



## Original Paper

# Malvaceae from Serra do Lenheiro, Minas Gerais, Brazil

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### Abstract

We present a taxonomic treatment of the Malvaceae from Serra do Lenheiro, a montane range in the municipality of São João del-Rei, Minas Gerais, Brazil, in order to contribute to the knowledge of this family and the state's flora. Eleven genera and twenty-nine species were recorded. *Sida*, *Pavonia* and *Peltaea* are the richest genera. Among the recorded species, nine are considered as ruderal and ten are endemic of Brazil. Three species have São João del-Rei as the type-locality. Analytic keys, morphological descriptions, photographic plates and comments about the treated species are presented. Illustrations are presented for two species: one has no iconography in Brazilian studies for Malvaceae (*Sida plumosa*) and one has only poor iconographic representations (*Sida viarum*).

**Key words:** campos rupestres, flora, Malvales, taxonomy.

### Resumo

Apresentamos um tratamento taxonômico para Malvaceae da Serra do Lenheiro, São João del-Rei, Minas Gerais, Brasil, com o objetivo de contribuir para o conhecimento dessa família e da flora do estado. Foram registrados 11 gêneros e 29 espécies. *Sida*, *Pavonia* e *Peltaea* são os gêneros mais ricos. Entre as espécies registradas, nove são consideradas ruderais e dez são endêmicas do Brasil. Três espécies têm como localidade-tipo São João del-Rei. São apresentados chaves analíticas, descrições morfológicas, pranchas fotográficas e comentários sobre as espécies tratadas. Ilustrações são apresentadas para duas espécies: uma que não possui iconografia em trabalhos brasileiros para Malvaceae (*Sida plumosa*) e uma que possui somente representações iconográficas pobres (*Sida viarum*).

**Palavras-chave:** campos rupestres, flora, Malvales, taxonomia.

## Introduction

Malvaceae comprises 243 genera and about 4,225 species with cosmopolitan distribution (Stevens 2021). In Brazil, Malvaceae is among the ten largest families of Angiosperms and it is represented by 80 genera and 840 species, with more than half considered endemic from the country (Flora do Brasil 2020, continuously updated). The family is currently divided into nine subfamilies, and two of them, Dombeyoideae and Tilioideae, do not occur in South America (Bayer & Kubitzki 2003).

Malvaceae has very large morphological variation (Bayer & Kubitzki 2003). The presence of stipulated alternate leaves, internal base of calyx with a nectary formed by glandular hairs, and stamens sometimes attached to a staminal tube are among the characters shared by most species (Bayer & Kubitzki 2003).

The economic value of the family derives from the use of some genera in ornamentation, such as *Abutilon* Mill., *Alcea* L., *Ceiba* Mill., *Pachira* Aubl., *Hibiscus* L., *Malvaviscus* Fabr. and *Thespesia* Sol. The textile industry also benefits

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from some species of the genus *Gossypium* L. that provide cotton and *Corchorus* L. and *Urena* L. that provide jute. In the food sector, the genera *Theobroma* L., by its supply of cocoa and cupuaçu, and *Abelmoschus* Medik., for okra, stand out (Bovini 2010).

Only a few surveys of Malvaceae in Minas Gerais state are available and they were carried out in Serra do Cipó (Esteves 1986; Colli-Silva *et al.* 2019; Yoshikawa *et al.* 2019, 2020), Rio Doce State Park (Bovini *et al.* 2001), Grão-Mogol (Esteves 2003; Esteves & Ferrucci 2006; Cristóbal 2006; Esteves & Krapovickas 2009) and Ibitipoca State Park (Fernandes-Júnior & Konno 2017). This effort is still limited given the extent and potential of the state.

Therefore, in order to contribute to the knowledge about Malvaceae from Minas Gerais, a taxonomic study of its species occurring in Serra do Lenheiro was carried out. A key for identification, morphological descriptions, photographs and illustrations are presented.

## Material and Methods

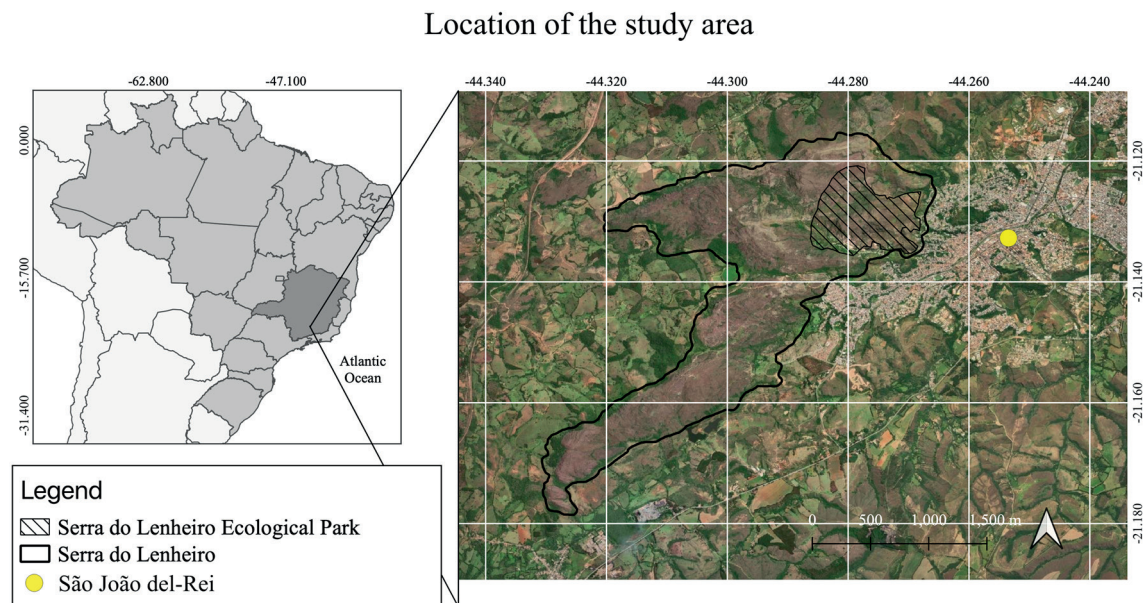
### Study area

Serra do Lenheiro is a montane range formed by a group of close elevations located in the northwestern portion of the City of São João del-Rei, Minas Gerais (Fig. 1). This range comprises an area of 1,760 ha with altitudinal variation between

900 and 1,246 m. A tiny portion of the range constitutes the Serra do Lenheiro Ecological Park (Fig. 1), a biological preservation area of the city. The region's climate is classified as Cwa sensu Köppen (Alvares *et al.* 2013) with rainy summers and dry winters (Alves & Kolbek 2009). Serra do Lenheiro is located in the Rio Grande basin at the Campos das Vertentes mesoregion (Minas Gerais 2010). It presents two types of soils: cambisols and latosols. The phytophysionomies present at Serra do Lenheiro are semideciduous seasonal forest, campos limpos (open grassland), campos sujos (shrubby fields) and campos rupestres (rocky fields) (Vasconcelos 2011). Campos rupestres grow up in association with quartzite rocks, and they are predominant in the landscape.

### Taxonomic treatment

This study was based on the analysis of specimens we collected at Serra do Lenheiro and collections from previous researchers kept in herbaria BHCN, HUFSJ, R and RB (acronyms according to Thiers, continuously updated). The field work was carried out between 2015 and 2019 covering many parts of the mountain range and the Ecological Park. The collected material was photographed, herborized according to conventional techniques (Mori *et al.* 1989), and incorporated into the collection of HUFSJ with duplicates in R and RB.



**Figure 1** – Locating of the study area: Serra do Lenheiro, Minas Gerais, Brazil.

The analysis of this material was done through the mensuration and description of the shapes of the stems, leaves, flowers, fruits and seeds using a stereomicroscope. The characterization of these structures follows that of Radford *et al.* (1974). More specific concepts of some genera were obtained from Lay (1950), Krapovickas & Cristóbal (1965), Fryxell (1988, 1999), Carvalho-Sobrinho (2006), Krapovickas (2006), Saunders (2007) and Gonçalves & Esteves (2017). Additional material was used in the description of some taxa when structures like flowers or fruits were absent. The cited iconographic representations follow illustrations already published in papers about Brazilian flora of Malvaceae, in addition to revisional works of the studied genera.

The species are organized in alphabetical order together with morphological description, examined specimens, geographic distribution and comments. The measurements presented in the descriptions of each species are given in the order length × width, and when a single set of measurements is mentioned, it refers to the

length of the structure. The characterization of the species as ruderal for the Cerrado was performed according to the list from the Flora vascular do bioma Cerrado, by Mendonça *et al.* (1998).

## Results and Discussion

Four subfamilies, 11 genera and 29 species of Malvaceae were recorded from the Serra do Lenheiro (Figs. 2; 3). The richest genera are *Sida* (12 spp.), *Pavonia* (4 spp.) and *Peltaea* (3 spp.). The growth form most representative of the species from the Serra do Lenheiro is herb, reflecting the local predominance of field vegetation (campos limpos and campos rupestres). Subshrubs, shrubs and trees are less frequent growth forms recorded.

Nine species are considered as ruderal to the Cerrado: *Malvastrum coromandelianum*, *Sida cordifolia*, *S. glaziovii*, *S. linifolia*, *S. rhombifolia*, *S. urens*, *S. viarum*, *Triumfetta semitriloba* and *Waltheria indica*. The presence of these ruderal species could reflect its wide distribution and could be evidence of the anthropization process that Serra do Lenheiro has suffered.

### Key for the subfamilies of Malvaceae from the Serra do Lenheiro

- |  |                   |
|--|-------------------|
| 1. Compound leaves; calyx not divided in lobes .....   | 2. Bombacoideae   |
| 1'. Simple leaves; calyx divided in lobes .....  | 2                 |
| 2. Calyx lobes united just in the base; stamens free or arranged in phalanges; androgynophore usually present .....        | 3. Grewioideae    |
| 2'. Calyx lobes united until the medium portion of the calyx; stamens forming a staminal tube; androgynophore absent ..... | 3                 |
| 3. Epicalyx sometimes present; fruits schizocarp or capsule (only <i>Hibiscus</i> ) type .....                             | 4. Malvoideae     |
| 3'. Epicalyx absent; fruits capsule type .....   | 1. Byttnerioideae |

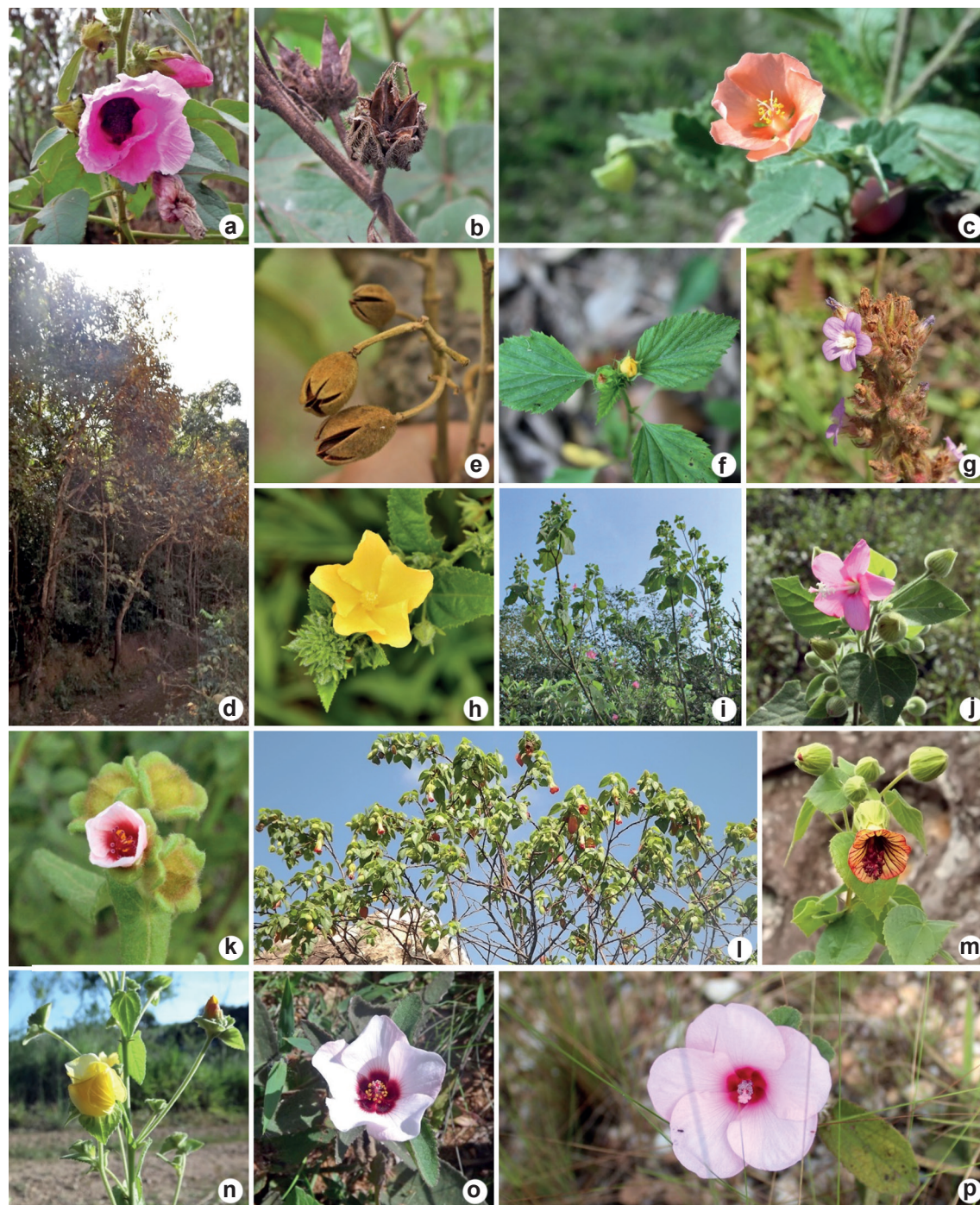
### 1. Subfamily Byttnerioideae.

