UNIVERSIDADE FEDERAL DE UBERLÂNDIA
INSTITUTO DE BIOLOGIA
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TRABALHO DE CONCLUSÃO DE CURSO

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Trabalho de Conclusão de Curso apresentado à Coordenação do Curso de Ciências Biológicas, da Universidade Federal de Uberlândia, como requisito para a obtenção do grau de Licenciado em Ciências Biológicas

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Taxonomic novelties in *Microlicia tomentella* Naudin complex (Melastomataceae) and a new species of *Microlicia* from Serra do Cabral, Minas Gerais, Brazil*

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Abstract— The morphological study of the sympatric species *M. glandulifera, M. passerina* and *M. tomentella* revealed that these binomials constitute a continuous of the same species, considered here as *M. tomentella*, since this is the oldest basionym. A new species of *Microlicia* (Melastomataceae) endemic to c*ampo rupestre* in Serra do Cabral, Minas Gerais, Brazil, is described, illustrated and compared with similar species. *Microlicia trianaei* sp. nov. resembles *M. tomentella* by the glandular emergences in the abaxial leaf surface, solitary, lateral and terminal flowers, obovate petals, and dimorphic and bicolored stamens with tetrasporangiate thecae. However, it differs by its branched pattern of ramification, sparse indumentum of short-stalked glandular trichomes and long-stalked glandular trichomes covering the branches, leaves, hypanthium and sepals, lanceolate leaf blade with apex abruptly acute with vernicous aspect, epidermis with outer periclinal cell walls thicked and collenchyma cells with annular thickening on the abaxial surface. The leaf anatomy of both species is described.

Keywords—Campo rupestre, endemism, leaf anatomy, Microlicieae, SEM images.

Resumo— O estudo morfológico das espécies simpátricas *M. glandulifera, M. passerina* e *M. tomentella* relevou que estes binômios constituem um contínuo da mesma espécie, considerada aqui como *M. tomentella* por ser o nome mais antigo. Uma nova espécie de *Microlicia* (Melastomataceae) endêmica do campo rupestre da Serra do Cabral, Minas Gerais, Brasil, é descrita, ilustrada e comparada com espécies similares. *Microlicia trianaei* sp. nov. assemelha-se a *M. tomentella* pelas emergências glandulares na face abaxial da lâmina foliar, flores solitárias, terminais e laterais, pétalas obovais, estames dimórficos e bicolores com tecas tetrasporangiadas. Entretanto, difere pelo padrão de ramificação, indumento esparso composto de tricomas glandulares curto-pedunculados e tricomas glandulares longo-pedunculados cobrindo os ramos, folhas, hipanto e sépalas. Além disso, a lâmina foliar é lanceolada com ápice abruptamente agudo e aspecto vernicoso, e a epiderme apresenta parede celular periclinal espessada e células do colênquima com espessamento anular na face abaxial. A anatomia foliar das duas espécies é descrita.

Palavras chave—Anatomia foliar, campo rupestre, endemismo, MEV, Microlicieae.

INTRODUCTION

The Cerrado has been considered one of the diversity hotspots due to the high concentration of endemic species and the exceptional loss of habitat (Myers et al. 2000). Approximately 5000 species of plants are found in *campo rupestre*, contributing with about 40% of the endemic plant species of this physiognomy (BFG 2015; Flora do Brasil 2020).

The *campo rupestre* is remarkably at the highest altitudes of Espinhaço Range, a mountain range from north of Bahia to south of Minas Gerais (Viana & Lombardi 2007; Rapini et al. 2008). *Campo rupestre* also constitute the mainly vegetational type in the Serra do Cabral, located between the coordinates 17°03'S–18°03'S and 44°05'W–44°05'W, forming an isolated island from Espinhaço Range by a depression about to 40 km of width (Hatschbach et al. 2006; Guedes & Wanderley 2015).

Microlicia is considered one of the main floristic elements of *campo rupestre*, mainly in Minas Gerais (80 species), Bahia (57 species) and Goiás (24 species) states (Romero 2003; Alves & Kolbek 2010; Flora do Brasil 2020). The flowers are typically 5-merous, very occasionally 6–8-merous, superior ovary, typically 3-locular and the capsule dehiscing longitudinally from the apex to the base (Almeda & Martins 2001).

The circumscription of some taxa in *Microlicia* is sometimes difficult, as this genus comprises wide morphological variation within and between many species (Romero & Woodgyer 2014). This case is observed in *Microlicia tomentella, M. passerina* and *M. glandulifera*, making the identification under some of these binomials uncertain as the delimitation is based mainly on leaf morphology, which is a character that varies along its distribution in Espinhaço Range. This study aimed to clarify the taxonomic relationship between the three binomials.

During a field expedition to the Serra do Cabral in May 2016, specimens of *Microlicia* were collected and recognized as a new undescribed species. The new species is described,

illustrated and its affinities are discussed. Additionally, anatomical characters of the leaf blade and geographic distribution map are provided.

MATERIAL AND METHODS

This study is based on information from the literature and the analysis of collections deposited in BHCB ESA, HUFU, K, MBM, NY, P, RB, S, SPF, UEC, UPCB and US (acronyms according to Thiers 2019), and on field observations in Serra do Cabral and Diamantina, Minas Gerais, Brazil. The area of occupancy and extent of occurrence were calculated using GeoCAT, georeferenced data from cited collections (Bachman et al. 2011). Distribution data were plotted on a map using the application ArcMap ver. 10.5. in ArcGis Desktop (ESRI 2016). The specific terminology adopted for morphological descriptions follows Radford (1986).

For the scanning electron microscopy (SEM) study, leaves of *M. tomentella* and *Microlicia* sp. nov. were removed from a voucher specimen (*F. N. A. Mello* et al. *310* and *R. Romero & J. N. Nakajima 6037*, and *R. Romero 8866*, respectively), glued directly onto aluminum stubs and coated with gold using LEICA EM SCD050 sputter coater. Samples were examined using a Zeiss EVO MA10 scanning electron microscope and images were generated digitally. The samples of the histological analysis were rehydrated in NaOH solution at 5% (Anderson 1963 modified; the time was changed to approximately 30 minutes), washed in distilled water, dehydrated in ethanol series and embedded in historesin (Leica, Heildelberg, Germany). Cross-sectioned samples 8 μm were obtained using a rotary microtome, stained with toluidine blue 0.05% (O'Brien et al. 1964, modified; the phosphate buffer was changed to acetate and pH of 6.8 to 4.7), and the slides were mounted with synthetic mounting media. Observations and images were obtained with a microscope with a digital camera attached.

TAXONOMIC TREATMENT

Microlicia tomentella is part of a complex of species, consisting of *M. passerina* Naudin and *M. glandulifera* Cogn., which are closely related and very difficult to separate. These plants are similar in several features, including ramification pattern, leaf shape and size, branches, leaves and hypanthium indumentum, bicolored and dimorphic stamens and color, size and shape of petals.

Naudin (1845) when describing *M. tomentella* mentioned as main features the hirto-tomentous branches, sessile leaves, elliptic-orbicullar and 3-nerved blade, tomentous hypanthium, axillary and terminals flowers almost arranged in panicles. Later, Naudin (1849) described *M. passerina* with tomentous-hirtellous branches, sessile leaves, elliptic-obovate blade, with sub-obtuse apex, and 3-nerved, furfuracea-tomentellous and axillary and terminals flowers arranged in short panicles. Cogniaux (1891) described *M. glandulifera* by having as main features the branches, leaves and hypanthium with a glandulous-hirtellous indumentum, 3-nerved leaves, oblong and slightly obtuse with attenuate base and subsessile and subaggregated flowers.

