© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



plasmolized and the cell walls will be rendered more distinct in consequence. It is less easy to induce the protoplasm to withdraw from the wall separating the two gametes than from the other walls of these cells. This is especially true of the smaller gamete. It has been accomplished in a sufficient number of cases, however, to leave no doubt in the writer's mind that there are two gametes which are definitely separated by a continuous cross wall as shown in fig. 20. There seems no doubt also that these two gametes which plasmolize into two separate masses of protoplasm unite later by the dissolution of the intervening cross wall into a single cell the contents of which now plasmolize into a single mass as shown in fig. 23.

## Explanation of Plates.

Figures in plates I and II were outlined with the aid of a camera lucida. half were all viewed through a 4 mm objective and have been reduced to about one They in reproduction. Surface sculpturing on mature zygospores is not represented.

**Plate I.** *Zygorhynchus heterogamus.*

Figures 1—8. Consecutive stages in zygospore development in living material from moist chamber culture. Drawings were made at times indicated.

**Plate II.** *Zygorhynchus Moelleri.*

Figures 9—15. Stages in zygospore development in living material from moist chamber culture.

Figures 16—24. Stages of zygospore development taken from stained and mounted material. Outlines of cell walls only are represented, except in figures 20 and 23 where plasmolized cell contents are shown in stippling. *a* Branch which has given rise to male gamete; *b* Branch which has given rise to female gamete; *c* Zygote formed by union of male and female gametes; *m* Male gamete; *f* Female gamete.

---

# On the Morphology and Development of *Phoma Richardiae* n. sp.

By

**W. B. Mercer,** B. Sc.

(Vans Dunlop Scholar, University of Edinburgh.)

(With 6 Textfigures.)

In a group of *Calla*-plants under glass-house cultivation isolated leaves, partially or wholly in a state of decay, are usually to be found. Sometimes the decaying area is sharply marked off from the rest of the leaf; sometimes the transition from sound to unsound tissue is very gradual. The unsound area is usually situated peripherally; at times however it is represented by a round or oval area in the middle of the leaf, wholly surrounded by healthy tissue. In the examination of such unsound leaves, numerous fungi have been met with, notably species of *Hormodendron*, *Alternaria*, *Macrosporium*, *Penicillium* etc. Together

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



with these, in one instance, *Phoma*-like pycnidia occured. In pure cultures the last-named developed secondary fruit forms; and as it seemed possible that this fungus was of a parasitic nature, an investigation into the morphology and physiology of the species was undertaken. The work was suggested by Prof. Dr. H. KLEBAHN, and has been conducted under his supervision in the Botanische Staatsinstitute, Hamburg.

I should like at the outset to express my thanks to the Director of the Institute for the use of the Laboratory and materials, to Prof. Dr. BRICK, Station für Pflanzenschutz, Hamburg, for assistance in connection with the literature, and especially to Prof. KLEBAHN for the constant advice and assistance he has so kindly afforded me throughout.

The fungus was first cultivated on plum-juice agar[1]); pycnidia, extruding single-celled hyaline spores were quickly formed; later on chains of brown, pear-shaped conidia were developed on the mycelium and around the masses of extruded pycnospores, while gemma-like structures appeared in the agar.

Subsequently moist-chamber, PETRI-dish, and tube cultures were made on a variety of media, minor differences being observable in the various cultures.

The drawings have all been made by the aid of the camera lucida.

## 1. The mycelium.

The best growth has been obtained on plum-juice agar. It will be convenient therefore, to describe first the appearance of the mycelium on this medium. In a moist-chamber culture a central mass of intertwined hyphae arises around the point of inoculation, from which main branches radiate, giving off smaller branches in all directions (Fig. 1, *1*). Side walls 12—25 $\mu$ apart are laid down 0,3—0,4 mm behind the growing point. Commonly a hypha forks two or three times in front of the first cross wall; but branches also arise further back. The pycnidia tend to form more or less in a circle in the central mass of mycelium, and in lines along the main branches. The young mycelium is at first colourless or very pale green, and contains numerous spherical oil-drops. The branches are slightly constricted at their points of origin. Fusions of hyphae occur frequently, especially towards the edge of the agar drop (Fig. 1, *2*, *3*). As age increases many of the cells become barrel-shaped or distorted, assume a yellowish colour and their oil drops often run together (Fig. 1, *4*); the agar also assumes a darker colour. As the mycelium dies its protoplasm becomes concentrated in short stretches, the cells of which are usually irregular (Fig. 1, *5*, *6*).

