Phyllanthus novofriburgensis and P. pedrosae, two new species of Phyllanthus subsect. Clausseniani (Phyllanthaceae) from Southeastern Brazil

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Abstract. Phyllanthus novofriburgensis J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. and P. pedrosae J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. are new species of Phyllanthaceae described from the Brazilian Atlantic Forest and Brazilian Cerrado, respectively. Phyllanthus novofriburgensis resembles P. acutifolius Poir. ex Spreng., P. hypoleucus Müll.Arg. and P. lilliputianus J.C.R.Mendes, J.M.A.Braga & Fraga, sharing ovate, elliptical, and lanceolate leaf blades. However, it can be distinguished by its pendulous habit, often with sinuous branches and lanceolate leaf blades with characteristically revolute margins. Phyllanthus pedrosae exhibits morphological similarities with P. claussenii Müll.Arg. due to its subshrubby and prostrate habit. It is distinguished by the unisexual inflorescence with cymules composed of one or two staminate flowers proximally positioned in the axil of the branches and solitary pistillate flowers distally situated, and the 5-merous calyx in the staminate and pistillate flowers. Both new species are classified in Phyllanthus subgen. Phyllanthus sect. Phyllanthus subsect. Clausseniani G.L.Webster, primarily due to the deeply emarginate anthers. Notes on their geographical distribution and habitat are provided, as well as a key to the species of Phyllanthus from Southeastern Brazil.

Keywords. Atlantic Forest, Brazilian Cerrado, Neotropics, rocky landscape, taxonomy.

Introduction

During the last decades, approximately 1270 species were recognized in Phyllanthus s.l. (Phyllanthaceae), making it one of the giant pantropical genera of angiosperms, with more than 50 sections and almost 20
subsections (Kathriarachchi et al. 2006; Bouman et al. 2018). However, with the recent split of the *Phyllanthus* s.l. in 18 genera based primarily on molecular phylogenetic data, the number of species in this genus has been reduced to just over 200 species, mainly occurring in the American continent, distributed into five subgenera, 24 sections and seven subsections (Bouman et al. 2022). The newly circumscribed genus *Phyllanthus* is characterized by its phyllanthoid or non-phyllanthoid branching, monochlamydeous flowers without pistillodes, and with a segmented nectariferous disc in staminate flowers and an entire nectariferous disc in pistillate flowers, and seeds differently ornamented (Bouman et al. 2022).

*Phyllanthus* subgen. *Phyllanthus* sect. *Phyllanthus* subsect. *Clausseniani* G.L.Webster is one of the largest subsections, with 26 species, including five species recently described from Brazil (Torres et al. 2020; Mendes et al. 2021, 2022). This section is characterized by deeply emarginate anthers, distinct and often stipitate thecae, 4-colporate pollen grains, and mostly non-capitate stigmas (Webster 2002; Mendes 2022). However, it is necessary to carry out a molecular phylogenetic study to elucidate the positioning of this subsection, since the *P. claussenii* Müll.Arg. and *P. caparaoensis* G.L.Webster emerged within a clade with neotropical species belonging to sections *Antipodanthus* (G.L.Webster) R.W.Bouman and *Choretropsis* Müll.Arg. (see Kathriarachchi et al. 2006; Bouman et al. 2021).

In recent years, five new species were discovered in subsection *Clausseniani*, which were all restricted to microhabitats in mountainous regions with altitudes ranging from 1000 to 1600 m and rugged topography where they grow on rocky outcrops or slopes, in lithic or sandy soils (Torres et al. 2020; Mendes et al. 2021, 2022). In these same environments of rocky outcrops and slopes, two additional species of subsection *Clausseniani* were discovered in the rocky landscape in the Atlantic Forest from Rio de Janeiro and in Cerrado (savanna) from Minas Gerais, both Brazilian states. In this paper, we provide morphological descriptions, illustrations, an identification key for *Phyllanthus* species occurring in Southeastern Brazil, a map with occurrence records, an assessment of the conservation status, and taxonomic notes.