The type specimens were reviewed and compared with each other, as well as with more than 200 recent collections from at least 11 herbaria. The morphological characters used to delimit the three species are quite variable and overlapping, revealing a polymorphic species, especially in regard to leaf morphology (Figure 5). Hence, we conclude that these taxa should be considered a single species under the oldest name *M. tomentella*.

Microlicia tomentella Naudin, Ann. Sci. Nat., Bot. sér. 3, 3: 174 (1845). TYPE: BRASIL. Minas Gerais. *In pascuis montium* Serra de Grumatahy *ad scatebras fluminis* Rio Pardo,

1845, *A. St. Hilaire* catalogue B1, n° 2029 (holotype: P02297677!, isotypes: P02297676!). Figures 1H–M, 5, 6.

= *Microlicia passerina* Naudin, Ann., Sci. Nat., Bot. sér. 3, 12: 244 (1849). TYPE: BRASIL. Brésil meridional, 1842, *M. Dupré s.n.* (holotype: P02297667!, isotypes: P02297668!). *syn. nov.*

= *Microlicia glandulifera* Cogn., Monogr. Phan. 7: 69 (1891). TYPE: BRASIL. Minas Gerais. Serra do Lenheiro, 23 Apr 1888, *A. F. M. Glaziou 16772* (Holotype BR!; isotypes: C, F [photo!]; G!, K!, P!, S). *syn. nov.*

Microlicia tomentella can be recognized by its sessile leaves, slightly crenulate or crenulate-ciliate margin, indumentum of short-stalked glandular trichomes, long-stalked glandular trichomes, and pale trichomes in the branches, leaves, hypanthium and sepals, and some few long-stalked glandular emergences only on abaxial leaf surface. In addition, the petals are obovate or obovate-oblong and the stamens are dimorphic and bicolored with tetrasporangiate anthers.

Subshrub or shrub, 0.3–1.5 m tall, much-branched. Stems dichotomous or trichotomous. Branches winged, younger branches greenish or brownish, quadrangular, and with indumentum of golden or translucent short-stalked glandular trichomes, long-stalked glandular trichomes and pale trichomes, older branches terete, without leaves at the base, becoming glabrous. Leaves sessile, ascending or horizontal, imbricate or not, sometimes conduplicate, discolorous, green, adaxial surface darker than abaxial surface, or concolorous, greenish or brownish, older leaves sometimes yellowish (when dry); internodes 1.5–2 mm long, internodes usually longer in the major branches; blade elliptic to widely elliptic, ovate to widely ovate, or obovate, 3.5–17 × 1.7- 9.3 mm, usually larger in the major branches, apex acute, acuminate or rounded, sometimes revolute, base cuneate to rounded, margin slightly

crenulate to crenulate-ciliate, with indumentum sparse or dense of indumentum of golden or translucent short-stalked glandular trichomes, long-stalked glandular trichomes, and pale trichomes on both surfaces, sometimes vernicose, abaxial surface with glandular emergences with red head (when dry) mainly along the midrib, 3 (-5)-nerved or only the midrib conspicuous. Flowers solitary, terminal and axillary, 5-merous, perianth actinomorphic; sessile or pedicel 0.3–3.8 mm long. Hypanthium campanulate, sometimes cylindrical or slightly urceolate, 2–3.3 × 1.2–2.5 mm, with a dense or sparse indumentum of golden or translucent short-stalked glandular trichomes, long-stalked glandular trichomes, and pale trichomes; calyx tube 0.3–0.8 mm long; sepals shorter or longer than the hypanthium, triangular, narrow-triangular or lanceolate, 1.7–4.4 × 0.6–0.9 mm, apex acute, frequently with an apical seta, seta caducous, same indumentum of the hypanthium, frequently sparser. Petals pink or magenta, obovate-oblong or obovate, 4.8–10.8 × 4–6.1 mm, apex acuminate or acute, margin entire, glabrous. Stamens 10, dimorphic, thecae tetrasporangiate. Larger (antesepalous) stamens 5; filaments vinaceous, 2.4–4 mm long; thecae vinaceous, obovate or obovate-oblong, 1.4–2.7 mm long including beak; the beak white, sometimes lilac, 0.3–0.9 mm long, pedoconnective vinaceous, 1–2 mm long; ventral appendage with proximal half vinaceous or lilac, distal half yellow; 1.2–2.6 mm long, slightly bilobate or trilobate or truncate at the apex. Smaller (antepetalous) 5; filaments pink, 2–3.8 mm long; thecae yellow, obovate or obovate-oblong, 1.6–2.2 mm long including beak, beak lilac, 0.5–0.7 mm long, pedoconnective with proximal half yellow, distal half vinaceous, 0.6–1 mm long; ventral appendage yellow, 0.9–2.6 mm long, truncate or rounded at the apex. Ovary globose, 1.6–2.2 × 0.8–1.5 mm, superior, 3-locular, glabrous; style vinaceous, terete, 4–6 mm long, stigma punctiform. Capsule brown, globose, 3–5 × 2.5–4 mm, dehiscing from the apex into 3 valves, hypanthium covering the entire ovary and peeling off as the fruit matures. Seeds numerous, pale brown, slightly curved, 0.6–0.8 × 0.3–0.4 mm, testa foveolate.

***Specimens Examined*—Brazil.—MINAS GERAIS:** s.l., s.d. (fl, fr), *A. F. M. Glaziou 16772* (K, S); *s.l.,* s.d. (fr), *A. F. M. Glaziou 14725* (P); Baependi, 8 Mar 2003 (fl), *F. M. Ferreira & B. V. Moreira 422* (UPCB); Belo Horizonte, 26 Apr 1940 (fl), *M. Barreto 10821* (HUFU!); Congonhas do Norte, 20 May 1989 (fl, fr), *G. Hatschbach et al. 52988* (MBM, SPF, US); Conselheiro Mata, 31 Mar 2001 (fl, fr), *R. Romero & J. N. Nakajima 6080* (HUFU!); idem, 20 Oct 2007 (fl, fr), *J. N. Nakajima et al. 4609* (HUFU!); idem, 21 Oct 2007 (fl, fr), *P. O. Rosa et al. 917* (HUFU!); idem, 21 Oct 2007 (fl, fr), *P. O. Rosa et al. 918* (HUFU!); Datas, 18 Mar 1987 (fl, fr), *G. Hatschbach et al. 51093* (MBM, UPCB, US); Diamantina, 07 Jun 1973 (fl), *P. Occhioni 5564* (US); idem, 7 Jun 1973 (fl, fr), *P. Occhioni 5583* (US); idem, 17 May 1977 (fl, fr), *P. E. Gibbs et al. 5250* (US); idem, 8 Apr 1982 (fl), *N. Hensold et al. 3177* (US); idem, 10 Apr 1982 (fl, fr), *N. L. Menezes et al. 3285* (SPF); idem, 20 Aug 1994 (fl, fr), *Splett 528* (US); idem, 6 Jul 1996 (fl), *V. C. Souza et al. 11887* (HUFU!); idem, 19 Mar 1997 (fl, fr), *G. Hatschbach et al. 66502* (HUFU!); idem, 9 Jun 1998 (fl, fr), *R. Romero et al. 5419* (HUFU!); idem, 31 Mar 2001 (fl, fr), *R. Romero & J. N. Nakajima 6081* (HUFU!); idem, 7 Jul 2001 (fl), *V. C. Souza 25343* (HUFU!); idem, 26 Jun 2004 (fl), *M. T. L. Oliveira et al.* 111 (SPF); idem 19 Oct 2007 (fr), *F. N. A. Mello et al. 352* (HUFU!); idem, 20 Oct 2007 (fr), *F. N. A. Mello 479* (HUFU!); idem, 20 Oct 2007 (fr), *J. N. Nakajima et al. 4693* (HUFU!); idem, 18 May 2008 (fl, fr) *F. N. A. Mello et al. 253* (HUFU!); idem, 18 May 2008 (fl), *F. N. A. Mello et al. 310* (HUFU!, K); idem, 19 May 2008 (fl), *J. N. Nakajima 4824* (HUFU!); idem, 19 May 2008 (fl), *J. N. Nakajima et al. 4842* (HUFU!); idem, 19 May 2008 (fl), *J. N. Nakajima et al. 4872* (HUFU!); idem, 19 May 2008 (fl), *J. N. Nakajima et al. 4922* (HUFU); idem, 19 May 2008 (fl), *J. N. Nakajima 4883* (HUFU!); idem, 13 Aug 2008 (fl, fr), *F. A. Vitta et al. 970* (HUFU!); idem, 12 Sep 2008 (fl, fr), *P. O. Rosa et al. 1172* (HUFU!); idem, 23 Sep 2008 (fl), *R. Romero et al.* 8131 (HUFU!); idem, 24 Feb 2010 (fl), *I. M. Franco*

