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RESEARCH ARTICLE

Five new species of *Streptocarpus* (Gesneriaceae) from Katanga, D.R. Congo

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Background and aims – Five new species of *Streptocarpus* (Gesneriaceae) are described from D.R. Congo in connection with preparing the family treatment for the Flore d'Afrique centrale.
Methods – Standard herbarium practices were applied.
Key results – *Streptocarpus malachiticola* sp. nov. is related to *S. compressus* and *S. goetzei* while *S. bampsii* sp. nov., *S. malaissei* sp. nov., *S. salesianorum* sp. nov., and *S. schaijesii* sp. nov. are related to *S. michelmorei* and S. *solenanthus*. The differences with these species are discussed and distribution maps for the new taxa are presented. An identification key for all known acaulescent species from D.R. Congo, Rwanda, and Burundi is provided. The conservation status of new species is preliminarily assessed. All taxa are range-restricted in Upper Katanga and the assessments are as follows: *S. malachiticola*: EN B1+2ab(iii), *S. bampsii*: CR B2ab(iii), *S. malaissei*: EN B1+2ab(iii), *S. salesianorum*: CR B2ab(iii), and *S. schaijesii*: EN B2ab(iii). *Streptocarpus malachiticola* is found on metalliferous rocks while the remaining species are either epiphytes in gallery forests (*S. bampsii*) or occur on humid rocks in gallery forests.

Keywords – Central Africa; endemism; new species, *Streptocarpus malachiticola*, *S. bampsii*, *S. malaissei*, *S. salesianorum*, *S. schaijesii*, taxonomy.

INTRODUCTION

The genus *Streptocarpus* Lindl. (Lindley 1828: t. 1173) has a mainly African and Malagasy distribution. Since the classic revision of Hilliard & Burtt (1971), numerous new taxa have been described from the African continent, e.g. *Streptocarpus bindseili* Eb.Fisch. (Fischer 1988: 386) from Eastern Rwanda, *S. burttianus* Pócs (Pócs 1991: 40) from the Nguru Mts of Tanzania, *S. cyaneus* S.Moore subsp. *longitommii* Weigend & T.J.Edwards (Weigend & Edwards 1994a: 372), *S. cyaneus* subsp. *nigridens* Weigend & T.J.Edwards (Weigend & Edwards 1994a: 371), *S. fenestra-dei* Weigend & T.J.Edwards (Weigend & Edwards 1994a: 370), *S. floribundus* Weigend & T.J.Edwards (Weigend & Edwards 1994b: 168), *S. parviflorus* Hook.f. subsp. *soutpansbergensis* Weigend & T.J.Edwards (Weigend & Edwards 1994a: 369), *S. kunhartii* T.J. Edwards (Edwards 2003: 185) from KwaZulu-Natal, South Africa, *S. hilburtianus* T.J.Edwards (Edwards 2003: 186) from Mpumalanga, South Africa, *S. lilliputana* Bellstedt & T.J.Edwards (Bellstedt & Edwards 2003: 410) from Pondoland, South Africa, *S. actinoflorus* T.J.Edwards & M.Hughes (Edwards et al. 2008: 743) and *S. aylae* T.J.Edwards (Edwards et al. 2008: 745) from South Africa, *S. mbeyensis* I.Darbysh. (Darbyshire 2006: 39) from the Southern Highlands of Tanzania, *S. mazumbaiensis* I.Darbysh. (Darbyshire & Massingue 2014: 4) from the Usambara Mts of Tanzania, and *S. acicularis* I.Darbysh. & Massingue (Darbyshire & Massingue 2014: 7) from the Chimanimani Mts of Mozambique.

Phylogenetic studies show that *Streptocarpus* is paraphyletic and includes at least *Schizoboea* (Fritsch) B.L.Burtt (Burtt 1974: 266), *Saintpaulia* H.Wendl. (Wendland 1893: 321), and *Linnaeopsis* Engl. (Engler 1900: 482) (Harrison et al. 1999; Möller & Cronk 2001).

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Darbyshire (2006) published new combinations to include *Linnaeopsis* within *Streptocarpus* but maintained *Saintpaulia* and *Schizoboea* on morphological grounds. Christenhusz (2012) subsequently published new combinations to include *Saintpaulia*, *Schizoboea*, and the Malagasy genera *Colpogyne* B.L.Burtt (Burtt & Keraudren-Aymonin 1971: 150) and *Hovanella* Weber & B.L.Burtt (Weber & Burtt 1998: 333) to render the genus *Streptocarpus* monophyletic. Nishii et al. (2015) redefined *Streptocarpus* to include all Afro-Malagasy Gesneriaceae (except *Epithema* Blume; Blume 1826: 737) and established an infrageneric classification. The authors adapt here the broad generic circumscription of *Streptocarpus* following Christenhusz (2012).

Several treatments for African Floras have been subsequently published based on the revision of Hilliard & Burtt (1971). Thus, East Africa (Darbyshire 2006) and the Flora Zambesiaca area (Botswana, Zambia, Zimbabwe, Malawi, Mozambique, Caprivi Strip of Namibia) (Hilliard & Burtt 1988) have been intensively studied and were shown to be very rich in species of *Streptocarpus*. The area of the Flore d'Afrique centrale (D.R. Congo, Rwanda, Burundi) has been considered to be comparatively species-poor and, except for Rwanda (Troupin 1985), lacks a modern treatment. For Rwanda, only *Streptocarpus glandulosissimus* Engl. (Engler 1893: 78) and *S. kamerunensis* (Engl.) Christenhusz (Christenhusz 2012: 7) (= *Schizoboea kamerunensis* (Engl.) B.L.Burtt (Burtt 1974: 266), *Didymocarpus kamerunensis* Engl. (Engler 1893: 79)) are reported (Troupin 1985). Fischer (1988) added the endemic *Streptocarpus bindseili* Eb.Fisch. The only region known to harbour other endemic species is the Albertine Rift where *Streptocarpus masisiensis* De Wild. (De Wildeman 1920: 39) is restricted to the Eastern Congo west of Lake Kivu, and *Streptocarpus burundianus* Hilliard & B.L.Burtt (Hilliard & Burtt 1971: 387) is confined to Western Burundi. *Streptocarpus wittei* De Wild. (De Wildeman & Staner 1932: 90) was described from Katanga but also occurs in adjacent NE Zambia and Malawi. *Streptocarpus katangensis* De Wild. & T.Durand (De Wildeman & Durand 1901: 25) was also described from Katanga but the type specimen only bears immature flowers and is thus unidentifiable (see below). We follow Hilliard & Burtt (1971) who consider *Streptocarpus katangensis* as a doubtful name.

While preparing the account of Gesneriaceae for the Flore d'Afrique centrale, nouvelle série, the first author came across several specimens of *Streptocarpus* from Katanga that proved to be new species and that are described below.

Upper Katanga represents the northern part of the Zambezian centre of endemism (Malaisse 1996). Schmitz (1971) estimated the number of vascular plants in Upper Katanga as 4000, but even this is likely as underestimation. It ranks among the regions in tropical Africa with the highest proportion of endemics (Linder 2001). Meerts (2016) published a checklist of trees and shrubs and recognized 664 species. Upper Katanga is also famous for its heavy metal tolerant flora where ca 550 species occur (Faucon et al. 2010; Malaisse et al. 2016). One of the new proposed *Streptocarpus* species apparently is restricted to metalliferous soils.

MATERIAL AND METHODS

The present study is based on the investigation of dried herbarium specimens from the following herbaria: BR, BRLU, and K (abbreviations after Thiers continuously updated) and, where available, on photographs of the living plants. Flowers were soaked with warm water and a detergence to obtain details and measurements. The information about the habitat of the involved species, as well as their phenology and chorology, were based on collection data from the labels. The measurements of *Streptocarpus michelmorei* are based on the type specimen at K. The majority of specimens studied can be consulted online from BR (http://www.botanicalcollections.be) and K (http://apps.kew.org/herbcat).

TAXONOMIC TREATMENT

Streptocarpus malachiticola Eb.Fisch. & I.Darbysh., **sp. nov.** (figs 1–2, 9A) – Type: D.R. CONGO – **Haut Katanga** • Le long du ruisseau Tshilongo, à proximité du village Kabwe, rochers bordant la rive droite, paroi verticale; 1370 m; 10°37′S, 26°05′E; 10 Jan. 1980; *Malaisse 11427*; holotype: BR[BR0000016803312].

Diagnosis – *Streptocarpus malachiticola* differs from *S. goetzei* in the glandular-pubescent pedicel with shorter eglandular hairs intermixed, the glandular-pubescent calyx, the smaller corolla with glandular hairs outside, the glandular-pubescent ovary, the bilobed stigma and the distinctly shorter capsule. The upper lip of the corolla bears strongly divaricate lobes, thus also differing from *S. goetzei*. It differs from *S. compressus* in the strictly unifoliate habit, the glandular-pubescent calyx, the shorter lower lip of the corolla, the blue-violet corolla with pale-whitish palate, the shape of the upper lobes and the more strongly constricted mouth, the eglandular style and the shorter capsules.

