

The Genus *Microcladia* (Red Algae) in South Africa

by

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The genus *Microcladia* is typified by *M. glandulosa* (Soland. ex Turn.) Grev., and has been regarded as distinct from the genus *Ceramium* Roth for over a century. *M. glandulosa* was distinguished by its flattened and unarticulated thallus but, since its establishment, other species have been associated with it which do not conform with this circumscription. As a result, Feldmann-Mazoyer (1940, p. 345) was persuaded that the genus should be revised. In fact, Mme Feldmann's (l.c.) comments about the genus suggested a lack of conviction about the separate status of *Microcladia*. She seemed to think that, if this status were to be maintained, it should be based on the bilateral nature of the thallus of *M. glandulosa*. This bilateral structure is the result of the disposition of the unequal pericentral cells, the largest of which are arranged in two opposite longitudinal ranks and thus increase the width of the thallus in that plane. The presence or absence of articulation in the thallus was, for her, scarcely relevant since she observed that articulations are visible in freshly collected plants (Feldmann-Mazoyer, l.c., p. 343). Be that as it may, the diagnostic characters of *Microcladia* seemed to be obscure and Kylin (1956, p. 380) offered no light on the problem. The present author became concerned with the status of *Microcladia* when, during his study of the South African species of *Ceramium*, the position of *Microcladia capensis* sensu Papenf. (1940, p. 233), had to be considered.

The plant known in South Africa as *Microcladia capensis* (Kuetz.) Papenf., appeared to be closely related to, if not identical to, *Ceramium rubrum* (Huds.) Ag., the type species of the genus *Ceramium*. When compared with the accounts of *Microcladia glandulosa*, the structure of *M. capensis* showed no reasonable likeness to them, and the criteria for identifying *Microcladia* after Mazoyer (l.c.) did not apply. When writing up the revision of the genus *Ceramium* in South Africa, Simons (1966), therefore, included *M. capensis* sensu Papenf. under the name of its alleged basionym, *Ceramium capense* Kuetz.

Some time after the paper (Simons, l.c.) was accepted for publication, Hommersand's (1963) account of *Microcladia* appeared. Here was published for the first time, what seemed to be a valid reason for upholding the genus *Microcladia*: species, related to *Ceramium*, having secondary cortical cells produced in an upward direction only, and, at the same time, being completely corticated. This combination of characteristics differentiates species of *Microcladia* from completely corticated species of *Ceramium*, since the latter produce secondary cortical cells in both an upward and downward direction. Hommersand (l.c.), recognized ten species of *Microcladia* and suggested that *M. capensis* sensu Papenfuss might make a possible eleventh. But the specimens of this species examined here have secondary cortical cells produced both upwards and downwards and they must, therefore, belong to *Ceramium*.

Microcladia capensis sensu Papenf. was the only plant from South Africa which had any pretensions to the genus *Microcladia*, and, after its removal to *Ceramium*, it was thought that there were probably no South African representatives of *Microcladia*.

But since the revision of the genus *Ceramium* (Simons, l.c.), a plant bearing a remarkable resemblance to *Microcladia glandulosa* (Soland. ex Turn.) Grev. was collected at Port St. Johns on the eastern Cape coast. The plant was epiphytic on a specimen of *Gelidium cartilagineum* (L.) Gaill., which was growing on a rocky substratum immediately below the sublittoral fringe (sensu Stephenson, 1948, p. 212). It appears to be comparatively rare, because further search in the area yielded only two more specimens. There are no other records of this plant known to the author. Microscopic examination of these plants confirmed their structural similarity to *Microcladia coulteri* Harv., (fide Hommersand, l.c., pp. 214–223), and thereby, their identity. The tetrasporic plant in the collection, revealed by its exserted sporangia, that it was unique amongst the known species of *Microcladia*.

In regard to its tetrasporangia, it is interesting to note that they were observed to be attached to both pericentral and other cortical cells (Fig. 1, a–f). This contrasts with the situation of tetrasporangia in five out of the ten species of *Ceramium* discussed by Simons (l.c.), where the attachment was to pericentrals only; although the actual attachment was not discerned in the other five species, the position of the tetrasporangia as revealed in sections was such as to indicate a high probability of a pericentral attachment. Simons (l.c.) suggested that this sporangial attachment in *Ceramium* might be a distinguishing character and this idea seems to be enhanced by Hommersand's (l.c.) observations: of the four species of *Ceramium* he described in detail, all had sporangia attached only to pericentrals, whereas *Microcladia coulteri* Harv., (Hommersand, l.c., p. 223), had tetrasporangia attached to both pericentrals and other cortical cells, which compares with the situation of the tetrasporangia in the plant described below.