**Material and methods**

The study was based on the analysis of specimens deposited in the herbaria OUPR, MBML, PEUFR and RB (acronyms according to Thiers 2023), including Mendes’s recent collections used as type in this study. Measurements and other traits (e.g., geographic distribution and phenology) provided in the descriptions are based on the analysis of herbarium specimens and on populations studied in the field. The morphological terminology follows Webster (2002) and Beentje (2016). The distribution map was generated in QGIS ver. 3.16. (QGIS Development Team 2020). The preliminary conservation status was assessed according to IUCN guidelines and criteria (IUCN 2022) complemented by the online geospatial conservation assessment tool (GeoCat), which was used to calculate the extent of occurrence (EOO) and area of occupancy (AOO), with a user-defined cell of 2 km² (Bachman et al. 2011).

**Results**

**Taxonomy**

Class Magnoliopsida Brongn.
Order Malpighiales Mart.
Family Phyllanthaceae Martinov
Genus *Phyllanthus* L.
Subgenus *Phyllanthus* L.
Section *Phyllanthus* L.
Subsection *Clausseniani* G.L.Webster
Phyllanthus novofriburgensis

J.C.R. Mendes, J.M.A. Braga & Fraga sp. nov.

**Diagnosis**

Diagnostic characteristics in relation to other species in the subsection: herbaceous to subshrubby habit, 0.6–1 m tall, pendulous. Stem rugose. Leaf blade 10–30 × 5–9.5 mm, lanceolate, base and apex obtuse, apex sometimes mucronate, margin revolute. Staminate pedicel 1.8–2 mm long and pistillate pedicel 3–5 mm long. Staminate disc surface slightly papillose.

**Etymology**

The specific epithet is based on the type locality.

**Type material**

- **Type**

- **Paratypes**

**Description**

Herb to subshrub 0.6–1 m tall, pendulous, monoecious. Stem cylindrical, rugose, glabrous. Cataphylls present. Branching non-phyllanthoid. Branches erect, sometimes flexuose, cylindrical, rugose, glabrous, pinnatifid; stipules ca 2 mm long, triangular, glabrous. Petiole 2–2.2 mm long, cylindrical, glabrous. Leaf blade 10–30 × 5–9.5 mm, membranaceous, lanceolate; base obtuse; apex obtuse, sometimes mucronate; adaxial and abaxial sides glabrous, adaxial side dark green and abaxial side light green; margin revolute; venation brochidodromous, 8–9 pairs of secondary veins. Inflorescence a simple cyme, axillary, bisexual; cymules with 2 staminate flowers and 1 pistillate flower arranged along the branch; bracts up to 1 mm long, triangular. Staminate flowers with pedicel 1.8–2 mm long; sepals 5, 1.5–2 × ca 1 mm, uniseriate, obovate, apex largely obtuse, glabrous on both sides, whitish, midrib not very evident; glandular disc 5-segmented, alternisepalous, obtriangular, surface slightly papillose; stamens 3, filaments completely free, up to 1.2 mm long; anthers deeply emarginate, with oblique dehiscence; pollen grains 4-colporate. Pistillate flowers with a 3–5 mm long pedicel; sepals 5, 2–2.2 × ca 1 mm, uniseriate, orbicular, apex obtuse, glabrous on both sides, whitish-green, midrib evident; glandular disc entire, cup-shaped, smooth; ovary up to 1 mm in diam., 3-locular, depressed globose; styles 3, free at base, 1–1.5 mm long; stigma 2-fid, descending, subcapitate. Capsules 1.8–2 mm in diam., 6-mericarp, light green, glabrous, calyx and stigma persistent; fruit pedicel 2–2.3 mm long. Seeds 1–1.2 mm long, trigonous; hilum terminal, obtriangular; verrucose ornamentation with regularly arranged stellate ribs; light brown.