et al. 43 (HUFU!); idem, 7 Mar 2010 (fl), *I. M. Franco & A. P. Lourenço 505* (HUFU!); idem, 21 Sep 2010 (fl, fr), *R. Romero et al.* 8331 (HUFU!); idem, 21 Sep 2010 (fl, fr), *J. Y. Costa 93* (HUFU!); idem, 22 Sep 2010 (fr), *R. Romero et al. 8359* (HUFU!); idem, 20 Oct 2010 (fr), *J. N. Nakajima et al. 4615* (HUFU!); idem, 17 May 2011 (fl, fr), *R. Romero et al. 8444* (HUFU!); idem, 18 May 2011 (fl, fr), *R. Romero et al. 8476* (HUFU!); idem, 18 May 2011 (fl, fr), *R. Romero et al. 8460* (HUFU!); idem, 18 May 2011 (fl, fr), *R. Romero et al. 8479* (HUFU!); idem, 18 May 2011 (fl, fr), *R. Romero et al. 8487* (HUFU!, RB); idem, 19 May 2011 (fl, fr), *R. Romero et al. 8498* (HUFU!); idem, 23 Aug 2011 (fl, fr), *I. M. Araújo & D. Marques 131* (HUFU!); idem, 3 Oct 2011 (fr), *D. Marques et al. 269* (HUFU!); idem, 26 Jun 2012 (fl), *I. M. Araújo et al. 302* (HUFU!); idem, 26 Jun 2012 (fl, fr), *I. M. Araújo et al. 303* (HUFU!); idem, 26 Jun 2012 (fl, fr), *I. M. Araújo et al. 314* (HUFU!); idem, 27 Jun 2012 (fl), *I. M. Araújo et al. 332* (HUFU!); idem, 19 Sep 2012 (fl, fr), *I. M. Araújo et al. 372* (HUFU!); idem, 04 Dec 2012 (fl), *A. F. A. Versiane & K. R. Silva 359* (HUFU!); idem, 5 Oct 2015 (fr), *R. Romero et al. 8698* (HUFU!); idem, 5 Oct 2015 (fl, fr), *R. Romero et al. 8728* (HUFU!); idem, 6 Oct 2015 (fl, fr), *R. Romero et al. 8775* (HUFU!); idem 31 Mar 2016 (fl, fr), *J. E. Q. Faria 5556* (HUFU!); idem, 9 Apr 2016 (fl, fr), *J. E. Q. Faria 5614* (HUFU!); idem, 4 Jun 2016 (fl, fr), *J. E. Q. Faria 5948* (HUFU!); Gouveia, 10 Apr 1973 (fl, fr), *W. R. Anderson 8555* (US, RB, NY); idem, 5 Apr 1998 (fl), *V. C. Souza et al.* 21022 (HUFU!); idem, 7 Jun 1998 (fl), *R. Romero et al. 5389* (HUFU!); Guaraciama, 18 Jun 2016 (fl), *R. Romero et al. 8898* (HUFU!); Jaboticatubas, 28 Apr 1952 (fl, fr), *L. B. Smith et al. 6772* (US); 29 May 1972 (fl, fr), *A. B. Joly et. al. 2527* (NY); idem, 31 May 1998 (fl, fr), *F. Almeda et al. 7756* (HUFU!); idem 4 Jun 1998 (fl, fr), *R. Romero et al. 5362* (ESA, HUFU!, RB); idem, 06 Jun 1998 (fl, fr), *F. Almeda et al. 7813* (HUFU!); Lavras, 11 May 1990 (fl, fr), *M. M. Arbo et al. 3893* (SPF); Mendanha, 29 Jun 2012 (fl, fr), *I. M. Araújo et al. 359* (HUFU!); Ouro Branco, 12 May 1990 (fl, fr), *M. M. Arbo 3926* (US, SPF); Ouro Preto, 16 Jan 1994 (fl),

S. Atkins et al. 13796 (SPF); idem, 25 Mar 2001 (fl, fr), *R. Romero & J. N. Nakajima 5969* (HUFU); idem, 25 Mar 2001 (fl, fr), *R. Romero & J. N. Nakajima 5975* (HUFU!); Patos de Minas–Pirapora, 16 Sep 1963 (fl, fr), *R. S. Santos s.n.* (US); Santana do Pirapama, 19 Feb 2007 (fl, fr), *V. C. Souza et al. 32768* (HUFU!); Santana do Riacho, 22 Jul 1973 (fl, fr), *J. Semir & M. Sazima 4276* (SPF); idem, 16 Aug 1979 (fl, fr), *J. Semir 5682* (SPF); idem, 11 May 1987 (fl), *T. Fontoura et al. 109* (SPF); idem, 3 Jul 1996 (fl), *V. C. Souza et al. 11601* (HUFU!); idem, 17 Apr 2012 (fl), *J. Ordones et al. 1812* (HUFU!); idem, 1 May 2012 (fl), *M. T. Kubo 48* (SPF); São Tomé das Letras, 29 Mar 2002 (fl), *R. C. Forzza et al. 2158* (HUFU!, UPCB); Serra do Cipó, 22 Apr 1950 (fl, fr), *A. P. Duarte 2610* (RB); idem, 24 Apr 1950 (fl, fr), *A. P. Duarte 2696* (RB, US); idem, 20 Jun 1964 (fl), *A. P. Duarte 8132* (US, RB); idem, 16 May 1995 (fl, fr), *N. M. Castro 489* (HUFU!); idem, 29 Jun 2015 (fl, fr), *R. Romero et al. 8592* (HUFU!, RB); idem, 1 Jul 2015 (fl, fr), *R. Romero et al. 8636* (HUFU!); Serro, 6 Jun 1998 (fl, fr), *F. Almeda et al. 7813* (ESA, UPCB, RB); idem, 29 Mar 2001 (fl), *R. Romero & J. N. Nakajima 6035* (HUFU!); idem, 29 Mar 2001 (fl, fr), *R. Romero & J. N. Nakajima 6037* (HUFU!); idem, 25 May 2009 (fl, fr), *L. M. Neto 723* (HUFU!, K); Tiradentes, 1 Apr 2011 (fl, fr), *M. Sobral et al. 14149* (HUFU!).

