

Studies in the genus *Riccia* (Marchantiales) from southern Africa. 6. *R. hirsuta*, a new species, in a new section

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ABSTRACT

Riccia hirsuta Volk & Perold, sp. nov., the type species of a new section, *Micantes* Volk & Perold, subgenus *Spongodes* (Nees) Volk is described. It is characterized by tall, dorsal, hair-like, multi-cellular outgrowths from an epidermis with distant air-pores, leading to polyhedral air-chambers below, and is the only species in this subgenus with these outgrowths. The ventral scales are triangular, apically splitting into long, hair-like appendages. This species is endemic to the north-west and central Cape Province.

UITTREKSEL

Riccia hirsuta Volk & Perold, sp. nov., die tipe spesie van die nuwe seksie *Micantes* Volk & Perold, subgenus *Spongodes* (Nees) Volk word beskryf. Dit word gekenmerk deur lang, haaragtige, veelsellige, dorsale sel-pilare, wat uitgroeï van 'n epidermis onderbreek deur porieë wat lei tot poliëdriese lugkamers benede en is die enigste spesie in die subgenus met hierdie sellulêre uitgroeïsele. Die ventrale skubbe is driehoekig en apikaal verdeel in lang, haaragtige aanhangsels. Die spesie is endemies tot die noordwestelike en sentrale Kaapprovinsie.

Micantes Volk & Perold, sect. nov. subgeneris *Spongodes* generis *Riccia*. Thallus dorsaliter dense obtectus pilis multicellularibus hyalinis, micantibus (inde nomen).

TYPE. — *Riccia hirsuta* Volk & Perold, sp. nov.

Thallus dorsally densely covered with multicellular, hair-like, hyaline, shiny (hence the name) pillars. In the subgenus *Spongodes* no other section has these tall dorsal hairs.

Riccia hirsuta Volk & Perold, sp. nov.

Frons usque ad 15 mm longa, 2–5 mm lata, duplo ad triplo latior quam crassa, simplex vel furcata, obcuneata vel oblonga, apice breviter emarginata, sub apice canaliculata, antice subplana, ab pilis multicellularibus quasihirsuta (inde nomen speciei), marginibus plus minus attenuatis; costa lata, crassa, subplana vel convexa, ad margines sensim excurrans. *Stratum aeriferum* cavernis altis. *Squamae* grandes, marginem frondis superantes, imbricatae, hyalinae, deltatae, apicibus in filis liberis scissis. *Sporae* triangulo-globulares, polares, brunneae, 115–125 µm diametro, late alatae, margine subtiliter crenato, irregulariter reticulatae, areolae centrales magnae, ad 25–38 µm latae, areolae marginales parviores. *Chromosomatum numerus* n = 8 (Bornefeld 1984).

TYPE. — Cape, 3018 (Kamiesberg): Kamiesberg plateau, north of Leliefontein, towards Draai-klip, on sandy, periodically moist soil (–AC), 1983/09/06 *Oliver 8040* (PRE, holo.), associated with other *Riccia* species and Restionaceae. Soil pH 5,3.