PETRI-dish cultures show marked concentric rings, due to the formation of numerous and scanty pycnidia respectively in alternate rings of

---

1) Plum agar. Half a dozen dried plums were boiled with 500 ccm water for 2 hours. The solid matter was then filtered off and 20 g agar, previously purified by MACÉ's method (Traité pratique de Bactériologie, Paris 1889) were added. The mixture was boiled for half an hour, and then filtered in steam till the filtrate came through clear — a process extending over about a day and a half. The filtrate was made up to 1000 ccm, filled into SOXHLET-bottles, and again sterilized. For moist chamber cultures it was found convenient to dilute with an equal volume of water. The medium is slightly acid.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



growth. The resemblance to the cross-section of an oak stem is striking, the vessels of the wood being here represented by pycnidia.

Mouse-grey aerial or "luft"-mycelium is formed scantily all over the dish, being most plentiful where the layer of agar is thickest; the amount varies with temperature, cultures kept at 12° C developing considerably more than those kept at 19° C, or 28° C. The general growth on other agar media which have been used, viz-Salep [1]), Horse-dung [2]) and *Calla*-leaf [3]) is very similar to that on plum agar. Concentric rings of growth occur on all. On Salep agar the mycelium is rather thinner than on any of the others (Fig. 1, *7*) and it becomes divided into very short cells with age.

Grown in tap water in moist chambers the fungus produces very thin, but otherwise normal mycelium; pycnidia are produced very slowly.

5% Gelatine containing various food stuffs proved also a fairly satisfactory medium, though growth was in all cases slow. Very broad (8 $\mu$) hyphae were produced on that to which 5% Lecithin had been added (Fig. 1, *8*).

Twigs of various trees cut up and sterilized were also inoculated with the fungus. It was found that the mycelium penetrated right through the wood, running mainly with the grain; on the outside, pycnidia were produced in abundance. The greatest irregularity in the cells of the mycelium was met with in tube cultures on potato. The amount of oil secreted in the hyphae was also striking here. In some cases the cell lumen was completely filled with this substance (Fig. 1, *9*).

Various other solid media were tried e. g. Banana, Carrot, Radish, Rhubarb, Apple, Asparagus — but the growth presented no marked peculiarities on any of these substrata.

## 2. The pycnidia.

These are typically round or pear shaped, with a circular mouth: but there are very great variations in size and shape on all media. They may be oval, or almost linear, or highly irregular in outline, while the diameter varies between 25 $\mu$ and 200 $\mu$. Taking however those produced in cultures on *Calla*-leaf as the most normal (Fig. 1, *10*), the diameter when fully ripe may be put at 120—150 $\mu$, that of the mouth at 20 to

---

1) Salep-agar. 30 g agar, purified as before, were boiled for half an hour with a litre of water. 9 g Salep powder (Bernard, Rev. Gén. de Bot. 1904, **16**, 408) were likewise boiled half an hour with a similar quantity of water, made up again to 1000 ccm, and mixed with the agar solution. Further food materials, according to Klebahn's method, were then added, viz:

| | | | |
|---|---|---|---|
| Glucose | 1 g | $NH_4NO_3$<br>$(NH_4)_2SO_4$<br>$FeSO_4$<br>$MgSO_4$ | Trace. |
| Tartaric acid | 0,2 g | | |
| $KH_2PO_4$ | 0,2 g | | |

The mixture was then boiled for a further half hour, filtered, and stored in the same manner as with plum agar (vide Klebahn, Jahrb. f. Wissensch. Bot. 1905, **41**, 488). The medium is practically neutral.

2) Horse-dung-agar. A decoction of horse dung to which 2% of pure agar was added.

3) *Calla*-leaf-agar. Abont 10 g of *Calla*-leaf boiled with 100 ccm water and 2 g agar added to the filtrate.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



30 $\mu$. On the majority of media the mouth does not project, at most a mere rim round the edge being present. On *Calla,* however, a short distinct neck, notable in the earlier stages by reason of its dark colour, is usually present (Fig. 1, *10*, *11*).

When ripe the wall, which consists of very irregular cells, is brown-black, or black. A number of loose hyphae are scattered over its surface; in some cases — notably in potato cultures — they are congregated around the mouth, while in others they radiate from the base.

