

# *Coleus serracafemaensis* (Lamiaceae), a new succulent species from southwest Angola

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**Abstract:** *Coleus serracafemaensis*, an ascending sparingly branched shrub with tuberous roots and sky-blue flowers is described here as a new species. It has a restricted range and is only known from Serra Cafema Mountain in southern Angola (within the Kaokoveld Centre of Endemism, southwestern Angola and northwestern Namibia). It grows on granite derived soil among granite boulders in a steep south facing boulder strewn kloof. Diagnostic characters for *Coleus serracafemaensis* include the large, tuberous rootstock, photosynthesizing stems with peeling bark, distinctly petiolate, broadly ovate to trullate leaves and its large sparingly branched panicles and accrescent sub-equally 5-lobed calyces, each lobe ending in a spine. *Coleus serracafemaensis* belongs to a group of species previously recognized as belonging to the genus *Holostylon* which includes 4 species with virgate ascending stems from a perennial base, persistent pedicels breaking near the base of the deciduous fruiting calyx, single flowered cymes and minutely lobed, almost entire style apices. A comparison of some of the more prominent morphological features to differentiate between *Coleus serracafemaensis* and its possible nearest relative, *Coleus gracilipedicellatum*, is provided. Based on IUCN Red List categories and criteria, a conservation assessment of Vulnerable (VU D2) is recommended for the new species.

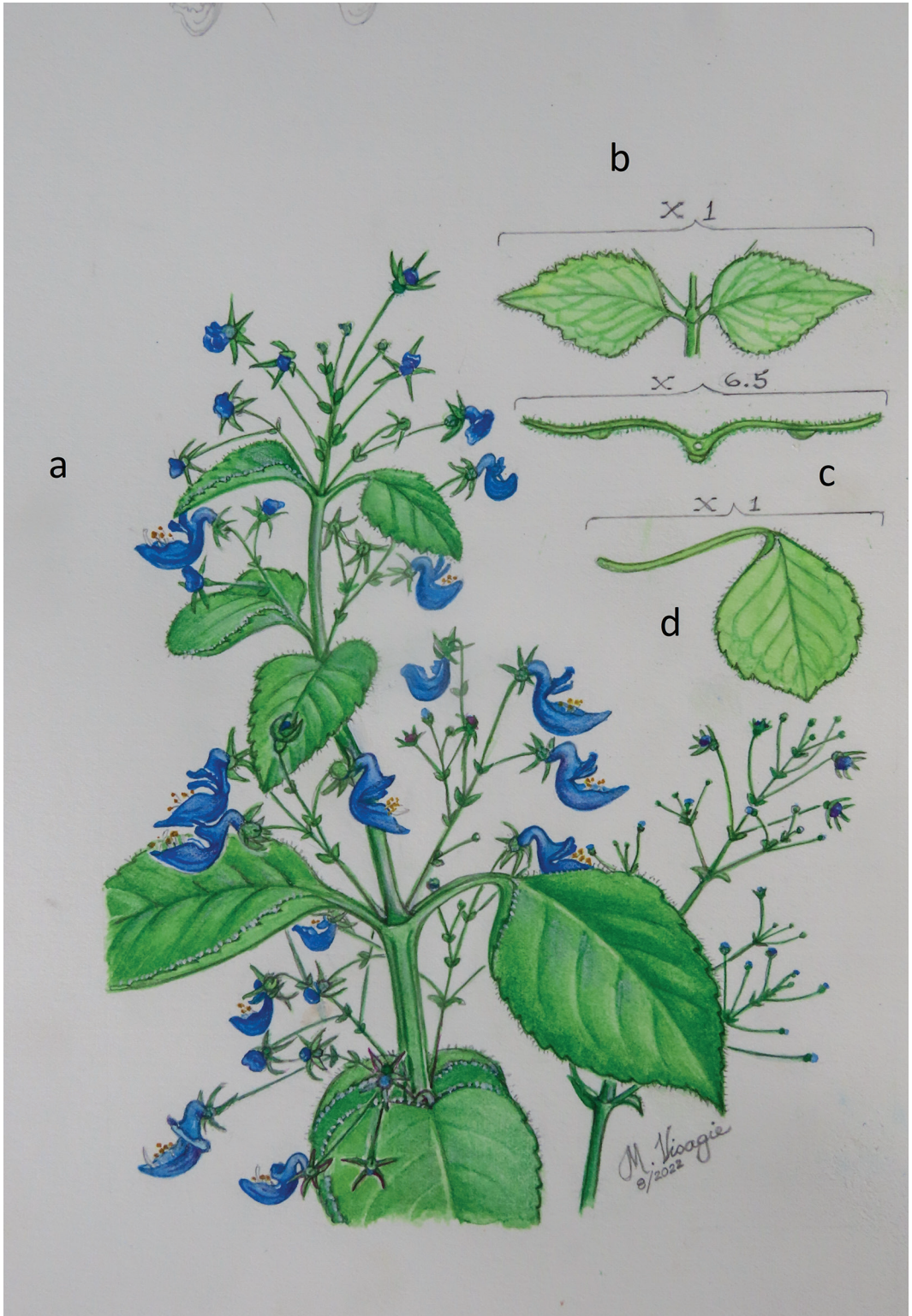
**Keywords:** new species, Kaokoveld Centre of Endemism, Kunene Region, *Coleus* taxonomy, Serra Cafema