Thallus monoicous (?), perennial, scattered or in incomplete rosettes, dorsally furry, whitish along margins, greenish grey over centre; medium-sized to large (Figure 1A, B); simple or bifurcate, lobes up to 15 mm long, 2,0–4,0 (–5,0) mm broad, 1,5–2,0 mm thick, i.e. about two to three times broader than thick; oblong, obcordate when young (Figure 1B), broadening towards rounded to truncate, emarginate apex; groove short, obscured by thick pelt of shiny hairs, dorsal surface soon becoming flat; margins subacute to slightly tumid; flanks steep to sloping outwards in a short wing (Figure 1C₁, C₂, C₃), greyish green, occasionally with some reddish purple flecks; ventral surface slightly rounded to plane, pale green; when dry, sides partly inflexed, dorsal surface grey, dusty from accumulation of sand grains trapped between collapsed hairs. *Anatomy*: dorsal covering of loose, hyaline, straight to bent, hair-like cell pillars (Figure 2A, B), up to 1 500 µm long, occupying up to nearly ½ the thickness of frond (Figures 1C₁, C₂, C₃, 2C), consisting of one to seven thin-walled cells (Figures 1D, 2D), 50–200 × 35–120 µm, tapering to apex (Table 1), distances separating bases of hairs ± 15–120 µm; epidermis between hairs consisting of flat to slightly bulging, polygonal cells (Figures 2G, H) 40–65 (–80) × 30–40 (–50) µm and about 20 µm high, sometimes slightly raised around base of hairs; air-pores rectangular or five-sided, up to 20 µm wide, formed between 4 or 5 surrounding cells, distances between pores about 50–250 µm (Figure 2G, H); assimilation tissue (chlorenchyma) about 500–600 µm thick, almost ¾ the thickness of frond (Figures 1C₁, C₂, C₃, 2C) with tall, polyhedral air-chambers (Figures 1D, 2D, E) 65–100 µm wide, sloping obliquely and gradually becoming almost vertical near surface, enclosed by four to six plates, one cell thick, cells 35–65 × 33–45 µm; storage tissue about 500 µm thick, consisting of irregularly arranged, polygonal cells, up to 50 µm wide, in older

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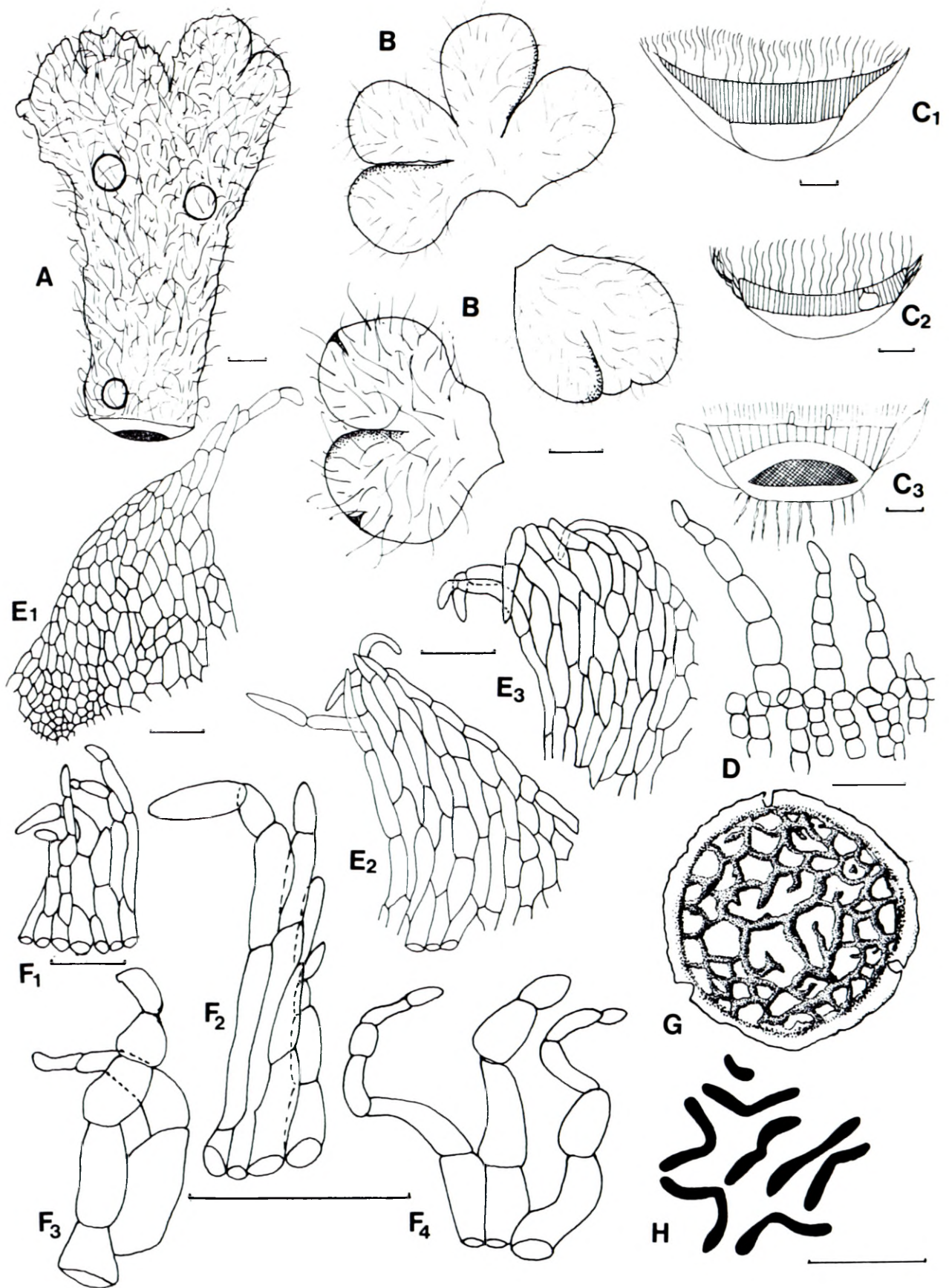


