ASCOCORTICIUM IN OHIO[1]

WILLIAM BRIDGE COOKE

Cincinnati Water Research Laboratory, Cincinnati, Ohio

ABSTRACT

A collection of the fungus *Ascocorticium anomalum* (Ell. & Harkn.) Schroet., was made in Ohio, on Nov. 4, 1961, by Harry Knighton and W. B. Cooke, in Hobey's Hollow, Shawnee State Forest, Scioto County. This fungus was named after comparison with 15 other collections of this species from four herbaria in the United States. It is suggested that Basidiomycetes might have arisen from a genus like *Ascocorticium*, where the amount of sterile tissue is reduced in comparison with the amount of ascogenous tissue.

The finding of a specimen of the fungus *Ascocorticium* is considered by mycologists as unusual and significant for the area where it was collected. In Ohio, the first recorded specimen of this genus was collected on Nov. 4, 1961, by Harry Knighton, then Chairman of the People-to-People Committee on Fungi, and the writer. In the attempt to name this fungus, all available materials in the United States and Canada were studied. Specimens were loaned by the curators of the following herbaria, whose kindness is here acknowledged: the National Fungus Collections (BPI), the New York Botanical Garden (NY), the University of Michigan (MICH), and the University of Toronto (TRTC). This report summarizes the data on all specimens of *Ascocorticium* found in these herbaria. The Ohio specimen agreed well with the other specimens studied and may be described as follows:

Ascocorticium anomalum (Ell. & Harkn.) Schroet.

Engler & Prantl, Nat. Pflanzenfam., Ed 1(1): 161. 1897.

Ascomyces anomalum Ell. & Harkn., Bull. Torr. Bot. Cl. 8: 26. 1881.

Ascocorticium albidum Brefeld, Unters. 9: 145, t. 1, f. 37–39. 1891.

Exoascus anomalus (Ell. & Harkn.) Sacc., Syll. Fung. 8: 820. 1889.

Fructification resupinate, white, initially appearing as a circular, effused growth up to 5 mm in diameter, becoming confluent on the bark surface; formed of a compact basal mycelial layer; hyphae 1.5–2.5 μ in diameter, with subgelatinous walls, strongly branched, arranged somewhat irregularly, without marginal or peridial hyphae. Basal mycelial layer thin, up to 10–20 μ thick, giving rise to a loose layer of asci and paraphyses. Paraphyses frequent, 18 x 1.5 μ, hyaline, hypha-like. Asci with croziers at the base, with a thickened wall near the tip, 18 x 5 μ. Spores biseriate to irregularly arranged within the ascus, smooth, cylindric or long-ovate, hyaline, 4.5–5.5 x 1.8–2.1 μ.

Ohio: Scioto County: Hobey's Hollow, Shawnee State Forest. Collected Nov. 4, 1961, by Harry Knighton and W. B. Cooke (WBC 33090) on old bark (oak?).

Non-Ohio specimens examined number 15. These include No. 306 of Otto Jaap's *Fungi selecti exsiccati* collected from the inside of bark on a stump of *Pinus silvestris*, Schleswig-Holstein, Germany, (BPI); No. 561 of Ellis' North American Fungi, collected in 1880 by Ellis and Harkness from bark of old pine logs at Newfield, New Jersey, probably the type of *Ascomyces anomalus* Ell. & Harkn. (BPI, NY, MICH); No. 98, Reliquiae Farlowianae, collected in 1914 on *Pinus rigida* by A. P. D. Piguet at Sharon, Massachusetts (BPI, NY, MICH, TRTC); No. 1102 of Rehm's Ascomyceten, collected by Dr. v. Tavel on *Pinus sylvestris* at Münster, Germany, in 1893 (BPI), apparently from the same location, host, and by the same collector as the type of Brefeld's species. In addition to these exsiccati reports, two specimens of Ellis and Harkness' type collection are filed, one in the National Fungus Collections and one in the New York Botanical Garden; at the New York Botanical Garden is a collection made by W. D. Graddon at Rushton, Staffordshire, England, on *Calluna*, Jan. 5, 1952; and at the University of Toronto is a specimen from Douglas fir bark collected at Comstock, Oregon, on Dec. 11, 1937, by A. M. and D. P. Rogers.

