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Original Paper

Senna (Leguminosae-Caesalpinioideae) in Minas Gerais state, Brazil

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Abstract

Senna comprises about 350 species worldwide, of which 80 species occur in Brazil. This work brings an update taxonomic treatment of *Senna* species in the state of Minas Gerais, the second most diverse state for the genus, through the morphological analysis of about 2,348 specimens from herbaria and fieldwork. Thirty-six species and 29 varieties were recognized, including 34 native species and 2 cultivated species. Of the 39 species reported in literature for the state, but 4 species were excluded from the list produced. The occurrence of *Senna acuruensis* was confirmed; *S. macranthera* var. *striata* and *S. pilifera* var. *tubata* are new records, and *S. hirsuta* var. *acuminata* is endemic to Minas Gerais. There are 28 species in the Cerrado, 26 species in the Atlantic Forest and 20 species in the Caatinga. The distribution of *Senna pentagonia* var. *pentagonia* is extended to include the Atlantic Forest. Identification keys, descriptions, illustrations, taxonomic comments and geographic distribution are provided for the species and varities.

Key words: angyosperm, diversity, Fabaceae, floristic, taxonomy.

Resumo

Senna possui cerca de 350 espécies em todo o mundo, sendo 80 no Brasil. Este trabalho realizou o estudo taxonômico das espécies de *Senna* ocorrentes no estado de Minas Gerais, o segundo mais diverso para o gênero, através da análise morfológica de cerca de 2.348 espécimes depositados em herbários e de trabalhos de campo. Foram reconhecidas 36 espécies e 29 variedades, sendo 34 espécies nativas, duas cultivadas. Na literatura, 39 espécies haviam sido reportadas, mas 4 espécies foram excluídas da listagem produzida. A ocorrência de *Senna acuruensis* foi confirmada; *S. macranthera* var. *striata* e *S. pilifera* var. *tubata* são novos registros para o estado e *S. hirsuta* var. *acuminata* é endêmica de Minas Gearais. Ocorrem 28 spp. no Cerrado, 26 spp. na Mata Atlântica e 20 spp. na Caatinga. *Senna pentagonia* var. *pentagonia* teve sua ocorrência ampliada para a Mata Atlântica. São fornecidos chave de identificação, descrições, ilustrações, comentários taxonômicos e distribuição geográfica para as espécies e variedades.

Palavras-chave: angiosperma, diversidade, Fabaceae, florística, taxonomia.

Introduction

Senna is the largest genus of Cassiinae Irwin & Barneby, comprises 295–350 species worldwide (Stevens 2012) and is represented by numerous species in the Americas, including 202 species recorded by Irwin & Barneby (1982). The genus can be recognized by the following: pinnate leaves; nectary (most species) on the petiole, rachis or pedicel; flowers usually yellow, bracteoles absent, and androecium with 3 adaxial staminodes and 6–7 fertile stamens that are free and heteromorphic (Irwin & Barneby 1982).

Irwin & Barneby (1982) proposed an infrageneric classification with 6 sections and 35 series that was phylogenetically analyzed by Marazzi *et al*. (2006). In the latter study, only section *Psilorhegma* (Vogel) H.S. Irwin & Barneby is monophyletic; sections *Chamaefistula* (Collad.)

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H.S. Irwin & Barneby, *Peiranisia* (Rafinesque) H.S. Irwin & Barneby and *Senna* P. Mill. are *paraphyletic*, while *Astroites* H.S. Irwin & Barneby and *Paradictyon* H.S. Irwin & Barneby are included in sections *Senna* and *Chamaefistula*, respectively.

In Brazil, 80 species of *Senna* have been recorded (BFG 2018). Floristic inventories have recorded 40 spp. for the state of Bahia (Lewis 1987), 25 spp. for Pernambuco (Lima 1999), 19 spp. for Rio Grande do Sul (Rodrigues *et al*. 2005), 17 spp. for Santa Catarina (Bortoluzzi *et al.* 2011) and, in the central region, 26 spp. for Mato Grosso, 25 spp. for Goiás, 23 spp. for Mato Grosso do Sul, 18 spp. for the Federal District (Silva *et al.* 2018) and 24 spp. for São Paulo (Wanderley *et al.* 2016).

Preliminary surveys of herbarium collections of *Senna* using the site speciesLink indicated 75 names and 351 unidentified specimens for Minas Gerais, showing a taxonomic study was needed to better understand the actual diversity of the genus in the state. Until now, 39 species had been reported for Minas Gerais (BFG 2018), which is about 50% of the species cited for Brazil.

This work is a taxonomic treatment of the *Senna* species in Minas Gerais. Identification keys, descriptions, illustrations, and distribution and taxonomic comments for the species are provided, increasing what is known about the flora of the state and contributing to the Flora of Brazil 2020 project.

Material and Methods

The taxonomic study of the species is based on morphological analyses of about 2,348 specimens of *Senna* from one foreign herbarium (NY) and 19 national herbaria: BHCB, CEN, CESJ, DIAM, ESA, FLOR, FUEL, HUEFS, HUFU, IBT, IPA, MBM, OUPR, R, RB, SPF, UB, UEC, VIC (abbreviations follow Holmgreen *et al.* 1990). The type collections observed virtually on speciesLink and the Reflora Virtual Herbarium were marked with the symbol "!" in the lists of examined specimens. The material classified as "selected specimens" was examined to write the description, make the illustration and/or is a representative of one of the collection regions in Minas Gerais. The other examined material, which was also used for the distribution map, is in the "list of the specimens". The observed botanical material was from three vegetation domains in the state: Atlantic Forest (41% of the state), Cerrado (57%) and Caatinga (2%) (Drummond *et al.* 2005).

The material collected during fieldwork (Tab. 1) was processed according to Bridson & Forman (1999) and registered at the VIC Herbarium, Department of Plant Biology, Federal University of Viçosa (UFV). The species were identified using the taxonomic literature for the genus (Irwin & Barneby 1982; Rodrigues *et al.* 2005; Bortoluzzi *et al*. 2011; Dantas & Silva 2013; Silva *et al.* 2018; Kuntz 2014).

The terminology in the morphological descriptions is based on Radford *et al.* (1974) and the taxonomic literature for the genus is based on Marazzi *et al.* (2007). The identification keys to the species and varieties are based on the vegetative and reproductive characteristics of the observed material. The illustrations were drawn by the botanical illustrator Reinaldo Pinto, with the aid of a camera lucida attached to a Zeiss stereomicroscope, and based on rehydrated herbarium specimens.

Information about the geographic distribution of the species was collected during expeditions and from the labels of the consulted specimens and taxonomic studies of the group (Irwin & Barneby 1982; BFG 2018). The geographic coordinates of non-georeferenced locations were obtained from GoogleEarth using the point given for the municipality. The software ArcGIS was used to make geographic distribution maps.

Results and Discussion

1. *Senna* Mill., Gard. Dict. Abr. ed. 4, vol. 3. 1754.

Trees, shrubs, subshrubs, scandent shrubs or lianas. Branches cylindrical, angular or sulcate, glabrous, sparsely tomentose, sparsely pubescent, tomentose or hirsute. Leaves petiolate; nectary present or absent on petiole and rachis. Stipules filiform, linear, triangular, ovate, reniform, falciform or lanceolate, deciduous or persistent. Leaflets pinnate, glabrous or with variable indument. Racemes: typic, umbellate, corymbiform or paniculate axillary and/or terminal. Bracts persistent or deciduous; pedicel with or without nectary. Bracteoles absent. Flowers hermaphrodities. Sepals 5, free, heteromorphic, rarely similar in size. Corolla zygomorphic or asymmetric; petals 5, free, yellow. Androecium: staminodes 3, adaxial; fertile stamens 6–7, free, heteromorphic, with 4 adaxial stamens, 1 centric abaxial stamen and 2 abaxial stamens; anthers with poricida apical dehiscence. Ovary sessile or stipitate. Legume dehiscent or indehiscent, cylindrical, linear, oblong, flat-compressed, or quadrangular. Seeds 1- or 2-seriate.

Table 1 – Collection points in Minas Gerais state. Font: ICMBIO, IEF, Google Maps.

Collection point	Ecossystems	Approximate coordinate
Caparaó National Park	Atlantic Forest	20º19'–20º37'S, 41º43'–41º53'W
Serra do Cipó National Park	Cerrado, Rock Field	19º12'–19º34'S, 43º27'–43º38'W
Diamantina	Cerrado, Rock Field and Galery Forest	18°14'S, 43°37'W
Serra do Cabral State Park	Cerrado and Vereda	17°35'S, 44°35'W
Conceição do Ibitipoca	Atlantic Forest	21°43'S, 43°55'W
Senador Firmino	Atlantic Forest	20°54'S, 43°06'W
Ubá	Atlantic Forest	21°04'S, 42°58'W
Viçosa	Atlantic Forest	20°45'S, 42°52'W

Identification key to the taxa of *Senna* in the state of Minas Gerais, Brazil

1. Nectary absent.
   2. Plant with prickles.....1.1. *Senna aculeata*
   2'. Plant without prickles.
      3. Racemes typic; legume cylindrical.
         4. Stipules filiform; distal pair of leaflets 3.5–4.5 × 1.5–2 cm; corolla asymmetrical; legume not winged.....1.29. *Senna spectabilis* var. *excelsa*
         4'. Stipules triangular; distal pair of leaflets 9.5–13 × 6.5–8 cm; corolla zygomorphic; legume winged.....1.4. *Senna alata*
      3'. Racemes corymbiform; legume flat-compressed.
         5. Leaflets apex acuminate or cuspidate, rarely retuse or obtuse; corolla yellow and orange base of the petals; legume 9–16 cm long, straight, green and vinaceous when mature.....1.28. *Senna silvestris*
         5'. Leaflets apex predominantly retuse; corolla yellow; legume 20–23cm, ondulate, brown when mature.....1.27. *Senna siamea*
1'. Nectary present.
   6. Nectary present in the petiole.
      7. Nectary present in the upper half of the petiole.....1.16. *Senna oblongifolia*
      7'. Nectary present in the lower half of the petiole.
         8. Apex of leaflets cuspidate or acuminate.
            9. Leaflets glabrous in both side; legume light color on the margins.....1.18. *Senna occidentalis*
            9'. Leaflets hirsutullous or strigulose in abaxial surface; legume all light brown when mature.....1.10. *Senna hirsuta*
         8'. Apex of leaflets acute or obtuse.
            10. Rachis 11.5–17(18.5) cm long; legume 19–24(–29.5) × 0.3–0.5 cm.....1.8. *Senna cernua*
            10'. Rachis (3–)4–6 cm long; legume 8.8–14 × 0.7–1 cm.....1.15. *Senna neglecta*
   6'. Nectary absent in petiole, present in leaf rachis and present or absent in pedicel.
      11. Leaflets 2 pairs.
         12. Branches hirsute.....1.22. *Senna pilifera*
         12'. Branches not hirsute.
            13. Bracts 6–12 × 2–5 mm, late deciduous.....1.5. *Senna angulata*
            13'. Bracts 1–4 × 0.5–1 mm, but they can be 5–6 mm long and ca. 0.5 mm wide in *S. splendida* and 1–2 mm wide in *S. tenuifolia*, deciduous

14. Nectary conical, pyriform or ovate.
    15. Leaflets coriaceous; nectary always between leaflets of two pairs, veins patent; legume 7.5–15 × 1–1.5 cm, black when mature ..... 1.26. *Senna rugosa*
    15'. Leaflets cartaceous; nectary between leaflets of proximal pairs, can be occurs between second pair also in *S. macranthera*; veins tenuous, can be patent in *S. affinis*; legume 19–37(–40) × 0.5–1 cm, brown when mature.
        16. Branches cylindrical, anthers of abaxial stamens 8–12 mm long; legume externally depressed between seed locules .....1.12. *Senna macranthera*
        16'. Branches angular, rare cylindrical, anther of abaxial stamens 5–6 mm long; legume externally flat.....1.3. *Senna affinis*
14'. Nectary narrowly elliptic, falciform or clavate.
    17. Leaflets glabrous, apex retuse or acute; sepals glabrous in dorsal surface .....
    .....1.30. *Senna splendida*
    17'. Leaflets sparsely tomentose, apex cuspidate; sepals pubescent in dorsal surface.....
    .....1.31. *Senna tenuifolia*

11'. Leaflets more than 2 pairs.
    18. Nectary present in leaf rachis and in pedicel, but can be deciduous in pedicel of *S. uniflora* and in some specimens of *S. cana*.
        19. Stipules linear or filiform.
            20. Leaflets grabrous; nectary between the proximal pair; legume sparsely tomentose.....
            .....1.25. *Senna rostrata*
            20'. Leaflets velutinous; nectary between 4-proximal pairs; legume velutinous .....
            .....1.33. *Senna uniflora*
        19'. Stipules reniform, falciform sometimes in *S. cana*.
            21. Leaflets with trichomes lannose, villous, tomentose or velutinous in abaxial surface.
                22. Abaxial surface of leaflets lannose or villous; legume slightly compressed.....
                .....1.7. *Senna cana*
                22'. Abaxial surface of leaflets always tomentose or densely velutinous; legume subquadrangular ..... 1.34. *Senna velutina*
            21'. Leaflets glabrous in both sides, some times occurs trichomes sparse tomentose at veins in abaxial surface in *S. reniformis*.
                23. Leaflets coriaceous, veins patent, apex retuse, stipules apex rounded.....
                ..... 1.9. *Senna corifolia* var. *caesia*
                23'. Leaflets cartaceous, veins tenuous, apex cuspidate; stipules apex acute .....
                .....1.24. *Senna reniformis*
    18'. Nectary present in leaf rachis and absent in pedicel.
        24. Leaflets 3–9 pairs, 2 can be occurs in *S. corymbosa* and *S. tropica*.
            25. Branches sulcate.
                26. Stipules ovate; legume subcylindrical, turgid ..... 1.11. *Senna itatiaiae*
                26'. Stipules linear-falciform; legume oblong, flat-compressed .....
                .....1.19. *Senna organensis* var. *organensis*
            25'. Branches not sulcate.
                27. Leaflets apex acute, cuspidate in *S. tropica*.
                    28. Corolla asymmetrical .....1.13. *Senna mucronifera*
                    28'. Corolla zygomorphic.
                        29. Leaflets pairs 2–3, distal pair 0.6–0.8 cm wide; nectary between the proximal pair of leaflets..... *Senna corymbosa** (cultivated)
                        29'. Leaflets pairs (2–)3–4, distal pair 1.5–2.5 cm wide; nectary between leaflets of all pairs, sometimes absent on the last pair.....
                        .....1.32. *Senna tropica*
                27'. Leaflets apex rounded, obtuse or retuse.

30. Legume linear, flat-compressed.
    31. Leaflets 3 pairs; stipule linear-falciform; sepals sparsely tomentose in dorsal surface .... 1.17. *Senna obtusifolia*
    31'. Leaflets 7–9 pairs; stipule ovate; sepals hirsute in dorsal surface.....1.23. *Senna pneumatica*
30'. Legume not linear and not compressed.
    32. Leaflets 3 pairs; latero-abaxial stamens filaments 1–2 mm long; legume winged..... ..... 1.21. *Senna pentagonia* var. *pentagonia*
    32'. Leaflets 4–6 pairs; latero-abaxial stamen filaments 15–25 mm long; legume subcylindrical ..... 1.20. *Senna pendula*

24'. Leaflets 10–37 pairs.
    33. Trees; branches and rachis sparsely or densely tomentose ..... 1.14. *Senna multijuga*
    33'. Shrubs; branches and rachis viscidulus.
        34. Branches sparsely tomentose and hispidulous; petal centric adaxial 16–20 × 7–8 mm .... 1.6. *Senna aristeguietae*
        34'. Branches sparsely tomentose; petal centric adaxial ca. 7 × 3 mm..... 1.2. *Senna acuruensis*

Sinopsis of the *Senna* species in Minas Gerais state

1.1. *Senna aculeata* (Pohl *ex* Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 478. 1982.

Cassia aculeata Pohl *ex* Benth. in Mart., *Fl. bras*. 15(2): 128, t. 39. 1870. Figs. 1a; 2a-d

Shrubs, 1–1.8 m tall, branches cylindrical, prickly, trichomes capitate. Leaves with 11–12 pairs of leaflets; stipules 35–45(–50) × 10–20 mm, ovate, base cordate, persistent, apex acute; nectary absent in petiole and in rachis; petiole 2–3 cm long; leaf rachis (7–)14–18 cm long, prickly; leaflets narrowly elliptic, apex acute, mucronate, both sides glabrous, veins tenuous, chartaceous, margin glabrous, proximal pair 3.5–5 × 0.8–1.5 cm, distal pair 4–6 × 0.5–1.6 cm. Racemes terminal, flowers united at apex; peduncle ca. 7 cm long; inflorescence rachis ca. 2.5 cm long. Bracts 25–30 × 15 mm, elliptic-acuminate, deciduous; pedicel ca. 7 mm long, nectary absent. Sepals ca. 10 × 10 mm, similar in size, circular or elliptic, apex rounded or obtuse, dorsal surface with capitate trichomes. Corolla zygomorphic; petals glabrous, yellow, central adaxial petal 10–12 × 5–6 mm, ovate, apex rounded, latero-adaxial and latero-abaxial petals ovate or elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminode lamina arrowlike, median stamen filament ca. 2 mm long, anther ca. 3 mm long, centric abaxial stamen filament ca. 5 mm long, anther ca. 3 mm long, latero-abaxial stamen filaments ca. 4 mm long, straight, anther ca. 8 mm long, rostrum oblique, ca. 1 mm long. Ovary glabrous, style ca. 1.5 cm long, with capitate trichomes. Legume 9–12.5 × 1.7–2 cm, oblong, flat-compressed, externally slightly depressed between seed locules, straight, glabrous, brown when mature, indehiscent. Seeds ca. 6 × 3 mm, 1-seriate, oblong.

Examined specimens: entre Sagarana e riachinho do Rio Urucuia, 16°10'S, 46°4'W, elev. 544 m, 27.XI.2000, fl. and fr., *C. Proença et al. 2343* (FUEL, MBM).

This species is the only representative of series *Aculeata* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) found in Minas Gerais and is easily recognized by the presence of prickles on the branches and leaf rachis. In addition, it has large stipules and bracts, flowers united at the apex of the inflorescence and a flat-compressed legume.

Senna aculeata is distributed throughout the American continent, from Cuba to Paraguay (Irwin & Barneby 1982). In Brazil, it occurs in Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Piauí and Tocantins, in the Caatinga, Cerrado and Pantanal (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It occurs on lagoon margins and in flooded places, pastures and disturbed areas (Irwin & Barneby 1982).

There are few records of this species from Minas Gerais, but is more abundant in Brazil's Central-West Region (Silva *et al*. 2018). The examined specimens were collected in the eastern part of the state in a region close to Goiás (Fig. 1a). Collected near river. Flowers and fruits in November.

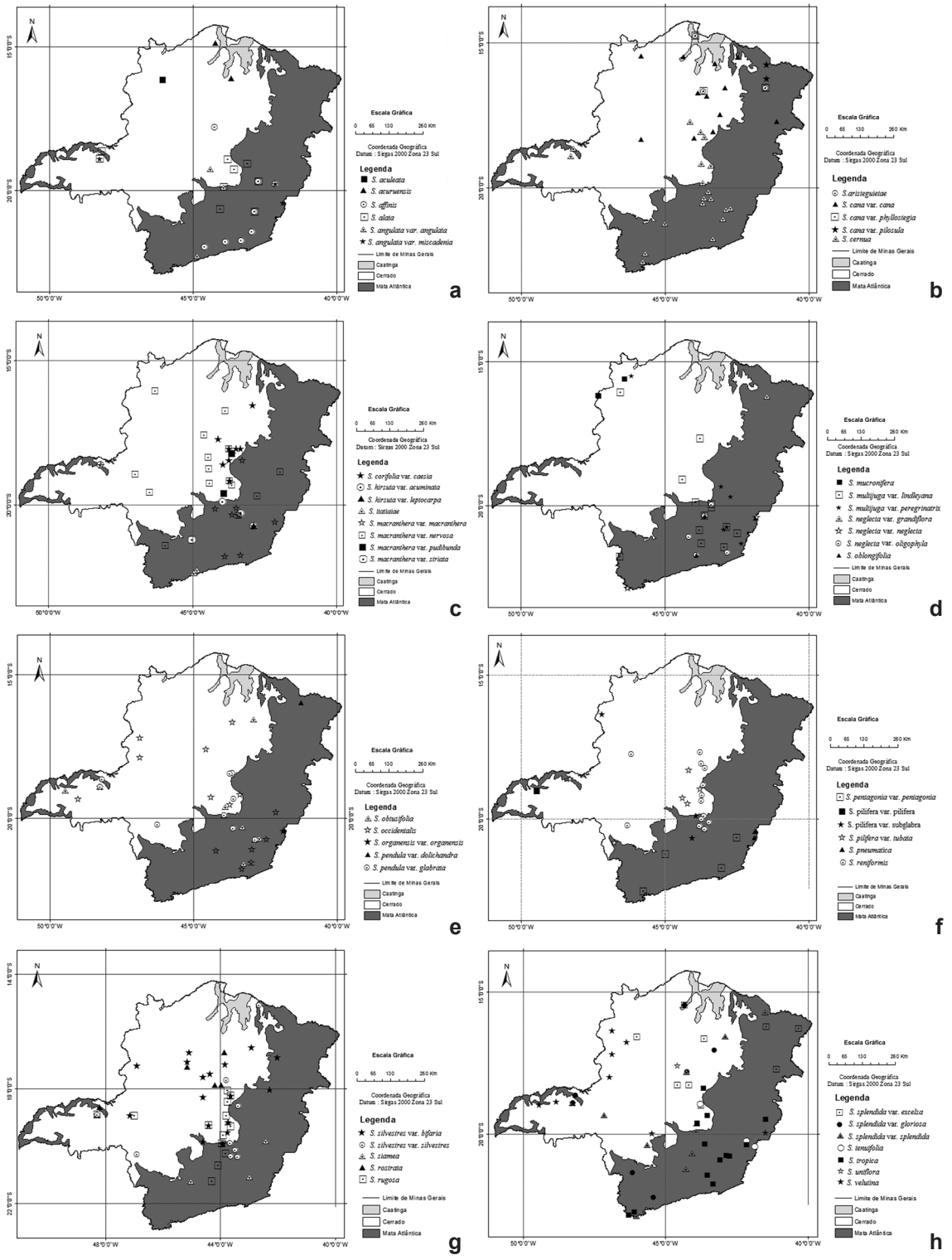

Figure 1 – a-h. Distribution of *Senna* species found in Minas Gerais, Brazil. The white, light and dark gray colors refers to the Cerrado biome, Caatinga and Atlantic Forest, respectively.

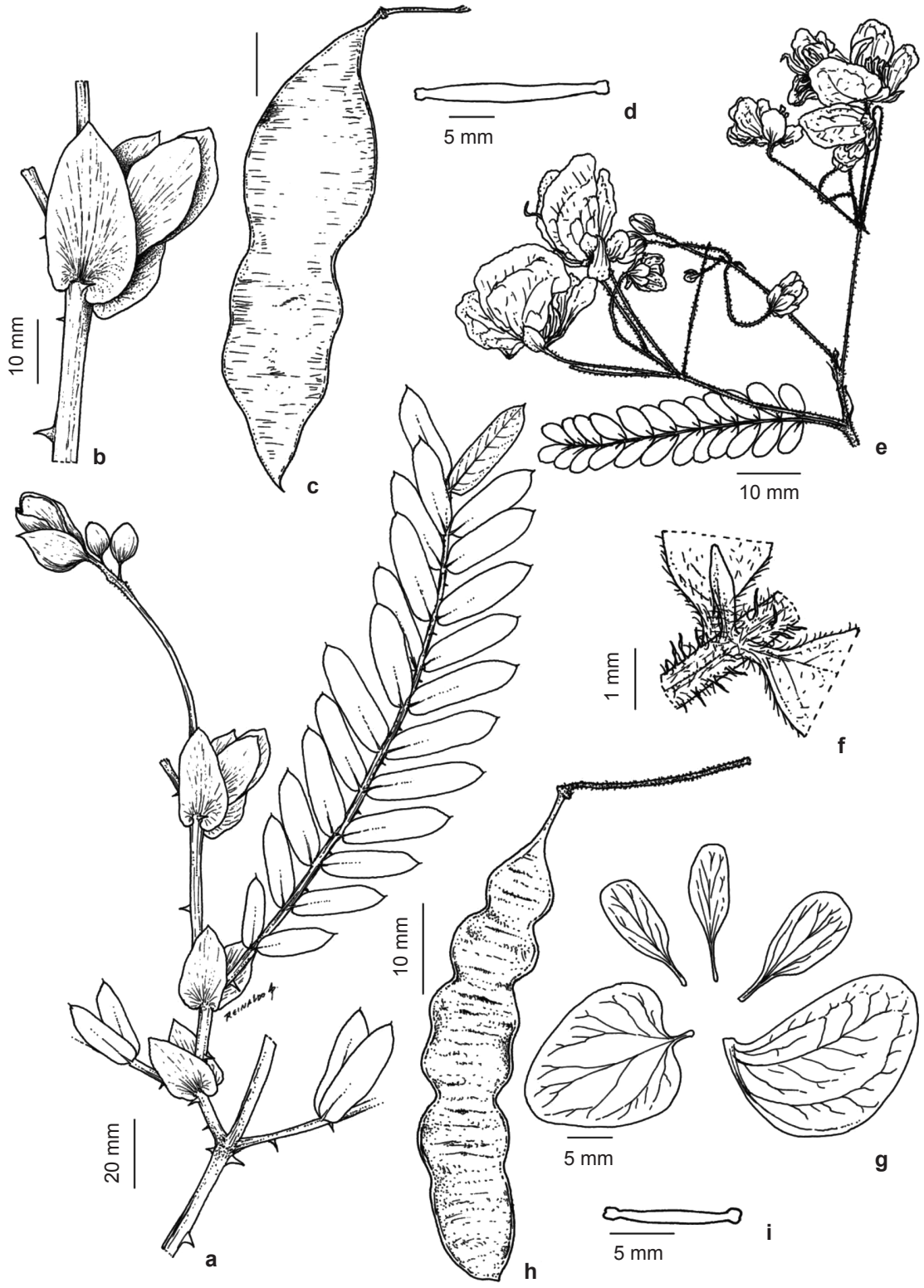

Figure 2 – a-d. *Senna aculeata* – a. branches with leaves and inflorescence; b. stipule; c. legume; d. transversal section of legume. e-i. *S. acuruensis* – e. branches with leaves and inflorescence; f. nectary between leaflets of proximal pair; g. corolla; h. legume; i. transversal section of legume (a-d. *C. Proença et al. 2343*-MBM; e-i. *C. Vidal 815*-BHCB).

1.2. *Senna acuruensis* (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 506. 1982. *Cassia acuruensis* Benth. *in* Mart., *Fl. bras.* 15(2): 122. 1870. Figs. 1a; 2e-i

Shrubs, ca. 3 m tall, branches cylindrical, viscidulous and sparsely tomentose. Leaves 12–17 pairs of leaflets; stipules ca. 5 × 0.1 mm, setiform, base truncate, apex acuminate, deciduous; nectary absent in petiole and present in the rachis, piriform-acuminate, stipitate, present between the first and the second pair of leaflets, sometimes between the third and fourth pairs; petiole 1–1.3 cm long; leaf rachis 4–5 cm long, viscidulous and sparsely tomentose; leaflets narrowly elliptic or obovate, apex rounded or obtuse, mucronulate, adaxial surface sparsely tomentose and abaxial surface tomentose, veins tenuous, chartaceous, margin ciliolate, proximal pair 0.9–1.2 × 0.4–0.5 cm, distal pair 0.5–1 × 0.3–0.5 cm. Racemes axillary; peduncle 2–3.8 cm long; inflorescence rachis 0.5–1.5 cm long. Bracts 1–3 × 0.5–1 mm, setiform, deciduous; pedicel 20–25 mm long, nectary absent. Sepals 5–6 × 3–4 mm, different size, elliptic or ovate, apex rounded or acute, sepals glabrous or sparsely tomentose; corolla asymmetric, petals sparsely tomentose at veins, yellow, central adaxial petal ca. 7 × 3 mm, elliptic, apex obtuse, latero-adaxial petals elliptic and latero-abaxial petals ovate and sub-reniform, apex obtuse. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina twisted, medium stamen filaments ca. 1 mm long, anther 5–7 mm long, centric-abaxial stamen filament ca. 2 mm long, anther ca. 5 mm long, latero-abaxial stamens filaments 4–5 mm long, straight, anther 5–7 mm long, rostrum straight, 2–3 mm long. Ovary sparsely tomentose, style 1.5–2 cm long, sparsely tomentose. Legume dehiscent, ca. 5.5 × 1 cm, oblong, flat-compressed, externally slightly depressed between seed locules, slightly curved, finely tomentose, brown when mature. Seeds ca. 6 × 1 mm, 1-seriate, oblong.

Examined specimens: Capitão Eneas, rodovia BR-365, 10-15 km ao norte do trevo, 3.IV.1992, *G. Hatschbach et al. 56511* (MBM!). São João das Missões, 15°00'S, 44°00'W, 16.V.2010, fl. and fr., *C. Vidal 815* (BHCB).

Senna acuruensis is easily recognized by the viscidulous rachis, several small leaflets, asymmetric corolla with adaxial and abaxial petals unequal in size and shape, and flat-compressed legume. Among the species of series *Interglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), it is more similar to *Senna aristeguietae* H.S. Irwin & Barneby, but *S. aristeguietae* has a corolla with a large, central, adaxial petal (ca. 20 mm long), and *S. acuruensis* has a corolla with a small, central, adaxial petal (ca. 7 mm long).

Irwin & Barneby (1982) reduced *Cassia catinga* Harms to a variety of *Senna acuruensis* and recognized three varieties for the species: var. *acuruensis*, var. *interjecta* and var. *catingae*. These taxa have adaxial and abaxial petals that are unequal in size. Based on vegetative characteristics, Queiroz (2009) recognized two taxa: *Senna acuruensis* and *Senna catingae* (Harms) Queiroz.

Senna acuruensis has viscidulous and sparsely tomentose branches and 12–17 pairs of small leaflets, the distal pair 0.5–1 × 0.3–0.5 cm (Fig. 2e), while *S. catingae* has glabrous branches with some glandular trichomes only at base of petiole and 6–7 pairs of larger leaflets, the distal pair ca. 3 × 1.5 cm.

Senna acuruensis is endemic to Brazil and the BFG (2018) cites it for the states of Alagoas, Bahia, Pernambuco and Sergipe. Irwin & Barneby (1982) noted the possible occurrence of *S. acuruensis* in Minas Gerais. They analyzed material collected by Martius in Grão Mogol but said the identity of the specimens needed to be confirmed. The present study confirms the occurrence of this species in the state.

This species is common in Caatinga forest (Irwin & Barneby 1982) (Fig. 1a) and has been collected in Minas Gerais in Carrascal near a river and on the side of a road. Flowers and fruits in May.