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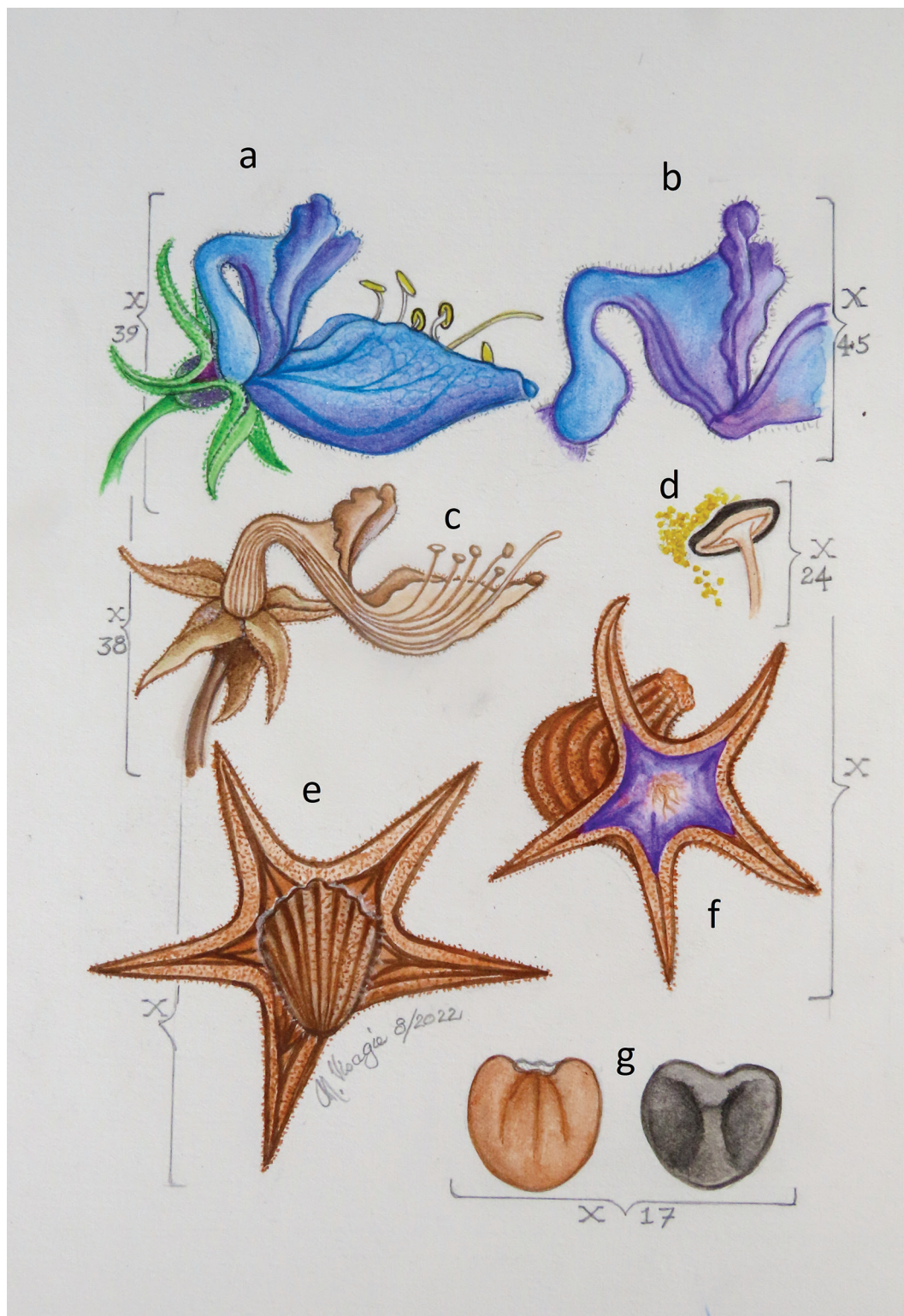
## INTRODUCTION