#### Key for the species of Byttnerioideae from the Serra do Lenheiro

- |  |  |
|--|--|
| 1. Ovary with 5 locules and 5 styles ..... | 1.1. <i>Melochia villosa</i> var. <i>villosa</i> |
| 1'. Ovary with 1 locule and 1 style .....  | 1.2. <i>Waltheria indica</i>                     |

**1.1. *Melochia villosa*** (Mill.) Fawc. & Rendle var. *villosa*, Fl. Jamaica 5: 165. 1926. = *Sida villosa* Mill., Gard. Dict. (ed. 8): [unpaged] *Sida* n. 6. 1768. Iconography: Gonçalves & Esteves (2017, Fig. 3: G-J); Colli-Silva *et al.* (2019, Fig. 4). Fig. 2g  
Subshrubs to shrubs 0.4–0.8 m tall, erect. Stems cylindrical, velutinous, with hyaline

simple and stellate hairs. Leaves simple, spiralled; petioles 0.3–0.5 cm, cylindrical, velutinous, with hyaline simple and stellate hairs; stipules 0.4–0.7 mm, triangular, persistent; leaf blades 1.2–3.5 × 1.1–2.5 cm, entire, membranaceous to chartaceous, widely ovate to elliptic, base truncate to cordate, margin irregularly serrate, apex acute



**Figure 2** – a-b. *Hibiscus kitaibelifolius* – a. flower; b. fruit. c. *Krapovickasia macrodon* – flower. d-e. *Luehea grandiflora* – d. habit; e. fruits. f. *Malvastrum coromandelianum* – buds. g. *Melochia villosa* – flower. h. *Pavonia communis* – buds and flower. i-j. *Pavonia malacophylla* – i. habit; j. buds and flower. k. *Pavonia sagittata* – buds and flower. l-m. *Pavonia viscosa* – l. habit; m. buds and flower. n. *Peltaea obsita* – buds and flower. o. *Peltaea polymorpha* – flower. p. *Peltaea speciosa* – flower. (Photos: a-p. M.T.R. Costa).

to rounded, adaxial and abaxial surfaces with hyaline simple and stellate hairs; extrafloral nectaries absent. Flowers in axillary or terminal glomerules; subsessile; epicalyx absent; calyx cupuliform, lobes ca.  $2.2 \times 1.5$  mm, triangular, united until the medium portion of the calyx, apex acute, velutinous externally, with stellate hairs; corolla with petals ca. 8 mm, obovate, purple; longistyle form: staminal tube ca. 3 mm, with simple hairs; brevistyle form: staminal tube ca. 1.5 mm, with simple hairs; staminodes absent; ovary 5-locular, 2-ovulate, longistyle form: style ca. 3 mm, brevistyle form: style ca. 1.5 mm, stigmas 5. Capsules 5-locular, ca.  $3.5 \times 5$  mm, dehiscent, unornamented; seeds glabrate.

**Specimens examined:** São João del-Rei, estrada que liga o Tijuco a Trindade, 21.II.2014, fl., *M.T.R. Costa & M. Sobral 43* (HUFJSJ); 21.II.2014, fl., *M.T.R. Costa & M. Sobral 46* (HUFJSJ); subida pelo Tijuco, 12.XII.2014, fl., *M.T.R. Costa et al. 266* (HUFJSJ); Águas Férreas, 16.X.2015, fl. and fr., *M.T.R. Costa et al. 456* (HUFJSJ).

*Melochia villosa* is distributed across the American continent, especially in Central and South America (González & Esteves 2017). In Brazil, it occurs in Cerrado and Atlantic Forest (González 2020). In Serra do Lenheiro, the species was found in campos limpos, campos rupestres and anthropized areas.

This species can be recognized in the genus *Melochia* by stems and adaxial surface of the leaves covered by simple, biradiated and stellate hairs (González & Esteves 2017). The other variety that occurs in Brazil, *Melochia villosa* var. *tomentosa* (K.Schum.) Goldberg, has stems and leaf blades covered by stellate hairs only (González & Esteves 2017). *Melochia villosa* is included in section *Melochia*, the biggest of the genus (Rondón 2009).

**1.2. *Waltheria indica* L., Sp. Pl. 2: 673. 1753.**

Iconography: Schumann (1891c, Tab. 12); Fernandes-Júnior & Konno (2017, Fig. 3: L); Colli-Silva *et al.* (2019, Fig. 6). Fig. 3r

Subshrub 0.4–1 m tall, erect. Stems cylindrical, velutinous, with yellowish simple hairs. Leaves simple, spiralled; petioles 0.3–0.5 cm, cylindrical, velutinous, with yellowish simple hairs; stipules 0.3–0.4 mm, linear to lanceolate, less persistent; leaf blades  $2.8\text{--}3.7 \times 1\text{--}1.5$  cm, entire, membranaceous to chartaceous, ovate to elliptic, base truncate to narrowly cordate, margin irregularly serrate, apex acute to rounded, adaxial and abaxial surfaces velutinous, with yellowish simple and stellate hairs; extrafloral nectaries absent. Flowers in axillary or terminal glomerules; flowers subsessile; epicalyx absent; calyx cupuliform, lobes  $2.3\text{--}4 \times 0.7\text{--}1$  mm, triangular, united until the medium portion of the calyx, apex acute, velutinous externally, with stellate hairs; corolla with petals ca. 3 mm, obovate, yellow; staminal tube 2–3 mm, glabrate; staminodes absent; ovary 1-locular, uniovulate locule, style 2–3 mm, stigma 1, penicillate. Capsules 1-locular,  $2\text{--}3.5 \times 2\text{--}3$  mm, dehiscent, unornamented; glabrate seeds.

**Specimens examined:** São João del-Rei, estrada que liga o Tijuco a Trindade, 10.VI.2013, fl. and fr., *M. Sobral et al. 15516* (HUFJSJ); estrada que liga o Tijuco a Trindade, 21.II.2014, fl., *M.T.R. Costa & M. Sobral 47* (HUFJSJ); campos próximos a Serra do Lenheiro, 27.III.2014, fl., *M.T.R. Costa et al. 515* (HUFJSJ; RB); 12.XII.2014, fl., *M.T.R. Costa 259* (HUFJSJ; RB); 6.III.2015, fl., *M.T.R. Costa et al. 342* (BHCB, HUFJSJ).

*Waltheria indica* has tropical and subtropical distribution across the world (Saunders 2007). In Brazil, it occurs in all states (Coutinho *et al.* 2020). In Serra do Lenheiro, the species was found in campos limpos and campos rupestres.

This species can be recognized by its stems and leaves with velutine indument, and homostylic flowers densely grouped in glomerules (Fernandes-Júnior & Konno 2017). It is one of the most widely distributed species of the genus in the world and has broad morphological variation of certain characters (Saunders 2007). *Waltheria indica* is also used for popular medicinal purposes (Zongo *et al.* 2013).

## 2. Subfamily Bombacoideae.

### Key for the species of Bombacoideae from the Serra do Lenheiro

1. Receptacle with 12 glands; calyx glabrate externally; staminal tube glabrate ..... 2.1. *Pseudobombax longiflorum*
- 1'. Receptacle with 14 glands; calyx velutinous externally; staminal tube pubescent..... 2.2. *Pseudobombax tomentosum*

**2.1. *Pseudobombax longiflorum*** (Mart.) A. Robyns, Bull. Jard. Bot. État Bruxelles 33: 57. 1963. = *Carolinea longiflora* Mart., Nov. Gen. Sp. Pl. 1: 86. 1823.

Iconography: Duarte *et al.* (2007, Fig. 2: B-E); Fernandes-Júnior & Cruz (2018, Fig. 3: A).

Fig. 3a-b

Tree 3 m tall. Stems irregular, glabrate. Leaves not seen. Flowers solitary axillar or more frequently terminal; pedicels 2.5–5 cm, cylindrical to sulcate, glabrate; receptacle with 12 glands on the base; epicalyx absent; calyx campanulate to cupuliform, ca. 2.1 × 1.5 cm, not subdivided in lobes, glabrate externally, sericeous internally; corolla with petals ca. 16.5 cm, lanceolate, white; staminal tube ca. 5.5 cm, glabrate; staminodes absent; ovary 5-locular, pluriovulate locules, styles ca. 6 cm, stigmas 5. Fruits not seen.

**Specimens examined:** São João del-Rei, campo rupestre imediato a estrada para as torres de transmissão, 11.VIII.2017, fl., M.T.R. Costa *et al.* 1099 (HUFSJ, R).

*Pseudobombax longiflorum* occurs in Bolivia, Brazil and Paraguay (Carvalho-Sobrinho 2006). In Brazil, the species occurs in all regions, especially in Cerrado formations (Carvalho-Sobrinho & Yoshikawa 2020). In Serra do Lenheiro, the species was recorded in campos rupestres in the southern region of the area, especially along the road leading to transmission antennas.

This species can be distinguished from others of the genus *Pseudobombax* by its large petioles 12.5–25.5 cm in length, glabrescent leaflets, calyx externally glabrate, petals internally glabrate in the basal third and oblong fruit (Carvalho-Sobrinho 2006). Although only one specimen was collected in the study area, the characteristics of the flowers were enough to recognize the species. The name of this species alludes to the length of its petals, which tends to be longer than that of other species of the genus (Carvalho-Sobrinho 2006).

**2.2. *Pseudobombax tomentosum*** (Mart.) A. Robyns, Bull. Jard. Bot. État Bruxelles 33: 63.

1963. = *Carolinea tomentosa* Mart., Nov. Gen. Sp. Pl. 1: 84. 1823.

Iconography: Duarte *et al.* (2007, Fig. 2: I-J).

Fig. 3c

Tree 4 m tall. Stems cylindrical to irregular, glabrescent. Leaves compound, spiralled; petiole ca. 15 cm, slightly flattened, velutinous, with yellowish to ferruginous stellate hairs; stipule not seen; leaf blades 7–8-foliated, leaflets sessile to subsessile, 10–17 × 4.8–10.5 cm, chartaceous, elliptic to obovate, base attenuate to obtuse, margin erose, apex rounded to obtuse, adaxial surface floccose, with stellate hairs, abaxial surface velutinous, with stellate hairs; 1 gland near to the leaf base. Flowers solitary terminal; pedicels ca. 2.1 cm, cylindrical to striated, tomentose, with yellowish stellate hairs; receptacle with 14 glands; epicalyx absent; calyx campanulate to cupuliform, ca. 2.1 × 2.2 cm, not subdivided in lobes, velutinous externally, sericeous internally; corolla with petals 10.5–11.7 cm, lanceolate, white; staminal tube ca. 5.1 cm, pubescent; staminodes absent; ovary 5-locular, pluriovulate locules, styles ca. 11 cm, stigmas 5. Fruits not seen.

**Specimens examined:** São João del-Rei, entorno da Serra do Lenheiro, 7.XII.2018, fl., M.T.R. Costa *et al.* (HUFSJ 10278, R).

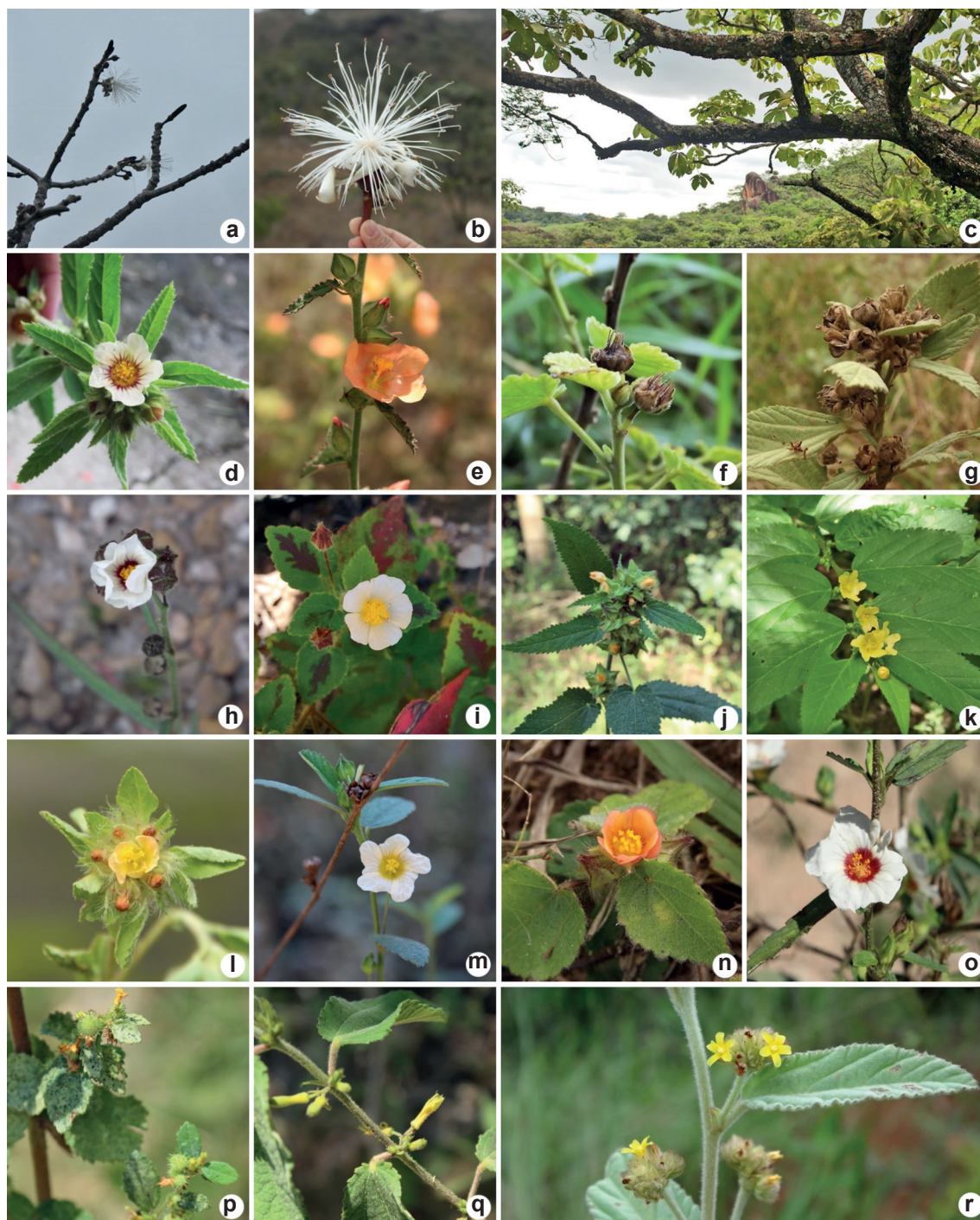
*Pseudobombax tomentosum* is distributed from Brazil to Paraguay (Carvalho-Sobrinho 2006). In Brazil, the species occurs in all regions, except the South. It is more frequently found in Cerrado formations (Carvalho-Sobrinho & Yoshikawa 2020). In Serra do Lenheiro, the species was recorded at the edge of a fragment of seasonal forest that surrounds the local highest areas.

