

eckige Lamellen, die sich gegen die Mitte zu als einfache, wenig hohe Schwielen fortsetzen.

Die hier aufgezeigten Merkmale zu denen noch einige weitere aus der Diagnose und Zeichnung ersichtliche hinzukommen, ließen es angebracht erscheinen, die neue Sippe zu begründen.

Sie wurde benannt nach Herrn Professor Dr. Friedrich MARKGRAF, Direktor am Botanischen Garten München.

### HEPATICAE collected in SOUTH WEST AFRICA

by Prof. Dr. O. H. VOLK

by

S. ARNELL

Our knowledge of the Hepatic Flora of South West Africa is very imperfect and because of that reason, the following list may be of some value. The number of new species described shows that there is still a lot to discover in this wide and little known part of the world, even in the neighbourhood of inhabited places.

The type specimens of the new species are at the Botanische Staatssammlung München.

#### List of the Localities.

Omuramba-Omatako (Okavango-Gebiet)	S	18°20'	E	19°50'
Neitsas, Bez. Grootfontein (NE)		19°20'		18°40'
Bornholm, Bez. Grootfontein (SE)		19°55'		18°20'
Hessenthal, Bez. Grootfontein (W)		19°40'		17°30'
Okosongomingo, Waterberg und Okamura Bez. Otjiwarongo		20°40'		17°10'
Erichsfelde, Bez. Okahandja (N)		21°40'		16°55'
Spitzkoppe, Bez. Swakopmund		21°55'		15°05'
Binsenheim, Bez. Windhoek (SE)		22°55'		17°20'
Voigtland, Bez. Windhoek (E)		22°40'		17°15'
Ondekaremba, Bez. Windhoek (E)		22°35'		17°20'
Donkershoek, Bez. Karibib (S)		22°50'		15°55'
Moutonsvley, Bez. Rehoboth (W)		23°30'		16°00'
Gravenstein, Bez. Rehoboth (E)		23°35'		17°40'
Haribes, Bez. Marienthal		24°30'		17°30'
Duwisib, Bez. Maltahöhe		25°20'		16°30'

List of Species

A n t h o c e r o t a l e s

Phaeoceros laevis (L.) Proskauer

Bez. Otjiwarongo: Waterberg, feuchte Schlucht (Sand), 2224.  
- Okamuru, auf feuchtem Sandstein an Quellen, 2485 p.p.

M a r c h a n t i a l e s - S p h a e r o c a r p i n e a e

Riella echinospora Wigglesworth

Bez. Marienthal: Haribes. In seichtem Wasser auf feinem Sand, häufig. - Until now, only known from the Orange Free-state: Schonken's Salt Pan, near Branfort.

Riella species (steril)

Bez. Marienthal (W): Haribes, häufig auf feinem Sand im Wasser, 12466.

M a r c h a n t i a l e s - M a r c h a n t i n e a e

Asterella muscicola (St.) S. Arn. comb. nov.

Syn.: Fimbriaria muscicola St. Hedwigia 31, 121 (1892).

Bez. Windhoek: Voigtland, Gambaka (Granit) 11405 (steril).

Exormotheca holstii St.

Syn.: E. Youngii S. Arn.

Bez. Okahandja: Erichsfelde (Granit) 11925.

Mannia capensis (St.) S. Arn. comb. nov.

Syn.: Grimaldia capensis St. Bull. Herb. Boiss. 6, 793 (1898).

Bez. Windhoek: Voigtland, an Felsen (Granit) 11400.

Mannia dichotoma (Raddi) Evans

Bez. Windhoek: Voigtland, Gambaka (Granit) 11407, dioicous, no carpocephala found.

Plagiochasma dinteri St.

Bez. Otjiwarongo: Großer Waterberg, Polizeistation (Sand) 2228.

Plagiochasma rupestre (Forst.) St.

Bez. Windhoek: Voigtland; Dassieskuppe (Granit) 11360 p.p. - 11361 p.p. - Bismarkberg (Kalk) 11402a. - Gambaka (Kalk) 11406. -

Plagioschasma tenue St.

Bez. Otjiwarongo: Okosongomingo (Sandstein) 938. - Okamura, auf feuchtem Sandstein an Quelle, 2485 p.p. - Bez. Windhoek: Voigtland, 11402 p.p. (Kalk). - 11363 (Granit). Bez. Marienthal: Haribes 12473. - Bez. Maltahöhe (W): Duwisib (Granit) 12744 p.p., 12743, 12728

Targionia hypophylla L.

