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The genus *Senna* Mill. (Leguminosae: Caesalpinioideae) in the Serra Geral of Licínio de Almeida, Bahia, Brazil

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ABSTRACT. *Senna* includes about 300 species with circumtropical distribution, widely represented in the Americas, also occurring in Africa, Australia, Asia and Oceania. The genus is represented in Brazil by 80 species, of which 26 are endemic. The Serra Geral de Licínio de Almeida (SGLA), situated in the central portion of the Cadeia do Espinhaço, state of Bahia, Brazil, presents areas relatively little studied, with great potential for the registration of new information about Brazilian biodiversity. The floristic survey of *Senna* in the SGLA included analysis of specimens collected from February 2012 to October 2013. The analyses were supplemented with dried collections from the following herbaria: ALCB, BHCB, HUEFS, HUNEB, HRB, MBM and SPF.The genus is represented in the study area by 14 taxa, the most representative in the area were: *S. silvestris* subsp. *bifaria* var. *bifaria*, *S. macranthera* var. *striata* and *S. macranthera* var. *nervosa*, occurring principally in cerrado environments. The taxonomic treatment includes a key for the identification, descriptions, illustrations, photos, data of the geographical distribution, reproductive phenology and comments about the taxa.

Keywords: floristics, taxonomy, cerrado, Espinhaço Range.

O gênero *Senna* Mill. (Leguminosae: Caesalpinioideae) na Serra Geral de Licínio de Almeida, Bahia, Brasil

RESUMO. *Senna* inclui cerca de 300 espécies com distribuição circumtropical, amplamente representada nas Américas, ocorrendo ainda na África, Austrália, Ásia e Oceânia. O gênero está representado no Brasil por 80 espécies, dentre estas 26 são endêmicas. A Serra Geral de Licínio de Almeida (SGLA), inserida na porção central da Cadeia do Espinhaço, estado da Bahia, Brasil, apresenta áreas relativamente pouco estudadas, com grande potencial para registro de novas informações acerca da biodiversidade brasileira. O levantamento florístico de *Senna* na SGLA incluiu análises de espécimes coletados de fevereiro de 2012 a outubro de 2013. As análises foram complementadas com coleções dos seguintes herbários: ALCB, BHCB, HUEFS, HUNEB, HRB, MBM e SPF. O gênero está representado na área de estudo por 14 táxons, onde os mais representativos foram: *S. silvestris* subsp. *bifaria* var. *bifaria*, *S. macranthera* var. *striata* e *S. macranthera* var. *nervosa*, ocorredo principalmente em ambientes de cerrado. O tratamento taxonômico inclui uma chave para a identificação, descrições, ilustrações, fotografias, dados de distribuição geográfica, fenologia reprodutiva e comentários sobre os táxons.

Palavras-chave: florística, taxonomia, cerrado, Cadeia do Espinhaço.

Introduction

Senna Mill. belongs to the subtribe Cassinae Irwin & Barneby, of the tribe Cassieae Bronn (Leguminosae, Caesalpinioideae) (Irwin & Barneby, 1981, 1982). The subtribe was established by Irwin and Barneby (1982), who proposed the separation of *Cassia s.l.*, into the genera *Cassia* L., *Senna* and *Chamaecrista* Moench (Irwin & Barneby, 1982).

Senna includes about 300 species, is circumtropical and is most represented in the Americas, but also occurs in Africa, Australia, Asia and Oceania (Lewis, Schrire, Mackinder, & Lock, 2005). There are 80 species in Brazil, of which 26 are endemic (Souza & Bortoluzzi, 2015).

Among the most important characters for distinguishing the genus is the presence of a zygomorphic androecium with three abaxial stamens; presence of convex, claviform to pyramidal extrafloral nectaries and cylindrical or plane-compressed fruit with inert dehiscence.

The genus is subdivided into six sections: *S.* sect. *Astroites* H.S. Irwin & Barneby, *S.* sect. *Chamaefistula* (Collad.) H.S. Irwin & Barneby, *S.*

sect. *Paradictyon* H.S. Irwin & Barneby, *S.* sect. *Peiranisia* (Raf.) H.S. Irwin & Barneby, *S.* sect. *Psilorhegma* (Vogel) H.S. Irwin & Barneby and *S.* sect. *Senna* Mill. (Irwin & Barneby, 1982). Of these, only the section *Psilorhegma* was recognized as monophyletic; the others, *Chamaefistula*, *Peiranisia* and *Senna,* were paraphyletic since *Astroites* and *Paradictyon* appeared grouped in other clades according to molecular phylogenetic analysis (Marazzi, Endress, Queiroz, & Conti, 2006).

The most comprehensive study of the group was the revision done by Irwin and Barneby (1982), which recognized 260 species. In Brazil, work has dealt with reports of new occurrences, such as Bortoluzzi, Miotto and Reis (2007) for the flora of southern Brazil, and the descriptions of new species such as Araújo and Souza (2007) for Tocantins and Irwin and Barneby (1985) and Cardoso and Queiroz (2008) for Bahia. Among regional work with the genus *Senna* in Brazil are Lewis (1987) for Bahia; Lewis (1995) for Pico das Almas (Bahia); Rodrigues, Flores, Miotto and Baptista (2005) for Rio Grande do Sul; Dantas and Silva (2013) for Parque Estadual da Serra Dourada (Goiás), and Rando, Hervencio, Souza, Giulietti and Pirani (2013) for Serra do Cipó (Minas Gerais). Studies of floristic surveys for the genus in Brazil showed that the number of works remains few, especially those with descriptions and identification keys.

Given the significant representation of the genus *Senna* in the flora of the state of Bahia, and especially in the Cerrado, this study aimed to better comprehend the diversity of this group in the Serra Geral de Licínio de Almeida (SGLA), Bahia, Brazil, to contribute to the knowledge of the flora of the state, as well as provided support for the development of a plan for a future conservation unit.

Material and methods

Study area

The Serra Geral de Licínio de Almeida - SGLA (Figure 1) is located in the central portion of the Espinhaço Range (Cadeia do Espinhaço), a mountain range that extends from the Serra de Ouro Preto in Minas Gerais to Bahia, forming a divide between the basin of São Francisco River and the Atlantic Ocean (Giulietti, Menezes, Pirani, Meguro, & Wanderley, 1987). It occupies a band of mountains located west of the municipality of Licínio de Almeida in southeastern Bahia between the latitudes of 14º26' to 14º50' S and longitudes of 42º36' to 42º29' W. It encompasses an area of approximately 24,000 ha, with altitudes varying from 700 to 1230 m, and borders the municipalities of Caetité, Jacaraci, Pindaí and Urandi. The vegetation of the region is predominantly cerrado, campo rupestre and gallery forest in localities at altitudes between 900-1230 m, but there is also caatinga vegetation present. The climate is semiarid and subhumid, with average annual rainfall of 500 to 1000 mm and average annual temperature of 21ºC. The soils are, in general, formed by latosol and quartzarenic neosol [quartzite sand] (Bahia, 2007).

Taxonomic study

The study was based on fieldwork carried from February 2012 to October 2013, besides information complemented by the analysis of specimens deposited in the following herbaria: ALCB, HUEFS, HUNEB, HRB, MBM and SPF (acronyms according to Thiers, 2017 continuously updated). The field collections and observations were performed during random walks exploring most of the study area. The herborization and material processing followed the methodology by Fosberg and Sachet (1965) and Mori, Mattos-Silva, Lisboa and Coradin (1989), where fertile material was collected with flowers and/or fruit. The specimens were deposited in the herbarium of the *Universidade Estadual da Bahia* (HUNEB – Collection Paulo Afonso) and the duplicates will be sent to the main herbaria in the state of Bahia (ALCB, HRB and HUEFS).

The identifications were made based mainly on specialized bibliographies (e.g., Irwin and Barneby (1982), Lewis (1987), protologues, photos of type collections and consulting of the collections in the herbaria that were visited. For the taxonomic desc riptions, the terminologies proposed by Radford, Dickison and Massey (1974), Irwin and Barneby (1982) and Harris and Harris (1994) were adopted. Phenological data refers to the observations made in the study area. The taxonomic treatment includes a key for the identification, descriptions, illustrations, photos, data of the geographical distribution, economic potential and reproductive phenology and comments about the taxa.

