

Studies in the genus *Riccia* (Marchantiales) from southern Africa. 13. A new species, *R. hantamensis*, in section *Pilifer* and a new record for *R. alatospora*

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ABSTRACT

Riccia hantamensis, a new species from the Hantams Mountain, District Calvinia, is described. It is clearly related to *R. alatospora*, but is a much larger plant. Like other species with a dorsal epithelium of free-standing cell pillars, it belongs to section *Pilifer* Volk. *R. alatospora*, originally only known from Platklip, Stellenbosch (Volk & Perold 1985), is now also recorded from Carolusberg, Hester Malan Reserve, Namaqualand.

UITTREKSEL

Riccia hantamensis, 'n nuwe spesie van die Hantamsberg, distrik Calvinia, word beskryf. Dit is duidelik verwant aan *R. alatospora*, maar is 'n veel groter plant. Soos die ander spesies met 'n dorsale epiteel van vrystaande selpilare, behoort *R. hantamensis* ook tot seksie *Pilifer* Volk. *R. alatospora*, oorspronklik slegs bekend van Platklip, Stellenbosch (Volk & Perold 1985), word nou ook vermeld van Carolusberg, Hester Malan Reserwaat, Namakwaland.

R. hantamensis is known from only three collections from the Hantams Mountain, all in the same vicinity (Figure 1), but this whole area is undercollected as far as liverworts are concerned, so it may be more widely distributed. The specimen, *Germishuizen 4034*, consists of only male plants and has been cultivated for 26 months, growing luxuriantly in a seed tray on soil overlying peat. Subsequently female plants with ripe sporangia were collected at ± the same locality on two separate occasions. The species grows on ± neutral to somewhat alkaline soil, together with small *Crassula* spp. and mosses, e.g. *Didymodon ceratodontes* (C. Müll.) Dix. in an area with predominantly fynbos vegetation. Altitude is ± 1 500 m above sea level, the annual rainfall is a winter one of less than 200 mm. The specific epithet refers to the only known locality.

Riccia hantamensis Perold, sp. nov.

Thallus dioicus, annuus, grandis, in vivo laete viridis aspectu nitido crystallino, in sicco flavo-virens. Frons usque ad 10 mm longa, 2,5–3,8 mm lata, 0,7–1,2 mm crassa, 3–3,5 plo latior quam crassa, symmetrice furcata vel bifurcata, oblonga vel obovata. Anatomia: epithelium dorsale e cellulis 3(–4) in columnis liberis, decrescentibus; tela assimilans canalibus aëriis 4–6–8 lateralibus ad 100 µm latis. Squamae parvae, hyalinae, apicem versus ventraliter positae. Sporae 60–85 µm diametro, ligno-brunneae, deltoideo-globulares, polares, ala usque ad 10 µm lata; superficiei distale areolis 4 grandis centralibus, 15–20 µm latis, bulla centrali; superficiei proximale signo triradiato distincto, areolis 5–10 µm latis, parietibus ad nodos prominentibus. *Chromosomatum numerus* n = 9 (Bornefeld pers. comm.).

TYPE.—Cape Province, 3119 (Calvinia): Hantams Mountain, Van Rhynshoek Farm, 8 km to FM tower, on

clayey soil at streamlet next to road (–BD), 1987.10.03, S.M. Perold 1830 (PRE, holo.).

Thallus dioicus, annual, bright green, with shiny, crystalline appearance, in crowded gregarious patches or scattered, medium-sized to rather large; branches once or twice symmetrically furcate (Figures 2A; 3A, B), closely to medium divergent, up to 10 mm long, terminal segments mostly short, 1,5–3,0 mm long, 2,5–3,8 mm wide, 0,7–1,2 mm thick, i.e. 3 to 3½ times wider than thick in section, shape oblong to obovate, generally widening distally; apex rounded to truncate (Figure 3C), shortly emarginate; groove apically deep, disappearing ± midway along length of thallus; margins rounded, obtuse, overhanging, flanks very obliquely sloping (Figure 2G), ventral surface gently rounded to flat, green (Figure 2G); when dry, yellowish green, margins raised and incurved, dorsally flat to slightly concave (Figure 2B). *Anatomy:* dorsal