*Coleus* Lour. is a large genus within the Lamiaceae and its recent re-instatement follows the molecular phylogeny by one of us (Paton 2019), resulting in 294 recognized species. Previously, it was treated within a broad concept of the genus *Plectranthus* L'Hér. by Codd (1975, 1985). *Coleus* (which includes annuals and perennials) was named by Joao

de Loureiro (1717–1791) in 1790 with *Coleus amboinicus* as the type, a sprawling, pleasantly aromatic succulent species of tropical southern Africa and adjacent Indian Ocean Islands. It is a useful herb both medicinally and for flavoring food (Van Jaarsveld 2005). *Coleus* is an Old World genus of economic importance of which many of the species have xeromorphic characteristics such as succulence and ephemeral growth. Most species are aromatic



**Fig 1.** *Coleus serracafemaensis*. Illustration by botanical artist Marieta Visagie. a; Flowering branch showing the flowers, bracts and upper leaves. b; leafy bracts, c; lateral projection of leaf and d: Leaf and petiole.



**Fig 2.** *Coleus serracafemaensis*. Illustration by botanical artist Marieta Visagie. a; Corolla with calyx, showing side view. b; Corolla with calyx and stamens and gynoecium removed. c; Longitudinal section of corolla showing the androecium and gynoecium. d; Anther and stamens. e. Calyx, distal view. f: Front end of mature calyx. g: Nutlet frontal and distal view.

herbaceous perennials (prostrate to ascending), some with shrubby growth to 3 m tall. The generic name according to Clark & Charters (2016) derives from the ancient Greek plant name *Coleos* meaning sheath, alluding to the filaments being connected at the base, and included in the fused corolla tube.

In this contribution, a new species of *Coleus* endemic to the Kaokoveld Centre of Endemism, a biogeographical region rich in range-restricted plants and animals in northwestern Namibia and adjacent southwestern Angola (Van Wyk & Smith 2001), is described.

During a botanical expedition, by helicopter, to the top of the remote Serra Cafema in south-western Angola in April 2021 (Becker *et al.* 2021, De Cauwer *et al.* 2023), three of the authors (EvJ, WS & AG) encountered an unfamiliar, woody shrub thought to be a member of the Lamiaceae with ovate to broadly ovate aromatic leaves. On the last day of our expedition the site was again visited by one of us (EvJ) and a plant was found in flower and fruit, enabling material to be collected and the plants to be identified as an undescribed species of *Coleus* (Paton 2019).

The new species seems to be closely related to a group of ascending species from a perennial rootstock. It comes closest to *Coleus gracilipedicellatum* (Robyns & Lebrun) A.J.Paton, from southern tropical Africa, due to similarities in growth and floral features. A study of the *Coleus* holdings in South African herbaria and WIND revealed no earlier collections of the new species.

## TAXONOMIC TREATMENT

*Coleus serracafemaensis* Van Jaarsv. & Swanepoel., *sp. nov.* (Figs. 1–4)

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A woody shrub 1–3 m tall, related to *Coleus gracilipedicellatum*, differing from it by its large tuberous rootstock, photosynthesizing bark (peeling translucent brown strips), leaves which are distinctly petiolate (*vs.* sessile to subsessile), lamina broadly ovate to trullate (*vs.* lamina ovate to ovate-deltate); by the shrubby habit (*vs.* annual stems arising from a thick woody rootstock).