The species can be characterized by its suberified branches, sessile to subsessile leaflets, and velutine indument on the abaxial face of the leaflets and calyx (Carvalho-Sobrinho 2006). Several pollination agents have already been recorded in flowers of *P. tomentosum*; among them bats, bees and marsupials stand out (Gribel 1988).

### 3. Subfamily Grewioideae.

#### Key for the species of Grewioideae from the Serra do Lenheiro

1. Trees; epicalyx present; fimbriated staminodes present..... 3.1. *Luehea grandiflora*
- 1'. Herbs, subshrubs and shrubs; epicalyx absent; fimbriated staminodes absent..... 2
2. Stipules linear; stamens on average 15; nutlet with 75–100 aculei ..... 3.2. *Triumfetta bartramia*
- 2'. Stipules ovate to lanceolate; stamens 20 or more; nutlet with 50–75 aculei ..... 3.3. *Triumfetta semitriloba*



**Figure 3** – a-b. *Pseudobombax longiflorum* – a. stems with flowers; b. flower. c. *Pseudobombax tomentosum* – habit. d. *Sida acrantha* – buds and flower. e. *Sida cerradoensis* – buds and flower. f. *Sida cordifolia* – fruits. g. *Sida glaziovii* – fruits. h. *Sida linifolia* – flower and fruits. i. *Sida martiana* – buds and flower. j. *Sida nemorensis* – buds. k. *Sida planicaulis* – flowers. l. *Sida plumosa* – a young flower and some senescent flowers. m. *Sida rhombifolia* – flower and fruits. n. *Sida urens* – flower. o. *Sida viarum* – flower. p. *Triumfetta bartramia* – buds and some immature fruits. q. *Triumfetta semitriloba* – buds. r. *Waltheria indica* – flowers. (Photos: a-r. M.T.R. Costa).

**3.1. *Luehea grandiflora*** Mart., Nov. Gen. Sp. Pl. 1: 99-100, t. 61. 1826.

Iconography: Cunha (1985, Fig. 3); Brandão & Laca-Buendia (1993, Fig. 1-B); Fernandes-Júnior & Konno (2017, Fig. 2: J-K); Yoshikawa *et al.* (2019, Fig. 1-H). Fig. 2d-e

Tree 4–6 m tall, erect. Stems cylindrical, glabrescent, with brown stellate hairs grouped in longitudinal lines. Leaves simple, distichous; petioles 0.9–1.5 cm, cylindrical to slightly flattened, pubescent, with brown stellate hairs; stipules ca. 3 mm, lanceolate, caducous; leaf blades 7–22 × 4–11.8 cm, entire, coriaceous, ovate to elliptic, base truncate to oblique, margin irregularly serrate, apex acute, adaxial surface puberulent, with brown stellate hairs, abaxial surface velutinous, with brown stellate hairs; extrafloral nectaries absent. Flowers in axillary or terminal racemes; pedicels 1–2.5 cm, cylindrical, pubescent, with brown stellate hairs; epicalyx with 8–9 involucellar bracts, 1.1–1.5 cm, not morphologically differentiated into pedicel and blade, lanceolate; calyx campanulate, lobes ca. 2.5 × 0.7 cm, lanceolate, united just in the base, apex acute to acuminate, tomentose externally, with simple hairs; corolla with petals ca. 2.5 cm, lanceolate, white; stamens fused in 5 phalanges, these ca. 2.5 cm, with simple hairs; staminodes present, ca. 1.2 cm, fimbriate; ovary 5-locular, pluriovulate locules, styles ca. 2.7 cm, stigmas 5. Capsules 5-locular, 2.5–3.1 × 1.2–2.2 cm, ovate, valves reflexed or flat, dehiscent, unornamented; seeds glabrate.

**Specimens examined:** São João del-Rei, 22.VIII.2015, fr., *M.T.R. Costa* 390 (HUFSJ; RB); entorno da serra, beira da estrada, 7.XII.2019, fr., *M.T.R. Costa et al.* (HUFSJ 10277).

**Additional specimens examined:** BRASIL. MINAS GERAIS: São João del-Rei, São Sebastião da Vitória, 10.V.2014, fl. and fr., *M.T.R. Costa* 106 (HUFSJ).

*Luehea grandiflora* occurs in Bolivia, Brazil, Paraguay and Peru (Cunha 1985). In Brazil, the species occurs in all regions within the phytogeographic domains of the Amazon Forest, Caatinga, Cerrado, Atlantic Forest and Pantanal (Gerace & Bovini 2020). In Serra do Lenheiro, this species was recorded at the edge of seasonal forests.

The presence of the lanceolate petals and staminodes slightly fimbriate (Cunha 1985) differentiates this species from others in the genus *Luehea*. Brandão & Laca-Buendia (1993) affirmed that the large dimensions of the fruit (3 × 2.5 cm) and the covering by golden hairs help in the identification of the species. *Luehea grandiflora* is probably the most polymorphic species into the

genus and it is also the most distributed in Brazil. It is suggested that more studies should focus on this taxon since its large distribution and morphological variations cause conflicts with *Luehea speciosa* Willd., as cited previously by Schumann (1891b) and Burret (1926). It is also suggested that the current concept of *L. grandiflora* comprises a taxonomic complex.

**3.2. *Triumfetta bartramia*** L., Syst. Nat. 10 (2): 1044. 1759.

Iconography: Schumann (1891b, Tab. 27: D).

Fig. 3p

Subshrubs 0.5–1.6 m tall, erect. Stems cylindrical, glabrescent to puberulent, with hyaline stellate hairs. Leaves simple, spiralled; petioles 0.4–3 cm, cylindrical, puberulent, with hyaline stellate hairs; stipules ca. 5 mm, filiform to linear, caducous; leaf blades 3.8–7.5 × 1.5–6 cm, entire to 3-lobed, membranaceous to chartaceous, rhombic to widely ovate, base truncate to rounded, margin irregularly serrate with the basal teeth transformed into 4–6 nectaries, apex acute, adaxial and abaxial surfaces tomentose, with hyaline stellate hairs. Flowers in axillary or terminal cymules; pedicels ca. 1 cm, cylindrical, tomentose, with hyaline stellate hairs; epicalyx absent; calyx cucullate, lobes 3.5–4 × 0.5–0.7 mm, oblong, united just in the base, apex rounded, pubescent externally; corolla with petals 0.6–0.7 cm, obovate, yellow; androgynophore ca. 0.5 mm, glabrate, stamens 10–15; staminodes absent; ovary 3-locular, 2-ovulate locules, style ca. 7.5 mm, stigma 1, tripartite. Nutlet spherical 4–4.7 mm diam., indehiscent, aculeate, aculeus 75–100; glabrate seeds.

**Specimens examined:** São João del-Rei, 6.III.2015, fl., *M.T.R. Costa et al.* 345 (BHCB, HUFSJ); 22.VIII.2015, fr., *M.T.R. Costa et al.* 392 (HUFSJ; RB); 16.X.2015, fl. and fr., *M.T.R. Costa et al.* 452 (HUFSJ); Águas Férreas, 21.II.2017, fr., *M.T.R. Costa et al.* 745 (HUFSJ, R).

*Triumfetta bartramia* is a species with wide distribution across the American continent (Lay 1950). In Brazil, it occurs in all regions of the country (Bovini 2020b). In Serra do Lenheiro, the species was found in anthropized field areas and edges of seasonal forests.

This species is distinguished from the others by presenting an average of 10 to 15 stamens and nutlet with a cinereal-tomentose body with 75 to 100 glabrescent aculei (Lay 1950). *Triumfetta bartramia* is very similar to *Triumfetta sampaioi* Mont., but the latter has 5 stamens and an occurrence recorded so far only in Northeastern Brazil.



**3.3. *Triumfetta semitriloba*** Jacq., Enum. Syst. Pl.: 22. 1760.

Iconography: Schumann (1891b, Tab. 27: III); Lay (1950, Fig. 11); Esteves & Ferrucci (2006, Fig. 1: D-I); Fernandes-Júnior & Konno (2017, Fig. 3: I; Fig. 4: L-M). Fig. 3q

Subshrubs up to 1 m tall, erect. Stems cylindrical, glabrescent to puberulent, with hyaline stellate hairs. Leaves simple, spiralled; petioles 0.5–3.8 cm, cylindrical, puberulent to pubescent, with hyaline stellate hairs; stipules ca. 3 mm, lanceolate, caducous; leaf blades 2.1–6 × 0.9–5 cm, entire to 3-lobed, membranaceous to chartaceous, lanceolate to widely ovate, base cuneate to rounded, sometimes subcordate, margin irregularly serrate with the basal teeth transformed into up to 4 nectaries, apex acute, adaxial and abaxial surfaces tomentose, with hyaline stellate hairs. Flowers in axillary or terminal cymules; pedicels 1–3 cm, cylindrical, tomentose, with hyaline stellate hairs, curved to down when bearing fruit; epicalyx absent; calyx campanulate, lobes 1.5–1.8 × 0.4 mm, oblong, united just in the base, apex rounded, pubescent externally; corolla with petals ca. 0.5 cm, obovate, yellow; androgynophore ca. 0.5 mm, glabrate; stamens 20–40; staminodes

absent; ovary 3-locular, 2-ovulate locules, style ca. 4.6 mm, stigma 1, tripartite. Nutlet spherical 3–5 mm diam., indehiscent, aculeate, aculeus 50–75; glabrate seeds.

**Specimens examined:** São João del-Rei, Águas Férreas, 21.II.2017, fl. and fr., *M.T.R. Costa et al. 733* (HUFJSJ, R).

*Triumfetta semitriloba* occurs on the American and African continents, most frequently in their tropical portions (Lay 1950). In Brazil, it occurs in all regions of the country (Bovini 2020b). In Serra do Lenheiro, the species was recorded in anthropized field areas.

*Triumfetta semitriloba* is characterized within its genus by having stamens numbering from 20 to 40 and pubescent nuclei with 3 locules and hairy aculei varying in number from 50 to 75 (Lay 1950). The epithet “semitriloba” alludes to leaf blades that often have three slightly pronounced lobes; however, the variability of this characteristic is not exclusive to *T. semitriloba*, occurring in several species and causing some controversies involving the determination of their identity. Thus, an updated review for the genus is necessary, so that dubious characters like this can be clarified.

#### 4. Subfamily Malvoideae.

### Key for the species of Malvoideae from the Serra do Lenheiro

1. Flowers with epicalyx ..... 2
- 1'. Flowers without epicalyx ..... 10
  2. Epicalyx composed by 3 involucellar bracts ..... 4.3. *Malvastrum coromandelianum*
  - 2'. Epicalyx composed by 5 or more involucellar bracts ..... 3
    3. Extrafloral nectaries present at the base of the leaf blades; leaf blades entire or 3–5-lobed; fruits capsule type ..... 4.1. *Hibiscus kitaibelifolius*
    - 3'. Extrafloral nectaries absent; leaf blades entire; fruits schizocarp type ..... 4
      4. Involucellar bracts morphologically differentiated into pedicel and blade ..... 5
      - 4'. Involucellar bracts not morphologically differentiated into pedicel and blade ..... 7
        5. Involucellar bracts peltate; corolla yellow ..... 4.8. *Peltaea obsita*
        - 5'. Involucellar bracts spatulate to lanceolate; corolla pink ..... 6
          6. Stems covered by sparse stellate hairs, these frequently grouped in longitudinal lines; flowers in terminal inflorescences, rarely in leaf axils ..... 4.9. *Peltaea polymorpha*
          - 6'. Stems densely covered by stellate hairs; flowers solitary in the leaf axils ..... 4.10. *Peltaea speciosa*
      7. Corolla yellow with or without reddish base and nervures ..... 8
      - 7'. Corolla pink ..... 9
        8. Epicalyx with 6–7 involucellar bracts; corolla entirely yellow; mericarps with spines ..... 4.4. *Pavonia communis*
        - 8'. Epicalyx with 12–14 involucellar bracts; corolla yellow with reddish base and nervures; mericarps without spines ..... 4.7. *Pavonia viscosa*