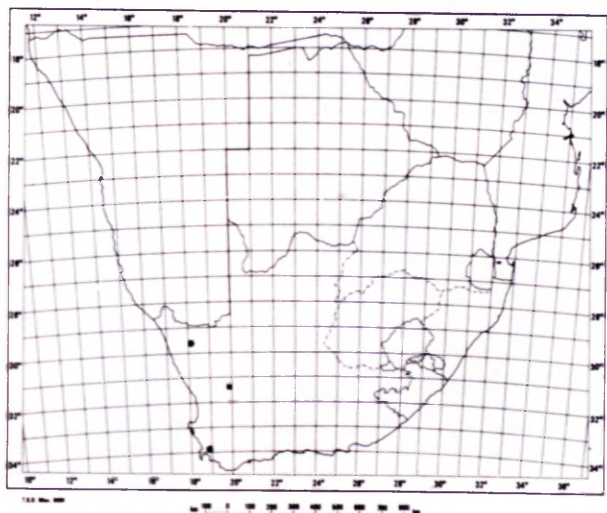


FIGURE 1.—Map showing distribution of *R. hantamensis* and *R. alatospora*.

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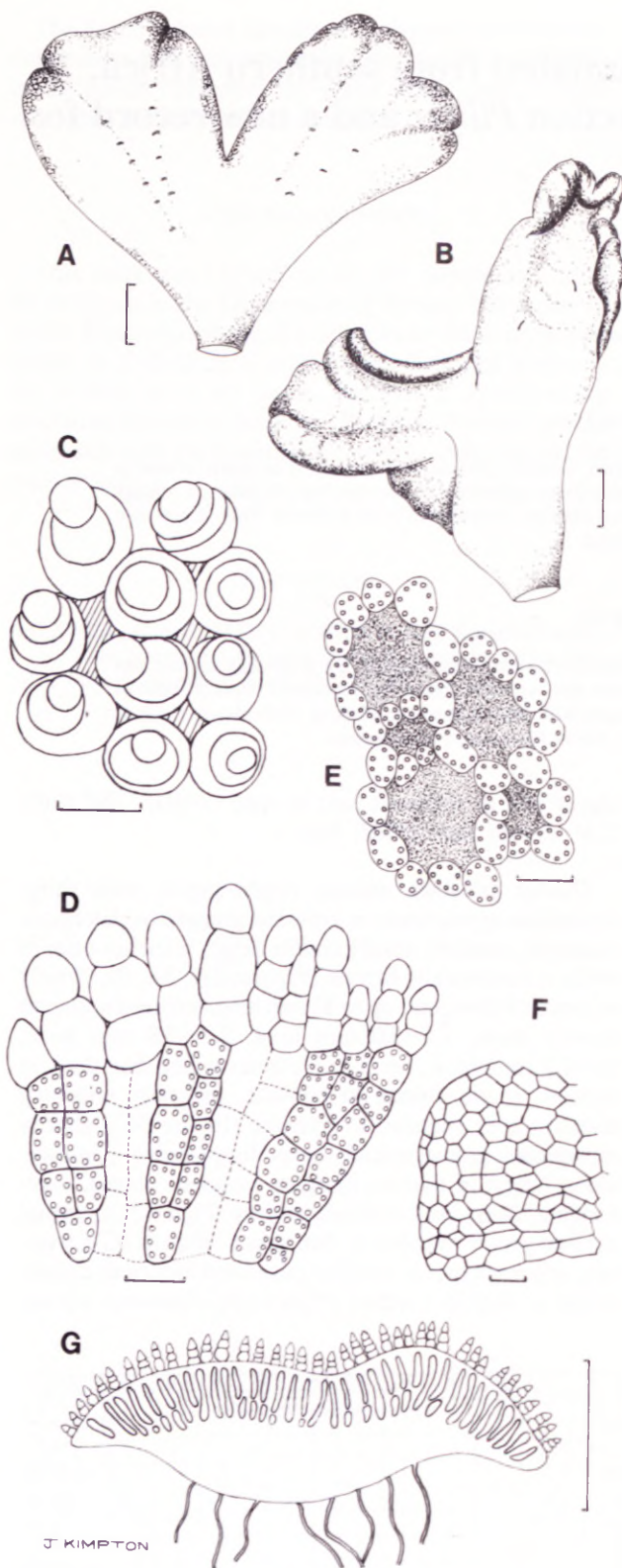


