

NEW SOUTH WALES FUNGI.

BY D. McALPINE.

(Communicated by J. H. Maiden, F.L.S.)

(Plates I.-II.)

The following ten species of New South Wales Fungi have been forwarded to me during 1896 by Mr. J. H. Maiden, Government Botanist. Of these six are new to science, three recorded for the first time from New South Wales and one on a new host from a new locality. They are thus classified :—

Group—UREDINES, Brongn.

Order—UREDINACEÆ, Brongn.

1. *ÆCIDIUM EBURNEUM*, McAlp.

Group—PYRENOMYCETES, Fries.

Order—PERISPORIACEÆ, Fries.

2. *ASTERELLA HAKEÆ*, n.sp.
3. *ASTERIDIELLA SOLANI*, n.sp.

Group—HYPHOMYCETES, Mart.

Order—DEMATIACEÆ, Fries.

4. *HETEROBOTRYS PARADOXA*, Sacc.
5. *HELMINTHOSPORIUM CONSPICUUM*, n.sp.
6. *FUMAGO VAGANS*, Pers.

Order—TUBERCULARIACEÆ, Ehrb.

7. *BACTRIDIIUM VERSICOLOR*, n.sp.

Group—SPHAEROPSIDES, Lev.

Order—SPHAERIOIDACEÆ, Sacc.

8. *PHYLLOSTICTA SORIFORMIS*, Cooke & Mass.
9. *SEPTORIA DIOSPYRI*, n.sp.

Group—USTILAGINES, Tul.

Order—USTILAGINACEÆ, Tul.

10. *USTILAGO CRYPTA*, n.sp.

1. *ÆCIDIUM* *EBURNEUM*, McAlp.

On legumes of *Bossiaea heterophylla*, Vent.; September 1896; National Park, near Sydney (Maiden).

This species has already been described on *Bossiaea cinerea*, R.Br., from Tasmania and Victoria (Proc. Roy. Soc. Vic. vii. N.S. 21, 1894), but is new for New South Wales. It was also found on legumes of *Bossiaea rhombifolia*, Sieber, sent from Richmond, N.S.W., in November by Mr. Musson.

2. *ASTERELLA* *HAKEÆ*, n.sp.

(Plate i. figs. 1-3.)

Forming black, soot-like patches on both surfaces of leaves, distinct or confluent, variable in size and shape, somewhat orbicular, commonly $\frac{1}{4}$ inch, but may unite into much larger masses. *Hyphæ* dark brown, thick-walled, septate, nodulose, branched, branches upright and rigid, $7\frac{1}{2}\mu$ broad. *Perithecia* depressed-globose, dark brown, rough, with a few adherent fibrils, 200-380 μ diameter. *Asci* clavate-obovate, subsessile, apex rounded, 8-spored, $35-40 \times 22-24\mu$. *Sporidia* at first colourless, then green, finally brown, 2-3 rowed, elliptic, uniseptate, slightly constricted, upper division usually slightly broader than lower, $22 \times 9\mu$.

On leaves of *Hakea dactyloides*, Cav.; September; National Park, near Sydney (Maiden).

With potassium-iodide-iodine solution the protoplasm of the ascus before the spores are formed and even up to the time when they assume the brown colour, is coloured bright yellow, while the rest of the contents is of a pale bluish tint. The subhymenial tissue is also coloured yellow, but the accompanying material is all pale blue.

It approaches *A. Baileyi*, Berk. & Br., but there the patches are reddish-brown and the sporidia are 37 μ long.

The old genus *Asterina* is now split up into several, according to the septation and colouration of the sporidia, but by those who

object to spore-characters being considered of generic value, they are regarded as subgenera. I have followed the system adopted by Saccardo in his well-known "Sylloge Fungorum," also in his latest publication just received, "I Prevedibili Funghi Futuri secondo la legge d' analogia" (1896).

Asterula, Sacc., has continuous hyaline spores (Hyalosporæ). *Asteronia*, Sacc., has continuous brown spores (Phaeosporæ). *Asterina*, Lev., has two-celled hyaline spores (Hyalodidymæ). *Asterella*, Sacc., has two-celled brown spores (Phaeodidymæ). *Asteridium*, Sacc., has multi-septate hyaline spores (Hyalophragmiæ). And in the case of the specimen on *Solanum viride* with multi-septate brown spores, I have ventured to use *Asteridiella* (Phaeophragmiæ).

3. ASTERIDIELLA SOLANI, n.sp.

(Plate i. figs. 4-9).

