



Flora of Espírito Santo: *Psidium* (Myrtaceae)

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Abstract

This study presents a floristic-taxonomic treatment of *Psidium* in the state of Espírito Santo, and is a result of fieldwork combined with analyses of herbarium specimens. Fourteen species of the genus were recognized in Espírito Santo state (*P. brownianum*, *P. cattleianum*, *P. cauliflorum*, *P. guajava*, *P. guineense*, *P. longipetiolatum*, *P. myrtoides*, *P. oblongatum*, *P. oligospermum*, *P. ovale*, *P. rhombeum*, *P. rufum*, *P. sartorianum*, and *Psidium* sp.), accounting for about 34% of the species richness estimated for the genus in the Atlantic Rainforest biome. The species occur predominantly in lowland forests up to 700 meters above sea level. These areas are highly threatened due to urbanization of coastal areas and agricultural expansion in the state Espírito Santo. Therefore, the conservation of *Psidium* species in this state requires the creation of more lowland protected areas.

Key words: Atlantic Rainforest, diversity, Myrteae, taxonomy.

Resumo

Este estudo apresenta o tratamento florístico-taxonômico para o gênero *Psidium* no estado do Espírito Santo, e resulta de trabalho de campo, combinado à análise de espécimes de herbário. Quatorze espécies do gênero foram reconhecidas no Espírito Santo (*P. brownianum*, *P. cattleianum*, *P. cauliflorum*, *P. guajava*, *P. guineense*, *P. longipetiolatum*, *P. myrtoides*, *P. oblongatum*, *P. oligospermum*, *P. ovale*, *P. rhombeum*, *P. rufum*, *P. sartorianum* e *Psidium* sp.), representando cerca de 34% da riqueza de espécies estimada para o gênero na Floresta Atlântica. As espécies ocorrem predominantemente em florestas baixas, até 700 metros. Essas áreas são altamente ameaçadas devido à urbanização das áreas costeiras e a expansão da agricultura do estado do Espírito Santo. Desta forma, a conservação das espécies de *Psidium* neste estado implica na criação de mais áreas de preservação em compreendendo florestas baixas.

Palavras-chave: Floresta Atlântica, diversidade, Myrteae, taxonomia.

Introduction

Psidium L. has been one of the most difficult genera to define within the American species of Myrtaceae (Landrum & Sharp 1989). The genus circumscription includes characteristics as solitary flowers or flowers disposed in small racemes, dichasia or botryoids; the flowers have a calyx with lobes either entirely fused or almost fused, breaking in irregular lobes or a calyptra, ovary with 2–5 locules on a peltate to lamellate intrusive placenta; seeds with bony testa and cochlear embryo with small cotyledons and large hypocotyl (Landrum & Kawasaki 1997; McVaugh 1968). However, not all species of *Psidium* exhibit this

set of traits, which has led to taxonomic confusion. This has direct implications for the understanding of species in local and regional studies.

The monograph of Berg (1857–1859) in *Flora brasiliensis* is the main contribution to the knowledge of the Brazilian species of *Psidium*. In this study, the genus was divided into six sections, delimited by morphological characters such as leaf texture, calyx shape and number of locules in the ovary. Since then, several new species were described (Landrum & Sobral 2006; Soares-Silva & Proença 2006, 2008), without a new broad taxonomic revision. However, regional and local floras carried out for Myrtaceae especially in

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Atlantic Rainforest biome (Barroso & Peron 1994; Kawasaki 1989; Legrand & Klein 1977; Morais & Lombardi 2006; Sobral 2003; Souza & Morim 2008) have added much information about the richness and morphology of the species in Brazil.

About 60 taxa of *Psidium* were recorded in the different Brazilian biomes, with 17 (28%) restricted to the Atlantic Rainforest (BFG 2015). The state of Espírito Santo, which lies entirely within the Atlantic Rainforest, is considered strategic for conservation of Myrtaceae due to the great diversity revealed in floristic studies in *restinga* vegetation (Pereira & Araújo 2000; Giaretta *et al.* 2015); *montane* forest (Saiter *et al.* 2011) and *tabuleiro* forest (Jesus & Rolim 2005). Taxonomic surveys with Myrtaceae were carried out especially in protected areas (Barroso & Peixoto 1995; Sobral *et al.* 2009; Mazine & Souza 2007; Giaretta & Peixoto 2015), and a recent study identified SSR markers with potential for *Psidium* species molecular delimitation (Tuler *et al.* 2015). However, the genus was never studied under a floristic survey. Aiming to fill this gap, we present this taxonomic study for *Psidium* in the Espírito Santo state, providing descriptions, key for species identifications, and species distribution.

Materials and Methods

Study area

The Espírito Santo state (ES) is located in southeastern Brazil entirely within the Atlantic Rainforest biome (Fig. 1). Three major vegetation formations occur in ES, in three distinct geomorphological provinces (Antongiovanni & Coelho 2005; Dutra *et al.* 2015): lowland coastal vegetation or *restinga* vegetation (formed by

deposition of sandy sediments of the quaternary), *tabuleiro* forest (characterized by flat relief with small slopes formed by continental and quaternary sediments) and *montane* forest (by mountainous areas on Precambrian crystalline rocks). Considering that, the fieldwork covered 13 locations in ES between 2012 and 2014. The expeditions were carried out in representative locations of *restinga* vegetation (Itaúnas State Park, mun. of Conceição da Barra and Paulo César Vinha State Park, mun. of Guarapari, Municipal Park of Jacarenema, mun. of Vila Velha); *tabuleiro* forest (Vale Natural Reserve, mun. of Linhares, Sooretama Biological Reserve, mun. of Sooretama, Córrego Grande Biological Reserve, mun. of Conceição da Barra), and *montane* forest (Caparaó National Park, mun. of Dores do Rio Preto; Vista Alegre, mun. of Iúna, Santa Lúcia Biological Station and Augusto Ruschi Biological Station, mun. of Santa Teresa, Experimental area of the Universidade Federal do Espírito Santo, mun. of Alegre, Mata das Flores State Park, mun. of Castelo, Piaçu, mun. of Muniz Freire, and Pacotuba National Forest mun. of Cachoeiro do Itapemirim).

Morphological analysis and distribution

The samples of fertile branches were collected and dried according to Peixoto & Maia (2013). The species were identified using taxonomic revisions and floras for Central and South America (*e.g.*, Berg 1857–1859; McVaugh 1958; McVaugh 1963; Legrand & Klein 1977; Kawasaki 1989; Barroso & Peron 1994; Barroso & Peixoto 1995; Sobral 2003; Souza & Morim 2008; Sobral 2007; Giaretta & Peixoto 2015) and type collections. The species were analysed and described at the Laboratório de Botânica of the Universidade Federal do Espírito Santo. Concepts and terminology used to describe the species follow Hickey & King (2000) and Radford *et al.* (1974). One specimen per municipality was listed as selected material, and additional collections from other states were listed when necessary. Voucher materials were included in the herbarium RB with duplicates for VIES, MBML and CVRD (acronyms following Thiers, continuously updated). The analysis of herbarium vouchers from RB, R, VIES, MBML, BHCBC, CVRD and UB followed traditional methods in plant taxonomy (Hickey & King 2000; Radford *et al.* 1974). The species distribution maps were prepared using the Diva-Gis 5.2 applicative (Hijmans *et al.* 2005).

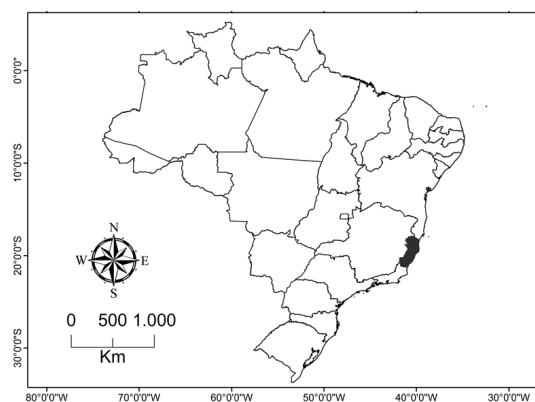


Figure 1 – Localization of the Espírito Santo state in Southeastern Brazil.

Results and Discussion

Fourteen species of *Psidium* were registered in Espírito Santo (Figs. 1-5): *Psidium brownianum* Mart. ex DC., *P. cattleianum* Sabine, *P. cauliflorum* Landrum & Sobral, *P. guajava* L., *P. guineense* Sw., *P. longipetiolatum* D. Legrand, *P. myrtoides* O. Berg, *P. oblongatum* O. Berg, *P. oligospermum* DC., *P. ovale* (Spreng.) Burret, *P. rhombeum* O. Berg, *P. rufum* Mart. ex DC., *P. sartorianum* (O. Berg) Nied., and *Psidium* sp. This last species is still under investigation. This number comprises about 36% of the *Psidium* species richness in the Atlantic Rainforest. Most of species occur in *tabuleiro* forest (11 spp.) and *montane* forest (12 spp.), being four and two species endemic to these environments, respectively. Six species occur in the *restinga* vegetation.