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All of these non-Ohio collections agree well with the Ohio specimen described above. There is slight variation in spore, ascus, and paraphysis measurements. Some of the initial fructifications measure as little as 1 mm in diameter, but in none of the specimens did there appear to be reason to believe that more species exist in the group of specimens studied.

Specimens of *Exoascus albidum* var. *aphthosum* Bommer, Rousseau, and Saccardo in Sacc., with ascospores 6 x 2.5 μ, and *Ascocorticium effusum* Rodway, with spores 12–15 x 6 μ, were not available for study.

In the Ascomycetes, there are two systems of hyphae in the fruit body, the basic tissue of the structure which, in studied material, contains only one nucleus per cell, and the ascogenous tissue which arises from this in one of several ways and in which, in studied material, there are two nuclei per cell, which divide conjugately until the ascus is reached. This ascogenous tissue is considered to be N+N, with one nuclear phase in the ascus representing a 2N phase. In *Ascocorticium*, only the paraphyses and their subtending cell system are of the N phase, while the asci and their subtending cell system are of the N+N phase. *Ascocorticium*, as a genus, is of interest because its fruit body possesses a minimum of N-phase tissue in comparison with other discomycetous genera. In the latter, there is an abundance of N tissue supporting and enclosing the N+N tissue, whose primary function appears to be the completion of the sexual phase of the life cycle and the production of ascospores. There is no peridial tissue and there are some paraphyses. Although some observers have reported seeing no paraphyses, these structures were observed in all specimens examined. The asci have appeared to some to be inoperculate, although Gäumann and Dodge (1928) include the genus in the Rhizinaceae, a family of operculate Discomycetes. Gäumann and Wynd (1952) assign the Ascocorticiaceae to the Helotiales, indicating that it probably forms a transition between the Gymnoascaceae and the more primitive Helotiales. Although Ellis placed his species in the genus *Exoascus*, most recent treatments assign the Ascocorticiaceae to the Helotiales with other inoperculate species. To me, the asci appeared inoperculate, although careful studies on the cytology of this fungus are required to answer several of the more critical questions concerning its nuclear phenomena.

In the definitely operculate Discomycetes, there is an unrelated genus, *Ascodesmis*, which also has a reduced amount of N tissue in comparison with the potential amount of N+N tissue of the fruit body. That genus has recently been monographed by Obrist (1961), who described *A. sphaerospora* from a culture obtained from sewage sludge by the writer at the Dayton, Ohio, sewage treatment plant. The five species of *Ascodesmis* are known mostly from dung from many parts of the world. In this genus the spores are beautifully ornamented. The family name Ascodesmidaceae has been mentioned by Nannfeldt (1932), but no formal publication of it has been found.

In discussing the phylogeny of the fungi, especially in reference to the relationships between the Ascomycetes and the Basidiomycetes, some authors have derived the Basidiomycetes from the Ascomycetes through areas where a reduction in N tissue appeared, resulting in an apparent increase in N+N tissue. According to Gäumann and Dodge (1928) and Rogers (1934), the genus *Ascocorticium* presents a good example of such a transition fungus, with a corticioid representative of the Hymenomycetes completing the bridge across the gap between these two classes. It may be suggested also that *Ascodesmis* could represent a fungus that might bridge another gap between these two classes, the basidiomycetous representative of such a bridging group being a member of the astrosporiaceous group, which includes various hypogaeous genera and the genera *Russula* and *Lactarius*.

Whether these genera represent terminal stages in the evolutionary development of inoperculate and operculate lines of Ascomycetes is a question that can

be argued indefinitely. The response of these fungi to their environmental conditions has resulted in a reduction in the amounts of peridial tissue in their fruit bodies as well as in the amount of N tissue supporting the N+N tissue producing the asci. Such a response can represent different things to different people. One of these points of view is briefly described here.

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