

# *Ceraria kuneneana* (Didiereaceae/Portulacaceae), a new species from the Kaokoveld, Namibia

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## Abstract

*Ceraria kuneneana* Swanepoel, here described as a new species, is only known from the Kaokoveld, Namibia. Illustrations of the species and a distribution map are provided. Diagnostic characters of *C. kuneneana* include an often slender erect habit, bark on older stems uniform yellow-brown with the nodes blackish, leaves glaucous or pale green with a thin whitish bloom and the midrib and lateral veins clearly visible and prominent (raised) adaxially. A table with diagnostic morphological features to distinguish between the new species and its closest relative, *C. carrissoana* Exell and Mendonça is provided.

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**Keywords:** *Ceraria*; Didiereaceae; Endemism; Kaokoveld; Portulacaceae; Taxonomy

## 1. Introduction

The genus *Ceraria* H. Pearson and Stephens is endemic to the arid western parts of southern Africa. Depending on the authority, either four (Craven, 1999; Germishuizen and Meyer, 2003) or six (Rowley, 2002) species are recognized at present. Two of the described species, *C. carrissoana* Exell and Mendonça and *C. longipedunculata* Merxm. and Podlech, are restricted to the Kaokoveld Centre of Endemism in northwestern Namibia and southwestern Angola, whereas the ranges of the other species are more or less centred on the Gariep Centre of Endemism in southwestern Namibia and northwestern South Africa (Van Wyk and Smith, 2001; Curtis and Mannheimer, 2005).

In this contribution, a new species of *Ceraria* from the Kaokoveld is described. During a botanical expedition to the Otjijhipa Mountains in northwestern Namibia in January 2005, the author encountered a *Ceraria* that superficially resembled *C. carrissoana* (Exell and Mendonça, 1939). In 2000, Ernst Van Jaarsveld of Kirstenbosch National Botanical Garden collected an undetermined *Ceraria* on the Gomgurib Mountain to the east of Sesfontein (Van Jaarsveld 16500 in WIND).

Subsequently, when the latter locality was revisited in April 2006 by Ernst Van Jaarsveld and the author, the Otjijhipa and Sesfontein plants were found to be conspecific. Apparently no other collections of the new species exist, as no specimens could be found in either NBG, PRE, SAM or WIND (herbarium abbreviations according to Holmgren et al., 1990).

The new species was studied in the field and morphological characters recorded in the description are from mature leaves, fresh flowering material and ripe fruit. Diagnostic features for *C. carrissoana* were determined through comparative examination of in situ plants in northwestern Namibia. Additional morphological information for *C. carrissoana* is from herbarium specimens and Exell and Mendonça (1939).

## 2. Description

*Ceraria kuneneana* Swanepoel, sp. nov., *C. carrissoanae* Exell and Mendonça proxima arborea parva caulibus cylindricis et cortice laevi; foliis semi-succulentis, lamina obovata in foliis aliquid, elliptica vel suborbiculari. Differt caule gracili et cortice caulibus uniformi luteo-brunneo; foliis numquam succulentis, lamina glauca, pruniosa, interdum rhombica vel reniformi, plerumque latiore 0.8–1.6 plo longiore quam latiore simili longitudine, costa nervisque lateralibus manifeste visibilibus et

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adaxialiter prominentibus, petalo plerumque longiore, 3–18 mm longo.

Type: Namibia, Kunene Region, Otjihipa Mountains, plateau of 1836 m high northwestern peak, 7 km ESE of Otjinhungwa, 1834 m a.s.l., 17-01-2005. *Swanepoel 234* (WIND holo.!, PRE, iso.!).