On upper and under surfaces of leaves, leaf-stalks and branches; forming densely crowded, minute, black, generally orbicular, often confluent, easily detachable, brittle crusts, with surface of leaf beneath of a pale brown or pale reddish colour. Mycelium composed of an interosculating network of delicate, colourless, septate, luxuriantly branched hyphæ, about $3\ \mu$ broad, and attached to matrix, gradually passing into the stouter coloured hyphæ above it. *Coloured hyphæ* dark brown, rigid, thick-walled, closely interwoven, septate, branched, $8-9\frac{1}{2}\ \mu$ broad, ultimate branchlets generally 1-septate, knobbed and paler in colour. *Perithecia* seated on crust in clusters, depressedly globose, black, rough with warty spines, $130-330\ \mu$, the latter being the average full-grown size. *Asci* oblong to cylindrical, 4-spored usually, $38-64 \times 13-26\ \mu$ (immature). *Sporidia* brown, oblong, 4-septate, slightly constricted at septa, rounded at both ends, $36-44 \times 14-15\ \mu$. *Pycnidia* globose, golden-brown, opening by circular mouth and wall composed of small polygonal cells $100-140\ \mu$, along with perithecia. *Sporules* minute, subglobose or oval, hyaline or rarely brownish, $5\frac{1}{2} \times 3\ \mu$ or $4\ \mu$ diameter borne, on delicate hyaline, septate, branched hyphæ.

On *Solanum viride*, R.Br.; Tintenbar, N.S.W. (Maiden).

The crusted mycelium is readily removed, and is steel-grey on the attached surface.

The asci when ripe seem to burst within the perithecium, hence the difficulty of getting a mature ascus. The sporidia, which are at first colourless, then greenish and finally brown, often germinate even within the perithecium either from one or more segments. They are stained greenish-yellow by potassium-iodide-iodine, and the other contents of the perithecia are similarly stained.

Helminthosporium solani, McAlp., was the name given to this species in the Agricultural Gazette of New South Wales, Vol. vi. Part 12, p. 855 (1895), from a somewhat imperfect specimen, no perithecia being observed, but a few detached worm-like spores.

On the leaves of *Diospyros caryillia*, F.v.M., three different fungi were found in July, viz., *Heterobotrys paradoxa* (?), Sacc., *Fumago vagans*, Pers., and *Septoria diospyri*, n.sp. *Fumago* and *Heterobotrys* are what are called form-genera, from being simply stages in the life-cycle of higher fungi, but until these higher stages are found, it will be convenient to record them.

4. HETEROBOTRYS PARADOXA, (?) Sacc.

On upper surface of leaf, forming minute black specks, scattered all over. *Hyphæ* pale green, septate, and usually slightly constricted at septa, branched, $5\frac{1}{2}\mu$ broad.

The irregularly shaped perithecium-like bodies consist of a parietal portion composed of small brown mulberry-like clusters, each cell about 4μ in diameter, and a central portion of hyaline spherical cells, either isolated or united in chains, $7-11\mu$ diameter and imbedded in a gelatinous matrix.

This occurs as a stage in *Capnodium citricolum*, McAlp., and has already been recorded in that connection from New South Wales.

5. HELMINTHOSPORIUM CONSPICUUM, n.sp.

(Plate i. figs. 10-11.)

Hypophyllous, Effused, sooty-black, velvety, conspicuous patches, roughly orbicular unless at margin of leaf, sometimes about 1 inch in diameter. *Mycelium* composed of green, slender, septate, branched hyphæ, forming a regular pavement next to matrix, and brown, stout, rigid, thick-walled hyphæ imbedded in and arising from the former. *Green hyphæ*, with portions colourless, average $2\ \mu$ diameter. *Brown hyphæ* creeping, very thick-walled, giving rise to short, club-headed branches, or long gonidiophores, $7\frac{1}{2}\ \mu$ broad. *Gonidiophores* simple, erect, rigid, brown, straight or wavy, apex rounded and often paler than the rest, up to $\frac{1}{2}$ mm. high and $5\ \mu$ broad. *Gonidia* clear brown, fusoid or elongated-fusoid, somewhat acute at one or both ends, often tapering towards base, not constricted, usually 3-septate, $24-28 \times 5\frac{1}{2}-6\frac{1}{2}\ \mu$.

On leaves of unknown plant; New South Wales (Maiden).

This species is quite distinct from any of the recorded Australian ones.

6. FUMAGO VAGANS, Pers.

(Plate i. fig. 12.)

On under surface of leaf among the mealy pubescence caused by the numerous short, curved, hyaline hairs. This, which is the gonidial form of a *Capnodium* (*C. salicinum*, Mart.), has not hitherto been recorded for New South Wales.

On leaves of *Diospyros cargillia*, F.v.M.; July; New South Wales (Maiden).

7. BACTRIDIIUM VERSICOLOR, n.sp.

(Plate ii. figs. 13-14.)

