SIGMOIDEOMYCES CLATHROIDES.

A NEW SPECIES OF FUNGUS.

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WITH PLATE 4.

Amended generic diagnosis. *Sigmoideomyces* Thaxter. Fertile hyphae septate, bent into many S-shaped curves, branched or almost dichotomous, the outermost branches sterile. Conidiophores vesicular, borne laterally on the hyphae by a stalk, sterigmata short, spine-like and scattered. Conidia, one-celled, spherical, almost hyaline.

Description of species. *S. clathroides*. Fructification, a minute globose cancellate peritheciium-like structure, diameter 200 to 230 μ , hyphae very much branched, intricate, branches sigmoid, some tapering, ending freely and projecting radially, others anastomosing; conidia round, 11 to 13 μ diameter, colourless, smooth, borne on short sterigmata which arise from large spherical conidiophores mounted on short paired lateral stalks; walls of hyphae thin at first, later thick, septa numerous when young.

This fungus appeared in the Zoological Laboratory, Birmingham University, April, 1910, on three or four cultures of damp soil containing dead earthworms, belonging to Mr. G. Johnson, who was investigating earthworms.

Each culture was enclosed either in a glass or a tin box. The soil had been in the boxes about six months when it was seen to be studded with hundreds of minute fawn coloured spots, which on being examined microscopically proved to be ball-like masses of hyphae, and were thought to be perithecia belonging to some species of *Gymnoascus*, for, in the first specimens examined no conidiophores could be seen and the conidia themselves suggested immature asci containing numerous ascospores.

The mature fructification is a minute spherical mass of interlacing hyphae, forming a kind of loose peritheciium-like structure, such as is seen in *Gymnoascus*, and encloses a dense mass of conidia, and radiating out from the periphery are many curved hyphae. (Fig. 7.)

When the fructification is examined closely under high magnification, the hyphae will be seen to be arranged on a definite plan and the conidia to be grouped together into rather indefinite masses. On teasing out a fructification, among the conidia will be distinguished large vesicular conidiophores studded over with minute projections, evidently the remains of short sterigmata to which the conidia were attached (Fig. 5, b); sometimes, though rarely a few conidia are seen still attached to the conidiophores (Fig. 4). Although the hyphae evidently radiate out from a centre on a definite plan, it is impossible to make out what this is near the centre, but towards the periphery radiating out from wide S-curved central hyphae are sickle-shaped hyphae (Fig. 1, a); from these other curved hyphae branch off, some with tapering ends remaining free and projecting out (Fig. 1, b), others becoming attached to similar hyphal branches (Fig. 1, c), and so the whole structure has a cancellate appearance.

It is difficult to make out the attachment of the conidiophores, but pairs of branches from the large central hyphae lose themselves in the conidia masses, hence it is inferred that the vesicular conidiophores are attached to these (Fig. 1, d).

In a younger stage (Fig. 2) the perithecial hyphae are very septate and thin walled, and the hyphal branches radiating peripherally are somewhat blunt and short. At this stage great care is needed when putting a cover glass over the fructifications, since they are rather brittle and easily crushed, breaking up into fragments. With careful focusing the vesicular conidiophores are easily seen (Fig. 2, a).

The conidia are quite colourless, round and smooth, 11 to 13 μ in diameter, and in young stages contain one large oil drop which later breaks up into very many small ones (Fig. 5, a). They are difficult to germinate, only three or four have been seen to send out germ tubes, which however soon ceased to grow (Fig. 6). It is not easy to disentangle the conidia from the perithecium-like structure, and yet in very old cultures the conidia evidently become detached and disappear, for many unbroken perithecium-like envelopes are found which are quite void of conidia and conidiophores.

In many instances very fine hyphae are found attached to the fructifications connecting groups of them together, these are doubtless the vegetative hyphae (Fig. 7).

Many attempts were made to get cultures of the fungus on various media and on soil, but without result, yet when certain black-looking soil such as that obtained from the University grounds, was moistened and shut up for six weeks or more in small tin boxes and a dead worm (*Lumbricus terrestris*) was buried in it, in 50 per cent or more of the cultures the fungus appeared. There thus seems to be some association between

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West,Newman lith.

