

A New Genus of the Hysterangiaceae.

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Plates 12, 13.

WHILE collecting in the Whakatikei Reserve, Paekakariki, Wellington, Mr. and Mrs. J. G. Myers obtained abundant specimens of a peculiar white fungus, which they handed to the writer for identification. On examination this species proved unique, and calls for a detailed description of its structure.

The plants were found growing on rotting wood partially buried in the humus of open grassy places in the forest. Specimens are white in colour, and vary greatly in size and shape. The most characteristic feature is the presence of numerous sterile lobes, springing from the dorsal surface of the peridium. These lobes are dull-white, and may be clavate, capitate, or fan-shaped, solitary or branched, and are at their bases attached to a common pulvinate or globular body, the peridium. This also is white externally, and is attached to the substratum by several coarse white rhizoids.

When a mature plant is sectioned longitudinally the lobes are seen to be sterile and frequently hollow, the gleba being present only in the basal portion or peridium to which the lobes are attached. The function of these lobes is unknown. The gleba may extend for some little distance into their base. It is olivaceous in colour, and is traversed by numerous stout trabeculae, which arise from a distinct sterile basal disc. It is gelatinous in consistency, as is the greater portion of the interior of the lobes.

STRUCTURE OF THE MATURE PLANT.

Peridium.—This consists of two layers, an outer thin cortex or exoperidium, and a thick, gelatinous endoperidium. The exoperidium consists of a layer, 0.5–1 mm. thick, of loosely-woven, intricately-branched, colourless hyphae. The hyphae of which it is composed remain distinct during the lifetime of the plant, and at no time are gelatinized, nor do they assume the form of a pseudoparenchyma. This layer surrounds the endoperidium. The outer few layers of hyphae are somewhat evanescent, and give to the plant a pruinose appearance.

The endoperidium lies within the exoperidium, and is sharply delimited from it. It consists of a thick (3–5 mm.) layer of hyphae, which in the mature plant is partly gelatinized. It forms the whole of the internal portion of the lobes. At the base it forms a pulvinate sterile disc (basal disc), from which arise numerous stout trabeculae, which tend to divide the gleba into numerous locules.

Gleba.—This is traversed by the trabeculae, which give off secondary branches, which in turn are divided until an intricately-branched network of tramal plates is produced, the spaces between being occupied by lacunae lined with the hymenium. The lacunae are minute irregular spaces, closely compacted together save in the centre of the plant, where they are less crowded, and are frequently separated by large irregular interspaces. The

tramal plates consist of a central gelatinized layer (often absent near the terminal ends of the ultimate branches), with a layer on either side composed of small polygonal cells—the subhymenium—bearing on their proximal surfaces basidia closely compacted into a palisade tissue. The basidia are long, cylindrical, frequently branched, and each bears, on short, almost obsolete sterigmata, eight elliptical continuous spores. The spores are minute, hyaline, and uninucleate.

DEVELOPMENT.

As a sufficiency of developmental stages has not been obtained, the account given below is incomplete, and in consequence somewhat disconnected.

Developing plants first become noticeable as minute globular nodules on the upper surface of the rhizoids. Sections at this stage show the whole to consist of loosely-woven hyphae. When the plant has attained to a size of 3–4 mm., differentiation of the different tissues commences. The plant at this stage is globular, save where it is attached at the base, where it is slightly flattened. A definite exoperidium is marked off through the remainder of the internal tissues becoming more compacted. In the latter a more compact zone of hyphae appears near the base: from it strands of compacted hyphae arise, differentiation proceeding in an upward and outward direction until several primary trabeculae are formed. These are partly surrounded by irregular and poorly-defined lacunae, due, no doubt, to rupture of the hyphae in the vicinity. Next, branches are given off from the trabeculae, and in turn these branch so that the loosely-woven network of the gleba is formed. Within the margin of these branches small lacunae arise, and around the inner surfaces of these appear the subhymenial cells, which soon give rise to basidia. No specimens have been obtained showing the first formation of these lacunae, so that it is not known whether the formation of the regular hymenium is preceded by production of occasional basidia from irregular scattered papillae, as in *Gallacea* (1924). Growth of the trabeculae and smaller branches continues in this manner until a well-developed gleba is produced, this tissue appearing in plants of a diameter of 6–7 mm.

Later lacunae form within the peripheral zone (here termed the "endoperidium") lying beneath the exoperidium. Gelatinization of the trabeculae, central portions of the tramal plates, and endoperidium commences shortly after glebal differentiation, until at maturity all the glebal tissue, save spores, hymenium, and subhymenium, is gelatinized.

Development of Lobes.—These do not appear until glebal differentiation is well begun. They arise as small outgrowths from the dorsal portion of the endoperidium, and enlarge until they appear as distinct clavate or capitate bodies. They arise from the portion of the endoperidium immediately underlying the exoperidium, and are thus in all probability not derived from potentially sporogenous tissue. While still small they may again produce secondary and even tertiary lobes. Lobes may arise from any part of existing lobes, but generally arise from the vicinity of their attachment with the peridium. In large specimens the lobes become hollow, but no further stage of development than this has been observed. The plants are indehiscent, spores being released by gradual decay of the plant.