The species of *Psidium* in ES can be distinguished from each other mainly by the combination of vegetative (shape and number of secondary veins of the leaves) and reproductive characters (shape and size of fruits, number of locules and seeds). *Psidium rhombeum* was initially considered endemic to northeastern Brazil, known only from the *Caatinga* biome in the state of Bahia (BFG 2015), but its distribution is here expanded to Espírito Santo. In Espírito Santo, species of *Psidium* occur predominantly in lowland forests up

to 700 m above sea level. This is worrying because these lowland forests are highly threatened due to urbanization of coastal areas and agriculture expansion (Paula 2006).

Psidium L., Sp. Pl. 1: 470. 1753.

Trees or shrubs, glabrous, glabrescent or sparsely to densely pubescent; branches cylindrical or tetragonal; leaves simple and opposite, exhibiting typical brochidodromous venation; elliptic, cordate, oblong or obovate, chartaceous or coriaceous, glabrous, glabrescent or sparsely to densely pubescent, margin entire, revolute or slight revolute, midvein slightly sulcate above and prominent below. Flowers solitary, axillary racemes, dichasium, panicle or inflorescence growing from auxotelic axis producing vegetative shoots with adult leaves after anthesis; floral buds pyriform, entire or constricted above the ovary, round or apiculate, calyx with lobes entirely or partially fused, tearing irregularly at anthesis, 4–5 lobed, pentamerous flowers; calyx cupuliform or calyptrate, petals free, numerous stamens; ovary inferior, with two to five locules and few to many ovules per locule on a peltate to lamellate intrusive placenta. Fruits with many seeded, seeds with a bony testa and a cochlear embryo with small cotyledons and a large hypocotyl.

Identification key for *Psidium* in Espírito Santo

1. Flowers in clusters attached to the trunk..... 2
- 1'. Flowers attached to the branches 3
 2. Young branches, leaves, inflorescences and fruits densely pubescent..... 3. *Psidium cauliflorum*
 - 2'. Young branches, leaves, inflorescences and fruits glabrous 14. *Psidium* sp.
 3. Tetragonal branches 4
 - 3'. Cylindrical branches..... 6
 4. Secondary veins 6–12 at each side..... 5
 - 4'. Secondary veins 12–18 at each side..... 4. *Psidium guajava*
 5. Flower buds pyriform, constricted, calyx with lobes entirely fused 5. *Psidium guineense*
 - 5'. Flower buds pyriform, not constricted and partially fused 12. *Psidium rufum*
 6. Leaf-blade obovate 7
 - 6'. Leaf-blade elliptic, cordate, ovate or rhomboid 8
 7. Petioles 3.2–10(–15) mm long, leaf/petiole length 9:1 2. *Psidium cattleianum*
 - 7'. Petioles (10–)12–25 mm long, leaf/petiole length 5:1 6. *Psidium longipetiolatum*
 8. Fruits with up to five seeds..... 9
 - 8'. Fruits with more than five seeds..... 10
 9. Fruits 4.8–5 × 4.5–5 mm, globose..... 10. *Psidium ovale*
 - 9'. Fruits 16–21 × 6–12 mm, pyriform or rounded..... 9. *Psidium oligospermum*

10. Petiole 0.5–4 mm long 11
 10'. Petiole 4–10 mm long 12
 11. Tree 20–28 m, elliptic or obovate leaves 2.1–5.8 × 0.8–2.2 cm, rounded fruits 11–15 × 9–14 mm 13. *Psidium sartorianum*
 11'. Tree or shrub 0.5–8 m, elliptic ovate or cordate leaves 1.7–10 × 0.8–7 cm, elliptic or rounded fruits 7–15 × 2.6–11 mm 1. *Psidium brownianum*
 12. Fruits 9–16 × 5.5–14 mm, angular seeds 4–10 per fruit 13
 12'. Fruits 38–53 × 26–56.5 mm, rounded seeds 15–20 per fruit 8. *Psidium oblongatum*
 13. Leaf-blade elliptic or obovate 2.5–11 × 1–4.5 cm 7. *Psidium myrtooides*
 13'. Leaf-blade rhomboid 6.3–7 × 3.1–3.5 cm 11. *Psidium rhombeum*

1. *Psidium brownianum* Mart. ex DC., Prodr., 3: 236. 1828. Figs. 2a-e; 5a

Tree or shrub, 0.5–8 m tall; glabrous, cylindrical branches, 1–4.7 mm diam.; petiole 0.5–4 × 0.5–3 mm; leaf-blade cordate or elliptic, 1.7–10 × 0.8–7 cm, cartaceous or coriaceous, glabrous, apex acute or obtuse, base obtuse, subcordate, rare acute, margin entire, slightly revolute, midvein slightly sulcate above and prominent below; 6–12 secondary veins at each side, visible on both faces, brochidodromous, marginal vein 1–4 mm from the margin. Inflorescence terminal raceme, lateral or auxotelic axis producing vegetative shoots with adult leaves after anthesis, 1–8 flowered; pedicels 3–13 mm long; bracts 0.5–2 × 0.4–1 mm, ovate or obovate, bracteoles 0.5–2 × 0.3–1.2 mm, both persistent after anthesis. Floral buds 2–5 × 0.7–4 mm, pyriform, calyx with lobes entirely fused or partially fused, tearing in four irregular lobes, sepals 1–3 mm long, 0.8–3 mm wide, rounded, equal in size; petals 2–4 mm × 2–3 mm; stamens 1.5–4.5 mm long, anthers globose, 0.3–1 mm long, rimose; ovary 2-locular, 10–12 ovules per locule. Fruits elliptic or rounded, 7–15 × 2.6–11 mm, glabrous, black when mature; seeds angular, 2.5–3 mm long, 8–12 per fruit.

Selected specimens: Águia Branca, 17.I.2008, fl., M.C. Souza 614 (MBML, RB). Aracruz, 12.XI.1992, fr., O.J. Pereira 2645 (VIES). Colatina, 17.IV.2006, fl., L.F.S. Magnago 793 (MBML). Conceição da Barra, 24.XII.2011, fr., M.M. Monteiro 127 (RB). Guarapari, 27.X.1987, fl., O.J. Pereira 1323 (VIES). Itapemirim, 10.V.1990, fl., P.C. Vinha 905 (VIES). Linhares, 9.II.2007, fr., G.S. Siqueira 305 (CVRD). Nova Venécia, 14.I.2009, fr., A.P. Fontana et al. 5766 (RB). Presidente Kennedy, 7.VIII.1990, fr., J.M.L. Gomes 1321 (VIES). São Mateus, 18.XI.2006, fr., A.O. Giaretta 05 (RB). Serra, 6.I.2000, fl., I.D. Rodrigues 05 (VIES). Vila Velha, 29.X.1997, fl., R.L. Dutra 293 (VIES). Vitória, 25.VI.1990, fr., P.C. Vinha 1042 (VIES, RB).

Psidium brownianum is recognizable by the cordate or elliptic and glabrous leaf-blade, and by

the elliptic and black fruits when ripe. It resembles *P. myrtooides* due to the auxotelic inflorescence and leaf size, differing by its short petioles and elliptic or rounded fruits. Flowers and fruits were collected all year round. *Psidium brownianum* is endemic to Brazil, occurring in the states of Alagoas, Pernambuco, Bahia, Espírito Santo, Minas Gerais and Rio de Janeiro, in Caatinga, Cerrado and Atlantic Rainforest (BFG 2015). This is the most widespread species in Espírito Santo, occurring in areas of *montane* and *tabuleiro* forests, but is predominant in *restinga* vegetation, including within protected areas (Fig. 5a).

2. *Psidium cattleianum* Sabine, Trans. Hort. Soc. London 4: 317, 1821. Figs. 1f-h; 5a

Tree or shrub, 0.7–15 m tall; glabrous; branches cylindrical, 0.5–6 mm diam.; petiole 5–15 × 0.5–2.8 mm, leaf-blade obovate, 3.2–14.5 × 1.3–8 cm, chartaceous or coriaceous, glabrous, apex obtuse, rare acute, base cuneate; margin entire, slightly revolute, midvein slightly sulcate above and prominent below; 6–12 pairs of secondary veins, inconspicuous in the adaxial face, evident in the abaxial face, brochidodromous, marginal vein 1–3 mm from the margin. Solitary flower; pedicels 3–18 mm long; bracts 1–5 × 1–2.5 mm, ovate, caducous; bracteoles 2 × 0.8–1 mm wide, persistent. Floral buds 5–12 × 3.5–6 mm, pyriform, apiculate, calyx partially fused, 4–5 lobed, sepals 2–8 × 2–10 mm, rounded, equal in size, with sparse trichomes; petals 5–8 × 4–5 mm; stamens 5–10 mm, anthers globose, 0.5–1 mm long, rimose; ovary 4-locular, 10–13 ovules per locule. Fruits rounded, 15–47 × 9–25 mm, glabrous, yellow or red when mature; seeds angular, 5–6 mm long, 38–45 per fruit.