Bez. Windhoek: Voigtland, Dassieskuppe, Ostseite, an schattigen Felsen (Granit), 11357, 11346 p.p.

M a r c h a n t i a l e s - R i c c i i n e a e

Riccia albolimbata S. Arn. spec. nov.

Typus: VOLK 11419, SW-Africa, Bez. Windhoek: Ondekaremba (Kalk)

Bez. Otjiwarongo: Okosongomingo, 1063. - Bez. Okahandja: Erichsfelde, 11946 (Kalk), 11967. - Bez. Windhoek: Binsenheim, 11080 (Kalk). - Voigtland, Bismarckkamp 11401 (Kalk). - Gambakakamp, 11408 (Kalk). - Bez. Rehoboth: Gravenstein, 11705 (Kalk).

Dioica, minor, pallide virens. Frons ad 7 mm longa, bifurcata, furcis ovatis, sulcatis, marginibus subacutis, apicibus subacutis. Squamae imbricatae, magnae, hyalinae, integrae, frondis marginem excedentes. Frondis sectio transversa duplo - triplo latior quam altior, subtus planoconvexa, lateribus rotundato-ascendingibus, angulis superioribus acutis, supra planoconvexa, sulco acuto plus minusve profunde interrupta (magis versus apicem, minus profunde versus basin plantae). Sporae 80 - 100  $\mu$  latae, brunneae, anguste et incomplete marginatae, reticulatim lamellatae, lamellis angustis, foveolis 8 - 10  $\mu$  diam.

Dioicous. Thallus pale green, up to 7 mm long, 2 mm broad, bifurcate, segments ovate, apex subacute, dorsal furrow deep and sharp (except in the oldest parts of the thallus, where the upper surface is plano-concave), upper face shiny when fresh.

Lateral parts of the dorsal surface convex, margin subacute. Ventral surface convex, sides ascending in about 45 - 60°, covered by large, hyaline scales. Epithelium thin walled, upper wall subspherical. Scales hyaline, imbricate, exceeding the margin of the thallus, rounded, entire, cells thin walled, almost quadratic, 30 x 30 - 40 x 60  $\mu$ . Rhizoids smooth and tuberculate. Archegonia in the midline of the dorsal surface, covering and surrounding epithelium colourless and spongy, neck colourless or pale purple. Spores 80 - 100  $\mu$  in diam., brown. Wing incomplete. Convex surface with thin reticulum, without

Tafel I

Fig.1

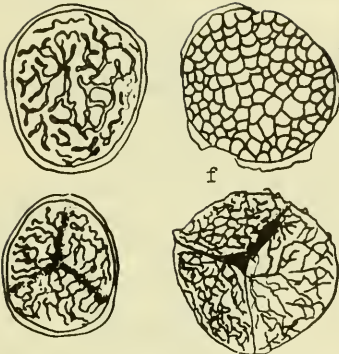


Fig.2

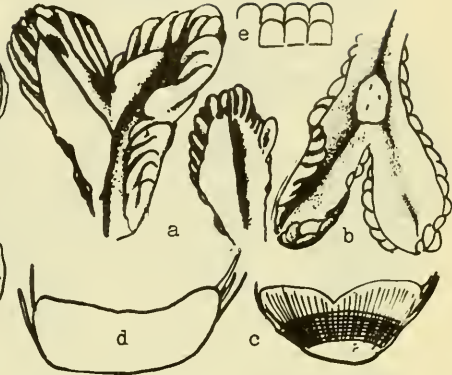


Fig.3

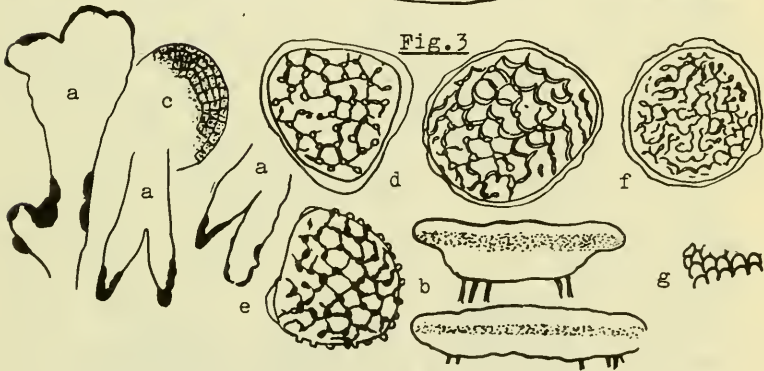


Fig.1 *Riccia limbata* Bisch. Spores

Fig.2 *Riccia albolimbata* S.Arn. a Thalli in dorsal view, b Thallus with archegonia, dorsal view, c Cross section near the apex, d Cross section in the middle part of the thallus, e Epithelium from near the apex, f Spores.

