

Two New Shrubby Species of the Genus *Staelia* (Rubiaceae) from Serra do Curral Frio, Bahia, Brazil

Roberto Manuel Salas¹ and Elsa L. Cabral

Instituto de Botánica del Nordeste, CONICET, Sargento 2131, C.P. 3400, c. c. 209, Universidad Nacional del Nordeste, FACENA, Corrientes, Argentina.

¹Author for corresponding: (robertoymanuels@gmail.com)

Communicating Editor: Rodger Evans

Abstract—Two new shrubby species of *Staelia* (Rubiaceae) from northeastern Brazil are described and illustrated. *Staelia glandulosa* inhabits rocky fields on white sand areas, and differs from *S. virgata* in its shrubby habit, entirely glandular stipular bristles, large flowers, number of calyx lobes and large seeds. *Staelia harleyi* was found in the Cerrado biome on sandstone rocks at altitudes of 1,000 m, recognizably different from *S. virgata* because the plant is shrubby, its calyx is a conspicuous tube, the calyx lobe is longer than the corolla tube, the corolla lobes are internally pilose, the ventral face of seeds has transverse furrows and the bracteole is sagittate at the apex. Electron microphotographs of the fruit and seed and images of both species in their habitats are provided.

Keywords—Curral Frio, endemism, mountain savannas, Spermacoceae, taxonomy.

Resumen—Dos nuevas especies arbustivas de *Staelia* (Rubiaceae) del noreste de Brasil se describen e ilustran. *Staelia glandulosa* habita en campos rupestres en áreas de arena cuarzosa, se diferencia de *S. virgata* en el hábito arbustivo, en las lacinias estipulares enteramente glandulares, por las flores mayores, por el cáliz (2–)3–4 lobulado y en las semillas de mayor tamaño. *Staelia harleyi* fue colectada en cerrado de altitud entre rocas de arenisca a 1,000 m de altitud, es visiblemente diferente de *S. virgata* por ser una planta arbustiva, por tener tubo calicino conspicuo, los lóbulos del cáliz mayores al tubo de la corola, lóbulos corolinos internamente pilosos, la cara ventral de la semilla con surcos transversales y bractéolas con ápice sagitado. Se presentan microfotografías electrónicas del fruto y semilla, e imágenes de ambas especies y sus hábitats.

Palabras Clave—Campos rupestres, Curral Frio, endemismo, Spermacoceae, taxonomía.

Staelia Cham. & Schltdl. belongs to the Spermacoceae tribe (Robbrecht and Manen 2006; Groeninckx et al. 2009). The genus was described by Chamisso and Schlechtendal (1828) based on a species from southern Brazil, *Staelia thymoides* Cham. & Schltdl. Currently, this genus comprises 18 species endemic to South America (Salas and Cabral 2010a, 2011a, 2011b).

Recently, we segregated two genera from *Staelia* based on morphological studies, *Tessiera* DC. from Mexico (Salas and Cabral 2010c) and the new genus *Planaltina* R. M. Salas & E. L. Cabral from central highland of Brazil (Salas and Cabral 2010b). In the same work, we proposed a strict concept of *Staelia*, which follows the original proposal of Chamisso and Schlechtendal (1828). This concept includes the species with the capsule dehiscence similar to *S. thymoides*. The taxonomic history and capsule descriptions of *Staelia* were provided by us in previous works (Salas and Cabral 2010a, 2010b, 2011a, 2011b).

The genus *Staelia* is currently under revision by the first author of this work and several new species have been described by both of us in recent years from Argentina (Cabral and Salas 2005), Bolivia (Salas and Cabral 2006a), Brazil (Salas and Cabral 2006b, 2011a, 2011b) and Paraguay (Salas and Cabral 2010a). The aim of this paper is to describe two new rare species recently found during field work carried out inside the caatinga domain in the state of Bahia, Brazil.

The new species named *Staelia glandulosa* and *S. harleyi* are known only from a small region in the junction of the Umburanas, Santo Sé and Campo Formoso municipalities. This region represents one of the most northern portions of “campos rupestres” in the state of Bahia and outside the Chapada Diamantina complex (Giulietti et al. 2006). The vegetation is characterized by tall caatinga forest and shrubby caatinga well conserved at altitudes between 500 and 800 m, with areas of transition to “campos rupestres” (900–1,200 m) and rocky cerrado of altitude (850–1,000 m). Giulietti et al. (2004) pointed out this area is of extreme biological importance to the integral conservation based on twenty endemic

species, mostly recently described. Three species of *Staelia*, the two here described and *S. virgata*, inhabit this relatively small area. However, the three taxa are separated by their preference for different habitats. *Staelia glandulosa* was found only in “campos rupestres” (with some floristic elements of caatinga), whereas *S. harleyi* belongs to cerrado of altitude and *S. virgata* to areas of open shrubby caatinga.

TAXONOMIC TREATMENT

Staelia glandulosa R. M. Salas & E. L. Cabral, sp. nov.—

TYPE: BRAZIL. Bahia: Umburanas, Serra do Curral Frio, Fazenda Licuri, 10 km from Delfino, 50 m depois do córrego da Empreitada em direção da mina de cristais Garimpo, 10°24'13.3"S, 41°18'41.7"W, 905 m, 28 May 2010 (fl, fr), Queiroz, L. P., R. M. Salas, D. B. O. S. Cardoso et P. Rivero 14813 (holotype: HUEFS!; isotypes: CTES!, K!, NY!, SI!).

Staelia glandulosa R. M. Salas & E. L. Cabral, *Staelia virgata* (Link ex Roem. & Schult.) K. Schum similis, sed frutex, lacinias stipulari omnino glandulosis, floris maioribus, calyx (2–)3–4-partito, seminis maioribus differt.

