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Taxonomic synopsis of Myrtaceae in the Serra de Caldas Novas State Park, Goiás, Brazil

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Abstract: Myrtaceae, widely distributed in tropical regions, has about 5,500 species and is recognized for its ecological importance, the extensive economic use of several of its species and its considerable taxonomic complexity. In Brazil, it is represented by 29 genera and more than 1,200 species. This study presents a taxonomic synopsis of the genera of Myrtaceae in the Serra de Caldas Novas State Park (PESCAN), located in the southeastern region of the state of Goiás, Brazil. Thirty species were found, distributed among five genera: *Campomanesia* Ruiz et Pav., *Eugenia* L., *Myrcia* DC., *Psidium* L., and *Siphoneugena* O. Berg. As a result, an identification key for the genera is presented, in addition to descriptions and comments on each one, including geographical distribution and a preliminary list of species that occurs in PESCAN.

Keywords: cerrado, floristic, taxonomy.

Resumo: (Sinopse taxonômica de Myrtaceae no Parque Estadual da Serra de Caldas Novas, Goiás, Brasil) A família Myrtaceae, amplamente distribuída em regiões tropicais, apresenta cerca de 5.500 espécies e é reconhecida pela importância ecológica, o extenso uso econômico de várias de suas espécies e sua considerável complexidade taxonômica. No Brasil, está representada por 29 gêneros e mais de 1.200 espécies. Este estudo apresenta uma sinopse taxonômica dos gêneros de Myrtaceae no Parque Estadual da Serra de Caldas Novas (PESCAN), localizado na região sudeste do estado de Goiás, Brasil. Constatou-se a ocorrência de 30 espécies distribuídas em cinco gêneros: *Campomanesia* Ruiz et Pav., *Eugenia* L., *Myrcia* DC., *Psidium* L., e *Siphoneugena* O. Berg. Como resultado, é apresentada uma chave para a identificação dos gêneros, além de descrições e comentários sobre cada um deles, incluindo distribuição geográfica e lista preliminar das espécies ocorrentes no PESCAN.

Palavras-chave: Cerrado, florística, taxonomia.

Introduction

Myrtaceae includes nearly 140 genera and more than 5,500 species (Wilson, 2011; Proença et al., 2026), and is considered the most diverse family within the Myrtales order (Maurin et al., 2021). The family is markedly concentrated in tropical and subtropical regions, with its main centres of diversity in South America, Southeast Asia, and Australia (Wilson et al., 2001; Souza & Lorenzi, 2020; POWO, 2026).

In Brazil, Myrtaceae is the eighth most diverse family among angiosperms, with more than 1,200 species distributed through 29 genera (BFG, 2021). All species in the Brazilian territory belongs to the Myrteae DC. tribe recognized as the richest in species within the family (Wilson et al., 2001). Of great ecological and economic importance, the Myrteae tribe stands out for its fleshy fruits which play a crucial role in feeding wildlife, promoting essential biotic interactions for the balance of ecosystems (Gomes et al., 2017).

The family plays a significant role in forest ecosystems (Jo et al., 2022), accountable for 10-15% of vegetation cover in biomes such as the Cerrado and the Atlantic Forest (Lucas & Bünger, 2015; Alvarez et al., 2025). In the Cerrado, it is particularly diverse and striking, highlighting in areas of *campos rupestres*, but also present in other phytophysiognomies (Rosa & Romero, 2012). Sano et al. (2008) report the presence of 18 genera and

336 species of Myrtaceae in the Cerrado. Among these, *Eugenia*, *Myrcia*, and *Psidium* represents approximately 73.81% of the total species recorded in the biome.

From a taxonomic point of view, the family is considered one of the most complex, both because of the vast number of described species and the scarcity of detailed and updated taxonomic studies (Souza & Lorenzi, 2020). This complexity makes species identification a challenging task, especially considering the great intraspecific morphological variability and the lack of consensus on the delimitation of many taxa, in addition to the insufficiency of systematic reviews in some geographic regions (Fernandes et al., 2025).