**Distribution, habitat and phenology**

*Phyllanthus novofriburgensis* sp. nov. is found in the phytogeographic domain of the Atlantic Forest in the city Nova Friburgo, state of Rio de Janeiro, Brazil, growing under rocky walls (inselberg), in altitudinal ranges between 868 and 1267 m (Fig. 3). It was collected with flowers and fruits in September, October and November and only with flowers in February.
Preliminary conservation assessment

*Phyllanthus novofriburgensis* sp. nov. falls into the Critically Endangered (CR) category, sub-criterion B1+B2 ab(iii,iv), due its range size (EOO) of 7 km² and AOO of 4 km². We classified it in this category because the species is restricted to a single rocky wall where an old train line is located. The surrounding area faces intense demographic pressure and anthropization. Consequently, we anticipate an imminent threat to the conservation of *P. novofriburgensis*.

*Phyllanthus pedrosae* J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov.

urn:lsid:ipni.org:names:77342726-1

Figs 1G–M, 3–4; Table 2

**Diagnosis**

Diagnostic characteristics in relation to other species in the subsection: subshrubby habit, 1.5–2 m tall, stems and branches angular, smooth. Leaf blade membranaceous, ovate to elliptical, apex mucronate. Cymules axillary, unisexual; staminate flowers 1 or 2 close to the branch axil and solitary pistillate flowers distally positioned. Staminate pedicel 12–13 mm long and pistillate pedicel 8.5–10 mm long. Fruit pedicel 10–12 mm long, capsules 3–5 mm in diam., oblate.

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*Fig. 3.* Distribution map of *Phyllanthus novofriburgensis* J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. (white square) and *P. pedrosae* J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. (white circle). State abbreviations: ES = Espírito Santo; MG = Minas Gerais; RJ = Rio de Janeiro; SP = São Paulo.
**Etymology**
The specific epithet is a tribute to Luciano Pedrosa, an independent botanist and great connoisseur of the flora of Minas Gerais, responsible for numerous collections that have contributed to the knowledge of the flora in this region.

**Type material**

**Type**
BRAZIL – Minas Gerais • Ouro Preto, Parque Estadual do Itacolomi, campo ferrugineo; 20°25’08″ S, 43°30’24″ W; 1470 m a.s.l.; 3 May 2021; fl., fr.; J.C.R. Mendes 222; holotype: PEUFR [PEUFR55853]; isotypes: OUPR, RB.

**Paratypes**
BRAZIL – Minas Gerais • Ouro Preto; 27 May 1995; fl.; M.C.T.B. Messias s.n.; OUPR [1701], PEUFR • same data as for preceding; 1 Nov. 1996; fl., fr.; M.C.T.B. Messias s.n.; OUPR [6395], PEUFR • same data as for preceding; 16 May 2000; fl.; M.C.T.B. Messias 350; OUPR, PEUFR • same data as for preceding; 20 Jun. 2023; fl.; J.C.R. Mendes et al. 390; OUPR, PEUFR.

**Description**
Subshrub 1.5–2 m tall, prostrate, monoecious. Stem angular, smooth, glabrous. Cataphylls present. Branching non-phyllanthoid. Branches erect, angular, smooth, glabrous, pinnatiform; stipules up to 1 mm long, slightly triangular, glabrous. Petiole 1.5–2 mm long, cylindrical, glabrous. Leaf blade 11–16 × 9–11 mm, membranaceous, ovate to elliptical; base cuneate; apex mucronate; adaxial and abaxial sides glabrous, adaxial side dark green and abaxial side light green; margin revolute; venation brochidodromous, 8–9 pairs of secondary veins. Inflorescence a simple cyme, axillary, unisexual; cymules with 1 or 2 staminate flowers close to the branch axil and solitary pistillate flowers distally positioned; bracts up to 1 mm long, triangular. Staminate flowers with pedicel 12–13 mm long; sepals 5, 1.8–2 × ca 2 mm, biseriate, orbicular, apex rounded, glabrous on both sides, pink, midrib evident; glandular disc 5-segmented, alternisepalous, cuneiform, surface glandular; stamens 3, filaments completely free, 0.8–1 mm long; anthers deeply emarginate, with vertical dehiscence; pollen grains 4-colporate. Pistillate flowers with a 8.5–10 mm long pedicel; sepals 5, 1–1.5 × ca 2 mm, biseriate, broadly obovate, apex rounded to slightly obtuse, glabrous on both sides, pinkish to pinkish-green, midrib evident; glandular disc entire, patelliform, smooth; ovary up to 1.8 mm in diam., 3-locular, oval; styles 3, united at base, up to 1 mm long; stigma 2-parted, parallel, subcapitate. Capsules 3–5 mm in diam., oblate, 6-mericarp, dark green, glabrous, calyx and stigma persistent; fruit pedicel 10–12 mm long. Seeds 1.8–2 mm long, trigonous; hilum terminal, ovate; verrucous ornamentation with regularly arranged stellate ribs; dark brown.