Description – Perennial acaulescent herb. Unifoliate, the phyllomorph on a short petiolode, 1 × 0.5 cm, lamina green, broadly oblong, ca 5–18 × 2–7 cm, with dense whitish hairs, base cordate, margin crenate, with 7–12 pairs of lateral nerves. Inflorescences 1–2 per plant at base of lamina, 6.5–19 cm long. Pedicel 10–18(–25) mm long, glandular-pubescent with intermixed much shorter eglandular hairs, bracts linear-lanceolate, 1–2 × 0.5–0.8 mm. Calyx 4–6 mm long, divided to the base, hairs on calyx glandular-pubescent. Corolla purple-blue with whitish mouth, 17–24 mm long, mouth distinctly compressed between the two upper lobes with the opening shaped like an inverted V, hairs on corolla glandular-pubescent, tube 9–13 mm long, tube diameter 2–3 mm, widening at mouth to 4 mm, upper lip 4–6 mm long, lobes 3.5 × 4.5 mm, lower lip 7–10 mm long, lateral lobes 5.5 × 4.5 mm, median lobe 6 × 5 mm. Stamens inserted at 2/3rd of corolla tube, filaments 2 mm long, with few short glandular hairs, anthers rounded, thecae 1.5 mm long, staminodes minute, ca 0.5 mm long. Ovary and style 4–7 mm long, ovary densely glandular-pubescent, style with short eglandular hairs, stigma bilobed, 0.8–0.9 × 0.5 mm. Capsules slender, 20–22 × 2 mm.

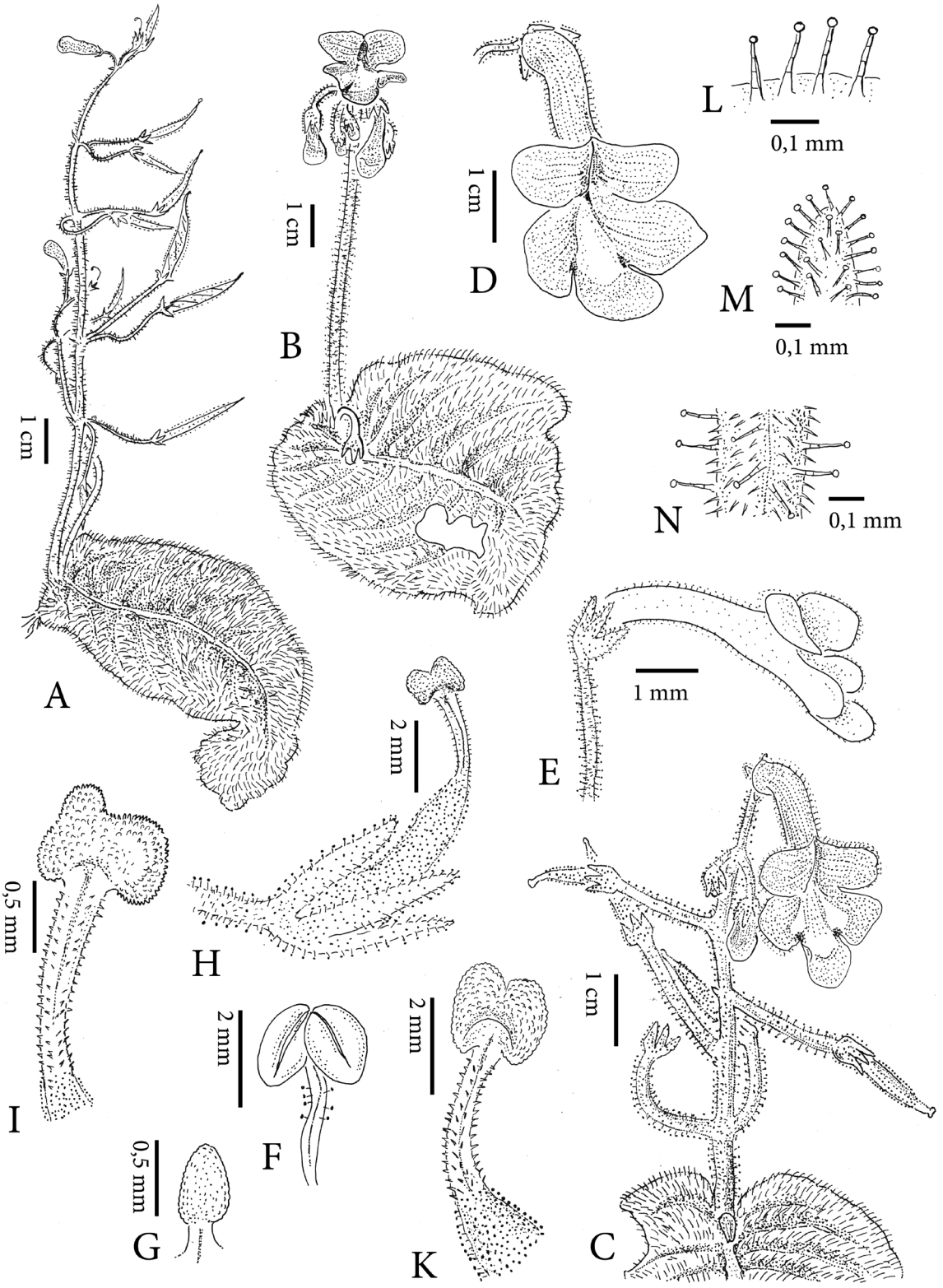

Figure 1 – *Streptocarpus malachiticola.* **A–B**. Habit. **C**. Inflorescence. **D**. Flower, frontal view. **E**. Flower, lateral view. **F**. Stamen. **G**. Staminode. **H**. Calyx with ovary, style, and stigma. **I**. Style and stigma. **K**. Tip of ovary, style, and stigma. **L**. Glandular hairs on calyx. **M**. Tip of sepal with glandular hairs. **N**. Hairs on pedicel. A, C–K from *Malaisse 11427*; B from *Schaijes 3850*. Illustration by Eberhard Fischer.

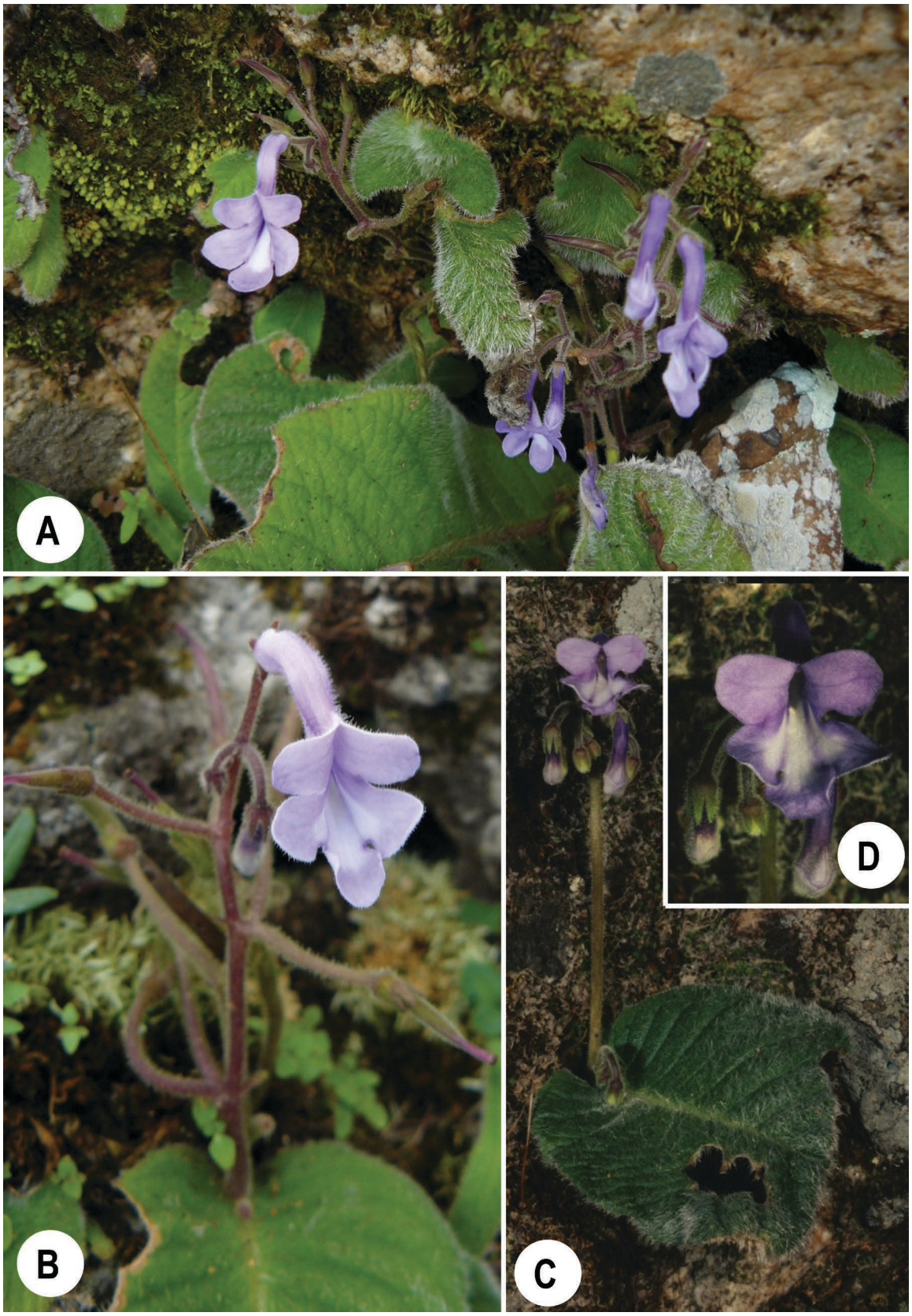

Figure 2 – *Streptocarpus malachiticola*. **A, C**. Habit. **B**. Inflorescence. **D**. Flower. Photographs taken by Julie Lebrun, Biodiversity and Landscape Unit, Gembloux Agro-Bio Tech, University of Liège at Tshilongo, Kabwe (A–B: © Julie Lebrun, all rights reserved) and Michel Schaijes at Tenke (C–D: © Michel Schaijes, all rights reserved).

