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Three Species of Fungi Parasitic
on Marine Algae in Tasmania

BY

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Three Species of Fungi Parasitic on Marine Algae in Tasmania

A. B. CRIBB* AND JOAN W. HERBERT*

The field of marine fungi has, in the past, been almost completely neglected in Australia, the only reference to the group being by Johnson and McNeil (1941), who record an unidentified ascomycete in hardwood immersed in seawater at Sydney.

As far as can be ascertained not more than about thirty species of Pyrenomycetes have been described as parasitic on marine algae, and in this paper two species of the class parasitic on Phaeophyta in Tasmania are described as new. One species of Fungi Imperfecti is recorded for the first time from the Southern Hemisphere.

Guignardia tumefaciens sp. n. (Fig. 1, a-d)

Perithecia spherica, usque ad 700 μ diam., immersa in hospitem et protuberantias gallaeformes usque ad 25 mm. diam. processibus clavatis compositas, poro apicalo aperta, parietibus pseudo-parenchymatis compressis non pigmentatis, 10-28 μ crassis; ascis clavatis, octosporis, usque ad 140 \times 60 μ , maturitate evanescentibus; sporis hyalinis, ellipticis vel arcuato-ellipticis, apicis acutis, 42-45.5 \times 16-19 μ , unicellularibus, zona granulata meridionali instructis. Hab. In frondibus *Sargassi* sp. parasitica, in Low Head, Tasmania (14.ix.1950).

The type specimen is located in the herbarium of the Department of Botany, University of Queensland.

The only known specimen of this species was found on a basal leaf of a small piece of *Sargassum* sp. collected from drift weed at Low Head on the north coast of Tasmania (A.B.C., 14.ix.1950).

The fungus causes a gall composed of numerous, crowded, clavate or irregularly clavate processes appearing on both sides of the leaf at the same point. The gall, approximately 23 mm. long, 5 mm. broad and up to 4 mm. high, is situated along the midrib in the apical half of the leaf. The individual processes all arise from or very near the midrib, the central ones standing erect and the outermost ones spreading almost horizontally; they are free from one another or sometimes shortly united at the base, in broadest diameter 0.5-1 mm., and up to 4 mm. tall. The apex is rounded, or somewhat flattened or depressed, with an ostiole in the centre.

The perithecia are globose, up to 700 μ diameter, entirely immersed, one in each clavate process of the gall, and open to the exterior by a definite pore. The perithecial wall, 10-28 μ thick, usually about 18 μ , is of unpigmented compressed pseudoparenchyma. From the wall in the lowermost part of the ostiole arise numerous crowded hyphal processes directed upwards and completely or almost completely blocking the opening which is up to 140 μ in diameter.

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Round the wall of the perithecium there project inwards numerous more or less triangular processes of variable size, the largest of them up to 120μ long. The asci are clavate, up to $140 \times 60 \mu$, 8-spored with the spores arranged in 2 rows or somewhat irregularly. At maturity the ascus wall breaks down and the spores lie in a jelly-like mass which is extruded through the ostiole. The spores, $42-45.5 \times 16-19 \mu$ are hyaline, one celled, ellipsoid to arcuate-ellipsoid with acute ends, and have the usual transverse granular band.

Five species of *Guignardia* have previously been described as occurring on marine algae. They are *G. ulvae* Reed (1902) on *Ulva californica* Wille with spores $10-13 \times 3.5-7 \mu$, *G. alaskana* Reed (1902) on *Prasiola borealis* Reed with spores $8.5-13.5 \times 3-4 \mu$, *G. prasiolae* (Winter) Reed (1902) on *Prasiola tessellata* Kuetz. with spores $12-15 \times 3.5-4.5 \mu$, *G. gloiopeltidis* Miyabe and Tokida (1948) on *Gloiopeltis furcata* (Post. et Rupr.) J. Ag. with spores $15-20 \times 3.4-3.8 \mu$ and *G. irritans* Setchell and Estee (1913) on *Cystoseira osmundacea* (Menzies) C.A.Ag. and *Halidrys dioica* Gardner with spores $30-45 \times 9-13 \mu$. From the first four species *G. tumefaciens* differs clearly in its much larger spores and totally unrelated host. *G. irritans*, which it closely resembles, also occurs on members of the Cystoseiraceae, but from this species *G. tumefaciens* differs mainly in the proportionally greater width of the spores.