FIGURE 1. — *Riccia hirsuta* (Oliver 8040, 8038a, Schelpe 7784). Morphology and anatomy. A. dry thallus with sporangia; B. freshly regenerating young thalli; C₁, C₂, transverse sections of lobe; C₃, transverse section through lobe of dormant thallus, only shaded part living and filled with storage material, other parts emptied and dead; D. hairs of dorsal cover; E₁, scale; E₂, E₃, top part of scales; F₁, F₂, F₃, F₄, tips of scales divided into cellular strings, variously shaped and bent; G. ornamentation on distal face of spore; H. chromosomes. (A–G by O.H. Volk; H by T. Bornefeld. Drawings by G. Condy.) Scale bars: A, B, C = 1 mm; D–F = 100 μ m; G spore diameter \pm 120 μ m; H = 1 μ m.

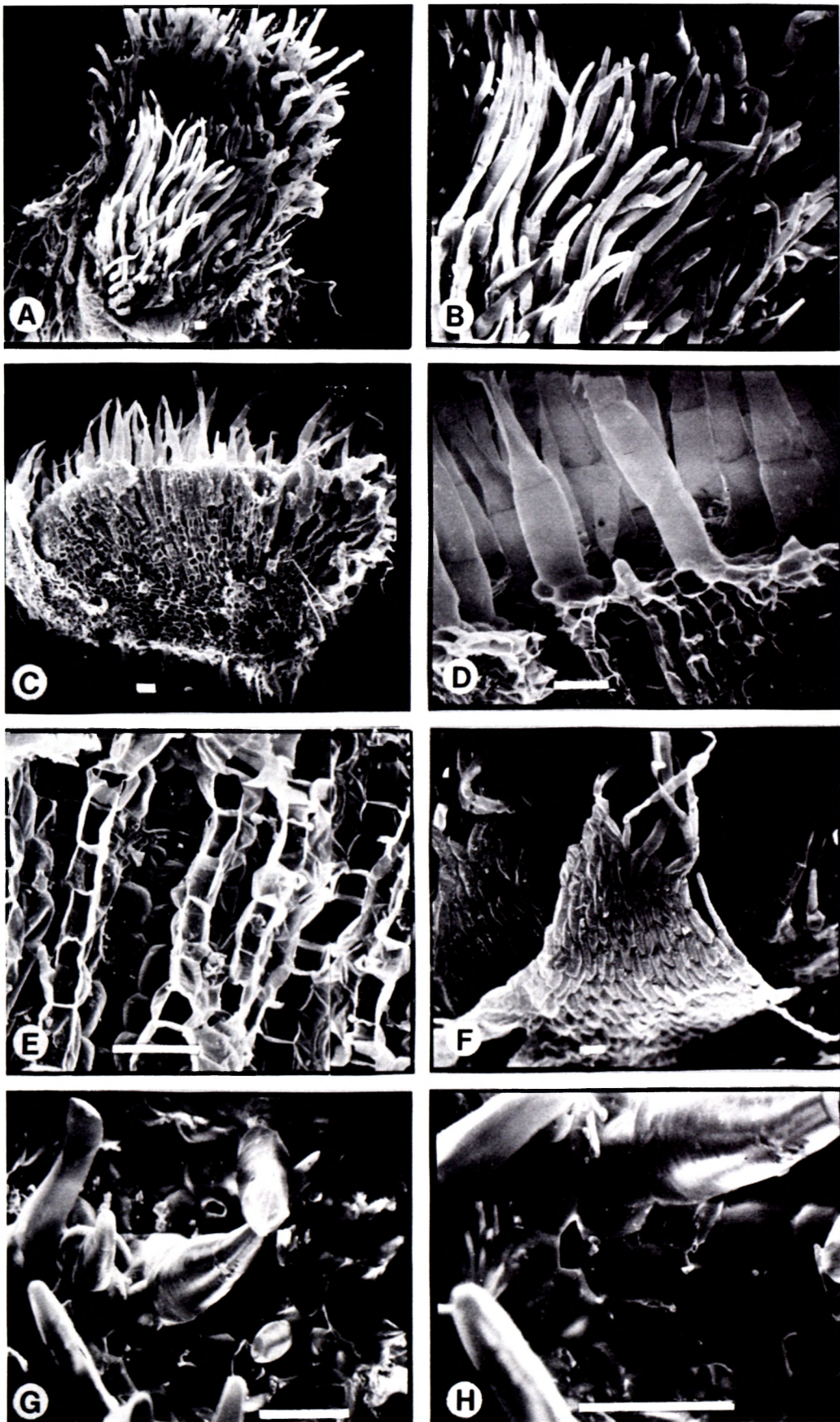


FIGURE 2. — *Riccia hirsuta* (Le Roux & Fourie CH4494). Morphology and anatomy. A, dorsal view of thallus; B, hair pillars; C, transverse section of lobe; D, transverse section showing top part of air-chamber and base of hairs; E, chlorenchyma and air-chamber; F, scale; G, H, epidermis and air-pores. (SEM micrographs by S.M. Perold). Scale bars on A-H = 100 μ m.

