STUDIES IN AFRICAN *GENTIANACEAE*

by

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Resumen

PAIVA, J. & I. NOGUEIRA (1990). Estudios sobre gencianáceas africanas. *Anales Jard. Bot. Madrid* 47(1): 87-103 (en inglés).

Se describen seis especies nuevas de *Gentianaceae* de África Tropical: *Chironia fernandesiana, Sebaea caudata, S. fernandesiana, S. africana, S. alata* y *S. clavata*. Se establecen dos nombres nuevos: *Sebaea minuta* para *Exochaenium exiguum* A. W. Hill y *Sebaea perpusilla* para *Exochaenium pygmaeum* Milne-Redhead. Se propone una combinación nueva: *Sebaea gracilis* (Welw.) Paiva & Nogueira. Se incluyen claves y una tabla comparativa para cuatro especies próximas del complejo *Sebaea brachyphylla*. Se aportan algunas notas sobre *Swertia*, comparando *S. usambarensis* Engl. con *S. eminii* Engl.; *S. quartiniana* A. Rich. con *S. welwitschii* Engl. y *S. intermixta* A. Rich. con *S. tetrandra* Hochst.

Palabras clave: Taxonomía, *Gentianaceae*, África Tropical.

Abstract

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Six new species of *Gentianaceae* from Tropical Africa are described: *Chironia fernandesiana, Sebaea caudata, S. fernandesiana, S. africana, S. alata* and *S. clavata*. Two new names are established: *Sebaea minuta* for *Exochaenium exiguum* A. W. Hill and *Sebaea perpusilla* for *Exochaenium pygmaeum* Milne-Redhead. A new combination is presented: *Sebaea gracilis* (Welw.) Paiva & Nogueira. Keys and a table of comparison for 4 closely related species of the *Sebaea brachyphylla* complex are given. Some notes on *Swertia* are presented, comparing *S. usambarensis* Engl. with *S. eminii* Engl.; *S. quartiniana* A. Rich. with *S. welwitschii* Engl. and *S. intermixta* A. Rich. with *S. tetrandra* Hochst.

Key words: Taxonomy, *Gentianaceae*, Tropical África.

I. NOTE ON *CHIRONIA GRATISSIMA* S. MOORE

R. BOUTIQUE *(Fl. Afr. Central, Gentianaceae:* 38. 1972) indicates *Chironia gratissima* S. Moore to Haut-Katanga (Zaire). The type locality is far away in Melsetter (E. Zimbabwe) and the species also occurs in the Zuira Mt. (Mozambique) which belongs to the same mountain chain, the Chimanimani.

After carefully studying specimens from Haut-Katanga (Zaire) we came to the conclusion that it does not belong to *C. gratissima* S. Moore, but to a new species,

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TABLE 1

Ch. fernandesiana	*Ch. elgonensis*	*Ch. gratissima*	*Ch. laxiflora*
Perennial erect herb, ± 100 cm tall.	Annual erect herb up to 120 cm tall.	Laxly trailing or scrambling annual or perennial herb up to 150 cm tall.	Spreading or weakly erect, annual herb, 30-150 cm tall.
Stem unbranched or branched above.	Stem unbranched or laxly branched above.	Stem branched.	Stem branched.
Stem leaves 4.5-5 × 0.5-1.2 cm, lanceolate or oblong-lanceolate, acute at the apex, semi-amplexicaule at the base, 1-3 nerved.	Stem leaves 1-4 × 0.3-1.5 cm, lanceolate or oblong-lanceolate, subacute at the apex, semi-amplexicaule at the base, 1-3 nerved.	Stem leaves (3-)6-9(-10) × (1-)2.5-3 cm, ovate-triangular to triangular-lanceolate, acute at the apex, semi-amplexicaule at the base, conspicuously 3-nerved.	Stem leaves 1.2-4(-5) × 1.8-2.5 (-3.5) cm, ovate-cordate, acute to acuminate at the apex, amplexicaule at the base, 3-5 nerved.
Flowers purple or red, in 2-3-flowered cymes arranged in ± compact panicles; lower branches erect.	Flowers crimson, rose, strawberry pink or red, in 1-2(-3) flowered cymes arranged in ± lax panicles, lower branches erecto-patent.	Flowers mauve, bright-mauve or deep magenta, pink or purple, in (1-3) flowered cymes arranged in terminal lax panicles, lower branches arcuate-erect.	Flowers crimson, pink, pinkish-purple, deep-magenta, to red, in 2-7 flowered cymes arranged in lax panicles; lower branches arcuate-erect.
Calyx lobes 5-7 mm long, lanceolate.	Calyx lobes 3-4.5 mm long, lanceolate.	Calyx lobes 6-8 mm long, lanceolate.	Calyx lobes 5-8 mm long, lanceolate.
Corolla tube 3.5-5 mm long; lobes 18-20 mm long.	Corolla tube 3-4.5 mm long; lobes 8-15 mm long, lanceolate, acute at the apex.	Corolla tube 5-8 mm long; lobes 18-25 mm long.	Corolla tube 4-5 mm long; lobes 10-18 mm long.
Style c. 13 mm long.	Style 4-8 mm long.	Style 7-10 mm long.	Style c. 4-5 mm long.
Stigma c. 3 mm long.	Stigma c. 2 mm long.	Stigma c. 2 mm long.	Stigma c. 2 mm long.
Anthers 5.5-6(-7.5) mm long.	Anthers 3.5-5 mm long.	Anthers 5-8 mm long.	Anthers c. 8 mm long.
Ovary 6-7 × 2 mm, narrowly-ellipsoid.	Ovary 6 × 3 mm, narrowly-ellipsoid.	Ovary 8-10 × 4-5 mm, narrowly-ellipsoid.	Ovary 3-5 × 4 mm, narrowly-ovoid.

named in honour of the eminent Portuguese botanist Prof. Abílio Fernandes *(Ch. fernandesiana* Paiva & Nogueira).

Ch. fernandesiana Paiva & Nogueira is closely related to *Ch. elgonensis* Bullock, *Ch. gratissima* S. Moore and *Ch. laxiflora* Bak., but differs in several features from those species, as is expressed in table 1.

The new species is distinguishable from *Ch. elgonensis* Bullock by having larger flowers and perennial habit; from *Ch. gratissima* S. Moore and *Ch. laxiflora* Bak. by its erect habit and the branches of the inflorescence, which are erect and not arcuate-erect.

Ch. gratissima S. Moore appears to be an endemic of Chimanimani, growing on rocky river stream banks or in damp soil; *Ch. fernandesiana* Paiva & Nogueira occurs on grasslands, open savannas, or woodlands; *Ch. elgonensis* Bullock on wet marsh and among tall grasses and *Ch. laxiflora* Bak. on damp sandy loam, open places in miombe woodland and in the partial shade of riverine forests.

We agree with BOUTIQUE *(Fl. Afr. Centr. Gentianaceae:* 38. 1972) that those closely related species need further, extensive examination combined with field studies. They should be, perhaps, treated as infraspecific taxa of the same species.