Shrub 0.80–2 m high, all herbaceous organs covered with sticky exudates. Stems single, sparsely branched in the apex, internodes cylindrical to subquadrangular, pubescent. Leaves verticillate, sessile or shortly petiolate; blade elliptic or narrowly elliptic, 5–8 × 0.5–1.2 mm, apex acute, base attenuate, adaxially glabrous, abaxial face sparsely pubescent on margin and midrib, slightly succulent, blackish and papery when dry, secondary nerves obscure. Stipular sheath 0.8–1 mm, glabrous or glabrescent, edge truncate with three bristles of 0.3–0.9 mm long, entirely glandular, the central larger than the lateral, glabrous. Flowering branch with indeterminate growth, (3–)10–30 glomerules, axillary; glomerules subspherical, 15–25 mm wide, internodes 0.5 mm to absent, bracts elliptic or

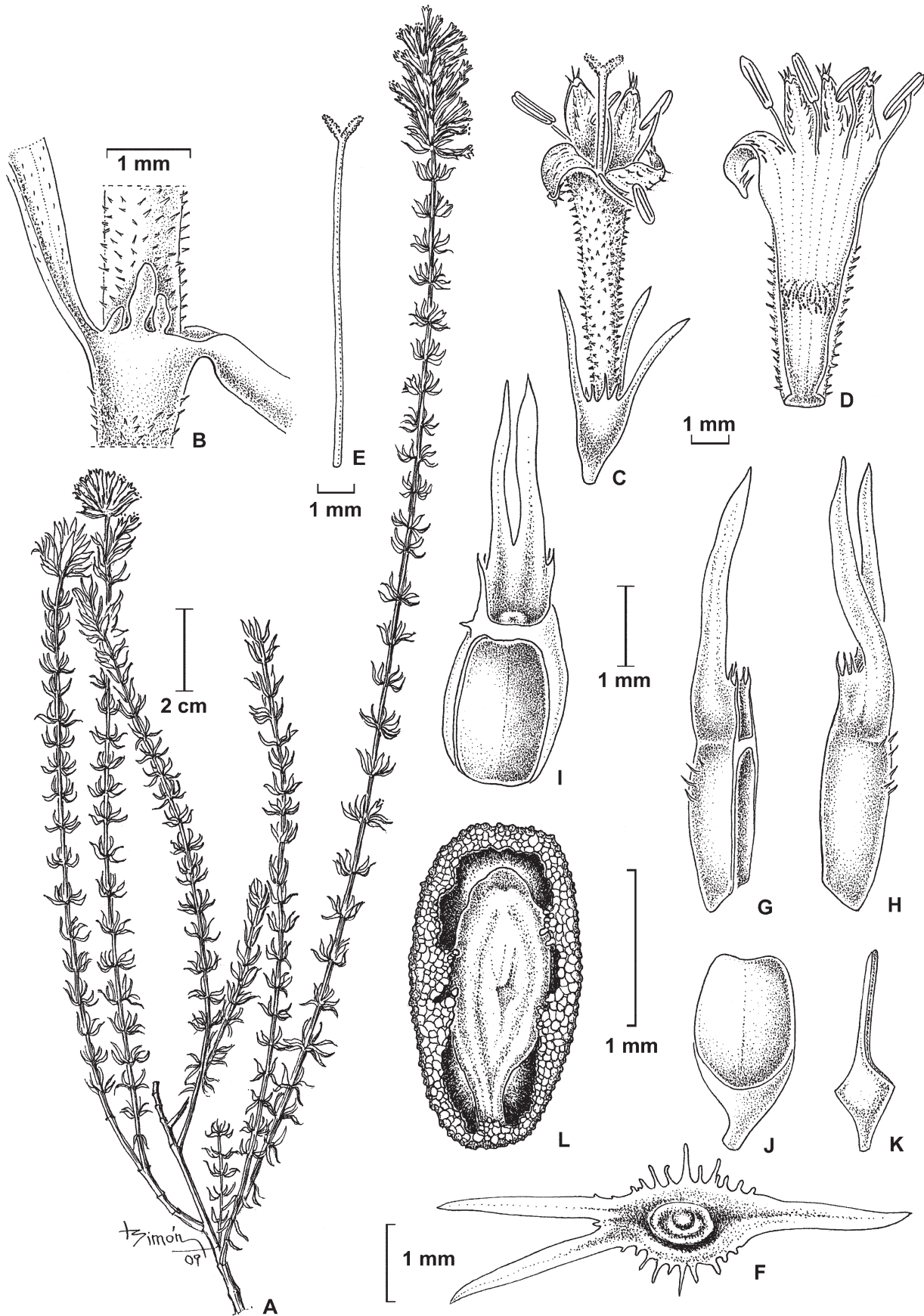


FIG. 1. *Staelia glandulosa*. A. Apical flowering branch. B. Stipular sheath. C. Flower. D. Inside the corolla. E. Style and stigma. F. Nectary disc and calyx lobes. G. Lateral view of valve with one calyx lobe. H. Lateral view of valve with two calyx lobes. I. Ventral view of valve, calyx tube and lobes. J. Internal view of septum. K. Lateral view of septum. L. Ventral view of seed (based on L. P. Queiroz et al. 14813).

Delivered by Publishing Technology to: Roberto Salas IP: 200.45.54.133 on: Fri, 04 May 2012 21:02:20
 Copyright (c) American Society for Plant Taxonomists. All rights reserved.