Tubercles closely crowded, globose, hemispherical, black, but passing through fawn, pink and brown when young, firm, about

$\frac{3}{4}$ mm. in diameter. Potassium-iodide-iodine differentiates the basal stratum from the gonidiophores by colouring the former yellow and the latter a beautiful indigo-blue, while the gonidia are coloured a very pale yellow. *Gonidiophores* compact, erect, colourless, septate, rounded at free ends, simple, $130-140 \times 4 \mu$. *Gonidia* hyaline, straight or slightly curved, elongated, linear-clavate, tapering towards attached end and blunt at the other, multiseptate, up to 15-septate, often decidedly constricted at septa, $47-60 \times 3\frac{1}{2}-4\frac{1}{2} \mu$.

On bark of *Tubernaemontana orientalis*, R.Br.; April; Macleay River, N.S.W. (Maiden).

The simple gonidiophores and multiseptate gonidia seem to point to Bactridium rather than Fusarium, but the firm, even hard, tubercles most resemble the latter.

The numerous distinct septa of gonidia (12 being a common number) distinguish this at once from any described species with compact tubercles.

8. PHYLLOSTICTA SORIFORMIS, Cooke & Mass.

(Plate ii. figs. 15-17.)

Spots on both surfaces of leaves, orbicular, commonly 2 mm. diameter and up to 5 mm., confluent and then may be $\frac{1}{2}$ inch or more and sometimes entire surface of leaf is more or less a continuous mass, pale reddish-brown without distinct margin, and sometimes entirely covered by the minute, black, densely aggregated, prominent perithecia. *Mycelium* composed of pale green, creeping, septate, much-branched anastomosing hyphæ, $4-5 \mu$ broad and producing two kinds of reproductive bodies. (a) *Gonidia* laterally and terminally at the ends of branches, brown, cylindrical, rounded at the ends, triseptate, slightly constricted at septa, Helminthosporium-like, $17-20 \times 5\frac{1}{2}-7\frac{1}{2} \mu$. (b) *Perithecia* punctiform, run together, arranged like sori of uredines, sub-cuticular and bursting through cuticle. *Sporules* rod-like, hyaline, $4 \times 1 \mu$.

On leaves of *Persoonia salicina*, Pers., and *P. lanceolata*, Andr., May-September; National Park, near Sydney (Maiden).

9. SEPTORIA DIOSPYRI, n.sp.

(Plate ii. fig. 18.)

Perithecia epiphyllous, minute, membranaceous, brownish, with a few (about 6) dark brown, flexuous, rigid, septate, sharply pointed appendages, associated with *Heterobotrys paradoxa*, Sacc. *Sporules* hyaline, filiform, curved, slender, 5-septate, $40-45 \times 1-1\frac{1}{2} \mu$.

On upper surface of leaf of *Diospyros caryillia*, F.v.M.; July; New South Wales (Maiden).

10. USTILAGO CRYPTA, n.sp.

(Plate ii. fig. 19.)

Forming black masses within the flowering-glumes which wither up and still envelop the spore-masses. Resting spores globose or slightly elliptic, yellow to yellowish-brown, episporium smooth, dark-brown, thickish, $8-10 \mu$ diameter or $8\frac{1}{2} \times 5\frac{1}{2} \mu$.

On *Panicum bicolor*, R.Br.; New South Wales (Maiden).

It differs from *U. confusa*, Mass., in the non-pulverulent, not naked spore-masses; and from *U. panici-miliacei* in the smaller and narrower spores.

EXPLANATION OF FIGURES.

All the figures, unless otherwise stated, are magnified 1000 diameters.

PLATE I.

Asterella hakeæ.

- Fig. 1.—Ascus with sporidia of a clear brown colour.
 Fig. 2.—Asci in which the shaded portions are stained with KI-I.
 Fig. 3.—Brown sporidium.

Asteridiella solani.

- Fig. 4.—Immature asci ($\times 540$); *b*, probably mature.
 Fig. 5.—Immature ascus treated with KI-I.
 Fig. 6.—Sporidia, some of which are producing germ-tubes.
 Fig. 7.—Surface view of pycnidium ($\times 145$).
 Fig. 8.—Colourless filament inside pycnidium producing sporules.
 Fig. 9.—Sporules.

Helminthosporium conspicuum.

Fig. 10.—Free ends of gonidiophores with immature gonidia.

Fig. 11.—Gonidia.

Fumago vagans.

Fig. 12.—Hyphæ with gonidia.

PLATE II.

Bactridium versicolor.

Fig. 13.—Terminal end of gonidiophore.

Fig. 14.—Gonidia.

Phyllosticta soriformis.

Fig. 15.—Gonidia produced laterally and terminally.

Fig. 16.—Section of leaf showing epidermal cells and perithecia on surface
($\times 145$).

Fig. 17.—Sporules ($\times 600$).

Septoria diospyri.

Fig. 18.—Sporule.

Ustilago crypta.

Fig. 19.—Resting-spores.



McAlpine, Daniel. 1897. "New South Wales fungi." *Proceedings of the Linnean Society of New South Wales* 22, 36–43. <https://doi.org/10.5962/bhl.part.12701>.

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