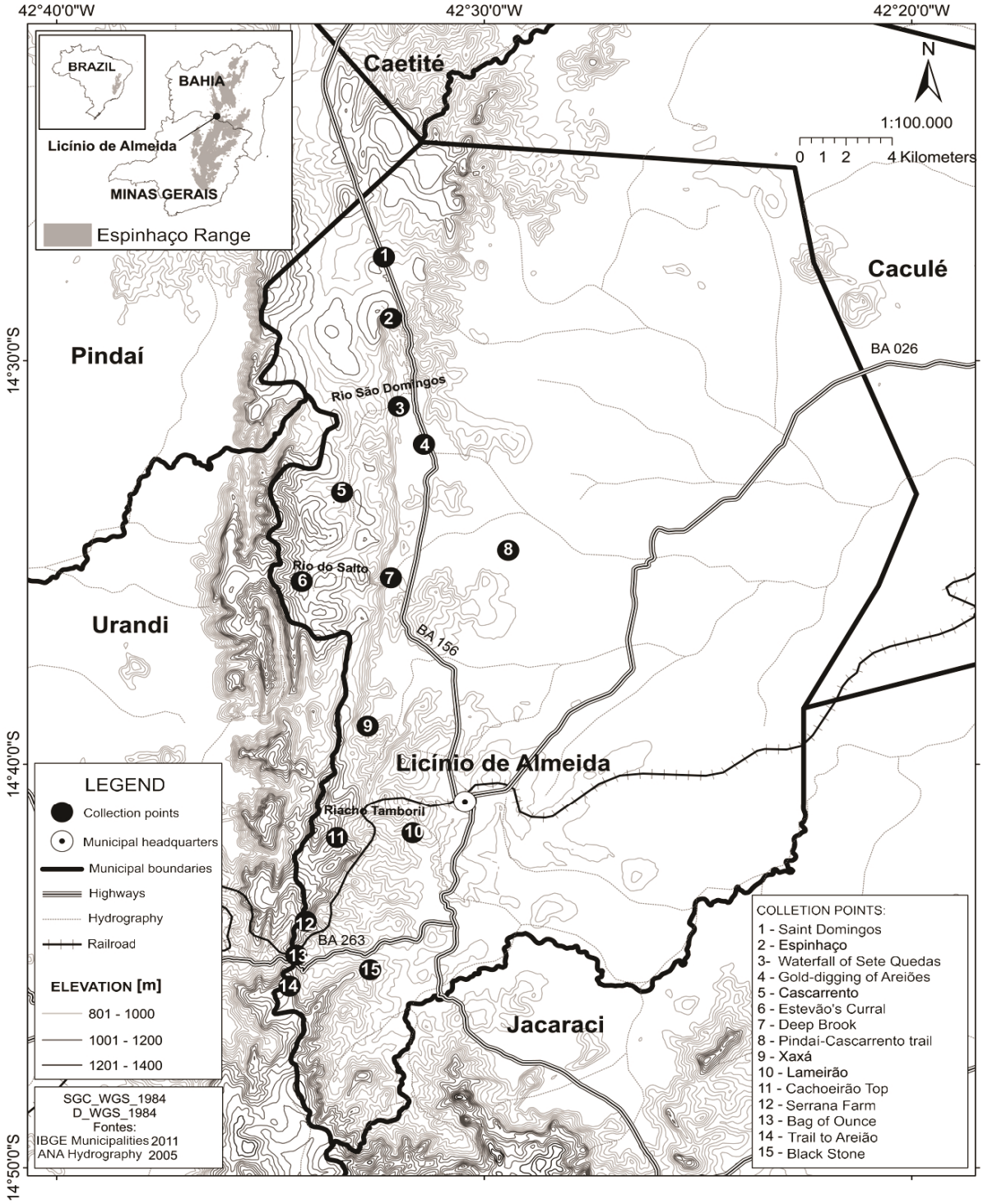

Figure 1. Location Serra Geral of Licínio de Almeida, Bahia, Brazil.

Results and discussion

Identification key for the representatives of the genus *Senna*

1. Leaves with exactly 2 pairs of leaflets.

2. Petiole 2.5-10 (-15) mm long; leaflets coriaceous. Extrafloral nectaries present between all pairs of leaflets. Petals almost isomorphic..... .....**11. *S. rugosa***

2'. Petiole 9-37 mm long, leaflets papyraceous. Extrafloral nectaries present between the proximal pair of leaflets or rachis just above the proximal pair. Petals heteromorphic.

3. Stipules 8-17 mm long, oblanceolate, apex

acute. Leaflets glabrous. Sepals external oblong-lanceolate..... **14. *S. splendida* var. *gloriosa***

3'. Stipules 0.5-7.5 mm long, linear-lanceolate, linear-subulate, apex attenuated. Leaflets puberulent and pubescent. Sepals external oblong-ovate, suborbicular e ovate.

4. Bracts oval-elliptic to ovate, persistent. Flower 3-5 cm diam. Petal vexilar obcordate .... **10. *S. rizzinii***

4'. Bracts lanceolate to ovate, deciduous. Flower 3.5-6 cm diam. Petal vexilar oblong-elliptic to oboval.

5. Stipules persistent. Sepals larger (7-)10-14 × (4-)6-8 mm; stamens largest abaxial 15-19 mm long; ovary pubescent ..... **5. *S. macranthera* var. *striata***

5'. Stipules deciduous. Sepals larger 6-9 × 3-4.5 mm; stamens largest abaxial 11-14 mm long; ovary strigose.

6. Leaflets distal 30-55 × 15-28 mm, stipules 1.2-5.5 mm long..... **3. *S. macranthera* var. *micans***

6'. Leaflets distal 60-80 × 25-37 mm, stipules 0.5-0.9 mm long..... **4. *S. macranthera* var. *nervosa***

1'. Leaves with 3-18 pairs of leaflets.

7. Extrafloral nectaries absent.

8. Leaflets 6-7 pairs. Petals almost isomorphic, with orange-red base. Stamens heteromorphic .... **12. *S. silvestris* subsp. *bifaria* var. *bifaria***

8'. Leaflets 12-28 pairs. Petals heteromorphic, with yellow base. Stamens almost isomorphic..... ..... **13. *S. spectabilis* var. *excelsa***

7'. Extrafloral nectaries present.

9. Extrafloral nectaries located on pulvinus..... ..... **7. *S. occidentalis***

9'. Extrafloral nectaries located between the pairs of leaflets.

10.Leaflets oblanceolate to obovate. Extrafloral nectaries located between the proximal pair of leaflets.

11. Petiole 1.3-3 mm long; leaflets 3 pairs, apex rounded and mucronate. Inflorescences 2 flowered; flower with 0.7-1.3 cm diam..... **6. *S. obtusifolia***

11'. Petiole 12-27 mm long; leaflets 5 pairs, apex emarginated. Inflorescences 9-23 flowered; flower with 5.3-6 cm diam..... **8. *S. pendula* var. *glabrata***

10'. Leaflets elliptic to suborbicular. Extrafloral nectaries located between all pairs of leaflets, occasionally absent on the proximal or distal pair.

12. Indumentum consisting of trichomes tector and glandular. Stipules linear-subulate, base truncate ..... **1. *S. acuruensis* var. *acuruensis***

12'. Indumentum consisting of trichomes tector. Stipules subreniform, base amplexicaul, subcordate-subauriculate.

13. Tree. Stipules 12-35 × 7-22 mm. Inflorescences 20-33 flowered; petal vexilar obovate..... **9. *S. reniformis***

13'. Shrubs. Stipules 6-12 × 3-5 mm. Inflorescences (5) 7-15 flowered; petal vexilar obcordate..... **2. *S. cana* var. *cana***

Senna Mill., Gard. Dict. Abr. ed. 4, v. 3. 1754.

Subshrubs, shrubs or trees. Indumentum constituted of trichomes glandular or tector, present or absent. Stipules entire, persistent or deciduous, oblanceolate to subulate. Leaves alternate, spiral or distichous; petiolate or subsessile, presence of pulvinus; extrafloral nectaries absent or present, convex, sessile or stipitate, located between the pairs of leaflets or on the petiole; leaflets 1-many pairs, papyraceous to coriaceous, elliptic to oblong, lanceolate to obovate, venation brochidodromous, craspedodromous or eucamptodromous, apex acuminate, rounded to mucronate, base oblique. Inflorescences axillary or terminal, racemose, 2-33 flowered; bracts persistent or deciduous; bracteoles absent; flowers zygomorphic or asymmetric; Sepals 5, two smaller and three larger; petals 5, yellow or orange base; stamens 7, heteromorphic, 4 smaller median, subsessile, fillet erect, 2-3 abaxial larger, 2 laterals, fillets curved, twice the length of the anthers, 1 central, fillet erect, less than anther, 3-4 adaxial staminodes, anthers dehiscent through apical sutures. Fruit cylindrical, linear and oblong, plano-compressed, dehiscent or indehiscent, dehiscence inert; seeds oblong, orbicular or ellipsoids.

Senna includes about 300 species circuntropical distribution, with center of diversity in the Americas, also occurring in Africa, Australia, Asia and Oceania (Lewis et al., 2005). In Brazil there are 80 species of which 49 are registered to Bahia (Souza & Bortoluzzi, 2015). In Serra Geral of Licínio de Almeida were recorded 14 taxa for the genus (Figure 2).

1. ***Senna acuruensis*** (Benth.) H.S. Irwin & Barneby var. ***acuruensis*****,** Mem. New York Bot. Gard. 35: 508. 1982. Figures 2. A, 4. f-g

Shrubs c. 1.5 m tall. Indumentum hispidulous constituted of trichomes glandular c. 0.1 mm long, dense to sparse, orange and trichomes tector 0.05-0.1 mm long, straight, sparse, distributed on the branches, stipules, petioles, rachis and pedicels. Stipules deciduous, linear-subulate, apex attenuated, base truncate, hispidulous, margin glabrous, 3.4-6.7 × 0.1 mm. Leaves 1.8-9 cm long; petiole 6-17 mm long; pulvinus 0.6-1.3 mm diam; rachis 1.7-8.5 cm long, interfoliolar segments 0.2-0.9 cm long; extrafloral nectaries 5-15, fusiform, shortly stipitate or stipitate, located between all pairs of leaflets, 0.8-1.5 × c. 0.1 mm; leaflets 5-15 pairs, papyraceous, pilose, 4-23 × 2-65 mm, oblong-elliptic, ovate and suborbicular, venation brochidodromous, nervures 6-9 pairs, apex emarginated and mucronate, base oblique, margin plane, ciliated.