Table 1 – Comparison of the key characters for *Streptocarpus malachiticola* and its allies.

Character	*S. malachiticola*	*S. compressus*	*S. goetzei*
Number of leaves	unifoliate	unifoliate to plurifoliate	unifoliate, rarely plurifolate
Leaf (cm)	5–18 × 2–7	11–28 × 7.5–22.5	6–32 × 2.5–30
Inflorescence length (cm)	6.5–19	3.5–20	7–26
Number of inflorescences	1–2 per plant	3–6 per plant	1–6 per plant
Pedicel length (mm)	10–18(–25)	10–30(–40)	10–25
Hairs on pedicel	glandular with shorter eglandular hairs intermixed	glandular with eglandular hairs intermixed	usually eglandular-pubescent
Calyx (mm)	4–6	2.5–6	2–3.5(–6)
Hairs on calyx	glandular-pubescent	eglandular-pubescent, few glandular hairs at base	eglandular-pubescent
Corolla colour	blue-violet with whitish palate	pale to mid blue violet with dark blotching on paler palate	pale to mid-blue violet with pale palate
Corolla length (mm)	17–24	22–33	(20–)25–37
Hairs on corolla	glandular-pubescent	glandular-pilose	eglandular-pubescent
Tube length (mm)	9–13 mm	10–17 mm	12–25(–30)
Upper lip length (mm)	4–6	5.5–7(–10) × 5–7(–9)	4–7 × 5–9 mm
Lower lip length (mm)	7–10	14–21	12–16
Lateral lobes (mm)	5.5 × 4.5	7–9.5 × 9–10.5	4.5–9 × 5.5–9.5
Median lobe (mm)	6 × 5	8.5–10 × 10–11	5–9 × 5.5–10
Filaments (mm)	2	2.5–3	2–3
Anthers (mm)	1.5	1.2	0.75–1.1
Staminode	minute, ca 0.5 mm	minute	minute
Ovary and style (mm)	4–7, ovary glandular, style eglandular	5–7.5, 1–2, glandular or glabrous, style glandular	5–9, 1.5–2, eglandular
Stigma	bilobed	bilobed	capitate
Fruit (mm)	20–22 × 2	30–45(–50) × 1.5–1.7	(25–)40–55(–70) × 1.5–1.7

Distribution – Endemic to south-eastern D.R. Congo (Haut Katanga).

Habitat – Shaded vertical siliceous rock faces, often on metalliferous rocks, e.g. malachite, or rarely on non-mineralized rocks, 1200–1500 m elevation. Malachite is a copper carbonate hydroxide mineral [$Cu_2CO_3(OH)_2$]. It often results from the weathering of copper ores.

Etymology – Named after the metalliferous rocks which are the preferred habitat.

Additional material examined – D.R. CONGO – **Haut Katanga** • Chilonge, à 4,5 km au sud de Tenke, affleurement des rochers siliceuses cellulaires; 5 Dec. 1987; *Schaijes 3850*; BR • Rocks at Chilonge near Tenke, non-mineralized rocky terrain; 10°35′06″S, 26°08′06″E; 1200 m; 11 Apr. 1990; *TROPMETEX 206*; MO, BR[BR0000016803308] • Luita, affleurement rocheux en pente; 10°44′S, 26°18′E; 1500 m; 4 Apr. 1986; *Malaisse 13819*; BR[BR0000016803305].

Taxonomic notes – The species is clearly related to *Streptocarpus goetzei* Engl. (Engler 1901: 406) and *S. compressus* B.L.Burtt (Burtt 1958: 570) which also bear a corolla mouth compressed between the upper lobes so that the opening is shaped like an inverted V (Hilliard & Burtt 1971). The three species are compared in table 1. *Streptocarpus goetzei* is usually confined to forests and is found in southwestern Tanzania (Rungwe Mts), southern Malawi, and northern Mozambique (Hilliard & Burtt 1971; Darbyshire 2006). The new species is endemic to metalliferous rocks in Katanga (Duvigneaud & Denaeyer-De Smet 1963). It is probably more closely related to *S. compressus* which is confined to Songea and Iringa Districts in Tanzania, where it grows in open rocky habitats (Hilliard & Burtt 1971; Darbyshire 2006). *Streptocarpus malachiticola* is already figured by Malaisse et al. (2016) under the name of *Streptocarpus* aff. *michelmorei* B.L.Burtt. A photograph is published on the website http://copperflora.org/eflora/index.php?family=Gesneriaceae under the name of *Streptocarpus rhodesianus.*

IUCN conservation assessment (preliminary) – Endangered: EN B1+2ab(iii). *Streptocarpus malachiticola* is restricted to copper-rich rocks of malachite and thus the three identified locations are under potential threat of mining. With an estimated AOO of 12 km^2 (assuming a 4 km^2 grid cell size) and four herbarium specimens from three locations, the most recent being collected in 1990, the species could be preliminarily assessed as Endangered: EN B1+2ab(iii).

Streptocarpus bampsii Eb.Fisch. & I.Darbysh., **sp. nov.** (figs 3–4, 9A) – Type: D.R. CONGO – **Haut Katanga** • Zone Lubudi, Kayo, Chutes de la Kalule Nord, forêt galerie

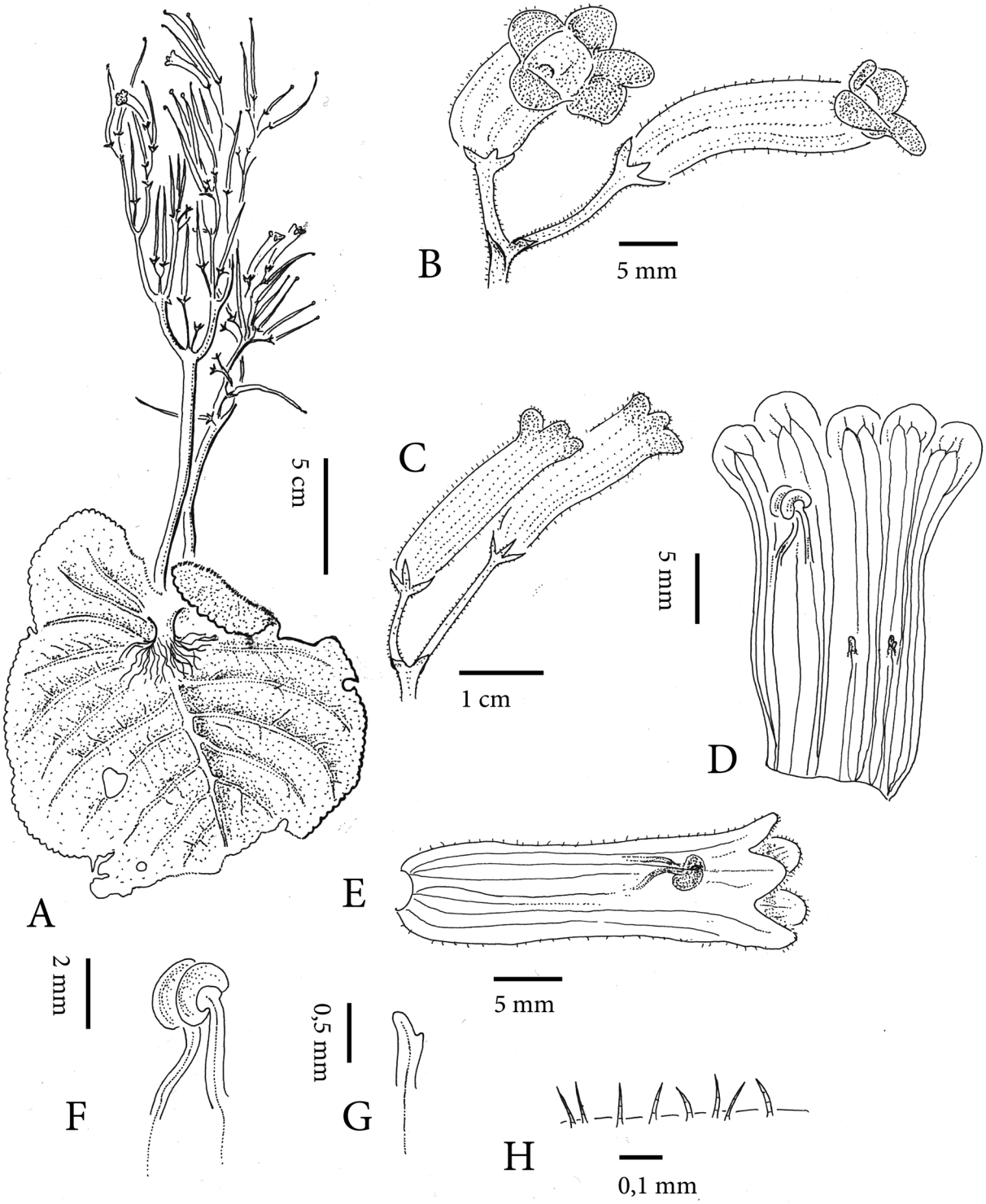

Figure 3 – *Streptocarpus bampsii*. **A**. Habit. **B–C**. Flowers. **D**. Corolla, dissected, showing stamens and staminodes. **E**. Corolla, lateral view. **F**. Stamens. **G**. Staminode. **H**. Hairs on corolla. From *Bamps & Malaisse 8389*. Illustration by Eberhard Fischer.

au pied de la chute; 9°52′S, 26°03′E; 1250 m; 29 Jan. 1986; *Bamps & Malaisse 8389*; holotype: BR[BR0000016803367, BR0000016803374].

