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Marine Fungi from Queensland — I

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The occurrence of marine fungi on phanerogamic plant remains in Australia has, up to the present, been unrecorded with the exception of the report by Johnson and McNeil (1941) of the occurrence of an unidentified Ascomycete in hardwood in the port of Sydney. Three species are recorded by Cribb and Herbert (1954) as parasitic on marine algae in Tasmania, but no marine species have hitherto been recorded from Queensland. The authors have collected a number of fungi from both living algae and phanerogamic remains in the littoral region in Queensland and this paper is the first of a planned series dealing with fungi from the marine environment in this area.

In general, the perithecia or pycnidia of different species are not intermingled but this is by no means always the case, at least with respect to those occurring on phanerogamic substrata. This, together with the paucity of fruiting bodies in some cases, and the fact that it is frequently impossible to identify a specimen with any certainty before the perithecium or pycnidium has been crushed and the spores examined, sometimes leads to difficulties in the designation of the type specimen of a new species. Descriptions and figures have therefore been made from specimens mounted in lactophenol-cotton blue and these have then been remounted in glycerine-phloxine according to the double coverglass method of Diehl (1929). The pieces of substratum from which the fruiting bodies were obtained have been retained, but, except in the case of species on algae or where the fruiting bodies may be prominent and unmistakable, it is the specimens on slides which will be regarded as the respective types. This is the practice adopted by Linder who encountered similar difficulties. Type specimens are located in the Department of Botany, University of Queensland.

FUNGI IMPERFECTI

Phialophorophoma

Phialophorophoma littoralis Linder (Fig. 3 a-e)

Barghoorn and Linder 1944, p. 403, pl. 1, fig. 7-9.

The specimens agree well with Linder's figures and description of specimens from Atlantic North America except that some pycnidia may be up to $\frac{3}{4}$ superficial with others immersed as in Linder's specimens, and the ostiole is less papilliform and sometimes quite plane. The spores show approximately the same size and shape range being $2.5-4 \times 1.5 \mu$ and ellipsoid to pyriform.

Hab.: On exposed dead root of *Avicennia marina* (Forsk.) Vierh. var. *resinifera* (Forst.) Bakh., Redcliffe, 6.x.1954 (A.B. & J. W. Cribb).

Macrophoma

Macrophoma gymnogongri Feldmann

Feldmann 1941, p. 167, fig. 1; Cribb and Herbert 1954, p. 11, fig. 3, a-c.

The black pycnidia^{*} up to 300μ diam. are embedded in irregular groups in the host thallus. Apart from the somewhat shorter necks of the pycnidia the specimens appear to agree in every way with the collection recorded from Tasmania in *Ptilonia australasica* Harv. (Cribb and Herbert, 1954).

Hab.: In *Laurencia concinna* Mont. drift, Currumbin, 28.viii.1954 (A. B. & J. W. Cribb).

