

## ***Riccia mamrensis*, a new species from Western Cape, South Africa**

Sarie M. PEROLD\*

*Bryophyte Herbarium, South African National Biodiversity Institute,  
Private Bag X101, 0001 Pretoria*

(Received 26 November 2004, accepted 30 November 2004)

**Abstract** – A new *Riccia* species, *R. mamrensis* Perold, from Western Cape, South Africa, is described. It is referred to subgenus *Riccia*. Details of the morphology of the thallus and of the scales, as well as sections of the branches and the ornamentation of the spores are provided. Also included are two figures: the first one with line drawings of the thalli, three cross sections of thallus branches, as well as some rows of upper thallus cells, and a scale; the second figure shows a set of SEM micrographs of the spores.

**New species / *Riccia* / subgenus *Riccia* / Western Cape / South Africa**

### **INTRODUCTION**

For several years before Duthie's retirement as Senior Lecturer in Botany at the University of Stellenbosch (Gunn & Codd, 1981), she had collaborated with Garside in collecting and describing some locally occurring *Riccia* species. Two of them were new, namely *R. cupulifera* A.V. Duthie (Duthie & Garside, 1936) and *R. compacta* Garside (Duthie & Garside, 1939). A taxonomic history of the Ricciaceae up to that time, as well as excellent descriptions of *R. crystallina* (as *R. plana*), *R. curtisii* and *R. cavernosa* (as *R. rautanenii*) were also provided in the above two publications. More recently, another two new species were described, based on Duthie collections, namely *R. alatospora* (Volk & Perold, 1985) and *R. rubricollis* (Perold, 1991).

Ever since first studying the *Riccia* collections held at Bolus Herbarium, University of Cape Town, I have been aware that there is yet another undescribed species, which Duthie had (?provisionally) named *R. mamrensis* and to which she had added the observation 'affinis *atropurpurea*'. I had hoped to collect fresh material of this undoubtedly new species before describing it, but have not been successful in my visits to the area, which, nowadays, is in the vicinity of Atlantis, an extensive housing development North of Cape Town, where little of the original vegetation has been preserved. In deference to Duthie, I have retained her choice of specific epithet, which is derived from 'Mamre', the name of the mission station and village, to which the road from Cape Town was heading, as noted on the specimen label.

---

\* Correspondence and reprints: Perold@nbi.ac.za

## DESCRIPTION

***Riccia mamrensis* Perold, sp. nov.** (Figs 1, 2).

*Thallus pusillus, ramis 2- vel 3-plo bifurcatis, non rosulatus; pallide viridis, interdum leviter purpurascens; squamae plerumque hyalinae, imbricatae, tantum leviter supra marginem thalli extensae. Monoicus. Sporae 90-115 µm diametro, polares, brunneolae ad brunneae; superficies distalis cristis irregularibus incrassatis radiantibus ornata, ab parietibus lateralibus elevatis conjunctis serierum inaequalium areolarum parvarum profundarum factis.*

**Type:** South Africa, Western Cape, 27 miles (=43.5 km) from Cape Town on the road to Mamre, on left side of road, in veld, altitude ± 150 m, 1941, *Duthie 5530* (holotype BOL, isotype PRE).

**Note:** only the year of collection was written on this specimen label, but it was possibly also made in August of that year, as Garside's small collection of *R. mamrensis*, no. 5528, from the same locality, was dated '21/8/1941'. Accompanying the latter was a microscope slide with mounted spores, labelled '*R. atropurpurea*?'.

**Thalli** small, only 4-5 mm long, scattered, sometimes partially overlying, not forming rosettes, dorsally light green, rarely with some mauve or purple-red blotches, two or three times symmetrically or asymmetrically furcate. **Branches** diverging at narrow (50°-65°) to wide (± 120°) angles, primary segments up to 1.5 mm long, basally 0.35-0.5 mm wide, then gradually widening to 0.6-1.0 mm before bifurcating; intermediate segments 1.0-1.25 mm long and 0.9-1.0 mm wide; ultimate lobes, some juvenile and very short, 0.08-0.10 mm long and only ± 0.03 mm wide, others 2.0-2.5 mm long and 0.25-0.35 mm wide, ligulate, tapering somewhat toward apices, the scales marginally inflexed when dry; when wet, apically rounded or truncate; median groove short, otherwise dorsally ± flat, margins thin, hyaline, slightly raised; flanks toward apices rising erectly, proximally soon sloping slightly obliquely outward, covered with overlapping, hyaline scales, some with purple-red patches; ventrally gently convex, bearing numerous rhizoids. **Cross section** near apex of ultimate segment mid-dorsally V-shaped and ventrally slightly rounded, at erect sides 0.28 mm thick and 0.33 mm wide below, i.e. ± 1.2 times wider than thick; in section of primary segment close to bifurcation ± 0.2 mm thick and 0.5 mm wide, dorsally slightly concave; in section near base of primary segment ± 0.16 mm thick and 0.44 mm wide.