Selected specimens: Águia Branca, 23.IV.2004, fr., A.M. Assis 1013 (MBML, VIES). Aracruz, 9.XII.1992, fr., O.J. Pereira 4387 (VIES, RB). Castelo, 9.IV.2009, fr., A.M.A. Amorim et al. 7820 (MBML, RB). Conceição da Barra, 9.I.2008, fl., D.A. Folli 5839 (CVRD). Domingos

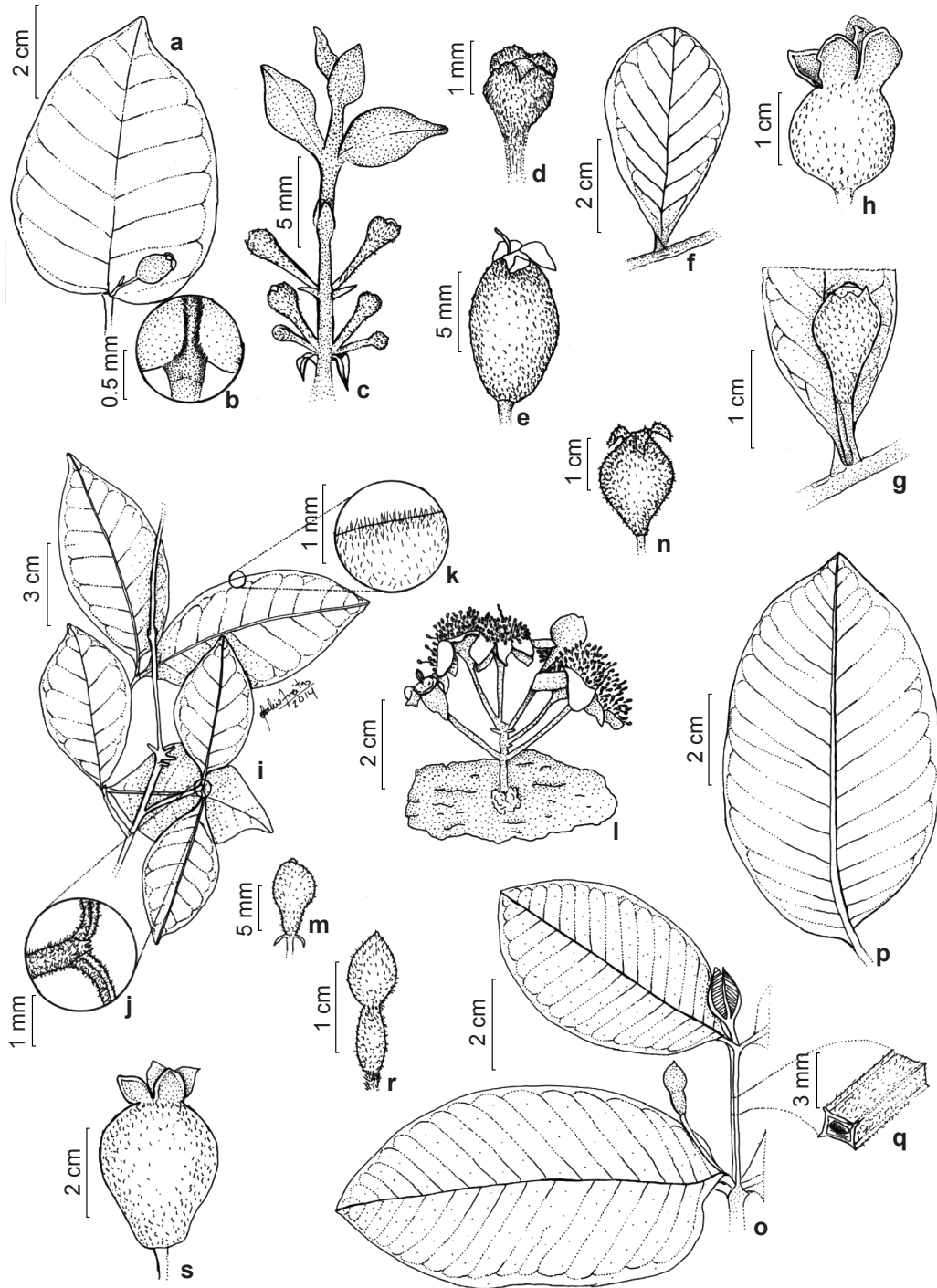


Figure 2 – a-e. *Psidium brownianum* – a. cordate leaves; b. cordate base; c. axillary inflorescences with 2–4 pairs of flowers with continuing vegetative growth; d. pyriform, partially fused floral buds; e. elliptic fruits. f-h. *Psidium cattleianum* – f. obovate leaves; g. pyriform, partially fused floral buds; h. rounded fruits. i-n. *Psidium cauliflorum* – i. branches; j,k. leaves sparsely to densely pubescent; l. flowers on the trunk; m. pyriform apiculate, densely pubescent floral buds; n. globose or pyriform fruits. o-s. *Psidium guajava* – o. axillary, uniflorous inflorescences; p. elliptic leaves (12–18 pairs of secondary veins); q. tetragonal branches; r. pyriform, constricted above the ovary, apiculated floral buds; s. pyriform fruits. (a,c. J.M.L. Gomes 1321; d,e. O. J. Pereira 802; J.E.Q. Faria 2498; f,h. A.C. Tuler 427; i,k. A.C. Tuler 480; l,n. A.C. Tuler 455; o,r. D.A. Folli 3881; s. A.C. Tuler 496).

Martins, 18.IV.2009, fr., *D.A. Folli 6336* (CVRD). Guarapari, V.1998, fr., *A.M. Assis 704* (VIES). Itaguaçu 10.IV.2004, fr., *A.P. Fontana 873* (MBML, VIES). Itarana, 14.II.1999, fr., *E.M. Nic Lughadha et al. 201* (RB). Linhares, 14.II.1999, fr., *D.A. Folli 4920* (CVRD). Marilândia, 18.IV.2006, fr., *L.F.S. Magnago et al. 834* (MBML, VIES). Santa Teresa, 19.VII.2003, fr., *J. Rossini 458* (MBML, VIES). São Mateus, 28.III.1992, fr., *V.D. Souza 318* (BHCB, CVRD). Vila Velha, 10.I.1993, fr., *J.M.L. Gomes 1805* (VIES).

Psidium cattleianum can be recognized by its obovate leaf-blade and rounded and glabrous fruits, which are yellow or red when ripe. The fresh leaves are thick and glossy. This species is apparently closely related to *P. longipetiolatum* because of its leaf morphology, differing by the short petioles. Endemic to Brazil, it occurs in the states of Pernambuco, Ceará, Sergipe, Bahia, Espírito Santo, Rio de Janeiro, Minas Gerais, São Paulo, Paraná, Santa Catarina and the Rio Grande do Sul, in Caatinga, Cerrado and Atlantic Rainforest (BFG 2015). In the state of Espírito Santo, it is a widely distributed species, occurring within protected areas. The species was collected in areas of *montane* and *tabuleiro* forests, being predominant in *restinga* vegetation (Fig. 5a). Flowers from September to March, and fruits from November to August.

3. *Psidium cauliflorum* Landrum & Sobral, Sida, 22: 927, 2006.

Figs. 1i-n; 5a

Tree, 5–7 m tall; sparsely to densely pubescent, hairs rusty brown to reddish; branches cylindrical, 1–3 mm diam., pubescent; petiole 2–4 × 1–1.5 mm, leaf-blade elliptic, 4.7–10 × 2.2–4.7 cm, chartaceous, sparsely pubescent, more densely so along midvein and leaf margin, apex acute or acuminate, base cuneate, margin entire, slightly revolute; midrib vein slightly sulcate above and prominent below; 7–13 secondary veins at each side, visible on both sides, brochidodromous, marginal vein 6–3 mm from the margin. Inflorescences in clusters or dichasia on older branches or trunk; pedicels, 1–4 mm long; bracts 1 × 1 mm, ovate, bracteoles 1–1.2 × 0.2–0.3 mm, both persistent. Floral buds 3–8 × 2–5 mm, pyriform, apiculate, densely pubescent, calyx with lobes entirely fused, tearing in four irregular lobes, sepals 5–6 × 2–5 mm, irregular size and shape, trichomes sparse; petals 5–6 × 3–5 mm; stamens 4–6 mm long, anthers globose 0.5–0.8 mm long, rimose; ovary 4–5 locular, 7–9 ovules per locule. Fruits rounded or slightly pyriform 15–21 × 13–16 mm, densely pubescent; vinaceous when mature; seeds angular, 4–6 mm long, 4 per fruit.