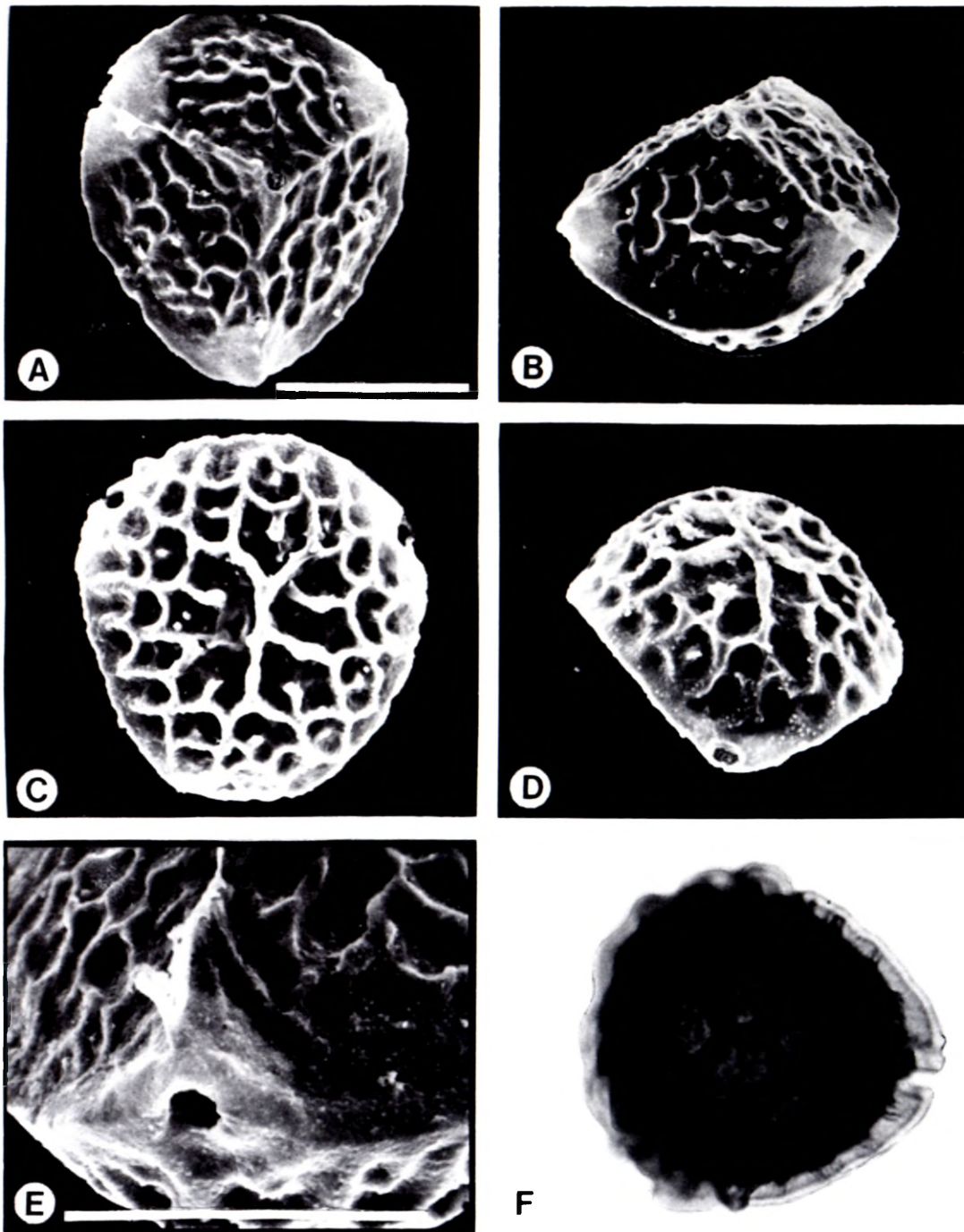


FIGURE 3. — *Riccia hirsuta* (Oliver 8040). Spores. A, proximal face; B, facet and pore on proximal face; C, distal face; D, oblique view of distal face; E, pore at marginal angle; F, distal face. (A–E, SEM micrographs; and F, LM (light microscope) by S.M. Perold). Scale bars on A–E = 50 μm ; diameter of spore on F \pm 120 μm .

parts of thallus, on transverse section (Figure 1C₃), a central lenticular core is seen, where the storage cells are densely filled with fatty oil or starch, the surrounding layers of cells partially empty; rhizoids arising from ventral epidermis and base of scales, hyaline, smooth and tuberculate mixed, up to 25 μm wide. Scales large, shaggy, partly extending above margin of thallus, overlapping apically, triangular (Figure 1E₂, E₃), about 650 μm wide at base and up to 1 500 μm high, hyaline, occasionally with reddish purple cells at base; cells at base small (Figure 1E₁), larger in body of scale and about 150 \times 50 μm , oblong-hexagonal, marginal row of cells long-rectangular, cell walls thin, straight, toward apex cells elongated to \pm 190 μm and split up into several loose

strands of about four cells (Figure 1F₁), variously bending and twisting (Figure 1F₂, F₃, F₄). Antheridia with tall hyaline ostioles, irregularly distributed, hidden by dorsal pillars. Archegonia with purple necks. Sporangia arranged across width of thallus, up to 700 μm wide, overlying epidermis tinged with purple, containing about 650 spores. Spores triangular-globular, polar, deep dull brown to nearly black, semi-transparent to opaque, (95–) 115–125 (–130) μm in diameter, with wing about 10 μm wide (Figure 3F), slightly undulating, crenulate to somewhat eroded, at angles with a pore or notched (Figure 1G, 3E); distal face reticulate, with 3–5 (–6) large central areolae, 25–38 μm wide, completely or incompletely subdivided into smaller areolae, about 12.5 μm

