

# *Chenia ruigtevleia* (Pottiaceae), a new moss species from the Western Cape Province of South Africa

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**ABSTRACT.** *Chenia ruigtevleia* is described from two localities in the Western Cape Province of South Africa. It is most readily distinguished from congeners by the presence of laminal papillae. Further points of distinction from the apparently closely related *C. leptophyllum* are the smaller laminal cells and generally short-ovate leaves. We provide a key for the four species recognized in *Chenia*.

**KEYWORDS.** *Chenia*, Cape Floristic Region, South Africa, mundivagant species, Pottiaceae.



*Chenia* (Pottiaceae) was erected by Zander (1989) to accommodate the species previously treated as *Tortula subobliqua* R. S. Williams (the generitype) and *T. rhizophylla* (Sakurai) Z. Iwats. & K. Saito (= *C. leptophylla*). Distinctive features of the genus include weakly dentate or sharply crenulate upper leaf margins, a thin costa ending in a thick-walled sharp spine, large, epapillose, thin-walled upper laminal cells, basal cells enlarged but quadrate or very short-rectangular, and red coloration in KOH. Because the laminal cells walls are very thin, the red tint is visible best in older leaves not masked by vivid chlorophyll, but the color is strong and distinctive under low magnification in the thicker walled apical spine. In his generic treatment of the Pottiaceae, Zander (1993) expanded the genus to include *C. lorentzii* (Müll. Hal.) R. H. Zander, which possesses the characteristic gametophyte features, with leaf

shape and degree of marginal dentition midway between that exhibited by the two other species.

More recently, Guerra and Cano (2000) excluded *C. leptophylla* from the genus, elevating *Tortula* subg. *Leptophascum* Müll. Hal. to generic rank to accommodate it. The main feature used by these authors to justify the exclusion of this species from *Chenia* is the cleistocarpous capsule; in the generitype the capsules are stegocarpous, while the sporophyte is unknown for *C. lorentzii*. However, as documented in detail by Zander (1993), sporophyte reduction series are rather common in the Pottiaceae. Given the shared unique gametophyte features among the three species, we here treat *Chenia* as circumscribed by Zander (1993).

As noted above, a consistent feature of all species currently assigned to *Chenia* is the complete absence of papillae on the leaf cells, excepting the sharp

marginal teeth or crenulations, which may end in a simple, small papilla. However, recent collections from the Cape region of South Africa include specimens that otherwise match this genus but have distinctly papillose upper laminal cells. In the present paper we describe these as a fourth species of *Chenia*, *C. ruigtevleia*.

***Chenia ruigtevleia*** Hedd. & R. H. Zander *sp. nov.*

**Fig. 1**

*Caules 1–5 mm, simplices, in sectione transversali elliptici, funiculo centrali bene effecto; folia late ovato-elliptica vel spathulata, 1.2–2.2 mm longa, caduca, marginibus planis vel leniter ad basem recurvis, e cellulis 2–4-seriatis minoribus parietibus crassioribus marginatis, prope apicem e projecturis papillosis acute dentata, in apice late acuta, in apiculum acutum rubrum ex 1–2 cellulis laevibus terminantia; costa infirma, sub apice evanida; cellulae mediales laminales quadratae vel hexagonales, 12–24 × 12–20 μm, in medio laminae papillis simplicibus cavis ornatae; gemmae e cellulis 10–20 compositae, in solo in funiculis brevibus.*

**TYPE:** SOUTH AFRICA. WESTERN CAPE PROVINCE: Sedgefield area, Road from N2 to Karatara, Ruigtevlei, on sandy soil in citrus orchard, 34°00'20"S, 22°49'02"E, 40 m, 24 Jun 2003, Hedderson 15106 (holotype BOL; isotype MO).