Selected specimens: Cachoeiro de Itapemirim, 7.I.2014, fl. and fr., *A.C. Tuler et al. 485* (RB). Montanha, 29.XI.2012, fl., *D.A. Folli 6961* (CVRD). Rio Bananal, 1.IV.2012, fl., *J.E.Q. Faria 2535* (CVRD).

Psidium cauliflorum can be recognized by the rusty brown to reddish hairs covering the branches, petioles, leaves, flowers and fruits, and by the flowers attached to the trunk and older branches. This species resembles *Psidium* sp. due the cauliflorous inflorescence and leaf size, but *Psidium* sp. has glabrous inflorescences and fruits. Considered a rare species, *P. cauliflorum* is endemic of the Atlantic Rainforest (Funch *et al.* 2009; BFG 2015). This species was first described based on a specimen collected in Bahia and was recently found in Espírito Santo. In this state, this species is restricted to three localities in the heavily deforested *montane* forest areas, and has not been recorded within any protected area (Fig. 5a). It was collected in flower in January and April, and fruiting in May.

4. *Psidium guajava* L. Sp. Pl.: 470. 1753.

Figs. 1o-s; 5b

Tree or shrub, 1.8–8 m tall; glabrescent, branches tetragonal, 1.2–3.5 mm diam.; petiole 0.8–8 × 1–1.5 mm, leaf-blade elliptic or obovate, 3.5–11.5 × 2.5–6 cm, chartaceous or coriaceous, sparsely glabrescent, apex acute or obtuse, base acute or obtuse, margin entire, slightly revolute; midrib vein slightly sulcate above and prominent below; 12–18 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 1 mm from the margin. Solitary flower or dichasia, 1–3 flowered; pedicels 4–17 mm long, 1–2 mm wide; bracts 1.5–2 × 1–2 mm wide, ovate or triangular, bracteoles 1.5–7 × 0.3–0.5 mm, ovate or linear, both caducous. Floral buds 10–18 × 4.5–7 mm, pyriform, constricted above the ovary, apiculate; calyx with lobes entirely fused, tearing irregularly at anthesis in 4–5 lobes, sepals 5–9 × 3–7 mm, irregular in size and shape, with sparse trichomes sparse; petals 6–15 × 5–10 mm; stamens 5–11 mm, anthers globose, 0.7–1 × 0.5–1 mm, rimose; ovary 4–5 locular, 65–90 ovules per locule. Fruits rounded or pyriform, 23–25 × 12–21 mm, glabrous, yellow when mature; seeds angular, 3–4 mm long, 230–325 per fruit.

Selected specimens: Alegre, 16.10.2008, fl., *D.R. Couto 1007* (MBML). Aracruz, 16.IV.2011, fr., *C.L. Dalmonech 03* (MBML). Castelo, 2.V.2008, fr., *C.N. Fraga et al. 1966* (RB). Linhares, 17.IV.2001, fl. and fr., *D.A. Folli 3881* (CVRD). Mimoso do Sul, 31.III.2013, fr., *M.F.S. Ferreira* (VIES). São Mateus, 5.VI.1996, fl., *M.C.F. Jesus 01* (VIES). Vitória, 12.X.1984, fl., *A.G. Silva 618* (RB).

Psidium guajava can be characterized by the quadrangular branches, elliptic or obovate leaf-blade with 12–18 pairs of secondary veins, floral buds pyriform and apiculate, and glabrous fruits. This species resembles *P. guineense* in leaf-blade shape and size, but is distinguishable by the greater number of secondary veins and apiculate floral buds. *Psidium guajava* is a species of great economic importance, cultivated worldwide. This species is naturalized in Brazil, occurring in almost all states (BFG 2015), and was found in cultivation or occurring spontaneously in disturbed areas in the state of Espírito Santo (Fig. 5b). It was collected in flower between June and October, and fruiting between March and May.

5. *Psidium guineense* Sw. Prodr.: 77, 1788.

Figs. 3a-f; 5b

Tree or shrub, 1–6 m tall; densely pubescent, hairs rusty to brown, branches tetragonal, 1–4 mm diam.; petiole 3–14 mm long, 0.5–2.5 mm wide, leaf-blade elliptic or ovate, 3–16.7 × 1.6–6.8 cm, chartaceous or coriaceous, sparsely pubescent, more densely so along midvein and leaf margin, apex acute, obtuse or rounded, base acute or obtuse, margin entire, slightly revolute; midvein slightly sulcate above and prominent below; 6–12 pairs of secondary veins, evident on both faces, brochidodromous, marginal vein 0.5–2 mm from the margin. Solitary flower or dichasia, 1–3 flowered; pedicels 2–17 × 0.3–2 mm; bracts 1–3 × 0.5–1 mm or linear, bracteoles 1.5–3 × 0.4–1 mm, ovate or linear. Floral buds 6–14 mm long, 4–6 mm wide, pyriform, constricted above the ovary, calyx with lobes entirely fused tearing irregularly at anthesis in 4–5 lobes, sepals 4–8 mm long, 2–8 mm wide, irregular in size and shape, puberulent; petals 7–13 × 4–11 mm; stamens 5–12 mm, anthers globose 1–2 mm long, rimose; ovary 4–5 locular, 70–77 ovules per locule. Fruits rounded, 13–24 mm long, 8–20 mm wide, pubescent, yellow when mature; seeds angular, 2–3 mm long, 220–234 per fruit.

Selected specimens: Alfredo Chaves, 8.V.1985, fr., *G. Martinelli* 10895 (RB). Aracruz, 11.IX.1993, fl., *M. Simonelli* (VIES 7454). Castelo 8.IV.2009, fr., *C.N. Fraga* 2465 (MBML, RB). Conceição da Barra, 24.I.2012, fr., *A. Giaretta* 1171 (RB). Fundão, 22.IV.1984, *W. Pizzolo* 96 (MBML). Guarapari, 18.V.2000, fr., *J.R. Pirani* 4726 (RB). Linhares, 18.II.1997, fr., *R.L.S. Dutra* 244 (VIES). Marataízes, 3.XI.1972, fr., *L. Krieger* 11872 (RB). Muniz Freire, 15.V.2009, fr., *C.C. Jorden Almaça* (RB 494178). Santa Leopoldina, 1.V.2006, fr., *M.O.S. Crepaldi* 125 (RB). Santa Maria de Jetibá, 11.I.2008, fl. and fr., *T.S.*

Lorencini 17 (VIES). Santa Teresa, 28.V.2002, fr., *R.R. Vervloet* 317 (MBML, VIES). São Mateus, 2.II.2012, fl. and fr., *A. Giaretta* 1223 (RB). Serra, 22.IV.1993, fl., *O.J. Pereira* 4525 (VIES). Vila Velha, 6.XII.1997, fr., *J.M.L. Gomes* 2238 (VIES). Vitória, 1.X.1998, fl., *A.M. Assis* 652 (VIES).

Psidium guineense can be recognized by the elliptic leaf-blade with 6–12 pairs of secondary veins, and rounded and pubescent fruits. This species resembles *P. guajava* in the quadrangular branches, elliptic leaf-blade and leaf size. However, *P. guajava* has 12–18 pairs of secondary veins, and glabrous leaves and fruits. *Psidium guineense* occurs from Mexico and the Caribbean to Argentina. The species is widely distributed in Brazil, occurring in the Amazon Rainforest, Cerrado and Atlantic Rainforest (BFG 2015), where is known in almost all states. In the state of Espírito Santo, *Psidium guineense* is a common and widely distributed species, occurring within protected areas (Itaúnas State Park, Paulo César Vinha State Park, Santa Lúcia Biological Station, Vale Natural Reserve). Occurs in *tabuleiro*, *montane* and *restinga* vegetation and is commonly found in disturbed areas (Fig. 5b). It was collected in flowers between October and May and fruiting between January and March.

6. *Psidium longipetiolatum* D.Legrand Sellowia, 13: 341, 1961.

Figs. 3g-j; 5b

Tree, 14–30 m tall; glabrous or glabrescent, branches cylindrical, 1.5–6 mm diam., petiole 10–25 × 1–1.5 mm, leaf-blade obovate, rare elliptic 6–12 × 2.3–5.5 cm, chartaceous or coriaceous, glabrous, apex acuminate, acute or obtuse rounded, base cuneate or obtuse, margin entire, slightly revolute; midvein slightly sulcate above and prominent below; 8–10 pair of secondary veins, inconspicuous in the adaxial face, evident in the abaxial face, brochidodromous, marginal vein 1–3 mm from the margin. Solitary flower; pedicels 7–30 × 0.7–1.5 mm; bracts 2–2.5 × 2.5–3 mm, ovate, caduceous; bracteoles 0.2–0.3 × 0.4–0.5 mm, persistent. Floral buds 13–15 × 7–11 mm, pyriform, calyx with lobes entirely fused, tearing at anthesis in 4–5 lobed, sepals 2–3 × 3–5 mm, equal in size. Flowers not seen. Ovary 4–5 locular, 8–10 ovules per locule. Fruits rounded, 13–20 × 10–17 mm, glabrous, yellow or red when mature; seeds angular, 4–6 mm long, 11–14 per fruit.