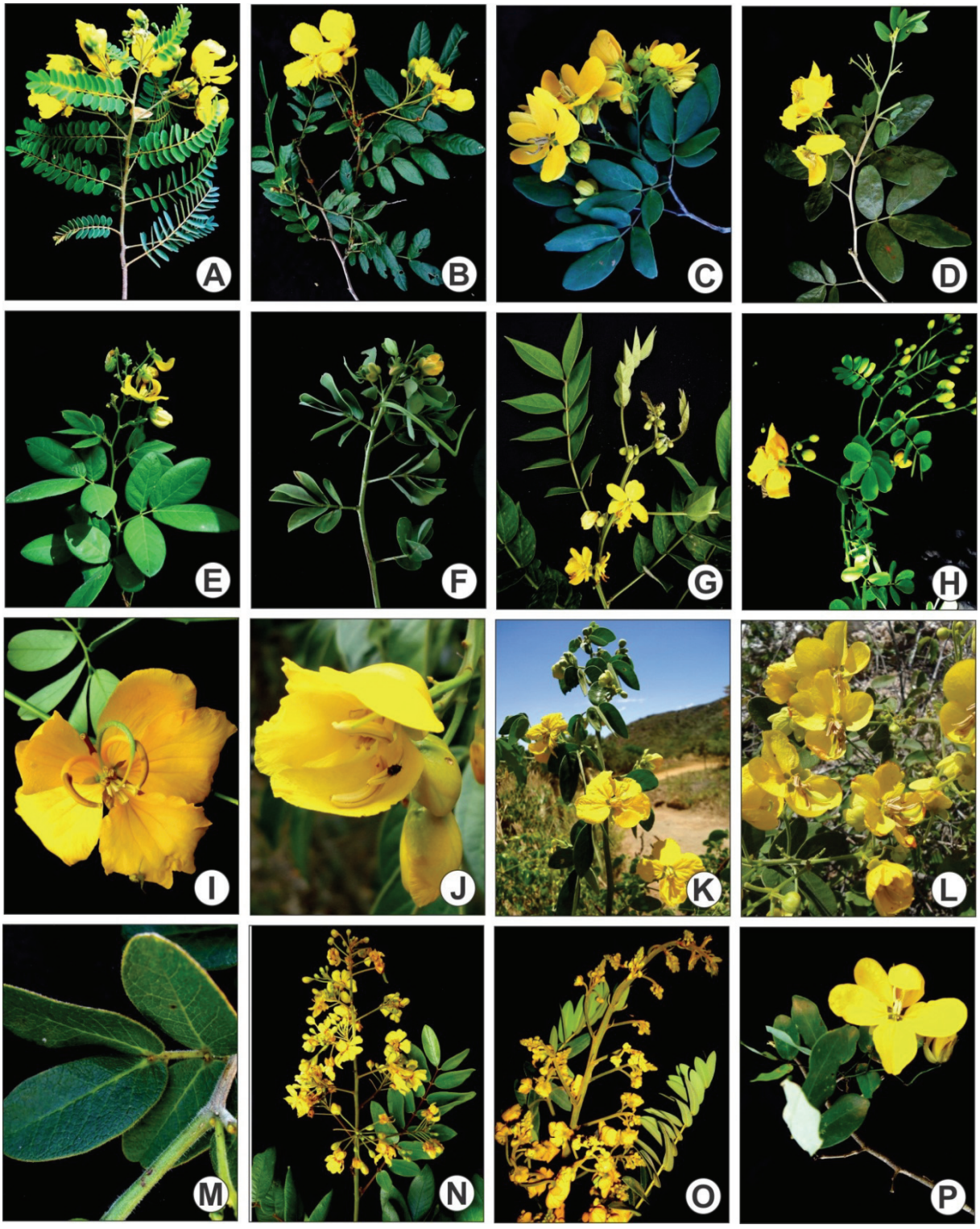

Figure 2. Representatives of the *Senna* in the SGLA. A. *S. acuruensis* var. *acuruensis*; B. *S. cana* var. *cana*; C. *S. macranthera* var. *micans*; D. *S. macranthera* var. *nervosa*; E. *S. macranthera* var. *striata*; F. *Senna obtusifolia*; G. *S. occidentalis*; H-I. *S. pendula* var. *glabrata*; J. *S. reniformis*; K. *S. rizzinii*; L-M. *S. rugosa*; N. *S. silvestris* subsp. *bifaria* var. *bifaria*; O. *S. spectabilis* var. *excelsa*; P. *S. splendida* var. *gloriosa*. Photos (A-P) by Azevedo, F.P.

Inflorescences axillary, racemose, 3-6 flowered, 4.5-6.5 cm long; bracts oblanceolate and obovate, 1.2-1.8 mm long, deciduous, pilose, margin glabrous; pedicel 1.3-2.2 cm long; extrafloral nectaries absent; flower 1.9-3.2 cm diam; sepals heteromorphic, two smaller ovate, 3.8-4.5 × 2.3-3.2 mm, puberulent, margin ciliated, three larger ovate and suborbiculares, 5-6.4 × 4.5-7 mm, glabrous, margin ciliated; petals heteromorphic, yellow, petal vexilar obovate, 9-19 × 4.2-6 mm, two laterals obovate, 11-15 × 5.4-7.4 mm, two abaxial oval-subcordate and subreniform, 12-22 × 13-21 mm; stamens 7, heteromorphic, three largest, 10-13 mm long, four smaller, 5.8-7.3 mm long, fillets 1.4-6.5 mm long, anthers 0.8-5.3 mm long; three staminodes 3-3.4 mm long; ovary pilosulous, 17-23 × 0.8-1 mm, 38-45 ovulated, style 1.4-2 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Estrada de Pindaí para Cascarrenco, 19-II-2013, fl., F.P. Azevedo et al. 141 (HUNEB); Rod. BA-S/C Caculé/Licínio de Almeida, 38.3 km, 30-III-2001, fr., J.G. Jardim et al. 3245 (ALCB); Xaxá, 5-IV-2013, fl., F.P. Azevedo et al. 158 (HUNEB).

Senna acuruensis is endemic to Brazil and widespread in Bahia, but is also distributed in the states of Alagoas, Minas Gerais, and Pernambuco (Souza & Bortoluzzi, 2015). The species encompasses three varieties (Irwin & Barneby, 1982), and in the SGLA is represented by *Senna acuruensis* var. *acuruensis,* which is restricted to Bahia, Alagoas and Pernambuco (Irwin & Barneby, 1982), and found associated with areas of cerrado and caatinga on argillaceous and very rocky soils. It flowers from February to April.

The taxon is characterized by the presence of a peculiar indumentum, composed principally of 0.1 mm long, glandular, orange-colored trichomes present on the branches, stipules, petiole, rachis and inflorescence. Moreover, it has 5-15 pairs of oblong-elliptical, obovate or suborbiculate leaflets with extrafloral nectaries present between all pairs of leaflets.

2. ***Senna cana*** (Nees & Mart.) H.S. Irwin & Barneby var. ***cana***, New York Bot. Gard. 35: 229. 1982. Figures 2.B, 3.a-c

Shrubs 1.5-3 m tall. Indumentum tomentulose constituted of trichomes tector 0.3-0.5 mm long, dense to sparse, pale, rufous, distributed on the branches, stipules, petioles, rachis, abaxial face of the leaflets, ribs, bracts, pedicels, sepals, ovary and fruit. Stipules persistent, subreniform, apex acuminate-caudate, base amplexicaul, subcordate-subauriculate, tomentulose, margin glabrous, 6-12 × 3-5 mm. Leaves 4.5-12.5 cm long; petiole 3-15 mm long; pulvinus 1.3-2.2 mm diam; rachis 3.6-8.2 cm long, interfoliolar segments 0.6-2 cm long; extrafloral nectaries 3-7, claviform and fusiform, stipitate, located between all pairs of leaflets, occasionally absent in the proximal pair or 0-2 in the distal, 2-3 × 0.2-0.6 mm; leaflets 3-7 pairs, chartaceous, adaxial surface strigose, the distal 10-50 × 4-23 mm, the proximal 10-40 × 4-12 mm, elliptic, lanceolate, oblong, ovate and oval-lanceolate, venation craspedodromous, nervures 9-11 pairs, apex acute, acute-mucronate, obtuse, obtuse-mucronate, acuminate and rarely emarginate, base oblique and subcordate, margin revolute, ciliated. Inflorescences axillary, racemose, (5-) 7-15 flowered, 4-9 cm long; bracts lanceolate, 3.8-5 mm long, deciduous, tomentulose, margin glabrous; pedicel 1.2-3 cm long; extrafloral nectaries 1, fusiform, stipitate, located at the base of the pedicel, 1.6-2 × c. 0.1 mm; flower 1.5-3 cm diam; sepals heteromorphic, two smaller ovate, 4-5 × 1.7-2.3 mm, glabrous, margin ciliated, three larger obovate and suborbiculares, 8-10 × 4-8 mm, tomentulose, margin glabrous; petals heteromorphic, yellow, petal vexilar obcordate, 9-17 × 5.5-12 mm, two laterals obovate, 10-17 × 6-13 mm, two abaxial obovate, 10-20 × 8-14 mm; stamens 7, heteromorphic, three largest, a central, 9-10 mm long, two laterals, 10-15 mm long, four smaller, median, 6-7 mm long, fillets 1.4-7 mm long, anthers 4-8 mm long; three staminodes, 3.5-4.5 mm long; ovary tomentulose, 10-17 × 0.1-0.5 mm, 21-25 ovulated, style 2-3.5 mm long. Fruit tomentulose, 6.5-10 × 0.4-0.5 cm; seeds 2-2.8 × 2.1-3 mm.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Alto do Cachoeirão, mata ciliar após a casinha, 28-VI-2013, fl., F.P. Azevedo 203 (HUNEB); Espinhaço, 25-II-2012, fl., F.P. Azevedo et al. 73 (HUNEB); Estrada Pindaí-Cascarrenco, 19-II-2013, fl., F.P. Azevedo et al. 142 (HUNEB); Fazenda São Domingos, Jurema, 10-XII-2009, fr., M.L. Guedes et al. 16760 (ALCB); Garimpo, 25-II-2012, fl., F.P. Azevedo et al. 76 (HUNEB); Garimpo dos Areiões, 25-II-2012, fl., M. Alves et al. 84 (ALCB); Salto da Onça, 25-II-2012, fl., F.P. Azevedo et al. 64 (HUNEB); F.P. Azevedo et al. 68 (HUNEB); Trilha do Cachoeirão, na ferrovia, 26-VII-2012, fl., F.P. Azevedo et al. 81 (HUNEB); Trilha do Saco da Onça, próximo ao limite Licínio de Almeida/Urandi, 19-VII-2012, fr., G.R. Oliveira et al. 7 (ALCB); Salto da Onça estrada para Areião, 12-V-2012, fl., F.P. Azevedo et al. 102 (HUNEB); Xaxá, 24-II-2012, fl., F. Hurbath et al. 211 (ALCB); F. Hurbath et al. 197 (ALCB).

The species is native to Brazil and is widely distributed throughout almost all of its regions with

five varieties (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). *Senna cana* var. *cana* was the only variety recorded in SGLA and occurs in Bahia, Distrito Federal, Goiás, Minas Gerais, Pará and Pernambuco, in areas of caatinga and cerrado (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). In the study area it was collected in areas of cerrado, campo rupestre, caatinga and disturbed areas at altitudes between 887-1168 m, on sandy, argillaceous or rocky soils. It was collected with flowers in February to June and fruits in June.

Senna cana var. *cana* can be recognized by the presence of subreniform stipules; inflorescence and abaxial face of leaflets, especially the ribs, composed of rufous trichomes; leaves with 3-7 pairs of leaflets and extrafloral nectaries present between all of the pairs of leaflets, occasionally absent on the proximal or distal pair. In the study area the taxon can be confused with *S. reniformis*, but can easily be distinguished by being of shrub habit 1.5-3 m in height (*vs.* tree habit 3.5-8 m in height in *S. reniformis*), with stipules 6-12 × 3-5 mm (*vs.* stipules 12-35 × 7-22 mm), leaves 4.5-12.5 cm long (*vs.* 5-20 cm long), petiole 3-15 mm long (*vs.* petiole 13-52 mm long) and 3-7 pairs of leaflets (*vs.* 3-4 pairs).