Phenology—Flowers were collected from January to October and December, and fruits from February, to October.

Distribution, Habitat and Conservation—*Microlicia tomentella* is endemic to Espinhaço Range, in the state of Minas Gerais (Figure 3), occurring in *campo rupestre* on sandy between 717 m and 1445 m elevation. According to the IUCN categories and criteria (IUCN 2001, 2016), *M. tomentella* is assessed as Last Concerned (LC) due to its wide area of occupancy (AOO = 136 km²) and extent of occurrence (EOO = 56,7 km²).

***Leaf Anatomy*—**The epidermis is uniseriate and covered by a thin cuticle, except in the midrib region, where the cuticle is thicker and sometimes slightly striated (Figures 7G, H, I). The leaf is amphistomatic with short-stalked glandular trichomes and long-stalked glandular trichomes on both surfaces and glandular emergences on the abaxial surface, mainly along the midrib (Figure 7A–I). The epidermis is uniseriate, juxtaposed with ordinary cells containing phenolic compounds. Epidermal cells, ranging from rectangular to nearly square at the midrib region, are of similar sizes on both sides of the blade (Figures 7G, H, I). The mesophyll is dorsiventral, with a small extension of palisade parenchyma in the leaf margins, invading the abaxial surface. Phenolic cells of the palisade parenchyma are present only on the adaxial surface. The spongy parenchyma occupies the middle portion of the mesophyll and contains phenolic cells next to the bundles. A few collenchyma cells with an annular to angular thickening were found on the abaxial and adaxial surface of the midrib (Figures 7G, H, I). Three collateral vascular bundles supply the leaf, a larger central one, and two lateral smaller ones. The vascular sheath includes cells with phenolic content, as well as parenchyma cells associated with the phloem and xylem (Figures 7G, H, I).

Microlicia trianaei K. Moreira & R. Romero sp. nov. TYPE: BRAZIL. Minas Gerais: Joaquim Felício, Serra do Cabral, estrada Real, ca. 20 km de Joaquim Felício, 17 May 2016 (fl), *R. Romero et al. 8866* (holotype: HUFU!; isotypes: BHCB!, DIAM!, K!, MBM!, NY!, P!, RB!, SP!, UB!, UEC!, US!). Figures 1H–M, 2.

Microlicia trianaei is most similar to *M. tomentella*, but can be distinguished by branching patterns, indumentum of short-stalked glandular trichomes and long-stalked glandular trichomes recovering the branches, leaves, hypanthium and sepals, and lanceolate blade with apex abruptly acute, and with vernicous aspect.

Subshrub, 0.5–0.6 m tall, much-branched. Stems dichotomous or trichotomous. Branches fastigiate, slender, younger branches green or cream, quadrangular, and with a dense indumentum of short-stalked glandular trichomes and long-stalked glandular trichomes 0.3–0.5 mm long, older branches brownish, terete, without leaves at base, glabrous; internodes 1.3–2.7 mm long. Leaves ascending or horizontal, imbricate or not, flat or conduplicate, discolorous, green, adaxial surface darker than abaxial surface, abaxial surface sometimes glaucous, older leaves frequently yellowish (when dry); blade lanceolate, sometimes elliptic, 4.5–5.5 × 2–4 mm, apex acute, base attenuate to slightly rounded, margin entire or slightly crenulate, both surfaces with a dense indumentum of short-stalked glandular trichomes and long-stalked glandular trichomes, slightly glutinous, 3-nerved, rarely 5-nerved, main vein conspicuous, prominent, cream or pink on abaxial surface. Flowers solitary, axillary and terminal, 5 (–6)-merous, perianth actinomorphic; pedicel 0.3–0.5 mm long. Hypanthium cylindrical, 2.5–3 × 1.5–2.5 mm, with a dense indumentum of short-stalked glandular trichomes in depressions and long-stalked glandular trichomes; calyx tube ca. 0.5 mm long; sepals shorter or with the same length as the hypanthium, triangular or oblong-lanceolate, 3–4 × 0.5–1 mm, apex acuminate, with the same indumentum of the hypanthium. Petals pink to pink-magenta, oblong, 7.5–8.5 × 3.5–4.5 mm, apex acute, margin entire, glabrous. Stamens 10, dimorphic, thecae tetrasporangiate. Larger (antesepalous) stamens 5; filaments pink, 3.5–4 mm long, thecae pink-reddish, oblong, ca. 1.5 mm long including beak, the beak white or purple, 0.2–0.5 mm long, pedoconnective pink, ca. 2 mm long, ventral appendage half pink, half yellow, ca. 1.2 mm long, truncate or retuse at the apex. Smaller (antepetalous) stamens 5; filaments pink, 3–3.7 mm long, thecae yellow, oblong, 1–1.5 mm long including beak, the beak light pink, 0.2–0.5 mm long, pedoconnective yellow, ca. 2 mm long, ventral appendage yellow, ca. 1.2 mm long, slightly retuse at the apex. Ovary globose,

1.5–2 × ca. 1.2 mm, superior, 3-locular, glabrous; style pink, terete, 3.5–5.5 mm long, curved at apex, stigma punctiform. Capsule brown, globose, 2–3.5 × 1.5–3 mm, dehiscing from the apex into 3 valves, hypanthium covering the entire ovary. Seeds numerous, pale brown, ca. 0.6 × 0.3–0.4 mm, half slightly curved, testa foveolate.

***Additional Specimens Examined (Paratypes)*—BRAZIL**.— MINAS GERAIS: Buenópolis, km 11, 23 Oct 2007 (fl, fr), *F. N. A. Mello et al. 136* (BHCB!, HUFU!); Joaquim Felício, estrada para Serra do Cabral, km 7, 17°54'30"S, 44°13'19"W, 1022 m, 23 Oct 2007 (fr), *F. N. A. Mello et al. 123* (HUFU!, RB!), idem, 23 Oct 2007 (fr), *F. N. A. Mello et al. 126* (HUFU!); road to the TV tower W of Joaquim Felício about 5 km from town, 1,099 m, 17°45'1"S, 44°11'27"W, 17 Oct 2001 (fr), *F. Almeda et al. 8512* (UEC!).

***Phenology*—**Collected with flowers and fruits in October.

Distribution, Habitat, and Conservation*—Microlicia trianaei* is endemic to Serra do Cabral, in the state of Minas Gerais, Brazil (Figure 3), occurring in *campo rupestre*, on sandy soil, at ca. 1000 m elevation. According to the IUCN categories and criteria (IUCN 2016), *M. trianaei* is assessed as Critically Endangered (CR) B1ab(iii) due to its restricted extent of occurrence and area of occupancy (AOO = 8 km²). However, all collections were made in the Serra do Cabral State Park.

***Etymology*—**The specific epithet was chosen to honor José Jéronimo Triana (1834-1890), an influential Colombian botanist that named more than 1000 species of Melastomataceae.