Dioecious (gynodioecy suspected, but this could not be confirmed), semisucculent, slender tree up to 6 m tall or multi-stemmed shrub up to 1.5 m tall. *Trunk* single or branching from 0.1–1.8 m above ground level into 2 to 4 stems, or many-stemmed from base,  $\pm$ straight, slender, cylindrical, with no lateral branches except for few short branches at apex, stems 15–60 mm in diam. *Bark* flaking in tough, papery pieces near ground; smooth on stems, peeling horizontally in small, tough, papery strips in places, brown at base, uniform yellow-brown on stems with black spots in places, black around remnants of nodes conspicuously contrasting with yellow-brown on stems, cream-coloured on branches; new growth maroon-red, younger growth grey. *Branches and branchlets* with raised, cushion-like nodes, opposite decussate, internodes 3–30 mm long; glabrous; branches 5–10 mm in diam., branchlets 2–5 mm in diam., prominently and irregularly winged-grooved when dry, some nodes with scarred dwarf lateral branchlets. *Leaves* petiolate, simple, opposite decussate or clustered on dwarf lateral branchlets, semi-fleshy, lamina glaucous or pale green with whitish bloom, young leaves with maroon tinge abaxially and along margin, flat, irregularly curved, glabrous, elliptic or obovate, occasionally broadly ovate, obcordate, rhombic, sub-orbicular or  $\pm$ reniform, 16–56  $\times$  10–68 mm, 0.5–0.6 mm thick, ratio of length versus width 0.8–1.6:1, base cuneate and abruptly attenuate onto petiole; apex obtuse, acute, truncate or emarginate, often minutely apiculate; margin entire; midrib visible ad- and abaxially, prominent adaxially, less so abaxially, lateral veins visible and prominent adaxially; petiole 3–18 mm long, in t/s orbicular, often flattened adaxially, 0.8–2.5 mm diam., glabrous. *Inflorescences* inserted at nodes, racemose, with cushion-like nodes, occasionally branched, densely flowered, flattened, glabrous, pale green, up to 100 mm long, up to 30 pedicels per node. *Flowers* structurally bisexual (functionally male) or female, pedicellate, glabrous. *Bracteoles*  $\pm$ ovate, flat to cucullate, up to 0.7  $\times$  1.0 mm long, glabrous, apex acute to apiculate. *Pedicel* very slender, greenish white, 0.1–0.2 mm diam., inserted on a short peduncle-like structure, up to 0.5 mm long, involucreted by bracteoles. *Receptacle* fleshy, pale green. *Calyx* comprising of 2 sepals; sepals short, broad, membranous, contiguous or distant, bract-like, persistent, hemispherical, greenish white. *Petals* 5, persistent, greenish white, oblanceolate or elliptic, cucullate towards apex. *Pistil* greenish white with ovary flask-shaped, in t/s slightly flattened, triquetrous; style absent; stigmas 3. *Bisexual (functionally male) flowers* 2.4–2.8 mm long; pedicel 1.6–2.0 mm long; receptacle cup-shaped,  $\pm$ 0.3 mm long,  $\pm$ 0.5 mm diam.; sepals  $\pm$ 0.4  $\times$  0.7 mm; petals  $\pm$ 0.2  $\times$  0.9 mm; stamens 5 with filaments semi-terete, greenish white,  $\pm$ 1.7 mm long; anthers pale yellow,  $\pm$ 0.6 mm long; pollen pale yellow; pistil  $\pm$ 1.7 mm long; ovary 1.6  $\times$  0.3  $\times$  0.2 mm; stigmas linear to triangular, pustulate above, short,  $\pm$ 0.1 mm long; ovule  $\pm$ 0.1 mm long. *Female flowers* 3.0–3.5 mm long;

pedicel 2.3–3.2 mm long; receptacle conical, 0.8–1.2 mm long,  $\pm$ 0.7 mm diam.; petals 1.8–2.4  $\times$  0.6–1.0 mm; sepals 0.4–0.6  $\times$  0.6–0.8 mm; pistil  $\pm$ 2 mm long; ovary  $\pm$ 1.7  $\times$  0.9  $\times$  0.3 mm; stigmas triangular, irregularly lobed, obscurely pustulate, patulous,  $\pm$ 0.9  $\times$  0.5 mm; ovule broadly oblanceolate,  $\pm$ 0.5  $\times$  0.2 mm; stamens 5, rudimentary, anthers not developed. *Fruit* asymmetrically elliptic to narrowly obovate, very narrowly triquetrous or rarely flat in t/s, pale green when fresh, pale brown when dry, pod-like, one-seeded, indehiscent, pedicel extremely thin, brittle, probably wind-dispersed, 2.8–3.4  $\times$  1.3–1.9  $\times$  0.3–0.9 mm (Figs. 1–3).

