

ROSACEAE

A NEW SPECIES OF *CLIFFORTIA* FROM THE SWARTBERG

Cliffortia nivenioides *Fellingham*, sp. nov., *C. aculeatae* Weim. sectionis *Multinerviae* DC. affinis sed foliis brevioribus, lateraliter complanatis, versus sulcatis teretibus, structura interna dissimilibus.

TYPE.—Western Cape, 3322 (Oudtshoorn): Eastern Swartberg, plateau north of Blesberg, 1 900 m, 29 November 1991, *Fellingham & Vlok 1588* (STE, holo.; K, PRE, MO, iso.).

A compact small shrub to 600 mm tall with long emerging procumbent branches spreading over 750 mm, monoecious but apparently of one or the other sex at any given time, female flowers totally hidden in axils of upper leaves. *Branches* reddish brown, glabrous, older parts with persistent vaginas of fallen leaves with or without internodes in between, axils of some containing either short shoots or long shoots; internodes about 12 mm long. *Leaves* unifoliolate, unifacial, bilaterally flattened, in transverse section elliptic and anatomically centric, closely arranged on the short shoot in a flat slightly elongated

fan; vagina 4–5 mm long, dorsally whitish and with three obscure parallel veins close together, laterally green; stipules, 3–4 mm long, subulate, glabrous, green, proximal edge straight, thick and flat, distal edge curved, membranous and whitish tinged with purple; lamina sessile, glabrous, glaucous green, red-tipped, smooth, drying sulcate, $3.0\text{--}33.0 \times 1.0\text{--}2.0$ mm, linear, straight to slightly falcate, base with two colourless cushions at joint to vagina, dorsally with a central nerve the length of leaf and two shorter parallel lateral nerves, ventrally from base upwards channelled for a third to half of its length forming a partial sheath to leaf above, apically tapering to an acute, somewhat dorsiventrally flattened point. *Male flowers*: bracteoles lanceolate-acuminate, 0.5–0.6 mm long, green, glabrous; pedicel and receptacle 1.0 mm long, glabrous; *sepals* 3, $7.0\text{--}8.0 \times 2.0\text{--}2.5$ mm, linear-lanceolate, leathery, the young lime green with occasional irregular longitudinal maroon lines, turning pink then maroon and eventually brown; *stamens* (13–)16(–20), *filaments* 6.5 mm long, filiform, maroon, glabrous; *anthers* 1.2 mm long, pink to maroon. *Female flowers*: bracteoles 0.4–0.5

mm long, similar to male bracteoles; pedicel absent or up to 0.4 mm long, thick and fleshy; *sepals* 3, 2.5–3.0 × 1.0–1.2 mm, lanceolate, dorsally concave, persisting in fruit; *ovary* narrowly elliptic in outline, 2.0–2.5 × 0.9–1.0

mm, longitudinally faintly ridged, glabrous; *style* solitary, 0.3–0.5 mm long; *stigma* short, broad, flat, maroon, margins long fimbriate. *Fruit* 4.5–5.5 × 1.9–2.0 mm, ellipsoid, apex truncate, base narrowed, resembling a pedicel. lon-



FIGURE 5.—A–H, *Cliffortia nivenioides*: A, B, fruit; C, male flower; D, female flower; E, long shoot with short shoots, three lower short shoots showing initial lengthening; F, long shoot with female flowers (above) and developing fruit below; G, male bud; H, male flower in axil of basal leaf of developing long shoot. I–K, *Cliffortia aculeata*. I, J, fruit; K, male bud. a, pedicel; b, bracteole; c, calyx lobe; d, basal part of fruit; e, style. A–H, Viviers & Vlok 470 (BM, BOL, K, MO, P, PRE, STE); I–K, Fellingham & Vlok 1590 (K, PRE, STE). Scale bars: 1 mm.

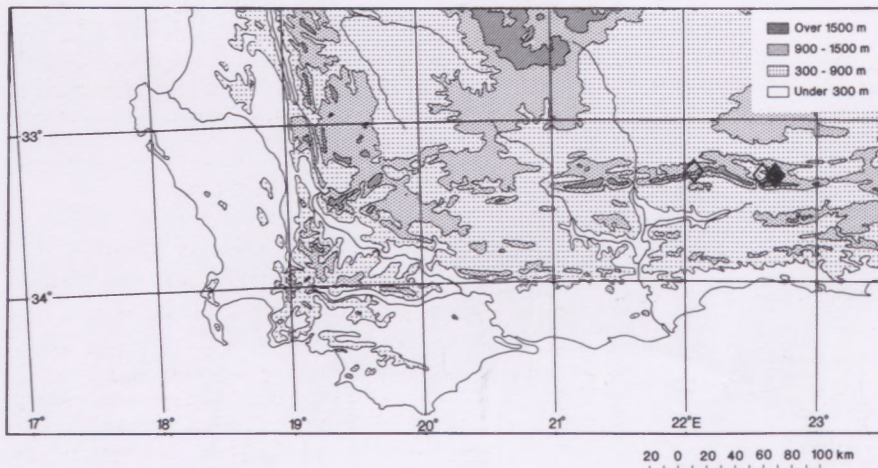


FIGURE 6.—Known distribution of *Cliffortia nivenioides*, ◆; and *C. aculeata*, ◇.

gitudinally faintly ridged, green with a tinge of red (Figure 5A–H).