3. ***Senna macranthera*** (DC. ex Collad.) H.S. Irwin & Barneby var. ***micans*** (Nees) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 185. 1982. Figures 2.C, 3.d-e

Shrubs 1-2 m tall. Indumentum pilosulose constituted of trichomes tector c. 0.1 mm long, straight, dense to sparse, occasionally lutescent and straight 0.1-0.2 mm long, sparse, distributed on thebranches, stipules, petioles, rachis and pedicels. Stipules deciduous, linear-lanceolate, apex attenuated, base truncate, pilosulose, margin glabrous, 1.2-5.5 × 0.1-0.3 mm. Leaves 4-11 cm long; petiole 9-27 mm long; pulvinus 0.7-1.8 mm diam; rachis 0.6-1.8 cm long, extrafloral nectaries 1, ovoid, claviform and fusiform, sessile or shortly stipitate, located between the proximal pair of leaflets, 1.2-1.5 × 0.2-0.7 mm; leaflets 2 pairs, papyraceous, abaxial surface pubescent and adaxial surface puberulent, the distal 30-55 × 15-28 mm, the proximal 14-43 × 7-24 mm, elliptic-oblanceolate, lanceolate-elliptic, obovate, ovate, venation brochidodromous, nervures 7-13 pairs, apex emarginate, short mucronate and obtuse, base cuneate, oblique, obtuse, subcordate, margin revolute, ciliated. Inflorescences axillary, racemose, (4-) 7-9 flowered, 4-9 cm long; bracts lanceolate to ovate, 2.6-3 mm long, deciduous, pubescent, margin glabrous; pedicel 0.7-3.2 cm long; extrafloral nectaries absent; flower 3.5-5.5 cm diam; sepals heteromorphic, two smaller ovate, 4-6.5 × 2.5-4 mm, strigulose, margin glabrous, three largerobovate, elliptic-oblanceolate, 6-9 × 3-4.5 mm, strigulose, margin glabrous; petals heteromorphic, yellow, petal vexilar oblong-elliptic to obovate, 17-27 × 10-14 mm, two laterals elliptical and oblong-elliptic, 18-28 × 10-16 mm, two abaxial oblong-elliptic and obovate, 20-28 × 11-18 mm; stamens 7, heteromorphic, three largest, 11-13 mm long, four smaller, 7-10 mm long, fillets 1.3-2.5 mm long, anthers 5.5-11 mm long; three staminodes 2-3 mm long; ovary strigulose, 21-29 × 0.8-1.1 mm, 105-122 ovulated, style 2.5-3.5 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Espinhaço, 25-II-2012, fl., Azevedo, F.P. et al. 72 (HUNEB); Estrada Pindaí-Cascarrenco, 19-II-2013, fl., Azevedo, F.P. et al. 139 (HUNEB); Rod. para Urandi, ca. 3.8 km da cidade, 30-III-2001, fl., Jardim, J.G. et al. 3293 (HUEFS); Saco da Onça, 25-II-2012, fl., Azevedo, F.P. et al. 71 (HUNEB); São Domingos, 28-III-2012, fl., Azevedo, F.P. et al. 85 (HUNEB); 19-II-2013, fl., Azevedo, F.P. et al. 149 (HUNEB).

The species is widespread throughout South American, from Venezuela, and the Peruvian and Ecuadorian Andes to southern Brazil. It occurs in different types of habitats, from edges of rainforest to open fields (Irwin & Barneby, 1982). *Senna macranthera* is a polymoprhic species with five varieties, all of which occur in Brazil (Irwin & Barneby, 1982), and three of which were recorded in SGLA. *Senna macranthera* var. *micans* is restricted to northeastern Brazil, occurring in the states of Bahia, Ceará, Paraíba, Pernambuco, Piauí and Rio Grande do Norte, and is common in areas of caatinga (Souza & Bortoluzzi, 2015). In the study area it was found in cerrado, and flowering in February and March.

In the study area, this variety can be confused with *S. macranthera* var. *nervosa,* because both have a calyx with relatively small sepals (6-9 × 3-4.5 mm), but are differentiated by *S. macranthera* var. *micans* having smaller distal leaflets (30-55 × 15-28 mm*vs.* 60-80 × 25-37 mm in *S.* var. *nervosa*).

4 ***Senna macranthera*** var. ***nervosa*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 184. 1982. Figures 2D, 3.f-g

Shrubs c. 2 m tall. Indumentum pilosulose constituted of trichomes tector c. 0.1 mm long, straight, dense to sparse, occasionally lutescent and straight 0.1-0.2 mm long, sparse, distributed on

thebranches, stipules, petioles, rachis and pedicels. Stipules deciduous, linear-lanceolate, apex attenuated, base truncate, pilosulose, margin glabrous, 0.5-0.9 × 0.1-0.2 mm. Leaves 4-13 cm long; petiole 10-37 mm long; pulvinus 0.4-1.6 mm diam; rachis 0.6-1.4 cm long, extrafloral nectaries 1, ovoid, claviform and fusiform, sessile or shortly stipitate, located between the proximal pair of leaflets, 1.2-1.6 × 0.4-0.9 mm; leaflets 2 pairs, papyraceous, abaxial surface pubescent and adaxial surface puberulent, the distal 60-80 × 25-37 mm, the proximal 22-60 × 10-35 mm, elliptic-oblanceolate, lanceolate-elliptic, obovate, ovate, venation brochidodromous, nervures 7-13 pairs, apex emarginate, short mucronate and obtuse, base cuneate, oblique, obtuse, subcordate, margin revolute, ciliated. Inflorescences axillary, racemose, (3-) 5-10 flowered, 6.5-11 cm long; bracts lanceolate to ovate, 2.2-3.5 mm long, deciduous, pubescent, margin glabrous; pedicel 2.3-3.7 cm long; extrafloral nectaries absent; flower 4.8-6 cm diam; sepals heteromorphic, two smaller ovate, 5-6 × 3-4 mm, strigulose, margin glabrous, three larger obovate, elliptic-oblanceolate, 6.5-8 × 3-4 mm, strigulose, margin glabrous; petals heteromorphic, yellow, petal vexilar oblong-elliptic to obovate, 21-28 × 11-15 mm, two laterals elliptical and oblong-elliptic, 17-28 × 0.9-16 mm, two abaxial oblong-elliptic and obovate, 19-29 × 9-16 mm; stamens 7, heteromorphic, three largest, 13-14 mm long, four smaller, 7.3-9 mm long, fillets 1-3.2 mm long, anthers 5.4-11 mm long; three staminodes 2-3 mm long; ovary strigulose, 16-25 × 0.8-1 mm, 103-106 ovulated, style 2.2-4 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, São Domingos, 19-II-2013, fl., Azevedo, F.P. et al. 148 (HUNEB).

The variety is endemic to Brazil, with records for Bahia, Distrito Federal, Goiás, Mato Grosso, Minas Gerais, Rio de Janeiro and São Paulo, and is common in cerrado, riparian or gallery forest and degraded areas (Souza & Bortoluzzi, 2015). In SGLA it occurs in areas of cerrado where it was found flowering in February.

The taxon can be confused with *S. macranthera* var. *micans* (see comments in *S.* var. *micans*).

5. ***Senna macranthera*** var. ***striata*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 185. 1982. Figures 2E, 3.h-j

Shrubs c. 1.5 m tall. Indumentum pilosulose constituted of trichomes tector c. 0.1 mm long, straight, dense to sparse, occasionally lutescent and straight 0.1-0.2 mm long, sparse, distributed on the branches, stipules, petioles, rachis and pedicels. Stipules persistent, linear-lanceolate, apex attenuated, base truncate, pilosulose, margin glabrous, 0.8-1.8 × 0.1-0.2 mm. Leaves 3-11.5 cm long; petiole 9-25 mm long; pulvinus 0.4-1.2 mm diam; rachis 0.2-1.1 mm long, extrafloral nectaries 1, ovoid, claviform and fusiform, sessile or shortly stipitate, located between the proximal pair of leaflets, 10-28 × 0.2-0.4 mm; leaflets 2 pairs, papyraceous, abaxial surface pubescent and adaxial surface puberulent, the distal 23-80 × 8-40 mm, the proximal 12-60 × 5-34 mm, elliptic-oblanceolate, lanceolate-elliptic, obovate, ovate, venation brochidodromous, nervures 7-13 pairs, apex emarginate, short mucronate and obtuse, base cuneate, oblique, obtuse, subcordate, margin revolute, ciliated. Inflorescences axillary, racemose, 3-6 flowered, 4.5-8 cm long; bracts lanceolate to ovate, 2.5-4 mm long, deciduous, pubescent, margin glabrous; pedicel 1.5-2.5 cm long; extrafloral nectaries absent; flower 4.8-5.3 cm diam; sepals heteromorphic, two smaller ovate, 5-6.5 × 3.5-4 mm, strigulose, margin glabrous, three larger obovate, elliptic-oblanceolate, (7-)10-14 × (4-)6-8 mm, strigulose, margin glabrous; petals heteromorphic, yellow, petal vexilar oblong-elliptic to obovate, 22-28 × 13-16 mm, two laterals elliptical and oblong-elliptic, 22-27 × 12-17 mm, two abaxial oblong-elliptic and obovate, 24-27 × 13-15 mm; stamens 7, heteromorphic, three largest, 15-19 mm long, four smaller, 7.5-9 mm long, fillets 1.5-9 mm long, anthers 5-12 mm long; three staminodes 1.2-2.4 mm long; ovary pubescent, 24-32 × 1-1.3 mm, 107-128 ovulated, style 4-6.4 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Xaxá, 5-IV-2013, fl., Azevedo, F.P. et al. 157 (HUNEB).

A taxon endemic to Brazil with records for caatinga and cerrado, occurring in the states of Bahia, Goiás, Pernambuco and Tocantins (Souza & Bortoluzzi, 2015). In the study area occurs in area of caatinga, collected in flower in April. The variety can be confused with *S. macranthera* var. *nervosa,* because both have large leaflets, but can be differentiated by the presence of persistent stipules and a calyx with relatively large internal sepals of (7-)10-14 × (4-)6-8 mm (*vs.* deciduous stipules and internal sepals of 6.5-8 × 3-4 mm in *S. macranthera* var. *nervosa*).