**Dorsal epithelium** with cells in one layer, hyaline and rounded above, 27.5-37.5 × 30.0-37.5 µm, but mostly collapsed, air pores obscured; assimilation tissue (chlorenchyma) ± 1/2 the thickness of thallus, in rows of up to 6 rectangular cells, 32.5-50.0 × 32.5-35.0 µm, attached end to end in each row; storage tissue forming the remaining thickness of thallus, cells crowded together, 42.5-47.5 × 47.5-52.5 µm; rhizoids arising from ventral epidermal cells and from cells at, and near to or inward from leading edge of scales, all smooth, 10.0-17.5 µm wide. **Scales** overlapping when dry, on wetting, projecting from flanks at an acute angle and at branch apices scales from two sides meeting and clasped together; hyaline, often with single scattered cells or groups of mauve or purple-red cells between colourless ones, cells in body of scale elongate, 5- or 6-sided, 75.0-87.5 × 35.0-52.5 µm, ± semilunar, sloping obliquely at front (or 'leading') edge, slightly rounded above and at rear (or 'following') margin also oblique, 280-350 µm high × 510-600 µm wide, extending up to ± 100 µm above thallus margins.

?Monoicous. **Antheridia** inconspicuous, only one observed near base of branch in wet material, neck hyaline, projecting ± 260 µm above dorsal thallus surface, 60 µm wide. **Archegonial** necks persistent, ± 330 µm long, of which basal