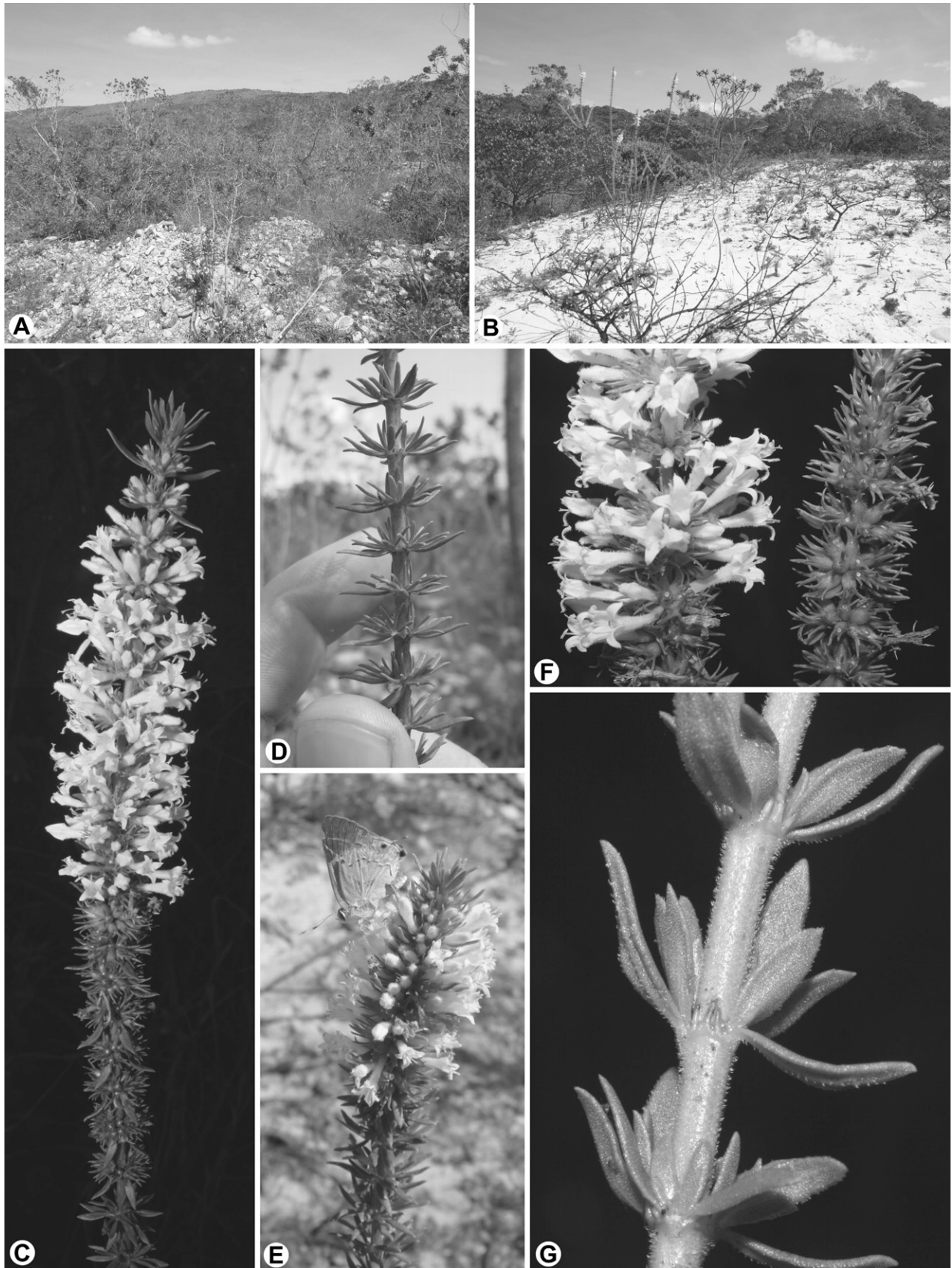


FIG. 2. *Staelia glandulosa*. A. Rocky fields or "Brazilian campos rupestres." B. The shrubby habit of *S. glandulosa* and sand dunes with scattered shrubs in the background. C. Apical inflorescence with indefinite growth. D. Portion of the stem showing the regular nodes and the leaves with size equal to the axilar brachyblast. E. Inflorescence with pollinator, a butterfly of the family Lycaenidae (Lepidoptera). F. flowers in anthesis (left) and immature fruits (right). Photographs B, C, F, G by Domingos Cardoso and A, D, E by Roberto Salas (*R. M. Salas et al.* 451).