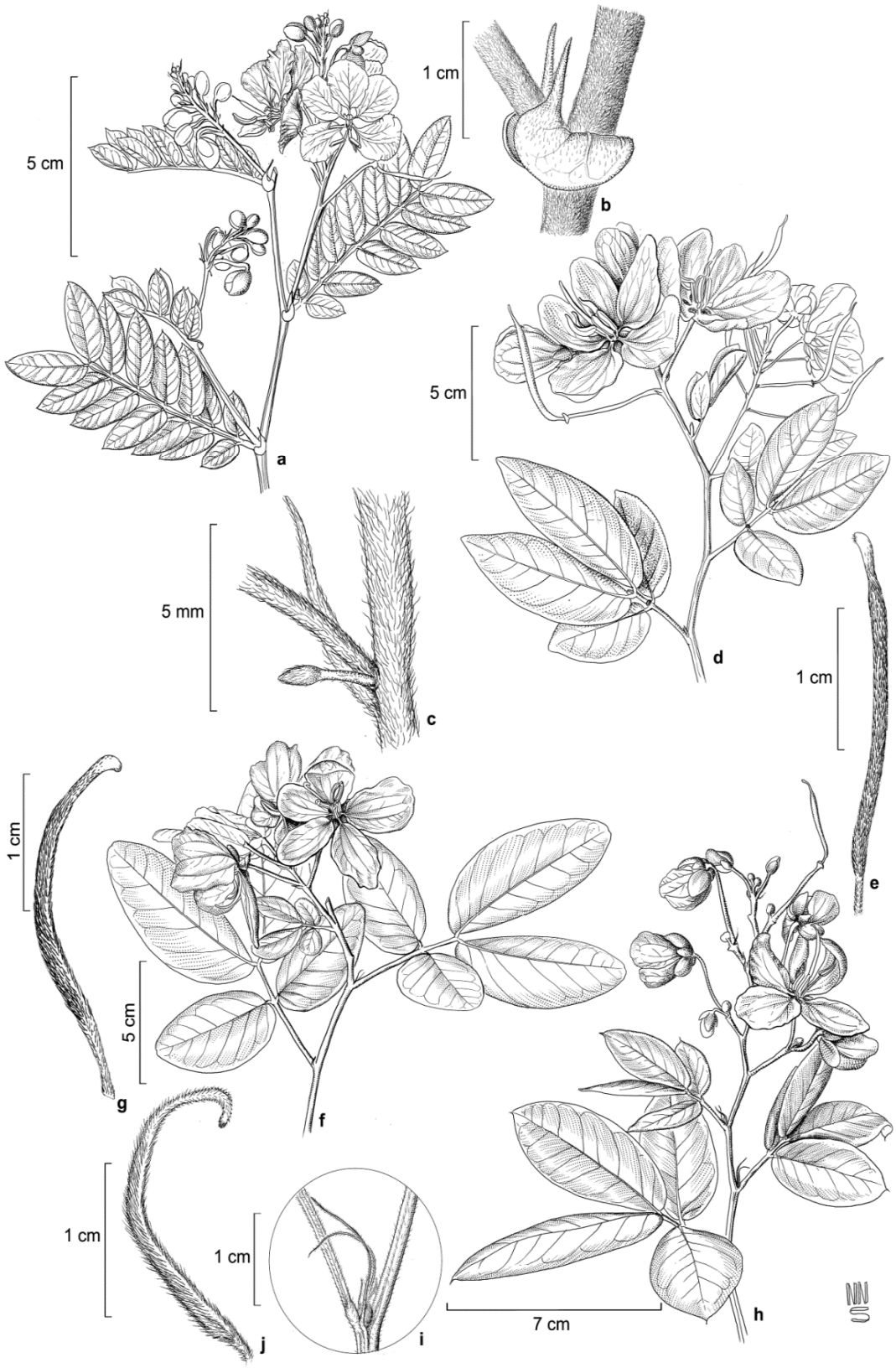

Figure 3. a-c. *Senna cana* var. *cana*: a. flowering branch; b. detail of the stipules; c. nectary in detail on the pedicel. d-e. *S. macranthera* var. *micans*: d. flowering branch; e. ovary. f-g. *S. macranthera* var. *nervosa*: f. flowering branch; g. ovary. h-j. *S. macranthera* var. *striata*: h. flowering branch; i. detail of the stipules; j. ovary. a-c. from Azevedo, F.P. 76; d-e. from Azevedo, F.P. 72; f-g. from Azevedo, F.P. 148; h-j. from Azevedo, F.P. 157.

6. ***Senna obtusifolia*** (L.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 252. 1982. Iconography: Dantas & Silva (2013: 107). Figure 2.F

Herb c. 40 cm tall. Indumentum strigulose constituted of trichomes glandular c. 0.1 mm long, verrucose, sparse and trichomes tector c. 0.1 mm long, sparse, distributed on the branches, petioles, rachis and pedicels. Stipules persistent, linear, apex acute, base truncate, strigulose, margin ciliated, 5.4-13 × 0.4-1 mm. Leaves 2.9-5.8 cm long; petiole 13-30 mm long; pulvinus 0.6-1.1 mm diam; rachis 1-2 cm long, interfoliolar segments 0.3-1.2 cm long; extrafloral nectaries 1, fusiform, stipitate, located between the proximal pair of leaflets, 1.3-2 × 0.3-0.6 mm; leaflets 3 pairs, papyraceous, abaxial face strigose and adaxial face glabrous, the distal 21-41 × 10-21 mm, the proximal 9-26 × 5-18 mm, obovate, venation brochidodromous, nervures 7-9 pairs, apex rounded and mucronate, base cuneate and oblique, margin plane. Inflorescences axillary, racemose, 2 flowered, 1.4-2.6 cm long; bracts lanceolate, 3-5 mm long, persistent, strigose, margin ciliated; pedicel 1.3-1.8 cm long; extrafloral nectaries absent; flower 0.7-1.3 cm diam; sepals heteromorphic, two smaller deltoid, 3.6-4 × 2-2.2 mm, strigose, margin ciliated, three larger ovate to obovate, 5.7-9 × 4-4.2 mm, strigose, margin ciliated; petals heteromorphic, yellow, petal vexilar obcordate, 8-8.2 × 3-5 mm, two laterals obovate and oblong, 5.7-9 × 3-5 mm, two abaxial obovate and oblong, 6-9 × 3-4 mm; stamens 7, heteromorphic, three largest, 4.4-6.1 mm long, four smaller, 4-5 mm long, fillets 11.2-2.1 mm long, anthers 1.8-3.6 mm long; three staminodes 1-1.5 mm long; ovary sericeous, 1.5-1.7 × c. 1.1 mm, 27 ovulated, style c. 3.5 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Distrito de São Domingos, 10-XII-2009, fl., E. Melo et al. 7394 (HUEFS); Garimpo, 25-II-2012, fl., F.P. Azevedo et al. 78 (HUNEB).

Senna obtusifolia is widely distributed in the Americas, occurring from Argentina to the United States, and has been introduced to Africa and Asia (Irwin & Barneby, 1982). In Brazil, it is recorded in the majority of states and in all regions, and is common on the shores of lakes and rivers, becoming a weed in pastures and crops, along roads, in desolate places and on farms and at homes (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). In the study area it was collected in anthropized environments on sandy or rocky soils, and with flower in February.

In the study area, the species can be recognized by the presence of leaves with three pairs of obovate leaflets with rounded and mucronate apices and flowers of c. 1.5 mm in diameter.

7. ***Senna occidentalis*** (L.) Link, Handbuch [Link] 2: 140. 1831. Iconography: Dantas & Silva (2013: 107). Figure 2.G

Shrubs 0.7-0.8 m tall. Indumentum pubescent constituted of trichomes glandular c. 0.1 mm long, verrucose, sparse and trichomes tector c. 0.1 mm long, sparse, distributed on the branches, stipules, rachis, abaxial face leaflets and pedicels. Stipules deciduous. Leaves 0.8-22 cm long; petiole 25-42 mm long; pulvinus 1.7-2.3 mm diam; rachis 4-10.7 cm long, interfoliolar segments 0.7-2.6 cm long; extrafloral nectaries 1, ovoid, ellipsoid, sessile or short stipitate, located on the pulvinus, 1.2-2 × 1.2-1.5 mm; leaflets (3-)4-5 pairs, papyraceous, pubescent, venation brochidodromous, nervures 5-9 pairs, the proximal 10-37 × 7-24 mm, oval-elliptic, apex acuminate, base oblique-obtuse, margin plane, ciliated, the distal 26-75 × 13-30 mm, elliptic, apex acuminate, base oblique-obtuse, margin plane, ciliated. Inflorescences axillary, racemose umbellately, 3-7 flowered, 2.7-3.3 cm long; bracts lanceolate, 2-2.5 mm long, deciduous, pubescent, margin glabrous; pedicel 1-1.4 cm long; extrafloral nectaries absent; flower 2-2.5 cm diam; sepals heteromorphic, two smaller elliptic and lanceolate-elliptic, 5-6.5 × 4-4.2 mm, puberulent, margin glabrous, three larger obovate, 7-9 × 5-6 mm, puberulent, margin glabrous; petals heteromorphic, yellow, petal vexilar obcordate, 1.1-16 × 8-12 mm, two laterals elliptic-obovate, 10-14 × 7-8 mm, two abaxial obovate, 11-16 × 5-8 mm; stamens 7, heteromorphic, three largest, a central, 5.5-6 mm long, two laterals, 10-12 mm long, four smaller, median, 5.5-6.5 mm long, fillets 1.7-7 mm long, anthers 2-6 mm long; three staminodes, 3.5-5.5 mm long; ovary strigulose, 16-20 × 0.8-1 mm, 63-72 ovulated, style 3-3.3 mm long. Fruit pubescent, 14-18 × 0.2-0.25 cm; seeds 1.6-1.8 × 0.9-1.2 mm.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Riacho Fundo, 19-II-2013, fl. fr., F.P. Azevedo et al. 145 (HUNEB).

Senna occidentalis encompasses tropical and subtropical America, Asia, Africa, and Australia, and is widely distributed throughout Brazil being recorded in each state (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). A ruderal species that occurs in disturbed environments such as roads, pastures and open areas (Irwin & Barneby, 1982). In the study area, it occurs in disturbed areas on sandy and rocky soils. It was collected in flower in February and April and fruiting in February.

The species is easily recognized by the presence of an extrafloral nectary on the pulvinus, a characteristic not encountered among congener species in the area, and by the presence of oval-

elliptical proximal leaflets and elliptical distant leaflets.