**Type:**—ANGOLA. Namibe Province: Serra Cafema, Korsmoskloof, steep southeast running kloof or drainage line, between scree slope and boulders, 1713BC, 1980 m, 30 April 2021, *Van Jaarsveld, Swanepoel & Gomes 28962* (holotype LUB! Isotypes K!, PRE!, PRU!).

Perennial woody shrub, with several ascending virgate **stems** from base, 1–3 m tall and 600 to 800 mm diam. **Rootstock** tuberous and up to 700 mm in diam., tubers to 80 mm in diam. Older **branches** terete 10–20 mm diam., faintly striated longitudinally, mottled with darker and lighter brown, and sparingly beset with slightly raised oval to rounded greyish-brown lenticels 1.5–2.0 mm diam. **Bark** characteristically peeling and shedding, in semi-translucent strips; young stems green sub-quadrangular 3.5–5.0 mm diam., faintly longitudinally fissured, beset with

minute eglandular translucent multicellular trichomes 0.3–0.4 mm long and copiously arranged at the nodes. **Leaves** decussate to ternate, petiolate, becoming smaller upwards, indumentum similar to stems, deciduous, leaf scars prominent, slightly raised, crescentic, semi-circular; internodes 30–70 mm apart, lamina broadly ovate to broadly trullate, sometimes rhombic, green, paler abaxially, thin-textured, 50–110 × 37–70 mm, apex acute to acuminate, base cuneate to rarely cordate; indumentum especially dense on veining abaxially, margin serrate-crenate, venation anastomosing and reticulate, prominent abaxially; upper and lower surface beset with amber colored sessile glands more so on the abaxial surface; petiole channeled adaxially, 17–30 mm long. **Inflorescences** terminal pyramidal shaped, lax, much branched panicles 190–600 mm long; flowers solitary, spreading bracts 4 × 1 mm, lanceolate, spirally arranged sometimes opposite 2–5 mm apart (in flower), 5–10 mm long (in fruit), pedicles 7–20 mm long in immature flower and 15–25 mm in mature flowers and in fruit, persistent, glabrous becoming shorter upwards slightly curved attached eccentrically behind posterior lip. **Calyx** gibbose at the base, 5–6 mm long, enlarging in fruit to 9 mm, becoming distinctly decurved, the gibbose base inflating to 6 mm, densely beset with gland-tipped translucent hairs and light orange to amber gland dots; throat truncate and sub-equally 5-lobed; superior and lateral deltate lip slightly shorter (6 mm), the lower lobes 7 mm long, linear each abruptly ending in a pointed bristle. **Corolla** sky-blue 20 mm long, tube 7 mm long, sigmoid; posterior lip vertical 4 mm long much shorter than anterior; anterior lip 10 mm long, deeply cucullate (6 mm), enclosing stamens, sparingly beset with honey-colored glands and glandular hairs. Staminal filaments fused; anthers elongated, dorsifixed. Style entire, stigma minute, minutely 2 lobed. **Nutlets** subcordate, angular 1.8 × 1.5 mm long, brown, minutely tuberculate.

