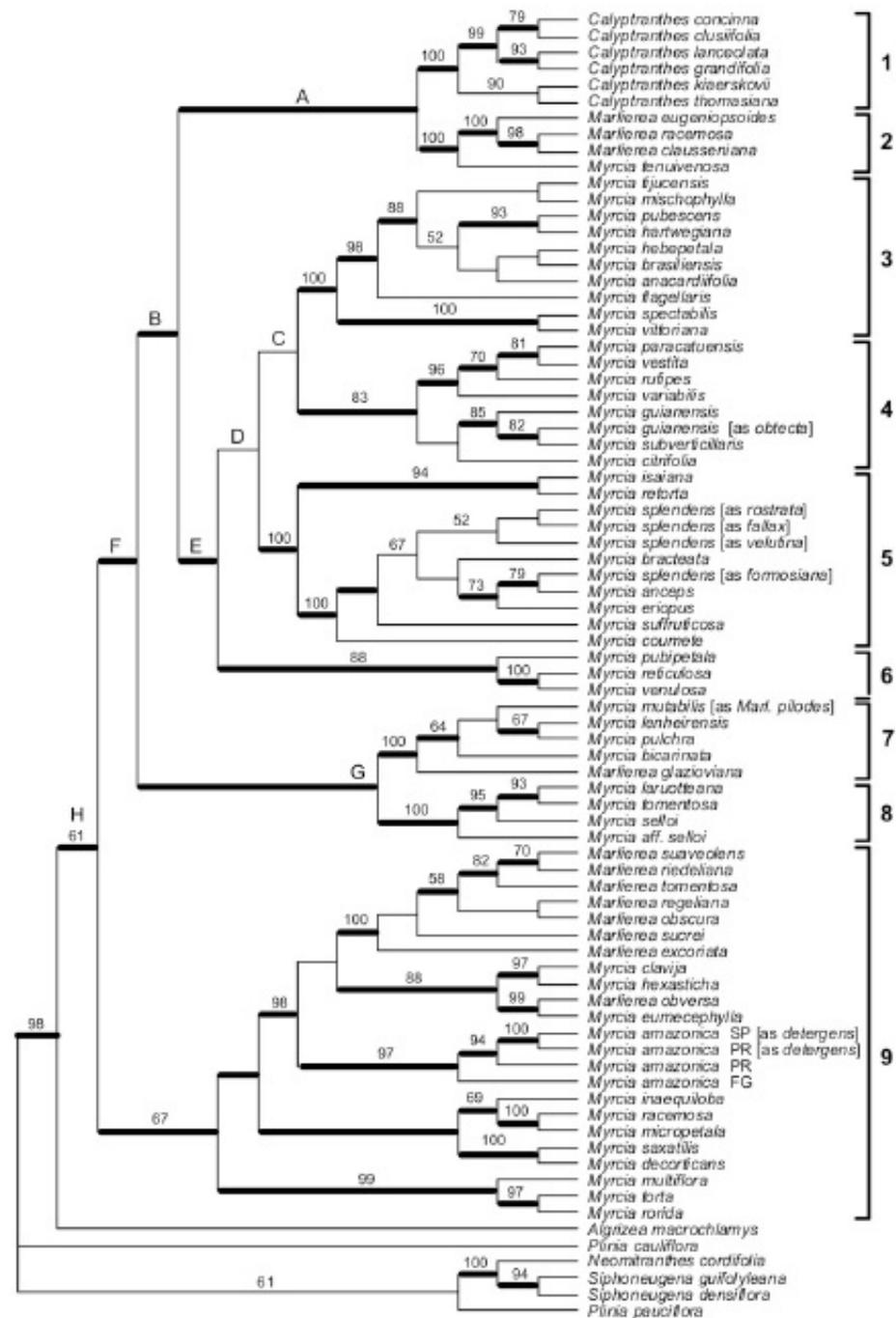


Figura 1. Árvore consenso da análise bayesiana com os marcadores ITS, ETS, *psbA-trnH*, *matK* e *trnL* combinados (Lucas et al. 2011). O Clado 3 corresponde ao clado Gomidesia (*sensu* Berg 1856).

3 ARTIGO 1 – Phylogenetic relationships, morphological evolution and geographic origin in the plant genus *Myrcia s.l.* and relatives, with a focus on the *Gomidesia* clade (Myrtaceae: Myrteae)

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Abstract

Myrcia s.l. is the second species rich genus of Myrtaceae in the neotropics with c. 770 species. Here we use a broader taxon sampling in combination with a multilocus phylogenetic approach with the aim of investigating phylogenetic relationships within and among this large genus, evaluating the evolution of morphological characters and biome colonization, and also testing the monophyly of one of the *Myrcia s.l.* clades (the *Gomidesia* clade), evaluating the phylogenetic relationships within it. The phylogenetic analyses included 124 of the 770 inferred species of *Myrcia s.l.*, in which 36 of the 50 *Gomidesia* clade species, plus 49 samples of related clades and outgroup taxa. Bayesian Inference and Maximum Likelihood analyses were conducted using the markers ETS, ITS, *matK*, *ndhF*, *pasbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF* comprising a total of 984 sequences. The morphological traits and bioreconstruction employed a Bayesian Binary MCMC. Our results produced a highly supported phylogenetic hypothesis in which *Myrcia s.l.* emerges as monophyletic with the confirmation of its nine previous known clades. A new clade of *Myrcia s.l.* with species restricted to the north of Atlantic Forest is recognised here. The genus *Luma*, which was previous known to be from a close lineage of *Myrcia s.l.* is proposed as the ancestral lineage in

tribe Myrteae. The first approach of morphological evolution and biogeography for *Myrcia s.l.* shows flowers with free calyx lobes, 2-locular ovary, bilocular anthers with symmetrical thecae, and the Atlantic Forest as plesiomorphic for the group. The Atlantic Forest was also recovered for most of *Myrcia s.l.* ancestrals. The *Gomidesia* clade is also highly supported and recovered as monophyletic, with asymmetric anthers that retain their curvature after dehiscence as a morphological synapomorphy. The southern Atlantic Forest is the ancestral for the *Gomidesia* clade, with lineages reaching the northern Atlantic Forest, Cerrado, Yungas, and other savannic vegetation of South America.

1. Introduction

Myrtaceae is comprised of 142 genera and 5,500-5,800 woody plant species of closed or open forests or woodlands (Wilson 2011; World Checklist of Selected Plant Families [WCSP] 2016). The family has a predominantly tropical to southern temperate distribution (Wilson 2011; WCSP 2016), poorly represented in Africa, but with centers of diversity in Australia, southeastern Asia and tropical America (Wilson et al. 2001; Wilson 2011; WCSP 2016). Myrtaceae is composed of two subfamilies and 17 tribes, of which most tribes comprise small genera with 1 to 40 species with narrow distributions in west Africa, Australia, New Zealand, New Caledonia, and New Guinea (Wilson et al. 2005; Wilson 2011). Tribe Myrteae is the most species rich with c. 2,500, mainly Neotropics but with few species in Australia and Asia (Wilson et al. 2005; Wilson 2011).

Following Vasconcelos et al. in press, tribe Myrteae is composed of four main lineages (the Australasian group, *Myrtus* group, *Myrcia* super group, and *Eugenia* super group). The *Myrcia* super group comprises the second richest Neotropical Myrtaceae genus *Myrcia sensu lato* (or *Myrcia* group), along with the *Blepharocalyx*, *Myrceugenia*, and *Plinia* groups (Vasconcelos et al. in press). *Myrcia s.l.* is the second most species rich genus in tribe Myrteae with c. 770 species (Lucas et al. in prep.), with most species in the Atlantic Forest, Cerrado, and the Amazon basin (Lucas et al. 2011; BFG 2015; WCSP 2016).

Myrcia s.l. (sensu Lucas et al. 2011) encompasses four well-known genera; *Calyptranthes* Swartz, *Gomidesia* O. Berg, *Marlierea* Cambessèdes, and *Myrcia* DC. (Lucas et al. 2011; Lucas & Sobral 2011). *Marlierea* and *Myrcia s.s.* were found to

be paraphyletic leading to the monophyletic circumscription of *Myrcia s.l.* In place of the four traditionally recognized genera, *Myrcia s.l.* is divided in nine morphologically cohesive clades, which represent an informal subgeneric classification (Lucas et al. 2011). These nine clades are highly supported, morphologically recognizable, and corroborated by further molecular phylogenetics studies (Staggemeier et al. 2015; Santos et al. 2016; Wilson et al. 2016; Vasconcelos et al. in press). Even though the effort to test, corroborate and understand the phylogenetic relationships within *Myrcia s.l.* using broader species sampled and analyzing more DNA markers, phylogenetic relationships between the *Myrcia s.l.* clades remains unclear (Staggemeier et al. 2015; Santos et al. 2016, 2017; Wilson et al. 2016; Vasconcelos in press).

The *Gomidesia* clade (or Clade 3; Lucas et al. 2011) of *Myrcia s.l.*, comprises all species of the genus formerly accepted as *Gomidesia* (sensu Berg 1955). This clade has ca. 50 species and is mostly composed of species from the Brazilian Atlantic Forest, except for *Myrcia barituensis* that occurs in Yungas of northwestern Argentina and Bolivia, and *Myrcia fenziiana* that is widely distributed in the Atlantic Forest, Cerrado, and savanna vegetations of Bolivia, Peru, Venezuela, the Lesser Antilles and West Indies (BFG 2015; WCSP 2016; Amorim, Chapter 3). The circumscription of the *Gomidesia* clade was broadened after the inclusion of *Myrcia mischophylla* (Lucas et al. 2011), a species not previously associated with *Gomidesia*. A re-evaluation of that circumscription is necessary.

The study presented here aims to use a multilocus phylogenetic approach and broad taxonomic sampling to 1. Test and strengthen phylogenetic relationships among the clades of the *Myrcia* super group; 2. Evaluate phylogenetic relationships, evolution of morphological characters and biome colonization in *Myrcia s.l.*; 3. Test the monophyly of the *Gomidesia* clade; 4. Evaluate phylogenetic relationships, the evolution of morphological characters and biome colonization within the *Gomidesia* clade.

2. Material and methods

2.1. Taxon sampling and DNA sequencing

175 accessions of tribe Myrteae were sampled, representing the *Myrceugenia*, *Myrcia*, *Myrteola* and *Plinia* groups (*sensu* Lucas et al. 2007). Outgroups are represented by two accessions of tribes Syzygieae and Eucalypteae (*sensu* Wilson et al. 2005). Tribe Myrteae accessions include 1 taxon of *Algrizea*, 1 *Blepharocalyx*, 2 *Lophomyrtus*, 2 *Luma*, 31 *Myrceugenia*, 126 *Myrcia s.l.*, 2 *Myrciaria*, 1 *Myrteola*, 1 *Myrtus*, 1 *Neomitranthes*, 1 *Neomyrtus*, 2 *Plinia*, and 2 *Siphoneugena*. The external transcribed spacer (ETS) and internal transcribed spacer (ITS) of the ribosomal nuclear region and seven plastid markers *matK*, *ndhF*, *psbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF* were used, comprising 984 sequences. A total of 216 new sequences of *Myrcia s.l.* (*sensu* Lucas et al. 2011) and sister group taxa were generated in this study: 34 of ITS, 34 of *psbA-trnH*, 58 of *rpl16*, 38 of *rps16-trnQ*, and 32 of *rps32-trnL*, of which 154 were of the *Gomidesia* clade. All sequences of ETS, *matK*, *ndhF*, *trnL-trnF*, and 144 sequences of ITS, 118 of *psbA-trnH*, 37 of *rpl16*, 37 of *rpl32-trnL*, and 104 of *rps16-trnQ* were obtained from previous studies (Lucas et al. 2007, Lucas et al. 2011, Murillo et al. 2012, Staggemeier et al. 2015) via Genbank (Benson et al. 2013) using the SUPERSMART tool (Antonelli et al 2017).

Total DNA was extracted mainly from 0.3 g of silica-gel-dried leaf material (0.2 g from herbarium samples) using a modified CTAB (cetyltrimethylammonium bromide) protocol (Doyle & Doyle 1987). Some samples were extracted using a DNeasy kit (Qiagen) according to the manufacturer's protocols. Amplification and purification of target DNA regions was executed according to protocols outlined in Lucas et al. (2007, 2011), Murillo et al. (2012) and Staggemeier et al. (2015). Amplified products were sent for sequencing at the Platform of sequencing-LABCEN/CCB at the Universidade Federal de Pernambuco in Brazil or the Jodrell Laboratory of the Royal Botanic Gardens Kew in the UK. DNA sequences were assembled and edited in Geneious v.7.1.9 (Kearse et al. 2012) and aligned using the MUSCLE (Edgar 2004) plugin with subsequent manual adjustment.

2.2. Phylogenetic analyses

Phylogenetic relationships were estimated using Maximum Likelihood (ML) and Bayesian Inference (BI) analyses performed separately on each dataset and combined. jModelTest v.2.1.6 (Darriba et al. 2012) was used to select the best model of DNA substitution for each individual marker in the combined dataset. Best-fitting substitution

models selected through the Akaike Information Criterion (AIC)(Akaike 1974) were GTR+G for *matK*, *ndhF*, *rpl16* and *rpl32-trnL*, and GTR+I+G for ETS, ITS, *psbA-trnH*, *rps16-trnQ* and *trnL-trnF* (Table 1).

Maximum Likelihood (ML) analyses were performed with RAxML v8.2.8 (Stamatakis 2006, 2014) using the rapid bootstrap algorithm with 1000 replicates to assess branch support, combined with a search of the best-scoring ML tree under default parameters. Bayesian Inference (BI) was performed using MrBayes v.3.2.6. (Ronquist et al. 2012). Two independent runs with four Markov Chain Monte Carlo (MCMC) runs were conducted, sampling every 1,000 generations for 20 million generations. Each run was evaluated in Tracer v.1.6 (Rambaut et al. 2014) to determine that the estimated sample sizes (ESS) for each relevant parameter was higher than 200. The consensus tree was generated in MrBayes with a burn-in of 25%. The consensus tree and posterior probability (PP) were visualized and edited in FigTree v.1.4.2. (Rambaut 2014). All analysis of ML, BI and jModelTest were performed in the CIPRES Science Gateway (Miller et al. 2010). Support values were considered high when bootstrapping (BS) was $\geq 70\%$, which means a high probability that the corresponding clade is real (Hillis & Bull 1993) or minimum posterior probability (PP) ≥ 0.95 (Erixon et al. 2003; Yang 2014; Pirie 2015). Informal clade classification follows Lucas et al. (2007), Lucas et al. (2011), and Staggemeier et al. (2015)

2.3. Ancestral reconstruction of morphological traits and biome occupation in *Myrcia s.l.* and the *Gomidesia* clade

The evolution of three morphological traits traditionally used to recognise the main *Myrcia s.l.* clades and six morphological traits used to compile informal groups and infra-taxonomical classification in the *Gomidesia* clade were analyzed (Table 2 and 3). Likely ancestral vegetation types in which ancestors of *Myrcia s.l.* and the *Gomidesia* clade originated were also reconstructed. Characters were scored on the basis of herbarium and field observations and data available in literature (Lucas et al., 2011; BFG, 2015; WCSP, 2016; Amorim chapter 3). To increase analytical efficiency, the number of biogeographical areas was reduced as far as possible. For this reason, Paramos and savanic vegetations of Venezuela, the Lesser Antilles and West Indies were coded as one state, representing 'open vegetation'. Regions used for the Atlantic Forest were influenced by the flow of the Doce river, a putative barrier between the

North and South portions of the Atlantic Forest, thought to shape species distribution in this habitat, (Prance 1982; Carnaval & Moriz 2008; Murray-Smith et al. 2009, Turchetto-Zolet et al. 2016; Zizka et al. 2017).

Bayesian analysis was used to infer ancestral state reconstructions. The evolution of selected morphological characters and vegetation was reconstructed on the Maximum Likelihood topology using the Bayesian Binary MCMC (BBM) tool implemented in RASP v.3.2. (Yu et al. 2015) using the default parameters. For these analyses, outgroup taxa were removed the tree was pruned to exclude the *Myrceugenia*, *Myrteola* and *Plinia* groups, *Myrcia fenzliana* DF, *Myrcia aff. hirtiflora*, *Myrcia aff. racemosa*, *M. rorida*, *M. springiana* PE, and *Myrcia* sp. 2 using the package “ape” (Paradis et al. 2016) implemented in R (R Core Team, 2016). The remaining species of *Myrcia s.l.* and the *Gomidesia* clade were each represented by a single accession to avoid potential bias from over-representation of intraspecific variation.

3. Results

The combined and aligned dataset comprise a total of 8,341 bp of two nuclear and seven plastidial regions (Table 1). The combined nuclear regions (ETS and ITS) comprise 18% (1,488 bp) of the total dataset length and contain more variable characters (37.9%). The combined plastidial region (*matK*, *ndhF*, *psbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF*) represent 82% (6,853 bp) of the total dataset and offer fewer variable characters (16.3%). Of the nuclear regions ETS provided most variation (42.1%), against ITS (35%). In the plastidial markers, *psbA-trnH* and *rps16-trnQ* provided most variable characters (30% and 20.7%, respectively), while *matK* and *ndhF* were the least variable regions (9.8% and 11.2%, respectively) (Table 1).

3.1. Phylogenetic relationships

Phylogenetic reconstructions of each partition provide topologies with low support values for both Maximum Likelihood (ML) and Bayesian Inference (BI) analyses, but congruence of major clades with no significantly significant topological contradictions with significant bootstrap and posterior probabilities between them. Results and discussions presented here focus on the combined dataset as it provided greater resolution and statistical support. Results of phylogenetic reconstructions

obtained with ML and BI showed similar consensus trees, diverging only in the weakly supported phylogenetic position of clade 10 among *Myrcia s.l.* clades. Discussion of these differences is based on figure 1.

3.1.1. Phylogenetic relationships within tribe Myrteae

Tribe Myrteae emerges as monophyletic (BS = 100; PP = 1) with *Myrtus communis* as sister to the rest of the tribe. Within Myrteae, the clade composed of species of *Luma* (BS = 100; PP = 1) is sister to a highly supported clade (BS = 94; PP = 1) comprised by the *Myrteola* group, and by the *Myrcia* supergroup clade. The *Myrteola* group (PP = 0.97) is sister to the *Myrcia* supergroup clade (PP = 0.97). Within the *Myrcia* supergroup, the *Myrceugenia* group (BS = 73; PP = 0.99) is sister to a clade (BS = 95; PP = 1), that is split into two sister lineages comprised by the *Plinia* (PP = 1) and *Myrcia* groups (BS = 83; PP = 1) (Fig. 1).

3.1.2. Phylogenetic relationships within *Myrcia s.l.* (*Myrcia* group)

Ten highly supported clades can be recognised (Fig. 1), one more than recognised until now (e.g. Lucas et al., 2011, Santos et al., 2017). Clade 9 (BS = 81; PP = 1) is sister to the rest of the *Myrcia* group (BS = 78). Within this clade, clade 5 (BS = 100; PP = 1) is sister to the clade composed of the remaining *Myrcia s.l.* lineages (BS = 76; PP = 1). Within that latter clade, clade 6 (BS = 100; PP = 1) is sister to a clade (BS = 72; PP = 1) comprising clades 1, 2, 3, 4, 7, 8, and 10. Clades 1 and 7 are strongly supported (BS = 100; PP = 1, each) but their sister relationship receives low support (BS = 60; PP = 0.86). That latter clade is sister to a weakly supported group composed of clades 2, 3, 4, 8, and 10. Within this group, Clade 10 (BS = 100; PP = 1) is sister to a well-supported clade (BS = 70; PP = 0.99) composed of two main lineages, the first shows a strong relationship (BS = 78) between clades 2 (BS = 99; PP = 1) and 8 (BS = 100; PP = 1), while the second shows a strongly supported relationship (BS = 98; PP = 1) between clades 3 and 4 (BS = 99; PP = 1, each). Clade 9 is also split into two main lineages. The first (BS = 73) comprises the highly supported subclades A, B, C1 and C2. The second main lineage (BS = 99; PP = 1) splits into two other highly supported lineages. The first (BS = 100; PP = 0.99) is composed of *Myrcia* sp. 7 sister to subclades D and E. The second lineage (BS = 90; PP = 1) is composed of subclades F and G. (Fig 1.).

3.1.3. Phylogenetic relationships within the *Gomidesia* clade

Our results corroborate clade 3 (or the *Gomidesia* clade) as monophyletic (BS = 99; PP = 0.99). This clade is composed of two highly supported lineages, the clades G1 and G2 (BS = 97; PP = 1, each) (Fig. 1), each composed of two subclades. In clade G1, subclade G1a (BS = 81; PP = 0.98) is composed of a lineage in which *Myrcia grazielae*, *M. springiana* and *M. pendula* are nested (PP = 0.98) sister to a group of species which comprises *M. lughadhai*, *M. rosangelae* and *M. serrana*. Clade G1b is highly supported (BS = 94 and PP = 1) and composed of *M. amplexicaulis*, *M. carvalhoi*, *M. crocea*, *M. espiritosantensis*, *M. magnifolia*, *M. spectabilis*, and *M. vittoriana*. Clade G2 is composed of subclade G2a (BS = 87; PP = 1); it is the most species rich clade and is composed of *Myrcia anacardiifolia*, *M. aurea*, *M. barituensis*, *M. brasiliensis*, *M. cordiifolia*, *M. eriocalyx*, *M. fenzliana*, *M. grandifolia*, *M. hartwegiana*, *M. hebeptala*, *M. ilheosensis*, *M. longisepala*, *M. montana*, *M. mischophylla*, *M. palustris*, *M. pubescens*, *M. reticulata*, *M. squamata*, *M. subsericea*, and *M. tijucensis*. Subclade G2b is composed of *Myrcia cerqueiria*, *M. flagellaris* and *M. ruschii*.

3.2.1. Evolution of morphological traits within *Myrcia s.l.*

Three important morphological features in traditional taxonomy and useful for species identification were used to infer ancestral states across the phylogeny (Fig 2a-b, 3a). The state of free calyx lobes is plesiomorphic in *Myrcia s.l.* (Fig 2a) with four shifts to the four fused calyx types in the group (for more details see Lucas et al. 2011). Species of clade 9 can have species with free or fused sepals but the ancestor of this group was likely to have had free calyx lobes (probability-P 99%), with three calyx fusion events in subclades A, D, E, and F; only clade E has an ancestral node with fused calyx lobes (Fig 2a). Species of clades 1 and 7 can also possess fused calyx lobes, but these calyx types are morphologically distinct. Clade 1 species have a fused and calyptrate calyx, falling as a calyptra while clade 7 species often have a fused calyx in the bud that tears more or less regularly (Fig 2a). Probabilities of ancestral character states do not give a clear picture with ancestral free calyx lobes receiving 55% probability and clade 1 and clade 7 fused calyx types receiving 17% and 16%, respectively. Fused calyx lobes are also found in clade 2 with the calyx commonly partially to completely fused (rarely free), tearing vertically through the calyx as in

clade 9. The ancestral character state of this clade is free calyx lobes with high probability (P 96%).

The 2-locular ovary is the plesiomorphic character state for *Myrcia s.l.* (P 99%). Six independent changes to 3 or more locular ovaries have occurred in clades 3, 4, 6 and 10 (Fig 2b), in which clade 3 has three independent events. The ancestral state of the *Gomidesia* clade is 2-locular (98% of probability) with shifts to 3 or 4-locular species relatively common (Fig 2b).

The bilocular anther with reversed curvature of the thecal wall on dehiscence is recovered as the ancestral state of *Myrcia s.l.* with 99% probability (Fig 3a). The only variation to this is in the *Gomidesia* clade, in which all species, to a lesser or greater extent, have asymmetric anthers in which the thecal walls retain curvature after dehiscence or with a visible septum, and clade 10 in which anthers are also asymmetric with a visible pseudo-septum (Fig 3a).

3.2.2. Evolution of morphological traits within the *Gomidesia* clade

Three anthers traits were used here: 1) proportion of thecal displacement, 2) presence or absence of glands and 3) septal prominence (Fig. 4a, b, c). In species of the *Gomidesia* clade, the most common degree of thecal displacement is one quarter of the anther size. This character occurs in all subclades and is returned as the ancestral state of the clade with 99% probability and for all subclades proposed here. Thecal displacement of one sixth to one eighth of total anther length occurs occasionally in clades G1b, G2a, and G2b (Fig. 4a). *Gomidesia* clade species in which thecal displacement is one half of anther length, are found in most species of subclade G2a only; however, the ancestral state for thecal displacement in this clade is one quarter (Fig. 4a).

The presence of anther glands is recovered as the ancestral state of the *Gomidesia* clade with 99% probability and for all subclades proposed (Fig. 4b). The absence of anther glands is restricted to a few lineages of clade G2a and only *Myrcia brasiliensis* varies between both states (Fig. 4b).

The hidden septum is recovered as the ancestral state of the *Gomidesia* clade with 99% probability (Fig. 4c). This feature is the ancestral state returned for all subclades with 99% probability (Fig. 4c). The visible septum was found in relatively

few lineages of clade G2a, with *Myrcia brasiliensis* the only species which shows both states, the same pattern was found for the presence of anther glands.

Three non-anther traits are used here: 1) distribution of flowers along the inflorescence, 2) number of flowers on the inflorescence, 3) trichomes on abaxial leaf surface. The most common distribution of flowers is evenly distributed along the inflorescence. This was recovered as the ancestral state of this clade with 98% probability (Fig. 5a) and of all proposed clades, except for clade G2b in which the ancestral state is unresolved (Fig. 5a). Flowers clustered at the apex of the inflorescence are present in all clades proposed, occurring only in two lineages of the clade G1 (*Myrcia carvalhoi* and *M. pendula*), and more represented in the clade G2, which has five lineages in clade G2a, in which *M. anacardiifolia* can have both states and in clade G2b in *M. cerqueiria* and *M. flagellaris*.

Besides the position, the number of flowers in the inflorescence is another relevant feature for informal morphological species grouping in *Gomidesia* clade (Amorim chapter 3). The ancestral number of flowers in the inflorescence in the *Gomidesia* clade is multi-flowered (P 99%) (Fig. 5b), with the same pattern repeated for all proposed subclades. Three-flowered inflorescences occur only in subclade G2, in four lineages of G2a; *Myrcia anacardiifolia* is the only species with both states, emerging in subclade G2b, with *M. flagellaris* (Fig. 5b).

The ancestral state of indument on the abaxial leaf surface of the *Gomidesia* clade is unresolved (Fig. 5c), as are results for the ancestral states of subclades G1 and G2. Only the ancestral states of this character in subclades G2a and G2b are well-defined as appressed trichomes (P 84%), and ascending to erect trichomes (P 70%), respectively. Lineages with appressed and ascending to erect trichomes on the abaxial leaf surface evolved independently in the four subclades proposed. The unique state of manicate trichomes on the abaxial leaf surface occurred only in subclade G2a.

3.3. Geographical origins of *Myrcia s.l.* and the *Gomidesia* clade

The ancestral biome recovered for *Myrcia s.l.* is the Atlantic Forest with 95% probability (Fig 3b). This probable ancestral vegetation is shared by all *Myrcia s.l.* lineages except clade 4 that has an uncertain ancestral state shared by the Atlantic Forest (P 56%), Atlantic Forest and Cerrado (P 38%), or Cerrado (P 5%). The ancestral biome

of clade 9 is the Atlantic Forest (P 69%) however, the clade is composed of subclades A, B, C1 and C2 and has the Amazon basin as its ancestral area (85% probability) as do subclades A (100% probability) (Fig 3b) and G (P 62%) (Fig 3b). In both cases, subsequent lineages are from the Atlantic Forest, Cerrado or widespread, suggesting a reversal of direction of biome occupation with lineages diverging back to Atlantic Forest or Cerrado.

The ancestral vegetation recovered for the *Gomidesia* clade is the southern region of the Atlantic Forest with 88% probability (Fig. 6). This same ancestral is recovered for clades G2, G2a, and G2b with 98, 97, and 98% probability, respectively (Fig. 6). Subclade G2a apparently shifted into the highest number of different vegetation types with most of its lineages from southern Atlantic Forest, and others from southern Atlantic Forest and Cerrado, endemic to Cerrado or widespread in Atlantic Forest. *Myrcia fenziiana* is the most widespread species, which in addition to the cited biomes also occurs in Yungas, Paramos, and in the savanic vegetations of Venezuela, Lesser Indies and West Indies. *Myrcia barituensis* is restricted to Yungas from northwestern Argentina and Bolivia.

Clade G2b is also composed of species restricted to the Atlantic Forest (Fig. 6). The ancestor of clade G1 is unresolved with states shared between the northern and southern Atlantic Forest regions with 21, and 31%, respectively, or the Atlantic Forest with 47% of probability. The ancestral biome recovered for subclade G1a is the northern Atlantic Forest (P 93%) despite the absence of Atlantic Forest lineages in the clade except *Myrcia lughadhai* that is restricted to campos rupestres (Cerrado vegetation). The ancestral habitat of G1b is the Atlantic Forest, but it is not clear from which region (Fig. 6).

4. Discussion

4.1. Phylogenetic relationships within tribe Myrteae

Results presented here corroborate the monophyly of most clades in tribe Myrteae proposed by previous phylogenetic studies (Lucas et al. 2007; Staggemeier et al. 2015; Vasconcelos et al. in press), except for the *Myrceugenia* clade (sensu Lucas et al. 2007). Within this clade, *Luma* has been related to *Blepharocalyx* and *Myrceugenia* in studies such as Lucas et al. (2007) and Vasconcelos et al. (in press) including six and

three *Myrceugenia* species, respectively. The phylogenetic hypothesis presented here includes 31 species or 77% of the genus *Myrceugenia* (Supplemental data S1, S2) and suggests that *Luma* is not related to the *Myrceugenia* group. Instead, the highly supported *Luma* clade (BS = 100; PP = 1) is sister to the rest of tribe Myrteae (BS = 94; PP = 1). *Luma* not belonging to the *Myrceugenia* group (sensu Lucas et al. 2007) was found in another previously well-sampled *Myrceugenia* phylogeny by Murillo et al. (2012, 2013). Murillo et al. (2012, 2013) found no evidence for the monophyly of *Myrceugenia* group (sensu Lucas et al. 2007) and instead accepted a *Myrceugenia* group composed only of *Myrceugenia* species and *Blepharocalyx cruckshankii*. *Luma* and *Myrceugenia* were previously treated as a single genus with a wide morphological circumscription by Niedenzu (1893). However, Landrum (1981) treated them as distinct based on their different embryo structures. *Luma* is composed of only two species with a narrow distribution in Chile and Argentina (Landrum, 1986; Wilson 2011). As a result, McVaugh (1968) hypothesized that *Luma* has a restricted distribution and had evolved locally, unrelated to the other main Myrteae lineages. This hypothesis was supported by Landrum (1981) who described *Luma* as an ancestral lineage based on plesiomorphic anatomical characters (ie. scalariform perforation plates and tracheids). Results presented here strongly corroborate the phylogenetic hypothesis of Murillo et al. (2012, 2013), and the morphological hypotheses of McVaugh (1968) and Landrum (1986).

The *Myrcia* supergroup clade (sensu Vasconcelos et al. in press) is composed of four monophyletic groups (*Blepharocalyx*, *Myrceugenia*, *Myrcia* and *Plinia* groups) but in that analysis not all relationships between clades received strong statistical support. In this study, relationships between the clades of the *Myrcia* supergroup are strongly supported, with the *Myrceugenia* group (sensu Murillo et al. 2012) sister to the *Plinia* and *Myrcia* groups (Fig. 1) as returned by Lucas et al. (2007) although with low statistical support.

Lucas et al. (2007) showed that the *Plinia* group is composed of the genera *Myrciaria*, *Neomitranthes*, *Plinia*, and *Siphoneugena*, all sister to *Algrizea macrochlamys*. Later studies based on more DNA data (Staggemeier et al. 2015; Santos et al. 2016; Vasconcelos et al. in press) included *Algrizea* within the *Plinia* group; results presented here corroborate this broader circumscription (Supplemental data S1, S2).

4.1.1.1. Phylogenetic relationships within *Myrcia s.l.*

Analyses presented here confirm the monophyly of *Myrcia s.l.* and the nine informally named subclades proposed by Lucas et al. (2011). Numbered clades one to nine in the following discussion follow that study. That study and subsequent analyses based on more DNA data (Staggemeier et al. 2015; Santos et al. 2016; Wilson et al. 2016) found different arrangements of these subclades, always with varying degrees of statistical support. In the multi-locus approach presented here based on more *Myrcia s.l.* samples (Fig. 1) and DNA regions analyzed, highly supported relationships were returned for and between the *Myrcia* group clades.

In addition to the nine traditional *Myrcia s.l.* clades (Lucas et al. 2011), a new clade is recognised. Clade 10 (Fig. 1) is composed of *Myrcia pulvinata* B.S. Amorim and *Myrcia* aff. *unana* (voucher: B.S. Amorim 2024). Both species are from a narrow region in the north of the Atlantic Forest. Parallel works on *Myrcia* systematics return other species in this clade (D.F. Lima pers. comm.); these are *Myrcia thomasi* B.S. Amorim & A.R. Lourenço, *M. maximiliana* O. Berg, and *M. robusta* Sobral. The clade composed of *Myrcia maximiliana* and *M. robusta* was already recovered but not recognized as a distinct clade by Santos et al. (2016). Clade 10 species share morphological features of large leaves, distinct and imbricate calyx lobes, a glabrous staminal disk and 3-locular ovary. In the description of *Myrcia pulvinata*, Amorim & Alves (2015) incorrectly placed it in the *Gomidesia* clade (clade 3 sensu Lucas et al. 2011) based on similar morphological traits, such as erect, distinct and imbricate calyx lobes, non-symmetrical anthers with an evident septum, and erect calyx lobes in fruit. Later, analyzing more flowers of the species, the authors concluded that it had a 3-locular ovary, a glabrous staminal disk, and anthers with a pseudo-septum, characters not usually found in *Gomidesia* clade species (Lucas et al. 2011; Amorim chapter 3).

In the phylogenetic hypothesis for *Myrcia s.l.* presented here, clade 9 is sister to the rest of the *Myrcia s.l.* clades (Fig. 1), corroborating Lucas et al. (2011). The arrangement of the remaining clades however is a better match for the topologies returned by Staggemeier et al. (2015) and Santos et al. (2016). Within the remaining lineages, clade 5 is sister to a clade comprising clade 6 plus a clade composed of the rest of *Myrcia s.l.* as returned by Staggemeier et al. (2015) and Santos et al. (2016). In this latter clade, a weakly supported group comprised of clades 1 and 7 is sister to the rest of *Myrcia s.l.* This weakly supported relationship was also found by Staggemeier et al.

(2015), Santos et al. (2016) and Wilson et al. (2016). Sister to this lineage is the weakly supported relationship between clade 10 and a highly supported clade composed of the remaining lineages of *Myrcia s.l.* that was highly supported in Staggemeier et al. (2015). Within the latter clade, two well-defined lineages represent clades 2 plus 8 and clades 3 plus 4.

Within clade 9, subclade C (sensu Staggemeier et al. 2015) is here split into two highly supported lineages C1 and C2. Clade C1 is composed of new accessions of *Myrcia rorida*, *M. rubella*, *M. torta* and *M. multiflora* (not sampled in Staggemeier et al. 2015). Clade C2 is comprised of *Myrcia decorticans* sister to *M. polyantha*. *Myrcia multiflora* was related to *M. decorticans* and *M. polyantha* in Staggemeier et al. (2015). The relationship between C1 and C2 is weakly supported and the relationships among clades C1, C2 and B (sensu Staggemeier et al. 2015) are not well-defined here.

4.1.2. Phylogenetic relationships within the *Gomidesia* clade

The *Gomidesia* clade sensu Lucas et al. (2011) is predominantly composed of species previously described in the genus *Gomidesia* (sensu Berg 1855). Lucas et al. (2011) also cite its non-monophyly due to the inclusion of *Myrcia mischophylla* within the clade, based on the lack of typical *Gomidesia* anther features in this species. *Myrcia mischophylla* had never been treated as *Gomidesia* (Berg 1855, 1857; Legrand 1958; NicLughada 1997). This species was published by Kiaerskov (1893), who did not accept *Gomidesia* as a distinct genus and treated it under *Myrcia*. Recently, the displaced anther with evident septum was reported in *Myrcia mischophylla* (Amorim non. publ.). The anther feature found in *Myrcia mischophylla* is common in the *Gomidesia* clade species which occur in Cerrado, whereas *M. mischophylla* is also restricted (Amorim non. publ.).

Results presented here support the monophyly of the *Gomidesia* clade (or clade 3) and split it into two main lineages. A similar arrangement was found in Lucas et al. (2011), in which a lineage composed of *Myrcia spectabilis* and *M. vittoriana* was sister to the remaining *Gomidesia* clade species. Within clade G1, subclade G1a is composed of two main lineages; *Myrcia grazielae*, *M. springiana*, *M. pendula*, are nested in a highly supported clade with species restricted to the North of the Atlantic Forest. Subclade G1b is weakly supported and comprises of *Myrcia lughadhai*, *M. rosangelae* and *M. serrana*. *Myrcia lughadhai* is restricted to campos rupestres (Cerrado

vegetation) of northeastern Brazil (Amorim et al. 2014) with *Myrcia rosangelae* and *M. serrana* restricted to the North portion of the Atlantic Forest (Amorim & Alves 2015; in press) (Fig. 1, 6). Clade G2 is composed of subclade G2a, the most species rich subclade represented by species from several biomes such as the Atlantic Forest, Cerrado, Yungas, Paramos, and savanna vegetations of Venezuela, the Lesser Antilles and West Indies (Fig. 1, 6). Subclade G2b is weakly supported and is composed of species restricted to the Atlantic Forest. A biogeographic signal stronger than morphological was also found in *Myrcia s.l.* clades (Staggemeier et al. 2015, Wilson et al. 2016) and is known to happen in Myrtales (Michelangeli et al. 2012). Gomidesia clade species share this pattern with clades composed of most species from Atlantic Forest with independent lineages from savanna vegetation.

4.2. Evolution of morphological traits within *Myrcia s.l.*

Despite the evident homoplasy of morphological characters of traditional importance in the ten *Myrcia s.l.* clades discussed, the clades are morphologically recognizable (Lucas et al. 2011). Results presented here indicate that the ancestor of *Myrcia s.l.* possessed free calyx lobes and underwent three independent shifts to fused calyx lobes. Staggemeier et al. (2015) propose that the free calyx state was the ancestral condition in *Myrcia* sect. *Aulomyrcia* (clade 9) as this is the state in lineages emerging from the deepest nodes and because most species possess this morphological feature. In the same study, free calyx lobes are hypothesized for the ancestor of subclades A, B and C but the state of this character for the ancestor of subclades D, E, F and G remained unknown due to the high presence of closed calyx species in that lineage (Staggemeier et al. 2015). Results presented here support the ancestor of that latter clade as having had free calyx lobes with only the ancestors of subclades D and E with a closed calyx (Fig. 2a). The calyx is one of the most variable organs in the Myrtaceous flower, occurring in every stage between a completely closed calyx in bud to a free lobed calyx. The character was often used for taxonomic purposes (McVaugh 1968), particularly to define generic limits (Landrum 1984). Historically, multiple genera were described based entirely on the presence of fused calyx lobes (e.g. *Britoa* Berg (= *Campomanesia*), *Calycorectes* (= *Eugenia*), *Calyptranthes* (= *Myrcia s.l.*), *Calyptrogenia* (= *Myrceugenia*), *Marlierea* (= *Myrcia s.l.*) and *Mitranthes* (= *Myrcia s.l.*; see McVaugh 1968; Landrum 1986; Lucas et al. 2011; Vasconcelos et al. in press).

However, recent molecular phylogenetic studies in tribe Myrteae have demonstrated that in many cases ‘genera’ that were described based only in the presence of the closed calyx lobes are not natural groups (Lucas et al. 2011; Murillo et al. 2012; Mazine et al. 2014; Staggemeier et al. 2015; Santos 2016; Wilson et al. 2016; Vasconcelos et al. in press).

Lucas et al. (2011) report the 3-locular ovary from clades 3, 4 and 6 but that character here is reported also from Clade 10. All clades that share this character state are strongly supported as distinct lineages (Figs. 1, 2b). Within the *Gomidesia* clade cases of 3 or 4-locular ovaries have been reported for some species (NicLughadha, 1997) although this is uncommon in this ancestrally 2-locular group. The multi-locular ovary was hypothesized to be primitive in tribe Myrteae, with *Campomanesia*, *Myrceugenia* and *Psidium* as representant of this group, in which 2-locular was considered to be a specialized state (McVaugh 1968). In having the 2-locular ovary as the ancestral state, *Myrcia s.l.* defies the pattern in tribe Myrteae with shifts to a 3 or 4 locular ovary.

The typical symmetrical anther with reversing curvature during dehiscence is the most common anther state in *Myrcia s.l.* (Lucas et al. 2011) and is here recovered as the ancestral state for the genus. Asymmetric anthers that retain curvature after dehiscence and asymmetric anthers with visible pseudo-septa are recovered as the most likely ancestral states for both the *Gomidesia* clade and clade 10. The *Gomidesia* clade was distinguished as a genus by Berg (1955), based on this feature and possession of this character by clade 10 species caused their mis-placement in the *Gomidesia* clade (Amorim & Alves 2015). The specialised anther with displaced thecae appears to be a derived state *Myrcia s.l.* and are diagnostic for the two clades in which they occur.

4.2.1. Ancestral state reconstruction of morphological traits within the *Gomidesia* clade

An infrageneric classification of the *Gomidesia* clade was proposed by Legrand (1958) who proposed sections of the genus *Gomidesia* (sensu Berg 1955) based on anther features. That morphology-based classification does not reflect the clades reconstructed in the phylogenetic hypothesis presented here where all sections proposed by Legrand (1958) emerge as polyphyletic (Fig. 7a). Legrand’s section *Eytroteca* subsect. *Subaequales* is best represented in this study with species emerging in subclades G1a, G1b, and G2a. Section *Eytroteca* subsect. *Oppositae* species were found only in subclade G2a (Fig. 7a). Section *Tetraspora* is represented by a single species,

Myrcia cerqueiria, placed here in clade G2b. Section *Platitecae* subsect. *Auriculatae* emerged in six separate lineages of clade G2a while subsect. *Collaterales*, here represented by *M. brasiliensis* and *M. ilheosensis* are recovered in separate clades within clade G2a (Fig. 4a). *Myrcia pubescens* (clade G2a) was also cited to sect. *Platitecae*, subsect. *Auriculatae*, and to sect. *Eytroteca* subsect. *Oppositae* (under *Gomidesia aubletiana* O. Berg).

An informal *Gomidesia* species grouping based on morphological similarity proposed by Nic Lughadha (1997) is a better fit to the molecular phylogenetic arrangement presented here. Nic Lughadha (1997) recognized nine morphological groups (Fig. 7b). Group 1 comprises large-leaved species from the Atlantic Forest with particularly long anthers with hidden septa. *Myrcia amplexicaulis*, *M. carvalhoi*, *M. crocea*, *M. grazielae*, *M. magnifolia*, *M. rosangelae*, *M. springiana*, and *M. vittoriana* belong to this group, forming clade G1 (Fig. 1), along with *M. espiritosantensis*, *M. lughadhahi*, *M. pendula*, and *M. Serrana* that were published later (Sobral 2010; Amorim et al. 2014; Amorim & Alves 2015, 2016). The morphological characters used by Nic Lughadha (1997) are useful to recognise group 1 species (sensu Nic Lughadha 1997) however they can not be considered diagnostic for clade G1 as they are also found in species from clade G2 (i.e. *Myrcia cordifolia*, *M. grandifolia*, and *M. ruschii*; Fig. 1). *Gomidesia* species placed in groups 2-9 sensu Nic Lughadha (1997) all emerge in clade G2 (Fig. 7b). Clade G2 includes the majority of species sampled here as well as high morphological variation and habitat occupation (Figs. 4a, b, c, 5a, b, c-, 6). Morphological characters exclusive to clade G2 are aglandular anthers with thecae displacement comprising c. half of the total anther length, a 3-flowered inflorescence and manicate trichomes on abaxial leaf surfaces. Species that occur in the Atlantic Forest and Cerrado biomes (ie. *Myrcia eriocalyx*, *M. montana* and *M. pubescens*) (Fig. 6), restricted to Yungas (ie. *M. barituensis*), and wide distributed in Atlantic Forest, Cerrado, Yungas, and savanna biomes of South America, Lesser Antilles and West Indies (ie. *M. fenzliana*), are also restricted to clade G2.

4.3. Geographical origins of *Myrcia s.l.* and *Gomidesia* clade

Lucas et al. (2011) supposed eastern South America to be the ancestral area of *Myrcia s.l.* due to the high number of species from the Cerrado and Atlantic Forest. The Amazon basin has been suggested to be the origin of *Myrcia* sect. *Aulomyrcia* (clade 9;

Staggemeier et al. 2015). The ancestral vegetation for *Myrcia s.l.* recovered in the current study is the Atlantic Forest, corroborating the pattern recovered by Santos et al. 2017; this pattern is further discussed in a study of a dated phylogeny of *Myrcia s.l.* (Amorim et al. in prep.).

The Atlantic Forest is a center of species diversity for *Myrcia s.l.* (Murray-Smith et al. 2009; Lucas et al. 2011) and is returned as the ancestral vegetation for the genus (see above). A majority of *Gomidesia* clade species occur in the Atlantic Forest (Amorim chapter 3) and due to the importance of this vegetation, the biome was subdivided allowing the part of the Atlantic Forest from which the ancestral lineages of the *Gomidesia* clade originated to be identified. The ancestral region of the *Gomidesia* clade is the southern Atlantic Forest (Fig. 6), the region is richest in *Gomidesia* clade species and has the highest number of endemics (BFG 2015; Amorim chapter 3). From the southern Atlantic Forest, multiple lineages reached the northern Atlantic Forest, in which clade G1a species and *Myrcia cavahoi* (clade G1b) are restricted (Fig. 6). Occupation of the Cerrado (ie. *M. eriocalyx*, *M. montana*, *M. lughadhai*, *M. mischophylla* and *M. pubescens*), Yungas (ie. *M. barituensis*), and savanna vegetation of South America, Lesser Antiles and West Indies (ie. *M. fenzliana*), also have their ancestral vegetation in the Atlantic Forest (clades G1b and G2a; Fig. 6). Similar patterns of multiple, independent lineages of Cerrado species with ancestral areas in wet forests are also found in e.g. *Eugenia* sect. *Phyllocalyx* and *Myrceugenia* (Myrtaceae), and *Andira* and *Mimosa* (Fabaceae) (Simon et al. 2009; Murillo et al. 2012; Bünger et al. 2016; Amorim non. publ.), and for the Tribes Cocoseae and Geonomateae (Arecaceae), where both tribes share the additional similar migration pattern of lineages moving in to the West Indies from continental sources (Roncal et al. 2008).

5. Conclusions

Results presented here uncover new phylogenetic relationships in tribe Myrteae. The genus *Luma* apparently represents an ancestral lineage that does not belong to the *Myrceugenia* group (sensu Lucas et al. 2007), which is monophyletic and composed of the genus *Myrceugenia* + *Blepharocalyx cruckshankii*. A relationship of the *Myrceugenia* group with the *Myrcia* and *Plinia* groups is also suggested for the first time. A broader *Plinia* group including *Algrizea macrochlamysis* corroborated. The

genus *Myrcia s.l.* and its 9 clades are highly supported as monophyletic, with the addition of the new clade 10.