Diagnostic features

C. nivenioides is similar to *C. aculeata* of the section *Multinerviae* DC., but differs in the more compact, upright growth form (elongated and trailing in *C. aculeata*); the shorter, laterally flattened, wider leaves (terete and somewhat sulcate in *C. aculeata*); the shorter wider calyx lobes; the somewhat different fruit structure; and the different habitat (Figure 5A–H versus 5I–K).

Distribution and habitat

C. nivenioides is known only from a very small area on the plateau north of the Blesberg in the eastern Swartberg, in grassy mountain fynbos on open, sunny, marshy flats. *C. aculeata* occurs nearby, but on a shady vertical cliff face in the spray of a waterfall. It also grows on the Waboomsberg on the eastern side of the Swartberg Pass, again in a shady, moist habitat on a north-facing cliff face (Figure 6).

Discussion

Superficially *C. nivenioides* is very similar to *C. aculeata* in its distribution, growth form, the colouring of stems and leaves, and the arrangement of the leaves in the form of fans. Closer examination, however, reveals significant differences mainly in the leaf anatomy (Figure 7A & B). In *C. nivenioides* the leaf is centric with the palisade continuous except where it is replaced by the dorsal strand of colourless sclerenchymatous tissue supporting the large middle vein with its double phloem elements and phloem cap, but lacking a xylem cap. In *C. aculeata* the leaf is near centric with the diminished adaxial surface in the form of a V-shaped sulcus lined with epidermis lacking stomata and supported by a rectangular strand of tissue comprising large, compactly arranged, thick-walled, colourless cells. At first this colourless strand appeared to be a 'window' but it became clear that it is similar to the abaxial 'vein.' No comparable adaxial structure was found in *C. nivenioides*.

Apart from being shorter and wider, the leaves of *C. nivenioides* are also bilaterally flattened throughout the whole length and channelled, but that, near the base only. The leaves of *C. aculeata*, by contrast, are longer, more

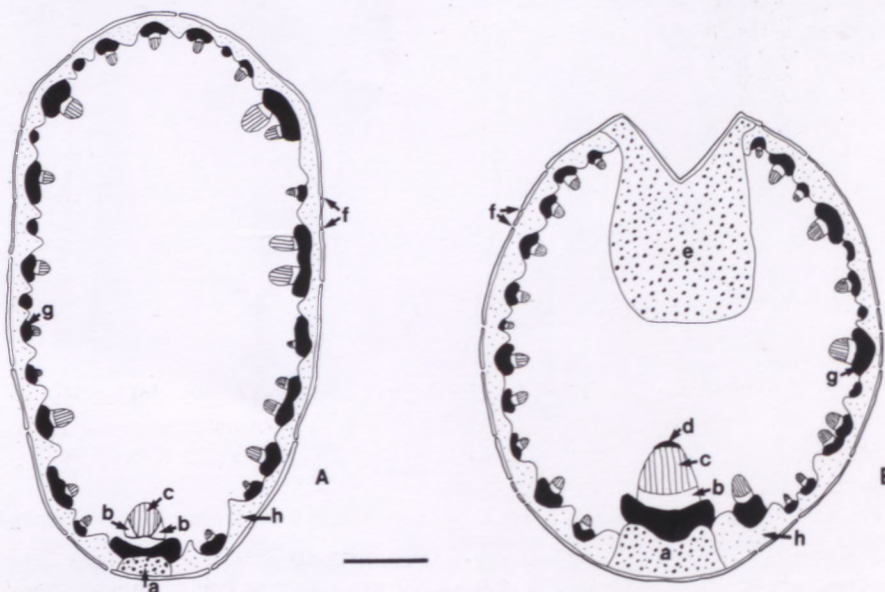


FIGURE 7.—Leaf anatomy. A, *Cliffortia nivenioides*; B, *C. aculeata*. a, colourless sclerenchymatous tissue; b, phloem; c, xylem; d, xylem cap; e, thick-walled colourless cells; f, stomata; g, extraxylary fibre cap; h, palisade. Scale bar: 10 μ m.

slender, subterete, canaliculate throughout their length, and aculeate.

