

BOTANICAL GAZETTE

APRIL, 1893.

Contributions from the Cryptogamic Laboratory of Harvard University. XIX.

Note on *Phallogaster saccatus*.

ROLAND THAXTER.

WITH PLATE IX.

During the past season the writer was so fortunate as to meet with the singular genus of *Phalloideæ* recently described by Mr. Morgan under the above name, as well as to observe its final development in connection with its earlier conditions; and since the description above referred to seems to indicate that the material on which it was based was somewhat immature, the publication of the present note seems desirable to supplement the original account. Through the courtesy of Mr. Morgan the writer has been able to compare an authentic specimen of *Phallogaster* with his own material and to determine their identity, although, as will be observed, the account here given involves some modification of the original description.

The genus presents so remarkable a departure from the type of structure common both to the *Phalleæ* and the *Clathreæ*, through the absence of any volva or receptacle differentiated as such in the mature condition, that it may not only be properly placed by itself as the type of a third subdivision of *Phallogastreæ*, but involves a distinct modification of the generally accepted definition of the family as a whole, in which its affinities are evidently rather with the *Clathreæ* than with other members of the group. Its structure is remarkably simple in a family peculiar for structural eccentricity, and, as stated by Mr. Morgan, appears to connect the phalloids more closely with the *Lycoperdaceæ* than any form hitherto discovered.

The sporophore in the present genus arises, like that of its allies, from a branching rope-like mycelium, running on or below the surface of the ground or decaying wood on which

it grows, and, though sometimes sessile, is usually raised upon a more or less clearly defined stalk, which, not infrequently, is abruptly distinguished from it (fig. 1). In section it is seen to consist (fig. 5) of a central portion, x , highly gelatinous even in young specimens and extending downwards, x' , into the stalk, while above it forms a more or less well defined central axis, x'' , surrounded laterally and superiorly by the gleba which it penetrates in all directions, not only separating and entering its main lobes, but extending to the peridial wall within which it forms a continuous layer, x''' , separating these two structures, except at definite points, y , where they are closely united. This gelatinous portion is composed of rather slender hyphae, branching and intertwining irregularly, among which numerous vesicular clamp-connections are conspicuous, one or both of the adjacent cell ends at such points being abruptly and very considerably inflated.

The gleba, the color and minute structure of which is similar to that of other phalloids, is irregularly lobed, and, as just mentioned, is separated from the peridial wall by a gelatinous layer continuous with the other gelatinous elements. This layer is, however, interrupted at irregular intervals by certain slightly projecting areas of the inner face of the peridial wall. These prominences, which are often ill defined and are irregular in size and outline, show no signs of any differentiation which might suggest the first step towards the formation of a receptacle proper, although the gleba is continuous with them and adheres to them after its deliquescence in clearly defined aggregates (fig. 4).

The peridial wall is moderately thick and clearly distinguished from the elements contained within it. In section it is seen to be formed by a thick layer of branching septate hyphae, the successive cells of which are irregularly inflated, forming eventually a rather loose pseudo-parenchyma which is covered externally by a very thin cortical layer, composed of slender cylindrical brownish hyphae and ill defined or scarcely distinguishable at maturity, although in the youngest specimen observed, measuring 7^{mm} in diameter, it is more prominent, as would naturally follow from its origin as a continuation of the mycelial cortex. The inner face of the peridial wall is beset with prominences irregular in outline and extent and at intervals wholly absent. Seen in section certain of these prominences coalesce with the gleba lobes, while others are bounded by the gelatinous layer already referred

to as separating the gleba from the peridium. The peridial wall, moreover, does not form a homogeneous and unbroken layer, but is singularly modified by the presence of numerous depressed areas (figs. 2, 3, 6, *z*), irregular in size, shape and position, giving the surface in many specimens an irregularly reticulated appearance, which, though less distinct in fresh material, becomes well defined when the wall is slightly shrunken by drying or by treatment with alcohol. These depressions, which constitute one of the most striking peculiarities of the form in question, are filled with loosely woven more or less shriveled brownish hyphae, and do not appear to represent a special differentiation of the wall, but to have resulted from the death or non-development of its hyphae at such points during the earlier period of its growth. The function of these depressions becomes manifest when the fungus has reached maturity. At this time dehiscence takes place in two ways. In smaller specimens the peridium may become irregularly clathrate through the perforation of its wall where these areas occur, the openings being enlarged through the outward curvature of the surrounding edges (fig. 5). More frequently, however, this perforation is associated with a general dehiscence at the apex (fig. 4), first indicated by the appearance of a series of cracks in this region (figs. 2, 3), the course of which is guided to some extent by the depressed areas just described. The peridial wall thus ruptures in an irregularly stellate fashion, into several segments, which, separating from one another and becoming divergent or slightly reflexed, expose the interior surface. At the same time the larger of the depressed areas which have not been included in this cracking may become perforate (fig. 4, *a*). Meanwhile the entire contents of the peridium has become deliquescent, the main lobes of the gleba contracting and adhering to the inner face of the peridium in the form of clearly defined slimy masses, of irregular size and shape (fig. 4, *b*). In this condition the expanded funnel-shaped peridium is hollow to its very base and has assumed the function usually accomplished in the group by means of a highly specialized receptacle, exposing to the air the fetid spore masses, the removal of which is, as usual, rapidly accomplished through the agency of flies, leaving an empty shell which soon collapses and decays.