1.3. *Senna affinis* (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 123. 1982.
Cassia affinis Benth. *in* Mart., *Fl. bras*. 15(2): 98. 1870. Figs. 1a; 3a-h

Shrubs or small trees, 1.5–3 m tall, branches angular, but can be occurs cylindrical, glabrous or sparsely pubescent. Leaves 2 pairs of leaflets; stipules ca. 4(–17) × 0.5–1 mm, linear, curved or spiral when long, deciduous; nectary absent in petiole and present in the rachis, between the proximal pairs, conical or ovate, sessile; petiole 4–8 cm long; leaf rachis 1.8–4 cm, glabrous or with some sparsely crooked trichomes; leaflets elliptic or obovate, apex acute, mucronulate, rare retuse, adaxial surface sparsely pubescent and abaxial surface pubescent or tomentose, veins patent, cartaceous, margin glabrous or sparsely pubescent, proximal pair 8–8.5(–11) × 4–5(–7)

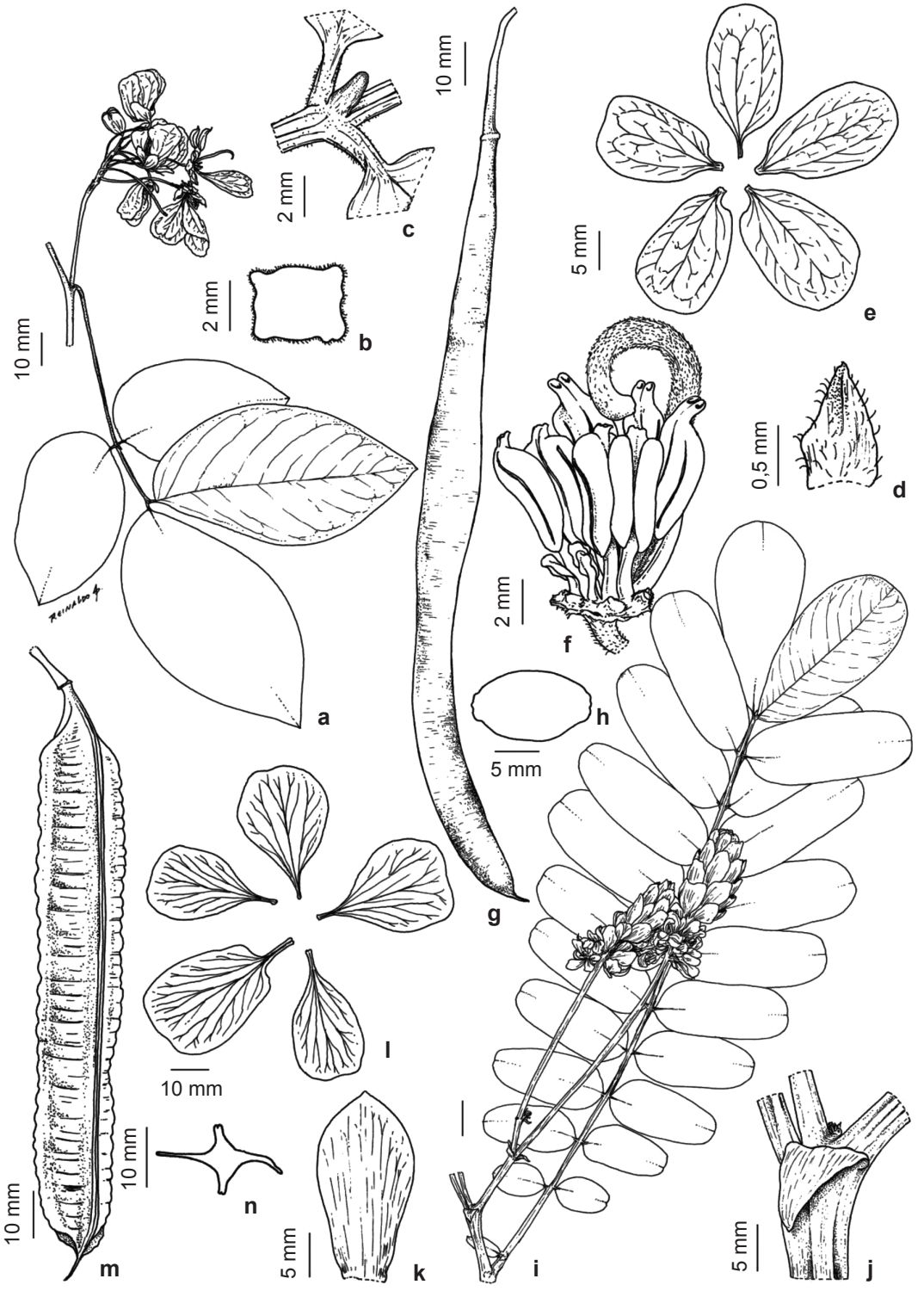

Figure 3 – a-h. *Senna affinis* – a. branches with leaves and inflorescence; b. tranversal section of branche; c. nectary between leaflets of proximal pair; d. bract; e. corolla; f. androecium and pistil; g. legume; h. transversal section of legume. i-n. *S. alata* – i. branches with leaves and inflorescence; j. stipule; k. bract; l. corolla; m. legume; n. transversal section of legume. (a, c-f. *R.L.C Bortoluzzi et al. 552*-VIC; b. *A.S.M. Valente et al. 138* -CESJ; g-h. *L.B. Bosquetti et al. 166*- VIC; i-l. *R.L.C Bortoluzzi & A.P. Gonçalves 616* -VIC; m-n. *L.A. Echternacht et al. 1029*- RB).

cm, distal pair 9–17 × 4–8 cm. Racemes axillary and panicula terminal; peduncle 2–2.5 cm long; inflorescence rachis 1.3–3 cm long. Bracts 3–4 × 0.5–1 mm, cymbiform, deciduous; pedicel 18–25 mm long, nectary absent. Sepals 6–10 × 3–5 mm, different size, ovate or elliptic, apex rounded or obtuse, sepals glabrous or sparsely tomentose. Corolla zygomorphic; petals sparsely tomentose in dorsal surface, yellow, central adaxial petal 10–18 × 6–8 mm, elliptic or obovate, apex emarginated, latero-adaxial and latero-abaxial petals elliptic or obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina elliptic, medium stamen filaments 2–3 mm long, anther 4–5 mm long, centric-abaxial stamen filament 3–4 mm long, anther 4–6 mm long, latero-abaxial stamens filaments 4–5 mm long, straight, anther 5–6 mm long, rostrum geniculate, 0.5–1 mm long. Ovary velutinous, style 1–2 cm long, velutinous. Legume 19–20 × 0.5–1 cm, cylindrical, externally flat, slightly curved, sparsely tomentose, brown when mature, indehiscent. Seeds ca. 4 × 2 mm, 2-seriate, elliptic.

Selected specimens: Aiuruoca, na mata, beira da estrada, 13.III.1989, fl. and fr., *L. Krieger & M. Brugger 24489* (CESJ). Caratinga, Fazenda Montes Claros, 23.III.1991, fl., *C.V. Mendonça Filho 1991* (MBM). Lima Duarte, estrada para Moreiras, 2.II.2012, fl., *A.S.M. Valente et al. 138* (CESJ). Marliéria, estrada do Aníbal, P. E. Rio Doce, 24.III.1999, fl., *R.L.C. Bortoluzzi et al. 552* (VIC); trilha da Lagoa do Meio, 23K0759178, UTM7819044, 27.VI.2003, fr., *L.B. Bosquetti et al. 166* (VIC); Serra do Cabral, ca. 2 km W. of Cantoni, elev. ca. 850 m, 8.III.1970, fl., *Irwin et al. 27187* (SPF).

This species is included in series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and can be recognized by the generaly angular branches and two pairs of large leaflets, conical or ovate nectary between the first pair of leaflets, zygomorphic flowers and externally flat, cylindrical legume.

Some specimens of *S. affinis* were identified as *Senna bacillaris* (L.f.) H.S. Irwin & Barneby. These species are morphologically similar (Irwin & Barneby 1982); however, *S. bacillaris* occurs in Ecuador, Guyana, Venezuela and Brazil, in the states of Amazonas and Roraima, while *S. affinis* occurs in Brazil, in the states of Bahia, Minas Gerais and Rio de Janeiro (Irwin & Barneby 1982). Therefore, all specimens from Minas Gerais with the group of characteristics mentioned above were identified as *S. affinis*. However, due to the similar morphology, a taxonomic revision that encompasses material from different regions is needed to better understand the relationship between these species.

The stipules of *S affinis* are early deciduous; *L. Krieger & M. Brugger 24489*, from Aiuruoca, was the only collection examined with large stipules (12–17 mm long).

Senna affinis is cited for Bahia, Espírito Santo, Minas Gerais and Rio de Janeiro (BFG 2018) and occurs in the Cerrado and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It can be found in virgin and disturbed or secondary forest, at less than 850 m elevation, including along the coast and headwaters (Irwin & Barneby 1982).

In Minas Gerais, *S. affinis* has often been collected in the southeastern region of the state (Fig. 1a), in gallery forest, near creeks and rivers, in steep patches of forest and on roadsides. Flowers fromJanuary to April and fruits in March and May to July.

1.4. *Senna alata* (L.) Roxb., Fl. Indica 2: 349. 1824.

Cassia alata L., *Sp. Pl*. 378. 1753. Figs. 1a; 3i-n

Shrubs or small trees, 2–4 m tall, branches angular or cylindrical, pubescent. Leaves 7–14 pairs of leaflets; stipules 10–15 × 5–7 mm, triangular, base straight, apex acuminate, deciduous late; nectary absent in petiole and in the rachis; petiole 1–3 cm long; leaf rachis 25–44 cm long, pubescent; leaflets narrowly elliptic, obovate or oblanceolate, apex rounded or retuse, mucronulate, both sides glabrous or pubescent at veins, veins tenuous, cartaceous, margin ciliolate, proximal pair 3–7 × 1–4 cm, distal pair 9.5–13 × 6.5– 8 cm. Racemes terminal with flowers united at apex; peduncle 10–14 cm long; inflorescence rachis 4–34 cm long. Bracts 20–25 × 8–10 mm, elliptic, deciduous; pedicel 10–12 mm long, nectary absent. Sepals 10–12 × 2–3 mm, similar size, elliptic or obovate, apex rounded, pubescent. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 11–15 × 7–9 mm, very widely obovate, apex emarginated, latero-adaxial and latero-abaxial petals elliptic or very widely obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina twisted, medium stamens filaments ca. 2 mm long, anther 3–4 mm long, centric abaxial stamen filament ca. 5 mm

long, anther 3–4 mm long, latero-abaxial stamens filaments ca. 3 mm long, straight, anther 9–10 mm long, rostrum oblique, ca. 0.5 mm long. Ovary hirsute, style 1–1.5 cm long, hirsute. Legume 10–14.5 × 1–1.5 cm, turgid, externally with wings by the sutures, cylindrical, glabrous, dark brown, dehiscent. Seeds ca. 7 × 6 mm, 1-seriate, ovate.

Selected specimens: Araguari, Funil I, 13.IV.2005, fl., *G.M. Araujo* (UFU 43200). Belo Horizonte, MG FZB. BH, área de visitação do Jardim Botânico, 8.VI.2005, fr., *L.A. Echternacht et al. 1029* (RB). Marliéria, estrada entre Ponte Alta e PERD-P. E. Rio Doce, 6.IV.1999, fl., *R.L.C. Bortoluzzi & A.P. Santos-Gonçalves 616* (VIC); Serra do Cipó, estrada para Morro do Pilar, perto da empresa Vellozia, 19°16'48.8"S, 43°35'21.0"W, 20.IX.2016, fr., *L.G. Rosignoli-Oliveira 21* (VIC). Santana do Riacho, acesso pela fazenda Inhame, afloramento de calcário explorado, entre Inhame e Coberto, 18°55'59"S, 43°48'54"W, 685 m, 16.III.2009, fl. and fr., *D.C. Zappi et al. 2206* (RB).

Senna alata is easily recognized by the presence of triangular stipules, numerous leaflets, narrowly elliptic, obovate or oblanceolate, racemes with flowers united at the apex, long bracts and a winged legume. It is similar to another species in series *Pictae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna reticulata* (Willd.) H.S. Irwin & Barneby, in habit and leaflet shape, but the legume of the latter species is flat and not winged.

Senna alata is native to America and distributed in Brazil, Colombia, the Guianas, Mexico and Venezuela (Irwin & Barneby 1982). In Brazil, it occurs in most states, in the Amazon, Atlantic Forest, Caatinga, Cerrado and Pantanal biomes (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It is found on riverbanks and in disturbed forest and pastures (Irwin & Barneby 1982).

In Minas Gerais, the species has been collected in the central and western regions of the state (Fig. 1a), on roadsides in the Cerrado, as well as on outcrops and in gallery forests. Flowers from February to June and fruits in: January, March, May, June and September.

1.5. *Senna angulata* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 177. 1982.
Cassia angulata Vogel, Syn. Gen. Cass. 16 & Linnae 11:658, descry. Ampliat. 1837.

Figs. 1a; 4a-h

Shrubs or liana. Branches angular, puberulent or tomentose. Leaves 2 pairs of -leaflets; stipules 10–12 × 0.5 mm, linear, base straight, apex acuminate, persistent or deciduous late; nectary absent in the petiole and present in leaf rachis, between the proximal pair of leaflets, elliptic, conical or fusiform, sessile or stipitate; petiole 2.2–2.5 (–3.5) cm long; leaf rachis 0.5–0.8 cm long, sparsely tomentose or tomentose; leaflets narrowly elliptic or oblanceolate, apex acute, rare retuse, mucronulate, both sides tomentose or puberulent, veins tenuous, membranaceous, margin ciliolate, proximal pair 2–3.1(–5.5) × 1.4–2(–3) cm, distal pair 5–8 × 2.2–2.3(–3) cm. Racemes axillary; peduncle 1–4 cm long; inflorescence rachis 1–1.5 cm long. Bracts 6–12 × 2–5 mm, cymbiform or ovate-acuminate, late deciduous; pedicel 20–35 mm long, nectary absent. Sepals 10–15 × 6–7 mm, different size, elliptic or obovate, apex obtuse, glabrous or with sparsely curved trichomes. Corolla zygomorphic, petals sparsely pubescent at veins, yellow, central adaxial petal 11–40 × 10–31 mm, circular or very widely obovate, apex emarginated, latero-adaxial and latero-abaxial petals elliptic or obovate, apex oblique. Androecium with 3 staminodes and 7 fertile stamens, filaments sparsely tomentose, staminodes lamina spatulate, medium stamen filaments ca. 2 mm long, anther 6–9 mm long, centric-abaxial stamen filament ca. 4 mm long, anther 9–11 mm long, latero-abaxial stamens filaments ca. 4 mm long, straight, anther 9–13 mm long, rostrum geniculate, 0.5–1 mm long. Ovary velutinous, style 1.3–2 cm long, velutinous. Legume 9–20 × 1–1.5 cm, cylindrical, externally slightly depressed between seed locules, straight, sparsely tomentose, light brown when mature, dehiscent. Seeds ca. 10 × 5 mm, 2-seriate, ovate.

Senna angulata is similar to *Senna tenuifolia* (Vogel) H.S. Irwin & Barneby, which are both in series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). These species have 2 pairs of leaflets, a nectary between the proximal pair of leaflets and a cylindrical legume. However, *Senna angulata* has angular branches, a rachis less than 1 cm long and bracts 6–12 mm long, while *S. tenuifolia* has cylindrical branches, a rachis 1–2 cm long and bracts 1–3 mm long.

Irwin & Barneby (1982) recognized two varieties of *S. angulata*, which can be distinguished by the indument on the branches and geographic distribution. According to these authors, var. *angulata* occurs in central Minas Gerais, between 750–1,800 m elevation, and var. *miscadenia* occurs on the coastal plain, at less than 500 m elevation.

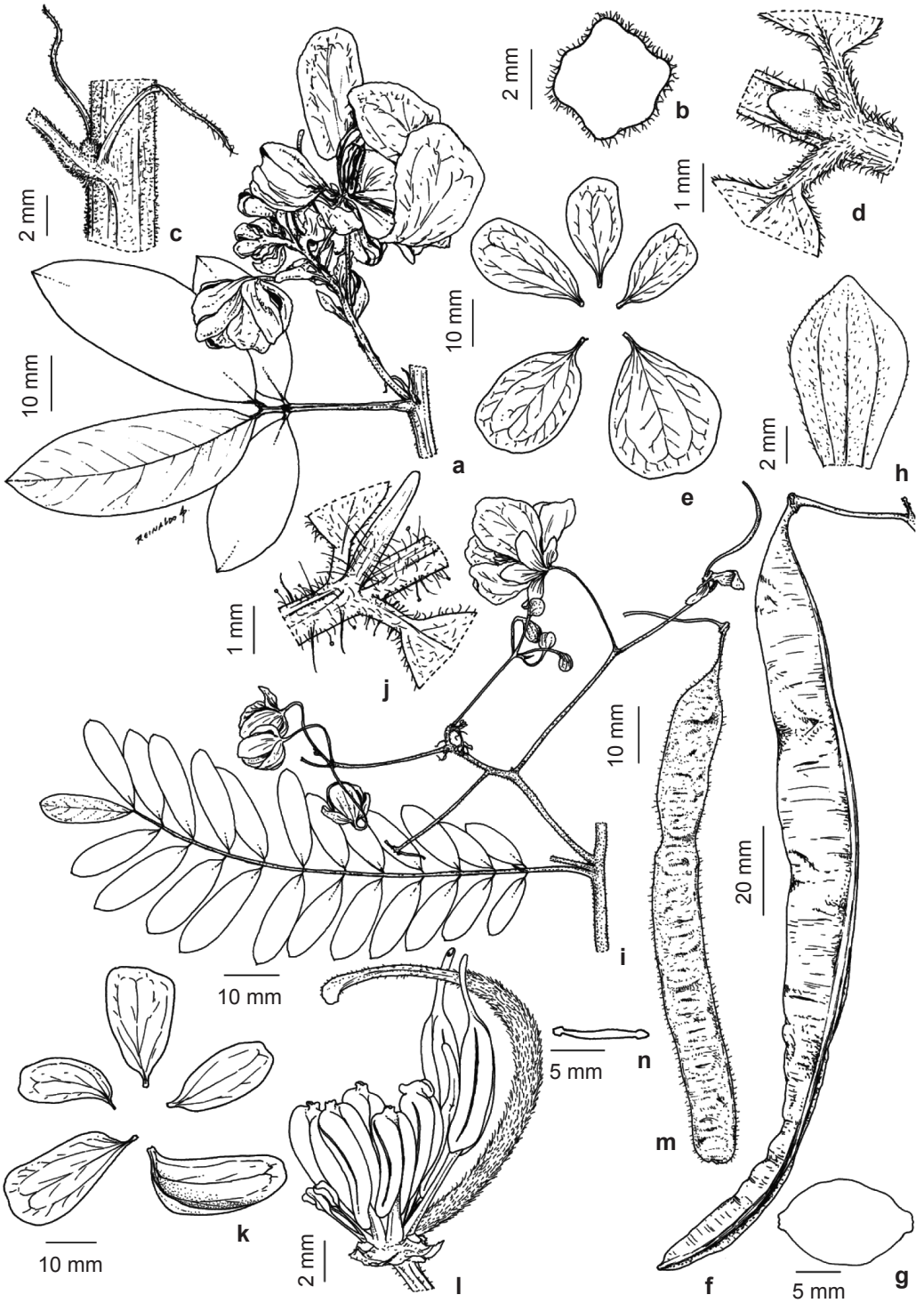

Figure 4 – a-g. *Senna angulata* var. *angulata* – a. branches with leaves and inflorescence; b. transversal section of branche; c. stipule; d. nectary between leaflets of proximal pair; e. corolla; f. legume; g. transversal section of legume. h. *S. angulata* var. *miscadenia* – bract. i-n. *S. aristeguietae* – i. branches with leaves and inflorescence; j. nectary between leaflets of proximal pair; k. corolla; l. androecium and pistil; m. legume; n. transversal section of legume. (a, c-e. *E. Pereira 2653*-RB; b, f, g. *J.A. Lombardi & L.G. Temponi 917*-BHCB; h. *M.A. Lopes & P.M. Andrade 379*-BHCB; i-n. *G. Hatschbach et al. 77785*).

Key to the varieties of *Senna angulata* in Minas Gerais

1. Branches and leaflets tomentose ..... 1.5.1. *Senna angulata* var. *angulata*
1'. Branches and leaflets puberulent..... 1.5.2. *Senna angulata* var. *miscadenia*

1.5.1. *Senna angulata* (Vogel) H.S. Irwin & Barneby var. ***angulata***, Mem. New. York Bot. Gard., 35(2)178.1982. Figs. 1a; 4a-g

Selected specimens: Belo Horizonte, Campus da UFMG, próximo à prefeitura, 10.VIII.1995, fr., *J.A. Lombard & L.G. Temponi 917* (BHCB). Itamonte, Fazenda Campo Redondo e Dois Irmãos, 22°14'25"S, 44°39'09"W, tall 1,380 m, 9.III.2001, fl., *F.B. Pereira 3678* (RB); Serra do Córrego, 26.III.1957, fl., *E. Pereira 2653* (RB).

This variety differs from *S. angulata* var. *miscadenia* by the indument. It is more abundant and perceptible in var. *angulata.*

Endemic to Brazil, distributed in Minas Gerais and Rio de Janeiro, ocurring in the Cerrado and Atlantic Forest (BFG 2018). In Minas Gerais, it was registered in the central and Southern regions (Fig. 1a) and can be found in open woods, near rivers (Irwin & Barneby 1982). Flowers in March and May and fruits in August.

1.5.2. *Senna angulata* (Vogel) H.S. Irwin & Barneby var. ***miscadenia*** (Vogel) H.S. Irwin & Barneby, Mem. New. York Bot. Gard., 35(2)178. 1982.

Cassia angulata miscadenia Vogel, Syn. Gen. *Cassia*. 16 & Linnaea 11: 659. 1837. Figs. 1a; 4h

Selected specimens: Alto Caparaó, P. N. Caparaó, estrada entre o alojamento e Vale Verde, 1.IX.1996, fr., *V.C. Souza et al. 12099* (ESA). Caratinga, estação biológica, 26.IV.1984, fl., *M.A. Lopes & P.M. Andrade 379* (BHCB). Uberlândia, estação Ecológica do Panga, trilha Mourões-Vereda do Fundo, 9.IV.2010, fl., *G.P.E. Rocha et al. 103* (HUFU).

According Irwin & Barneby (1982), *S. angulata* var. *miscadenia* has branches glabrate or puberulent. Indument puberulent was observed in examined materials, with sparsely distributed trichomes.

Endemic to Brazil, distributed in states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, Paraná and Santa Catarina in Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It can be found in forest margins and capoeira (Irwin & Barney 1982). In Minas Gerais, was collected to the Southeast and West of the state (Fig. 1a). Flowers in April and fruit in September.

1.6. *Senna aristeguietae* H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 502. 1982. Figs. 1b; 4i-n

Shrubs, 1.5–3 m tall, branches cylindrical, sparsely tomentose and hispidulous. Leaves 10–11 pairs of leaflets; stipules 7–10 × 0.5 mm, filiform, base straigth, apex acuminate, deciduous late; nectary absent in the petiole and present in the leaf rachis, between the proximal pair and often between the next second or third pairs of leaflets, narrowly oblong or fusiform, stipitate; petiole ca. 1 cm long; leaf rachis 6.5–8.5 cm long, viscidulous, tomentose, hispidulous and strigose; leaflets narrowly elliptic, elliptic, oblanceolate, apex acute, both sides sparsely tomentose, rare glabrous, veins tenuous, chartaceous, margin ciliolate, proximal pair 1.4–1.7 × 0.5–0.7 cm, distal pair 1.7–2 × 0.5 cm. Racemes umbellate, axillary and terminal; peduncle 2.5–3.7 cm long, inflorescence rachis absent. Bracts not seen, deciduous; pedicel 22–30 mm long, nectary absent. Sepals 5–10 × 3–4 mm, different size, elliptic or obovate, apex rounded, sparsely tomentose. Corolla asymmetric, petals sparsely tomentose at veins, yellow, central adaxial petal 16–20 × 7–8 mm, obovate, apex oblique, latero-adaxial petals elliptic, apex rounded, latero-abaxial petals elliptic and one is obovate-falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous or hispidullous, staminodes lamina elliptic, medium stamens filaments ca. 2 mm long, anther 6–7 mm long, centric abaxial stamen filament ca. 2 mm long, anther ca. 8 mm long, latero-abaxial stamens filaments ca. 7 mm long, straight, anther ca. 5 mm long, rostrum curved or straigth, 3–4 mm long. Ovary hirsute, style 1.5–2.2 cm long, hirsute. Legume ca. 8 × 1 cm, oblong, flat-compressed, externally depressed between seed locules, straight or slightly curved, tomentose and hispid, green, indehiscent. Seeds not seen.

Examined specimens: entre Araçuaí e Itaobim, 5.X.1961, fl., *Andrade-Lima 3916* (IPA). Itaobim, Pasmado, 14.VI.1986, fl., *G. Hatschbach & F.J. Zelma 50403* (RB). Macambinho, rodovia Jaíba-Porto da Balsa (Mun. Jaíba), 12.VI.2004, fl., *G. Hatschbach et al. 77785* (UB, MBM). Manga, 2.V.1991, fl. and fr., *L.V.Costa* (BHCB 22277).

Senna aristeguietae has sparsely tomentose and hispidulous branches, rachises, sepals and fruits. It has 10–11 pairs of small leaflets, with a nectary between the proximal pair, asymmetric flowers, with one falciform petal and the anther of the abaxial stamen with an elongate rostrum, and a flat-compressed legume. *Senna aristeguietae* is similar to *S. acuruensis* in habit, the presence of many leaflets, and viscidulous trichomes on the rachis, as explained in the taxonomic comments of *S. acuruensis*.

This species is restricted to South American, in Venezuela and Brazil (Irwin & Barneby 1982). In Brazil, it occurs in the states of Bahia and Minas Gerais in the Atlantic Forest, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It is found in thickets, disturbed forests (Irwin & Barneby 1982) and on roadsides. In Minas Gerais, it has been collected to the northern and northeastern parts of the state (Fig. 1b). Flowers in May, June and December and fruit in May.

1.7. *Senna cana* (Nees & Mart.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 226. 1982.

Cassia cana Nees & Mart., Nov. Acta Phys.-Med. Acad. Caes. Leopold. -Carol. 12:34. 1825.

Figs. 1b; 5a-j

Shrubs or small trees, 1.7–4 m tall, branches cylindrical or angular, tomentose or villous. Leaves (4–)5–6(–7) leaflets; stipules 7–10 × 4–10 mm, reniform or falciform, base straigth, apex cuspidate, persistent or deciduous; nectary absent in the petiole and present in the leaf rachis between median pairs of leaflets, rare between the proximal pair and sometimes present between the distal pairs, where can be occur two nectaries, fusiform, narrowly elliptic or ovate, sessile or stipitate; petiole (0.7–)1.3–1.5 cm long; leaf rachis (6.5–)8–10 cm long, tomentose or villous; leaflets narrowly elliptic, lanceolate, ovate, elliptic or obovate apex acuminate, acute, rounded or obtuse, rare retuse, mucronulate, adaxial surface glabrous or sparsely tomentose and in general lustrous, abaxial surface lannose or villous, veins patent in abaxial surface, coriaceous, margin ciliolate, proximal pair 1.3–3(–3.5) × 0.6–1.5 cm, distal pair (3.5–)4.5–5.5 × 0.8–2 cm. Racemes terminal; peduncle 1.7–3 cm long; inflorescence rachis 2.2–4 cm long. Bracts 2–5(–16) × 1–2 (–5) mm, lanceolate-acuminate or elliptic-acuminate, deciduous; pedicel 1–3 mm long, nectary at base, fusiform, can be deciduous in some materials. Sepals 5–11 × 4–9 mm, different size, elliptic or obovate, apex rounded or obtuse, dorsal surface glabrous. Corolla zygomorphic, petals sparsely or densely velutinous in dorsal surface, yellow, central adaxial petal 12–22 × 6–11 mm, obovate or elliptic, apex emarginated, latero-adaxial petals elliptic, apex rounded and latero–abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina ovate, medium stamen filaments ca. 2 mm long, anther ca. 4 mm long, centric-abaxial stamen filament ca. 5 mm long, anther 6–7 mm long, latero-abaxial stamens filaments 4–6 mm long, straight, anther 10–12 mm long, rostrum oblique or geniculate, ca. 1 mm long. Ovary velutinous, style ca. 1 cm long velutinous. Legume 12–15 × 0.3–0.5 cm, linear, slighty compressed, externally depressed between seed locules, straight or curved, glabrous or sparsely tomentose, brown, dehiscent. Seeds ca. 2 × 3 mm, 1-seriate, oblong.

Senna cana is similar to *S. velutina* (Vogel) H. S. Irwin & Barneby. Both species belong to series *Laxiflorae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and have reniform stipules, pilose leaflets and a nectary on the rachis and pedicel. However, *Senna velutina* has leaflets that are velutinous on the abaxial surface and a subquadrangular legume, while *S. cana* can also have falciform stipules and has leaflets that are lannose or villous on abaxial surface and a slightly compressed legume.

The species is native but not endemic to Brazil (BFG 2018); although, Irwin & Barneby (1982) did not cite it for other countries. It has five varieties, var. *calva*, var. *cana*, var. *hypoleuc*a, var. *phylostegia* and var. *pilosula*, but only three were recorded in the present study.

Key to the varieties of *Senna cana* in Minas Gerais

1. Bracts elliptic-acuminate, persistent, 12–16 mm long..... 1.7.3. *Senna cana* var. *phyllostegia*
1'. Bracts lanceolate-caudate, deciduous, 2–6 mm long.

2. Leaflets lanceolate, ovate or elliptic; apex acuminate or acute; abaxial surface of leaflets lanose or villous.....1.7.1. *Senna cana* var. *cana*
2'. Leaflets predominantly elliptic or obovate; apex rounded or obtuse; abaxial surface of leaflets always villous.....1.7.2. *Senna cana* var. *pilosula*

1.7.1. Senna *cana* (Ness &Mart.) H.S. Irwin & Barneby var. ***cana***, Mem. New York Bot. Gard. 35: 229. 1982. Figs. 1b; 5a-g

Selected specimens: Carbonita, AcelorMittal Florestas Ltda, Estiva, Centro de Educação Ambiental (CEAM), 17°28'21.5"S, 43°4'52.3"W, tall 847 m, 28.V.2008, fr., *G.E. Valente et al. 2287* (VIC). Diamantina, próximo ao distrito de Conselheiro Mata, 18°17'2400"S, 43°58'44.983W, elev. 1,018 m, 22.I.2012, fl., *M.M.T. Cota et al. 285* (DIAM). Januária, vale do Rio Peruaçu, cerrado do Judas, 21.VII.1997, fr., *A. Salino 3286* (BHCB, SPF). Juramento, Montes Claros a Itacambira, rodovia, Serra do Catuni, 17.III.1997, fl., *G. Hatschbach et al. 66371* (BHCB, MBM). Montes Claros, 32 km west of Montes Claros road to Água Boa, elev. 1,000 m, 23.II.1969, fl., *Irwin et al. 23745* (UB).

Senna cana var. *cana* exhibits high phenotypic plasticity for its indument and leaflet and stipule shape. Its stipules are reniform or falciform.

It occurs in Bahia, the Distrito Federal, Goiás, Minas Gerais, Pará and Pernambuco, in Amazonia, Caatinga and Cerrado, in thickets and at headwaters (Irwin & Barneby 1982). In Minas Gerais, the variety is frequent in the central-north part of the state (Fig. 1b), where it is found in rocky fields, disturbed areas, *carrasco* and on roadsides in the Cerrado region. Flowers from January to May and fruits in March, May, June and November.

1.7.2. *Senna cana* (Nees &Mart.) H.S. Irwin & Barneby var. ***pilosula*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 230. 1982. Figs. 1b; 5h-i

Examined specimens: Águas Vermelhas, 30.III.1959, fl. and fr., *M. Magalhães 15263* (UB 2383). Medina, 5 km S. de Águas Vermelhas, capoeira seca, 31.III.1959, fl., *M. Magalhães 15263* (UB 2383).

According to Irwin & Barneby (1982), this variety can be distinguished from the others by the indument on the leaflets, which is pilose and never lanose or tomentose. The authors refer to the amount of trichomes, indicating that in this variety the trichomes do not appear as numerous as the most similar variety, *S. cana* var. *cana.* On the material collected in Minas Gerais that was examined, the indument is sparsely and villous, which, along with the characteristics of the leaflets, allowed this variety to be identified.

This variety is endemic to Brazil and occurs in Bahia, Espirito Santo, Minas Gerais and Rio de Janeiro, in Caatinga and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in Caatinga thickets, on rock outcrops and around valleys (Irwin & Barneby 1982). It has been collected in northeastern Minas Gerais (Fig. 1b). Flowers in March.

1.7.3. *Senna cana* (Ness &Mart.) H.S. Irwin & Barneby var. ***phyllostegia*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 231. 1982. Figs. 1b; 5j

Examined specimens: Itaobim, BR-4, 18.I.1965, fl., *A. P. Duarte 8751* (RB). Itacambira, estrada para Montes Claros, 9.I.1986, fl., *I. Cordeiro et al.* (SPF 41245).

There are few collections of this variety from Minas Gerais, but the large bracts allow it to be easily recognized.

This variety is endemic to Brazil and occurs in the states of Bahia and Minas Gerais, in the Atlantic Forest, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), in areas of disturbed forestforest and on rocky slopes along rivers (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the northern and northeastern parts of the state (Fig. 1b). Flowers in January.