9. Presence of glandular hairs in the stems; epicalyx with 16–22 involucellar bracts; blackish mericarps ..... 4.5. *Pavonia malacophylla*
- 9'. Absence of glandular hairs in the stems; epicalyx with 5 involucellar bracts; mericarps never blackish ..... 4.6. *Pavonia sagittata*
10. Calyx accrescent and inflate ..... 4.2. *Krapovickasia macrodon*
- 10'. Calyx not accrescent or inflate ..... 11
11. Leaf blades linear to lanceolate ..... 12
- 11'. Leaf blades rhombic, elliptic, ovate to obovate ..... 13
12. Leaf blades with margin entire; inflorescence in corymbs; mericarps 7–9 ..... 4.15. *Sida linifolia*
- 12'. Leaf blades with margin serrate at the apical portion; inflorescence other types, not a corymb; mericarps 5 ..... 4.22. *Sida viarum*
13. Leaf blades with margin serrate only at the apical portion ..... 14
- 13'. Leaf blades with entire margin serrate ..... 17
14. Leaf blades with tomentose indumentum covering both surfaces; seeds puberulent ..... 15
- 14'. Leaf blades glabrescent on both surfaces; seeds glabrate to glabrescent .... 16
15. Leaf blades with yellow hairs; flowers axillary, rarely terminal; mericarps 10–11 ..... 4.14. *Sida glaziovii*
- 15'. Leaf blades with ferruginous hairs; flowers terminal, surrounded by apical leaves, rarely along the stems; mericarps 5–7 ..... 4.11. *Sida acrantha*
16. Subshrubs usually erect; mericarps 9–12, without dorsal prominences ..... 4.20. *Sida rhombifolia*
- 16'. Subshrubs prostrate; mericarps 5–7, with dorsal prominences ..... 4.19. *Sida plumosa*
17. Leaf blades with purplish margin ..... 18
- 17'. Leaf blades with margin not purplish ..... 19
18. Mericarps 5, not spined ..... 4.16. *Sida martiana*
- 18'. Mericarps 10–12, spined ..... 4.12. *Sida cerradoensis*
19. Subshrubs decumbent; mericarps muticous ..... 4.21. *Sida urens*
- 19'. Subshrubs erect; mericarps 2-spined ..... 20
20. Stems and leaves glabrescent; leaves distichous ..... 4.18. *Sida planicaulis*
- 20'. Stems and leaves velutinous, tomentose or hirsute; leaves spiralled ..... 21
21. Stems with glandular hairs; mericarps 5 .. 4.17. *Sida nemorensis*
- 21'. Stems without glandular hairs; mericarps 9–10 ..... 4.13. *Sida cordifolia*

**4.1. *Hibiscus kitaibelifolius*** A.St.-Hil., Fl. Bras. Merid. 1(7): 248-249, pl. 48. 1828.  
Iconography: Esteves *et al.* (2014, Fig. 1: A-F); Fernandes-Júnior & Konno (2017, Fig. 2: E; Fig. 4: C); Rigueiral *et al.* (2019, Fig. 4: F-H).

Fig. 2a-b

Shrubs ca. 1.6 m tall, erect. Stems cylindrical, hirsute, with yellowish simple and stellate hairs, the stellate hairs grouped in longitudinal lines. Leaves simple, spiralled; petioles 4–10.5 cm, cylindrical,

hirsute, with yellowish simple and stellate hairs; stipules ca. 5 mm, lanceolate, caducous; leaf blades 4.7–11.5 × 4.6–13.5 cm, entire or 3–5-lobed, chartaceous, ovate to obovate, base rounded to cordate, margin irregularly serrate, apex acute to acuminate, adaxial and abaxial surface pubescent, with yellowish stellate hairs; 1–3 adaxial extrafloral nectaries on the basal portion of the nerves. Flowers in axillary or terminal racemes, rarely solitary; pedicels 0.6–1.5 cm, cylindrical, hirsute, with

yellowish simple and stellate hairs; epicalyx with 10–12 involucellar bracts, 1–1.2 cm long, linear, bifurcated at the apex; calyx campanulate, lobes ca.  $2.2 \times 0.7$  cm, triangular, united until the medium portion of the calyx, apex acuminate, hirsute, with simple and stellate hairs, 1 nectary on the apical third of midvein; corolla with petals ca. 5.5 cm, obovate, pink with a dark pink centre; staminal tube ca. 3.3 cm, with glandular hairs; staminodes absent; ovary 5-locular, pluriovulate locules, styles ca. 4.3 cm, stigmas 5. Capsules 5-locular, ca.  $1.8 \times 1.4$  cm, dehiscent, unornamented, glabrate; seeds floccose. **Specimens examined:** São João del-Rei, brejo na beira da estrada para Trindade, 5.VIII.2017, fl. and fr., *M.T.R. Costa et al.* 1056 (HUFJSJ).

*Hibiscus kitaibelifolius* is an endemic species from Minas Gerais and São Paulo (Rigueiral *et al.* 2019). In Serra do Lenheiro, this species was recorded in a seasonal swamp in the central area of the range.

This species is characterized by the presence of a hirsute stem, leaf blades 3–5-lobed, leaf base with 1–3 nectaries and capsule glabrate (Rigueiral *et al.* 2019). Krapovickas & Fryxell (2004) reported that the presence of three nectaries at the base of the leaf blade distinguishes *H. kitaibelifolius* from other species of section *Furcaria* DC., to which it belongs. However, in the driest months of the year, these nectaries can become inconspicuous. The type-material of *H. kitaibelifolius* was collected in 1822 by Saint-Hilaire in São João del-Rei, where Serra do Lenheiro is located. This type-material is deposited in the collection of the Muséum National d'Histoire Naturelle herbarium (P) in Paris.

**4.2. *Krapovickasia macrodon* (A.DC.) Fryxell**, *Brittonia* 30(4): 456–457. 1978. = *Sida macrodon* DC., *Prodr.* 1: 464. 1824.  
Iconography: Fryxell (1978, Fig. 3: C–D).

Fig. 2c

Subshrub 0.1–0.15 m tall, procumbent. Stems cylindrical, hirsute, with yellowish simple and stellate hairs. Leaves simple, spiralled; petioles 3.6–6 cm, cylindrical, hirsute, with yellowish simple and stellate hairs; stipules 2.5 mm, lanceolate, caducous; leaf blades  $1.1–2 \times 0.8–1.6$  cm, entire, membranaceous, ovate to widely ovate, base cordate, margin crenate to dentate, apex acute, adaxial and abaxial surfaces pubescent, with yellowish stellate hairs; extrafloral nectaries absent. Flowers solitary in the leaf axils; pedicels 1.2–3 cm, cylindrical, hirsute, with yellowish simple and stellate hairs; epicalyx absent; calyx

campanulate, accrescent and inflate, lobes ca.  $6 \times 2.5$  mm, triangular, united until the medium portion of the calyx, apex acuminate, hirsute, with simple and stellate hairs; corolla with petals ca. 8 mm, obovate, pink or orange; staminal tube ca. 5 mm, with glandular hairs; staminodes absent; ovary 8-locular, uniovulate locules, styles ca. 5.3 mm, stigmas 8. Schizocarps 8 mericarps, ca.  $2.5 \times 1.5$  cm, with a small dehiscence, mucous; seeds puberulent.

**Specimens examined:** São João del-Rei, 8.III.2005, fl., *M. Quinelato* (HUFJSJ 398; RB 568127); 27.III.2014, fr., *M.T.R. Costa et al.* 517 (HUFJSJ); campo rupestre na trilha para o areal, parte central da serra, 12.XII.2017, fr., *M.T.R. Costa et al.* 1298 (HUFJSJ).

*Krapovickasia macrodon* is found in field formations in Argentina, Bolivia, Brazil and Paraguay (Fryxell 1978). In Brazil, the species occurs in Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Gring 2020). In Serra do Lenheiro, this species was found in Cerrado formations called campos limpos and campos rupestres.

The species is distinguished from others of the genus *Krapovickasia* by its solitary flowers and the presence of 8–9 stigmas and mericarps (Fryxell 1978; Grings 2020).

**4.3. *Malvastrum coromandelianum* (L.) Garcke**, *Bonplandia* (Hannover) 5(18): 295. 1857. = *Malva coromandeliana* L., *Sp. Pl.* 2: 687. 1753.

Iconography: Schumann (1891a, Tab. 53); Hill (1982, Fig. 63 e 64); Bovini *et al.* (2001, Fig. 3: H–I); Bovini (2010, Fig. 3: A). Fig. 2f

Subshrubs 0.5 m tall, erect. Stems cylindrical, hirsute, with hyaline simple and stellate hairs. Leaves simple, spiralled; petioles 0.4–1.7 cm, cylindrical, hirsute, with hyaline simple and stellate hairs; stipules ca. 4.5 mm, triangular, caducous; leaf blades  $1.5–4 \times 1.1–3$  cm, entire, membranaceous, ovate to widely ovate, base truncate to cuneate, margin irregularly serrate, apex acute, adaxial and abaxial surfaces with hyaline simple and stellate hairs; extrafloral nectaries absent. Flowers solitary in the leaf axils or terminal, rarely in axillary glomerules; pedicels 1.3–6.6 mm, cylindrical, hirsute, with hyaline simple and stellate hairs; epicalyx with 3 involucellar bracts, ca. 4.5 mm, lanceolate, not morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca.  $6.8 \times 4.2$  mm, triangular, united until the medium portion of the calyx, apex acuminate, externally hirsute, with simple and stellate hairs; corolla

with petals ca. 5.7 mm, obovate, yellow; staminal tube ca. 5 mm, glabrate; staminodes absent; ovary 10–12-locular, uniovulate locules, styles ca. 5 mm, stigmas 10–12. Schizocarps 10–12 mericarps, ca.  $2.2 \times 1.5$  mm, indehiscent, 3-spined, spines 0.1–0.2 cm; seeds glabrate.

**Specimens examined:** São João del-Rei, subida pelo Tijuco, 12.XII.2014, fl. and fr., *M.T.R. Costa et al.* 264 (HUFJSJ).

*Malvastrum coromandelianum* has pantropical distribution (Fryxell 1988). In Brazil, it occurs in all regions of the country (Coutinho 2020). In Serra do Lenheiro, the species was recorded in anthropized areas.

This species differs from the others of the genus by its mericarps 3-spined and habitat weedy (Hill 1982). *Malvastrum coromandelianum* is frequently used in popular medicine of some countries, such as India, for example, as an anti-inflammatory, analgesic and anti-dysenteric (Khonsung *et al.* 2006).

**4.4. *Pavonia communis*** A.St.-Hil., Fl. Bras. Merid. (quarto ed.) 1(6): 224–225. 1827.

Iconography: Esteves (2001, Fig. 20: G-K).

Fig. 2h

Subshrubs 0.8 m tall, erect. Stems cylindrical, velutinous, with yellowish stellate hairs. Leaves simple, spiralled; petioles 0.2–1.8 cm, cylindrical, velutinous, with yellowish stellate hairs; stipules ca. 0.6 mm, linear, persistent; leaf blades 4–7.7  $\times$  2.5–5.4 cm, entire, membranaceous, ovate, base truncate to subcordate, margin irregularly serrate, apex acuminate, adaxial surface sparsely puberulent with yellowish stellate hairs, abaxial surface velutinous with yellowish stellate hairs; extrafloral nectaries absent. Flowers solitary in leaf axils or grouped at the apex of stems; pedicels 0.5–2 cm, cylindrical, velutinous, with yellowish stellate hairs; epicalyx with 6–7 involucellar bracts, ca. 1 mm, linear to lanceolate, not morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca.  $8.4 \times 3$  mm, triangular, united until the medium portion of the calyx, apex acute, with sparse stellate hairs, margin ciliate; corolla with petals ca. 2.3 cm, obovate, yellow; staminal tube ca. 1.5 cm, glabrate; staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 2.1 cm, stigmas 8. Schizocarps 5 mericarps, ca.  $8.5 \times 3$  mm, dehiscent, 3-spined with retrorse hairs, spines 0.3–0.5 cm; seeds glabrate.

**Specimens examined:** São João del-Rei, estrada que liga o Tijuco a Trindade, 21.II.2014, fl. and fr., *M.T.R. Costa & M. Sobral* 48 (HUFJSJ).

*Pavonia communis* is widely distributed across South America (Fryxell 1999). In Brazil, it occurs in the Central and Southern regions of the country, especially in Atlantic Forest and Cerrado phytophysionomies, in addition to secondary forest clearings and pasture areas (Esteves 2001). In Serra do Lenheiro, the species was recorded in anthropized field areas.

This species can be distinguished from other species within the genus *Pavonia* by its flowers distributed along the foliar axils and also at the apex of the stems, the petals 2–3.5 cm, and the presence of retrorse hairs on the spines of the mericarps (Fryxell 1999). *Pavonia communis* is included in the subgenus *Typhalea* (DC.) C. Presl, in the section *Urenoideae* A.St.-Hil., where yellow corolla and mericarps 3-spined are shared by a majority of the species (Fryxell 1999).

**4.5. *Pavonia malacophylla*** (Link & Otto) Garcke, Jahrb. Königl. Bot. Gart. Berlin 1: 221. 1881. = *Sida malacophylla* Link & Otto, Icon. Pl. Select.: 67–68, t. 30. 1828.

Iconography: Bovini *et al.* (2001, Fig. 3: J-K); Esteves (2001, Fig. 7: A-F).

Fig. 2i-j

Shrubs 1.2 m tall, erect. Stems cylindrical, densely pubescent, with yellowish stellate and glandular hairs. Leaves simple, spiralled; petioles 2–6 cm, cylindrical, densely pubescent, with yellowish stellate and glandular hairs; stipules ca. 7 mm, lanceolate, caducous; leaf blades 4–14  $\times$  3.5–13 cm, entire, membranaceous, ovate to widely ovate, base cordate, margin serrulate, apex acute, adaxial and abaxial surfaces densely pubescent, with yellowish stellate and glandular hairs; extrafloral nectaries absent. Flowers in axillary racemes or terminal panicles; pedicels 2–4.5 cm, cylindrical to slightly flattened, pubescent, with yellowish stellate and glandular hairs; epicalyx with 16–22 involucellar bracts, 1–1.2 mm, linear to lanceolate, not morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca.  $4.5 \times 2.5$  mm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally; corolla with petals ca. 2.3 cm, obovate, pink with a white centre; staminal tube ca. 1.7 cm, glabrate; staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 2.5 cm, stigmas 10. Schizocarps 5 mericarps, ca.  $5.2 \times 2.4$  mm, dehiscent, muticous, viscose, frequently blackish; seeds glabrate.

