A PRELIMINARY NOTE ON THE LIFE-HISTORY AND CYTOLOGY OF SPONGOSPORA SUBTERRANEA, WALLROTH.—Though the life-history of *Spongospora subterranea*, the organism producing the 'Powdery' or 'Corky Scab' of the potato, has to some extent been described already,¹ no account of its cytology has yet appeared.

The organism is first apparent in young potato cells just below the surface of the tuber, as a uninucleate amoeba. This increases in size, while its nucleus divides by a special method of amitosis, not unlike that described for *Sorosphaera*² and *Plasmodiophora*.³ The amoeba itself divides by fission, so that a late stage shows many multinucleate amoebae in a single host-cell. Fresh cells are infected, not by a passage being bored through their cell-walls, but by the passing of amoebae into the daughter cells in the meristematic tissue. On the conclusion of the vegetative phase a plasmodium is formed, and the nuclei undergo a reconstruction. The chromatin passes out into the protoplasm as chromidia (akaryote stage), while later new nuclei are formed, apparently on different sites from the old ones. These nuclei fuse in pairs, the fusion being followed by a condition suggestive of synapsis. Following this state the nuclei divide twice by karyokinesis, the first of these divisions being marked by a longer spindle than the second, while in the latter eight chromosomes can be counted. These mitoses probably correspond to heterotype and homotype divisions. During the karyokinesis the protoplasm of the plasmodium has developed numerous cleavages; subsequent to the divisions it rounds itself off about the nuclei and forms spores. These are about 5μ in diameter, uninucleate, and are united in irregularly spherical masses, characterized by depressions and fissures giving the structure a sponge-like appearance.

The main conclusions reached as a result of these observations are that *Spongospora* should be united with *Plasmodiophora*, *Sorosphaera*, and *Tetramyxa* in the family Plasmodiophoraceae.

The account of the karyogamy⁴ in the cysts of *Plasmodiophora* is not substantiated by more recent work,⁵ while no nuclear fusion has as yet been observed in the life-history of *Sorosphaera*. In the latter organism synapsis and reduction divisions are recorded just prior to spore-formation, and it is not impossible that a nuclear fusion has been overlooked.

The karyogamy described for *Spongospora* and the two subsequent mitoses present a striking resemblance to the occurrences in the plasmodia of *Arcyria* and *Trichia*,⁶ and serve to strengthen the relationship between Plasmodiophoraceae and the Mycetozoa.

T. G. B. OSBORN.

THE CRYPTOGAMIC RESEARCH LABORATORY,
MANCHESTER UNIVERSITY,
November 1910.

¹ Johnson, T. ('08): Economic Proc. Roy. Dublin Soc., vol. i, p. 453. Massee, G. ('08): Journ. Board of Agric., vol. xv, p. 592. Johnson, T. ('09): Sci. Proc. Roy. Dublin Soc., vol. xii (N.S.), p. 165.

² Maire, R., and Tison, A. ('09): Ann. Mycolog., vol. vii, p. 226. Bloomfield, J. E., and Schwartz, E. J. ('10): Ann. Bot., vol. xxiv, p. 35. Schwartz, E. J. ('10): Ann. Bot., vol. xxiv, p. 511.

³ Nawaschin, S. ('99): Flora, vol. lxxxvi, p. 404. Prowazek, S. ('05): Arb. a. d. kaiserl. Gesundheitsamte, vol. xxii, p. 396.

⁴ Prowazek, S.: l. c.

⁵ Maire, R., and Tison, A.: l. c.

⁶ Kränzlin, Helene ('08): Archiv f. Protistenkunde, vol. ix, p. 170.

Osborn, T G B. 1911. "A preliminary note on the life-history and cytology of *Spongospora subytterranea*, Wallroth." *Annals of botany* 25, 271-271.

<https://doi.org/10.1093/oxfordjournals.aob.a089321>.

View This Item Online: <https://www.biodiversitylibrary.org/item/236971>

DOI: <https://doi.org/10.1093/oxfordjournals.aob.a089321>

Permalink: <https://www.biodiversitylibrary.org/partpdf/319830>

Holding Institution

Smithsonian Libraries

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: Not in copyright. The BHL knows of no copyright restrictions on this item.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.