FIGURE 2.—*Riccia hantamensis*. Morphology and anatomy. A, male thallus with rows of antheridial necks, turgid; B, dry female thallus with 2 archegonial necks; C, dorsal cells and air pores (hatched lines) from above; D, transverse section through dorsal epithelium and assimilation tissue, showing wide air canals (cells with broken outlines); E, horizontal section through assimilation tissue, with air canals stippled; F, scale; G, transverse section through thallus branch. A, C, D, E, G, *Germishuizen 4034*; B, F, *S.M. Perold 1830*. Drawings by J. Kimpton. Scale bars on A, B, G = 1 mm; C-E = 50 μm ; F = 100 μm .

epithelium $\pm 135\text{--}160\ \mu\text{m}$ high, in free tapering pillars, consisting of 3(–4) thin-walled hyaline cells, $40\text{--}58 \times 48\text{--}80\ \mu\text{m}$, topmost cells small, rounded to conical, basal

cells wide and bulging at sides (Figures 2C, D; 3E, F), air pores 3–5-sided, proximally wider and clearly visible from above; assimilation tissue $\pm 350\ \mu\text{m}$ thick in section, i.e. almost $\frac{1}{2}$ the thickness of thallus, consisting of cells $\pm 50 \times 35\ \mu\text{m}$, arranged in vertical columns up to 8 cells high and 1(–2) cells wide, with abundant chloroplasts, enclosing 4–6–8-sided, obliquely sloping air canals, up to $100\ \mu\text{m}$ wide (Figure 2D, E); storage tissue $\pm 180\text{--}200\ \mu\text{m}$ thick, $\pm \frac{1}{4}$ the thickness of thallus, cells roundish, $62\text{--}70 \times 55\text{--}85\ \mu\text{m}$. Rhizoids arising from ventral epidermis, mostly smooth, some tuberculate, $\pm 25\ \mu\text{m}$ wide. Scales hyaline, small and inconspicuous, $600 \times 325\ \mu\text{m}$, fragile, situated ventrally toward the apex, spaced (Figures 2F; 3D), cells $\pm 75 \times 50\ \mu\text{m}$, 4–6-sided. Antheridia numerous along groove, with conspicuous, hyaline necks, up to $500\ \mu\text{m}$ long. Archegonia with purple necks, scattered along length of lobes in female plants. Sporangia bulging slightly dorsally, up to $700\ \mu\text{m}$ wide, containing 900–1200 spores each. Spores (60–) $65\text{--}80(=85)\ \mu\text{m}$ in diameter, pale yellow-brown, semi-transparent, triangular-globular, polar, with wing up to $10\ \mu\text{m}$ wide, perforated at marginal angles and occasionally also elsewhere, margin finely crenulate; distal (outer) face with ± 4 large, central areolae, $15\text{--}20\ \mu\text{m}$ wide, some with central boss (Figure 4B, D, E), outer areolae smaller, $5\text{--}12\ \mu\text{m}$ wide, walls extending across wing; proximal (inner) face with triradiate mark distinct (Figure 4C), suture ridges $\pm 5\ \mu\text{m}$ high and extending on to wing, areolae $5\text{--}10\ \mu\text{m}$ wide (Figure 4A, C), angular, walls raised at nodes, often irregular and incompletely separating the areolae. (The size and ornamentation of the spores were quite variable when comparing the two gatherings, *S.M. Perold 2338* and *1830*, from the same site (Figure 4A, B & 4C–E respectively), the former having been collected during drought, when the spores were smaller and more numerous in each sporangium; the latter were collected during good rains. Chromosome number $n = 9$ (Bornefeld pers. comm.).