Taxonomic Notes*—Microlicia trianaei* bears some resemblance to *M. tomentella* Naudin, endemic from Espinhaço range in Minas Gerais state, *M. canastrensis* Naudin, endemic from Serra da Canastra and its surroundings, Minas Gerais state (Romero 2000), and *M. nervosa* R. Romero, endemic from Espinhaço range (around Diamantina and Serra do

Cipó), Minas Gerais state (Romero 2013). The three species also have quadrangular young branches, solitary, lateral and terminal flowers, and dimorphic and bicolored stamens. However, *M. tomentella* differs from *M. trianaei* by having branches, leaves, hypanthium and sepals covered by a dense (rarely sparse) indumentum of short-stalked glandular trichomes, long-stalked glandular trichomes and pale trichomes, the blade is elliptic to widely elliptic, ovate to widely ovate, or obovate (*vs*. lanceolate in *M. trianaei*) and the leaf margin is slightly crenulate to crenulate-ciliate, rarely entire (*vs.* entire in *M. trianaei*). *Microlicia canastrensis* differs by having sessile leaves or with a petiole of 0.5 mm long (*vs*. only sessile in *M. trianaei*) and longer pedicels (1.5–2 mm *vs.* 0.3–0.5 in *M. trianaei*). *M. nervosa* has petiolate leaves (vs. sessile in *M. trianaei*), broadly elliptical to obovate blade (vs. lanceolate, sometimes elliptical in *M. trianaei*) and pedicels of 1.3–2.3 mm long (vs. 0.3–0.5 in *M. trianaei*) (Table 1).

Microlicia trianaei is also similar *to M. macrophylla* Naudin, a species with a wide distribution in the state of Minas. *Microlicia macrophylla* also has sessile leaves, obovate petals and dimorphic and bicolored stamens but is otherwise quite different in that it has 1–5 nerved leaves and flowers arranged in a condensed thyrsoid inflorescence.

***Leaf Anatomy*—**The leaves are lanceolate (Figure 4A, B) with stomata and short-stalked glandular trichomes and long-stalked glandular trichomes on both surfaces, and glandular emergences on the abaxial surface, mainly along the midrib (Figure 4C, D, E). The epidermis is uniseriate, juxtaposed with ordinary cells containing phenolic compounds only on the abaxial surface, and the outer periclinal cell wall is thick (Figures 4D, E). Stomata are present throughout the length of the leaf blade, arranged above the ordinary cells on both surfaces (Figures 4C, D, E). Epidermal cells, ranging from rectangular to nearly square at the midrib region, are of similar sizes on both sides of the blade (Figure 4D, E). The mesophyll is dorsiventral, with a small extension of palisade parenchyma in the leaf margins, invading the

abaxial surface. Phenolic cells of the palisade parenchyma are present only on the adaxial surface (Figure 4D). The spongy parenchyma occupies the middle portion of the mesophyll and contains phenolic cells next to the bundles (Figure 4D, E). A few collenchyma cells with an annular thickening were found on the abaxial surface of the midrib (Figure 4D). Three collateral vascular bundles supply the leaf, a larger central one, and two lateral smaller ones. The vascular sheath includes cells with phenolic content, as well as parenchyma cells associated with the phloem and xylem (Figure 4D).

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FIGURES

TABLE 1. Comparative features of *Microlicia tomentella* and *Microlicia trianaei* and relatives.

	M. trianaei	*M. canastrensis*	*M. tomentella*	*M. macrophylla*	*M. nervosa*
Leaf margin	Entire or slightly crenulate	Entire	Slightly crenulate to crenulate-ciliate, rarely entire	Entire	Entire
Lateral veins	Visible	Visible	Visible	Visible	Conspicuously visible
Petiole (mm)	Absent	Absent or 0.5	Absent	Absent	1–2 mm
Pedicel (mm)	0.3–0.5	1.5–2	Absent or 0.3–3.8	< 1 mm	1.3–2.3 mm
Glandular emergences (abaxial leaf surface)	Present	Absent	Present	Absent	Absent

FIG. 1. A–G. *Microlicia tomentella* Naudin. A. Flowering branch. B. Part of the flowering branch showing a flower and floral buds. C. Leaf abaxial surface. D. Hypanthium and sepals. E. Larger (left) and smaller stamens (right). F. Gynoecium. G. Immature capsule enclosed by the hypanthium. H–M. *Microlicia trianaei* K. Moreira & R. Romero. H. Flowering branch. I. Part of the flowering branch showing flower and floral bud. J. Leaf abaxial surface. K. Hypanthium and sepals. L. Smaller (left) and larger stamens (right). M. Gynoecium. (A–G: *J. N. Nakajima et al. 4681*; H–M: *R. Romero et al. 8866*).