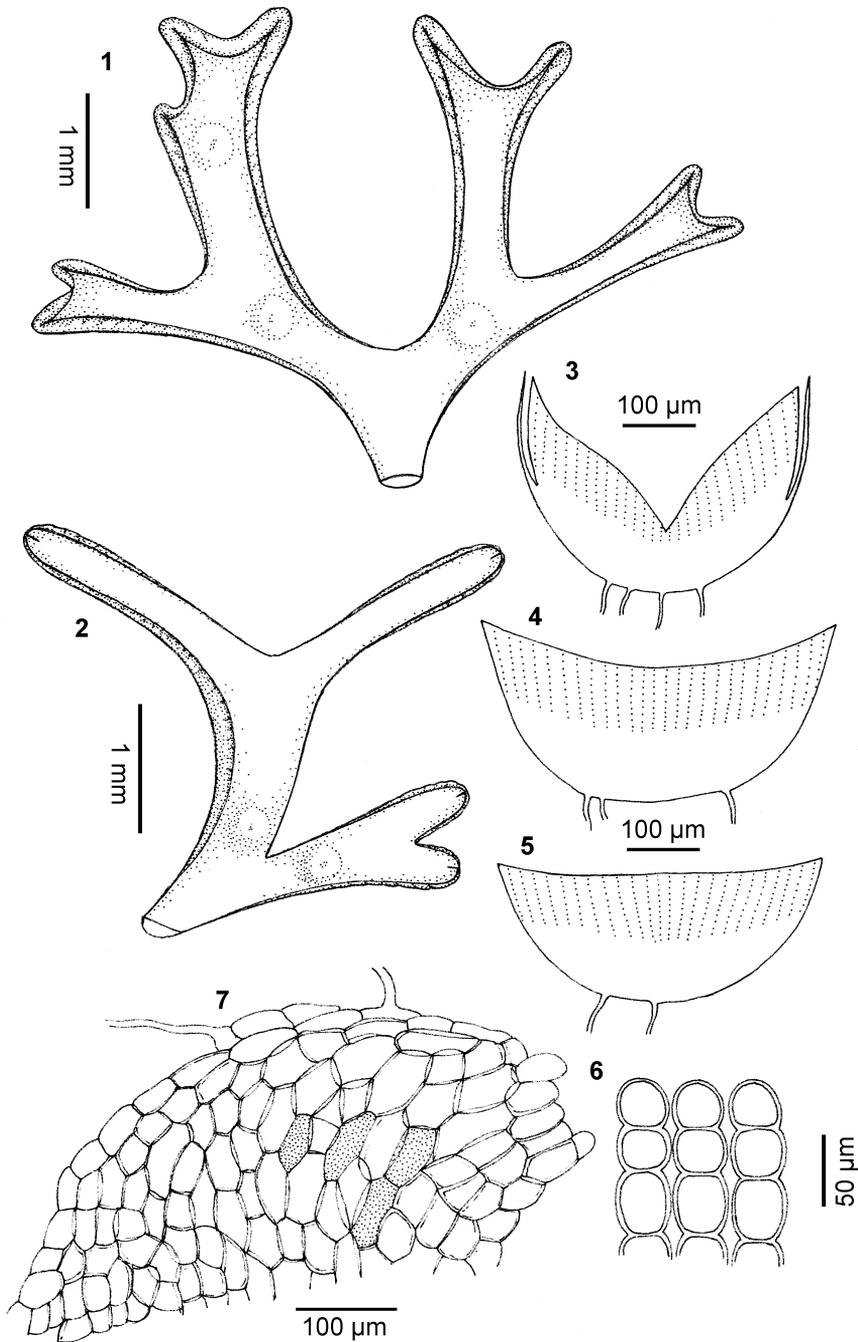


Fig. 1. *Riccia mamrensis* Perold. 1. Dorsal view of dry thallus. 2. Dorsal view of wet thallus. 3. Cross section near apex of ultimate segment of branch. 4. Cross section of primary segment of branch close to bifurcation. 5. Cross section near base of primary segment of branch. 6. A few dorsal epithelial cells, on top of some assimilation tissue cells. 7. Scale. All drawn from *Duthie* 5530. Scale bar = 1 mm (1,2); = 100 µm (3-5, 7); = 50 µm (6).

