

SOME NEW RECORDS OF HYPERMASTIGIDS (Protozoa)
FROM EASTERN UTTAR PRADESH, INDIA

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INTRODUCTION

A survey on termite flagellates from Eastern Uttar Pradesh comprising the district Azamgarh, Ballia, Gorakhpur, Deoria and Basti were conducted. Previously no such survey was taken up from this part of India. Out of two hundred examples of termite examined from twenty localities almost all the termites belonging to *Coptotermes heimi* (Wasm.) harbour six species namely, *Holomastigotoies ogivalis*, *H. bengalensis*, *H. sphaeroidalis*, *Spirotrichonympha froilanoi*, *Pseudotriconympha indica* and *P. cardiformis*. De Mello (1937) from Daman, Karandikar and Vittal (1954) from Dhawar, Chakravarty and Banerjee (1956) and Das (1976) from West Bengal reported these species. Termites were collected from the various cultivated trees, timber depots, wood and log, plywood and cemented brick built wall. Most of the collections were made from mango tree (*Mangifera indica*), banyan tree (*Ficus bengalensis*), pipal (*Ficus religiosa*) jackfruit and drum-stick (*Moringa* sp.) which were infested by these termites. The gut of the termites was desected and smears of the gut contents were prepared. The live flagellates were studied in fresh smears of the guts contents diluted with 0.5% saline. The specimens were fixed in Schaudins fluid and stained with Heidenhain's iron haematoxylin. All the measurement were taken with the aid of ocular micrometer and photomicrograph were also taken.

Order : HYPERMASTIGIDA

Family : HOLOMASTIGOTIDAE

Holomastigotoides ogivalis De Mello, 1937

(Fig. A)

Description : The body resembles the form of an inverted cup with a blunt finger like elevation, measuring 60.5-90 μm in length (average 80.75 μm), and 40.5-56.25 μm (average 48.37 μm) in breadth. The body is covered by two types of flagella. The shorter flagella occupy the whole of the body in dextrotropic rows leaving the posterior extremity which is thickly set with longer flagella. The nucleus is oval and measures 11.62 x 9 μm , Prenuclea zone well developed and clearly visible in permanent preparation.

Host : *Coptotermes* sp., Daman, India, *C. heimi* (Wasm.) Dharwar, Karnataka ; *C. heimi* (Wasm.), Haldia (Midnapore Dist.) and Falta (24-Pargnas Dist.), West Bengal ; *C. heimi*, Kasumi, Nichlaul, (Gorakhpur Dist.) Uttar Pradesh.

Remarks : De Mello (1937) described this species from *Coptotermes* sp., Karandikar and vittal (1954) and Das (1976) recorded it from *C. heind*. In the present study the species recorded it from *C. heimi* from Eastern Uttar Pradesh is identical with type and other recorded species. But it is smaller in size and finger like elevation is very distinct and well developed.

Holomastigotoides bengalensis Chakravarty and
Banerjee, 1956

(Fig. B)

Description : The body is more or less oval but sometime elliptical with the anterior part of the body gradually tapering and terminating in a blunt cone while posterior end is round. The body measures 67.50-76.72 μm (average 70.86 μm) in length and with 41.25-48 μm (average 43.12 μm) in breadth. Flagella are of two types. The shorter ones cover the whole body whereas the longer ones occupy the posterior portion of the body. Axostyle is well developed extending upto

the posterior extremity of the body. The nucleus lies anterior. It is oval in shape and $11 \times 9.5 \mu\text{m}$ in size. The conical prenuclear zone is densely granulated around the anterior part of the nucleus.

Host : *Heterotermes* sp., Calcutta (type host) ; *Heterotermis indicola* (Wasm.), Indian Museum campus Calcutta ; *Coptotermes heimi* (Wasm.), Padrauna, Gauribazar (Deoria Dist.) ; Bilthra Road, Nagra (Ballia Dist.) Uttar Pradesh.

Remarks : Chakravarty and Banerjee (1956) described *H. bengalensis* from an undetermined species of *Heterotermes* and Das (1976) recorded this species from the host *Heterotermes indicola* (Wasm.) in West Bengal. *Coptotermes heimi* (Wasm.) is therefore, a new host record for *H. bengalensis* from Eastern Uttar Pradesh. The present species is identical with the type in all respects except that this is slightly smaller in dimension and the exostyle is extending upto the posterior extremity of the body wall.

Holomastigotoides sphaeroidalis De Mello, 1937

(Fig. C)

Description : Body shape is spherical as indicated by its specific name, measuring $14.4-32 \mu\text{m}$ in diameter (average $21.8 \mu\text{m}$). Flagella are of one type covering the body dextrotropically. Nucleus is circular in shape and situated very near to a point at the anterior end from which the flagellar bands seems to diverge out. It measures $13 \times 6 \mu\text{m}$ in diameter. Axostyle is not well developed and prenuclear zone is distinct.