Very commonly two or more pycnidia fuse together, producing a compound fructification with more than one mouth.

In agar-cultures the pycnidia are formed in the aerial mycelium, on the surface of, and immersed in the agar. Spores are extruded even from those immersed.

Temperature has considerable effect upon pycnidia formation. Cultures on plum agar kept at different temperatures yielded the following results:

| Temp. | No. of pycnidia per area a | Avge. diam. of pycnidia |
|---|---|---|
| 12° C | 1,5 | 0,1 —0,15 mm |
| 19° C | 2 | 0,1 —0,2 mm |
| 28° C | 14 | 0,03—0,05 mm |

The culture kept at 28° C was remarkable in that pycnidia were formed immediately behind the growing points. At ordinary room temperatures and below, this does not occur; during the growth of the culture a peripheral band of hyphae some 3 mm broad, as yet sterile, is always to be seen.

## 3. Development of pycnidia.

The immediate forerunner of a pycnidium is a solid mass or primordium, which may arise by one of two methods designated by VON TAVEL [1]) Symphyogen and Meristogen respectively.

Symphyogen. Development of the primordium was followed by means of moist-chamber cultures. An agar drop was inoculated with spores of the fungus, and as soon as pycnidia began to develop — about 48 hours later — a favourable one was selected and its position marked by a circle drawn on the cover glass. The young pycnidium was then observed every few hours and drawings made with the camera lucida.

Hyphae in a particular part of the mycelium become closely woven together, branching profusely. Some of the branches remain short, while others grow out as vegetative hyphae, their bases only contributing to the interwoven mass (Fig. 1, *12, 13*). In a short time all that can be seen is a great number of loosely woven hyphae surrounding a central tighter mass, which begins to assume a pseudoparenchymatic appearance (Fig. 1, *14*). At this stage, which, in the case of the first formed pycnidia occurs some 24 hours after formation commenced [2]), groups of spores whose origin

1) Vergleichende Morphologie der Pilze (Jena 1899, G. FISCHER).
2) The later formed pycnidia develop more slowly.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



cannot be seen may usually be found among and outside the loose hyphae (lower part of Fig. 1, *14*); the central mass also begins to assume a yellowish colour. As development proceeds the central mass enlarges, the surrounding network of hyphae is to a great extent absorbed, and the peripheral cells become sharply differentiated, their colour changing through pale yellow and brown to black.

