

**GUIDE TO THE BRITISH  
MYCETOZOA EXHIBITED IN THE  
DEPARTMENT OF BOTANY  
BRITISH MUSEUM (NATURAL  
GISTORY)**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649264544

Guide to the British Mycetoza Exhibited in the Department of Botany British Museum (natural history) by Arthur Lister

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Cover @ 2017

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**ARTHUR LISTER**

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BRITISH MYCETOZOA.

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= of Botany

BY 1834-1900  
ARTHUR LISTER, F.L.S.

PRINTED BY ORDER OF THE TRUSTEES.

1895.

Science Library

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.B862

British Mus. of Nat. Hist.

10-8-1921

Transf. to  
Science  
3-9-62

## P R E F A C E .

THE collection of British Mycetozoa, and the series of coloured drawings explaining their structure, exhibited in the Botanical Gallery, have been presented by Mr. Arthur Lister, the author of this Guide. All known British Mycetozoa are described briefly, and it is hoped that this account will serve as an introduction to the systematic study of the group.

In preparing his *Monograph of the Mycetozoa*, based on the collection in the British Museum, Mr. Lister generously enriched the national herbarium by the gift of numerous specimens which had the special value of having been named after comparison with type specimens in the herbaria of the Royal Gardens, Kew; the Royal Botanic Gardens, Edinburgh, Strassburg, Paris, Christiania, Leyden; the collections of Messrs. Phillips and Masee, in this country, and with specimens furnished by Dr. Rex, Prof. Farlow of Harvard University, Prof. Macbride of the State University of Iowa, and Mr. Morgan of Ohio.

For the purpose of ready microscopic examination Mr. Lister also prepared and presented to the Trustees eight hundred and thirty-two mounted slides, illustrating the British Museum collection of Mycetozoa, and they are preserved in a cabinet in the Cryptogamic Herbarium for consultation by students.

The present Guide is based on the study of this valuable material, and in its preparation Mr. Lister has had the advantage of the diligent assistance of his daughter, Miss Gulielma Lister, who has also made the coloured drawings exhibited in the case.

GEORGE MURRAY.

E.P.S.



**ERRATUM.**

On page 11, line 10 from bottom, *for* "forms" *read* "walls."

## BRITISH MYCETOZOA.

THE Mycetozoa are a group of organisms which may be placed in the border-land between the Animal and Vegetable Kingdoms. They are characterised by the constant sequence of three main stages in their life history, viz. :—

1. The firm-walled spore gives birth to a *swarm-cell*.
2. The swarm-cells coalesce to form a wandering *plasmodium*.
3. The plasmodium ultimately concentrates to form either *sporangia*, enclosing numerous spores (Endosporeæ), or *sporophores* bearing spores on their outer surface (Exosporeæ).

Many species are quite common, and are found on old decaying stumps and fallen branches in moist woods and shaded gardens ; others inhabit heaps of dead leaves which have lain undisturbed and become soaked with rain. The only stage in which they are

conspicuous is that of the sporangia, when they appear as minute objects, some roundish, about the size of small mustard seeds, others rising in clusters of brown columns on black hair-like stalks, while many take other characteristic forms. The different species display great variety and beauty in the colours they assume, ranging from pure white, golden yellow, bright crimson, and iridescent violet to dark purple and black.

The various phases in the life history of the group may be described as follows :—

The swarm-cells emerge from the spores as amœboid bodies ; they soon acquire a flagellum at the anterior end, and creep in a linear form with the flagellum extended in advance, or swim in the surrounding water with a dancing

Swarm-cells

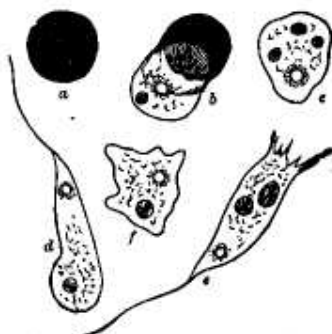


Fig. 1.—*DIDYMIUM DIFFORME* Duby.

- a. Spore.
  - b. Swarm-cell escaping from the spore-case.
  - c. Newly hatched swarm-cell containing a nucleus and three vacuoles.
  - d. Flagellated swarm-cell.
  - e. Swarm-cell, with two vacuoles containing bacteria, and produced at the posterior end into pseudopodia, to one of which a bacterium is attached.
  - f. Amoeboid swarm-cell.
- Magnified 750 times.

motion occasioned by the lashing movement of the flagellum. They possess a single *nucleus* and a *contractile vacuole*. To a large extent the swarm-cells feed on bacteria, which are caught by *pseudopodia* projected from the posterior end of the body. The bacteria are conveyed into the body-substance, where they are digested in vacuoles which form round them; there may be one or more digestive vacuoles, each containing several bacteria at one time. The swarm-cells rapidly increase in number by bipartition. When this takes place the flagellum is first withdrawn, and the swarm-cell assumes a globular form; it then elongates, and a constriction occurs at right angles to the long axis. Meanwhile the nucleus is passing through the process of division by karyokinesis, and in the course of a few minutes the two halves of the nuclear plate separate and retreat to the opposite ends of the constricted cell, which now

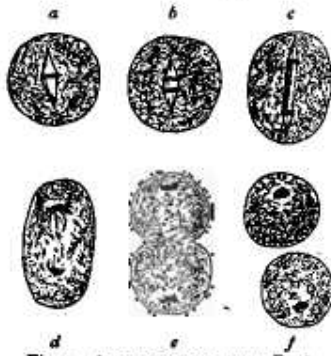


Fig. 2.—*AMAUROCHETE ATRA* Rost.

*a* to *f*. Successive stages in bipartition of swarm-cell, accompanied by the division of the nucleus by karyokinesis. Magnified 1200 times. Drawn from stained preparations in Canada balsam.



Fig. 3.—*DIDYMIUM DIFFORME* Duby.

Young plasmodium, with attendant amoeboid swarm-cells, some of which have turned into microcysts (*m*): one microcyst is being digested in a vacuole (*v*). An empty spore-shell is shown at *s*. Magnified 470 times.

divides into two; each segment soon acquires a flagellum, and resumes the former active state.

#### Microcysts.

In all cultivations of germinating spores a number of the swarm-cells, after a short time of activity, become encysted in a globular form as *microcysts*. In this state they may remain dry for several days, but on water being added the cyst-wall is ruptured and the contents creep out and assume again the motile condition. Frequently the entire group of swarm-cells will change to microcysts, and reawaken in the course of two or three days while still immersed in water. A few days after the germination of the spores, the process of bipartition, by which the number of the swarm-cells has greatly increased, ceases. The majority now withdraw the flagellum, and adopt true amoeboid movements. These amoeboid

#### Plasmodium.

bodies collect in clusters, and coalesce to form plasmodia, which may