Selected specimens: Linhares, 10.II.2007, fr., *D.A. Folli* 5197 (CVRD).

Additional specimen examined: Nova Friburgo, 3.XI.2013, fr., *P.V. Pietro* (RB 843286).

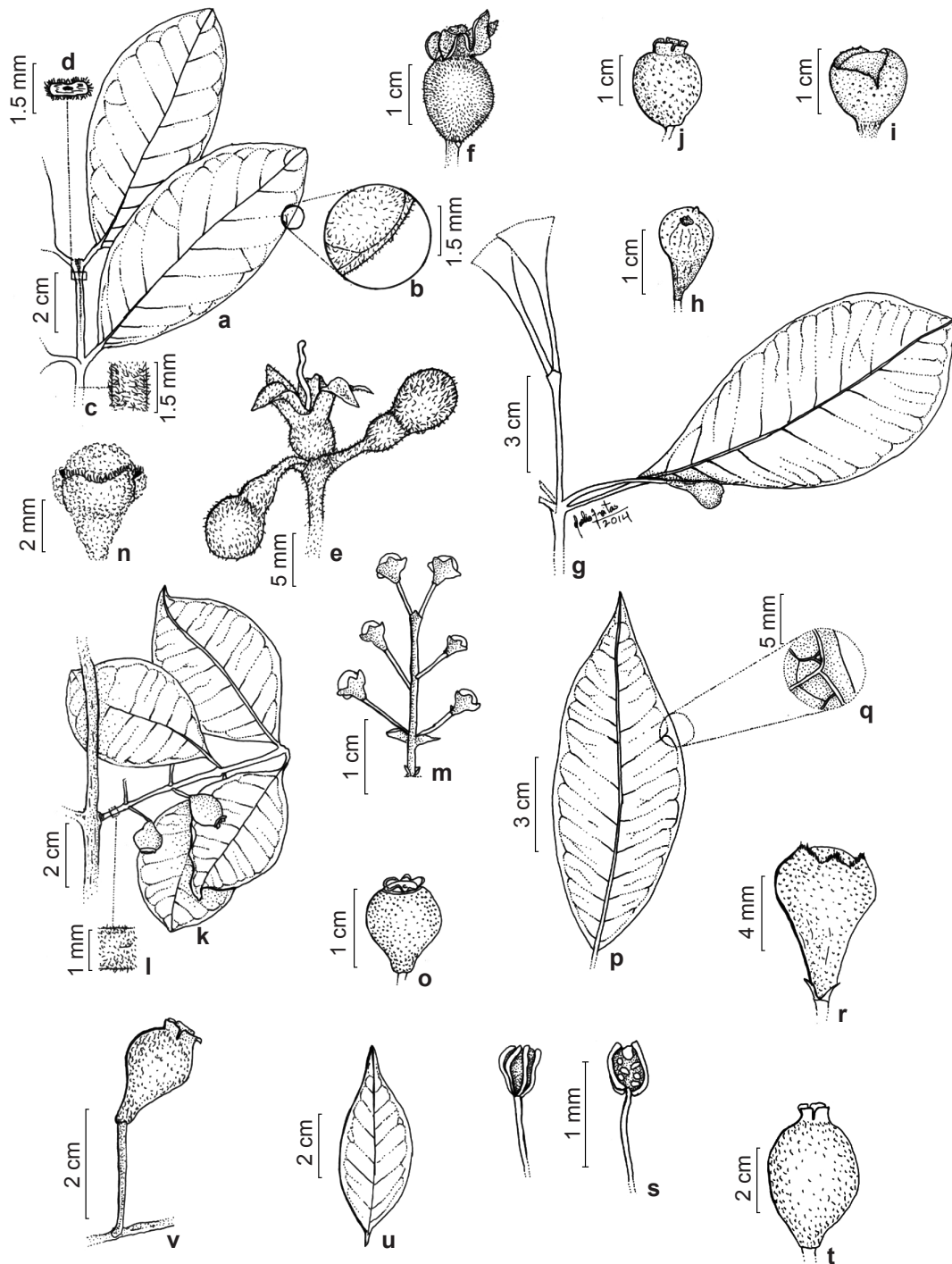


Figure 3 – a-f. *Psidium guineense* – a. elliptic leaves; b,c. leaves and branches sparsely pubescent; d. tetragonal branches; e. dichasia; f. pubescent and globose fruit. g-j. *Psidium longipetiolatum* – g. obovate leaves and axillary, uniflorous inflorescences; h,i. pyriform, apiculated floral buds; j. rounded fruits. k-o. *Psidium myrtilloides* – k. elliptic leaves; l. glabrescent branches; m. raceme; n. calyx partially fused; o. pyriform fruits. p-t. *Psidium oblongatum* – p. elliptic or oblong leaves; q. secondary veins evident on both sides; r. pyriform, partially fused floral buds; s. anthers globose with apical glands; t. pyriform fruit. u,v. *Psidium oligospermum* – u. elliptic leaves, apex acuminate; v. pyriform fruit. (a,f. V.C. Manhães 459; g,i. P.V. Pietro sn.(RB 843286); j. D.A. Folli 5197; k,n. A.C. Tuler 451; o. A.C. Tuler 510; p,q. V. Demuner 4594; r,t. T.T. Carrijo 2105; u,v. L.A. Silva 106).

Psidium longipetiolatum resembles *P. cattleanum* in the obovate leaf-blade and rounded fruits, however it differs mainly by the longer petiole and pedicels, and by fused calyx lobes. In the field, the bark of this species is remarkably smooth and reddish in colour. Endemic to the Atlantic Rainforest, *P. longipetiolatum* occurs in the states of Rio de Janeiro, São Paulo, Paraná, Rio Grande do Sul and Santa Catarina (Legrand & Klein 1977; BFG 2015). In Espírito Santo this species is known from *tabuleiro* forest in the Vale Natural Reserve (Fig. 5b). It was collected in fruit in February and March.

7. *Psidium myrtoides* O.Berg, *Fl. bras.* 14 (1): 384, 1857. Figs. 3k-o; 5c

Tree or shrub, 3–20 m tall; glabrous or glabrescent, branches cylindrical, 0.8–3.5 mm diam.; petiole 4–7 × 0.5–1.5 mm, leaf-blade elliptic or obovate, 2.5–11 × 1–4.5 cm, chartaceous or coriaceous, sparsely pubescent so along midvein, apex acuminate, acute or obtuse, base cuneate or acute, margin entire, slightly revolute.; midvein slightly sulcate above and prominent below; 7–14 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 1–2 mm from the margin. Inflorescence growing from terminal raceme or lateral or auxotelic axis producing vegetative shoots with adult leaves after anthesis, 1–8 flowered; pedicels 3–12 mm long; bracts ovate or triangular 2–3 × 1.5–2 mm, caducous; bracteoles 0.5–1 × 0.2–1 mm. Floral buds 2–6 × 2.3–4 mm, pyriform, calyx partially fused, tearing in five lobes, sepals 0.8–2 × 1–3 mm, rounded, equal in size; petals 4–5 × 3–5 mm, white; stamens 3–6 mm, anthers globose, 0.5–1 mm long, rimose; ovary 4-locular 5–8 ovules per locule. Fruits pyriform or rounded, 9–16 mm long, 5.5–14 mm wide, glabrous, red when mature; seeds angular, 4–5 mm long, 4–10 per fruit.

Selected specimens: Cariacica, 20.VII.2008, fr., *A.M.A. Amorim* 7576 (RB). Conceição da Barra, 24.X.2012, fr., *A. Giaretta* 1350 (RB). Domingos Martins, 15.III.2001, fr., *O.J. Pereira*, 6920 (VIES). Fundão, 18.III.2005, fr., *L. Kollmann* 7459 (MBML). Itapemirim, VII.2003, fr., *A.L. Ferreira* (VIES). Itarana, 14.II.1999, fr., *E.M. Nic Lughadha* (MBML, VIES). Linhares, 10.V.2000, fr., *D.A. Folli* 3617 (CVRD). Marechal Floriano 4.IV.2008, fr., *J.W. Calatrone* 69 (VIES). Pancas, 23.III.2007, fr., *A.A. Luz* 382 (CVRD). Santa Leopoldina, 23.X.2007, fl., *V. Demuner* 4293 (MBML, VIES). Santa Teresa, 13.V.2005, fr., *L. Kollmann* 7766 (MBML, VIES). Serra, 23.XII.2010, fr., *R.M. Botelho* 99 (MBML). Vitória, 10.X.1990, fr., *M.L.L. Martins* 23 (VIES).