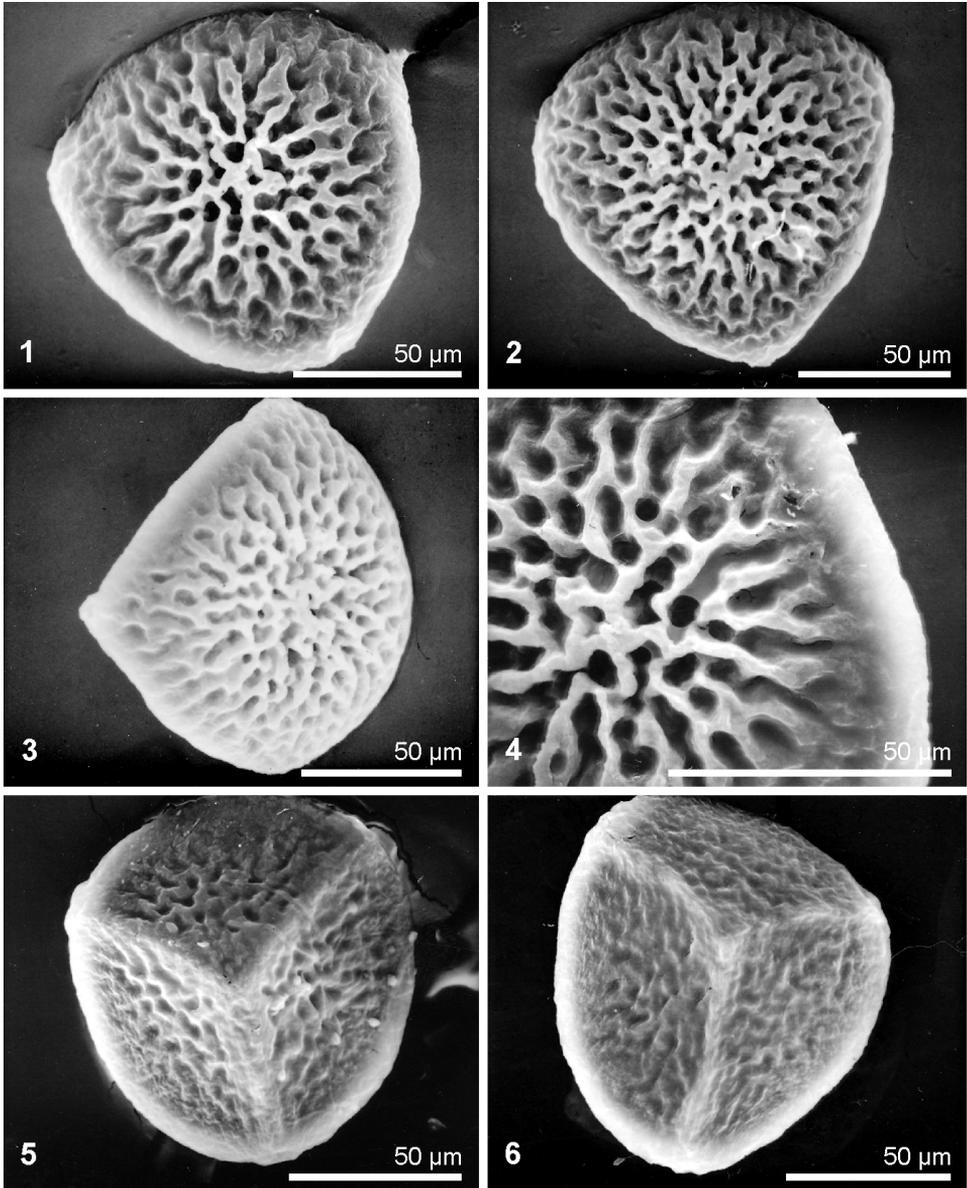


Fig. 2. *Riccia mamrensis* Perold. 1-3. distal face of spores. 4. part of distal face of spore much enlarged. 5, 6. proximal face of spores. All SEM micrographs from *Duthie* 5530. Scale bar = 50 µm.

1/2 deep red, the rest colourless, projecting from dorsally bulging sporangia, ( $\pm$  500 µm wide), in acropetal sequence along narrow thallus branches; quite frequently present, but no young ones seen.

**Spores** from freshly opened capsules shiny black, sometimes still in tetrads, which readily fall apart, 90-115 µm in diameter, triangular-globular, polar,

medium to dark brown, when mounted in Hoyer's medium, wing  $\pm 5 \mu\text{m}$  wide, margin finely crenulate, marginal angles slightly notched; distal face convex, ornamented with ridges and small, fairly deep areolae, 4 or 5  $\mu\text{m}$  wide, round or oval, extending from middle of spore to wing in fairly irregular rows of 5 or 6, their raised lateral walls thickened and joined together in irregular, radiating ridges reaching nearly up to the wing, but terminally becoming less prominent and then disappearing, some cross walls between areolae poorly developed or absent; proximal face with distinct triradiate mark, each of three facets with small, shallow areolae, separated from one another by low, confluent, ill-defined ridges.

**Chromosome number:** not known.

*Riccia mamrensis* has been referred to subgenus *Riccia*, as the upper part of the thalli is composed of compact tissue in  $\pm$  vertical columns.

**Distinguishing characters.** — *Riccia mamrensis* is rare; it is recognized by its small size, by the light green, linear branches of the thalli, which do not form rosettes, by rather inconspicuous, mostly hyaline, overlapping scales along the flanks and by the winged spores, distally with rows of areolae, their raised lateral walls linked up into irregular, radiating ridges.

## DISCUSSION

The *Duthie* and *Garside Riccia* collections have labels with printed headings: 'RICCIACEAE AUSTRAL-AFRICANAE. Duthie et Garside'. Those specimens of uncertain identification are not held with the main collection in BOL, but are kept in 'jewellers' and other small boxes, stored in larger cardboard containers. On the label of no. 5528 is clearly written in Duthie's hand, 'Leg. S. Garside'; it is mounted on a card, and, affixed with glue, are also a few small pieces of soil bearing *Riccia* thalli. Regrettably, they are lightly covered with strands of mildew. Specimen no. 5530, on the other hand, consists of 14 rectangles of cardboard, on to which pieces of soil, up to 3  $\times$  5.5 cm each, with numerous adhering *Riccia* thalli, had been stuck down with liberal applications of glue! Unfortunately, none of this copious *Riccia* material was left unmounted, which would have made later examination far easier.

For the present study, pieces of glued-on soil with attached *Riccia* thalli, were dislodged with difficulty and soaked in water for lengthy periods of time; cutting suitable sections of the branches proved particularly difficult. Fortunately, the spores, having been encapsulated, showed no alteration of the ornamentation, when compared with the old mounted spores of no. 5528, except that the latter were lighter in colour. Perhaps they had been harvested from younger capsules or, it may even be that they had been bleached. Freshly sampled spores from this collection, mounted in Hoyer's solution, were dark brown.