***Othtiella cystophorae* sp. n. (Fig. 2, a-c)**

Perithecia spherica, usque ad 1000μ diam., semi-immersa in prominentem hospitis, poro apicalo aperta, parietibus pseudo-parenchymatis, nigris, firmis, $30-105 \mu$ crassis; ascis clavatis, octosporis, usque ad 150μ longis, usque ad 50μ latis, paraphysibus filiformibus, septatis, $3-5 \mu$ latis, usque ad 300μ longis; sporis hyalinis, $50-60 \times 15-21 \mu$, raro usque ad 73μ longis, saepe leviter constrictis in medio, ellipsoideis vel cylindrico-ellipsoideis vel inaequalis, raro citriformis, utrinque apicis acute vel late rotundis, raro acutis. Hab. In stipites *Cystophorae retroflexae* (Labill.) J.Ag. parasitica, in Port Arthur, Tasmania.

The type specimen is located in the herbarium of the Department of Botany, University of Queensland.

This species forms rounded or irregular galls up to 1.5 cm. in diameter on the older parts of the stipe of *Cystophora retroflexa* (Labill.) J.Ag. The gall has a warted appearance due to the presence of the prominently projecting black perithecia which are densely placed over its surface and are $\frac{1}{2}-\frac{3}{4}$ immersed in a short cupule formed by the host tissue.

The perithecia are globose, up to 1000μ diameter, and open to the exterior by an apical pore; the perithecial wall is of carbonous pseudoparenchyma, $30-105 \mu$ thick. Asci are clavate, up to 150μ long and 50μ broad and are mixed with filiform septate paraphyses up to 300μ long and $3-5 \mu$ broad. The hyaline spores are $50-60 \times 15-21 \mu$, often slightly constricted at the middle, ellipsoid to cylindrico-ellipsoid, sometimes irregularly so, the two cells often similar or sometimes dissimilar in shape and/or size. The ends are broadly rounded, sometimes vaguely citriform or flattened, or rarely acute. At each end there is a small accumulation of deeply staining protoplasm.

The species has been collected on two occasions at Port Arthur, Tasmania (A.B.C., Oct., 1951, Jan., 1952).

Macrophoma gymnogongri Feldmann (Fig. 3, a-c)

This species is parasitic on the red alga *Ptilonia australasica* Harvey. The species was described on *Gymnogongrus norvegicus* (Gunn.) J.Ag. from Algeria by Feldmann (1941). The only Australian collection was found in drift at Low Head, on the north coast of Tasmania (A.B.C., 14.ix.1950).

The pycnidia occur clustered in usually more or less circular patches, appearing as a group of black dots on the pink thallus. They are totally immersed and open to the surface by a prominent neck with an apical pore. The pycnidia are located in the large-celled medulla immediately below the small-celled cortex through which the neck projects. The fungus apparently stimulates the cortex, which enlarges sometimes up to fourteen times the normal thickness and may be up to 210 μ thick. The pycnidia are more or less spherical or somewhat deformed probably through crowding, up to 300 μ diameter, with the neck up to 225 μ long. The pycnidial wall is black or occasionally almost colourless, pseudoparenchymatous, up to 35 μ thick. Spores are hyaline, unicellular, ellipsoidal, sometimes irregularly so or somewhat allantiform, with broadly rounded or rarely somewhat acute ends, 14-21 \times 3.5-6 μ , including the apical thickening. The end walls usually bear a cap-like thickening up to 1.3 μ thick and a prominent oil globule is present towards each end. Very rarely there have appeared ascus-like groups of apparently 8 spores, but no ascus wall can be detected, and the grouping may be fortuitous.

SUMMARY

Three species of fungi parasitic on marine algae in Tasmania are recorded; they are *Guignardia tumefaciens* sp. n. on *Sargassum* sp., *Othiella cystophorae* sp. n. on *Cystophora retroflexa* (Labill.) J.Ag., and *Macrophoma gymnogongri* Feldmann on *Ptilonia australasica* Harvey. These constitute the first records of fungi parasitic on marine algae in Australia.

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EXPLANATION OF PLATE

- Fig. 1—*Guignardia tumefaciens* sp. n. a, leaf of *Sargassum* with gall, $\times 5$; b, section through leaf and gall, $\times 5$; c, vertical section through perithecium, $\times 52$; d, spores, $\times 320$.
- Fig. 2—*Othiella cystophorae* sp. n. a, gall on branch of *Cystophora retroflexa*, $\times 5$; b, vertical section through perithecium, $\times 52$; c, spores, $\times 320$.
- Fig. 3—*Macrophoma gymnogongri* Feldmann. a, branch of *Ptilonia australasica* with groups of pycnidia, $\times 1.7$; b, transverse section through pycnidium $\times 52$; c, spores, $\times 470$.