Fig.3 *Riccia pseudolimbata* S.Arn. a Thalli in dorsal view, b Cross section of thallus, c Ventral scale, d Spores, convex face, e Spore, inside view, f Spore, inner face, g Epithelial cells from the apex of the thallus.

papillae, foveolae 8 - 10  $\mu$  in diam., rounded. Inner surfaces with irregular, thin lamellae. Antheridia with neck thick and colourless.

Riccia albomarginata Bisch.

Bez. Marienthal: Haribes, am Rivier, feuchte Böschung, 12433 p.p. - 12462 p.p.

Riccia albosquamata S. Arnell nov.spec.

Typus: VOLK 452 p.p., South West Africa, Damaraland: Neitsas near Grootfontein, am Rande einer Kalkpfanne, mit *Riccia canescens* St. - 453 p.p. ebenda; Bez. Otjiwarongo: Okosongomingo, Okariaberg (Kalk) 881 and 883. - Bez. Okahandja: Erichsfelde (Kalk) 11906 p.p. Bez. Maltahöhe: Duwisib, 12744 p.p.

Monoica. Frons usque ad 5 mm longa, bifurcata, furcis parum divergentibus, apicibus rotundatis, crassis, supra leviter concava - subplana; margines acutae lateribus recte adscendentibus; sectio frondis triplo latior quam altior, subtus late lunata. Squamae inferiores maximae, dense imbricatae, albae (basi purpureae), frondis marginem superantes. Sporae 70 - 80  $\mu$  latae, subnigrae, reticulatim lamellatae, foveolis 8 - 12  $\mu$  diam.

Monoicous. Thalli up to 5 mm long, once dichotomously branched, one branch larger, colour white, dorsal face slightly concave, shiny when fresh, margins sharp, thin and scalelike, sides perpendicular and almost straight in the upper 2/3, arched in the ventral 1/3, covered by large scales. Ventral face slightly arched; rhizoids colourless, up to 20  $\mu$  wide; dorsal epithelium thin walled, cells about cubic, 20  $\mu$ , soon destroyed. Ventral scales large, imbricate, widely exceeding the margin of the thallus, in shape and size resembling the scales of *R. limbata*, but white except in the pale purple base, margin entire, rounded. Cells large, about 50 x 70  $\mu$ , thick walled, lumen + filled of fine granules, giving the scale a white spotted appearance (lumen white, walls grayish). Antheridia and archegonia with long colourless necks. Sporogonia in the midline, slightly or not prominent. Spores 70 - 80  $\mu$  in diam., irregularly areolate, dark brown; wing narrow (2 - 4  $\mu$ ), margin minutely crenulate, areolae (8 -) 10 - 12  $\mu$  in diameter, 7 - 8 in the diameter of the spore, processes of the reticulum as spines in the wing.

Differs from *R. albomarginata* Bisch. by the texture of the face of the spores, the thin-walled, cubic epithelium, the white spotted scales with thick walled cells (in *R. albomarginata* the cells of the scales are thin walled and generally hexagonal).



