**Tubulimonoides gryllotalpae** n.g., n.sp.  
(Mastigophora: Oxymonadida) from the cricket in India

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**Abstract**

The morphology of a new flagellate *Tubulimonoides gryllotalpae* n.g., n.sp. is described from the gut of the cricket *Gryllotalpa africana* in Maharashtra, India. The organism has four flagella arising from two distinctly separated blepharoplasts as in the genus *Monocercomonoides* Travis, 1932 but the flagellar grouping is 3:1 instead of 2:2. The axostyle is distinctly tubular unlike in the latter genus where it is thread-like or filamentous. Body dimensions: $7.7-19.0 \times 4.6-19.5 \mu m$ (average: $11.7 \times 9.3 \mu m$).

1. Introduction

During a survey of the flagellate fauna of arthropods of Maharashtra State, several flagellates were found in the gut of the cricket *Gryllotalpa africana*. One of these was an interesting flagellate which showed some similarities with the species of the genus *Monocercomonoides* Travis, 1932\(^1\) (Order Oxymonadida Grassé, 1952\(^2\) emend. Honigberg, 1963\(^3\) Family Monocercomonoididaceae, Honigberg, 1963), but on closer examination revealed several important features differentiating it from that genus. A preliminary note on the structure of this organism has already been published\(^4\) and the present communication gives a detailed account of its morphology and systematic position.

2. Morphology

The parasites are spherical (figures 1, 2, 4, 5), ovoidal (figure 3) or somewhat irregular (figure 7) in their body shape. The cytoplasm is slightly vacuolated and contains scattered granules. The periplast is fairly thin.

There are two blepharoplasts situated at the anterior end of the body. They are conspicuous being somewhat conical or triangular in shape (figures 1, 6, 7) or flattened or rod-like (figures 2 and 5). The two are connected by
a thin rhizoplast (figure 1). One of these gives origin to three short flagella directed forwards, while from the other arises the fourth flagellum which is the longest and trails behind the body (figures 2 and 7). Two of the three anterior flagella are almost equal in length while the third is slightly longer (figures 2 and 7). All the flagella are longer than the body, the trailing flagellum being two to two-and-a-half times the body length (figure 7).

Figures 1-7. *Tubulimonoides gryllotalpae* n.g., n.sp.

All figures from smears exposed to osmic vapours, fixed in methanol and stained with Giemsa Stain. (2,000×) showing 1. rhizoplast; 2 and 5, rod-like blepharoplasts, origin of flagella and filament-like tip of axostyle; 3, 4 and 6, tubular axostyle; 7, conical blepharoplast and long trailing flagellum.
Occasionally some flagella show a terminal acroneme (figure 2). No funis was observed.

The axostyle is extremely characteristic. The anterior part is obscured by the massive nucleus, but it appears to arise from the same blepharoplast as the trailing flagellum (figures 1 and 6). The trunk, emerging from underneath the nucleus and extending up to the posterior end of the body (figures 2–5) is in the form of a delicate tubular structure. The posterior end suddenly tapers into a fine filament, as it emerges out of the posterior end of the body (figures 2, 4 and 5).

The nucleus is fairly large and massive, lying close to the anterior end measuring 3·7 μm on the average, in diameter.

The body dimensions, based on measurement of 50 specimens, selected at random from different smears, showed the following range (All measurements are in microns):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Range</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of the body</td>
<td>7·7–19·0 (11·7)</td>
<td></td>
</tr>
<tr>
<td>Maximum width of body</td>
<td>4·6–19·5 (9·3)</td>
<td></td>
</tr>
<tr>
<td>Length of axostyle</td>
<td>5·1–19·0 (10·6)</td>
<td></td>
</tr>
<tr>
<td>Diameter of nucleus</td>
<td>2·6–6·2 (3·7)</td>
<td></td>
</tr>
<tr>
<td>Length of anterior flagellum I</td>
<td>4·6–26·2 (14·4)</td>
<td></td>
</tr>
<tr>
<td>Length of anterior flagellum II</td>
<td>7·7–38·6 (17·0)</td>
<td></td>
</tr>
<tr>
<td>Length of anterior flagellum III</td>
<td>6·2–38·6 (14·9)</td>
<td></td>
</tr>
<tr>
<td>Length of the trailing flagellum</td>
<td>16·5–62·7 (25·9)</td>
<td></td>
</tr>
</tbody>
</table>

3. DISCUSSION

The presence of four flagella and their origin in two groups from clearly separated blepharoplasts is close to the pattern in the genus Mono-cercomonoides. However, in that genus the four flagella arise in two groups, two from each blepharoplast (i.e., two anterior flagella from one and the third anterior flagellum and the trailing flagellum from the other). In the flagellate described here the grouping is 3:1, all the three anterior flagella arising from one and the trailing flagellum from the other blepharoplast.

Further, the axostyle in all the species of the genus Mono-cercomonoides so far described from insect hosts is thread-like or filamentous or in rare
cases somewhat sheath-like. In the present case, the axostyle is distinctly tubular and different from any, described in species of Monocercomonoides.

In view of these distinct characteristics, the organism from *Gryllo-talpa africana* is placed in a new genus and designated *Tubulimonoides gryllo-talpae* n.g., n.sp. (Order: Oxymonadida; Family: Monocercomonoididae).

Species : *Tubulimonoides gryllo-talpae* n.g., n.sp.
Host : *Gryllo-talpa africana*
Habitat : Gut
Locality : Aurangabad, Maharashtra, India.

The type slides are deposited in the Department of Zoology, Marathwada University, Aurangabad.

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**References**