1.8. *Senna cernua* (Balb.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 419: 1982.
Cassia cernua Balb. Cat. Stirp. Hort. Bot. Taur. 22. 1813. Figs. 1b; 5k-p

Shrubs, 0.6–2 m tall, branches cylindrical, sparsely tomentose. Leaves (6–)7(–9) pairs of leaflets; stipules 3–4 × 0.5–1 mm, lanceolate, base truncate, apex acuminate, deciduous; nectary present at base of the petiole and absent in the leaf rachis, piriform or conical, sessil; petiole 5–5.5(–7.5) cm long; leaf rachis 11.5–17(–18.5) cm long, sparsely tomentose; leaflets elliptic, ovate, obovate, apex acute, mucronulate, adaxial surface glabrous, abaxial surface sparsely tomentose, veins tenuous, membranaceous, margin ciliolate, proximal pair 2.5–3.6 × 1.5–2.5 cm, distal pair 4.5–6.5 × 1.5–2 cm. Racemes axillary and terminal; peduncle 1–1.5

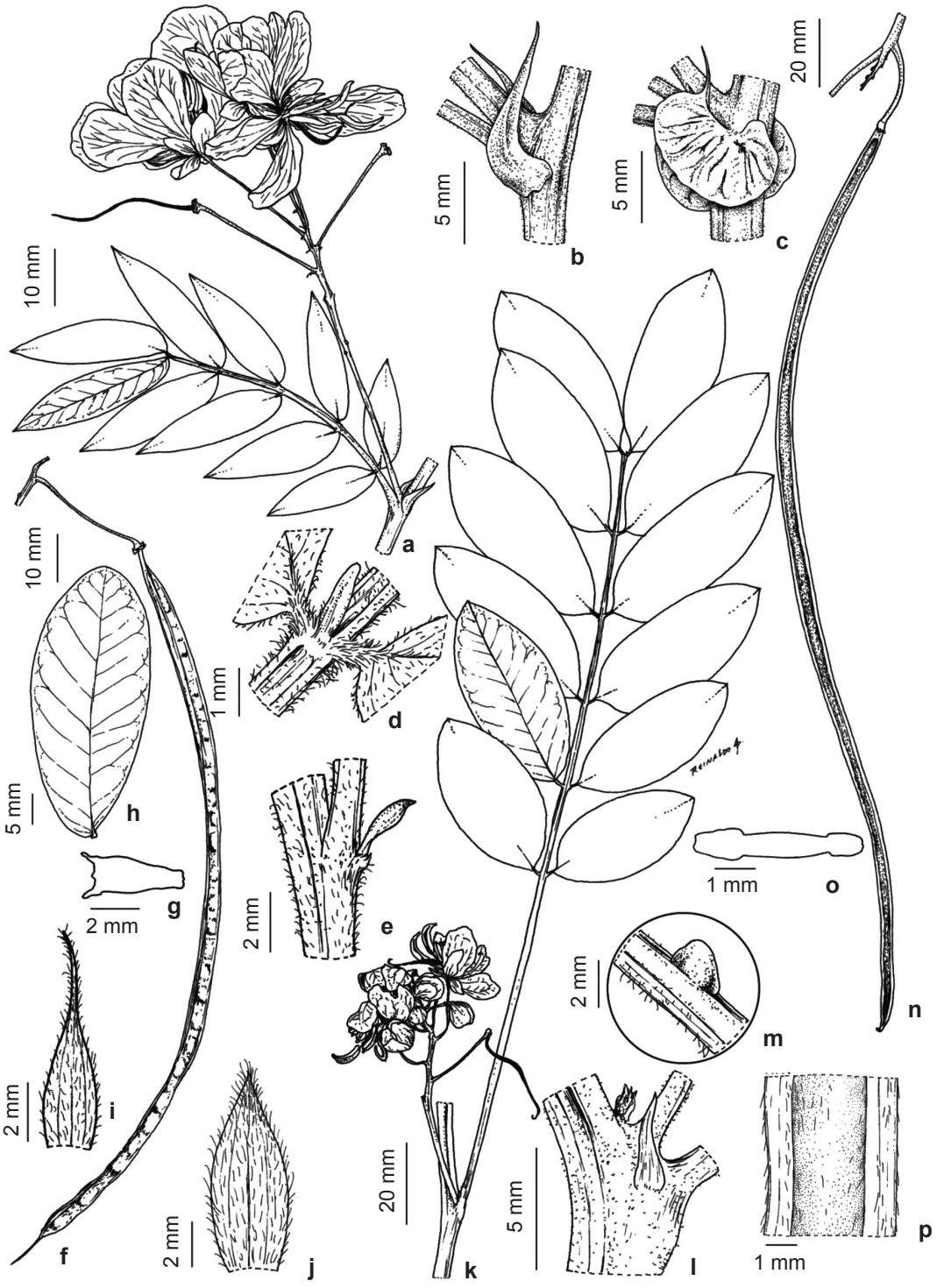

Figure 5 – a-g. *Senna cana* var. *cana* – a. branches with leaves and inflorescence; b,c. stipule variations; d. nectary present in rachis; e. nectary in pedicel; f. legume; g. transversal section of legume. h-i. *S. cana* var. *pilosula* – h. distal leaflet detail; i. bract. j. *S. cana* var. *phylostegia* – bract. k-p. *S. cernua* – k. branches with leaves and inflorescence; l. stipule; m. petiolar nectary; n. legume; o. transversal section of legume; p. margins of legume detail. (a-b. *G. Hatschbach et al. 66371*-MBM; c-e. *Irwin et al. 23745*-UB; f-g. *G.E. Valente et al. 2280*-VIC; h-i. *M. Magalhães 15263*-UB; j. *A.P. Duarte 8751*-VIC; k-m. *Irwin et al. 29184*-UB; n-p. OUPR 19608).

cm long; inflorescence rachis 3.5–4 cm long. Bracts 3–4 × 0.5 mm, lanceolate, deciduous; pedicel 13–20 mm long, nectary absent. Sepals 6–8 × 3–4 mm, not strongly different size, obovate, apex obtuse, dorsal surface sparsely tomentose. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 12–14 × 10–12 mm, obovate, apex emarginated, latero-adaxial petals and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina spatulate, medium stamen filaments ca. 2 mm long, anther 4–5 mm long, centric-abaxial stamen filament 2 mm long, anther 2–3 mm long, latero-abaxial stamens filaments 10–13 mm long, straight, anther 6–7 mm long, rostrum transversely oblique, 1–2 mm long. Ovary velutinous, style 1.3–1.5 cm long, velutinous. Legume 19–24 (–9.5) × 0.3–0.5 cm, linear, compressed, externally slightly depressed between seed locules, slightly curved, sparsely tomentose, light brown on the margins, indehiscent. Seeds observed not mature, ca. 2 × 1 mm, 1-seriate, oblong.

Selected specimens: Araguari, Bosque John Kennedy, 16.III.1993, fl., *G.B. Araújo 976* (UB). Joaquim Felício, ca. 2 km N. of Joaquim Felício, elev. 650 m, 10.III.1970, fl., *Irwin et al. 27338* (UB). Ouro Preto, Saramenha, beira da estrada, 22.III.1979, fl., *J. Badini* (OUPR 19608); P. N. Serra do Cipó, próximo ao Morro do Pilar, beira da estrada, 19°13'52.9"S, 43°23'06.7"W, 21.IX.2016, fr., *L. G. Rosignoli-Oliveira 24* (VIC). Santa Rita do Sapucaí, Timburé, 26.II.2001, fl., *O.S. Ribas & A.M.S. Ponchon 3310* (ESA); Serra da Caraça, base of Serra da Caraça, elev. ca. 1,500-1,750 m, 26.I.1971, fr., *Irwin et al.* 29184 (UB). Ubá, estrada em direção a Ubari, 2.III.2016, fl. and fr., *L.G. Rosignoli-Oliveira 19* (VIC).

Among the species of series *Basiglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna cernua* is more similar to *S. neglecta* (Vogel) H.S. Irwin & Barneby due to the presence of a nectary at the base of the petiole and some leaflet shapes. Besides this, these species have vinaceous branches in the field. However, *S. cernua* has 7 fertile stamens and a narrow, long legume (19–24[–29.5] × 0.3–0.5 cm), while *S. neglecta* has 6 fertile stamens and a short, flat-compressed legume (8.8–14 × 0.7–1 cm).

Senna cernua occurs in Paraguay and Brazil (Irwin& Barneby 1982), where it has been collected in Bahia, the Distrito Federal, Espírito Santo, Goiás, Minas Gerais, Rio de Janeiro, São Paulo and Paraná, in Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in disturbed forest, along roads and in pastures (Irwin & Barneby 1982).

In Minas Gerais, this species frequently occurs in the central, southeastern, southern and western regions of the state (Fig. 1b), and is found near rivers, on rocky slopes, and in thickets, uplands, and gallery forests. Flowers from January to May and in November and December, and fruits from January to April and in September.

1.9. *Senna corifolia* (Benth.) H.S. Irwin & Barneby var. ***caesia*** (Taub. *ex* Harms) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 222. 1982.
Cassia caesia Taub. *ex* Harms, Feddes Repert. 24: 123. 1924. Figs. 1c; 6a-f

Shrubs, 1–2 m tall, branches cylindrical, glabrous. Leaves (3–)4 pairs of leaflets; stipules (25)30–40 × 35–55 mm, reniform, base reniform, apex rounded, persistent; nectary absent in the petiole and present in the leaf rachis, between leaflets of all pairs, piriform or ovate, sessil; petiole 2–3.5(–4) cm long; leaf rachis 4.5–9 cm long, glabrous or sparsely pubescent; leaflets elliptic, narrowly elliptic, apex retuse, both sides glabrous, veins patent, coriaceous, margin glabrous, proximal pair 3.2–4(–5.5) × 2–3.5 cm, distal pair (4.5–)5.8–6.5 × 2.5–3.5 cm. Racemes axillary and panicula terminal; peduncle 3.5–6.5 cm long; inflorescence rachis (4.5–)6.5–14.5 cm long. Bracts 4–10 × 6–8 mm, reniform, deciduous; pedicel (15–)20–28 mm long, nectary at medium region, ovate or falciform, stipitate. Sepals 6–15(–18) × 6–15 mm, different size, obovate, apex obtuse, dorsal surface glabrous. Corolla zygomorphic; petals pubescent at veins, yellow, central adaxial petal 17–20 × 8–9 mm, obovate, apex rounded, latero-adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina elliptic, medium stamens filaments 1–2 mm long, anther 5–6 mm long, centric abaxial stamen filament 4–6 mm long, anther 5–6 mm long, latero-abaxial stamens filaments 7–13 mm long, straight, anther 7–11 mm long, rostrum transversely truncate, ca. 1 mm. Ovary pubescent, style 1.8–2.5 cm long, pubescent. Legume 9–15 × 1.1–1.3 cm long, oblong, flat-compressed, externally depressed between seed locules, slightly curved, glabrous, dark brown when mature, dehiscent late. Seeds observed not mature, ca. 5 × 1 mm, 1-seriate, oblong.

Selected specimens: Campos Tristes, PARNA Sempre Vivas, tall 1,281 m, 18.VI.2010, fl. and fr., *M.R. Santos 16* (VIC). Diamantina, córrego do soberbo, próximo a UFVJM, 18°11'02.7"S, 43°34'1.7"W, 22.IX.2016, fr., *L.G. Rosignoli-Oliveira 26* (VIC). Grão Mogol, arredores, 20.IV.1978, fl., *R. Barneby 79* (UEC); Rio

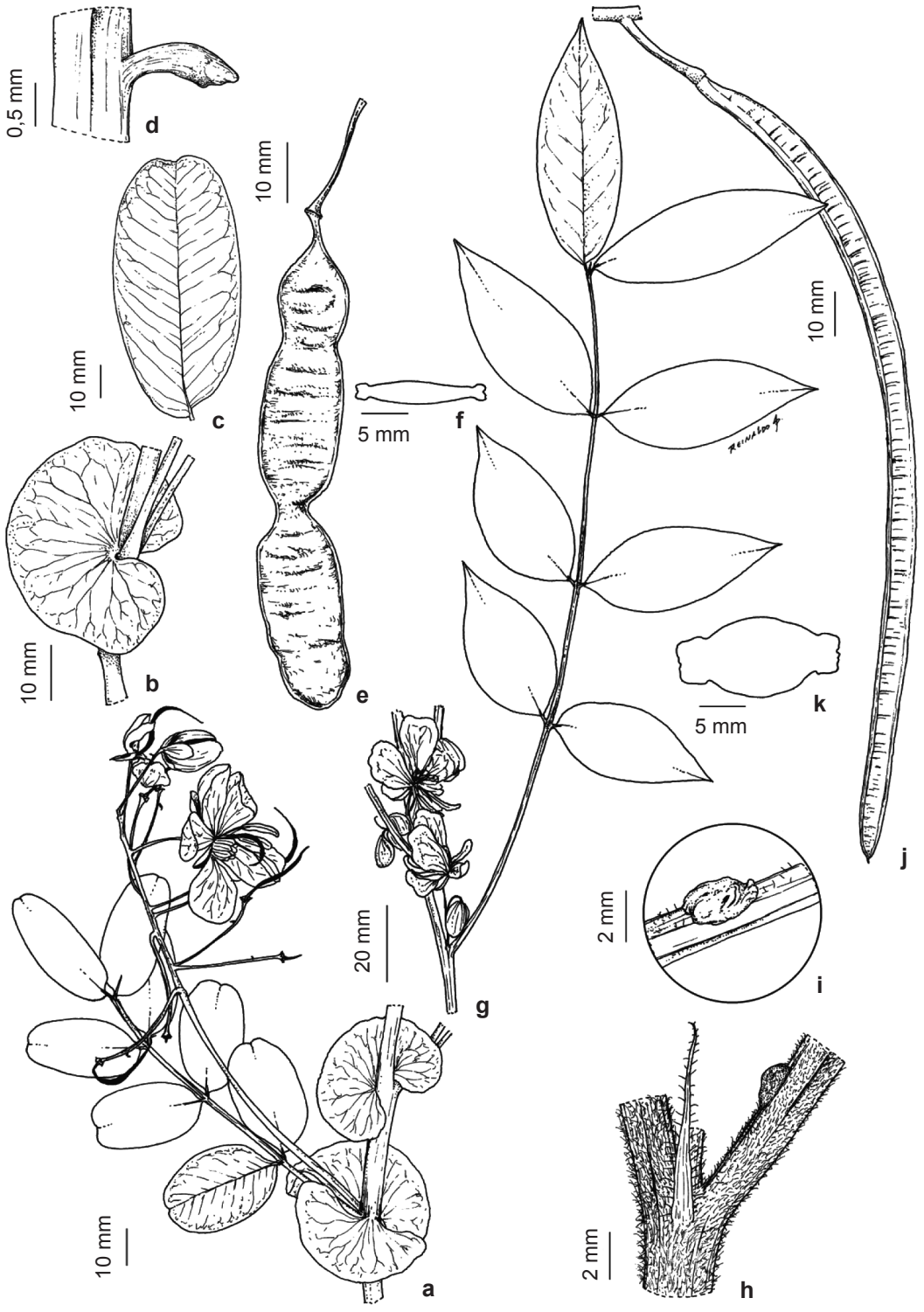

Figure 6 – a-f. *Senna corifolia* var. *caesia* – a. branches with leaves and inflorescence; b. stipule; c. veins of leaflet; d. nectary in pedicel; e. legume; f. transversal section of legume. g-h. *S. hirsuta* var. *acuminate* – g. branches with leaves and inflorescence; h. petiolar nectary and stipule. i-k. *S. hirsuta* var. *leptocarpa* – i. petiolar nectary and indument detail; j. legume; k. transversal section of legume. (a-b. *M.R. Santos 16*-VIC; c-f. *L.G. Rosignoli-Oliveira 26*-VIC; g-h. *P.O. Rosa et al. 340*-HUFU; i-k: *L.C. Siqueira 849*-VIC).

Itacambiruçu, 15.V.1988, fl., *G. Hatschbach et al. 52014* (MBM). Santana de Pirapama, reservatório, PCH Quartel III, 18°37'51,9"S, 43°56'10,8"W, 7.VI.2007, fl., *D.T. Souza et al. 188* (BHCB, ESA).

Senna corifolia and *S. reniformis* (G. Don) H.S. Irwin & Barneby belong to series *Coriaceae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). Both species have reniform stipules, glabrous leaflets, a nectary on the pedicel and a flat-compressed legume. However, *S. corifolia* is easily recognized by the coriaceous leaflets with a retuse apex and patent veins, and stipules with a rounded apex, while *S. reniformis* has chartaceous leaflets with a cuspidate or acuminate apex and tenuous veins, and stipules with an acute apex.

Irwin & Barneby (1982) recognized two varieties of *S. corifolia* based on the number and width of typical leaflets. Variety *caesia* has 3–5 pairs of leaflets that are less than 4 mm wide, while var. *corifolia* has 2 pairs of leaflets that are 4–7 mm wide. The latter variety was not recorded for Minas Gerais in the present study.

Senna corifolia is endemic to Brazil and occurs in Goiás, Minas Gerais and Espírito Santo in the Cerrado and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It is common on quartzite outcrops (Irwin & Barneby 1982) and has been found in dense Cerrado, campo rupestre, wet sandy and adjacent gallery forest, and transition areas between Cerrado and gallery forest. In Minas Gerais, it has been collected in the central and northern regions (Fig. 1c). Flowers from February to July; fruits in June, July and November.

1.10. *Senna hirsuta* (L.) H.S. Irwin & Barneby, Phytologia 44(7): 425. 1979.
Cassia hirsuta L., *Sp. Pl.* 378. 1753.

Figs. 1c; 6g-k

Shrubs or sub-shrubs, 0.8–2 m tall, branches cylindrical or angular, glabrous or hirsutullous. Leaves 4(–5) pairs of leaflets; stipules 5–9 × 1 mm, linear, base truncate, apex acuminate, deciduous; nectary at base of petiole, discoid or depressed conical, sessile or stipitate and can be present between leaflets of distal pair, pyriform or fusiform, sessile; petiole 3–12 cm long; leaf rachis 5.5–14(–20) cm, hirsutullous; leaflets lanceolate, ovate or elliptic, apex acuminate or cuspidate, adaxial surface hirsutullous or glabrous, abaxial surface hirsutullous or strigulose, veins tenuous, membranaceous, margin ciliate, proximal pair 2.5–3.5(–7) × 1.8–3 cm, distal pair 5.5–10 × 2–3.2 cm. Racemes axillary; peduncle ca. 0.5 cm long; inflorescence rachis 0.3–0.4 cm long. Bracts ca. 6 × 0.5 mm, linear, deciduous; pedicel 10–15 mm long, nectary absent. Sepals 7–10 × 3–4 mm, different size, obovate, apex rounded, dorsal surface hirsute. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 15–20 × 10 mm, obovate, apex emarginated, latero-adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina oblate, medium stamen filaments ca. 2 mm long, anther 4–5 mm long, centric–abaxial stamen filament ca. 3 mm long, anther ca. 4 mm long, latero-abaxial stamens filaments 7–8 mm long, straight, anther 6–7 mm long, rostrum transversely oblique, ca. 1 mm long. Ovary velutinous, style 1–1.2 cm long, velutinous. Legume 13.5–15(–18) × 0.1–0.2(–0.6) cm, linear, compressed, externally flat, slightly curved, hirsutullous or sparsely tomentose, all light brown when mature, dehiscent late. Seeds not seen.

In series *Basiglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna hirsuta* is most similar to *S. occidentalis* because of the nectary on the petiole and lanceolate leaflets, but *S. hirsuta* var. *acuminata* has hirsutulous leaflets and *S. hirsuta* var. *leptocarpa* has strigulose leaflets on the abaxial surface, while *S. occidentalis* has glabrous leaflets. Some material of *S. hirsuta* has a nectary between the distal pair of leaflets and a completely light brown legume when mature, whereas *S. occidentalis* has a nectary only on the petiole and a legume that is light in color only on the margins.

There are seven varieties of this species, var. *acuminata*, var. *glaberrima*, var. *leptocarpa*, var. *hirsuta*, var. *hirta*, var. *puberula*, var. *streptocarpa*, but only two were recorded for Minas Gerais in this study.

Key to the varieties of *Senna hirsuta* in Minas Gerais

1. Branches, rachis, leaflets and legumes hirsutulous ..... 1.10.1. *Senna hirsuta* var. *acuminata*
1'. Branches, rachis and adaxial surface of leaflets glabrous, abaxial surface of leaflets and legumes strigulose ..... 1.10.2. *Senna hirsuta* var. *leptocarpa*

1.10.1. ***Senna hirsuta*** (L.) H.S. Irwin & Barneby var. ***acuminata*** (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 431. 1982.
Cassia neglecta var. *acuminate* Benth. In Mart., *Fl. bras*. 15(2): 111. 1870. Figs. 1c; 6g-h
Examined specimens: Araguari, Funil I, Capim Branco I, 26.I.2007, fl., *P.O. Rosa et al. 340* (HUFU); 2.III.2007, fl. and fr., *P.O. Rosa et al. 462* (HUFU). Belo Horizonte, Campus da UFMG, 19°52'S, 43°58'W, 19.IV.1999, fl. and fr., *J.A. Lombardi & P.O. Morais 2784* (BHCB). Mariana, distrito de Mosenhor Horta, próximo à Lagoa Ponte das Crioulas, estrada, próximo a curso d'água, 20°18'08.8"S, 43°18'59.4"W, elev. 621 m, 25.II.2003, fl. and fr., *F.F. Mazine et al. 866* (ESA).

This variety is easily recognized by the hirsutullous indument. Endemic to Minas Gerais, occur in Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) inSoutheast of the state (Fig. 1c). Flowers from January to April and fruitsfrom February to April.

1.10.2. ***Senna hirsuta*** var. ***leptocarpa*** (L.) H.S. Irwin & Barneby var. ***leptocarpa*** (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 431. 1982.
Cassia leptocarpa Benth. Linnaea 22: 528. 1849. Figs. 1c; 6i-k
Examined specimen: Araponga, Parque Estadual da Serra do Brigadeiro, próximo a casa de hóspedes, sede do PESB, 20°42'59.9"S, 42°28'50.5"W, elev. 1,351 m, 11.VI.20013, fr., *L.C. Siqueira 849* (VIC). Viçosa, Agricultural College lands: Cha-Cha valley; near boundary, elev. 600 m, 14.III.1930, fr., *Y. Mexia 4161* (NYBG).

This variety is very similar to *S. occidentalis* because its leaflets are apparently glabrous; however, with a stereomicroscope it is possible to observe that the abaxial surface is strigulose and it has a nectary between the distal pair of leaflets, which is different than *S. occidentalis* (as explained above).

Senna hirsuta var. *leptocarpa* was confirmed from material collected by Ynes Mexia in 1930 in Viçosa, but during expeditions in the region no individuals were found.

Apparently, Irwin & Barneby (1982) considered the variety an uncommon flat; however, there is a record (*Siqueira* 849) from the state collected in 2013 in Araponga, a city near Viçosa.

This variety is endemic to Brazil and occurs in Minas Gerais and Rio de Janeiro, in Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It has been found in disturbed forest (Irwin & Barneby 1982) in the central region of Minas Gerais (Fig. 1c). Fruits in April and June.

1.11. ***Senna itatiaiae*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 349. 1982.
Figs. 1c; 7a-d

Shrubs, 2–5 m tall, branches sulcate, glabrous. Leaves 6–7 pairs of leaflets; stipules ca. 8 × 4 mm, ovate, base truncate, apex cuspidate, deciduous; nectary absent in the petiole and present in the leaf rachis, between the first and second proximal pairs or between three median pairs, narrowly elliptic or fusiform, stipitate or sessile; petiole 3.5–4.5 cm long; leaf rachis 7–8 cm long, glabrous; leaflets elliptic or obovate, apex obtuse, mucronulate, both sides glabrous, veins tenuous, membranaceous, margin ciliolate, proximal pair 2–3 × 1–1.2 cm, distal pair 3–3.5 × 1.3–1.5 cm. Racemes axyllary; peduncle 3–4 cm long; inflorescence rachis 0.5–2.5 cm long Bracts 7–9 × 1 mm, ovate-acuminate, deciduous late; pedicel 12–19 mm long, nectary absent. Sepals 5–6 × 2–5 mm, different size, elliptic or obovate, apex obtuse, dorsal surface finely pubescent or glabrous. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal ca. 11 × 7 mm, elliptic, apex obtuse, latero-adaxial and latero-abaxial petals elliptic or obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina oblate, medium stamen filaments ca. 2 mm long, anther ca. 3 mm long, centric-abaxial stamen filament ca. 4 mm long, anther ca. 4 mm long, latero-abaxial stamens filaments ca. 4 mm long, straight, anther 4–5 mm long, rostrum truncate, ca. 0.5 mm long. Ovary glabrous, style ca. 0.4 cm long, glabrous. Legume 4.5–5 × 0.9–1 cm, sub-cylindrical, turgid, externally flat, straight, glabrous, brownish, indehiscent. Seeds ca. 4 × 3 mm, 2-seriate, obovate.
Examined specimens: Itamonte, P. N. Itatiaia, 22°22'12"S, 44°42'34"W, elev. 2,350 m, 29.VI.2013, fr., *D.M. Neves et al. 1368* (HUEFS). Passa Quatro, Serra Fina, Capim Amarelo (Médio), 1,974-2,037 msm, 22°26'31.4"S, 44°53'35.6"W, Campo de Nifelina, 5.V.2006, fr., *L.D. Meireles & J.A. Nunes 2306* (RB).
Aditional Examined specimens: BRAZIL. RIO DE JANEIRO: Itatiaia, estrada para as Prateleiras, 24.I.1987, fl., *R. Mello-Silva et al. 12* (SPF, VIC).

Among the species of series *Coluteoideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna itatiaiae* is most similar to *S.*

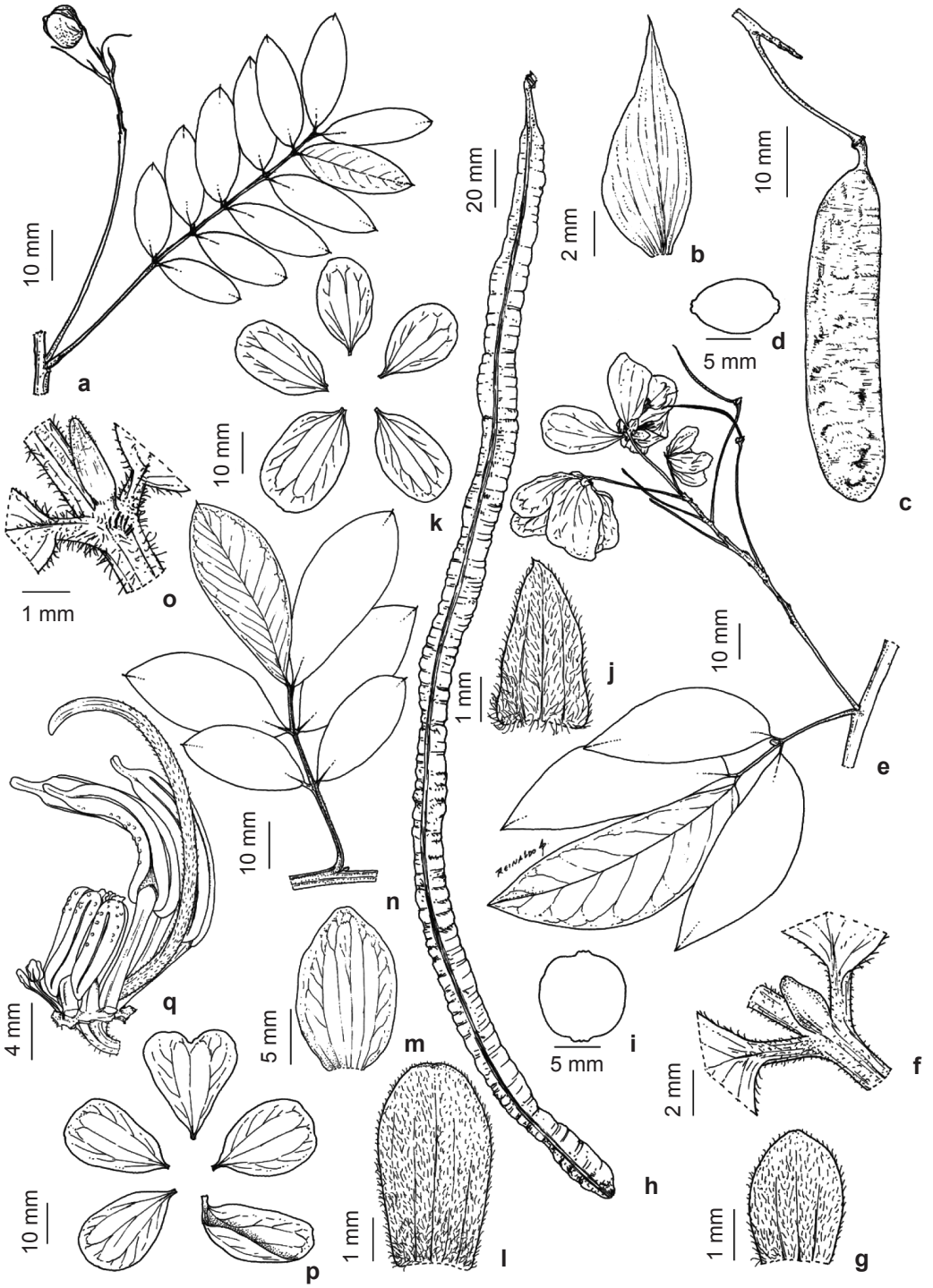

Figure 7 – a-d. *Senna itatiaiae* – a. branches, leaves and inflorescence; b. stipule; c. legume; d. transversal section of legume. e-i. *S. macranthera* var. *macranthera* – e. branches, leaves and inflorescence; f. nectary between leaflets of proximal pair; g. sepals detail; h. legume; i. transversal section of legume. j-k. *S. macranthera* var. *nervosa* – j. sepal; k. corolla. l. *S. macranthera* var. *pudibunda* – sepal. m. *S. macranthera* var. *striata* – sepal. n-q. *S. mucronifera* – n. leave; o. nectary between leaflets of proximal pair; p. corolla; q. androecium and pistil. (a. *R. Mello-Silva et al. 12*-VIC; b-d. *L.D. Meireles & J.A. Nunes 230*-RB; e-g. *L.C.P. Lima et al. 305*-VIC; h-i. *E. Tameirão Neto 2626*-BHCB; j-k. *Irwin et al. 22214* -UB; l. *Irwin et al. 22644*-UB; m. *K. Ferreira* (RB 480801); n-q. *G. Pereira-Silva et al. 6206*-CEN).

oblongifolia (Vogel) H.S. Irwin & Barneby because of the appearance and shape of the leaflets. However, these species are easy distinguished because *S. oblongifolia* has a nectary on the petiole, cymbiform bracts and a linear legume, and *S. itatiaia* has a nectary only on the rachis, ovate bracts and a subcylindrical legume.

All of the collections from Minas Gerais have only legumes. Therefore, material from Rio de Janeiro state (*Mello-Silva et al. 12* [SPF, VIC]) was used to describe the flowers.

Senna itatiaiae is endemic to Brazil and occurs in Rio de Janeiro and Minas Gerais. It is common in Itatiaia State Park in the southern part of the state (Fig. 1c), an area of the Atlantic Forest, disturbed humid forest and thickets, and on roadsides (Irwin & Barneby 1982). In Minas Gerais, it has been collected from 1,974–2,350 m elevation. Flowers in January and fruits in May and June.

1.12. *Senna macranthera* (DC *ex* Collad.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 181. 1982.

Cassia macranthera DC. *ex* Collad., Hist. Casses 99. 1816. Figs. 1c; 7e-m

Shrubs or trees, 2–9 m tall, branches cylindrical, sparsely tomentose or tomentose. Leaves 2 pairs of leaflets; stipules 10–12 × 0.5–1 mm, linear-falciform, base truncate, apex acuminate, deciduous; nectary absent in the petiole and present in the leaf rachis, between the first pair of leaflets, sometimes between the second pair also or in a rachis' extension, conical, ovate, sessile; petiole 2–3.5(–6) cm long; leaf rachis 1–3(–4.5) cm long, sparsely tomentose or tomentose leaflets narrowly elliptic, elliptic or ovate, common strongly asymetric, apex acute, acuminate, rare cuspidate, not mucronate, concolor or discolor, adaxial surface strigillose ortomentose adaxial surface strigillose, pubescent or tomentose, veins tenuous or patent, cartaceous, margin ciliolate, proximal pair (3–)5–9 × (1.5–)2–3.5(–4.2) cm, distal pair 6.5–9.7(–14) × 2.2–4(–4.5) cm. Racemes axillary and panícula terminal; peduncle 1.3–2 (–4.5) cm long; inflorescence rachis 0.5–3 cm long. Bracts ca. 1–3 × 0.5–1 mm, ovate-acuminate or cymbiform, deciduous; pedicel (20–)35–40(–45) mm long, nectary absent. Sepals 3–7(–16) × 1–4(–9) mm, different size, narrowly elliptic or ovate, apex rounded, dorsal surface pubescent or tomentose. Corolla asymmetrical; petals pubescent, yellow, central adaxial petal 21–30 × 10–15 mm, elliptic, apex rounded, latero-adaxial petals elliptic, apex rounded, latero-abaxial petals elliptic and one is slight falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments tomentose, staminodes lamina obovate, medium stamen filaments 1–2 mm long, anther 7–8 mm long, centric-abaxial stamen filament ca. 3 mm long, anther 7–9 mm long, latero-abaxial stamens filaments 3–5 mm long, straight, anther 8–12 mm long, rostrum geniculate, 0.5–1 mm long. Ovary velutinous, style 2–3 cm long, velutinous. Legume 23–37(–40) × 0.7–1 cm, cylindrical, externally depressed between seed locules, slightly curved, pubescent, green, indehiscent. Seeds 5–6 × 4–5 mm, 1-seriate, elliptic.