This newly discovered South African plant is named *Microcladia gelidii*, because it was found as an epiphyte of *Gelidium cartilagineum* (L.) Gaill. It is at present the only species of *Microcladia* known in South Africa.

Microcladia gelidii Simons, sp. nov., *M. glandulosae* (Soland. ex Turn) Grev. affinis, sed ab ea thallo sursum et deorsum parum attenuato, cellulis axialibus brevioribus et tetrasporangiis exsertis differt.

Planta epiphytica atrosanguinea subfastigiata subsetacea. *Hapteron* intra hospitem ramificans et nodulum, c. 2 mm diam., in superficie hospitis formans. *Axes* plures ex nodulo excurrentes cauliformes complanati bilaterales ramosi ad 8 cm alti ad 1 mm lati sursum deorsum parum attenuati. *Rami* distichi laterales pinnatim in uno plano decompositi, in planta tetrasporifera inferiores subrecurvati superiores forcipati, in planta feminea omnes forcipati. *Rami adventitii* curti frequentes. *Tetrasporangia* exserta verticillata in ramis subultimis vel in ramis adventitiis ad cellulas corticales et, saepius, ad cellulas pericentrales affixa. *Cystocarpia* subterminalia involucreta. *Planta mascula* ignota. *Thallus* intra ex cellulis axialibus uniseriatis omnino corticatis quam altis parum latioribus constans. *Cortex* ex pericentralibus et secundariis cellulis corticalibus constans. *Pericentrales* ad usque 9, sed 6 vel 7 saepius, circum axiales cellulas parentales, inaequimagnae, maximae oppositae biseriatae margines thalli complanati congruentes, omnes quam cellulis axialibus angustiores sed altitudinem earum aequantes et cum eis alternantes. *Secundariae cellulae corticales* quam aliis parviores stratum ad duas cellulas latas extrorsus formantes ex pericentralibus solum sursum exorientes. PLATES 1 and 2. FIG. 1.

Type: Cape, Port St. Johns, epiphytic on *Gelidium cartilagineum*, Simons 698 (PRE, holo.).