8. ***Senna pendula*** (Willd.) H.S. Irwin & Barneby var. ***glabrata*** (Vogel) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 383. 1982. Iconography: Dantas & Silva (2013: 109). Figure 2.H-I

Shrubs c. 1.5 m tall. Indumentum pubescent constituted of trichomes tectores 0.2-1 mm long, sparse, distributed on the petiole, rachis, abaxial face leaflets, bracts, pedicel and sepals. Stipules deciduous. Leaves 4.5-9.3 cm long; petiole 12-27 mm long; pulvinus 0.8-1 mm diam; rachis 2-3.8 cm long, interfoliolar segments 0.3-1.1cm long; extrafloral nectaries 1, oblong, obovoid, globose or claviform, sessile or short stipitate, located between the proximal pair of leaflets, 1-1.6 × 0.4-1.1 mm; leaflets 5 pairs, papyraceous, abaxial face pubescent, adaxial face glabrous, the distal 15-32 × 7-16 mm, the proximal 10-19 × 6-13 mm, oblanceolate to obovate, venation brochidodromous, nervures 5-7 pairs, apex emarginated, base oblique-obtuse, margin plane, glabrous. Inflorescences axillary, racemose, 9-23 flowered, 5.5-17.8 cm long; bracts lanceolate-subulate, 3-4 mm long, deciduous, pubescent, margin glabrous; pedicel 1-1.8 cm long; extrafloral nectaries absent; flower 5.3-6 cm diam; sepals heteromorphic, two smaller ovate and lanceolate-elliptic, 6-10 × 4-5 mm, pubescent, margin glabrous, three larger lanceolate-elliptic, 10-13 × 5.5-9 mm, pubescent, margin glabrous; petals heteromorphic, yellow, petal vexilar obcordate, 23-25 × 18-20 mm, two laterals obovate, 22-26 × 16-21mm, two abaxial obovate, 23-26 × 10-12 mm; stamens 7, heteromorphic, three largest, a central, 11-13 mm long, two laterals, 24-26 mm long, four smaller, median, 6-7.5 mm long, fillets 0.7-16 mm long, anthers 8-9 mm long; three staminodes, 7-8 mm long; ovary pilosulous, glabrous on the laterals sutures, 14-28 × 0.7-1 mm, 11-142 ovulated, style 2.5-8 mm long. Fruit not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Estrada para Areião, 5-IV-2013, fl., Azevedo, F.P. et al. 159 (HUNEB).

The species in known from Mexico to Argentina. In Brazil, it occurs in the majority of the states, with the exception of some states in the North and Northeast regions, in addition to Rio de Janeiro (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). Irwin and Barneby (1982) recognized 19 varieties for *S. pendula*, of which only two occur in Bahia: *S. pendula* var. *glabrata* and *S. pendula* var. *dolichandra*. In the study area, only *S. pendula* var. *glabrata* was recorded, which is distributed form the north to the south of Brazil, occurring in Bahia, Goiás, Distrito Federal, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Rio de Janeiro and São Paulo (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). Generally it is found in cerrado, campo rupestre, areas of contact with caatinga and seasonal forest, and can be ruderal (Souza & Bortoluzzi, 2015). In SGLA it was collected in an anthropized environment on argillaceous and rocky soils and flowers in April.

Senna pendula var. *glabrata* can be easily recognized by the presence of five pairs of oblanceolate to obovate leaflets with a globose or claviform extrafloral nectaries inserted between the proximal pair of leaflets. Moreover, it has obcordate vexilar petals and an androceum with a reduced central abaxial stamen.

9. ***Senna reniformis*** (G. Don) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 223. 1982. Figures 2.J, 4.a-c

Tree 3.5-8 m tall. Indumentum puberulent constituted of trichomes tector c. 0.1 mm long, straight, sparse, lutescent, distributed on the branches, stipules, petiole, rachis, leaflets, pedicel ovary and fruit. Stipules persistent, subreniform, apex acuminate-caudate, base amplexicaul, subcordate-subauriculate, puberulent, margin glabrous, 12-35 × 7-22 mm. Leaves 5-20 cm long; petiole 13-52 mm long; pulvinus 1.5-2.7 mm diam; rachis 1.8-6.8 cm long, interfoliolar segments 0.9-3.6 cm cm long; extrafloral nectaries 3-4, ovoid, turbinate, sessile or short stipitate, located between all pairs of leaflets, 1-1.5 × 0.7-1.2 mm; leaflets 3-4 pairs, chartaceous, puberulent, the distal 33-112 × 15-48 mm, the proximal 20-84 × 12-37 mm, elliptic, lanceolate-elliptic and ovate, venation brochidodromous, nervures 9-10 pairs, apex acuminate and obtuse, base oblique, margin revolute, ciliated. Inflorescences axillary, racemose, 20-33 flowered, 6.3-14.8 cm long; bracts deciduous; pedicel 1.2-3.2 cm long; extrafloral nectaries 1, turbinate, stipitate, located above the middle of pedicel, 1.2-1.5 × 0.5-0.7 mm; flower 3.5-4 cm diam; sepals heteromorphic, two smaller ovate and suborbicular, 8-10 × 5.2-8 mm, puberulent, margin ciliated, three larger suborbicular, 11-15 × 11-12 mm, puberulent, margin ciliated; petals heteromorphic, yellow, petal vexilar obovate, 1.4-1.7 × 1-1.2 mm, two laterals obovate, 17-19 × 12-13 mm, two abaxial obovate, 12-15 × 8-10 mm; stamens 7, heteromorphic, three largest, 12-1.5 mm long, four smaller, 6.4-7 mm long, fillets 1.4-5.5 mm long, anthers 5-10 mm long; three staminodes 4.2-5 mm long; ovary puberulent, 1.1-22 × 0.7-1 mm, c. 44 ovulated, style 3-5.4 mm long. Fruit puberulent, 9.7-13 × 0.9-1 cm; seeds 5-5.6 × 1.5-2 mm.

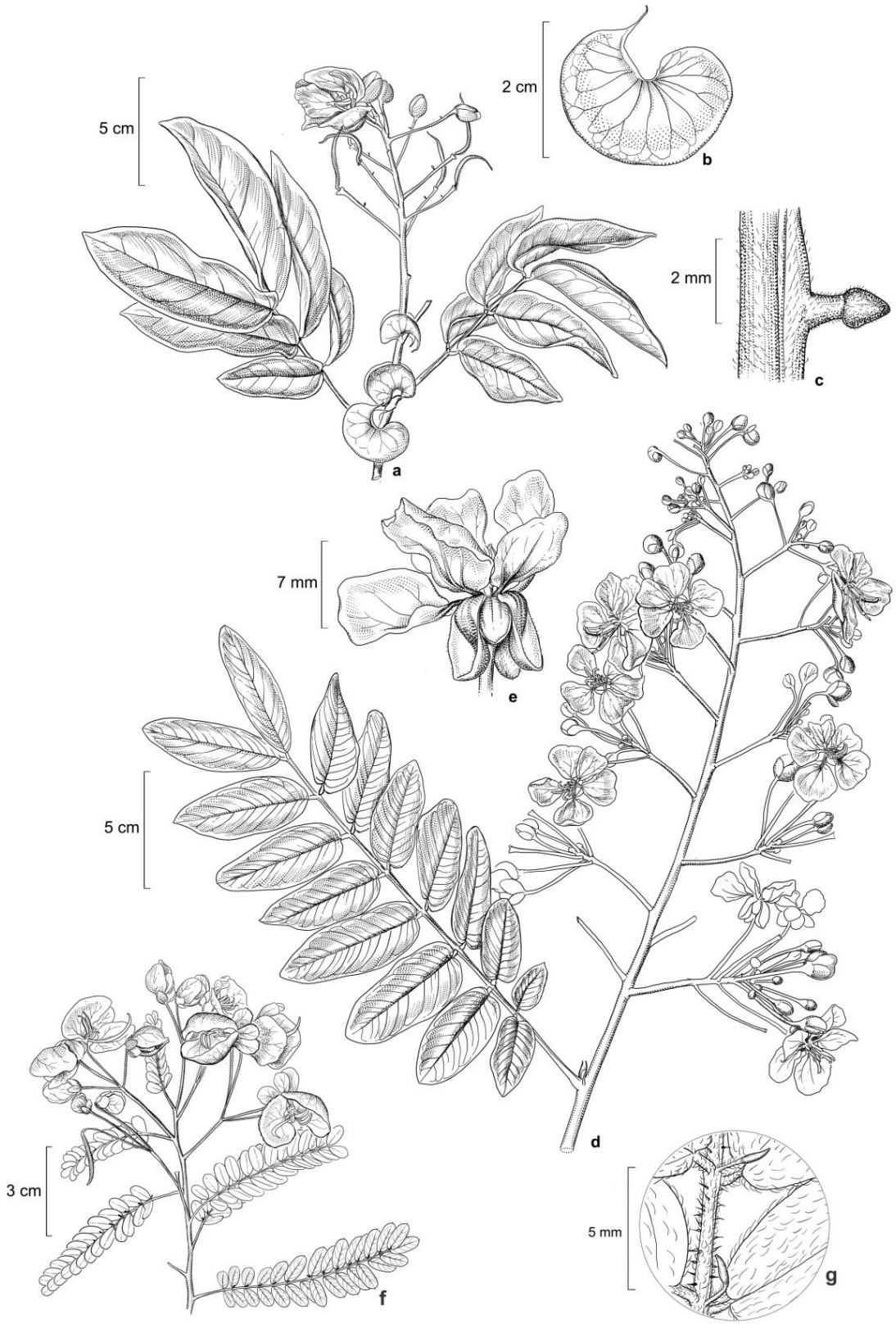

Figure 4. a-c. *S. reniformis*: a. flowering branch; b. stipule; c. detail of nectary on the pedicel. d-e. *S. silvestris* subsp. *bifaria* var. *bifaria*: d. flowering branch; e. flower with sepals deflexed, f-g. *S. acuruensis* var. *acuruensis*: f. flowering branch; g. detail of indumentum and nectary. a-c. from Azevedo, F.P. 99; d-e. from Azevedo, F.P. 126; f-g. from Azevedo, F.P. 141.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Alto do Cachoeirão, mata ciliar após a casinha, 28-VI-2013, fr., F.P. Azevedo et al. 202 (HUNEB); Trilha do Cachoeirão, depois da casinha, 11-V-2012, fl. fr., F.P. Azevedo et al. 99 (HUNEB).

The species is endemic to Brazil with occurrences in the states of Bahia, Minas Gerais, Sergipe and São Paulo, where it is common in caatinga and the cerrado (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). In SGLA it occurs in riparian forest environments and was collected in flower in April and May and fruiting in June.