Senna macranthera and other species of series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) have two pairs of leaflets and a nectary between the proximal pair of leaflets, but they can be distinguished by the following traits:

-*S. macranthera* has abaxial stamens with anthers that are 8–12 mm long and a legume externally depressed between the seed locules, while *S. affinis* has abaxial stamens with anthers that are 5–6 mm long and an externally flat legume;

-*S. macranthera* has cylindrical branches and bracts 1–3 mm long and *S. angulata* has angular branches and bracts 6–12 mm long;

-*S. macranthera* has chartaceous leaflets and a legume 23–37(–40) cm long, which is brown, while *S. rugosa* (G. Don) H.S. Irwin & Barneby has coriaceous leaflets and a legume 7.5–15 cm long, which is black when mature;

-*S. macranthera* has a conical, pyriform or ovate nectary, abaxial stamen anthers with a geniculate rostrum and an externally depressed legume, and *S. tenuifolia* (Vogel) H.S. Irwin & Barneby has a narrowly elliptic or fusiform nectary, abaxial stamen anthers with a straight rostrum and externally flat legume.

-*S. macranthera* has a conical, pyriform or ovate nectary and strongly asymmetrical leaflets, and *S. splendida* (Vogel) H.S. Irwin & Barneby has a narrowly elliptic, clavate or falciform nectary and symmetrical leaflets.

There are eight varieties, var. *andina*, var. *lindeni*, var. *macranthera*, var. *micans*, var. *nervosa*, var. *pudibunda*, var. *quadrifoliolata* and var. *striata*, of which three were recorded in this study. *Senna macranthera* occurs in Brazil, Colombia, Ecuador, Peru and Venezuela (Irwin & Barneby 1982).

Key to the varieties of *Senna macranthera* in Minas Gerais

1. Tree; longest sepal 3–6 × 2–4 mm.
   2. Leaflets strigillose, surface rough ..... 1.12.1. *Senna macranthera* var. *macranthera*
   2'. Leaflets tomentose, surface soft ..... 1.12.2. *Senna macranthera* var. *nervosa*

1'. Shrubs; longest sepal 8–16 × 4–9 mm.
   3. Leaflets strigillose, surface rough, concolor ..... 1.12.4. *Senna macranthera* var. *striata*
   3'. Leaflets tomentose, surface soft, discolor ..... 1.12.3. *Senna macranthera* var. *pudibunda*

1.12.1. *Senna macranthera* (DC *ex*. Collad.) H.S. Irwin & Barneby var. ***macranthera***, Mem. New York Bot. Gard. 35: 183. 1982. Figs. 1c; 7e-i

Selected specimens: Diamantina, ca. 7 km w. of Diamantina, km 299 on MG 259, elev. 1,350, 2.II.1972, fl., *W.R. Anderson et al. 35152* (UB). Lima Duarte, P. E. Ibitipoca, elev. 1,300 m, mata ciliar, junto a prainha do Rio do Salto, 20.III.1995, fl., *A.E. Luchi et al. 427* (IBT). Mariana, 3.VII.1997, fr., *E. Tameirão Neto 2626* (BHCB); P.E. Itacolomi, estrada para Cibrão, 17.II.2005, fl., *L.C.P. Lima et al. 305* (VIC). Santana do Riacho, estrada MG-010, ca. 400 m antes da bifurcação entre Morro do Pilar e Conceição do Mato Dentro, 4.IV.1994, fl., *M.T.V.A. Campos & J.M. Arcanjo* (SPF 106606, IBT 293274). Viçosa, campus da UFV, em frente ao Departamento de Dança, 22.V.2015, fr., *L.G Rosignoli-Oliveira 1* (VIC).

This variety is represented by many specimens deposited in herbaria and is easily recognized by the habit and indument, which can be observed with a stereomicroscope or felt by touching the leaflets, since the surface is strigillose.

It occurs in Bahia, Espirito Santo, Minas Gerais, Rio de Janeiro, São Paulo and Paraná, in areas of the Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). According to Irwin & Barneby (1982), it can be found in gallery forest, *chapadão*, on mountains and is cultivated in gardens and on streets.

In Minas Gerais, the variety is common in the central and southeastern regions of the state (Fig. 1c) and has been collected near a river, inside a forest, on forest margins and roadsides, and in pastures. Flowers from January to April and in November, and fruits in May.

1.12.2. *Senna macranthera* (DC *ex*. Collad.) H.S. Irwin & Barneby var. ***nervosa*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 184. 1982. Figs. 1c; 7j-k

Cassia nervosa Vogel, Syn. Gen. Cass. 39 & Linnaea 11: 682.

Selected specimens: Alfenas, Fazenda Mundo Novo, 12.II.1986, fl., *M.C.W. Vieira 868* (SPF). Diamantina, ca. 23 km s.w. of Diamantina, road to Gouveia, elev. 1,250 m, 18.I.1969, fl., *Irwin et al. 22214* (UB, SPF). Guarapuava, 16°2'S, 46°18'W, tall 551 m.s.m., 26.XI.2000, fr., *L.C. Milhomens et al. 64* (UB). Marliéria, PERD, trilha campo de pouso, 19.V.2001, fr., *S.R.D.F. da Silva Nunes et al. 63* (VIC). Montes Claros, ca. 32 km west of Montes Claros, road to Água Boa, elev. 1,000 m, 23.II.1969, fl., *Irwin et al. 23744* (UB).

Senna macranthera var. *nervosa* is very well represented in herbarium collections and is easily recognized by the density of trichomes on the leaflets; the leaflet surface feels very soft.

This variety occurs in Bahia, Goias, the Distrito Federal, Mato Grosso, Minas Gerais, Rio de Janeiro and São Paulo, in Atlantic Forest and Cerrado (BFG 2018). It can be found in gallery forest, thickets, chapadão and on outcrops in Cerrado and is used as an ornamental street tree (Irwin & Barneby 1982).

The variety is widely distributed in Minas Gerais (Fig. 1c), in forest-Cerrado transition areas, disturbed Cerrado, gallery forest and on rocky slopes. Flowers from January to March and fruits in March, April, May, July, August and November.

1.12.3. *Senna macranthera* (DC *ex*. Collad.) H.S. Irwin & Barneby var. ***pudibunda*** (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 186. 1982.

Cassia pudibunda Mart. *ex* Benth. *in* Mart., *Fl. bras.* 15(2):102. 1870. Figs. 1c; 7l

Examined specimens: Diamantina, ca. 17 km n.e. of Diamantina, elev. 1,300 m, 26.I.1969, fl., *Irwin et al. 22644* (UB); divisa Bahia-Minas Gerais, 20.I.1965, fl., *E. P. Heringer 10280* (UB); estrada para Conselheiro Mata, 500 m do asfalto, 27.I.1986, fl., *I.C.F.C.R. Cordeiro et al. 9278* (SPF); Serra do Cipó, Lagoa Santa, Km 01, 2.IV.1983, fl., *A.F. da Silva et al. 469* (VIC).

The varieties *nervosa* and *pudibunda* have pilosulous leaflets and can be distinguished by habit and sepal size. In material deposited in herbaria, it is common to observe that the leaflets are discolor, with a vinaceous adaxial surface.

This variety is distributed in Alagoas, Bahia, Ceará, Minas Gerais, Paraíba, Pernambuco, Piauí and Rio Grande do Norte, in areas of the Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It has been collected in the central region of Minas Gerais (Fig. 1c) in gallery forest. Flowers in January and April.

1.12.4. *Senna macranthera* (DC *ex*. Collad.) H.S. Irwin & Barneby var. ***striata*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 185. 1982.

Cassia striata Vogel Gen. Cass. Syn. 39. 1837.

Figs. 1c; 7m

Examined specimens: Lavras, estrada do Madeira, 3.II.2006, fl. and fr., *K. Ferreira* (RB 480801).

Three herbarium specimens of *Senna macranthera* var. *striata* were found, which were observed online. The specimen *I. C. Cordeiro 9278* (SPF) was reidentified as *S. macranthera* var. *pudibunda* and the specimen *L. S. Leoni 657* (RB) was reidentified as *Senna macranthera* var. *macranthera*.

The material *K. Ferreira* (RB 480801), identified only to the species level, is *S. macranthera* var. *striata* due to the strigillose indument and very large sepals (15–16 × 9–10 mm).

The variety is endemic to Brazil and it is a new record for Minas Gerais. It also occurs in Bahia, Goias, Pernambuco and Tocantis, in the Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). In Minas Gerais it has been collected in the southern part of the state (Fig. 1c). Flowers and fruits in February.

1.13. *Senna mucronifera* (Benth.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 247. 1982.

Cassia mucronifera Mart. *ex* Benth. *in* Mart., *Fl. bras*. 15(2): 116. Figs. 1d; 7n-q

Shrubs, 0.9–1.5 m tall, branches cylindrical or angular, not sulcate, densely pubescent. Leaves 3 pairs of leaflets; stipules not seen, deciduous; nectary absent in the petiole and present in the leaf rachis, between all pairs or only between the first and the second proximal pairs, linear or piriform, stipitate; petiole 1–2 cm long; leaf rachis 1.5–2.5 cm long, densely pubescent; leaflets elliptic or obovate, apex acute, mucronulate, both sides tomentose, veins patent in abaxial surface, membranaceous, margin ciliolate, proximal pair 2.5–4 × 1.3–1.6 cm, distal pair 4–4.5 ×1.5–1.8 cm. Racemes umbellate, terminal; peduncle ca. 0.5 cm long; inflorescence rachis absent. Bracts 5–8 × 0.5 mm, lanceolate, deciduous; pedicel 16–20 mm long, nectary absent. Sepals 5–20 × 4–10 mm, different size, elliptic or obovate, apex rounded, dorsal surface sparsely tomentose. Corolla asymmetrical; petals sparsely tomentose, yellow, central adaxial petal 20–28 × 9–12 mm, obovate, apex emarginated latero-adaxial petals abovate, apex rounded, latero-adaxial petals obovate and one is falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina obovate, medium stamen filaments ca. 2 mm long, anther 6–8 mm long, centric-abaxial stamen filament ca. 10 mm long, anther 10-15 mm long, latero-abaxial stamens filaments ca. 10 mm long, straight, anther 10–12 mm long, rostrum straight, ca. 2 mm long. Ovary velutinous, style 1.5–2 cm long, velutinous. Legume ca. 7.6 × 0.5 cm, linear, externally flat, curved, brown when mature, indehiscent. Seeds not seen.

Selected specimens: Buriti, Fazenda Furquilho Novo, 23.VIII.1964, fr., *Irwin et al. 5511* (NYBG). Unai, cerca de 500 m a oeste do portão central da UHE Queimado, campo sujo em topo de morro, 16°12'56"S, 47°19'32"W, tall 850 m, 25.III.2002, fl., *G. Pereira-Silva et al. 6206* (CEN).

Senna mucronifera can be recognized by the presence of 3 pairs of obovate or elliptic leaflets with a mucronulate apex, longer pedicel, large sepals, asymmetric flowers and a long rostrum on the anthers of the abaxial stamens. It is similar to several other species of series *Trigonelloideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). *Senna obtusifolia* (L.) H.S. Irwin & Barneby and *Senna pentagonia* (Mill.) H.S. Irwin & Barneby are similar in the number and shape of the leaflets. However, *S. mucronifera* has a nectary between all pairs of leaflets (or between the first and second proximal pairs) and asymmetric flowers, while *S. obtusifolia* has a nectary only between the proximal pair of leaflets and zygomorphic flowers. Further, the flowers of *S. mucronifera* have a large, central, adaxial petal (20–28 × 9–12 mm) and a legume without wings, while *S. pentagonia* has a smaller, central, adaxial petal (6–11 × 4 mm) and a legume with wings.

The species occurs in Bolivia, Brazil and Paraguay (Irwin & Barneby 1982). In Brazil it has been collected in Bahia, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo and Tocantins, in Amazonia, Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It occurs in fields, disturbed forestsforest and headwaters (Irwin& Barneby 1982). In Minas Gerais it has been collected in the northwestern part of state (Fig. 1d) in disturbed fields. Flowers in March and May, and fruits in May and August.

1.14. ***Senna multijuga*** (Rich.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 492. 1982. Figs. 1d; 8a-g
Cassia multijuga Rich., Actes Soc. Hist. Nat. Paris 1:108. 1782.

Trees, (3–)6–20 m tall, branches cylindrical, sparsely or densely tomentose. Leaves 19–23(–37) pairs of leaflets; stipules 5–7 × 0.5–1 mm, linear, linear-falciform or filiform, base truncate, apex acute, deciduous; nectary absent in the petiole and present in the leaf rachis, between the first pair of leaflets, sometimes in other proximal pairs or distal pairs also, falciform, fusiform, rare ovate-acuminate or cylindrical, sessile or stipitate; petiole 1–2.5 cm long; leaf rachis 14–18(–21) cm long, sparcely or densely tomentose and can be yellow or rusty; leaflets oblong, apex obtuse, mucronulate, adaxial surface finely sparsely tomentose and abaxial surface sparsely tomentose or sparsely velutinous, rare both sides glabrous, veins tenuous, membranaceous, margin ciliolate, proximal pair 0.6–3 × 0.5–0.8 cm , median pair 1.2–4 × 0.3–1 cm, distal pair (1.2–)1.5–3 × 0.4–0.9 cm. Raceme or panicula axyllar and panicula terminal; peduncle 2.5–4.5 cm long; inflorescence rachis 1–7 cm long. Bracts ca. 3–4 × 1 mm, lanceolate, deciduous; pedicel 15–20 mm long, nectary absent. Sepals 2–5 × 1–3 mm, different size, elliptic or ovate, apex rounded, dorsal surface glabrous or sparsely tomentose. Corolla asymmetric; petals glabrous or sparsely tomentose, yellow, central adaxial petal 8–10 × 3–6 mm, obovate, apex rounded or emarginated, latero-adaxial petals elliptic, apex rounded, latero-abaxial petals obovate and one is falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina twisted, medium stamen filaments 0.5–1 mm long, anther 4–5 mm long, centric-abaxial stamen filament 1–2 mm long, anther 4–5 mm long, latero-abaxial stamens filaments 4–6 mm long, straight, anther 5–6 mm long, rostrum curved, ca. 1 mm long. Ovary tomentose, style 1–1.4 cm long, tomentose. Legume 9–15 × 1.5–2 cm, oblong, flat-compressed, externally with depression between seed locules, slightly curved, glabrous, brown when mature, dehiscent. Seeds ca. 7 × 2 mm, 1-seriate, oblong.

Senna multijuga belongs to series *Interglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and can be easily recognized by the presence of several small oblong leaflets, inflorescence in panicles, asymmetric flowers and a flat-compressed legume. It occurs in Bolivia, Brazil, Colombia, Costa Rica, the Guianas, Panama and Venezuela (Irwin & Barneby 1982).

Irwin & Barneby (1982) treated *Senna multijuga* as having three subspecies and four varieties: subsp. *doyle*, that occurs in Mexico; subsp. *multijuga*, with the var. *multijuga* and var. *verrucosa*; and subsp. *peregrinatrix*, with var. *lindleyana* and var. *peregrinatriz.*

To recognize the subspecies, Irwin & Barneby (1982) used the shape of the stipules; however, the stipules are deciduous and were not present on most of the examined specimens, which made it difficult to identify the material. When the stipules were present, they were linear or filiform, which is similar to what these authors described for subsp. *lindleyana,* so we considered the material from Minas Gerais to be *S. multijuga* subsp. *lindleyana*.

To distinguish the varieties, Irwin & Barneby (1982) used the size of the largest leaflets. In this species, the largest leaflets are the median pairs so, for *S. multijuga*, these pairs were measured to try to separate the varieties. When making these measurements, it is important to use mature leaves.

The examined specimens of *Senna multijuga* from Minas Gerais have variations in the indument and shape of the nectary on the leaf rachis. Yellow or rusty trichomes are common in *S. multijuga* var. *lindleyana* and also occur on some material of *S. multijuga* var. *peregrinatrix*. Due to this, it was difficult to find other characteristics to use with leaflet size in the identification key to the varieties. A future taxonomic revision using taxonomic methods and field observations should include collections from different places to try to understand the variations in this species, as noted by Bortoluzzi *et al.* (2011).

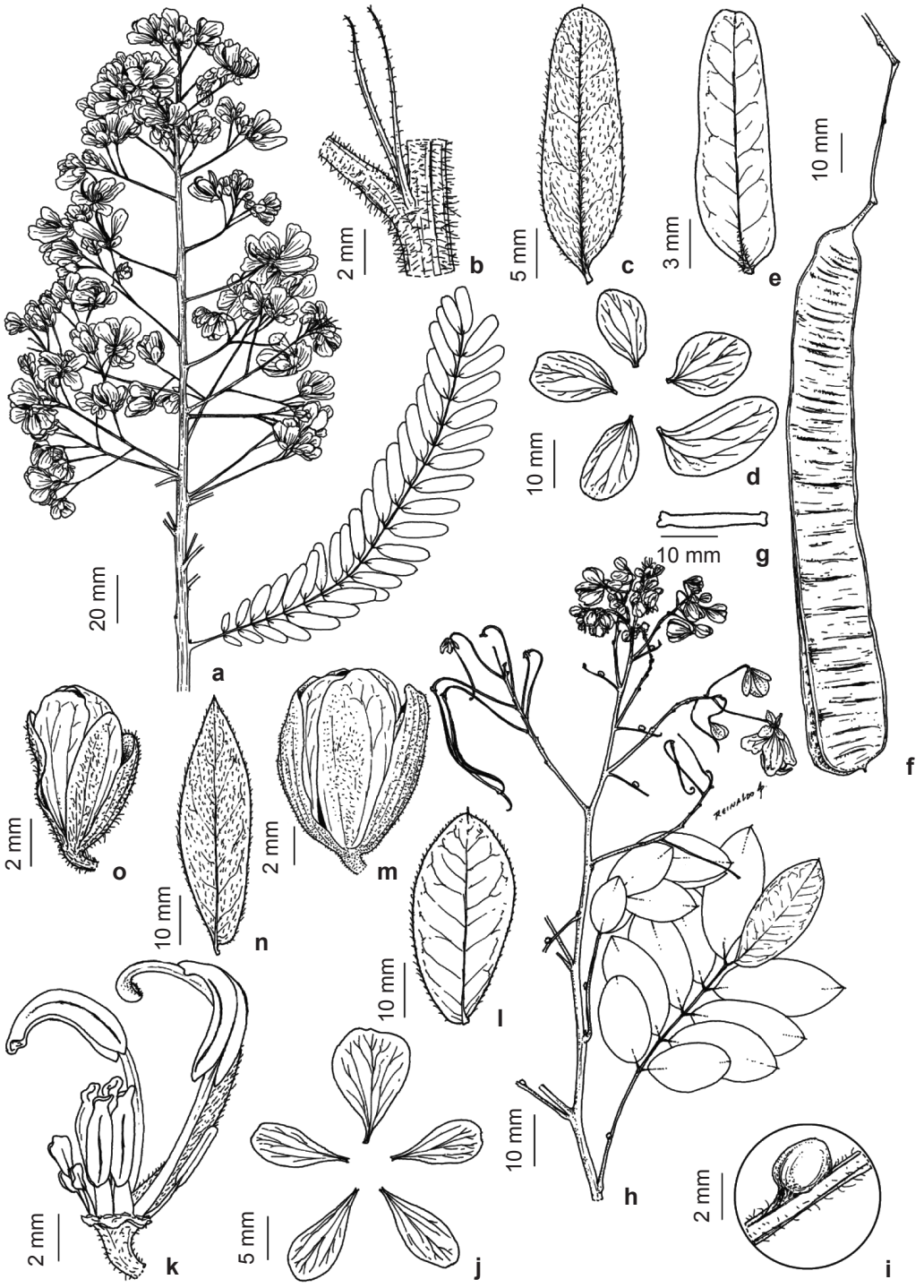

Figure 8 – a-d. *Senna multijuga* subsp. *lindleyana* var. *lindleyana* – a. branch; b. stipule; c. median leaflet detail; d. corolla. e-g. *S. multijuga* subsp. *lindleyana* var. *peregrinatrix* – e. median leaflet detail; f. legume; g. transversal section of legume. h-k. *S. neglecta* var. *oligophylla* – h. branches with leaves and inflorescence; i. petiolar nectary; j. corolla; k. androecium and pistil. l-m. *S. neglecta* var. *grandiflora* – l. leaflet detail; m. sepal. n-o. *S. neglecta* var. *neglecta* – n. leaflet detail; o. sepal detail. (a, c-d. *O. Roppa & O. Leoncini 552*-IPA; b. *L.C.P. Lima & M.P. Andrade 394*-VIC; e-g. *L.G. Rosignoli-Oliveira 25*; h-k. *M.C.T.B. Messias 1003*-OUPR; l. *L.F. Yamamoto 1168*-VIC; n,o. *G. Hatschbach 46317*-MBM).

Key to the varieties of *Senna multijuga* subsp. *lindleyana* in Minas Gerais

1. Median pair of leaflets 2–4 × 0.5–1 cm ..... 1.14.1. *Senna multijuga* var. *lindleyana*
1'. Median pair of leaflets 1.2–1.8 × 0.3–0.4 cm ..... 1.14. 2. *Senna multijuga* var. *peregrinatrix*

1.14.1. *Senna multijuga* (Rich.) H.S. Irwin & Barneby subsp. ***lindleyana*** (Gard.) Irwin var. ***lindleyana*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 498. 1982. Figs. 1d; 8a-d
Cassia lindleyana Gard., London J. Bot. 2: 341. 1843.

Selected specimens: Catas Altas, 12 km s. of Catas Altas on Road to Santa Rita Durão, 22.I.1959, fl., *Irwin 2511* (R). Ouro Preto, P. E. Itacolomi, trilha do Custódio, 20.X.2005, fr., *L.C.P. Lima & M.P. Andrade 394* (VIC). Poços de Caldas, Retiro Branco, 3.II.1965, fl., *O. Roppa & O. Leoncini 552* (IPA); Serra do Espinhaço, lower cut-over slopes of Serra da Caraça, near riacho, ca. 10 km w. of Barão de Cocais, elev. ca. 1,400 m, 22.I.1971, fl., *Irwin et al. 28868* (R). Viçosa, 5.I.1931, fl., *Y. Mexia 4218* (VIC).

Bortoluzzi *et al*. (2011) studied *Senna* species in Santa Catarina state and observed that, in addition to leaflet measurements, nectary shape and the absence of glanduliform trichomes on the pedicel could help in the identification of var. *lindleyana*. However, in the material from Minas Gerais nectary shape overlaps with the shapes found in var. *peregrinatrix*. In addition, glanduliform trichomes are present on some of examined material so these characteristics did not help separate these taxa.

It occurs in Colombia, Venezuela and Brazil, where it is distributed along the Atlantic Coast between Bahia and Santa Catarina (Irwin & Barneby 1982). In BFG (2018), the distribution includes information about the subspecies, including that *S. multijuga* subsp. *lindleyana* occurs in Bahia, Espírito Santo, Goias, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>).

Variety *lindleyana* is found in treefall gaps, on the margin of humid forest, in gallery forest and on mountains in the Atlantic Forest and Cerrado (Irwin & Barneby 1982). In Minas Gerais it is frequent in the central and southeastern regions and is also found in the northwestern region (Fig. 1d), near rivers, on roadsides and in fields (*campos*) in Cerrado. Flowers from January to May and in December, and fruits in January, April and October.

1.14.2. *Senna multijuga* (Rich.) H.S. Irwin & Barneby subsp. ***lindleyana*** (Gard.**)** H.S. Irwin & Barneby var. ***peregrinatrix*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 499. 1982.
Figs. 1d; 8e-g

Selected specimens: Arinos, km 21 da rodovia Arinos-Unaí, aproximadamente 600 m de altitude, entre 15°30' e 16°10'S, 46°10' e 47°30'W, 2.V.1996, fl., *B.A.S. Pereira & D. Alvarenga 3056* (UB). Marliéria, P. E. Rio Doce, estrada do Restaurante, 12.III.1998, fl., *R.L.C. Bortoluzzi et al. 1* (VIC). Monte Belo, Fazenda Lagoa, 23.VI.1985, fr., *M.C.W. Vieira 965* (RB); Serra do Cipó, estrada para Morro do Pilar, beira da rodovia, km 123, 21.IX.2016, fr., *L.G. Rosignoli-Oliveira 25* (VIC). Viçosa, zona rural do Cascalho, Sítio Vai e Volta do Sr. Milton, a 30 m do curral, beira brejo, 9.IV.1999, fl., *L.A. Basílio & E. Miranda* (VIC).

Leaflet size, nectary shape and the presence of glanduliform trichomes on the pedicel were used by Bortoluzzi *et al*. (2011) to distinguish the varieties of *S. multijuga* (see comments under *S. multijuga* var. *lindleyana*). However, in the material from Minas Gerais most of the characteristics were not useful to distinguish the two varieties. The size of the leaflets was the only characteristic that could be used to differentiate the varieties, since the leaflets of var. *peregrinatrix* are smaller.

This variety occurs in Colombia, Venezuela and Brazil, where it is present in coastal mountain ranges from Rio de Janeiro to Santa Catarina (Irwin & Barneby 1982). In BFG (2018), there is information about subsp. *lindleyana* but no information is provided about var. *peregrinatrix*. *Senna multijuga* subsp. *lindleyana* occurs in Bahia, Espírito Santo, Goias, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>).

Variety *peregrinatrix* occurs in humid forests, Atlantic Forest and savanna forestforest (Irwin & Barneby 1982). In Minas Gerais, it is common in the southeastern region of the state, and has also been found in the northwestern region (Fig. 1d), near rivers and lagoons and on roadsides in semideciduous forest. Flowers from February to June and fruits in May, June, September and October.

1.15. *Senna neglecta* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 421. 1982. Figs. 1d; 8h-o
Cassia neglecta Vogel, Linnaea 10(5): 594. 1836.

Shrubs or small trees, 1.5–2.5 m tall, branches cylindrical, pubescent or sparsely tomentose. Leaves 4–5(–6) pairs of leaflets; stipules ca. 5 × 1 mm, lanceolate, base truncate, apex acuminate, deciduous; nectary present in the lower half of the petiole and absent in the leaf rachis, conical or globose, sessil; petiole 1.5–2.5(–2.8) cm long; leaf rachis (3–)4–6 cm long, pubescent or sparsely tomentose; leaflets narrowly elliptic or elliptic, rare obovate, apex acute or obtuse, mucronulate, adaxial surface glabrous or sparsely pubescent, abaxial surface glabrous, but can be pubescent at base or velutinous overall, veins tenuous or patent, cartaceous, margin glabrous or ciliolate, proximal pair 2–3.5 × 1.1–1.3 cm, distal pair 4–6.5 × 1.5–2 cm. Racemes axillary and paniculas terminal; peduncle 0.5–1 cm long; inflorescence rachis ca. 3 cm long. Bracts ca. 4 × 2 mm, lanceolate, deciduous; pedicel 1.5–2 mm long, nectary absent. Sepals 5–11 × 2–4 mm, similar size, elliptic or obovate, apex rounded, dorsal surface pubescent. Corolla zygomorphic, petals pubescent in dorsal surface, yellow, central adaxial petal 8–14 × 2–5 mm, obovate, apex emarginated, latero-adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 6 stamens fertile, filaments glabrous, staminodes lamina obovate, medium stamen filaments ca. 1 mm long, anther 3–5 mm long, centric-abaxial stamen not fertile, filament 3–6 mm, lamina 0.5(–4) mm, latero-abaxial stamens filaments 5–9 mm long, straight, anther 4–7 mm long, rostrum transversely oblique, ca. 1 mm long. Ovary velutinous, style 1–1.5 cm long, velutinous on the margins. Legume 8.8–14 × 0.7–1 cm, linear, flat-compressed, externally depressed between seed locules, curved, glabrous, brown when mature, indehiscent. Seeds not seen.

Senna neglecta can be recognized by the following characteristics: nectary on the lower half of petiole; in general, narrowly elliptic or elliptic leaflets; zygomorphic flowers with narrow petals and six fertile stamens; and flat-compressed legume. It belongs to series *Basiglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and is similar to *S. cernua*, as explained in the taxonomic comments under this species.

Senna neglecta occurs in Brazil and Irwin & Barneby (1982) do not comment about its occurrence in other countries; however, BFG (2018) notes that it is probably not endemic and likely occurs in Argentina (Souza & Bortoluzzi 2014 *apud* Kuntz 2014).

The species has four varieties, var. *furnicola*, var. *grandiflora*, var. *neglecta* and var. *oligophyla*, but only three were recorded in Minas Gerais.

Key to the varieties of *Senna neglecta* in Minas Gerais

1. Abaxial surface of leaflets glabrous or pubescent at base.....1.15.3. *Senna neglecta* var. *oligophylla*
1'. Abaxial surface of leaflets completely velutinous.
   2. Leaflet apex obtuse; veins patent on adaxial surface; sepals 8.5–11 mm long.....1.15.1. *Senna neglecta* var. *grandiflora*
   2'. Leaflet apex acute; veins tenuous; sepals 5–7.5(–8) mm long..... 1.15.2. *Senna neglecta* var. *neglecta*

1.15.1. *Senna neglecta* (Vogel) H.S. Irwin & Barnebyvar. ***grandiflora*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 423. 1982. Figs. 1d; 8l-m

Examined specimens: ao lado da rodovia BR-4, km 777, 22.VI.1968, fl. and fr., *R.P. Belem* (Isotype R 139127!; Holotype NYBG 00004860!). Medina, rod. BR-116, 13.V.1983, fl., *G. Hatschbach 46317* (MBM, RB). Perdizes, Fazenda Cambucá, 935 m.s., margens da estrada de acesso, 19°20'S, 47°16'W, 26.I.1994, fl., *L. A. Martens* (SPF 86161).

According to Irwin & Barneby (1982), *Senna neglecta* var. *grandiflora* has a central adaxial petal that is 14–19 mm long; however, for the specimens examined this structure is 12–14 mm long. Only a few specimens of the variety were found from Minas Gerais so this characteristic was not used in the identification key.

There is no information on the label about the exact location for a specimen collected by R. P. Belem (R 139127 NYBG). According to Irwin &

Barneby (1982), the collection was made between the valleys of the Jequitinhonha and Mucuri rivers (ca. 16–17°30'S). It is probably from the Itaobim region, near Medina, a city where the variety has also been collected, in the northeastern part of Minas Gerais (Fig. 1d).

This variety is endemic to Brazil and occurs in Bahia, Goiás and Minas Gerais, in the Atlantic Forest, Caatinga and Cerrado biomes (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), between river valleys (Irwin & Barneby 1982). Flowers in January, May and June, and fruits in June.

1.15.2. ***Senna neglecta*** (Vogel) H.S. Irwin & Barneby var. ***neglecta***, Mem. New York Bot. Gard. 35: 423. 1982. Figs. 1d; 8n-o

Examined specimens: Alto Caparaó, P. N. Caraparaó, estrada entre Vale Verde e Tronqueira, 20º24'68,4"S, 41º50'966"W, elev. 1,487 m, 27.VIII.2015, fl., *J. Kuntz & G.D. Colleta 813* (ESA); estrada que dá acesso a Tronqueira, P. N. Caparaó, 20.III.2012, fl., *J. Kuntz et al. 450* (ESA). Extrema, Serra do Lopo, 5.III.2003, fl., *L.F. Yamamoto 1168* (UEC).

The acute apex of the leaflets, tenuous veins and smaller sepals of var. *neglecta* allow it to be easily distinguished from the other pilosulous variety.

This variety is endemic to Brazil and occurs in Espírito Santo, Minas Gerais, Paraná, Rio Grande do Sul, São Paulo and Santa Catarina, in Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in disturbed forest and waste places (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the southern and southeastern parts of the state. Flowers in March and August.

1.15.3. ***Senna neglecta*** (Vogel) H.S. Irwin & Barneby var. ***oligophylla*** (Benth.), Mem. New York Bot. Gard. 35: 424. 1982.

Cassia oblongifolia var. *oligophylla* Benth. *in* Mart., *Fl. bras*. 15(2): 111. 1870. Figs. 1d; 8h-k

Selected specimens: P. E. Ibitipoca, próximo da casa da polícia florestal, 21°42'33"S, 43°53'46"W, 4.II.2004, fl., *R.C. Forzza et al. 2636* (SPF). Ouro Preto, P. E. Itacolomi, lagoa seca, próximo a gruta, 30.I.2006, fl. and fr., *M.C.T.B. Messias 1003* (OUPR). Santa Bárbara, Serra do Caraça, trilha do Pico do Carapuça, 23.IV.1997, fl., *A. Rapini et al. 299* (IBT,SPF).

This variety is easily recognized by the leaflets that are glabrous or pubescent only at base.