Psidium myrtoides can be distinguished by the elliptic leaf-blade and fruits with rounded, persistent sepals. This species resembles *P. brownianum* by leaf size and shape, but differs by the pyriform or rounded fruits with rounded and persistent sepals. Endemic to Brazil, *P. myrtoides* occurs in the states of Tocantins, Bahia, Ceará, Maranhão, Distrito Federal, Goiás, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Rio Grande do Sul, in Caatinga, Cerrado and Atlantic Rainforest (BFG 2015). In the state of Espírito Santo, this species is known by the common name “araçáúna”, and is widely distributed, occurring in *tabuleiro*, *montane* and *restinga* vegetation, including protected areas (Fig. 5c). It was collected in flower between April and December, and fruits between February and December.

8. *Psidium oblongatum* O. Berg, *Fl. bras.* 14(1): 392. 1857. Figs. 3p-t; 5c

Tree or shrub, 4–12 m tall; glabrous, branches cylindrical, 1.5–4 mm diam., petiole 4–10 × 0.9–2.5 mm, leaf-blade elliptic or oblong, 6.8–19 × 2.7–7.8 cm, chartaceous or coriaceous, apex acuminate, base cuneate or attenuate, margin entire, slightly revolute; midvein impressed or slightly sulcate above, prominent below; 10–16 pairs of secondary veins, evident on both sides, marginal vein 1–4 mm from the margin. Inflorescence growing from terminal raceme or lateral, 1–8 flowered; pedicels 3–6 mm long, 0.4–1 mm wide; bracts ovate or lineate 1 × 0.5 mm, caducous; bracteoles ovate or lineate 0.6–1 × 0.3–1 mm. Floral buds 7–10 × 6–7 mm, pyriform, calyx partially fused, 4–5 lobed, sepals 4–7 × 3–5 mm, quadrangular, equal in size; petals 4–7 × 3–5 mm, white; stamens 3–5 mm, anthers globose 0.6–1 mm long, rimose, with apical glands; ovary 4-locular, 6–10 ovules per locule. Fruits pyriform or rounded, 38–53 × 26–56.5 mm, glabrous, yellow when mature; seeds rounded, 7–9 mm long, 15–20 per fruit.

Selected specimens: Águia Branca, 1.II.2006, fl., *L.F.S. Magnago* 555 (MBML). Cariacica, 22.VII.2008, fr., *C.N. Fraga* 2177 (RB). Governador Lindemberg, 23.VIII.2006, fr., *V. Demuner et al.* 2732 (MBML, VIES). Linhares, 16.XII.2003, fl., *D.A. Folli* 4708 (CVRD). Santa Leopoldina, 30.XII.2007, fl., *V. Demuner* 4647 (MBML). Santa Teresa, 11.III.1999, fr., *L. Kollmann* 2139 (MBML, RB).

Psidium oblongatum can be recognized by the elliptic or oblong leaf-blade with clearly marked secondary veins on both sides, fruits with rounded seeds, and globose anthers with apical

glands. The shape and size of fruits resemble those of *P. guajava*. However, *P. oblongatum* differs by the floral buds partially fused, regular sepals, and 15–20 rounded seeds per fruit. This species is restricted to the Atlantic Rainforest areas of Espírito Santo and Minas Gerais states (BFG 2015). In Espírito Santo, populations with few, scattered individuals were found both in *montane* and *tabuleiro* forests (Fig. 5c). It was collected in flowers between October and February and fruiting between December and July.

9. *Psidium oligospermum* Mart. ex DC. Prodr., 3: 236. 1828. Figs. 3u,v; 5c

Shrub 1 m tall; glabrescent, branches cylindrical, 1–2 mm diam., petiole 2–4 × 0.6–0.7 mm, leaf-blade elliptic, 3.3–6.5 × 1.2–2.2 cm, chartaceous, sparsely pubescent so along midvein, apex acuminate, base acute or cuneate; margin entire, slightly revolute; midvein slightly sulcate above and prominent below; 6–8 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 1–1.5 mm from the margin. Solitary flower; pedicels 12–17 × 0.2–0.5 mm; bracts and bracteoles not seen. Floral buds 4–6 × 3.5–4 mm, pyriform, calyx with lobes entirely fused, tearing irregularly as a calyptra; petals 5 × 4 mm, white; stamens 4–6 mm, anthers globose, 1 mm long, rimose; ovary 3-locular, 8–12 ovules per locule. Fruits pyriform or rounded, 16–21 × 6–12 mm, glabrous, yellow when mature; seeds angular, 3–4 mm long, 5 per fruit.

Selected specimens: Santa Teresa, 10.II.1999, fr., *L. Kollmann 1913* (MBML). Vila Velha, 8.II.2012, fr., *L. A. Silva 106* (VIES).

Additional specimen examined: BRAZIL. BAHIA: Esplanada, 29.V.1996, fl., *T. Jost & M.C. Ferreira 306* (RB).

Psidium oligospermum can be distinguished by its shrubby habit and rounded or pyriform yellow fruits. This species resembles *P. sartorianum* in leaf size and shape, differing by its shrubby habit and yellow fruits. Native to Brazil, *P. oligospermum* occurs in the states of Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Sergipe, Goiás, Espírito Santo and Minas Gerais, in Caatinga, Cerrado, and Atlantic Rainforest (BFG 2015). Although it is common in the Northeast of Brazil, in the state of Espírito Santo the species has so far been found only in the localities of Santa Teresa, outside the protected areas, and at Vila Velha, within the Municipal Park of Jacarenema (Fig. 5c). It was collected in fruit in February and March.

10. *Psidium ovale* (Spreng.) Burret, Notizbl. Königl. Bot. Gart. Berlin, 15: 485. 1941.

Figs. 4a-e; 5d

Shrub 1–2 m tall; glabrescent, cylindrical branches, 0.7–3 mm diam., petiole 1–2 × 0.7–1 mm, pubescent; leaf-blade ovate or elliptic 1–3.5 × 0.5–2 cm, chartaceous, sparsely pubescent so along midvein, apex obtuse or rounded, base acute or attenuate, margin entire, revolute; midvein slightly sulcate above and prominent below; 6–10 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 0.5–1 mm from the margin. Inflorescence growing from terminal raceme, solitary flower or auxotelic axis producing vegetative shoots with adult leaves after anthesis, 1–6 flowered; pedicels 2–8 × 0.2–0.5 mm; bracts triangular, ovate or lineate 0.5–2 × 0.3–1 mm, bracteoles ovate or lineate 0.4–1.5 × 0.2–0.5 mm, pubescent. Floral buds 1.5–3 × 1–2 mm, pyriform, calyx partially fused, tearing in five lobes, sepals 0.2–1 × 1–1.5 mm, rounded, equal in size, puberulent; petals 4-mera 3–3.2 × 1.5–2 mm, white; free, stamens 1.5–2 mm long, anthers globose, 0.3–0.6 mm long, rimose; ovary 2–3 locular, 2–4 ovules per locule. Fruits rounded, 4.8–5 × 4.5–5 mm, glabrous, yellow when mature; seeds angular, 4–5 mm long, 4 per fruit.

Selected specimens: Santa Leopoldina, 18.V.2011, fl., *J.E.Q. Faria 1218* (UB). Santa Teresa, 6.VI.1990, fl., *M. Gibran 123* (RB, CVRD). São Roque do Canaã, 14.XI.2004, fl., *A.P. Fontana et al. 1050* (MBML, VIES).

Psidium ovale can be recognized by the ovate or elliptic leaf-blade and small and rounded fruits. This species resembles *P. oligospermum* due to its similar leaves, but differs by presenting smaller and rounded fruits. Endemic to the Atlantic Rainforest, *P. ovale* occurs in the states of Minas Gerais, São Paulo, Espírito Santo, Paraná and Santa Catarina (BFG 2015). In Espírito Santo, populations of few and scattered individuals of this species grow in *montane* forest within conservation areas (Fig. 5d). It was collected flowering between June and November, and fruiting in April.