Hosts : *Coptotermes* sp., Daman, *Heterotermes malabaricus* Snyder, Dharwar, Karnataka ; *Heterotermes indicola* (Wasm.), Indian Museum campus Calcutta, West Bengal ; *Coptotermes heimi* (Wasm.), Dharwar ; *Coptotermes heimi* Maldah (Ballia Dist.) ; Maryadpur, Lalganj (Azamgarh Dist.) Uttar Pradesh.

Remarks : De Mello (1937) described this species from

Coptotermes sp., Karandikar and Vittal (1954) recorded this species from *Coptotermes heimi* and *Heterotermes malabaricus* and Das (1976) recorded it from *Heterotermis indicola* and they described it as perfectly spherical. The present species recorded from *Coptotermes heimi* (Wasm.) is a new record of this area and having the same shape as recorded by previous workers but the axostyle is not clearly visible and even it is lacking in some specimens.

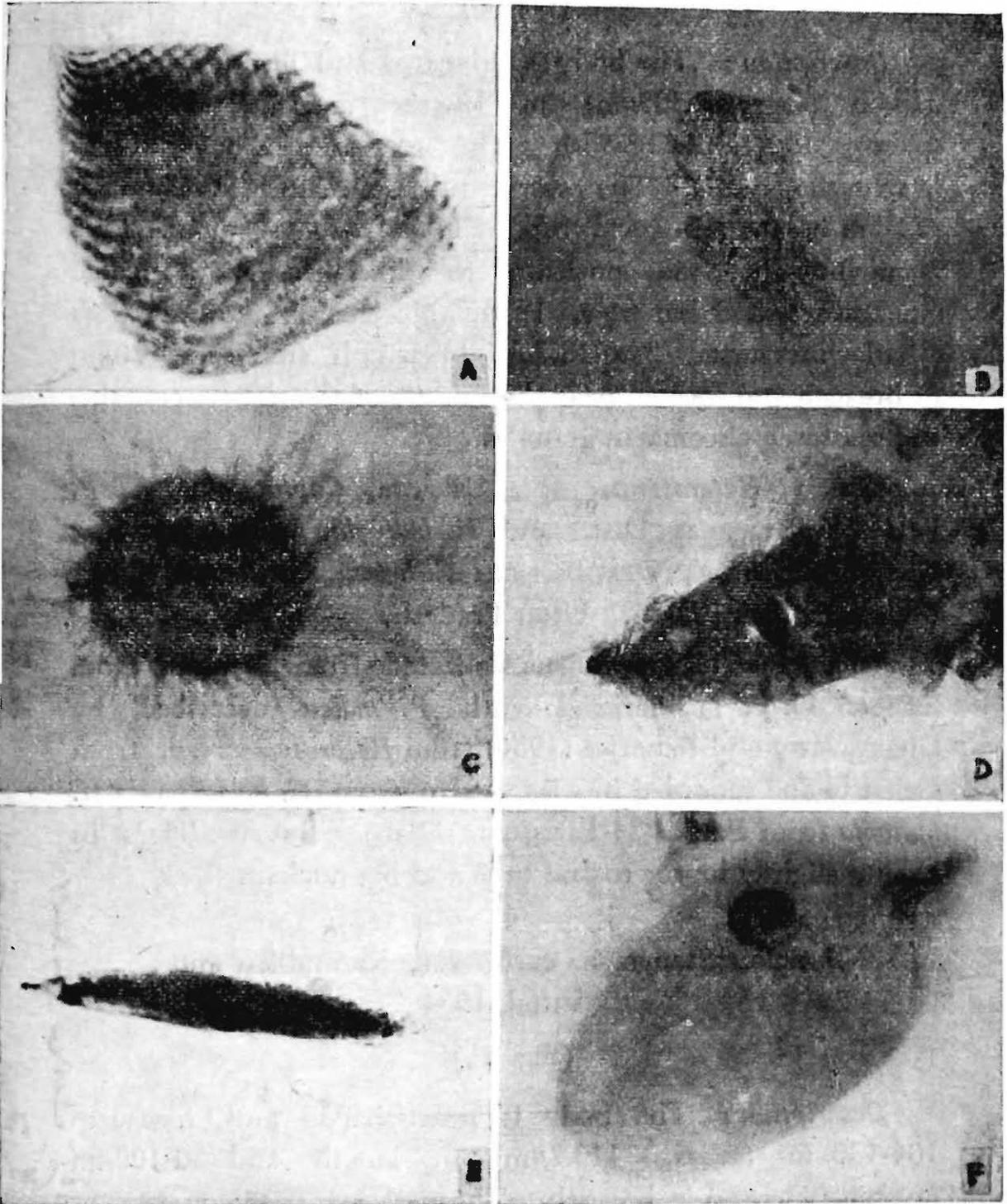
***Spirotrichonympha froilanoi* Karandikar and Vittal, 1954**

(Fig. D)

Description : The body is cone-shaped with anterior portion narrowed to a blunt end and posterior portion is the broadest. The body measures 19.2-51.2 μ m (average 32.5 μ m) in length and 14.4-33.6 μ m (average 21.1 μ m) in breadth. Nucleus more or less round, located anteriorly and measures 4.8-6 μ m in diameter. The body is covered with flagella of two types which can be distinguish by their length and location. The posterior portion carry a bunch of very long flagella. The axostyle does not extend beyond the posterior extremity of the body.