Chironia fernandesiana Paiva & Nogueira, **sp. nov.** (fig. 1)
Ch. gratissima sensu Boutique in Fl. Afr. Central Gentianaceae: 37 (1972), non Moore (1911)

Herba perennis usque ad 100 cm *alta. Caulis erectus, simplex vel pauciramosus, 4-angulatus. Folia lanceolata vel oblongo-lanceolata,* 4.5-5 × 0.5-1.2 cm, *apice acuta, basi semiamplexicauli,* 1-3 *nervata. Flores purpurei vel rubri, pedicellati, pedicellis* 10-35 mm *longis, glabris; in cymas* 2-3 *floras, dense paniculatas dispositi. Calyx tubo inconspicuo, segmentis* 5, *lanceolatis,* 5-7 mm *longis. Corolla tubo* 3.5-5 mm *longo, lobis lanceolatis,* 18-20 mm *longis. Staminorum filamenta filiformia,* 1.5-3 mm *longa; antherae ellipsodeae,* 5.5-6(7.5) mm *longae. Ovaria oblongo-ellipsoidea,* 6-7 × 2 mm. *Stylus c.* 13 mm *longus; stigma oblongo-lineare,* 3 mm *longum, papillosum. Capsula ellipsoidea,* 7-10 × 3-3.5 mm.

Typus: Zaire, Haut-Katanga, Marungu, Kampela-Kayabala, *A. Robyns* 2174 (BR). Other record: Zaire. Haut-Katanga, Tompa, fl. & fr. IV- 1945, *J. Dubois* 1408 (BR).

Affinis Ch. gratissimae et Ch. laxiflorae a quibus ramis inflorescentiae erectis nec arcuatis differt.

II. FIVE NEW SPECIES OF *SEBAEA*

Sebaea caudata Paiva et Nogueira, **sp. nov.** (fig. 2)

Herba annua, usque ad 30 cm *alta. Caulis erectus, gracilis, ramosus,* 4-*costatus. Folia lineari-lanceolata,* 10-14 × 1-1.5 mm, *apice acuta, basi cuneata, glabra. Flores cremei vel eburnei, pedicellati, pedicellis* 2.5-3 mm, *glabris, in cymas pauciflo-ras dispositi. Calyx tubum corollae aequans; segmentis* 5, *lanceolatis,* 4-5.5 mm *longis, carinatis, paulo alatis, apice caudatis. Corolla tubo* 4.5-5.5 mm *longo, infundibuliformi, lobis late ovatis,* 3 mm *longis, apiculatis. Stamina in tubo co-*

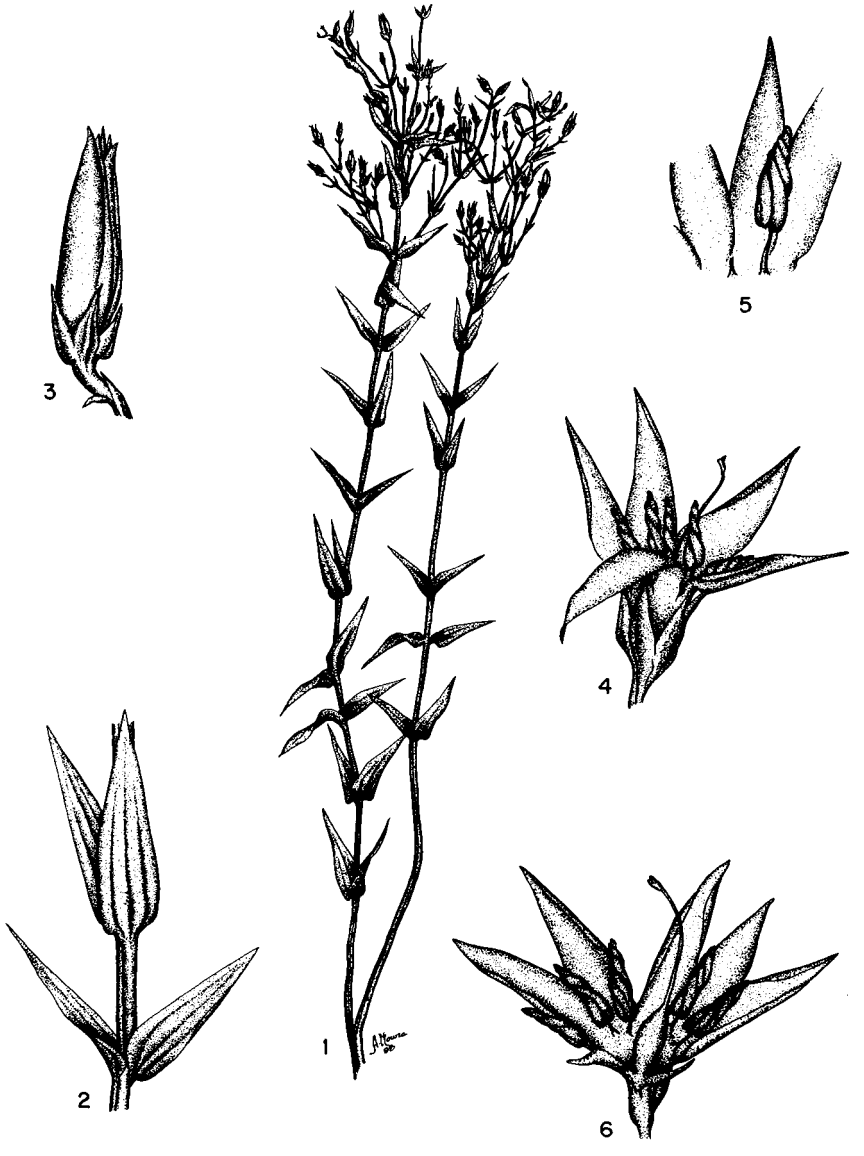

Fig. 1.—*Chironia fernandesiana:* 1, flowering stem (× 1/3); 2, part of branch with leaves (× 3/4); 3, calyx and corolla (× 2); 4, corolla (× 2); 5, corolla showing a stamen (× 3); 6, corolla opened showing stamens and pistil (× 2), all from *Robyns* 2174.