Tafel II

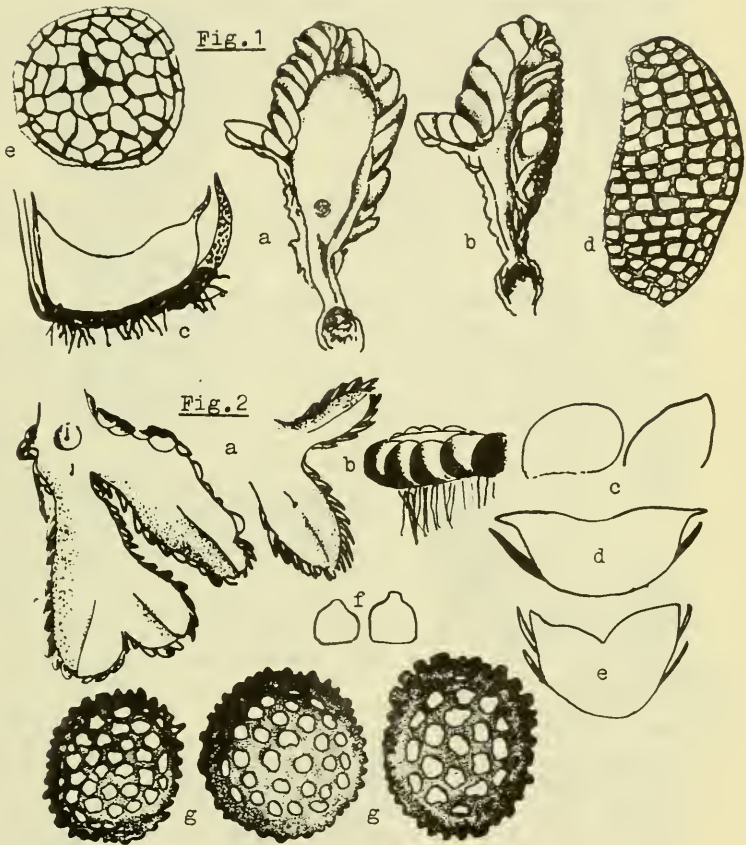


Fig. 1 *Riccia albosquamata* S. Arn. a Thallus in dorsal view (moist), b The same thallus in dry condition, c Cross section of a thallus, about 1 mm from the apex, d Ventral scale, e Spore.

Fig. 2 *Riccia runssorensis* St. a Thalli in dorsal view, b Side view of the apex of a thallus, c Scales, d Cross section from the middle portion of a thallus, e Cross section from the neighbourhood of the apex, f Epithelial cells, g Spores.

Riccia canescens St.

Bez. Grootfontein: Neitsas (Kalkpfanne) 452 p.p. - 453 p.p. - Bornholm, Vleyrand 681 p.p. (Kalk). - Bez. Otjiwarongo: Okosongomingo 210 p.p. - Bez. Okahandja: Erichsfelde (Kalk) 11777, 11906 p.p. - Bez. Windhoek: Voigtland, Dassieskuppen 11358. - Bez. Rehoboth: Moutonsvley (Vleyrand) 11446 p.p.

Riccia crystallina L.

Bez. Otjiwarongo: Waterberg; häufig an feuchten Grabenwänden, Citrusplantage (Kalk) 2229. - Bez. Marienthal: Haribes, feuchter Boden am Damm 12195, 12446.

Riccia okahandjana S. Arnell nov.spec.

Typus: VOLK 11906, South West Africa, Bez. Okahandja: Weg zum Erichsfelde; dto. 11967, 11944 Granitverwitterung Bez. Otjiwarongo: Okosongomingo (Sandstein) 209, 210, 502, 943. - Okariaberg bei Okosongomingo (Sandstein) 882. - Kleiner Waterberg (Sandstein) 987. - Bez. Grootfontein: Hesselthal, lehmiger Sand 2569. - Bez. Windhoek: Binsenheim-Jakalswater (Granit) 11079, 11081, 11082. - Bez. Maltahöhe: Duwisib, 12744 (?). - Bez. Karibib: Donkershoek, am Rande von Wannen im Granit, 2766 (steril).

*Monoica, parva, glaucovirens.* Frons ad 10 mm longa, duplo - sesqui latior quam altior, simplex vel bifurcata, furcis brevibus, apicibus ovatis vel breviter incis; sulcus apicem versus profundus et acutus, basin versus parum distinctus; costa subtus convexa. Frons lateribus adscendentibus, marginibus acutis. Squamae mediocres, imbricatae, integrae, nigro-purpureae, marginem + superantes. Sporae 70 - 120  $\mu$ , brunneae, dense papillatae et breviter lamellatae.

Monoicous, bluish-grayish green. Thallus 2 - 10 mm long, 1 mm broad, simple or bifurcate, segments ovate-linear ovate, apex rounded or shortly incised, at the apex with a short, sharp and deep furrow. Upper surface except at the apex almost plane or with a shallow furrow, lateral parts slightly convex, margins sharp, sides almost vertical, covered by dark purple, adherent scales. Ventral face lunate. Cross section almost twice as broad as high. Epidermal cells in two layers, thin-walled, outer cells 20  $\mu$  broad, up to 70  $\mu$  long, often narrowed in the middle part. Scales dark purple, imbricate, somewhat exceeding the margin of the thallus, dorsal margin rounded, sometimes rounded triangular, cells 20 - 30  $\mu$ . Archegonia in the midline, neck dark purple, up to 150  $\mu$  long. Spores dark brown, 70 - 120  $\mu$ , wing absent or incomplete, irregular. Outer face obtusely