The first implementation of morphological trait evolution and biome occupation in *Myrcia s.l.* is proposed based on a well supported phylogenetic hypothesis, indicating flowers with free calyx lobes, 2-locular ovaries, bilocular anthers with symmetrical thecae, and occupation of the Atlantic Forest as ancestral states. The Atlantic Forest was recovered as the ancestral vegetation for the main *Myrcia s.l.* clades, with subsequent colonization of the Amazon basin and savanna biomes, with the exception of clade 4 for which the ancestral vegetation unresolved.

The *Gomidesia* clade is also highly supported and recovered as monophyletic with asymmetric anthers that retain their curvature after dehiscence a derived character. Anthers with hidden septa, apical glands and thecal displacement making up to one quarter of their size, and occupation of Atlantic Forest vegetation, are proposed as ancestral conditions in the *Gomidesia* clade. This clade is composed of two main lineages within which G1 is composed mostly of species from the Atlantic Forest and G2 is the most species rich clade with lineages from the Atlantic Forest and/or the Cerrado, Yungas, and other savanic vegetations of South America. Clade G2 has high morphological diversity of reconstructed traits such as anther features and inflorescence morphology. It is here suggested that this diversity could be related to the highly diverse biomes colonized by the groups lineages; character correlation and phylogenetic signal analyses are needed to confirm these results.

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Table 1. Sequence statistics summary for the analyzed markers used to infer phylogenetic relationships in *Myrcia* super group

	ETS	ITS	<i>matK</i>	<i>ndhF</i>	<i>psbA-trnH</i>	<i>rpl16</i>	<i>rpl32-trnL</i>	<i>rps16-trnQ</i>	<i>trnL-trnF</i>	Nuclear combined	Plastid combined	All data combined
No. of taxa	107	176	67	63	149	95	89	140	97	176	177	177
Aligned length (bp)	603	885	1,344	733	739	905	881	1,410	841	1,488 (18%)	6,853 (82%)	8,341
Conserved characters	315 (52.2%)	533 (60.2%)	1,212 (90.2%)	651 (88.8%)	399 (53.9%)	780 (86.2%)	696 (79.0%)	1,052 (74.6%)	649 (77.8%)	848 (57.0%)	5,439 (79.4%)	6,287 (75.4%)
Variable characters	254 (42.1%)	310 (35.0%)	132 (9.8%)	82 (11.2%)	222 (30.0%)	119 (13.1%)	153 (17.4%)	292 (20.7%)	118 (14.0%)	564 (37.9%)	1,118 (16.3%)	1,682 (20.2%)
Mean CG content	49.0%	56.2%	33.6%	28.3%	25.7%	30.1%	27.4%	26.3%	34.9%	53.9%	28.8%	45.9%
Substitution model	GTR+I+G	GTR+I+G	GTR+G	GTR+G	GTR+I+G	GTR+G	GTR+G	GTR+I+G	GTR+I+G			

Table 2. Morphological traits and states of *Myrcia s.l.* used in ancestral reconstruction of figures 2 and 3.

	Calyx lobes	Ovary locules	Anthers
Clade 1	fused and calyptrate calyx, falling as a calyptra	2-locular	symmetric, with reversing curvature
Clade 2	partially to completely fused, tearing vertically through the calyx	2-locular	symmetric, with reversing curvature
Clade 3	free	2-locular (less frequent 2-3, 3-4-locular)	asymmetric, with retain its curvature
Clade 4	free	3-locular	symmetric, with reversing curvature
Clade 5	free	2-locular	symmetric, with reversing curvature
Clade 6	free	3-locular	symmetric, with reversing curvature
Clade 7	often fused in bud, tearing more or less regularly	2-locular	symmetric, with reversing curvature
Clade 8	free	2-locular	symmetric, with reversing curvature
Clade 9	free or less fused, irregularly tearing through the hypanthium	2-locular	symmetric, with reversing curvature
Clade 10	free	3-locular	asymmetric, with a visible pseudo-septum

Table 3. Morphological traits and states of *Gomidesia* clade used in ancestral reconstruction of figures 4 and 5

	Anther displacement	Anther glands	Anther septum	Position of flowers in the inflorescence	Number of flowers in the inflorescence	Trichomes on abaxial leaf surface
<i>Myrcia amplexicaulis</i>	1/6-1/8	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. anacardiifolia</i>	¼	lack	hidden	evenly distributed or clustered at the apex	3-flowered or multi-flowered	apressed
<i>M. aurea</i>	½	present	visible	clustered at the apex	3-flowered	apressed
<i>M. barituensis</i>	½	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. brasiliensis</i>	½	present or lack	hidden or visible	evenly distributed	multi-flowered	apressed
<i>M. carvalhoi</i>	1/6-1/8	present	hidden	clustered at the apex	multi-flowered	ascending to erect
<i>M. cerqueiraia</i>	1/6-1/8	present	hidden	clustered at the apex	multi-flowered	apressed
<i>M. congestiflora</i>	1/6-1/8	present	hidden	clustered at the apex	multi-flowered	apressed
<i>M. cordifolia</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. crocea</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. eriocalyx</i>	½	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. espiritosantensis</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. fenziiana</i>	½	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. flagellaris</i>	¼	present	hidden	clustered at the apex	3-flowered	apressed
<i>M. grandifolia</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. grazieleae</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. hartwegiana</i>	½	lack	hidden	evenly distributed	multi-flowered	apressed
<i>M. hebeptala</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. ilheosensis</i>	½	present	visible	evenly distributed	multi-flowered	apressed
<i>M. lughadhai</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. magnifolia</i>	X	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. mischophyla</i>	½	lack	visible	evenly distributed	multi-flowered	maniculate
<i>M. montana</i>	½	lack	visible	clustered at the apex	3-flowered	apressed
<i>M. palustris</i>	½	lack	visible	evenly distributed	multi-flowered	apressed
<i>M. pendulla</i>	¼	present	hidden	clustered at the apex	multi-flowered	ascending to erect
<i>M. pubescens</i>	½	lack	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. reticulata</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. rosangelae</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. ruschii</i>	¼	present	hidden	evenly distributed	multi-flowered	ascending to erect
<i>M. serrana</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. spectabilis</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. springiana</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. squamata</i>	¼	present	hidden	clustered at the apex	3-flowered	apressed
<i>M. subsericea</i>	¼	present	hidden	evenly distributed	multi-flowered	apressed
<i>M. tijuacensis</i>	½	lack	hidden	evenly distributed	multi-flowered	apressed
<i>M. vittoriana</i>	1/6-1/8	present	visible	evenly distributed	multi-flowered	apressed

Fig. 1. Maximum likelihood (ML) majority rule consensus tree from analysis of the combined ITS (internal transcribed spacer), ETS (external transcribed spacer), *matK*, *ndhF*, *pasBA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF* matrix. Bootstrap percentages (from ML analysis) greater than 70 are shown above branches; clades that receive Bayesian posterior probabilities greater than 0.95 are indicated by thicker branches. PE = state of Pernambuco; BA = state of Bahia; DF = Federal District; REP = Dominican Republic. Clades 1-9 follows Lucas *et al.* 2011. Subclades A-G follows Staggemeier *et al.* 20015. Clade 10* is proposed here. Scale bar: substitutions per site.

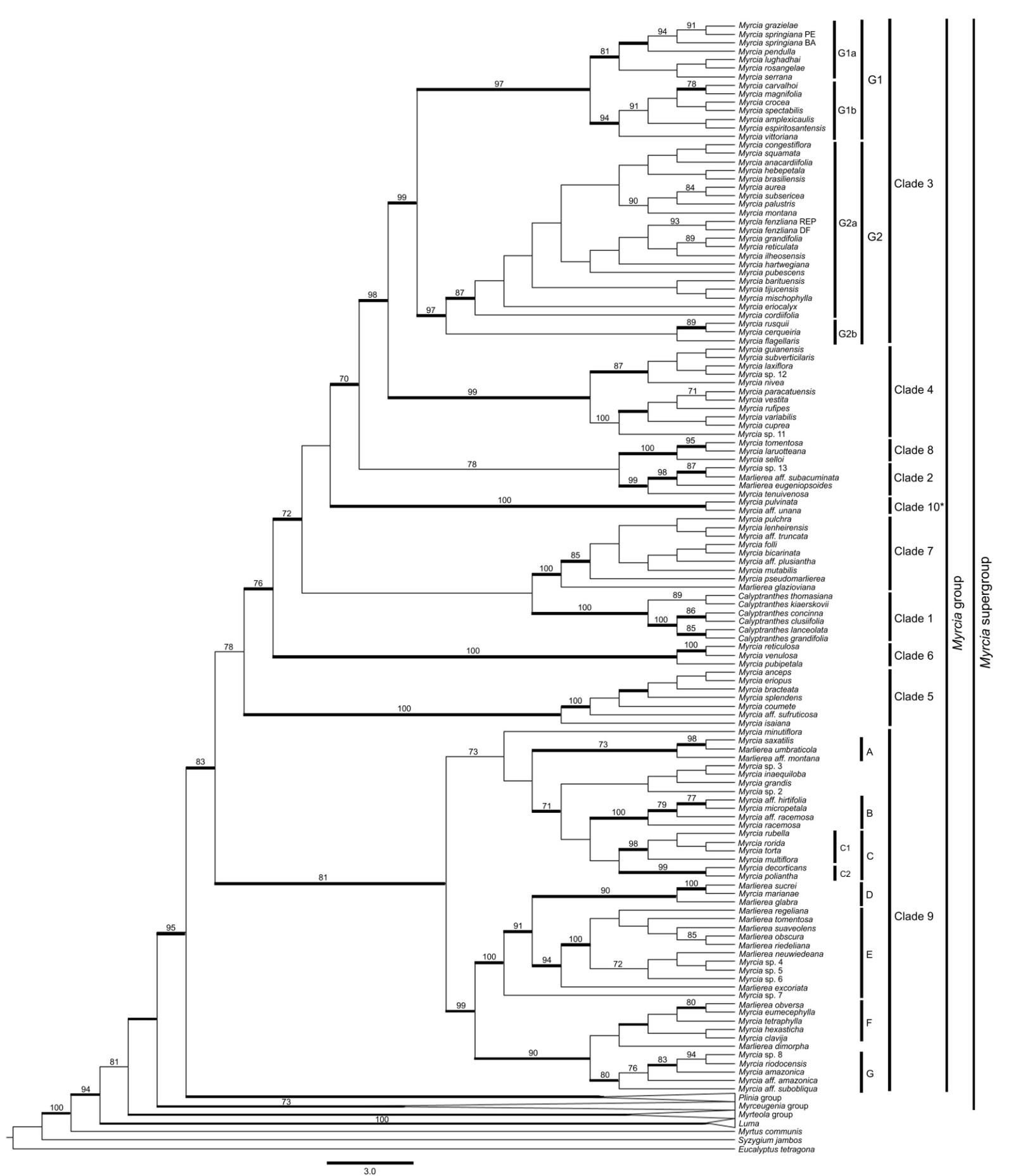
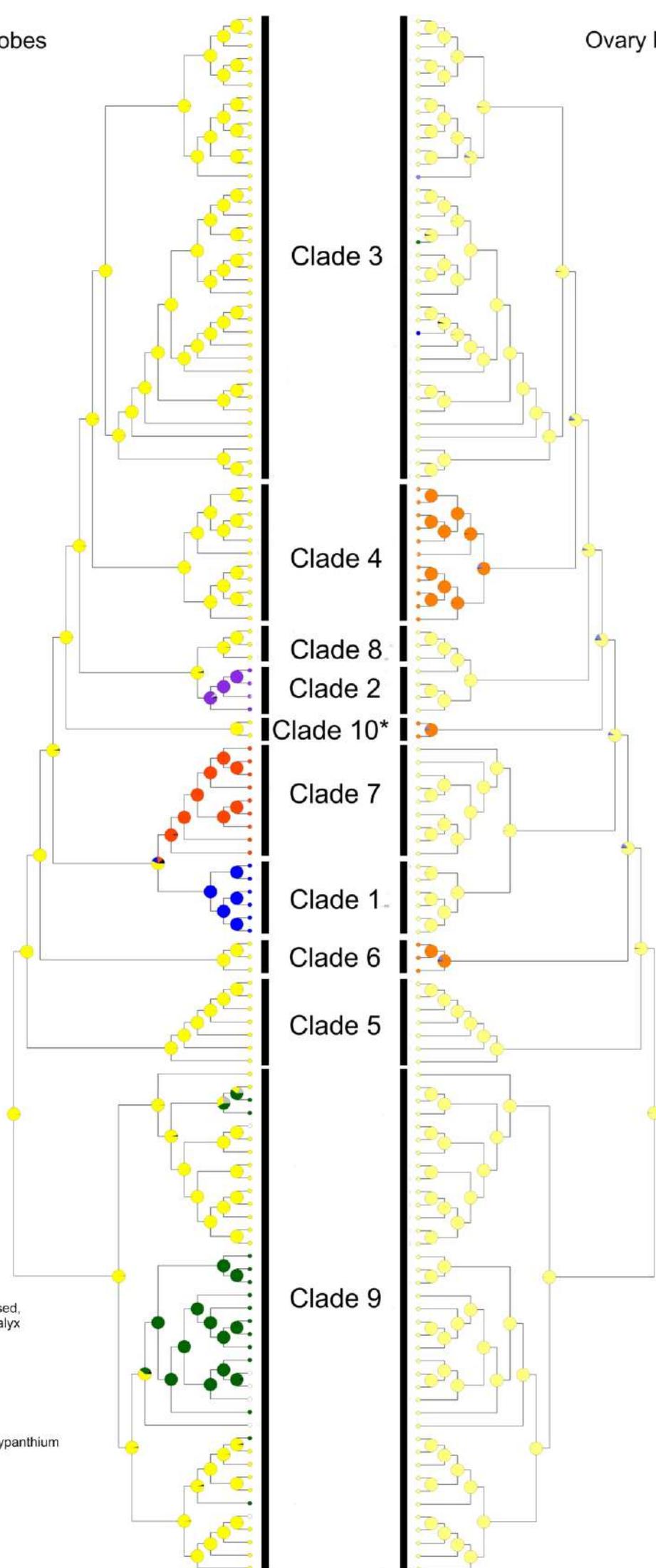


Fig. 2. Inference of *Myrcia s.l.* ancestral reconstruction using BMM. A. Calyx lobes. B. Ovary locules. (*) = indicates the alternative reconstructions with probability lower than 5%. Pie charts for each node indicate probabilities for each alternative ancestral character. Colors represented in the nodes indicate the proportional likelihood of the states reconstructed for each node (see text).

Calyx lobes

Ovary locules



*

- Free calyx lobes
- Fused and calytrate calyx, falling as a calyptra
- Calyx partially to completely fused, tearing vertically through the calyx
- Often fused in bud, tearing more or less regulary
- Less fused, irregularly tearing vertically through the hypanthium
- Other combinations

*

- 2-Locular
- 2 or 3-Locular
- 3-Locular
- 3 or 4-Locular
- 4-Locular

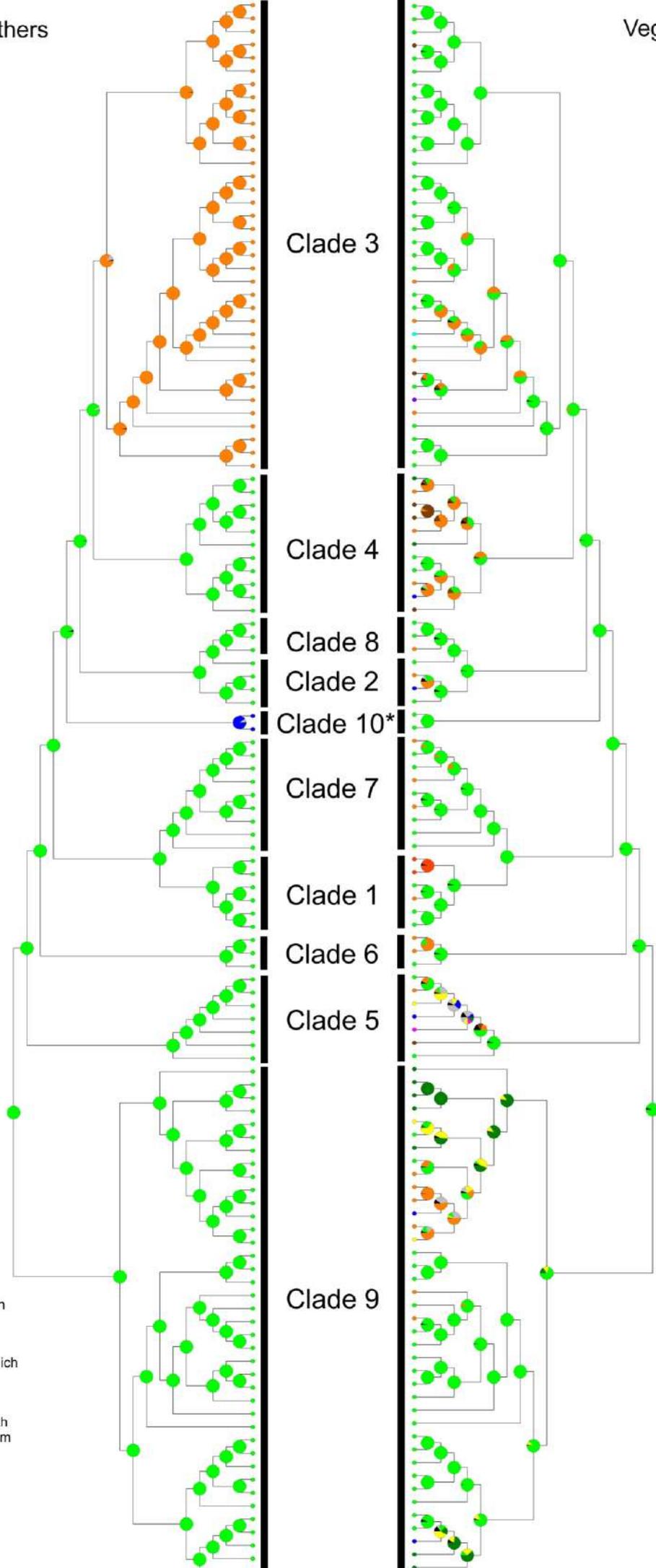
A

B

Fig. 3. Inference of *Myrcia s.l.* ancestral reconstruction using BMM. A. Anthers. B. Vegetation. (*) = indicates the alternative reconstructions with probability lower than 5%. Pie charts for each node indicate probabilities for each alternative ancestral character. Colors represented in the nodes indicate the proportional likelihood of the states reconstructed for each node (see text).

Anthers

Vegetation



- *
- Symmetric anthers with reversing curvature
 - Asymmetric anthers which retain its curvature
 - Asymmetric anthers with a visible pseudo-septum
 - Other combinations

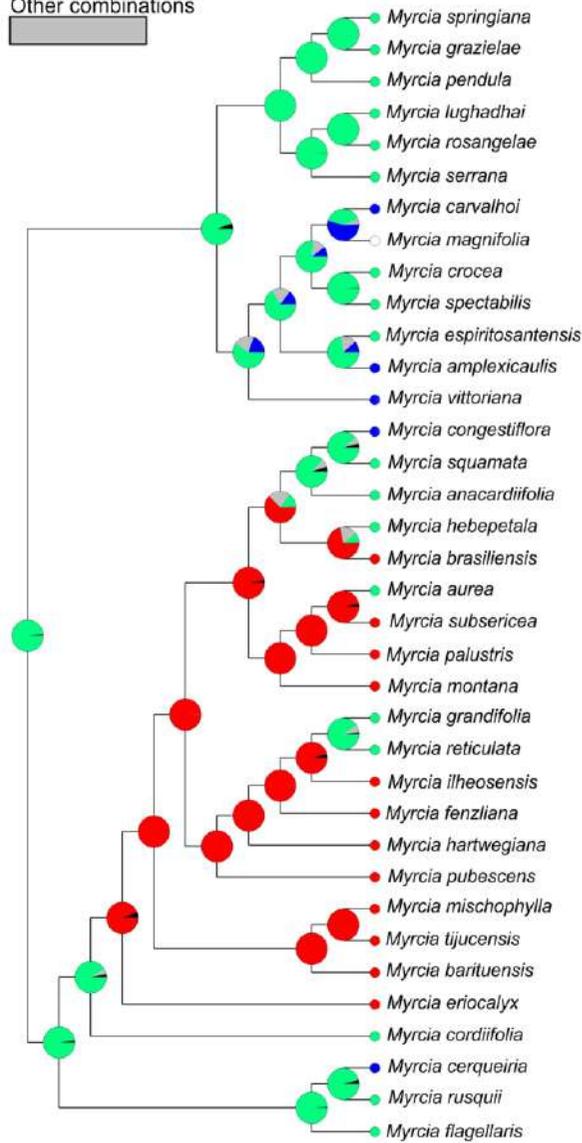
- *
- Atlantic Forest
 - Cerrado
 - Amazon basin
 - Caribbean savanas
 - Yungas
 - Paramos and Venezuela's savanas
 - Atlantic Forest and Cerrado
 - Atlantic Forest and Amazon basin
 - Amazon basin and Caribbean savanas
 - Atlantic Forest, Cerrado, Amazon basin and Caribbean savanas
 - Atlantic Forest, Cerrado, Amazon basin, Paramos and Venezuela's savanas
 - Other combinations

A

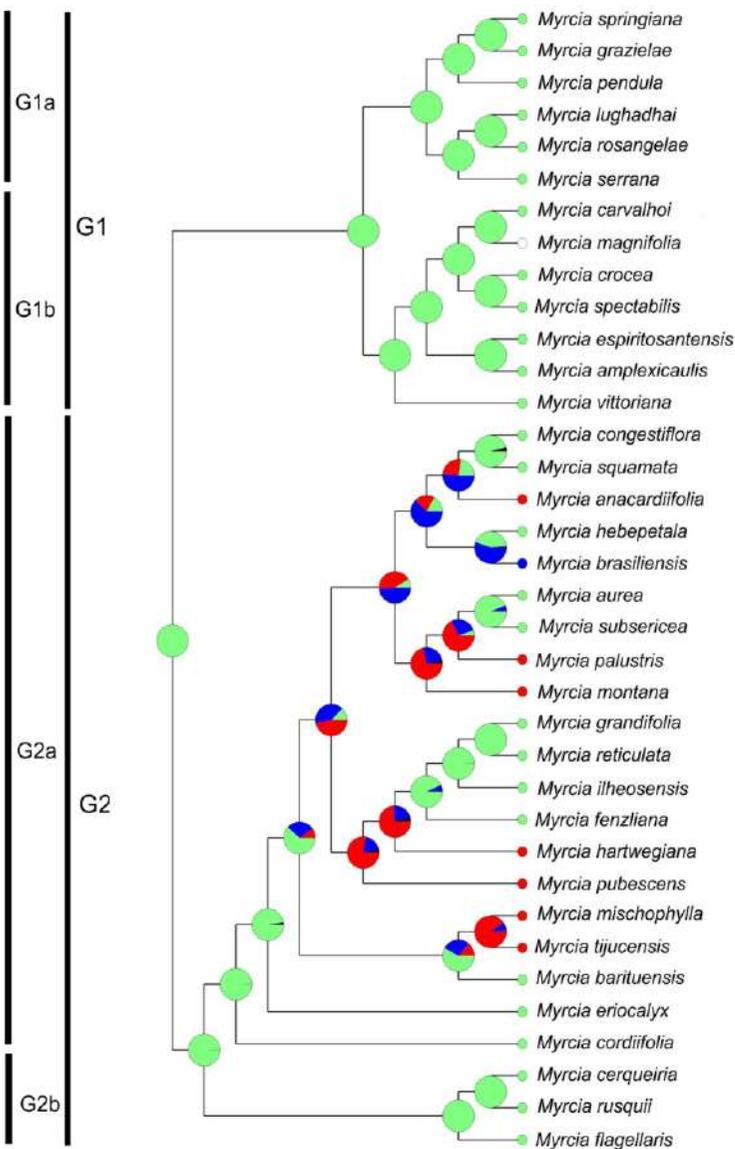
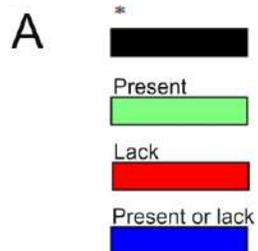
B

Fig. 4. Inference of *Gomidesia* clade (clade 3) ancestral reconstruction using BMM. A. Anther displacement. B. Anther glands. C. Anther septum. (*) = indicates the alternative reconstructions with probability lower than 5%. Pie charts for each node indicate probabilities for each alternative ancestral character. Colors represented in the nodes indicate the proportional likelihood of the states reconstructed for each node (see text).

Anther displacement



Anther glands



Anther septum

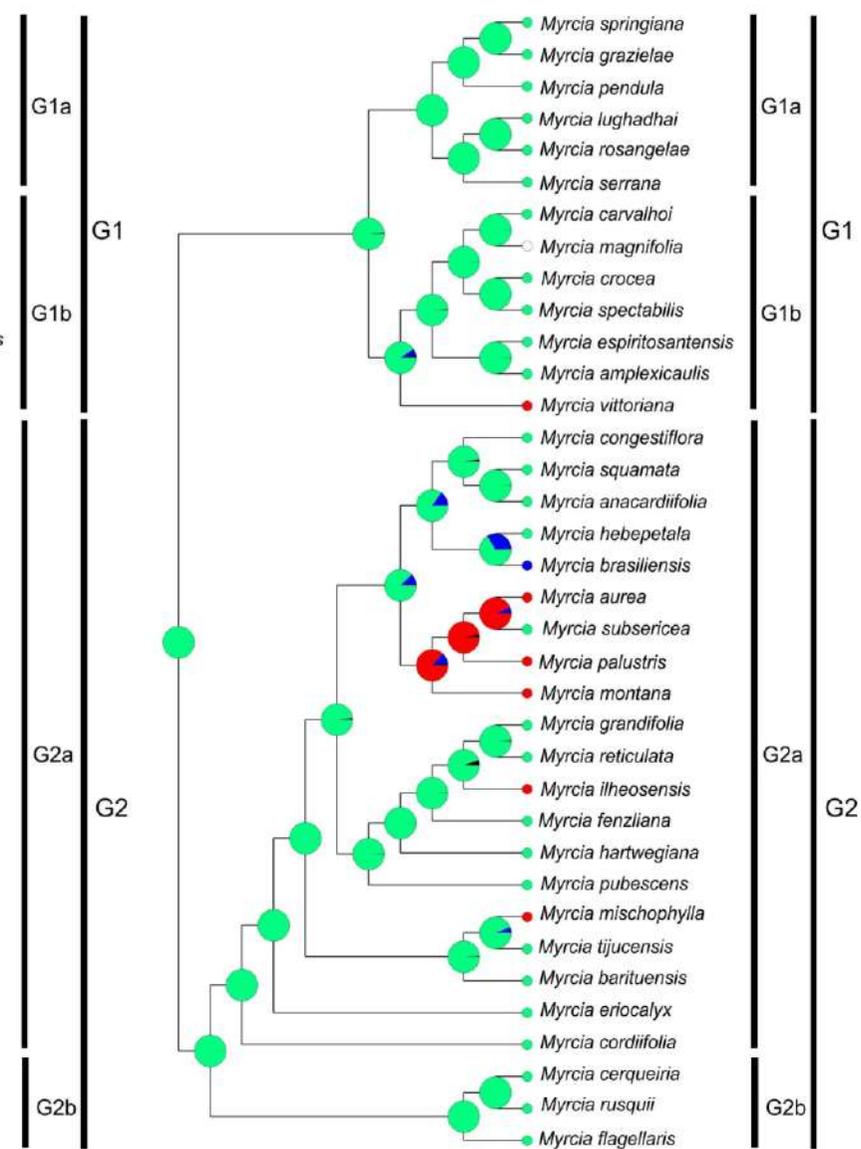
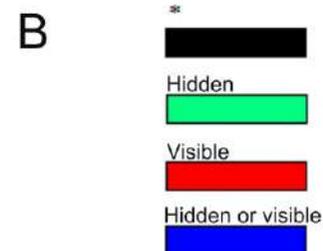
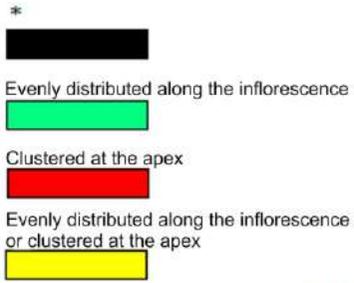
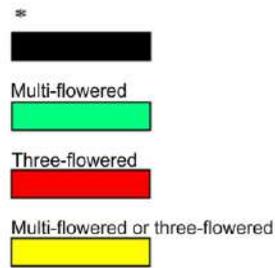


Fig. 5. Inference of *Gomidesia* clade (clade 3) ancestral reconstruction using BMM. A. Position of flowers in the inflorescence. B. Number of flowers in the inflorescence. C. Trichomes on abaxial leaf surface. (*) = indicates the alternative reconstructions with probability lower than 5%. Pie charts for each node indicate probabilities for each alternative ancestral character. Colors represented in the nodes indicate the proportional likelihood of the states reconstructed for each node (see text).

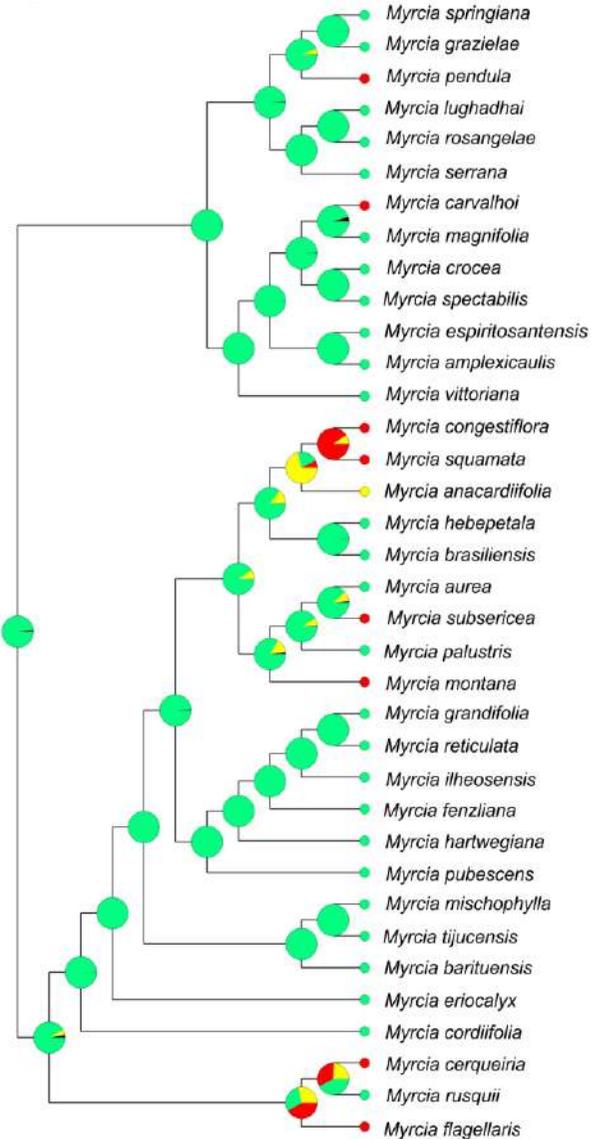
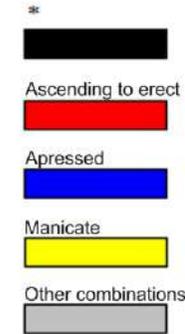
Position of flowers in the inflorescence



Number of flowers in the inflorescence



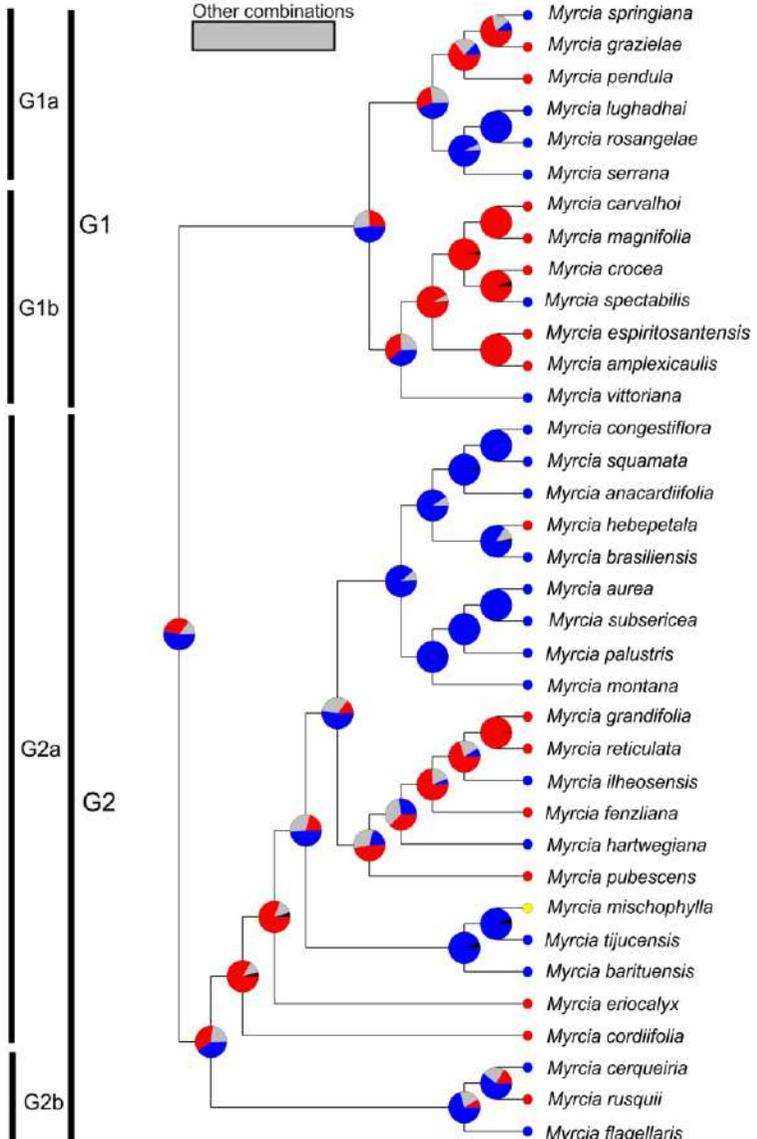
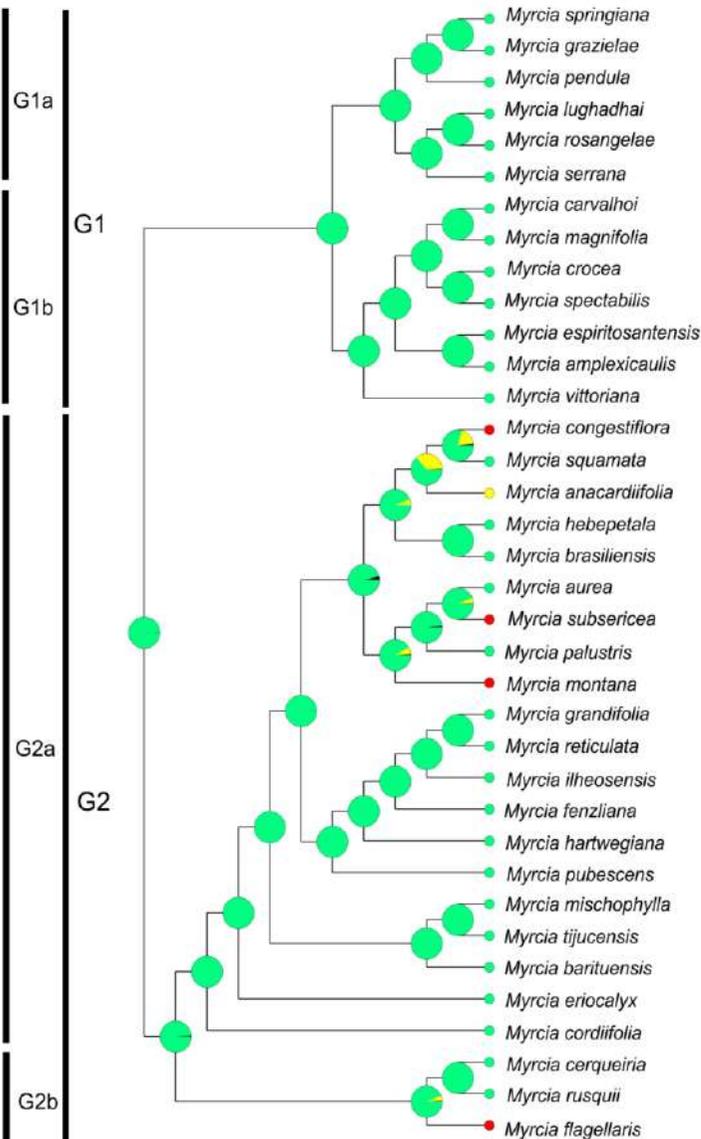
Trichomes on abaxial leaf surface



A

B

C



G1a

G1a

G1a

G1

G1

G1

G1b

G1b

G1b

G2a

G2a

G2a

G2

G2

G2

G2b

G2b

G2b

Fig. 6. Inference of *Gomidesia* clade ancestral reconstruction using BMM. Vegetation. (*) = indicates the alternative reconstructions with probability lower than 5%. Pie charts for each node indicate probabilities for each alternative ancestral character. Colors represented in the nodes indicate the proportional likelihood of the states reconstructed for each node (see text).

Vegetation

*



Northern Atlantic Forest



Southern Atlantic Forest



Widely distributed in Atlantic Forest



Cerrado



Yungas



Southern Atlantic Forest and Cerrado



Southern Atlantic Forest, Cerrado,
Yungas, Paramos and savanic vegetation
of Venezuela, Lesser Indies and West Indies

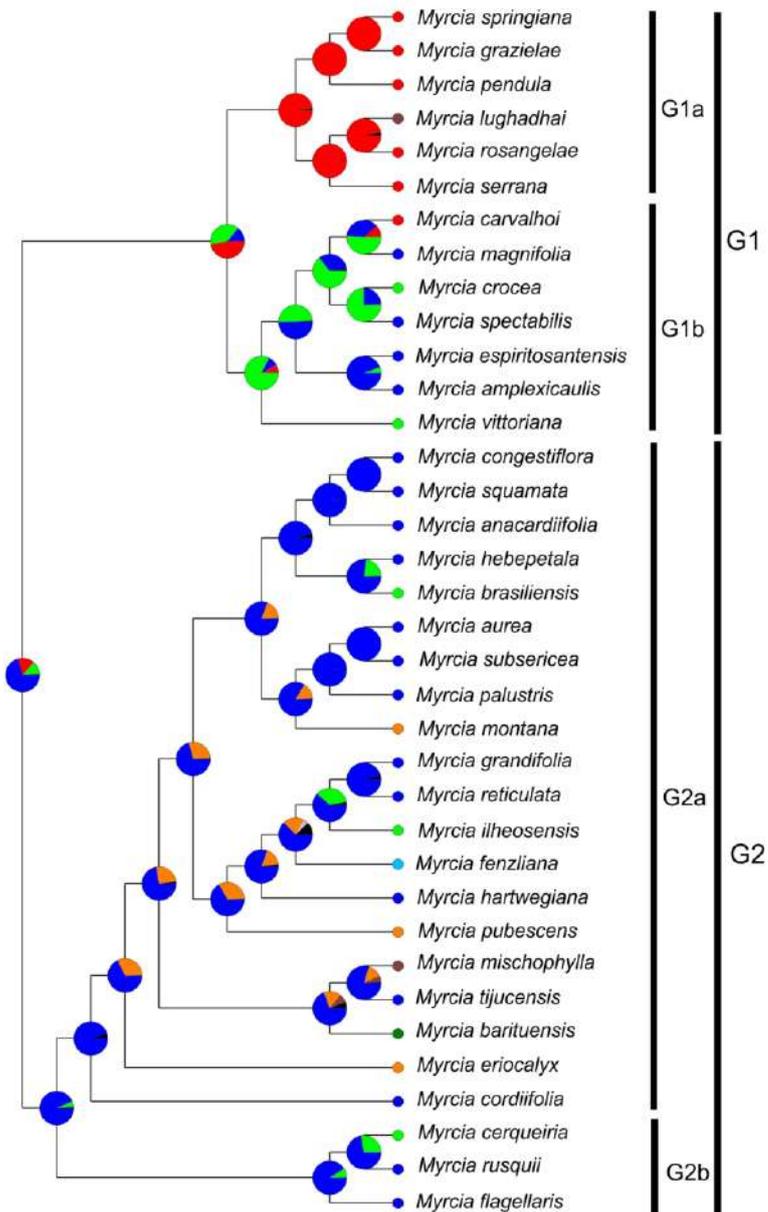
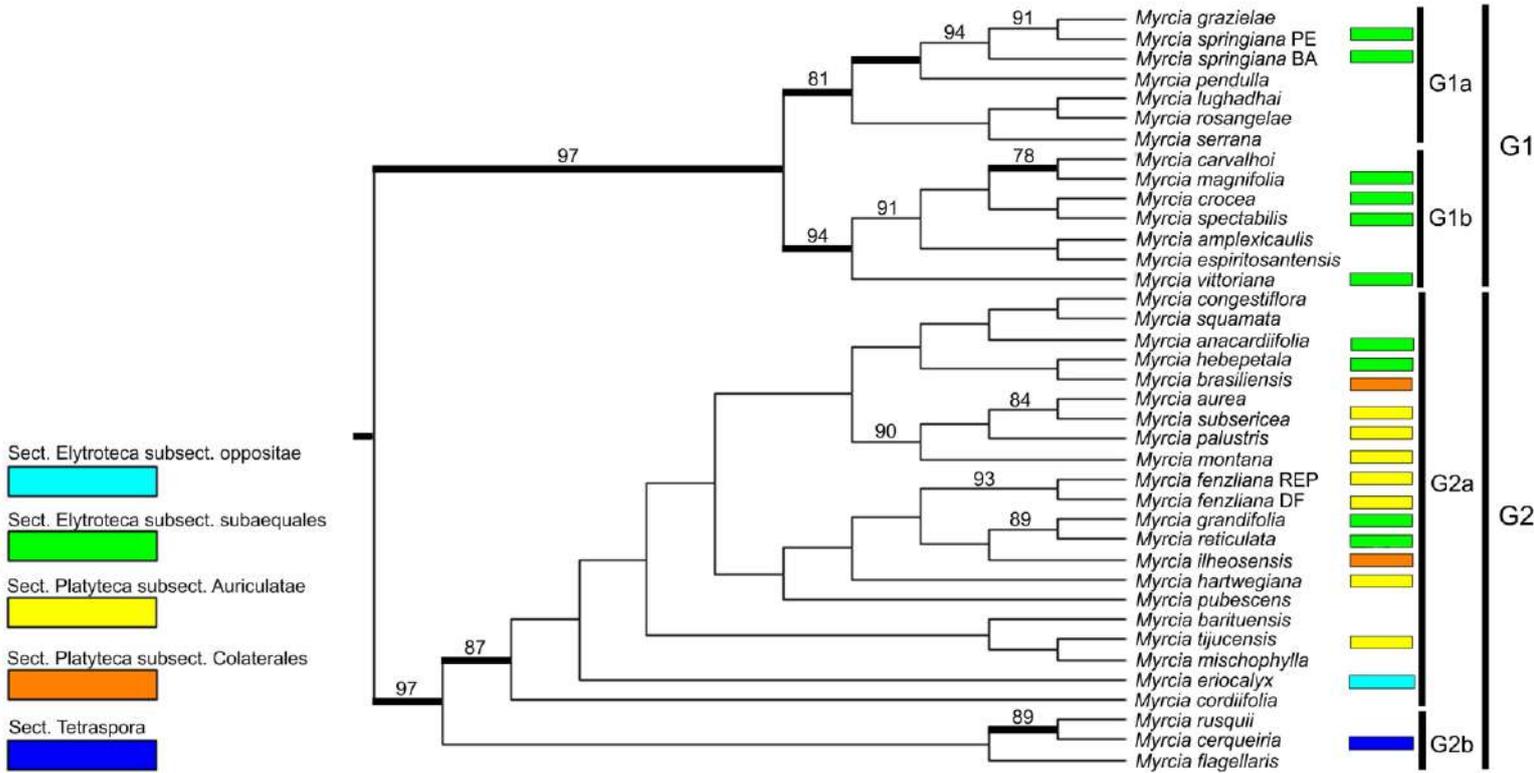


Fig. 7. Maximum likelihood (ML) majority rule consensus tree from analysis of the combined markers. A. Infrageneric classification (Legrand 1958) of the genus *Gomidesia* (sensu Berg 1855). B. Informal classification (Lughadha 1997) of the genus *Gomidesia* (sensu Berg 1855). Bootstrap percentages (from ML analysis) greater than 70 are shown above branches; clades that receive Bayesian posterior probabilities greater than 0.95 are indicated by thicker branches. PE = state of Pernambuco; BA = state of Bahia; DF = Federal District; REP = Dominican Republic.