In *C. nivenioides* the calyx lobes in both male and female flowers are shorter and wider (note: the scale bar for Figure 5G is twice the length of that for 5K) and the fruit shorter and more tapered to the ends than in *C. aculeata* (Figure 5B: structure 'd' versus Figure 5I: structure 'd').

The habitat of *C. nivenioides* is sunny, open and flat, whereas that of *C. aculeata* is shady, sheltered and vertical. One collection of *C. aculeata* (Fellingham & Vlok 1593) however, was from a level, sunny and dry site, no more than 4 m away from the vertical stream bank from which a typical specimen (Fellingham & Vlok 1592) was collected. The specimen from the sunny position had shorter leaves which were arranged in more compact fans than those normally found in this species, but rather like the leaves of *C. nivenioides*. It was, in fact, difficult to recognize the plant immediately as *C. aculeata*, and momentary excitement was caused at the thought of this being a possible new find of *C. nivenioides*. On closer examination, however, there was no doubt that it was *C. aculeata*.

C. nivenioides is known from only one very discreet area north of the Blesberg, very close to its related species *C. aculeata*. The latter species was originally discovered on the Swartberg Pass and later on the Waboomsberg. To date no specimens of *C. nivenioides* have been collected from these two localities.

The fan-like arrangement of the leaves in *C. nivenioides* resembles the arrangement characteristic of the genus *Nivenia* Vent. (Iridaceae), prompting the derivation of the specific epithet.

Specimens examined

C. nivenioides sp. nov.

WESTERN CAPE.—3322 (Oudtshoorn): eastern Swartberg, plateau north of Blesberg, next to track; in moist, broad but relatively dry seepage area, 1 880 m, 30-04-1980, (–BC), *Bond 1754* (PRE, STE); Swartberg, head of Tierkloof, northwest of Blesberg, marshy flats, 1 900 m, 06-01-1975, (–BC), *Thompson 2275* (PRE, STE); Swartberg Mountains, next

to track near Blesberg, in wet humic sandy soil on north-facing slope, 1 900 m, 18-12-1985, (–BC), *Vlok 1326* (PRE, STE); eastern Swartberg, plateau north of Blesberg, between E-W running track and the track up Blesberg, open mountain fynbos on peaty soil in marshy area on gentle N slope, 1 900 m, 29-11-1991, (–BC), *Fellingham & Vlok 1588* (K, MO, PRE, STE); Swartberg Mountains, on plateau just north of Blesberg, next to forestry track, in deep peaty sandy soil in seepage on gentle north-facing slope in grassy mountain fynbos, 1 900 m, 30-01-1990, (–BC), *Viviers & Vlok 470* (BM, BOL, K, MO, P, PRE, S, STE).

C. aculeata Weim. in *Botaniska Notiser* 4: 410 (1946).
Type: Swartberg Pass growing in wet places near stream, 00-12-1945, *Stokoe 9250* (LD, holo.; NBG, iso. !).

WESTERN CAPE.—3322 (Oudtshoorn): upper northern slopes of Waboomsberg, next to perennial stream in deep moist sand, 1 600 m, 26-12-1984, (–AC), *Vlok 879* (PRE, STE); Swartberg, Waboomsberg, about 15 km along road to Die Hel at foot of mountain, mountain fynbos on edge of stream, in shade, few plants hanging down from vertical streambank, 1 860 m, 30-11-1991, (–AC), *Fellingham and Vlok 1592* (PRE, STE); Swartberg, Waboomsberg, about 15 km along road to Die Hel, at foot of mountain, in mountain fynbos in dry streambed in full sun, 1 860 m, 30-11-1991, (–AC), *Fellingham & Vlok 1593* (PRE, STE); Swartberg Pass, damp places, 00-12-1942, (–AC), *Stokoe SAM 58304* (SAM); Swartberg Pass, 1 600 m, 00-01-1944, (–AC), *Stokoe SAM 58303* (PRE, SAM); 8 miles west of top of Swartberg Pass, 1 600 m, 00-10-1951, (–AC) *Stokoe SAM 67049* (PRE, SAM); Swartberg Pass, 12-12-1942, (–AC), *Stokoe 8606* (PRE); Swartberg Mountains, mid northern slopes of Blesberg, near forestry track, in deep moist loamy soil next to perennial stream on north-facing slopes in grassy disturbed mountain fynbos, 1 400 m, 15-12-1986, (–BC), *Vlok 1777* (STE); eastern Swartberg, Blesberg area, top of Tierkloof, vertical north-facing seep, 29-11-1991, (–BC), *Fellingham & Vlok 1590* (K, PRE, STE).

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