Thus, given the significant species richness and taxonomic complexity in Myrtaceae, the objective of this study is to provide a taxonomic synopsis of the family in the Serra de Caldas Novas State Park, Goiás, Brazil, providing a key to genera and a preliminary list of species that occurs in the area in order to contribute to enhance the knowledge of the diversity of its flora.

Material and Methods

Serra de Caldas Novas State Park (PESCAN) is located in the southeastern region of the state of Goiás (17° 44' 40.8" S and 48° 39' 49.6" W) covering an area of approximately 12,500 ha and situated between the municipalities of Caldas Novas and Rio Quente (Figure 1). The region has a tropical climate Aw type, according to Köppen's classification, characterized by a dry winter season and a rainy summer. The average annual rainfall is approximately 1,500 mm concentrated predominantly between October and March (Nimer, 1989). The Serra de Caldas Novas encompasses a diversity of vegetation formations distributed along a topographic gradient. This mosaic ranges from forest environments, such as *cerradão* and gallery forests, to grassland areas, such as *campo limpo* and *campos rupestres*, reflecting the ecological complexity of the region (Eiten, 1978).

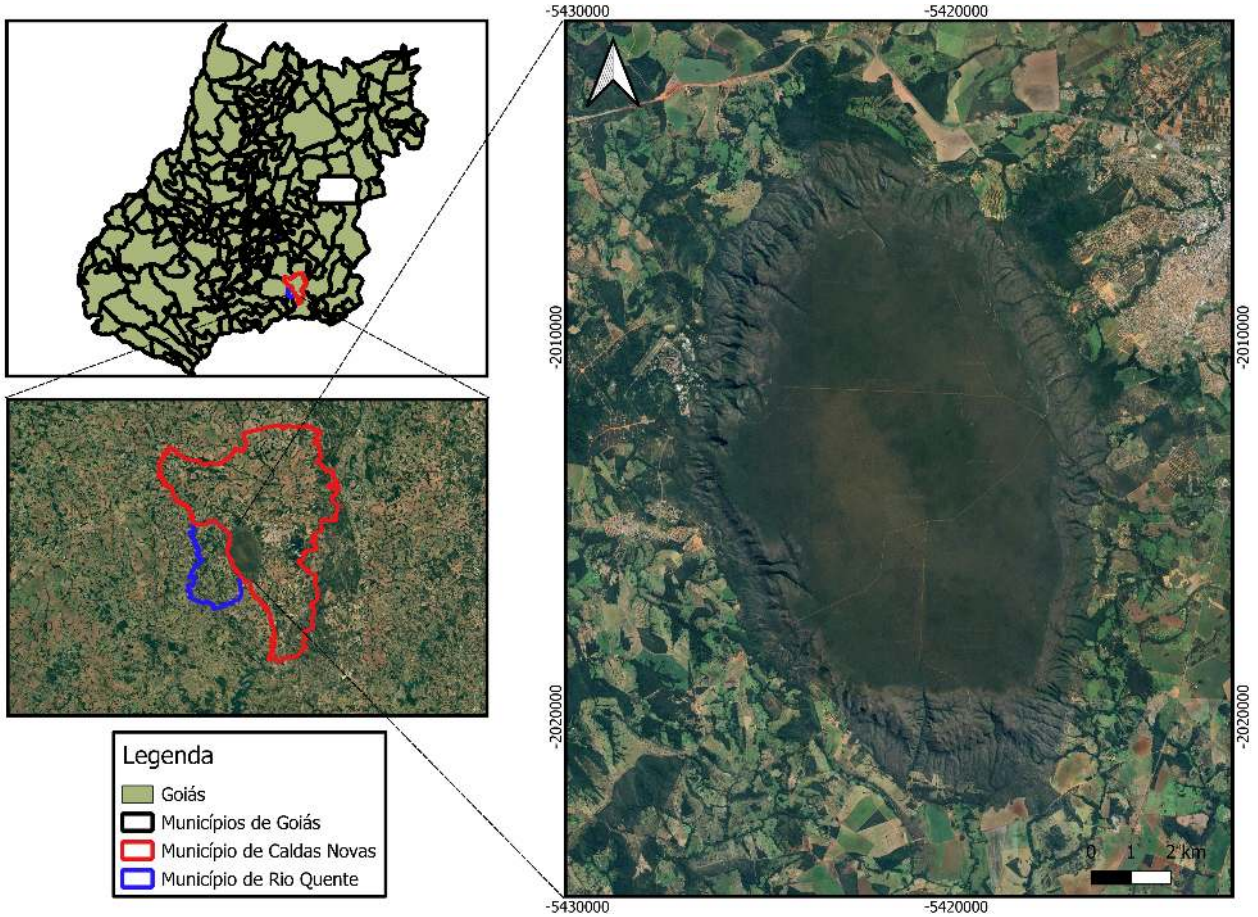


Figure 1: Location of Serra de Caldas Novas State Park between the municipalities of Caldas Novas and Rio Quente in the Goiás state, Brazil.

Myrtaceae samples collected at PESCAN were compiled in a survey in CEN, HUFU, MBM, UB, UFG and UPCB herbaria, acronyms follow Thiers (2026), only herbarium specimens were analyzed in this study. The nomenclature was reviewed and follows Flora e Funga do Brazil (2026). The descriptions of the family and genera were based on the available literature, including classic studies and recent reviews, as well as on the analysis of specimens collected at PESCAN. The key to the genera was constructed prioritizing diagnostic characteristics, including the vegetative ones. The list of species was obtained from the collections of the herbaria consulted and