According to Irwin & Barneby (1982), var. *oligophylla* occurs in Rio de Janeiro and Minas Gerais. However, it is not known if this variety is endemic to Brazil (BFG 2018). It occurs in Atlantic Forest (BFG 2018) in openings in humid forest and on rock outcrops and mountains (Irwin & Barneby 1982). In Minas Gerais, it is common in the southeastern region (Fig. 1d) and grows in pastures, on forest margins, near lagoons and on rock outcrops. Flowers from January to April and fruits in January and March.

1.16. ***Senna oblongifolia*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 374. 1982.

Cassia oblongifolia Vogel, Syn. Gen. Cass. 23 & Linnaea 11: 666, 1837. Figs. 1d; 9a-e

Trees, 3–7 m tall, branches cylindrical, pubescent. Leaves (6–)7(–8) pairs of leaflets; stipules 3–10 × 0.5–1 mm, linear-acuminate, base truncate, apex acuminate, deciduous; nectary present in upper half of the petiole and absent in the leaf rachis, fusiform or ovate, stipitate;petiole 3(–3.5) cm long; leaf rachis 5.5–7(–11) cm long, densely pubescent; leaflets oblanceolate or narrowly elliptic, apex retuse, sometimes obtuse, both sides glabrous or sparsely tomentose, veins tenuous, cartaceous, margin ciliolate, proximal pair 2–2.5 × 0.6–1 cm, distal pair 3.5–4 × 1–1.7 cm. Racemes axillary; peduncle 2.5–5 cm long; rachis 3–4.5 cm long. Bracts ca. 3 × 1 mm, cymbiform, deciduous; pedicel 15–25 mm long, nectary absent. Sepals 4–7 × 2–3 mm, different size, elliptic or narrowly elliptic, apex obtuse, sparsely tomentose. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 8–11 × 5–6 mm, obovate, apex emarginated, latero-adaxial petals obovate, apex emarginated, latero-abaxial petals oblanceolate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina oblate, medium stamen filaments 1–2 mm long, anther ca. 4 mm long, centric-abaxial stamen filament 3–4 mm long, anther 4–5 mm long, latero-abaxial stamens filaments 4–5 mm long, curved, anther 4–6 mm long, rostrum truncate, ca. 0.5 mm long. Ovary tomentose, style ca. 1 cm long, tomentose. Legume 8–9 × 0.8–1 cm, linear, flat-compressed, externally depressed between seed locules, curved, glabrous, green, dehiscent. Seeds 5–6 × 5 mm, 1-seriate, circular.

Selected specimens: Alto Caparaó, estrada da Tronqueira, 20.III.2914, fr., *J. Kuntz 752* (ESA). Conceição do Ibitipoca, caminho para Pousada das

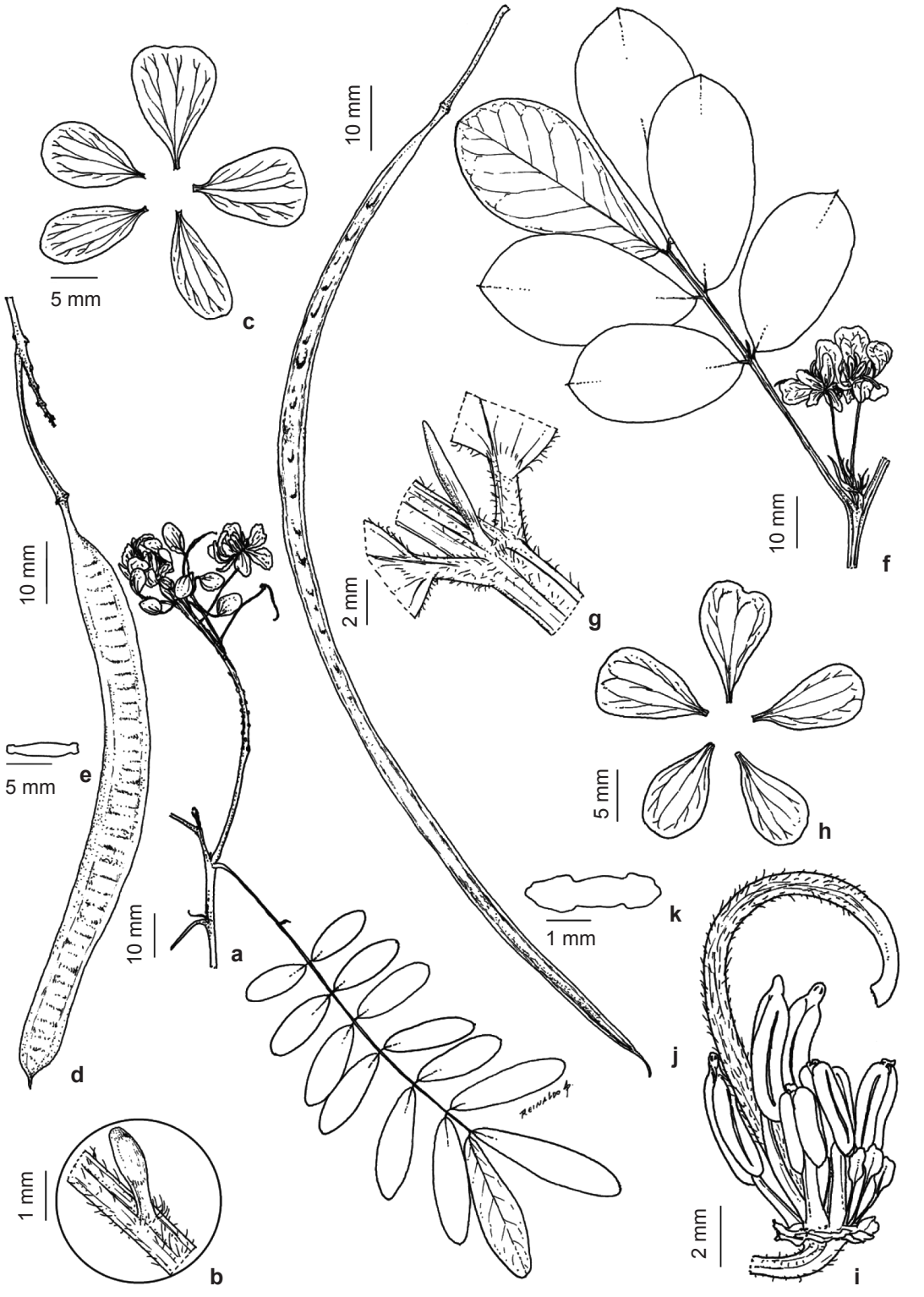

Figure 9 – a-e. *Senna oblongifolia* – a. branches with leaves and inflorescence; b. nectary in the upper half of the petiole; c. corolla;d. legume; e. transversal section of legume. f-k. *S. obtusifolia* – f. branche with leaves and inflorescence; g. nectary between the leaflets of the proximal pair; h. corolla; i. androecium and pistil; j. legume; k. transversal section of legume. (a-d. *L.G. Rosignoli-Oliveira 30*-VIC; g-i. VIC 2206; j-k. *F.F. Mazine et al. 866*-RB).

Hortências, 8.X.2016, fl.e fr., *L.G. Rosignoli-Oliveira 30* (VIC). Ouro Preto, Feixo do Funil, 24.IX.1974, fl., *J. Badini* (OUPR 19662. 19663).

Senna oblongifolia can be confused with *S. itatiaiae* because of the shape of the leaflets. These species are in series *Coluteoideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and can be easily distinguished by the nectary on the upper half of the petiole in *S. oblongifolia* and no nectary on the petiole in *S. itatiaiae*; the latter species only has a nectary between the pairs of leaflets.

The species occurs in Argentina and Brazil (Irwin & Barneby 1982), where it has been recorded in Amazonas, the Distrito Federal, Minas Gerais, Rio de Janeiro, Paraíba, Paraná, Rio Grande do Sul, Santa Catarina and Tocantins, in Amazonia, Cerrado and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in stony fields, disturbed forestsforest, and thickets (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the southeastern region (Fig. 1d) in forests and on roadsides. Flowers in September and October and fruits in January, March and October.

1.17. *Senna obtusifolia* (L.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 252. 1982. Figs. 1e; 9f-k

Cassia obtusifolia L., *Sp. Pl*. 377. 1753.

Cassia tora var. *obtusifolia* (L.) Haines, Bot. Bihar & Orissa 304. 1922.

Shrubs, 0.7–2 m tall, branches cylindrical or angular, not sulcate, sparsely tomentose. Leaves 3 pairs of leaflets; stipules 12–17 × 1 mm, linear-falciform, base truncate, apex acuminate, deciduous late; nectary absent in the petiole and present in the leaf rachis, between the proximal pair of leaflets, linear, stipitate; petiole (1.5–)2.5–4.2 cm long; leaf rachis (1.3–)2.5–3.4 cm long, sparsely tomentose; leaflets obovate, apex acute, mucronulate, adaxial surface glabrous or sparsely velutinous, abaxial surface sparce velutinous, veins tenuous, membranaceous, margin ciliolate, proximal pair 2.5–4.5 × 1.5–2.6 cm, distal pair 3–6 × 1.2–3 cm. Racemes umbellate, axillary and terminal; peduncle 0.2–0.5 cm long; inflorescence rachis absent. Bracts 4–5 × 0.5 mm, linear-falciform, deciduous; pedicel 15–25 mm long, nectary absent. Sepals 5–8 × 2–3 mm, similar size, elliptic, apex obtuse, dorsal surface sparsely tomentose. Corola zygomorphic, petals glabrous, yellow, central adaxial petal 8–11 × 5–6 mm, obovate, apex emarginated, latero-adaxial and latero-abaxial petals abovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina obovate, medium stamens filaments ca. 1 mm long, anther 2–3 mm long, centric-abaxial stamen filament ca. 2 mm long, anther ca. 4 mm long, latero-abaxial stamens filaments 2–3 mm long, straight, anther 3–5 mm long, rostrum oblique, ca. 0.5 mm long. Ovary velutinous, style 1–1.2 cm long, velutinous. Legume 13–16 × 0.1–0.3 cm, linear, flat-compressed, externally slightly depressed between seed locules, curved, sparsely tomentose, green, indehiscent. Seeds ca. 5 × 3 mm, 1-seriate, obovate.

Selected specimens: Mariana, distrito de Monsenhor Horta, próximo a Lagoa Ponte das Crioulas (estrada), 20º18'08.8"S, 43º18'59.4"W, 621 m, 25.II.2003, fl. and fr., *F.F. Mazine et al. 866* (RB). São João Nepomuceno, Serra dos Núcleos, Fazenda Primavera, 17.II.2003, fl. and fr., *D.S. Pifano et al. 498* (CESJ). Uberlândia, Fazenda Buriti, 3.III.1995, fr., *G.M. Araujo et al. 1162* (HUFU). Viçosa, 7.I.1931, fl. and fr., (VIC 327); escola, 9.III.1935, fl. and fr., *J.Y. Kuhlmam* (VIC 2206).

The examined specimens of *Senna obtusifolia* from Minas Gerais have 3 pairs of leaflets, while those from Santa Catarina State have 2 pairs (Bortoluzzi *et al.* 2011) and those from Goiás state have up to 4 pairs (Silva *et al.* 2018).

In Minas Gerais, *Senna obtusifolia* is similar to *S. mucronifera* and *S. pentagonia* (Mill.) H.S. Irwin & Barneby, which also belong to series *Trigonelloidea*e (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), by the number (3 pairs) and shape of the leaflets. The characteristics that distinguish these species are discussed in the comments of *Senna mucronifera*.

The species occurs in the Americas in Argentina, Brazil, Colombia and Mexico (Irwin & Barneby 1982). In Brazil, it has been collected in most states of the country and occurs in the Amazon, Caatinga, Cerrado, Atlantic Forest and Pantanal regions (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It occurs near rivers, in pastures and on plantations and roadsides (Irwin & Barneby 1982).

In Minas Gerais, the species is common in the central and southeastern regions, and has been collected in the northern and western parts of the state (Fig. 1e), on roadsides, near rivers, in gallery

forests and on forest margins. Flowers from January to April and in July, October and November, and fruits from January to April and in October and November.

1.18. *Senna occidentalis* (L.) Link, Mem. New York Bot. Gard. 35: 436. 1982. Figs. 1e; 10a-e
Cassia occidentalis L., *Sp. Pl*., 377. 1753.

Shrubs or sub-shrubs, 0.5–1 m tall, branches cylindrical, glabrous. Leaves 4–5 pairs of leaflets; stipules ca. 5 × 1 mm, triangular, base truncate, apex acuminate, deciduous; nectary present at base of the petiole and absent in the leaf rachis, conical or pyriform, sessil; petiole 2.5–3.5 cm long; leaf rachis 6–11 cm long, glabrous; leaflets lanceolate, apex acuminate or cuspidate, both sides glabrous, veins tenuous, membranaceous, margin ciliolate, proximal pair 3–3.5(–4) × 1–2 cm, distal pair 5–7.5 × 1.7–2(–3) cm. Racemes axillary and terminal; peduncle 2–3.4 cm long; rachis 1.5–2.5 cm long. Bracts 6–11 × 1–2 mm, triangular, deciduous; pedicel 5–12 mm long, nectary absent. Sepals 5–8 × 3–5 mm, similar size, elliptic, apex obtuse, dorsal surface glabrous. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal ca 15 × 5 mm, obovate, apex rounded, latero adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 6–7 fertile stamens, filaments glabrous, staminodes lamina twisted or sub-quadrangular, medium stamens filaments 3–5 mm long, anther 5–6 mm long, centric abaxial stamen, filament ca. 6 mm long, anther ca. 5 mm long when fertile or lamina lanceolate, latero-abaxial stamens filaments ca. 5 mm long, straight, anther 5–9 mm long, rostrum transversely oblique, ca. 1 mm long. Ovary velutinous; style 1–1.5 cm long, velutinous. Legume 23 × 0.6–0.9 cm, oblong, compressed, externally slightly depressed between seed locules, slightly curved, sparsely tomentose, vinaceous, brown when mature with light color on the margins, dehiscent. Seeds 5–4 mm, 1-seriate, elliptic.

Selected specimens: Araponga, P. E. Serra do Brigadeiro, próximo à casa de hóspedes, sede do PESB, 20°42'59.9"S, 42°28'50.5"W,11.VI.2013, fr., *L.C. Siqueira 849* (VIC). Jaboticatubas, São José de Almeida, Fazenda Barreiro D'Antas, 8.XI.1998, fl. and fr., *A.F. Silva* (VIC 20635). Mocambinho, leito dono, Br, 30.X.1996, fl. and fr., *Projeto Jaíba 194* (VIC). Paracatu, ca. 5 km n. of Paracatu, 800 m., 5.V.1970, fl., *Irwin & Barneby et al. 26.110* (UB). Ubá, estrada em direção a Ubari, 2.III.2016, fl. and fr., *L.G. Rosignoli-Oliveira 18* (VIC). Uberlândia, rod. Udi. Cruzeiro dos Peixotos, 17. XII.1996, fl. and fr., *R.C. Vieira 66* (UB).

Senna occidentalis can be easily recognized by the following group of characteristics: nectary at the base of the petiole; 4–5 pairs of lanceolate, glabrous leaflets; 6–7 fertile stamens; and an oblong legume with light-colored margins. Among the species in series *Basiglandulosae*, *S. occidentalis* is most similar to *S. hirsuta* because of the lanceolate leaflets, but can be distinguished by the indument; *S. occidentalis* has glabrous leaflets, while *S. hirsuta* var. *acuminata* has hirsutulous leaflets and *S. hirsuta* var. *leptocarpa* has strigillose leaflets.

Senna occidentalis is distributed from Mexico to Brazil (Irwin & Barneby 1982). The species occurs in all states of Brazil, in the Amazon, Atlantic Forest, Caatinga, Cerrado and Pantanal regions (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), in disturbed and waste places, savannas, pastures and on roadsides (Irwin & Barneby 1982). In Minas Gerais (Fig. 1e), it has been found on roadsides, river banks and in disturbed areas.

Flowers in February, March, May, June and October to December and fruits from Februay to July and from October to December.

1.19. *Senna organensis* (Harms) H.S. Irwin & Barneby var. ***organensis***, Mem. New York Bot. Gard. 35: 326. 1982. Figs. 1e; 10f-k
Cassia organensis Glaziou *ex* Harms, Feddes Repert. Sp. Nov. 24: 123. 1924.

Shrubs, 0.2–2.5 m tall, branches sulcate, sparsely tomentose. Leaves (5–)6–7 pairs of leaflets; stipules 7–10 × 5 mm, linear-falciform, base truncate, apex acuminate, deciduous late; nectary absent in the petiole and present in the leaf rachis, in general, between leaflets of all pairs, but it can be absent between some leaflets, botuliform, ovate, fusiform or falciform, sessile or stipitate ; petiole 1.5–2 cm long; leaf rachis 3.5–4.5 cm, sparsely tomentose; leaflets elliptic or obovate, apex retuse, both sides glabrous, veins tenuous, cartaceous, margin ciliolate, proximal pair (0.8–)1–12 × 0.5–1 cm, distal pair 1.5–3 × 0.7–1.4 cm. Racemes axillary; peduncle 3.5–6.3 cm long; inflorescence rachis 1.2–1.5 cm long. Bracts 5–8 mm, lanceolate, persistent; pedicel 13–16 mm long, nectary absent. Sepals 5–7 × 3–4 mm, similar size, elliptic, apex obtuse, dorsal surface glabrous. Corolla zygomorphic; petals glabrous, yellow, central adaxial petal 9–10 × 6–7 mm, obovate, apex emarginated, latero-adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile

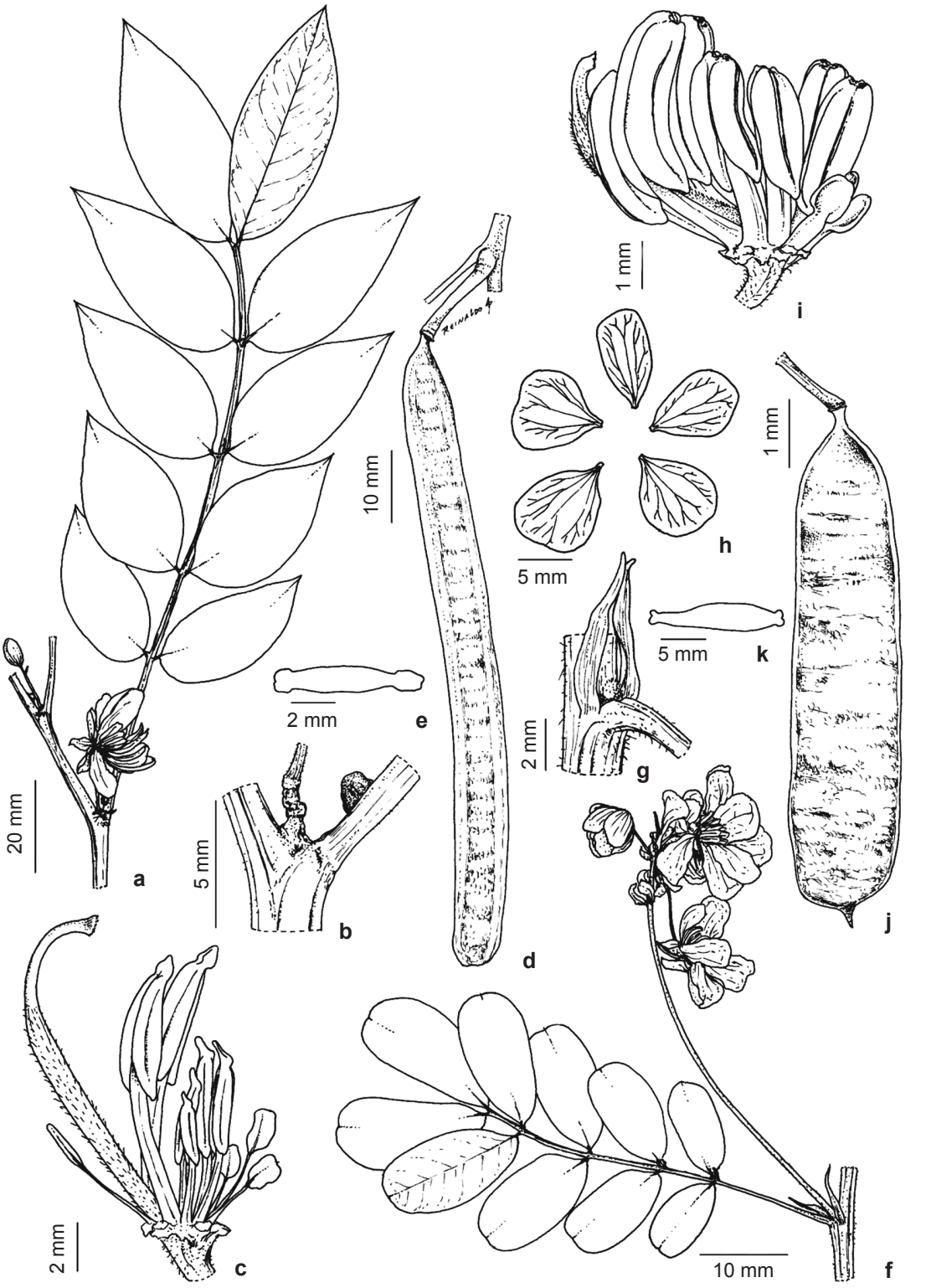

Figure 10 – a-e. *Senna occidentalis* – a. branches with leaves and inflorescence; b. petiolar nectary; c. androecium and pistil; d. legumel e. transversal section of legume. f-k. *S. organensis* var. *organensis* – f. branches with leaves and inflorescence; g. stipule; h. corolla; i. androecium and pistil; j. legume; k. transerval legume section. (a-d. VIC 20635; f-i. *L.G. Krieger et al. 24006*-CESJ; j-k. *L.G. Rosignoli-Oliveira 5*-VIC).

stamens, filaments tomentose, staminodes lamina elliptic, medium stamen filaments 1–2 mm long, anther 2–4 mm long, centric-abaxial stamen filament ca. 2 mm long, anther ca. 3 mm long, latero-abaxial stamens filaments 2–3 mm long, straight, anther 3–4 mm long, rostrum truncate, ca. 0.5 mm. Ovary velutinous, style 0.4 cm long, velutinous. Legume 4.3–7 × 1–1.5cm, oblong, flat-compressed, externally depressed between seed locules, straight, glabrous, green, dehiscent. Seeds ca. 0.6 × 0.4 cm, 1-seriate, oblong.

Selected specimens: P. N. Caparaó, Campos Altos, 19.XI.1988, fl., *L. Krieger et al.* (CESJ 24006); terreirão, 20°25'13,1"S, 41°48'41,9"W, 2,362 m, 15.VIII.2015, fr., *L.G. Rosignoli-Oliveira 5* (VIC).

Senna organensis var. organensis has (5–) 6–7 pairs of elliptic leaflets, a falciform stipule, zygomorphic flowers, small anthers and a flat-compressed legume. This species, together with *S. pneumatica* Irwin & Barneby, belongs to series *Stipulaceae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). *Senna pneumatica* differs from *S. organensis* by the ovate stipules and hirsute bracts.

Senna organensis has four varieties, var. *extratropica*, var. *friburguensis*, var. *heterandra* and var. *organensis*, but only the last one occurs in Minas Gerais. This variety is recognized by its 3 abaxial stamens with filaments 2–3 mm long and anthers 3–4 mm long, 4–8 pairs of leaflets and a nectary between all pairs of leaflets (Irwin & Barneby 1982).

The species is endemic to Brazil. Variety *organensis* occurs in Espírito Santo, Rio de Janeiro and Minas Gerais, in the Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in rocky and montane fields (campos de altitude), from 1,200–1,600 m elevation, and is common in Serra do Caparaó in the southeastern part of the state, where it was collected between 2,100–2,713 m elevation (Fig. 1e). Flowers in March, April, June, August and November, and fruits in March, July and August.

1.20. *Senna pendula* (Willd.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 378. 1982. Figs. 1e; 11a-f

Cassia pendula Humb. & Bonplad *ex* Willd., Enum. Pl. Hort. Berol. 440. 1809.

Shrubs, 2–3 m tall, branches cylindrical, not sulcate, glabrous, sparsely or densely pubescent. Leaves 4–6 pairs of leaflets; stipules ca. 6 × 1 mm, linear-falciform, base truncate, apex acute, deciduous; nectary absent in the petiole and present in the leaf rachis, between the first pair of leaflets, rare on the second pair elliptic, conical, fusiform or falciform, sessile or stipitate; petiole 2–3 cm long; leaf rachis 2.5–5 cm long, glabrous or pubescent; leaflets elliptic or obovate, apex obtuse or retuse, mucronate, adaxial surface glabros and abaxial surface glabrous, sometimes pubescent at base or sparsely tomentose overall, veins tenuous, membranaceous, margin ciliolate, proximal pair 0.9–1.5 × 0.5–1.3 cm, distal pair 1.6–4.5 × 0.8–1.5 cm. Racemes axillary; peduncle 3.5–4.5 cm long; rachis 3.5–4.5 cm long. Bracts ca. 2–3 × 0.5–1 mm, linear or lanceolate, deciduous; pedicel 15–30 mm long, nectary absent. Sepals 12–18 × 5–8 mm, diferent size, elliptic or ovate, apex obtuse, dorsal surface glabrous. Corola zygomorphic, petals glabrous, yellow, central adaxial petal 15–25 × 13–18 mm, obovate, apex emarginated; latero-adaxial petals obovate, apex emarginated, latero-abaxial petals narrowly elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina twisted, obovate or quadrangular, medium stamens filaments 3 mm long, anther 5–6 mm long, centric abaxial stamen filament 3–7 mm long, anther 7–10 mm long, latero-abaxial stamens filaments 15–25 mm long, curved, anther 7.5–10 mm long, rostrum oblique, ca. 1 mm long. Ovary pubescent; style 1.5–2.5 cm long, densely pubescent on the margins. Legume 11–18 × 1–1.5 cm, subcylindrical, externally flat, light curved, sparsely pubescent, yellow to black when mature, dehiscent late. Seeds ca. 5 × 3 mm, 2-seriate, ovate.

Senna pendula is in series *Coluteoideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and can be recognized by the following characteristics: 4–6 pairs of obovate or elliptic leaflets; zygomorphic corolla; long, curved abaxial stamen filaments; and subcylindrical legume.

Several herbarium specimens were identified as *Senna bicapsularis* (L.) Roxb., but this species is not cited for Brazil (BGF 2018). The morphology of these species is really similar; however, according to Irwin & Barneby (1982), they can be distinguished by the size of the pedicel after flower anthesis and geographic distribution. *Senna pendula* has a pedicel 8–33(–37) mm long

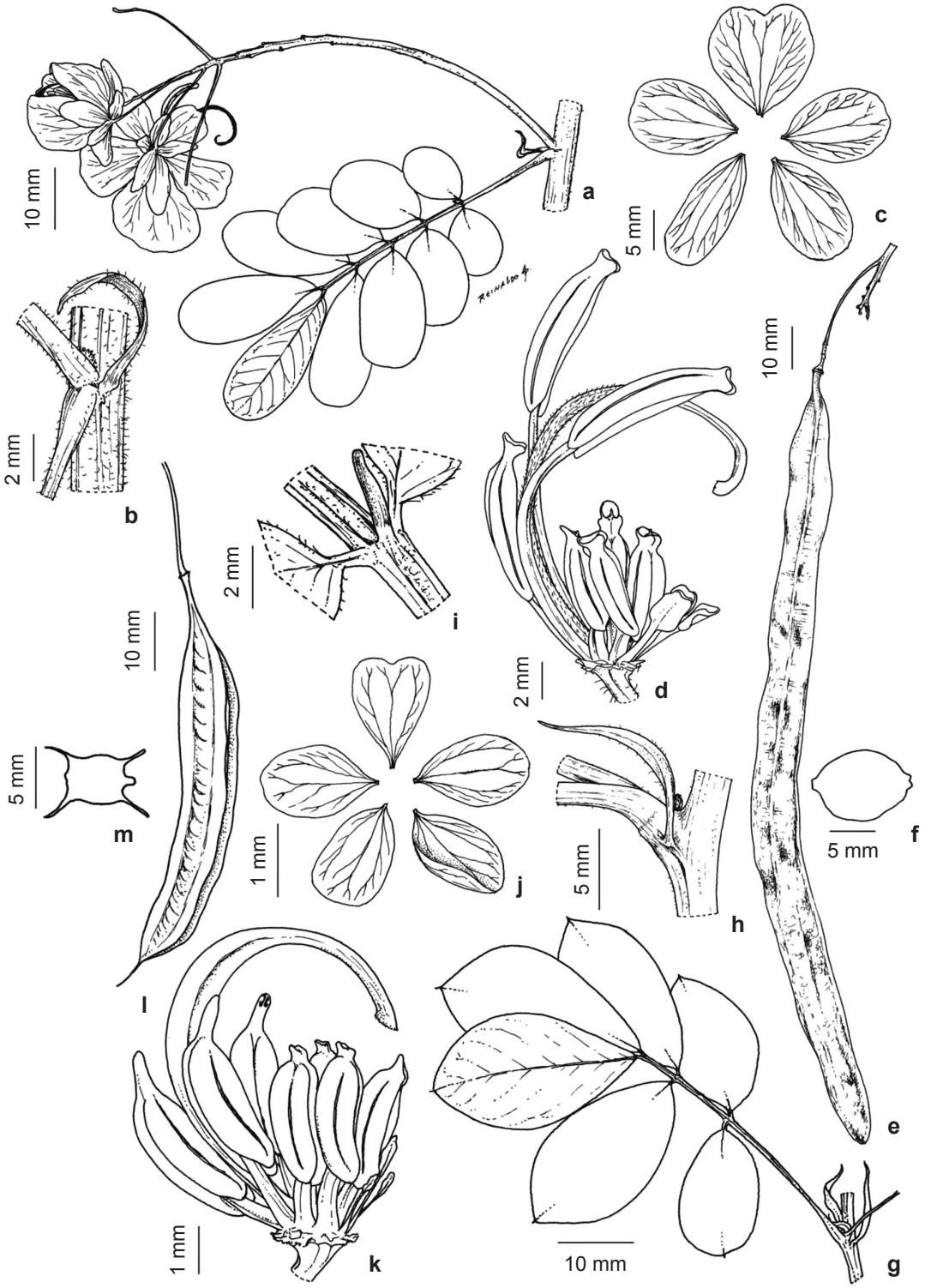

Figure 11 – a-f. *Senna pendula* var. g*labrata* – a. branches with leaves and inflorescence; b. stipule; c. corolla; d. androecium and pistil; e. legume; f. transversal section of legume. g-m. *S. pentagonia* var. *pentagonia* – g. branches with leaves; h. stipule; i. nectary between leaflets of proximal pair; j. corolla; k. androecium and pistil; l. legume; m. transversal section of legume. (a-d. OUPR 18672; e-f. *I.A. Coutinho et al. 26*-VIC; g, i-k. CESJ 8730; h, l-m. CESJ 24955).

and occurs from North to South America, while *S. bicapsularis* has a pedicel 1–3.5 mm long and occurs in the Caribbean, Central America and northwestern South America.

Irwin & Barneby (1982) established 20 varieties for *S. pendula*, which are widely distributed in America. For Minas Gerais, only two varieties were recorded.

Key to the varieties of *Senna pendula* in Minas Gerais

1. Abaxial stamen anther 13–14 mm long .....1.20.1. *Senna pendula* var. *dolichandra*
1'. Abaxial stamen anther 7.5–10 mm long .....1.20.2. *Senna pendula* var. *glabrata*

1.20.1. *Senna pendula* (Willd.) H.S. Irwin & Barneby var. ***dolichandra*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 387. 1982. Fig. 1e

Examined specimens: Pedra Azul, caminho do aeroporto, 20.IV.1964, fl*., Z.A. Trinta 801* (Holotypus, NY!).

This variety can be recognized by the long anthers of the abaxial stamens, but it is probably rare in the state because all the examined specimens of the species had anthers less than 10 mm long. The holotype was collected in Pedra Azul, in Minas Gerais, and was observed online.

Variety *dolichandra* is endemic to Brazil and occurs in Bahia, Minas Gerais and Paraíba, in the Atlantic Forest, Caatinga and Cerrado regions (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). In Minas Gerais, it has been collected in the northeastern part of the state (Fig. 1e) and grows in weedy thickets or on forest edgesforest (Irwin & Barneby 1982). Flowers in April.

1.20.2. *Senna pendula* (Willd.) H.S. Irwin & Barnebyvar. ***glabrata*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 382. 1982. Figs. 1e; 11a-f

Cassia indecora var. *glabrata* Vogel, Syn. Gen. Cass. 19. 1837.