**Distribution, habitat and phenology**
*Phyllanthus pedrosae* sp. nov. is found in the phytogeographic domain of Cerrado in the city of Ouro Preto, state of Minas Gerais, Brazil, growing on slopes of rocky outcrops, close to watercourses in the Parque Estadual do Itacolomi, in altitudinal ranges between 1470 and 1600 m (Fig. 3). It was collected with flowers and fruits in May and November; and with flowers in May and June.

**Preliminary conservation assessment**
*Phyllanthus pedrosae* sp. nov. is categorized as Critically Endangered (CR), sub-criterion B2ab(ii,iv) due to its AOO of 4000 km². Although this species has abundant populations and is inserted in the context of a protected area, we believe that the species faces many threats due to the uncontrolled deforestation process in the surroundings of the Parque Estadual do Itacolomi and because the region is heavily visited by tourists.
Fig. 4. *Phyllanthus pedrosae* J.C.R. Mendes, J.M.A. Braga & Fraga sp. nov. **A–B.** Habitat. **C.** Branches (in detail the shape of the branches, as well as the apex of the leaf blade). **D.** Floral branches. **E.** Branches with a staminate flower in detail. **F–G.** Capsule. Photos by J.C.R. Mendes (A–B), L. Pedrosa (C–E) and F–G by M.C.T.B. Messias (OUPR [6395]).
Key to species of Phyllanthus subsect. Clausseniani known from Southeastern Brazil (including two species found in Northeastern Brazil)

1. Stem and branches with trichomes ........................................................................................................... 2
   - Stem and branches glabrous .................................................................................................................. 5

2. Branches hirsute ........................................................................................................................................ 3
   - Branches mucilaginous-hyaline ............................................................................................................ 4

3. Leaf blades ovate 5–13 mm long; stamens 3 completely free ................................................................. \( P. \) arenicola Casar.
   - Leaf blades elliptical to orbicular 15–30 mm long; stamens 2 completely united ............................ \( P. \) piranii G.L. Webster

4. Subshrub 50–80 cm tall, erect; leaf blade ovate-lanceolate, apex attenuate, adaxial surface scabrous;
staminate sepals largely elliptical; staminate disk obtriangular with glandular surface; anthers with
   vertical dehiscence; pistillate sepals obovate to broadly obovate; capsule smooth, pink to reddish or
   rarely light green ......................................................................................................................................... \( P. \) acutifolius Poir. ex Spreng.
   - Herb 14–30 cm tall, erect; leaf blade elliptical, apex acute to acuminate, adaxial surface sparsely
     mucilaginous-hyaline; staminate sepals rhombic to widely obovate; staminate disk cuneiform with
     papilllose surface; anthers with oblique dehiscence; pistillate sepals slightly unguiculate; capsule
     strigose, light green ............................................................................................................................... \( P. \) lilliputianus J.C.R. Mendes, J.M.A. Braga & Fraga

5. Branches angular to finely angular-flat .................................................................................................... 6
   - Branches cylindrical ................................................................................................................................ 7

6. Branches finely angular-flat; leaf blades 3–10 mm long, broadly elliptic to orbicular, base rounded to
   truncate, apex rounded sometimes obtuse-mucronate, coriaceous; staminate pedicel and fruit pedicel
   < 3 mm long. ............................................................................................................................................. \( P. \) caparaoensis G.L. Webster
   - Branches angular; leaf blade 11–16 mm long, ovate to elliptical, base cuneate, apex mucronate,
     membranaceous; staminate pedicel and fruit pedicel ≥ 10 mm long ................................................ \( P. \) pedrosae sp. nov.