organized in alphabetical order of genera and respective species.

Results and Discussion

Myrtaceae Juss., Gen. Pl., 322, 1789.

Subshrubs, shrubs or trees, exfoliating or non-exfoliating bark, glabrous or with indumentum, simple unicellular or rarely scaly trichomes. **Leaves** simple, opposite or alternate, without stipules, entire margin, marginal vein, pinnate venation, evident translucent glands on leaves, flowers, fruits, and seeds. **Inflorescences** uniflorous, paniculate or racemose, often reduced to fascicles or glomerules, determinate (dichasial) or indeterminate, terminal or axillary; flowers solitary and axillary or in bracteate branches, androgynous, actinomorphic, with or without developed hypanthium; sepals 4-5, free or fused, opening into regular or irregular lobes or in the form of a calyptra; petals usually 4-5[6], white, rarely reddish, pink, purple, or absent; stamens generally numerous; carpels 2-5(-10), fused; stigma generally capitate; ovary inferior; ovules (1-)2-20 per locule, anatropous to campylotropous. **Fruits** single or multi-seeded, berry; seed with membranous to bony shell; leafy cotyledons embryo, strongly folded, twisted, and long radicle (myrtle-like); fleshy cotyledons, conjoined or distinct, and small or inconspicuous radicle (eugenoid); very small cotyledons and long, curved, or spiraled radicle (myrtle-like).

Identification key for Myrtaceae genera in the Serra de Caldas Novas State Park

1. More than 2 loculi ovary
   2. Numerous seeds fruit (usually 4–80, but sometimes more than 300), bony testa ..... ***Psidium***
   2. Few seeds fruit (1-8), without a bony testa ... . ***Campomanesia***
1. 2 loculi ovary
   3. Inflorescences usually reduced, fasciculate or racemose
      4. Flowers not constricted above the ovary, flattened hypanthium ..... ***Eugenia***
      4. Flowers constricted above the ovary, tube-like hypanthium extending above it .... ***Siphoneugena***
   3. Inflorescences in panicles ..... ***Myrcia***

1. *Campomanesia* Ruiz *et* Pav., Fl. Peruv. Prodr.: 72, 1794.