11. *Psidium rhombeum* O. Berg, *Fl. bras.*, 14(1): 383, 1857. Figs. 3f; 5d

Tree, 8 m tall; albo-pubescent, cylindrical branches 1–3 mm diam.; petiole 4–5 × 0.8–1 mm, leaf-blade rhomboid, 6.3–7 × 3.1–3.5 cm, chartaceous, glabrescent, apex acuminate, base acute or cuneate; midvein slightly sulcate above and prominent below; 8–10 pairs of secondary veins, evident on both sides, brochidodromous,

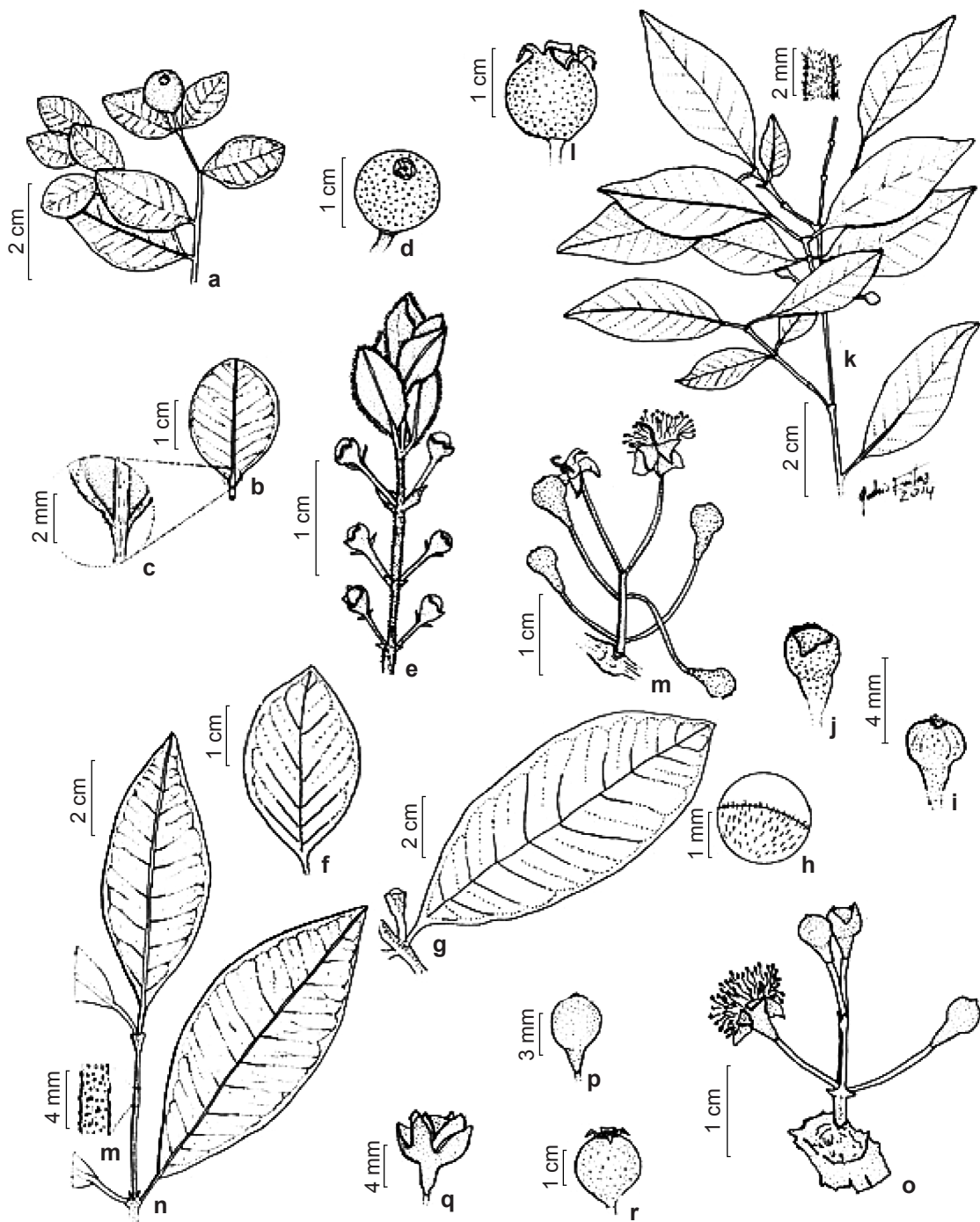


Figure 4—a-e. *Psidium ovale*— a. branches; b,c. ovate leaves, sparsely pubescent; d. globose fruits; e. axillary inflorescences, with continuing vegetative growth. f. *Psidium rhombicum* — rhomboid leaves. g-i. *Psidium rufum* — g. elliptic leaves; h. densely pubescent; i. pyriform, partially fused floral buds. j-m. *Psidium sartorianum* — j. floral buds; k. sparsely pubescent raceme; l. globose fruits; m. pyriform floral buds. n-r. *Psidium* sp. — n. glabrous branches; o. flowers on the trunk; p. pyriform, entirely fused, apiculate q. calyx 4–5-lobed; r. glabrous, rounded fruit. (a,c. A.P. Fontana 1050; d,e. V. Demuner 920; f. E.M. Nic Lughadha 201; g,i. M.M. Arbo 7724; j,l. D.A. Folli 376; m. I.A. Silva 279; n,o. M. Ribeiro 811; p,r. A.C. Tuler 496).

marginal vein 1 mm from the margin, margin entire, slightly revolute. Solitary flower or auxotelic axis producing vegetative shoots with adult leaves after anthesis, 1–8 flowered; pedicels 7–10 × 0.2 mm; bracts rounded 1 × 1 mm, bracteoles lineate 0.3–0.5 × 0.1 mm. Floral buds 3 × 4 mm, pyriform, calyx partially fused, tearing in five lobes, sepals 1–2 × 1–1.5 mm, stamens 4–5 mm long, anthers globose, 0.8–1 mm long, rimose; ovary 2-locular, 3–4 ovules per locule. Fruits pyriform, 10–13 × 6.8–9 mm, 5-sepals, 1.5–2 mm, glabrescent; seeds 4–5 per fruit, 5–7 mm long, angular.

Selected specimens: Itarana, 14.II.1999, *E.M. Nic Lughadha 201* (JBRJ, MBML, VIES). Marechal Floriano, 21.X.2000, *G. Hatschbach 71498* (CEPEC).

Psidium rhombeum can be distinguished by the rhomboid and glabrescent leaf-blade. This species resembles *P. myrtoides* in fruit size and shape, but differs by its rhomboid leaf-blade. *Psidium rhombeum* was previously known only from the Atlantic Rainforest of Bahia (BFG 2015). The specimen identification of *G. Hatschbach 71498* from Marechal Floriano and *E.M. Nic Lughadha 201* from Itarana expanded the geographic distribution of this species into Espírito Santo, where the species also occurs in *montane* forest (Fig. 5d). It was collected with fruits in February.

12. *Psidium rufum* Mart. ex DC., Prodr. 3: 234, 1828. Figs. 3g-i; 5d

Tree 3–4 m tall; branches densely pubescent, hairs rusty brown to reddish, tetragonal; petiole 1.5–2 mm diam.; petiole 4–6 × 0.5–1 mm, leaf-blade elliptic, 6–14 × 2.5–6 cm, chartaceous or coriaceous, sparsely pubescent, more densely so along midvein and leaf margin, apex acute, base cuneate or acute, margin entire, slightly revolute; midvein slightly sulcate above and prominent below; 10–12 pairs of secondary veins, evident on both faces, brochidodromous, marginal vein 1–2 mm from the margin. Solitary flower; pedicels 3–5 × 0.3–0.5 mm; bracts ovate 1–3 × 0.5–1 mm, bracteoles ovate or linear, 2–3 × 1–2 mm. Floral buds 5–8 × 4–5 mm, pyriform, calyx partially fused, tearing in five lobes, sepals 4–5 × 2–3 mm, irregular size and shape, puberulent; flowers not seen. Ovary 3-locular, 5 ovules per locule. Fruits rounded, 30–42 × 15–23 mm wide, pubescent; seeds angular, 3–4 mm long, 10 per fruit.

Selected specimens: Venda Nova do Imigrante, 27.I.1997, fl., *M.M. Arbo 7724* (RB). Santa Teresa, 18.I.1995, fr., *L.D. Thomaz 1073* (MBML, RB)

Additional specimen examined: BRAZIL. MINAS GERAIS: Descoberto, Reserva Biológica da Represa do Grama 18.V.2002, fr., *A.V. Lopes 36* (RB).

Psidium rufum can be recognized mainly by having branches, leaves and fruits covered with densely ferruginous to reddish indumentums, otherwise resembling *P. oblongatum* in leaf-blade size and shape. Native to Brazil, it occurs in the states of Bahia, Ceará, Goiás, Distrito Federal, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo and Paraná in Cerrado and Atlantic Rainforest (BFG 2015). In the state of Espírito Santo, the species is only known so far from two collections from Venda Nova do Imigrante and Santa Teresa, both on *montane* forest and not known inside protected areas (Fig. 5d). It was collected in flowers in January and fruiting in April.