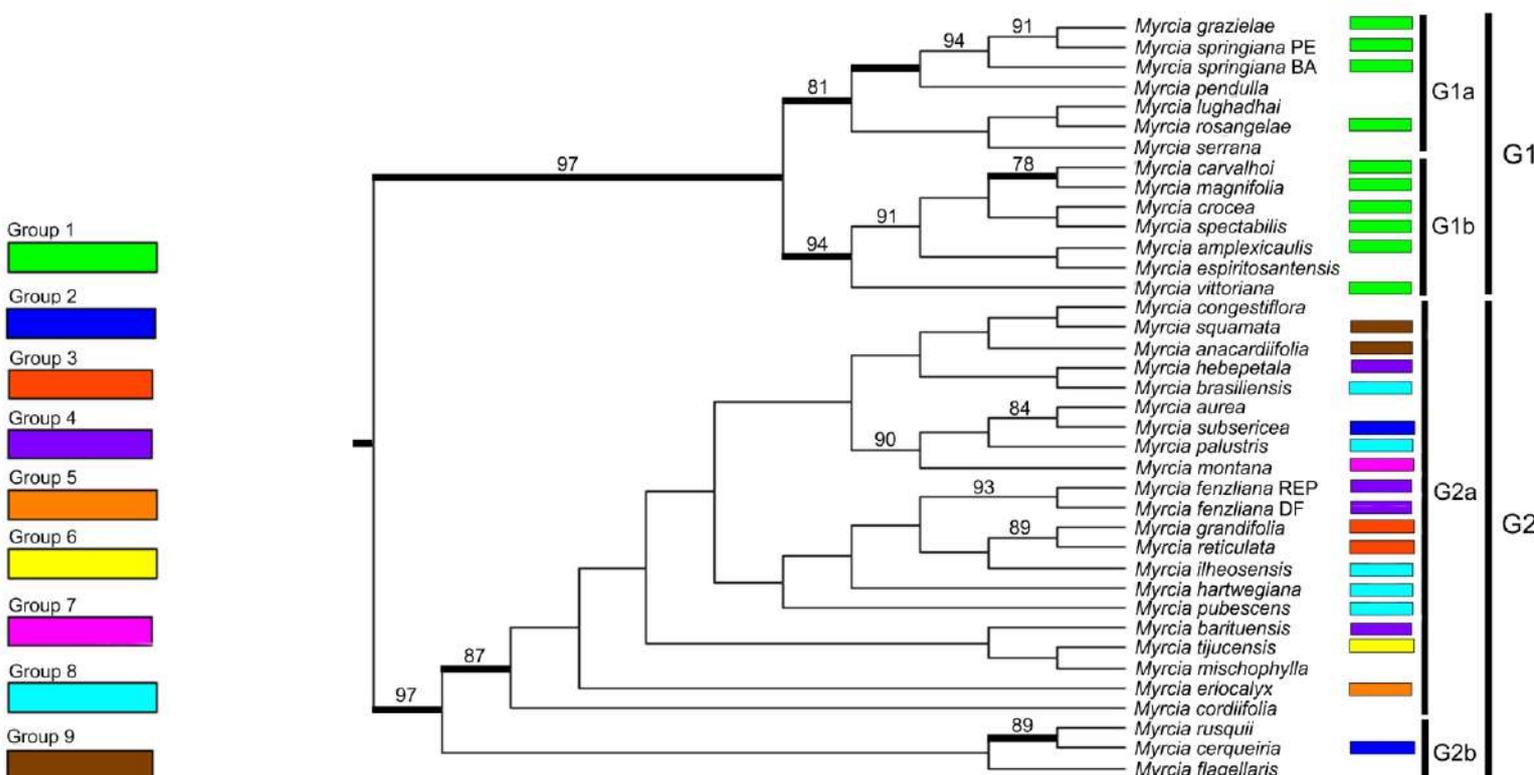
A

Infrageneric classification (Legrand 1958) of the genus *Gomidesia* (sensu Berg 1855)



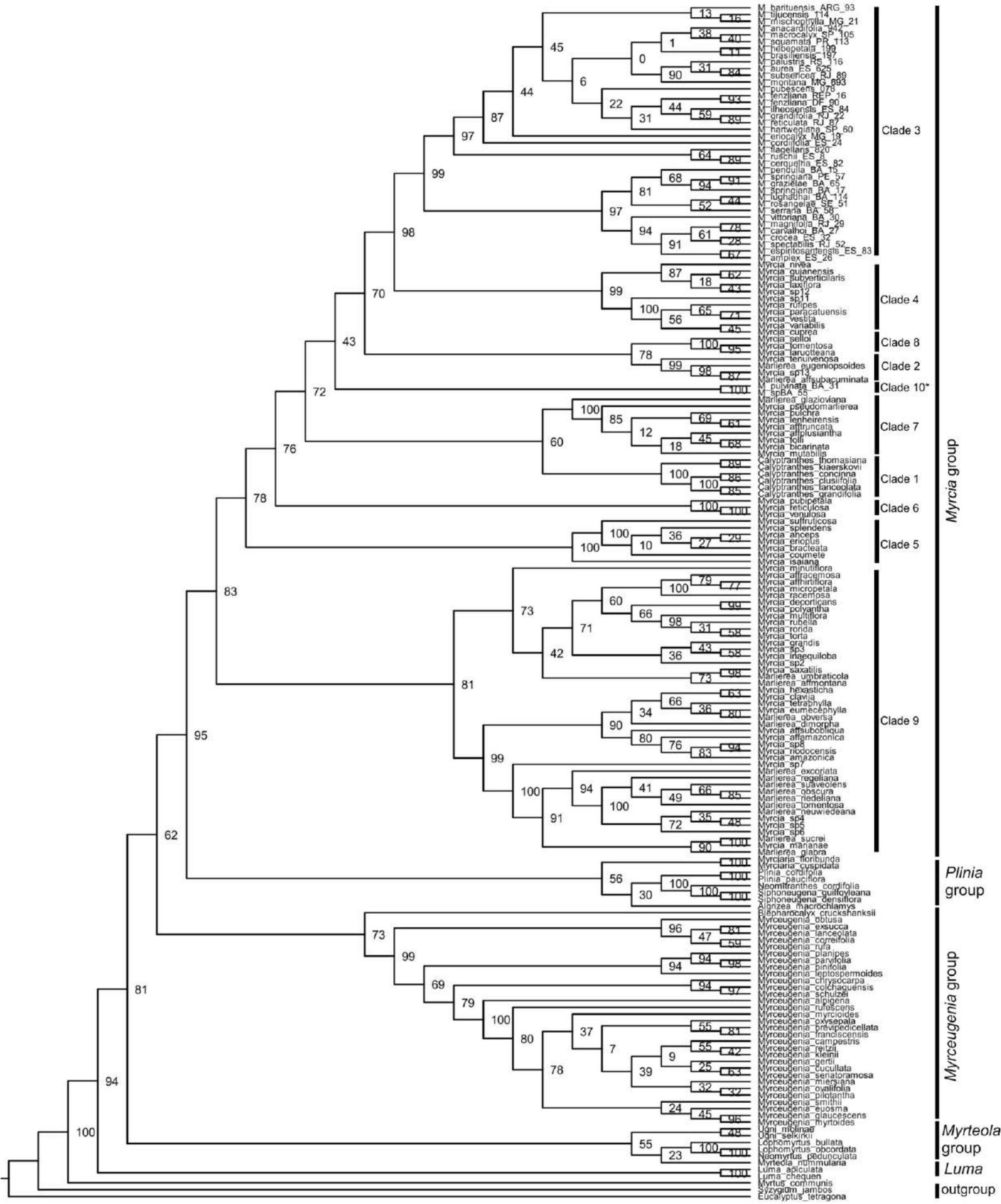
B

Informal classification (Lughadha 1997) of the genus *Gomidesia* (sensu Berg 1855)



Supplemental data S1

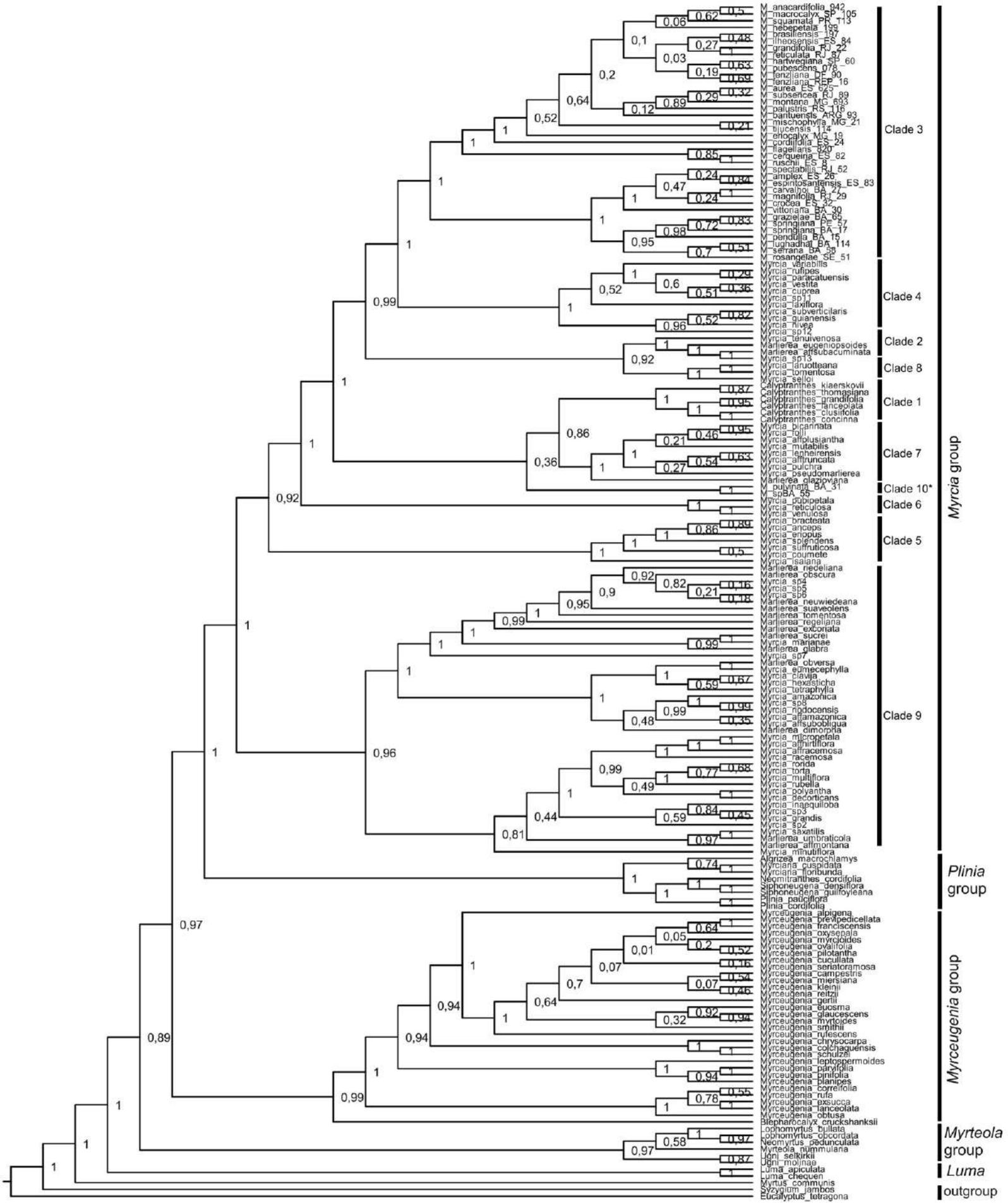
S1. Maximum likelihood (ML) consensus tree from analysis of the combined ITS (internal transcribed spacer), ETS (external transcribed spacer), *matK*, *ndhF*, *pasbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF* matrix.



0.02

Supplemental data S2

S2. Bayesian Inference (BI) consensus tree from analysis of the combined ITS (internal transcribed spacer), ETS (external transcribed spacer), *matK*, *ndhF*, *pasbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, and *trnL-trnF* matrix.



4 NOVIDADES TAXONÔMICAS

4.1 ARTIGO 2 – Two new species of the *Gomidesia* clade of *Myrcia* s.l. (Myrteae, Myrtaceae) from the Atlantic Forest of southern Bahia, Brazil

Two new species of the *Gomidesia* clade of *Myrcia* s.l. (Myrteae, Myrtaceae) from the Atlantic Forest of southern Bahia, Brazil

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Abstract. Two new species of *Myrcia* from the Atlantic Forest zone of northeastern Brazil are described and illustrated. Both species are restricted to southern Bahia and belong to the *Gomidesia* clade of *Myrcia* s.l., as indicated by the irregular opening on the dorsal side of the thecae. *Myrcia pulvinata* grows in lowland forest and is morphologically similar to *M. spectabilis*, from which it differs in its pulvinate petioles, cordate leaf base, and ellipsoid fruits. *Myrcia serrana* is found in montane forest and is morphologically similar to *M. ilheosensis*, but it can be distinguished from that species by the greater distances between the inter-secondary veins in the leaves and between the marginal veins and the leaf margin, navicular bracteoles, and larger fruits. Conservation status assessments for the two new species based on IUCN criteria are provided.

Key Words: Biodiversity, endemism, IUCN, *Myrcia*, Myrtaceae, Neotropics, taxonomy.

Resumo. Duas novas espécies de *Myrcia* a Floresta Atlântica do nordeste do Brasil são aqui descritas e ilustradas. Ambas são restritas para o sul da Bahia e pertencem ao Bclado *Gomidesia* de *Myrcia* s.l., devido à abertura irregular das peças. *Myrcia pulvinata* é encontrada em florestas de terras baixas e é morfológicamente semelhante à *M. spectabilis* DC., porém diferencia-se por seus pecíolos pulvinados e com base cordada, além de frutos elipsóides. *Myrcia serrana* é encontrada em Florestas Montanas e morfológicamente semelhante à *M. ilheosensis* Kiaerskou, porém diferenciando da mesma por sua maior distância entre as nervuras secundárias nas folhas, e maior distância da nervura marginal para a margem da folha, pelas suas bractéolas naviculares e seus frutos maiores. O status de conservação baseado nos critérios da IUCN são também fornecidos.

Myrcia s.l. (sensu Lucas et al., 2011) is the second richest genus of Myrtaceae in number of species in the Neotropics with ca. 770 species and is distributed from Mexico to Uruguay (WCSP, 2015). Brazil leads other countries with ca. 400 species, and the Brazilian Atlantic Forest is a center of diversity with ca. 260 species, of which more than 70% are endemic (Stehmann et al., 2009; Sobral et al., 2015; WCSP, 2015).

The portion of the Atlantic Forest in northeastern Brazil holds 30% of the species of *Myrcia* s.l. recorded in the country (Sobral et al., 2015), which reinforces the value of local forest fragments for the conservation of Myrtaceae (Thomas et al., 1998, 2008, 2009; Rocha & Amorim, 2012). Within this area, the portion known as Southern Bahia State[^]

is considered a center of endemism for plants and a hotspot for *Myrcia* s.l. (Prance, 1982; Thomas et al., 1998; Murray-Smith et al., 2009) with 26 narrowly endemic species (Amorim, unpubl. data, Sobral et al., 2015) and several new, recently described species (Sobral, 2010, 2013; Nic Lughadha et al., 2012; Sobral et al., 2012; Amorim et al., 2013).

The *Gomidesia* clade (sensu Lucas et al., 2011) is characterized morphologically by the combination of specialized anthers with an irregular opening on the dorsal side of the thecae, a prolonged and internally densely pubescent hypanthium, and erect or connivent calyx lobes subtending the fruits (Nic Lughadha, 1997; Lucas et al., 2011). In the state of Bahia, the *Gomidesia* clade is represented by 20 species, of which three are

endemic to the Atlantic Forest of Southern Bahia (Amorim, unpubl. data; Sobral et al., 2015).

During the course of fieldwork and herbarium studies (Amorim et al., 2014, 2015), a number of specimens of *Myrcia* from lowland and montane forests of southern Bahia were recognized as belonging to two new species, which are here described and illustrated.

Myrcia pulvinata B. S. Amorim, sp. nov. Type: Brazil. Bahia: Mun. Itacaré, Reserva Refúgio dos Anjos, 14°20'31"S 39°02'06"W, 120 m elev., 14 Dec 2013 (fr), B. S. Amorim & J. R. Maciel 1901 (holotype: UFP). (Figs. 1, 2, 3)

Myrcia pulvinata is morphologically similar to *M. spectabilis* DC. but differs in its cordate leaf base, pulvinate petioles, and ellipsoid fruits.

Shrubs or treelets, to 3 m tall; young stems glabrous to puberulent, covered by yellowish (when dried), simple trichomes. Leaves opposite; leaf blade elliptic to lanceolate, 30–32.5 × 10.7–11.5 cm, flat adaxially, coriaceous (when dried), glabrous or with scattered appressed trichomes on abaxial and

adaxial surfaces; base cordate; apex acuminate; midrib sulcate with scattered trichomes adaxially, raised and puberulent abaxially; secondary veins in 20–24 pairs, marginal vein 5–7 mm from margin, inframarginal vein 2 mm from margin; petiole 2–3 mm long, sulcate and with scattered hairs adaxially, flat and with scattered trichomes abaxially, pulvinate at base. Inflorescence paniculate, puberulent, covered by yellowish (when dried), simple trichomes, main floral axis 7–8 cm long, secondary axes 0.5–1 cm long, occasional tertiary ones 1–2 mm long; bracts at the base of secondary axes deciduous; bracteoles deciduous; flowers not seen; calyx lobes 5, 2 mm long, acute, erect, margin puberulent; stamens persistent in immature fruit, 2–3 mm long, reddish (when dried), anthers 0.5 mm long, ellipsoid, thecae with irregular dorsal opening, with flat margins in plane of curvature, residual septum visible, staminal ring 4 mm in diam., puberulent; style 6–7 mm long, glabrous; stigma punctiform; hypanthium prolonged 1 mm beyond ovary, puberulent. Fruit 1.2–1.4 × 0.9–1.1 cm, ellipsoid, smooth, green to reddish, puberulent (when immature).

Distribution and habitat.—*Myrcia pulvinata* is found only in lowland Atlantic forest in southern Bahia (northeastern Brazil). It is known from small populations growing in the protected areas Reserva Refúgio dos Anjos and Fazenda Boa Paz. The species is part of the sub-canopy community. It grows together with *Aechmea amorimii* Leme, *Araeococcus parviflorus* (Mart. ex Schult. f.) Lindm., and *Ronnbergia brasiliensis* E. Pereira & I. A. Penna, which are endemic to southern Bahia, and with *Lymania smithii* Read, *Miersiella umbellata* (Miers) Urb., *Myrcia grazielae* NicLugh., *M. micropetala* (Mart.) Nied., *Pourouma guianensis* Aubl., and *Voyria flavescens* Griseb.

Conservation status.—The species meets the criteria for the IUCN Red list category of Vulnerable (VU) due to the size of the existing population being less than 1000 mature individuals (criterion D1) and the area of occupancy covering approximately 12 km² (criterion D2; IUCN, 2001; IUCN Standards and Petitions Subcommittee, 2014).

Phenology.—*Myrcia pulvinata* was observed fruiting in December, suggesting that it flowers from October to November.

Etymology.—The epithet refers to the pulvinate petiole which is uncommon among the species of the genus.

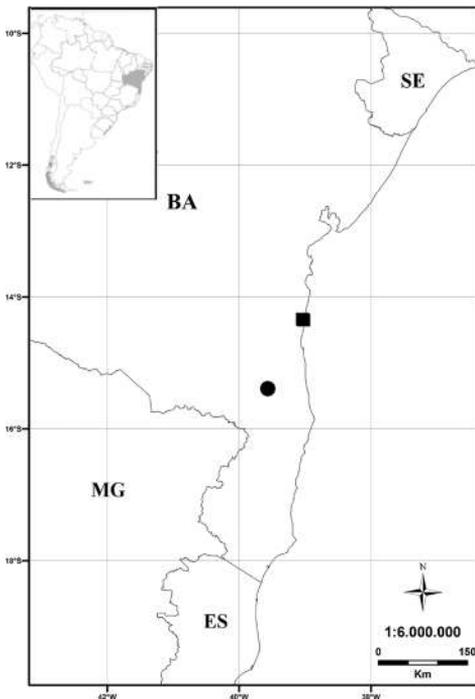


FIG. 1. Geographical distribution of *Myrcia pulvinata* (square) and *M. serrana* (circle). Brazilian states are labeled with standard abbreviations

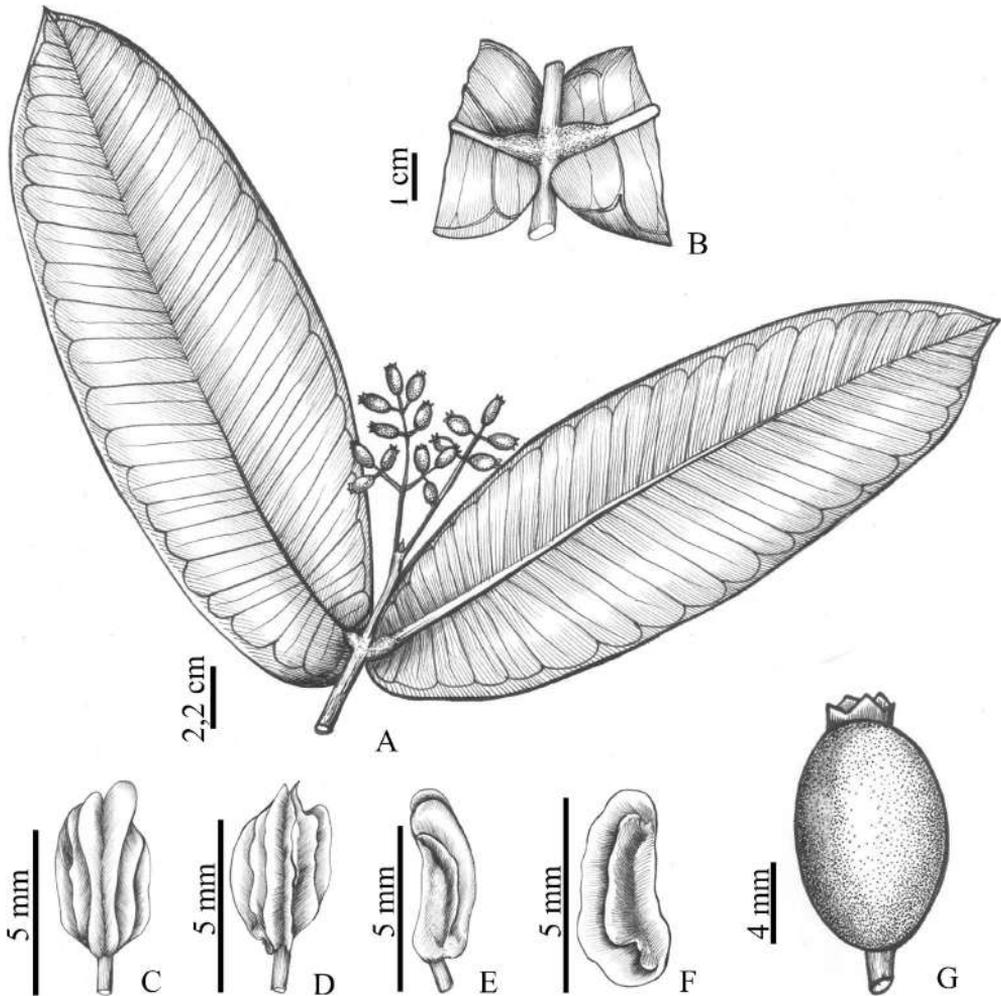


FIG. 2. *Myrcia pulvinata*. A. Branch in fruit. B. Detail of pulvinus. C, D. Detail of anthers in frontal view. E, F. Detail of anthers in lateral view. G. Fruit. (From Amorim & Maciel 1901, UFP.)

Additional specimens examined. BRAZIL. Bahia: Itacaré, Fazenda da Boa Paz, trilha da Boa Paz, 14°20'05"S 39°01'94"W, 105 m elev., 5 Dec 2006 (fr), E. Lucas, D. Sampaio, N. A. Brummitt, O. R. Campos, T. B. Flores & L. V. S. Jennings 1031 (ESA, K).

Myrcia pulvinata has the morphological features identified by Nic Lughadha (1997) and Lucas et al. (2011) as being characteristic for the BGomidesia clade,^ including an elongated hypanthium, erect calyx lobes, and an irregular opening on the dorsal side of the thecae. It is most similar to *M. spectabilis*, with which it shares relatively large, elliptic to lanceolate leaves, with the abaxial surface appressed pubescent, an elongate inflorescence (≥ 7 cm long), and acute calyx lobes. Both

species belong to an informal Blarge-leaved^ group of species in the Gomidesia clade, which also includes *M. amplexicaulis*, *M. crocea*, and *M. grazielae*. The new species can be easily distinguished from these related species by the characters listed in Table I.

Myrcia serrana B.S. Amorim, sp. nov. Type: Brazil. Bahia: Mun. Camacã, Reserva Particular do Patrimônio Natural-RPPN Serra Bonita, 15°23'30"S 39°33'55"W, 850 m elev., 27 May 2014 (fr), B. S. Amorim, J. R. Maciel, D. Cavalcanti & L. Daneu 2013 (holotype UFP; isotypes CEPEC, K, MO, N Y, RB, SP). (Figs. 1, 4, 5)



FIG. 3. *Myrcia pulvinata*. A. Young stem. B. Branch in fruit. C. Detail of pulvinus. D. Detail of cordate leaf base. E. Immature infructescence. F. Fruits. (From Amorim & Maciel 1901.)

Myrcia serrana is morphologically similar to *M. ilheosensis* Kiaersk. but differs by the distance between the inter-secondary veins in the leaves (1.2–1.5 cm vs. 0.7–0.9 cm in *M. ilheosensis*), the distance between the marginal vein and the leaf margin (2–3 mm vs. 1–2 mm), the bracteoles navicular, and the fruits 0.8–1 cm long and equally wide.

Treelets or trees, to 20 m tall; young stems puberulent, covered by yellowish (when dried), simple trichomes. Leaves opposite; leaf blade obovate, 6.5–13 × 3.7–8 cm, flat adaxially,

chartaceous, puberulent with appressed trichomes on abaxial surface and puberulent or with scattered trichomes on adaxial surface; apex rounded, retuse or rarely apiculate; base cuneate; midrib sulcate near base and flat near apex on adaxial surface, raised and puberulent abaxially; secondary veins in 10–12 pairs, marginal vein 2–3 mm from the margin; petiole 7–9 mm long, flat and glabrous adaxially, pubescent abaxially, pulvinus absent. Inflorescence paniculate, puberulent, covered by

TABLE I
COMPARISON OF MORPHOLOGICAL CHARACTERISTICS OF *MYRCIA PULVINATA*, *M. AMPLEXICAULIS*, *M. CROCEA*, *M. GRAZIELAE*, AND *M. SPECTABILIS*.

Characters	<i>M. pulvinata</i>	<i>M. amplexicaulis</i>	<i>M. crocea</i>	<i>M. grazielae</i>	<i>M. spectabilis</i>
Leaf apex shape	Acuminate	Acute, rounded or retuse	Acuminate or rounded	Acute or rounded	Acuminate
Leaf base shape	Cordate	Cuneate or rounded	Cuneate or rounded	Cuneate or rounded	Cuneate
Leaf adaxial surface texture	Flat	Flat	Flat	Bullate or tessellate	Flat
Petiole presence	Present	Absent	Present	Absent	Present
Pulvinus presence	Present	Absent	Absent	Absent	Absent
Calyx lobes shape	Acute	Acute or rounded	Rounded or truncate	Acute or rounded	Acute or cuspidate
Hypanthium and fruit texture	Smooth	Smooth	Ribbed	Smooth	Smooth
Fruit shape	Ellipsoid	Subglobose to globose	Subglobose to globose	Subglobose to globose	Subglobose to globose

yellowish, simple trichomes (when dried), main floral axis 7–9 cm long, secondary axes 1–2 cm long, occasional tertiary ones 0.5 cm long; bracts at the base of secondary axes deciduous; bracteoles 2 mm long, navicular, puberulent; flowers sessile; flower bud ovoid, 6 × 5 mm, hypanthium smooth, pubescent; calyx lobes 5, 1 mm long, acute or rounded, erect, persistent, puberulent, covered by yellowish (when dried) trichomes; petals obovate, 8 × 6 mm, concave, pubescent on adaxial surface and glabrous on abaxial surface, whitish; stamens ca. 150, 3–4 mm long, reddish (when dried), anthers 1 mm long, ellipsoid, thecae with an irregular dorsal opening, septum not visible; staminal ring 4 mm in diam., pubescent; style 7–8 mm long, base pubescent; stigma punctiform; hypanthium prolonged 1 mm beyond ovary, pubescent; ovary 2-locular; ovules 2 per locule. Fruit 0.8–1 × 0.8–1 cm, smooth, subglobose, puberulent (when immature), calyx lobes erect; seeds not seen.

Distribution and habitat.—*Myrcia serrana* is known from a single locality in a fragment of montane Atlantic forest in southern Bahia (northeastern Brazil) at ca. 1000 m elevation. The single small population is located in the protected area *Reserva do Patrimônio Natural-RPPN Serra Bonita*,[^] which encompasses ca. 2000 ha. (Amorim et al., 2009). The species is part of the canopy community and grows together with *Aechmea subbahianensis* Leme, Amorim & J. A. Siqueira, *Merostachys neesii* Rupr., and *Quesnelia koltesii* Amorim & Leme.

The Brazilian montane Atlantic forest is a threatened vegetation type with many endemic species (Martinelli, 2007). Angiosperm species that are restricted to the montane Atlantic forest of Northeastern Brazil include *Begonia obdeltata* Gregório & E. L. Jacques, *Campylocentrum serranum* E. M. Pessoa & M. Alves, *Diospyros serrana* Sothers, *Epidendrum sanchezii* E. M. Pessoa & L. P. Félix, *Erythroxylum umbrosum* Costa-Lima & M. Alves, *Eugenia culicina* Sobral, *E. submontana* B. S. Amorim & M. Alves, *Specklinia integripetala* E. M. Pessoa & F. Barros, *Vriesea barbosa* J. A. Siqueira & Leme, *V. freicanecana* J. A. Siqueira & Leme (Sothers, 2003; Leme & Siqueira, 2006; Costa-Lima & Alves, 2013; Sobral, 2013; Gregório et al., 2014; Pessoa et al., 2014a, 2014b; Amorim & Alves, 2015a & Alves, 2015). There are also several species that are even more narrowly restricted to montane forests in the state of Bahia, such as *Chusquea clemirae* A. C. Mota, R. P. Oliveira & L. G. Clark, *Eugenia serraegrans* Sobral, *Myrcia lascada* Sobral, *M. pendula* Sobral, *M. teimosa* Sobral, *M. truncata* Sobral, *Quesnelia clavata* Amorim & Leme, *Q. koltesii* Amorim & Leme, and *Sorocea longipedicellata* A. F. P. Machado, M. D. M. Vianna & Romaniuc (Amorim & Leme, 2009; Sobral, 2010; Sobral et al., 2012; Machado et al., 2013; Mota et al., 2013).

Conservation status.—Based on the criteria of the IUCN Red List, we recommend that the species be listed as Vulnerable (VU) because it is known from only a single population (criterion

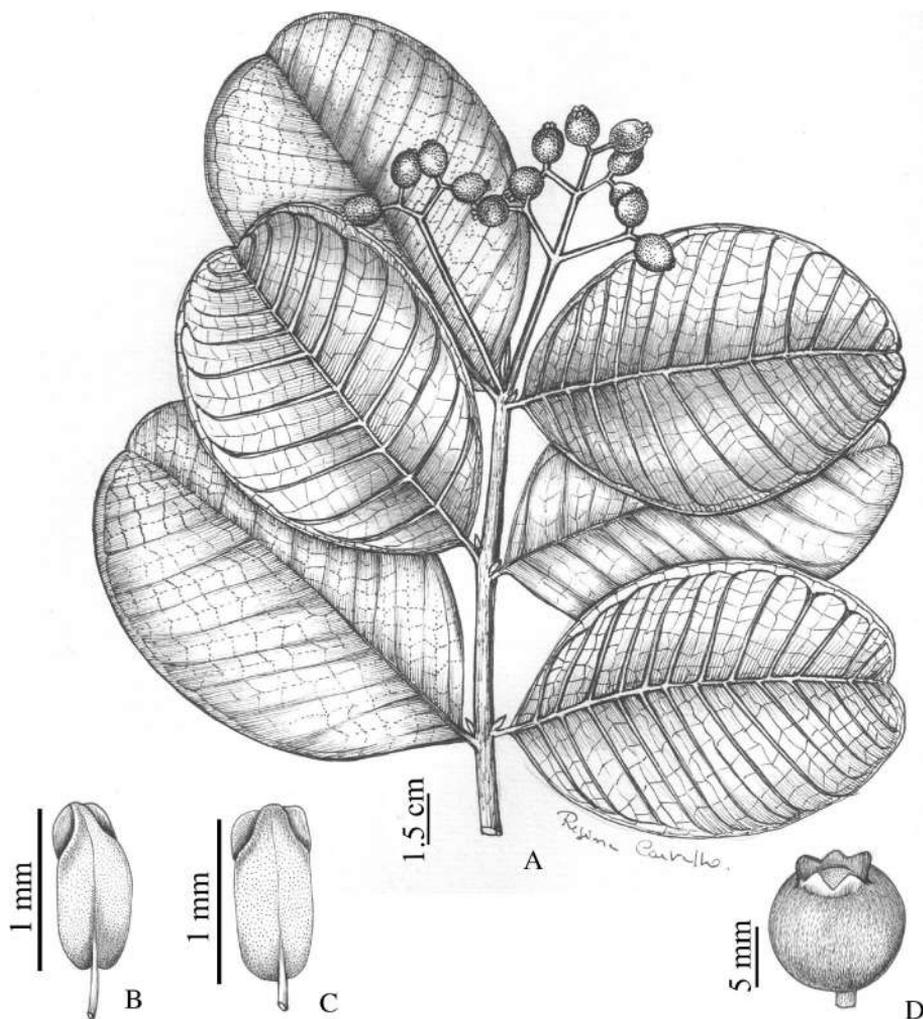


FIG. 4. *Myrcia serrana*. A. Branch in fruit. B, C. Young anthers. D. Fruit. (From Amorim et al. 2013, UFP.)

D2; IUCN, 2001; IUCN Standards and Petitions Subcommittee, 2014).

Phenology.—*Myrcia serrana* has been collected in flower from February to March, and in fruit from May to June.

Etymology.—The epithet refers to the species montane habitat in the Serra Bonita.

Additional specimens examined. BRAZIL. Bahia: Camacã, RPPN Serra Bonita, 15°23'30"S, 39°33'55"W, 850 m elev., 6 Jun 2006 (fr), *M. Lopes, M. Sobral, L. C. de J. Gomes & S. C. Sant'Ana* 830 (BHBC, CEPEC, NY); 5 Jun 2005 (fr), *J. L. Paixão, A. Amorim, M. Teixeira & L. Carlos* 447 (CEPEC, NY); 4 Jun 2005 (fr), *A. Amorim, J. Paixão, L. C. de Jesus Gomes & M. Teixeira* 5123 (CEPEC, UB); 18 Mar 2005 (fl), *P. Fiaschi, J. L. Paixão, L. C. J. Gomes & A. B.*

Rodrigues 2855 (CEPEC); 4 Feb 2005 (fl), *M. Reginato, A. Amorim, J. Paixão, F. Mattos & S. Sant'Ana* 198 (CEPEC).

Its elongated hypanthium, erect calyx lobes, and irregular opening on the dorsal side of the thecae are sufficient to locate *M. serrana* within the BGomidesia clade[^] of *Myrcia* (Nic Lughadha, 1997; Lucas et al., 2011). The species is morphologically similar to *M. ilheosensis* Kiaersk. in the shape of the leaf, the appressed trichomes on abaxial leaf surface, the elongate inflorescence (≥ 7 cm long), the acute calyx lobes, and the subglobose to globose fruits, but it can be distinguished from that species by the characters listed in Table II.



FIG. 5. *Myrcia serrana*. A. Trunk. B. Branch in fruit and view of abaxial leaf surface. C. Branch in fruit and view of adaxial leaf surface. D. Fruits. (From Amorim et al. 2013.)

TABLE II
COMPARISON OF MORPHOLOGICAL CHARACTERISTICS OF *MYRCIA*
SERRANA AND *M. ILHEOSENSIS*.

Characters	<i>M. serrana</i>	<i>M. ilheosensis</i>
No. of secondary veins in leaves	10–12	8–10
Distance between leaf margin and marginal vein (mm)	3–4	1–2
Distance between secondary veins in leaves (mm)	12–15	7–9
Maximum length of primary axis of inflorescence (cm)	10	16
Maximum length of secondary axis of inflorescence (cm)	3	4
Bracteole shape	navicular	lanceolate
Appearance of opening in dehisced thecae	margins inrolled	margins recurved
Presence of residual septum in dehisced thecae	Absent	Present
Fruit width (mm)	8–10	4–5

Acknowledgments

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4.2 ARTIGO 3 – Taxonomic novelties in *Gomidesia* clade (*Myrcia s.l.*, Myrtaceae) from the Atlantic Forest of Brazil

Taxonomic novelties in *Gomidesia* clade (*Myrcia s.l.*, Myrtaceae) from the Atlantic Forest of Brazil

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Abstract

Two new species of *Myrcia* from the Atlantic Forest of southeastern Brazil are here described and illustrated. Morphological features set them in the *Gomidesia* clade. *Myrcia espiritosantensis* and *M. ruschii* are recorded from southeastern Brazil, which is considered the diversity center for the genus *Myrcia*, and the species have restricted distribution in submontane and montane forests. Conservation assessments based on IUCN criteria are also given.

Key words: Endemic Species, Montane Forests, Myrteae, Neotropics, South America, Taxonomy

Resumo

Duas novas espécies de *Myrcia* da Floresta Atlântica da região sudeste do Brasil são aqui descritas e ilustradas. Estas espécies apresentam características morfológicas que as posicionam no clado *Gomidesia*. *Myrcia espiritosantensis* e *M. ruschii* são encontradas na região sudeste do Brasil, a qual é considerada um centro de diversidade para o gênero *Myrcia*. As espécies possuem distribuição restrita para florestas submontana e montana. Os status de conservação baseados nos critérios da IUCN são também fornecidos.

Palavras-chave: Espécies Endêmicas, Florestas Montanas, Myrteae, Região Neotropical, América do Sul, Taxonomia

Introduction

The *Gomidesia* clade is an informal group of ca. 50 *Myrcia s.l.* species distributed predominantly in the Brazilian Atlantic Forest (NicLughadha 1997, Lucas *et al.* 2011, WCSP 2015). These species share the morphological features of incompletely or completely 4-locular anthers, which is the main morphological character to recognize the taxa which belong to this group (NicLughadha 1997, Lucas *et al.* 2011). Brazil is the most species-rich country with 48 species of the *Gomidesia* clade, of which more than 95% are recorded from the Atlantic Forest (Stehmann *et al.* 2009, Amorim & Alves 2015, BFG 2015). This ecosystem is considered a center of diversity for *Myrcia s.l.* and 41 species included in the *Gomidesia* clade are restricted to this area (Murray-Smith *et al.* 2009, Amorim & Alves 2015, BFG 2015).

Recent efforts to improve the knowledge of the diversity of the *Gomidesia* clade have been made (NicLughadha *et al.* 2010, 2012a, b, Sobral 2010b, Amorim *et al.* 2014, 2015, Amorim & Alves 2015, Caliari *et al.* 2016). As a result of field expeditions and herbarium surveys in southeastern Brazil, two new species from the *Gomidesia* clade are here described and illustrated.

Methods

This study was based on field expeditions in areas of the Brazilian Atlantic Forest in the period 2014–2015, and herbarium collections. Specimens and type collections from 41 herbaria were studied (ALCB, ASE, BM, BR, C,

CEPEC, CVRD, EAC, EAN, ESA, FLOR, FURB, G, G-DC, HRB, HRCB, HST, HUEFS, IAC, IPA, JPB, K, M, MAC, MAR, MBM, MBML, MO, NY, P, PEUFR, PH, R, RB, SP, SPF, UEC, UESB, UFP, UFRN, US, and VIES; acronyms follow Thiers 2015). Morphological studies were carried out under a stereomicroscope using dried and fresh (spirit collections) specimens. The distribution map of species was produced by Quantum GIS (QGIS Development Team 2015) and the geographic range of the extent of occurrence and area of occupancy were calculated with the GeoCAT tool (Bachman *et al.* 2011).

Results

Myrcia espiritosantensis B.S. Amorim, *sp. nov.* (Figures 1 A, 2 A–F, 3 A–B)

Type:—BRAZIL. Espírito Santo: Mun. Santa Leopoldina, arredores da Reserva Biológica de Duas Bocas, estrada para Viana, Boqueirão do Santilho, 20°14'32"S, 40°31'20"W, 340 m alt., 17 January 2009, fl., R.C. Forzza, C.N. Fraga, R. Goldenberg, A.P. Fontana, P.B. Schwartsburd & P.H. Labiak 5397 (holotype: RB!; isotypes: CEPEC!, MBML!, UPCB).

Treelets up to 4 m tall, closely related to *M. carvalhoi* NicLughadha (NicLughadha *et al.* 2012b: 235) but differing by truncate or cordate leaf base, 16–18 pairs of secondary leaf veins, longer main floral axis (9–11.5 cm long), and rounded bracteoles.

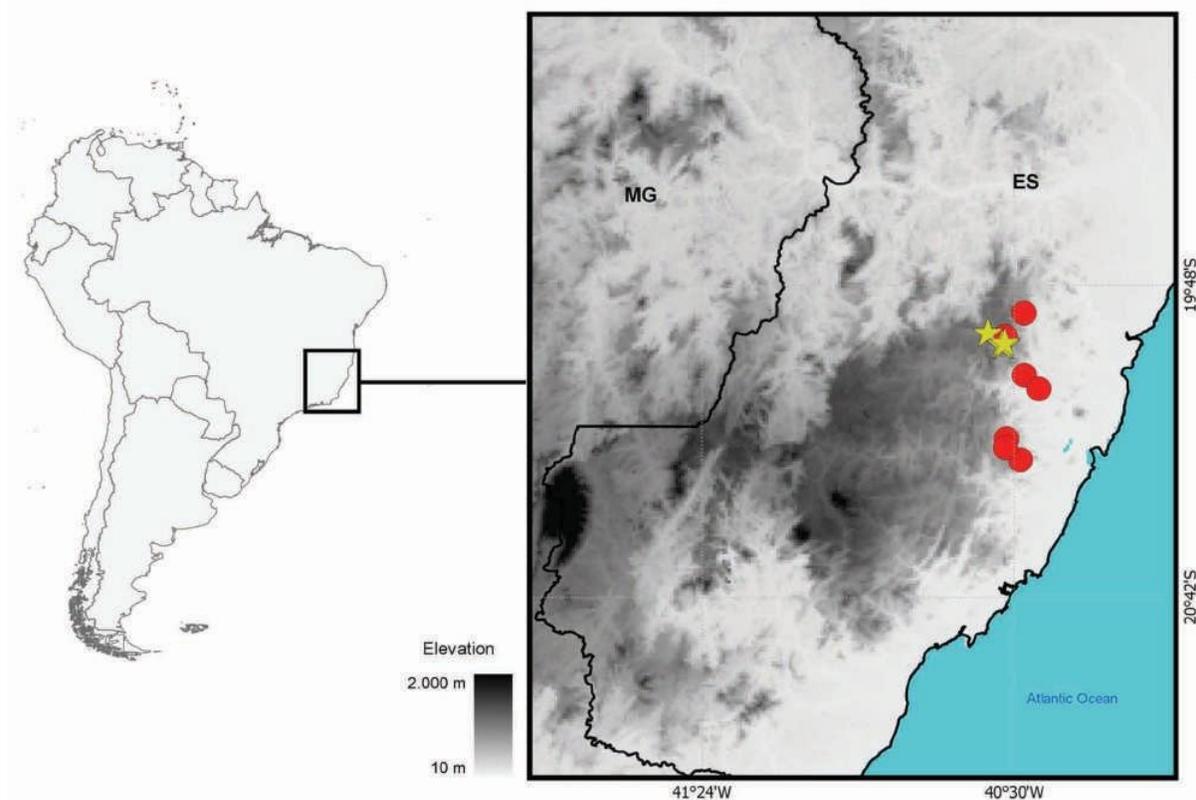


Figure 1. Distribution map of *Myrcia espiritosantensis* (red circle) and *M. ruschii* (yellow star). ES—Espírito Santo state, MG—Minas Gerais state.

Treelets up to 4 m tall; young stems hirsute covered in reddish (when dried), simple trichomes. Leaves opposite, leaf blade lanceolate, 16.5–30 × 4.5–10.2 cm, chartaceous (when dried), covered by hirsute, ascending or erect, simple trichomes (1–1.5 mm long) on abaxial and adaxial surfaces; apex acuminate, acumen 1.5–3 cm long; base truncate to cordate; midrib sulcate adaxially, raised abaxially, pubescent; secondary veins 16–18 pairs, marginal vein 3–5 mm from the margin, inframarginal vein 1 mm from the margin. Petioles 0.5–0.7 cm long, sulcate adaxially, flat abaxially, puberulent. Inflorescence paniculate, main floral axis 9–11.5 cm long, pubescent, with simple trichomes, these reddish

when dry; bracts deciduous, not seen; bracteoles 7 mm long, rounded, puberulent; hypanthium smooth, pubescent; calyx lobes 5, ca. 2 mm long, rounded or acute, pubescent adaxially; petals not seen; stamens ca. 200, filaments 6–7 mm long, reddish when dry, the anthers 1.5–2 mm long, elliptical, thecae opening displaced, septum not visible; staminal ring to 4 mm in diameter, pubescent; style to 1.3 cm long, base pubescent, stigma punctiform; ovary 2-locular with 2 ovules per locule. Fruits 1.0–1.5 × 1.0–1.5 cm, globose, smooth, puberulent, reddish when dry.

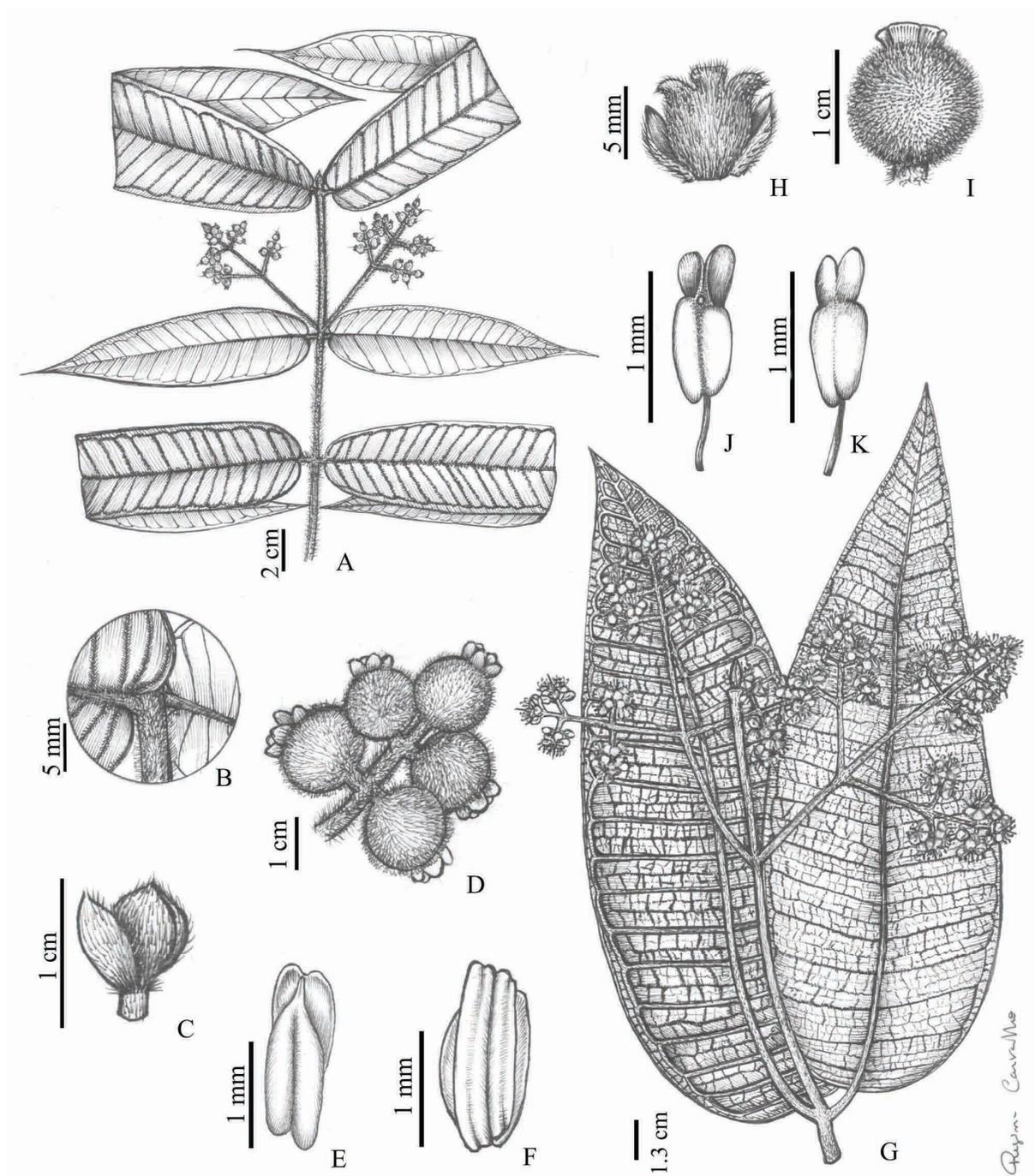


Figure 2. A–F. *Myrcia spiritosantensis*. A. Flowering branch. B. Detail of short petiolate leaf. C. Detail of flower bud and bracteoles. D. Infructescence. E. Anther, dorsal view. F. Anther, ventral view. G–K. *Myrcia ruschii*. G. Flowering branch. H. Detail of flower bud and bracteoles. I. Detail of immature fruit. J. Anther, ventral view. K. Anther, dorsal view (A, B, C, E and F from the holotype: R. C. Forzza 5397 et al. D. from: R. C. Forzza 5237 et al. G, H, J, and K, from the holotype: B.S. Amorim & J. R. Maciel 2035. I. from: L. Kollmann et al. 3931).