The use of water-soluble glue for mounting on to cards *Riccia* specimens, which had been washed and then lightly pressed and dried, was highly recommended by Mayfield *et al.* (1983). However, the disadvantages of glue and the above other practices were stressed by Jovet-Ast (1985), unfortunately many years too late to be of benefit to the people assisting Duthie and Garside.

*Riccia mamrensis* is only known from the type locality, but it must surely be more widespread. At least now, with this communication, collectors will be aware of its existence.

Mixed with *R. mamrensis* in Duthie's collection no. 5530 are some scattered, proximally wider *Riccia* thalli with ripe capsules, and apically narrowing

bifurcate branches, splashed with purple; they clearly belong to section *Pilifer*, with fuzzy, stuck together, dorsal cell pillars, that cannot be reconstituted. The spore ornamentation on the distal face consists of  $\pm 18$  coarse, thick, radiating ridges, some branched, and only with a few centrally placed areolae; the proximal face has a distinct triradiate mark and is almost smooth, thus markedly different from *R. mamrensis* spores.

The substrate at the above locality consists of fine to coarse, unevenly shaped quartzite crystals, 160-450  $\times$  160-520  $\mu\text{m}$ , mostly clear, occasionally pink or yellow. The vegetation type falls within the Fynbos Biome (Sand Plain Fynbos, with acid sands) and is typically Mediterranean, with most of the rain falling in winter, the summers being hot and dry (Low and Rebelo, 1998).

With reference to Duthie's perceived affinity between *R. mamrensis* and *R. atropurpurea*, it can be stated categorically that there are no records of *R. atropurpurea* occurring in the winter rainfall areas of southern Africa. It commonly occurs in the summer rainfall areas, where it often grows together with *R. oka-handjana*, on clayey or fine sandy soil. Its known range extends northward into subsaharan Africa as far as Ghana and Nigeria in the west and Uganda and Tanzania in the east (Perold, 1995).

*Riccia atropurpurea* Sim is a rather plastic species, smallish to medium-sized, in irregular or incomplete rosettes or scattered; glaucous-green to silvery grey-green and white along the margins. The spores are subglobular, without a wing, the ornamentation areolate on both faces, and lacking a triradiate mark on the proximal face (Perold, 1999).

**Acknowledgements.** I wish to express my gratitude to the Curator of BOL for the loan of the Duthie and Garside specimens. Also to the artist, Mrs M. Steyn, the graphic artist, Mrs S. Turck and to the typist, Ms D. Maree for their valued contributions. A special thank you to Dr O.A. Leistner for the Latin text and for critically reading the manuscript.

## REFERENCES

- DUTHIE A.V. & GARSIDE S., 1936 — Studies in South African Ricciaceae 1. *Transactions of the Royal Society of South Africa* 24: 93-133.
- DUTHIE A.V. & GARSIDE S., 1939 — Studies in South African Ricciaceae II. *Transactions of the Royal Society of South Africa* 27: 17-28.
- GUNN M. & CODD L.E., 1981 — *Botanical Exploration of southern Africa*. A.A. Balkema, Cape Town.
- JOVET-AST S. 1985 — A propos des techniques de préparation des spécimens de Ricciaceae (Hépatiques). *Taxon* 34: 267-268.
- LOW A.B. & REBELO A.G. (Eds), 1998 — *Vegetation of South Africa, Lesotho and Swaziland*. Published by the Department of Environmental Affairs and Tourism, Pretoria.
- MAYFIELD M.R., COLE M.C. & WAGNER W.H., Jr., 1983 — Techniques for preparing *Riccias* for Herbarium study. *Taxon* 32: 616-617.
- PEROLD S.M., 1991 — Studies in the genus *Riccia* (Marchantiales) from southern Africa. 22. *R. rubricollis* now validated, typified and described. *Bothalia* 21: 51-54.
- PEROLD S.M., 1995 — A survey of the Ricciaceae of tropical Africa. *Fragmenta Floristica et Geobotanica* 40: 53-91.
- PEROLD S.M., 1999 — Hepatophyta. Part 1: Marchantiopsida. Fascicle 1. Marchantiidae. *Flora of southern Africa*. National Botanical Institute, Pretoria.
- VOLK O.H. & PEROLD S.M., 1985 — Studies in the genus *Riccia* (Marchantiales) from southern Africa. 1. Two new species of the section *Pilifer* : *R. duthieae* and *R. alatospora*. *Bothalia* 15: 531-539.