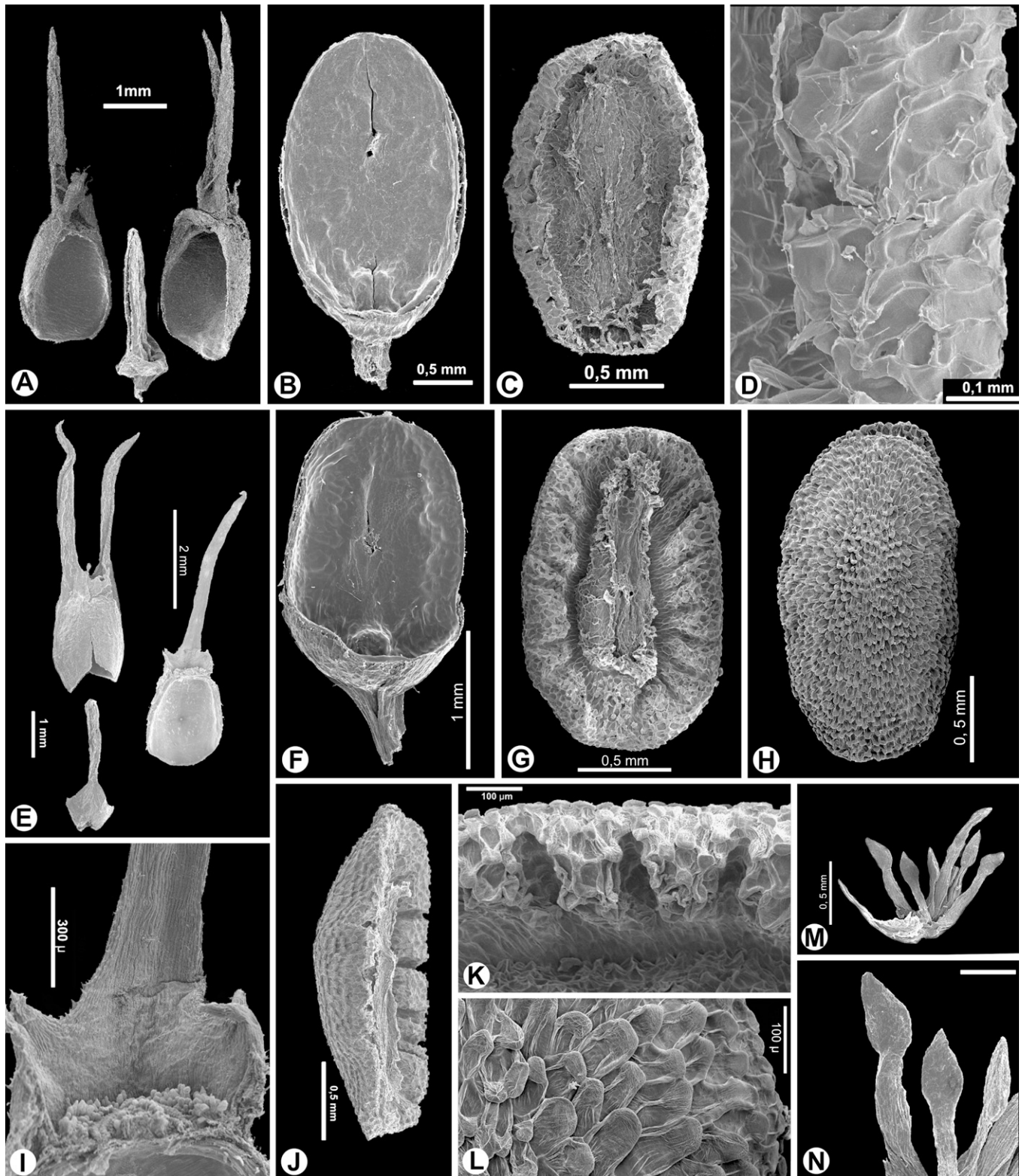


FIG. 3. *Staelia glandulosa*. A. Dehiscent fruit. B. Internal view of intercarpelar septum. C. Ventral face of seed. D. Detail of seed coat surface (based on L. P. Queiroz *et al.* 14813). *Staelia harleyi*. E. Fruit dehiscent (left) and internal view of valve (right). F. Internal view of intercarpelar septum. G. Ventral face of seed. H. Dorsal face of seed. I. Internal view of valve showing the calyx tube. J. Lateral view of seed. K. Ventral surface of seed with transverse grooves. L. Detail of dorsal seed coat surface. M. Bracteoles. N. Apex sagittate of bracteoles (based on R. M. Salas *et al.* 456).

narrowly elliptic, rarely linear, 4–8 × 0.4–1 mm; bracteoles inconspicuous with apex glandular. Flowers shortly pedicellate, hypanthium obovoid, glabrous or sparsely pubescent at the apex; calyx 3–4 lobed, rarely 2, tube 0.7–0.9 mm long; calyx

lobes linear, 2.7–3.1 mm, apex acuminate, glabrous, with glandular teeth intercalary; corolla 8–11 mm, infundibuliform, white, externally pilose, internally with a ring of moniliform hairs in the middle of the corolla tube, lobes internally pilose,

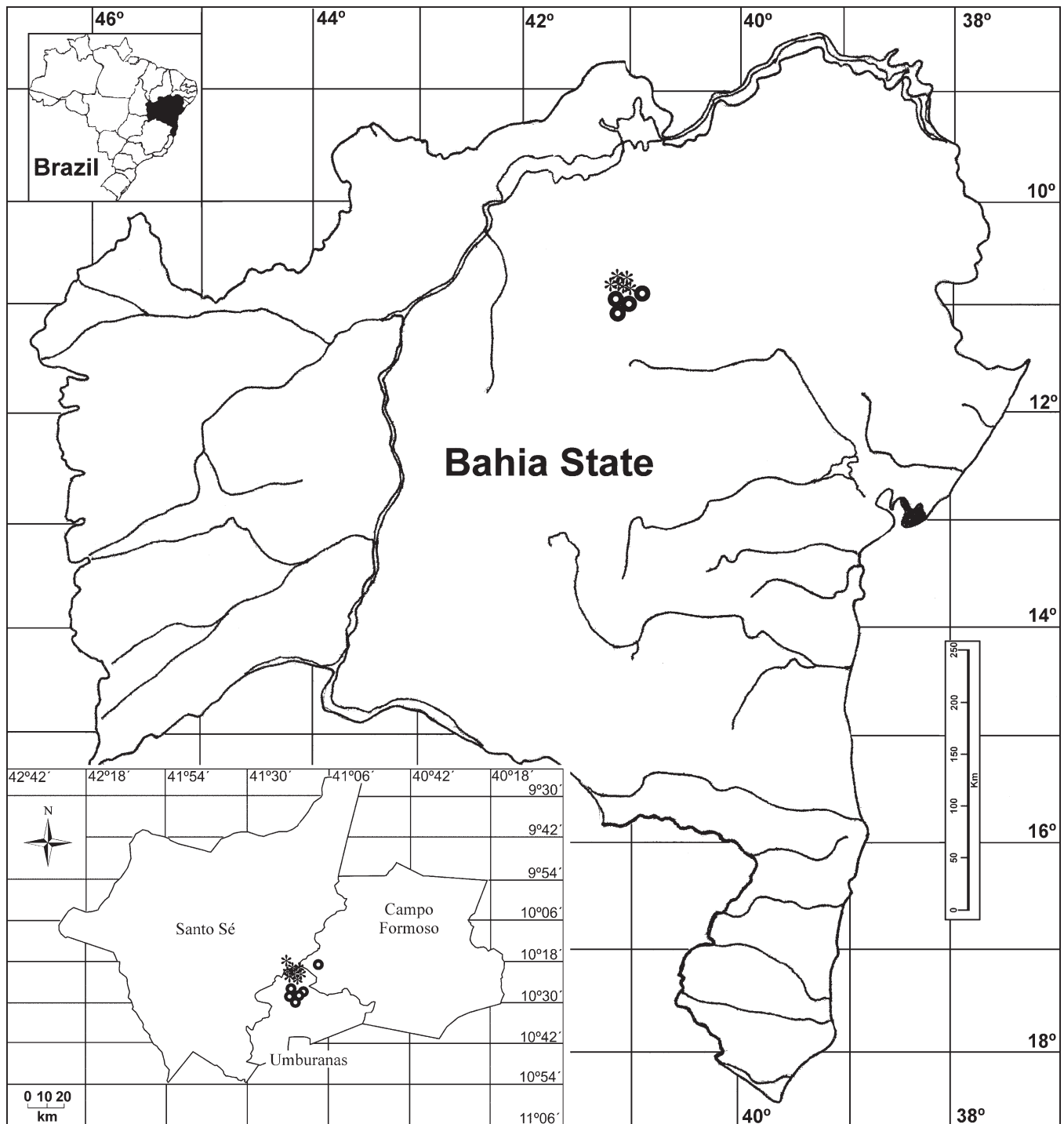


FIG. 4. Distribution map of *Staelia glandulosa* (circles) and *Staelia harleyi* (stars), in Bahia state (up) and the Santo Sé, Campo Formoso and Umbranas municipalities (down).