Diagnosis – The species differs from *Streptocarpus solenanthus* in the straight and usually shorter corolla tube and the shorter lower lip of the corolla, the darker colouring of the corolla lobes and the longer calyx lobes. The species differs from *Streptocarpus michelmorei* in the smaller pale lilac corolla lacking a deep violet patch on the palate and behind, the corolla tube being almost straight and not deepened on the lower side at the middle, and the upper and the lower lip being almost equal while in *S. michelmorei* the lower lip is distinctly larger. It also differs from *S. michelmorei* in the distinctly shorter capsule.

Description – Monocarpic acaulescent herb. Unifoliate, lamina broadly ovate to nearly orbicular, 15–32 × 14–25 cm, base shallowly cordate, margin crenate-dentate, apex obtuse, usually withered, pubescent on upper and lower surface, with 10–15 pairs of lateral nerves, petiolode not exceeding 1 cm long, pubescent. Inflorescences 1–3 per plant, arising from the petiolode, peduncle up to 9.5(–11) cm long, pubescent. Pedicels 6–20 mm long, eglandular pubescent, bracts linear-lanceolate, up to 5 mm long. Calyx divided to base, lobes lanceolate, 5–7 mm long, hairs on calyx eglandular. Corolla pale violet, lobes darker violet, tube outside whitish-violet, mouth pale violet to whitish-violet, 22–29 mm long, densely eglandular-pubescent, glabrous within, tube straight, not or only slightly expanded towards mouth,18–23 mm long, 3–4 mm in diameter, 5(–6) mm towards mouth, limb bilabiate, upper lip of two rounded lobes, 3–5 × 3–4 mm, lower lip of 3 rounded lobes, 4–5 × 4–5 mm. Stamens inserted in upper third of corolla tube towards mouth, filaments 3–6 mm long, glabrous, anthers white, 2–2.3 mm long, staminodes inserted below stamens, 0.6–1 mm long. Ovary densely eglandular-pubescent, ovary and style 21–22 mm long. Capsules 50–70 × 1.5–2 mm, eglandular-pubescent.

Distribution – Endemic to south-eastern D.R. Congo (Haut Katanga), only known from the type collection.

Habitat – Epiphyte in gallery forest at foot of waterfalls, 1250 m elevation.

Etymology – Named after Paul Bamps, who made major contributions to the knowledge of the flora of Central Africa, and who collected the type.

IUCN conservation assessment (preliminary) – Critically Endangered: CR B2ab(iii). *Streptocarpus bampsii* is only known from the type collection. The estimated AOO is 4 km^2 (assuming a 4 km^2 grid cell size). The habitat, a gallery forest, is under potential threat of logging. As there is only one locality known, and to emphasize the clear threats (logging of gallery forests) to the type locality, we prefer to assess it preliminarily as Critically Endangered: CR B2ab(iii).

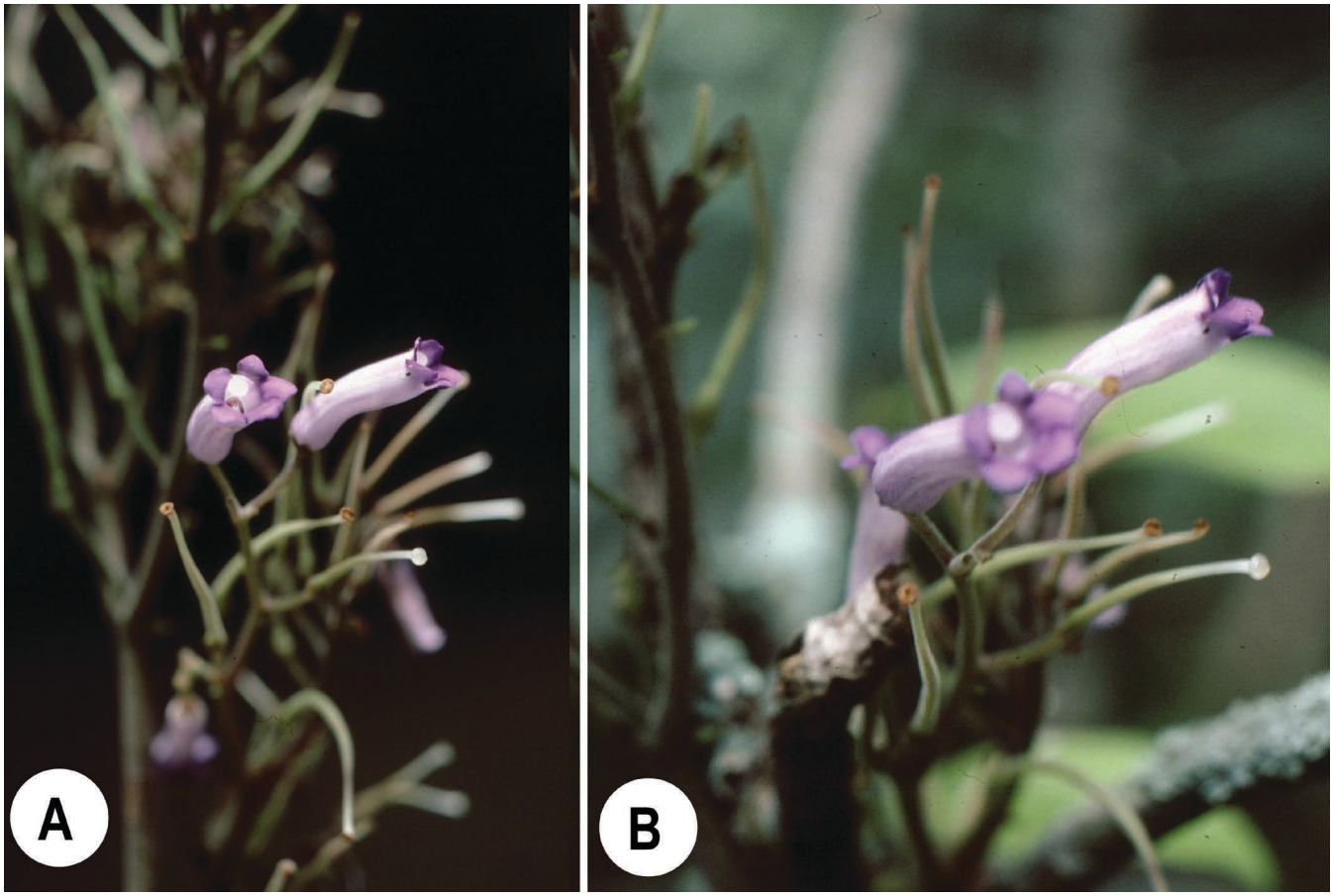

Figure 4 – *Streptocarpus bampsii*. **A–B**. Details of inflorescence. Photographs taken by Paul Bamps (*Bamps & Malaisse 8389*). © Paul Bamps, all rights reserved.

Streptocarpus malaissei Eb.Fisch. & I.Darbysh., **sp. nov.** (figs 5, 9B) – Type: D.R. CONGO – **Haut Katanga** • Lubumbashi, voyage Lubudi; 2 Jan. 1983; *Bodenghien 30*; holotype: BR[BR0000016803442].

Diagnosis – The species differs from *Streptocarpus michelmorei* in the smaller pale lilac corolla lacking a deep violet patch on the palate and behind, the corolla tube being almost straight and not deepened on the lower side at the middle, and the upper and the lower lips being almost equal while in *S. michelmorei* the lower lip is distinctly larger. It also differs from *S. michelmorei* in the distinctly shorter capsule. The species differs from *Streptocarpus solenanthus* in the straight and usually shorter corolla tube and the shorter lower lip of the corolla. It differs from the morphologically similar *Streptocarpus bampsii* in the deep violet corolla with pale violet tube, shorter ovary and style and the shorter capsule.