Tafel III

Fig.1

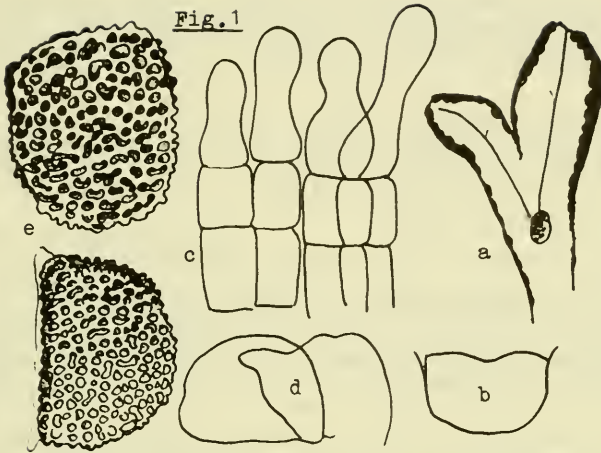


Fig.2

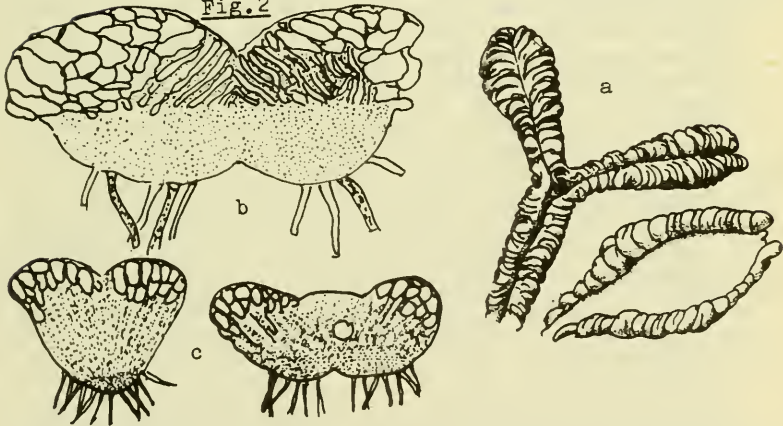


Fig.1 *Riccia okahandjana* S. Arn. a Plant in dorsal view, b Cross section of the thallus, c Epithelial cells, d Scales, e Spores.

Fig.2 *Riccia (Ricciella) volkii* S. Arn. a Thalli in dorsal view, the lower one with unusually broad distal end, b Cross section of the middle part of a branch, c Cross sections of thalli, to the right a broad branch and to the left an unusually narrow branch.



spinous, sometimes with short ridges, areolae rare. Inner Faces of about the same appearance, or with short, irregular ridges. Antheridia in the lateral parts of the thallus, neck pale purple, shortly prominent.

Riccia perssonii Khan

Okavango-Gebiet, Omatako, feuchter Sand, 2059. Only known from East Pakistan.

Riccia plana Tayl.

Bez. Windhoek: Binsenheim (Granit) 2318.

Riccia pseudolimbata S. Arnell nov. spec.

Typus: VOLK 12409, South West Africa, Bez. Marienthal: Haribes, feuchte schattige Uferböschung; dto. 12412, 12413, 12462 (Uferböschung), 11082, 12433, 12461. - Bez. Swakopmund: Spitzkoppe, Namib, feuchter Sand 11847. -

Monoica, maior, viridis. Frons ad 10 mm longa, subplana, marginibus obtusis, bifurcata, furcis parum divergentibus, linearibus, apicibus rotundatis, sub apicibus leviter sulcatis; costa 2 mm lata, 4 - 5 plo latior quam altior. Squamae interiores maximae, imbricatae, nigri-purpureae, frondis marginem superantes. Sporae 80 - 100  $\mu$ , brunneae, reticulatim lamellatae, foveolis 8 - 10  $\mu$  diam., ad angulos papillatis; facies internae irregulariter lamellatae.

Monoicous. Green, thallus up to 10 mm long, 2 mm broad, dichotomously branched. Thallus almost flat, when dry slightly concave, with distinct furrow at the apex. Margin obtuse. Cross section 4 - 5 times broader than high. Epidermal cells in two layers, thin-walled, 20 - 30  $\mu$ , dorsal wall convex and frequently mamillate. Ventral scales large, dark purple, imbricate, semicircular, margin entire. Antheridia scattered in the dorsal portion of the thallus, neck colourless, about 160  $\mu$ . Archegonia in the midline, neck dark purple, about 160  $\mu$  long. Spores 80 - 100  $\mu$  in diameter, brown. Wing 2 - 4  $\mu$  broad. Outer face with reticulum forming + incomplete areolae about 8 - 10  $\mu$  in diameter, in the corners with + truncate spines.