It should perhaps be mentioned that the depressed areas and resultant perforations of the peridial wall, which, as far

as can be determined from the material at hand, do not find a parallel elsewhere in the family, appear to bear no definite relation to the areas on the inner face of the peridial wall upon which the gleba lobes are seated, including them or not without regularity.

The question of homologies between this and other phalloid genera may well be deferred till its earliest conditions are exactly known; meanwhile it would be perhaps more easy than profitable to point out by what modifications we might readily convert it into something very like the genus *Clathrus*.

In view of the above history the original diagnosis of the form may be modified as follows:

PHALLOGASTER Morgan.—Mycelium fibrous, branching. Peridium spherical to pyriform, stipitate or substipitate, consisting of a single layer covered by an evanescent cortex and coarsely reticulated through the presence of numerous irregular thin areas which become perforate at maturity, the perforation commonly associated with a general terminal dehiscence of the peridium into several divergent lobes. Gleba irregularly lobed, the lobes continuous with slight prominences from the surface of the peridium from which they are elsewhere separated by a gelatinous layer continuous with a central gelatinous axis which penetrates the gleba and separates its lobes. The entire contents deliquescent at maturity, adhering in distinct masses to the inner surface of the ruptured peridium.

PHALLOGASTER SACCATUS Morgan: Journ. Cincinnati Soc. Nat. Hist. XV, 171, plate II, Oct. 1892.—Plate IX. Solitary or rarely subcespitose. Peridium spherical to pyriform, 20–50 × 10–25^{mm}, stipitate or nearly sessile, the surface smooth, slightly uneven, whitish stained with dull flesh-color at maturity, becoming coarsely clathrate from the formation of irregular perforations, the perforation usually associated with a terminal dehiscence of the peridium into from three to five divergent lobes: the dark sage-green gleba adhering in definite masses of irregular size and shape to the inner face of the peridial wall. Spores greenish, sub-cylindrical 4–5.5 × 1.5–2.6–8 on each basidium.

Ohio (*Morgan and Herrick*). New York and Connecticut (*Underwood*). Maine (*Thaxter*) on the ground or rotting wood under *Fagus*.

Harvard University.

EXPLANATION OF PLATE IX.—*Phallogaster saccatus* Morgan. Fig. 1. Stipitate habit. Fig. 2, 3. Appearance just before dehiscence showing cracks at apex and thin areas z . Fig. 4. The same specimen as fig. 3, after dehiscence. a , perforate thin areas. b , deliquesced gleba masses adhering to inner face of peridial wall. Fig. 5. Smaller example which has become perforate without complete dehiscence. Fig. 6. Longitudinal section of a mature specimen before dehiscence. x, x', x'', x''' , gelatinous axis and its derivatives, y points of origin of gleba from peridial wall. z , thin areas in peridial wall. Fig. 7. Basidia with spores *in situ*. Fig. 8. spores.
Figs. 1-6 about natural size. Fig. 7 drawn with Leitz 1-12 oil immersion, Zeiss ocular 4. Fig. 8 Leitz 1-12 oil im. Zeiss comp. oc. 12.

The genus *Cæsalpinia*.

E. M. FISHER.

Following the publication of my revision of the genus *Hoffmanseggia* in Contributions National Herbarium, I. no. 5, I desire to make certain corrections and supplementary statements.

On page 144, §1, line 1 of synopsis, the reference should be to no. 2 (*H. drepanocarpa* Gray) not no. 4 (*H. gracilis* Watson).

Since *nomina nuda* are not to be recognized, *H. glabra*, var. *intricata* Fisher should read *H. intricata* Brandg.; and *H. glabra* Fisher should read *H. intricata*, var. *glabra* Fisher.

It may be well to speak of the combination *H. falcaria*, var. *demissa* Fisher. Dr. Gray, in 1852, published in Pl. Wright., in the following order, *H. densiflora* Benth. MSS., *H. stricta*, var. *demissa* Gray, and *H. stricta* Benth. MSS. *H. densiflora* Benth. is described incompletely, the fruit being wanting, and Dr. Gray remarks that he is not sure that it is distinct from the next form, *H. stricta*, var. *demissa* Gray. From an examination of the types, I concluded that *H. densiflora* is intermediate between *H. stricta* Benth. and *H. stricta*, var. *demissa* Gray. Dr. Gray's remark is sufficient to show that he doubted whether they should be separate, and his unwillingness to publish the var. *demissa* as a species (although having mature fruit) shows which he considered to be the type. Undoubtedly in this case, however, the rules of nomenclature demand that *H. falcaria*, var. *demissa* (Gray) Fisher be changed to *H. falcaria*, var. *densiflora* (Benth.) Fisher. At the time of writing the revision, it was with hesitation that it was not merged with *Cæsalpinia*. After a careful examination of the flowering parts and their tissues, in several species



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