Sigmoidomyces clathroides Bayliss Elliott.

the worm and the fungus, for the fungus never appeared in the control boxes of soil which did not contain worms.

The fungus never appeared in cultures made from worm casts, nor on cultures in which sandy soil was used instead of black soil.

This fungus evidently belongs to the genus *Sigmoideomyces* originally described by Thaxter, of which only one species *S. dispiroides* Thaxt. has been recorded, and that was found in North America.

This species presents several features which distinguish it from *S. dispiroides*; its conidiophores are attached to main hyphae by short hyphae instead of by long and thin ones, the conidia are smooth and not rough, while the hyphae forming the fructification anastomose so as to form a very characteristic cancellate perithecium-like structure.

It also seems closely related to another North American genus *Thamnocephalis* (*quadrapedata* Blakeslee), but in this the globose fructification is not cancellate, and it is mounted on a long stalk which is connected with very prominent rhizoid structures.

The great resemblance of this fungus to the perithecial stage of a *Gymnoascus* seems to suggest that it may perhaps be a conidial form of some species of that genus.

Sigmoideomyces clathroides is a fungus which has not hitherto been recorded, and this is apparently the first record of the genus *Sigmoideomyces* being found elsewhere than in North America.

* Latin diagnosis of *Sigmoideomyces clathroides*.

Hyphis sterilibus paucis repentibus tenuissimis, fertilibus in massam globosam 200-230 μ diam. perithecioideam compactis, ramosissimis, intricatis, ramulis sigmoideis, aliis liberis falcatis radiatim protrusis, aliis interioribus crebre anastomosantibus; conidiophoris magnis sphaericis geminatis ramulis brevibus suffultis; conidiis globosis levibus hyalinis 11-13 μ diam. e sterigmatibus curtis spinosis oriundis; hypharum septis juniorum numerosis, lateribus primo tenuibus senio incrassatis.

EXPLANATION OF PLATE 4.

Fig. 1. Mature fructification $\times 504$.

- a, sickle-shaped hypha branching off from large S-curved central hypha.
- b, tapering branch, projecting from fructification.
- c, branch connecting two sickle-shaped hyphae.

* I have to thank Mr. W. B. Grove, M.A., for this Latin diagnosis.

- d, paired branches, each disappears into a mass of conidia and is presumably connected with the spherical conidiophore bearing them.
 e, sterigmata arising from a conidiophore.
- Fig. 2. A young fructification showing numerous septa $\times 300$.
 a, spherical conidiophores with minute sterigmata.
- Fig. 3. Groups of young conidia attached to fragments of the conidiophore $\times 504$.
- Fig. 4. Conidiophore with two conidia attached by short sterigmata $\times 504$.
- Fig. 5. A piece of the mature fructification teased out $\times 800$.
 a, mature conidium filled with oil drops.
 b, conidiophore.
- Fig. 6. Germinating conidium after 24 hours.
- Fig. 7. Groups of fructifications connected together by vegetative hyphae as they appear growing on soil $\times 93$.

NEW BRITISH FUNGI.

By John W. Ellis, M.B., F.E.S.

Phoma strobiligena Desm. var. *microspora* Sacc. Syll. III., 150

Perithecia almost superficial, gregarious, black, rugulose, opening by a minute pore at the apex of a slightly conical ostiole, then becoming collapsed. Spores oblong-oval, rounded at both ends, continuous, occasionally biguttulate, $4\text{--}6\mu \times 2\text{--}2\cdot5\mu$, hyaline.

On the scales of the cones of *Pinus sylvestris*, Storeton (Cheshire), April, 1912. Confined to the exposed (rhomboidal) area of the scale.

Macrophoma fraxini Delacr. Bull. Soc. Myc. Fr. (1890) 140.
 Sacc. Syll. X, 191.

Perithecia gregarious, subepidermal, slightly convex, causing the surface of the bark to appear like a rasp, opening through the epidermis with a round or stellate pore. Spores cylindraceo-elliptical with rounded ends, thick walled, with granular contents, continuous, $20\text{--}25\mu \times 7\text{--}8\mu$, hyaline.

On a fallen twig of *Fraxinus excelsior*, Bebington (Cheshire), Feb. 10, 1912.