**Phenology:**—Flowers were recorded during autumn to winter (April to May).

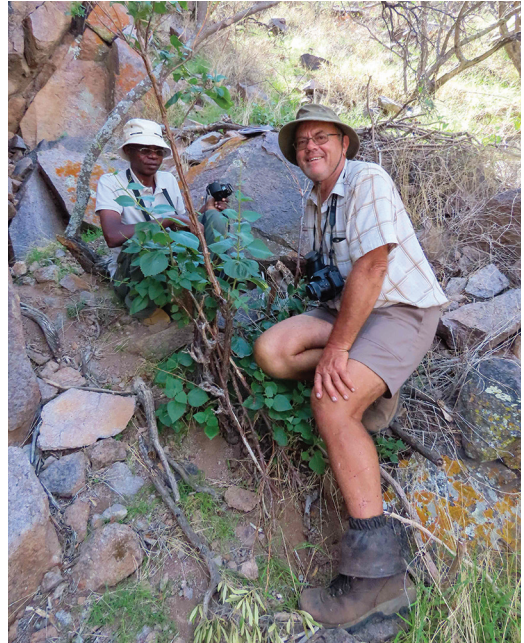
**Distribution and habitat:**—*Coleus serracafemaensis* is only known from a solitary location, Serra Cafema, situated in southwest Angola, adjacent and directly north of the Otjihipa Mountains (northwestern Kaokoveld in Namibia) fringing the Namib Desert to the west, where fewer than 25 plants were recorded (Figs. 5 and 10). The species may, however, eventually prove to be more widespread in protected kloofs in southwest Angola and perhaps the Otjihipa Mountains on the Namibian side. Serra Cafema consists of a granite massif, the peak just over 2,000 m high and the vegetation at this altitude is semi-arid *Commiphora-Combretum* savannah with medium levels of plant endemism (Van Wyk & Smith 2001, De Cauwer *et al.* 2023). *Coleus serracafemaensis* grows on lichen covered boulder screes derived from weathered granite (Fig. 6) of the Kunene Complex (Miller & Schalk 1980, Mendelsohn *et al.* 2002), which is fairly rich in succulent species. It occurs in an upper steep south facing kloof in partial shade among small trees



**Fig 3.** *Coleus serracafemaensis* illustration by botanical artist Marieta Visagie during the winter season. 1 & 2; young green deciduous side shoots showing the swollen roots and base of stem. 3; young greenish photosynthesizing stems with darker peeling bark. 4 & 5; older stems showing the peeling bark. 6; A cross section of the stem.



**Fig 4.** *Coleus serracafemaensis* habitat sketch of plant by botanical artist Marieta Visagie, growing in its rocky habitat.



**Fig 5.** *Coleus serracafemaensis* in habitat on the upper south slope of Serra Cafema with two of the authors (Wessel Swanepoel [right] and Antonio Gomes [left]). Photo: E. van Jaarsveld.

and shrubs (Fig 9). Trees and shrubs include *Maytenus undata* (Thunb.) Blakelock, *Olea europea* L. subsp. *afriicana* (Mill.) P.S.Green, *Othonna huillensis* Welw. ex Hiern, *Manuleopsis dinteri* Thell., *Portulacaria kunenana* Swanepoel, *Obetia carruthersiana* (Hiern) Rendle, *Tetradenia kaokoensis* Van Jaarsv. & A.E. van Wyk and *Pelargonium vanderwaltii* Van Jaarsv. (the latter two species first records for Angola), and *Cyphostemma currorii* (Hook. f) Desc., *Cotyledon orbiculata* L., *Aloe hereroensis* Engl., and *Cynanchum viminale* (L.) L. are present in crevices on the adjacent rocks. Smaller herbs include *Aeollanthus haumannii* Van Jaarsv., *Coleus hereroensis* (Eng.) A.J. Paton, *C. dinteri* (Briq.) A.J.Paton, *Kalanchoe laciniata* (L.) DC., *K. lanceolata* (Forssk.) Pers., *Crassula lanceolata* (Eckl. & Zeyh.) End. ex Walp, and the invasive weed *Rumex acetocella* L. subsp. *angiocarpus* (Murb.) Murb. Two species of poikilohydric ferns include *Cheilanthes parviloba* (Sw.) Sw., and a species of *Selaginella* P. Beauv. The numerous lichens are sustained by regular fog from the Atlantic Ocean which is about 60 km to the west. The average annual rainfall in the area is estimated at about 100–150 mm (Mendelsohn et al. 2002).

**Conservation status:**—*Coleus serracafemaensis* is only known from the type collection. The plants do not seem to be utilised by humans or domestic animals and the habitat does not appear to be threatened. It should be considered as Vulnerable (VU D2) due to the single known locality. (IUCN 2012).

**Etymology:**—The specific epithet refers to Serra Cafema, in the Kaokoveld of southwestern Angola, the type locality of the new species.