Description – Monocarpic acaulescent herb. Unifoliate, lamina broadly ovate to nearly orbicular, 6–27 × 4–20 cm, base shallowly cordate, margin crenate-dentate, apex obtuse, usually withered, pubescent on upper and lower surface, with 12–17 pairs of lateral nerves, petiolode not exceeding 1 cm long, pubescent. Inflorescences 1–2 per plant, arising from the petiolode, peduncle up to 4–14 cm long, pubescent. Pedicels 5–9 mm long, eglandular pubescent, bracts linear-lanceolate, up to 5 mm long. Calyx divided to base, lobes lanceolate, ± 4 mm long, hairs on calyx eglandular. Corolla pale violet to blue-mauve with tube pale violet, 15–30 mm long, densely eglandular-pubescent, glabrous within, tube straight, not or only slightly expanded towards mouth, 15–24 mm long, 3–4 mm in diameter, 5(–6) mm towards mouth, limb bilabiate, upper lip 3–7 × 3–5 mm, of two rounded lobes, lower lip 3–8 × 3–7 mm, of 3 rounded lobes, lateral lobe 3–5 × 3–6 mm, median lobe 3–8 × 3–7 mm. Stamens inserted in upper third of corolla tube towards mouth, filaments 7 mm long, glabrous, anthers white, 2 mm long, staminodes inserted below stamens, 0.8 mm long. Ovary densely eglandular-pubescent, ovary and style 7–15 mm long. Capsules 40–50 × 1–1.5 mm, eglandular-pubescent.

Distribution – Endemic to south-eastern D.R. Congo (Haut Katanga).

Habitat – Epiphyte or lithophyte on humid rocks in gallery forest or ravine near waterfall, 1450 m elevation.

Etymology – Named after François Malaisse, who made major contributions to the knowledge of the flora of Katanga, and who collected the type.

IUCN conservation assessment (preliminary) – Endangered: EN B1+2ab(iii). *Streptocarpus malaissei* is only known from 5 herbarium collections and 3 localities. The estimated AOO is 12 km^2 (assuming a 4 km^2 grid cell size). The habitat of gallery forest is under potential threat of logging. The most recent collection dates back to 1986. Thus, a preliminary assessment of Endangered: EN B1+2ab(iii) is proposed.

Additional specimens studied – D.R. CONGO **– Haut Katanga** • Lubudi, colline Kaboyaboya, rocher entre grotte; 1 Jan. 1983; *Bodenghien 28*; BR[BR0000016803459] • Biano, descente vers Mukabe Kasasi, riv. Lubudi, termitière; 2 Jan. 1983; *Bodenghien 29*; BR[BR0000016803473] • Lubudi, Chutes Dipera, Rive droite, Bas chute, epiphyte; 30 Dec. 1982; *Bodenghien 18*; BR[BR0000016803466] • Plateau des Biano, rivière Mulamba (chutes), dans les rochers (parfois suintantes); env. 1450 m; 6 Mar. 1986; *Malaisse 13793*; BR[BR0000016803435].

Streptocarpus salesianorum Eb.Fisch. & I.Darbysh., **sp. nov.** (figs 6, 9A) – Type: D.R. CONGO – **Haut Katanga** • Bords rocheux de la Panda; 1937; *E. Hofmann S 1799*; holotype: BR[BR0000013147648].

Diagnosis – *Streptocarpus salesianorum* differs from all other related species even at first glance by the orbicular leaf with a length/width ratio of ca 1. The flowers are similar to that of *S. schaijesii* but differ in the much shorter tube and the distinctly shorter upper and lower lips. There is an overall similarity to *S. solenanthus* but the latter species has a corolla with shorter upper lip and a distinctly longer lower lip and a much more ovate to oblong leaf (7–15 × 4–12 vs 25–27 × 24.5–26.5 cm in *S. salesianorum*).

Description – Monocarpic acaulescent herb. Unifoliate, lamina almost orbicular, 25–27 × 24.5–26.5 cm, base cordate, margin crenate-dentate, apex obtuse, emarginate, pubescent on upper and lower surface, with 13–16 pairs of lateral nerves, petiolode not exceeding 1 cm long, pubescent. Inflorescences 1–2 per plant, arising from the petiolode, peduncle up to 14–17 cm long, eglandular-pubescent. Pedicels 6–12 mm long, eglandular pubescent, bracts linear, up to 2 × 0.5 mm. Calyx divided to base, lobes lanceolate, 3.5–4 mm long, hairs on calyx eglandular. Corolla pale violet, 20–22 mm long, densely eglandular-pubescent, glabrous within, tube slightly curved, only slightly expanded towards mouth, 18–20 mm long, ± 4 mm in diameter, 5(–6) mm towards mouth, limb bilabiate, upper lip 3 × 3–4 mm, of two rounded lobes, lower lip 3–4 × 3–4 mm, of 3 rounded lobes, lateral lobe 3 × 3 mm, median lobe 4 × 3–4 mm. Stamens inserted in upper third of corolla tube towards mouth, filaments 4 mm long, glabrous, anthers white, 1.5 mm long, staminodes inserted below stamens, 0.8 mm long. Ovary densely eglandular-pubescent, ovary and style 7 mm long. Capsules 54–65 × 1–1.5 mm, eglandular-pubescent.

Distribution – Endemic to south-eastern D.R. Congo (Haut Katanga), only known from the type locality.

Habitat – Humid rocks along stream, ± 1450 m elevation.

Etymology – Named after the Salesian missionaries from Institut Saint François de Sales at Lubumbashi (= Elisabethville) who collected the type specimen.

IUCN conservation assessment (preliminary) – Critically Endangered: CR B2ab(iii). *Streptocarpus salesianorum* is only known from the type locality. The estimated AOO is 4 km^2 (assuming a 4 km^2 grid cell size). The habitat, a gallery forest, is under potential threat of logging. As there is only one locality, and to emphasize the threats to the type locality we prefer to assess it preliminarily as Critically Endangered: CR B2ab(iii).

Additional specimens studied – D.R. CONGO **– Haut Katanga** • Bords de la Panda; 1937; *s.col. S 1640*; BR[BR0000013147655] • Bords de Panda; Apr. 1942; *s.col. 195*; BRLU.

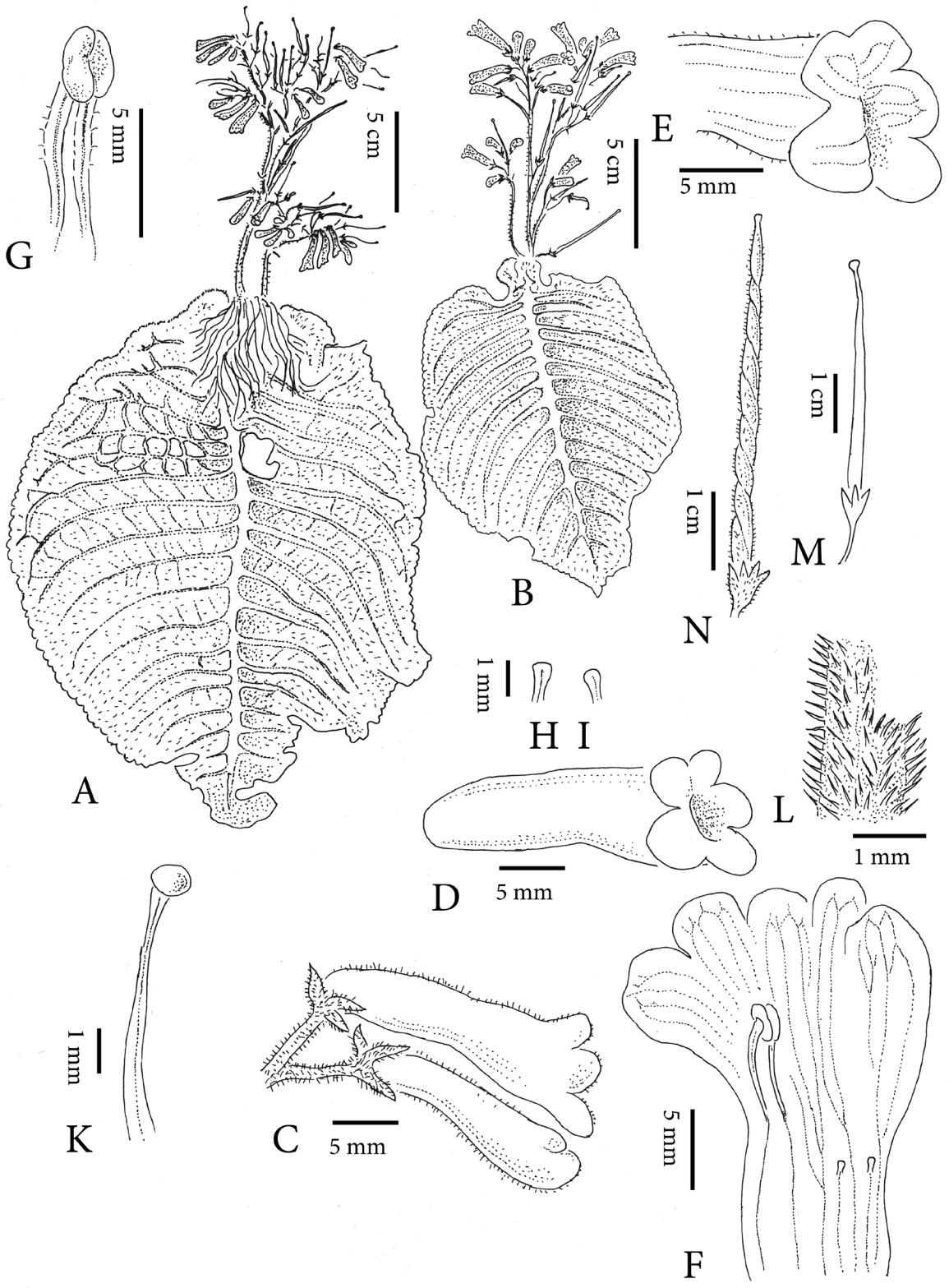

Figure 5 – *Streptocarpus malaissei.* **A**–**B**. Habit. **C**. Detail of inflorescence. **D**–**E**. Corolla. **F**. Corolla dissected showing position of stamens and staminodes. **G**. Stamens. **H**–**I**. Staminodes. **K**. Apex of ovary with style and stigma. **L**. Hairs on ovary. **M**. Young capsule. **N**. Mature capsule. A, C, D, F–N from *Bodenghien 30*, B from *Malaisse 13795*, and E from *Bodenghien 18*. Illustration by Eberhard Fischer.