Figure 3. A–B. *Myrcia spiritosantensis*. A. Leaves, abaxial view. B. Detail of short petiole and cordate leaf base. C–F. *Myrcia ruschii*. C. Bark. D. Leaves. E. Inflorescence in flower. F. Flower (A, and B, from B. S. Amorim & J. R. Maciel 2033; C, D, E, and F, from the holotype: B.S. Amorim & J. R. Maciel 2035).

Affinities:—*Myrcia spiritosantensis* is morphologically related to species of the *Gomidesia* clade which share the morphological features of leaf abaxial surface with ascending and/or erect trichomes ($\geq 1\text{--}2$ mm long), elongate floral axis (≥ 7 cm long), and smooth surfaces of the hypanthium and fruit. It is morphologically similar to *M. carvalhoi*, in rounded or acute calyx lobes, and smooth hypanthium and fruit but it can be distinguished from that species by its truncate to cordate leaf base (vs. cuneate to rounded in *M. carvalhoi*), 16–18 pairs of secondary leaf veins (vs. 12–14), elongate floral axis 9–11.5 cm long (vs. reduced floral axis 1.5–3 cm long), and rounded bracteoles (vs. lanceolate). *Myrcia spiritosantensis* has been informally recognized as *M. amplexicaulis* (Vellozo, 1829: 210) Hooker filius (1869: 5790), which also occurs in sub-montane Atlantic Forest of Espírito Santo state and belongs to the same

morphological group cited above. However, they can be distinguished by the acuminate leaf apex, cordate or truncate leaf base, and petiolate leaves in *M. espiritosantensis* (vs. acute, rounded or retuse leaf apex, cuneate or rounded leaf base, and sessile leaves in *M. amplexicaulis*). The species was observed flowering from January to March and fruiting from April to July.

geographic distribution and ecology:—*Myrcia espiritosantensis* is found in sub-montane and montane forests (ca. 500–800 m elev.) of Espírito Santo state, southeastern Brazil. It is known from small populations growing in protected and unprotected private areas. The species is part of the sub-canopy community and grows together with *Aechmea capixabae* Smith (1941: 56), *A. pineliana* (Brongniart ex Planchon, 1854: 25) Baker (1829: 232), *A. racinae* Smith (1941: 56) [Bromeliaceae], and other Myrtaceae species which are restricted to sub-montane and montane areas of Espírito Santo, such as *Eugenia rugosissima* Sobral (2006: 74), *E. valsuganana* Sobral (2010b: 136), and *Myrcia tumida* Sobral (2010a: 340).

Conservation status:—*Myrcia espiritosantensis* is restricted to sub-montane and montane forests of Espírito Santo state which are considered threatened (Martinelli 2007) and are the type localities of *M. espiritosantensis*, *Aechmea racinae* [Bromeliaceae] and *Hypolytrum amorimii* M.Alves & W.W.Thomas (2002: 124) [Cyperaceae], among several examples of montane-restricted species. The species meets the criteria of Endangered, due to its extent of occurrence of ca. 243 Km² and area of occupancy of 24 Km² (criterion B1 and B2, respectively; IUCN 2001) and for the conditions of severely fragmented habitat and actual or potential levels of exploitation of the Atlantic Forest area (conditions “a” and “b”, respectively; IUCN, 2001; IUCN Standards and Petitions Subcommittee, 2014).

etymology:—The epithet refers to the locality where the species was found—the state of Espírito Santo, Brazil.

Paratypes:—BRAZIL. Espírito Santo: Mun. Cariacica, Reserva Biológica de Duas Bocas, 11 April 2009, fr., A.M. Amorim, R. Goldenberg, C.N. Fraga, A.P. Fontana, L. Kollmann & L. Daneu 7849 (CEPEC!, MBML!, RB!, UPCB); localidade de Alegre, trilha do Pau Oco, 05 September 2014, est., B.S. Amorim & J.R. Maciel 2033 (UFP!); *ibidem*, 20 July 2008, fr., R.C. Forzza, A.M. Amorim, J.L. Paixão & L.C.J. Gomes 5237 (BHCB!, CEPEC!, MBM, MBML!, RB!, SPF, UPCB); Mun. Fundão, APA Goiapaba-açu, Piabas, 08 February 2007, fl., A.P. Fontana & K.A. Brahim 2836 (K!, RB!). Mun. Santa Leopoldina, Morro Agudo, 28 January 2008, fl., V. Demuner, T.A. Cruz, M. Belisário 4895 (MBML!); *ibidem*, Fazenda Caioaba, 17 July 2007, fr., R.R. Vervloet, V. Demuner, E. Bausen & T.A. Cruz 2846 (MBML!); *ibidem*, 8 August 2006, fr., L.F.S. Magnago V. Demuner, T. Cruz & E. Bausen 1216 (MBML!); *ibidem*, Santa Teresa, cabeceira do rio Saltinho, 10 February 2007, fr., A.P. Fontana, K.A. Brahim, F. Andrikopoll & G. Furlani 2846 (MBML!, RB); Mun. Santa Teresa, Estação Biológica de Santa Lúcia, 19 April 1994, fr., L.D. Thomaz 1503 (HRCB!, MBML!, UFP!).

Myrcia ruschii B.S. Amorim, *sp. nov.* (Figures 1 A, 2 G–K, 3 C–F)

Type:—BRAZIL. Espírito Santo: Mun. Santa Teresa, Estação Biológica de Santa Lúcia, Trilha do Palmito, 19°58'28"S, 40°31'43"W, 650–700 m alt., 20 September 2014, fl., B.S. Amorim & J.R. Maciel 2035 (holotype: MBML!; isotypes: RB!, UFP!).

Treelets to trees up to 15 m tall, closely related to *M. longipaniculata* Caliari & V.C. Souza (Calari *et al.* 2016: 205) but differing by the presence of purple trichomes, rounded leaf base, and naviculate bracts.

Treelets to trees up to 15 m tall; young stems pubescent, covered with purple, simple trichomes. Leaves opposite; leaf blade lanceolate, 19–25 × 10–13.5 cm, chartaceous, bullate to tessellate, hirsute, ascending or erect, purple, trichomes 1–2 mm long on abaxial surface and glabrous to scattered white hairs on adaxial surface; apex rounded or acute; base rounded; midrib adaxially sulcate with puberulent trichomes, white when dry, abaxially raised with pubescent purple hairs; secondary veins 18–20 pairs, marginal vein 0.4–0.7 cm from the margin, inframarginal vein to 0.1 mm from the margin; margins revolute. Petiole 1–1.8 cm long, sulcate adaxially, and flat abaxially, puberulent, covered with purple hairs (when dry). Inflorescence paniculate, main floral axis 29–32 cm long, pubescent, covered in purple simple trichomes (when dry); bracts 0.9–1 cm long, naviculate, puberulent, trichomes purple; bracteoles to 0.5 cm long, ovate, puberulent, trichomes purple; hypanthium smooth, pubescent; calyx lobes 5, ca. 2 mm long, rounded, pubescent (trichomes purple when dry) on adaxial surface, petals not seen; stamens ca. 200, filaments 4–5 mm long, reddish when dry, the anthers 1–1.3 mm long, elliptical, thecae opening displaced, septum not visible; staminal ring to 4 mm in diameter, reddish (when fresh), puberulent; style and stigma not seen; hypanthium prolonged about 1 mm beyond the ovary; ovary 2-locular with 2 ovules per locule. Fruits to 1 × 1 cm (immature), globose, smooth, pubescent, trichomes purple.

Affinities:—*Myrcia ruschii* is morphologically related to species of the *Gomidesia* clade that share the morphological features of long leaves (20–35 cm) with ascending and/or erect trichomes (≥ 1–2 mm long) on abaxial

surface, bullate or tessellate on adaxial surface, elongate floral axis (15–26 cm long), and smooth hypanthium and fruit. It is morphologically similar to *M. longipaniculata* due to its bullate to tessellate leaves with revolute margin, inflorescence main axis length, and calyx lobe size and shape, but differs by the occurrence of purple trichomes (vs. reddish in *M. longipaniculata*), rounded leaf base (vs. cordate), and naviculate bracts (vs. lanceolate). The species was observed flowering from June to November and fruiting from June to December.

geographic Distribution and ecology:—*Myrcia ruschii* is found in montane Atlantic Forests of Espírito Santo state, southeastern Brazil. It is known from small populations growing in protected areas. The species is part of the canopy community and grows together with *Aechmea castanea* Smith (1956: 111), *A. pineliana* [Bromeliaceae], and other Myrtaceae species which are restricted to montane areas of Espírito Santo, such as *Eugenia rugossima*, *E. valsuganana* and *Myrcia tumida* [Myrtaceae].

Conservation status:—*Myrcia ruschii* is restricted to montane forests of the municipality of Santa Teresa in Espírito Santo state which have been considered threatened (Martinelli 2007). The forest fragments in the municipality of Santa Teresa, where *M. ruschii* is found, are known for their high number of restricted Myrtaceae species, such as *Eugenia crassa* Sobral (2010a: 338), *E. rugossima*, *E. valsuganana*, *Myrcia crassa* Sobral (2010b: 138), *M. robusta* Sobral (2006: 75), *M. santateresana* Sobral (2010a: 340), *M. tumida*, and also species of the *Gomidesia* clade as *Myrcia aurea* NicLughadha (2010: 22), *M. curtispindula* NicLughadha (2010: 21), and *M. teresensis* NicLughadha (2010: 26). Currently, the species is known only from the type locality where some narrow endemic species can also be found, such as *Bactris timbuiensis* Fernandes (1996: 4) [Arecaceae], *Begonia ruschii* Kollmann (2003: 30) [Begoniaceae], *Miconia ruschiana* Caddah & R. Goldenberg (2007: 974) [Melastomataceae] and *Neoregelia ruschii* Leme & B.R. Silva (2001: 147) [Bromeliaceae]. *Myrcia ruschii* meets the criteria of Endangered due to its area of occupancy of 16 Km², and its very small and restricted population (criterion B2 and D, respectively; IUCN, 2001; IUCN Standards and Petitions Subcommittee, 2014).

etymology:—The epithet honors the naturalist Augusto Ruschi who was an activist in the preservation of montane Atlantic Forest in Espírito Santo state and created the Santa Lúcia Ecological Reserve where *Myrcia ruschii* can be found.

Paratypes:—BRAZIL. Espírito Santo: Mun. Santa Teresa, cabeceira do rio Bonito, 13 June 2001, fl., fr., L. Kollmann, E. Bausen & W. Pizziolo 3931 (BHCB!, ICN, MBML!); *ibidem*, Estação Biológica de Santa Lúcia, rio Timbuí, 12 July 1989, fl., W. Boone, E. Bausen, W. Pizziolo & J.L. Molino 1315 (ICN, MBML!, RB!); *ibidem*, Trilha do Palmiteiro, 2 November 2005, fl., L. Kollmann, A.P. Fontana & C. Esgario 8278 (MBML!, UFP!).

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5 ARTIGO 4 – *Gomidesia* clade (*Myrcia s.l.*, Myrtaceae) from the Brazilian Atlantic Forest including new species

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Abstract

The *Gomidesia* clade belongs to genus *Myrcia s.l.*, which has the Brazilian Atlantic Forest as a diversity center. This group of species is known for its narrow distribution and high levels of endemism mostly in montane habitats. An extensive herbarium work and field studies were carried out with the aim to produce a taxonomic treatment of the 44 *Gomidesia* clade species for the Brazilian Atlantic Forest, which is presented here. It includes an identification key, descriptions, taxonomic comments, lectotypifications and synonymizations, illustrations, photographs, geographic distribution and habitat updates, phenological information, and conservation status, and description of *Myrcia longisepala* and *M. mcvaughii*, two new *Gomidesia* clade species.

Key-words— Endemic species, Montane forest, Neotropics, Taxonomy, Myrteae

Resumo

O clado *Gomidesia* pertence ao gênero *Myrcia s.l.*, que têm a Floresta Atlântica brasileira como centro de diversidade. Este grupo de espécies é conhecido por sua distribuição restrita e altos níveis de endemismo, em sua maioria, em habitats de florestas montanas. Um aprofundado estudo das coleções botânicas combinado com trabalhos em campo, foram realizados com o objetivo de elaborar um tratamento taxonômico para as 44 espécies do clado *Gomidesia* ocorrentes na Floresta Atlântica brasileira. Este trabalho inclui chave de identificação para as espécies, assim como descrições, comentários taxonômicos, ilustrações, fotografias, confirmação de

distribuição e habitats, informações fenológicas, status de conservação, lectotipificações, sinonimizicações e as descrições de *Myrcia longisepala* e *M. mcvaughii* duas novas espécies do clado *Gomidesia*.

Palavras-chave—Espécies endêmicas, Floresta Montana, Região neotropical, Taxonomia, Myrteae

Introduction

Myrcia s.l. (sensu Lucas et al. 2011) is a broader circumscription of the genus *Myrcia* de Candolle (1827: 406) including species that were previously known as *Calyptranthes* Swartz (1788: 79), *Gomidesia* O. Berg (1855–1856: 6), *Marlierea* Cambessèdes (1833: 373), and *Myrcia* de Candolle (1827: 406). *Myrcia s.l.* is restricted to the Neotropics where it is the second richest genus of Myrtaceae, with ca. 770 species occurring from Mexico to Uruguay in savanna vegetation, and Tropical Rain Forests (World Checklist of Selected Plant Families [WCSP] 2016, Lucas *et al.* in press).

In the phylogenetic hypothesis for *Myrcia s.l.* (Lucas et al. 2011, Staggemeier *et al.* 2015, Santos *et al.* 2016, Wilson *et al.* 2016), nine cohesive morphologically recognizable clades were proposed as an informal and preliminary infrageneric classification. One of these clades, clade 3 also called *Gomidesia* clade, is composed of species that were previously placed under *Gomidesia*. The *Gomidesia* clade species can be morphologically recognized by its specialized anthers, which are asymmetric with a vertical displacement and retain its curvature after dehiscence, and also by the pubescent staminal disk, prolonged hipanthium and erect calyx lobes in fruits (Nic Lughadha 1997, Lucas et al. 2011).

Historically, species currently under *Myrcia* were placed in *Gomidesia* based on these diagnostic morphological features by Berg (1855–1856). Since then, the genus *Gomidesia* has been accepted by some authors (Berg 1855–1856, 1857, 1859, Niedenzu 1893, Legrand 1958, Legrand & Klein 1967, Legrand & Mattos 1975, Nic Lughadha 1997), questioned (McVaugh 1968, Landrum & Kawasaki 1997), or refused (Sobral 2003, Sobral et al. 2010, Brazilian Flora Group [BFG] 2015, WCSP 2016).

The *Gomidesia* clade comprises ca. 50 species (BFG 2015, WCSP 2016) which are phylogenetically related and arranged in two main clades and four subclades

(Amorim chapter 1). These clades have a biogeographic signal in which the species are grouped by their area of occurrence and disagree with traditional *Gomidesia* infrageneric classification based on morphology (Amorim chapter 1). The Brazilian Atlantic forest is the ancestral vegetation for *Gomidesia* clade species (Amorim chapter 1, Santos et al. 2017) and this biome is the diversity center for this group (BFG 2015). Only three species have records in other countries of Central and South America (ie. *Myrcia fenziiana* O. Berg (1857: 196), *M. barituensis* (Legname) B. Holst in Jørgensen et al. (2014: 1272) and *M. palustris* De Candolle (1828: 246) (WCSP 2016). The distribution pattern of *Gomidesia* clade species is also the same distribution of *Myrcia* s.l., in which the species richest areas are the south of Bahia and North of Espírito Santo, and Rio de Janeiro and São Paulo states (Murray-Smith 2009, BFG 2015). More than 70% of the *Gomidesia* clade species were published in the 19th century (De Candolle 1828, Vellozo 1829, Cambessedes 1832, Berg 1855–1856, 1857, 1859). Recently, taxonomic efforts have been made focus on a better understanding of the biological diversity of this group (NicLughadha et al. 2010, 2012a, b, Sobral 2010, Amorim & Alves 2012a, 2015, 2016, Amorim et al. 2014, 2015, Caliari 2013, Caliari et al. 2016). The taxonomic treatment of the *Gomidesia* clade for the Brazilian Atlantic forest presented here is the part of this effort.

Material and methods

This study was based on field expeditions along the Brazilian Atlantic Forest during 2013–2015, and analysis of herbarium collections. The concept of Atlantic Forest adopted here comprises only the coastal and continuous rain forests up to 300 km inland (Azevedo 1950), excluding the gallery forests of “Cerrado”, “Campos rupestres vegetation”, and “Brejos de Altitude” from Northeastern Brazil. Botanical samples were submitted to usual taxonomic procedures (Peixoto & Maia 2013) and deposited at the UFP Herbarium. Duplicates have been sent to HUEFS, RB and SPF herbaria. Specimens and types from 40 herbaria were studied [ALCB, ASE, BM, BR, C, CEPEC, CVRD, EAC, EAN, ESA, FLOR, FURB, G, G–DC, HRB, HRCB, HST, HUEFS, IAC, IPA, JPB, K, M, MAC, MAR, MBM, MBML, MO, NY, P, PEUFR, PH, R, RB, SPF, UEC, UESB, UFP, UFRN, US, and VIES; acronyms follow *Index Herbariorum* (Thiers 2016)]. Morphological studies were carried out under a stereomicroscope using dried and fresh (spirit collections) specimens. McVaugh (1956), and Harris & Harris (2001)

were followed for the morphological terminology. The additional selected specimens cited were chosen to indicate the wide range geographical distribution. The Brazilian Flora Group (BFG 2015) was followed for the nomenclature. The geographic range of the extent of occurrence and area of occupancy were calculated with the GeoCAT tool (Bachman *et al.* 2011) and the conservation status was evaluated according to IUCN (2001) besides IUCN Standards and Petitions Subcommittee (2014).

Results

Fourty four *Gomidesia* clade species are confirmed for the Brazilian Atlantic Forest. The richest region in number of species is Southeastern Brazil with 39, followed by Northeastern and Southern Brazil, with 15 and 10 species, respectively. The Southeast region has the highest number of endemics with 21 species, whereas Rio de Janeiro and Espírito Santo states have 5 and 7 endemic species, respectively, with most of them occurring in submontane and montane forests. In the Northeast region, Bahia state is the richest one with 11 spp, and also has the highest number of endemics, with 3 species. Due to its narrowly distribution and the actual conditions of severely fragmented habitat and potential levels of exploitation of the Atlantic Forest, more than 50% of the *Gomidesia* clade species are threatened, in which *Myrcia neocambessedean* E. Lucas & Sobral in Sobral *et al.* (2010: 55) is considered an extinct species due to the fact that it is known only for few collections from the end of the 19th century.

Two new species restricted to Atlantic Forest of southeastern Brazil in Espírito Santo state are described here. *Myrcia longisepala* is found in lowland Atlantic Forest and “Restingas”, and *M. mcvaughii* occurs in submontane forests. Both species share the threatened category of vulnerable due to their narrowly distribution.

Nine names were synonymized. *Gomidesia freyreissiana* O. Berg (1857: 19) and *Myrcia freyreissiana* (O. Berg) Kiaerskov (1893: 102) were synonymized under *Myrcia brasiliensis* Kiaerskov (1893: 102), *Gomidesia sonderiana* Berg (1859: 533) and *Myrcia dolichopetala* Kiaerskov (1893: 106) under *Myrcia gestasiana* Cambessedes (1832: 303), *Myrcia buxifolia* var. *glazioviana* Kiaerskov (1893: 61) under *M. glazioviana* Kiaerskov (1893: 111), *Gomidesia affinis* var. *catharinensis* D. Legrand (1958: 14) and *Myrcia catharinensis* (D. Legrand) NicLughadha in NicLughadha *et al.* (2012: 240) under *M. hebepetala* De Candolle (1828: 246), and *Myrcia innovans* Kiaerskov (1983: 100) and *Gomidesia innovans* (Kiaersk.) D. Legrand (1958: 23) under *M. tijuensis* Kiaerskov (1893: 102). Moreover, five names were lectotypified, [ie.

Eugenia amplexicaulis Vellozo (1829: pl. 44), *Myrcia crocea* (Vellozo) Kiaerskov (1893: 105), *M. eriocalyx* De Candolle (1828: 247), *M. hebeptala* De Candolle (1828: 246), *M. spectabilis* De Candolle (1828: 247), and *Plinia crocea* Vellozo. (1829: 47)]. Some species of *Gomidesia* clade which were already cited for the Atlantic Forest domain by BFG (2015), had their occurrence excluded due to their restrict range of occurrence in “Campos Rupestres” (Cerrado vegetation), such as *Myrcia mischophylla* Kiaerskov (1893: 61), *M. neoblanchetiana* Sobral & E. Lucas in Nic Lughadha *et al.* (2012: 19) (see excluded species for more details), and *M. neospruceana* E. Lucas & Sobral in Sobral *et al.* (2010: 55).

New geographical ranges were also confirmed here. *Myrcia fenziiana* O. Berg (1857: 196) was recorded for the first time to Peru. *Myrcia grazielae* Nic Lughadha in Nic Lughadha *et al.* (2012a: 238) was known to be restricted to southern Bahia, but its known distribution was expanded to the northwards in the submontane forests of Alagoas and Pernambuco states. *Myrcia palustris* De Candolle (1828: 246) and *M. pubescens* had been cited to the “Campos Rupestres” in Bahia state, based on misidentified samples of *M. ilheosensis* Kiaerskov (1893: 109). *Myrcia pubescens* De Candolle (1828: 247) had also been known to occur in Bolivia and Brazil. The records from Bolivia were based on misidentified samples of *M. barituensis* (Legname) B. Holst, a species restricted to northwestern Argentina and Bolivia. Thus, we changed the status of *M. pubescens* to endemic to Brazil occurring in “Cerrado”, “Campos Rupestres” and montane Atlantic Forest of southern Brazil.

Taxonomic treatment

***Gomidesia* Clade**

Shrubs to trees. Leaves 1.1–60 x 1.9–24.5 cm flat, bullate or reticulate adaxially, oval, ovate, obovate, rotund, orbicular or elliptic with appressed (< 1 mm long), ascending to erect trichomes (\geq 1–3 mm long), or manicate trichomes abaxially, setose, strigose or manicate with withish, yellowish, brownish, redish, purple or dense goldish trichomes, and scattered or sparsely puberulent adaxially; apex acute, acuminate, rounded cuspidate or retuse, basis cuneate, rounded, truncate or cordate, midvein sulcate on adaxial surface, pubescent, secondary veins 6–28 pairs, diverging at 45–90° from the midvein marginal, vein distant 0.1–1 cm from the margin; sessile to subsessile (\leq 0.3 cm long) or petiolate (0.4–2 cm long), sulcate or flat adaxially, pubescent or puberulent.

Inflorescence reduced to expanded, main floral axis 0.6–32 cm long, pubescent, 3 to multi-flowered (≥ 10 flowers), clustered at the apex or evenly distributed along the inflorescence, pubescent, puberulent or with farinose surface; bracts 0.4–2 cm long, lanceolate, ovate, or navicular; bracteoles 0.2–0.6 cm long, linear, lanceolate, elliptic, ovate, deltoid, navicular or deciduous; hypanthium smooth or ribbed, 5-calyx lobes 1–5 mm long, acute, rounded, truncate or muricate; staminal disk and style base pubescent, anthers asymmetric with vertical displacement and retaining its curvature after dehiscence or losing its curvature with visible septum; ovary 2 (3–4)-locular. Fruits 0.4–2.5 x 0.4–2.6 cm, globose to subglobose, smooth or ribbed, puberulent, pubescent, or farinose, calyx lobes persistent or deciduous.

Key to species of *Gomidesia* clade (*Myrcia* s.l.) species from the Brazilian Atlantic Forest

- 1 Leaves densely covered by goldish trichomes abaxially (Fig. 6 P)... 2
 - Leaves not covered by goldish trichomes abaxially... 3
- 2 Leaves 6.5–8.5 long, secondary veins 14–15 pairs; inflorescence reduced, main floral axis 0.6–1 cm long, 5-flowered, flowers clustered at the apex; calyx lobes persistent in fruit... 3. *M. aurea*
 - Leaves 10.5–18 long, secondary veins 20–22 pairs; inflorescence expanded, main floral axis 7–8 cm long, multi-flowered, inflorescence with flowers evenly distributed, calyx lobes deciduous in fruit... 39. *M. subsericea*
- 3 Leaves abaxial surface manicate (with interwoven trichomes) (Fig. 5 C)..... 17. *M. glazioviana*
 - Leaves abaxial surface with appressed or ascending to erect trichomes (Fig. 5 A-B)... 4
- 4 Inflorescence axis, hypanthium, or/and fruit with farinose surface.... 5
 - Inflorescence axis, hypanthium, or/and fruit without farinose surface.... 6
- 5 Calyx lobes rounded; fruit conic... 43. *M. vittoriana*
 - Calyx lobes acute to cuspidate; fruit globose to subglobose... 36. *M. spectabilis*
- 6 Hypanthium or/and fruit ribbed (Fig. 3 H, S)..... 7
 - Hypanthium or/and fruit smooth (Fig. 3 J)..... 9
- 7 Leaves secondary veins 14–18 pairs, leaf abaxial surface with ascending to erect trichomes (1–2 mm long); hypanthium and fruit 10–ribbed... 10. *M. crocea*

- Leaves secondary veins 8–12 pairs, leaf abaxial surface with appressed trichomes (< 1 mm long); hypanthium and fruit 8–ribbed.... 8
- 8 Leaves oval, obovate, or orbicular, leaf apex rounded, retuse to acute; inflorescence main axis expanded (8–16 cm long).... 22. *M. ilheosensis*
- Leaves elliptic to obelliptic, leaf apex acuminate; inflorescence main axis reduced (3–5.5 cm long)..... 44. *M. warmingiana*
- 9 Leaves \geq 45 cm long..... 25. *M. magnifolia*
- Leaves < 45 cm long..... 10
- 10 Leaves surface bullate or reticulate adaxially (Fig. 2 D, S)..... 11
- Leaves surface flat adaxially (Fig 1 A, J)..... 17
- 11 Leaves surface reticulate adaxially..... 32. *M. reticulata*
- Leaves surface bullate adaxially..... 12
- 12 Leaves covered by reddish or purple trichomes..... 13
- Leaves covered by whitish trichomes..... 14
- 13 Leaf covered by reddish trichomes, basis cordate... 23. *M. longipaniculata*
- Leaf covered by purple trichomes, basis rounded to truncate.... 34. *M. ruschii*
- 14 Leaves petiolate (\geq 0.4 cm long)..... 15
- Leaves sessile to subsessile (up to 0.3 cm long)..... 16
- 15 Leaves 6–15 cm long; petiole 0.4–0.5 cm long; bracts 0.5 cm long, bracteoles 0.4 cm long, linear..... 21. *M. hebepetala*
- Leaves 23–32 cm long; petiole 1–2 cm long; bracts 0.2–0.3 cm long, bracteoles 0.1–0.2 cm long, lanceolate 9. *M. cordiifolia*
- 16 Inflorescence main floral axis ca. 15 cm long, flowers evenly distributed along the inflorescence; bracts lanceolate; calyx lobes 1–2 mm long..... 19. *M. grazielae*
- Inflorescence main floral axis 4–12 cm long, flowers clustered at the apex; bracts ovate; calyx lobes 4–5 mm long..... 30. *M. pendula*
- 17 Flowers clustered at the apex of the inflorescence (Fig. 2 F, I)..... 18
- Flowers evenly distributed along the inflorescence (Fig. 2 D, 5 Q, 6 N).... 32
- 18 Inflorescence 3–5-flowered (Fig. 3 L, P)..... 19
- Inflorescence multi-flowered (Fig. 3 D, M).... 25
- 19 Inflorescence 5-flowered..... 20
- Inflorescence 3-flowered.... 21

- 20 Leaves with ascending or erect trichomes ($\geq 1-2$ mm long) abaxially, leaf width 1–2.1 cm, petiole subsessile (0.1–0.2 cm long); calyx lobes acute... 28. *M. neocambessedean*
- Leaves with appressed trichomes (< 1 mm long) abaxially, leaf width 3.5–8.5 cm, subsessile to petiolate (0.3–1 cm long); calyx lobes rounded or truncate..... 2. *M. anacardiifolia*
- 21 Leaves up to 2 cm long.... 27. *M. montana*
- Leaves 2.5–15 cm long..... 22
- 22 Leaf secondary veins 8–10 pairs; inflorescence main floral axis 2–3 cm long.... 23
- Leaf secondary veins 12–14 pairs; inflorescence main floral axis 5–6 cm along.... 24
- 23 Leaf basis rounded; bracteoles elliptic.... 2. *M. anacardiifolia*
- Leaf basis cuneate; bracteoles lanceolate... 38. *M. squamata*
- 24 Calyx lobes rounded..... 15. *M. flagellaris*
- Calyx lobes acute.... 40. *M. teresensis*
- 25 Calyx lobes 1–3 mm long.... 26
- Calyx lobes 4–5 mm long..... 30
- 26 Leaves with ascending to erect trichomes ($\geq 1-2$ mm long) abaxially 6. *M. carvalhoi*
- Leaves with appressed trichomes (< 1 mm long) abaxially.... 27
- 27 Leaf apex acuminate..... 7. *M. cerqueiria*
- Leaf apex acute or rounded...28
- 28 Leaves with marginal vein distant 4–7 mm from the margin ... 2. *M. anacardiifolia*
- Leaves with marginal vein distant 2–3 mm from the margin.... 29
29. Leaves 7–10 cm long; calyx lobes acute..... 16. *M. gestasiana*
- Leaves 11–14.5 cm long; calyx lobes rounded..... 26. *M. mcvaughii*
- 30 Leaves with ascending to erect trichomes ($\geq 1-2$ mm long) abaxially..... 30. *M. pendula*
- Leaves with appressed trichomes (< 1 mm long) abaxially.....31
- 31 Leaves 6.5–10.5 cm long; leaf secondary veins 10–12 pairs; fruits 0.7–0.8 x 0.8–0.9 cm..... 24. *M. longisepala*
- Leaves 16–24.5 cm long; leaf secondary pairs 18–20 pairs; fruits 0.9–1.6 x 0.9–1.6 cm..... 8. *M. congestiflora*
- 32 Leaves with ascending to erect trichomes ($\geq 1-2$ mm long) abaxially..... 33
- Leaves with appressed trichomes (< 1 mm long) abaxially..... 40

- 33 Leaves sessile to subsessile (petiole ≤ 0.3 cm long)..... 34
- Leaves petiolate (> 0.3 cm long)..... 36
- 34 Leaf length 17.5–41.5 cm, secondary veins 16–18 pairs; inflorescence main axis 12–15 cm long; fruits 1–1.5 x 1–1.5 cm..... 1. *M. amplexicaulis*
- Leaf length 2–8 cm, secondary veins 6–8 pairs; inflorescence main axis 3–10 cm long; fruits 0.5–0.8 x 0.4–0.8 cm..... 35
- 35 Inflorescence main axis 3–4 cm long; bracteoles lanceolate; calyx lobes acute to acuminate; fruits 0.5–0.6 x 0.4–0.5 cm..... 12. *M. eriocalyx*
- Inflorescence main axis 5–10 cm long; bracteoles deltoid; calyx lobes rounded; fruits 0.7–0.8 x 0.7–0.8 cm..... 31. *M. pubescens*
- 36 Leaf secondary veins 16–18 pairs.... 37
- Leaf secondary veins 10–14 pairs... 38
- 37 Leaf apex acuminate; inflorescence main axis 9–11.5 cm long; bracteoles rounded..... 13. *M. espiritosantensis*
- Leaf apex acute to rounded; inflorescence main floral axis 6–7 cm long; bracteoles linear.... 18. *M. grandifolia*
- 38 Inflorescence main axis 4–4.5 cm long; bracteoles lanceolate.... 5. *M. brunnea*
- Inflorescence main axis 9–24 cm long; bracteoles linear or deltoids..... 39
- 39 Bracteoles deltoids; calyx lobes acute; fruits 0.5–0.6 x 0.6–0.7 cm..... 14. *M. fenzliana*
- Bracteoles linear; calyx lobes rounded to truncate; fruits 1–1.5 x 1–1.5 cm..... 21. *M. hebepetala*
- 40 Inflorescence main axis 2–6 cm long..... 41
- Inflorescence main axis 7–16 cm long... 46
- 41 Leaf apex acuminate..... 42
- Leaf apex acute to rounded..... 43
- 42 Calyx lobes acute.... 11. *M. curtispindula*
- Calyx lobes rounded..... 41. *M. tijucensis*
- 43 Leaf secondary veins 6–8 pairs..... 44
- Leaf secondary veins 12–18 pairs, pairs..... 45
- 44 Leaves margin reflexed, secondary veins diverging 60–65° from the midvein..... 20. *M. hartwegiana*
- Leaves margin flat, secondary veins diverging 45–50° from the midvein..... 29. *M. palustris*

- 45 Leaf secondary veins 16-18 pairs; bracteoles lanceolate; calyx lobes acute.... 42. *M. velutiflora*
- Leaf secondary veins 10-12 pairs; bracteoles elliptic; calyx lobes rounded to truncate..... 2. *M. anacardiifolia*
- 46 Leaves sessile to subsessile (petiole up to 0.3 cm long)..... 47
- Leaves petiolate..... 48
- 47 Calyx lobes acute..... 22. *M. ilheosensis*
- Calyx lobes rounded.... 33. *M. rosangelae*
- 48 Leaf apex acuminate..... *M. brasiliensis*
- Leaf apex acute, retuse or rounded.... 49
- 49 Calyx lobes rounded, retuse or truncate..... 50
- Calyx lobes acute..... 53
- 50 Leaf marginal vein 1 mm from the margin, petiole 0.5–0.6 cm long... 51
- Leaf marginal vein 2–4 mm from the margin, petiole 0.7–1 cm long... 52
- 51 Inflorescence main axis 9–10 cm long; calyx lobes 2 mm long..... 4. *M. brasiliensis*
- Inflorescence main axis 13–15 cm long; calyx lobes 1 mm long..... 37. *M. springiana*
- 52 Inflorescence main axis 7–9 cm long; bracteoles navicular..... 35. *M. serrana*
- Inflorescence main axis 13–15 cm long; bracteoles lanceolate..... 37. *M. springiana*
- 53 Leaf marginal vein 1–2 mm from the margin; bracteoles lanceolate; fruit 0.5–0.6 x 0.4–0.5 cm..... 22. *M. ilheosensis*
- Leaf marginal vein 3–4 mm from the margin; bracteoles navicular; fruit 0.8–1 x 0.8–1 cm..... 35. *M. serrana*

1. *Myrcia amplexicaulis* (Vell.) Hooker filius (1869: 5790). *Eugenia amplexicaulis* Vellozo (1829: pl. 44). (lectotype, designated here, Vellozo's original illustration at Manuscript Section of the Biblioteca Nacional of Rio de Janeiro (later published in Fl. flumin. Icon. 5: pl. 44. 1829).

Figures 1 A, 5 D-F

Trees 8–12 m tall. Leaves 17.5–41.5 × 7–20 cm, flat adaxially, oval, ovate or rotund, reflexed (adult ones), apex acute, rounded or retuse, basis cuneate to rounded, ascending to erect trichomes (≥ 1–2 mm long) abaxially, setose, whitish, and scattered adaxially,

midvein sulcate on adaxial surface, pubescent, secondary veins 16–18 pairs, diverging at 60–90° from the midvein marginal vein distant 4–5 mm from the margin; sessile to subsessile (petiole \leq 0.3 cm long). Inflorescence expanded, main floral axis 12–15 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 5 mm long, ovate, pubescent; hypanthium smooth, pubescent; calyx lobes 2–3 mm long, acute or rounded; staminal disk and style base pubescent. Fruits 1–1.5 \times 1–1.5 cm, globose, smooth, pubescent calyx lobes persistent.

Distribution and habitat:—*Myrcia amplexicaulis* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in the montane forests of Espírito Santo state. Although the type locality is from Rio de Janeiro and BFG (2015) cites the occurrence of *M. amplexicaulis* to this state, no further collections were found and this species is probably locally extinct. Amorim and Alves (2012a), Lucas *et al.* (2012), and Melo *et al.* (2016) also cited *M. amplexicaulis* to Northeastern Brazil for the submontane Atlantic Forest of Alagoas and Pernambuco states and also for the lowland Atlantic forest of southern Bahia state. But later these misidentified samples were described as *Myrcia grazielae*, a new species published by Nic Lughadha *et al.* (2012a).

Phenology:—Flowering from November to January and fruiting from January to April.

Taxonomic comments:—It is similar to *Myrcia grazielae* which shares sessile to subsessile (petiole \leq 0.3 cm long), leaf features, inflorescence length, flowers evenly distributed along the inflorescence, shape of the calyx lobes and globose and smooth fruits, but differs by flat leaves adaxially (vs. bullate in *M. grazielae*). The morphological pattern of flat vs. bullate leaves is the most consistent morphological character to differentiate these species. Molecular phylogenetics studies also support them as distinct lineages in different recognized clades (Amorim chapter 1). *M. amplexicaulis* is also similar to *M. crocea* which shares inflorescence length, flowers evenly distributed along the inflorescence, shape of the calyx lobes, but differs by sessile to subsessile leaves and smooth hypanthium and fruit (vs. petiolate leaves and ribbed hypanthium and fruit in *M. crocea*).

Conservation status:—This species meets the criteria of Endangered (EN) due to its extent of occurrence of ca. 100 Km², area of occupancy of 24 Km², for the conditions of severely fragmented habitat and actual or potential levels of exploitation of the Atlantic Forest, and also for the restricted habitat (criteria B1 and B2, conditions “a” and “b”, respectively).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Santa Maria Jetibá, Caramuru, Sítio Jetibá, 18 March 2003, fr., *H.Q. Boudet-Fernandes et al.* 3322 (MBML); Mun. Santa Teresa, Nova Lombardia, Reserva Biológica (REBIO) Augusto Ruschi, 19 February 2002, fr., *L. Kollmann et al.* 5577 (BHCB, MBML); Valsununga Velha, terreno Luiz Bringhente, 30 November 2000, fl., *V. Demuner et al.* 1575 (ESA, ICN, SPF); Reserva Biológica Santa Lúcia, 12 February 1999, fr., *E.M. Nic Lughadha et al.* 191 (K, SPF, RB); *Ibid*, 20 March 2014, fr., *B.S. Amorim et al.* 1953 (RB, UFP).

2. *Myrcia anacardiifolia* Gardner (1843: 354). *Gomidesia anacardiifolia* (Gardner) Berg (1955: 8). Type:—Brazil. Rio de Janeiro: “Organs Mountains“, February 1838, fl., *Gardner* 422 (lectotype, designated by Nic Lughadha 1997: 64, K!; isolectotypes, BM!, F!, G!, K!, P!, W).

Figures 1 B, 3 A-B

Treelets to trees 3–5 m tall. Leaves 7–15 × 3.5–8.5 cm, flat adaxially, elliptic to ovate, apex acute to rounded, basis rounded, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and sparsely puberulent adaxially, midvein sulcate adaxially, secondary veins 10–12 pairs, diverging at 55–65° from the midvein, marginal vein 4–7 mm from the margin; subsessile to petiole 0.3–1 cm long, sulcate adaxially, puberulent. Inflorescence reduced, main floral axis 3–5 cm long, 3– multi-flowered with flowers clustered at the apex or multi-flowered with flowers evenly distributed along the inflorescence; bracts 0.6 cm long, lanceolate, pubescent; bracteoles 0.2–0.3 cm long, elliptic, pubescent; hypanthium smooth, pubescent; calyx lobes 2 mm long, rounded to truncate; staminal disk and style base pubescent. Fruits 0.7–0.8 × 0.9–1 cm, globose to subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia anacardiifolia* is confirmed as endemic to Atlantic Forest of Southeastern and Southern Brazil in lowland and montane forests from Minas Gerais and Rio de Janeiro to Rio Grande do Sul states.

Phenology:—Flowering from September (probably) to July and fruiting from October to August.

Taxonomic comments:—*Myrcia anacardiifolia* morphotypes with 3–5-flowers clustered at the apex of the inflorescence are morphologically similar to *M. flagellaris* and *M. squamata*, but differs by its bracts lanceolate, bracteoles elliptic (vs. bracts

deciduous, bracteoles lanceolate in *M. squamata*), and acute to rounded leaf apex, and lanceolate bracts (vs. acuminate leaf apex, and ovate bracts in *M. flagellaris*). The morphotypes of *M. anacardiifolia* with flowers evenly distributed along the inflorescence is morphologically related to *Myrcia brunnea* and *M. hebeptala*, but differs by its leaves with appressed trichomes abaxially (vs. leaves with ascending to erect trichomes abaxially in *M. brunnea* and *M. hebeptala*), and its elliptic bracteoles (vs lanceolate in *M. brunnea*, and linear in *M. hebeptala*).

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Minas Gerais:** Mun. Lima Duarte, Estadual da Serra do Ibitipoca, trilha da Mata Grande, 21 November 2004, fl., *Forzza et al. 3613* (K, RB). **Paraná:** Mun. Paranaguá, São José dos Pinhais, Guacaricana, 6 May 1999, fr., *J.M. Silva et al. 2963* (MBM). Mun. Tijucas do Sul, Área de Proteção Permanente de Guaratuba, 6 July 2013, fl., *G. Felitto et al. 580* (RB). Mun. Ventania, Fazenda California, 4 May 2005, fr., *D.A. Estevan et al. 681* (BHCB, FUEL, MBM, UB). **Rio de Janeiro:** Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de cima, 20 January, 1993, fl., *T.S. Pereira et al. 12* (K, RB); *Ibid*, 26 January 2010, fl., *T.B. Flores et al. 411* (ESA, K, RB, SPF, UB). **Rio Grande do Sul:** Mun. Torres, Perdida, 27 January 1991, fl., *J.A. Jarenkow et al. 1827* (FLOR); *Ibid*, São Jacó, 19 March 1992, fl., *J.A. Jarenkow et al. 2081* (FLOR). **Santa Catarina:** Mun. Itaiópolis, rio do Toldo, 5 January 2003, fl., *E. Barbosa et al. 709* (BHCB, ESA, MBM, RB). Mun. São Francisco do Sul, Mina Velha, Garuva, 21 January 1958, fl., *P.R. Reitz & R.M. Klein 6270* (FLOR, HRB, K). **São Paulo:** Mun. Mariporã, Parque Estadual de Cantareira, região de Águas Claras, 4 April 2001, fr., *F.A.R.D.P. Arzolla et al. 255* (HRCB, SPSF, UEC). Mun. Iporanga, ca. 18 Km da cidade em direção à Apiaí, 22 April 1994, fr., *V.C. Souza et al. 5892* (HRCB, K, SPF, UEC).

3. *Myrcia aurea* Nic Lughadha in Nic Lughadha *et al.* (2010: 22). Type:—BRAZIL. Espírito Santo: Santa Teresa, Estrada para Nova Lombardia, 19 February 1999, fl., *E. Nic Lughadha et al. 200* (holotype: MBML!; isotypes: K!, RB!, SP!).

Figures 1 C, 3 C

Shrubs to treelets up to 4 m tall. Leaves 6.5–8.5 × 1.9–2.2 cm, flat adaxially, elliptic, apex acuminate, acumen 1–1.5 cm, basis cuneate, appressed trichomes (<1 mm long)

abaxially, strigose, densely goldish, and glabrous adaxially, midvein sulcate at the base and flat at the apex on adaxial surface, secondary veins 14–15 pairs, diverging at 50–60° from the midvein, marginal vein distant 1 mm from the margin; subsessile (0.2–0.3 cm long) to petiole (0.4–0.6 cm long), sulcate adaxially, puberulent, translucent, densely goldish. Inflorescence reduced, main floral axis 0.6–1 cm long, puberulent, 5-flowered, flowers clustered at the apex; bracts deciduous; bracteoles 0.3 cm long, linear, puberulent; hypanthium smooth, puberulent; calyx lobes 1 mm long, acute; staminal disk and style base puberulent. Fruits 0.4–0.6 × 0.4–0.6 cm, subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia aurea* is confined as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in montane Atlantic Forests of Espírito Santo state.

Phenology:—Flowering from December to June and fruiting from January to July.

Taxonomic comments:—It is similar to *Myrcia subsericea* which shares the leaves densely covered by goldish trichomes on abaxial surface, but *M. aurea* differs by its smaller leaves (6.5–8.5 long, vs. 10.5–18 long in *M. subsericea*) with 14–15 pairs of secondary veins (vs. 20–22 pairs), and calyx lobes persistent in fruit (vs. calyx deciduous).

Conservation status:—This species meets the criteria of Endangered (EN) due to its area of occupancy of 32 Km², and restricted and fragmented habitat with potential levels of exploitation (criterion B2 and conditions “a” and “b”, respectively).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Santa Teresa, Estação Biológica de Santa Lúcia, 27 May 1999, fl., *W.P. Lopes et al.* 238 (BHCB, MBML); *Ibid*, estrada para o Country Club, 29 January 2002, fl., *P. Fiaschi* 944 (RB, SPF); *Ibid*, Reserva Biológica Augusto Ruschi, 30 January 2002, fr., *L. Kollmann et al.* 5410 (MBML, UFP); *Ibid*, Santo Antônio, terreno do Boza, 14 January 1999, fl., *L. Kollmann et al.* 1543 (BHCB, ICN, MBML); *Ibid*, Valsugana Velha, Sítio do Sr. Leomir, 14 June 2000, fl. *V. Demuner et al.* 11115 (BHCB, MBML).

4. *Myrcia brasiliensis* Kiaerskov (1893: 102). *Gomidesia schaueriana* O. Berg (1857: 18). Type:—BRAZIL. s/Loc, s.d., fl., *Sellow n.s.* (lectotype, designated by Nic Lughadha 1997: 160, BR!; isolectotype, F [fragment]).

Gomidesia freyreissiana O. Berg (1857: 19). *syn. nov. Myrcia freyreissiana* (O. Berg) Kiaerskov (1893: 102). *syn. nov.* Type:—BRAZIL, Bahia, “ad Rio Mucuri”, s.d., fl.,

Freyreiss s.n. (lectotype, designated by Nic Lughadha 1997: 105, P! [barcode P00761712]).

Figures 1 D-F, 3 D, 5 G

Treelets to trees 5–10 m tall. Leaves 5–12 × 1.7–4.5 cm, flat adaxially, elliptic or obovate, apex rounded or acuminate, acumen 0.3–0.5 cm long, basis cuneate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 8–10 pairs, diverging at 55–65° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.5–0.6 cm long, sulcate, pubescent. Inflorescence expanded, main floral axis 9–10 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.4 cm long, lanceolate, pubescent; bracteoles 0.3 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes, 2 mm long, rounded to truncate; staminal disk and style base pubescent. Fruits 1–1.5 × 1–1.5 cm, subglobose to globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia brasiliensis* is confirmed as endemic to Atlantic Forest and recorded from Northeastern to Southern Brazil in lowland and montane forests from Bahia to Rio Grande do Sul states.

Phenology:—Flowering from September (probably) to May and fruiting from October to August.