**Notes:**—*Coleus serracafemaensis* differs from *C. gracilipedicellatum* in habit, stem, leaf, and flower characters. Apart from the differences in habit and morphological characters, the distribution of the two taxa does not overlap. *C. gracilipedicellatum* is widespread in Angola, Zambia, Zimbabwe, Malawi and north to the Democratic Republic of Congo and associated with *Brachystegia* woodland growing on sandy flats and streambanks, whilst *C. serracafemaensis* is only known from the upper south facing kloof at Serra Cafema and confined to the Kaokoveld Centre of Endemism in southern Angola (Fig. 9). Diagnostic features for *Coleus serracafemaensis* were determined through examination of fresh material and for *C. serracafemaensis* and *C. gracilipedicellatum* from the literature and herbarium specimens (Codd 1985, Paton et al. 2013, Paton et al. 2019) (Table 1).

*Coleus serracafemaensis* is winter-deciduous, sparingly multi-stemmed (Fig. 6), has tuberous roots, the younger stems sprouting of which the primary root soon becomes swollen. Older stems with characteristic peeling bark (Fig. 7) revealing the brownish-green bark. It lacks the sessile to subsessile ovate to ovate deltoid leaves so characteristic of *C. gracilipedicellatum*. The leaf base of *C. gracilipedicellatum* are truncate whilst cuneate to rarely cordate in *C. serracafemaensis*. The leaf margin is coarsely and shallowly serrate in *C. gracilipedicellatum* whilst serrate-crenate in *C. serracafemaensis*. The corolla of *C. serracafemaensis* is larger (20 mm long) whilst 15 mm in *C. gracilipedicellatum*.

**Table 1.** Prominent morphological differences amongst *Coleus serracafemaensis* and *Coleus gracilipedicellatus*

Character	<i>Coleus serracafemaensis</i>	<i>C. gracilipedicellatus</i>
<b>Habit</b>	Perennial woody shrub, with several ascending virgate stems from base, 1–3 m tall and 600 to 800 mm diameter; Rootstock tuberous and up to 700 mm in diameter, tubers to 80 mm in diameter	Rootstock perennial with several annual ascending branches 1.2 to 2.5 m tall;  Rootstock unknown
<b>Stems</b>	Bark distinctly peeling revealing the brownish-green stems	Bark not peeling
<b>Lamina</b>	Lamina broadly ovate to broadly trullate, sometimes rhombic, green, paler abaxially, thin-textured, 50–110 × 37–70 mm	Leaves sessile to subsessile ovate to ovate-deltoid 50–70 × 25–40 mm
<b>Lamina margin</b>	Margin serrate, dentate, crenate or crenate-serrate	Margin coarsely to shallowly serrate
<b>Pedicels</b>	15–25 mm in flower	3–18 mm
<b>Calyx</b>	Fruiting calyx 5 mm long enlarging to 9 mm	Fruiting calyx 8 mm long, stipitate
<b>Corolla</b>	Sky-blue 20 mm long	Blue, 13–16 mm long
<b>Nutlets</b>	Subcordate, angular 1.8mm long	Broadly elliptic, 1.8–2 mm

**Fig 6.** *Coleus serracafemaensis* Plant in habitat on the upper south facing rocky kloof (autumn 2021). Note the multi-stemmed base of younger and older stems with peeling bark. (SW Angola). Photo: E. van Jaarsveld.



**Fig 7.** *Coleus serracafemaensis*. Plant in habitat on the upper south facing kloof (autumn 2021). Note the stems with distinctive peeling bark. (SW Angola). Photo: E. van Jaarsveld.



**Fig. 8:** *Coleus serracafemaensis* flowering in a container in a garden at Die Boord, Stellenbosch (Western Cape). Photo: E. van Jaarsveld.



**Fig 9.** *Coleus serracafemaensis* habitat, the upper south facing kloof near the summit of Serra Cafema, SW. Angola. Photo: E. van Jaarsveld.



**Fig 10.** Known distribution (black dot) of *Coleus serracafemaensis*.

The sharply pointed calyx lobes of *C. serracafemaensis*, once mature, become detached and are probably dispersed by the hides of mammals, scattering the seed.

Plants grown at Stellenbosch (Western Cape), flower during autumn (Fig. 8), become deciduous during winter. The stems also tend to die back to near the base of the plant.

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