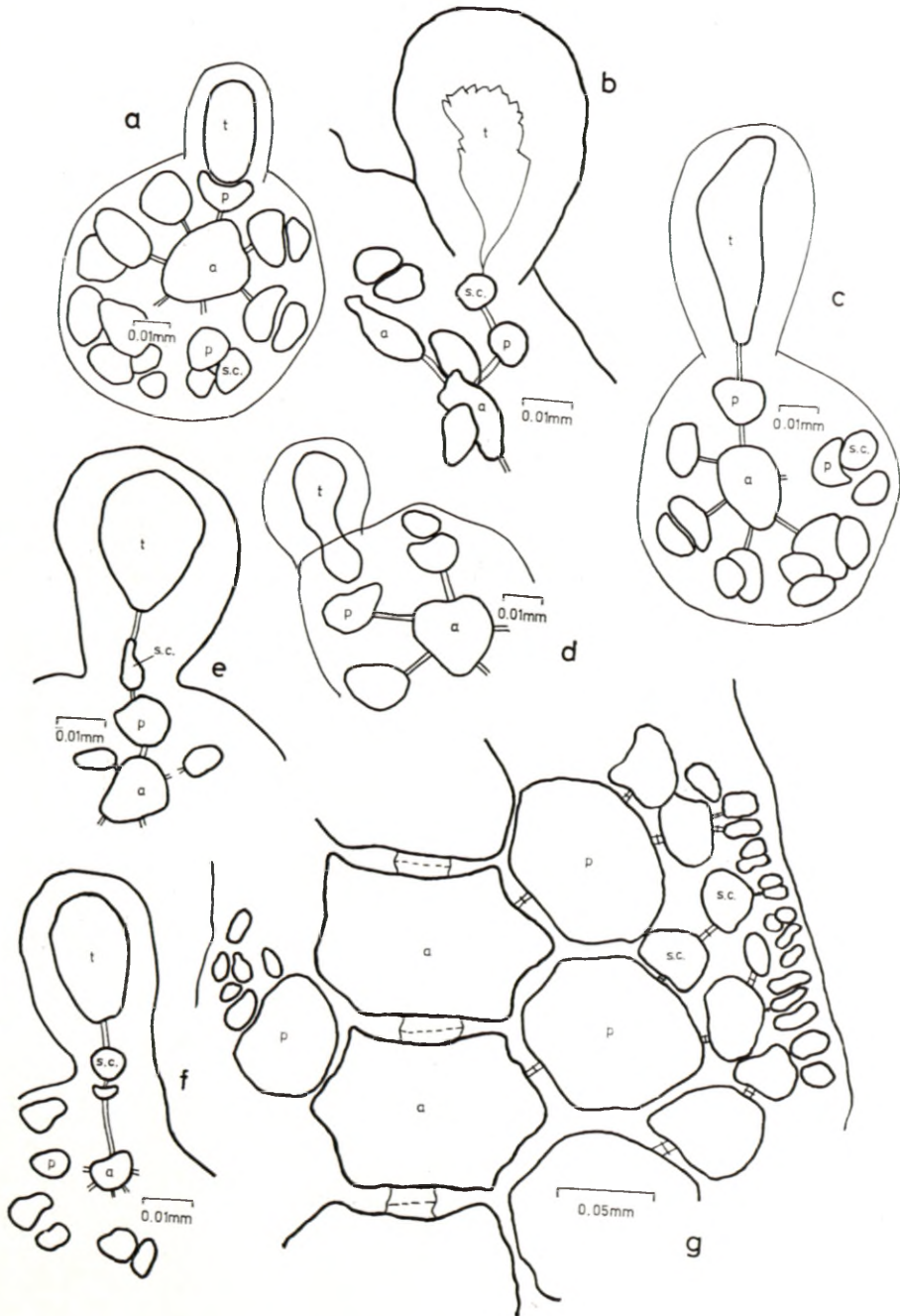


FIG. 1.—*Microcladia gelidii*; a–f, various transverse sections through tetrasporangial thalli indicating the attachment of the tetrasporangia; a and c, tetrasporangia connected directly to a pericentral cell; d, a constriction in the lower portion of a maturing tetrasporangium; b, e and f, a cortical cell intermediate between tetrasporangia and pericentral cells; g, an oblique longitudinal section through a mature portion of the thallus.

a.—axial cell; p.—pericentral cell; s.c.—secondary cortical cell; t.—tetrasporangium.

Plant epiphytic, dark blood-red, subfastigiate, subsetaceous. *Holdfast* ramifying within host and forming an external nodule, about 2 mm in diam., on the surface of the host. *Axes* several, arising from nodule, stem-like flattened bilateral branched up to 8 cm high and 1 mm thick tapering slightly upwards and downwards. *Branches* distichous lateral pinnately decompound in one plane, in tetrasporic plant the lower ones somewhat recurved the upper forcipate, in female plant all forcipate. *Adventitious branches* short lateral frequent. *Tetrasporangia* exerted whorled on subultimate branches or on adventitious branches; attached to cortical cells and, more often, to pericentral cells. *Cystocarps* subterminal involucrate. *Male plants* unknown. *Thallus internally* composed of entirely corticated uniseriate axial cells a little wider than high. *Cortex* consisting of pericentrals and secondary cortical cells. *Pericentrals* as many as 9, but more often 6 or 7, forming a ring around the parent axial cells, unequal in size, the largest in two opposite series corresponding to the edges of the flattened thallus, all narrower than but equalling the height of the axial cells and alternating with them. *Secondary cortical cells* smaller than the rest forming up to two layers outwards arising from the pericentrals in an upward direction only.

CAPE.—Port St. Johns: Port St. Johns, *Simons* 698 (PRE); 699 (BOL).