Taxonomic comments:—It is morphologically similar to *Myrcia ilheosensis* which shares the leaf shape, expanded and multi-flowered inflorescence, but differs by its rounded or truncate calyx lobes (vs. acute calyx lobes in *M. ilheosensis*) and larger fruits with 1–1.5 × 1–1.5 cm (vs. 0.5–0.6 × 0.4–0.5 cm). Due to the overlap of vegetative and reproductive morphological characters, as well as their sympatric distribution in the coastal Atlantic Forest, *Gomidesia freyreissiana* Berg (1957) is here synonymized under *Myrcia brasiliensis*.

Conservation status:—This species meets the criteria of least concern (LC) due to its widely distribution in Atlantic Forest of Northeastern, Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Ilhéus, Fazenda Barra, 3 February 1992, fl., *L.A. Mattos et al. 1407* (CEPEC). **Espírito Santo:** Mun. Linhares, Reserva Natural da Vale do Rio Doce, estrada Oiticica, 10 February 1999, fr., *E. Nic*

Lughadha et al. 186 (CVRD, K, RB, SPF); *Ibid.*, próximo a casa de Guarda, 20 May 1988, fr., *D.A. Folli et al. 724* (CVRD, K). **Paraná:** Mun. Paranaguá, Colônia Pereira, 29 July 1988, fl., *G. Hatschabach et al. 52559* (BHCB, HUEFS, MBM, UEC). Mun. Quatro Barras, Morro Sete, 31 January 1989, fl., *J.M. Silva et al. 613* (BHCB, ESA, MBM, RB, SPF). **Rio de Janeiro:** Mun. Rio de Janeiro, Parque Nacional da Tijuca, estrada da Vista Chinesa, 18 January 1960, fl., *H.F. Martins et al. 145* (K, RB); *Ibid.*, Mun. Silva Jardim, Reserva Biológica Poço das Antas, margens do rio São João, 15 April 1995, fr., *D.S. Farias et al. 371* (ESA, K, RB). **Rio Grande do Sul:** Mun. Barra do Ribeiro, área da Riocell, 26 April 2002, fl., *R.A.G. Viani et al. s/n* (ESA 94871, RB). Mun. Torres, Faxinal, 22 December 1979, fl., *J.L. Waechter et al. 1508* (ICN, HRB). **Santa Catarina:** Mun. Araquarí, estrada Araquarí-Schneider, 22 January 2008, fl., *M.S. Weiers et al. 12* (JOI, SPF). Mun. Camboriú, estrada que liga Santa Catarina a Camboriú, 1 April 1981, fr., *J.M. Campos et al. 36* (FLOR, HRB). **São Paulo:** Mun. Cananeia, Fazenda Folha Larga, 16 January 2004, fl., fr., *C. Urbanetz 330* (UEC). Mun. São Paulo, Parque Estadual da Serra do Mar, núcleo Curucutu, fr., 12 April 2001, *F.T. Farah 2171* (RB). Mun. São Sebastião, Praia Barra da Uma, 22 September 2000, fr., *G. Franco 2981* (RB). Mun. Ubatuba, Picinguaba, praia da Fazenda, 27 January 1996, fr., *S.L.R. Castro et al. 36* (HRCB, UEC).

5. *Myrcia brunnea* Cambessèdes (1832: 306). *Gomidesia brunnea* (Cambess.) D. Legrand (1958: 261). Type:—BRAZIL. Minas Gerais: “in sabulosis montis Serra Negra”, s.d, fl., *Saint-Hilaire s.n.* (lectotype, designated by Nic Lughadha 1997: 72, P! [barcode P02440192]; isolectotypes: F [fragment], P! [2 sheets]).

Figures 1 G

Shrubs 2–3 m tall. Leaves 6.5–10 × 4–5.5 cm, flat adaxially, elliptic to ovate, apex acute, basis cuneate to rounded, ascending to erect trichomes (\geq 1–2 mm long) abaxially, setose, yellowish, and pubescent adaxially, midvein sulcate near from the base and flat near from the apex adaxially, secondary veins 10–12 pairs, diverging at 60–70° from the midvein, marginal vein distant 2–3 mm from the margin; petiole 0.5–0.7 cm long, sulcate adaxially, pubescent. Inflorescence reduced, main floral axis 4–4.5 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.3 cm long, lanceolate, pubescent; hypanthium smooth,

pubescent; calyx lobes 1–2 mm long, acute to truncate; staminal disk and style base pubescent. Fruits 0.8–1 × 0.8–1 cm, globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia brunnea* is confirmed as endemic to Atlantic Forest and recorded to Southeastern Brazil in Minas Gerais and São Paulo states.

Phenology:—Flowering probably from June to August and fruiting from probably August to September.

Taxonomic comments:—It is similar to *M. anacardiifolia* and *M. squamata* which shares leaf shape morphology and reduced inflorescence main axis, but differs from *M. anacardiifolia* by the characters cited under the comments of that species, and differs from *M. squamata* by the multi-flowered inflorescence with flowers evenly distributed along the inflorescence (vs. 3-flowered inflorescence with flowers clustered at the apex of the inflorescence in *M. squamata*).

Conservation status:—The species meets the criteria of Vulnerable (VU) due to its restricted population (criteria D2). This species is also known only by the type and two collections from the end of 60's.

Additional Specimens:—BRAZIL. **São Paulo:** Mun. Paranapiacaba, Estação Ecológica, 25 July 1968, fr., *O. Handro et al. 2063* (K, SPF, UFP); *Ibid*, 25 August 1968, fr., *J. Mattos & O. Handro 9091* (K, NY, SP).

6. *Myrcia carvalhoi* Nic Lughadha in Lughadha *et al.* (2012a: 235). Type:—BRAZIL. Bahia: Una, Ribeirão da Caveira, Serra Javi, 25 February 1986, *T. S. Santos et al. 3996* (holotype: CEPEC!; isotypes: K!, SP, RB!, UB, US!).

Figures 1 H, 3 E, 5 H-I

Shrubs to treelets 1.5–5 m tall. Leaves 15–29 × 3.7–9 cm, flat adaxially, elliptic to oval, apex acute or apiculate, basis cuneate or rounded, ascending to erect trichomes (\geq 1–2 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 12–14 pairs, diverging at 60–70° from the midvein, marginal vein distant 3–6 mm from the margin; petiole subsessile 0.3–0.5 cm long, sulcate adaxially, puberulent. Inflorescence reduced, main floral axis 1.5–3 cm long, pubescent, multi-flowered, flowers clustered at the apex of the inflorescence; bracts 0.8–1 cm long, lanceolate, pubescent; bracteoles 0.5–0.6 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes, 2–3 mm long,

rounded; staminal disk and style base pubescent. Fruits 1.3–1.4 × 1.3–1.4 cm, globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia carvalhoi* is confirmed as endemic to Atlantic Forest and restricted to Northeastern Brazil in lowland and submontane forests of southern Bahia state.

Phenology:—Flowering from probably September to February and fruiting from October to July.

Taxonomic comments:—It is morphologically similar to *Myrcia espiritosantensis* which shares the leaf shape, and leaf abaxial surface with ascending to erect trichomes, but differs by leaves with 12–14 pairs of secondary veins, its cuneate to rounded leaf basis, reduced inflorescence main axis with 1.5–3 cm long, flowers clustered at the apex, and lanceolate bracteoles (vs. leaves with 16–18 pairs of secondary veins, truncate or cordate leaf base, longer floral main axis with 9–11.5 cm long, flowers evenly distributed along the inflorescence, and rounded bracteoles in *M. espiritosantensis*). *Myrcia carvalhoi* is also similar to *M. cerqueira* and *M. congestiflora* which shares the reduced main floral axis and flowers clustered at the apex of the inflorescence but it differs by its acute or apiculate leaf apex, 12–14 pairs of leaf secondary veins, rounded calyx lobes and fruits 1.3–1.4 × 1.3–1.4 cm (vs. acuminate leaf apex, 14–16 pairs of secondary leaf veins, bracteoles linear to lanceolate, rounded to truncate calyx lobes with 1–2 mm long, and fruits 0.8–1 × 0.8–1 cm, in *M. cerqueira*, and 18–20 pairs of secondary leaf veins, bracteoles elliptic and calyx lobes 4–5 mm long in *M. congestiflora*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its extent of occurrence of ca. 6,000 Km² (criterion B1).

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Arataca, Serra Peito de Moça, 4 February 2010, fr., *L. Daneu 244* (CEPEC). Mun. Buerarema, rodovia São José da Vitória–Una, 12 May 1999, fr., *A.M. Amorim et al. 3066* (CEPEC, SP). Mun. Ilhéus, ca. 7 Km na estrada de Olivença para Vila Brasil, 30 May 1991, fr., *A.M. Carvalho et al. 3288* (CEPEC, SP). Mun. Itamarajú, 13 February 2000, fl., *R.A.X. Borges et al. 763* (CEPEC, NY, RB). Mun. Una, REBIO Una, 1 June 2014, fr., *B.S. Amorim et al. 2026* (RB, UFP).

7. *Myrcia cerqueiria* (Nied.) E. Lucas & Sobral in Sobral et al. (2010: 54). *Gomidesia cerqueiria* Niedenzu (1893: 78). *Cerqueiria sellowiana* O. Berg (1857: 10). Type:—BRAZIL. Bahia: s.d., fl., *Sellow s.n.* [barcode K000275953] (lectotype, designated by Nic Lughadha 1997: 81, K!).

Figures 1 I, 3 F, 5 J-K

Shrubs to trees 2–5 m tall. Leaves 10.5–19 × 3.5–5.5 cm, flat adaxially, elliptic to obovate, apex acuminate, acumen 0.5–1 cm long, basis cuneate, appressed trichomes (<1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate on adaxial surface, secondary veins 14–16 pairs, diverging at 70–80° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.5–1 cm long. Inflorescence reduced, main floral axis 1–2.5 cm long, puberulent, multi-flowered, flowers clustered at the apex; bracts 1 cm long, lanceolate; bracteoles 0.2–0.3 cm long, linear to lanceolate; hypanthium smooth, pubescent; calyx lobes, 1–2 mm long, rounded to truncate; staminal disk and style base pubescent. Fruits 0.8–1 × 0.8–1 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia cerqueiria* is confirmed as endemic to Atlantic Forest of Northeastern and Southeastern Brazil in lowland and submontane forests from southern Bahia to northern Espírito Santo states.

Phenology:—Flowering from August (probably) to March and fruiting from September to July.

Taxonomic comments:—It is morphologically similar to *Myrcia congestiflora*, and *M. carvalhoi* which shares leaf morphology features, and reduced main floral axis with flowers clustered at the apex of the inflorescence but it differs by the characters cited under the comments of *Myrcia carvalhoi*.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its extent of occurrence of ca. 48,500 Km² (criterion B1).

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Alcobaça: ramal para Santo Antônio, 24 January 1972, fl., *R.S. Pinheiro 1762* (CEPEC); Mun. Itacaré, fazenda Caetitu, 18 March 2006, fr., *J.G. Carvalho-Sobrinho et al. 789* (HUEFS); Mun. Porto Seguro, estrada Eunápolis a Porto Seguro, Reserva do Patrimônio Natural Estação Vera Cruz, 2 July 2006, fr., *M.M.M. Lopes et al. 920* (CEPEC, NY). **Espírito Santo:** Mun. Conceição da Barra, Itaúnas, 4 July 2007, fr., *C.F.C. Sá et al. 1744* (RB); Mun.

Domingos Martins, próximo a Victor Hugo, 17 January 1995, fl., *G. Hatschbach et al.* 61602 (BHCB, MBM); Mun. Linhares, Reserva Natural da Vale, 29 March, 2012, fr., *J.E.Q. Faria et al.* 2493 (CVRD, RB, UB); *Ibid*, 3 September 2014, fr., *B.S. Amorim et al.* 2028 (RB, UFP).

8. *Myrcia congestiflora* Caliari & V.C. Souza in Caliari et al. (2016: 202). Type:—BRAZIL. São Paulo: Ubatuba, Parque Estadual da Serra do Mar, Núcleo de Picinguaba 27 January 1996, fl., *A. Takahasi et al.* 211 (holotype: HRCB [not found], isotypes: SP [not found], SPSF [not found], UEC [not found]).

Figures 1 J

Treelets to trees up to 5 m tall. Leaves 16–24.5 × 3.8–7.5 cm, flat adaxially, elliptic to obovate, apex acute to acuminate, acumem ca. 1 cm long, basis cuneate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate and near from the basis, and flat near from the apex adaxially, secondary veins 18–20 pairs, diverging at 60–70° from the midvein, marginal vein 3 mm from the margin; petiole 0.5–0.7 cm long, sulcate, puberulent. Inflorescence reduced, main floral axis 1.5–3.5 cm long, puberulent, multi-flowered, flowers clustered at the apex; bracts 0.7–0.8 cm long, elliptic, pubescent; bracteoles 0.4 cm long, elliptic, pubescent; hypanthium smooth, pubescent; calyx lobes 4–5 mm long, acute; staminal disk and style base pubescent. Fruits 0.9–1.6 × 0.9–1.6 cm, globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia congestiflora* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in lowland and submontane forests of São Paulo and Rio de Janeiro states.

Phenology:—Flowering from January to May and fruiting from July to December.

Taxonomic comments:—It is morphologically similar to *Myrcia carvalhoi*, and *M. cerqueiria* which shares the reduced main floral axis with flowers clustered at the apex of the inflorescence but it differs by the characters cited under the comments of *Myrcia carvalhoi*.

Conservation status:—This species meets the criteria of Vulnerable (VU), due to its extent of occurrence of ca. 6,180 Km² and for the conditions of severely fragmented habitat and actual and levels of exploitation of the Atlantic Forest area (criterion B1).

Additional Selected Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Magé: Parque Nacional da Serra dos Órgãos, 25 September 2007, fr., *M. Nadruz et al. 2002* (RB); Mun. Paraty: Área de Proteção Permanente Cairuçu, 30 August 1994, fr., *L.C. Giordano et al. 1698* (RB); Mun. Silva Jardim: Reserva Biológica Poço das Antas, 03 February 1995, fl., *J.M.A. Braga 1893* (ESA, INPA, K, MBM, NY, RB). **São Paulo:** Mun. Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, 17 July 2000, fr., *F. O. Souza et al. 20* (MO, SP); Mun. Ubatuba, Parque Estadual da Serra do Mar, Núcleo Picinguaba, 26 July 2008, fr., *E.M.B. Prata s.n.* (HRCB 51027); 19 July 2008, fr., *R.B. Torres, J.A.M.A. Gomes et al. 1887* (IAC, UFP).

9. *Myrcia cordiifolia* De Candolle (1828: 248). *Gomidesia cordiifolia* (DC.) Nic Lughadha (1998:248). Type:—BRAZIL. São Paulo: “in silvis, vulgo Capões, udis ad Taubaté et Aldea da Escada”, s.d, fl., *Martius s.n.* (lectotype, designated by Nic Lughadha 1997: 83, M! [barcode M0137577]; isolectotypes, G! [G-DC 43], M!).

Figures 1 K, 5 L-M

Trees ca. 8 m tall. Leaves 23–32 × 12–16 cm, bullate adaxially, ovate, apex acute or rounded, basis rounded, ascending to erect trichomes ≥ 1 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein flat adaxially, secondary veins 14–16 pairs, diverging at 55–70° from the midvein, marginal vein distant 3–5 mm from the margin; petiole 1–2 cm long, sulcate adaxially, puberulent. Inflorescence expanded, main floral axis 10–14 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.2–0.3 cm long, lanceolate, pubescent; bracteoles 0.1–0.2 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, acute or rounded; staminal disk and style base pubescent. Fruits 0.7–1 × 0.7–1 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia cordiifolia* is confirmed as endemic to Atlantic Forest of Southeastern Brazil in montane forest of Espírito Santo, Minas Gerais, and São Paulo states. Despite the type locality, São Paulo state is not cited by BFG (2015). BFG (2015) also cited the record of *M. cordiifolia* to Rio de Janeiro state, but no collections from this area were found and this occurrence is not confirmed here.

Phenology:—Flowering from December to July and fruiting from July to September.

Taxonomic comments:—It is morphologically similar to Gomidesia clade species with large leaves (20–32 cm long) with bullate surface adaxially such as *M. grazielae*, *M. longipaniculata*, *M. pendula*, *M. ruschii*, but differs by its petiolate leaves (sessile to subsessile in *M. grazielae* and *M. pendula*), rounded leaf basis (vs. cordate in *M. longipaniculata*) and leaves and young stem covered by whitish trichomes (vs. purple trichomes in *M. ruschii* and redish in *M. longipaniculata*). *M. cordifolia* is also similar to *M. hebeplatata* but differs by its longer leaves (23–32 cm), and petioles (petiole 1–2 cm), and lanceolate bracteoles (vs. leaves 6–15 cm long, petiole 0.4–0.5 cm long, and bracteoles linear in *M. hebeplatata*).

Conservation status:—Besides the species reach a wide extent of occurrence of ca. 75,000 Km², this species meets the criteria of Endangered (EN) due to its area of occupancy of 28 Km², very restricted and fragmented habitat, and actual levels of exploitation of the Atlantic Forest (criterion B2 and conditions “a” and “b”, respectively).

Additional Specimens:—BRAZIL. **Espírito Santo:** Mun. Guaçuí, estrada Guaçuí para São José do Calçado, 27, August 2010, fr., *D.A. Folli et al. 6680* (CVRD, HUFSJ, K). **Minas Gerais:** Mun. Descoberto, Reserva Biológica da Represa do Grama, 15 July 2002, fl., *R.C. Forzza et al. 2198* (BHCB, MBM). Mun. Dionísio, morro do Gavião, 6 July 2004, fr., *G.S. França 601* (BHCB, ESA); *Ibid*, CEMAS-CIA Agrícola e Florestal Santa Bárbara, 10 February 1986, fl., *W.G. Campos et al. 53* (BHCB, FRUB). Mun. Marliérea, Parque Estadual do Rio Doce, 18 September 1975, fr., *E.P. Heringer & G. Eiten 15078* (MO, UB, US); *Ibid*, 27 February 1998, fl., *W.P. Lopes 528* (BHCB); *Ibid*, 26 March 2012, fl., *J.E.Q. Faria et al. 2470* (HUFSJ, UB). Mun. Novo Cruzeiro, estrada Palmeiras para fazenda Araras, 2 December 2004, fl., *J.R. Stehmann et al. 3673* (BHCB). Mun. Timóteo, Macuco, Parque Estadual do Rio Doce, 3 March 2004, fl., *G.S. França et al. 499* (BHCB).

10. Myrcia crocea (Vell.) Kiaerskov (1893: 105). *Plinia crocea* Vellozo. (1829: 47). [(lectotype, designated here, Vellozo’s original illustration at Manuscript Section of the Biblioteca Nacional of Rio de Janeiro. (later published in Fl. flumin. Icon. 5: t. 47. 1829)].

Figures 1 L, 3 G, 5 N

Treelets to trees 3–8 m tall. Leaves 10–20.5 (30–40) × 4.5–13 cm, flat adaxially, elliptic, ovate to lanceolate, apex rounded to acuminate, basis cuneate to rounded, ascending to erect trichomes (1–2 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 14–18 pairs, diverging at 60–80° from the midvein, marginal vein distant 2–3 mm from the margin; petiole 0.5–0.7 cm long, flat adaxially, pubescent. Inflorescence expanded, main floral axis 7–12 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.5–0.6 cm, lanceolate, pubescent; bracteoles 0.3 cm long, lanceolate, pubescent; hypanthium 10–ribbed, pubescent; calyx lobes 2 mm long, rounded or truncate; staminal disk and style base pubescent. Fruits 1.4–1.5 × 1.4–1.5 cm, globose, 10–ribbed, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia crocea* is confirmed as endemic to Atlantic Forest of Northeastern and Southeastern Brazil in lowland and montane forests from southern Bahia to Rio de Janeiro states.

Phenology:—Flowering from September to March and fruiting from September to July.

Taxonomic comments:—It is morphologically similar to *Myrcia amplexicaulis*, *M. espiritosantensis*, *M. grazielae*, *M. longipaniculata*, and *M. ruschii* which shares leaf features, inflorescence length, flowers evenly distributed along the inflorescence, and the shape of the calyx lobes, but differs by its petiolate leaves with flat surface adaxially (vs. sessile to subsessile leaves in *M. amplexicaulis* and *M. grazielae*, and bullate leaves adaxially in *M. grazielae*, *M. longipaniculata* and *M. ruschii*), leaf basis cuneate to rounded (vs. truncate to cordate leaf basis in *M. espiritosantensis* and *M. longipaniculata*), and ribbed hypanthium and fruits (vs. flat hypanthium and fruits in *M. amplexicaulis*, *M. espiritosantensis*, *Myrcia grazielae*, *M. longipaniculata*, and *M. ruschii*).

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Northeastern and Southeastern Brazil.

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Una Fazenda B. Rafael, 16 February 1966, fr., *R. Pinheiro 60* (CEPEC). Mun. Almadina, plantaçaõ de cacau, 22 November, 1966, fl., *R.P. Belém & R.S. Pinheiro 2911* (CEPEC). **Espírito Santo:** Mun. Anchieta, Fazenda do Samarco, 9 March, 2007, fr., *R.C. Britto et al. 194* (MBML). Mun. Cariacica, Localidade de Alegre, 20 July 2008, fr., *R.C. Forzza et al. 5229* (RB).

Mun. Santa Teresa, Estação Biológica de Santa Lúcia, 19 December 1990, frl, fr., S.V. *Pereira et al.* 44 (K, MBML).. **Minas Gerais:** Mun. Caratinga, Estação Biológica de Caratinga, Mata do Rafael, 26 April 1984, fr., M.A. *Lopes et al.* 367 (RB). Mun. Novo Cruzeiro, estrada Palmeiras para fazenda Araras, 2 December 2004, fl., J.R. *Stehmann et al.* 3673 (BHCB, ESA). **Rio de Janeiro:** Mun. Silva Jardim, distrito de Peclas, fazenda Santa Helena, 29 February 2008, fl., A.G. *Christo et al.* 636 (BHCB, K, RB). Mun. Rio de Janeiro, Leblon, April 1946, fr., M. *Duarte* 104 (RB).

11. *Myrcia curtipendula* Nic Lughadha in Nic Lughadha *et al.* (2010: 21). Type:—BRAZIL. Espírito Santo: Santa Teresa, Estação Biológica de Caixa d'Água, 13 February 1999, fl., *Nic Lughadha et al.* 195 (holotype: MBML!; isotypes: K!, RB!, SP, SPF!).

Figures 1 M, 3 H

Shrubs to treelets ca. 4 m tall. Leaves 4–10.5 (14) × 1–2.4 cm, flat adaxially, elliptic, apex acuminate, acumem 1.5–2 cm long, basis cuneate, scattered appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and glabrous adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, diverging at 60–70° from the midvein, 10–12 secondary pairs, marginal vein distant 1 mm from the margin; subsessile (up to 0.3 cm long) to petiolate 0.5 cm long, puberulent. Inflorescence reduced, main axis 3.5–5 cm long, puberulent, 5-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.3 cm, linear, puberulent; hypanthium smooth, scattered hairs; calyx lobes 1–2 mm long, acute; staminal disk and style base with scattered hyaline hairs. Fruits 1–1.2 × 0.9–1 cm, subglobose, smooth, puberulent calyx lobes persistent.

Distribution and habitat:—*Myrcia curtipendula* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in montane forests of Espírito Santo state.

Phenology:—Flowering from November to February and fruiting from March to May.

Taxonomic comments:—It is morphologically similar to *Myrcia tijuensis* and *M. teresensis* which shares leaf shape morphology, appressed trichomes on leaf abaxial surface, leaf secondary veins with 10–14 pairs, and reduced inflorescence main axis, but

differs by its 5-flowered inflorescence with flowers evenly distributed along the inflorescence (vs. multi-flowered in *M. tijucensis* and 3-flowered and clustered at the inflorescence apex in *M. teresensis*) and linear bracteoles (vs. lanceolate bracteoles in *M. tijucensis* and deciduous bracteoles in *M. teresensis*).

Conservation status:—This species meets the criteria of Endangered (EN) due to its extent of occurrence of ca. 927 Km², area of occupancy of 36 Km², and very restricted and fragmented habitat (criterion B1 and B2, and conditions “a” and “b”, respectively).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Domingos Martins, estrada para Santa Luzia, 15 May 1995, fr., *R. Mello–Silva et al.* 827 (FUEL, MO, NY, RB, SP, SPF, UEC). Mun. Itarana, alto Jaboticaba, 14 February 1999, fl., *E.M. Nic Lughadha et al.* 202 (RB, SPF); *Ibid*, 14 February 1999, fl., *E.M. Nic Lughadha et al.* 195 (RB, SPF). Mun. Santa Teresa, Nova Lombardia, Reserva Biológica Augusto Ruschi 28 November 2001, fl. *L. Kollmann et al.* 5063 (ICN, MBML); *Ibid*, Estação Biológica de Santa Lúcia, 9 August 1994, fl. *L.D. Thomaz* 1413 (HRCB, MBM, SPF). Santo Alselmo, 24 March 2006, fl., fr., *L. Kollmann et al.* 8796 (BHCB, MBML).

12. *Myrcia eriocalyx* De Candolle (1828: 247). *Gomidesia eriocalyx* (DC.) O. Berg (1855: 10). Type:—BRAZIL. Minas Gerais: “habitat in silvis Capões, territorii Adamantium”, s.d., fl., *Martius s.n.* (lectotype, designated here, M! [barcode M0137571]; isotype, G! [G-DC 33]).

Figures 1 N–Q, 5 O

Shrubs to treelets 0.5–4 m tall. Leaves 2–4.5 (5–8) × 1–3.4 cm, flat adaxially, elliptic, ovate, lanceolate, orbicular, or cordate, apex acute or rounded, basis cuneate, rounded or cordate, ascending to erect trichomes (≥ 1–2 mm long) abaxially, setose, whitish to yellowish, and scattered trichomes adaxially, midvein sulcate at basis and flat at apice adaxially, secondary veins 6–8 pairs, diverging at 60–70° from the midvein, marginal vein distant 1 mm from the margin; sessile to subsessile (up to 0.3 cm long), pubescent. Inflorescence reduced, main floral axis 3–4 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.6 cm long, elliptic, pubescent; bracteoles 0.2–0.3 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 1 mm long, acute to acuminate; staminal disk and style base pubescent. Fruits 0.5–0.6 × 0.4–0.5 cm, subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia eriocalyx* is confirmed as endemic to Brazil and recorded to Atlantic Forest and *Campo Rupestre* (Cerrado vegetation) of Southeastern Brazil in montane areas (above 750 m elev.) of Minas Gerais, Rio de Janeiro and São Paulo states. Despite BFG (2015) records *Myrcia eriocalyx* to Bahia and Espírito Santo states, the collection *R.M. Harley 6047* cited to Bahia was not found to be confirmed and no samples were associated to the state of Espírito Santo.

Phenology:—Flowering from July to April and fruiting from August to July.

Taxonomic comments:—It is morphologically similar to *M. brunnea* and *M. pubescens* which shares leaves with ascending to erect trichomes abaxially, sessile to subsessile leaves (only in *M. pubescens*) and inflorescence with flowers evenly distributed, but differs by its leaf secondary veins with 6–8 pairs, leaf marginal vein distant 0.1 cm, and leaves sessile to subsessile (vs. leaf secondary veins with 10–12 pairs, marginal vein distant 0.2–0.3 cm from the margin and petiolate leaves in *M. brunnea*), and for its inflorescence main axis with 3–4 cm long, lanceolate bracteoles, and acute to acuminate calyx lobes (vs. inflorescence main axis with 5–10 cm long, deltoid bracteoles, and rounded calyx lobes in *M. pubescens*).

Nomenclatural comments:—De Candolle (1828) cited *Martius s.n.* from Minas Gerais, “Habitat in silvis Capóes, territorii Adamantium” as the analyzed material in the description of *Myrcia ericalyx* but with no indication of the herbarium. Two collections by Martius from the same locality were found at G and M herbaria, and we, therefore, decided to select the collection at M as the lectotype because it is a complete and better preserved specimen.

Conservation status:—Although this species has a restricted habitat and only occurs in areas above 750 m elev., it meets the criteria of Least Concern (LC) due its extent of occurrence of ca. 157,000 Km².

Additional Selected Specimens:—BRAZIL. **Minas Gerais:** Mun. Brumadinho-Inhotim, 22 January 2008, fl., *J.G. Oliveira 135* (RB). Mun. Diamantina, 5 February 1972, fl., *W.R. Anderson 35492* (RB); *Ibid.*, Gruta do Satélite, 16 December 2004, fl., *R. Mello-Silva 2682* (RB, SPF). Mun. Itabirito, Pico do Itabirito, 7 February 1995, fl., *W.A. Teixeira s/n* (BHCB 26287); Mun. Lima Duarte, Parque Estadual da Serra do Ibitipoca, fl., 18 January 2005, *R.C. Forzza et al. 3910* (ESA, K, RB). Mun. Ouro Preto, Serra do Antônio Pereira, 10 October 2007, fl., *M.C.T.B. Messias et al. 1463* (BHCB, OUPR). Mun. Santana do Pirapama, Serra do Cipó, 24 XI 2009, fl., *D.C. Zappi et al. 2507* (RB).

Mun. Santana do Riachão, Serra do Cipó, 5 July 2001, fr., *V.C. Souza et al.* 25096 (ESA, RB, SPF). **Rio de Janeiro:** Mun. Macaé, Pico do Frade, 7 August 1985, fr., *S.V.A. Pessoa et al.* 41 (RB). Mun. Nova Friburgo, Reserva Macaé de Cima, estrada Sítio Sophronites, 19 January 1999, fl., *L.O. Anderson et al.* 99-45 (RB, UEC). Mun. Petrópolis, Vale das Videiras, 7 January 1973, fl., *G. Martinelli et al.* 168 (RB). Mun. Teresópolis, Morro da Televisão, 10 February 1968, fl., *D. Sucre et al.* 2334 (K, RB). **São Paulo:** Mun. Pindamonhangaba, Fazenda São Sebastião do Ribeirão Grande, 25 January 1997, fl., *S.A. Nicolau et al.* 1304 (BHCB, SP).

13. *Myrcia espiritosantensis* B. S. Amorim in Amorim & Alves (2016: 288). Type:—BRAZIL. Espírito Santo: Santa Leopoldina, arredores da Reserva Biológica de Duas Bocas 17 Jan 2009, fl., *R. C. Forzza 5397 et al.* (holotype: MBML!; isotypes: CEPEC!, RB!, UPCB!).

Figures 1 R, 4 5-P

Treelets up to 4 m tall. Leaves 16.5–30 × 4.5–10.2 cm, flat adaxially, lanceolate, apex acuminate, acumem 1.5–3 cm long, basis truncate (young) to cordate (expanded leaves), ascending or erect trichomes (≥ 1–2 mm long) abaxially, and adaxially, setose, whitish, midvein sulcate on adaxial surface, secondary veins 16–18 pairs, diverging at 65–75° from the midvein, marginal vein 3–5 mm from the margin; petiole 0.5–0.7 cm long, sulcate, puberulent. Inflorescence expanded, main axis 9–11.5 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 7 mm long, rounded, puberulent; hypanthium smooth, pubescent; calyx lobes 2 mm long, rounded or acute; staminal disk and style base pubescent. Fruits 1.0–1.5 × 1.0–1.5 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia espiritosantensis* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern region of Brazil in montane forests of Espírito Santo state.

Phenology:—Flowering from January to March and fruiting from April to July.

Taxonomic comments:—It is morphologically similar to *Myrcia carvalhoi* which shares the leaf shape, and leaf abaxial surface with ascending to erect trichomes, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Endangered (EN) due to its extent of occurrence of ca. 243 Km² and area of occupancy of 24 Km² (criterion B1 and B2, respectively) and for the conditions of severely fragmented habitat and actual and potential levels of exploitation of the Atlantic Forest area (conditions “a” and “b”, respectively; IUCN 2001, IUCN Standards and Petitions Subcommittee 2014).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Cariacica, Reserva Biológica de Duas Bocas, 11 April 2009, fr., *A.M. Amorim et al.* 7849 (CEPEC, MBML, RB, UPCB). Mun. Fundão, Área de Proteção Permanente Goiapaba-açu, Piabas, 08 February 2007, fl., *A.P. Fontana et al.* 2836 (K, RB). Mun. Santa Leopoldina, Morro Agudo, 28 January 2008, fl., *V. Demuner et al.* 4895 (MBML). Mun. Santa Teresa, Estação Biológica de Santa Lúcia, 19 April 1994, fr., *L.D. Thomaz* 1503 (HRCB, MBML, UFP).

14. *Myrcia fenzliana* O. Berg (1857: 196). non *Gomidesia fenzliana* O. Berg (1857: 20). Type:—BRAZIL. Minas Gerais: s.d., *Sellow* 986 (holotype, BR!).

Gomidesia linderniana O. Berg (1858: 208). Type:—CUBA. Guinea: Sommet de La Guinea, Prov. De Santiago, 213 m, September 1844, *J.J. Linden* 2123 (lectotype, designated here, BR!; isolectotype, BR!, G! [2-sheets], LE, MICH! [photo]).

Figures 1 S-U, 5 Q

Shrubs to treelets 2.5–5 m tall. Leaves 8.5–17 × 3.5–8 cm, flat adaxially, elliptic, ovate or lanceolate, apex acute, rounded or acuminate, acumem 0.5–1 cm, basis cuneate to rounded, pubescent, ascending to erect trichomes (≥ 1–2 mm long) abaxially, setose, whitish, scattered adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 12–14 pairs, diverging at 50–60° from the midvein, marginal vein distant 2–3 mm from the margin; petiole ca. 0.5 cm long, flat, pubescent. Inflorescence expanded, main axis 12–24 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.6 cm long, lanceolate, pubescent; bracteoles 0.3 cm long, deltoids, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, acute; staminal disk and style base pubescent. Fruits 0.5–0.6 × 0.6–0.7 cm, subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia fenzliana* is confirmed to occur in the Caribbean islands (Cuba, Dominica, Dominican Republic, Haiti, Jamaica, Montserrat, and Puerto

Rico), Bolivia, Colombia, Guyana, Peru, Venezuela and Brazil, where it is recorded in Cerrado (including “Campos Rupestres” and gallery forests) and montane Atlantic Forest of Bahia, Maranhão, Espírito Santo, Minas Gerais, São Paulo, Goiás states and in the Federal District.

Phenology:—Flowering from July to May and fruiting from August to July.

Taxonomic comments:—It is morphologically similar to *M. hebeptala* which shares leaves with ascending to erect trichomes abaxially, inflorescence with flowers evenly distributed along the inflorescence, but differs by its deltoid bracteoles, acute calyx lobes and smaller fruits with 0.5–0.6 x 0.6–0.7 cm (vs. linear bracteoles, rounded to truncate calyx lobes and larger fruits with 1–1.5 x 1–1.5 cm in *M. hebeptala*).

Nomenclatural comments:—In the protologue of *Gomidesia linderniana*, O. Berg (1858) did not indicate which material examined was the holotype. Six collections of *J.J. Linden 2123* were found at BR, G, LE and MICH herbaria, and the best preserved specimen is here selected as the lectotype.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in South America and Caribbean islands.

Additional Selected Specimens:—BOLIVIA. **Santa Cruz:** Chiquitos, Serrania del Mirador, 16 October 2008, fr., *J.R. Wood et al. 25131* (K). **La Paz:** Puonte Villa, 8 February 1998, fl., *J.R. Wood et al. 13003* (K). BRAZIL. **Bahia:** Mun. Abaíra, Mata do Barbado, 2 January 1992, fl., *E. Nic Lughadha et al. H50637* (CEPEC, HUEFS, K, SPF). Mun. Rio de Contas, Pico das Almas, 29 November 1988, fr., *R.M. Harley et al. 26666* (BHCB, CEPEC, HUEFS, K, RB, SPF). **Distrito Federal:** Brasília, Lago Azul, lado D, 16 May 2008, fl., *R.C. Martins et al. 897* (RB). **Espírito Santo:** Mun. Divino São Lourenço, estrada entre Patrimônio da Penha e Santa Maria, 22 October 2012, fr., *T.B. Flores et al. 1431* (CCTS, ESA, MBML, RB, UB, VIES). **Goiás:** Mun. Pirenópolis, Serra dos Pirineus, 8 December 1987, fl., fr., *L.C. Bernacci et al. 19971* (FUEL, UEC). **Maranhão:** Mun. Barra do Corda, 14 July 1976, fr., *Miguel 38* (PEUFR). **Minas Gerais:** Mun. Caparaó, Parque Nacional do Caparaó, 15 October 1988, fr., *M. Brugger et al. 22926* (CESJ, ESA). Mun. Joaquim Felício, Serra do Cabral, 20 October 1999, fr., *G. Hatschbach et al. 69358* (K, MBM, SP, UPCB). Mun. São João Del Rei, serra do Lenheiro, 13 June 2013, fr., *M. Sobral 15517* (RB). **São Paulo:** Mun. Assis, ca. 12 Km de Marília, 20 December 1995, fl., *V.C. Souza et al. 9721* (ESA, K, UEC). COLOMBIA. **Santander:** Mesa de Los Santos, 11–15 December 1926, fr., *Killip & A.C. Smith 15060* (US). CUBA. **Loma del Gato:** Cobre

Range, Maestra, August 1945, fl., *B. Chrysogone* 4812 (NY). DOMINICA. s/loc, 30 May 1888, *G.A. Ramage* s/n (K 000332221). DOMINICAN REPUBLIC. **Barahona**: Sierra de Baoruco, 22 May 1984, fr., *T.A. Zaroni et al.* 30181 (NY). GUYANA. **Potato-Siparuni**: Pakaraimas, Ciong Valley, 1 June 1995, fr., *Mutchnick* 1448 (SEL). HAITI. **Département du Sud**: Massif de la Horte, Morne Mansinte, fr., 26 January 1985, *T.A. Zaroni et al.* 33232 (NY). JAMAICA. s/loc: bellow Vinegar Hill, 12 June 1896, fl., *W. Harris* 6282 (NY). MONTSERRAT. **Saint Antony**: Slopes of Chance's Mountain, 23 February 1980, fr., *R.A. Howard et al.* 19723 (NY). PERU. **Amazonas**: Luya Province, 31 May 1989, fr., *C. Díaz et al.* 3569 (K, MO). PUERTO RICO. **Jayuya**: Toro Negro Forest Reserve, 23 January 1996, fr., *P Acevedo-Rodríguez et al.* 7846 (K, NY, US). VENEZUELA. **Bolívar**: 2–10 km from El Dorado- Sta. Helena road, 16 March 1974, fr., *A. Gentry et al.* 10514 (MO). **Sifontes**: Parupa, 25 April 1986, fr., *Picón* 1095 (MO).

15. *Myrcia flagellaris* (D. Legrand) Sobral (2008: 109). *Gomidesia flagellaris* D. Legrand (1961: 279). Type:—BRAZIL. Santa Catarina: Três Barras, Guaruva, São Francisco do Sul, 19 December 1957, fl., *P. R. Reitz & R. M. Klein* 5745 (holotype: MVM; isotypes: MO!, US!).

Figures 1 V, 3 I

Shrubs to treelets 2.5–4 m tall. Leaves 7.5–14.5 × 2.1–4.5 cm, flat adaxially, elliptic to lanceolate, apex acuminate, acumen 0.5–1 cm, basis cuneate, tomentulose, appressed trichomes (<1 mm long) abaxially, strigose, whitish, and scattered adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 12–14 pairs, diverging at 60–70° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.5–0.6 cm long, sulcate, tomentulose. Inflorescence reduced, main axis 5–6 cm long, puberulent, 3-flowered, flowers clustered at the apex, bracts 0.4 cm long, ovate, tomentulose; bracteoles 0.3 cm long, elliptic, tomentulose; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, rounded; staminal disk and style base pubescent. Fruits 0.7–1.5 × 0.7–1.1 cm, subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia flagellaris* is confirmed as endemic to Atlantic Forest and restricted to Southeastern and Southern Brazil from lowland to montane forests from São Paulo to Santa Catarina states.

Phenology:—Flowering from probably August to April and fruiting from September to July.

Taxonomic comments:—It is morphologically similar to *M. squamata*, *M. teresensis* and *M. warmingiana*, which shares leaf abaxial surface with appressed trichomes abaxially and 3-flowered inflorescence with flowers clustered at the apex, but differs from *M. squamata* by its leaf secondary veins with 12-14 pairs, and inflorescence main axis 5-6 cm long (vs. leaf secondary veins with 8-10 pairs, and inflorescence main axis 2-3 cm long in *M. squamata*), from *M. teresensis* by its rounded calyx lobes (vs. acute calyx lobes in *M. teresensis*), and from *M. warmingiana* by its smooth hypanthium and fruits (vs. ribbed hypanthium and fruits in *M. warmingiana*).

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of from Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Paraná:** Mun. Antonina, Serra Negra, 19 January 1966, fl., *G. Hatschbach et al.* 13552 (MBM, K, RB); Mun. Guaraqueçaba, rio do Costa, 4 February 1971, fl., *G. Hatschbach et al.* 26266 (K, MBM); Mun. Morretes, rio Mãe Catira, 11 July 1977, fr., *G. Hatschbach et al.* 40022 (MBM, UEC); **Santa Catarina:** Mun. Cunhas, Itajaí, 23 June 1955, fr., *R. Klein et al.* 1420 (HBR, K); Mun. Garuva, Fazenda Rio do Melo, 14 January 1997, fl., *E. Barbosa et al.* 39 (FLOR, MBM); Mun. Ibirama, 24 October 1999, fl., *A. Krambech s/n* (FURB 1683); **São Paulo:** Mun. Cananeia, Ilha do Cardoso, 19 January 2002, fl., *E.R. Castro et al.* 89 (HRCB); Mun. São Sebastião, Parque Estadual da Serra do Mar, 20 April 2000, fr., *A.A. Oliveira et al.* 3625 (ESA, MBM, SP, SPSF, UEC, UNIP); Mun. Sete Barras, Parque Estadual Carlos Botelho, 25 January 2003, fl., *E. Lucas et al.* 83 (ESA).

16. Myrcia gestasiana Cambessedes (1832: 303). *Gomidesia gestasiana* (Cambess.) Legrand (1958: 261). Type:—BRAZIL. Rio de Janeiro: “in montane Tijuca prope Rio de Janeiro“, s.d., fl., *Saint-Hilaire s.n.* (lectotype, designated by Nic Lughadha 1997: 107, P! [barcode P02273000]; isoelectotypes, P! [2 sheets], F [fragment]).

Gomidesia sonderiana Berg (1859: 533). *syn. nov. Myrcia dolycopetala* Kiaerskov (1893: 106). *syn. nov.* Type:—Brazil. Rio de Janeiro: s.d., fl., *Riedel 351* (neotype, designated by Nic Lughadha 1997: 169, LE; isoneotypes K!, LE [2 sheets], P!).

Figures 1 W

Treelets 3–5 m tall. Leaves 7–10 × 2.6–3.2 cm, flat adaxially, elliptic, apex acute, basis cuneate or rounded, appressed trichomes (<1 mm) abaxially, scattered to strigose, whitish, and strigose adaxially, midvein sulcate near basis and flat near apex, on adaxial surface, secondary veins 12–14 pairs, diverging at 50–60° from the midvein, marginal vein distant 2–3 mm from the margin; petiole 0.5–0.7 cm long, sulcate adaxially, puberulent. Inflorescence reduced, the main floral axis ca. 2 cm long, puberulent, multi-flowered, flowers clustered at the apex; bracts deciduous; bracteoles 0.2 cm long, linear, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, acute; staminal disk and style base pubescent. Fruits 0.6–0.7 × 0.6–0.7 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia gestasiana* is confirmed as endemic to Atlantic Forest and restricted to montane forests of Rio de Janeiro state.

Phenology:—Flowering from November to May and fruiting from February (probably) to July.

Taxonomic comments:—It is morphologically similar to *M. cerqueiria* and *M. congestiflora*, which shares the reduced inflorescence with main floral axis 1–3 cm long and flowers clustered at the apex, but it differs by its leaves 7–10 cm long and calyx lobes 1–2 mm long (vs. leaves 16–24.5 cm long and calyx lobes 4–5 mm long in *M. congestiflora*) and by its leaf apex and calyx lobes acute (vs. acuminate leaf apex, and rounded calyx lobes in *M. cerqueiria*). *Gomidesia sonderiana* was described by Berg (1959) as a new species based mainly on “pedunculis subterminatibus”, “apice 3–7floris”, and “bacca subglobosa” from Rio de Janeiro state. Lughadha (1997) also stressed how morphologically close *Myrcia gestasiana* and *G. sonderiana* are based on a few collections, but considered them as distinct species based on leaf venation and anther morphology. Here more specimens were analysed and due to the overlaps of vegetative and reproductive morphological characters, and also its sympatric distribution restricted to Atlantic Forest of the Rio de Janeiro state, *Gomidesia sonderiana* was synonymized under *Myrcia gestasiana*.

Conservation status:—This species meets the criteria of Endangered (EN) due its area of occupancy of 12 Km², the conditions of severely fragmented habitat and actual and potential levels of exploitation of the Atlantic Forest area (criterion B2 and conditions “a” and “b”, respectively).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Maricá, Distrito de Itaipuaçu, Pico Alto Mourão, 25 November 1981, fl., *R.H.P. Andreato et al. 307* (RB, UFP); *Ibid*, 1 July, 1982, fr., *R.H.P. Andreato et al. 494* (RB); *Ibid*, 16 November 1983, fl., *R.H.P. Andreato et al. 617* (RB); *Ibid*, Mun. Niterói, Itacoatiara, Parque Estadual da Serra da Tiririca, 25 May 2004, fr., *A.A.M. Barros et al. 2158* (RB).

17. *Myrcia glazioviana* Kiaerskov (1893: 111). *Gomidesia glazioviana* (Kiaersk.) D. Legrand (1958: 22). Type:—BRAZIL. Rio de Janeiro: “Serra de Alto Macahé de Nova Friburgo”, s.d., fl., *Glaziou 17005* (lectotype, designated by Nic Lughadha 1997: 110, C!; isolectotypes, BR!, K! [2 sheets], P! [2 sheets], R!).

Myrcia buxifolia var. *glazioviana* Kiaerskov (1893: 61). *syn. nov.* Type:—BRAZIL. Rio de Janeiro: “Orgaos (Macahé), 14 March 1988, fl., *A. Glaziou 16996* (lectotype, designated here, R!; isolectotypes, G!, NY!, P! [3 sheets]).

Figures 1 X

Trees ca. 4 m tall. Leaves 1.7–3 × 0.8–1.3 cm, flat adaxially, elliptic to ovate, apex acute, basis cuneate to rounded, interwoven trichomes abaxially, manicate, whitish trichomes, and glabrous to manicate adaxially, midvein sulcate adaxially, secondary veins 6–8 pairs, diverging at 50–70° from the midvein, marginal vein distant 1 mm from the margin; petiole sessile, 0.2 cm long, sulcate, manicate. Inflorescence reduced, floral axis ca. 3 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.3 cm long, lanceolate; hypanthium smooth, manicate; calyx lobes 1–2 mm, acute; staminal disk pubescent, style base scattered hairs. Fruits 0.4–0.5 × 0.4–0.5 cm, globose, smooth, manicate, calyx lobes persistent.

Distribution and habitat:—*Myrcia glazioviana* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in Rio de Janeiro state. Despite BFG (2015) cited records to Espírito Santo and Minas Gerais states, no samples were found to Espírito Santo and the collection (*C.T. Oliveira 152*) from Minas Gerais was misidentified. Then, both records are not confirmed here.

