[Proc. Roy. Soc. Victoria, 35 (N.S.), Pt. II., 1923.]

Art. XV.—*Additions to the Australian Ascomycetes. No. I.*

By ETHEL McLENNAN, D.Sc., and ISABEL COOKSON, B.Sc.

(With Plates IX., X., and 1 Text Figure.)

[Read 9th November, 1922.]

This paper contains an account of several new Victorian Ascomycetes. The Australian forms of this group have so far not received very much attention from botanists, and although several fungal papers have appeared, these deal mainly with the Basidiomycetes of this country. Cooke, in the introduction to his "Handbook of Australian Fungi," remarks on the small number of Discomycetes and Pyrenomycetes recorded for Australia, as compared with other countries. The authors hope from time to time to record and describe new members of these groups in a series of papers under the above heading.

I.—Sphaerosoma alveolatum, sp. nov. (Plate IX.).

Corpore fructigero cervicaliaceo, colore modo atro-fusco modo nigro, ·5-1 cm. diam. sessili. Hymenio perperidium limitato. Ascis cylindricis 40μ diam. cum iodino caeruleis. Sporis octo globularibus subfuscis, alveolatis 34-36μ diam. Paraphysibus clavatis subinde ramulatis.

Fruiting body cushion-like between fleshy and cartilaginous, dark brown to black, viscid, 0.5-1 cm. in diam., and from 1.5-2 mm. high, sessile, with a broad attaching base, hymenium limited by a peridium, internally dark, pseudoparenchymatic. Asci cylindrical, clavate, 40μ diam., and 300-400μ long, blue with iodine, operculate. Spores 8 globular, light brown, uniseriate, irregularly alveolate, 34-36μ diam., 26-28μ without the wing. Paraphyses not exceeding the ripe asci, clavate, septate, often branched.

On open clayey or sandy soil, near Castlemaine, Vic., and at Ringwood, near Melbourne, Vic. (I. Cookson). August and September, 1921.

The plants are mostly scattered, varying in size, with a broad basal attachment, and are not easily detached from the substratum. They are usually rounded in outline, occasionally slightly lobed, the convex upper surface giving to the plant a cushion-like appearance; this surface is nearly always smooth, but sometimes it is slightly convolute. Plants are dark coloured, even when young, and almost black in the adult condition; when moist they are viscid and shining. Internally they are also dark coloured; the hymenium does not cover the entire outer surface of the plant, but is bounded at its extremities

by a distinct peridium [Plate IX., figs. 2 and 3 (p)]; it is composed of large cylindrical asci and numerous paraphyses.

The asci when young contain the ascospores grouped towards the distal end of the ascus in a biseriate fashion [Plate IX., fig. 3 (s)], as they become mature the spores are arranged in a monostichous manner, they are 8 in number, globular, and alveolate in character [Plate IX., figs. 4, 7], light brown at maturity and 34-36$_\mu$ in diameter. The asci turn blue with iodine, and are distinctly operculate.

The paraphyses do not extend beyond the asci to any extent in the ripe specimens; they are septate, swollen towards the apex, very often branched, the two branches being equal [Plate IX., fig. 5], when old they become brown at their apices and tend to shrivel.

The sterile portion of the receptacle is composed of large pseudo-parenchymatous cells without a well marked hypothecium, the extension of this sterile tissue in the form of a peridium can be seen macroscopically, when fruiting bodies are cut in vertical section [Plate IX., fig. 2].

The genus *Sphaerosoma* was founded by Klotzsch (1) in 1893, and it has been the subject of much discussion. Uncertainty as to the exact characters of the type species *Sphaerosoma fuscescens*, Klotzsch, collected in the Grunewald, and also in the Botanical Gardens near Berlin, led to many conflicting statements, and as a consequence much confusion existed in regard to the members of the genus. In 1909, Rouppert (2) published a revision of the genus *Sphaerosoma*, and this was followed in 1910 by an exhaustive account of the genus by Setchell (3). This paper includes the principal references to the genus and its various species, so that it is unnecessary to deal with these in detail here.