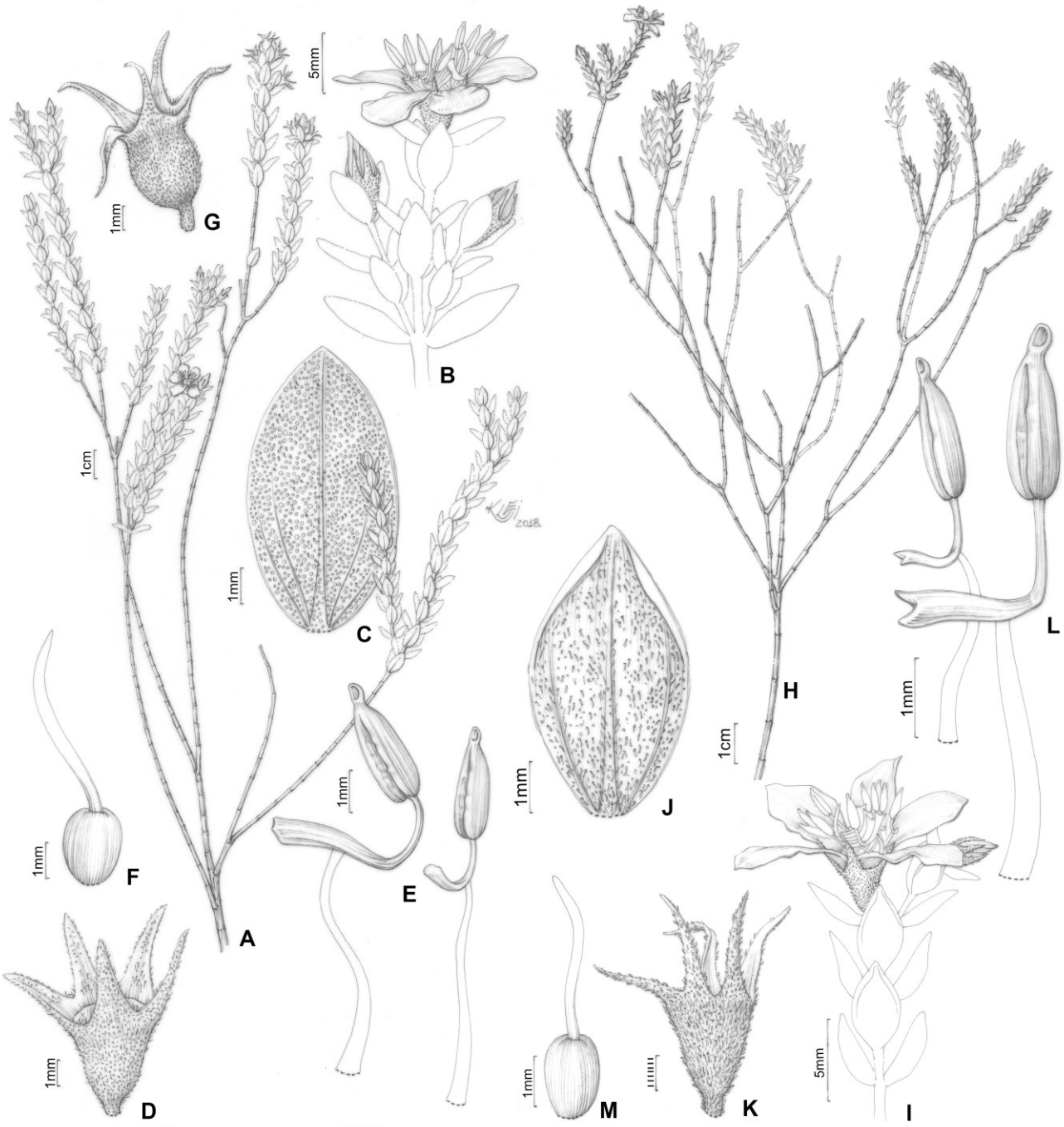
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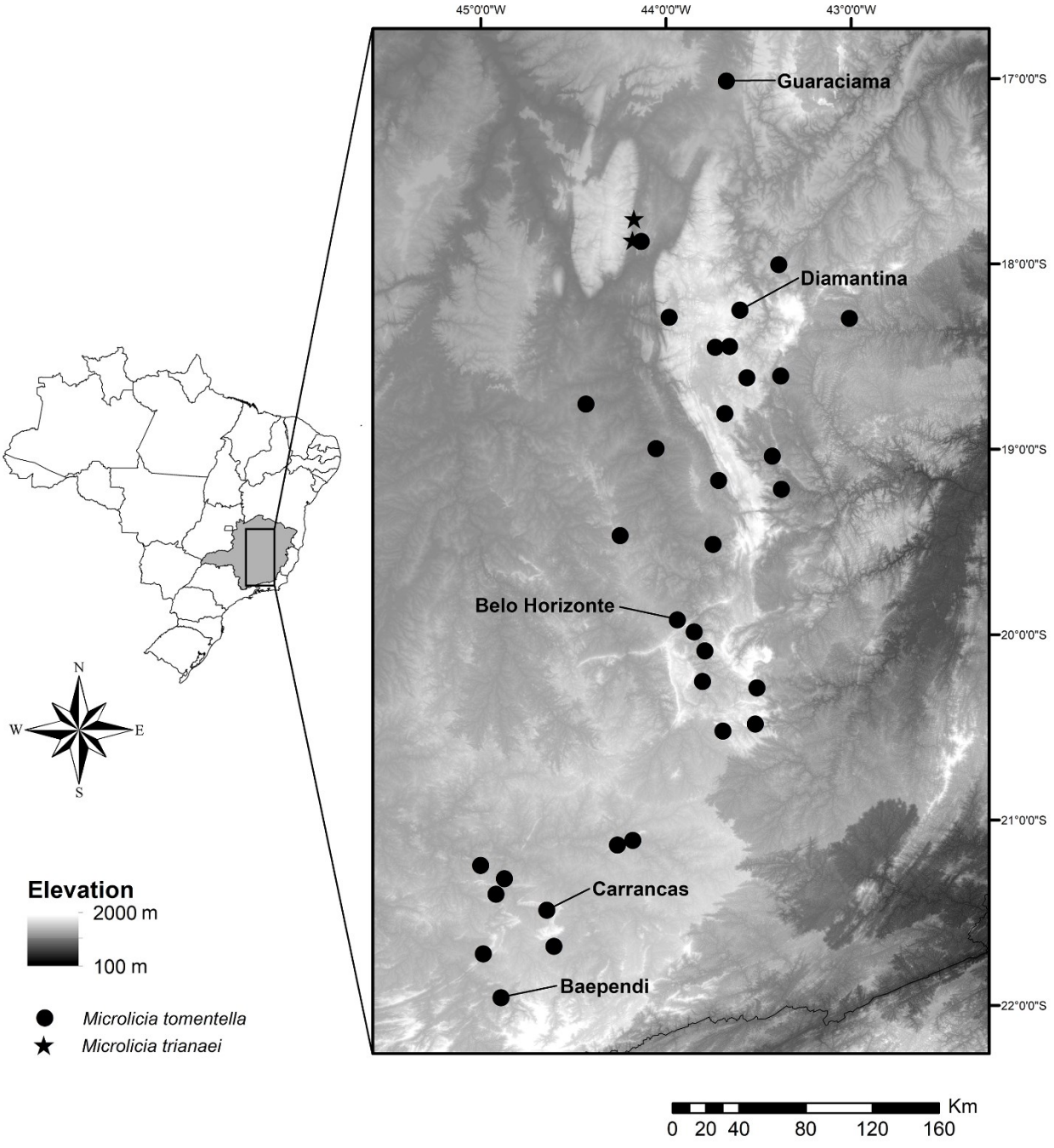
FIG. 2. *Microlicia trianaei* K. Moreira & R. Romero. A. Habit. B. Flowering branch. C. Flowering branch showing the disposition of the flowers. D. Flower in front view. Photos: R. Romero.


A
B
C
D

FIG. 3. Distribution of *Microlicia tomentella* Naudin and *Microlicia trianaei* K.V.C. Moreira & R. Romero in Espinhaço Range, Minas Gerais, Brazil.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21°0'0"S
22°0'0"S
Guaraciama
Diamantina
Belo Horizonte
Carrancas
Baependi
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Microlicia tomentella
Microlicia trianaei
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FIG. 4. Scanning electron microscopy (A–C) and anatomy (D–E) of the leaf of *Microlicia trianaei*. A. Abaxial surface. B. Adaxial surface. C. Detail of the previous figure showing the distribution of trichomes and emergences. D–E. Leaf blade cross-sections. D. Detail of midrib. E. Lateral veins. arrowhead = stomata; asterisk = phenolic cells; co = collenchyma; ep = epidermis; le = long-stalked emergence; ph = phloem; pp = palisade parenchyma; sp = spongy parenchyma; st = short-stalked glandular trichome ; xy = xylem.