Phenology:—Flowering probably from May to June and fruiting in August.

Taxonomic comments:—It is morphologically similar to *M. montana* and they share small leaves (up to 3 cm long), the 3-flowered inflorescence with flowers clustered at

the apex, calyx lobes acute and small fruits (0.4–0.5 x 0.4–0.5 cm), but differs by leaves with interwoven trichomes on abaxial surface (vs. appressed trichomes in *M. montana*). *Myrcia buxifolia* var. *glazioviana* was described by Kiaerskov (1893) as a new variety mainly based on “foliis majoribus”, and “pedunculis foliis saepissime brevioribus”. The author also cited the morphological similarity of the new described variety with *Myrcia glazioviana* Kiaersk. “forte potius varietas Myrciae glaziovianae Kiaersk.”. Based on the lack of morphological characters to recognize the proposed variety and the sympatric distribution of them, we synonymized *Myrcia buxifolia* var. *glazioviana* under *Myrcia glazioviana*.

Nomenclatural comments:—In the protologue of *M. buxifolia* var. *glazioviana*, Kiaerskov (1893) did not indicate which material examined was the holotype. Six collections of A. Glaziou 16996 were found at G, NY, P [3 sheets], and R. All the collections are equally good candidates as lectotype, however the last collection was selected because according to the Brazilian recommendation, the primary type specimens should be deposited in collections in the country of origin, and the collection at R herbarium is here selected as the lectotype.

Conservation status:—This species meets the criteria of Vulnerable due to its very small and restricted population (criterion D).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, 14 August 1989, fr., *M. Peron* 876 (BHCB, NY, RB);

18. *Myrcia grandifolia* Cambessedes (1832: 298). *Gomidesia grandifolia* (Cambess.) Mattos & D. Legrand in Legrand & Mattos (1975: 17). Type:—BRAZIL. São Paulo: s.d., fr., *Saint-Hilaire* D786 (lectotype, designated by Nic Lughadha 1997: 111, P!; isoelectotypes F! [fragment], P!).

Figures 1 Y, 5 R

Shrubs to trees ca. 2–5 m tall. Leaves 12–22.5 × 5–6.8 cm, flat adaxially elliptic to lanceolate, apex acute to rounded, basis cuneate or rounded, ascending to erect trichomes (1–2 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 16–18 pairs, diverging at 60–80° from the midvein, marginal vein distant 2 mm from the margin; petiole 0.7–1 cm long, sulcate, pubescent. Inflorescence expanded, main floral axis 6–7 cm long, pubescent, multi-

flowered, flowers evenly distributed along the inflorescence; bracts 0.5 cm long, lanceolate, pubescent; bracteoles 0.4 cm long, linear, pubescent; hypanthium smooth, pubescent; calyx lobes 1 mm long, rounded; staminal disk pubescent, style base with scattered trichomes. Fruits 0.8–1 × 0.8–1 cm, globose, smooth, calyx lobes persistent.

Distribution and habitat:—*Myrcia grandifolia* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in montane forests of Minas Gerais, Rio de Janeiro, and São Paulo states. Despite BFG (2015) cited the records of *Myrcia grandifolia* to Bahia, Espírito Santo, and Paraná states, the sample related to Bahia (*S. C. Sant'Ana* 859) was not found, one from Espírito Santo (*V. Demuner* 1500) is misidentified, and no one was cited or found to Paraná.

Phenology:—Flowering from October (probably) to April and fruiting from November to July.

Taxonomic comments:—It is morphologically similar to *M. neoblanchetiana*, *M. springiana*, and *M. velutiflora* which shares the leaf shape morphology, leaves with appressed trichomes abaxially, expanded inflorescence main axis, and with flowers evenly distributed along the inflorescence, but differs by its leaves secondary veins with 16–18 pairs, acute or rounded leaf apex, linear bracteoles, and rounded calyx lobes (vs. leaves secondary veins with 10–12 pairs in *M. neoblanchetiana*, and with 12–14 pairs in *M. springiana*; acuminate leaf apex in *M. neoblanchetiana*; lanceolate bracteoles in *M. springiana* and *M. velutiflora*; and acute calyx lobes in *M. velutiflora*). *M. grandifolia* is also morphologically similar to *M. crocea*, which shares the leaf shape, but differs by its leaves with appressed trichomes abaxially smooth hypanthium and fruits (vs. leaves with ascending to erect trichomes abaxially and ribbed hypanthium and fruits in *M. crocea*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its extent of occurrence of ca. 7,700 Km² (criterion B1; IUCN 2001, IUCN Standards and Petitions Subcommittee 2014).

Additional Selected Specimens:—BRAZIL. **Minas Gerais:** Mun. Itamonte, Reserva do Patrimônio Natural em criação Projeto Bacia Rio Verde, 13 February 2004, fl., *M.C. Weyland-Vieira* 1999 (RB); Mun. Santa Rita de Jacutinga, 28 July 1970, fr., *C. Urbano* 8957 (RB). **Rio de Janeiro:** Mun. Resende, 13 June 1930, fr., *J. Ignacio* 1743 (RB); *Ibid*, próximo a divisa RJ/MG, 24 November 2012, fr., *J.E.Q. Faria* 3073 (HUFSJ, K, RB, SP, UB). **São Paulo:** Mun. Joanópolis, 30 April 1946, fl., *P. Gonçalves*

et al. 1345 (NY, SP); *Ibid*, Serra da Mantiqueira, 16 March 1939, fl., *M. Kulmann et al. s.n.* (SP 40059). Mun. São José do Barreiro, Serra da Bocaina, 12 February 1876, fl., *A. Glaziou 8381* (P).

19. *Myrcia grazielae* Nic Lughadha in Nic Lughadha *et al.* (2012a: 238). Type:—BRAZIL. Bahia: Itacaré, 06 Jan 1967, fl., *R. P. Belém & R. S. Pinheiro 2999* (holotype: CEPEC!; isotype: UB).

Figures 1 Z, 6 A-B

Trees 5–20 m tall. Leaves 17–23 × 4.5–8 cm, bullate abaxially, elliptic to ovate, apex acute to rounded, basis cuneate to rounded, ascending or erect trichomes (\geq 1–2 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 12–14 pairs, diverging at 65–80° from the midvein, marginal vein distant 3–4 mm from the margin; sessile to subsessile (petiole \leq 0.3 cm long). Inflorescence expanded, main floral axis ca. 15 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.4–0.5 cm long, lanceolate; bracteoles 0.2–0.3 cm long, lanceolate, puberulent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, acute to rounded; staminal disk and style base pubescent. Fruits 1.4–1.8 × 1.5–1.9 cm, globose to subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia grazielae* is here confirmed as endemic to Atlantic Forest of Northeastern Brazil and recorded to submontane forests of Alagoas and Pernambuco states and for lowland forests of southern Bahia. Although Nic Lughadha *et al.* (2012a) and BFG (2015) cited *Myrcia grazielae* as restricted to southern Bahia, this species was already reported to Alagoas and Pernambuco states under the misidentified name of *M. amplexicaulis* by Amorim and Alves (2012a) and Lucas *et al.* (2012).

Phenology:—Flowering from November to February and fruiting from March to October.

Taxonomic comments:—It is morphologically similar to *M. longipaniculata*, *M. pendula* and *M. ruschii* which shares leaves with bullate surface adaxially, but differs by its cuneate to rounded leaf basis (vs. cordate leaf basis in *M. longipaniculata*), leaf with whitish trichomes abaxially (vs. redish trichomes in *M. longipaniculata* and purple

trichomes in *M. ruschii*), and sessile to subsessile leaves (vs. petiolate in *M. longipaniculata*, and *M. ruschii*). *Myrcia grazielae* is also similar to *M. amplexicaulis* and *M. crocea*, which shares leaf shape features, but differs by the characters cited under their comments.

Conservation status:—This species meets the criteria of Endangered (EN) due to its area of occupancy of 52 Km², the conditions of severely fragmented habitat and the actual level of exploitation of the Atlantic Forest area (criterion B2 and conditions “a” and “b”, respectively).

Additional Selected Specimens:—BRAZIL. **Alagoas:** Engenho Pé de Serra, 17 January 1967, fl., *F. Paiva et al. 3381* (HST). **Bahia:** Mun. Ilheus, Fazenda Serrapilheira, 27 November 1987, fl., *P.J.M. Maas et al. 7059* (CEPEC). Mun. Itacaré, Fazenda Almas, 27 January 1982, fl., *T.S. Santos et al. 3726* (CEPEC). Mun. Una, Fazenda Queimada, 4 January 1970, fl., *S. Tavares et al. 3139* (IPA). Mun. Porto Seguro, 29 May 2014, fr., *B.S. Amorim et al. 2016* (JPB, NY, UFP). **Pernambuco:** Mun. Jaqueira, Reserva Natural do Patrimônio Natural Frei Caneca, 11 March 2011, fl., *B.S. Amorim et al. 817* (UFP); *Ibid*, 30 July 2011, fr., *B.S. Amorim et al. 948* (UFP). Mun. Vicência, Engenho Jundiá, 7 January 1961, fl., *S. Tavares et al. 572* (HST).

20. *Myrcia hartwegiana* (O. Berg) Kiaerskov (1893: 109). *Gomidesia hartwegiana* O. Berg (1857: 22). Type:—BRAZIL. Minas Gerais: s.d., *Widgren 544 1/2* (lectotype, designated by Nic Lughadha 1997: 164, S; isolectotype, C!).

Gomidesia sellowiana Berg. (1857: 21). Type:—BRAZIL. São Paulo: s.d., *Houllet s.n.* (lectotype, designated by Nic Lughadha 1997: 164, BR! [BR0000013515782]).

Figures 2 A-B, 6 C

Shrubs to treelets, 1.5–4 m tall. Leaves 3–9 × 2–3.5 (4) cm, flat adaxially, elliptic, ovate or obovate, apex acute to rounded, basis cuneate or rounded, appressed trichomes (<1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 6–8 pairs, diverging at 60–65° from the midvein, marginal vein distant 2 mm from the margin, margin reflexed; sessile to subsessile or petiolate (petiole 0.2–0.4 cm long), sulcate, appressed trichomes. Inflorescence expanded, main floral axis 5–6 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.3 cm long, lanceolate, pubescent; bracteoles 0.2 cm long, lanceolate, pubescent;

hypanthium smooth, pubescent; calyx lobes 1 mm long, acute or rounded; staminal disk and style base pubescent. Fruits 0.5×0.5 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia hartwegiana* is confirmed as endemic to Atlantic Forest and recorded to Southeastern and Southern Brazil in lowland and montane forests from Espírito Santo to Rio Grande do Sul.

Phenology:—Flowering from June to April and fruiting from September to June.

Taxonomic comments:—It is morphologically similar to *M. palustris*, which shares acute to rounded leaf apex, leaf secondary veins with 6–8 pairs, expanded inflorescence main axis with flowers evenly distributed along the inflorescence, but differs by its reflexed leaf margin, and leaf secondary veins diverging $60\text{--}65^\circ$ from the midvein (vs. flat leaf margin, and secondary veins diverging $45\text{--}50^\circ$ from the midvein in *M. palustris*).

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Divino de São Lourenço, Parque Nacional do Caparaó, Falcão de Pedra, 24 January 2008, fl., *L. Kollmann et al. 10458* (MBML, RB). Mun. Santa Maria do Jetibá, Pedra do Garrafão, 9 June 2006, fl., fr., *A.P. Fontana et al. 2188* (RB). **Minas Gerais:** Joaquim Felício, Serra do Cabral, 15 November 2007, fl., *P.L. Viana et al. 3307* (BHCB, RB). Mun. Lima Duarte, Parque Estadual do Ibitipoca, 9 March 2004, fl., *E. Lucas et al. 256* (RB). **Paraná:** Mun. Bocaiuva do Sul, Serra da Bocaina, 7 September 2006, fr., *G.O. Romão et al. 1674* (ESA, K, MBM, RB, SPF, RB, UB). Mun. Piraquara, Morro do Canal, fl., 3 February 2004, *O.S. Ribas et al. 5881* (MBM, RB). **Rio de Janeiro:** Mun. Rio de Janeiro, Pedra da Gávea, 4 January 1969, fl., fr., *D. Sucre 4288* (RB). Mun. Santa Maria Madalena, Parque Estadual do Desengano, pedra do Desengano, 28 June 1988, fl., fr., *G. Martinelli et al. 13356* (RB). **Rio Grande do Sul:** Mun. Caxias do Sul, Santa Lúcia do Piaí, 2 February 2003, fl., *A. Kleger et al. 1459* (BHCB, HUUCS). Mun. São José dos Ausentes, Serra da Rocinha, 3 November 2005, fr., *G.O. Romão et al. 1891* (ESA, UEC). **Santa Catarina:** Mun. Urupema, Fazenda das Ovelhas, 9 April 2007, fl., *R.P.M. Souza et al. 119* (BHCB, ESA, LUSC, SPF). Mun. São José, Serra da Boa Vista, 24 October 1957, fr., *R. Reitz & R. Klein 5406* (HBR, K, US). **São Paulo:** Mun. Cunha, Parque Estadual da Serra do Mar, 18 November 2006, fl., *E. Lucas et al. 461* (BHCB,

ESA, K, UB). Mun. São José do Barreiro, Parque Nacional Serra da Bocaina, 17 February 2014, fl., fr., *B.S. Amorim et al. 1925* (RB, UFP).

21. *Myrcia hebeptala* De Candolle (1828: 246). *Gomidesia hebeptala* (DC.) O. Berg (1855: 27). Type:—BRAZIL. “Rio São Francisco”, s.d., fl., *Martius s.n.* (lectotype, designated here, M! [barcode M0137141]; isolectotype, G! [G-DC 32]).

Myrcia affinis Cambessedes (1832: 307). *Gomidesia affinis* (Cambess.) D. Legrand (1958: 260). Type:—BRAZIL. São Paulo: “in campis prope urbem Mugy das Cruzes”, 1816–1821, fl., *A. Saint-Hilaire C1 655* (holotype: P!).

Gomidesia affinis var. *catharinensis* D. Legrand (1958: 14). *syn. nov.* *Myrcia catharinensis* (D. Legrand) NicLughadha in NicLughadha *et al.* (2012: 240). *syn. nov.* Type:—Brazil, Santa Catarina, Garapuvu, Vista Alegre, Sombrio, 29 Jan. 1960, s.d, fl., *P. R. Reitz & R. M. Klein 9485* (holotype MVM; isotype G!, HBR).

Figures 2 C-D, 6 D-E

Shrubs to trees 3–8 m tall. Leaves 6–15 × 2.5–4.6 cm, bullate or flat adaxially, elliptic to lanceolate, apex acute, rounded, or cuspidate, basis cuneate, ascending to erect trichomes (\geq 1–2 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 10–12 pairs, diverging at 55–65° from the midvein, marginal vein distant 2–3 mm from the margin, margin reflexed; petiole 0.4–0.5 cm long, sulcate adaxially, tomentulose. Inflorescence expanded, main floral axis 9–10 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.5 cm long, lanceolate, pubescent; bracteoles 0.4 cm long, linear, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, rounded to truncate; staminal disk and style base pubescent. Fruits 1–1.5 × 1–1.5 cm, globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia hebeptala* is confirmed as endemic to Atlantic Forest and recorded to Southeastern and Southern Brazil in lowland to montane forests from Espírito Santo and Minas Gerais to Rio Grande do Sul.

Phenology:—Flowering from August (probably) to June and fruiting from August to July.

Taxonomic comments:—*Myrcia hebeptala* morphotypes with flat leaf surface adaxially are morphologically similar to *M. fenzliana* which shares leaves with

ascending to erect trichomes abaxially, inflorescence main axis 9-12 cm long with flowers evenly distributed along the inflorescence, but differs by the characters cited under the comments of that species. *Myrcia hebepetala* morphotypes with bullate leaf surface adaxially are morphologically similar to *M. cordifolia* ascending to erect trichomes abaxially, flowers evenly distributed along the inflorescence, but differs by the characters cited under the comments of that species. *Gomidesia affinis* var. *catharinensis* was described by Legrand (1958) as a new variety. The author suggests its morphology as an intermediate between *Myrcia reticulata* Cambessedes (1832: 304), *G. affinis*, and *G. hebepetala*. The last two taxa are synonyms of *Myrcia hebepetala*, and share vegetative and reproductive morphological features with the variety described by Legrand (1958) as well as geographic distribution. Lughadha *et al.* (2012a) recognized *Gomidesia affinis* var. *catharinensis* as a new species of *Myrcia*, [*ie. Myrcia catharinensis* (D. Legrand) NicLughadha]. Based on the lack of morphological characters to recognize these species and the sympatric distribution we synonymized *Myrcia catharinensis* under *Myrcia hebepetala*.

Nomenclatural comments:—De Candolle (1828) cited *Martius s.n.* from Brazil, “Rio S. Francisco” as the analyzed material to *Myrcia hebepetala* with no indication of the herbarium. Two collections from the same locality were found at G and M herbaria, and we, therefore, decided to select the collection at M as the lectotype because it is a complete and better preserved specimen.

Conservation status:—This species meets the criteria of least concern (LC) due to its widely distribution in Atlantic Forest of Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Castelo, Parque Estadual do Forno Grande, 14 October 2008, fr., *P.H. Labiak et al.* 4951 (BHCB, CEPEC, MBML, RB, SPF, UPCB). Mun. Dores do Rio Preto, margem do Parque Nacional do Caparaó, 19 October 1999, fr., *F.F. Mazine et al.* 185 (ESA, RB). **Minas Gerais:** Mun. Alto Caparaó, Parque Nacional do Caparaó, 17 August 1988, fr., *P.L. Krieger et al.* s/n (CESJ 23323, ESA, RB, UFJF). Mun. Mutum, Imbiruçu, Pedra Santa, 31 May 2009, fl., *M.M. Saavedra et al.* 914 (BHCB, K, RB). **Paraná:** Mun. Apucarana, Parque da Raposa, 10 April 2000, fl., *E.M. Francisco et al.* s.n. (HUEFS 75605). Mun. Paranaguá, Ipanema, 24 March 1993, fl., *J.M. Silva et al.* 1238 (ESA, K, HRCB, HUEFS, HRCB, MBM, SPF). Mun. São José dos Pinhais, Purgatório, 19 July 1967, fr., *G. Hatschbach* 16705 (MBM, SPF). **Rio Grande do Sul:** Sarandi, matas ao redor da cidade, April 1966, fr., *P. Fragomeni* s/n (RB 248013). **Santa Catarina:** Mun. Palhoça,

Morro da Cambirela, 20 August 1971, fr., *A. Bresolin et al.* 357 (FLOR, HRB). Mun. Três Barras, 18 June 2008, fr., *A.L. Gasper et al.* 1817 (FURB). **São Paulo:** Mun. Cananeia, Parque Estadual Ilha do Cardoso, 22 April, 2005, fl., *V.G. Staggemeier et al.* 32 (HRCB, HUFSJ). Mun. São Paulo, Jardim Botânico de São Paulo, s.d., fl., *O. Handro* 262 (SPF).

22. *Myrcia ilheosensis* Kiaerskov (1893: 109). *Gomidesia fenzliana* O. Berg (1857: 20). Type:—BRAZIL. Rio de Janeiro: s.d., fl., *Mart. hb. Fl. bras.* 683 (lectotype, designated by Nic Lughadha 1997: 97, BR!; isolectotypes: BR!, F, G!, K!, LE, M!, NY!, P!, US! [photo], W).

Figures 2 E-G, 6 F-I

Treelets to trees 3–14 m tall. Leaves 6–11 × 3–7.5 cm, flat adaxially, oval, obovate, to orbicular, apex rounded, retuse to acute, basis cuneate, rounded, or cordate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate near from the base and flat near from the apex adaxially, secondary veins 8–10 pairs, diverging at 50–60° from the midvein, marginal vein distant 1–2 mm from the margin; petiole 0.1–1 cm long, sulcate, tomentulose. Inflorescence expanded, main floral axis 8–16 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.6 cm long, lanceolate, pubescent; bracteoles 0.1–0.2 cm long, lanceolate; hypanthium smooth or 8-ribbed, pubescent; calyx lobes 1 mm long, acute; staminal disk and style base pubescent. Fruits 0.5–0.6 × 0.4–0.5 cm, subglobose, smooth or 8-ribbed, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia ilheosensis* is confirmed as endemic to Atlantic Forest and recorded from Sergipe to Rio Grande do Sul States in restingas, lowland and submontane Forests.

Phenology:—Flowering from October to May and fruiting from March to September.

Taxonomic comments:—It is morphologically similar to *Myrcia pubescens* and *M. serrana*, which shares leaf shape features, and expanded inflorescence with flowers evenly distributed, but differ by its leaves with appressed trichomes abaxially (vs. ascending to erect trichomes abaxially in *M. pubescens*), leaf marginal vein distant 0.1–0.2 cm from the margin, lanceolate bracteoles, and smaller fruits with 0.5–0.6 × 0.4–0.5

cm (vs. leaf marginal vein distant 0.3–0.4 cm from the margin, navicular bracteoles, and larger fruits with 0.8–1 × 0.8–1 cm in *M. serrana*). *Myrcia ilheosensis* is also similar to *M. brasiliensis*, which shares leaf shape features, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Northeastern, Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Ilhéus, Road from Ilhéus to Serra Grande, 5 May 1992, fr., *W.W. Thomas et al. 9121* (CEPEC, K, NY). Mun. Lençóis, caminho para Barro Branco, 2 March 1980, fr., *S.A. Mori et al. 13351* (CEPEC, K, NY, RB); *Ibid.*, Chapadinha, 27 February 1997, fl., *F. França et al. PCD 5899* (ALCB, CEPEC, HRB, HUEFS, SPF); Mun. Morro do Chapéu, Morro da Antena, 27 October 1978, fl., *G. Martinelli et al. 5274* (RB). **Espírito Santo:** Mun. Conceição da Barra, Parque Estadual de Itaúnas, 1 May 2010, fr., *M.M. Monteiro et al. 239* (RB, VIES). Mun. Santa Teresa, Reserva Biológica Augusto Ruschi, 11 September 2014, fr., *B.S. Amorim et al. 2037* (RB, SPF, UFP). **Minas Gerais:** Mun. Grão-Mogol, estrada Boqueirão-Grão-Mogol, fl., *F. França et al. 4367* (HUEFS). Mun. Lima Duarte, Parque Estadual do Ibitipoca, próximo a guarita, 23 January 2007, fl., *R.C. Forzza et al. 4406* (BHCB, K, RB). **Paraná:** Mun. Guaratuba, Pirraças, 16 February 1991, fl., *J.M. Silva et al. 928* (ESA, MBM, HUEFS). Mun. Paranaguá, Reserva Ecológica Ilha do Mel, 14 February 1987, fl., *W.S. Souza et al. 24591* (UEC). **Rio de Janeiro:** Mun. Macaé, entre Lapas Compridas e Carapedas, 13 December 1995, fl., *C. Farrey et al., 3513* (RB). Mun. Rio de Janeiro, Barra da Tijuca, 30 December 1964, fl., *W. Hoehne 5954* (BHCB, IAC, K, SPF). **Rio Grande do Sul:** Mun. Campo Bonito, fr., *O.R. Camargo et al. 1252* (MBM). Mun. Torres, 20 January 1967, fl., *K. Hagelund et al. 5150* (ICN). **Santa Catarina:** Mun. Governador Celso Ramos, 20 March 1972, fl., *A. Bresolin et al. 516* (FLOR, HRB). Mun. Barra do Sul, restinga, 8 March 2001, fr., *O.S. Ribas et al. 3371* (BHCB, MBM). **São Paulo:** Mun. Cananéia, Parque Estadual Ilha do Cardoso, 22 February 2005, fl., *V.G. Staggemeier et al. 6* (BHCB, HRCB). Mun. Ilha Comprida, Pedrinhas, 22 May 2009, fr., *C.P. Caliyari et al. 2472* (ESA, RB). Mun. Pariqueira-Açú, Parque Estadual da Campina do Encantado, 24 March 1999, fl., fr., *M. Sztutman et al. 294* (ESA). **Sergipe:** Mun. Itabaiana, Parque Nacional Serra de Itabaiana, 27 January 1983, fl. *E. Carneiro et al. 477* (ASE, SP); *ibid.*, January 1998, fl., *M. Landim et al. 1399* (ASE, HUFSJ, SP, UFP, UFRN).

23. *Myrcia longipaniculata* Caliari & V.C. Souza in Caliari *et al.* (2016: 205). Type:—BRAZIL. Divisa RJ–SP: Km 0, picada em beira da estrada, 22 November 1990, fl., *M. Nadruz 651* (holotype: RB!).

Figures 2 H

Treelets up to 6 m tall. Leaves 26.5–33 × 10.5–13.5 cm, bullate adaxially, lanceolate, apex acute or rounded, basis cordate, ascending to erect trichomes (2–3 mm long) abaxially, setose, reddish, and glabrous to scattered trichomes adaxially, midvein raised adaxially, secondary veins 18–20 pairs, diverging at 60–70° from the midvein, marginal vein distant 5–9 mm from the margin; petiole 0.5 cm long, sulcate, puberulent. Inflorescence expanded, main floral axis 18–26 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 1.5–2 cm long, ovate, puberulent; bracteoles 0.5 cm, ovate, puberulent; hypanthium smooth, pubescent; calyx lobes, 2 mm long, acute or rounded; staminal disk and style base pubescent. Fruits not seen.

Distribution and habitat:—*Myrcia longipaniculata* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in lowland forests of southern Rio de Janeiro state.

Phenology:—Flowering from October to probably December or January and fruiting probably from December to March.

Taxonomic comments:—It is morphologically similar to *Myrcia grazielae*, *M. pendula* and *M. ruschii* which shares leaves bullate surface adaxially, but differs by the characters cited under the comments of *M. grazielae*. It is also similar to *M. amplexicaulis* and *M. crocea*, which shares leaf shape features, but differs by the characters cited under their comments.

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its very small and restricted population (criterion D).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Paraty, Área de Proteção Ambiental Cairuçu, 26 Oct 2010, fl., *M. C. Souza et al. 447* (RB, UFP). Mun. Laranjeiras, caminho para Praia do Sono, 15 September 1993, fl., *M.R. Barbosa 29813* (UEC).

24. *Myrcia longisepala* B.S. Amorim *sp. nov.* Type:—BRAZIL. Espírito Santo: Aracruz, A.I. do Limão, 17 June 2009, fr., *L.D. Thomaz, J.M.L. Gomes & V.B. Sarnaglia-Júnior* 1828 (holotype: VIES!; isotype: UFP!).

Figures 4 A-C

Treelet up to 3 m tall, closely related to *M. congestiflora* but differing by smaller leaves (6.5–10.5 cm long), fewer secondary leaf veins (10–12 pairs), smaller petioles (0.3–0.4 cm) and smaller fruits (0.7–0.8 x 0.8–0.9).

Treelet up to 3 m tall; young stems pubescent, simple trichomes. Leaf decussate; leaf blade elliptic to lanceolate, 6.5–10.5 × 2.4–3.7 cm, flat adaxially, membranaceous (when dried), base cuneate; apex acuminate, acumen 1 cm long; appressed simple trichomes (< 1 mm long) abaxially and adaxially, strigose; midvein flat with puberulent white hairs (when dried) adaxially, and raised with pubescent redish hairs abaxially; secondary veins 10–12 pairs, diverging at 60–70° from the midvein, marginal vein 2–3 mm from the margin, inframarginal vein not visible to 1 mm from the margin; petiole 0.3–0.4 cm long, flat adaxially, and abaxially, puberulent, covered by yellowish hairs (when dried). Inflorescence panicle, reduced, main floral axis 1.5 cm long, pubescent, multi-flowered, flowers clustered at the apex; bracts not seen, deciduous; bracteoles not seen, deciduous; hypanthium smooth, pubescent; calyx lobes-5, 4 mm long, rounded, pubescent (yellowish trichomes when dried), petals not seen; stamens persistent in immature fruit, ca. 200, filaments 5–6 mm long, reddish (when dried), the anthers ca. 1 mm long, elliptic, thecal displaced opening, septum not visible; staminal ring 3 mm diam., puberulent; style and stigma not seen; hypanthium prolonged 1 mm beyond the ovary; ovary 2-locular with 2-ovules per locule. Fruit 0.7–0.8 × 0.8–0.9 cm, subglobose to globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia longisepala* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in “restingas” of Espírito state.

Phenology:—Flowering from probably from January to April and fruiting from May to July.

Taxonomic comments:—It is morphologically similar to *Myrcia carvalhoi*, *M. cerqueiraia*, and *M. congestiflora*, which shares reduced inflorescence main axis with

flowers clustered at the apex, but differs by smaller leaves 6.5–10.5 cm long (vs. 15–29 cm long in *M. carvalhoi*, *M. cerqueira*, and *M. congestiflora*), smaller petiole 0.3–0.4 cm long (vs. 0.5–1 cm in *M. cerqueira* and *M. congestiflora*), leaf with appressed trichomes abaxially (vs. ascending to erect trichomes in *M. carvalhoi*), leaf secondary veins with 10–12 pairs (vs. 12–14 pairs in *M. carvalhoi*, 14–16 pairs in *M. cerqueira* and 18–20 pairs in *M. congestiflora*), calyx lobes 4 mm long (vs. 1–2 mm long in *M. cerqueira* and 2–3 mm long in *M. carvalhoi*), and fruits 0.7–0.8 × 0.8–0.9 cm (vs. 1.3–1.4 × 1.3–1.4 in *M. carvalhoi* and 0.9–1.6 × 0.9–1.6 in *M. congestiflora*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its very small and restricted population (criterion D).

Etymology:—The epithet “longisepala” refers to the long calyx lobes, an uncommon morphological feature in *Gomidesia* clade species which is found in this species.

25. *Myrcia magnifolia* (O. Berg) Kiaerskov (1893: 107). *Gomidesia magnifolia* O. Berg (1859: 531). Type:—BRAZIL. Rio de Janeiro: “prope Macahé”, s.d., fr., Riedel 1320. (lectotype, designated by Nic Lughadha 1997: 128, LE; isolectotypes, F! [fragment], G!, K!, LE [4 sheets]).

Figures 2 I, 3 J

Trees 15 m tall. Leaves 45–60 × 22.5–24.5 cm, flat adaxially, elliptic, apex acute, basis rounded, ascending to erect trichomes (≥ 1 mm long) abaxially, setose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 26–28 pairs, diverging at 70–80° from the midvein, marginal vein distant 7–10 mm from the margin; petiole sessile to 0.5 cm long, sulcate adaxially, puberulent. Inflorescence expanded, main floral axis 18–20 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles deciduous; hypanthium smooth, pubescent; calyx lobes 4–5 mm long, rounded or truncate; staminal disk and style base pubescent. Fruits 1.8–2 × 1.8–2 cm, globose to subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia magnifolia* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in lowland forests of Rio de Janeiro state.

Phenology:—Flowering probably from April to May and fruiting from June to August.

Taxonomic comments:—It is morphologically similar to *M. amplexicaulis* and *M. crocea*, which shares leaf shape features, and expanded inflorescence with flowers evenly distributed but differs by larger leaves with 45–60 cm long (vs. 17.5–41.5 cm long in *M. amplexicaulis*, and 10–40 cm in *M. crocea*), sessile to subsessile leaves (vs. petiolate in *M. crocea*), calyx lobes 4–5 mm long (vs. 2–3 mm long in *M. amplexicaulis* and 2 mm long in *M. crocea*), smooth hypanthium and fruits (vs. ribbed in *M. crocea*), and larger fruits with 1.8–2 × 1.8–2 cm (vs. 1–1.5 × 1–1.5 cm in *M. amplexicaulis*, and 1.4–1.5 × 1.4–1.5 cm in *M. crocea*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its very small and restricted population (criterion D).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Silva Jardim, Reserva Biológica do Patrimônio Natural Poço das Antas, 17 July 1994, fr., S.V.A. Pessoa *et al.* 725 (RB); *Ibid*, 8 August 1994, fr., C. Luchiari *et al.* 488 (RB); *Ibid*, 17 August 1995, fr., P.R. Farag *et al.* 92 (RB).

26. Myrcia mcvaughii B.S. Amorim sp. nov. Type:—BRAZIL. Espírito Santo: Mun. Nova Venécia, Área de Proteção Ambiental Pedra do Elefante, 19 February 2008, fl., P.H. Labiak, J.L. Paixão, A.M. Amorim & R.C. Forzza 4712 (holotype: RB!; isotype: BHCB, CEPEC, HUFSJ, MBML, UFP!, UPCB).

Figures 4 D-F

Treelet up to 3 m tall, morphologically closely related to *M. springiana* but differs by its reduced inflorescence main axis and flowers clustered at the apex of the inflorescence.

Treelet up to 3 m tall; young stems puberulent, covered by yellowish (when dried), simple trichomes. Leaf decussate; leaf blade elliptic, 11–14.5 × 3.6–5.1 cm, flat adaxially, membranaceous (when dried), base cuneate; apex acute; scattered, appressed trichomes (< 1 mm long) abaxially and adaxially, strigose; midrib sulcate with puberulent white hairs (when dried) adaxially, and raised with puberulent; secondary veins in 12–14 pairs, diverging at 70–80° from the midvein, marginal vein 2–3 mm from the margin, inframarginal vein 1 mm from the margin; petiole 4–5 mm long, sulcate adaxially puberulent. Inflorescence panicle, reduced, main floral axis 2–3.5 cm long,

pubescent, multi-flowered, clustered at the apex of the inflorescence; bracts deciduous; bracteoles deciduous; hypanthium smooth, pubescent; calyx lobes-5, 2 mm long, rounded, puberulent (whitish trichomes when dried), petals not seen; stamens ca. 200, filaments 4–5 mm long, brownish (when dried), anthers 1 mm long, elliptic, thecal displaced opening, septum not visible; staminal ring 3 mm diam., puberulent; style 6–7 mm long, basis puberulent, stigma punctiform; hypanthium prolonged 1 mm beyond the ovary; ovary 2-locular with 2-ovules per locule. Fruit not seen.

Distribution and habitat:—*Myrcia mcvaughii* is endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in submontane forests of Espírito state.

Phenology:—Flowering probably from December to February and fruiting probably from March to May.

Taxonomic comments:—It is morphologically similar to *M. springiana*, which shares leaf shape features, but differs by reduced inflorescence main axis with 2-3.5 cm long, and flowers clustered at the apex of the inflorescence (vs. expanded inflorescence main axis with 13-15 cm long, and flowers evenly distributed along the inflorescence in *M. spectabilis*). *Myrcia mcvaughii* is also similar to *M. anacardiifolia* and *M. gestasiana*, which shares leaves with appressed trichomes abaxially, reduced inflorescence with flowers clustered at the apex, and calyx lobes 1–3 mm long, but differs by leaves with marginal vein distant 2–3 mm from the margin (vs. leaves with marginal vein distant 2–3 mm from the margin in *M. anacardiifolia*), leaves 11–14.5 cm long and rounded calyx lobes (vs. leaves 7–10 cm long and acute calyx lobes in *M. gestasiana*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its very small and restricted population (criterion D).

Etymology:—The epithet honours Dr. Rogers McVaugh, who encouraged the first author in his first steps on the taxonomy of Myrtaceae and was one of the most important taxonomists of the 20th century due to his lifelong study of the family besides his contributions to the Mexican flora.

27. *Myrcia montana* Cambessedes (1832: 325). Type:—BRAZIL. Minas Gerais: “In montibus Serra Ibitipoca et Serra do Papagaio”, s.d., fl., A. *Saint-Hilaire D 501* (lectotype, designated by Nic Lughadha 1997: 135, P!; isolectotypes, P! [2 sheets]).

Figures 2 J-L, 3 K

Shrubs 1–2 m tall. Leaves 1.1–2 × 0.6–0.9 cm, flat adaxially, ovate to lanceolate, reflexed, apex acute or rounded, basis rounded, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate on adaxial surface, secondary veins 6–8 pairs, diverging at 50–60° from the midvein, marginal vein distant 1 mm from the margin; petiole sessile to subsessile (0.1–0.2 cm long), sulcate, villous. Inflorescence reduced, main floral axis 3.5–5 cm long, puberulent, 3-flowered, clustered at the apex of the inflorescence; bracts 0.8 cm long, lanceolate, pubescent; bracteoles deciduous; hypanthium smooth, villous; calyx lobes 2 mm long, acute, villous; staminal disk and style base pubescent. Fruits 0.5–0.6 × 0.5–0.6 cm, globose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia montana* is confirmed Atlantic Forest and “Campos Rupestres” (Cerrado Vegetation) of Southeastern Brazil in montane forests (above 1,000 m elev.) from Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo states.

Phenology:—Flowering from June to April and fruiting from June to May.

Taxonomic comments:—It is morphologically similar to species which has 3-flowered inflorescence with flowers clustered at the apex, such as *Myrcia flagellaris*, *M. squamata* and *M. teresensis*, but differs by its smaller leaves up to 2 cm long (vs. larger leaves) and sessile to subsessile (vs. petiolate in *M. flagellaris* and *M. teresensis*), besides acute calyx lobes (vs. rounded in *M. flagellaris* and rounded to apiculate in *M. squamata*).

Conservation status:—Although this species has a restricted habitat, it meets the criteria of Least Concern (LC) due its extent of occurrence of ca. 99,000 Km², and the occurrence of most of the populations in protected areas.

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Iuna, Parque Nacional do Caparaó, rancho dos Cabritos, 18 February 2000, fl., V.C. Souza et al. 23394 (CESJ, ESA, GFJP, MBM, SPF). **Minas Gerais:** Mun. Alagoa, Parque Estadual da Serra do Papagaio, subida do Chapadão, 14 May 2008, fr., P. Viana et al. 3540 (BHCB). Mun. Alto Caparaó, Parque Nacional do Caparaó, 25 September 1941, fr., A.C. Brade 17015 (K, RB); *Ibid.*, 11 February 2001, fl., L.S. Leoni et al. 4602 (BHCB, GFJP). Mun. Itamonte, Hotel Casa Alpina, 25 January 2011, fl., T.A. Batista et al. 251 (RB). Mun. Lima Duarte, Parque Nacional do Ibitipoca, 13 March 2004, fl., E. Lucas et al. 262 (K, RB). Mun. Ouro Branco, Serra do Ouro Branco, 18 May 2011, fr., R.C.

Forzza et al. 6377 (RB). Mun. Serra do Espinhaço, Serra da Piedade, 13 January 1971, fl., *H.S. Irwin et al. 30233* (HRB, NY, MO, UB). **Rio de Janeiro**: Mun. Itatiaia, Parque Nacional do Itatiaia, 23 March 1978, fr., *A.M. Camerit et al. 14* (K, RB). Mun. Petrópolis, Araras, Pico da Maria Comprida, 9 April 2006, fl., *G. Martinelli et al. 16104* (RB). Mun. Teresópolis, Parque Nacional Serra dos Órgãos, campos das Antas, 1 February 1983, fl., *G. Martinelli et al. 9049* (RB). **São Paulo**: Mun. Campos do Jordão, Instituto Florestal, 22 February 1984, fl., *M.J. Robim et al. s/n* (RB 273736). Mun. Pindamonhangada, Fazenda São Sebastião do Ribeirão grande, 22 January 1988, fl., *S.A. Nicolau et al. 1580* (BHCB, SP).

28. *Myrcia neocambessedeana* E. Lucas & Sobral in Sobral *et al.* (2010: 55). *Gomidesia cambessedeana* O. Berg (1857: 24). Type:—BRAZIL. Rio de Janeiro: “in memorosis pr. Santa Anna”, s.d., fl., *H.K. Beyrich s.n.* (lectotype, designated by Nic Lughadha 1997: 74, P! [barcode P02273013]).

Figures 2 M, 3 L

Shrubs 3–5 m tall. Leaves 6–7 × 1–2.1 cm, flat adaxially, elliptic to lanceolate, apex acute, basis cuneate to rounded, ascending to erect trichomes (\geq 1–2 mm long) abaxially, brownish, and scattered hairs adaxially, midvein sulcate adaxially, secondary veins 12–14 pairs, diverging at 60–70° from the midvein, marginal vein distant 1 mm from the margin, margin reflexed; petiole subsessile (0.1–0.2 cm long), sulcate, villous. Inflorescence reduced, main floral axis 4–5 cm long, 5-flowered, clustered at the apex; bracts 0.6 cm long, lanceolate, villous; bracteoles 0.4–0.5 cm long, linear to lanceolate, villous; hypanthium smooth, puberulent; calyx lobes 2 mm long, acute; staminal disk villous, style base with scattered hairs. Fruits not seen.

Distribution and habitat:—*Myrcia neocambessedeana* is confirmed as endemic to Atlantic Forest of Southeastern Brazil and restricted to Rio de Janeiro state.

Phenology:—Flowering and fruiting unknown.

Taxonomic comments:—It is morphologically similar to species which have few-flowered inflorescence (up to 5-flowers) with flowers clustered at the apex, such as *Myrcia anacardiifolia*, *M. flagellaris*, *M. montana*, and *M. squamata*, but differs by its leaves with ascending to erect trichomes on abaxial surface, 5-flowered inflorescence (vs. leaves with ascending to erect trichomes on abaxial surface 3-flowered in *Myrcia*

anacardiifolia, *M. flagellaris*, *M. montana*, and *M. squamata*) and main floral axis 4–5 cm long (vs. 2–3 cm long in *M. anacardiifolia* and *M. squamata*).

Conservation status:—This species is considered extinct due to it is known only for the type material and few collections from the end of 19th century. No recent collection is available for *M. neocambessedana*.

Additional Specimens:—BRAZIL. s. loc., s.d., fl., *Sellow s.n.* (barcode K000566648 K);

29. *Myrcia palustris* De Candolle (1828: 246). *Gomidesia palustris* (De Candolle) Kausel (1966: 348). Type:—BRAZIL. São Paulo and Rio de Janeiro: “in paludosis ad S. Cruz et Mogy das Cruces”, s.d., fl., *Martius s.n.* (lectotype, designated here, M! [barcode M0137569]; isolectotype, G! [G-DC 31]).

Figures 2 N-O

Shrubs to trees 3–5 m tall. Leaves 2.5–7.5 × 1.5–3.2 cm, flat adaxially, elliptic, obovate or orbicular, apex acute to rounded, basis cuneate or rounded, appressed trichomes (< 1 mm long) abaxially, whitish, and scattered trichomes to tomentulose adaxially, midvein flat adaxially, secondary veins 6–8 pairs, diverging at 45–50° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.2–0.4 cm long, sulcate, tomentulose. Inflorescence reduced, main floral axis 5–6 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.4 cm long, lanceolate, pubescent; bracteoles 0.2–0.3 cm long, linear to lanceolate, pubescent; hypanthium smooth, puberulent; calyx lobes 1 mm long, rounded or cuspidate; staminal disk and style base puberulent. Fruits 0.5–0.6 × 0.5–0.6 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia palustris* had its distribution confirmed to Northeastern Argentina, Paraguay, Uruguay and Brazil, where the species is distributed along the Atlantic Forest in Southeastern and Southern regions from Espírito Santo to Rio Grande do Sul states. Despite BFG (2015) cited the occurrence of *Myrcia palustris* to Western Brazil in Goiás state, we had not access to this sample and this record can not be confirmed. Specimens of *Myrcia palustris* were also cited to “Campos Rupestres” (Cerrado vegetation) in Bahia state (Lucas *et al.* 2012), but they were misidentified collections of *Myrcia ilheosensis*.

Phenology:—Flowering from July to April and fruiting from September to July.

Taxonomic comments:—It is morphologically similar to *M. hartwegiana*, which shares acute to rounded leaf apex, leaf secondary veins with 6–8 pairs, expanded inflorescence main axis with flowers evenly distributed along the inflorescence, but differs by the characters cited under that species.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Southeastern and Southern Brazil and also to Northeastern Argentina, Paraguay, and Uruguay.

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Linhares, Reserva Natural da Vale, 20 January 1999, fl., *D.A. Folli et al. 3334* (CVRD, RB). **Minas Gerais:** Mun. Lima Duarte, Parque Nacional do Ibitipoca, 27 July 1970, fr., *P.L. Krieger et al. 9253* (CESJ, ESA, RB); Mun. São Roque de Minas Gerais, Parque Nacional Serra da Canastra, 10 April 2010, fl., *G.O. Romão et al. 2654* (CESJ, EAFM, ESA, K, MBM, MO, RB). **Paraná:** Mun. Cascavel, Parque Nacional Nova Iguaçu, 23 November 1966, fl., *J.C. Linderman et al. 1970* (RB); Mun. Paranaguá, Ipanema, 7 February 1995, fl., *O.S. Ribas et al. 794* (BHCB, ESA, HRCB, HUEFS, MBM). **Rio de Janeiro:** Mun. Rio de Janeiro, Restinga de Jacarepaguá, 14 December 1967, fl., *P. Carauta et al. 507* (RB); *Ibid*, 6 January 1972, fl., *D. Sucre 8211* (CEPEC, RB). **Rio Grande do Sul:** Mun. Cambará do Sul, Parque Nacional Aparados da Serra, 30 November 2010, fr., *M.P. Morim 524* (RB). Mun. Encruzilhada do Sul, Estação Experimental, 22 January 1981, fl., *J. Mattos et al. 22382* (RB). Mun. Taim, Estação Ecológica do Taim, 6 May 1998, fr., *G. Martinelli et al. 14899* (RB) **Santa Catarina:** Mun. Bombinhas, prais de Marissol, 11 February 2006, fr., *M.G. Caxamsu, 1026* (BHCB, HCF); Mun. Campo Alegre, serra do Quiriri, 11 February 2001, fl., *O.S. Ribas et al. 3265* (BHCB, MBM). Mun. Navegantes, Meia praia, 22 December 2011, fl., *L.A. Funez et al. 165* (RB). **São Paulo:** Cananeia, Ilha do Cardoso, 22 February 2005, fr., *V.G. Staggemeier et al. 31* (HRCB); Mun. Guarulhos, mata de Cumbica, aeroporto internacional, 22 November 1984, fl., *S. Gandolfi s.n.* (ESA 5656, UB). PARAGUAY. **Alto Parana:** estância rio bonito, 28 November 1995, fl., *E.M. Zardini et al. 44003* (ESA, MBM, MO, PY, RB); San Pedro: Yaguarete Forest, 19 January 1996, fr., *E.M. Zardini et al. 44534* (AS, ESA, MO, PY).

30. *Myrcia pendula* Sobral (2010: 145). Type:—BRAZIL. Bahia: Ibirapitanga, Reserva Municipal Cachoeira do Pau, 12 May 2005, fl., A. M. Amorim 4940 *et al.* (holotype: CEPEC!; isotypes: BHCB [not found], HUFJSJ, UB).

Figures 2 P, 3 M

Trees ca. 3–16 m tall. Leaves 12.5–23 × 6.5–8.5 cm, flat to bullate adaxially, elliptic to ovate, apex acute, basis cuneate to rounded, ascending to erect trichomes (\geq 1–2 mm long) abaxially, setose, whitish, and scattered hairs adaxially, midvein sulcate adaxially, secondary veins 16–18 pairs, diverging at 70–80° from the midvein, marginal vein distant 3 mm from the margin; petiole sessile to subsessile (up to 0.3 cm long), pubescent. Inflorescence reduced to expanded, main floral axis 4–12 cm long, multi-flowered, flowers clustered at the apex; bracts 1 cm long, ovate, pubescent; bracteoles 0.3 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 4–5 mm long, acute or rounded; staminal disk and style base puberulent. Fruits 2.2–2.5 × 2.3–2.6 cm, subglobose, smooth, pubescent, calyx lobes, persistent.