3–4 times shorter than the tube; stamens exserted, size equal to the corolla lobes; anthers 1.4–1.6 mm, white; style 8–12 mm; stigma bifid, papillose, nectary disc entire. Capsules obovoid, 2.8–3.6 mm long, glabrous or sparsely pubescent at the apex, septum rounded or truncate at the apex; seeds 2–3 mm long, plano-convex, obovate or elliptic in outline; testa reticulo-foveate; cell irregular, periclinal walls smooth, anticlinal walls straight. Figures 1, 2, 3A–D, 4.

Paratypes—BRAZIL. Bahia: Umbranas, Serra do Curral Feio (locally referred to as Serra da Empreitada), entrando para W, ca. de 20 km S

de Delfino na estrada para Umbranas, 10°22'S, 41°19'W, 1,000 m, 09 Apr 1999 (fl, fr), *L. P. Queiroz* 5135 (K!, HUEFS!); Delfino, Estrada velha Delfino-Minas do Mimoso, 22 km de Delfino, 10°24'7"S, 41°18'43"W, 09 Mar 1997, *R. M. Harley* 6136 (ALCB!, HUEFS!, IBGE!, K, SPF!); 16 km NW of Lagoinha (5.5 SW of Delfino) on the side of the road to Minas do Mimoso, 10°22'S, 41°20'W, 950–1,000 m, 4 Mar 1974, *R. M. Harley et al.* 16650 (CEPEC!, HUEFS!, RB!, K!, P!); Idem., Serra do Curral Frio, Fazenda Licuri, 10 km de Delfino, 50 m depois do córrego da Empreitada em direção da mina de cristais Garimpo, 10°24'13.3"S, 41°18'41.7"W, 905 m, 28 May 2010 (fl, fr), *R. M. Salas et al.* 451 (CTES!, HUEFS!); Idem., *D. B. O. S. Cardoso et al.* 2989 (CTES!, HUEFS!). Campo Formoso, Serra do Boa, 4 Sep 1981, *R. P. Orlandi* 515 (HRB, RB!).

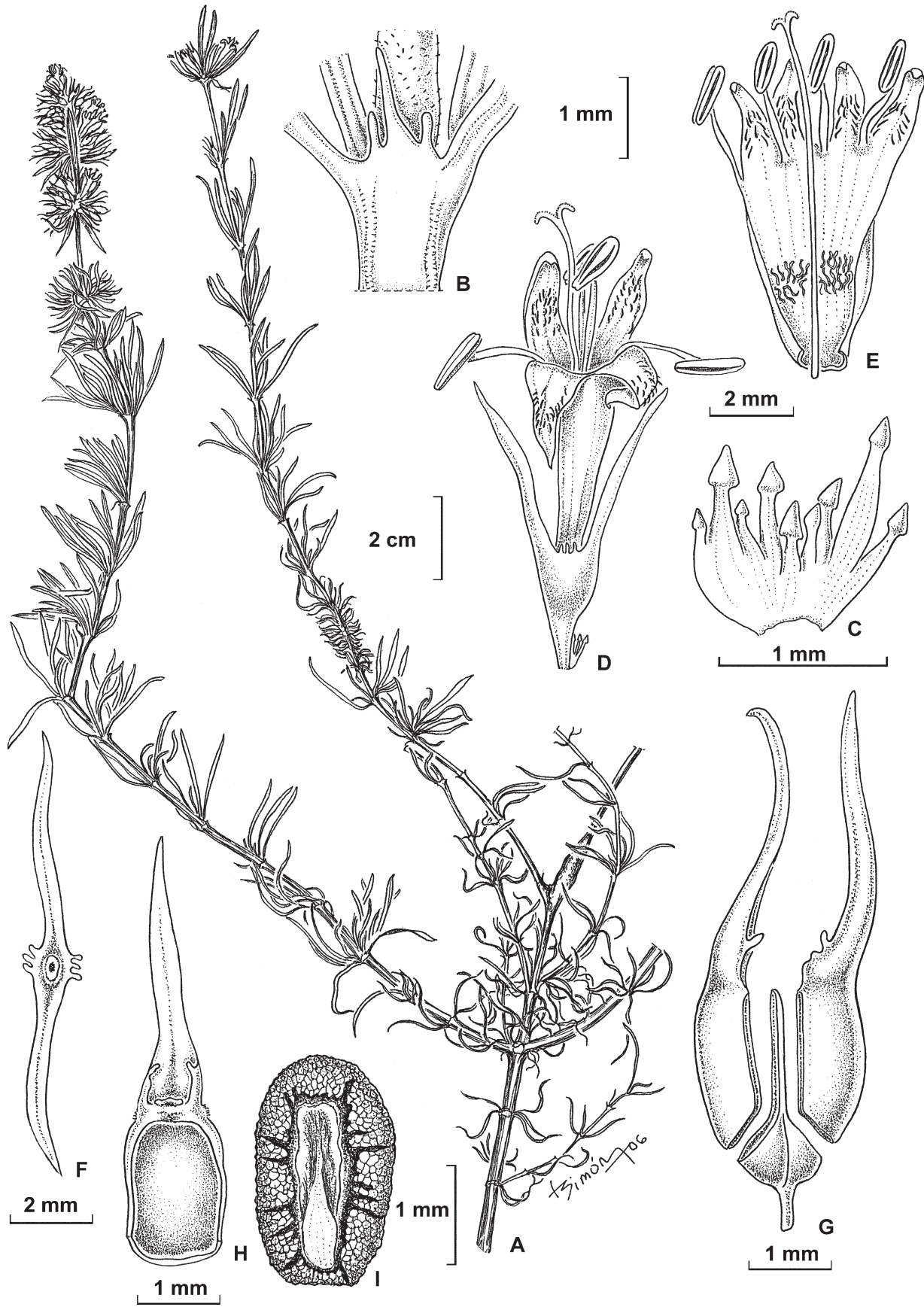


FIG. 5. *Staelia harleyi*. A. Apical flowering branch. B. Stipular sheath. C. Bracteoles with sagittate apex. D. Flower. E. Inside the corolla. F. Nectary disc and calyx lobes. G. Fruit dehiscent in three parts, two apical and one basal. H. Ventral view of valve. I. Ventral view of seed (based on R. M. Salas et al. 456).