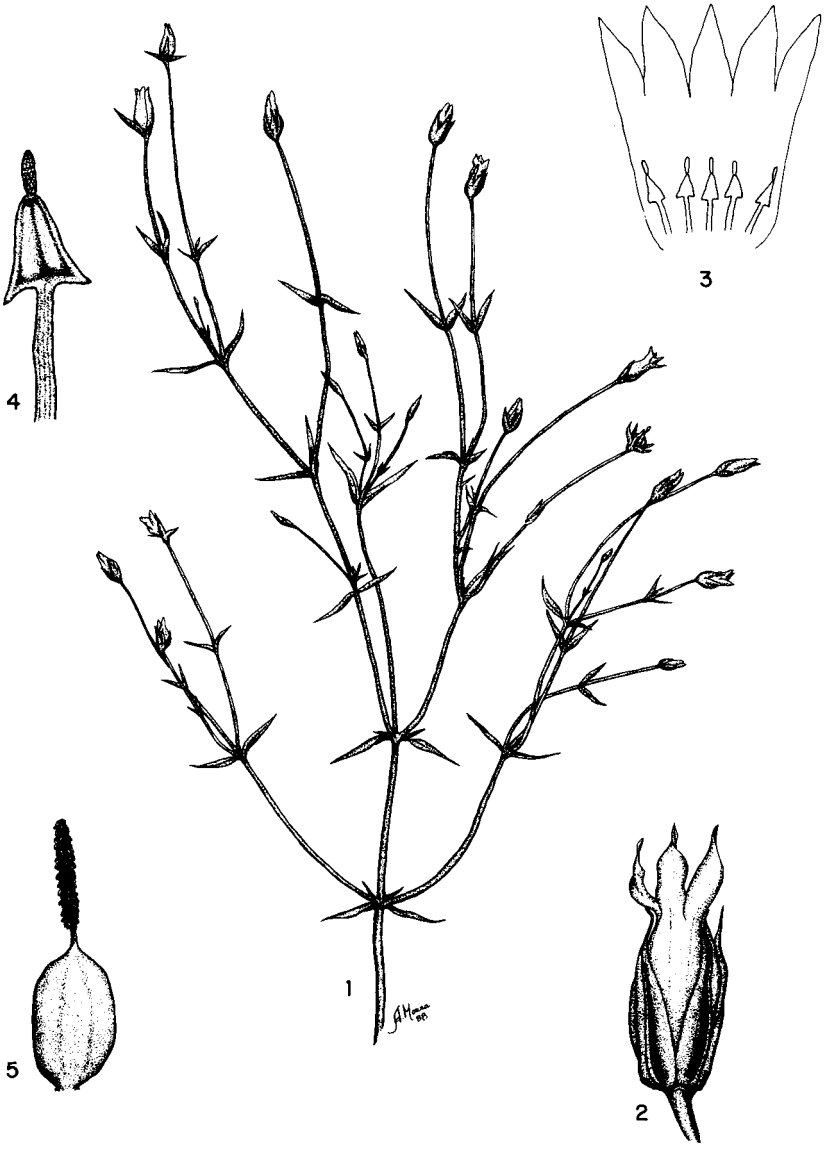

Fig. 2.—*Sebaea caudata:* 1, flowering stem (× 1 3/4); 2, flower (× 4 1/2); 3, corolla opened out showing stamens (× 4); 4, stamen (× 19); 5, pistil (× 7 1/2), all from *Robinson* 1251.

rollae supra basin sed infra medium inserta; filamenta filiformia, 1-1.2 mm *longa; antherae ellipsoideae,* 0.8-0.9 × 0.3-0.4 mm *longae, glandula apicali lineari-clavata,* 0.35-0.4 mm *longa, basi longe caudatae. Ovarium ellipsoideum,* 3 × 2 mm. *Stylus* 0.7-0.8 mm *longus; stigma oblongo-lineare, c.* 1.5 mm *longum, papillosum, exsertum. Capsula ellipsoidea,* 3.5-4 × 2-2.5 mm. *Semina cubica,* 0.2-0.25 mm *diam., testa foveolata.*

Typus: Zambia, Mapanga, *E. Robinson* 1251 (K, holotypus).

Affinis S. minutae et S. gracili, a quibus antheris conspicue caudatis-nec ecaudatis-praecipue differt.

S. caudata has the anthers clearly tailed, which easily distinguishes it from the two closely related species, *S. minuta* and *S. gracilis.* The following table shows the differences between these three species.

TABLE 2

S. caudata	*S. minuta*	*S. gracilis*
Calyx lobes equal, caudate at the apex, 4-5.5 mm long.	Calyx lobes equal, acuminate or caudate at the apex, 3.5-5.5 mm long.	Calyx lobes unequal, acuminate at the apex, 6-9 mm long.
Corolla tube as long as the calyx.	Corolla tube longer than the calyx.	Corolla tube slightly longer or as long as the calyx.
Anthers clearly tailed at the base, not having basal glands.	Anthers not appendiculate at the base, with 2 minute and globose basal glands.	Anthers not appendiculate at the base, not having basal glands.
Apical glands of the anthers clavate, 0.35-0.4 mm long.	Apical glands of the anthers linear clavate, 0.5-0.8 mm long.	Apical glands of the anthers linear clavate, 0.5 mm long.

Sebaea fernandesiana Paiva & Nogueira, **sp. nov.** (fig. 3)

Herba annua, usque ad 15 cm *alta. Caulis erectus, gracilis, simplex vel ramosus,* 4-*costatus. Folia ovato-elliptica vel elliptica,* 3-8 × 2-4 mm, *apice acuta, basi cuneata. Flores cremei vel albidi, pedicellati, pedicellis usque ad* 7 cm *longis, solitarii, terminales. Calyx segmentis* 5, *lanceolatis,* 4-6 mm *longis, carina paulo alatis (ala* 0.25-0.3 mm *lata), apice acuto, acuminato. Corolla tubo* 9-10 mm *longo, lobis obovatis,* 3-3.5 mm *longis, apice apiculatis. Stamina in tubo corollae supra basin sed infra medium inserta; filamenta c.* 2 mm *longa; antherae oblongo-ellipsoideae,* 0.7-1 mm *longae, glandula apicali lineari-clavata,* 1-1.5 mm *longa, glandulis basalibus globosis, stipitatis. Ovarium subglobosum, c.* 2 mm *diam.; stylus c.* 1.8 mm *longus; stigma clavatum papillosum. Capsula ellipsoidea,* 4-5.5 × 3.5 mm. *Semina* 0.2-0.25 mm *diam., cubica, testa foveolata.*

Typus: Zambia, Mwinilunga, Zambesi Rapids, c. 6 km N of Kalene Hill, *Sh. Hopper & C. Townsend* 256 (K, holotypus). Other records: Zambia, Mwinilunga 7 km of Kalene Hill, fl. & fr. 16-IV-1965, *E. Robinson* 6574 (K); 6 km of Kalene Hill, fl. & fr. 22-II-1975, *G. Williams & R. Grosvenor* 2464 (K).