### 2.1. Flowering time

In nature *Ceraria kuneneana* flowers in March and April. Plants cultivated at Kirstenbosch National Botanical Garden, Cape Town, flowered in June.

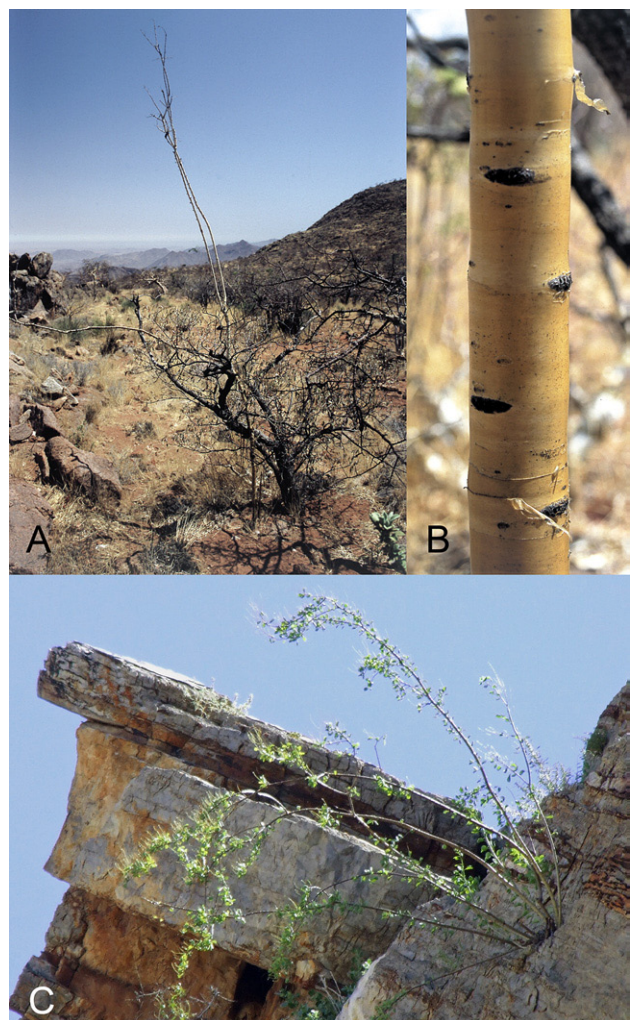


Fig. 1. A. *Ceraria kuneneana* in its natural habitat on the 1836 m high northwestern peak of the Otjihipa Mountains. Plant slender, erect, sparsely branched,  $\pm$ 4 m tall (associated low-growing shrub is *Croton gratissimus*). B. *Ceraria kuneneana*. Stem ( $\pm$ 60 mm in diameter) showing the smooth and uniform yellow-brown bark with black around remnants of nodes, the latter conspicuously contrasting with the paler internodes. C. Cliff-dwelling shrub-form of *Ceraria kuneneana* ( $\pm$ 1 m tall) on dolomite, Gomgurib Mountain, Sesfontein.