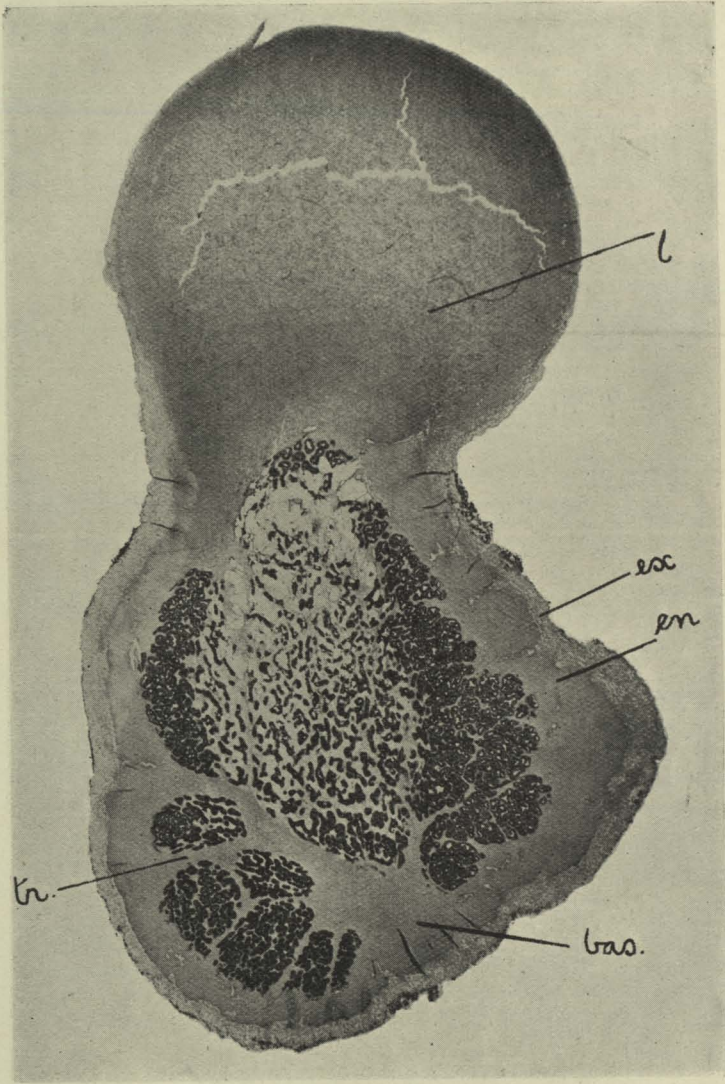
As no plants possessing these peculiar lobed structures have been described, the writer believes the genus to be undescribed, and proposes to name it *Phallobata*, on account of its phalloid-like spores and basidia, and the lobed character of the peridium.



FIG. 1.—Selected plants, natural size : showing variations in size and shape of plants, and especially of the lobes so characteristic of the genus.

FIG. 2.—Section of plant, $\times 2$: showing structure of lobes and gleba.

[G. H. Cunningham, photo.]



[G. H. Cunningham, photo.]

Section of plant, $\times 6$: *en*, endoperidium; *ex*, exoperidium; *l*, sterile lobed portion; *bas*, sterile base; *tr*, trabecula.

PHALLOBATA n. gen.

Peridium sessile, indehiscent, variously shaped, crowned with 1-several large single or branched sterile lobes; of two layers—an external loosely-woven intricately-branched layer of hyphae (the exoperidium), and an inner thick gelatinized layer forming the body of the lobes; attached to the substratum by numerous coarse rhizoids.

Gleba permanent, consisting of numerous anastomosing gelatinized tramal plates, enclosing minute lacunae, divided by several stout trabeculae springing from a sterile base into several loculae; hymenium lining the free surfaces of the tramae. Basidia 8-spored, subclavate or cylindrical, branched; spores borne on short slender sterigmata (or subsessile), continuous, hyaline or tinted, smooth, uninucleate. Cystidia and other aberrant cells absent.

Habitat: Saprophytic upon decaying wood.

Phallobata alba n. sp.

Peridium white or greyish-white, depressed-globose, globose, elliptical, or tuberous, up to 30 mm. wide, 35 mm. high, crowned with 1-several sterile lobes: attached to the substratum by numerous coarse white rhizoids. Lobes springing from the apical portion of the peridium, cylindrical, clavate, capitate, pulvinate, or irregular, white, smooth or rugose, pruinose, dry, frequently hollow within.

Gleba olivaceous, traversed by numerous gelatinized hyaline trabeculae, arising from the sterile pulvinate basal disc, enclosed within the broad gelatinized endoperidium. Lacunae elliptical, ranging in size from 0.1 mm. to 2 mm. or more.

Spores smooth, continuous, almost hyaline, rounded at both ends, $2-3 \times 1$ mm.

Habitat: Gregarious on rotting wood in grassy places in the forest.

Distribution: Forest reserve, Whakatikei, Paekakariki, Wellington, 45 m.; *J. G. Myers, Mrs. Myers!* 2nd June, 1924. *J. C. Neill! J. G. Myers!* 16th June, 1924.

Type collection. Herb. No. 1187.

SYSTEMATIC POSITION OF THE GENUS.

The earlier stages of development and glebal characters would place the genus in the family Hysterangiaceae, as defined by Fisher (1900). The 8-spored branched basidia and subsessile minute uninucleate spores would place it in the Phallales. It more closely resembles the genus *Phallogaster* Morg. than any other, but is separated on account of its being indehiscent, and in the possession of the queer lobes, so characteristic a feature of the plant. This genus, together with *Phallogaster*, would serve as a connecting-link between the Phallales and the Hysterangiaceae, and for this reason should be placed in an intermediate family. As such does not exist, it is retained in the Hysterangiaceae for the present.

LITERATURE CITED.

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