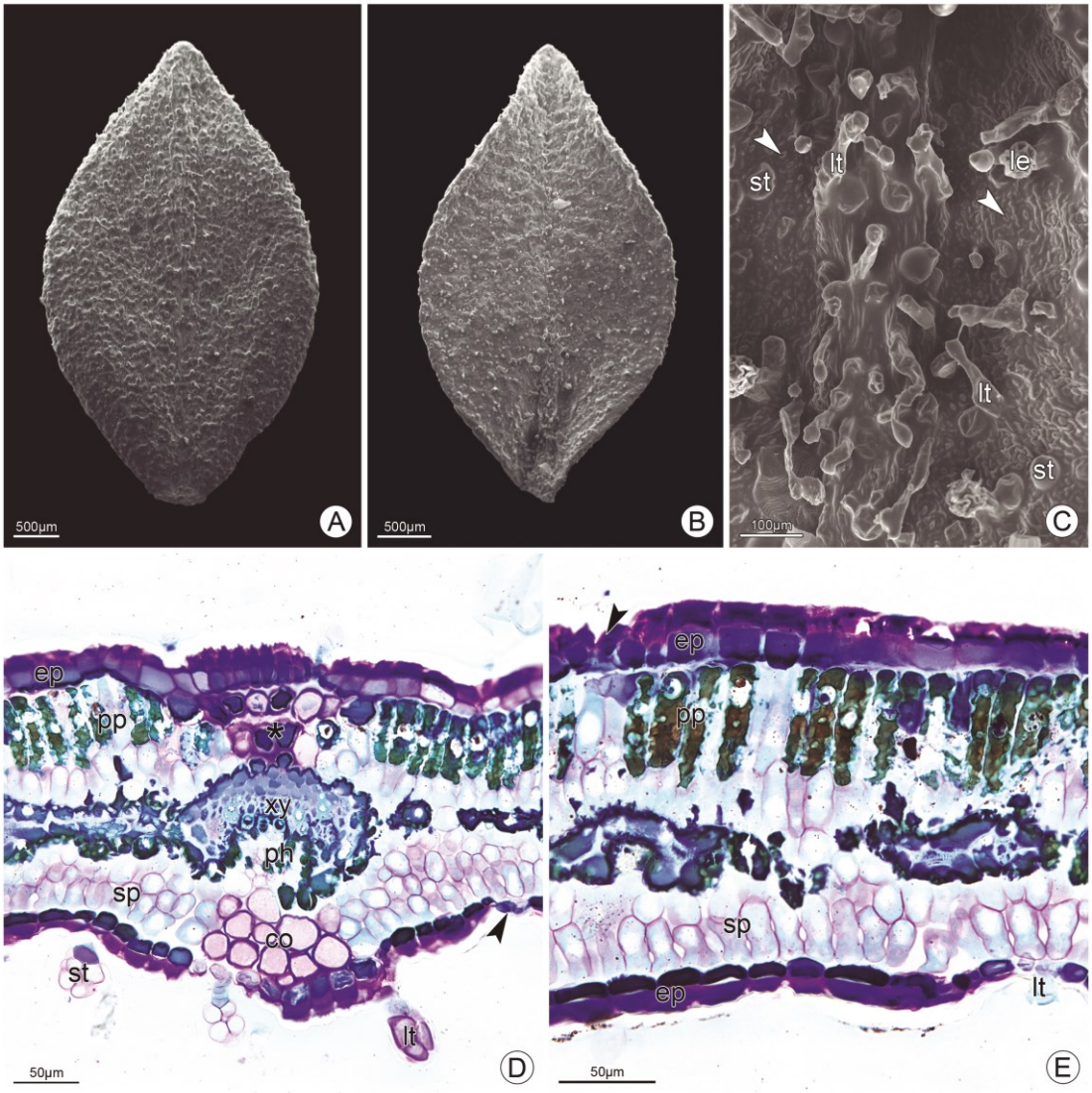
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FIG. 5. *Microlicia tomentella* Naudin. A. Habit. B, C. Flower in front view. D. Flowering branch. E. Floral bud. F. Fruits. Photos: A–D: R. Romero; E, F: J. N. Nakajima.

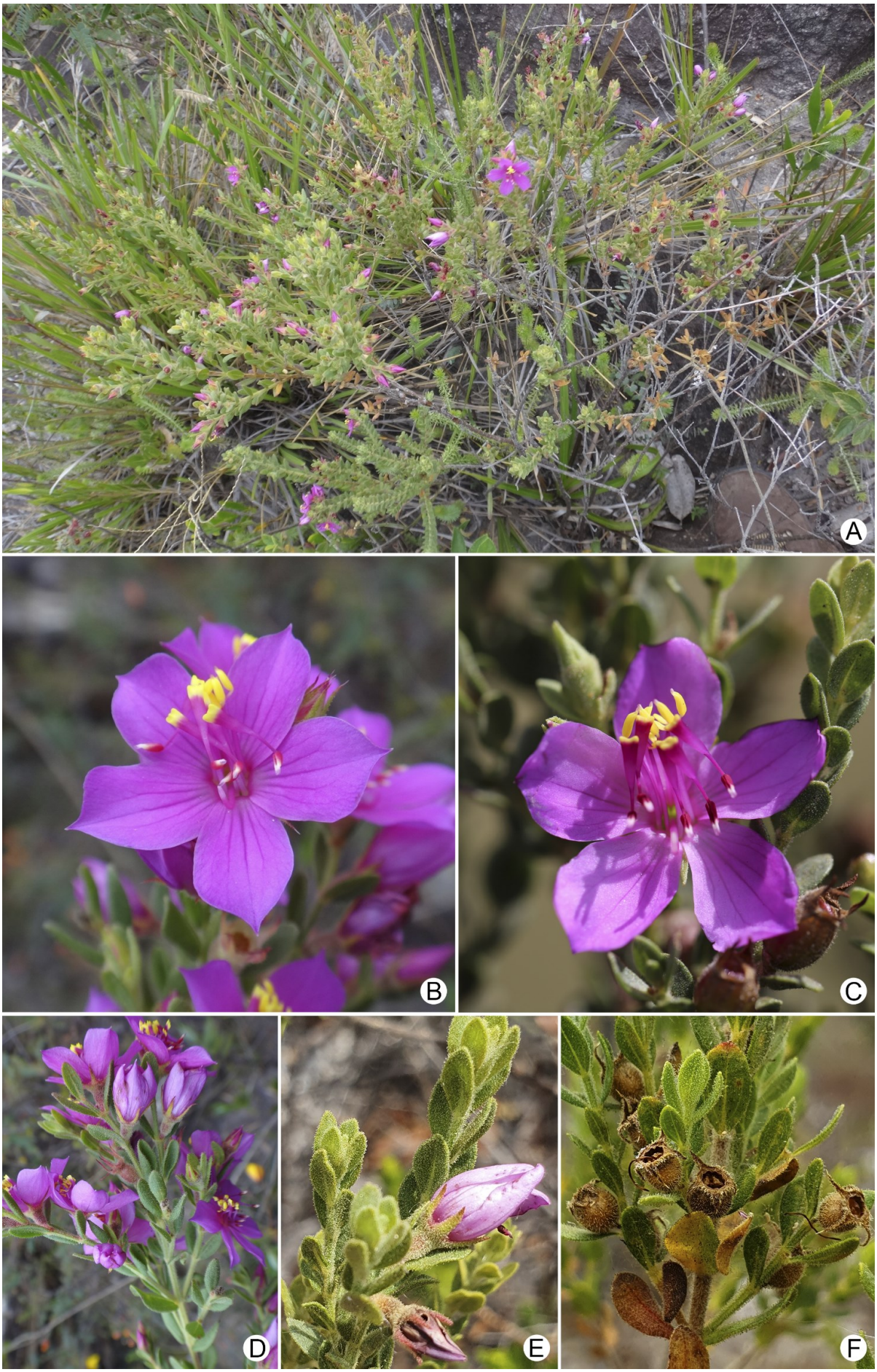
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FIG. 6. Morphological variation in *Microlicia tomentella*. A–F. Variation of leaf shape and size. G–L. Variation of shape and length of hypanthium and sepals. M–O. Variation of pedicel length and indumentum of hypanthium. A. *R. Romero 6081*; B. *R. Romero 8898*; C. *R. Romero 8131*; D. *R. Romero 6037*; E. *P. O. Rosa 918*; F. *R. Romero 5419*; G. *R. Romero 5975*; H. *F. N. A. Mello 310*; I. *F. N. A. Mello 253*; J. *R. Romero 8898*; K. *I. M. Araújo 314*; L. *R. Romero 8131*; M. *R. Romero 6081*; N. *F. N. A. Mello 253*; O. *R. Romero 5975*.