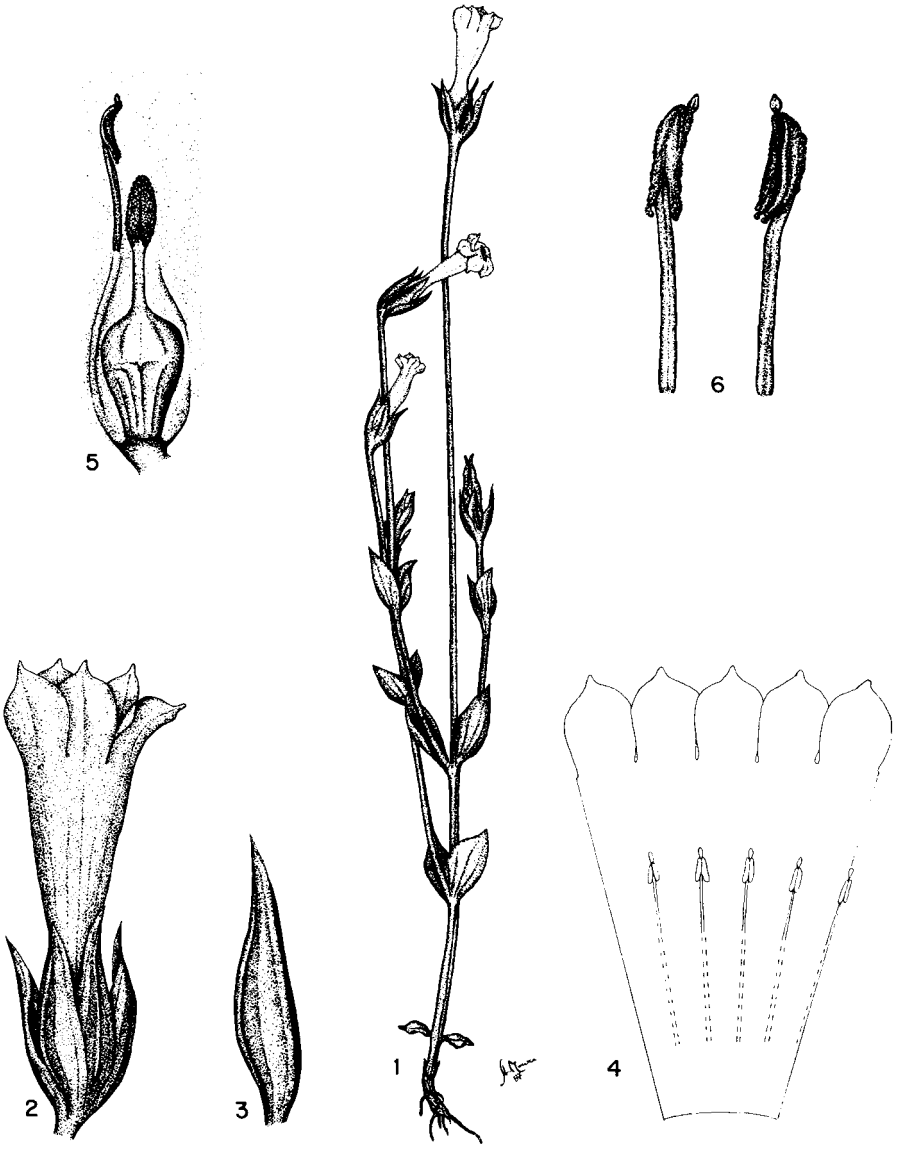

Fig. 3.—*Sebaea fernandesiana:* 1, habit (× 1 1/2); 2, flower (× 6); 3, calyx lobes (× 7 1/3); 4, corolla open to show stamens (× 7); 5, part of longitudinal section of the corolla showing one stamen and pistil (× 7 1/3); 6, stamens, two aspects (× 15 1/8), all from *Hooper & Townsend* 256.

Affinis S. pumilae a qua pedicellis maioribus (20-70 mm *longis, non vero* 2-10 mm), *calycis segmentis maioribus* (4-6 mm *longis, non vero* 3-4 mm) *et corolla tubulis etiam maioribus* (9-10 mm *longis, non vero* 3-4.5 mm) *differt.*

S. fernandesiana is closely related to *S. pumila.* They differ as is shown in table 3.

TABLE 3

S. pumila	*S. fernandesiana*
Stem up to 6 cm tall.	Stem up to 15 cm tall.
Pedicels 2-10 mm long.	Pedicels 20-70 mm long.
Calyx lobes 3-4 mm long.	Calyx lobes 4-6 mm long.
Corolla tube 3-4.5 mm long, almost as long as the calyx.	Corolla tube 9-10 mm long, twice as long as the calyx.
Apical glands of the anthers 0.2-0.5 mm long, shorter than the anthers (0.6-0.7 mm long).	Apical glands of the anthers 1-1.5 mm long, longer than the anthers (0.7-1 mm long).
Capsule subglobose, 2-3 mm diam.	Capsule ellipsoid 4-5.5 × 3-3.5 mm.

Sebaea africana Paiva & Nogueira, **sp. nov.** (fig. 4)

Herba annua, usque ad 6 cm *alta. Caulis erectus, simplex vel ramosus,* 4-*costatus. Folia lineari-lanceolata,* 3-8 × 0.5-1 mm. *Flores pedicellati, pedicellis* 5-15 mm *longis, solitarii, terminales. Calyx segmentis* 5, *lanceolatis,* 4.5-6 mm *longis, apice acuminatis, carina paulo alatis (ala usque ad* 0.4-0.5 mm *lata inxta basis). Corolla tubo usque ad* 9 mm *longo; limbo infundibuliformi; lobis oblongo-ovatis,* 3-4 mm *longis. Stamina in tubo corollae supra basin sed infra medium inserta; filamenta filiformia,* 0.5-0.6 mm *longa; antherae ellipsoideae, c.* 0.9 mm *longae, glandula apicali lineari-clavata,* 1-1.5 mm *longa, glandulis basalibus globosis, stipitatis. Ovarium subglobosum,* 1.1-1.2 mm *diam.; stylus* 1.5 mm *longus; stigma clavatum,* 1.5 mm *longum, papillosum. Capsula ellipsoidea,* 3 × 2 mm. *Semina cubica,* 0.2-0.3 mm *diam.; testa foveolata.*

Typus: Zambia, Kawambwa, Imbershi road, 19-IV-1957, *M. A. Richards* 9337 (K, holotypus).

Affinis S. pumilae, a qua autem calyce maiore (4.5-6 mm *longo, nec* 3-4 mm), *lobis alae latioribus* (0.5 mm *latis, non vero* 0.2-0.3 mm) *atque glandula apicali longiore* (1-1.5 mm *longa, non vero* 0.2-0.5 mm) *differt.*

S. africana is distinguishable from *S. fernandesiana* and *S. alata* by having short pedicellate flowers (pedicels 5-15 mm long) whereas the two latter have long pedicellate flowers (pedicels 20-70 mm long), and from *S. pumila* by the longer calyx lobes (4.5-6 mm long instead of 3-4 mm), wider wing-keeled calyx lobes (0.5 mm broad, instead of 0.2-0.3 mm) and the anther with a very long apical gland (1-1.5 mm long, instead of 0.2-0.5 mm long).