Delivered by Publishing Technology to: Roberto Salas IP: 200.45.54.133 on: Fri, 04 May 2012 21:02:20
 Copyright (c) American Society for Plant Taxonomists. All rights reserved.

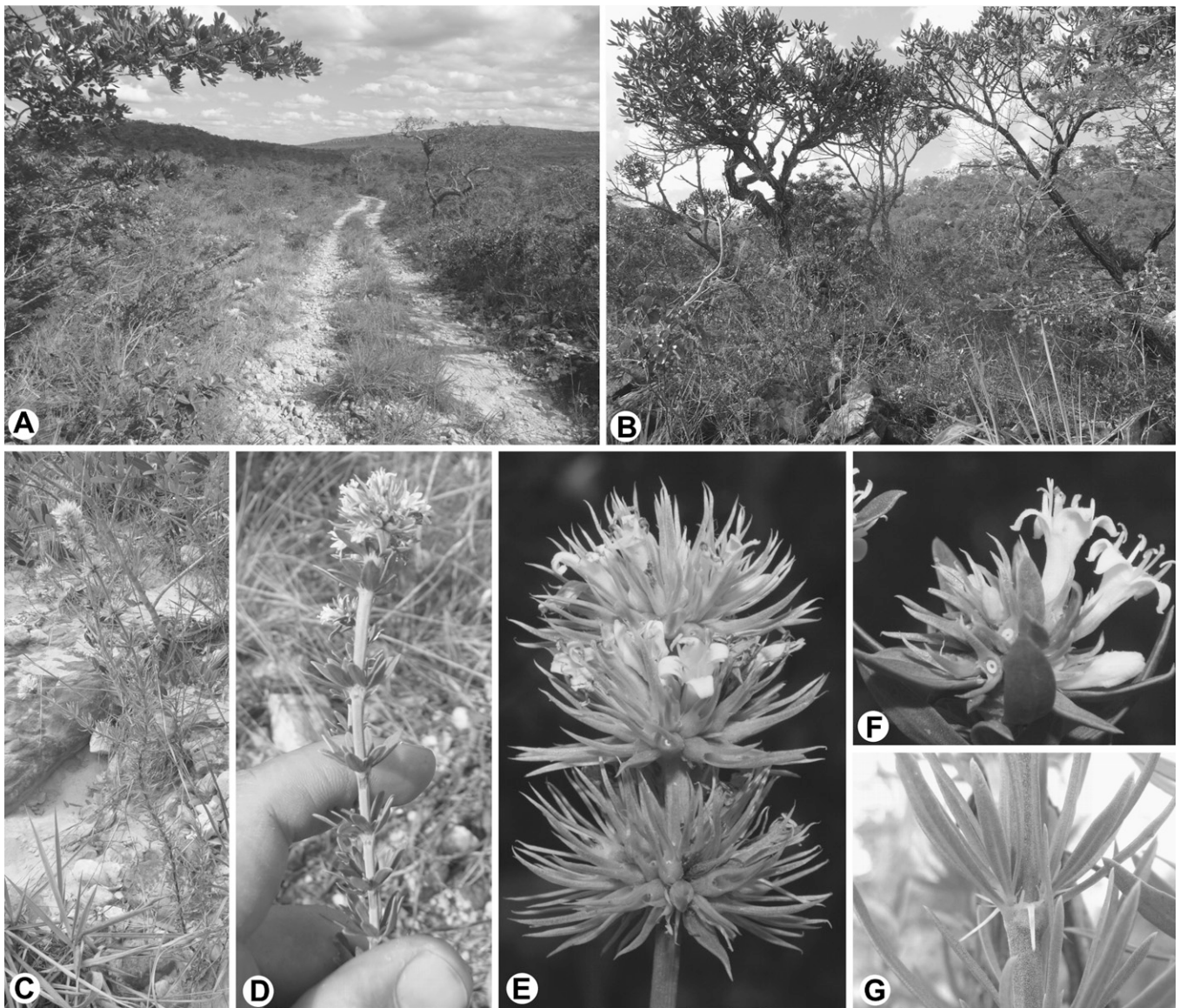


FIG. 6. *Staelia harleyi* A. Cerrado of altitude with rocky outcrops above 900 m. B. Physiognomy of cerrado of altitude. C. Habit. D. Inflorescence with determinate growth. E. Apex of inflorescence. F. Flowers in anthesis. G. Stipule with bristles reflexed. Photographs E–F by Domingos Cardoso and A–D, G by Roberto Salas (based on R. M. Salas *et al.* 456).

Distribution and Habitat—It is found in Brazil, in Umburanas and Campo Formoso municipalities, apparently endemic to the small region of Bahia state known as “Serra do Curral Frio” (also known as “Serra do Curral Feio”) and adjacent areas. It grows in areas with white sandy soil surrounded by some floristic elements of “campos rupestres” and Caatinga at altitudes of 900–1,000 m (Fig. 2A). Here, *Staelia glandulosa* cohabits with other rare species of the tribe Spermaceaceae, *Mitracarpus rigidifolius* Standl. and *Diodella gardneri* (K. Schum.) Bacigalupo & E. L. Cabral. The flowers were visited by butterflies (Fig. 2 E, Lycaenidae) and bumblebees (*Bombus brevivillus*). The visits were frequent between 11:30 AM and 13:00 PM, after which they were less frequent or absent.

Conservation—*Staelia glandulosa* is considered endangered [EN B1ab(ii, iv)] according to IUCN Red List criteria (IUCN 2001): area of occupancy estimated to be less than 500 km² in a severely fragmented area, besides the species is only

known from seven collections, representing one locations, all outside protected areas.

Etymology—The epithet ‘*glandulosa*’ was chosen because all herbaceous organs are covered with sticky exudates, a feature never seen before in other members of Spermaceaceae (sensu Robbrecht 1988).

Staelia glandulosa is morphologically similar to *S. virgata*, but differs from it in having shrubby habit, stipular bristles entirely glandular, calyx (2–)3–4 lobed, corolla 8–11 mm long and seed 2–3 mm long (vs. subshrub, calyx 2(-)3 lobed, corolla 5–7 mm long and seeds 0.9–1.1 mm long).