As Setchell points out, Klotzsch figures his type specimen as possessing echinulate spores, but describes them as verrucose in character. Later Corda (4) and Zobel (5) figured this species with tuberculate spores. As no type specimen had been preserved, much confusion naturally arose. Setchell, after examining material of all the species he could secure, and considering all the points in this mass of conflicting ideas, states that "the weight of probability can hardly prevail against the really convincing figures and description of Klotzsch."[1] He therefore regards the echinate spore as characteristic of the type, and considers that *S. Janczewskianum*, Rouppert, is probably identical with *S. fuscescens*, Klotzsch, as the spines on the spores are short, rather than with *S. echinulatum*, as the spines on the spores of the European (Rehm and Rouppert) and American (Seaver) form of this latter species are longer and stouter.

Setchell in comparing these echinulate-spored forms with others described under the genus *Sphaerosoma*, shows that in addition to their spore marking they are characterised by the possession of a distinct peridium. In a young form of *S. echinulatum*, Seaver, the

1. The writers are cognisant of a paper "Observations on *Sphaerosoma* and allied genera," by J. F. Seaver (6), but follow Setchell (loc. cit.) in preferring to accept Klotzsch's figure as expressing the characters of the type in the absence of an authentic type specimen.

hymenium was almost completely surrounded by the peridium; for this reason he suggests that these forms do not belong to the Helvellineae, but should probably be regarded as members of the Pezizineae, and restricts the genus *Sphaerosoma* to them. The reticulate-spored forms known at this time did not agree in this respect, and Setchell considers them to belong more properly with the Helvellineae as the hymenium covers the entire outer surface,[2] and to fall into the genus *Ruhlandiella*, Hennings.

The genus *Sphaerosoma* then, according to Setchell, contained 2, or perhaps 3, species:—

1. *S. fuscescens*, Klotzsch, identical with *S. Janczewskiana*, Rouppert.
2. *S. echinulatum*, including *S. echinulatum*, Seaver, the American form, and *S. echinulatum*, Rehm and Rouppert, the European form.

These members agree in possessing a peridium and having echinulate spores. The Australian specimens (*S. alveolatum*) should undoubtedly be included in this genus, they resemble the known forms in their structure, but as they possess reticulated or alveolated spores they illustrate another species of *Sphaerosoma*. The echinate spore marking cannot therefore be regarded as a generic character, and Setchell's idea of the genus as restricted to echinate-spored forms must in consequence be enlarged.

This is the first record of the genus for Victoria. Rodway (8) has recently published a form under the name *S. tasmanica*, Rod., which, however, shows no affinities with *S. alveolatum*, McL. & C. His plant is described as "hollow, closed or opening on one side towards the base, the hymenium lining the internal surface," and, as possessing elliptic spores. These characters differ so widely from the accepted limitations of the genus as to probably exclude from it this Tasmanian form.

LAMPROSPORA AREOLATA, Seaver, var. australis, var. nov.

(Text figure I.).

Plantis 1-3 mm. diam. Hymenio aurantiaco, margine in morem institae exstanti circumdato. Ascis 20-22μ diam., cylindricis. Sporis globosis reticulatis. Areolis 2μ, altispora tota 18-20μ diam. Paraphysibus simplicibus, clavatis 4-6μ diam., granulorum aurantiacorum, refertis.

Plants gregarious but not crowded, 1-3 mm. diam., at first closed, globose, later expanding, hymenium bright orange-red plane, or slightly convex, at first smooth, later roughened by protruding asci, finally spongelike, surrounded by a raised frill-like margin. Asci 20-22μ diam., cylindric, operculate, tapering at the base into a curved pedicel. Spores uniseriate, globose, at first smooth, later the wall becoming reticulate, reticulations 3-6 sided, sides being equal or unequal, areolae

2. See Setchell (loc. cit.), Pl. 15, figs. 1 and 2, and Hennings (7) text figs. 2 and 3.

2 μ deep, and ridges 1μ thick, entire spore 18-20μ diameter; paraphyses simple, septate, clavate, 4-6μ diam. at tip, and filled with orange granules.