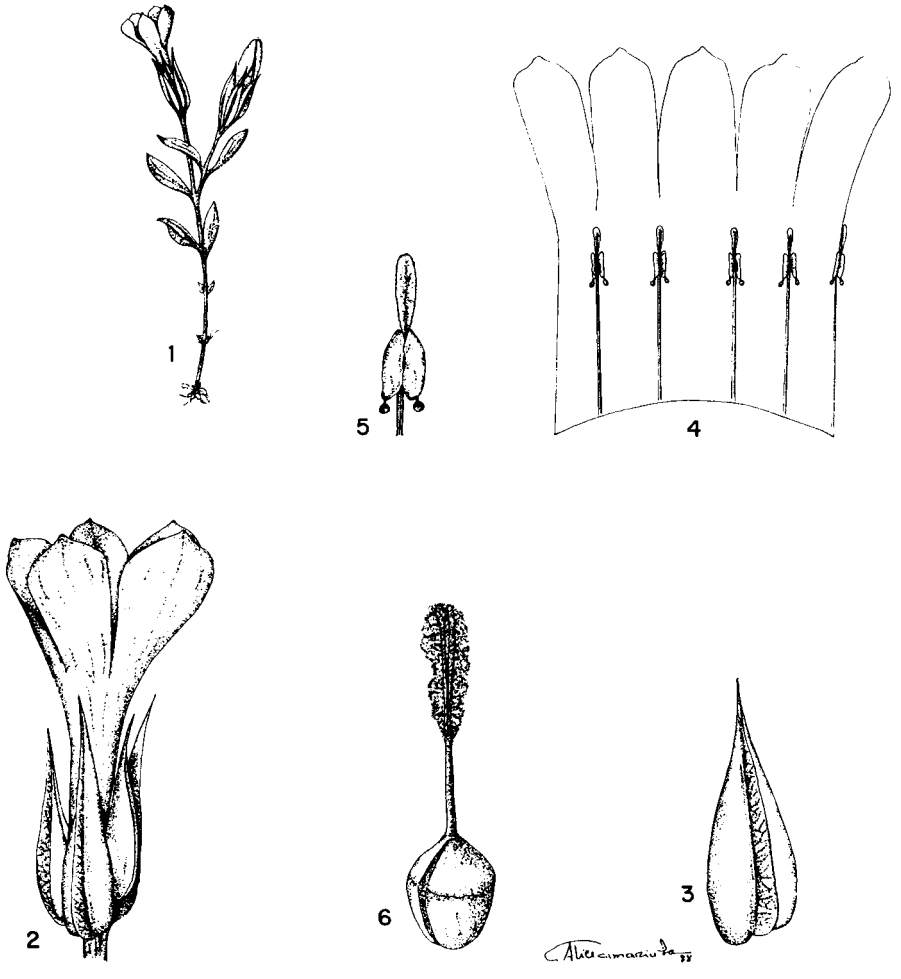

Fig. 4.—*Sebaea africana:* 1, habit (× 1 1/2); 2, flower (× 6); 3, calyx lobe (× 12 1/2); 4, corolla open to show stamens (× 6); 5, anther (× 12 1/2); 6, pistil (× 12 1/2), all from *Richards* 9337.

Sebaea alata Paiva & Nogueira, **sp. nov.** (fig. 5)

Herba annua, usque ad 15 cm *alta. Caulis erectus, gracilis, simplex vel ramosus,* 4-*costatus. Folia lineari-lanceolata,* 1.5-10 × 0.9 mm. *Flores cremei vel flavescentes, pedunculati, pedunculo* (1,5-)2 cm *longo, solitarii, terminales. Calyx segmentis* 5, *lanceolatis,* 6-8 mm *longis, apice acuminatis, carina paulo alatis (ala* 1.5 mm *lata). Corolla tubo* 1.2 cm *longo, infundibuliformi; lobis oblongo-ovatis,* 3.5-4 mm *longis, apice obtusatis. Stamina in tubo corollae supra basin sed infra medium inserta; filamenta brevissima; antherae ellipsoideae, c.* 1-2 mm *longae,*

glandulis basalibus globosis, stipitatis. Ovarium subglobosum, c. 1.5 mm *diam.; stylus c.* 2 mm *longus; stigma clavatum, c.* 2.5 mm *longum, papillosum. Capsula subglobosa, c.* 2.5 × 2 mm. *Semina cubica,* 0.2-0.25 mm *diam.*

Typus: Zambia, Chishinga Ranch, near Luwinga, 27-IV-1961, *W. Astle* 545 (K, holotypus).

Affinis S. fernandesianae, a qua vero alis loborum calycis latioribus, usque ad 1.5 mm *latis, non vero* 0.25-0.3 mm, *et capsulis subglobosis,* 2.5 × 2 mm, *neque ellipsoideis* 4-5.5 × 3-3.5 mm, *bene differt.*

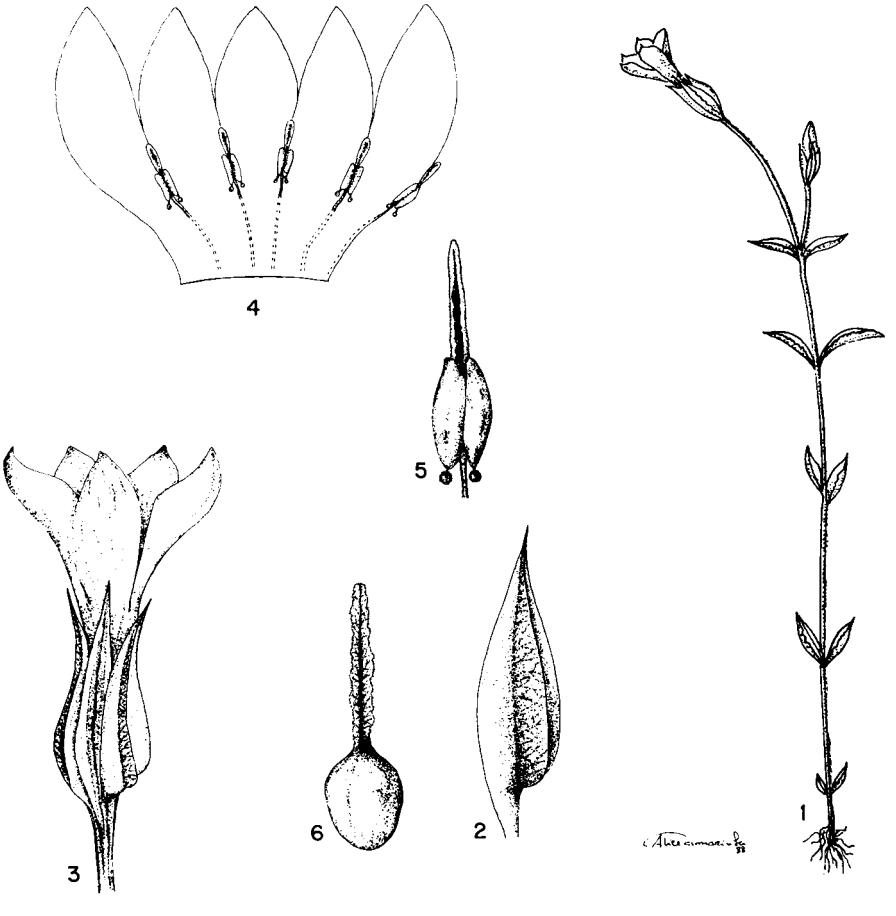

Fig. 5.—*Sebaea alata:* 1, habit (× 1 1/2); 2, calyx lobe (× 12 1/2); 3, flower (× 3); 4, corolla opened out showing stamens (× 3); 5, anther (× 12 1/2); 6, pistil (× 12 1/2), all from *Astle* 545.

S. alata and *S. fernandesiana* are closely related and have long pedicellate flowers (pedicels 20-70 mm long), which distinguish them from the other two closely related species *(S. pumila* and *S. africana),* which have short-pedicellate flowers (pedicels 2-15 mm long). *S. alata* and *S. fernandesiana* can be distinguished as is shown in table 4.