Selected specimens: Ouro Preto, 16.IV.1974, fl., *J. Badini* (OUPR 18672); Serra do Cipó, jardim do alojamento Alto Palácio, uma das casas de apoio do IBAMA, 19º19'04,3"S, 43º36'26,5"W, 31.VII.2012, fr., *I.A.C. Coutinho et al. 26* (VIC). Uberlandia, Estação Ecológica do Panga, 22.V.1992, fl. and fr., *F.E.E.P 161* (HUFU).

According to Irwin & Barneby (1982), this variety can be distinguished from the other 19 varieties of this species by its occurrence in South America, subcylindrical legume and 2-seriate seeds.

It occurs in Argentina, Bolivia, Brazil, Paraguay and Peru (Irwin & Barneby 1982). In Brazil, it is known from the Distrito Federal, Goias, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Rio de Janeiro, Santa Catarina, São Paulo, Pará and Paraná, in Amazonia, Caatinga, Cerrado and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows in disturbed *cerradão*, on margins of gallery forest, and in rocky fields and disturbed forest (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the central, southeastern and eastern regions of the state (Fig. 1e), in rocky fields, on outcrops and roadsides, and in gallery forest. Flowers from January to May and in November, and fruits in February, May, July and September.

1.21. *Senna pentagonia* (Mill.) H.S. Irwin & Barneby var. ***pentagonia***, Mem. New York Bot. Gard. 35: 256. 1982. Figs. 1f; 11g-m

Cassia pentagonia P. Mill., Gard. Dict. Ed. 8, Cassia no. 18. 1768.

Shrubs, ca. 0.5 m tall, branches cylindrical, not sulcate, glabrous. Leaves 3 pairs of leaflets; stipules ca. 11–15 × 1 mm, lanceolate, base truncate, apex acuminate, deciduous late; nectary absent in the petiole and present in the leaf rachis between the first pair of leaflets, sometimes in second pair, linear or fusiform, stipitate; petiole 3–4 cm; long, leaf rachis 1.5–2 cm, sparsely tomentose, leaflets obovate, apex obtuse, mucronulate, both sides glabrous, veins tenuous, membranaceous, margin ciliolate, proximal pair 2–3 × 1.5–2 cm, distal pair 2.7–3.7 × 1.5–2.2 cm. Racemes axillary; peduncle ca. 1 cm long; rachis ca 1 cm long. Bracts 3–7 × 0.5–1 mm, lanceolate, deciduous; pedicel 10–15 mm long, nectary absent. Sepals 4–7 × 2–5 mm, not strongly different size, ovate, apex acuminate,

dorsal surface glabrous. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 6–11 × ca. 4 mm, obovate, apex rounded, latero-adaxial and abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina obovate, medium stamen filaments ca. 1 mm long, anther ca. 3 mm long, centric-abaxial stamen filament ca. 1 mm long, anther ca. 3 mm long, latero-abaxial stamens filaments ca. 1–2 mm long, straight, anther ca. 3.5 mm long, rostrum straight, ca. 1 mm long. Ovary velutinous, style ca 0.8 cm long, velutinous. Legume ca. 18.5 × 1 cm, cylindrical, externally with wings, slightly curved, glabrous, light brown, dehiscent. Seeds ca. 3 × 3 mm, 1-seriate, elliptic.

Examined specimens: Araponga, distrito de Viçosa, 20.IV.1935, fl. and fr., *J.F. Kuhlmann 31* (UFV). Bicas, 13.VI.1970, fl. and fr., *L. Krieger & U.C. Camara* (CESJ 8730). Lavras, 22.I.1939, fr., *E.P. Heringer* (IBT 40374). São João Del Rei, Bengo, 30.V.1989, fr., *L. Krieger & M. Brugger* (CESJ 24955). Paraisópolis, 14.IV.1927, fl. and fr., *F.C. Hoehne* (IBT 20042).

Senna pentagonia, *S. mucronifera* and *S. obtusifolia*, which belong to series *Trigonelloideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), have the same leaflet number (3 pairs) and leaflet shapes, as discussed in the taxonomic comments of *S. mucronifera*; however, *S. pentagonia* has a winged legume.

The species has two varieties, var. *pentagonia* and var. *valens*, which both occur in Brazil. The examined specimens collected in Minas Gerais are similar to the description of *S. pentagonia var. pentagonia* because, according to Irwin & Barneby (1982), the variety has sepals less than 9 mm long, petals less than 15 mm long and a rostrum of the abaxial anthers 1–2 mm long. These features are larger in var. *valens*: sepals 13–15 mm long, petals 21–30 mm long and rostrum of abaxial anthers 4–5 mm long.

It is distributed in Brazil, Honduras and Mexico (Irwin & Barneby 1982). In Brazil, variety *pentagonia* occurs in Bahia, Maranhão, Minas Gerais and São Paulo, in the Caatinga and Cerrado regions (BFG 2018), as well as in the Atlantic Forest in Minas Gerais (Fig. 1f). According to Irwin & Barneby (1982), this variety occurs in disturbed thickets, pastures, on roadsides and around lakes. Flowers in April and June and fruits in January, April, May and July.

1.22. *Senna pilifera* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 241. 1982.

Figs. 1f; 12a-k

Cassia pilifera Vogel, Syn. Gen. Cass. 23. 1837.

Shrubs or sub-shrubs, 0.5–1.5 m tall, branches cylindrical or angular, hirsute. Leaves 2 pairs of leaflets; stipules ca. 6–15 × 0.5 mm, filiform, base truncate, apex acuminate, deciduous; nectary absent in the petiole and present in the leaf rachis, between all pairs of leaflets, narrowly elliptic, ovate-acuminate, falciform, stipitate; petiole 1.5–3(–3.5) cm long; leaf rachis 0.3–0.9 cm long, hirsute, tomentose; leaflets elliptic or obovate, apex acute, mucronulate, both side glabrous or sparsely pubescent, veins tenuous, membranaceous, margin ciliolate, proximal pair 2–4(–4.5) × 1.3–2(–2.5) cm, distal pair 2.5–4.5(–6) × 1.3–2.5(–3) cm. Racemes umbellate, axillary; peduncle 9–11 mm long; inflorescence rachis absent. Bracts 1–2 × 0.5 mm, cymbiform, deciduous; pedicel 12–14 mm long, nectary absent. Sepals 3–11 × 3–4 mm, diferent size, narrowly elliptic or elliptic, apex rounded, dorsal surface sparsely pubescent or hirsute. Corolla asymmetric, petals sparsely pubescent, yellow, central adaxial petal ca 10–20 × 4–7 mm, obovate or elliptic, apex emarginated or rounded, latero-adaxial petals elliptic or obovate, apex rounded, latero-abaxial petals obovate and one is falciform with one smaller than other, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina twisted, medium stamens filaments ca. 2 mm long, anther 2–4 mm long, centric abaxial stamen filament ca. 3 mm long, anther 4–6 mm long, latero-abaxial stamens filaments ca 4mmlong, straight, anther 4–13(–16) mm long, rostrum curved, ca. 0.5 mm long. Ovary velutinous; style 1–2 cm long, velutinous. Legume 13–18 × 0.1 cm, linear, compressed, externally flat, curved, sparsely tomentose or hirsute, light brown, dehiscent. Seeds ca. 4 × 1 mm, 1-seriate, elliptic.

Senna pilifera can be distinguished from other species of series *Trigonelloideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and from those in Minas Gerais by the presence of hirsute trichomes on the branches, rachises, pedicels and sepals. Besides this, the two pairs of leaflets, linear stipules, nectary between the proximal leaflet pairs, asymmetrical flowers and linear, curved legumes also help distinguish this species.

This species has 3 varieties (Irwin & Barneby 1982), which were all recorded in this study.

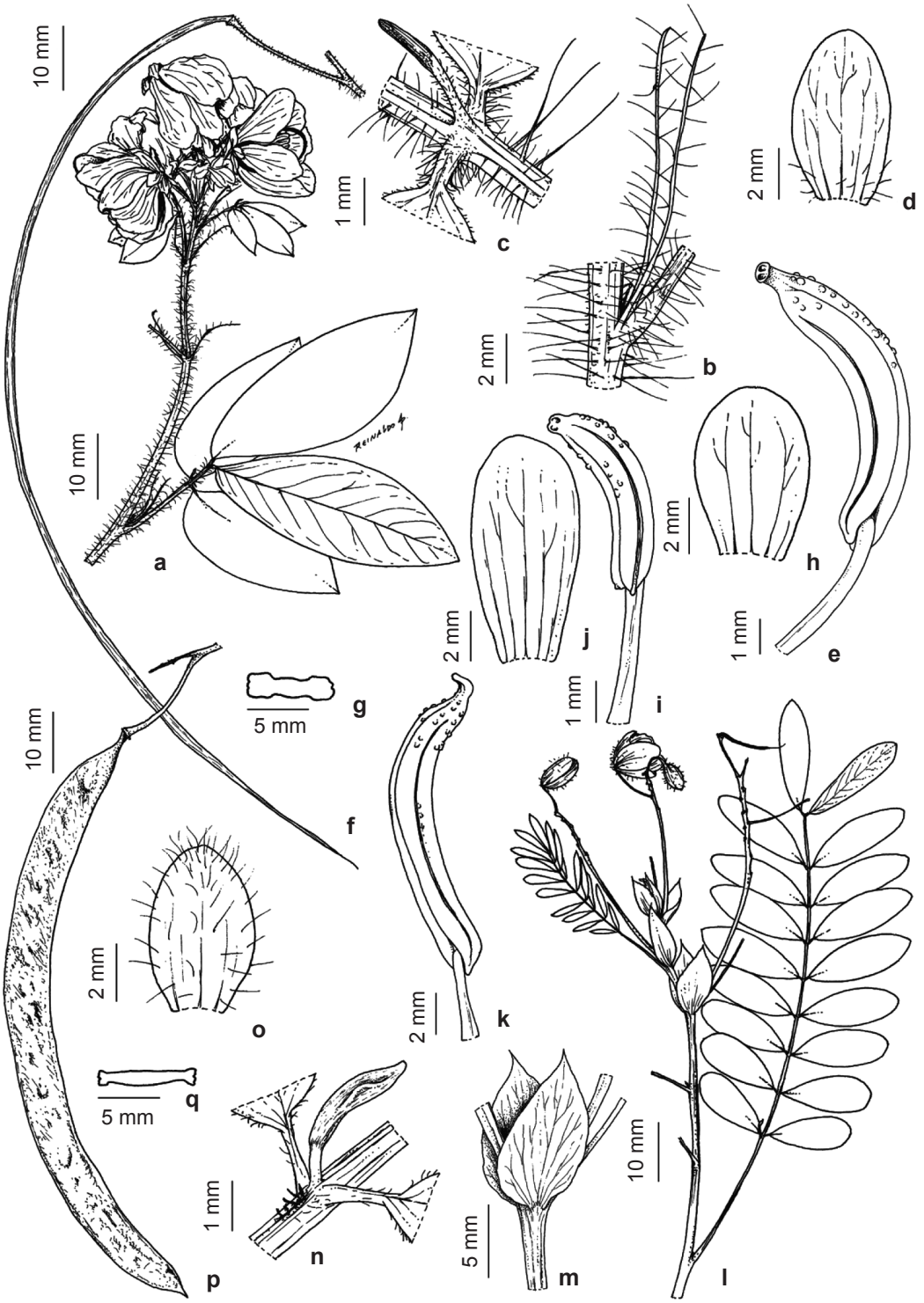

Figure 12 – a-g. *Senna pilifera* var. *subglabra* – a. branches with leaves and inflorescence; b. stipule; c. nectary between proximal pair of leaflets; d. sepal; e. anther of abaxial stamen; f. pod; g. transversal section of pod. h-i. *S. pilifera* var. *tubata* – h. sepal; i. anther of abaxial stamen. j-k. *S. pilifera* var. *pilifera* – j. sepal; k. anther of abaxial stamen. l-q. *S. pneumatica* – l. branches with leaves and inflorescence; m. stipules; n. nectary between leaflets of proximal pair; o. sepal; p. pod; q. transversal section of pod. (a-g. *G. Sousa 368*-BHCB; h-i. UEC 95349; j-k. *H.S. Irwin 2539*-VIC; l-q. *L.C.P. Lima 293*-VIC).

Key to the varieties of *Senna pilifera* in Minas Gerais

1. Leaflet rachis 0.7–0.9 cm long; longest sepal 8–11 mm; anthers of 3 abaxial stamens 10–13(–16) mm long ..... 1.22.3. *Senna pilifera* var. *pilifera*
1'. Leaflet rachis 0.3–0.6(–0.8) cm long; longest sepal 3–7.5 mm; anthers of 3 abaxial stamens 4–10 mm long.
   2. Leaflets sparsely pubescent on both surfaces; anthers of 3 abaxial stamens 6.5–10 mm long ..... 1.22.1. *Senna pilifera* var. *subglabra*
   2'. Leaflets glabrous on both surfaces; anthers of 3 abaxial stamens 4.5–5.5 mm long ..... 1.22.2. *Senna pilifera* var. *tubata*

1.22.1. *Senna pilifera* (Vogel) H.S. Irwin & Barneby var. ***subglabra*** (S. Moore) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 243.1982. *Cassia pilifera* var. *subglabra* S. Moore, Trans. Linn. Soc. London II, 4: 346. 1895.

Figs. 1f; 12a-g

Selected specimens: Belo Horizonte, Barreiro, Reserva da Copasa, 11.III.1999, fl. and fr., *G. Souza 368* (BHCB); Cabeceira Grande, estrada para o túnel de fuga, cerca de 500 m a nordeste do portão secundário, 16°22'22"S, 47°12'22"W, 850 m, 28.III.2002, fl. and fr., *G.P. Silva et al. 6373* (CEN). Entre Rios de Minas, II.1970, fl. and fr., *Pe. L. Krieger 8314* (RB).

This variety has sparsely tomentose leaflets like *S. pilifera* var. *pilifera*, but its rachises, sepals and anthers are smaller.

The variety occurs in Colombia, Cuba, Mexico, Panama, Peru, Venezuela and Brazil (Irwin & Barneby 1982). In Brazil, it has been recorded in Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraná and São Paulo, in Amazonia, Cerrado, Atlantic Forest and Pantanal (BFG 2018). It grows in thickets, open or disturbed forest, on the margins of gallery forest and in pastures (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the central and northeastern regions (Fig. 1f), in humid areas (near or in fields) and on forest margins. Flowers from February to April and fruits in February and March.

1.22.2. *Senna pilifera* **(**Vogel) H.S. Irwin & Barneby var. ***tubata*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 245. 1982.

Figs. 1f; 12h-i

Selected specimens: Araguari, Fazenda Furna, trevo da rodovia BR-050, eixo Araguari-Caldas Novas, 18°36'23"S, 48°18'13"W, 3.IV.2009, fl. and fr., *G.P.E. Rocha & Nogueira-Ferreira 1* (HUFU). Paraopeba, Horto Florestal, 27.IV.1957, fl. and fr., *E.P. Heringer 5597* (UB, IBT). Pratápolis, estrada entre Passos e Fortaleza de Minas, 20°49'84"S, 46°46'662"W, elev. 944 m, 6.V.2003, fl., *A.M.G.A. Tozzi et al.* (UEC 95349).

This variety is recognized by the glabrous leaflets and sepals and small abaxial stamen anther. It is a new record for Minas Gerais and several collections from the state were found.

It occurs in Bolivia, Paraguay and Brazil (Irwin & Barneby 1982), where it has been collected in Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná and São Paulo, in Cerrado and Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). In Minas Gerais, it is more common in the central region (Fig. 1e) where grows in gallery forest. Flowers from February to May and fruits in April.

1.22.3. *Senna pilifera* (Vogel) H.S. Irwin &Barneby var. ***pilifera***, Mem. New York Bot. Gard. 35: 243. 1982. Figs. 1f; 12j-k

Cassia pilifera Vogel, l.c. & Linnaea 11: 668, 1837.

Selected specimens: Ituiutaba, Serra do Corpo Seco, 19°01'59.80"S, 49°28'0.40"W, tall 680 m, 5.XI.2012, fl., *A.R. Rezende & V.M. Teodoro 694* (HUFU).

Material additional examined: BRAZIL. GOIÁS: Itumbiara, 27 km n. w. of Itumbiara on road to Rio Verde, 2.II.1959, fl., *H.S. Irwin 2539* (VIC).

This variety has the largest rachis, sepals and anthers compared to the others, which makes it easy to recognize. For the illustration, the best specimen found was *Irwin & Barneby 2539* from a municipality on the border with Minas Gerais.

The variety occurs in Argentina, Bolivia, Brazil and Paraguay (Irwin & Barneby 1982). In Brazil, it occurs in Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Rio Grande do Sul and São Paulo, in the Atlantic Forest, Cerrado and Pantanal (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), in pastures, disturbed Cerrado, along roadsides and in regenerating forest (Irwin & Barneby 1982). In Minas Gerais, it has

been recorded in the western region of the state (Fig. 1f) in the Cerrado. Flowers in November and December and fruits in December.

1.23. ***Senna pneumatica*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 329. 1982. Figs. 1f; 12l-q

Shrubs or sub-shrubs, 1.5–1.6 m tall, branches cylindrical, glabrous or with some crooked trichomes. Leaves 7–9 pairs of leaflets; stipules 6–7 × 5–6 mm, ovate, base oblique, apex cuspidate, deciduous; nectary absent in the petiole and present in the leaf rachis, between the proximal pair of leaflets, falciform, stipitate; petiole (1.5–)2–3 cm long; leaf rachis 5.5–7 cm long, glabrous or with some crooked trichomes; leaflets obovate, apex obtuse, mucronulate, both sides glabrous, veins tenuous, membranaceous, margin ciliolate, proximal pair 1–1.5 × 0.5–0.7 cm, distal pair 2.2–3 × 0.7–1 cm. Racemes axillary; peduncle 2–3.5 cm long; rachis 0.9–1 cm long. Bracts 5–10 × 2–3 mm, ovate, deciduous; pedicel 10–11 mm long, nectary absent. Sepals 6–8 × 2–3 mm, similar size, elliptic, apex obtuse, dorsal surface hirsute. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal ca. 7–14 × 4–8 mm, elliptic, apex emarginated, latero-adaxial petals obovate, apex rounded, latero-abaxial petals narrowly elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments pilose, staminodes lamina elliptic, medium stamen filaments ca. 2 mm long, anther ca. 4 mm long, centric-abaxial stamen filament ca. 1 mm long, anther ca. 4 mm long, latero-abaxial stamens filaments ca. 2 mm long, straight, anther 5–6 mm long, rostrum oblique, ca. 0.5 mm long. Ovary pubescent, style 0.5–0.7 cm long, pubescent. Legume 9–10.5 × 0.8–1cm, linear, flat-compressed, externally flat, slightly curved, glabrous, brown when mature, dehiscent. Seeds 6–7 × 3–4mm, 1-seriate, widely oblong.

Selected specimens: Espera Feliz, P. N. Caparaó, em direção a Macieira, 11.II.2009, fl. and fr., *F. Marcolino 55* (ESA). Ouro Preto, trilha da Mata do Baú, P. E. Itacolomi, 7.VI.2005, fr., *V.F. Dutra et al. 181* (VIC); Serra do Caparaó, elev. 2,200 m, 30.IX.1941, fr., *A.C. Brade 17052* (holotype RB!; Isotype NYBG!).

*Senna pneumatic*a has 7–9 pairs of leaflets, ovate sepals, a falciform nectary between the proximal pair of leaflets, hirsute bracts and a flat-compressed legume. It is similar to *Senna organensis*. These species are in series *Stipulaceae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and can be distinguished using the features described in the taxonomic comments of *S. organensis* var. *organensis*.

This species is endemic to Brazil and common in Serra do Caparaó, between the states of Minas Gerais and Espírito Santo, and in Ouro Preto, which are both regions of the Atlantic Forest (Fig. 1f). It grows in rocky fields and on outcrops, at an elevation of 2,200 m (Irwin & Barneby 1982). Flowers and fruits in February, June and November.

1.24. ***Senna reniformis*** (G. Don) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35(1): 223. 1982. Figs. 1f; 13a-e

Cassia reniformis G. Don, Gen. Hist. Dichl. Pl. 2: 440. 1832.

Shrubs or small trees, 2–3 m tall, branches cylindrical, sparsely tomentose. Leaves (3–)4(–5) pairs of leaflets; stipules 10–25(–40) × 10–20(–40) mm, reniform, base sagittate, apex acute, persistent; nectary absent in the petiole and present in the leaf rachis, between all pairs of leaflets, piriform or ovate, sessile or stipitate; petiole 2–4 cm long; leaf rachis 4.5–10 cm long, sparsely tomentose; leaflets elliptic, apex cuspidate, rare acuminate, both sides glabrous but can be sparsely tomentose at veins in abaxial surface, veins tenuous, cartaceous, margin ciliolate, proximal pair 3.5–6(–9) × 2–4(–4.5) cm, distal pair 5.5–10.5(–16) × 2.8–3.5(–5.5) cm. Racemes axillary and terminal; peduncle 4.5–10 cm long; rachis 3.5–16 cm long. Bracts ca. 5 × 2 mm, lanceolate, deciduous; pedicel 20–30 mm long, nectary at medium region, ca. 2 × 0.5 mm, ovate or falciform, stipitate. Sepals 5–13 × 6–15 mm, different size, ovate, apex obtuse, dorsal surface glabrous. Corolla zygomorphic; petals glabrous, yellow, central adaxial petal 20–22 × 10–13 mm, obovate, apex obtuse, latero-adaxial and latero-abaxial petals obovate, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina narrowly elliptic, medium stamens filaments 2–3 mm long, anther 5–7 mm long, centric abaxial stamen filament 5–6 mm long, anther 8–10 mm long, latero-abaxial stamens filaments 8–10 mm long, straight, anther 10–11 mm long, rostrum transversely oblique or truncate, ca. 0.5 mm long. Ovary sparsely tomentose, style 2–3.5 cm long, sparsely tomentose. Legume 8–18 × 0.9–1.3 cm, oblong, compressed, externally depressed between seed locules, curved, glabrous, dark brown, dehiscent. Seeds ca. 5 × 3 mm, oblong.

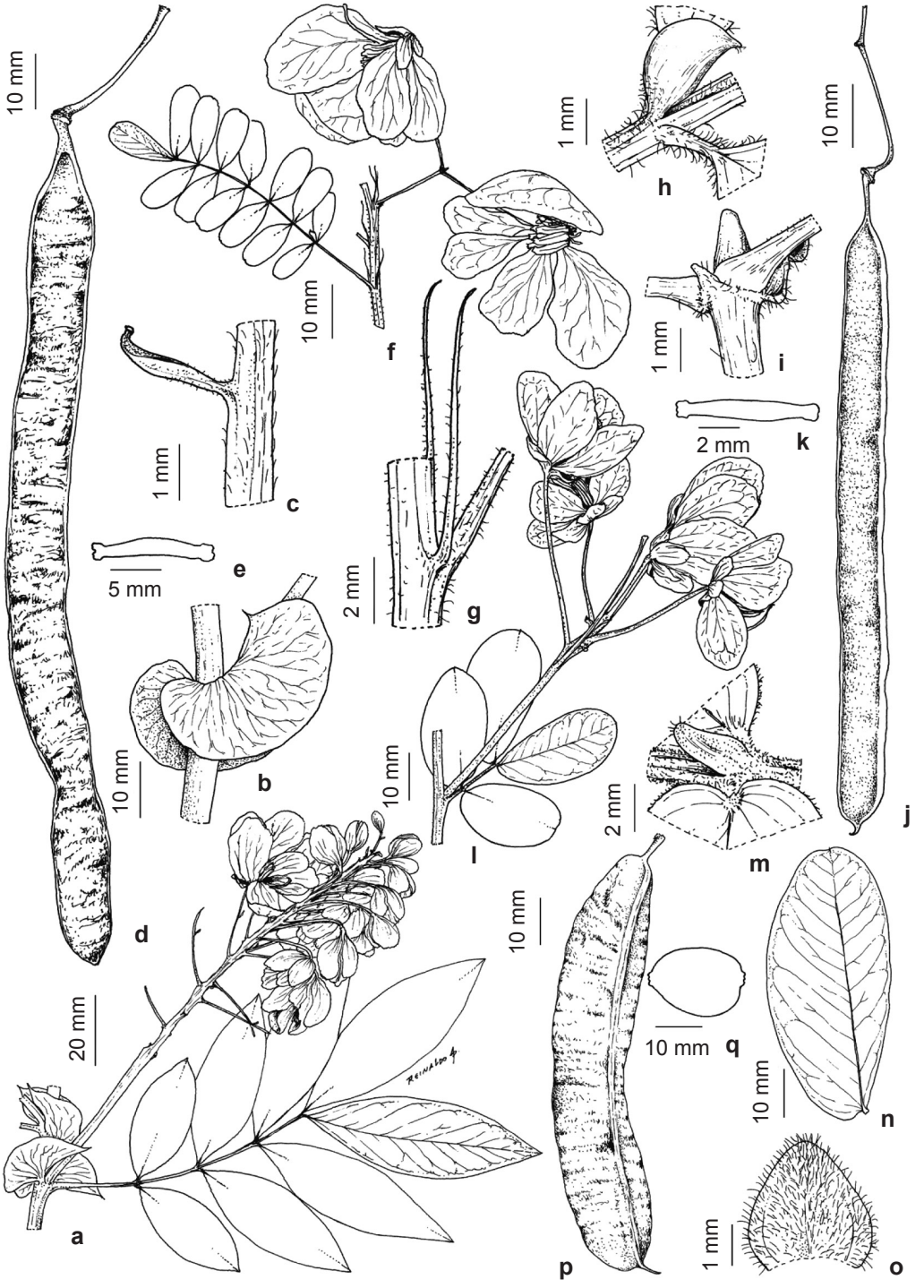

Figure 13 – a-e. *Senna reniformis* – a. branches with leaves and inflorescence; b. stipule; c. nectary in pedicel; d. pod; e. transversal section of pod. f-k. *S. rostrata* – f. branches with leaves and inflorescence; g. stipule; h. nectary between leaflets of proximal pair; i. nectary in pedicel; j. pod; k. transversal section of pod. l-q. *S. rugosa* – l. branches with leaves and inflorescence; m. nectary between the proximal pair of leaflets; n. distal leaflet and vein detail; o. bract; p. pod; q. transversal section of pod. (a-c. *V.F. Dutra 603*-VIC; d-e. *L.G. Rosignoli-Oliveira 22*-VIC; f-i. *P.E. Gibis et al.* 6279-UEC; j-k. *H.S. Irwin & T.R. Soderstrom 5504*-UB; l-o. *G.E. Valente & J.A.A Meira Neto 2118*-VIC; p-q. *L.G. Rosignoli-Oliveira 20*-VIC).

Selected specimens: Diamantina, Biribiri, Cristais, à beira do Córrego Soberbo, Capoeira, 15.IV.2005, fl., *E.H. Silva & C.V. Mendonça 270* (DIAM). Mariana, estrada Samitri, 27.VI.2013, fl., *S.M. Faria & J. Bibiano 2091 (*RB). Santana do Riacho, rodovia para Morro do Pilar, trilha paralela à estrada que leva a um córrego, 20.IX.2016, fr., *L.G. Rosignoli-Oliveira 22* (VIC). São Roque de Minas, 3.IV.2008, fl., *V.F. Dutra 603* (VIC); Serra do Espinhaço, Congonhas, RPPN da Ferteco (Compainha Vale do Rio Doce), 18.X.2003, fl., *M.A. Sartori et al. 660* (VIC).

Senna reniformis is in serie *Coriaceae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and is similar to *S. corifolia* because of the reniform stipules, glabrous leaflets and a nectary on the pedicel. The difference between these species is discussed in the taxonomic comments of *S. corifolia*. *Senna reniformis* is similar to *S. cana* because of the shape of the stipules and presence of a nectary on the petiole. However, *S. cana* has coriaceous leaflets, a villous or velutinous indument and a linear legume, while *S. reniformis* has chartaceous, glabrous leaflets and an oblong legume.

Senna reniformis is endemic to Brazil and occurs in Bahia, Minas Gerais, São Paulo and Sergipe, in Atlantic Forest, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), on the margins of gallery forest, in thickets and small flooded areas (brejos), and on rock outcrops (Irwin & Barneby 1982).

In Minas Gerais, the species is frequent in the central region (Fig. 1f), in gallery forests, forest margins and rocky fields. Flowers in January, from March to June, and in October and November, and fruits in February, March, June, September, November and December.

1.25. *Senna rostrata* (Mart.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 528. 1982. Figs. 1g; 13f-k

Cassia rostrata Mart., Verhandl. Vereins Beford. Garternbaues Konigl. Preuss. Staaten 3: 99, t.7. 1827.

Shrubs, sub-shrubs or small trees, 0.5–4 m tall, branches cylindrical, glabrous or sparsely tomentose. Leaves 6–7(–9) pairs of leaflets; stipules 3–6 × 0.5 mm, linear or filiform, base truncate, apex acuminate, deciduous; nectary absent in the petiole and present in the leaf rachis, between the proximal pair of leaflets, clavate or capitate, stipitate; petiole 2–2.5 cm long; leaf rachis 4–6.5 cm long, glabrous or sparsely tomentose; leaflets elliptic or obovate, apex obtuse, mucronulate, both sides glabrous, veins tenuous, membranaceous, margin glabrous, proximal pair 2–2.5 × 0.8–1.2 cm, distal pair 2.5–3 × 1.1–1.3 cm. Racemes umbellate, axillary; peduncle 1.5–2 cm long; rachis absent. Bracts ca. 2 × 0.5 mm, cymbiform, deciduous; pedicel 25–35 mm long, nectary present at base of pedicel, ca. 2 × 1 mm, botuliform or fusiform, sessil or stipitate. Sepals 5–10 × 2–10 mm, different size, obovate, apex obtuse, dorsal surface glabrous. Corolla asymmetric, petals with some hairs at base of dorsal surface, yellow, central adaxial petal 20–25 × 8–9 mm, obovate, apex rounded, latero-adaxial petals obovate, apex rounded, latero-abaxial petals obovate and one is falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina arrowlike, medium stamens filaments 2 mm long, anther 5–7 mm long, centric-abaxial stamen filament 5–9 mm long, anther 7–8 mm long, latero-abaxial stamens filaments 9–10 mm long, straight, anther 7–8 mm long, rostrum curved, 3–5 mm long. Ovary velutinous, style 1–2 cm long, velutinous. Legume 9.5–11 × 0.5–0.8cm, oblong, flat-compressed, externally depressed between seed locules, straight, sparsely tomentose, dark brown, dehiscent. Seeds 3–4 × 1–2 mm, 1-seriate, oblong. **Selected specimens**: Araguari, Funil I, 10.V.2005, fl., *G.M. Araujo* (HUFU 43198). Belo Horizonte, rodovia Belo Horizonte-Curvelo, 80 km de Curvelo, 29.VII.1976, fl. and fr., *P. Davis et al*. (UEC 6278). Buritizeiro, Cachoeira da Mantega, 4 km, elev. 700 m, 12.V.2001, fl., *G. Hatschbach et al. 71966* (ESA). Montes Claros, Mirabela, ca. km 45, 14.V.1977, fl., *P.E. Gibbs et al.* (IBT 153398, UEC 6279). 23.VIII.1964, fr., *H.S.H.S. Irwin & Barneby 5504* (UB).

This species differs from the other species studied by the presence of a clavate nectary between the proximal pair of leaflets and base of the pedicel. In addition, it has umbelliform racemes, asymmetric flowers, one falciform petal, abaxial stamen anthers with a large rostrum, and a flat-compressed legume. Among the species of series *Interglandulosae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), it is similar to *Senna aversiflora* (Herb.) H.S. Irwin & Barneby, which does not occur in Minas Gerais. Based on herbarium collections from other states, these species can be differentiated by the following: glabrous or pilose branches and legumes externally depressed between the seed locules in *S. rostrata*; and hirsute branches and legumes with projections in the form of an X in *S. aversiflora*.

Senna rostrata occurs in Paraguay and Brazil (Irwin & Barneby 1982), where it has been collected in Bahia, Goiás, Minas Gerais and São Paulo, in the Atlantic Forest and Cerrado regions (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It can be found on forest margins, around humid places andforest in disturbed Cerrado, pastures and thickets (Irwin & Barneby 1982).

In Minas Gerais, the species has been collected in the central-north and western regions (Fig. 1g), in forests, disturbed fields and on roadsides. Flowers from April to July and in September, and fruits from July to September.

1.26. *Senna rugosa* (G. Don) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35:188, 1982.