On the ground in open places or in moss, near Castlemaine, Vic., and at Ringwood, near Melbourne, Vic. (E. McLennan), August and September, 1921.

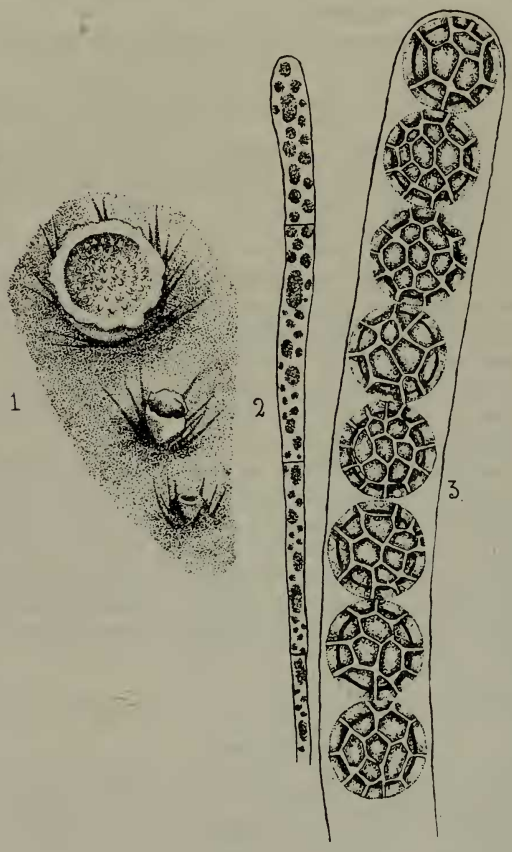

Fig. 1.

1. Plants of **Lamprospora areolata,** Seaver, var. Australis, var. nov.
2. Paraphysis × 750.
3. Portion of ascus × 750.

The plate above described very closely resembles the form *L. areolata*, Seaver (9 and 10), both in the size of the spore and the nature of the spore marking. It, however, differs in its size, and in the possession of a well-marked fringe at the margin of the apothecium [Text fig. I., fig.I.] such a structure being entirely absent in the latter

species. The differences, however, appears to be varietal rather than specific in character, and lead us to regard the Australian representatives of this species as a variety of the American type.

LAMPROSPORA TUBERCULATA, Seaver

Ringwood and Castlemaine, Victoria, E. McLennan, September and October, 1921.

This form is recorded here as new for Victoria, and the plants examined coincide exactly with the description given by Seaver (9 and 10) of the American form. All their characters closely resemble those of a Tasmanian plant *Barlaea verrucosa*, Rod. (11) and it is probable that they are identical since Seaver regards the genus *Lamprospora* as embracing forms described under the generic name *Barlaea* [Sacc] and is defined by him as including "the smaller plants of the globose-spored type of operculate Discomycetes, except those which are commonly placed with the *Ascobolaceae*."

L. tuberculata, Seaver, and *L. areolata*, Seaver, var. *australis*, McL. and C., occur in the same localities, and close to one another. In the field they are quite indistinguishable, their external appearance being identical; it is only after microscopic examination reveals the spore characters that we are able to distinguish the two forms.

IV.—CORDYCEPS FURCATA, sp. nov. (Plate X.).

Stromate simplici, stipite trifido. Aerio stipite brevi rubro-fusco transverse fasciato, 6 mm. longo, 2·5 mm. lato, in tres pares et breviores ramulos sursum diviso, qui capitula fertilia gerunt. Capitulo clavato ovoideo rubro fusco 4-5 mm. longo, 2·5 mm. lato, in rostellum sterile desinenti. Peritheciis penitus immersis. Ascis linearibus, capitatis. Sporis octo, filiformibus, hyalinis in segmenta baculiformia 8-10 μ longa, 2 μ lata se dividentibus.

Stroma single, entomogenous, stem trifid, continued below the surface of the ground as a root-like structure, 1·7 cm. long, and tapering from 2·5-1 cm. in breadth.