Differs from *Riccia limbata* Bisch. in having thallus almost flat, the outer face of the spores with incomplete areolae, the profile of the spores bluntly papillose, the inner faces of the spores irregularly lamellate (in *R. limbata* areolate, diameter of the areolae 6  $\mu$ , in the centre frequently a small papilla). *R. limbata* prefers rather dry localities, *R. pseudolimbata* seems to prefer more wet places.

Es mag erlaubt sein, hier die Beschreibung der bisher schlecht bekannten Sporen von Riccia limbata Bisch. nach einem Exemplar von Cogmans Kloof, Montagu, Kapland, anzufügen:

Gelbbraun - braun, 90 - 100  $\mu$ , Saum 2 - 6  $\mu$  breit, gelbbraun, ganzrandig oder leicht gekerbt. Außenfläche mit unregelmäßigen, schmalen oder dicken, geschlängelten und verästelten Leistchen, oder undeutlich klein gefeldert. Innenfläche durch kleine Gruben dicht punktiert.

Riccia runssorensis St.

Bez. Marienthal (W): Haribes 12461, 12403, Vleysaum. - Bez. Rehoboth (E): Gravensten 11500, Schafrivier. - This species is earlier only known from Ruwenzori, Kiuani, leg. SCOTT ELLIOT (Hb. Kew). As the description of STEPHANI of the spores is incorrect (I have examined the type specimen), I give a new description and drawings.

Dioicous. Thallus dark green, in incomplete rosettes or densely crowded, up to 7 mm long, segments generally only about 2 - 3 mm long, 1 mm broad, 2 - 3 furcate, lobes diverging at varying angle ( $30^{\circ}$  -  $100^{\circ}$ ), with deep and sharp furrow, deepest nearest the apex, lateral part of the upper surface slightly convex, margins sharp and thin, ventral surface convex, sides covered with + purple scales. Scales large, rounded, loosely imbricate, slightly exceeding the margins of the thallus, cells about 30 x 40  $\mu$ . Rhizoids smooth and tuberculate. Cross section of the thallus near the apex as high as broad, in the middle portion of the thallus twice as broad as high. Epithelial cells thin walled, usually umbonate. Archegonia numerous, in the midline, neck purple, up to 200  $\mu$  long. Spores 70 - 100  $\mu$ , dark brown - almost black, wing lacking, margin spinous by truncate - rounded papillae, alveoli 8 - 10  $\mu$  in diameter, lamellae thick, with papillae in the corners. Antheridia not observed.

Riccia stricta (Trevis.) A.V.Duthie ined.

Bez. Marienthal: Haribes 12460, 12462. - Bez. Otjiwarongo; Waterberg, Quelle, 467. - Okosongomingo, Quellsumpf 293.

Riccia (Ricciella) volkii S. Arnell nov.spec.

Typus: VOLK 1029, South West Africa, Bez. Otjiwarongo: Kleiner Waterberg, am Rand der Wannen im roten Sandstein, Boden kalkfrei.

Sterilis, pallide virens. Frons usque ad 7 mm longa, anguste linearis, crassa, duplo latior quam altior, furcis late divergentibus, canaliculatis apicibus incisus; cavernae numerosae, stratum cavernosum costa duplo ad triplo altius. Cetera desunt.

Sterile. Pale yellow. Thalli up to 7 mm long, 1 mm broad, bifurcate or simple, branches diverging in about 80°, usually almost linear, somewhat broader towards the apex, sometimes up to 1,5 mm broad in the distal part, and then with margins raised and middle part plane - concave, apex incised, thallus usually with a deep and sharp dorsal furrow, upper face of the lateral halves strongly convex and wrinkled by arched folds. Cross section of the thallus generally twice as broad as deep, upper 1/2 - 2/3 composed of airchambers, in the upper and lateral parts rather large, in the central part pillars separating narrow air filled spaces. Ventral surface usually bilobate by a central furrow. Rhizoids smooth-walled and tuberculate.

Characterized by the pale green colour, the narrow, wrinkled thallus with a deep dorsal furrow.

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