7. Staminate and pistillate flowers with 6 sepals .......................................................................................... 8
   - Staminate and pistillate flowers with 5 sepals ....................................................................................... 10

8. Stamens 3, connate forming a column ......................................................................................... \( P. \) fastigiatus Mart. ex Müll.Arg.
   - Stamens 3, completely free .................................................................................................................. 9

9. Shrub 100–150 cm tall; leaf blade broadly elliptical to orbicular; staminate disk 6-segmented,
   obtriangular with faveolate surface; pistillate disc patelliform with alveolate surface ........................................ \( P. \) claussenii Müll.Arg.
   - Subshrub 50–80 cm tall; leaf blade ovate to lanceolate; staminate disc 6-segmented, obovate
     with verrucose surface; pistillate disc cupuliform with glabrous surface ................................................. \( P. \) hypoleucus (Miq.) Müll.Arg.

10. Branches fractiflex (zigzag) .................................................................................................................. 11
    - Branches sometimes erect or sinuose .................................................................................................. 12

11. Shrub 80–100 cm tall; leaf blade 2.5–5 × 3–4.5 mm, orbicular to subovate; inflorescence unisexual;
staminate sepals biseriate, orbicular; anthers with vertical dehiscence ........................................ \( P. \) retroflexus Brade
    - Herb 30–50 cm tall; leaf blade 15–25 × 10–15 mm, largely elliptical to oval-elliptical;
      inflorescence bisexual; staminate sepals uniseriate, obovate; anthers with horizontal
      dehiscence ............................................................................................................................................. \( P. \) sobralii J.C.R. Mendes, J.M.A. Braga & Fraga
12. Leaf blade elliptical-falcate or oblong-obovate ................................................................. 13
   - Leaf blade broadly elliptical, orbicular, lanceolate or ovate ........................................... 14

13. Branching non-phyllanthoid; leaf blade elliptical-falcate, base oblique, apex obtuse to rounded;
stipules triangular, evident; staminate disc with glandular surface; anthers with vertical dehiscence;
pistillate flower pedicel 6–8 mm long ............................................................... P. itatiaiensis Brade
   - Branching phyllanthoid; leaf blade oblong-obovate, base cuneate, apex obtuse-mucronate; stipules
     narrowly triangular, not evident; staminate disc with smooth surface; anthers with horizontal
     dehiscence; pistillate flower pedicel 4–5 mm long ........................................ P. mocotensis G.L.Webster

14. Leaf blade broadly elliptical to orbicular; staminate disc verruculose ................................P. subemarginatus Müll.Arg.
   - Leaf blade lanceolate to ovate; staminate disc tuberculate or papillose ................................ 15

15. Staminate disc tuberculate, with a pore in each tubercle.................................................... P. tuberculatus Marques-Torres & M.J. Silva
   - Staminate disc slightly papillose ......................................................................................... 16

16. Subshrub to shrub, erect; branching phyllanthoid; leaf blade ovate-lanceolate 35–85 × 9–35 mm,
    base acute, apex acuminate to long-acuminate; stipules 4–5 mm long, narrowly triangular; staminate
    pedicel 7–8 mm long; fruit pedicel 20–25 mm long; seeds 1.8–2 mm long ................................. P. glaziovii Müll.Arg.
   - Herb to subshrub, pendulous; branching non-phyllanthoid; leaf blade lanceolate, base obtuse,
     apex obtuse sometimes mucronate; stipules ca. 2 mm long, triangular; staminate pedicel 1.8–2 mm long;
     fruit pedicel 2–2.3 mm long; seeds 1–1.2 mm long. ................................................. P. novofriburgensis sp. nov.