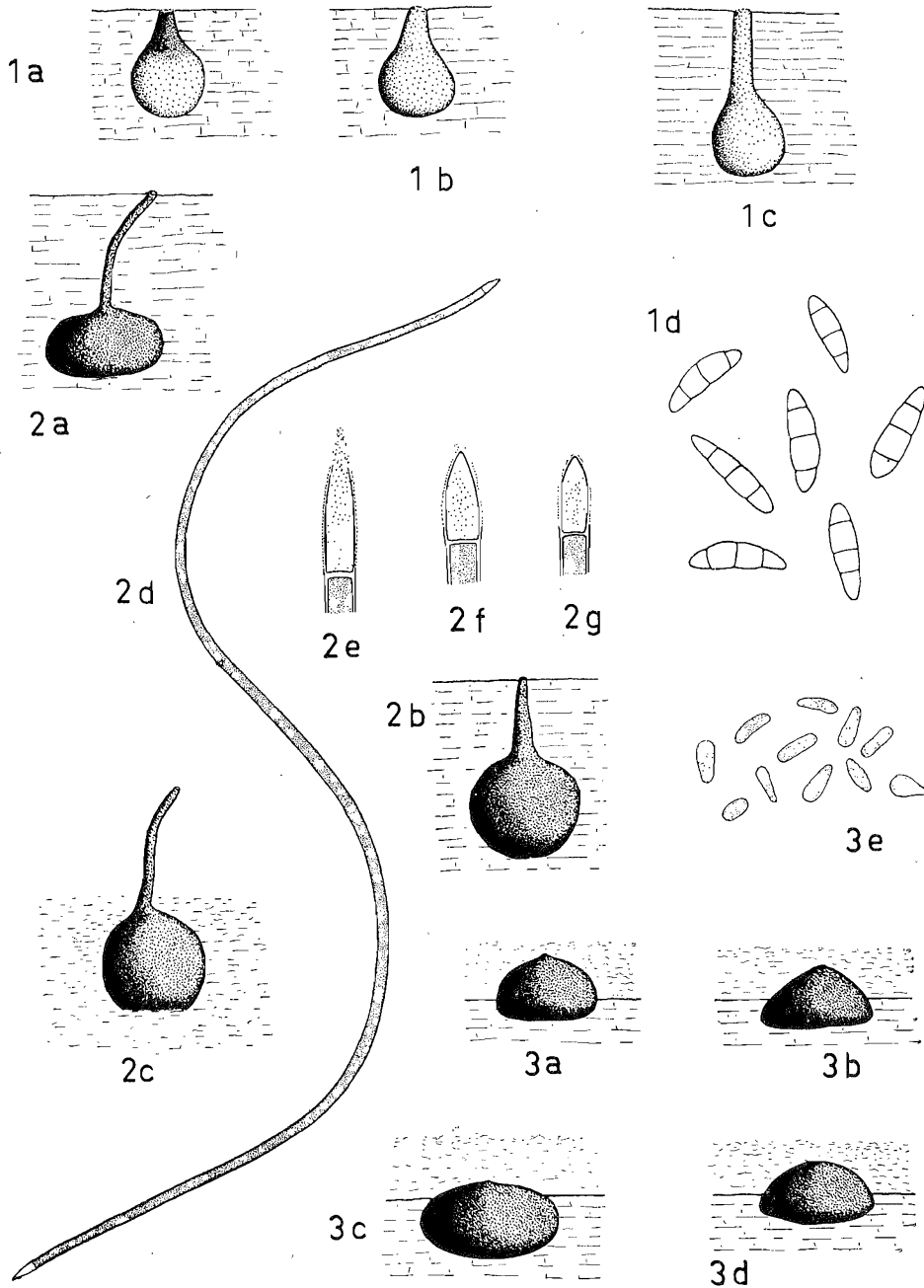


Fig. 1—*Metasphaeria australiensis*. a-c, Perithecia, x 60; d, Spores, x 600.

Fig. 2—*Lulworthia longispora*. a-c, Perithecia, x 60; d, Spore, x 600; e-g, Spore apices, x 1800.

Fig. 3—*Phialophorophoma littoralis*. a-d, Pycnidia, x 60; e, Spores, x 1800.

PYRENOMYCETES

*Metasphaeria**Metasphaeria australiensis* sp. n. (Fig. 1 a-d)

Perithecia immersa, ampulliforma, 120–195 μ diam., pseudoparenchymata, fusca, aliquando pallidiora in basis; ostioli immersis, fuscis vel pallidioribus, cylindricis vel fastigatis, usque ad 225 μ longis, 45–65 μ latis; ascis clavato-fusiformibus, 10–14 μ latis, parte sporogena 70–105 μ longa; ascosporis triseptatis, fusiformibus vel clavato-fusiformibus, saepe leviter constrictis in septis, utrinque obtusis vel rotundis, 20–26 \times 5.5–7.5 μ ; paraphysibus 1 μ vel minus diam., aliquando ramosis, ultra axis.

Hab.: In radicem defunctam apertam *Avicenniae marinae* (L'orsk.) Vierh. var. *resiniferae* (Forst.) Bakh. in Redcliffe, 6.x.1954 (A. B. & J. W. Cribb).

This represents the first record of the genus *Metasphaeria* from a marine environment.

Lulworthia

Barghoorn and Linder (1944) in the introduction to their paper on marine fungi reviewed some of the literature on this subject and cited four papers by Sutherland. This latter author unfortunately used the same title, namely, "Additional notes on marine Pyrenomycetes" for two papers published in consecutive years (1915, 1916). This seems to have led to the overlooking by Barghoorn and Linder of the second of these two papers in which Sutherland described the new genus *Lulworthia* with elongate continuous spores provided with hyaline tips. This genus appears to be the same as the one described by Linder as *Halophiobolus* which is characterised by the same combination of characters as *Lulworthia*, i.e., marine environment, 8-spored asci, elongate or filamentous, hyaline, mostly continuous spores with short hyaline apical appendages, and absence of paraphyses.

The only point on which the two differ is that in *Lulworthia fucicola*, the only species described by Sutherland, the ostiole is not produced or is only slightly so, whereas in *Halophiobolus* the ostiole is conical to cylindrical. However, in *H. salinus* the ostiole may be short and broadly conoid, and in Linder's figure does not differ appreciably from that of one perithecium represented in Sutherland's Pl. 5, fig. 4.

Sutherland's species was parasitic on the brown alga *Fucus vesiculosus* L., while the species recorded by Linder were found in *Zostera*, *Spartina* or wood. However, Wilson (1951), reports *H. salinus* Linder from old worn stumps of seaweed, probably *Fucus vesiculosus*, in Britain, so Linder's genus is not composed of species entirely restricted to phanerogamic plant tissue.