Riccia hantamensis is one of several species which have a dorsal epithelium consisting of free cell pillars and hence it is classified in section *Pilifer* Volk. It is closely related to, but distinguished from *R. alatospora* Volk & Perold, mainly on account of its robust size. In addition, the apical cells of its free dorsal epithelial pillars are more rounded and the inconspicuous scales are hyaline and occur ventrally only near the apex (Figure 3D), in contrast to the red scales present along most of the length of the flanks in *R. alatospora*. The somewhat wider 4–6–8-sided air canals in the assimilation tissue and the wide-winged spores with their very distinctive ornamentation, are characters shared by both species, but the spores of *R. hantamensis* are smaller in diameter (Figure 4F), and far more numerous in each sporangium. The chromosome number for *R. hantamensis* is $n = 9$, in comparison with $n = 8$ in *R. alatospora*, but this may be of less significance as more than one karyotype is known in some species (Volk *et al.* 1988).

Although the spore ornamentation of the two species is very similar, the differences in thallus morphology mentioned above, warrant recognition of *R. hantamensis* at specific level. Cultures of the two species which were maintained side by side in a Petri dish for nine months, retained the differences in size and morphology. Both species are probably derived from a common ancestor,

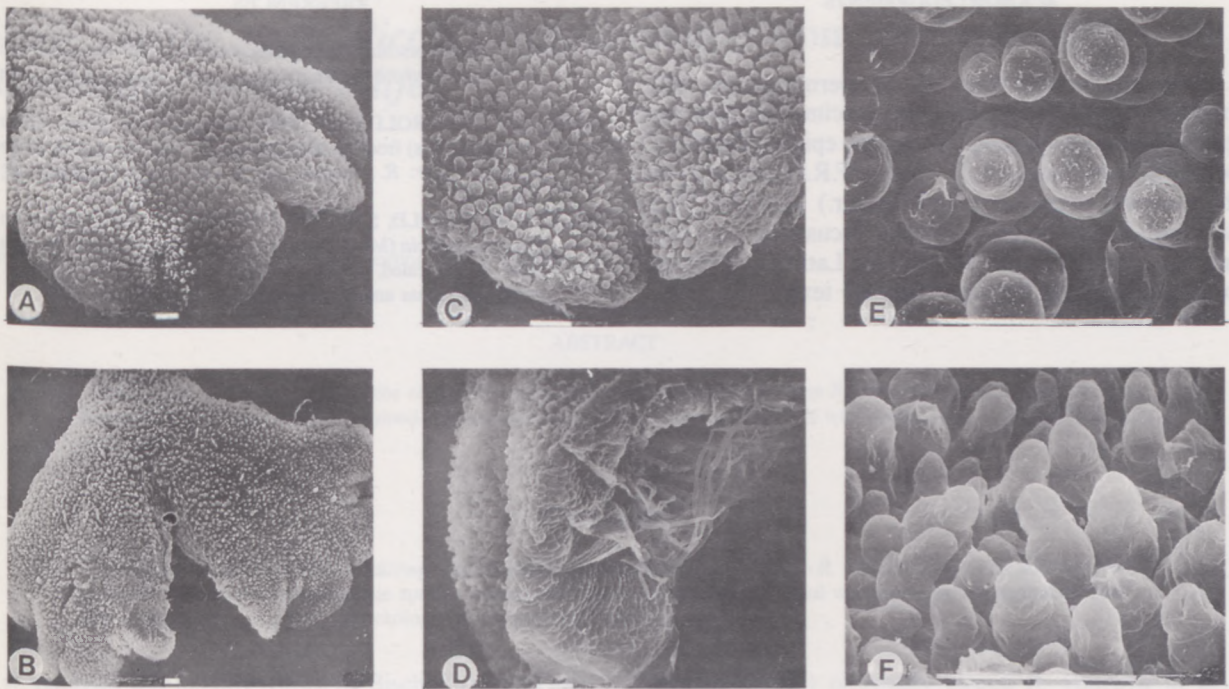


FIGURE 3.—*Riccia hantamensis*. Morphology and anatomy. A, dorsal view of thallus, branches once furcate; B, branches twice furcate; C, apex of thallus from above; D, ventral scales and rhizoids shown from side; E, dorsal cells and air pores from above; F, dorsal cell pillars partly from the side. A–F, *Germishuizen 4034*. Scale bars on A–F = 100 μ m.

as indicated by similarities in the more conservative sporophyte.