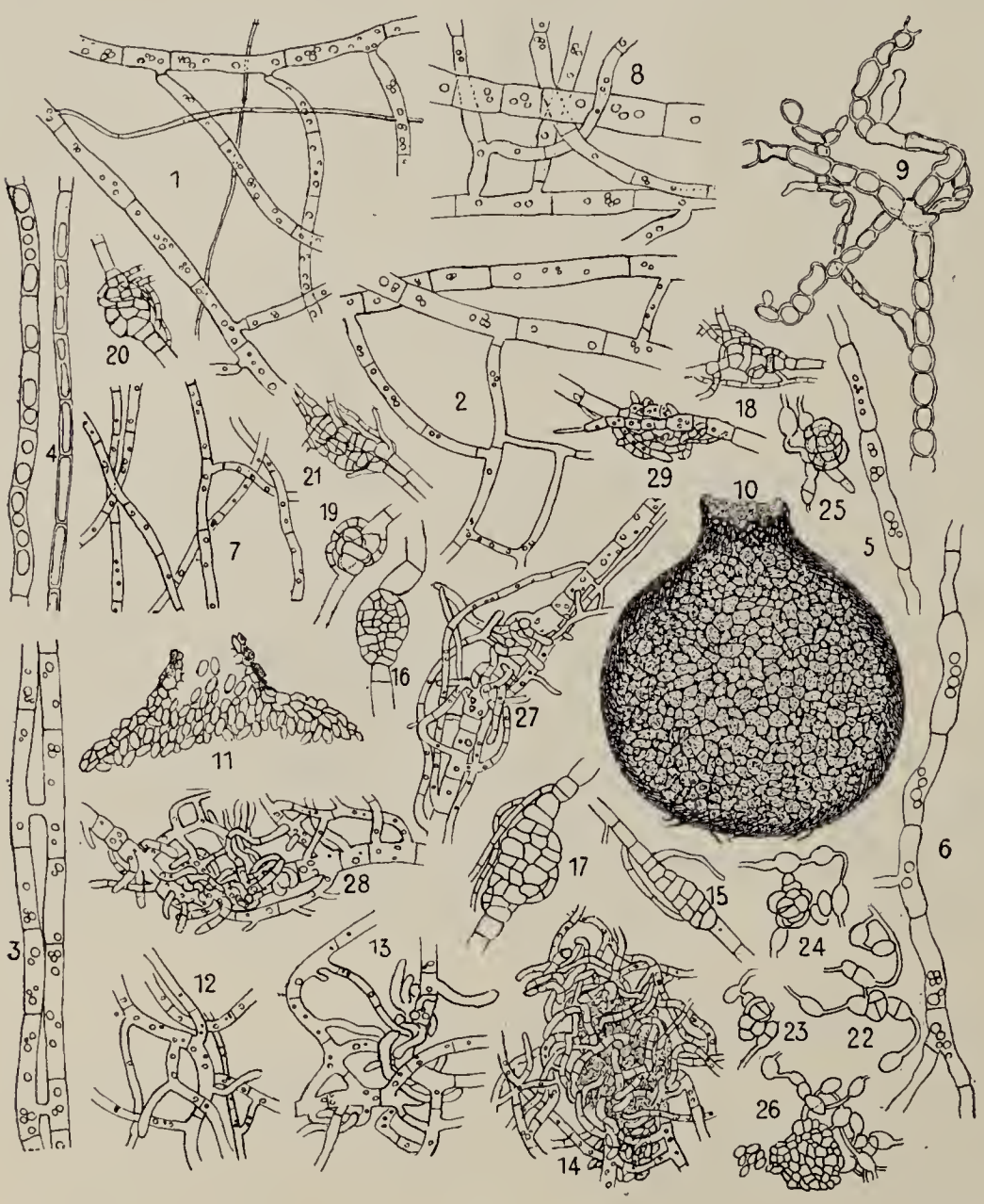


Fig. 1. *1* Mycelium on plum agar. — *2*, *3*: Fusions of hyphae. — *4*: Old hyphae with large oil drops. — *5*, *6*: Isolated stretches of living hyphae in old mycelium. — *7*: Mycelium on Salep agar. — *8*: Mycelium on Lecithin-gelatine. — *9*: Mycelium on Potato. — *10*: Pycnidium on surface of sterilized *Calla*-leaf. — *11*: Section of upper part of same. — *12—14*: Evolution of symphyogen pycnidium on plum agar. — *15—21*: Devoloping meristogen pycnidia on Salep agar. — *22—26*: Pycnidia developing from pycnospores in Cane Sugar solution. — *27—29*: Pycnidia developing by intermediate methods. — Fig. *1—8* = $^{353}/_{1}$, Fig. *9—29* = $^{263}/_{1}$.

Meristogen. This method of formation is confined to late formed pycnidia. Development is much slower than in the former case. In moist chambers extremely few primordia arise in this manner, and these rarely develop into pycnidia. Though the earlier stages in the evolution of a number were followed in the same manner as for the symphyogen, no case was met with which completed its development. Evolution, therefore, has been traced by a comparison of examples in different stages of development occurring in moist-chamber and Petri-dish cultures.

The main part of the primordium is derived from the repeated division and growth of a few adjoining cells of a hypha. At a particular point in a hypha a number of cross walls are laid down at close interwals (Fig. 1, *15*). The short cells so formed swell and divide in all directions; the daughter cells repeat the process, a solid cellular mass being formed (Fig. 1, *16*, *17*). A certain amount of branching usually takes place, the branches being small and divided into short cells which fuse with the cells derived from the division of the main hypha (Fig. 1, *18—20*). The exact amount of assistance the growing mass receives by

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



this process it is impossible to see; but it appears to be usually small. A number of vegetative hyphae may also arise from the developing mass (Fig. 1, *17, 18, 20*). The primordium becomes eventually more or less spherical or oval.

It is sometimes formed from two hyphae lying close together (Fig. 1, *21*).

This method of development is commoner on some media than others. On plum agar it is rare; on Salep agar, and on 5 % Gelatine containing 5 % Cane Sugar, however, a considerable number of pycnidia arise in this manner. Pycnidia so formed are notable for their small size — they are rarely more than 50 $\mu$ in diameter — and their regularity of outline.