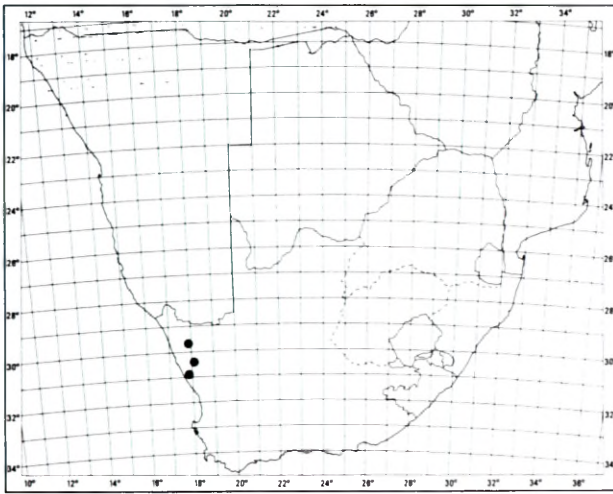


FIGURE 4. — Distribution map of *Riccia hirsuta* in southern Africa.

TABLE 1. — *R. hirsuta*, size (in μm) of the cells of the dorsal hair-pillars and cells of the chlorenchyma on transverse section (Schelpe 7784)

	Average size		Ratio Length to Breadth	Variation in size	
	Length	Breadth		Length	Breadth
Terminal cell	45	25	1.8:1	40–50	20–30
6	125	45	2.8:1	90–160	40–50
5	90	60	1.5:1	80–100	50–75
4	107	75	2.2:1	90–120	70–80
3	100	80	1.2:1	80–120	70–85
2	105	95	1.1:1	80–130	70–130
Basal cell	75	120	0.6:1	60–80	80–140
Chlorenchyma	40	50	0.8:1		

wide, often with a papilla in the middle (Figure 3C, D), occasionally areolae equally wide and then 8–10 across diameter; central ridges thick and high, outer ridges thinner and lower, sometimes extending partly onto wing; proximal face with triradiate mark distinct, but poorly delineated, each facet irregularly and rarely completely reticulated (Figure 3A, B). *Chromosome number* $n = 8$ (Bornefeld 1984) (Figure 1H).

R. hirsuta is endemic to, and rare in the north-western Cape Province (Figure 4). It grows

on sandy, acid soil and may be associated with other *Riccia* species, e.g. *R. parvo-areolata* Volk & Perold, *R. bullosa* Link, *R. schelpei* Volk & Perold, *R. cupulifera* A. V. Duthie, and sometimes with small shrublets such as *Ruschia robusta* L. Bol., and members of the Restionaceae.

The tall dorsal hair-like cell pillars have not previously been found in any species of the subgenus *Spongodes* (Nees, pro sectio) Volk (*Ricciella* auct., non A. Braun) (Volk 1983). They form an interesting parallel development to the pillars in the section *Pilifer* Volk (1983), subgenus *Riccia*, where, however, all the columns of the assimilation tissue continue into loose hyaline pillars and the air-pores are formed by small interstices between rounded, densely packed, hyaline cells.

R. hirsuta differs from all the known southern African species of *Riccia* in the unique dorsal, hair-like outgrowths from many of the epidermal cells and the large \pm triangular scales, apically splitting into hair-like appendages. It is the type species of the new section, *Micantes*, so named because of the glistening dorsal covering.

CAPE. — 2917 (Springbok): Hester Malan Res., Carolusberg N. at gate on western boundary (–DB), 1983/08/30. *Le Roux & Fourie CH 4494* (PRE); 1977/09/14, *Schelpe 7784* (BOL. PRE). 3017 (Hondeklipbaai): Nuwefontein (–DD), 1951/1952, *Vogel C5446* (MJG). 3018 (Kamiesberg): Kamiesberg plateau, north of Leliefontein, towards Draaiklip (–AC), 1983/09/06, *Oliver 8038a* (M).

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