TABLE 4

S. fernandesiana	*S. alata*
Leaves (middle of the stem) broadly elliptic, 5-6 × 3-4 mm.	Leaves (middle of the stem) linear-lanceolate, 7-10 × 0.9 mm.
Calyx segments 4-6 mm long.	Calyx segments 6-8 mm long.
Wing of the calyx lobes 0.25-0.3 mm broad.	Wing of the calyx lobes 1.5 mm broad.
Capsule ellipsoid, 4-5.5 × 3-3.5 mm.	Capsule subglobose, 2.5 × 2 mm.

Sebaea clavata Paiva & Nogueira, **sp. nov.** (fig. 6)

Herba annua, usque ad 30 cm *alta. Caulis erectus, gracilis, parce ramosus,* 4-*costatus. Folia lineari-lanceolata,* 15-70 × 1-2 mm, *apice acuta. Flores flavidi, pedicellati, pedicello usque ad* 20 cm *longo, in cymas* 1-*paucifloras dispositi. Calyx segmentis* 5, *lanceolatis,* 8-10 mm *longis, apice caudatis, carina paulo alatis (ala* 0.4-0.8 mm *lata). Corolla tubo* 10-15 mm *longo; lobis ovatis,* 4-5 mm *longis, apice rotundatis et apiculatis. Stamina in tubo corollae supra basin sed infra medium inserta; filamenta* 1.5 mm *longa; antherae ellipsoideae, glandula apicali* 1-1.2 mm *longa; glandulis basalibus subglobosis, stipitatis. Ovarium subglobosum,* 4-5 × 3-4 mm; *stylus* 0.4-0.5 mm *longus; stigma clavatum,* 2-3 mm *longum, papillosum. Capsula ellipsoidea,* 7-9 × 4-6 mm. *Semina cubica,* 0.2-0.25 mm; *testa foveolata.*

Typus: Zambia, Mbala, the Dambo, 15 miles along the road from Senga Hill to Mporokoso, fl. & fr. 8-VI-1956, *E. Robinson* 1736 (K, holotypus). Other records: Zambia, Mbala, near Mporokoso, fl. & fr. 8-VI-1936, *B. Burtt* 6116 (BM; K); Kasama, Mungwi, fl. & fr. 24-IV-1961, *E. Robinson* 4618 (K).

Affinis S. grandi et S. teuszii, a quibus alis loborum calycis latioribus (0.4-0.8 latis, non vero 0.1-0.2 mm) et antherae apicali glandula longiore (1-1.2 mm *longa, non vero* 0.1-0.6 mm) *differt.*

S. clavata is similar to both *S. grandis* and *S. teuszii,* but the three species are easily distinguishable by the following key:

1. Anthers with a long apical gland, 1-1.2 mm long; wing of the calyx lobes 0.4-0.8 mm broad . . . . . **S. clavata**
– Anthers with a short apical gland, 0.1-0.6 mm long; wing of the calyx lobes narrower, 0.1-0.2 mm broad 2
2. Leaves 5-25 × 1.5-8 mm; corolla tube longer than the calyx lobes; capsule ellipsoid to compressed-ovoid, 7.5-10 mm long; seeds 0.2-0.25 mm diam. . . . . **S. teuszii**
– Leaves 5-40 × 2.5-10 mm; corolla tube as long as the calyx lobes; capsule subglobose, 7-8 mm diam.; seeds 0.1-0.2 mm de diam. . . . . **S. grandis**

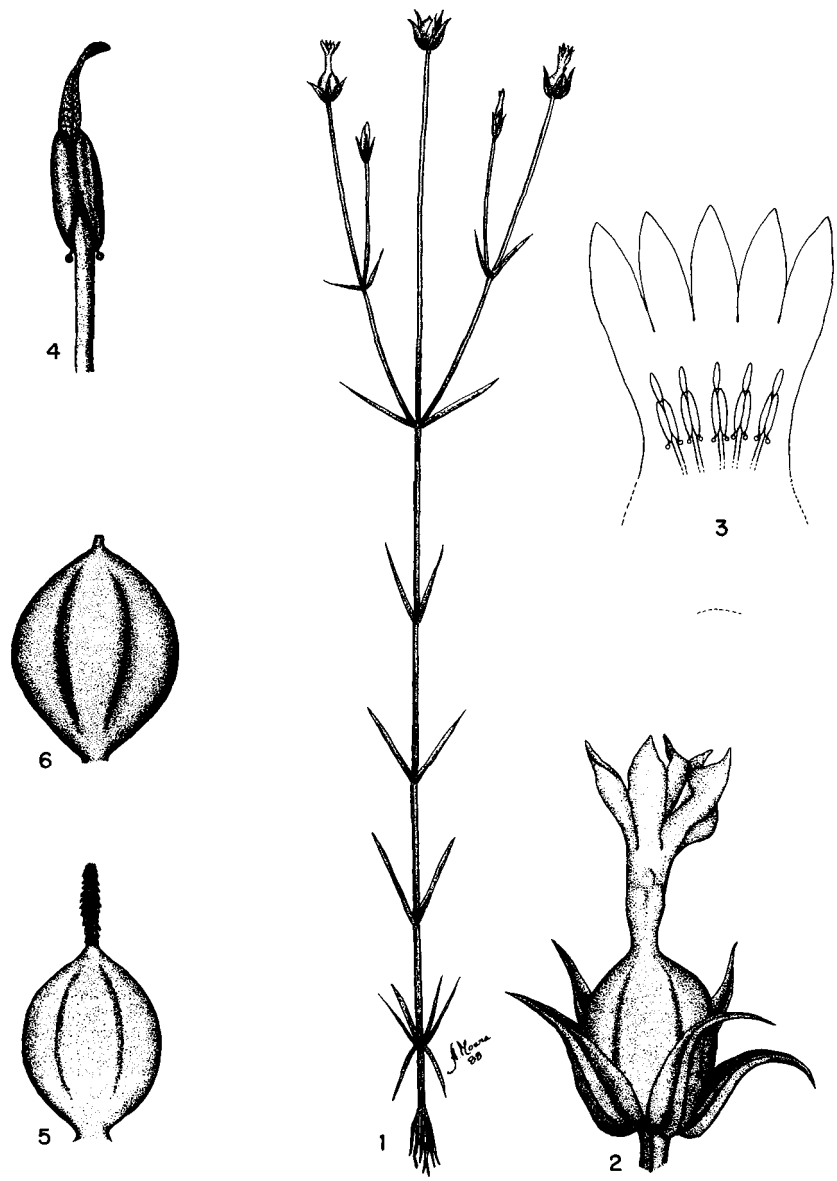

Fig. 6.—*Sebaea clavata:* 1, habit (× 1/3); 2, flower (× 3); 3, corolla opened out showing stamens (× 4); 4, stamen (× 6 1/2); 5, pistil (× 3); 6, capsule (× 3), all from *Robinson* 1736.

III. TWO NEW NAMES IN *SEBAEA*

Sebaea minuta Paiva & Nogueira, **nom. nov.**
Exochaenium exiguum A. W. Hill in Kew Bull. 1909: 50 (1909)

Typus: Zimbabwe, Bulawayo, *F. Eyles & W. Johnson* 1032 (K, holotypus).