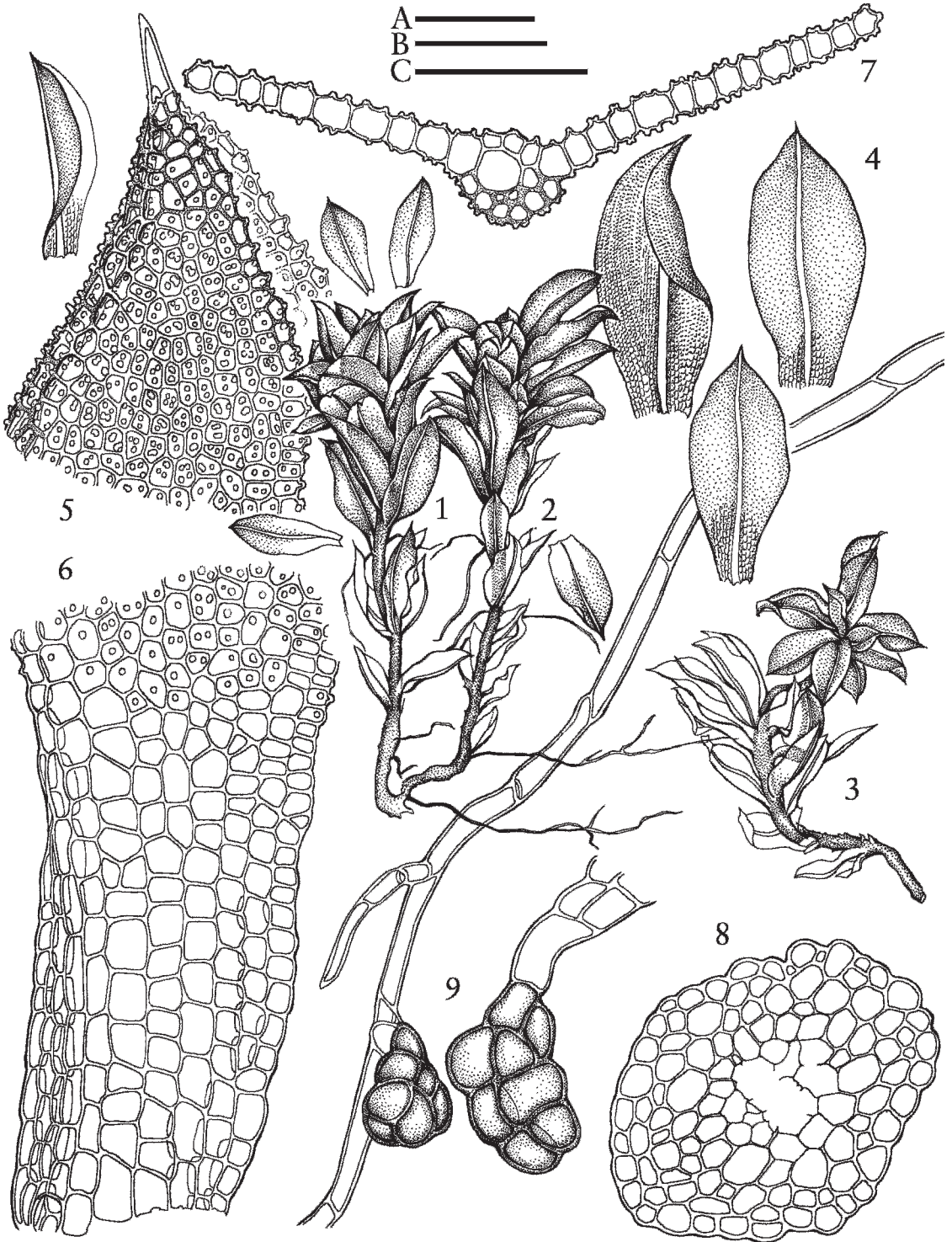
**PARATYPE:** SOUTH AFRICA. WESTERN CAPE PROVINCE: Robertson area, off road to Dassieshoek Nature Reserve, clay bank in fynbos-karoo transition, 3319DD, Hedderson 16106 (BOL).