REFERENCES

- FELDMANN-MAZOYER, G. (1940). *Céramiacées de la Méditerranée Occidentale*. Alger: Imprimerie Minerva.
- HOMMERSAND, MAX H. (1963). Morphology and classification of Ceramiaceae and Rhodomelaceae. *Univ. Calif. Publ. Bot.* 35, 2 : 165–366.
- KYLIN, H. (1956). *Die Gattungen der Rhodophyceen*. Lund: CWK Gleerups Förlag.
- PAPENFUSS, G. F. (1940). Notes on South African marine algae. I. *Bot. Notiser*.
- SIMONS, R. H. (1966). The genus *Ceramium* in South Africa. *Bothalia* 9, 1 : 153–168.
- STEPHENSON, T. S. (1948). The constitution of the intertidal fauna and flora of South Africa. III. *Ann. Natal Mus.* 11, 2 : 207–324.

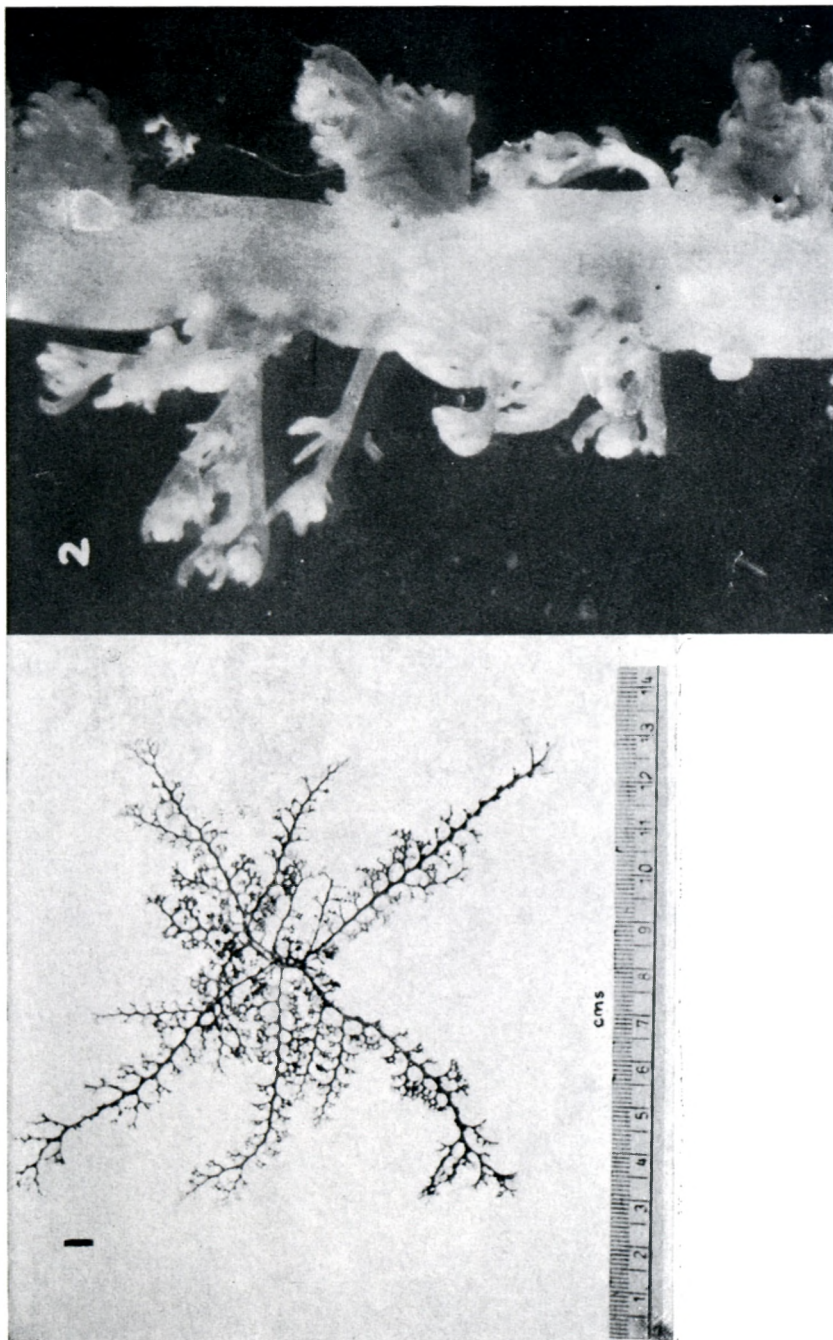


PLATE 1.—*Microcladia gelidii* Simons, tetrasporic plant (*Simons* 698, holotype, in **PRE**).

PLATE 2.—*Microcladia gelidii*, fertile female branches adventitious on a mature axis.