Staelia harleyi R. M. Salas & E. L. Cabral, sp. nov.—TYPE: BRAZIL. Bahia: Umburanas, Serra do Curral Frio, ca. 20 km aprox. de Delfino pasando la Fazenda Licuri, camino al sitio de extracción de cristales de cuarzo llamado garimpo, 10°21'27.7"S, 41°19'30.3"W, 1,051 m, 28 May 2010 (fl, fr), R. M. Salas, L. P. Queiroz, D. B. O. S.

TABLE 1. Morphologically distinctive characters of *Staelia glandulosa*, *S. harleyi* and *S. virgata*. Character documented for the first time in *Staelia*,* and in Spermaceae s. s.**

| Character | <i>Staelia glandulosa</i> | <i>Staelia harleyi</i> | <i>Staelia virgata</i> |
|--|---|--|---|
| Habit/height (m) | Shrub*, 0.8–2* | Shrub*, 0.8–1.7* | Subshrub, 0.10–1.20 |
| Leaves | Verticillate | Verticillate | Pseudoverticillate |
| Stipular sheath | Edge truncate | Edge subtriangular | Edge truncate |
| Stipular bristles | 3, entirely glandular** | 3, apex glandular | 3–15, apex glandular |
| Inflorescences number and diameter (mm wide) | 10–30, 15–25* | 2–5, 15–22* | 4–40, 10–14 |
| Calyx and calyx tube (mm) | (2–)3–4 lobed*, 0.7–0.9* | 2–3(–4) lobed*, 0.8–1.1* | 2(–3) lobed, 0.2 to absent |
| calyx lobe/corolla tube ratio | Equal to or shorter than the half of the tube | Longer than the tube | Equal to or shorter than the half of the corolla tube |
| Length of corolla (mm) | 8–11* | 5.3–6.6 | 5–7 |
| Inside corolla lobes | Pilose* | Pilose* | Glabrous |
| Capsule (mm) | 2.8–3.6* | 3–4* | 1–1.5 |
| Seeds (mm) | 2–3, flat ventral side | 2.3–3, ventral side flat and transversally sulcate | 0.9–1.1, ventral side with longitudinally groove, no transverse sulcate |

Cardoso & P. Rivero 456 (holotype: HUEFSI; isotypes: CTES!, K!, NY!, SII!).

Staelia virgata (Link ex Roem. & Schult.) K. Schum similis, sed frutex, calycis tubo conspicuius, calyx lobis longioribus quam corollae tubo, corolla pilosa, seminis cum facies ventrali transverse sulcata et bracteolis cum apice sagittato differt.

Shrub 0.80–1.7 m high. Stems single, sparsely-branched in the apex, internodes cylindrical to quadrangular, glabrous or pubescent. Leaves verticillate, sessile; blade linear, linear-lanceolate or narrowly elliptic, 13–25 × 1–1.5 mm, apex mucronate, base attenuate, glabrous, slightly succulent, greenish and papery when dry, secondary nerves obscure. Stipular sheath 0.9–1.1 mm, glabrescent or pubescent, edge subtriangular with three bristles of 0.5–1.5 mm long, often reflexed, the central larger than the laterals, glabrous, apex glandular. Flowering branch with determinate growth, 2–5 glomerules, 1 apical and 1–4 axillary, glomerules subspherical, 15–22 mm wide, internodes 20 mm to absent, bracts 15–24 × 1–1.3 mm, linear-lanceolate or narrowly elliptic, foliaceous; bracteoles 0.6–1.5 mm long, with apex sagittate and glandular. Flowers shortly pedicellate, hypanthium obovoid, glabrous or sparsely pubescent at the apex; calyx 2–3 lobed, rarely 4 lobed, calyx tube 0.8–1.1 mm long; calyx lobes linear, 3.4–5 mm, apex acuminate, glabrous or glabrescent, with glandular teeth intercalary; corolla 5.3–6.6 mm, infundibuliform, white, externally glabrous or glabrescent, internally with a ring of moniliform hairs in the middle of the corolla tube, lobes internally pilose, 1.6–2.1 times shorter than the tube; stamens exerted, longer than the corolla lobes; anthers 1–1.1 mm, white; style 6–7 mm; stigma bifid, papillose. Capsules obovoid, 3–4 mm long, glabrous or glabrescent, with dehiscence longitudinal and oblique, separate in two apical deciduous valves and the intercarpelar persistent septum; rounded apex; seeds 2.3–3 mm long, plano-convex, obovate or elliptic in outline, apex slightly winged, ventral surface with transverse grooves; testa reticulo-foveate; cell elongated, periclinal walls smooth papillose at the margin overlapped on the next cell, anticlinal walls straight, slightly thickened. Figures 3E–P, 4, 5, 6.

Paratypes—BRAZIL. Bahia: Umburanas, Lagoinha 22 Km NW of Lagoinha (which is 5.5 Km SW of Delfino) on the side of the road to Minas do Mimoso, 10°20'S, 41°20'W, 1,000 m, 06 Mar 1974 (fl, fr), R. M. Harley et al. 16835 (CEPEC!, HUEFSI!, K!, RB!); Idem, Serra do Curral Frio, a 22 Km NW de Delfino, pasando la Fazenda Licuri, camino a sitio de extracción de critales de cuarzo llamado Garimpo, 10°21'27.7"S, 41°19'30.3"W, 1,051 m, 28 May 2011 (fl, fr), R. M. Salas et al. 456 (CTES!,

HUEFSI!, SII!); Santo Sé, 10°28'S, 41°23'W, 4 Sep 1981 (fl, fr), R. P. Orlandi 408 (CEPEC!, HRB!, HUEFSI!, RB!).

Distribution and Habitat—It is found in Brazil, in Umburanas and Santo Sé municipalities, endemic to a small region of Bahia state known as “Serra do Curral Frio” (also known as “Serra do Curral Feio”) and adjacent areas. *Staelia harleyi* grows between sandstone outcrops and soil with white sand at altitudes of 990–1,090 m. The vegetation is composed of typical floristic elements of the cerrado biome.