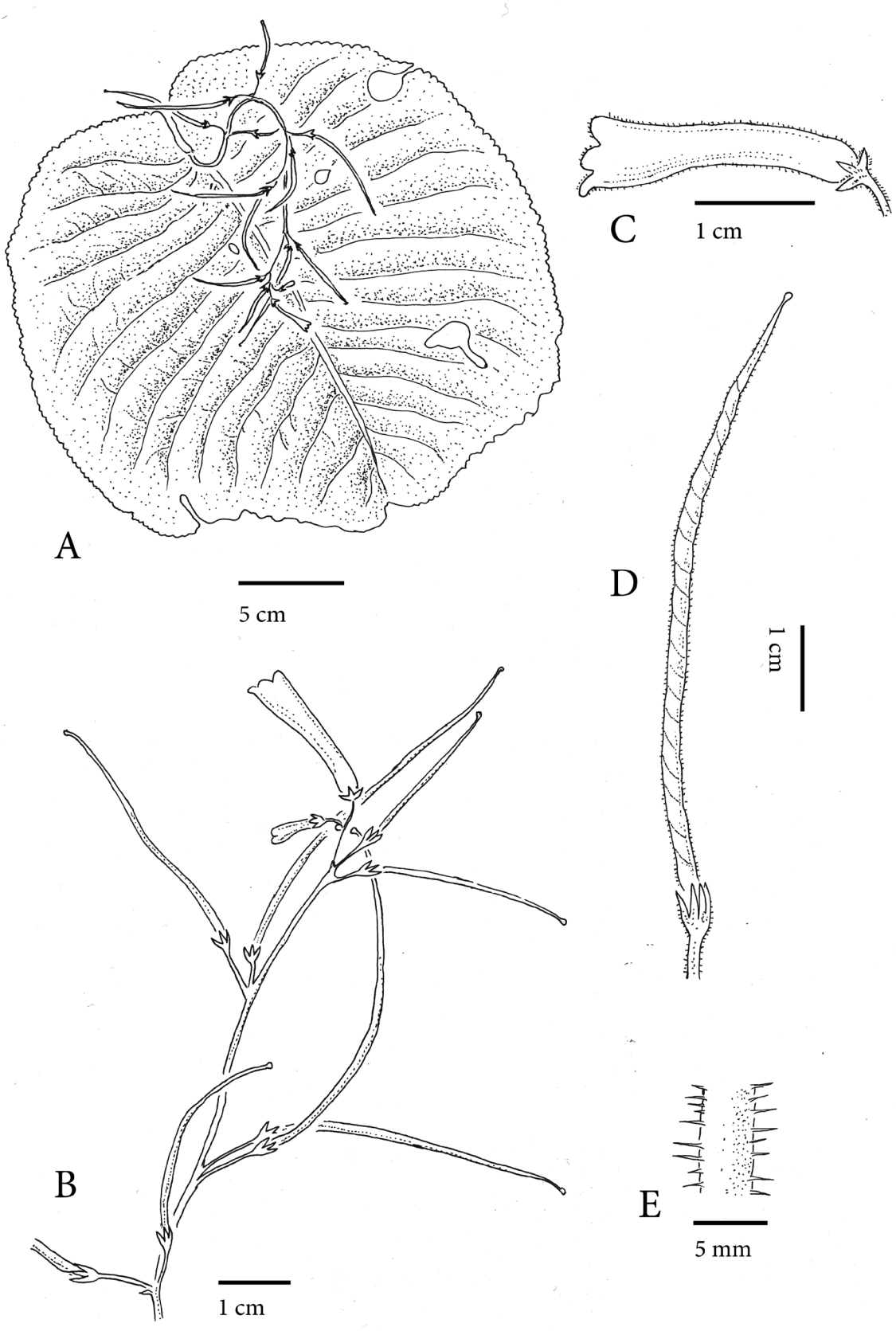

Figure 6 – *Streptocarpus salesianorum.* **A**. Habit. **B**. Inflorescence. **C**. Corolla. **D**. Mature capsule. **E**. Hairs on the ovary. From *E.Hofmann S 1799*. Illustration by Eberhard Fischer.

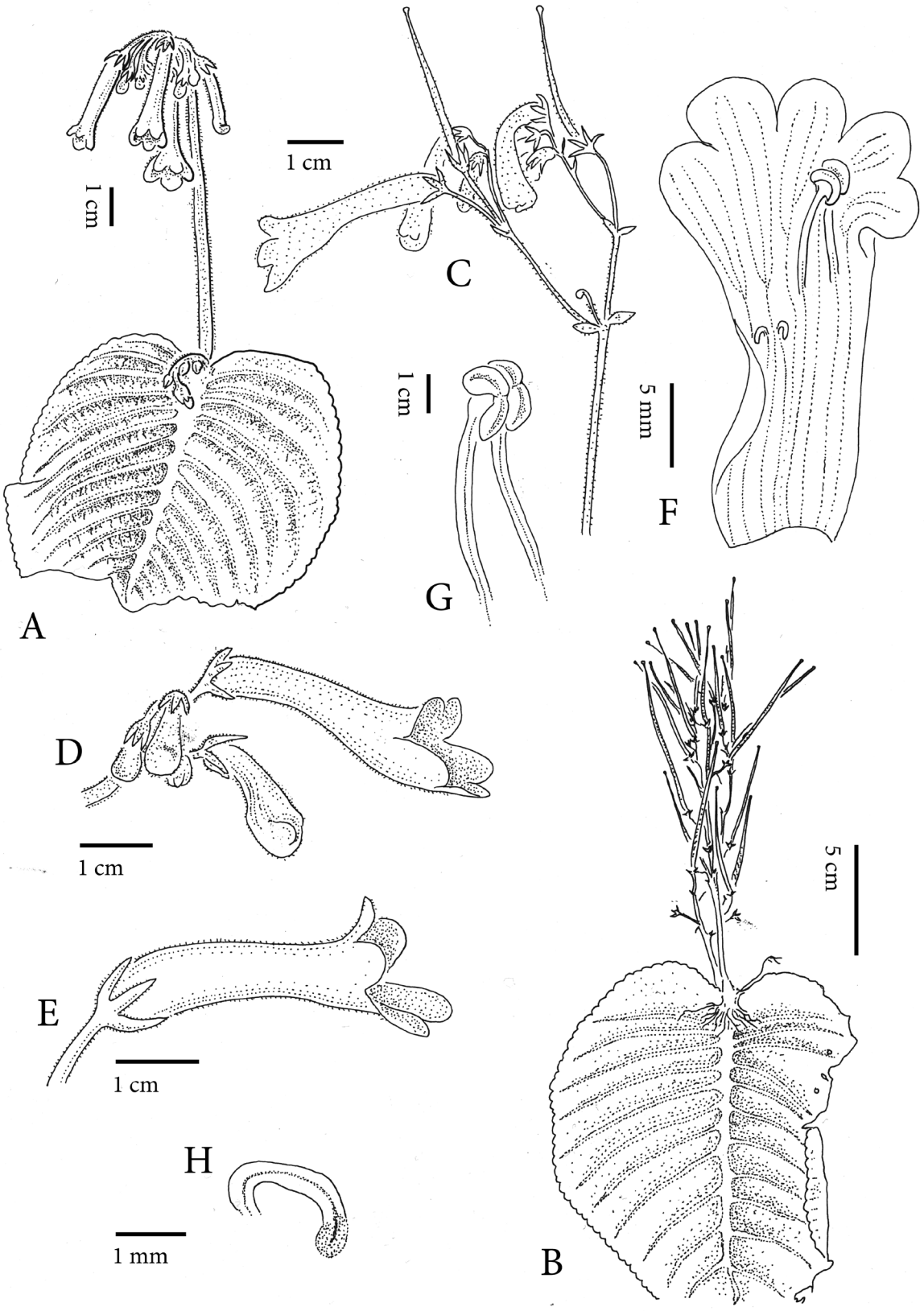

Figure 7 – *Streptocarpus schaijesii.* **A**–**B**. Habit. **C**–**D**. Partial inflorescence. **E**. Flower, lateral view. **F**. Corolla dissected, showing position of stamens and staminodes. **G**. Stamens. **H**. Staminode. A, C–H from *Schaijes 1695* and B from *Malaisse 13809*. Illustration by Eberhard Fischer.