The generic name *Halophiobolus* Linder must therefore be regarded as a synonym of *Lulworthia* Sutherland, and the four species of the former genus described by Linder together with the three species transferred by Linder from *Ophiobolus* must now be transferred to *Lulworthia*.

L. fucicola Sutherland and *Halophiobolus cylindrica* Linder are very similar in the shape and size of the spores, those of the former being given as 70–100 \times 4.5–5.5 μ , and those of the latter as 74–82.5 \times 5 μ . However, the globose perithecium of the former species, with a papillate or plane ostiole, clearly distinguishes it from the latter, which has a cylindrical or sub-cylindrical perithecium with a long projecting neck arising from a bulbous pseudo-parenchymatous base.

The seven species of *Halophiobolus* Linder are recombined as follows:—

Lulworthia cylindrica (Linder) **comb. nov.**

Halophiobolus cylindricus Linder 1944, p. 416, Pl. VI, figs. 12–14.

Lulworthia opaca (Linder) **comb. nov.**

Halophiobolus opacus Linder 1944, p. 417, Pl. VI, figs. 1–5; Wilson 1951, p. 542.

Lulworthia longirostris (Linder) **comb. nov.***Halophiobolus longirostris* Linder 1944, p. 418, pl. VI, figs. 6-7.*Lulworthia maritima* (Sacc.) **comb. nov.***Ophiobolus maritimus* Sacc. 1883, p. 350; Mounce & Diehl 1934, p. 245.*Halophiobolus maritimus* (Sacc.) Linder 1944, p. 419.*Lulworthia medusa* (Ell. & Ev.) **comb. nov.***Ophiobolus medusa* Ell. & Ev. 1885, p. 150; Mounce & Diehl 1934, pp. 243-5, figs. 2, 6 c-d.*Halophiobolus medusa* (Ell. & Ev.) Linder 1944, p. 419.*Lulworthia halima* (Mounce & Diehl) **comb. nov.***Ophiobolus halimus* Mounce & Diehl 1934, pp. 242-6, figs. 1, 3-5, 6 a-b, 7-9.*Halophiobolus halimus* (Mounce & Diehl) Linder 1944, p. 419.*Lulworthia salina* (Linder) **comb. nov.***Halophiobolus salinus* Linder, p. 944, p. 419, pl. VI, figs. 8-11; Wilson 1951, p. 542.*Lulworthia longispora* sp. n. (Fig. 2 a-g)

Perithecia immersa vel sublibera, globosa vel subglobosa, 210-255 μ diam., vel ellipsoidea, usque ad 670 μ longa, 450 μ lata, axi longiora superficie substrati parallelo, pseudoparenchymata, membranacea vel subcarbonacea; ostiolis centricis vel excentricis in peritheciis globosis et subglobosis, excentricis in peritheciis ellipsoideis, cylindricis vel nonnihil fastigatis, 150-650 μ longis, 60-120 μ latis, saepe nonnihil undulatis, immersis vel eminentis, plerumque fuscis vel subcarbonaceis; asci deliquescentibus; ascosporis filiformibus, curvatis vel eminentis, spiraliter tortis, hyalinis, multivacuolatis, 330-450 μ longis, 3-4 μ diam. in mediis, 1.5-2.5 μ diam. in apices, ad extrema utrinque appendice hyalina, cylindrica, apicis acutis vel rotundatis, 6-9 μ longa, aliquando leviter inflata.

Hab.: In radicem defunctam apertam *Avicenniae marinae* (Forsk.) Vierh. var. *resiniferae* (Forst.) Bakh. in Redcliffe, 6.x.1954 (A. B. & J. W. Cribb)—TYPE.

Other collections: Nerang River, Southport, on wood and bark in lower and mid littoral, 27.x.1954; Tallebudgera Ck., 28.x.1954; Redcliffe, 24.i.1955, 12.iii.1955.

The spores germinate readily in sea water within a few hours, becoming irregularly multiseptate and producing germ tubes from more than one of the cells so formed.

L. longispora provides the first record of the genus from the southern hemisphere. Eight other species of *Lulworthia* are known, five of them restricted to the Atlantic coast of North America, one restricted to Britain, and two occurring in both these areas. The Australian species resembles *L. cylindrica*, *L. opaca* and *L. longirostris* in the long neck of the perithecium, the neck in all other species being shorter than the height of the perithecium; from these three species mentioned, however, *L. longispora* differs in having much longer spores, 330-450 μ , those of the other three species not exceeding 200 μ . Of the short necked species, those closest to *L. longispora* in spore length are *L. halima* and *L. maritima*; *L. halima* described from *Zostera marina* has spores 260-308 μ , while *L. medusa* with spores 400 μ long has the hyaline appendages characteristically inflated and tapering to a slender flanged beak. The inflation in *L. longispora* is very slight and sometimes hardly detectable.

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