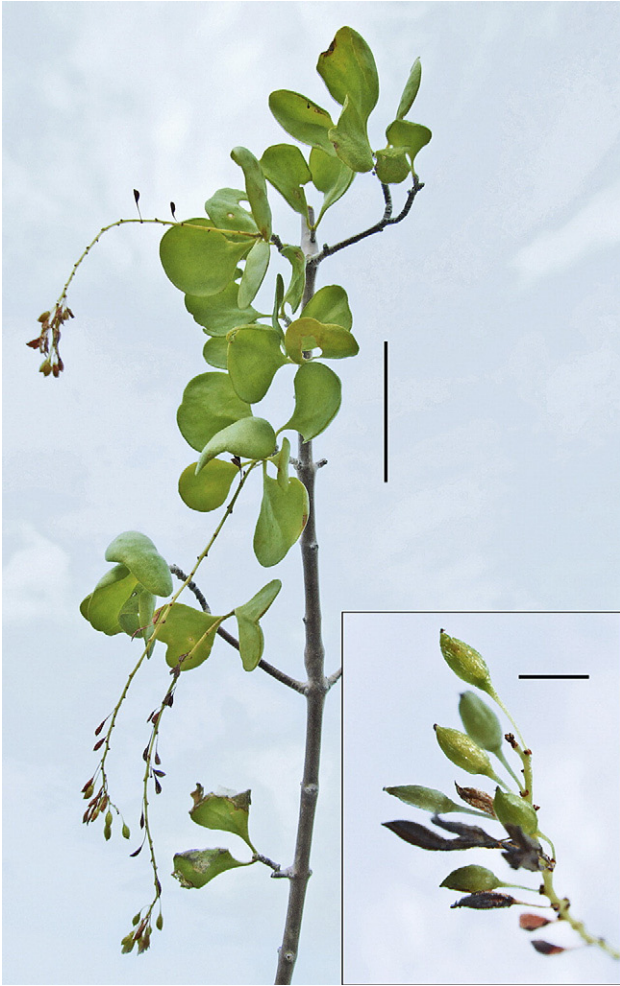


Fig. 2. *Ceraria kuneneana*. Branchlet with infructescences, scale bar 30 mm. Insert showing enlargement of almost mature fruit, scale bar 3 mm.

## 2.2. Distribution and habitat

Currently *Ceraria kuneneana* is known from only three localities, all within the Namibian part of the Kaokoveld Centre of Endemism where it is locally uncommon to rare: the northwestern

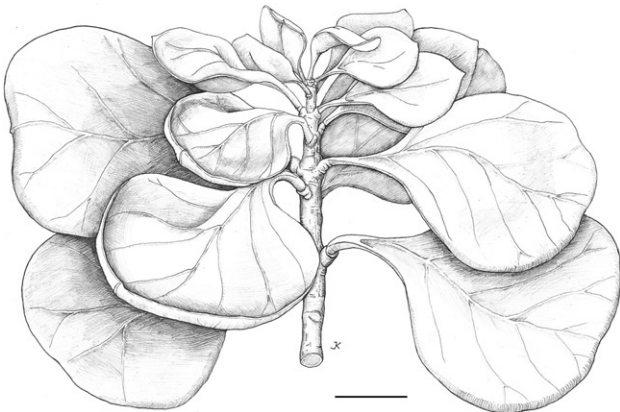


Fig. 3. *Ceraria kuneneana*. Distal part of actively growing shoot showing arrangement and shape of semi-fleshy foliage leaves, scale bar 10 mm.