Aerial stem short, stout, red-brown transversly banded owing to the disruption of the outer layer at intervals, and the exposure of the more colourless tissue below, [Plate X., fig. 2] 6 mm. long and 2·5 mm. broad, dividing above into 3 equal, shorter, and more slender branches, each 2·5 mm. long, and 1·5 mm. broad, and bearing a fertile capitulum. Capitulum clavate-ovoid, red-brown, 4-5 mm. long, and 2·5 mm. broad, very faintly punctate with the dark-brown ostiola of the perithecia, terminating in a small sterile, beak-like prolongation, darker brown than the capitulum and 1 mm. long, by ·5 mm. broad.

Perithecia flask-shaped, deeply immersed in the tissue of the stroma [Plate X., fig. 3 & 4], 460-500μ long, and about 135μ broad, each opening to the exterior by an ostiole visible with slight-magnification as a dark brown circular area on the red-brown surface of the capitulum. Asci linear capitate, 6·5-8μ broad, Spores 8 filiform soon dividing into numerous rod-like segments, 8-10μ long, and 2 μ broad, hyaline.

On an undetermined larva at Ringwood, near Melbourne, Vic. (E. McLennan & I. Cookson). September, 1922.

We desire to record our appreciation of assistance given to us by Mr. Laidlaw, B.Sc., Government Botanist and Biologist to the Agricultural Department, who placed the libraries of the National Herbarium and Department of Agriculture (Science Branch) at our disposal, and to Mr. C. C. Brittlebank, Vegetable Pathologist, for his very material assistance and interest in our work.

REFERENCES.

(1) Klotzsch, J. F., *Sphaerosoma fuscescens*, Kl. Flora Regni Borussici, 1839.
(2) Rouppert, C. Revision du genre *Sphaerosoma*. Bull. Internat. de l'Acad. Sci. Cracovie, 1908.
(3) Setchell, W. A. The genus *Sphaerosoma*. Univ. of California Publications in Botany, Vol. IV., 1910.
(4) Corda, A. C. J. Icones Fungorum, Bd. V., 1842.
(5) Zobel, J. B. In Corda, Icones Fungorum, Bd. VI., 1854.
(6) Seaver, F. J. Observations on *Sphaerosoma* and allied genera. Mycologia, vol. VI., 1914.
(7) Hennings, P. *Ruhlandiella berolinensis*, P. Henn. gen. nov. et sp. nov. Hedwigia, Bd. 42, 1903.
(8) Rodway, L. Notes and additions to the fungus flora of Tasmania. Proc. Roy. Soc. of Tasmania, 1919.
(9) Seaver, F. J. The genus *Lamprospora*, with descriptions of two new species. Mycologia 4, No. 2, 1912.
(10) Seaver, F. J. A preliminary study of the genus *Lamprospora*. Mycologia VI., No. 1, 1914.
(11) Rodway, L. Additions to the Fungus Flora of Tasmania, Part III. Proc. Roy. Soc. of Tasmania, 1920.

EXPLANATION OF PLATES.

Detailed drawings have been made with the aid of the camera lucida.

Plate IX.

Fig. 1. Plants of *Sphaerosoma alveolatum*, sp. nov. × 4.
Fig. 2. Diagrammatic representation of plant in vertical section. p., peridium; h., hymenium; b., broad basal attachment, × 8.
Fig. 3. Longitudinal section through outer portion of young plant. s., spores. × 103.
Fig. 4. Portion of an ascus, showing spores. × 375.
Fig. 5. Paraphyses. × 375.
Fig. 6. Operculate ascus. × 375.
Fig. 7. Mature spore: × 1125.

Plate X.

Fig. 1. *Cordyceps furcata*, natural size. g., ground level.
Fig. 2. *Cordyceps furcata*, × 4. g., ground level.
Fig. 3. Longitudinal section through upper portion of capitulum, a., sterile apex. b., ostiole of perithecium. × 23.
Fig. 4. Single perithecium, with asci × 375.
Fig. 5. Portion of ascus. × 750.