**Specimens examined:** São João del-Rei, trilha para a Serra do Lenheiro, 13.VI.2017, fl. and fr., *M.T.R. Costa et al.* 994 (HUFJSJ).

*Pavonia malacophylla* occurs sporadically from Mexico to Brazil, especially at forest edges (Fryxell 1999). In Brazil, the species is found in all regions (Esteves 2001). In Serra do Lenheiro, this species was recorded next to a trail in the Northwestern area of the range.

This species is characterized by 15–24 involucellar bracts, petals length of 2–3 cm and exerted androecium (Fryxell 1999). According to Esteves (2001), the species presents a rare feature in the genus: the presence of a white mucilaginous substance over the surface of the mericarps. However, this feature disappears during the herborization process. The large leaf blades with length up to 21 cm distinguishes *P. malacophylla* from other species of the section *Lopimia* Mart. (Esteves 2001). Bovini (2001) noted that the glandular hairs over the stems and leaves give them a sticky aspect.

**4.6. *Pavonia sagittata*** A.St.-Hil., Fl. Bras. Merid. (quarto ed.) 1(6): 229-230. 1827.

Iconography: Schumann (1891a, Tab. 95: II); Esteves (2001, Fig. 4: A-H); Fernandes-Júnior & Konno (2017, Fig. 2: F-G; Fig. 4: G). Fig. 2k

Shrubs 0.4–0.5 m tall, erect. Stems cylindrical, hirsute, with ferruginous stellate hairs. Leaves simple, spiralled; petioles 0.9–1.5 cm, cylindrical, hirsute, with ferruginous stellate hairs; stipules ca. 1 mm, linear, caducous or frequently hidden by stem hairs; leaf blades 3–5.5 × 1–1.6 cm, entire, membranaceous to chartaceous, lanceolate to elliptic, base sagittate, margin dentate and slightly revolute, apex acute, adaxial and abaxial surfaces hirsute, with ferruginous stellate hairs; extrafloral nectaries absent. Flowers solitary axillary or terminal; pedicels 1–1.5 cm, cylindrical, hirsute, with ferruginous stellate hairs; epicalyx with 5 involucellar bracts, ca. 6 mm, obovate to suborbicular, not morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca. 7.2 × 4 mm, obovate, united until the medium portion of the calyx, apex acute, with stellate hairs externally; corolla with petals ca. 1.2 cm, obovate, pink with a dark pink centre; staminal tube ca. 5 cm, glabrate; staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 5.5 mm, stigmas 10. Schizocarps 5 mericarps, mericarps ca. 4.5 × 3.5 mm, dehiscent, muticous; seeds glabrate.

**Specimens examined:** São João del-Rei, 6.III.2015, fl. and fr., *M.T.R. Costa et al.* 339 (BHCB, HUFSJ); Águas Férreas, 16.X.2015, fl. and fr., *M.T.R. Costa et al.* 455 (HUFSJ, RB).

*Pavonia sagittata* is considered endemic from Brazil, occurring mainly in Cerrado and Atlantic Forest (Fryxell 1999). The species is most frequently found in southern region of Brazil (Esteves 2001). In Serra do Lenheiro, the species was recorded in campos limpos and campos rupestres.

This species is characterized in the genus *Pavonia* by sagittate leaves and ovate to suborbicular involucellar bracts, besides the hirsute indumentum with a ferruginous aspect (Fryxell 1999). However, Esteves (2001) affirmed that this species can exhibit variable indumentum density, leaf morphology and involucellar bracts shapes. The type-material of *P. sagittata* was collected by Saint-Hilaire in field formations in São João del-Rei (Saint-Hilaire 1828), and it is deposited at the Muséum National d'Histoire Naturelle herbarium (P).

**4.7. *Pavonia viscosa*** A.St.-Hil., Fl. Bras. Merid. (quarto ed.) 1(6): 236. 1827.

Iconography: Schumann (1891a, Tab. 100: II); Fernandes-Júnior & Konno (2017, Fig. 2: H-I; Fig. 4: E-F). Fig. 2l-m

Shrubs 0.5–1.6 m tall, erect. Stems cylindrical, puberulent, with ferruginous stellate and glandular hairs. Leaves simple, spiralled; petioles 1–5 cm, cylindrical to slightly flattened, puberulent, with ferruginous stellate and glandular hairs; stipules 0.7–1.1 mm, linear, caducous; leaf blades 1.5–7.5 × 0.8–5.2 cm, entire, membranous, ovate, base cordate, margin irregularly serrate, apex acute, adaxial surface puberulent, with ferruginous simple and glandular hairs, abaxial surface pubescent, with ferruginous simple and glandular hairs; extrafloral nectaries absent. Flowers solitary in the leaf axils; pedicels 2–4.5 cm, cylindrical, puberulent, with ferruginous stellate and glandular hairs; epicalyx with 12–14 involucellar bracts, ca. 1.5 cm, linear to lanceolate, not morphologically differentiated into pedicel and blade; calyx campanulate, lobes 12–18 × 3–5 mm, ovate, united until the medium portion of the calyx, apex acute, with sparsely simple hairs externally, margin ciliate; corolla with petals ca. 3 cm, obovate, yellow with reddish base and nervures; staminal tube 2.5–2.8 cm, glabrate; staminodes absent; ovary 5-locular, uniovulate locules, styles 2.9–3.3 mm, stigmas 10. Schizocarps 5 mericarps, ca. 7 × 3.5 mm, dehiscent, muticous; seeds puberulent.

**Specimens examined:** São João del-Rei, estrada para Trindade, 25.XII.2012, fl., *M. Sobral 15287* (HUFSJ); 28.XI.2013, fl., *M.T.R. Costa & O. Lara 10* (HUFSJ);

28.I.2014, fl., *M.T.R. Costa & M. Sobral* 27 (BHCB, HUFJSJ, RB); 9.V.2015, fl., *M.T.R. Costa & S.N. Carvalho* 354 (HUFJSJ); 14.VI.2015, fl. and fr., *M.T.R. Costa & S. Franco* 378 (HUFJSJ, RB); 8.VIII.2015, fl. and fr., *M.T.R. Costa et al.* 338 (HUFJSJ).

*Pavonia viscosa* is an endemic species from campos rupestres of Bahia and Minas Gerais (Fryxell 1999). In Serra do Lenheiro, the species was found in campos rupestres, growing between the quartzitic rocks.

This species can be distinguished from other species of the genus by the linear to lanceolate involucellar bracts, as well as stems and leaves covered by glandular hairs (Fryxell 1999) that emit a strong odour (Esteves 2001). In 1981, Sazima registered hummingbirds as frequent pollinators of the species. Sazima (1981) had previously described this species as protogynous and indicated that crossed pollination has had major success in the formation of fruits and seeds.

**4.8. *Peltaea obsita*** (Mart. ex Colla) Krapov. & Cristóbal, *Bonplandia* 9 (1-2): 148. 1996. = *Sida obsita* Mart. ex Colla, *Herb. Pedem.* 1: 416. 1833. Iconography: Bovini *et al.* (2001, Fig. 3: P-Q); Esteves & Krapovickas (2009, Fig. 1: D-E).

Fig. 2n

Shrubs 0.4–0.5 m tall, erect. Stems cylindrical, tomentose, with yellowish stellate hairs. Leaves simple, spiralled; petioles 1–4 cm, cylindrical, tomentose, with yellowish stellate hairs; stipules 2–2.2 mm, triangular, persistent; leaf blades 3.3–7.5 × 2.3–6 cm, entire to 3-lobed, membranaceous, ovate, base cordate, margin double-serrate, apex acute, adaxial to abaxial surfaces tomentose, with yellowish stellate hairs; extrafloral nectaries absent. Flowers congested in axillary and terminal inflorescences; flowers subsessile, pedicels up to 2 mm, cylindrical, tomentose, with yellowish stellate hairs; epicalyx with 7–9 involucellar bracts, ca. 1.7 mm, peltate, morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca. 8 × 3 mm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally; corolla with petals ca. 1.6 cm, obovate, yellowish; staminal tube ca. 1.1 cm, puberulent; staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 1.6 cm, stigmas 10. Schizocarps 5 mericarps, ca. 3 × 2 mm, indehiscent, mucous; seeds glabrate. **Specimens examined:** São João del-Rei, trilha para a Serra do Lenheiro, 6.III.2015, fl., *M.T.R. Costa et al.* 341 (BHCB, HUFJSJ); 13.III.2015, fr., *M.T.R. Costa et al.* 394 (HUFJSJ, RB); 10.IV.2015, fl., *M.T.R. Costa et al.* 408 (HUFJSJ).

*Peltaea obsita* is distributed across Bolivia, Brazil and Paraguay (Zuloaga *et al.* 2008; Jørgensen *et al.* 2014; BFG 2015). In Brazil, it occurs in Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Espírito Santo, Rio de Janeiro and Paraná (Fernandes-Júnior 2020). In Serra do Lenheiro, the species was found in the seasonally flooded field areas between 900 and 1,000 m in altitude.

Inside the genus, this species is characterized by stems and leaves covered exclusively by stellate hairs, peltate involucellar bracts and yellow corolla without a dark centre (Fernandes-Júnior 2020). *Peltaea obsita* is very close to *P. trinervis* (Presl) Krap. & Crist. and this fact has caused controversies in determinations in herbaria collections. In this case, *P. obsita* can be distinguished from *P. trinervis* by its stellate hairs with similar length covering the herb's entire surface and by its mericarps mucous. *Peltaea trinervis* has stems and leaves covered by stellate hairs of different length and spined mericarps (Fernandes-Júnior 2020).

**4.9. *Peltaea polymorpha*** (A.St.-Hil.) Krapov. & Cristóbal, *Kurtziana* 2: 199-202. 1965. = *Pavonia polymorpha* A. St.-Hil., *Fl. Bras. Merid.* (quarto ed.) 1(6): 232. 1827.

Iconography: Krapovickas & Cristóbal (1965, Fig. 5: C; Fig. 18); Fernandes-Júnior & Konno (2017, Fig. 4: H-I).

Fig. 2o

Subshrubs up to 0.2 m tall, decumbent. Stems cylindrical, hirsute to glabrescent, with yellowish stellate hairs sparse and frequently grouped in longitudinal lines. Leaves simple, spiralled; petioles 0.5–1 cm, cylindrical, hirsute, with yellowish stellate hairs; stipules ca. 4 mm, linear, persistent; leaf blades 3.2–7.5 × 3.3–5.5 cm, entire, membranaceous, ovate, elliptic to circular, base rounded, margin crenate to serrate, apex acute to obtuse, adaxial and abaxial surfaces hirsute, with yellowish stellate hairs; extrafloral nectaries absent. Flowers congest in terminal inflorescences or rarely solitary in leaf axils; flowers subsessile, pedicels up to 2 mm, cylindrical, hirsute, with yellowish stellate hairs; epicalyx with 8–10 involucellar bracts, ca. 1 cm, spatulate, morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca. 8.5 × 3 mm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally on nervures, margin ciliate; corolla with petals ca. 3.5 cm, obovate, pink with a dark pink centre; staminal tube ca. 1 cm, puberulent, with glandular hairs;

staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 1.5 cm, stigmas 10. Schizocarps 5 mericarps, 4–4.5 × 2.5 mm, dehiscent, muticous; seeds puberulent.

**Specimens examined:** São João del-Rei, campos próximos a Serra do Lenheiro, 27.III.2014, fl. and fr., *M.T.R. Costa et al. 508* (HUFSJ); 6.III.2015, fl., *M.T.R. Costa et al. 346* (HUFSJ); 22.V.2015, fr., *M.T.R. Costa et al. 370* (HUFSJ); Águas Férreas, 16.X.2015, fr., *M.T.R. Costa et al. 453* (HUFSJ); 10.IV.2015, fl., *M.T.R. Costa et al. 408* (HUFSJ); 8.I.2017, fl., *M.T.R. Costa et al. 673* (HUFSJ, R); campo rupestre, acesso por trilha em frente à Base do Exército, 28.X.2017, fl., *M.T.R. Costa et al. 1241* (HUFSJ, R).

*Peltaea polymorpha* is considered as an endemic species from Brazil, occurring from the central area of the country to the South (Krapovickas & Cristóbal 1965; Fernandes-Júnior 2020). In Serra do Lenheiro, the species was recorded in campos limpos and campos rupestres.

This species can be recognized by sessile flowers which are frequently grouped in apical inflorescences, spatulate involucellar bracts and dehiscent pubescent mericarps (Fernandes-Júnior & Konno 2017). *Peltaea polymorpha*, as suggested by its name, presents variations in the shape and dimensions of the leaf blades (Krapovickas & Cristóbal 1965).

**4.10. *Peltaea speciosa*** (Kunth) Standl., Contr. U.S. Natl. Herb. 18(3): 113. 1916. = *Pavonia speciosa* Kunth, Nov. Gen. Sp. (quarto ed.) 5: 281–282, t. 477. 1822.

Iconography: Krapovickas & Cristóbal (1965, Fig. 5: A; Fig. 19). Fig. 2p

Subshrubs to shrubs up to 0,2 m tall, decumbent to erect. Stems cylindrical, hirsute, with yellowish stellate hairs. Leaves simple, spiralled; petioles 0.4–1 cm, cylindrical, hirsute, with yellowish stellate hairs; stipules ca. 5 mm, linear, caducous; leaf blades 4.5–8 × 2.3–6.2 cm, entire, membranaceous, ovate, obovate to circular, base rounded, margin crenate to serrate, apex acute to obtuse, adaxial and abaxial surfaces hirsute, with yellowish stellate hairs; extrafloral nectaries absent. Flowers solitary, axillary or terminal; pedicels up to 1.2 cm, cylindrical, hirsute, with yellowish stellate hairs; epicalyx with 7–9 involucellar bracts, ca. 1.2 cm, lanceolate to spatulate, morphologically differentiated into pedicel and blade; calyx campanulate, lobes ca. 1.2 × 0.4 cm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally; corolla with petals 4–4.5 cm, obovate, pink sometimes

with a dark pink centre; staminal tube ca. 1.6 cm, puberulent, with glandular hairs; staminodes absent; ovary 5-locular, uniovulate locules, styles ca. 2.5 cm, stigmas 10. Schizocarps 5 mericarps, ca. 5 × 3 mm, dehiscent, muticous; seeds glabrate.