Subshrubs, shrubs or trees, young branches glabrous, pubescent, hirsute, villous or tomentose. Leaves opposite or decussate; petiole absent, short, developed, canaliculate; blade 1.0–15 cm long, glabrous or covered by trichomes, dense or sparse glands; flat or conduplicate, smooth, bulged or wrinkled; adaxial surface glabrous, pubescent, velutinous, tomentose, hirsute or villose along the veins; venation visible or not; domatia absent or present, in tufts of trichomes or in pockets in the axil of the midvein with the secondary veins; base acute, cordate, subcordate, obtuse or rounded; margin entire, revolute, undulate, crenate or dentate; apex acute, acuminate, obtuse or rounded. Flowers axillary, solitary or in racemose, dichasial, triflorous inflorescences; flower bud with open or closed calyx, completely apiculate or with rounded or star-shaped apical pore; bracts navicular or not; pedicels glabrous or pubescent; bracteoles leafy or not, linear, lanceolate or triangular, persistent or deciduous in the flower bud, larger or smaller than the hypanthium; hypanthium elongated or not, with or without lateral expansion, constricted or not near the apex of the ovary; calyx 4–6 sepals (lobes), densely or sparsely glandular, equal or unequal, irregular, ovate, triangular, auriculate, truncate, oblong or navicular, reflexed or not; petals densely or sparsely glandular; ovary 2–18 locules, inner walls glandular (persisting in the seed as a false stigma); 2–15 ovules per locule. Fruit berry, subglobose or globose, rarely discoid or pyriform, glandular or not, smooth or ornamented, immature green, mature green, yellow, orange, red, vinaceous or dark purple; seeds 1–8; rudimentary cotyledons embryo, elongated curved axis.

Campomanesia has a wide geographical distribution extending from northeastern Argentina to Trinidad, and from the Brazilian coast to the Andes in Peru, Ecuador and Colombia (Landrum, 1986). In Brazil 37 species are recognized occurring all over the country, the Southeast region with the highest number of species (Oliveira et al., 2026). Many species are associated with the Atlantic Forest. One species is recorded in the Serra de Caldas Novas State Park: *Campomanesia adamantium* (Cambess.) O.Berg (Figure 2a).

2. Eugenia L., Sp. Pl., 1(1): 470-471, 1753.

Subshrubs, shrubs or trees, glabrous or covered by trichomes. **Leaves** predominantly opposite, but also ternate, subternate, subopposite or whorled; midvein usually grooved, occasionally flat or prominent on the adaxial surface, prominent on the abaxial surface; petiole present. **Inflorescences** fascicles, glomerules, simple or compound dichasia, botryoids, thyrses, thyrsoids, racemes, auxothetic racemes, as well as isolated flowers; flowers 4-[5-6]-merous; calyx free, partially or completely fused lobes, tearing regularly or irregularly; bracts persistent or deciduous; bracteoles persistent until fruiting or deciduous; hypanthium glabrous or covered by trichomes; calyx lobes persistent in fruit, sometimes forming a tube; stamens numerous; punctate stigma style; ovary 2-locular, containing one to numerous ovules per locule, locules glabrous or with internal indumentum. **Fruits** globose, oblate, ellipsoid or pyriform; yellow, orange, red, or purple when ripe; glabrous or covered by trichomes; seeds 1-15, testa varying from membranous to thick and woody; embryo with free, fused or partially fused cotyledons.



Figure 2: (A) *Campomanesia adamantium*; (B) *Eugenia acutata*; (C) *E. aurata*; (D) *E. bimarginata*; (E) *E. complicata*; (F) *E. involucrata*.

Eugenia comprises about 1,050 species, distributed from southern Mexico, Cuba, and the Antilles to Uruguay and Argentina, with a small number of species (approximately 60) in Africa (Merwe et al., 2005), Southeast Asia, and the Pacific Islands (c. 14 and 35 species, respectively). In Brazil, 423 species are recognized, occurring in all regions of the country, the Southeast region being the most representative, most species are associated with the Atlantic Forest (Mazine et al., 2026). Seven species are recorded in the Serra de Caldas Novas State Park: *Eugenia acutata* Miq.; *E. aurata* O.Berg; *E. bimarginata* DC.; *E. complicata* O.Berg; *E. involucrata* DC. (Figure 2); *E. punicifolia* (Kunth) DC. and *E. stictopetala* Mart. ex DC. (Figure 3).