peak (1836 m) of the Otjihipa Mountains, the northeastern peak (1973 m) of the Otjihipa Mountains, and the Gomgurib Mountain (1325 m) to the east of Sesfontein (Fig. 4). The Otjihipa Mountains are located in a remote part of northwestern Namibia (Kaokoveld) and are bordered by the Kunene River to the north and the Marienfluss Valley to the west. The mentioned two peaks are amongst the highest points in the Kaokoveld and rise almost 1600 m above the Kunene River and floor of the Marienfluss Valley. As such the Otjihipa Mountains are one of the highest mountain ranges along the western Escarpment of Namibia. *C. kuneneana* is found 80–110 km from the coast at altitudes of 700–1970 m, with the mean annual rainfall  $\pm 150$  mm (Mendelsohn et al., 2002). In the Otjihipa Mountains the species occurs above 1800 m, growing as a very slender small tree (Fig. 1A), on sandy-rocky plateaus on granites and quartzites of the Epupa Metamorphic Complex. On the Gomgurib Mountain it was found at 700 m, growing as a multi-stemmed cliff-dwelling shrub (Fig. 2C), on sheer cliffs of Otavi Group dolomite (Miller and Schalk, 1980; Mendelsohn et al., 2002). The new species almost certainly occurs in the adjacent mountainous parts of southwestern Angola as well, especially the botanically poorly known Serra Cafema range. It may also prove to be more widespread on the higher mountains of the Kaokoveld, especially in the extensive areas of dolomite between Sesfontein and Kaoko Otavi, most of which remains botanically poorly explored. Although *C. carrisoana* and *C. longipedunculata* Merxm. and Podlech both occur on the same northwestern peak of the Otjihipa Mountains as *C. kuneneana*, the former two species are restricted to lower altitudes.

## 2.3. Conservation status

Although *C. kuneneana* is known from three localities only, its habitat is not prone to destruction by humans as it is located in

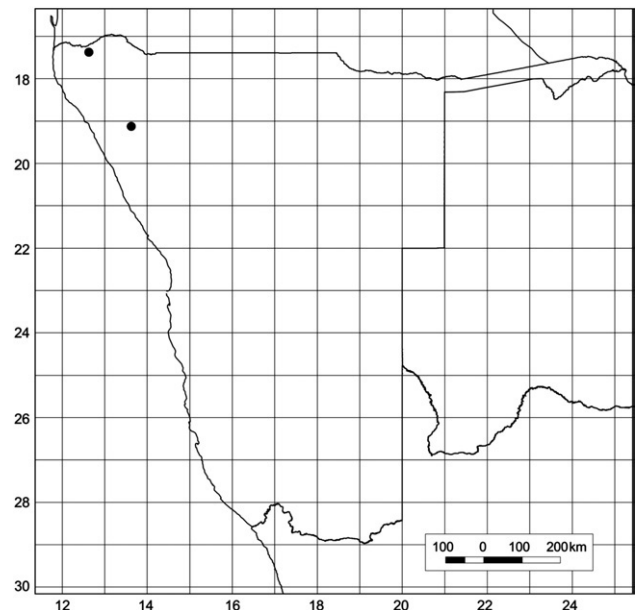


Fig. 4. Known distribution of *Ceraria kuneneana*.

Table 1  
Prominent morphological differences between *Ceraria kuneneana* and *C. carrissoana*

Character	<i>C. kuneneana</i>	<i>C. carrissoana</i>
Habit	Very slender, sparsely branched, erect tree up to 6 m tall, or multi-stemmed shrub up to 1.5 m tall	Low bushy shrub or small tree, never slender, up to 3 m tall
Bark	Uniform yellow-brown with contrasting dark nodes	Mottled in different shades of brown or grey; nodes not contrasting with internodes
Leaves		
Texture	Semi-fleshy	Semi-fleshy to fleshy
Lamina (shape)	Elliptic, obovate, ovate, rhombic, suborbicular, obcordate or ±reniform; irregularly curved; ratio of length versus width 0.8–1.6:1	Elliptic, obovate, broadly oblanceolate, or suborbicular; flat or curved upwards towards apex; ratio of length versus width 1.2–2.9:1
Lamina (venation)	Midrib and lateral veins clearly visible, prominent adaxially	Midrib and lateral veins obscure or barely visible, not prominent
Lamina (size)	15–56 × 10–68 mm, up to 0.6 mm thick	10–37 × 10–31 mm, up to 1.6 mm thick
Colour	Glaucous or pale green	Green
Bloom	Present; thin, whitish	Absent
Petiole (size)	3–18 mm long, 0.8–2.5 mm diam.	1–5 mm long, 0.7–1.3 mm diam.
Pistil		
Ovary in t/s	Triquetrous	Triquetrous or elliptic
Stigmas (female flower)	±0.9 mm long, obscurely postulate	±0.3 mm long, papillate
Fruit		
Colour (dried)	Pale reddish brown	Pale or dark reddish brown
Size (length)	2.8–3.4 × 1.3–1.9 mm	3.1–5.3 × 1.9–3.0 mm

mostly uninhabited, remote mountainous areas. The cliff habitat of the Sesfontein population provides additional protection against possible damage by larger animals.