Cassia rugosa G. Don, Gen. Hist. Dichl. Pl. 2: 440. 1832. Figs. 1g; 13l-p

Shrubs, 0.5–2 m tall, branches cylindrical, sparsely tomentose and hispidulous. Leaves 2 pairs of leaflets; stipules 4–7 × 1 mm, linear, base truncate, apex acuminate, deciduous; nectary absent in the petiole and present in the leaf rachis, between all leaflets' pairs, conical or pyriform, sessile or sub-sessil; petiole 0.5–1.7 cm long;; leaf rachis 1–1.5(–2) cm long, sparsely tomentose and hispidulous; leaflets elliptic, narrowly elliptic or obovate, apex obtuse, acute, retuse, obcordate or slightly retuse, mucronulate, adaxial surface glabrous or with some sparsely trichomes, abaxial surface tomentose, rare glabrous, veins patent, coriaceous, margin ciliolate, proximal pair 3.5–8 × 2– 3.5 cm, distal pair 5–9 × 2–3. Racemes axillary and terminal; peduncle 3.5–4 cm long; inflorescence rachis 2.5–3 cm long. Bracts ca. 3 × 1 mm, cymbiform, deciduous. pedicel 25–40 mm long, nectary absent. Sepals 5–8 × 3–5 mm, different size, ovate or obovate, apex obtuse, dorsal surface tomentose. Corolla zygomorphic, petals sparsely tomentose, yellow, central adaxial petal ca. 15–22 × 13–20 mm, elliptic, apex rounded, latero-adaxial and latero-abaxial petals elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments puberulent, staminodes lamina arrowlike, medium stamens filaments 2–3 mm long, anther 5–7 mm long, centric abaxial stamen filament ca. 4 mm long, anther 6–8 mm, latero-abaxial stamens filaments 6–8 mm long, straight, anther 10–11 mm long, rostrum geniculate, ca. 1 mm long. Ovary velutinous, style 1.5–2.5(–3) cm, velutinous. Legume 7.5–15 × 1–1.5 cm, cylindrical, externally depressed between seed locules, straight, sparsely tomentose, black when mature with brown suture region, indehiscent. Seeds ca. 6 × 3 mm, 2-seriate, obovate.

Selected specimens: Diamantina, beira da estrada, 18º10'07.8"S, 43º30'23.4"W, 23.IX.2016, fr., *L.G. Rosignoli-Oliveira 27* (VIC). Paraopeba, 18.III.2008, fl., *G.E. Valente e J.A.A. Meira Neto 2118* (VIC); Serra do Cipó, P. N. Caparaó, borda da trilha das Lagoas, 19º21'00.8"S, 43º36'47.9"W, 19.IX.2016, fr., *L.G. Rosignoli-Oliveira 20* (VIC). São João Del Rei, 26.III.1970, fl., *L. Krieger 8225* (CESJ). Uberlândia, on righway BR-106, 1 km east of Uberlandia, 30.VII.1967, fr., *R. Goodland* 3602 (UB).

Senna rugosa has 2 pairs of coriaceous leaflets with patent veins, a nectary between both pairs, and a cylindrical legume that is black when mature. Some herbarium specimens of *S. rugosa* were identified as *S. macranthera*. These species are in series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) and are very similar. The differences between them are discussed in the comments of *S. macranthera*.

Senna rugosa is distributed from Paraguay to Bolivia (Irwin & Barneby 1982). In Brazil, it occurs in Bahia, Ceará, the Distrito Federal, Goiás, Maranhão, Minas Gerais, Mato Grosso do Sul, Mato Grosso, Pará, Paraná, Pernambuco, Piauí, Rondônia, São Paulo and Tocantins, in the Amazon, Atlantic Forest, Caatinga and Cerrado biomes (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), on forestforest margins and roadsides, and in disturbed Cerrado, *cerradão*, pastures and thickets (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the central and western regions (Fig. 1g), in grassy fields, gallery forests, valleys, rocky fields, and on outcrops. Flowers from February to July and fruits from July to August.

1.27. *Senna siamea* (Lam.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 98. 1982.

Figs. 1g; 14a-d

Cassia siamea Lam., Encycl. Meth. Bot. 1(2): 648. 1785.

Trees, 5–7 m tall, branches cylindrical, sparsely pubescent. Leaves (4–)6(–7) pairs of leaflets; stipules not seen; nectary absent in the petiole and in the leaf rachis; petiole 2–2.5 cm long; leaf rachis 7.5–9 cm long, sparsely tomentose; leaflets elliptic, apex predominantly retuse, mucronulate, adaxial surface glabrous and

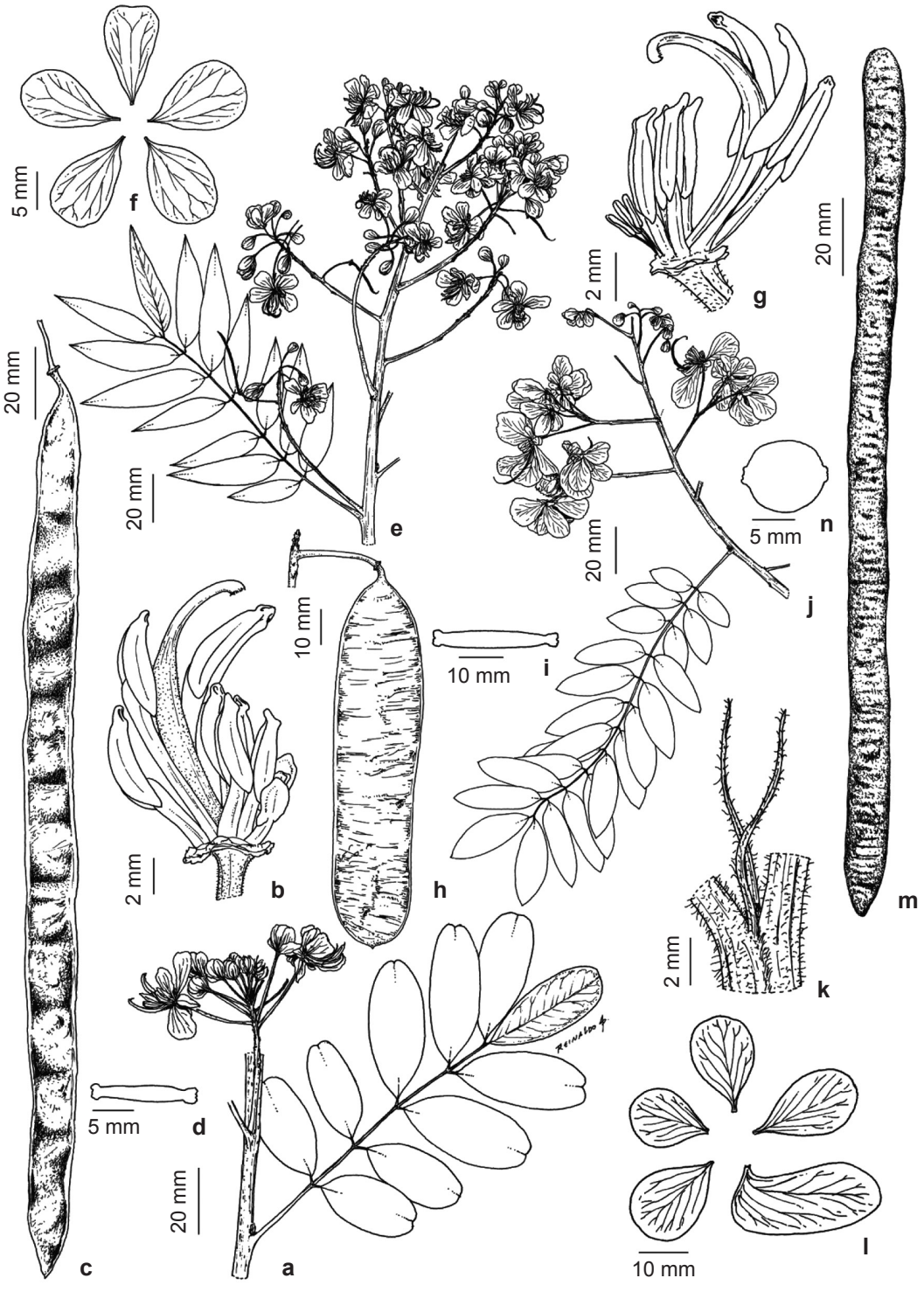

Figure 14 – a-d. *Senna siamea* – a. branches with leaves and inflorescence; b. androecium and pistil; c. legume; d. transversal section of legume. e-g. *S. silvestris* var. *silvestris* – e. branche with leaves and inflorescence; f. corolla; g. androecium and pistil. h-i. *S. silvestris* var. *bifaria* – h. legume; i. transversal section of legume. j-n. *S. spectabilis* var. *excelsa* – j. branches with leaves and inflorescence; k. stipule; l. corolla; m. legume; n. transversal section of legume (a-b. *L.G. Rosignoli-Oliveira 34*-VIC; c-d. *G.S. França 354*-BHCB; e-g. OUPR 9598; h-i. *G.E. Valente & A.A. Azevedo 2213*-VIC; j, l. VIC 17150; k, m-n. VIC 16871).

abaxial surface sparce pubescent, veins tenuous, membranaceous, margin glabrous, proximal pair 2.5–3.5 × 1.5–1.8 cm, distal pair 4–6.5 × 1.5–2.2. Racemes corymbiform axillary and panicula terminal; peduncle 1–2 cm long, rachis 3–3.5 cm long. Bracts ca. 4 × 1 mm, ovate-cuspidate, deciduous pedicel 24–27 mm long, nectary absent. Sepals 5–8 × 4–8 mm, different size, elliptic, apex rounded, dorsal surface sparsely pubescent. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 10–15 × 5–6 mm, elliptic, circular or sub-quadrangular, apex slight truncate, latero-adaxial petals circular or obovate, apex rounded and latero-abaxial petals obovate and one can be is slightly smaller than other, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina arrowlike, medium stamens filaments 2–4 mm long, anther 5–6 mm long, centric abaxial stamen filament 3–5 mm long, anther 5–6 mm, latero-abaxial stamens filaments 6–9 mm long, slightly curved, anther 6–7 mm long, rostrum triangular, ca. 0.5 mm long. Ovary velutinous, style 1–2 cm long, velutinous. Legume 20–23 × 1.5 cm, oblong, flat-compressed, externally flatondulated, depressed between seed locules, straight or slightly curved, sparsely pubescent, brown when mature, indehiscent. Seeds observed not mature, ca. 6 × 3 mm, 1-seriate, oblong.

Selected specimens: Córrego Novo, Lagoa das Piabas, 19°50'28"S, 42°30'21"W, tall 244 m, 5. VI.2003, fl. and fr., *G.S. França 354* (BHCB). Santana do Riacho, km 133, ao longo da rodovia Belo Horizonte-Conceição do Mato Dentro, 2.III.1981, fl., *M.C. Amaral et al.* (UEC 31344). Ubá, bairro Tanquinho, beira da estrada, 30.X.2016, fl., *L.G. Rosignoli-Oliveira* 34 (VIC).

Senna siamea is the only representative of series *Floridade* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) that occurs in Minas Gerais. This species and *Senna silvestris* (Vell) H.S. Irwin & Barneby have an arboreal habit, no nectary, corymbiform raceme and a flat-compressed legume. However, *S. siamea* has a predominantly retuse leaflet apex, completely yellow petals and long, undulate, brown legumes, while *S. silvestris* generaly has an acute or cuspidate leaflet apex, orange petal base (in fresh material) and smaller, straight, vinaceous legumes.

Senna siamea occurs in Mexico, Central America, Colombia, Venezuela and Brazil. In Brazil, it has been recorded in Alagoas, Amazonas, Bahia, Ceará, the Distrito Federal, Goiás, Maranhão, Minas Gerais, Pará, Paraíba, Pernambuco, Piauí, Rondônia, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo, in the Amazon, Atlantic Forest, Caatinga and Cerrado biomes (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), in forests or forest margins (Irwin & Barneby 1982). In Minas Gerais, it is common in the central and southeastern regions (Fig. 1g), on roadsides and near lagoons. Flowers from March to June and in October, and fruits in April and June.

1.28. ***Senna silvestris*** (Vell.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 87. 1982.
Cassia silvestris Vell. Fl. Flum. 169, 1825.
Figs. 1g; 14e-i

Shrubs or small trees, 0.5–5.5 m tall, branches cylindrical, tomentose. Leaves (6–)7–9(–11) pairs of leaflets; stipules 6–7 × ca. 0.5 mm, linear-falciform, base truncate, apex acuminate, deciduous; nectary absent in the petiole and in the leaf rachis; petiole 2.5–4(–5) cm long; leaf rachis 9–13.5(–20) cm long, tomentose; leaflets lanceolate or ovate, apex acuminate or cuspidate, rare but can be occurs retuse or obtuse in some leaflets, mucronulate, adaxial surface glabrous, pubescent or sparsely tomentose and abaxial surface sparsely pubescent or tomentose, veins tenuous, cartaceous, margin finely ciliolate or glabrous, proximal pair 3.5–6.5(–7.5) × 1.5–2(–2.5) cm, distal pair 5.5–8(–10) × 1.5–3.5(–4.5) cm. Racemes corymbiform axillary and panícula terminal; peduncle 2.2–3 cm long; rachis 3–4 cm long. Bracts ca. 2 × 1 mm, cymbirform, deciduous; pedicel 15–20 mm long, nectary absent. Sepals 4–8 × 2–4 mm, different size, ovate or elliptic, apex obtuse, dorsal surface glabrous or tomentose. Corolla zygomorphic, petals glabrous, yellow and is possible to observe in field the collor orange at base, central adaxial petal 12–15 × 6–7 mm, obovate, apex slightly emarginated, latero-adaxial and latero-abaxial petals obovate, apex rounded or slightly emarginated. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina like a anther, medium stamen filaments 1–2 mm long, anther ca. 4 mm long, centric-abaxial stamen filament 4–5 mm long, anther ca. 2 mm long, latero-abaxial stamens filaments 4–5 mm long, straight, anther 5–6 mm long, rostrum transversely oblique, 0.5 mm long. Ovary glabrous, style 0.8–1 cm long, glabrous or pubescent on the margins. Legume 9–16 × 1.5–2.5 cm, oblong, flat-compressed, externally flat or

with some printing, straight, glabrous, in the field is green and vinaceous when mature, indehiscent. Seeds ca. 5 × 3 mm, 1 or 2-seriate, oblong.

Senna silvestris is the only species in series *Sapindifolieae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) that occurs in Minas Gerais and is similar to *Senna siamea* because of the tree habit, no nectary, corymbiform raceme and flat-compressed legume. The differences between these species are discussed in the taxonomic comments of the latter species.

Senna silvestris occurs in South America in Bolivia, Paraguay and Brazil, and has two subspecies, supsp. *silvestris* and supsp. *bifaria*, and six varieties. The varieties of subsp. *silvestris* are var. *guaranitica*, var. *sapindifolia* and var. *silvestris*, and those of subsp. *bifaria* are var. bifaria, var. *unifaria* and var. *velutina*. Two varieties occur in Minas Gerais.

Key to the subspecies and varieties of *Senna silvestris* in Minas Gerais

1. Leaflets with glabrous adaxial surface and pubescent abaxial surface .... 1.28.1. *Senna silvestris* subsp. *silvestris*, var. *silvestris*
1'. Leaflets with pubescent or sparsely tomentose adaxial surface and tomentose abaxial surface..... ..... 1.28.2. *Senna silvestris* subsp. *bifaria*, var. *bifaria*

1.28.1. *Senna silvestris* (Vell.) H.S. Irwin & Barneby susp. ***silvestris*** var. ***silvestris***, Mem. New York Bot. Gard. 35: 89. 1982. Figs. 1g; 14e-g
Cassia silvestris Vell. 1825, l.c. & Icones 4: t. 78. 1835.

Selected specimens: Divisa entre os municípios de Espinosa e Montezuma, a 35 km da Serra do Pau DÁrco, 15°04'55"S, 42°38'27"W, elev. 1,300-1,400 m, 15.III.1994, fl., *C.M. Sakuragui et al.* (SPF 97045). Delfinópolis, estrada para Sacramento, ca. 14 km de Delfinópolis, 20°16'50.4"S, 46°54'01.5"W, 630 m tall, mata ciliar, 9.I.1996, fl., *V.C. Souza et al. 9874* (DIAM). Ouro Preto, APA Estadual Cachoeira das Andorinhas, 24.II.2000, fl., *J.L. Silva* (OUPR 9598); Serra do Espinhaço at Lapinha, ca. 21 km n. of Serro on Road to Diamantina, elev. 1,200 m, 25.II.1968, fl., *Irwin et al. 20857* (UB). Uberlândia, Capim Branco I, 17.IV.2005, fr., V.*H.P. Rodrigues & R. Kilca* (HUFU 43189).

This variety is represented by many herbarium collections and can be distinguished from var. *bifaria* by its glabrous or sparsely pubescent leaflet surface that is not soft.

This variety occurs in Bolivia, Colombia, Paraguay, Brazil and Venezuela (Irwin & Barneby 1982). In Brazil, it is distributed in Bahia, Minas Gerais and on the coast from Rio de Janeiro to Santa Catarina, in the Atlantic Forest, Caatinga and Cerrado regions (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). The variety grows on forest margins, along riverbanks and in disturbed forest, savannas and thickets (Irwin & Barneby 1982).

In Minas Gerais, the variety is common in the central region, but has also been found in the western and northern regions (Fig. 1g), in wooded valleys, gallery forest, humid fields, rocky fields and on forest margins. Flowers from January to March and in November, and fruits in January and April.

1.28.2. *Senna silvestris* (Vell.) H.S. Irwin & Barneby subsp. ***bifaria*** var. ***bifaria*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 94. 1982. Figs. 1g; 14h-i

Selected specimens: Água Boa, 3 km sw of Água Boa, road to Jequitaí, elev. 950 m, 25.II.1969, fl. and fr., *Irwin et al. 23915* (UB). Bonfinópolis de Minas, 16°43'S, 45°4'W, tall 790 m, 3.III.2001, fl. and fr., *L.H. Soares e Silva et al. 835* (UB). Grão Mogol, ca. 8 km west of Grão Mogol, elev. 950 m, 15.II.1969, fl. and fr., *Irwin et al. 23311*(UB). Januária, about 1 km e of Rio Pandeiros, near road to Januária, elev. 520 m, 18.IV.1973, fr., *W.R. Anderson 9121* (UB). Paraopeba, FLONA, 19°16'24"S, 44°24'0.7"W, tall 722 m, 5.V.2008, fr., *G.E. Valente & A.A. Azevedo 2213* (VIC). Uberlândia, Fazenda Dona Lourdes, Capim Branco II, 25.I.2007, fl., *P.O. Rosa et al. 289* (UB).

This variety has many records from Minas Gerais. It is easily distinguished from var. *silvestris* by the leaflet indument, which is soft.

It occurs in Paraguay and Brazil, where it has been recorded in Goiás, Mato Grosso, Minas Gerais and São Paulo, in Atlantic Forest and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), on gallery forest margins and in disturbed forest (Irwin & Barneby 1982).

In Minas Gerais, this variety is common in the central and northern regions and has also been collected in the northeastern and western regions (Fig. 1g), on rocky slopes, in gallery forest and on roadsides in the Cerrado. Flowers from January to May and fruits from February to May.

1.29. *Senna spectabilis* (DC.) H.S. Irwin & Barneby var. ***excelsa*** (Schrad.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 604. 1982. Figs. 1h; 14j-n
Cassia excelsa Schrad., Gotting Gelehrte Anz. 1(72): 717. 1821.

Shrubs or trees, 2–6 m tall, branches cylindrical, sparsely tomentose. Leaves 7–8 pairs of leaflets; stipules 7 × 0.5 mm, filiform, base truncate, apex acuminate, deciduous; nectary absent in the petiole and in the leaf rachis; petiole 2.5–3(–5) cm long; leaf rachis 12.5–17.5 cm long, sparsely tomentose; leaflets elliptic or narrowly elliptic, apex obtuse or acute, both sides, veins tenuous, membranaceous, margin ciliolate, proximal pair 2.1–3 × 1–3 cm, distal pair 3.5–4.5 × 1.5–2 cm. Racemes axillary and paniculas terminal; peduncle 2.5–4 cm; rachis 2–3 cm long. Bracts 3 × 1 mm, lanceolate, deciduous; pedicel 20–25 mm long, nectary absent. Sepals 6–8 × 4–6 mm, different size, elliptic or obovate, apex rounded, dorsal surface sparsely tomentose. Corolla asymmetrical, petals glabrous, yellow, central adaxial petal 22–25 × 11–15 mm, obovate, apex rounded, latero-adaxial petals obovate, apex rounded, latero-adaxial petals obovate and one petal is falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, staminodes lamina reniform, medium stamens filaments 2–3 m long, anther 5–6 mm long, centric abaxial stamen filament 2–4 mm long, anther 5–6 mm long, latero-abaxial stamens filaments ca. 3 mm long, straight, anther 6–7 mm long, rostrum twisted, ca. 0.5 mm long. Ovary glabrous, style 20–24 mm long, glabrous. Legume (9–)14–25 × 1 cm, cylindrical, not winged, externally slightly depressed between seed locules, straight or slightly curved, glabrous, black when mature, dehiscent. Seeds ca. 6 × 4 mm, 1-seriate.
Selected specimens: Bonfinópolis de Minas, 16°35'S 46°1'W, tall 860 m, 3.III.2001, fl. and fr., *L.H. Soares e Silva et al. 833* (CESJ, HUFU, UB). Januária, 13 km by road w of Januária on road to Serra das Araras, elev. 575 m, 19.IV.1973, fl., *W.R. Anderson 9146* (UB). Mocambinho, Projeto Jaíba, 22.II.1997, fl., *O.A. Filho et al.* (VIC 17150); estrada do canal em frente a colônia, lado esquerdo, frente 2, 15.X.1996, fr., *O.A. Filho et al.* (VIC 16871).

Senna spectabilis var. *excelsa* is the only representative of series *Excelsa* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) in Minas Gerais. It is recognized among the other studied taxa by the following characteristics: tree habit, linear stipules, absence of a nectary, 7–8 pairs of leaflets, asymmetric flowers with a falciform adaxial petal and a cylindrical legume.

The species has two varieties that can be distinguished by the size of the leaflets, distribution and phenology: *S. spectabilis* var. *spectabilis* has leaflets (4.5–)5–9.5 × 1.5–2.5 cm and occurs in South American, in Amazonia and the Andes, in Argentina, Bolivia and Paraguay, while *S. spectabilis* var. *excelsa* has leaflets (2.6–)3–5.5 × 1–2 cm and occurs in Ecuador and Brazil (Irwin & Barneby 1982).

Senna spectabilis var. *excelsa* occurs in Brazil in Alagoas, Bahia, Ceará, the Distrito Federal, Goiás, Maranhão, Mato Grosso do Sul, Minas Gerais, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Sergipe and Tocantins, in the Atlantic Forest, Caatinga and Cerrado biomes, in disturbed forestsforest, pastures and thickets (Irwin & Barneby 1982).

In Minas Gerais, this variety has been collected in the central, northern and northeastern regions (Fig. 1h), on outcrops and steep rocky slopes and in gallery forest. Flowers from February to April and fruits in March, April and December.

1.30. *Senna splendida* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 190. 1982. Figs. 1h; 15a-i
Cassia splendida Vogel, Gen. Cass. Syn. 17. 1837.

Shrubs or trees, 2–3 m tall, branches cylindrical, glabrous. Leaves 2 pairs of leaflets; stipules 5–11 × 1–3 mm, lanceolate, base truncate, apex acute or cuspidate, deciduous; nectary absent in the petiole and present in the leaf rachis, between proximal pair, narrowly elliptic, falciform or clavate, stipitate; petiole 1.5–2.5 cm long; leaf rachis 0.5–1.3 cm long, glabrous; leaflets ovate, narrowly elliptic, elliptic, apex retuse or acute, mucronulate or not, both side glabrous, veins tennuous, cartaceous, margin glabrous, proximal pair 4.6–5.2 × (1–)1.5–2.5 cm, distal pair 5–6.7 × 1.3–2.3 cm. Racemes corimbiform axillary; peduncle 2–3.3 cm long; inflorescence rachis 0.4–0.5 mm. Bracts 5–6 × ca. 0.5 mm, lanceolate,

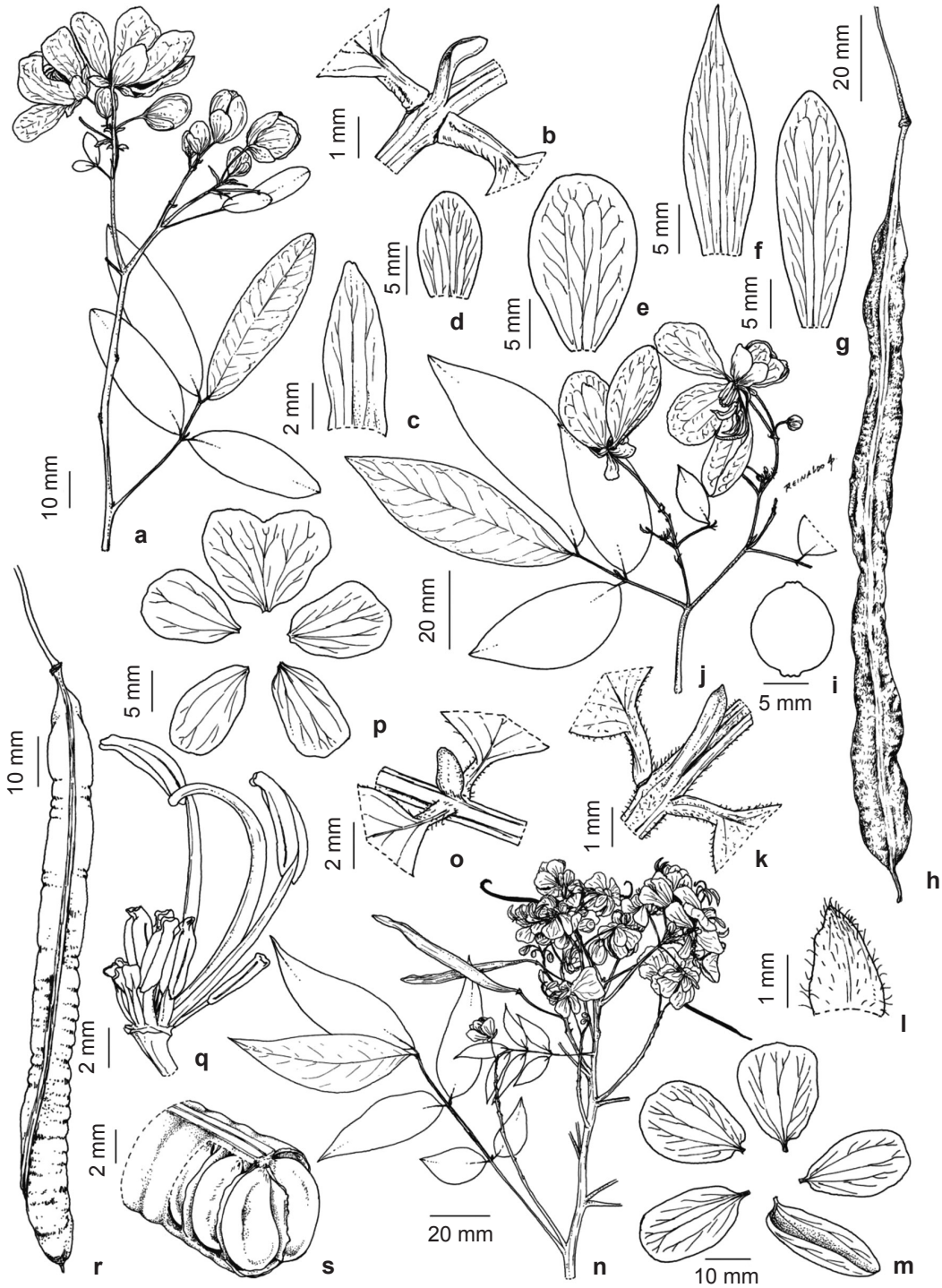

Figure 15 – a-e. *Senna splendida* var. *splendida* – a. branches with leaves and inflorescence; b. nectary between leaflets of the proximal pair; c. bract; d. sepal outside; e. sepal inside. f-i. *S. splendida* var. *gloriosa* – f. sepal outside; g. sepal inside; h. pod; i. transversal section of pod. j-m. *S. tenuifolia* – j. branches with leaves and inflorescence; k. nectary between leaflets of proximal pair; l. bract; m. corolla. n-s. *S. tropica* – n. branche with leaves and inflorescence; o. nectary in rachis; p. corolla; q. androecium and pistil; r. pod; s. transversal section of pod, showing 2-series of seed. (a-c. *L.S. Kinishita et al. 12*-UEC; d-e, h-i. *J.P. Braga 221*-CESJ; f-g. *W.R. Anderson 9207*-UB; j-l. *L.G. Rosignoli-Oliveira 15*-VIC; m-s. *L.G. Rosignoli-Oliveira 33*-VIC).

deciduous; pedicel 25–30(–40) mm long, nectary absent. Sepals 10–28 × 8–13 mm, different or similar size, narrowly elliptic or elliptic, apex rounded or acuminate, dorsal surface glabrous. Corolla asymmetric, petals glabrous, yellow, central adaxial petal 26–40 × 15–28 mm, elliptic or obovate, apex emarginated, latero-adaxial petals elliptic, apex rounded, latero-abaxial petals elliptic, but with different size, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina narrowly elliptic, medium stamens filaments 2–3 mm long, anther 5–8 mm long, centric-abaxial stamen filament 3–5 mm long, anther 3–7 mm long, latero-abaxial stamens filaments 4–10 cm long, straight, anther 9–15 mm long, rostrum geniculate, 0.5–2 mm long. Ovary pubescent, style 2–3 cm long, pubescent. Legume 22–25 × 0.5–10 cm, cylindrical, externally flat, straight, glabrous, brown when mature, indehiscent. Seeds ca. 3 × 2 mm, 1-seriate, oblong.

Within series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna splendida* is most similar to *S. tenuifolia* due to the shapes of the nectary between the proximal pair of leaflets. However, *S. splendida* has glabrous leaves and sepals, and a retuse or acute leaflet apex, while *S. tenuifolia* has pubescent leaves and sepals and a cuspidate leaflet apex.

The size and the shape of sepals were used by Irwin & Barneby (1982) to distinguish the two varieties of *S. splendida*, which both occur in Minas Gerais.

Key to the varieties of *Senna splendida* in Minas Gerais

1. Sepals differing in size, 5–15 mm long, apex rounded or obtuse ..... 1.30.1. *Senna splendida* var. *splendida*
1’. Sepals not strongly differing in size, 16–18(28) mm long, apex acuminate..... 1.30.2. *Senna splendida* var. *gloriosa*

1.30.1. *Senna splendida* (Vogel) H.S. Irwin & Barneby var. ***splendida***, Mem. New York Bot. Gard. 35: 191.1982. Figs. 1h; 15a-e

Cassia splendida Vogel, Syn. Gen. Cass. 17 & Linnaea 11:660.

Selected specimens: Águas Vermelhas, povoado de Maristela, 18.V.1994, fl., *P. Frigo* (VIC 20007). Camanducaia, Monte Verde, 1,716 m, 22°52’32,8”S, 46°01’30,4”W, 26.IV.2012, fl., *L.S. Kinoshita et al. 12* (UEC). Lagoa Santa, 26.II.1933, fl., *M. Barreto 5875* (IBT). São João Del Rei, III.1970, fl., *L. Krieger 8336* (HUFU). Serra do Cabral, ca. 5 km e. of Parada das Batistas, MG-1, elev. 625 m, 11.III.1970, fl., *Irwin et al. 27387* (SPF). Pedralva, Serra da Pedra Branca, 5.VI.2004, fr., *J.P. Braga 221* (CESJ). Uberlândia, Fazenda do Irara, 27.IV.2010, fl., *B.C. Vargas & G.M. Araújo 75* (HUFU).

In this variety, the sepals are strongly differentiated in size and have a rounded or obtuse apex.

Variety *splendida* occurs in Paraguay, Uruguay and Brazil (Irwin & Barneby 1982), where it has been collected in Bahia, Ceará, Espirito Santo, Mato Grosso do Sul, Minas Gerais, Paraná, Piauí, São Paulo and Sergipe, in the Atlantic Forest, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It grows on the margins of dense forest and in disturbed forestforest and *capoeira* (Irwin & Barneby 1982).

In Minas Gerais, this variety is widely distributed (Fig. 1h) and grows in gallery forest and on forest margins. Flowers from February to May and in November, and fruits in April.

1.30.2. *Senna splendida* **(**Vogel) H.S. Irwin & Barneby var. ***gloriosa*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 190. 1982.

Figs. 1h; 15f-i

Selected specimens: Araguari, Funil I, 13.IV.2005, fl., *G.M. Araujo & J.P. Souza* (UFU 43199). Itacambira, 22 km by road w of Januária on road to Serra das Araras, elev. 610 m, 19.IV.1973, fl., *W.R. Anderson 9207* (UB). Januária, 13 km by road w of Januaria on Road to Serra das Araras; elev. 575 m, 19.IV.1973, fl., *W.R. Anderson 9148* (UB). Ouro Preto, S. Julião, 3.XI.2001, fl. and fr., *J. Badini & M.A. Zurlo* (OUPR).