Discussion

Due to the distinct morphology of the deeply emarginate anthers, distinct and often stipitate thecae, 4-colporate
pollen grains, and mostly non-capitate stigmas (see Webster 2002; Mendes 2022), P. novofriburgensis sp. nov.
and P. pedrosae sp. nov. are assigned to the Phyllanthus subgen. Phyllanthus sect. Phyllanthus subsect.
Claussenian, which presently includes 26 species exclusively found in Brazil (Torres et al. 2020; Mendes

Phyllanthus novofriburgensis sp. nov. is an easily identifiable species due to its pendulous habit, often
with sinuous branches and lanceolate leaf blades with characteristically revolute margin. It exhibits
morphological similarity to P. acutifolius Poir. ex Spreng., P. hypoleucus Müll.Arg., P. lilliputianus
J.C.R.Mendes, J.M.A.Braga & Fraga, and P. tuberculatus Marques-Torres & M.J.Silva, which
present ovate, elliptical, and lanceolate leaf blades, but these species are easily distinguished from
P. novofriburgensis by the characteristics highlighted in Table 1.

Phyllanthus pedrosae sp. nov. can be recognized mainly by its subshrubby habit, angular stems, smooth
branches, membranaceous ovate to elliptical leaf blades with mucronate apex, 2-parted stigma, parallel
stigmas, and fruit pedicels measuring 10–12 mm. The subshrubby and prostrate habit indicates close
affinity with P. claussenii, differing mainly in its unisexual inflorescences with cymes composed of 1 or
2 staminate flowers proximally positioned at the axil of the branches and solitary pistillate flowers distally
positioned in the branches (vs bisexual inflorescences with 3 cymes, each one with 2–3 staminate
flowers and one pistillate flower with an elongated filiform pedicel arranged along the branches in P.
claussenii) and by the number of sepals (5) in staminate and pistillate flowers (vs 6 sepals in P. claussenii).
Furthermore, P. pedrosae is a species that maintains a certain affinity with P. subemarginatus Müll.Arg.
and P. caparaoensis G.L.Webster, especially because they present 5 sepals in both flowers and occur in
Table 1. Diagnostic comparison between *Phyllanthus novofriburgensis* J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. and congeneric species. Abbreviations: BA = Bahia; ES = Espírito Santo; MG = Minas Gerais; RJ = Rio de Janeiro; SP = São Paulo; AF = Altitude Fields; MSSF = Montana Seasonal Semideciduous Forest; DOF = Dense Ombrophylous Forest; ADOF = Altomontana Dense Ombrophylous Forest; REST = restingas.