Distribution and habitat:—*Myrcia pendula* is confirmed as endemic to Atlantic Forest and restricted to submontane forests of Northeastern Brazil in Southern Bahia state.

Phenology:—Flowering from December to May and was collected in fruiting on January to February.

Taxonomic comments:—It is morphologically similar to *Myrcia grazielae*, *M. longipaniculata* and *M. ruschii* which shares leaves with bullate surface adaxially, but differs by the characters cited under the comments of *M. grazielae*. *Myrcia pendula* is also similar to *M. crocea*, which shares the leaf shape and expanded inflorescence main axis with flowers evenly distributed, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Endangered (EN) due to its extent of occurrence of ca. 3,800 Km², area of occupancy of 16 Km², for the conditions of severely fragmented habitat and actual levels of exploitation of the Atlantic Forest area (criterion B1 and B2, and conditions “a” and “b”, respectively).

Additional Specimens:—BRAZIL. Bahia: Mun. Almadina, Serra do Corcovado, 19 April 2007, fr., M.M.M. Lopes *et al.* 1232 (CEPEC, NY); *Ibid.*, 2 February 2012, fl., M.M. Coelho *et al.* 603 (CEPEC). Mun. Arataca, Serra Peiro de Moça, fl., J.G. Jardim

et al. 4800 (CEPEC, HUEFS, RB, UFP). Mun. Camumu, Fazenda Exílio, sede da Fazenda, 21 February 2000, fl., *J.G. Jardim et al.* 2732 (ALCB, CEPEC, HRB, NY). Mun. Ibirapitanga, Reserva Municipal Cachoeira do Pau, 19 May 2003, *W.W. Thomas et al.* 13454 (CEPEC, NY).

31. *Myrcia pubescens* De Candolle (1828: 247). *Gomidesia pubescens* (DC.) D. Legrand (1958: 20). Type:—BRAZIL. Minas Gerais: s.d., fl., *Martius s.n.* (lectotype, designated by Nic Lughadha 1997: 150, M! [loan to K]; isolectotype, G! [G-DC 34], K! [barcode 000914083]).

Figures 2 Q-R, 6 J

Shrubs ca. 2.5 m tall. Leaves 3.5–8 × 1.6–3.4 cm, flat adaxially, oblong or rounded to ovate, apex acute or rounded, basis cuneate, rounded, truncate, or cordate, ascending to erect trichomes (≥1 mm long) abaxially, setose, whitish, and puberulent to scattered trichomes adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 6–8 pairs, diverging at 60–70° from the midvein, marginal vein distant 1–2 mm from the margin; subsessile (petiole 0.2–0.3 cm long), sulcate, pubescent. Inflorescence reduced to expanded, main floral axis 5–10 cm long, pubescent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.1 cm, deltoid, pubescent; hypanthium smooth, pubescent; calyx lobes 1 mm long, rounded; staminal disk and style base pubescent. Fruits 0.7–0.8 × 0.7–0.8 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia pubescens* is endemic to Brazil and had its distribution confirmed to Cerrado of middle–western and Southeastern Brazil in Goiás, Federal Distric, and Minas Gerais states, and to montane Atlantic Forest of Southeastern Brazil in Rio de Janeiro state. Specimens of *Myrcia pubescens* were already cited to “Campos Rupestres” (Cerrado vegetation) of Bahia state (Lucas *et al.* 2012), but based on misidentified collections of *Myrcia ilheosensis*. *Myrcia pubescens* was also cited to Bolivia (NicLughadha 1997, WCSP 2016), but this record was based on misidentified samples of *Myrcia barituensis* (Legname) B. Holst in Jørgensen *et al.* (2014: 1272), which is a *Gomidesia* clade species restricted to northwestern Argentina and Bolivia.

Phenology:—Flowering from August (probably) to June and fruiting from August to July

Taxonomic comments:—It is morphologically similar to *Myrcia ilheosensis*, which shares leaf shape features, and expanded inflorescence with flowers evenly distributed, but differ by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution Atlantic Forest and “Cerrado” vegetation of Southeastern and Western Brazil.

Additional Selected Specimens:—BRAZIL. **Discrito Federal:** Mun. Brasília, Reserva Ecológica do IBGE, área do Cristo Redentor, 9 September 2008, fr., *J.E.Q. Faria et al. 316* (HUEG, UB, VIES). Mun. Planaltina, 14 July 2008, fr., *A.G. Amaral et al. 2122* (HEPH, RB); Mun. Taguatinga, Floresta Nacional de Brasília, 17 December 2010, fl., *M.F. Santos et al. 626* (RB). **Goiás:** Alto Paraíso de Goiás, arredores da Estação de Tratamento, 22 January 2005, fl., *J.P. Souza et al. 4469* (ESA). **Minas Gerais:** Mun. Catas Altas, cachaça de canga, 15 March 2009, fl., *F.F. Carmo et al. 4381* (BHCB). Mun. Grão Mogol, bacia da Ribeirão da Morte, 4 September 1987, fl., *R. Mello-Silva et al. 11477* (SPF, UEC). Mun. Joaquim Felício, Serra do Cabral, 18 January 1996, fl., *G. Hatschbach 63349* (ASU, BHCB, MBM, NY, SP, SPF, SPSF). Mun. Santo Antônio do Itambé, Pico do Itambé, 26 February 2002, fl., *V.C. Souza 28491* (ASU, ESA). Mun. Uberaba, estrada entre Araxá e Uberaba, fl., 22 February 1978, fl., *G.J. Shepherd et al. 7227* (MBM, UEC). **Rio de Janeiro:** Mun. Nova Friburgo, Macaé de Cima, Pedra Bicuda, 23 March 1994, fl., *M. Nadruz et al. 1008* (ESA, NY, RB). Mun. Nova Iguaçu, Reserva Biológica do Tinguá, 30 January 2002, fl., *H.C. de Lima et al. 5990* (RB).

32. *Myrcia reticulata* Cambessedes (1832: 304). *Gomidesia reticulata* (Cambess.) O. Berg (1857: 15). Type:—BRAZIL. Minas Gerais: “i prope praedim Rancho de Medeiro ad iter quod ducit a Sebastianopoli”, s.d., fl., *A. Saint-Hilaire s.n.* (lectotype, designated by Nic Lughadha 1997: 154, P! [P02273018]; isolectotypes, F! [fragment], P! [2 sheets]).

Figures 2 S-T

Treelets 3.5 m tall. Leaves 9–18 × 3–4.7 cm, reticulate adaxially, elliptic, apex acute, basis cuneate or rounded, ascending or erect trichomes (\geq 1–2 mm long) abaxially, setose, whitish, and tomentulose to scattered hairs adaxially, midvein sulcate adaxially, secondary veins 16–20 pairs, diverging at 65–80° from the midvein, marginal vein

distant 1–2 mm from the margin; petiole 0.4–0.5 cm long, sulcate adaxially. Inflorescence expanded, main floral axis 8–8.5 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.6 cm long, lanceolate, pubescent; bracteoles 0.4 cm long, linear, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, rounded to muricate; staminal disk and style base pubescent. Fruits 0.6–0.7 × 0.6–0.7 cm, globose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia reticulata* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in montane forests of Minas Gerais and Rio de Janeiro states. Despite BFG (2015) cited the occurrence of this species to Northeastern Brazil in Bahia state, the sample (*N. G. Jesus 1361*) is misidentified and the occurrence was not confirmed.

Phenology:—Flowering from January to March and fruiting from April to August.

Taxonomic comments:—It is morphologically similar to *M. fenzliana*, which shares leaf shape features, and expanded inflorescence with flowers evenly distributed, but differs by its reticulate leaf surface adaxially, linear bracteoles, and rounded to muricate calyx lobes (vs. flat leaf surface adaxially, deltoid bracteoles, and acute calyx lobes in *M. fenzliana*).

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its extent of occurrence of ca. 5,480 Km², and for its restricted and severely fragmented habitat (criterion B1).

Additional Specimens:—BRAZIL. **Minas Gerais:** Mun. Itamonte, Fazenda Tijucaí, 13 February 2004, fl., *M.C.W. Vieira et al. 1999* (RB). Mun. Rio Preto, São Gabriel, estrada para Rio Funil, 27 February 1999, fl. *E. Nic Lughadha et al. 225* (BR, ESA, K, RB, SPF). **Rio de Janeiro:** Mun. Itatiaia, Parque Nacional do Itatiaia, atrás do abrigo 3, 18 February 2003, fl., *C.J. Silva-Neto et al. 1782* (LPB, MBML, MG, MO, RB, SP, UC, UEC); *Ibid*, trilha Barbosa Rodrigues, Vale do Último Adeus, 20 May 2010, fr., *C.N. Fraga et al. 2892* (K, NY, RB); *Ibid*, trilha para cachoeira Bela Vista e os Três Picos, 13 January 2012, fl., *M.F. Santos et al. 803* (SPF). Mun. Vassouras, April 1976, fr., *D. Sucre et al. 11193* (INPA, K, RB).

33. *Myrcia rosangelae* Nic Lughadha in Nic Lughadha *et al.* (2012b: 19). Type:—BRAZIL. Alagoas: Santo Antônio, 21 Sep 1954, fl., *J.I.A. Falcão et al. 1195* (holotype: RB!; isotypes: CEPEC!, F, IPA [not found], K!, NY!).

Figures 2 U, 6 K

Shrubs or treelets 1.5–8 m tall. Leaves 7–12 × 4.3–5.4 cm, flat adaxially, ovate, apex acute, basis cuneate or rounded, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate adaxially, secondary veins 8–10 pairs, diverging at 60–70° from the midvein, marginal vein distant 2 mm from the margin; petiole sessile to subsessile (0.1–0.2 mm long), sulcate adaxially, puberulent. Inflorescence expanded, main floral axis 8–9 cm long, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.3–0.4 cm long, lanceolate, pubescent; bracteoles deltoids, 2 mm long, puberulent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, rounded; staminal disk and style base pubescent. Fruits 0.6–0.8 × 0.6–0.8 cm, subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia rosangelae* is confirmed as restricted to Atlantic Forest of Northeastern Brazil from Pernambuco to Northern Bahia states in lowland forests and *restinga* vegetation.

Phenology:—Flowering from September to April and fruiting from April to August.

Taxonomic comments:—It is morphologically similar to *Myrcia springiana* which shares the appressed trichomes (< 1 mm long) on abaxial leaf surface, expanded inflorescence with flowers evenly distributed, and rounded calyx lobes, but differs by its leaf secondary veins 8–10 pairs, sessile to subsessile petiole and smaller fruits with 0.6–0.8 × 0.6–0.8 cm (vs. 12–14 pairs of secondary leaf veins, petiolate leaves and larger fruits with 1–1.3 × 1–1.2 cm in *M. springiana*).

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in the north portion of Atlantic Forest in Northeastern Brazil.

Additional Selected Specimens:—BRAZIL. **Alagoas:** Mun. Junqueiro, Povoado de Maçaranduba, 26 May 2002, fr., *A.L.S. Santos et al. 15* (HUEFS, MAC). Mun. Maceió, tabuleiro dos Martins, bacia do Pratygy, 2 January 1991, fl. *R.P. Lyra-Lemos et al. 2562* (ASE, HUEFS, MAC). **Bahia:** Mun. Camaçari, 6 April 1991, fr., *M.C. Ferreira et al. 361* (HRB). Mun. Conde, Fazenda do Bú, 1 February 1996, fl. *Jost et al. 220* (ALCB, HRB, HUEFS, IPA, MBM). Mun. Esplanada, caminho para restinga do Conde, 9 May 2000, fr., *N.G. Jesus et al. 926* (ALCB, CEPEC, HUEFS, SPF). **Pernambuco:** Mun. Cabo de Santo Agostinho, próximo a Mata do Zumbi, 7 October 1999, fl., *J.R.R. Cantarelli et al. 203* (PEUFR). **Sergipe:** Mun. Areia Branca, Parque Nacional Serra de

Itabaiana, 21 July 2006, fr. *M.F.A. Lucena et al. 1547* (BHCB, UFP); *Ibid*, Mun. Santa Luzia do Itanhi, Reserva do Patrimônio Natural Mata do Crasto, 17 April 2012, fr., *B.S. Amorim et al. 1499* (ASE, UFP).

34. *Myrcia ruschii* B. S. Amorim in Amorim & Alves (2016: 291). Type:—BRAZIL. Espírito Santo: Santa Teresa, Estação Biológica de Santa Lúcia, 20 Sep 2014, fl., *B. S. Amorim 2035* & *J. R. Maciel* (holotype: MBML!; isotypes: RB!, UFP!).

Figures 2 V, 6 L

Treelets to trees up to 15 m tall. Leaves 19–25 × 10–13.5 cm, bullate adaxially, lanceolate, apex acute or rounded, basis rounded to truncate, ascending to erect trichomes (1–2 mm long) abaxially, setose, purple, and glabrous to scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 18–20 pairs, diverging at 75–85° from the midvein, marginal vein distant 4–7 mm from the margin; petiole 1–1.8 cm long, sulcate, puberulent. Inflorescence expanded, main floral axis 29–32 cm long, pubescent, purple trichomes, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.8–1 cm long, navicular, puberulent; bracteoles 0.5 cm, ovate, puberulent; hypanthium smooth, pubescent; calyx lobes 2 mm long, rounded; staminal disk and style base pubescent. Fruits 1 × 1 cm (immature), globose, smooth, pubescent, purple trichomes, calyx lobes persistent.

Distribution and habitat:—*Myrcia ruschii* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in montane forests of Espírito Santo state.

Phenology:—Flowering from June to November and fruiting from June to December.

Taxonomic comments:—It is morphologically similar to *Myrcia grazielae*, *M. longipaniculata*, and *M. pendula* which shares leaves with bullate surface adaxially, but differs by the characters cited under the comments of *M. grazielae*. It is also similar to *M. crocea*, which shares the leaf shape and expanded inflorescence main axis with flowers evenly distributed, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Endangered (EN) due to its area of occupancy of 16 Km², and its very small and restricted population (criterion B2 and D, respectively).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Santa Teresa, cabeceira do rio Bonito, 13 June 2001, fl., fr., *L. Kollmann, et al. 3931* (BHCB, ICN, MBML); Estação Biológica de Santa Lúcia, rio Timbuí, 12 July 1989, fl., *W. Boone et al. 1315* (ICN, MBML, RB); Trilha do Palmitreiro, 2 November 2005, fl., *L. Kollmann et al. 8278* (MBML, UFP).

35. *Myrcia serrana* B.S. Amorim in Amorim & Alves (2015: 313). Type:—BRAZIL. Bahia: Camacã, Reserva Particular do Patrimônio Natural Serra Bonita, 27 May 2014, fr., *B.S. Amorim et al. 2013* (holotype UFP!; isotypes CEPEC!, K!, MO!, NY!, RB!, SP!).

Figures 2 W, 6 M

Treelets to trees up to 20 m tall. Leaves 6.5–13 × 3.7–8 cm, flat adaxially, elliptic to obovate, apex rounded, or retuse, basis cuneate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and puberulent or scattered trichomes adaxially, midvein sulcate near the base and flat near the apex, secondary veins 10–12 pairs, diverging at 60–70° from the midvein, marginal vein distant 3–4 mm from the margin; petiole 0.7–0.9 cm long, flat, glabrous. Inflorescence expanded, main floral axis 7–9 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.2 cm long, navicular, puberulent; hypanthium smooth, pubescent; calyx lobes 1 mm long, acute to rounded; staminal disk and style base pubescent. Fruits 0.8–1 × 0.8–1 cm, subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia serrana* is confirmed as endemic to Atlantic Forest and restricted to montane forests of Northeastern Brazil in Bahia state.

Phenology:—Flowering from February to March and fruiting from May to June.

Taxonomic comments:—It is morphologically similar to *M. ilheosensis*, which shares leaf shape features, and expanded inflorescence with flowers evenly distributed, but differs by the characters cited under that species.

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its very small and restricted population (criterion D2).

Additional Selected Specimens:—BRAZIL. **Bahia:** Mun. Camacã: Reserva do Patrimônio Natural Serra Bonita, 4 February 2005, fl., *M. Reginato et al. 198*.

(CEPEC); *Ibid*, 18 March 2005, fl., *P. Fiaschi et al.* 2855 (CEPEC); *Ibid*, 4 June 2005, fr., *A Amorim et al.* 5123 (CEPEC, UB); 5 June 2005, fr., *J.L. Paixão et al.* 447 (CEPEC, NY); 6 June 2006, fr., *M. Lopes et al.* 830 (BHBC, CEPEC, NY).

36. *Myrcia spectabilis* De Candolle (1828: 247). *Gomidesia spectabilis* (DC.) O. Berg (1855: 27). Type:—BRAZIL. Rio de Janeiro: “in sylvis locis editis secus Viam publicam Paulinam”, s.d., fl., *Martius s.n.* (lectotype, designated here, M!; isolectotype, G! [G-DC 45]).

Figures 2 X, 6 N

Treelet to trees ca. 4–10 m tall. Leaves 12–25 × 3.5–7 cm, flat adaxially, elliptic, apex acute or acuminate, acumen 1–1.5 cm, basis cuneate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate adaxially, secondary veins 16–22 pairs, diverging at 55–70° from the midvein, marginal vein distant 2–3 mm from the margin; petiole 0.5–0.8 cm long, sulcate adaxially, pubescent. Inflorescence expanded, main floral axis 8–9 cm long, farinose surface, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.4 cm long, lanceolate, pubescent; bracteoles 0.2–0.3 cm, lanceolate, pubescent; hypanthium smooth, farinose surface, pubescent; calyx lobes 1–2 mm long, acute to cuspidate, farinose; staminal disk and style base pubescent. Fruits 0.8–1.4 × 0.8–1.4 cm, globose to subglobose, smooth, farinose surface, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia spectabilis* is confirmed as endemic to Atlantic Forest and restricted to Southeastern and Southern Brazil in lowland and montane forests from Minas Gerais and Rio de Janeiro to Santa Catarina states. Despite BFG (2015) cited the occurrence of *Myrcia spectabilis* to Distrito Federal (*R. C. Forzza* 2229), this sample has a mistake in locality database and it is from Minas Gerais state. This species had also been cited to Northeastern Brazil in Alagoas (*R. P. Lira-Lemos et al.* 4601), Bahia (*A. M. Carvalho et al.* 3275), and Pernambuco (*B. S. Amorim et al.* 553; 592) states (Amorim and Alves 2012, BFG 2015) but these samples were misidentified and are *M. springiana*, *M. vittoriana* and *M. springiana*, respectively.

Phenology:—Flowering from August to June and fruiting from September to July.

Taxonomic comments:—It is morphologically similar to *Myrcia vittoriana* which shares the farinose surface on inflorescence axis, hypanthium, calyx lobes, and fruits,

but differs in calyx lobes acute or cuspidate and fruit globose to subglobose (vs. rounded calyx lobes and fruits conic in *M. vittoriana*). *Myrcia spectabilis* is also similar to *M. springiana* but differs in presence of the the farinose surface on reproductive structures (vs. absence of farinose surface in *M. springiana*).

Nomenclatural comments:—De Candolle (1828) cited *Martius s.n.* from Rio de Janeiro, “in silvis locis editis secus Viam publicam Paulinam” as the analyzed material to *Myrcia spectabilis* which no indication of the herbarium. Two collections from the same locality were found at G and M herbaria, and we, therefore, decided to select the collection from M as the lectotype because it is a complete and better preserved

Conservation status:—This species meets the criteria of Least concern (LC) due to its widely distribution Atlantic Forest of Southeastern and Southern Brazil.

Additional Selected Specimens:—BRAZIL. **Minas Gerais:** Coronel Pacheco, Estação Experimental do Café, 20 December 1940, fl., *E.P. Heringer 532* (RB, SP). Mun. Descoberto, Reserva Biológica da Represa da Grama, 23 September 2002, fr., *R.C. Forzza et al. 2229* (CESJ, MBM, RB;). **Paraná:** Mun. Guaratuba, rio São João, estrada Castelhanos, 4 December 2012, fl., *M.G. Caxambu et al. 3803* (HCF, MBM); *Ibid*, Mun. Paranaguá, Quintilha, 12 July 2013, fr., *R.A. Bolnaldi et al. 666* (FURB, HCF). **Rio de Janeiro:** Mun. Rio de Janeiro, Parque Nacional da Tijuca, estrada dos Picos, 7 May 2014, fr., *B.S. Amorim et al. 1989* (RB, UFP). Mun. Teresópolis, Parque Nacional da Serra dos Órgãos, 21 November 2006, fr., *E. Lucas et al. 606* (BHCB, ESA, K, RB, SP, SPF). **Santa Catarina:** Mun. Garuva, trilha para o alto do Monte Cristo, 1 August 2003, fr., *J. Cordeiro et al. 2097* (BHCB, MBM). Mun. Palhoça, Morro Cambireia, 3 August 1985, fr., *D.B. Falkenberg et al. 2533* (FLOR, HUEFS, RB). **São Paulo:** Cananéia, Parque Estadual Ilha do Cardoso, 23 April 2005, fr., *V.G. Staggemeier et al. 38* (BOTU, ESA). Mun. Ubatuba, praia Vermelha, 8 December 2014, fl., *B.S. Amorim & F.N. Cabral 2054* (RB, UFP).

37. *Myrcia springiana* (O. Berg) Kiaerskov (1893: 102). *Gomidesia springiana* O. Berg (1857: 13). Type:—BRAZIL. Bahia: “prope Castel novo in district Ilheos”, s.d., *L. Riedel 482* (neotype, cited by Nic Lughadha 1997: 179, P! [P02273018]; isoneotypes, F! [photo], P! [2 sheets]).

Figures 2 Y, 6 O

Trees ca. 3–10 (23) m tall. Leaves 8–14.5 (30) × 2.5–4 (11) cm, flat adaxially, elliptic or ovate, apex acute to rounded, basis cuneate, appressed trichomes (< 1 mm long), abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 12–14 pairs, diverging at 60–70° from the midvein, marginal vein distant 1–2 mm from the margin; petiole 0.5–1 cm long, sulcate, puberulent. Inflorescence expanded, main floral axis 13–15 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.5 cm long, lanceolate, pubescent; bracteoles 0.2 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 1 mm long, rounded; staminal disk and style base pubescent. Fruits 1–1.3 × 1–1.2 cm, globose to subglobose, smooth, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia springiana* is confirmed as endemic to Atlantic Forest and recorded to Northeastern and Southeastern Brazil in lowland and submontane forests from Pernambuco to Espírito Santo and Minas Gerais states. Despite Lucas *et al.* (2012) and Sobral *et al.* (2013) cited a restricted distribution of *Myrcia springiana* to Bahia, it was expanded by BFG (2015) to Minas Gerais and São Paulo. The specimen collected in São Paulo was not analyzed and this record can not be confirmed here. *Myrcia springiana* is also recorded to Atlantic Forest and gallery forests of “Chapada Diamantina”. Here, the occurrence of *M. springiana* was expanded towards the north of Atlantic Forest in Alagoas and Pernambuco states due to a correct identification of Gomidesia clade samples that have been collected in these locations (previously under *Myrcia spectabilis*) (Amorim & Alves 2012b).

Phenology:—Flowering from October to June and fruiting from March to August.

Taxonomic comments:—It is morphologically similar to *Myrcia spectabilis* and *M. vittoriana* which shares the leaf shape, leaf abaxial surface with appressed trichomes, and expanded inflorescence main axis with flowers evenly distributed, but it differs by the characters cited under the comments of *M. spectabilis*. *M. springiana* is also similar to *M. rosangelae*, which shares leaf shape features, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in north portion of Atlantic Forest, and in gallery forests of “Chapada Diamantina”.

Additional Selected Specimens:—BRAZIL. **Alagoas:** Mun. Murici, 17 May 2000, fr., *Lyra-Lemos et al.* 4601 (MAC). **Bahia:** Ilhéus, área do CEPLAC, quadra D, 5 December 1978, fl., *T.S. Santos et al.* 3416 (CEPEC, HRB, HUEFS, RB). Mun. Eunápolis, entre Eunápolis e Tabela, 28 November 1970, fl., *L.E.M. Filho et al.* 2983 (CEPEC). Mun. Jacobina, Serra do Cruzeiro, 7 April 2001, fr., *H.P. Bautista et al.* 3057 (ALCB, BAH, CEPEC, HRB, HUEFS). **Espírito Santo:** Linhares, Reserva Natural da Vale do Rio Doce, 5 November 1972, fl., fr., *D. Sucre* 8476 (K, RB); *Ibid*, trilha do Pequi, fr., *D.A. Folli et al.* 4177 (CVRD, K, UB). **Minas Gerais:** Mun. Santa Rita do Ituetto, estrada Quatituba a Santa Rita do Ituetto, 20 January 2005, fr., *A.A. da Luz et al.* 269 (CVRD, K). **Pernambuco:** Mun. Lagoa dos Gatos, Reserva do Patrimônio Natural Pedra D'Anta, 24 November 2011, fl., *B.S. Amorim et al.* 1284 (JPB, NY, UFP). Mun. Recife, Jardim Botânico do Recife, 24 April 2014, fr., *B.S. Amorim et al.* 1985 (RB, SPF, UFP).

38. *Myrcia squamata* (Mattos & D. Legrand) Mattos (2008:4). *Gomidesia squamata* Mattos & D. Legrand in Legrand & Mattos (1975: 14). Type:—BRAZIL. Paraná: Quatro Barras, Rio Itaperavi, 21 Sep 1954, fl., *G. Hatschbach* 10997 (holotype: MBM!; isotypes: HUEFS [not found], MO [not found]).

Figures 2 Z, 3 N

Shrubs to treelets 2–4 m tall. Leaves 4.5–8.2 × 1.8–4 cm, flat adaxially, elliptic or obovate, apex rounded or acuminate, acumen 0.5 cm long, basis cuneate, appressed trichomes (< 1 m long) abaxially, strigose, whitish, and scattered hairs adaxially, midvein sulcate at basis and flat at apex on adaxial surface, secondary veins 8–10 pairs, diverging at 50–60° from the midvein, marginal vein distant 1–2 mm from the margin; petiole sessile (up to 0.2 cm long) to petiolate (0.4 cm long). Inflorescence reduced, main floral axis 2–3 cm long, 3-flowered, flowers clustered at the apex; bracts not seen, deciduous; bracteoles 0.4–0.5 cm long., lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, rounded to apiculate; staminal disk and style base puberulent. Fruits 0.8–1 × 0.8–1 cm, globose to subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia squamata* is confirmed as endemic to Atlantic Forest and recorded to Southeastern and Southern Brazil in montane forest from south

of São Paulo to the north portion of Santa Catarina states. Despite BFG (2015) being cited to Minas Gerais (*M. Sobral 14137*), the record is not confirmed.

Phenology:—Flowering from January to June and fruiting from February to November.

Taxonomic comments:—It is morphologically similar to *Myrcia flagellaris*, and *M. teresensis* which shares leaf abaxial surface with appressed trichomes and 3-flowered inflorescence with flowers clustered at the apex, but differs by the characters cited under the comments of *M. flagellaris*.

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its extent of occurrence of ca. 12,380 Km² (criterion B1).

Additional Selected Specimens:—BRAZIL. **Paraná:** Mun. Campina Grande do Sul, 2 August 1967, fl., *G. Hatschbach 16862* (MBM). Mun. Guaratuba, Alto da Serra, 10 March 1996, fl., *O.S. Ribas 1373* (MBM). Mun. Morretes, Bela Vista, 23 February 1967, fl., *J.C. Linderman et al. 4640* (MBM). Mun. Piraquara, Manaciais da Serra, Represa do Cavalinho, 27 February 2005, fl. *M. Reginato 203* (BHCB, MBM, UPCB); *Ibid.*, 28 February 2007, fr., *M. Reginato 697* (MBM, UPCB); Mun. Quatro Barras, Morro do Caranguejo, 15 August 1971, fr., *N. Imaguire 579* (MBM); **Santa Catarina:** Mun. Joinville, Castelo dos Bugres, 25 January 2005, fl., *F.C.S. Vieira 800* (FURB, JOI); *Ibid.*, 26 March 2005, fl., *F.C.S. Vieira 921* (FUEL, JOI). Mun. Garuva, Monte Crista, 4 July 2004, fr. *F.C.S. Vieira 1873* (FUEL, JOI, UPCB). **São Paulo,** São Paulo, Parque Estadual da Serra do Mar, núcleo Curucutu, 13 April 2001, fr., *F.T. Farah et al. 2211* (UEC).

39. *Myrcia subsericea* Gray (1854: 533). Type:—BRAZIL. Rio de Janeiro: “s.d.”, fl., *Mikan/Pohl 1047* (lectotype, designated by Nic Lughadha 1997: 139, W!; isolectotypes, F!, K!, W! [2 sheets]).

Eugenia nitida Vellozo (1829: pl. 35). *Gomidesia nitida* (Vell.) Niedenzu (1893: 77). *Myrcia nitida* (Vell.) Kiaerskov (1893: 102).

Figures 2 A1, 3 O, 6 P-Q

Shrubs to trees 2–4 m tall. Leaves 10.5–18 × 2.8–5.2 cm, flat adaxially, elliptic or lanceolate, apex acuminate, acumen 0.5–1 cm, basis cuneate, appressed trichomes (< 1 m long) abaxially, strigose, densely goldish, and scattered trichomes adaxially, midvein sulcate near at the base and flat near from the apex on adaxial surface, secondary veins

20–22 pairs, diverging at 60–70° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.8–1 cm long, sulcate adaxially, puberulent. Inflorescence expanded, main floral axis 7–8 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.6–1.3 cm long, lanceolate, pubescent; bracteoles 0.4 cm long, elliptic, pubescent; hypanthium smooth, puberulent; calyx lobes 1–2 mm long, rounded or cuspidate; staminal disk and style base pubescent. Fruits 1.5–1.7 × 1.5–1.7 cm, globose, smooth, puberulent, calyx lobes deciduous.

Distribution and habitat:—*Myrcia subsericea* is confirmed as endemic to Brazilian Atlantic Forest and restricted to Southeastern Brazil in submontane and montane Atlantic Forest of Espírito Santo and Rio de Janeiro states. Despite BFG (2015) cited *M. subsericea* to Northeastern Brazil, no samples were related to this record. The species was reported to Minas Gerais state (*J.N. Nakajima 3983*) in Southeastern Brazil as well (BFG 2015), but no collections were found to confirm its occurrence.

Phenology:—Flowering from September (probably) to May and fruiting from October to July.

Taxonomic comments:—It is similar to *Myrcia aurea* which shares the leaves densely covered by goldish trichomes on abaxial surface, but differs by the characters cited under that species.

Conservation status:—This species meets the criteria of Vulnerable (VU) due to its extent of occurrence of ca. 14,168 Km² (criterion B1).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Cachoeira do Itapemirim, 5 May 1949, fl., *A.C. Brade 19763* (RB); Mun. Domingos Marttíns, estrada para Pedra Azul, 19 January 1971, fl., *A.L. Peixoto et al. 483* (RB). **Rio de Janeiro:** Mun. Guapimirím, Estação Ecológica Estadual de Paraíso, Morro das Pacas, 20 February 1992, fl., *L. Sylvestre et al. 772* (RB); Mun. Magé, Paraíso, área do Cenrto de Primatologia do Rio de Jneiro, 18 October 1984, fr., *H.C. de Lima et al. 2267* (RB); Mun. Nova Friburgo, Lumiar, Flor das Andorinhas, 9 March 2001, fr., *A. Quinet et al. 9-79* (RB, RFA); Mun. Nova Iguaçú, Tinguá, Reserva Biológica Boa Esperança. 23 April 2002, fr., *M.G. Bovini et al. 2155* (RB); Mun. Rio de Janeiro; Parque Nacional da Tijuca, Mata do Pai Ricardo, 22 July 1997, fr., *A. Quinet et al. 64* (RB); *Ibid*, Morro da Tijuca, 7 May 2014, fr., *B.S. Amorim et al. 1992* (RB, UFP); *Ibid*, Vista Chinesa, 23 January 1968, fl., *D. Sucre 2145* (RB); *Ibid*, Taquara-Jacarepaguá, 2 June 2000, fr., *A. Quinet et al. 343* (19-018) (RB).

40. *Myrcia teresensis* Nic Lughadha in Nic Lughadha *et al.* (2010: 26). Type:—BRAZIL. Espírito Santo: Santa Teresa, Santo Antônio, terreno do Boza, 09 February 1999, fl., *L. Kollman et al. 1853* (holotype: MBML!; isotypes: K!).

Figures 2 B1, 3 P

Treelets 3–5 m tall. Leaves 2.5–13 × 1–3.5 cm, flat adaxially, elliptic to lanceolate, apex acuminate, acumem 1–2 cm long, basis cuneate, apressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midrib sulcate near leaf base and raised near apex, secondary veins 12–14 pairs, diverging at 60–70° from the midvein, marginal vein distant 1–2 mm from the margin; petiole 0.4–1 cm long, sulcate adaxially, puberulent. Inflorescence reduced, main floral axis 5–6 cm long, puberulent, 3-flowered, flowers clustered at the apex; bracts deciduous, pubescent; bracteoles deciduous; hypanthium smooth, pubescent; calyx lobes 1–2 mm long, acute; staminal disk and style base pubescent. Fruits 0.8–0.9 × 0.7–0.8 cm, globose to subglobose, smooth, pubescent, calyx lobes persistent.

Distribution and habitat:—*Myrcia teresensis* is confirmed as endemic to Atlantic Forest of Southeastern Brazil and restricted to montane forests of Espírito Santo state.

Phenology:—Flowering from November to April (probably) and fruiting probably from May to August.

Taxonomic comments:—It is morphologically similar to *Myrcia flagellaris*, and *M. squamata* which shares leaf abaxial surface with apressed trichomes abaxially and 3-flowered inflorescence with flowers clustered at the apex, but differs by the characters cited under the comments of *M. flagellaris*

Conservation status:—This species meets the criteria of Endangered (EN) due to its extent of occurrence of ca. 111.2 Km², area of occupancy of 12 Km², for the conditions of severely fragmented habitat and actual levels of exploitation of the Atlantic Forest area (criterion B1 and B2, and conditions “a” and “b”, respectively).

Additional Selected Specimens:—BRAZIL. **Espírito Santo:** Mun. Santa Teresa, Santo Antônio, terreno do Boza, 7 January 1999, fl., *Kollmann et al. 1497* (K, MBML); *Ibid*, 27 November 2006, fl., *E. Lucas et al. 734* (BHCB, ESA, K); *Ibid*, 27 November 2006, fl., *E. Lucas et al. 739* (BHCB, ESA); *Ibid*, Estação Biológica da Caixa d’Água, 8 August 1985, fr., *H.Q. Boudet-Fernandes 1370* (MBML, RB); Estrada de Santa Teresa

a Nova Lombardia, sítio Sr. Alcebíades, 4 February 1985, fl., A. Peixoto *et al.* 3458 (ASU, MO, RB); Vale do Canaã, 18 June 1985, fr., J.M. Vimecat 282 (MBML, RB); Mun. Viana, São Paulo Viana, Propriedade Sr. Valtinho, 19 January 2009, fl., L. Kollmann 11477 (RB).

41. *Myrcia tijuensis* Kiaerskov (1893: 102). *Gomidesia tijuensis* (Kiaersk.) D. Legrand (1958: 23). Type:—BRAZIL. Rio de Janeiro: “Tijuca”, July 1874, fl., A. Glaziou 6886 (lectotype, designated by Nic Lughadha 1997: 184, C!; isoelectotypes, BR!, F!, K!, P!, S!).

Myrcia innovans Kiaerskov (1983: 100). *syn. nov.* *Gomidesia innovans* (Kiaersk.) D. Legrand (1958: 23). *syn. nov.* Type:—BRAZIL. Rio de Janeiro: “Petrópolis, Alto do Imperador”, s.d., A. Glaziou 12000 (lectotype, designated by Nic Lughadha 1997: 117, C!; isoelectotypes, BR!, G!, K!, LE, P!, R!).

Figure 2 C1

Treelets to trees 6–10 m tall. Leaves 5.5–9.5 × 1.8–4 cm, flat adaxially, elliptic, lanceolate, apex acuminate, acumem 0.5–2 cm, basis cuneate to rounded, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate at basis and flat at apex on adaxial surface, secondary veins 12–14 pairs, diverging at 50–60° from the midvein, marginal vein distant 1 mm from the margin; petiole subsessile (0.3 cm long) to petiolate (0.5 cm long), sulcate adaxially, puberulent. Inflorescence reduced, main floral axis 3–5 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.3 cm long, lanceolate, pubescent; bracteoles 0.2 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes 1 mm long, rounded; staminal disk and style base puberulent. Fruits 0.7–0.8 × 0.7–0.8 cm, globose, smooth, glabrous to puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia tijuensis* is confirmed as endemic to Atlantic Forest and recorded to Southeastern and Southern Brazil in lowland to montane forests from Rio de Janeiro to Rio Grande do Sul states. Despite BFG (2015) and Amorim *et al.* 2015 cited the occurrence to Bahia and Espírito Santo states, no specimens were confirmed to the areas.

Phenology:—Flowering from November to March and fruiting from March to November.

Taxonomic comments:—It is morphologically similar to *Myrcia curtispindula* and *M. teresensis* which shares leaf shape morphology, appressed trichomes on leaf abaxial surface, leaf secondary veins with 10–14 pairs, and reduced inflorescence main axis, but differs by the characters cited under the comments of *M. curtispindula*. *Myrcia innovans* was described by Kiaerskov (1893) as a new species based mainly on “foliis discoloribus, apice acuminata”, and “inflorescentiae compositae”, from a collection of montane forests of Rio de Janeiro state. Lughadha (1997) also recognized a similar morphology between *M. tijuensis* and *M. innovans*, but consider them as distinct species based on leaf consistence and anther morphology. Due to the overlap of vegetative and reproductive morphological characters, and also their sympatric distribution, *M. innovans* was synonymized under *Myrcia tijuensis*.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Southeastern and Southern Brazil.

Additional Selected Specimens:—**Paraná:** Mun. Campina Grande do Sul, Serra Virgem Maria, 30 January 1969, fl., *G. Hatschbach et al.* 20960 (MBM, UEC); Mun. Guaraqueçaba, 20 August 1996, *A. Soares et al.* 105 (BHCB, MBM). **Rio de Janeiro:** Mun. Rio de Janeiro, Parque Nacional da Tijuca, Mesa do Imperador, 25 April 1945, fl., *P. Ochioni* 254 (RB); Mun. Teresópolis, Parque Nacional Serra dos Órgãos, próximo a casa do Pesquisador, 20 August 2005, fl., *J. Wesenberg et al.* 859 (RB). **Santa Catarina:** Mun. Blumenau, Parque Natural Municipal São Francisco de Assis, 15 December 2006, fl., *M. Verdi et al.* s.n. (BHCB, FURB 5128); Mun. Morro do Ribeirão, 16 April 1969, fr., *R.M. Klein et al.* 8304 (FLOR, HRB). **São Paulo:** Mun. Cananéia, Ilha do Cardoso, 23 March 2004, fr., *E.R. Castro* 343 (BHCB, HRCB); Mun. Itanhaém, Parque Estadual da Serra do Mar, núcleo Cucurutu, 17 April 2001, fr., *F.T. Farah et al.* 2308 (ASU, ESA, SPF); Mun. São Miguel do Arcanjo, Parque Estadual Carlos Botelho, s.d., fl., .

42. *Myrcia velutiflora* (Mattos & D. Legrand) Mattos (2008: 8). *Gomidesia velutiflora* Mattos & D. Legrand in Legrand & Mattos (1975: 15). Type:—BRAZIL. Rio de Janeiro: Rio de Janeiro, Estrada da vista Chinesa perto da Cutia, 03 February 1941, fl., *F. Gonçalves* s.n. (holotype: MVM; isotypes: NY! [barcode 1546325], RB! [barcode RB00662354]).

Figures 2 D1

Trees ca. 15 m tall. Leaves 7.5–16 × 1.7–3.9 cm, flat adaxially, elliptic or lanceolate, apex acute, basis cuneate, appressed trichomes (< 1 mm long) abaxially, whitish, and scattered trichomes adaxially, midvein sulcate at basis and flat at apex adaxially, secondary veins 16–18 pairs, diverging at 60–70° from the midvein, marginal vein distant 1–2 mm from the margin; petiole 0.8–1.2 cm long, sulcate adaxially, puberulent. Inflorescence reduced, main floral axis 5–6 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles 0.1–0.2 cm long, lanceolate, pubescent; hypanthium smooth, pubescent; calyx lobes, 1 mm long, acute; staminal disk and style base pubescent. Fruits not seen.

Distribution and habitat:—*Myrcia velutiflora* is confirmed as endemic to Atlantic Forest and restricted to Southeastern Brazil in submontane forests of Rio de Janeiro state.

Phenology:—Flowering from December to March and fruiting probably from March to May.

Taxonomic comments:—It is morphologically similar to *Myrcia grandifolia* which shares the leaf shape morphology, leaves with appressed trichomes abaxially, and expanded inflorescence main axis with flowers evenly distributed, but differs by the characters cited under the comments of that species.

Conservation status:—This species meets the criteria of Critically Endangered (CR) due its extent of occurrence of ca. 3 Km², area of occupancy of 8 Km², for the conditions of severely fragmented habitat and actual levels of exploitation of the Rio de Janeiro urban forest (criterion B1 and B2, and conditions “a” and “b”, respectively).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Rio de Janeiro, entre Corcovado e Santa Tereza, 24 February 1959, fl., *E. Pereira* 4528 (M, RB, US); entre Silvestre e Hotel das Paineiras, 16 March 1962, fl., *A.P. Duarte* 6265 (RB); Estrada da Vista Chinesa, 22 January 1934, fl., *P. Rosa* 140 (RB); *Ibid*, 22 January 1934, fl., *P. Rosa* s/n (NY, RB barcode 00662355); *Ibid*, 13 January 1997, fl., *D.S.D. Araújo* 10516 (RB); Mata do Horto Florestal, 24 December 1927, fl., *Pessoal do Horto Florestal* s/n (RB).

43. *Myrcia vittoriana* Kiaerskov (1893: 102). *Gomidesia martiana* O. Berg (1857: 12). Type:—BRAZIL. Rio de Janeiro: s.d., fl., *Sellow s.n.* (lectotype, designated by Nic Lughadha 1997: 130, K! [barcode K000275956]; isolectotypes, BR, P! [barcode P05131745] [2 sheets]).

Figures 2 E, 6 R

Trees 3–6 m tall. Leaves 15.5–28 (30.5) × 6–9 cm, flat adaxially, elliptic or lanceolate, apex acute or acuminate, acumen 0.5–1 cm, basis cuneate or rounded, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 14–16 (18–20) pairs, diverging at 70–80° from the midvein, marginal vein distant 2–3 mm from the margin; petiole 0.8–1 cm long, sulcate adaxially, farinose surface and scattered trichomes. Inflorescence expanded, main floral axis 6.5–7.5 cm long, farinose surface and puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts 0.3 cm long, lanceolate, farinose surface and puberulent; bracteoles 0.2 cm long, lanceolate, farinose surface and puberulent; hypanthium smooth, farinose surface and pubescent; calyx lobes 1–2 mm long, rounded; staminal disk and style base farinose surface and puberulent. Fruits 0.8–1 × 1–1.2 cm, conic, smooth, farinose surface, puberulent, calyx lobes persistent.

Distribution and habitat:—*Myrcia vittoriana* is confirmed as endemic to Atlantic Forest and recorded to Northeastern, and Southeastern Brazil in lowland Atlantic Forest and *Restinga* vegetation from Pernambuco to Rio de Janeiro states.

Phenology:—Flowering from August to May and fruiting from October to July.

Taxonomic comments:—It is morphologically similar to *Myrcia spectabilis* and *M. springiana* which shares the leaf shape, leaf abaxial surface with appressed trichomes, expanded inflorescence main axis with flowers evenly distributed, and reproductive features with farinose surface (only in *M. spectabilis*), but differs by the characters cited under the comments of each species.

Conservation status:—This species meets the criteria of Least Concern (LC) due to its widely distribution in Atlantic Forest of Northeastern and Southeastern Brazil.

Additional Selected Specimens:—BRAZIL. **Alagoas:** Mun. Maceió, Fazenda Bamburral, 14 January 1994, fl., *R.P. Lyra-Lemos et al.* 8052 (HUEFS, MAC). **Bahia:** Mun. Ilhéus, rodovia de Olivença para Maruim, 1 May 1992, fr., *W.W. Thomas et al.*

9044 (CEPEC, HUEFS, K, NY); Mun. Porto Seguro, estrada para Reserva do Patrimônio Natural Veracel, 29 May 2014, fr., *B.S. Amorim 2017 et al.* (UFP). Mun. Santa Cruz Cabrália, entrada de Santo André para Porto Central, 19 May 2002, fr., *J.L. Paixão et al. 183* (CEPEC, UB). **Espírito Santo:** Mun. Conceição da Barra, Parque Estadual de Itaúnas, 26 January 2012, fl., *A. Giaretta et al. 1201* (RB, VIES); Mun. Guarapari, Setiba, próximo ao Condomínio Aldeia de Setiba, 26 February 1993, fl., *J.M.A. Braga 250* (RB). **Pernambuco:** Mun. Cabo de Santo Agostinho, Mata do Zumbi, 10 January 1996, fl., *D.R. Siqueira et al. 130* (PEUFR, RB); Mun. Recife, Reserva Ecológica de Dois Irmãos, 4 March 2011, fr., *B.S. Amorim et al. 830* (RB, UFP). **Rio de Janeiro:** Mun. Macaé, estrada para Carapebus, Fazenda Jurubatiba, 9 May 1987, fr., *H.C. de Lima 2893 et al.* (K, RB); Mun. Rio de Janeiro, Jacarepaguá, mata de restinga ao sul da Pedra de Itaúna, 4 June 1969, fr., *D. Sucre 5415 et al.* (CEPEC, K, RB).

44. *Myrcia warmingiana* Kiaerskov (1893: 104). *Gomidesia warmingiana* (Kiaersk.) D. Legrand (1958: 23). Type:— BRAZIL. Rio de Janeiro: 8 January 1889, fl., *Glaziou 17673* (lectotype, designated by Nic Lughadha 1997: 191, P!; isolectotype: C!).

Figures 2 F1, 3 R-S

Treelets to trees 3–9 m tall. Leaves 9.5–17 × 2.3–6.2 cm, flat adaxially, elliptic to obelliptic, apex acuminate, acumen 1–1.5 cm long, basis cuneate, appressed trichomes (< 1 mm long) abaxially, strigose, whitish, and scattered trichomes adaxially, midvein sulcate near from the basis and flat near from the apex adaxially, secondary veins 10–12 pairs, diverging at 60–80° from the midvein, marginal vein distant 1 mm from the margin; petiole 0.4–0.6 cm long, sulcate adaxially, pubescent. Inflorescence reduced, main floral axis 3–5.5 cm long, puberulent, 3-flowered clustered at the apex; bracts 0.6–0.7 cm long, linear, scattered trichomes; bracteoles deciduous; hypanthium 8-ribbed, puberulent; calyx lobes 1 mm long., acute; staminal disk and style base puberulent. Fruits 1–1.2 × 1–1.1 cm, subglobose, 8-ribbed, puberulent, calyx lobes persistent.

Phenology:—Flowering probably from December to April and fruiting from March to September.

Distribution and habitat:—*Myrcia warmingiana* is confirmed as endemic to Atlantic Forest of Southeastern Brazil and restricted to montane forests of Rio de Janeiro state.