**Specimens examined:** São João del-Rei, campos próximos a Serra do Lenheiro, 27.III.2014, fl. and fr., *M.T.R. Costa et al. 516* (HUFSJ, RB); 6.III.2015, fl., *M.T.R. Costa et al. 340* (BHC, HUFSJ); 10.IV.2015, fl., *M.T.R. Costa et al. 410* (HUFSJ); 22.V.2015, fl., *M.T.R. Costa 368* (HUFSJ, RB).

*Peltaea speciosa* occurs across Central and South America, preferably in savannas and Brazilian Cerrado (Krapovickas & Cristóbal 1965). In Brazil, it occurs in Bahia, Tocantins, Minas Gerais, Goiás, Mato Grosso and Mato Grosso do Sul (Fernandes-Júnior 2020). In Serra do Lenheiro, the species was recorded growing in campos limpos and campos rupestres.

This species is characterized inside the genus *Peltaea* as the one having stems and leaves densely covered by yellow stellate hairs, spatulate involucellar bracts and stamens distributed equally along the staminal tube (Fernandes-Júnior 2020). *Peltaea speciosa* is the most distributed species of the genus with registers from 100 to 1400 m in altitude (Krapovickas & Cristóbal 1965).

**4.11. *Sida acrantha*** Link, Enum. Hort. Berol. Alt. 2: 203. 1822.

Iconography: Monteiro-Filho (1936, Tab. 1, fig. 9 = *Sida subcuneata* A. St.-Hil.). Fig. 3d

Subshrubs 0.3–0.7 m tall, erect. Stems cylindrical, tomentose, with ferruginous stellate hairs. Leaves simple, spiralled; petioles 0.4–0.7 cm, cylindrical, tomentose, with ferruginous stellate hairs; stipules ca. 1.2 cm, lanceolate to linear, persistent; leaf blades 2.6–4 × 0.4–0.7 cm, entire, membranaceous, rhombic to elliptic, base cuneate, margin dentate from half to the apex of the leaf blade, apex acute to obtuse, adaxial and abaxial surfaces tomentose, with ferruginous stellate hairs; extrafloral nectaries absent. Flowers congest at the stem apex evolved by the leaves, rarely grouped in 1–3 flowers in the leaf axils; pedicels up to 1.4 cm, cylindrical, tomentose, with yellowish stellate hairs; epicalyx absent, calyx campanulate, lobes ca. 8 × 3.5 mm, triangular, united until the medium portion of the calyx, apex acute, tomentose externally; corolla with petals ca. 1.2 cm, obovate, white with a dark red centre; staminal tube ca. 8 mm, glabrate; staminodes absent; ovary 5–7-locular, uniovulate locules, styles ca. 9 mm,

stigmas 5–7. Schizocarps 5–7 mericarps, ca. 5.2 × 2.3 mm, indehiscent, muticous; puberulent seeds. **Specimens examined:** São João del-Rei, 9.V.2015, fr., *M.T.R. Costa & S.N. Carvalho 353* (HUFSJ); campo rupestre, acesso pela estrada para Cunha, trilha à esquerda, 19.V.2018, fr., *M.T.R. Costa et al. 1470* (HUFSJ, R).

**Additional specimens examined:** BRAZIL. MINAS GERAIS: São João del-Rei, estrada para a Fazenda do Pombal, 11.III.2015, fl., *M.T.R. Costa et al. 313* (HUFSJ).

*Sida acrantha* is a poorly recorded species and it has a questionable geographic distribution. Today, it is considered an endemic species from Minas Gerais and São Paulo (Bovini 2020a). Krapovickas (2014) cited Bahia and Rio de Janeiro as Brazilian states where the species also occurs. In Serra do Lenheiro, the species was found in campos limpos and campos rupestres.

*Sida acrantha* belongs to section *Sidae* and is distinguished by stems and leaves covered by tomentose ferruginous indument, flowers frequently congested at the apex and 5–7 mericarps muticous (Krapovickas 2014). In São Paulo state, this species is considered as “in danger” (São Paulo 2016). Monteiro (1949) considered this species as a variety of *Sida subcuneata* A. St.-Hil. because it presents differences on the indument only. However, Monteiro did not realize at the time that the name *S. acrantha* is older and would have priority to be used. Krapovickas (2014), when reviewing section *Sidae*, re-adopted the name *S. acrantha* as correct and synonymized *S. subcuneata*.

**4.12. *Sida cerradoensis*** Krapov., Bonplandia 3: 11\*. 1969.

Iconography: Esteves & Krapovickas (2009, Fig. 1: T); Brandão *et al.* (2017, Fig. 1: G-H); Grings & Boldrini (2022, Fig. 1: G-L; Fig. 14: E).

Fig. 3e

Subshrubs 0.45–0.6 m tall, erect. Stems cylindrical, hispid, with hyaline, yellow to red simple hairs, and hyaline to yellowish stellate hairs. Leaves simple, spiralled; petioles 0.3–1 cm, cylindrical to flattened, hispid to hispidulous, with hyaline to yellowish simple and stellate hairs; stipules ca. 2 mm, linear, persistent; leaf blades 0.5–2.5 × 0.3–0.7 cm, entire, membranaceous, lanceolate to oblong, base rounded to subcordate, margin dentate and purplish, apex acute, adaxial and abaxial surfaces pubescent, with hyaline to yellowish stellate hairs; extrafloral nectaries absent. Flowers solitary in the leaf axils or

congest at the stem apex; pedicels 0.3–0.5 cm, cylindrical, hispidulous, with hyaline to yellowish stellate hairs; epicalyx absent; calyx campanulate, lobes ca. 7 × 4 mm, triangular, united until the medium portion of the calyx, apex acute, margin purplish, with stellate hairs externally; corolla with petals ca. 1.5 mm, obovate, yellowish to orange sometimes with a dark red centre; staminal tube ca. 0.9 cm, glabrate; staminodes absent; ovary (9–)10–12-locular, uniovulate locules, style ca. 1 cm, stigmas 10. Schizocarps 10–12 mericarps, 8–9 × 2 mm, indehiscent, 2-spined with retrorse hairs, spines 0.3–0.4 cm; glabrate seeds.

**Specimens examined:** São João del-Rei, estrada que liga o Tijuco a Trindade, 21.II.2014, fl. and fr., *M.T.R. Costa & M. Sobral 42* (HUFSJ; RB); subida pelo Tijuco, 12.XII.2014, fl. and fr., *M.T.R. Costa et al. 267* (HUFSJ; RB); 6.III.2015, fl. and fr., *M.T.R. Costa et al. 343* (HUFSJ).

*Sida cerradoensis* is considered an endemic species from Brazil and it occurs across all Brazilian regions (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos rupestres from the central-most part of the range.

The features that differentiate *S. cerradoensis* from the other species in *Sida* section *Cordifoliae* (DC.) Fryxell are the purplish leaf blades and sepal lobes margin, besides the presence of 9–10 mericarps 2-spined (Krapovickas 1969). Brandão *et al.* (2017) comment that *S. cerradoensis* can have verrucous stems. The epithet “*cerradoensis*” alludes to the known occurrence of the species at the time it was described since it was considered restricted to the Cerrado. However, the current distribution of the species includes all Brazilian phytogeographic domains (Bovini 2020a).

**4.13. *Sida cordifolia*** L., Sp. Pl. 2: 684. 1753.

Iconography: Monteiro-Filho (1936, Tab. 3: 5); Monteiro (1949, Fig. 2: 3-4); Bovini *et al.* (2001, Fig. 4: D-E); Esteves & Krapovickas (2009, Fig. 1: N-R); Lima & Conceição (2016, Fig. 2: J); Brandão *et al.* (2017, Fig. 2: A); Grings & Boldrini (2022, Fig. 3: A-E; Fig. 14: F).

Fig. 3f

Subshrubs 0.8 m tall, erect. Stems cylindrical, velutinous, with hyaline to yellowish simple and stellate hairs. Leaves simple, spiralled; petioles 0.9–4.2 cm, cylindrical, longitudinally sulcate, velutinous, with hyaline to yellowish simple and stellate hairs; stipules ca. 4 mm, linear, caducous; leaf blades 2–5.5 × 1.5–4 cm, entire, membranaceous, ovate to lanceolate, base cordate to rounded, margin dentate to serrate, apex acute,



adaxial and abaxial surfaces tomentose, with hyaline to yellowish simple and stellate hairs; extrafloral nectaries absent. Flowers in axillar or terminal racemes, solitary flowers less frequent; pedicels 2–5 mm, cylindrical, tomentose, with hyaline to yellowish simple and stellate hairs; epicalyx absent; calyx campanulate, lobes 6–7 × 3.5–4 mm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally; corolla with petals 1.2 cm, obovate, yellowish, sometimes with a dark yellow or orange centre; staminal tube ca. 8 mm, glabrescent; staminodes absent; ovary 9–10-locular, uniovulate locules, styles ca. 9 mm, stigmas 10. Schizocarps 9–10 mericarps, 5–5.5 × 1.5 mm, indehiscent, 2-spined with retrorse hairs, spines ca. 0.5 cm; glabrate seeds.

**Specimens examined:** São João del-Rei, 13.VI.2014, fr., *M.T.R. Costa et al.* 72 (HUFSJ).

**Additional specimens examined:** BRAZIL. MINAS GERAIS: São João del-Rei, distrito de Rio das Mortes, 9.V.2016, fl. and fr., *M.T.R. Costa & L.L. Alves* 588 (HUFSJ).

*Sida cordifolia* is a species with pantropical distribution, occurring on all continents (Fuertes-Aguilar 1995). In Brazil, it occurs in all the regions of the country (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos rupestres at the Northwestern area of the range.

This species is characterized by the velutinous indument covering the stems and leaf blades, large petals 1.2 m in length and mericarps 6–10 with two large spines covered by retrorse hairs (Bovini 2020a). The species is included in *Sida* section *Cordifoliae* and is widely used in popular medicinal remedies in some countries, such as India, where it is used as an anti-rheumatic, analgesic, anti-asthmatic, and diuretic, among other uses (Galal *et al.* 2015).

**4.14. *Sida glaziovii*** K.Schum., *Fl. bras.* 12(3): 322-323. 1891.

Iconography: Monteiro-Filho (1936, Tab. 3: 15); Bovini *et al.* (2001, Fig. 4: F-H); Bovini (2010, Fig. 3: B-D); Fernandes-Júnior & Konno (2017, Fig. 3: A; Fig. 4: K); Grings & Boldrini (2022, Fig. 3: K-N; Fig. 14: D). Fig. 3g

Subshrubs ca. 0.45 m tall, erect. Stems cylindrical, tomentose, with yellowish simple and stellate hairs. Leaves simple, spiralled; petioles 2–8 mm, cylindrical, tomentose, with yellowish simple and stellate hairs; stipules ca. 4.5 mm, linear, persistent; leaf blades 1.5–4.2 × 0.6–2.5 cm, entire, membranaceous, ovate to rhombic, base cuneate to

rounded, margin irregularly serrate at the 2/3 apical portion of the blade, apex rounded, adaxial and abaxial surfaces tomentose, with yellowish stellate hairs; extrafloral nectaries absent. Flowers in axillar racemes, rare in terminal, and some solitary axillar flower; pedicels 0.5–1.2 cm, cylindrical, tomentose, with yellowish stellate hairs; epicalyx absent; calyx campanulate, lobes 6–7.5 × 2.7–3.5 mm, triangular, united until the medium portion of the calyx, apex acute, with stellate hairs externally, corolla with petals 0.8–1 cm, obovate, white to yellowish with a dark red centre; staminal tube ca. 2 mm, glabrescent; staminodes absent; ovary 10–11-locular, uniovulate locules, style ca. 4 mm, stigmas 10. Schizocarps 10–11 mericarps, 3–3.5 × 1.8–2 mm, indehiscent, submuticous, spines up to 0.1 cm; puberulent seeds.

**Specimens examined:** São João del-Rei, 13.VI.2014, fr., *M.T.R. Costa et al.* 73 (HUFSJ).

**Additional specimens examined:** BRAZIL. MINAS GERAIS: São João del-Rei, Rua Luís Giarola, 27.II.2012, fl., *M. Sobral* 14724 (HUFSJ).

*Sida glaziovii* is considered as endemic species from Brazil (Bovini 2020a). It occurs in Espírito Santo, Minas Gerais, São Paulo, Rio de Janeiro, Bahia, Sergipe, Distrito Federal, Mato Grosso do Sul and Paraná states (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos rupestres.

This species can be distinguished from others of the genus *Sida* by its tomentose indumentum present in the stems, leaves and calyx, the shape of its leaves, varying from ovate to rhombic, and petals with a dark centre (Bovini 2010; Fernandes-Júnior & Konno 2017). The species is circumscribed in *Sida* section *Sida* and is very close to *S. rhombifolia*: these two are frequently confused. In 1977, Fryxell described a new species based on the same characteristics as *S. glaziovii*: *Sida andersonii* Fryxell. Later, Bovini (2001) commented on this mistake made by Fryxell and synonymized this name described by him in 1977.