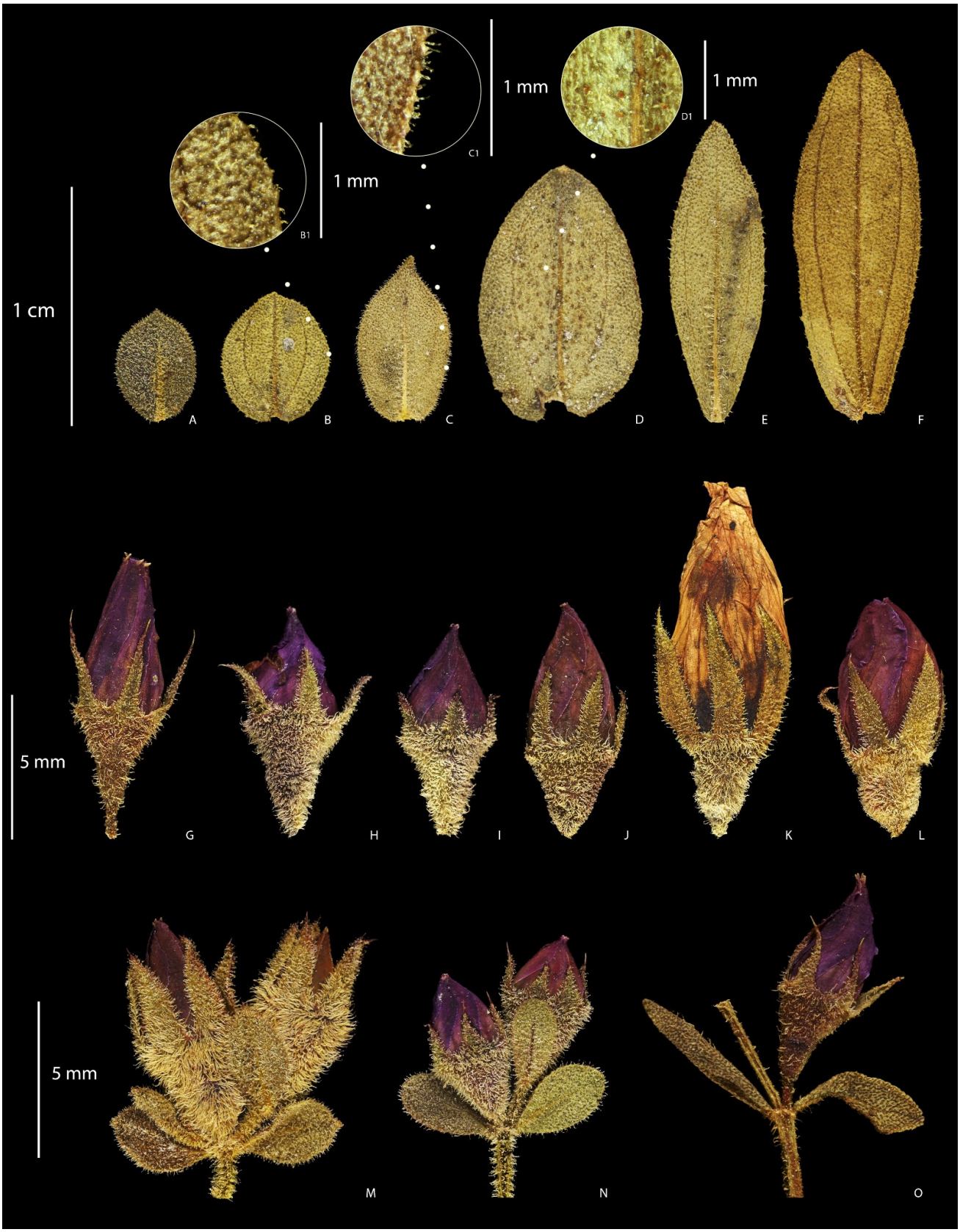
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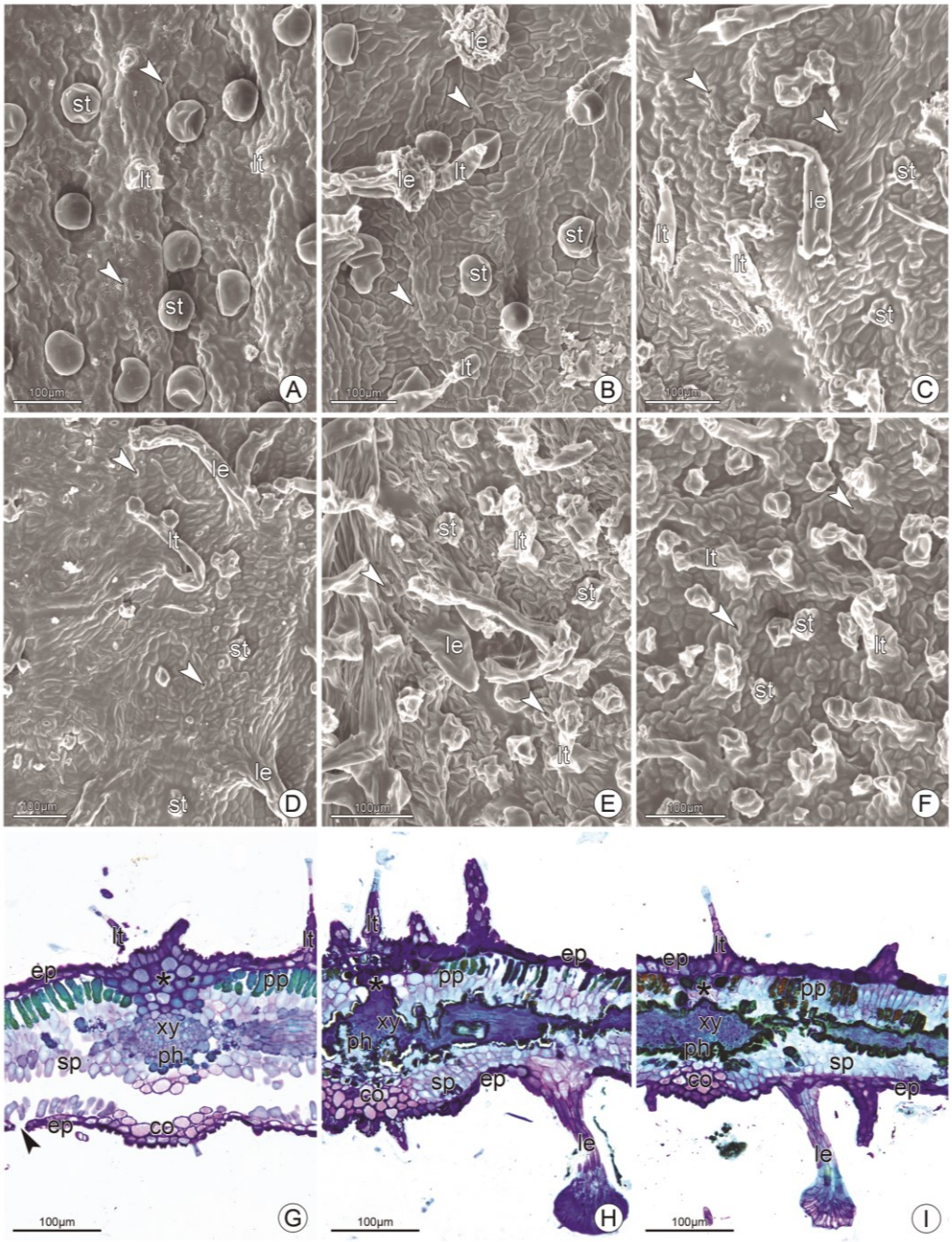
FIG. 7. Scanning electron microscopy showing a variation on the indumentum density of *Microlicia tomentella* at the adaxial and abaxial surface, respectively (A–F) and anatomy (G–I). A–B. *R. Romero 6037*. C–D. *P. O. Rosa 918*. E–F. *R. Romero 6081*. G–I. Detail of the midrib. arrowhead = stomata; asterisk = phenolic cells; co = collenchyma; ep = epidermis; le = long-stalked emergence; le = long-stalked emergence; ph = phloem; pp = palisade parenchyma; sp = spongy parenchyma; st = short-stalked glandular trichome; xy = xylem.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