Specimens examined

CAPE.—3119 (Calvinia): Hantams Mountain, Van Rhynshoek Farm (–BD), 1986 October, *G. Germishuizen 4034* (PRE); 1987 October, *S.M. Perold 1830* (PRE) (see type); 1988 September, *S.M. Perold 2338* (PRE).

A NEW RECORD OF *R. ALATOSPORA* VOLK & PEROLD

Until now, this species was known only from Platklip, Stellenbosch, where it was first collected by Duthie in 1929. Two more collections of *R. alatospora* were recently made (Figure 1):

CAPE.—2918 (Gamoep): Carolusberg, Hester Malan Res. (–CA), *S.M. Perold 1425* p.p., *1426* (PRE).

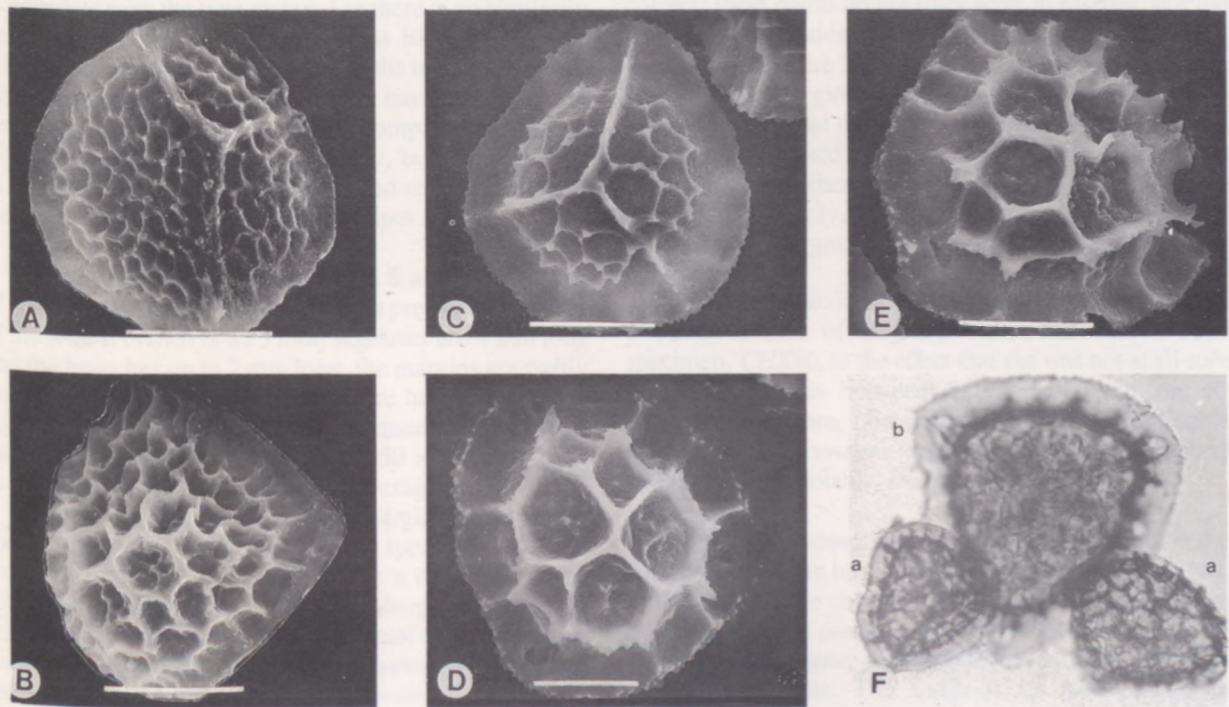


FIGURE 4.—*Riccia hantamensis* and *R. alatospora*. Spores. A–Fa, *R. hantamensis*; Fb, *R. alatospora*. A, C, proximal face; B, D, distal face; E, distal face, partly from the side; A–E, SEM micrographs; F, LM (light microscope) micrograph. A, B, Fa, *S.M. Perold 2338*; C–E, *S.M. Perold 1830*; Fb, *Duthie 5004*. Photography by S.M. Perold. Scale bars on A–E = 50 μ m; diameter of Fb \pm 120 μ m.

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