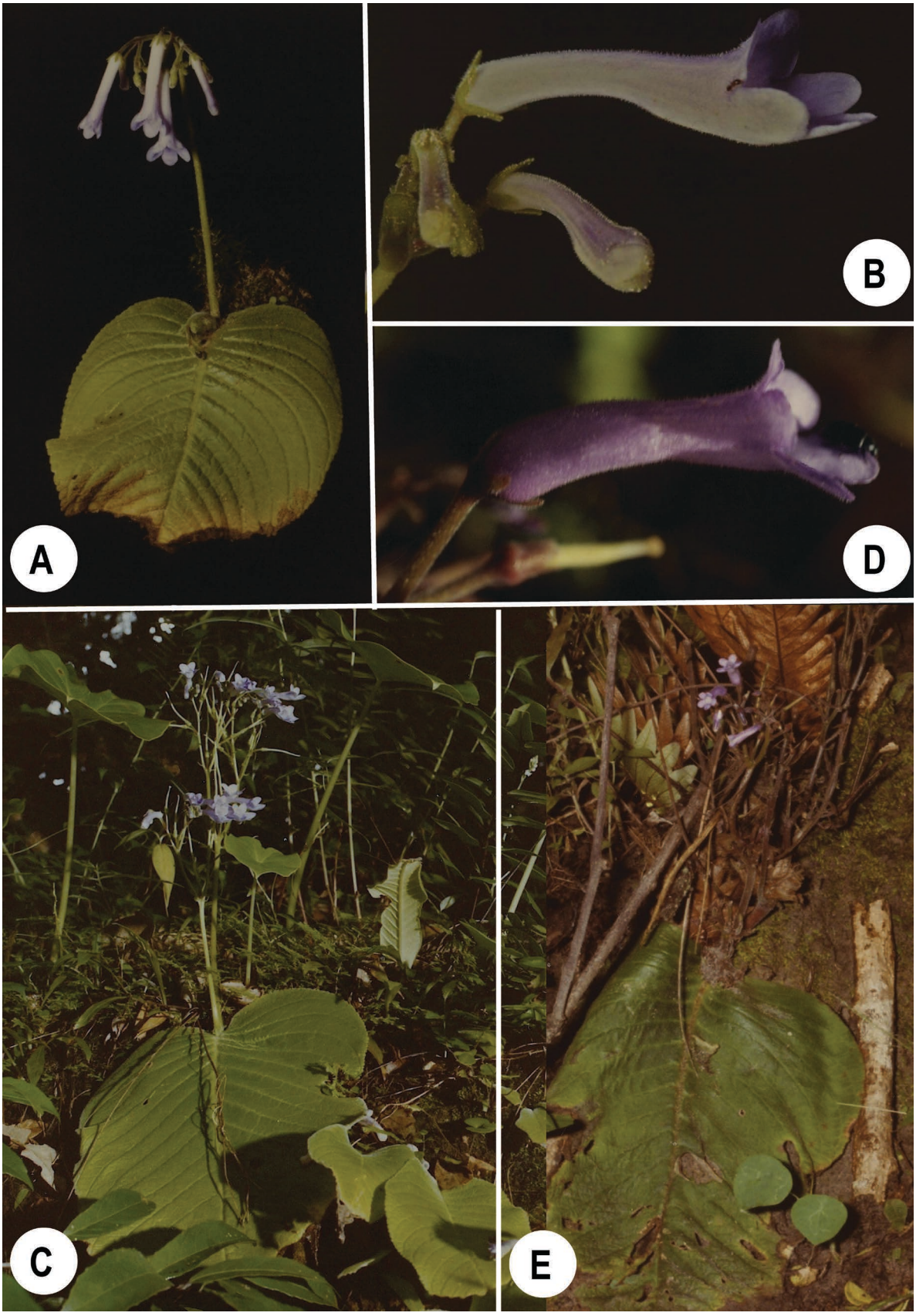

Figure 8 – *Streptocarpus schaijesii*. **A, C, E**. Habit. **B, D**. Flower. Photographs taken by Michel Schaijes at Musokatanda (A–C, *Schaijes 1695*) and Biano, Temke (D, E, *Schaijes 2282*).

Streptocarpus schaijesii Eb.Fisch. & I.Darbysh., **sp. nov.** (figs 7, 8, 9B) – Type: D.R. CONGO – **Haut Katanga** • à 53 km SW de Kolwezi, Musokatanda, près des chutes de la Lofupa, rocher couvert des mousses en galerie forestière; 1200 m; 25 Dec. 1982; *Schaijes 1695*; holotype: BR[BR0000016803411].

Diagnosis – The species differs from *Streptocarpus michelmorei* in the pale lilac corolla lacking a deep violet patch on the palate and behind, in the corolla tube being only slightly curved and scarcely deepened on the lower side at the middle, and in the distinctly shorter capsule. The species differs from *Streptocarpus solenanthus* in usually having a shorter corolla tube and in the longer lower lip of the corolla. It differs from *Streptocarpus bampsii* in the slightly curved and longer corolla tube, the longer corolla lower lip and the longer staminodes.

Description – Monocarpic acaulescent herb. Unifoliate, lamina broadly ovate to nearly orbicular, 10–25 × 9–19.9 cm, base shallowly cordate, margin crenate-dentate, apex obtuse, usually withered, pubescent on upper and lower surface, with 12–17 pairs of lateral nerves, petiolode not exceeding 1 cm long, pubescent. Inflorescences 1–2 per plant, arising from the petiolode, peduncle up to 9.5(–14) cm long, pubescent. Pedicels 12–19 mm long, eglandular pubescent, bracts linear-lanceolate, up to 5 mm long. Calyx divided to base, lobes lanceolate, 3–6 mm long, hairs on calyx eglandular. Corolla dark violet to blue, lobes of almost the same colour as the tube, 25–43 mm long, densely eglandular-pubescent, glabrous within, tube slightly curved, only slightly expanded towards mouth, (15–)22–35 mm long, 3–5 mm in diameter, 6–7 mm towards mouth, limb bilabiate, upper lip of two rounded lobes, 3–6 × 3–5 mm, lower lip of 3 rounded lobes, 6–11 × 4–6 mm, lateral lobe 6 × 4–6 mm, median lobe 6–11 × 6 mm. Stamens inserted in upper third of corolla tube towards mouth, filaments 7 mm long, glabrous, anthers white, 2–3 mm long, staminodes inserted below stamens, 1.5–2 mm long. Ovary densely eglandular-pubescent, ovary and style 15–20 mm long. Capsules 45–65 × 1.5–2 mm, eglandular-pubescent.

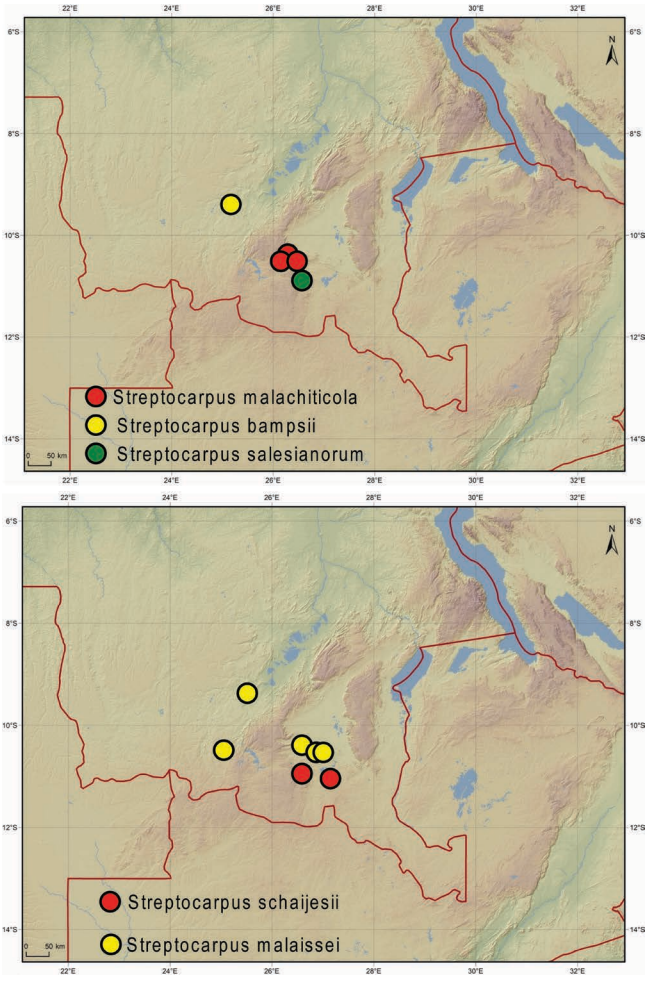

Figure 9 – **A**. Distribution map of *Streptocarpus malachiticola*, *S. bampsii*, and *S. salesianorum*. **B**. Distribution map of *S. schaijesii* and *S. malaissei*. Map created using ArcMap 10.8 (https://www.arcgis.com). © Esri and its licensors, all rights reserved.

Distribution – Endemic to D.R. Congo, Haut Katanga.

Habitat – Humid, calcareous rocks in gallery forest or ravine near waterfall, 1200–1650 m elevation.

Etymology – Named after Michel Schaijes, who made major contributions to the knowledge of the flora of Katanga, and who collected the type.

IUCN conservation assessment (preliminary) – Endangered: EN B2ab(iii). *Streptocarpus schaijesii* is known from 8 herbarium collections comprising 5 localities. The estimated AOO is 20 km^2 (assuming a 4 km^2 grid cell size). The habitat of gallery forest is under potential threat of logging. Thus, the species could be preliminarily assessed as Endangered: EN B2ab(iii).