Senna reniformis can be easily identified by its arboreal habit, leaves with 3-4 pairs of leaflets, subreniform stipules, acuminate-caudate apex, amplexicaul, subcordate-subauriculate base and extrafloral nectaries located between all pairs of leaflets and the pedicels of the flowers. It is morphologically similar to *S. cana* var. *cana,* with which it shares characteristics such as shape of the stipules and extrafloral nectaries located on the pedicels. The differences between the two species are provided in the comments of *S. cana* var. *cana.*

10. ***Senna rizzinii*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 174. 1982. Iconography: Melo (2013: 86). Figure 2.K

Shrubs c. 1.5 m tall. Indumentum villose constituted of trichomes tectores c. 0.1 mm long, dense, distributed on the branches, stipules, petiole, rachis, and pedicel. Stipules deciduous, linear-subulate, apex attenuate, base truncate, villose, margin glabrous, 6-7.5 × c. 0.1 mm. Leaves 2.7-6.5 cm long; petiole 11-18 mm long; pulvinus 1-1.3 mm diam; rachis 0.4-0.7 cm long; extrafloral nectaries 1, ellipsoid, fusiform to claviform, short stipitate or stipitate, located between the leaflets of the proximal pair, 1.2-1.5 × 0.2-0.4 mm; leaflets 2 pairs, papyraceous, abaxial face pubescent and adaxial face puberulent, the distal 22-50 × 9-22 mm, the proximal 17-33 × 9-23 mm, elliptic and ovate, venation brochidodromous, nervures 6-8 pairs, apex acute, rounded and obtuse, base rounded, oblique-cuneate to subcordada, margin revolute, ciliated. Inflorescences axillary, racemose-subcorymbose, 3-8 flowered, 4-7.5 cm long; bracts oval-elliptic to ovate, 6-8 mm long, persistent, pubescent, margin glabrous; pedicel 1.4-2 cm long; extrafloral nectaries absent; flower 3-5 cm diam; sepals heteromorphic, two smaller oblong-ovate and suborbicular, 8-9.2 × 5-6.2 mm, pubescent, margin ciliated, three larger oblong-obovate, elliptic and obovate, 10-12 × 5.5-7.5 mm, pubescent, margin ciliated; petals heteromorphic, yellow, petal vexilar, obcordate, 14-25 × 13-23 mm, two laterals, obovate and ovate, 14-26 × 11-20 mm, two abaxial, obovate, 15-27 × 9-20 mm; stamens 7, heteromorphic, three largest, 13-16 mm long, four smaller, 10-11 mm long, fillets 2.2-5 mm long, anthers 9-11 mm long; three staminodes 4-6 mm long; ovary pilosulous, 27-33 × 1.3-15 mm, 104-117 ovulated, style 3.5-4 mm long. Fruit glabrous to pilosulous, 6-9 × 1-1.4 cm; seeds not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Estrada para Areião, 18-X-2012, fl. fr., F.P. Azevedo et al. 109 (HUNEB).

The species is endemic to the Northeast Region of Brazil, and occurs in all of the states where it is common in caatinga and cerrado (Souza & Bortoluzzi, 2015). In the study area, it was collected in an anthropized area with flowers in October.

Senna rizzinii can be recognized in the study area by having two pairs of elliptical and ovate leaflets, apex rounded and obtuse, extrafloral nectary located between the proximal pair of leaflets and suborbicular persistent bracts. Of the species recorded for SGLA, it most resembles *S. macranthera*, however it can easily be distinguished by having suborbicular persistent bracts and flowers of 3-5 cm in diameter (*vs.* lanceolate-ovate deciduous bracts and flowers of 3.5-6 cm diameter in *S. macranthera*).

11. ***Senna rugosa*** (G. Don) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 188. 1982. Iconography: Dantas & Silva (2013: 111). Figure 2.L-M

Shrubs 0.5-1 m tall. Indumentum pubescent constituted of trichomes tectores c. 0.1 mm long, dense and straight, 0.5-0.7 mm long, dense to sparse, lutescent, distributed on the branches, stipules, petiole, leaflets, rachis, bracts, pedicel, sepals and petals. Stipules deciduous, linear-subulate, apex attenuate, base truncate, pubescent, margin glabrous, 2.7-6.3 × 0.2-0.3 mm. Leaves 33-12.2 cm long; subsessile or short petiolate, petiole 2.5-10 (-15) mm long; pulvinus 1.2-2 mm diam; rachis 0.6-1.8 cm long; extrafloral nectaries 2, ovoid, ovoid-ellipsoid, occasionally ellipsoid-fusiform or short stipitate, sessile, located between all pairs of leaflets, 9-20 × 8-13 mm; leaflets 2 pairs, coriaceous, rough, pubescent, the distal 21-94 × 6-29 mm, the proximal 17-70 × 8-28 mm, elliptic, elliptic-oblanceolate and ovate, venation brochidodromous, nervures 8-14 pairs, apex acute, emarginate and obtuse, base subcordate-oblique, margin revolute, ciliated. Inflorescences axillary, racemose, 4-14 flowered, 6.5-13 cm long; bracts oval-elliptic, 2.3-4 mm long, deciduous, pubescent, margin glabrous; pedicel 1.4-3.7 cm long; extrafloral nectaries absent;

flower 3.5-4.5 cm diam; sepals heteromorphic, two smaller ovate, 5-7 × 4-4.2 mm, glabrous, margin ciliated, three larger oblong-obovate, 8.7-10 × 5-6.5 mm, glabrous, margin ciliated; petals almost isomorphic, yellow, orbicular, obovate, suborbicular, 18-24 × 14-21 mm; stamens 7, heteromorphic, three largest, 12-15 mm long, four smaller, 7.4-9 mm long, fillets 1.7-5 mm long, anthers 5.3-19 mm long; three staminodes 3-3.5 mm long; ovary pilosulous, 20-25 × 1.5-2 mm, 63-65 ovulated, style 5-5.5 mm long. Fruit puberulent, 4.3-9 × 0.8-12 cm; seeds 5.5-6 × 2-2.5 mm.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Alto do Cachoeirão, mata ciliar após a casinha, 28-VI-2013, fl. fr., F.P. Azevedo et al. 201 (HUNEB); Areião, 5-IV-2013, fl., F.P. Azevedo et al. 161 (HUNEB); Cascarrenco, 11-V-2012, fl. fr., F.P. Azevedo et al. 95 (HUNEB); Curral do Estevão, 10-V-2012, fl., N. Roque et al. 3503 (ALCB); Fazenda Serrana, depois da mata, 5-IV-2013, fl., F.P. Azevedo et al. 162 (HUNEB); km 20, em direção ao povoado de 2 passagens de Jurema, divisa município Caetité e Pindaí, 16-VII-2011, fr., N. Roque et al. 3200 (ALCB); Região de Formigas, 10-V-2012, fr., N. Roque et al. 3236 (ALCB); Saco da Onça, estrada para Areião, 12-V-2012, fl., F.P. Azevedo et al. 103 (HUNEB); São Domingos, 28-III-2012, fl., F.P. Azevedo et al. 84 (HUNEB); Pedra Preta, 5-IV-2013, fl., F.P. Azevedo et al. 165 (HUNEB).

The species is distributed in South America in the countries of Bolivia, Paraguay and Brazil, in the latter of which it occurs in all of the regions and is common in cerrado and open and degraded environments on sandy and rocky soil (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). It flowers from March to May and fruits from April to May.

The species can be recognized by the presence of lutescent trichomes covering mainly the branches, petiole, leaflets, sepals and petals; petioles relatively short, shorter than the rachis; leaflets leathery, rugose with extrafloral nectaries located between the pairs of leaflets. In the study area it can be confused with *S. macranthera*, but differs in having a shorter petiole, 2.5-10 (-15) mm, that is usually shorter than the rachis, leathery leaflets with extrafloral nectaries located between the two pairs of leaflets (*vs.* petiole 9-37 mm, usually longer than rachis, leaflets papyraceous with extrafloral nectaries located between the proximal pair of leaflets in *S. macranthera*).

12. ***Senna silvestris*** (Vell.) H.S. Irwin & Barneby subsp. ***bifaria*** var. ***bifaria*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 92. 1982. Figures 2.N, 4.d-e

Tree or shrub 1.6-3 m tall. Indumentum pilosulose constituted of trichomes tectores c. 0.1 mm long, tiny, dense and erect 0.1-0.3 mm long, dense to sparse, lutescent, distributed on the branches, stipules, petiole, rachis, leaflets and pedicel. Stipules deciduous, linear-subulate, apex attenuate, base truncate, pilosulose, margin glabrous, 7-8 × 0.2-0.9 mm. Leaves 15-21 cm long; petiole 30-42 mm long; pulvinus 2-3.2 mm diam; rachis 8.2-13 cm long; interfoliolar segments 1.1-2.8 cm long; extrafloral nectaries absent; leaflets 6-7 pairs, papyraceous, pilosulose, 33-73 × 17-25 mm, lanceolate, oblong to oval, elliptical, venation brochidodromous, nervures 11-18 pairs, apex acute and obtuse-mucronate, base rounded and cordate, margin revolute, glabrous. Inflorescences terminal or axillary, paniculate-corimbosa, 8-21 flowered, 3.5-11.5 cm long; bracts ovate, 2.3-4 mm long, deciduous, strigulose, margin glabrous; pedicel 2-3.3 cm long; extrafloral nectaries absent; flower 3-4.7 cm diam; sepals heteromorphic, deflexed, two smaller oval-suborbicular, 4-7 × 3.6-5 mm, puberulent, margin ciliated, three larger oval-suborbicular and oblong-obovate, 7-10 × 6-9 mm, glabrous, margin ciliated; petals almost isomorphic, yellow, base orange-red, oval-flabellate, 17-22 × 15-25 mm; stamens 7, heteromorphic, three largest, 9-11 mm long, four smaller, 6.7-8 mm long, fillets 2.2-6 mm long, anthers 4.2-7 mm long; three staminodes 3.2-4 mm long; ovary pilosulous the laterals seams, 13-14 × 1.3-2 mm, 42-56 ovulated, style 2-2.5 mm long. Fruit pilosulous the laterals seams, 11.5-16.7 × 1.7-2 cm; seeds not seen.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Areião, 5-IV-2013, fl. fr., F.P. Azevedo et al. 160 (HUNEB); Riacho Fundo, 19-II-2013, fl., F.P. Azevedo et al 147 (HUNEB); Saco da Onça, 10-I-2013, fl., F.P. Azevedo 126 (HUNEB).

Senna silvestris is known from South America and is widely distributed in Brazil. The species was circumscribed by Irwin and Barneby (1982) with two subspecies and six varieties, while in the study area only *S. silvestris* var. *bifaria* is found. The taxon is distributed in Bahia, Distrito Federal, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, São Paulo and Tocantins, and is common in cerrado, edges of gallery forest and in perturbed environments (Souza & Bortoluzzi, 2015). In the study area, the variety occurs in cerrado and edges of riparian forest and flowers from January to April and was collected with fruits in April.