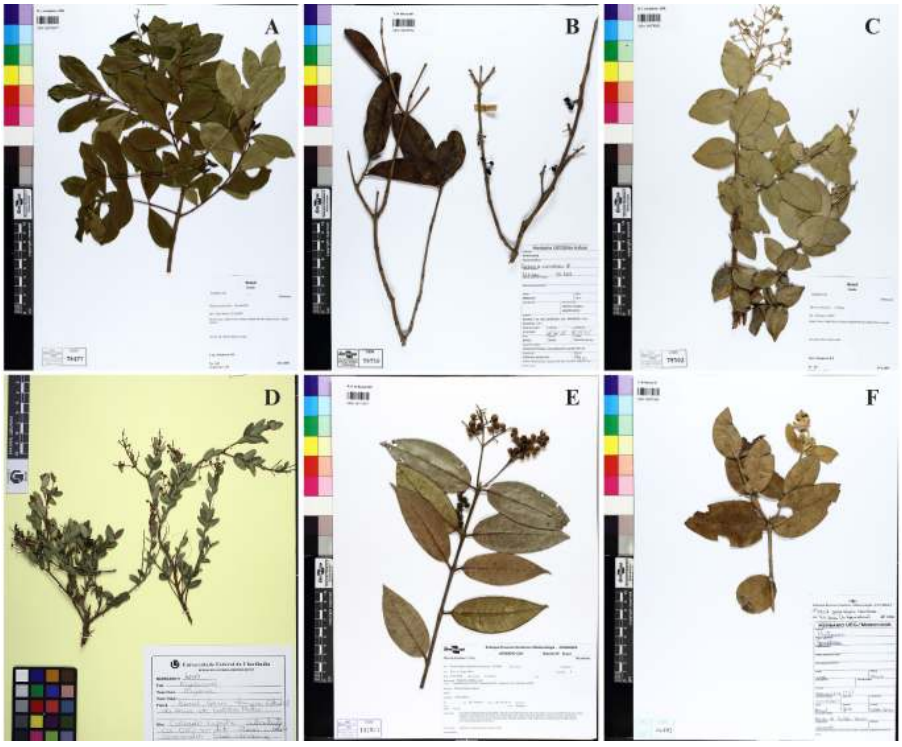


Figure 3: (A) *Eugenia punicifolia*; (B) *E. stictopetala*; (C) *Myrcia albotomentosa*; (D) *M. dictyophylla*; (E) *M. fenzliana*; (F) *M. goyazensis*.

3. *Myrcia* DC., Dict. Class. Hist. Nat., 11: 401, 1827.

Subshrubs, shrubs, or trees; cataphylls present or absent in vegetative internodes; glabrous or with simple trichomes, occasionally dibrachiate, translucent glands present throughout the branches, leaves, flowers, sepals, petals, and fruits. **Leaves** opposite distichous or decussate, alternate; midvein usually grooved, occasionally flat or prominent on the adaxial surface, prominent on the abaxial surface; margin entire, flat, involute, revolute or conduplicate; petiole present or absent. **Inflorescence** usually in regularly branched panicles, sometimes reduced or organized in subopposite arrangements, forming spikes; terminal flowers usually grouped in triads; bracts and bracteoles deciduous, rarely persistent after the flowers opening; sepals (0–)4–5(–7)-merous; disc flat, glabrous or covered by trichomes; hypanthium flat or forming a tube above the ovary; calyx lobes free or partially to fully fused, sometimes opening irregularly longitudinally or transversely or falling as a calyptra at anthesis; petals usually white, red or pink, sometimes reduced or atrophied in closed buds; circular stamen ring covered by trichomes or glabrous; stamens (30–)50–300, tetrasporangiate and bilocular anthers at anthesis, thecae of equal or unequal length, sometimes with apical oil gland; ovary predominantly 2-locular (rarely 1 or 4–8 locules), 2 ovules per locule (exceptionally 1 or 3–9), attached at a single point on the septum, usually below the central region. **Fruit** berry, globular or ellipsoid, persistent or deciduous calyx lobes (remnants sometimes evident); usually a single seed, membranous testa; leafy cotyledons embryo, folded, surrounded by an elongated hypocotyl.