A new restrictive specific epithet is required for *Exochaenium exiguum* A. W. Hill when it is transferred to the genus *Sebaea* in accordance with the International Rules of Botanical Nomenclature. There is already *Sebaea exigua* (Oliv.) Sching in Mitt. Geogr. Ges Ludbeck 17: 26 (1903) (= *Chironia exigua* Oliv. in Hook., Ic. Pl.: t. 1229. 1877).

Sebaea minuta Paiva & Nogueira is a very small annual herb (up to 30 cm tall) growing at the edge of laterite pans in marshy soils. It is closely related to *S. caudata* Paiva & Nogueira, but the latter has clearly tailed anthers, whereas in the former they are not appendiculate, but have two minute and globose basal glands. It is also closely related to *S. gracilis* (Welw.) Paiva & Nogueira from Angola and the north of Zambia, but has smaller flowers (calyx lobes of *S. minuta* up to 5.5 mm long and in *S. gracilis* they are 6-9 mm long) and the anthers have two minute and globose basal glands, whereas in *S. gracilis* the anthers have no basal glands.

MOZAMBIQUE. N: Malema, Inago, fl. 20-III-1964, *A. Torre & J. Paiva* 11286 (LISC).

ZAMBIA. N: Chinsali, Lake Young, Shiwa Ngandu, fl. & fr. 17-I-1959, *Richards* 10712 (K); 13 km N of Choma, fl. & fr. 17-IV-1958, *E. Robinson* 2835 (K), Kasanshi, 55 km SE of Mporokoso, fl. & fr. 13-V-1962, *E. Robinson* 5170 (K; LISC), W: 7 km of Chizera, fl. & fr. 27-III-1961, *R. Drummond, R. Rutheford-Smith* 7420 (K; LISC; PRE). C: Chiwefwe, fl. & fr. 1-V-1957, *D. Fanshawe* 3238 (K). S: Simansunda, 3 km E of Mapanza, fl. & fr. 28-III-1954, *E. Robinson* 642 (K); Mapanza, fl. & fr. 27-IV-1955, *E. Robinson* 1250 (K); Masonsa, 5 km N of Mapanza, fl. & fr. 18-III-1956, *E. Robinson* 1378 (K); Mazabuka, Choma, Mapanza Dambo, fl. & fr. 8-III-1958, *E. Robinson* 2790 (K; PRE).

ZIMBABWE. N: Gokwe, Sergwa Reserve Station, fl. & fr. 16-IV-1968, *N. Jacobsen* 618 (K); Rukete Farm Doma area, fl. & fr. 12-II-1963, *N. Jacobsen* 2118 (K); W: Matobo, Farm Besna Kobila, fl. & fr. II-1954, *O. Miller* 2220 (K); fl. & fr. IV-1956, *O. Miller* 3468 (PRE); Farm Chasterfield, fl. & fr. III-1958, *O. Miller* 5129 (K; PRE). C: Harare, Hatfield, fl. & fr. 7-IV-1957, *J. Whellam* 1223 (K; PRE); Harare, fl. & fr. 8-III-1950, *H. Wild* 3241 (K); Chindamoi, Res. Ngoma Kurira, fl. & fr. 25-III-1952, *H. Wild* 3786 (K); Hartley (Chegutu), Poole Farm, fl. & fr. 7-IV-1954, *H. Wild* 4551 (K; LISC).

Sebaea perpusilla Paiva & Nogueira, **nom. nov.**
Exochaenium pygmaeum Milne-Redhead in Kew Bull. 4: 377 (1951)

Typus: Mwinilunga, Sinkabalo Dambo, *E. Milne-Redhead* 3579 (K, holotypus).

With the same reasons as for *S. minuta* Paiva & Nogueira, a new name is required because *S. pygmaea* Schinz [*in Bull. Herb. Boiss., sér.* 2, 6: 740 (1906)], which is a synonym of *S. erosa* Schinz [*in Bull. Herb. Boiss., sér.* 2, 6: 728 (1906)] already exists.

S. perpusilla is easily distinguishable from other *Sebaea* species from the Flora Zambesiaca area, by its dwarf habit, fleshy roots and winged stem, whereas the others are erect and annual (rarely rhizomatous), with ridged and not winged stems.

ZAMBIA. B: Mongu, fl. & fr. 29-I-1966, *E. Robinson* 6829 (K); W: Mwinilunga, 37 km W, of Mwinilunga on Matonchi road, fl. & fr. 24-I-1975, *R. Brummitt, S. Chisumpa & R. Polhill* 14093 (K); Chingabola, near Matonchi, fl. & fr., 16-II-1975, *Sh. Hooper & C. Townsend* 120 (K).

IV. A NEW COMBINATION IN *SEBAEA*

Sebaea gracilis (Welw.) Paiva & Nogueira, **comb. nov.**
Basion.: *Belmontia gracilis* Welw. in Trans. Linn. Soc. 27: 47 (1869)
Parasia gracilis (Welw.) Hiern, Cat. Pl. Welw. 1: 708 (1898)
Exochaenium gracilis (Welw.) Schinz in Bull. Herb. Boiss., sér. 2, 6: 716 (1906)

Typus: Angola, Huila, river Monino, *F. Welwitsch* 1524 (K).

S. gracilis is closely related to *S. minuta* from which it is distinguishable as indicated above.

ANGOLA. Alto Catumbela, fl. & fr. II-1940, *H. Faulkner* (K).
ZAMBIA. W: Kitwe, fl. & fr. 20-IV-1957, *D. Fanshawe* 3197 (K).

V. THE *SEBAEA BRACHYPHYLLA*-COMPLEX

As shown by HEDBERG *in Webbia* 11: 471-487 (1955), *S. brachyphylla* Griseb. *(S. schimperiana* Buching ex Schweinf.), *S. leiostyla* Gilg *(S. bequaertii* De Wild.), *S. sedoides* Gilg and *S. longicaulis* Schinz *(S. oreophila* Gilg), are closely related, but there are marked differences between them, and in spite of the great degree of superficial resemblance, it has been thought best to uphold the distinction at specific level.

With the following key and table 5 it is possible to separate these four taxa from the Flora Zambesiaca area:

1. Corolla up to 7.5 mm long; corolla tube 3-4 mm long; lobes 1.5-3.5 × 0.8-1.2 mm . . . . . **brachyphylla**
– Corolla longer than 7.5 mm, up to 20 mm long; corolla tube longer than (3.5)4.5 mm; lobes 4.5-11 × 2.5-5.5 2
2. Inflorescence lax or compact cymes, terminal and solitary or somewhat corymbose; calyx lobes up to 11 × 5 mm; corolla lobes up to 11 × 5.5; filaments up to 4 mm long; anthers 2-4.25 mm long . . . . . **longicaulis**
– Inflorescence corymbose, paniculate-corymbose, a fairly dense or dense cyme, sometimes much contracted and capitate; calyx lobes up to 8 × 3 mm; corolla lobes up to 7.25 × 3.5 mm; filaments up to 2 mm; anthers 1-2.5 mm long 3
3. Perennial herbs; taproot well developed with annual, simple or branched stems; inflorescence a dense corymb, sometimes much contracted and capitate . . . . . **sedoides**
– Annual or perennial herbs; without a taproot; inflorescence a fairly dense corymb or paniculate-corymbose, sometimes contracted and almost capitate . . . . . **leiostyla**