**Description.** Plants terricolous, forming turfs, green above and brown to yellow brown below, reddish in direct sunlight. Stems 1–5 mm, unbranched, in section elliptic, central strand well developed, occasionally represented by a void, sclerodermis weakly differentiated; axillary hairs of ca. 6 entirely hyaline cells. Leaves folded and loosely incurved-contorted when dry, erect- to wide-spreading wet, broadly ovate-elliptical to obovate or somewhat spathulate, 1.2–2.2 mm long, caducous, margins plane throughout or weakly recurved basally, 2–4 rows of smaller and thicker-walled cells forming an indistinct border, sharply dentate above by papillose projections arising from the middle of the exterior cell wall; apex broadly acute, with a

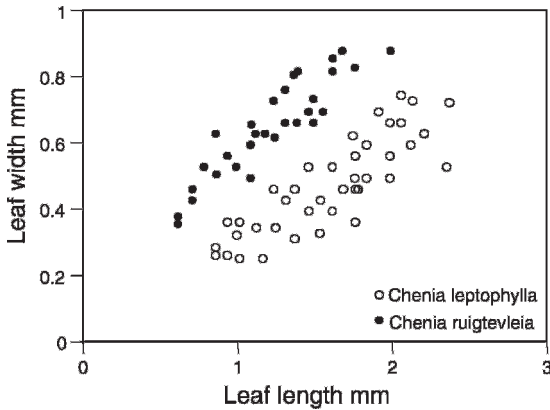
distinct, sharp, red apiculus formed by 1 or 2 smooth, thick-walled cells; costa weak, ending 1–3 cells below apex, superficial cells short-rectangular both ventrally and dorsally, in section round to slightly elliptic, ventral and dorsal epidermis well differentiated, dorsal stereid band present but weak and with 2–4 cells, sometimes only substereids present, guide cells 2, in a single layer; laminal cells quadrate to hexagonal, 12–24 × 12–20 μm, collenchymatous, papillae simple, hollow, (2–)3–5 (–6) per cell; basal cells quite thin-walled, short-rectangular, 24–26 μm wide, 1.8–2.2 × as long as wide. Specialized asexual reproduction by brown, irregularly shaped, 5–20-celled brood bodies, ca. 40–125 μm, borne on short stalks in the soil on the rhizoids. Apparently dioicous. Perichaetia terminal, leaves undifferentiated, often with 2–3 naked archegonia in upper leaf axils. Perigonia not seen. Sporophyte not seen. Laminal KOH color reaction red.

**Etymology.** The species epithet is derived from the type locality.

**Discussion.** Of the other three species currently assigned to the genus (Zander 1993), *Chenia ruigtevleia* is most similar to *C. leptophylla* because of the strongly differentiated apiculus and the lack of coarse teeth in the upper part of the leaf, the denticulations rather formed of projecting-papillose cell walls. In addition it has caducous leaves that presumably function as vegetative propagules, a condition also seen commonly in *C. leptophylla*. However, *C. ruigtevleia* is easily distinguished from this, and all other species in the genus, by the presence of papillae on the medial laminal cells. The new species is further distinguished from *C. leptophylla* by its leaf shape (Figs. 1, 2). Although leaves of the two overlap greatly in overall size, the leaves of *C. ruigtevleia* are considerably broader for any given length (Fig. 2). The contrasting leaf shapes give the two species quite different aspects when hydrated. In addition, the leaf cells of the new species are on average smaller than those of *C. leptophylla*, being rarely more than 17 μm wide while those of the latter often exceed 25 μm and plants with cells to 30 μm or more are not uncommon. The key given below separates the four known species of the genus. *Chenia ruigtevleia* is superficially similar to certain



**Figure 1.** *Chenia ruigtevleia*. 1–3. Habits, some leaves fragile along their insertions. 4. Leaves. 5. Leaf apex. 6. Basal cells. 7. Leaf transverse section. 8. Stem section. 9. Brood bodies on rhizoids. Drawn from *Hedderson 15106* (MO). Scale bars: A = 2 mm, figs. 1–3; B = 1 mm, fig. 4; C = 100  $\mu$ m, figs. 5–9.