An extreme case of this method of formation was observed where a great number of spores were brought on to a hanging drop of weak potato-decoction gelatine. While a great number of the spores behaved in a manner to be subsequently described, some swelled, and, after producing one or more short tubes, divided repeatedly to form a spherical mass of tissue from which a minute pycnidium was eventually evolved (Fig. 1, *22—26*). During growth a great deal of oil was secreted, and it was sometimes necessary to place the cover slip in Xylol before the structure of the mass could be seen. Sometimes it appeared as though more than one spore contributed to the formation of the primordium (Fig. 1, *23, 24*).

Intermediate methods of formation are common on all media. Indeed, a more or less regular sequence is to be observed in the method of pycnidia formation in a Salep agar culture. The first formed originate through the branching and interweaving of several hyphae (Fig. 1, *12—14*), then follow a great number produced around a single hypha (or two hyphae lying close together) by profuse branching of a few adjoining cells, the branches applying themselves closely to the main strand, and the latter itself dividing to a varying extent (Fig. 1, *27—29*). Later on the primordium is produced mainly by the repeated division of a few cells of one hypha, comparatively few branches assisting (Fig. 1, *18—20*). It is tolerably certain that pycnidia may, finally, be produced solely by the repeated division of contiguous cells, no branches whatever arising therefrom. In development, however, the mass becomes so complex that it is impossible to say whether some of the cells have arisen by branching, or by division; though cases are met with (Fig. 1, *16*), which present every appearance of having been developed solely by the latter process.

In order to observe the changes going on after the cellular mass becomes too complex to see through, cultures were allowed to grow for four or five days in a PETRI-dish on plum agar; pieces of different ages were then cut out, killed and fixed in chromacetic [1]), and embedded in paraffin in the usual way for microtoming. The agar hardened sufficiently to allow of fairly good ribbons 1 and 2 $\mu$ thick being cut. Some difficulty was met with in the selection of a suitable stain, as it was necessary to have the cell walls clearly differentiated. Congo-red, followed by Gentian-Violet was eventually used. Congo-red, even in concentrated solution stained the walls too faintly to be satisfactory alone.

---

1) 3 g Chromic acid, 1 ccm Glacial Acetic acid, 99 ccm Water.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



The pycnidia in young cultures on plum agar are all formed by symphyogen growth, though they may be formed around a few cells of a hypha which itself divides to a certain extent. In section it is impossible to distinguish by what method the initial masses have arisen.

At first the primordia are solid (Fig. 2, *1*). An internal cavity, frequently of irregular outline, in which the spores are formed, soon arises (Fig. 2, *2—4*). The cavity is not always centrally situated. As the pycnidium increases in size the cavity enlarges and becomes more regular (Fig. 2, *5—7*). In a short time it is packed with spores (Fig. 2, *8*). No differentiation is observable among the cells of the three or four layered wall surrounding the cavity. Towards the apex a mouth arises; which, at first very narrow, gradually widens as growth proceeds (Fig. 2, *7—9*). As the pycnidium approaches ripeness the wall becomes stretched to two or three layers of flattened irregular cells which gradually darken in colour.