TABLE 5

S. brachyphylla	*S. leiostyla*	*S. longicaulis*	*S. sedoides* var. *confertiflora*
Erect annual herb, up to 40 cm tall.	Erect annual herb, up to 60 cm tall.	Erect annual herb, up to 60 cm tall.	Erect or ascending perennial herb, up to 65 cm tall.
Leaves 5-12 × 5-14, ovate-circular to subreniform.	Leaves 6-25 × 7-30 mm, ovate-circular to subreniform.	Leaves 18 × 15 mm, lanceolate or narrowly elliptic-lanceolate to subcircular-cordate.	Leaves 18 × 20 mm, reniform-circular or broadly cordate.
Inflorescences terminal paucimany flowered dichotomous cymes, rarely flowers solitary.	Inflorescences terminal many-flowered dichotomous cymes, arranged corymbosely or paniculately.	Inflorescences terminal few-flowered cymes, solitary or arranged corymbosely.	Inflorescences very dense corimb or much contracted and sometimes capitate.
Calyx lobes, 2.5-5 × 1.5-3 mm, ovate-lanceolate.	Calyx lobes 4-7.5 × 1.3 mm, lanceolate to elliptic.	Calyx lobes 7-11 × 2-5 mm, lanceolate to elliptic.	Calyx lobes 3-8 × 1.75-2.75 mm, lanceolate to elliptic-lanceolate.
Corolla tube 3-4 mm long.	Corolla tube (3.5-)4.5-7 mm long.	Corolla tube 5.5-9 mm long.	Corolla tube (3.5-)4.5-7.5 mm long.
Corolla lobes 1.5-3.5 × 0.8-1.2 mm, obovate-oblong.	Corolla lobes 5-6.5 × 2.5-3.5 mm, obovate-oblong.	Corolla lobes 5.5-11 × 2.5-5.5 mm, broadly elliptic to obovate.	Corolla lobes 4.5-7.25 × 2.75-3.25 mm, lanceolate.
Stamen filaments 0.2-0.7 mm long.	Stamen filaments 0.5-2 mm long.	Stamen filaments 1-4 mm long.	Stamen filaments 1.25 mm long.
Anthers 0.5-0.7 mm long.	Anthers 1-2.25 mm long.	Anthers 2-4.25 mm long.	Anthers 1-2.5 mm long.
Apical glands of the anthers minute, ovoid-ellipsoid.	Apical glands of the anthers minute, ellipsoid.	Apical glands of the anthers minute, ellipsoid.	Apical glands of the anthers minute, ellipsoid.
Basal glands of the anthers missing.	Basal glands of the anthers sometimes present, minute.	Basal glands of the anthers sometimes present, minute.	Basal glands of the anthers sometimes present, minute.
Style 3-5 mm long, with a swelling above the middle.	Style 3.5-5 mm long, with a swelling below the middle.	Style 6.5-9.5 mm long, with or without a swelling near the base.	Style 4-7.25 mm long, with a swelling below the middle, rarely without a swelling.
Capsules 2-4 mm long, ellipsoid.	Capsules 3.5-5 mm long, ellipsoid.	Capsules 5-6 × 2.5-3 mm, ellipsoid.	Capsules 3.5-4 × 1.5-2 mm, ellipsoid.
Seeds 0.25-0.3 mm diam., cubical.	Seeds 0.35-0.45 × 0.25-0.3 mm, ellipsoid-cubical.	Seeds 0.35-0.4 × 0.3 mm, ellipsoid-cubical.	Seeds 0.25-0.3 mm diam., ellipsoid-cubical.
Testa of the seeds frilled.	Testa of the seeds frilled.	Testa of the seeds frilled.	Testa of the seeds frilled.

VI. SOME NOTES ON *SWERTIA*

The species of *Swertia* in the Flora Zambesiaca area are mainly in the mountains, some of them afro-alpine, and as shown by HEDBERG *(Webbia* 11: 471-487. 1955) they have variable characters, sometimes with a continuous range of intermediates and in some cases populations of a species from different mountains may show different average-values for characters considered to be of taxonomic importance, but their variation curves overlap (HEDBERG, 1955). Even with regard to the number of sepals and petals, there are variations. As shown by HEDBERG *(Symb. Bot. Ups.* 15, 1: 5-41, t. 1-12. 1957) this feature is very variable not only in material from the same mountain but also in plants from the same population.

For those reasons, and in spite of the results of a study of African *Swertia* by FRIES *(in Notizbl. Bot. Gart. Berlin* 8: 505-534. 1923), we share the opinion of HEDBERG (1955), that there is a need for a revision of the *Swertia* of Tropical Africa, with field observations and renewed studies.

In some groups of *Swertia* from the Flora Zambesiaca area, there are such variations, that sometimes it is not easy to make a decision as to whether one "taxon" is, or is not, a good species. Without a large study of *Swertia* in Africa, we preferred to follow more or less BOUTIQUE *(Fl. Afr. Centr., Gentianaceae;* 1972) and MARAIS & VERDOOM *(in Fl. South Afr.* 26: 171-243. 1963).

Some species are very closely related to each other and they can be distinguished as shown in the following tables (6, 7 & 8).

TABLE 6

S. usambarensis	*S. eminii*
Inflorescences few-many flowered corymbiform cymes.	Inflorescences 1-5 flowered corymbiform cymes.
Flowers 5-merous.	Flowers 4-5 merous.
Corolla lobes 5-12 × 3.5-6 mm, obovate-elliptic.	Corolla lobes 3-5 × 2-3 mm, elliptic.
Stamen filaments 4-6 mm long.	Stamen filaments 3-3.5 mm long.
Capsule 7-10 × 3-3.5 mm.	Capsule 4-5 × 2.5-3.

TABLE 7

S. quartiniana	*S. welwitschii*
Rhizomatous ascending herbs.	Annual erect herbs.
Stem stout, 2-6 mm diam.	Stem slender, 1-3 mm diam.
Cauline leaves patent or subpatent, ovate, to elliptic-lanceolate.	Cauline leaves erect or suberect, linear to lanceolate.
Corolla lobes 8-13 mm long.	Corolla lobes 6-10 mm long.

TABLE 8

S. tetrandra	*S. intermixta*
Leaves narrowing upwards.	Leaves widering upwards.
Upper leaves 0.3-0.5 mm broad.	Upper leaves 4-7 mm broad.
Calyx lobes unequal, 5-7 × 0.25-0.5, elliptic to linear.	Calyx lobes subequal, 3.5-5 × 0.9-1.2 mm, subspathulate.
Corolla lobes 6-7 × 1.5-2 mm linear-lanceolate acute or subacute at the apex.	Corolla lobes 5-5.5 × 1-1.5 mm, elliptic, obtuse at the apex.
Capsule 8 × 2 mm, narrowly-ellipsoid.	Capsule 4.5 × 3.5-4, broadly ellipsoid.

S. curtioides Gilg is very closely related to those two species but can be easely distinguished by its upper leaves which are folded lengthwise.

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