<table>
<thead>
<tr>
<th>Morphological character</th>
<th><em>P. novofriburgensis</em> sp. nov.</th>
<th><em>P. acutifolius</em></th>
<th><em>P. hypoleucus</em></th>
<th><em>P. lilliputianus</em></th>
<th><em>P. tuberculatus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaf blade size (mm)</td>
<td>10–30 × 5–9.5</td>
<td>8–20 × 5–12</td>
<td>6–38 × 3–20</td>
<td>15–20 × 8–13</td>
<td>11–20 × 5–8</td>
</tr>
<tr>
<td>Leaf blade shape</td>
<td>Lanceolate</td>
<td>Ovate-lanceolate</td>
<td>Ovate, sometimes elliptical</td>
<td>Elliptical</td>
<td>Ovate</td>
</tr>
<tr>
<td>Leaf base</td>
<td>Obtuse</td>
<td>Obtuse to rounded</td>
<td>Obtuse to rounded</td>
<td>Cuneate</td>
<td>Rounded</td>
</tr>
<tr>
<td>Leaf apex</td>
<td>Obtuse to sometimes mucronate</td>
<td>Attenuate to acute</td>
<td>Acute to acuminate</td>
<td>Acute to acuminate</td>
<td>Acuminate</td>
</tr>
<tr>
<td>Leaf margin</td>
<td>Revolute</td>
<td>Revolute-hyaline</td>
<td>Entire</td>
<td>Slightly revolute</td>
<td>Entire</td>
</tr>
<tr>
<td>Leaf surface</td>
<td>Glabrous</td>
<td>Scabrous</td>
<td>With papillae</td>
<td>Sparsely mucilaginous-hyaline</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Leaf blade consistency</td>
<td>Membranaceous</td>
<td>Membranaceous</td>
<td>Membranaceous</td>
<td>Membranaceous</td>
<td>Chartaceous</td>
</tr>
<tr>
<td>Stamine pedicel (mm long)</td>
<td>1.8–2</td>
<td>2.5–3</td>
<td>2–3</td>
<td>2.5–3</td>
<td>7–10</td>
</tr>
<tr>
<td>Stamine flower disc</td>
<td>5-segmented, obovate</td>
<td>5-segmented, obtriangular</td>
<td>6-segmented, rounded</td>
<td>5-segmented, cuneiform</td>
<td>5-segmented, obtriangular</td>
</tr>
<tr>
<td>Stamine flower disc surface</td>
<td>Slightly papillose</td>
<td>Glandular</td>
<td>Verrucose</td>
<td>Papillose</td>
<td>Tuberculate, with a central pore</td>
</tr>
<tr>
<td>Anthers and dehiscence</td>
<td>Deeply emarginate, oblique</td>
<td>Deeply emarginate, vertical</td>
<td>Deeply emarginate, horizontal</td>
<td>Deeply emarginate, oblique</td>
<td>Not-emarginate, horizontal</td>
</tr>
<tr>
<td>Stamine and pistillate sepals (respectively)</td>
<td>5, obovate; orbicular</td>
<td>5, largely elliptical; obovate to broadly obovate</td>
<td>6, elliptical or obovate; elliptical to oblanceolate</td>
<td>5, rhombic to widely obovate; slightly unguiculate</td>
<td>5, largely obovate, sometimes elliptical; obovate</td>
</tr>
<tr>
<td>Pistillate pedicel (mm long)</td>
<td>3–5</td>
<td>7–8</td>
<td>6–8</td>
<td>3–4</td>
<td>18–20</td>
</tr>
<tr>
<td>Pistillate flower disc</td>
<td>Cupuliform</td>
<td>Cupuliform</td>
<td>Cupuliform</td>
<td>Annular</td>
<td>Patelliform</td>
</tr>
<tr>
<td>Styles branches (mm long)</td>
<td>1–1.5</td>
<td>0.8–1</td>
<td>0.5–1</td>
<td>0.8–1</td>
<td>Up to 1</td>
</tr>
<tr>
<td>Geographic distribution/habitat</td>
<td>RJ; AF</td>
<td>MG, RJ, SP; AF, MSSF, ADOF</td>
<td>BA; DOF, REST</td>
<td>ES; DOF</td>
<td>BA; DOF</td>
</tr>
</tbody>
</table>
### Table 2. Diagnostic comparison between *Phyllanthus pedrosae* J.C.R.Mendes, J.M.A.Braga & Fraga sp. nov. and congeneric species.