The taxon can be recognized in SGLA by the absence of extrafloral nectaries, leaves with 6-7 pairs of leaflets and yellow petals with a yellow-orange base. It can be confused with *S. spectabilis* var. *excelsa* in the study area, but the two taxa can be distinguished by *S. silvestris* var. *bifaria* having paniculate-corymbose inflorescences, yellow petals with a yellow-orange base and heteromorphic stamens (*vs.* paniculate or racemose inflorescences, flowers with yellow petals and almost isomorphic stamens in *S. silvestris* var. *excelsa*).

13. ***Senna spectabilis*** (DC.) H.S. Irwin & Barneby var. ***excelsa*** (Schrad.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 604. 1982. Iconography: Melo (2013: 86). Figure 2.O

Tree or shrub 2.5-3 m tall. Indumentum pilosulose constituted of trichomes tectores c. 0.1 mm long, incurved, dense to sparse and erect 0.1-0.5 mm long, sparse, lutescent, distributed on the branches, stipules, petiole, rachis, leaflets, bracts and pedicel. Stipules deciduous, linear, apex attenuate, base truncate, pilosulose, margin glabrous, 9-10 × 0.3-1 mm. Leaves 7.5- 24.5 cm long; petiole 17-32 mm long; pulvinus 1-2.3 mm diam; rachis 4.5-21.5 cm long; interfoliolar segments 0.7-1.5 cm long; extrafloral nectaries absent; leaflets 12-18 pairs, chartaceous, pilosulose, 13-41 × 7-13 mm, elliptic, oblong-elliptic, obovate or suborbicular, venation brochidodromous, nervures 10-16 pairs, apex mucronate, base obtuse, margin revolute, ciliated. Inflorescences terminal, paniculate or racemose, 18-30 flowered, 3.5-8 cm long; bracts lanceolate, 8-9 mm long, deciduous, pilosulose, margin glabrous; pedicel 0.9-2.5 cm long; extrafloral nectaries absent; flower 1.3-2.5 cm diam; sepals heteromorphic, two smaller ovate, 3-4 × 2.2-3.4 mm, puberulent, margin glabrous, three larger oval and suborbicular, 5.8-8.6 × 4.2-8 mm, puberulent, margin glabrous; petals heteromorphic, yellow, petal vexilar obovate, 14-17 × 11.5-13 mm, two laterals obovate, 17-20 × 11.5-15 mm, two abaxial obovate and subreniform, 14-25 × 24-29 mm; stamens 7, almost isomorphic, 9-11 mm long, fillets 2-3.8 mm long, anthers 6-8 mm long; three staminodes 3-5 mm long; ovary glabrous, 23-25 × 0.7-0.8 mm, 89-101 ovulated, style 2-2.4 mm long. Fruit glabrous, 9.5-20 × 0.8-1.1 cm; seeds 5-6 × 3.5-4.2 mm.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Estrada Licínio-Sete Quedas, 11-I-2013, fl., F.P. Azevedo et al. 131 (HUNEB); Lameirão, 28-IV-2013, fr., F.P. Azevedo et al. 208 (HUNEB); Saco da Onça, 25-II-2012, fl., F.P. Azevedo et al. 65 (HUNEB).

The species endemic to Brazil, occurring in Alagoas, Bahia, Ceará, Distrito Federal, Goiás, Maranhão, Mato Grosso do Sul, Minas Gerais, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Sergipe and Tocantins, and is normally associated with caatinga, cerrado and ombrophilous forest (Irwin & Barneby, 1982; Souza & Bortoluzzi, 2015). According to Irwin and Barneby (1982) *S. spectabilis* has two varieties, but only *S. spectabilis* var. *excelsa* occurs in Bahia. In the study area, the taxon inhabits distrubed areas, principally on roadsides. It was collected with flowers in January and February and fruits in June.

Senna spectabilis var. *excelsa* is easily characterized in the study area by having leaves with 12-18 pairs of chartaceous, pilosulose leaflets with revolute margins and almost isomorphic stamens. It is morphologically similar to *S. silvestres* var. *bifaria,* with which it shares characteristics such as habit and absence of extraflorial nectaries. The characters that differ between the two species are in the comments of *S. silvestris* var. *bifaria.*

14. ***Senna splendida*** (Vogel) H.S. Irwin & Barneby var. ***gloriosa*** H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35: 192. 1982. Iconography: Melo (2013: 87). Figure 2.P

Shrubs 1-3 m tall. Indumentum strigulose constituted of trichomes tector c. 0.1 mm long, adpressed, dense to sparse, distributed on the ovary and fruit. Stipules deciduous, oblanceolate, apex acute, base cuneate, glabrous, margin glabrous, 8-17 × 1.5-4.5 mm. Leaves 2.5-10 cm long; petiole 13-34 mm long; pulvinus 7-1.5 mm diam; rachis 0.2-1.7 mm long, extrafloral nectaries 1, ovoid, lanceolate-ellipsoid, claviform to linguiform, stipitate or shortly stipitate, located between the proximal pair of leaflets or rachis just above the proximal pair, 1-6.5 × 0.2-0.7 mm; leaflets 2 pairs, papyraceous, glabrous, the distal 14-67 × 6-27 mm, the proximal 11-54 × 6-24 mm, lanceolate-elliptic, obovate, venation brochidodromous, nervures 14-17 pairs, apex obtuse, subemarginate to short mucronate, base oblique to rounded, margin plane or slightly revolute, glabrous. Inflorescences axillary, racemose-subumbellate, 3-6 flowered, 6-13 cm long; bracts ovate and lanceolate, 4.5-5.5 mm long, persistent, glabrous, margin glabrous; pedicel 1.2-2.5 cm long; extrafloral nectaries absent; flower 4-6.5 cm diam; sepals heteromorphic, two smaller oblong-lanceolate, 19-21 × 5-8 mm, glabrous, margin glabrous, three larger oblanceolate and ovate, 23-26 × 9-14 mm, glabrous, margin glabrous; petals heteromorphic, yellow, petal vexilar, obcordate, 26-38 × 18-28 mm, two laterals oblanceolate, cymbiform, 33-41 × 20-25 mm, two abaxial

oblanceolate-ovate, 2-4 × 1.2-2.3 mm; stamens 7, heteromorphic, three largest, 16-20 mm long, four smaller, 8-9 mm long, fillets 2.7-10 mm long, anthers 6-16 mm long; three staminodes 3.5-5 mm long; ovary strigulose, 28-40 × 1-1.2 mm, 152-173 ovulated, style 3-5 mm long. Fruit strigulose, 18.2-20.6 × 0.4-0.5 cm; seeds 2.6-3 × 1.3-1.5 mm.

Material examined: BRAZIL. Bahia: Licínio de Almeida, Estrada Garimpo-Espinhaço, 28-III-2012, fl., F.P. Azevedo 89 (HUNEB); Fazenda Serrana, depois da mata, 5-IV-2013, fl. fr., F.P. Azevedo et al. 163 (HUNEB); Saco da Onça, 18-X-2012, fl., F.P. Azevedo et al. 113 (HUNEB); Trilha do Cachoeirão, antes da caixa, 6-IV-2013, fl. fr., F.P. Azevedo 167 (HUNEB); Rod. BA-S/C Caculé/Licínio de Almeida, 38.3 km, 30-III-2001, fl. fr., J.G. Jardim et al. 3242 (ALCB).

Senna splendida occurs in Paraguay, Brazil, Uruguay, Africa and the Malayan Peninsula (Irwin & Barneby, 1982). In Brazil it occurs in all the states of the Northeast and Southeast regions, and in the states of Mato Grosso do Sul and Paraná (Souza & Bortoluzzi, 2015). According to Irwin and Barneby (1982) the species has two varieties, of which *S. splendida* var. *gloriosa* was catalogued for the study area. The taxon is endemic to Brazil, occurring in the states of Alagoas, Bahia, Ceará, Minas Gerais, Paraíba, Pernambuco and Rio Grande do Norte, in areas of caatinga, cerrado, ombrophilous forest and restinga (Irwin & Barneby, 1982, Souza & Bortoluzzi, 2015). In SGLA, *S. splendida* var. *gloriosa* occurs in edges of forest and cerrado on argillaceous and rocky soils. It was collected with flowers in March and October and fruits in April and November.

In SGLA, the taxon can be recognized by having oblanceolated stipules with acute apices; leaves with two pairs of lanceolate-elliptical, papyraceous, glabrous leaflets; oblong-lanceolated external sepals and the presence of a strigulose indumentum on the gynoecium and fruits. In the study area, it can be confused with *S. macranthera* because both possess leaves with two pairs of leaflets, extrafloral nectaries between the proximal pair of leaflets, relatively large flowers and heteromorphic anthers. *Senna splendida* var. *gloriosa* differs from *Senna macranthera* by having oblanceolate stipules, glabrous leaves and oblong-lanceolated external sepals (*vs.* linear-lanceolate, leaflets puberulous or pubescent and oval external sepals *S. macranthera*).

Conclusion

A total of 14 taxa of the genus *Senna* were recorded in SGLA. The most representative species in the area were *S. silvestris* subsp. *bifaria* var. *bifaria*, *S. macranthera* var. *striata* and *S. macranthera* var. *nervosa*, occurring principally in cerrado environments. The occurrence of *Senna reniformis* was restricted, and associated with the riparian forest environment. Two taxa had wide distributions in SGLA, *S. cana* var. *cana* and *S. rugosa,* occurring in cerrado, campo rupestre, caatinga, riparian forest and anthropized environments.

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APPENDIX

LIST OF ADDITIONAL MATERIAL EXAMINED

André, M. C.: 1745(2), 6259 (2). **Bautista, H. P.**: 3236 (2). **Correia, C**.: 68 (2). **Hatschbach,G.**: 46567 (12), 65841 (1), 75912 (12), 77812 (9), 78491(11). **Guedes, M. L**.: 10300 (2), 14316 (2), 14317 (4), 14534 (2). **Noblick,L. R**.:767 (9). **Groppo,M.**: 731 (9). **Arbo, M. M.**: 5619 (4). **Queiroz, L.**: 3617 (12), 5577 (2). **Ribeiro, T**.: 411 (1). **Sant'Ana, S. C.**: 1275 (9). **Silva, T. R. S.**: 110 (2). **Sousa, T. Jost.**: 507 (2). **Sousa,V. C.**:3056 (2), 25950 (2).