This variety is easy to recognize because the sepals are large, similar in size and have an acuminate apex.

Variety *gloriosa* is endemic to Brazil and occurs in the states of Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Rio Grande do Norte and

Minas Gerais, in Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It occurs in thickets and savanna forestsforest (Irwin & Barneby 1982).

In Minas Gerais, the variety is widely distributed (Fig. 1h) and has been collected in disturbed areas, near rivers and on forest margins. Flowers from March to June and in September and November, and fruits in May, June, September and December.

1.31. *Senna tenuifolia* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 179. 1982.
Cassia tenuifolia Vogel, Syn. Gen. Cass. 16 & Linnaea 11: 657, 1837. Figs. 1h; 15j-m

Shrubs, 1–2 m tall, branches cylindrical, tomentose. Leaves 2 pairs of leaflets; stipules 5–6 × 0.5 mm, filiform or linear, base truncate, apex acute, late deciduous; nectary absent in the petiole and present in the leaf rachis, between the first pair of leaflets, narrowly elliptic or falciform, stipitate; petiole (1.8–)2–3.3 cm long; leaf rachis 1–2 cm long, tomentose; leaflets elliptic, apex cuspidate, both sides sparsely tomentose, veins tenuous, membranaceous, margin ciliolate, proximal pair 3–4 × 1.5–1.9 cm, distal pair 5.3–7 × 2–2.5 cm. Racemes axillary; peduncle 0.7–1.5 cm long; inflorescence rachis ca. 1 cm long. Bracts 1–3 × 1–2 mm, cymbiform, deciduous; pedicel 15–20 mm long, nectary absent. Sepals (5–)8–10 × 2–6 mm, different size, obovate or narrowly elliptic, apex obtuse, dorsal surface pubescent. Corolla zygomorphic, petals pubescent, yellow, central adaxial petal 17–20(–25) × 12–15(–19) mm, obovate, apex rounded, latero-adaxial petals elliptic or obovate, apex rounded and latero-abaxial petals narrowly elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments finely tomentose, staminodes lamina spatulate, medium stamen filaments ca. 2 mm long, anther ca. 5 mm long, centric–abaxial stamen filament 2–4 mm long, anther 6–7 mm long, latero-abaxial stamens filaments 6–7 mm long, straight, anther 7–8 mm long, rostrum straight, ca. 1 mm long. Ovary velutinous, style ca. 1.5 cm long, velutinous. Legume observed not mature 7 × 0.4–1.3 cm, cylindrical, externally flat, slightly curved, sparsely pubescent, green, indehiscent. Seeds ca. 6 × 4 mm, 1-seriate, obovate.

Selected specimens: P. N. Caparaó, estrada principal para o terreirão, 20°25'4.3"S, 41°51'5.4"W, 16.VIII.2015, fl., *L.G. Rosignoli-Oliveira 15* (VIC). Santana do Pirapama, Serra do Cipó, Fazenda Toucan Cipó, estrada para a captação, 19°00'18"S, 43°46'6"W, elev. 683 m, 15.II.2007, fl., *D.C. Zappi 275* (ESA).

Among the species of series *Bacillaris* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), *Senna tenuifolia* resembles *S. splendida* and *S. macranthera*; see the taxonomic comments of these species. *Senna tenuifolia* is also similar to *S. angulata* in the shape and indument of the leaflets. However, *S. angulata* has angular branches, a leaf rachis less than 1 cm long and bracts 6–12 mm long, while *S. tenuifolia* has cylindrical branches, a leaf rachis more than 1 cm long and bracts 1–3 mm long.

This species is endemic to Brazil and has been recorded in Minas Gerais, Rio de Janeiro and Paraná, in Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). In Minas Gerais, it has been found in the central and southeastern regions (Fig. 1h). Flowers in February, August and September, and fruits in September.

1.32. *Senna tropica* (Vell.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 368. 1982.
Cassia tropica Vell. Fl. Flum. 166. 1825 & Ic. 4: t.64, 1835. Figs. 1h; 15n-s

Shrubs, 1.5–3 m tall, branches cylindrical, not sulcate, glabrous or sparsely tomentose. Leaves (2–)3–4 pairs of leaflets; stipules 6–7 × 0.5–1 mm, lanceolate, base truncate, apex acute, deciduous; nectary absent in the petiole and present in the leaf rachis, between all pairs of leaflets or absent only in last pair, ovate, pyriform, sessile or stipitate; petiole (2–)3–4 cm long; leaf rachis (1.5–)3–7 cm long, glabrous or sparsely tomentose; leaflets narrowly elliptic or lanceolate, apex cuspidate, sometimes acute, mucronulate, adaxial surface glabrous, abaxial surface glabrous or sparsely tomentose, veins tenuous, membranaceous, margin glabrous or finely ciliolate, proximal pair 3–4(–4.5) × 0.8–1.8 cm, distal pair (4.5–)6–9 × 1.5–2.5 cm. Racemes corimbiform axillary and panicula terminal; peduncle 2–3.8 cm long; inflorescence rachis 1.5–3.5 mm long. Bracts ca. 5 × 1 mm, lanceolate, deciduous; pedicel 15–20 mm long, nectary absent. Sepals 3–8 × 2–3 mm, different size, narrowly elliptic or obovate, apex rounded, dorsal surface glabrous. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal 9–15 × 7–8 mm, obovate, apex emarginated, latero-adaxial petals elliptic or obovate, apex rounded

and latero-abaxial petals elliptic-falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, staminodes lamina elliptic, reniform or twisted, medium stamen filaments ca. 1 mm long, anther 3–4 mm long, centric-abaxial stamen filament ca. 2 mm long, anther 4–5 mm long, latero-abaxial stamens filaments 8–10 mm long, curved, anther 5–6 mm long, rostrum oblique, ca. 1 mm long. Ovary glabrous, style ca. 1 cm long, sparsely tomentose. Legume 6–10 × 0.7–1 cm, cylindrical, externally flat, straight, glabrous, green, indehiscent. Seeds ca. 5 × 2 mm, 2-seriate, obovate.

Selected specimens: estrada Curvelo-Diamantina, Datas, próximo ao km 63, 18°23'42.2"S, 43°40'44"W, tall 1,347 m, 16.I.2008, fr., *V.F. Dutra & J.M. Fernandes 427* (VIC). Extrema, Serra do Lopo, 5.III.2003, fr., *L.F. Yamamoto 1162* (UEC). Ouro Preto, Antônio Pereira, 23.XI.1977, fl. and fr., *J. Badini* (OUPR 19654). Senador Firmino, estrada após o bar da cachoeira, 30.X.2016, fl. and fr., *L.G. Rosignoli-Oliveira 33* (VIC).

Senna tropica has leaflets that vary greatly in size but can be recognized by the following group of characteristics: (2–)3–4 glabrous, narrowly elliptic or lanceolate leaflets, with a cuspidate apex; nectary usually between all pairs of leaflets, sometimes absent in the last pair; zygomorphic flowers; cylindrical legume; and 2-seriate seeds. It is very similar to other species of series *Coluteoideae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), although these do not occur in Minas Gerais: *Senna araucarietorum* H.S. Irwin & Barneby and *S. septemtrionalis* (Viv.) H.S. Irwin & Barneby are similar because of the number and shape of the leaflets and cylindrical legumes. *Senna araucarietorum* has 1-seriate seeds and is endemic to southern Brazil (BFG 2018). *Senna septemtrionalis* is more difficult to distinguish because the anther rostrum on the abaxial stamens and distribution have been used to distinguish the species. According Irwin & Barneby (1982) and Bortoluzzi *et al.* (2011), *S. tropica* has a protuberance facing the interior of the flower and is endemic to Brazil, and *S. septemtrionalis* has no protuberance, is native to Central America and Mexico, and is cultivated and naturalized in other countries and in Brazil, is cited for the Distrito Federal and Santa Catarina (BFG 2018).

Senna tropica is endemic to Brazil and occurs in Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, São Paulo and Santa Catarina, in Atlantic Forest (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>), in thickets and disturbed forestsforest (Irwin & Barneby 1982). In Minas Gerais, it is common in the southern and southeastern regions (Fig. 1h), on forest margins and in humid environments. Flowers in February, July and from September to December, and fruits from January to March and from September to November.

1.33. *Senna uniflora* (Mill.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 258. 1982.

Figs. 1h; 16a-e

Cassia uniflora Mill., Gard. Dict. Ed. 8, Cassia n 5. 1768.

Shrubs, ca. 1 m tall, branches cylindrical, sparsely velutinous or velutinous. Leaves 5(–6) pairs of leaflets; stipules 10–20 × 1 mm, linear or filiform, base truncate, apex acuminate, persistent; nectary absent in the petiole and present in the leaf rachis, between 4-proximal pairs of leaflets, fusiform; petiole 1.7–2.5 cm long; leaf rachis 3.5–5.5 cm long, velutinous; leaflets elliptic or obovate, apex acute, mucronulate, both sides velutinous, veins tenuous, membranaceous, margin ciliate, proximal pair 2.2–3.5 × 1–1.5 cm, distal pair 3.5–4 × 1.5–2 cm. Racemes axillary, peduncle ca. 0.5 cm long; inflorescence rachis ca. 0.5 cm. Bracts 5–6 × 0.5 mm, triangular or filiform, persistent; pedicel 4–5 mm long, nectary at median region, fusiform, sessile, but can be deciduous. Sepals 2–4 × 1–2 mm, similar size, elliptic, apex rounded, dorsal surface velutinous. Corolla zygomorphic, petals glabrous, yellow, central adaxial petal ca. 4 × 3 mm, elliptic or sub-quadrangular, apex rounded or emarginated, latero-adaxial and latero-abaxial petals elliptic, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments glabrous, staminodes lamina arrowlike, medium stamens filaments ca. 1 mm long, anther ca. 1 mm long, centric-abaxial stamen filament ca. 1 mm long, anther ca. 1 mm long, latero-abaxial stamens filaments ca. 2 mm long, straight, anther ca. 2 mm, rostrum truncate, ca. 0.5 mm long. Ovary tomentose, style ca. 0.4 cm long, tomentose. Legume 2.5–3.5(–4) × 0.4, oblong, compressed, externally impressed-sulcate, straight, velutinous, green-brownish, dehiscent. Seeds ca. 4 × 3 mm, 1-seriate, rhombic.

Selected specimens: Januária, Vale do Rio Peruaçu, 20.III.2003, fl. and fr., *L.V. Costa & J.C. Amado 162* (BHCB). Joaquim Felicio, ca. 2 km n. of Joaquim Felicio, elev. 650 m, 10.III.1970, fl. and fr., *Irwin & Barneby et al.27344* (RB, SPF).

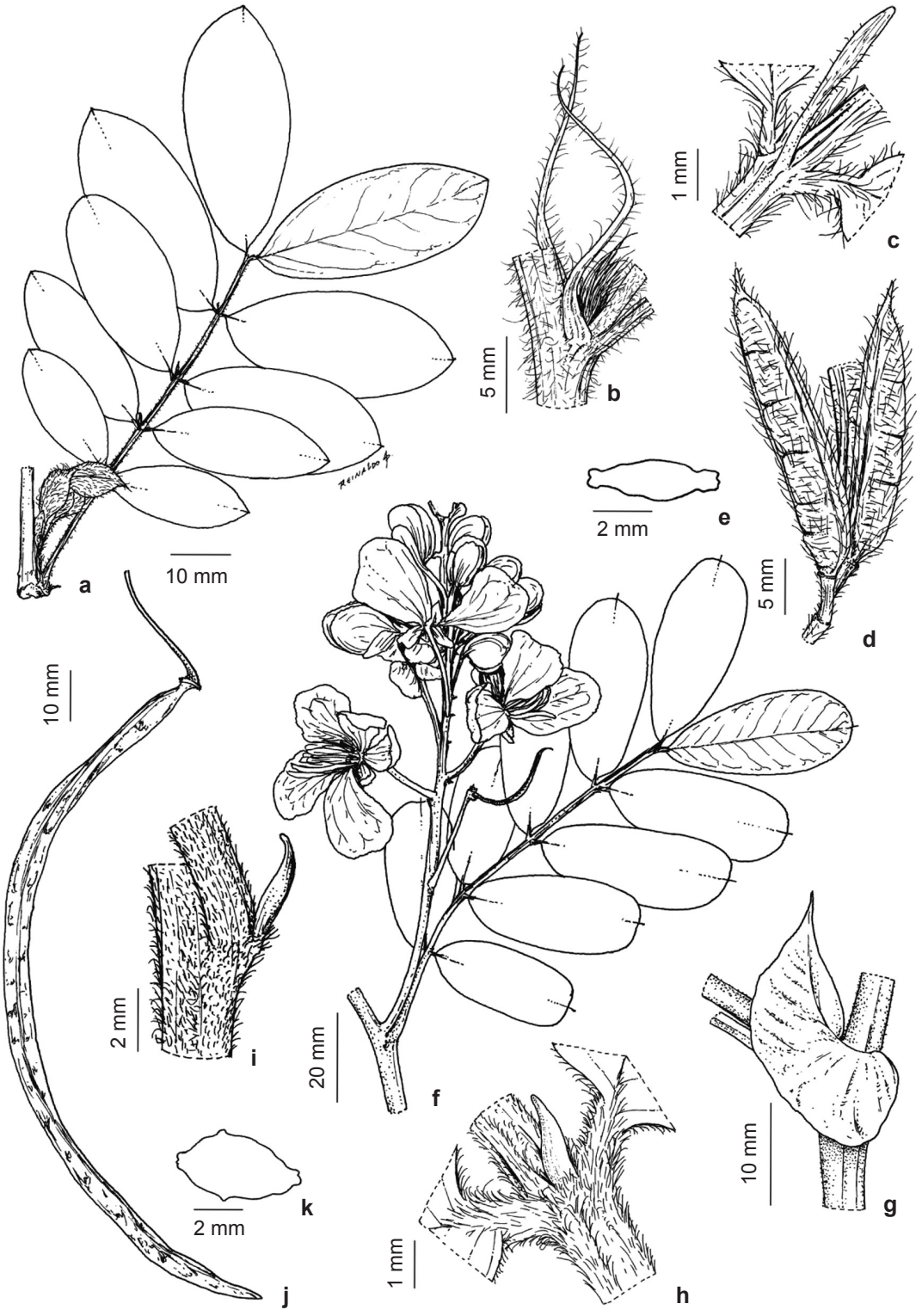

Figure 16 – a-e. *Senna uniflora* – a. branches with leaves; b. stipule; c. nectary in rachis; d. legume; e. transversal section of legume. f-k. *S. velutina* – f. branches with leaves and inflorescence; g. stipule; h. nectary between leaflets of the proximal pair; i. nectary in pedicel; j. legume; k. legume section (a-e. *L.V. Costa & J.C. Amado 162*- BHCB; f, i. *R.C. Vieira 130*-RB; g-h, j-k. *R. Goodland 3424*-RB).

Senna uniflora is the only species of series *Confertae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>) in Minas Gerais. It is a shrub and it is easily distinguished from other species by the velutinous branches, rachis and leaflets, small flowers and sulcate, velutinous legumes.

The species occurs in Central America, Brazil, Ecuador, Mexico, and Venezuela (Irwin & Barneby 1982). In Brazil, it has been recorded in Alagoas, Bahia, Ceará, Goiás, Maranhão, Minas Gerais, Paraíba, Pernambuco, Piaui, Rio Grande do Norte, Roraima, São Paulo and Sergipe, in Amazonia, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). It occurs in disturbed forestsforest, savannas, pastures and on shores (Irwin & Barneby 1982). In Minas Gerais, it has been collected in the northern part of the state (Fig. 1h), in gallery forest and adjacent disturbed Cerrado and on mountains, at an elevation of 575–650 m. Flowers and fruits in March and April.

1.34. *Senna velutina* (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 232. 1982. Figs. 1h; 16f-k

Cassia velutina Vogel, Syn. Gen. Cass. 24 & Linnaea 11: 670, 1837.

Shrubs or small trees, 1–3 m tall. Branches cylindrical or slightly angular, tomentose. Leaves 4–5 pairs of leaflets; stipules (5–)10–25 × 10–15 mm, reniform, base asymmetric, apex cuspidate, persistent or late deciduous; nectary absent in the petiole and present in the leaf rachis, between all pairs of leaflets, ovate or conical, stipitate or sessile; petiole 2–4 cm long; leaf rachis 5.2–8 cm long, tomentose; leaflets elliptic, narrowly elliptic or obovate, apex obtuse, mucronulate, adaxial surface tomentose, velutinous, sometimes sparce tomentose, abaxial surface always tomentose or densely velutinous, veins tenuous, cartaceous, margin ciliolate, proximal pair 3.5–5 × 1.7–3 cm, distal pair 4.5–7.5 × 2–4.3 cm. Racemes axillary and terminal; peduncle 2–4 cm long; inflorescence rachis 8.5–10 cm long. Bracts 5–8 × 3–4 mm, ovate-cuspidate or lanceolate-acuminate, deciduous; pedicel 20–25 mm long, nectary at base, ovate or falciform, stipitate or sessile. Sepals 8–19 × 5–10 mm, different size, ovate or elliptic, apex obtuse, dorsal surface velutinous. Corolla asymmetric, petals velutinous in adaxial surface, yellow, central adaxial petal 15–20 × 9–15 mm, obovate, apex emarginated, latero-adaxial petals obovate, apex rounded, latero-adaxial petals obovate and one is falciform, apex rounded. Androecium with 3 staminodes and 7 fertile stamens, filaments with a tomentose line or with sparsely hairs, staminodes lamina twisted, medium stamens filaments ca. 3 mm long, anther 4–8 mm long, centric abaxial stamen filament ca. 5 mm long, anther 7–10 mm long, latero-abaxial stamens filaments 8–9 mm long, straight, anther (8–)11–14 mm long, rostrum transversely oblique, ca. 0.5 mm long. Ovary velutinous, style 1–1.5 cm long, velutinous. Legume 11–25 × 0.5 cm, subquadrangular, externally slightly depressed between seed locules and patent margins, curved, velutinous, brownish, dehiscent. Seeds ca. 4 × 3 mm, 1-seriate, rhombic.

Selected specimens: Ituiutaba, 18 km w. of Ituiutaba on righway BR-71, 18.VII.1967, fr., *R. Goodland 3424* (UB). Lagoa da Prata, Arcos, Cerrado, estrada rodagem Garças, 30.V.1950, fl., *M. Magalhães 6100* (IPA). Paracatu, ca. 2km N. of Paracatu, 700 m, 03.II.1970, fl., *Irwin et al*. 25941 (UB). Uberlândia, km 6 de rodovia para Goiânia BR-365, 6.III.1981, fl., *R.C .Vieira* 130 (RB). Unai, 18.II.1984, fl., *E.P. Heringer 18480* (IBT; VIC).

Additional Examined specimens: *Senna appendiculata*. BRAZIL. ESPÍRITO SANTO: Setiba, P. E. Paulo César Vinha, limite norte do Parque, 5.III.1997, fl., *A.F. da Silva et al. 2012* (VIC). RIO DE JANEIRO: Maricá, Itaipuaçu, 8.IV.1977, fl. and fr., *P.L. Krieger et al. 14799* (VIC).

Senna velutina has elliptic, narrowly elliptic or obovate leaflets and a nectary between all pairs of leaflets and on the pedicel. It is similar to *S. cana*, as explained in the taxonomic comments of this species, and to *S. appendiculata* (Vogel) Wiersema, but this species does not occur in Minas Gerais. These species belong to series *Laxiflorae* (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>).

According to Irwin & Barneby (1982), *S. velutina* and *S. appendiculata* can be separated by their ecology and distribution; *S. velutina* occurs in South America, mainly in the Cerrado, while *S. appendiculata* is endemic to coastal areas of restinga in Brazil. However, these species can be distinguished by the following: leaflets larger, obovate and glabrous or sparsely tomentose on adaxial surface in *S. appendiculata* (*vs.* elliptic, narrowly elliptic or obovate, with a tomentose adaxial surface in *S. velutina*); and sepals, petals and stamen filaments (of the studied material) glabrous in *S. appendiculata* (*vs.* velutinous sepals and tomentose petals and stamen filaments in *S. velutina*).

Senna velutina occurs in Bolivia, Guiana, Paraguay, Venezuela and Brazil, where it has been collected in the states of Bahia, Ceará, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Piauí, São Paulo and Tocantins, in Amazonia, Caatinga and Cerrado (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>). In the Cerrado, it usually occurs on red sandy soils, in disturbed area and thickets, and along roadsides (Irwin & Barneby 1982).

In Minas Gerais, the species is most frequent in the western and northwestern regions but has also been collected in the central and southeastern regions (Fig. 1h), on roadsides, in very open xeromorphic savanna scrub, and on outcrops and inselbergs. Flowers from February to May and fruits from April to July.

Taxonomic discussion

In this taxonomic study, 36 species and 28 varieties of *Senna* were confirmed to occur in Minas Gerais. Most are native and only two cultivated species were recorded: *Senna corymbosa* (Lam.) H.S. Irwin & Barneby, whose material was analyzed and confirmed, was included in the identification key; *Senna reticulata* (Willd.) H.S. Irwin & Barneby is only represented in the state by the specimen *H.S. Irwin 2020* (NY), which was identified by H.S. Irwin and R.C. Barneby. This specimen was analyzed virtually but is not fertile, which helps distinguish it from *S. alata* (L.) Roxb, a similar species. Thus, *S. reticulata* was not included in the identification key.

Irwin & Barneby (1982) recognized 6 sections and 35 series of *Senn*a. In Minas Gerais, there are 3 sections (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>): *S.* sect. *Chamaefistula* (Collad.) H.S. Irwin & Barneby, with 10 series and 28 species; *S.* sect. *Peiranisia* (Rafinesque) H.S. Irwin & Barneby, with 2 series and 5 species; and *S.* sect. *Senna* Mill, with 2 series and 3 species.

In BFG (2018), the occurrence of 39 species is reported for Minas Gerais, but the number found in this study was lower. *Senna spinigera* (Rizzini) H.S. Irwin & Barneby, *Senna bacillaris* (L.f.) H.S. Irwin & Barneby, *Senna chrysocarpa* (Desv.) H.S. Irwin & Barneby and *Senna trachypus* (Benth.) H.S. Irwin & Barneby were excluded from the list in the present work.

Senna spinigera (Rizzini) H.S. Irwin & Barneby was cited in BFG (2018); however, no specimens collected in the state were indicated. The material identified as *Senna bacillaris* (L.f) H.S. Irwin & Barneby was reidentified as *Senna affinis* (Benth.) H.S. Irwin & Barneby, a similar species.

Five specimens identified as *Senna chrysocarpa* (Desv.) H.S. Irwin & Barneby were reidentified: *E.P. Heringer 18480* (IBT; VIC) as *S. velutina* (Vogel) H.S. Irwin & Barneby; *L. Krieger* (CESJ 8287) and *L. Krieger & U.C. Camara* (CESJ *8823*) as *S. rugosa* (G. Don) H.S. Irwin & Barneby; and *L. Krieger* (CESJ 10689) as *Senna reniformis* (G. Don) H.S. Irwin & Barneby. *Senna trachypus* (Benth.) H.S. Irwin & Barneby, represented by *J. Badini* (OUPR 19661; 19662; 19663 and 19664), was reidentified as *Senna oblongifolia* (Vogel) H.S. Irwin & Barneby. After updating these examined specimens, no other specimens of these species from the state were found.

Senna pilifera (Vogel) H.S. Irwin & Barneby var. *tubata* H.S. Irwin & Barneby is a new record for the state.

In this study, the occurrence of *Senna acuruensis* (Benth.) H.S. Irwin & Barneby was confirmed. Irwin & Barneby (1982) thought this species might occur in the state but it was not cited by the BFG (2018).

Geographical distribution of species

Senna hirsuta var. *acuminata* is endemic to Minas Gerais and, among the taxa of *Senna* in the state, ca. 36% are endemic to Brazil. Furthermore, ca. 26% occur in at least three Brazilian states, 48% are in at least 10 states and ca. 26% occur in more than 11 states (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.16862521.v1>).

Senna is very diverse in the biomes in Minas Gerais; 28 spp. occur in the Cerrado, 26 spp. in the Atlantic Forest and 20 spp. in the Caatinga. Eight taxa are restricted to the Atlantic Forest: *S. itatiaiae*, *S. pneumatica*, *S. tenuifolia* and *S. tropica*; and the varieties *S. angulata* var. *miscadenia*, *S. neglecta* var. *neglecta*, *S. neglecta* var. *oligophylla* and *S. organensis* var. *organensis*. *Senna rostrata* and *S. hirsuta* var. *acuminata* are restricted to the "Cerrado" biome and *S. acuruensis* is restricted to the "Caatinga".

Based on this study, the distribution of *Senna pentagonia* var. *pentagonia* is here extended, since this variety was cited in the literature (BFG 2018; Irwin & Barneby 1982) for only the Caatinga and Cerrado but has also been collected in the Atlantic Forest biome in Minas Gerais.

Among the native species in the state, 14 species also occur in the Amazon biome and 5 in the Pantanal biome, and about 72% occur in at least one of the dry biomes (Caatinga or Cerrado) and at least one of the humid biomes (Amazon, Atlantic Forest or Pantanal) in Brazil.

Some species in Minas Gerais were represented by few herbarium specimens, which may be because few collections have been made in the area or because they have restricted distributions.

For *Senna aculeata*, the observed specimen was collected in the northwestern part of the state, in the region closest to Goiás, Mato Grosso and Mato Grosso do Sul, where it is more abundant (Silva *et al.* 2018). Likewise, *S. cana* var. *pilosula* and *S. cana* var. *phyllostegia* are uncommon but occur in northern and northeastern Minas Gerais, closer to the states of Bahia, Espírito Santo and São Paulo, where the varieties seem to be more common (BFG 2018; speciesLink 2016).

Senna acuruensis is restricted to the Caatinga biome (Irwin & Barneby 1982). It is represented by few collections from Minas Gerais and occurs in the northern region, closer to Bahia where it also occurs (Queiroz 2009).

Senna hirsuta var. *leptocarpa* is an uncommon variety (Irwin & Barneby 1982) and was collected in Minas Gerais, in Viçosa, in 1930. However, it was confirmed based on recent material collected in 2013 in Araponga, which borders the municipality of Viçosa.

Senna neglecta var. *grandiflora* is represented by few specimens among the material found for the species. The information on the holotype is incomplete and only says "BR 4 km, 777"; however, according to Irwin & Barneby (1982), the collection was found between the valleys of the Jequitinhonha and Mucuri rivers, at approximately 16–17°30'S. Based on this, the collection is probably from the Itaobim region, in northeastern Minas Gerais, and their coordinates were used in the distribution map (Fig. 1l). In Goiás, this variety was considered rare, with only the historic collection of *E.P. Heringer et al.* made in 1998 (Silva *et al.* 2018).

Only the holotype of *Senna pendula* var. *dolichandra* was observed, which was collected in the city of Pedra Azul. According Irwin & Barneby (1982), the variety is apparently rare in the state. In BFG (2018), it was also cited for Bahia and Paraíba.

This study increased what is known about *Senna* species in Minas Gerais, which is the second most diverse state for the genus in Brazil. Four species that have been cited for the state were reidentified: *Senna bacillaris*, *S. chrysocarpa*, *S. spinigera* and *S. trachypus*. Two varieties are new records for the state: *Senna macranthera* var. *striata* and *Senna pilifera* var. *tubata*.

The Atlantic Forest has the largest number of species with restricted distributions, including 4 species and 4 varieties, and the distribution of *Senna pentagonia* var. *pentagonia* is extended to include this biome. Most of the species (about 70%) occur in at least one humid biome (Amazon, Atlantic Forest, Pantanal) and one dry biome (Caatinga, Cerrado), while the remaining species are generaly restricted to one or two humid or dry biomes.

Senna pendula var. *dolichandra* needs special attention because it has not been recorded in recent years and may be threatened with extinction in the state.

The Caatinga, with 20 species, showed high diversity because it only occupies an area of 2% of the state. However, it is the biome in Minas Gerais with the fewest herbarium specimens, which demonstrates the need for more expeditions in this region to increase the herbarium collections and contribute to taxonomic studies.

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Almeida EF 209 (1.4),422 (1.19). **Alvim OADP** VIC3326(1.32). **Anderson WR** 8612 (1.26), 8671 (1.20), 9141 (1.33), 35701 (1.12.1), 35737(1.14.1), 36121 (1.12.1). **Andrade P** 1126 (1.15.3). **Arantes AA** 812 (1.4). **Araújo D** 2024 (1.7.1). **Araujo GM**1124 (1.20), UB4155(1.12.1). **Badini J** OUPR18652(1.12.1), OUPR19661(1.16). **Barreto M** 4194 (1.22.2), 5884 (1.26), 5889 (1.26), 5897 (1.14.1), 5908 (1.14.1), 5924 (1.20), 5929 (1.17), 5933 (1.32), 6029 (1.28.1). **Bautista HP** 584 (1.14.2). **Belém RP** 398 (1.7.1). **Bidá A** SPF66032(1.9). **Bordon N** HUFU 50172 (1.30.1), HUFU50173(1.5.2). **Bortoluzzi RLC** 321 (1.14.2), 491 (1.14.2), 614 (1.3). **Bosquetti LB** 143 (1.3), 176 (1.3). **Brade AC** 16930 (1.19). **Bovini MG** VIC22940(1.8). **Carvalho AF** 771 (1.8). **Castro RM** 869 (1.18). **Ceccantini G** 444 (1.12.2). **Conceição AS** 811 (1.7.1). **Coons MP** 376 (1.4). **Cordeiro I** SPF22930(1.17). **Costa FN** 553 (1.9). **Costa LV** BHCB27630(1.28.1). **Cota MMT** 10 (1.24). **Coutinho IAC** 173 (1.28.1), 385 (1.28.1), 457 (1.24). **Damasco PP** 45 (1.34). **Davidse G** 10818 (1.28.1), 11458 (1.12.2), 11576 (1.29). **Duarte AP** 7721 (1.32). **Dutra VF** 211 (1.12.1), 411(1.12.2), 415 (1.28.1), OUPR3420(1.20). **Eiken G** 10897 (1.12.1). **Eiten G** 7039 (1.24). **Eiterer M** 129 (1.15.3). **Farinaccio MA** 332 (1.20). **Felippe GM** 145 (1.18). **Fernandes JM** 627 (1.8), 716 (1.12.2), 722 (1.7.1). **Ferreira FM** 1024 (1.15.3), CESJ46899(1.15.3). **Ferreira KRB** 424462(1.27). **Fonseca ML** 5441 (1.7.1). **Forzza RC** 2074 (1.14.1), 2076 (1.3),6056 (1.34). **Freitas FS** 779 (1.4). **Garcia MVB** VIC8524 (1.4). **Graças M** 51 (1.28.1). **Gehrt** 112 (1.22.2), 122 (1.17). **Gentry A** 59127 (1.30.1). **Giulietti AM** SPF92589(1.15.3). **Goodland R** 3698 (1.26). **Grillo AA** SPF112924(1.18). **Guarçoni E** 794 (1.14.1). **Handro W** 67 (1.28.1). **Hattori EKO** 703 (1.25). **Hatschbach G** 52719 (1.29), 52951(1.24), 54196 (1.9), 55524 (1.19), 61763 (1.7.1), 67381 (1.28.2), 72029 (1.9), 72207 (1.25), 77658 (1.25), 79401 (1.25). **Heringer EP** 3380 (1.12.2), 5088 (1.18), 7107 (1.22.3), 7497 (1.5.1), 78009 (1.30.1), UB7248 (1.12.2). **Hevencio P *et al.*** 25 (1.20). **Hoehne FC** IBT20202(1.8), IBT 3759 (1.20). **Irwin HS** 2106 (1.8), 2107 (1.17), 2387 (1.28.2), 2507 (1.28.2), 8370 (1.9), 19518 (1.24), 19577 (1.26), 11930 (1.9), 22824 (1.8), 22980 (1.7.1), 23003 (1.29), 23499 (1.7.1), 26900 (1.12.2), 26934 (1.28.1), 27071 (1.28.1), 27153 (1.22.2), 27339 (1.18), 27387 (1.30.1), 27412 (1.12.2), 27732 (1.12.2), 27965 (1.12.2), 28002 (1.24), 28059 (1.28.1), 28074 (1.26), 28132 (1.8), 28170 (1.24), 28595 (1.9), 28629 (1.12.2), 28631 (1.24), 28878 (1.12.1), 28986 (1.28.2), 29111 (1.24), 29186 (1.28.2), 30202 (1.8), 3379 (1.14.1), 36158 (1.12.2), 41382 (1.30.2), 46858 (1.31), 77569 (1.8), UB7139(1.14.1). **Julio Filho A** VIC 6906(1.32). **Krieger PL** 7307 (1.32), 7622 (1.32), 8219 (1.12.1), 8287 (1.26), 9263(1.16), 10689 (1.24), 11450 (1.14.1). 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