<table>
<thead>
<tr>
<th>Morphological character</th>
<th><em>P. pedrosae</em> sp. nov.</th>
<th><em>P. caparaensis</em></th>
<th><em>P. claussenii</em></th>
<th><em>P. fastigiatus</em></th>
<th><em>P. subemarginatus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem and branches</td>
<td>Angular, glabrous</td>
<td>Finely angular-flat, scabridulous</td>
<td>Cylindrical, fissured</td>
<td>Cylindrical, rugous</td>
<td>Cylindrical, glabrous to rarely papillose</td>
</tr>
<tr>
<td>Leaf shape</td>
<td>Ovate to elliptical</td>
<td>Orbicular</td>
<td>Largely elliptical to orbicular</td>
<td>Elliptical to obovate (± concave)</td>
<td>Ovate, broadly elliptical to orbicular</td>
</tr>
<tr>
<td>Leaf blade size (mm)</td>
<td>11–16 × 9–11</td>
<td>3–10 × 1.5–10</td>
<td>13–22 × 6–17</td>
<td>3.5–5 × 1.3–2</td>
<td>12–19 × 9–12</td>
</tr>
<tr>
<td>Base of leaf blade</td>
<td>Cuneate</td>
<td>Rounded to truncated</td>
<td>Obtuse</td>
<td>Obtuse to rounded</td>
<td>Obtuse</td>
</tr>
<tr>
<td>Apex of leaf blade</td>
<td>Mucronate</td>
<td>Rounded, sometimes obtuse-mucronate</td>
<td>Rounded, sometimes mucronate</td>
<td>Obtuse to acute</td>
<td>Obtuse, sometimes discreetly mucronate</td>
</tr>
<tr>
<td>Leaf blade consistency</td>
<td>Membranaceous</td>
<td>Coriaceous</td>
<td>Membranaceous</td>
<td>Subcoriaceous</td>
<td>Membranaceous</td>
</tr>
<tr>
<td>Inflorescence (Cymula)</td>
<td>Unisexual</td>
<td>Bisexual</td>
<td>Bisexual</td>
<td>Bisexual</td>
<td>Bisexual</td>
</tr>
<tr>
<td>Staminate pedicel (mm long)</td>
<td>12–13</td>
<td>1.5–3</td>
<td>0.2–1</td>
<td>1–2</td>
<td>0.5–3.5</td>
</tr>
<tr>
<td>Sepals of staminate flower</td>
<td>5, orbicularis</td>
<td>5, orbicularis</td>
<td>6, elliptical</td>
<td>6, obovate</td>
<td>5, broadly obovate</td>
</tr>
<tr>
<td>Staminate flower disc</td>
<td>5-segmented, cuneiform</td>
<td>5-segmented, trapezoids</td>
<td>6-segmented, obtriangular</td>
<td>6-segmented, cuneiform</td>
<td>5-segmented, obtriangular</td>
</tr>
<tr>
<td>Disc surface of staminate flowers</td>
<td>Glandular</td>
<td>Glandular</td>
<td>Foveolate</td>
<td>Verrucose</td>
<td>Verrucose</td>
</tr>
<tr>
<td>Stamens</td>
<td>3, free</td>
<td>3, free</td>
<td>3, free</td>
<td>3, united, forming a column</td>
<td>3, free</td>
</tr>
<tr>
<td>Anthers dehiscence</td>
<td>Vertical</td>
<td>Oblique</td>
<td>Horizontal</td>
<td>Vertical</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Pistillate pedicel (mm long)</td>
<td>8.5–10</td>
<td>8–12</td>
<td>1,5–2</td>
<td>1.3–2</td>
<td>4–8.5</td>
</tr>
<tr>
<td>Sepals of pistillate flower</td>
<td>5, broadly obovate</td>
<td>5, obovate</td>
<td>6, elliptical-oboovate</td>
<td>6 (–5), obovate</td>
<td>5 (–6), obovate</td>
</tr>
<tr>
<td>Pistillate flower disc and surface</td>
<td>Patelliform, smooth</td>
<td>Patelliform, smooth</td>
<td>Patelliform, alveolate</td>
<td>Patelliform, smooth</td>
<td>Cupuliform, smooth</td>
</tr>
<tr>
<td>Styles (mm long) and stigmas</td>
<td>1–2, 2-parted</td>
<td>1.8–2, 2-fid</td>
<td>0.9–1.3, 2-fid</td>
<td>2–2.5, bifurcate</td>
<td>2–2.3, bifurcate</td>
</tr>
<tr>
<td>Fruiting pedicel (mm long)</td>
<td>10–12</td>
<td>1.5–2</td>
<td>1.5–2</td>
<td>2–2.3</td>
<td>0.8–18</td>
</tr>
<tr>
<td>Capsule (mm diam.)</td>
<td>3.5–5.3, oblate</td>
<td>2–3, oblate</td>
<td>1–1.5, depressed-globose</td>
<td>3–4, oblate</td>
<td>1.5–2, subglobose</td>
</tr>
</tbody>
</table>


Minas Gerais. *Phyllanthus pedrosae* has the greatest morphological affinity with *P. caparaoensis*; they are the only species in *Phyllanthus* sect. *Clausseniani* that present angular stems and branches. However, *P. pedrosae* is easily separated from *P. subemarginatus* and *P. caparaoensis* mainly by morphological characteristics such as the shape of the stem and branch, inflorescence, the disc surface of staminate flower, the dehiscence of the anther and the size of the fruiting pedicel, as shown in Table 2. *Phyllanthus pedrosae* is found in the same environment as *P. fastigiatus* Mart. ex Müll.Arg., but the latter is easily recognized by its dense branches at the apex of the stem, elliptical to obovate leaf blades, and 3 connate stamens. Differences between congener species are summarized in Table 2.

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**References**


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