Mycia comprises approximately 800 exclusively neotropical species (POWO, 2026). In Brazil, 410 species are recognized, occurring in all regions of the country, with the Southeast region and the Atlantic Forest biome as the most representative for the genus (Santos et al., 2026). Sixteen species are recorded in the Serra de Caldas Novas State Park: *Myrcia albotomentosa* DC.; *M. dictyophylla* (O.Berg) Mattos & D.Legrand; *M. fenzliana* O.Berg; *M. goyazensis* Cambess.; *M. guianensis* (Aubl.) DC.; *M. lasiantha* DC.; *M. linearifolia* Cambess.; *M. myrtillifolia* DC.; *M. pinifolia* Cambess.; *M. racemulosa* DC. (Figure 4); *M. splendens* (Sw.) DC.; *M. tomentosa* (Aubl.) DC.; *M. tortuosa* (O.Berg) N.Silveira; *M. uberavensis* O.Berg; *M. variabilis* DC.; and *M. vestita* DC. (Figure 5).



Figure 4: (A) *Myrcia guianensis*; (B) *M. lasiantha*; (C) *M. linearifolia*; (D) *M. myrtillifolia*; (E) *M. pinifolia*; (F) *M. racemulosa*.

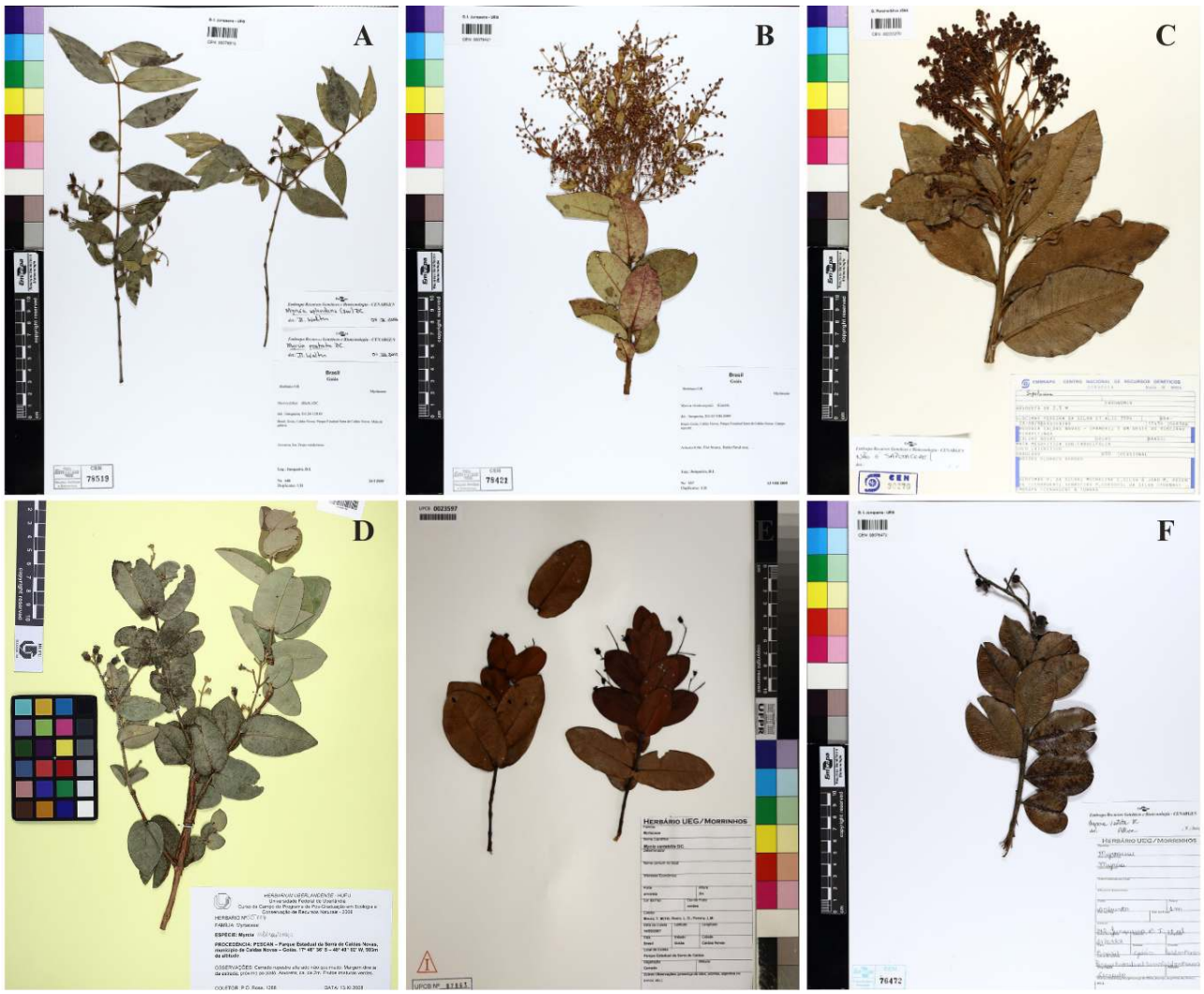


Figure 5: (A) *Myrcia splendens*; (B) *M. tomentosa*; (C) *M. tortuosa*; (D) *M. uberavensis*; (E) *M. variabilis*; (F) *M. vestita*.

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

Shrubs or trees, trichomes ranging from tiny to long, white, yellowish, golden, ochre or rusty; young branches cylindrical, slightly to strongly flattened distally or strongly tetragonal. **Leaves** opposite, rarely ternate; in fast-growing branches proximal leaves might be subopposite or alternate; cholethers rarely present; brochidodromous to eucamptodromous venation, forming or not a submarginal collecting vein, sometimes avennate. **Flowers** solitary axillary or in simple triflorous dichasium, more rarely in a compound dichasium (7 - 15 flowers) or in botryoids, sometimes in racemes; usually auxotrophic, subterminal, axillary or cauline, 1–3(4) pairs of opposite flowers; buds 4–15 mm; bracteoles deciduous or persistent until fruiting; 5-merous, sometimes 4 and 5-merous at the same