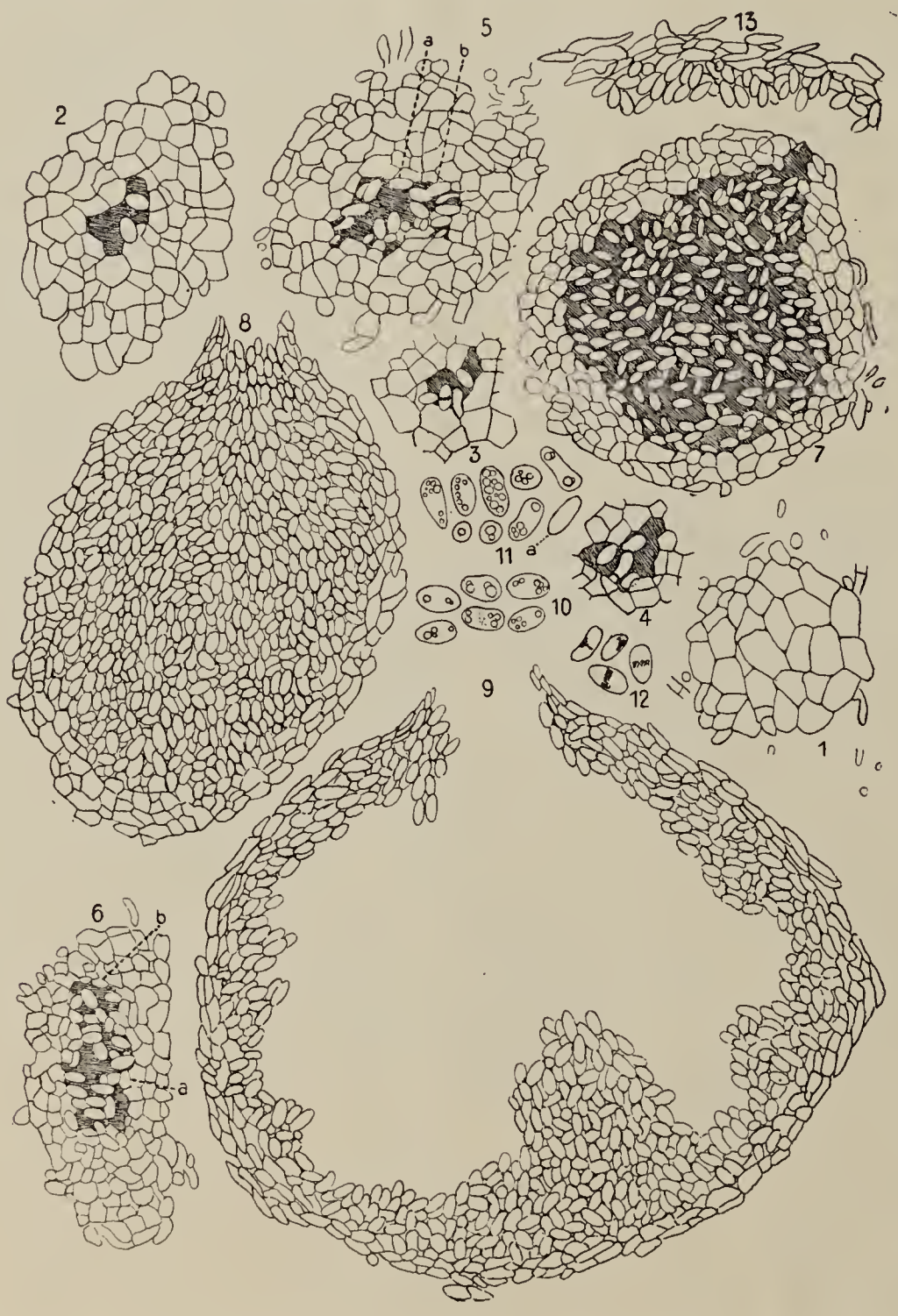


Fig. 2. *1*, *2* and *5—9*: Median longitudinal sections through pycnidia on plum agar in various stages of development (only a portion of the spores — which completely fill the cavity — shown in *9*). — *3*, *4*: Central part of very young pycnidia. — *10*: Typical pycnospores. — *11*: Variations of same. — *12*: Pycnospores stained with Safranin. — *13*: Wall of pycnidium on Potato. — Fig. *1—9* = $^{510}/_{1}$; Fig. *10—12* = $^{608}/_{1}$.

The exact manner in which the spores arise is not easy to see; indeed it is only possible in very young pycnidia. In development the cavity soon becomes so packed with spores that, even in sections 1 $\mu$ thick, it is impossible to see the exact connection between spore and wall, and often difficult to tell whether a particular cell represents spore or wall (Fig. 2, *8*, *9*). In the very young stages half formed spores are comparatively seldom met with; and the spores often lie with their long sides in contact with wall cells (*a*, *b*, Fig. 2, *5*, *6*). These facts for a time

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



led me to the belief that the spores were not formed by a process of budding, but by division and rounding off of the wall cells. Examination of a larger number of young pycnidia, however, disposed of this idea, since several were found in which spores in the process of budding off were discovered (Fig. 2, *3—5*). Here and there spores which appear bicellular are occasionally found in a young pycnidium (Fig. 2, *3*). I have never seen this in a pycnidium which has reached any considerable degree of development, and only once or twice in very young pycnidia.