#### 2.4. Diagnostic characters

*Ceraria kuneneana* is probably most closely related to *C. carrissoana*, from which it differs mainly in habit, bark and leaves. Some of the more prominent morphological features to differentiate between the two species are summarized in Table 1. *C. kuneneana* is a very slender, small tree up to 6 m high or a multi-stemmed shrub up to 1.5 m high (Fig. 1A and C), whereas *C. carrissoana* is never slender and grows as a low bushy shrub or a small tree up to 3 m high. In *C. kuneneana* the stem bark is uniform yellow-brown with the dark-coloured nodes contrasting conspicuously with the pale-coloured stems (Fig. 1B). In *C. carrissoana*, however, the bark is mottled in shades of brown, yellowish brown, greyish brown or grey and the nodes are not conspicuously contrasting with the colour of the bark. The leaves in *C. kuneneana* are semi-fleshy, glaucous or pale green, with a thin whitish bloom, the lamina is elliptic, obovate, broadly ovate, rhombic, sub-orbicular, obcordate or ±reniform, irregularly curved, usually larger but thinner than in *C. carrissoana*, up to 56 × 68 mm, 0.5–0.6 mm thick, with the ratio of length versus

width 0.8–1.6:1 (Figs. 2 and 3). In *C. carrissoana* the leaves are semi-fleshy to fleshy, green, broadly oblanceolate, obovate, elliptic or sub-orbicular, flat or curved upwards towards the apex, usually smaller but thicker than in *C. kuneneana*, up to 37 × 31 mm, up to 1.6 mm thick, with the ratio of length versus width 1.2–2.9:1. The midrib and lateral veins in *C. kuneneana* are clearly visible and prominent (raised) adaxially (Fig. 3), whereas in *C. carrissoana* the venation is obscure or only slightly visible. Furthermore, the petiole in *C. kuneneana* is usually longer, 3–18 mm, whereas in *C. carrissoana* it is only 1–5 mm. The pistil in *C. kuneneana* has the ovary triquetrous in t/s, with the stigmas obscurely pustulate and 0.9 mm long. In *C. carrissoana*, the ovary is triquetrous or elliptic, with the stigmas papillate, shorter than in *C. kuneneana*, ±0.3 mm long. The fruit in *C. kuneneana* is pale reddish brown, 2.8–3.4 × 1.3–1.9 mm. In *C. carrissoana*, the fruit is pale or dark reddish brown and usually larger, 3.1–5.3 × 1.9–3.0 mm.

#### 2.5. Etymology

The specific epithet refers to the politically demarcated Kunene Region in northwestern Namibia where the new species is found. The Region was named after the Kunene River which forms its northern boundary and which is also the international border with Angola (where it is spelled “Cunene”).

#### 2.6. Specimens examined

##### Namibia, Kunene Region:

- 1712 (Posto Velho): Otjihipa Mountains, plateau of 1836 m high peak, 7 km ESE of Otjinhungwa (–BC), *Swanepoel 234* (WIND, PRE), *Swanepoel 235* (WIND); Otjihipa Mountains, plateau of 1973 m peak, 6 km SW of Onyezu (–BC), *Swanepoel 236* (WIND).
- 1913 (Sesfontein): Gomgurib Mountain, 11 km E of Sesfontein, on road to Warmquelle (–BA), *Swanepoel, Van Jaarsveld & Voigt 237* (WIND), *Swanepoel, Van Jaarsveld & Voigt 238* (WIND); 12 km E of Sesfontein (–BA), *Van Jaarsveld 16500* (WIND).

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