**Figure 2.** Scatterplot of leaf length and width in *Chenia leptophylla* and *C. ruigtevleia*. Measurements for the latter are taken from five plants from each of the holotype, isotype and paratype.

small species of *Hennediella* (e.g., *H. oedipodioides*). However, these are easily distinguished by their laminal border of thick-walled, elongate cells, and the apex not ending in a single, sharp, colored conical cell with walls thicker than those of other apical cells.

The new species, like *Chenia leptophylla*, is anacrogynous (common in liverworts but probably an aberrancy in mosses) in that naked archegonia are scattered along the distal stem in leaf axils, lacking perichaetial leaf protection. As pointed out by Zander (1976), this condition is also known for *Globulinella peruviana*, *Gymnostomum aeruginosum*, *Mnium undulatum* and species of *Fissidens*, *Splachnum* and *Tayloria*.

*Chenia leptophylla* is a mundivagant species or Schuhpflanze (Eckel 1986; Zander 1993) that, like *Didymodon umbrosus*, spreads by human agency through rhizoid-borne gemmae or plant fragments in the soil. Apparently, the same is true of *C. ruigtevleia*, which has similar brood bodies, though these appear uncommon, as well as very fragile leaves that break readily from the stem at the insertion. The relative survival rates of the two types of vegetative propagules remain unstudied. However the gemmae are likely to survive the dry summer season in the soil diaspore bank, while the thin-walled cells of the leaves would be expected to succumb to desiccation more readily.

Of the two known populations, the type locality (a citrus orchard) is clearly anthropogenic, and the species was very abundant here, evidently reproducing solely by vegetative means since no sporophytes or male plants could be found. The second locality, however, is in a quite undisturbed karroo/arid fynbos transition site. This suggests that the species is indigenous in southern Africa, and may only recently have become a ruderal. It should be sought at similar sites in the southern and western Cape.

#### KEY TO THE SPECIES OF *CHENIA*

1. Leaves broadly rounded and dentate in upper 1/3 of the leaf, apical cell not thick-walled; capsule peristomate ... *Chenia subobliqua* (R. S. Williams) R. H. Zander
1. Leaves usually broadly acute, seldom rounded, sharply crenulate on upper margins, seldom with teeth, apical cell usually more thick-walled than other cells of the apex; capsule (where known) cleistocarpic ..... 2
  2. Upper leaf cells with 3–5 simple papillae per lumen. .... *Chenia ruigtevleia*
  2. Leaf cells lacking papillae except on extreme margins 3
  3. Leaves broadly acute, upper margins not dentate though minutely and sharply crenulate ..... *Chenia leptophylla* (Müll. Hal.) R. H. Zander
  3. Leaves broadly acute to broadly obtuse, upper margins occasionally dentate ..... *Chenia lorentzii* (Müll. Hal.) R. H. Zander

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Appendix 1. Specimens of *Chenia leptophylla* used  
for leaf measurements.

AUSTRALIA, QUEENSLAND: *Norris 36196* (MO). BRAZIL,  
SÃO PAULO: *Schäfer-Verwimp 14769* (MO). COSTA  
RICA, SAN JOSÉ: *Holz CR 99-13339* (MO). SOUTH AFRICA,

ADDO: *Hedderson 15119* (HB, TAH); PRETORIA:  
*Evenwel 13560* (MO); SWELLENDAM-ASHTON AREA:  
*Hedderson 15313* (HB, TAH); WARTBERG: *Hedderson*  
*16002* (BOL). U.S.A. LOUISIANA: *Reese 16960*  
(MO).