**4.15. *Sida linifolia*** Cav., Diss. 1: 14, tab. II, f. I. 1785.

Iconography: Cavanilles (1785, Tab. II); Schumann (1891a, Tab. 57); Monteiro-Filho (1936, Tab. 1:4); Bovini *et al.* (2001, Fig. 5: A-B); Lima & Conceição (2016, Fig. 2: m); Brandão *et al.* (2017, Fig. 5: B-C); Grings & Boldrini (2022, Fig. 4: G-J; Fig. 14: H). Fig. 3h

Subshrubs 0.4–0.6 m tall, erect. Stems cylindrical, hirsute, with hyaline to yellowish simple and stellate hairs. Leaves simple, spiralled;

petioles 3–5 mm, cylindrical, hirsute, with hyaline to yellowish simple and stellate hairs; stipules 6–6.5 mm, linear to narrowly lanceolate, persistent; leaf blades 3.5–10 × 0.3–0.6 cm, entire, membranaceous to chartaceous, lanceolate to narrowly lanceolate, base obtuse to cuneate, margin entire, apex acute, adaxial surface hirsute, with hyaline to yellowish simple and stellate hairs, abaxial surface velutinous, with hyaline to yellowish stellate hairs; extrafloral nectaries absent. Flowers in terminal corymbs; pedicels 1.4–10 mm, cylindrical, hirsute, with hyaline to yellowish simple and stellate hairs; epicalyx absent; calyx campanulate, lobes 3.5–6 × 2–3 mm, triangular, united until the medium portion of the calyx, apex acute, pubescent, with hyaline simple hairs; corolla with petals 0.8–1 cm, obovate, white with a dark red centre; staminal tube ca. 2 mm, glabrescent; staminodes absent; ovary 7–9-locular, uniovulate locules, style ca. 2.2 mm, stigmas 7–9. Schizocarps 7–9 mericarps, 2.5–3 × 1 mm, indehiscent, submuticous, spines up to 0.1 cm; glabrescent seeds.

**Specimens examined:** São João del-Rei, 13.VI.2013, fl. and fr., *M.T.R. Costa et al. 74* (HUFSJ); estrada que liga o Tijuco a Trindade, 21.II.2014, fr., *M.T.R. Costa & M. Sobral 45* (HUFSJ); 12.XII.2014, fl. and fr., *M.T.R. Costa et al. 261* (HUFSJ).

*Sida linifolia* is distributed across Central and South America, especially in the tropical region (Fryxell 1985). In Brazil, it occurs in all the states of the country (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos limpos and campos rupestres.

This species is included in *Sida* section *Stenindae* Griseb. and is characterized by leaf blades linear to narrowly lanceolate and margin entire, besides flowers grouped in corymbs and corolla with a dark red centre (Bovini 2010).

**4.16. *Sida martiana*** A.St.-Hil., Fl. Bras. Merid. (quarto ed.) 1(5): 187. 1827.

Iconography: Krapovickas (2006, Fig. 2: A).

Fig. 3i

Subshrubs up to 0.4 m tall, erect. Stems cylindrical, hirsute, with hyaline simple, stellate and glandular hairs. Leaves simple, spiralled; petioles 0.5–3 cm, cylindrical, hirsute, with hyaline simple, stellate and glandular hairs; stipules 1–1.1 mm, linear, persistent; leaf blades 2–5 × 1.1–2.5 cm, with some purplish blots, entire, membranaceous, ovate, base cordate, margin irregularly serrate and purplish, apex acute, adaxial

surface glabrescent, with sparse hyaline simple and stellate hairs, abaxial surface puberulent, with hyaline simple and stellate hairs; extrafloral nectaries absent. Flowers solitary axillar or terminal; pedicels 0.15–2 cm, cylindrical, hirsute, with hyaline simple and stellate hairs; epicalyx absent; calyx campanulate, lobes 5–6 × 2–3.2 mm, triangular, united until the medium portion of the calyx, apex acute, ciliate, with hyaline simple hairs; corolla with petals ca. 0.6 cm, obovate, yellowish; staminal tube ca. 2 mm, glabrescent; staminodes absent; ovary 5-locular, uniovulate locules, style ca. 2.2 mm, stigmas 5. Schizocarps 5 mericarps, ca. 2 × 1.4 mm, indehiscent, muticous; glabrate seeds. **Specimens examined:** São João del-Rei, 22.V.2015, fl. and fr., *M.T.R. Costa et al. 371* (HUFSJ; RB); trilha alternativa de acesso às torres de transmissão, 6.IV.2017, fl., *M.T.R. Costa et al. 828* (HUFSJ, R); acesso pela estrada para Cunha, 26.IV.2018, fl., *M.T.R. Costa et al. 1461* (HUFSJ, R).

*Sida martiana* is an endemic species from Brazil (Bovini 2020a). In Brazil, it is found in Pernambuco, Sergipe, Bahia, Tocantins, Goiás and Minas Gerais (Bovini 2020a). In Serra do Lenheiro, the species was registered in campos limpos and campos rupestres.

This species can be recognized by stems and leaves covered by glandular hairs, leaf blades with purplish macules and petals up to 0.6 cm in length (Fryxell 1987; Krapovickas 2006). According to Fuertes-Aguilar (1995), *S. martiana* belongs to a species complex within *Sida* section *Nelavagae* Borss. *Sida martiana* is very similar to *Sida luschnathiana* Steud., but the presence of small glandular hairs on the adaxial face of the leaf blades of the latter distinguishes the two species (Bovini 2020a). In the treatment of the section *Nelavagae* for Argentina and neighbouring countries, Krapovickas (2006) states that *S. martiana* was only known up to that time for the Espinhaço Range. However, *S. martiana* has since been registered for several other locations and states in Brazil in the last few years (Bovini 2020a).

**4.17. *Sida nemorensis*** Mart. ex Colla, Herb. Pedem. 1: 416-417. 1833.

Iconography: Krapovickas (2006, Fig. 2: H); Grings & Boldrini (2022, Fig. 6: A-D; Fig. 14: J).

Fig. 3j

Subshrubs ca. 1.7 m tall, erect. Stems cylindrical, hirsute, with hyaline simple, stellate and glandular hairs. Leaves simple, spiralled; petioles

0.8–2.5 cm, cylindrical, hirsute, with hyaline simple, stellate and glandular hairs; stipules 5–6 mm, linear, persistent; leaf blades 3.8–6.1 × 1.8–2.8 cm, entire, membranaceous, ovate, base cordate, margin irregularly serrate, apex acute, adaxial and abaxial surfaces velutinous, with hyaline simple and stellate hairs; extrafloral nectaries absent. Flowers in axillar and terminal glomerules; flowers subsessiles, pedicels up to 2 mm, cylindrical, hirsute, with hyaline simple and stellate hairs; epicalyx absent, calyx campanulate, lobes ca. 6 × 3 mm, triangular, united until the medium portion of the calyx, apex acute, puberulent, ciliate, with rare hyaline simple and glandular hairs; corolla with petals ca. 0.9 cm, obovate, yellowish; staminal tubes ca. 2 mm, glabrescent; staminodes absent; ovary 5-locular, uniovulate locules, style ca. 3 mm, stigmas 5. Schizocarps 5 mericarps, 2–3 × 1.5 mm, indehiscent, 2-spined, spines 0.1–0.2 cm; glabrescent seeds.

**Specimens examined:** São João del-Rei, 21.IX.2016, fl. and fr., *M.T.R. Costa et al. 604* (HUFJSJ).

*Sida nemorensis* occurs in Argentina, Brazil and Paraguay (Krapovickas 2006). In Brazil, the species is found in Mato Grosso, Goiás, Distrito Federal, Minas Gerais, Rio de Janeiro and Paraná states (Bovini 2020a). In Serra do Lenheiro, this species was recorded at the edge of seasonal forests.

*Sida nemorensis* belongs to *Sida* section *Nelavagae* and can be recognized from other species in the section by its stems covered by simple long, starry and glandular hairs, flowers grouped in axillary or terminal glomerules, and mericarps with two spines (Krapovickas 2006). After consulting physical herbaria and the speciesLink network (2021), it was determined that the species apparently has few records in Brazil. It is believed that unidentified specimens may still reveal new occurrences.

**4.18. *Sida planicaulis*** Cav., Diss. 1: 24, tab. III, f. 11. 1785.

Iconografia: Cavanilles (1785, Tab. III: 11); Monteiro-Filho (1936, Tab.1: 13 = *S. acuta* var. *cbidensis*); Bovini *et al.* (2001, Fig. 4: A-C); Krapovickas (2013, Fig. 5: I); Fernandes-Júnior & Konno (2017, Fig. 3: E); Grings & Boldrini (2022, Fig. 6: K-P; Fig. 14: L). Fig. 3k

Subshrubs ca. 0.3 m tall, erect. Stems cylindrical, lateral stems flattened, glabrescent, with hyaline simple hairs. Leaves simple, distichous; petioles 3–5 mm, slightly flattened,

glabrescent to puberulent, with hyaline simple hairs; stipules 4.5–6 mm, 3-nerved, two shapes: linear and falcate, persistent; leaf blades 2.1–4 × 0.9–1.7 cm, entire, membranaceous, lanceolate to ovate, base oblique to rounded, margin irregularly serrate, apex acute, adaxial and abaxial surfaces puberulent to glabrescent, with hyaline simple hairs; extrafloral nectaries absent. Flowers solitary or in 2–4-flowered glomerules at the leaf axils; flowers subsessiles, pedicels up to 1.5 mm, cylindrical to flattened, puberulent, with hyaline simple hairs; epicalyx absent; calyx campanulate, lobes ca. 2.5 × 1.5 mm, triangular, united until the medium portion of the calyx, apex acute, puberulent to glabrescent, with hyaline simple hairs; corolla with petals 0.4–0.5 cm, obovate, yellow; staminal tube ca. 2 mm, glabrate; staminodes absent; ovary 8-locular, uniovulate locules, style ca. 2.5 mm, stigmas 8. Schizocarps 8 mericarps, 2.5–2.7 × 1.5 mm, indehiscent, spines ca. 0.2 cm; glabrescent seeds.

**Specimens examined:** São João del-Rei, 10.IV.2015, fl. and fr., *M.T.R. Costa et al. 404* (HUFJSJ; RB).

*Sida planicaulis* has wide tropical and subtropical distribution (Robyns 1966). In Brazil, it occurs in all regions of the country, except the Northern region (Bovini 2020a). In Serra do Lenheiro, the species was found near edges of seasonal forests.

This species is characterized by flattened stems, distichous leaves and 3-nerved stipules in two formats: linear and falcate (Bovini *et al.* 2001). *Sida planicaulis* is included in *Sida* section *Distichifolia* (Monteiro) Krapov., so it has distichous leaves and stipules with 1–6 ribs (Krapovickas 2003). Undoubtedly, this is one of the species with the most controversy surrounding its circumscription among authors. *Sida planicaulis* is very similar to *Sida acuta* Burm. and *Sida carpinifolia* L.f. In this sense, Rodrigo (1944), Monteiro-Filho (1949), Borssum-Waalkes (1966), Robyns (1966), and Fuertes-Aguilar (1995), among others, established morphological characters that separate the three aforementioned species. However, these species can appear as synonyms, or even in infraspecific categories of each other. Krapovickas (2003) wrote that *S. planicaulis* has a broader occurrence on the Brazilian coast, while *S. acuta* is more concentrated in the northern and northeastern regions of Brazil. Krapovickas (2003) also moved *S. carpinifolia* and its varieties to infraspecific categories.

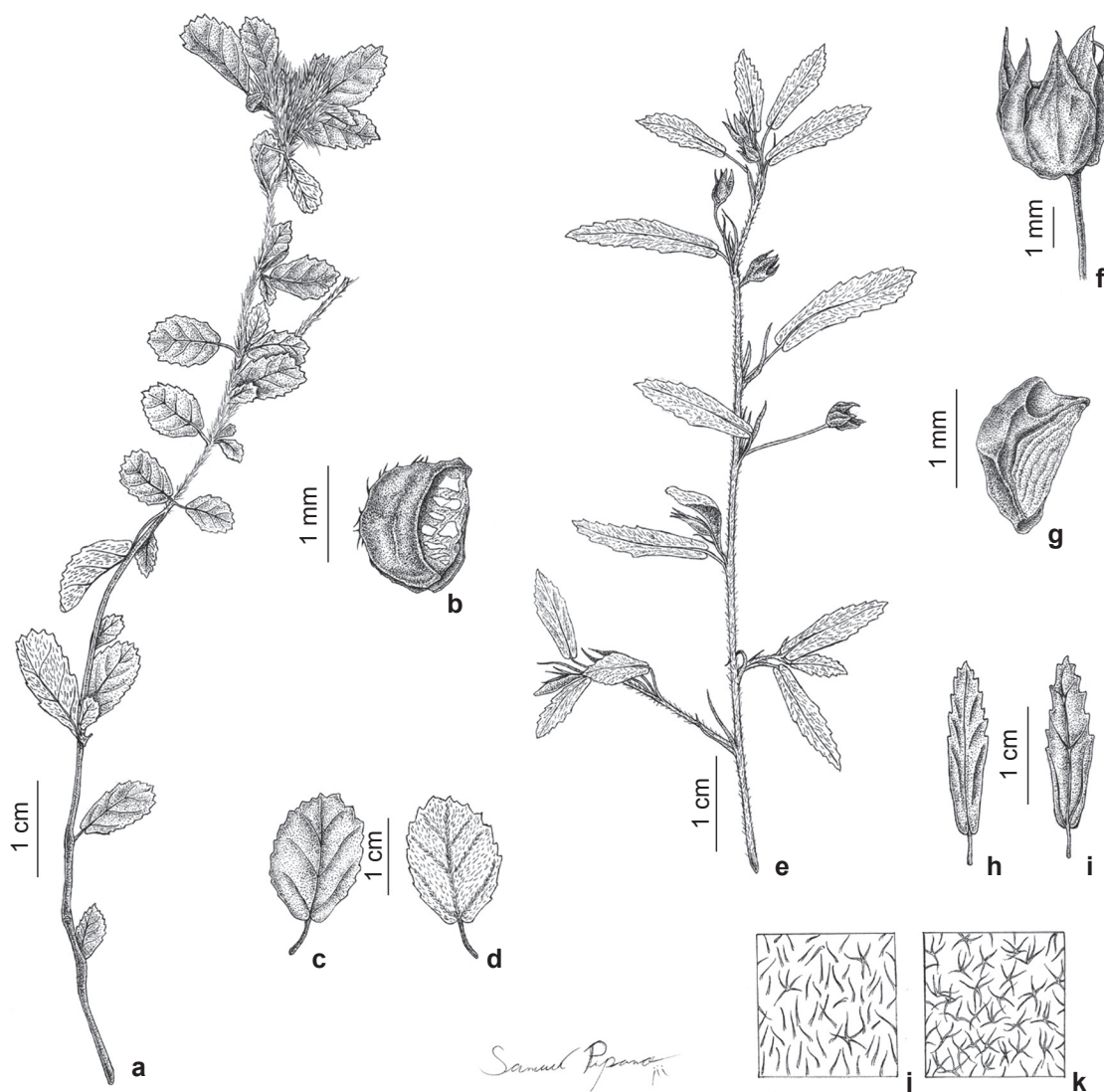
**4.19. *Sida plumosa*** Cav., Diss. 1: 7, tab. XII, f. 4. 1785.