Hosts : *Coptotermes heimi*, Dharwar ; *Heterotermes malabaricus*, Dharwar, Karnataka ; *C. heimi*, Falta (24-Paraganas), West Bengal *C. heimi*, Kusumi, Farenda (Gorakhpur Dist.) Uttar Pradesh.

Remarks : Karandikar and Vittal (1954) described this species from gut of *Coptotermes heimi* and *Heterotermes malabaricus* from Karnataka and Das (1976) recorded it from *C. heimi* from West Bengal. Karandikar and Vittal and Das stressed on the character namell presence of long flagella spreading out from the posterior surface in a brush like manner and the axostyle protrude out side to a short distance respectively as for specific diagnosis. The present material collected from *C. heimi* is identical with type except that its axostyle is not protruding out side the body.



Figs. A—F. A. *Holomastigotoides ogivalis* De Melo x 680, B. *Holomastigotoides bengalensis* Chakravarty and Banerjee x 425, C. *Holomastigotoides spaeroidalis* De Mello x 1380, D. *Spirotrichonympha froilanoi* Karandikar and Vittal x 1220, E. *Pseudotriconympha indica* Chakravarty and Banerjee x 185, F. *Pseudotriconympha cardiformis* Karandikar and Vittal x 525.

Family : TRICHONYMPHIDAE

Pseudotrichonympha indica Chakravarty and
Banerjee, 1956

(Fig. E)

Description : The body is elongated and measures 274.7-328 μ m (average 300 μ m) in length and 53.7-102.5 μ m (average 68.3 μ m) in breadth. The broadest part of the body is near the middle. The rostral tube measures 10.25 μ m to 12.3 μ m having an apical cap. Flagella are of three types occupying the same position as described in *P. indica* Chakravarty and Banerjee, 1956. Nucleus is more or less circular measuring 24.0-28.7 μ m in length and 20.5-24.0 μ m in breadth and located near the middle of the body containing scattered chromatin granules.

Hosts : *Heterotermes* sp., Calcutta, *Coptotermes heimi*, Falta (24-Paraganas Dist.) and *H. indicola*, Indian Museum Campus Calcutta ; West Bengal ; *C. heimi*, Khalilabad, Basti, Mehdawal (Basti Dist). Uttar Pradesh.

Remarks : The specimens collected from *C. heimi* from Eastern U. P. is identical with *P. indica* described by Chakravarty and Banerjee (1956) from *Heterotermes* sp. from Calcutta and recorded by Das (1976) from *C. heimi* and *H. indicola* from Falta (24-Paraganas Dist.). But it differs in having slightly bigger rostral tube and big nucleus.

Pseudotrichonympha cardiformis Karandikar and
Vittal, 1954

(Fig. F.)

Description : The body is heart-shaped and measures 104-130 μ m (average 113.2 μ m) in length and 80-100 μ m (average 90.4 μ m) in breadth. The anterior part consists of a bell like campanula with a rostral tube which measure 15 μ m in length. The campanular surface is covered by three types of flagella which are distinguishable from one another in regards to their length and location. The first type of flagella is the shortest and immobile and are strictly confined

to the rostral tube. Second type of flagella is the longest and arranged below the first one. The third type is arranged in longitudinal rows in a leiotropic manner. They cover the companula and rest of the body. Nucleus is spherical and situated in the middle of the body and measures 10-15 μ m in diameter.

Hosts : *Heterotermes malabaricus* and *C. heimi*, Dharwar, Karnataka (Type host) ; *C. heimi*, Falta (24-Paraganas Dist.), and Haldia (Midnapore Dist.), West Beugal ; *C. heimi* ; Sonavali, (Gorakhpur Dist.), Sukhpura (Ballia Dist.), Uttar Pradesh.

Remarks : Karandikar and Vittal (1954) described this species from *H. malabricus* and *C. heimi* from Dharwar and Das (1976) recorded it from *C. heimi* from Falta (24-Paraganas Dist.) and Haldia (Midnapore Dist.). The specimen recorded from Eastern Uttar Pradesh is exactly identical with the type in all characters except that it is smaller in size and nuclear length.

SUMMARY

A systematic account of the species of hypermastigids recorded from the Eastern Uttar Pradesh consisting of six species namely *Holomastigotoiaes ogivalis*, *H. bengalensis*, *H. Sphaeroidalis*, *Spirotrichonympha froilanoi*, *Pseudotrichonympha indica* and *P. Cardiformis* from the gut of a termite, *Coptotermes heimi* (Wasm.) has been dealt with in this paper. This includes some morphological variations recorded in the species. These flagellates will be new record from this area.

ACKNOWLEDGEMENTS

Sincere thanks are due to the Director, Zoological Survey of India for facilities provided for the work. Thanks are also due to Dr. A. K. Mandal, Scientist-'SE' Zoological Survey of India, Calcutta for going through the manuscript and valuable suggestions.

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