

ART. I.—Notes on Two Australian Fungi of the "Sooty Mould" Group.

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LIMACINIA PHLOIOPHILIA n. sp.

Mycelio in cortice crescente; interdum per summam stirpem arboris aequaliter patente, sed in ingenti magnitudine massas, pulvinis similes, saepe aggregato. Hyphis septatis, cellulis proxime aequis diametris. Maturis hyphis, septis plane constrictis, Saccardi pigmento fusco (umber) (Ridgway) plerumque diametro 4.5 μ . Juvenibus hyphis, in duas partes divisus, ad apicem attenuatis (plerumque diametro 9.4 μ), olivaceo-fulvo (Ridgway). Conidiis in hyphis terminantibus, Saccardi pigmento fusco (umber) fusiformibus laterculis in muro similibus formatis septatis, 4-5 transversis septis, 32-38 plerumque longis 34.8 μ \times 11-13.5 plerumque latis 13.2 μ . Similes hyphis appendices conidia interdum ferentes ex base ascocarporum oriuntur. Ascocarpis globosis, sessilibus, ora ferentibus, 183-332 plerumque 249 μ diametro. Paraphysibus; ascis tenuibus muris, evanescentibus, octosporis. Ascosporibus Saccardi pigmento fusco (umber), fusiformibus paulum curvatis, phragmoseptatis (14-17 septis) 103-148 plerumque 116 μ longis \times 8-14 plerumque 10 μ latis. Loca: Stirpibus Kunzeae peduncularis F.v.M. Warburtoniensi Victoriae carptis; et Leptospermo lanigero specie montana Smithi, in Valle Cradle Tasmaniae carpto.

This "sooty mould" was found first at Warburton, 50 miles E.N.E. of Melbourne (altitude 523 feet). It was growing on *Kunzea peduncularis* F.v.M., which was infected with the woolly coccid, *Pulvinaria tecta* var. *alba* Maskell. More recently this fungus has been collected at Cradle Valley (altitude 3,100 feet) in Northern Tasmania, occurring on *Leptospermum lanigerum* var. *montanum* Smith. Also in this locality, a mould very similar to that produced by *Limacinia phloiophilia* was found on *Melaleuca squamea* Lab., another member of the family *Myrtaceae*. However, as this specimen exhibited vegetative structure only, it could not be identified with certainty.

Limacinia phloiophilia appears to be restricted to the stems of plants provided with abundant papery bark. The mycelium, which inhabits the superficial layers of bark only, may extend evenly over the surface of the stem, but it is frequently aggregated to form cushion-like masses of considerable size. The specimen

photographed (Plate I., fig. 5), measured 3 inches in diameter. When, as during the winter, vegetative growth is prolific, the surface of these mycelial masses is sepia (Ridgway), but later it darkens to black.

The young hyphæ are tawny olive (Ridgway), dichotomously branched and taper towards the apex, where the average diameter is 9.4μ ; in the adult condition they are darker (Saccardo's umber (Ridgway)) and measure 44.5μ in diameter (Plate I., fig. 1). The cells are approximately isodiametric and the mature hyphæ are conspicuously constricted at the septa.

The conidia arise terminally on the hyphæ and are of the same colour; they are fusiform, muriform-septate, with 4-5 transverse walls but the longitudinal septa are sometimes lacking (Plate I., fig. 3). The conidial dimensions are: Length, $32-38 \mu$, aver. 34.8μ ; width, $11-13.5 \mu$, aver. 13.2μ .

The mature ascocarps are visible to the naked eye as small black spots on the surface of the stromatic mycelium. They are spherical and sessile, towards the apex the wall is thin forming a fairly well-defined ostiole, and hyphal appendages, which sometimes bear conidia, arise from the base (Plate I., fig. 4). Paraphyses are present; and the asci, which are thin-walled and evanescent, contain 8 spores. When mature, these ascospores are coloured Saccardo's umber, they are phragmoseptate (14-17 septa), and fusiform but slightly curved. They measure $103-148 \mu$, aver. 116μ in length; and $8-14 \mu$, aver. 10μ in width (Plate I., fig. 2). The ascocarps are of variable size, $183-332 \mu$, aver. 249μ in diameter.

HYSTEROSTOMELLA FILICINA (B. & Br.) v. H.

In the fern gullies near Melbourne, *Hysterostomella filicina* is frequently found as a parasite on the tree-fern *Dicksonia antarctica* Labill. The specimens described in this paper were collected at Marysville, 63 miles N.E. of Melbourne, but others have been found in the gullies to the east, at Kallista and Gembrook.