individual; sepals free exposing the petaliferous globe or partially fused leaving the petaliferous globe visible through a rounded, tetragonal, or pentagonal pore or fully fused to the apex forming a closed bud with a hidden petaliferous globe, sometimes apiculate; anthesis may occur by opening of the calyx lobes without tearing or by opening accompanied by slight to deep tearing of the hypanthium, forming 5 regular lobes or 2–5 irregular lobes or by the fall of a perfect or imperfect calyptra; petals white or cream, occasionally pink in bud; stamens 80–300(–700), arranged in 3–12 whorls; anthers rounded to oblong usually crowned by a single apical gland, 1–20(–22) glands along the connective on both sides, rarely eglandular; ovary 2–5(6) locules; placenta lamellar or peltate, poorly or strongly developed; lamellae intrusive, extrusive or parallel to the outer walls of the locules when developed, 1–8 rows of ovules in the margins; stigma punctiform to peltate. **Fruits** usually green, yellowish-green or yellow, more rarely reddish, dark carmine or black at maturity; seeds (1–)4–80(–320), bony testa, rough or opaque surface (rarely somewhat glossy), with an operculum; cochlear embryo, rudimentary apical cotyledons.

Psidium includes 70 accepted species distributed from Mexico and the Caribbean to Argentina and Uruguay (POWO, 2026). In Brazil, 60 species are recognized, occurring all over the country, mainly in the Southeast and Northeast region, most species are associated with the Atlantic Forest and the Cerrado (Tuler et al., 2026). Five species are recorded in the Serra de Caldas Novas State Park: *Psidium australe* Cambess.; *P. laruotteanum* Cambess.; *P. myrsinites* DC.; *P. myrtoides* O.Berg; and *P. rufum* Mart. ex DC. (Figure 6).



Figure 6: (A) *Psidium australe*; (B) *P. laruotteanum*; (C) *P. myrsinites*; (D) *P. myrtoides*; (E) *P. rufum*; (F) *Siphoneugena densiflora*.

5. *Siphoneugena* O.Berg, Linnaea 27: 136, 344. 1854.