13. *Psidium sartorianum* (O. Berg) Nied., Nat. Pflanzenfam. 3(7): 69, 1893. Figs. 4i-m; 5d

Tree 20–28 m tall; glabrescent, cylindrical branches, 1–3.2 mm diam., petiole 1.5–4 × 0.3–1 mm, leaf-blade elliptic 2.1–5.8 × 0.8–2.2 cm, chartaceous, discoloured when dry, sparsely pubescent so along midvein, apex acute or acuminate, base acute or cuneate, margin entire, revolute; midvein slightly sulcate above and prominent below; 8–10 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 0.5–1 mm from the margin. Solitary flower or raceme 1–8 flowered; pedicels 6–15 × 0.2–0.5 mm; bracts ovate or triangular 1 × 0.5 mm, bracteoles ovate or lineate 0.3–0.4 × 0.2 mm. Floral buds 3–5 × 2–3 mm, pyriform, calyx with lobes entirely fused tearing at anthesis in four or five lobes, sepals 1.5–3 × 2–3 mm, irregular size and shape; petals 3–4 × 2.5–3 mm, white; stamens 3–5 mm, anthers globose, 0.8 × 0.4 mm, rimose; ovary 3-locular, 6–8 ovules per locule. Fruits rounded, 11–15 × 9–14 mm, glabrous, striated fruits, red when mature; seeds 9–10 per fruit 4–5 mm long, rounded.

Selected specimen: Linhares, 9.XII.1981, fl. and fr., *D.A. Folli 376* (CVRD, BHCB).

Psidium sartorianum can be recognized by their habit and red, rounded fruits. This species resembles *P. oligospermum* by its elliptic leaf-blade; however it differs in habit and calyx tearing at anthesis in four or five lobes. *P. sartorianum* is known by the common name of “araçá-gigante”. Native to Brazil, the species occurs in the states of Acre, Rondônia, Bahia, Goiás, Mato-Grosso, Espírito Santo, Minas Gerais, São Paulo and Paraná (BFG 2015). In the state of Espírito Santo,

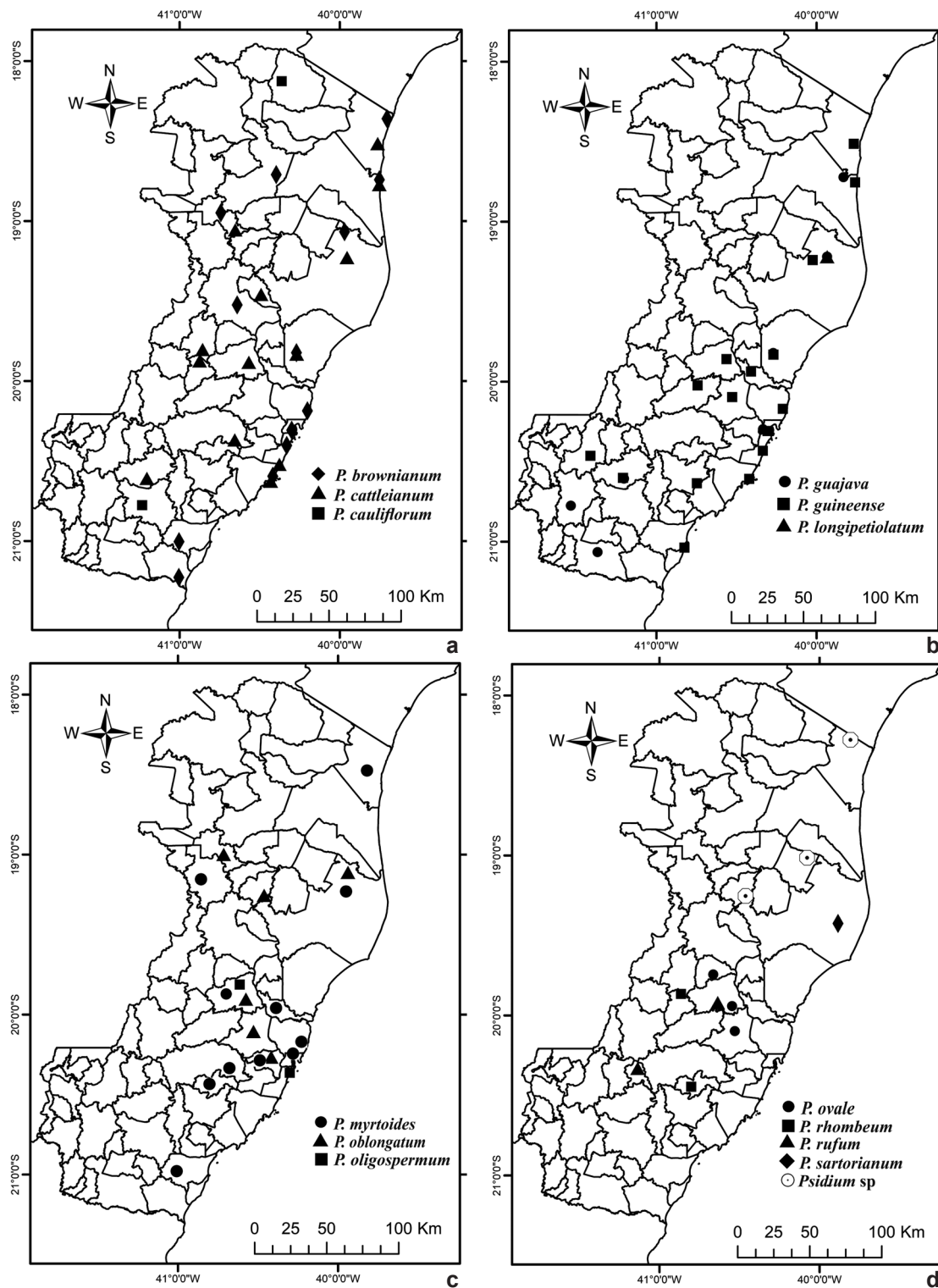


Figure 5 – Geographic distribution of *Psidium* species in the state of Espírito Santo: a. *P. brownianum*, *P. cattleianum*, *P. cauliflorum*. b. *P. guajava*, *P. guineense* and *P. longipetiolatum*. c. *P. myrtoides*, *P. oblongatum* and *P. oligospermum*. d. *P. ovale*, *P. rhombeum*, *P. rufum*, *P. sartorianum* and *Psidium* sp.

P. sartorianum is known by few collections from the Vale Natural Reserve, in *tabuleiro* forest (Fig. 5d). It was collected in flower in December and fruiting between December and March.

14. *Psidium* sp. Figs. 4n-r; 5d

Tree 6–12 m tall, glabrous, cylindrical branches, 1–3 mm diam., petiole 3–7 × 0.5–1.2 mm, leaf-blade elliptic, 4.5–11.5 × 2–4.7 cm, chartaceous, discolorous when dry, sparsely pubescent, apex acuminate or acute, base cuneate, margin entire, slightly revolute, repined; midvein slightly sulcate above and prominent below; 12–14 pairs of secondary veins, evident on both sides, brochidodromous, marginal vein 1–2 mm from the margin. Inflorescence borne in clusters on older branches or trunk, or dichasia botryoid, or raceme 1–8 flowered; pedicels 7–18 × 0.1–0.5 mm, redish; bracts ovate or triangular 1–1.5 × 0.5–0.8 mm; lineate bracteoles 0.5–1 × 0.2–0.5 mm. Floral buds 4–7 × 3–4.5 mm, pyriform, apiculated, sparsely pubescent, calyx with lobes entirely fused tearing at anthesis in 4–5 lobes, sepals 3–5 × 2–4 mm, rounded or triangular, pubescent; petals 4–5 × 4–5.5 mm, white; stamens 5–7 mm, anthers globose 0.3–0.5 × 0.2–0.4 mm, rimose; ovary 3-locular, ovules 7–12 per locule. Fruits rounded or slightly pyriform 11–25 × 10–20 mm, glabrous, wine-coloured when mature; seeds 6–8 per fruit 4–5 mm long, angular. **Selected specimens:** Conceição da Barra, 14.I.2014, fl. and fr., A.C. Tuler et al. 496 (RB). Governador Lindemberg, J.E.Q. Faria 2535. Sooretama, 18.I.2010, fr., M.F. Gusson 04 (VIES).

Psidium sp. can be recognized by the clusters of flowers attached to the trunk or to older branches and glabrous, wine-colored fruits. This species resembles *P. cauliflorum* due the cauliflorous inflorescence and by the elliptic leaf-blade, but differs by the absence of trichomes in flowers and fruits, and its apiculate floral buds. So far found only in the Atlantic Rainforest, there are records of similar materials in Espírito Santo and Rio de Janeiro (I.G. Costa, 359). In the state of Espírito Santo, *Psidium* sp. is known by populations of few scattered individuals occurring in *tabuleiro* forest at Sooretama Biological Reserve and Córrego Grande Biological Reserve (Fig. 5d). It was collected in flower between December and January and fruiting between January and April.

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