On the under surface of infected fronds *H. filicina* forms black patches or stromata, which, on cursory examination, resemble the "tar spot" fungus, *Rhytisma acerinum*. It is possible, however, to differentiate these two species by means of sections, and for this purpose, material was fixed in the fluid known as 2 B.D. (La Cour 1931). Microtome sections of about 8μ were cut and stained with Heidenhain's iron-alum-haematoxylin, followed by a counter-stain of eosin. The stromata of *H. filicina* may be readily distinguished by the fact that this species does not penetrate the cells of the leaf. The hyphæ are intercellular; they accumulate in the stomatal air-cavities forming masses of hyaline

plectenchyma, strands of which emerge between the guard cells and attach a superficial stroma of olive coloured hyphae (Ridgway) to the surface of the leaf. Several such organs of attachment occur beneath each stroma (Plate I., fig. 6). These plates of hyphae are more or less circular, approximately 2.5 mms. in diameter, and each comprises several irregularly arranged loculi, which contain asci, but no paraphyses. The mature ascospores are yellowish-citrine (Ridgway), bi-cellular, and they measure $8-11 \mu \times 2.7 \mu$.

This fungus has not been previously recorded on *Dicksonia antarctica*; furthermore, its confused taxonomy required investigation.

The type-material was collected on *Alsophila gigantea*, and it was described by Berkeley and Broome (1875) under the name of *Rhytisma filicinum* B. and Br.

The inaccuracy of this nomenclature was realized by Saccardo (1889) who transferred the species to the genus *Marchalia* Sacc.

Later, von Höhnelt (1909) examined the type-material and referred it to the genus *Hysterostomella* Speg.

More recently, however, to accommodate this species, Theissen and Sydow (1915) have created a new genus, *Monorhizina*, because in their opinion each ascostroma is fixed to the leaf by a single central attachment, while *Hysterostomella* is characterized by several points of insertion.

Through the courtesy of the Director of the Kew Herbarium I have examined a fragment of the type-material of *Rhytisma filicinum*. Although this specimen was insufficient to prove the multiple attachment of the ascostromata, it served to confirm the identity of the species occurring on *Dicksonia antarctica*. The latter, as already indicated, illustrates clearly that each ascostroma is attached to the leaf at more than one point (Plate I., fig. 6).

Furthermore, this feature was described by von Höhnelt (1909), when he examined the type-material of *Rhytisma filicinum*, and upon this basis he differentiated it from the closely related *Hysterostomella rhytismoides*, in which a central hypodermal stroma was observed.

Conflicting evidence was supplied by Theissen and Sydow (1915). Apparently they did not examine the type-material, however, and the new genus which they formed to accommodate *Rhytisma filicinum*, is not accepted by me. The easily detachable character of the ascostroma, they attributed to a solitary organ of attachment, but this is due rather to the absence of any hypodermal stroma. The hyphae do not penetrate the cells of the leaf, but merely accumulate in the small air-cavities beneath the stomata.

I suggest therefore that von Höhnel correctly referred *Rhytisma filicinum* to the genus *Hysterostomella*, and the fungus parasitizing *Dicksonia antarctica* is identified as *Hysterostomella filicina* (B. and Br.) v. H.

Specimens of both species described in this paper have been sent to The National Herbarium, Kew, England.

References.

- BERKELEY, M. J., and BROOME, C. E., 1875.—Enumeration of the Fungi of Ceylon. *Journ. Linn. Soc. Bot.*, Vol. 14, p. 130.
- LA COUR, L., 1931.—Improvements in Everyday Technique in Plant Cytology. *Journ. Roy. Micro. Soc.*, Vol. 51.
- HÖHNEL, F., VON, 1909.—Fragmente zur Mykologie, IX Mitt. Nr. 447. Sitzungsber. *K. Akad. Wiss. Wien, Math.—naturw. Kl.*, Bd. 118, Abt. 1, 1515-1516.
- RIDGWAY, R., 1912.—Color Standards and Color Nomenclature. A. Hoen and Company, Baltimore, M.D.
- SACCARDO, P. A., 1889.—Syll. Fung., Vol. 8, p. 738.
- THEISSEN, F., and SYDOW, H., 1915.—Die Dothidiales. *Ann. Myc.*, Vol 13, 172-179 and 220.

Explanation of Plate.

PLATE I.

1. Young hyphæ of *Limacinia phloiophila*. $\times 85$.
2. Ruptured ascocarp of *Limacinia phloiophila*. $\times 125$.
a = young ascus; b = mature ascus; c = paraphysis.
3. Conidial-bearing hyphæ of *Limacinia phloiophila*. $\times 175$.
4. Ascocarps of *Limacinia phloiophila*. $\times 90$.
a = hyphal appendage bearing a conidium.
5. *Limacinia phloiophila*. Natural size.
6. T.S. Frond of *Dicksonia antarctica* infected with *Hysterostomella filicina* (B. & Br.) v.H. $\times 300$
a = two loculi in a superficial ascostroma; b = mass of plectenchyma filling a stomatal air-cavity, note hyphæ emerging between the guard cells.