In discussing the changes which the wall surrounding the spore cavity undergoes during growth, it may be noted in the first place that it expands greatly, and that the number of cell layers of which it is composed, diminishes (comp. Fig. 2, *2* with *8*, *9*). Expansion might be brought about by division of the cells, by rearrangement, or by a combination of the two methods. But cell division alone could not lead to a thinning of the wall. A certain amount of separation and rearrangement of the cells must go on, and they must be comparatively loosely bound together to allow of this process — a view which is rendered all the more tenable by the fact that the tissue-like mass owes its origin to the interweaving of hyphae. The wall is best regarded, therefore, as a more or less mobile aggregation of cells; not, as it appears in section, as a firm pseudoparenchyma. The production of a spore cavity in the once solid mass, and of a mouth in the once continuous wall, is no doubt referable to this mobility of the cells. There is no sign of disorganisation of the cells in either case, nor, in the latter case, of tearing such as occurs in the formation of some pycnidia mouths. Here the mouth is formed gradually, and, like the spore cavity, opens wider as growth proceeds (Fig. 2, *7—9*). This is precisely what would occur if it owed its origin to separation of the cells. In some cases formation may be assisted by the presence of the packed spores in the cavity; but the mouth is often formed before the accumulation of spores within is very dense (Fig. 2, *7*).

Mere rearrangement of the cells, however, could not account for such a great expansion of the wall as occurs (comp. Fig. 2, *2* and *9*). New cells must be added. Now it was observed in tracing the early evolution in moist-chamber cultures, that the central mass continually adds to its bulk during growth, by the absorption of hyphae from the outside. No doubt this process accounts, in part at least, for wall expansion. Either hyphae from the outside push in between the already existing cells, or, what amounts to the same thing, the primary cells push outwards, gradually enclosing peripheral hyphae among themselves.

The irregular size and shape of the wall cells and the fact that, as the pycnidium ripens, they become flattened, make it difficult to compare them in different stages of growth. Flattening, however, seems to take place chiefly late in life (comp. Fig. 2, *7*, *8* and *9*) and comparison of Fig. 2, *1—8* shows that the cells do, on the whole, become smaller as development proceeds. It is probable therefore that the process of cell division which assists in the formation of the primordium in some cases, is instrumental at a later period in aiding wall expansion.

The meristogen pycnidia are produced in too small numbers and are too much intermingled with symphyogen to make the task of picking them out separately and trying to follow their evolution in the later stages,

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



a practicable one. From the small number I have been able to examine, however, their development appears to be similar to that described for the symphyogen.

Perhaps the chief interest attaching to the pycnidia lies in the development of the primordium. The majority of the pycnidia whose evolution has heretofore been studied, form their primordia in one of the two ways. Thus it arises by the weaving together of hyphae in *Diplodia mamillana* [1]) and in the *Graphiola* [2]) studied by Alfr. Fischer.

Meristogen growth, however, appears to be commoner — e. g. *Pycnis sclerotivora* [3]), *Curcurbitaria elongata* [4]), *Curcurbitaria Platani* [4]), *Leptosphaeria Doliolum* [1]), *Fumago vagans* [5]). The extreme case of the formation of the pycnidium by division of the spore, finds a parallel in the direct development of pycnidia from ascospores of *Curcurbitaria Platani* [3]), when brought on to gelatine.

Zopf [5]) has shown that pycnidia of the same fungus may arise by either of these methods. The resemblance of the pycnidia on *Calla* fungus, in form and development, to the "Gewebefrüchte" of *Fumago vagans* is striking. In both cases the general construction of the fruit is simple, there are no sterigmata, and there is no differentiation among the wall cells; the two differ only in that the pore is formed in *Fumago* by gelatinisation of the apical wall cells, whereas this does not occur with the *Calla*-fungus. They both stand in marked contrast to the more highly evolved types such as *Septoria apii* [6]), *Phoma apiicola* [6]), *Curcurbitaria Laburni* [7]), *Septoria atriplicis* [8]) etc. in which the spores are borne on sterigmata, and the wall shows two types of cells, an outer, darker, layer and lighter isodiametrical cells towards the inside.

Though the earlier stages in the evolution of the pycnidium of the *Calla*-fungus present some similarity to that of *Thelebolus stercoreus* [9]), there is no primary "fertile cell" as in that fungus. Indeed *Thelebolus* would seem to be an isolated case of such a method of formation.

## 4. The pycnidial spores.

The spores are colourless, oval, or egg shaped, 6—7 $\mu$ long, and 4 $\mu$ broad. Oil is characteristically present as two or three drops towards each end (Fig. 2, *10*). Occasionally they are flattened, spherical, or irregular in shape (Fig. 2, *11*). Elongated spores with little or no oil are sometimes met with (Fig. 2, *11a*): they do not, however germinate.