Taxonomic comments:—It is morphologically similar to *Myrcia flagellaris*, which shares leaf shape, leaf with appressed trichomes abaxially, and 3-flowered inflorescence with flowers clustered at the apex, but differs by the characters cited under the comments of that species.

Conservation status:— This species meets the criteria of Endangered (EN) due to its very small and restricted population, area of occupancy of 16 Km², for the conditions of severely fragmented habitat and actual levels of exploitation of the Atlantic Forest area (criterion D, B2, and conditions “a” and “b”, respectively).

Additional Specimens:—BRAZIL. **Rio de Janeiro:** Mun. Nova Friburgo, Macaé de Cima, Sítio Sophronites, 25 May 1987, fr., *G. Martinelli et al.* 12080 (RB); *Ibid*, 1988, fr., *S.V.A. Pessoa et al.* 338 (NY, MO, RB); *Ibid*, 17 July 1989, fr., *M. Peron et al.* 842 (RB); *Ibid*, 22 March 1994, fr., *M. Nadruz* 997 (CEPEC, ESA, K, RB, SP); *Ibid*, margem do Rio das Flores, 15 September 1988, fr., *T. Wendt et al.* 182 (RB); *Ibid*, 2 August 1989, fr., *S.V.A. Pessoa et al.* 466 (RB).

Excluded species

Myrcia neoblanchetiana Sobral & E. Lucas in Nic Lughadha *et al.* (2012b: 19) has been incorrectly cited to Brazilian Atlantic Forest (BFG 2015). The Gomidesia clade samples which were misidentified under this name, were published as a new species (ie. *Myrcia rosangelae*, and *M. congestiflora*) by Nic Lughadha *et al.* (2012) and Caliarì *et al.* (2016), respectively. The type collection of *M. neoblanchetiana* (*J. Blanchet* 3415) is from “prov. Bahiensis” (Berg 1857), and one isotype collection bears the locality “Jacobim”, referring to the municipality of Jacobina in the north of the Chapada Diamantina (Nic Lughadha 1997, Stadnik *et al.* 2016). Due to its narrowly distribution in “Campos Rupestres” (Cerrado vegetation) of northeastern Brazil, *M. neoblanchetiana* had its occurrence excluded from the Atlantic Forest.

Myrcia neoblanchetiana Sobral & E. Lucas in Nic Lughadha *et al.* (2012b: 19). *Gomidesia blanchetiana* Berg (1857: 14). Type:—BRAZIL. Bahia: s.d., fl., *Blanchet* 3415 (lectotype: OXF; isoelectotypes: BM!, BR!, C!, F, LE, MICH! [image], NY!, P!, W), non *Myrcia blanchetiana* (O. Berg) Mattos (1966: 59).

Treelets. Leaves 12–21 × 4.3–7 cm, flat adaxially, elliptic, apex acuminate, acumem 1–2 cm long, basis cuneate, appressed trichomes (< 1 mm long) abaxially, yellowish, and adaxially, midvein flat or raised adaxially, secondary veins 10–12 pairs, diverging at 60–70° from the midvein, marginal vein distant 0.4–0.7 cm from the margin; petiole 0.6–0.8 cm long. Inflorescence reduced to expanded, main floral axis 6–8.5 cm long, puberulent, multi-flowered, flowers evenly distributed along the inflorescence; bracts deciduous; bracteoles deciduous; hypanthium smooth, pubescent; calyx lobes, 1 mm long, rounded or acute; staminal disk and style base pubescent. Fruits not seen.

Distribution and habitat:—*Myrcia neoblanchetiana* is confirmed as restricted to Northeastern Brazil in “Campos rupestres” (Cerrado vegetation) of Bahia state. Despite BFG (2015) cited *Myrcia neoblanchetiana* to Southeastern Brazil, no samples were found. This species has been confused and misidentified with *M. congestiflora* from Southeastern as well as with *M. rosangelae* from Northeastern Brazil. *Myrcia neoblanchetiana* is known only by the type collection (*Blanchet 3415*).

Phenology:—Flowering and fruiting unknown.

Taxonomic comments:—It is morphologically similar to *Myrcia grandifolia*, *M. springiana*, and *M. velutiflora* which shares the leaf shape morphology, leaves with appressed trichomes abaxially, and expanded inflorescence main axis with flowers evenly distributed, but differs by the characters cited under the comments of *M. grandifolia*.

Conservation status:—*Myrcia neoblanchetiana* is restricted to “Campos rupestres” (Cerrado vegetation) of Bahia state. Due to the fact that it is known only for the type collection in the end of 19th century with no recent collections, it is considered an extinct species.

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Figure 1. Leaf adaxial surface. A. *Myrcia amplexicaulis*. B. *M. anacardiifolia*. C. *M. aurea*. D-F. *M. brasiliensis*. G. *M. brunnea*. H. *M. carvalhoi*. I. *M. cerqueiria*. J. *M. congestiflora*. K. *M. cordiifolia*. L. *M. crocea*. M. *M. curtispindula*. N-Q. *M. eriocalyx*. R. *M. espiritosantensis*. S-U. *M. fenzliana*. V. *M. flagellaris*. W. *M. gestasiana*. X1. *M. glazioviana*. Detail of lanate trichomes on abaxial leaf surface. X2. *M. glazioviana*. Leaf adaxial surface. Y. *M. grandifolia*. Z. *M. grazielae*. (A. from B.S. Amorim *et al.* 1953. B. from G. Fellito *et al.* 580. C. from E. Nic Lughadha *et al.* 200. D. from F.T. Farah *et al.* 2171. E. from G. Franco *et al.* 2981. F. from D.S. Farias *et al.* 371. G. from **Saint-Hilaire s.n.** [barcode P02440192]. H. from B.S. Amorim *et al.* 2026. I. from B.S. Amorim *et al.* 2028. J. from J.A.M.A. Gomes & C.B. Virillo 1887. K. from D.A. Folli *et al.* 6680. L. from R.C. Forzza 5229. M. from **E.M. Nic Lughadha et al. 195**. N. from J.G. Oliveira 135. O. from W.R. Anderson 35492. P. from D.C. Zappi 2507. Q. from R. Mello-Silva 2682. R. from **R.C. Forzza 5397**. S. from R.C. Martins 897. T. from R.M. Harley 26666. U. from M. Sobral 15517. V. from G. Hatschbach 13552. X1-2. From **A. Glaziou 17005**. Y. from J.E.Q. Faria 3073. Z. from B.S. Amorim *et al.* 948). Type specimens are in bold.

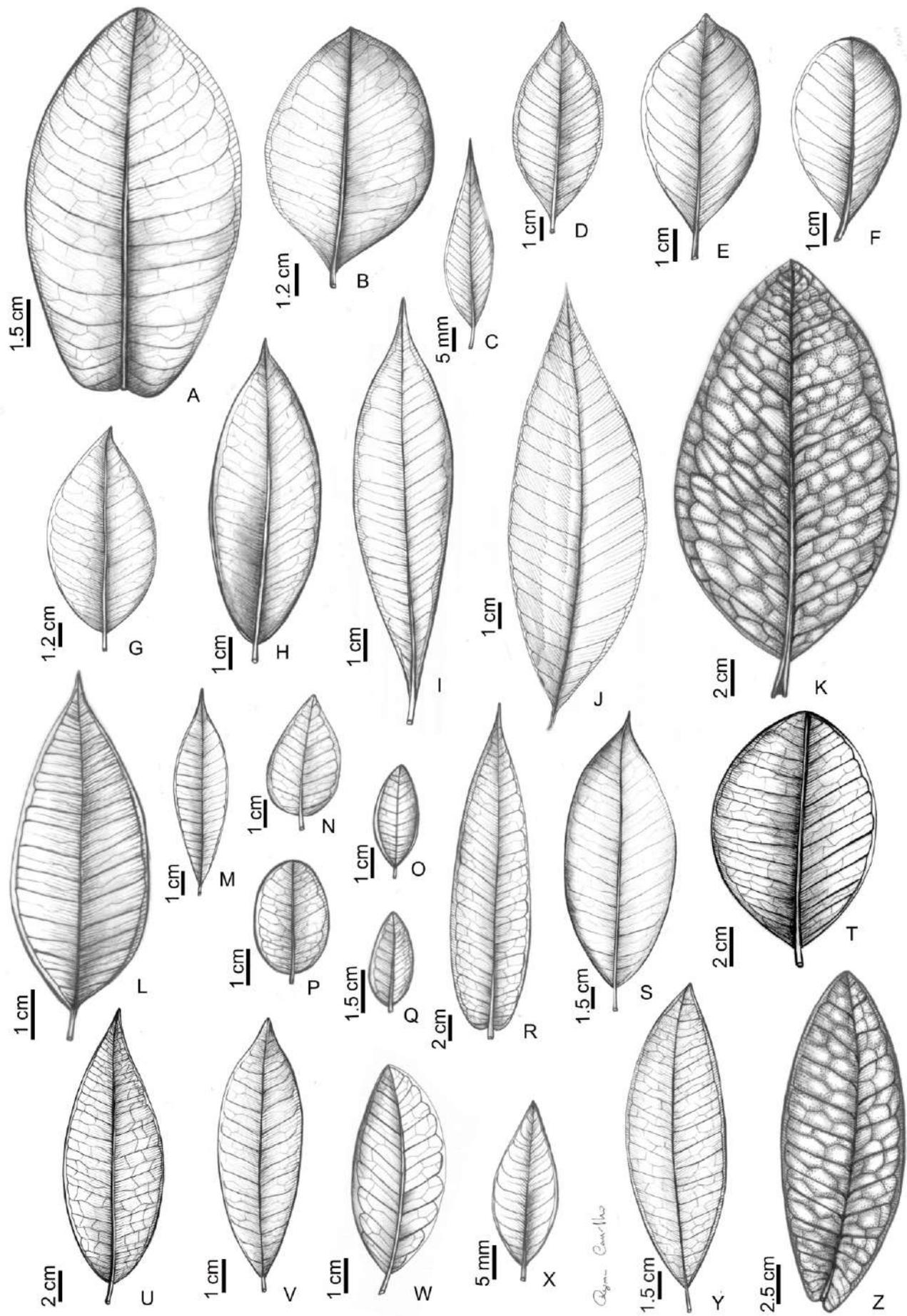


Figure 2. Leaf adaxial surface. A-B. *M. hartwegiana*. C-D. *M. hebeptala*. E-G. *M. ilheosensis*. H. *M. longipaniculata*. I. *M. magnifolia*. J-L. *M. montana*. M. *M. neocambessedeanana*. N-O. *M. palustris*. P. *M. pendula*. Q-R. *M. pubescens*. S. *M. reticulata*. Detail of leaf abaxial reticulate surface. T. *M. reticulata*. Leaf adaxial surface. U. *M. rosangelae*. Leaf abaxial surface. V. *M. ruschii*. Leaf adaxial surface. W. *M. serrana*. X. *M. spectabilis*. Y. *M. springiana*. Z. *M. squamata*. A1. *M. subsericea*. B1. *M. teresensis*. C1. *M. tijucensis*. D1. *M. velutiflora*. E1. *M. vittoriana*. F1. *M. warmingiana*. (A. from E. Lucas 256. B. from B.S. Amorim et al. 1925. C. from E.M. Francisco et al. s.n. (FUEL 15057). D. from W.J. Burchel 4510. E. from C.P. Caliari 2472. F. from G. Martinelli 5274. G. from S. Mori 13351. H. from M. C. Souza 447 et al.. I. from C. Luchiari et al. 488. J. from T.A. Batista 251. K. from R.C. Forzza 6377. L. from A.C. Brade 17015. M. from Sellow s.n. (K barcode 000566648). N. from L.A. Funez 165. O. from G. Martinelli 14899. P. from J. Jardim 4800. Q. from M.F. Santos 626. R. from G. Hatschbach 63349. S-T. from C.N. Fraga 2892. U. from B.S. Amorim et al. 1499. V. from **B.S. Amorim 2035**. W. from **B.S. Amorim et al. 2013**. X. from B.S. Amorim et al. 1989. Y. from B.S. Amorim et al. 1985. Z. from J.C. Lindeman 4640. A1. from B.S. Amorim et al. 1992. B1. from A. Peixoto 3458. C1. from V.C. Souza 30174. D1. from E. Pereira 4528. E1. from B.S. Amorim et al. 2017. F1. from S.V.A. Pessoa 466). Type specimens are in bold.

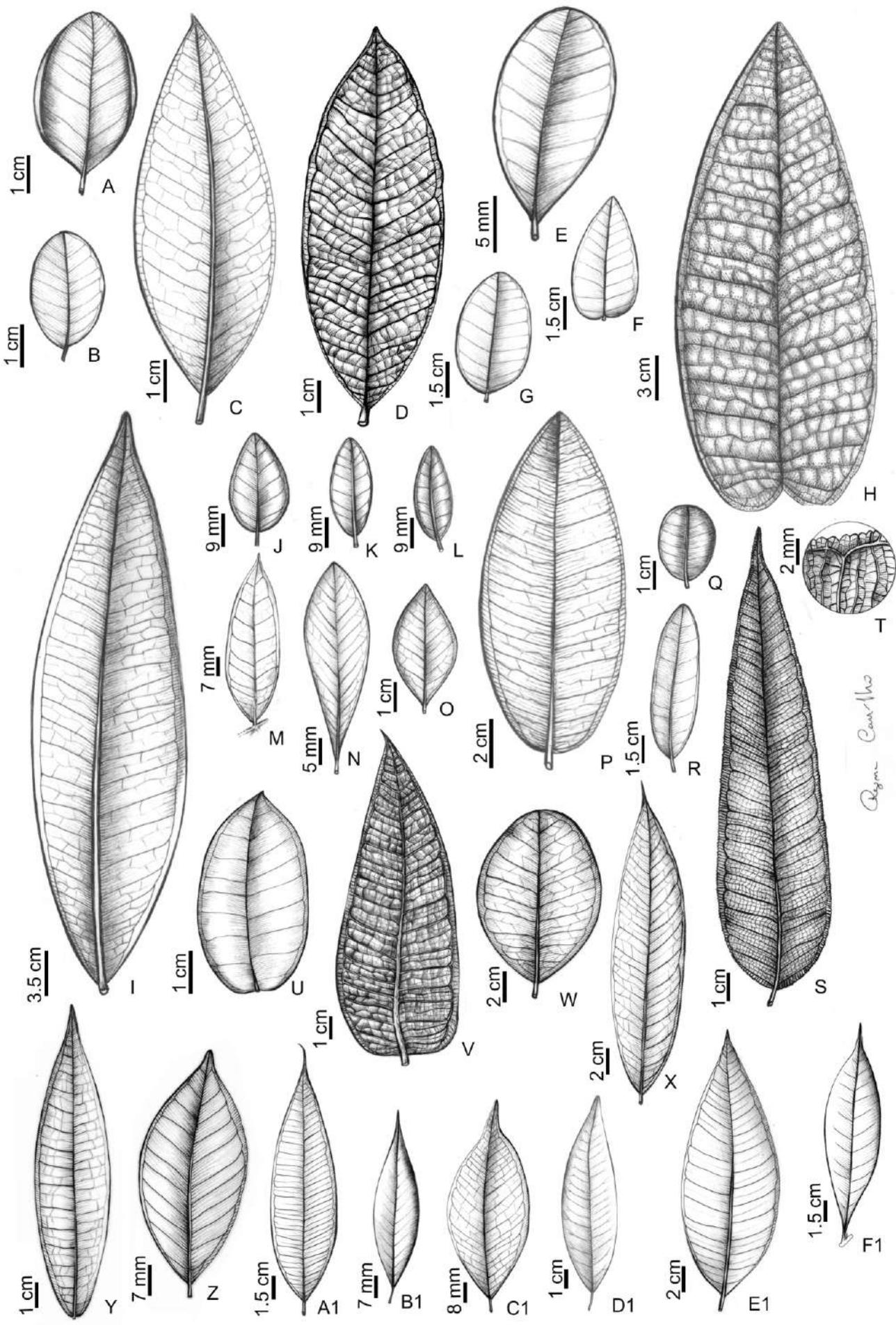


Figure 3. A-B. *Myrcia anacardiifolia*. A. Inflorescence. B. Infrutescence. C. *M. aurea*. Inflorescence. D. *M. brasiliensis*. Inflorescence. E. *M. carvalhoi*. Infrutescence. F. *M. cerqueiria*. Inflorescence. G. *M. crocea*. Detail of fruit. H. *M. curtispindula*. Inflorescence. I. *M. flagellaris*. Inflorescence. J. *M. magnifolia*. Detail of fruits. K. *M. montana*. Inflorescence. L. *M. neocambessedeana*. Inflorescence. M. *M. pendula*. Inflorescence. N. *M. squamata*. Inflorescence. O. *M. subsericea*. Infrutescence. P. *M. teresensis*. Inflorescence. Q. *M. vittoriana*. Infrutescence. R-S. *M. warmingiana*. R. Infrutescence.. S. Detail of fruit. (A. R.C Forzza et al. 3613. B. from J.M. Silva 2963. C. from E. Nic Lughadha et al. 200. D. from C. Urbanez 330. E. from B.S. Amorim et al. 2026. F. P. Fiaschi et al. 3458. G. from S.V. Pereira et al. 44. H. from E. Nic Lughadha et al. 195. I. from G. Hatschbach 13552. J. from C. Luchiari et al. 488. K. from E. Lucas et al. 262. L. from Sellow s.n. (K barcode 000566648). M. from J. Jardim 4800. N. from J.C. Lindeman 4640. O. from B.S. Amorim et al. 1992. P. from A. Peixoto 3458. Q. from B.S. Amorim et al. 2017. R-S. from S.V.A. Pessoa 466).

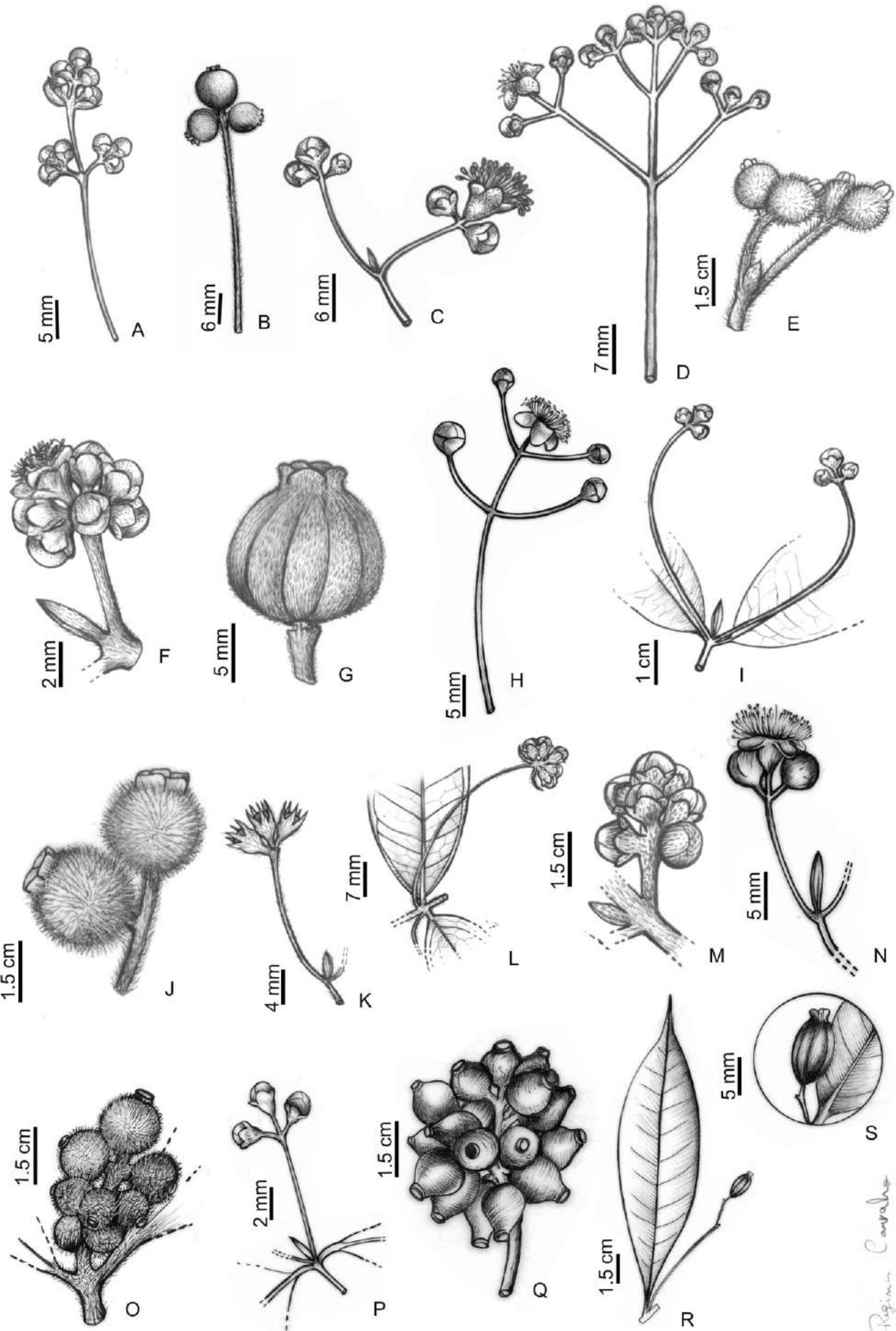
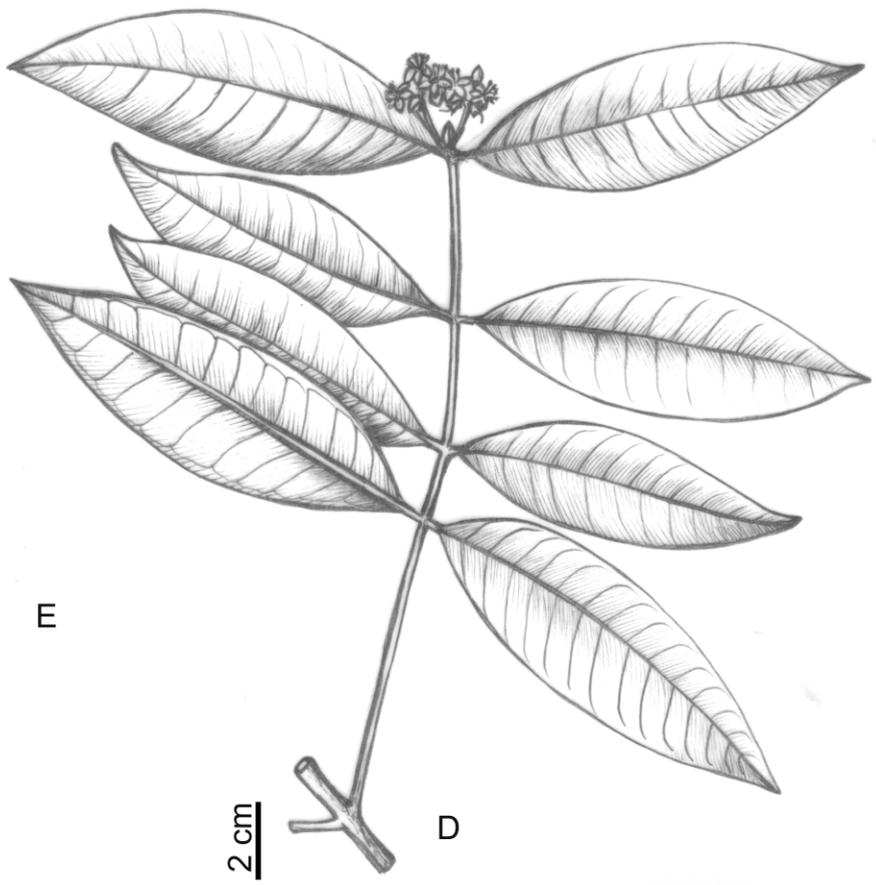
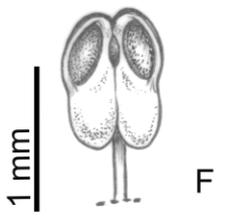
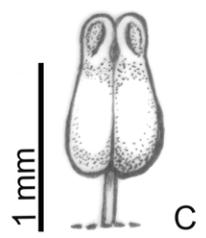
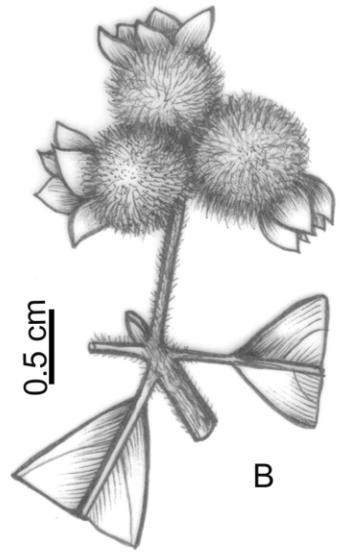
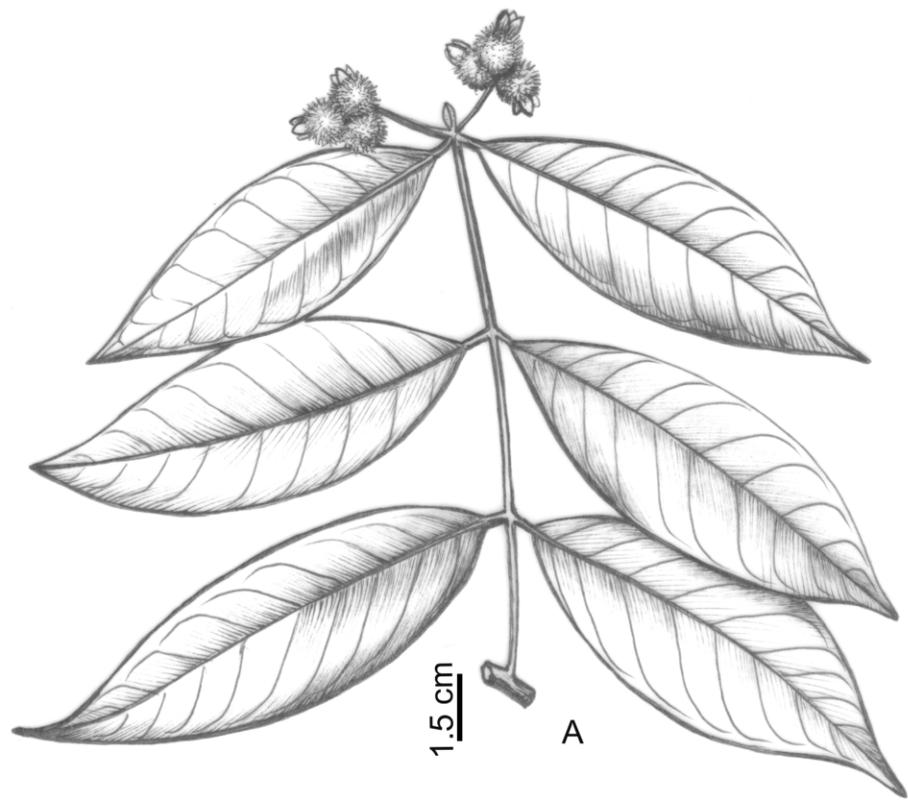


Figure 4. A-C. *Myrcia longisepala*. A. Branch in fruit. B. Detail of inflorescence. C. Detail of anther. D-F. *Myrcia mcvaughii*. D. Branch in flower. E. Detail of inflorescence. F. Detail of anther. (A-C. from the holotype: *L.D. Thomas et al. 1828*. D-F. from the holotype: *P.H. Labiak 4712*).



Reym. Cantho

Figure 5. A-C. Trichomes on abaxial leaf surface. A. Appressed trichomes. *Myrcia cerqueiria*. B. Ascending to erect trichomes. *Myrcia ruschii*. C. interwoven trichomes. *Myrcia glazioviana*. D-F. *Myrcia amplexicaulis*. D. Detail of leaf base. E. Leaf abaxial surface and infrutescence. F. Detail of fruits. G. *M. brasiliensis*. Branch in fruits. H-I. *M. carvalhoi*. H. Leaves. I. Branch in fruits. J-K. *M. cerqueiria*. J. Leaves and branch in fruits. K. Detail of infrutescence. L-M. *M. cordiifolia*. L. Leaves and branch in flower. M. Detail of inflorescence. N. *M. crocea*. Young individual. O. *M. eriocalyx*. Leaves and branch in flower. P-Q. *M. espiritosantensis*. P. Leaves and branch in flower. Q. *M. fenzliana*. Branch in fruits. R. *M. grandifolia*. Branch in fruits. (A-F, H-K, and N by B. S. Amorim. G. by V. Staggemeier. O. by A. Giaretta. L-M, and R. by J.E.Q. Faria. P-Q. by C.N. Fraga. O. by T.N.C. Vasconcelos).

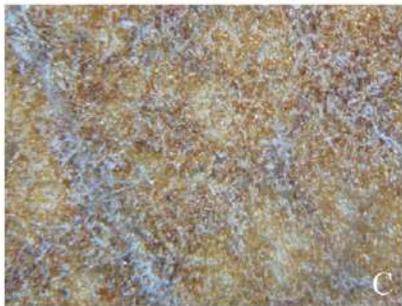


Figure 6. A-B. *Myrcia grazielae*. A. Branch in flowers. B. Branch in fruits. C. *M. hartwegiana*. Branch in flowers. D-E. *M. hebepetala*. D. Branch in flowers. E. Branch in fruits. F-I. *M. ilheosensis*. F. Detail of leaf (population from “Campos Rupestres”). G. Branch in flowers (population from “Campos Rupestres”). H. Branch in fruits (smooth, population from submontane Atlantic Forest). I. Branch in fruits (ribbed, population from “restingas”). J. *M. pubescens*. Branch in fruits. K. *M. rosangelae*. Branch in fruits. L. *M. ruschii*. Detail of inflorescence. M. *M. serrana*. Branch in fruits. N. *M. spectabilis*. Branch in fruits. O. *M. springiana*. Branch in fruits. P-Q. *M. subsericea*. P. Details of goldish leaf abaxial surface. Q. Branch in fruits. R. *M. vittoriana*. Branch in fruits. (A-C, F-H, and J-R.. by B.S. Amorim. D-E, and I.. by V. Staggemeier. J. by D.F. Lima).



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.

Acevedo-Rodríguez, P. 7846 (14)

Amaral, A.G. 2122 (31)

Amorim, A.M. 3066 (6); **4940 (30)**; 5123 (35); 7849 (13)

Amorim, B.S. & Maciel, J.R. 2035 (34)

Amorim, B.S. 553 (37); 768 (37); 817 (19); 830 (43); 948 (19); 969 (37); 1284 (37); 1355 (37); 1388 (37); 1497 (33); 1499 (33); 1777 (37); 1925 (20); 1953 (1); 1985 (37); 1989 (36); 1992 (39); 2007 (37); 2008 (43); **2013 (35)**; 2016 (19); 2017 (43); 2025 (43); 2026 (6); 2028 (7); 2037 (22); 2054 (36)

Anderson, L.O. 99-45 (12)

Anderson, W.R. 35492 (12)

Andreato, R.H.P. 307 (16); 494 (16); 617 (16)

Araújo, D.S.D. 10516 (42)

Arzolla, F.A.R.D.P. 255 (2)

Barbosa, E. 39 (15); 709 (2)

Barbosa, M.R. 29813 (23)

Barros, A.A.M. 2158 (16)

Batista, T.A. 251 (27)

Bautista, H.P. 3057 (37)

Belém, R.P. & Pinheiro, R.S. 2911 (10); **2999 (19)**

Bernacci, L.C. 19971 (14)

Beyrich s.n. (28) (P barcode 02273013)

Bolnaldi, R.A. 666 (36)

Boone, W. 1315 (34)

Borges, R.A.X. 763 (6)

Boudet-Fernandes, H.Q. 1370 (40); 3322 (1)

Bovini, M.G. 2155 (39)

Brade, A.C. 17015 (27); 19763 (39)

Braga, J.M.A. 250 (43); 1893 (8)

Bresolin, A. 357 (21); 516 (22)
Britto, R.C. 194 (10)
Brugger, M. 22926 (14)
Burchel, W.J. 4510 (21)
Caliari, C.P. 2014 (22); 2472 (22)
Camargo, O.R. 1252 (22)
Camerit, A.M. 14 (27)
Campos, J.M. 36 (4)
Campos, W.G. 53 (9)
Cantarelli, J.R.R. 203 (33)
Carauta, P. 507 (29)
Carmo, F.F. 4381 (31)
Carneiro, E. 477 (22)
Carvalho, A.M. 3288 (6)
Carvalho-Sobrinho, J.G. 789 (7)
Castro, E.R. 89 (15); 343 (41)
Castro, S.L.R. 36 (4)
Caxambu, M.G. 1026 (29); 3803 (36)
Christo, A.G. 636 (10)
Chrysogone, B. 4812 (14)
Coelho, M.M. 603 (30)
Cordeiro, J. 2097 (36)
Demuner, V. 1575 (1); 4895 (13); 11115 (3)
Díaz, C. 3569 (14)
Duarte, A.P. 6265 (42)
Duarte, M. 104 (10)
Estevan, D.A. 681 (2)
Falcão, J.I.A. 1195 (33)
Falkenberg, D.B. 2533 (36)
Frag, P.R. 92 (25)
Farah, F.T. 2171 (4); 2211 (38); 2308 (41)
Faria, J.E.Q. 316 (31); 2470 (9); 2493 (7); 3073 (18)
Farias, D.S. 371 (4)

- Farrey, C. 3513 (22)
Fellito, G. 580 (2)
Fernandes, H.Q.B. 2429 (10)
Ferreira, M.C. et al. 361 (33)
Fiaschi, P. 944 (3); 2855 (35); 3458(7)
Filho, L.E.M. 2983 (37)
Flores, T.B. 411 (2); 1431 (14)
Folli, D.A. 724 (4); 3334 (29); 4177 (37); 6680 (9)
Fontana, A.P. 2188 (20); 2836 (13)
Forzza, R.C. et al. 2198 (9); 2229 (36); 3613 (2); 3910 (12); 4406 (22); 5229(10); **5397 (13)**; 6377(27)
Fraga, C.N. et al. 2892 (32)
Fragomeni, P. s/n (21) (RB 248013).
França, F. PCD 5899 (22); 4367 (22)
França, G.S. 499 (9); 601 (9)
Francisco, E.M. s.n. (FUEL 15057) (21)
Franco, G. 2981 (4)
Funez, L.A. 165 (29)
Gandolfi, S. s.n. (29) (ESA 5656)
Gardner 422 (2)
Gasper, A.L. 1817 (21)
Gentry, A. 10514 (14)
Giaretta, A. 1201 (43)
Giordano, L.C. 1698 (8)
Glaziou, A. **6886 (41)**; 8381 (18); 12000 (41); **17005 (17)**; **17673 (44)**
Gomes, J.A.M.A. 1887(8)
Gonçalves, F. s.n. (42) (RB barcode 00662354)
Gonçalves, P. 1345 (18)
Hagelund, K. 5150 (22)
Handro, O. 262 (21); 2063 (5)
Harley, R.M. 26666 (14)
Harris, W. 6282 (14)

Hatschabach, G. **10997** (38); 13552 (15); 16705 (21); 16862 (38); 20960 (41); 26266 (15); 40022 (15); 52559 (4); 61602 (7); 63349 (31); 69358 (14)

Heringer, E.P. 532 (36); 14897 (14); 15078 (9)

Hoene, W. 5954 (22)

Howard, R.A. 19723 (14)

Imaguire, N. 579 (38)

Irwin, H.S. 30233 (27)

Jardim, J.G. 2732 (30); 4800 (30)

Jarenkow, J.A. et al. 1827 (2); 2081 (2)

Jesus, N.G. 926 (33)

Jost. 220 (33)

Killip & A.C. Smith 15060 (14)

Kleger, A. 1459 (20)

Klein, R.M. 1420 (15); 8304 (41)

Kollmann, L. 1497 (40); 1543 (3); **1853 (40)**; 3931 (34); 5063 (11); 5410 (3); 5577 (1)
8278 (34); 8796 (11); 10458 (20); 11477 (40)

Krambech, A. s/n (15) (FURB 1683)

Krieger, P.L. s/n (21) (CESJ 23323); 9253 (29)

Kulmann, M. s.n. (18) (SP 40059)

Labiak, P.H. 4712 (26); 4951 (21)

Landim, M. 1399 (22)

Leoni, L.S. 4602 (27)

de Lima, H.C. 2267 (39); 2893 (43); 5990 (31)

Linderman, J.C. 1970 (29); 4640 (38)

Lopes, M. 830 (35)

Lopes, M.A. 367 (10)

Lopes, M.M.M. 920 (7); 1232 (30)

Lopes, W.P. 238 (3); 528 (9)

Lucas, E. 83 (15); 120 (2); 256 (20); 262 (27); 461 (20); 606 (36); 734 (40); 739 (40)

Lucena, M.F.A. 1547 (33)

Luchiari, C. 488 (25)

da Luz, A.A. 269 (37)

Lyra-Lemos, R.P. 2562 (33); 4601 (37); 8052 (43)

- Maas, P.J.M. 7059 (19)
- Martinelli, G. 168 (12); 5274 (22); 9049 (27); 12080 (44); 13356 (20); 14899 (29);
16104 (27)
- Marquete, R. 3092 (20)
- Martins, H.F. 145 (4)
- Martins, R.C. 897 (14)
- Martius s.n. (9) (M barcode 0137577); s.n. (12) (M barcode 0137571); s.n. (21) (M
barcode 0137141); s.n. (29) (M barcode 0137569); s.n. (31) (K barcode
000914083); s.n. (36), (G-DC 45); Mart. hb. Fl. bras. 683 (22)**
- Mattos, J. & Handro, O. 9091 (5)
- Mattos, J. 22382 (29)
- Mattos, L.A. 1407 (4)
- Mazine, F.F. 185 (21)
- Mello-Silva, R. 827 (11); 2682(12); 11477 (31)
- Messias, M.C.T.B. 1463 (12)
- Miguel 38 (14)
- Mikan/Pohl 1047 (39)**
- Monteiro, M.M. 239 (22)
- Mori, S. 13351 (22)
- Morim, M.P. 524 (29)
- Mutchnick 1448 (14)
- Nadruz, M. **651 (23)**; 997 (44); 1008 (31); 2002 (8)
- Nic Lughadha, E. H50637 (14); 186 (4); 191 (1); **195 (11)**; **200 (3)**; 202 (11); 225 (32)
- Nicolau, S.A. 1304 (12); 1580 (27)
- Ochioni, P. 254 (41)
- Oliveira, A.A. 3625 (15)
- Oliveira, J.G. 135 (12)
- Paiva, F. 3381 (19)
- Paixão, J.L. 183 (43); 447 (35)
- Peixoto, A.L. 483 (39); 3458 (40)
- Pereira, E. 4528 (42)
- Pereira, S.V. 44 (10)
- Pereira, T.S. 12 (2)

Peron, M. 842 (44); 876 (17)
Pessoa, S.V.A. 41 (12); 338 (44); 466 (44); 725 (25)
Pessoal do Horto Florestal s/n (42) (RB barcode 00520616)
Picón 1095 (14)
Pinheiro, R.S. 1762 (7)
Pinheiro, R. 60 (10)
Prata, E.M.B. s.n. (8) (HRCB 51027)
Quinet, A. 9-79 (39); 64 (39); 343 (19-018) (39)
Ramage, G.A. s/n (14) (K barcode 000332221)
Reginato, M. 198. (35); 203 (38); 697 (38)
Reitz, P.R. & Klein, R.M. 5406 (20); **5745 (15)**; 6270 (2); 9485 (21)
Ribas, O.S. 794 (29); 1373 (38); 3265 (29); 3371 (22); 5881 (20)
Riedel, L. 1320 (25)
Robim, M.J. s/n (27) (RB 273736)
Romão, G.O. 1674 (20); 1891 (20); 2654 (29)
Rosa, P. s/n (42) (RB barcode 00662355); 140 (42)
Sá, C.F.C. 1744 (7)
Saavedra, M.M. 914 (21)
Saint-Hilaire, A. **s.n. (5) (P barcode 02440192)**; **s.n. (16) (P barcode 02273000)**; **s.n. (32) (P barcode 02273018)**; C1 655 (21); **D 501 (27)**; **D786 (18)**
Santos, A.L.S. 15 (33)
Santos, M.F. 626 (31); 803 (32)
Santos, T. S. 3416 (37); 3726 (19); **3996 (6)**
Sellow **n.s. (4)**; **s.n. (7) (K barcode 000275953)**; Sellow s.n. (28) (K barcode 000566648); **s.n. (37)**; **s.n. (43) (K barcode 000275956)**; **986 (14)**
Shepherd, G.J. 7227 (31)
Silva, J.M. 613 (4); 928 (22); 1238 (21); 2963(2)
Silva-Neto, C.J. 1782 (32)
Siqueira, D.R. 130 (43)
Soares, A. 105 (41)
Sobral, M. 15517 (14)
Souza, F. O. 20 (8)
Souza, J.A.N. 630 (37)

Souza, J.P. 4469 (31)
Souza, M. C. 447 (23)
Souza, R.P.M. 119 (20)
Souza, V.C. 5892 (2); 9721 (14); 23394 (27); 25096 (12); 28491 (31); 30174 (41)
Souza, W.S. 24591 (22)
Staggemeier, V.G. 6 (22); 31 (29); 32 (21); 38 (36); 100 (4)
Stehmann, J.R. 3673a (9); 3673b (10)
Sucre, D. 2145 (39); 2334 (12); 4288 (20); 5415 (43); 8211 (29); 8476 (37); 11193 (32)
Sylvestre, L. 772 (39)
Sztutman, M. 294 (22)
Takahasi, A. 211 (8)
Tavares, S. 572 (19); 3139 (19)
Teixeira, W.A. s/n (12) (BHCB 26287)
Thomas, W.W. 9044 (43); 9121 (22); 13454 (30)
Thomaz, L.D. 1413 (11); 1503 (13); 1828 (24)
Torres, R.B. 1887 (8)
Urbano, C. 8957 (18)
Urbanez, C. 330 (3)
Verdi, M. s.n. (41) (FURB 5128)
Viana, P.L. 3307 (20); 3540 (27)
Viani, R.A.G. s/n (ESA 94871) (4)
Vieira, F.C.S. 800 (38); 921 (38); 1873 (38)
Vieira, M.C.W. 1999 (32)
Vimecat, J.M. 282 (40)
Waechter, J.L. 1508 (4)
Weiers, M.S. 12 (4)
Wendt, T. 182 (44)
Wesenberg, J. 859 (41)
Weyland-Vieira, M.C. 1999 (18)
Widgren 544 1/2 (20)
Wood, J.R. 13003 (14); 25131 (14)
Zanoni, T.A. 30181 (14); 33232 (14)
Zappi, D.C. 2507 (12)

Zardini, E.M. 44003 (29); 44534 (29)

6 CONSIDERAÇÕES FINAIS

Com base nos dados apresentados nos capítulos anteriores, podemos concluir que o clado *Gomidesia* é constituído por 44 espécies na Floresta Atlântica brasileira, onde a região sudeste apresenta a maior riqueza com 39 espécies, sendo também a região com o maior número de espécies endêmicas, com o total de 21 espécies. Os esforços deste trabalho também fizeram com que cinco espécies, do clado *Gomidesia*, inéditas para a ciência fossem publicadas (ie. *Myrcia espiritosantensis*, *M. longisepala*, *M. mcvaughii*, *M. serrana* e *M. ruschii*) para as florestas submontanas e montanas das regiões Nordeste e Sudeste. Além dos novos táxons, correções a respeito da circunscrição de algumas espécies previamente conhecidas foram feitas, levando à sinonimização de sete nomes. Os nomes *Myrcia amplexicaulis* (Vell.) Hooker filius, *M. eriocalyx* De Candolle e *M. spectabilis* De Candolle foram lectotipificadas. Atualizações na distribuição geográfica de algumas espécies também foram realizadas, onde *Myrcia fenzliana* O. Berg teve seu primeiro registro para o Peru, *Myrcia grazielae* Nic Lughadha que era citada como restrita para o sul da Bahia teve sua ocorrência ampliada para as florestas submontanas de Alagoas e Pernambuco. Os registros de *Myrcia palustris* De Candolle e *M. pubescens* De Candolle para áreas de Campos Rupestres na Chapada Diamantina, eram baseados em identificações incorretas de amostras de *M. ilheosensis* Kiaerskov e tiveram seus registros corrigidos. *Myrcia pubescens* também teve seu limite de ocorrência corrigido, onde é endêmica do Brasil. Previamente esta espécie era citada para a Bolívia baseada em amostras incorretamente identificadas de *Myrcia barituensis* (Legname) B. Holst, uma espécie de ocorrência restrita para o noroeste da Argentina e Bolívia.

O clado *Gomidesia* teve seu monofiletismo confirmado com base em análises de Maxima-Verossimilhança e Inferência Bayesiana usando dados moleculares de 9 regiões do DNA nuclear e plastidial (ETS, ITS, *matK*, *ndhF*, *psbA-trnH*, *rpl16*, *rps16-trnQ*, *rps32-trnL*, e *trnL-trnF*). Duas principais linhagens e quatro subclados foram reconhecidos no grupo, onde o agrupamento das espécies obedece um padrão geográfico e independente do morfológico, contrariando agrupamentos morfológicos considerados como grupos naturais propostos anteriormente. Além dos resultados relevantes para o clado *Gomidesia*, evidências de relações filogenéticas com elevado suporte estatístico também foram encontradas entre os demais clados em *Myrcia s.l.*

Com base nestas relações, evoluções de caracteres morfológicos e habitats foram propostas para *Myrcia s.l.* e o clado *Gomidesia*, onde pode-se verificar que: 1. a linhagem ancestral de *Myrcia s.l.* apresentava ovário bilocular, cálice com lobos do cálice livres, e anteras biloculares com tecas simétricas, onde ovário multi 3-multilocular, cálice apresentando algum grau de fechamento e anteras tetraloculares ou pseudo-tetraloculares, assimétricas ocorrem várias vezes em diferentes linhagens ao longo da evolução de *Myrcia s.l.* 2. . Abertura. 2. No clado *Gomidesia* foi evidenciado que anteras assimétricas que retêm sua curvatura mesmo após a antese é o estado de caráter da linhagem ancestral e é a sinapomorfia morfológica para o clado. Anteras com deslocamento de $\frac{1}{4}$ do seu tamanho, com glândulas presentes, septo não evidente, flores distribuídas ao longo da inflorescência e inflorescência multiflora foram os estados de caráter recuperados para a linhagem ancestral do clado, onde anteras com deslocamento de $\frac{1}{2}$ ou $\frac{1}{6}$ - $\frac{1}{8}$ do seu tamanho, com glândulas ausentes, septo evidente, flores agrupadas no ápice da inflorescência e inflorescência 3-flora foram recuperadas em várias linhagens independentes no clado *Gomidesia*, com uma maior frequência no clado G2a. 3. O habitat Floresta Atlântica foi recuperado tanto para *Myrcia s.l.* quanto para o clado *Gomidesia*, com posterior colonização de outros habitats em diversas linhagens independentes nos dois grupos.

Com relação aos grupos filogeneticamente próximos à *Myrcia s.l.*, houve um rearranjo no clado *Myrceugenia*, onde o gênero *Luma* previamente era citado como pertencente à ele. Porém, com o uso de uma abordagem fazendo uso de várias regiões de DNA analisadas e uma ampla amostragem de representantes do gênero *Myrceugenia*, o seu posicionamento fora do referido clado foi confirmado com alto suporte estatístico, corroborando hipóteses morfológicas de que o gênero *Luma* seria pertencente à uma linhagem não relacionada ao gênero *Myrceugenia*.

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