Additional specimens studied – D.R. CONGO – **Haut Katanga** • Lubumbashi–Likasi, km 50, riv. Kamianga, Thalweg de ravin boisé; 11°18′S, 27°17′E; 1335 m; 15 Jan. 1986; *Bamps & Malaisse 8026*; BR[BR0000016803428] • Luita, forêt dense de ravin, sur un bloc rocheux; 10°44′S, 26°18′E; 1500 m; 4 Apr. 1986; *Malaisse 13820*; BR[BR0000016803404] • Biano, au 22,8 km au N de Temke, sur la piste de la ferme Scholls, sur termitière; 1650 m; 26 Mar. 1984; *Schaijes 2282*; BR[BR0000016803398] • Route carrefour Likasi-Kambove et bifurcation Mindigi, Kakontwe, paroi verticale de calcaire; 27 Mar. 1986; *Malaisse 13809*; BR[BR0000016803497] • Calcaire de Kakontwe; 2 Apr. 1981; *Malaisse 11761*; BR[BR0000016803503] • Kakontwe, affleurement calcaire, paroi verticale ombragé; 3 Oct. 1979; *Malaisse 9956*; BR[BR0000016803510] • à 5 km au N de Kakontwe, chandelle calcaire, au paroi rocheuse vertical; 30 Jan. 1980; *Malaisse 10213*; BR[BR0000016803350].

Taxonomic notes – *Streptocarpus bampsii*, *S. malaissei*, *S. salesianorum*, and *S. schaijesii* are morphologically close and apparently related to *Streptocarpus michelmorei* B.L.Burtt (Burtt 1939: 72) and *S. solenanthus* Mansfeld (Mansfeld 1934: 96) in *Streptocarpus* agg. *cooperi* of Hilliard & Burtt (1971). They have eglandular hairs on the pedicel, calyx, and corolla, and the limb is small in relation to the tube, with a lower lip not exceeding 15 mm of length. Hilliard & Burtt (1971) assigned some taxa to the *S. michelmorei* complex, where they distinguished two species from Malawi (7A *Streptocarpus* sp. *S. michelmorei* affinis) and Zambia (7B

Key to the acaulescent species of *Streptocarpus* in Central Africa (D.R. Congo, Rwanda, Burundi)

1. Several leaves of similar size in a rosette, corolla pale pink with wine-red tube and wine-red spots at throat, corolla tube with long blunt unicellular hairs on the floor within, leaf margin entire ..... ***S. rhodesianus* S.Moore (D.R. Congo, Zambia, Angola)**

1'. Leaves solitary or several leaves with one large and several smaller leaves, corolla white, blue or purple, corolla tube lacking long blunt unicellular hairs on the floor within, leaf margin crenate or dentate **2**

2. Throat of corolla distinctly compressed from both sides ..... ***S. malachiticola* Eb.Fisch. & I.Darbysh. (D.R. Congo)**

2'. Throat of corolla not compressed **3**

3. Corolla 8–15 mm de long; rhizome, base of leaves and peduncle covered by woolly brown hairs **4**

3'. Corolla usually more than 20 mm long; rhizome, base of leaves and peduncle without woolly brown hairs **5**

4. Corolla ca 15 mm long, ovary glandular-pubescent, capsule 25–30 mm long, epiphyte in montane forest ..... ***S. masisiensis* De Wild. (D.R. Congo)**

4'. Corolla less than 10 mm long, ovary glabrous, capsule 10 mm long, on shaded rocks ..... ***S. burundianus* Hilliard & B.L.Burtt (Burundi)**

5. Corolla tube distinctly curved below inflated throat, corolla entirely white ..... ***S. bindseilii* Eb.Fisch. (Rwanda)**

5'. Corolla ± straight or slightly curved, inflated or not towards throat, corolla blue or purple at least on the lobes, sometimes with white or dark purple spots **6**

6. Limb large in relation to tube, lower lip 17(–20) mm long, lobes violet, throat with yellow bar, tube often calcareous-white outside ..... ***S. wittei* De Wild. (D.R. Congo, Zambia, Malawi)**

6'. Limb very small in relation to tube, lower lip not exceeding 11–15 mm length, lobes and tube violet to blue, throat sometimes slightly whitish but never yellow **7**

7. Leaf orbicular, 25–27 × 24.5–26.5 cm, length/width ratio ca 1, corolla 2 cm long, slightly curved, ovary and style not exceeding 7 mm ..... ***S. salesianorum* Eb.Fisch. & I.Darbysh. (D.R. Congo)**

7'. Leaf oblong and broadly ovate, 6–32 × 4–25 cm, length/width ratio between (1.3–)1.6–2.7, corolla (1.5–)2.2–4.3 cm long, slightly curved or straight, ovary and style (7–)15–22 mm long **8**

8. Corolla with similar color throughout, tube slightly curved, narrowing from a wider throat (see fig. 7, lower lip of corolla 6–11 × 4–6 mm, staminodes 1.5–2 mm long ..... ***S. schaijesii* Eb.Fisch. & I.Darbysh. (D.R. Congo)**

8'. Corolla with lobes darker than tube, tube ± straight, not or only slightly narrowing from the throat (see figs 3, 5), lower lip of corolla 3–8 × 3–7 mm, staminodes not exceeding 1 mm of length **9**

9. Corolla pale violet, throat pale violet to whitish-violet, ovary and style 21–22 mm long, capsule 50–70 × 1.5–2 mm ..... ***S. bampsii* Eb.Fisch. & I.Darbysh. (D.R. Congo)**

9'. Corolla dark violet, throat dark violet, tube pale-violet, ovary and style 7–15 mm long, capsule 40–50 × 1–1.5 mm ..... ***S. malaissei* Eb.Fisch. & I.Darbysh. (D.R. Congo)**

Streptocarpus sp. *S. michelmorei* affinis). Despite the overall similarities, several distinct entities can be distinguished which are described here as new species. One taxon from this aggregate, *Streptocarpus mbeyensis* I.Darbysh. (Darbyshire 2006: 39) has already been described. For a comparison of the species see table 2.

Wild-collected material assigned to *S. michelmorei* appears to be rather more variable than the type material. Hilliard & Burtt (1988) suggests that plants from Bridal Veils Falls in the Chimanimani Mts of Zimbabwe (e.g. *Bamps, Symoens & Vandenberghen 770*, BR0000016801868, BR0000027611722V) may be intermediate between *S. michelmorei* and *S eylesii* S.Moore, stating that the deep corolla colouration and slender fruits are close to *S. michelmorei* but that the distinctly curved corolla tube and larger median lobe suggest the influence of *S. eylesii*. However, the Bridal Veils Falls plants have a short eglandular indumentum on the inflorescence, whilst both *S. michelmorei* and *S. eylesii* usually have a glandular component to their

Table 2 – Comparison of the key characters for *Streptocarpus bampsii*, *S. malaissei*, *S. salesianorum*, *S. schaijesii*, and their allies.

Character	*S. bampsii*	*S. schaijesii*	*S. malaissei*	*S. salesianorum*	*S. mbeyensis*	*S. michelmorei*	*S. solenanthus*
Leaf (cm)	15–32 × 14–25	10–25 × 9–19.9	6–27 × 4–20	25–27 × 24.5–26.5	15–40 × 13–30	35 × 30	7–15 × 4–12
Inflorescence length (cm)	17–28	(9–)14–20	4–14	14–17	6.5–9.5(–13)	30–35	15
Number of inflorescences	1–3 per plant	1–2 per plant	1–2 per plant	1–2 per plant	2–5 per plant	1–several	1–4 per plant
Hairs on inflorescence	eglandular	eglandular	eglandular	eglandular	eglandular	glandular	eglandular
Pedicel length (mm)	6–20	12–19	5–9	6–12	10–22	25	20
Calyx length (mm)	5–7	3–6	4	3.5–4	3–4	2–5	2–3.5
Hairs on calyx	eglandular	eglandular	eglandular	eglandular	eglandular	eglandular	eglandular
Corolla length (mm)	22–29	25–43	15–30	20–22	33–44	30–50	22–36
Hairs on corolla	eglandular	eglandular	eglandular	eglandular	eglandular	eglandular	eglandular
Tube length (mm)	18–23	(15–)22–35	15–24	18–20	25–33	25–30	18–26
Tube diameter (mm)	3–4	3–5	3–4	4	3.5–6	4	3–5
Tube diameter at mouth (mm)	5–6	6–7	6	5(–6)	8.5–10	8	5–6
Upper lip (mm)	3–5 × 3–4	3–6 × 3–5	3–7 × 3–5	3 × 3–4	4–6 × 4–6	4 × 7	2–4 × 2–5
Lower lip (mm)	4–5 × 4–5	6–11 × 4–6	3–8 × 3–7	4 × 3–4	7.5–14	11	5–8
Filaments length (mm)	3–6	7	7	4	4–6.5	5	4
Anthers length (mm)	2–2.3	2–3	2	1.5	1–1.5	1.5	0.75
Staminode length (mm)	0.6–1	1.5–2	0.8	0.8	0.5	1	0.5
Ovary and style length (mm)	21–22	15–20	7–15	7	19–33	20	15, 6–7.5
Fruit (mm)	50–70 × 1.5–2	45–65 × 1.5–2	40–50 × 1–1.5	54–65 × 1–1.5	55–70 × 1.5–2	130 × 1	50–80 × 1–1.3

inflorescence indumentum, casting doubt over Burtt's theory that this is a hybrid population.

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