Iconography: Cavanilles (1785, Tab. XII: 4).

Figs. 3l; 4a-d

Subshrubs prostrate. Stems cylindrical, tomentose, with yellowish simple and stellate hairs. Leaves simple, spiralled; petioles 3–4.5 mm, cylindrical to slightly flattened, tomentose, with yellowish simple and stellate hairs; stipules 4.5–5 mm, two shapes: lanceolate and oblong, persistent; leaf blades 0.7–1.2 × 0.6–0.8 cm, entire, membranaceous, oblong to obovate, base cuneate, margin irregularly dentate at the 2/3 apical portion

of the blade, apex rounded to retuse, adaxial surface puberulent to glabrescent, with rare hyaline simple hairs, abaxial surface slightly tomentose, with hyaline adpressed hairs; extrafloral nectaries absent. Flowers in terminal glomerules; flowers subsessile; epicalyx absent; calyx campanulate, lobes ca. 3 × 1.5 mm, triangular, united until the medium portion of the calyx, apex acute, pubescent, with yellowish simple hairs; corolla with petals 0.7–0.8 cm, obovate, yellow; staminal tube ca. 3 mm, glabrescent; staminodes absent; ovary 5–7-locular, uniovulate locules, style ca. 2.5 mm, stigmas 5. Schizocarps 5–7 mericarps, ca.



**Figure 4** – a-d. *Sida plumosa* – a. habit; b. mericarp; c. adaxial face of the leaf; d. abaxial face of the leaf. e-k. *Sida viarum* – e. habit; f. calyx; g. mericarp; h. adaxial face of the leaf; i. abaxial face of the leaf; j. indument of adaxial face of the leaf; k. indument of abaxial face of the leaf. [a-d. *Costa 511* (RB); e-k. *Costa 403* (RB)].

1.5 × 1.5 mm, indehiscent, mucous with dorsal prominences and lacking glochids; glabrescent seeds.

**Specimens examined:** São João del-Rei, campos próximos a Serra do Lenheiro, 27.III.2014, fl. and fr., *M.T.R. Costa et al. 511* (HUFJSJ; RB); 22.V.2015, fr., *M.T.R. Costa et al. 369* (HUFJSJ; RB); 21.IX.2016, fl., *M.T.R. Costa et al. 601* (HUFJSJ); 28.VI.2019, fr., *M.T.R. Costa et al. 1655* (HUFJSJ, R).

*Sida plumosa* is an endemic species from Brazil and occurs in Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro and São Paulo (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos limpos and campos rupestres.

*Sida plumosa* belongs to *Sida* section *Malacroideae* G. Don, where the species share among themselves a prostrate habit and a chromosome number of  $2n = 24$  (Fuertes-Aguilar *et al.* 2003). Among other species in this section, *S. plumosa* can be recognized by the presence of a few simple hairs on the adaxial face of leaf blades and mericarps without glochids. For a long time, *S. plumosa* was recognized as a synonym of *S. ciliaris* var. *fulva* (A. St-Hil.) K. Schum. Only in 2007 was *S. plumosa* returned to the species category with the work of Krapovickas (2007). Here it is illustrated for the first time in Brazilian studies.

#### 4.20. *Sida rhombifolia* L., Sp. Pl. 2: 684. 1753.

Iconography: Schumann (1891a, Tab. 57); Monteiro-Filho (1936, Tab. 3: 7 e 8); Monteiro-Filho (1949, Fig. 16-18); Bovini *et al.* (2001, Fig. 5: C-D); Brandão *et al.* (2017, Fig. 5: D); Grings & Boldrini (2022, Fig. 9: F-J; Fig. 14: P).

Fig. 3m

Subshrubs to shrubs 0.15–0.4 m tall, erect. Stems cylindrical, glabrate to puberulent, with hyaline simple and stellate hairs. Leaves simple, spiralled; petioles 0.5–1.8 cm, cylindrical to slightly flattened, puberulent to velutinous, with hyaline simple and stellate hairs; stipules ca. 5 mm, linear, persistent; leaf blades 3–7.2 × 1.1–2.2 cm, entire, membranaceous to chartaceous, rhombic, lanceolate to obovate, base cuneate, margin irregularly dentate at the 2/3 apical portion of the blade, apex acute, adaxial surface glabrescent, with sparse hyaline stellate hairs, abaxial surface puberulent to velutinous, with hyaline stellate hairs; extrafloral nectaries absent. Flowers solitary in axils or in terminal glomerules; pedicels 0.4–1.2 cm, cylindrical, puberulent, with hyaline simple and stellate hairs; epicalyx absent; calyx campanulate, lobes 4.5–5 × 2–2.6 mm,

triangular, united until the medium portion of the calyx, apex acute, puberulent externally, with hyaline simple hairs; corolla with petals ca. 0.6 cm, obovate, yellow; staminal tube ca. 2 mm, glabrate; staminodes absent; ovary 9–12-locular, uniovulate locules, style ca. 2.3 mm, stigmas 10. Schizocarps 9–12 mericarps, ca. 3.2 × 2.8 mm, indehiscent, spines ca. 0.2 cm; glabrate seeds.

**Specimens examined:** São João del-Rei, fl. and fr., *M. Quinelato* (HUFJSJ 405); estrada que liga o Tijuco a Trindade, 21.II.2014, fr., *M.T.R. Costa & M. Sobral 44* (HUFJSJ); subida pelo Tijuco, 12.XII.2014, fl. and fr., *M.T.R. Costa 263* (HUFJSJ); 10.IV.2015, fr., *M.T.R. Costa et al. 406* (HUFJSJ; RB); 21.IX.2016, fr., *M.T.R. Costa et al. 605* (HUFJSJ); 8.I.2017, fl., *M.T.R. Costa et al. 668* (HUFJSJ, R).

*Sida rhombifolia* is a species with wide distribution in tropical and subtropical regions of the New and Old World (Fryxell 1988). In Brazil, it occurs in all states of the country (Bovini 2020a). In Serra do Lenheiro, the species was found in campos limpos and campos rupestres, as well as anthropized areas and near edges of seasonal forests.

*Sida rhombifolia* belongs to *Sida* section *Sidae* and can be recognized within the section by its puberulent indumentum covering almost all the plant and solitary flowers (Krapovickas 2014). *Sida rhombifolia* composes a taxonomic complex within the genus *Sida*, contemplating a concept of morphological variation of its leaves and number of mericarps (Sivarajan & Pradeep 1994). Most likely, this species is one of the most collected and polymorphic species of the genus. Fuertes-Aguilar (1995) mentioned that the resolution of the *S. rhombifolia* complex requires a worldwide study and the use of different approaches, not just morphological taxonomy.

#### 4.21. *Sida urens* L., Syst. Nat. (ed. 10) 2: 1145. 1759.

Iconography: Schumann (1891a, Tab. 60); Monteiro-Filho (1936, Tab. 1: 7); Bovini *et al.* (2001, Fig. 5: E-G); Krapovickas (2006, Fig. 2: E); Brandão *et al.* (2017, Fig. 6: E); Fernandes-Júnior & Konno (2017, Fig. 3: F; Fig. 4: L); Grings & Boldrini (2022, Fig. 12: A-E; Fig. 14: U).

Fig. 3n

Subshrubs decumbent. Stems cylindrical, hirsute, with hyaline simple and rarely stellate hairs. Leaves simple, spiralled; petioles 0.8–1.5 cm, cylindrical to slightly flattened, hirsute, with hyaline simple hairs; stipules 4–5 mm, filiform

to linear, caducous; leaf blades  $2.5\text{--}5.8 \times 1.5\text{--}3.1$  cm, entire, membranaceous to chartaceous, ovate, base cordate, margin irregularly serrate, apex acute, adaxial and abaxial surfaces tomentose, with hyaline stellate hairs; extrafloral nectaries absent. Flowers in axillar and terminal glomerules, rare axillar solitary flowers; flowers subsessile or with pedicels up to 0.7 cm, cylindrical, hirsute, with hyaline simple and stellate hairs; epicalyx absent; calyx campanulate, lobes  $4\text{--}4.6 \times 2.6\text{--}3$  mm, triangular, united until the medium portion of the calyx, apex acute, setose externally, with hyaline simple hairs; corolla with petals 0.5–0.6 cm, obovate, yellow; staminal tube ca. 2.2 mm, glabrate, staminodes absent; ovary 5-locular, uniovulate locules, style ca. 2.3 mm, stigmas 5. Schizocarps 5 mericarps,  $3 \times 2\text{--}2.5$  mm, indehiscent, submuticous, spines up to 0.1 cm; puberulent seeds.

**Specimens examined:** São João del-Rei, 13.VI.2013, fl., *M.T.R. Costa et al. 75* (HUFSJ); campos próximos a Serra do Lenheiro, 27.III.2014, fl., *M.T.R. Costa et al. 512* (HUFSJ); 16.X.2015, fl., *M.T.R. Costa et al. 454* (HUFSJ).

**Additional specimens examined:** BRAZIL. MINAS GERAIS: Carandaí, 16.XI.2013, fr., *M.T.R. Costa et al. 4* (HUFSJ).

*Sida urens* is a well distributed species on the American continent from Mexico to Argentina (Krapovickas 2006). In Brazil, it occurs in all regions of the country (Bovini 2020a). In Serra do Lenheiro, the species was recorded in campos limpos and campos rupestres.

*Sida urens* is characterized by its decumbent habit, stems and leaves covered by long simple hairs, flowers grouped in glomerules and five muticous mericarps (Bovini 2010). The species belongs to *Sida* section *Nelavagae*, the species of which are characterized by chordate leaf blades, dark green calyx lobes and a constant number of 5 mericarps (Krapovickas 2006).

**4.22. *Sida viarum*** A.St.-Hil., Fl. Bras. Merid. 1. 182. 1827.

Iconography: Monteiro-Filho (1936, Tab. 2: 2); Grings & Boldrini (2022, Fig. 12: F-J; Fig. 14: V). Figs. 3o; 4e-k

Subshrubs up to 0.3 m tall, decumbent to erect. Stems cylindrical, pubescent, with yellowish simple and stellate hairs. Leaves simple, spiralled; petioles 3–4 mm, cylindrical, glabrescent to pubescent, with yellowish simple and stellate hairs; stipules ca. 5 mm, linear, persistent; leaf blades  $3\text{--}5 \times 0.4\text{--}0.7$  cm, entire, membranaceous, lanceolate

to almost oblong, base truncate to cuneate, margin dentate at the 2/3 apical portion of the blade, apex acute, adaxial surface pubescent, with yellowish simple and stellate hairs, abaxial surface pubescent, with yellowish stellate hairs; extrafloral nectaries absent. Flowers solitary at the leaf axils or congest at the stem apex; pedicels ca. 3 mm, cylindrical, pubescent, with yellowish stellate hairs; epicalyx absent; calyx campanulate, lobes  $5\text{--}7 \times 2\text{--}3$  mm, triangular, united until the medium portion of the calyx, apex acute, glabrescent; corolla with petals 0.7–1.1 cm, obovate, white with a dark red centre; staminal tubes ca. 5 mm, glabrescent; staminodes absent; ovary 5-locular, uniovulate locules, style ca. 5.2 mm, stigmas 5. Schizocarps 5 mericarps,  $3.5\text{--}4 \times 2\text{--}3$  mm, indehiscent, submuticous, spines up to 0.1 cm; puberulent seeds.

**Specimens examined:** São João del-Rei, campos próximos à Serra do Lenheiro, 27.III.2014, fr., *M.T.R. Costa et al. 510* (HUFSJ); 6.III.2015, fl. and fr., *M.T.R. Costa et al. 344* (BHCB, HUFSJ); 10.IV.2015, fl. and fr., *M.T.R. Costa et al. 403* (HUFSJ, RB); 29.VIII.2015, fl. and fr., *M.T.R. et al. 385* (HUFSJ); trilha alternativa de acesso às torres de transmissão, 6.IV.2017, fl., *M.T.R. Costa et al. 841* (HUFSJ, R).

*Sida viarum* is distributed across Argentina, Bolivia, Brazil Paraguay and Venezuela, besides a record in Mexico (Krapovickas 2014). In Brazil, the species occurs from Pará to Rio Grande do Sul (Krapovickas 2014). In Serra do Lenheiro, the species was found in campos limpos and campos rupestres, in addition to some anthropized areas.

*Sida viarum* belongs to *Sida* section *Sidae*. This species is recognized by leaf blades with serrated margin in the apical portion, calyx up to 0.7 cm in length and mericarps muticous to submuticous (Krapovickas 2014). The species was described based on material collected in the municipality of São João del-Rei by Saint-Hilaire. The type-material is deposited in the herbarium of the Muséum National d'Histoire Naturelle in Paris (P). Here, we present a better iconographic representation since the original illustration shown by Monteiro-Filho (1936).

### Acknowledgements

We thank Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), for the grants of the first author to conduct this study in 2015. We also thank all colleagues that helped in fieldwork, Isabel Restrepo for the map confection, the reviewers for the great contributions, the curators and teams of the listed herbaria.

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Area Editor: Dr. Leandro Giacomini

Received in December 16, 2021. Accepted in July 04, 2022.



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