1) Bauke, Beiträge zur Kenntnis der Pycnidien (Nova Acta **38**, Nr. 5, p. 443).
2) Fischer, Alfr., Beiträge zur Kenntnis der Gattung *Graphiola* (Bot. Ztg. 1883).
3) v. Tafel, E., Beiträge zur Entwicklung der Pyrenomyceten (Bot. Ztg. 1886).
4) Eidam, Über Pycnidien (Bot. Ztg. 1887).
5) Zopf, Die Conidienfrüchte von *Fumago* (Nova Acta **40**, Nr. 7).
6) Klebahn, Krankheiten des Selleries (Ztschr. f. Pflanzenkrankh. 1910, **20**, H. 1).
7) Tulasne, Select. Fung. Carpologia II, p. 215.
8) Frank, Handbuch der Pflanzenkrankh., 2. Aufl., **2**.
9) Brefeld, Untersuchungen aus dem Gesamtgebiete der Mycologie 1891, H. 9, p. 114.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



When the spores are stained with Bleu Coton or Safranin, a dark band across the middle — apparently due to a concentration of the protoplasm around a central nucleus — is usually to be seen. This stained patch occasionally lies to one side, and may be of irregular outline (Fig. 2, *12*).

The number of spores produced from one pycnidium is very large, the mass far exceeding in volume that of the pycnidium itself. In examining old cultures it has frequently been necessary to boil them away before the mycelium could be clearly seen. They generally lie heaped around the mouth of the pycnidium as they are extruded, forming at first pale yellow, or in some cases reddish masses. They appear to be embedded in a gelatinous substance which hardens with age; old masses are extremely difficult to disintegrate completely. (Schluß folgt.)

---

# Zur Systematik von *Fusarium nivale* bzw. seiner höheren Fruchtform[1]).

Von Dr. **E. Schaffnit**-Bromberg.

(Mit 2 Textfiguren.)

Die älteste Literaturangabe über *Fusarium nivale*, das häufig auf Wintersaaten, Grasplätzen, Wiesen usw. den sog. Schneeschimmel erzeugt, rührt wohl von E. Fries her. Er beschreibt mit wenigen Worten (Syst. orb. vegetabilis, Lund 1825, p. 317) einen Pilz als *Lanosa nivalis*, der später von Unger[2]), dem zweifellos nach seinen weiteren Ausführungen *Fusarium nivale* vorlag, mit diesem identificiert wurde. Späterhin (1846) diagnosiert Fries nach Ungers Veröffentlichung etwas genauer: „Flocci tenerrimi, arachnoidei, septati, ramosi, intricati, fugaces; sporae ad latera e verrucis enatae, fasciculatae difformes, 1—4 septatae."

Unger hat jedenfalls als erster auch die Conidienfruchtform beschrieben; er weist darauf hin, daß der Pilz zu der Gattung *Fusisporium* oder *Trichothetium* zu stellen sei und hat die Bedeutung des Pilzes als die eines Parasiten erkannt. Die zweifellos unrichtigen Angaben von Fuckel[3]) und Rostrup[4]) haben kein weiteres Interesse. Weit eingehender als die genannten Autoren hat sich Sorauer[5]) mit dem Pilz beschäftigt. Er beschreibt einen Teil der Entwicklungsformen des Pilzes und nennt ihn nach der Form der Conidien und nach seinem Vorkommen unter dem Schnee *Fusarium nivale*. Daß bei Saccardo[6]) bereits eine

1) Ausführliches über die Morphologie und Physiologie des Pilzes vgl. Landw. Jahrb. 1912, **43**.

2) Bot. Zeitung 1844, **2**, p. 569.

3) Symbolae mycologic., Wiesbaden 1869, p. 142.

4) Cit. nach Mortensen, Om Sygdomme hos Kornarterne, Kopenhagen, Sep.-Abdr. aus Tidsskrift för Landbrugeis Planteavl. 1911, **18**.

5) Zeitschr. f. Pflanzenkrankh. 1901, **11**, p. 220 und Landw. Jahrb. 1903, **36**, p. 1.

6) Vgl. Saccardos Sylloge 1892, **10**, p. 726.

# ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Mycologisches Centralblatt. Zeitschrift für Allgemeine und Angewandte Mycologie

Jahr/Year: 1913

Band/Volume: 2

Autor(en)/Author(s): Mercer W. B.

Artikel/Article: On the Morphology and Development of Phoma Riehardiae n. sp. 244-253