Trees, young branches flattened. **Leaves** opposite, usually distichous, flat midvein or, more often, prominent on the adaxial surface when young, flat-grooved in the adult leaves of some species; numerous secondary veins, collecting vein 0.3–2 mm from the margin. **Inflorescence** racemose, axillary or lateral, rarely subterminal; peduncle generally absent; rachis 0–2.7 mm; flowers (1–)2–9(–14), opposite, decussate, often appearing to originate from the same point due to the extreme reduction of the rachis in umbelliform racemes; bracts and bracteoles free and poorly developed; flower buds open or closed, glandular dots present; anthesis with or without rupture of the hypanthium or forming a calyptra; calyx formed by 4 calyx lobes or transformed into a calyptra; petals white, occasionally pink in bud, 4-merous, developed or rudimentary; hypanthium extended into a infundibuliform tube above the apex of the ovary, revolute at the apex and deciduous in the fruit; ovary predominantly 2-locular, (2)3–5(–8) ovules per locule. **Fruit** berry, globular, dark purple when ripe, circular scar resulting from the abscission of the hypanthium tube; whitish pulp, free from the seed coat; seeds 1(–4); reduced radicle-hypocotyl axis and free embryo, flat-convex cotyledons.

Siphoneugena is distributed from Puerto Rico to Northwest Argentina (Proença, 1990; POWO, 2026). It has 14 species, twelve of which are distributed throughout the Brazilian regions, the Southeast region being the most representative, most species are associated with the Atlantic Forest and the Cerrado (Proença, 2026). One species is recorded in the Serra de Caldas Novas State Park: *Siphoneugena densiflora* O.Berg. (Figure 6).

Conclusion

Thirty species of the Myrtaceae were recorded, distributed across five distinct genera: *Campomanesia, Eugenia, Myrcia, Psidium* and *Siphoneugena*. *Myrcia* with 16 species (53.33%) and *Eugenia* with seven species (23.33%) are the most prominent genus, followed by *Psidium* with five species (16.67%), while *Campomanesia* and *Siphoneugena* were represented by one species each (3.33%). These data indicate the significant floristic richness of Myrtaceae in the studied area, reinforcing its ecological relevance for the local biome.

Although the results are satisfactory they highlight the need to expand research efforts through new expeditions. The scarcity of material in herbaria leads to limited

studies on Myrtaceae, especially in areas of high diversity such as PESCAN, requiring further investigation to deepen knowledge about the taxonomy, ecology and conservation of these species. The continuity of these studies is essential to support strategies for the preservation of regional flora and to broaden the understanding of the ecological dynamics of the family, contributing to the conservation of biodiversity in the area.

The list of Myrtaceae species from PESCAN with their respective vouchers is availabe in the Table 1:

Table 1. Myrtaceae species in the Serra de Caldas Novas State Park (PESCAN) and respective voucher.

Scientific name	Voucher
Campomanesia adamantium (Cambess.) O.Berg	CEN 42645
Eugenia acutata Miq.	CEN 78446
*Eugenia aurat*a O.Berg	CEN 76471
Eugenia bimarginata DC.	CEN 78485
Eugenia complicata O.Berg	CEN 100657
Eugenia involucrata DC.	CEN 78486
Eugenia punicifolia (Kunth) DC.	CEN 78477
Eugenia stictopetala Mart. ex DC.	CEN 78750
Myrcia albotomentosa DC.	CEN 78502
Myrcia dictyophylla (O.Berg) Mattos & D.Legrand	HUFU 42515
Myrcia fenzliana O.Berg	UB 160023
Myrcia goyazensis Cambess.	CEN 76392
Myrcia guianensis (Aubl.) DC.	HUFU 55734
Myrcia lasiantha DC.	UFG 23784
Myrcia linearifolia Cambess.	MBM 47167
Myrcia myrtillifolia DC.	HUFU 39403
Myrcia pinifolia Cambess.	CEN 78420
Myrcia racemulosa DC.	UB 153619
Myrcia splendens (Sw.) DC.	CEN 78519
Myrcia tomentosa (Aubl.) DC.	CEN 78421
Myrcia tortuosa (O.Berg) N.Silveira	CEN 30270
Myrcia uberavensis O.Berg	HUFU 55717
Myrcia variabilis DC.	UPCB 87863
Myrcia vestita DC.	CEN 76472
Psidium australe Cambess.	CEN 110888
Psidium laruotteanum Cambess.	HUFU 42514
Psidium myrsinites DC.	CEN 78494
Psidium myrtoides O.Berg	UFG 13609
Psidium rufum Mart. ex DC.	CEN 63501
Siphoneugena densiflora O.Berg	CEN 78389

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