Conservation—Like *S. glandulosa*, *Staelia harleyi* is considered endangered [EN B1ab(ii, iv)] according to IUCN Red List criteria (IUCN 2001): area of occupancy estimated to be less than 500 km² in a severely fragmented area, besides the species is only known from five collections, representing two locations, all outside protected areas.

Etymology—The epithet ‘harleyi’ is named after Dr. Raymond M. Harley, a renowned plant taxonomist from Kew and an important collector in Brazil, especially in Bahia state. One of the first collectors in the Serra do Curral Frio (Harley and Mayo 1980).

Staelia harleyi is similar to *S. virgata*, but differs in the shrubby habit, the calyx with a conspicuous tube, the calyx lobe longer than the corolla tube, the corolla lobes internally pilose, the ventral face of seeds with transverse furrows and the bracteole sagittate at the apex.

The shrubby habit is found only in *Staelia glandulosa* and *S. harleyi* (0.8–2 m high), although in some environments, the plants of *S. virgata* might develop the same way, but range between 0.15 and 1.2 m high, always represented by branched subshrubs.

Staelia glandulosa and *S. harleyi* are morphologically more similar to each other than to the related species previously described. The two new species share the shrub habit with stems simply or sparsely branched, the leaves verticillate slightly succulent and the calyx with a conspicuous tube. Both species might be differentiated from each other and from *S. virgata* by means of Table 1.

ACKNOWLEDGMENTS. We thank the herbarium curators of ALCB, CEPEC, CTES, HRB, IBGE, K, RB, and SPF for allowing access to collections, especially Dr. Luciano Paganucci de Queiroz from HUEFS. We also thank the artist Laura Simon for the fine illustrations, Domingos Cardoso for inestimable assistance in the field work and reviewers for critical reading of the manuscript. Two grants from CONICET (Tipo I and II, 2007–2012) are also gratefully acknowledged.

LITERATURE CITED

- Cabral, E. L. and R. M. Salas. 2005. Novedades en el género *Staelia* (Rubiaceae) de Argentina. *Bonplandia* 14: 83–89.
- Chamisso, L. A. and D. F. L. Schlechtendal. 1828. De plantis in expeditione speculatoria Romanzoffiana observatis. *Linnaea* 3: 364, t. 3. f. 3.
- Giulietti, A. M., A. L. B. Neta, A. R. L. Paula, D. C. Barbosa, E. Nogueira, E. V. S. B. Sampaio, G. C. Silva, I. C. Machado, J. F. Virgínio, L. C. Maia, L. M. S. Griz, L. P. Queiroz, J. L. S. Lima, M. A. Silva, M. A. Figueiredo, M. J. N. Rodal, M. M. Barradas, M. R. V. Barbosa, M. R. Vasconcellos, R. M. Harley, and S. Chaves. 2004. Vegetação: áreas e ações prioritárias para a conservação da caatinga. Pp. 114–131 In *Biodiversidade da Caatinga: áreas e ações prioritárias para a conservação*, eds. J. M. C. Silva, M. Tabarelli, M. T. Fonseca, and L. V. Lins. Brasília: Ministério do Meio Ambiente.
- Giulietti, A. M., L. P. Queiroz, T. R. S. Silva, F. França, M. L. Guedes, and A. M. Amorim. 2006. Flora da Bahia. *Sitientibus Série Ciências Biológicas* 6: 169–173.
- Groeninckx, I., S. Dessein, H. Ochoterena, C. Persson, T. Motley, J. Kårehed, J. B. Bremer, S. Huysmans, and E. Smets. 2009. Phylogeny of the herbaceous tribe Spermacoceae (Rubiaceae) based on plastid DNA data. *Annals of the Missouri Botanical Garden* 96: 109–132.
- Harley, R. M. and S. J. Mayo. 1980. *Towards a checklist of the flora of Bahia*. P. 174. Kew: Royal Botanic Gardens.
- IUCN. 2001. IUCN red list categories and criteria, Version 3.1. www.iucn.org.
- Robbrecht, E. 1988. Tropical woody Rubiaceae. Characteristic features and progressions. Contributions to a new subfamilial classification. *Opera Botanica Belgica* 1: 1–271.
- Robbrecht, E. and J. F. Manen. 2006. The major evolutionary lineages of the coffee family (Rubiaceae, Angiosperms). Combined analysis (nDNA and cpDNA) to infer the position of *Coptosapelta* and *Luculia*, and supertree construction based on *rbcL*, *rpc16*, *trnL-TrnF* and *atpB-rbcL* data. A new classification in two subfamilies, Chinchonoideae and Rubioideae. *Systematics and Geography of Plants* 76: 85–146.
- Salas, R. M. and E. L. Cabral. 2006a. Una nueva especie y una nueva combinación en el género *Staelia* (Rubiaceae–Spermacoceae) de Bolivia. *Darwiniana* 44: 500–503.
- Salas, R. M. and E. L. Cabral. 2006b. Una nueva especie del género *Staelia* (Rubiaceae) para la flora de Brasil. *Revista de Biología Neotropical* 3: 1–3.
- Salas, R. M. and E. L. Cabral. 2010a. The species of the genus *Staelia* (Rubiaceae) from Paraguay, a new species and new synonym. *Blumea* 55: 123–128.
- Salas, R. M. and E. L. Cabral. 2010b. *Planaltina*, nuevo género de la tribu Spermacoceae (Rubiaceae) endémico del Planalto Central de Brasil y una nueva especie del estado de Goiás, Brasil. *Journal of the Botanical Research Institute of Texas* 4: 195–208.
- Salas, R. M. and E. L. Cabral. 2010c. Rehabilitación y lectotipificación del género *Tessiera*, su relación con *Diphragmus* y *Staelia* (Rubiaceae, Spermacoceae): una nueva combinación y un nuevo sinónimo. *Journal of the Botanical Research Institute of Texas* 4: 183–194.
- Salas, R. M. and E. L. Cabral. 2011a. Dos especies nuevas de *Staelia* con hojas ternadas de Brasil. *Brittonia* 63: 355–364.
- Salas, R. M. and E. L. Cabral. 2011b. *Staelia culcita* (Rubiaceae), a new species from Minas Gerais, Brazil. *Plant Ecology and Evolution* 144: 372–376.