

ON A TRYPANOSOME FOUND IN THE BLOOD OF  
THE INDIAN FRESH WATER FISH *CLARIAS*  
*BATRACHUS* LINN.

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THE Indian fishes have rarely been studied on the point of view of their blood parasites. As far as our informations go only a paper by Lingard has been written on this subject.<sup>1</sup> The blood parasites recorded on the Indian fishes are<sup>2</sup>:

*Barbus carnaticus*. Trypanosome (unnamed). Lingard 1903.

*Gobius giuris*. Trypanosome (unnamed). Patton 1908. (First recorded by Castellani and Willey 1905 in Ceylon.)

*Macrones seenghla*. Trypanosome (unnamed). Lingard 1904.

*Ophiocephalus striatus*. Trypanosome (unnamed). Lingard 1903.

*Trichogaster fasciatus*. Trypanosome (unnamed). Lingard 1904, Plimmer 1914.

*Description of our Trypanosome.*

Some specimens of *Clarias batrachus* (Portuguese name: *peixe bigodeiro*, Konkani: *tigur*), kindly identified by Dr. Hora, from the Zoological Survey of India (Calcutta) have been examined. Two of them showed trypanosomes, not very abundant, as in each slide not more than half a dozen parasites could be available. General morphology typical of a trypanosome. Anterior extremity pointed, rostrum like. At some distance behind its point a very conspicuous kintonucleus is found under the form of a very compact granule, stained dark violet by Romanowsky derivatives and lodged in the anterior part of a very fine, oval alveole (Fig. 1). The macronucleus is oval, its long axis parallel to the axis of the parasite and composed of some chromatic granules packed up together and where no distinct centriole is visible. From the kintonucleus starts the axoneme of the undulating membrane, under the form of a merely blue sinuous line at Leishmann stain, and chromatic violet at May Grunwald Giemsa. At the posterior extremity this axoneme becomes a free flagellum,

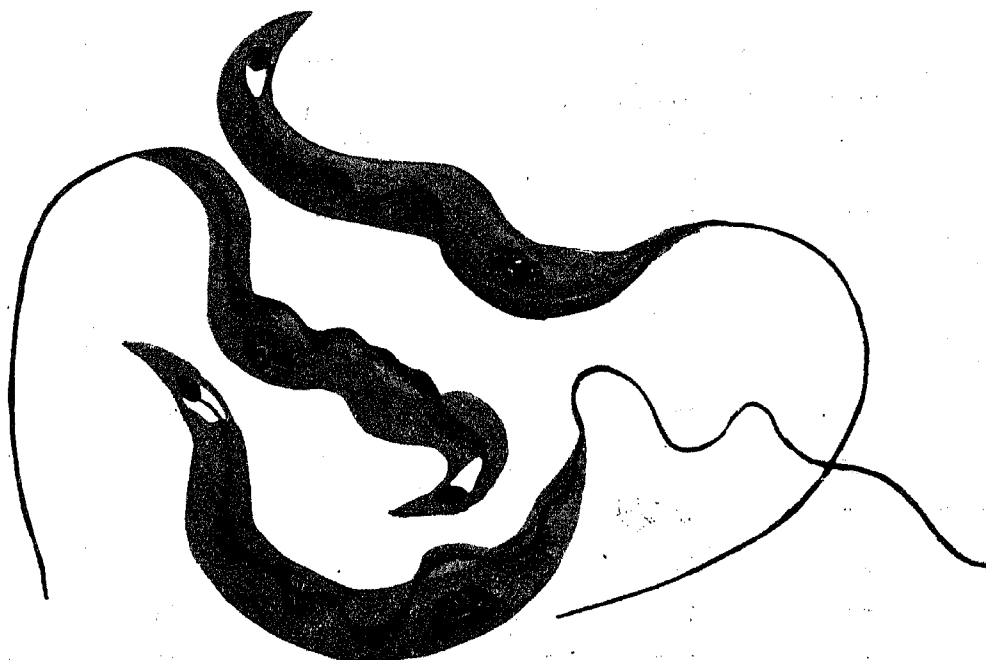


FIG. 1.

often as long as the body, and abruptly cut at its distal end, not terminating therefore by an effilated point. The macronucleus is sub-central and situated at the limit of the middle and posterior thirds. The protoplasm is irregularly vacuolated, showing seldom on the middle zone, in front of the nucleus, irregularly scattered minute volutine granules, and often in the same middle zone a kind of longitudinal striation (myonemmes?). All the parasites studied are monomorphic and excepting to the measurements of the flagella do not show any variations at all. Longitudinal division rarely seen.

The measurements taken on 25 individuals gave the following number (see Table on p. 122).

In the list of Wenyon<sup>2</sup> we find that some species of *Clarias* have been found harbouring blood trypanosomes:

*Clarias angolensis*: Trypanosome (unnamed). Dutton, Todd and Tobey 1906, Congo.

This trypanosome has the following characters<sup>3</sup>: Three types; small, median and long ones, all variations of the same species, and possessing a large four-lobed blepharoplast. There is also a constant clear space about the nucleus. The *small type* has a faint staining nucleus situated more anteriorly than in the other two types, and with its long diameter parallel to that of the body. Protoplasm reticular with few violet stain granules

No.	From the ant. extr. to the kinetonucleus	From the kinet. to the ant. border of the nucleus	Long axis of this nucleus	From the post. border of the nucleus to the end of the cytoplasm	Free flagellum	Breadth
1	1,5	12	2	5	22	1,5
2	1,5	16	2,5	6	16	1,5
3	1	13	2	6	18	1
4	2	8	2,5	3	14	1,25
5	1,5	13	1,5	5	20	1
6	2,5	16	2,5	4	21	1
7	1,5	12	2	5	19	1
8	3	19	2	5	20	1
9	3,5	10	2,5	8	18	1,5
10	1	17,5	2,5	7	15	1,25
11	3,5	17	2,5	3	16	2,5
12	1	18	1,5	8	22	2
13	2,5	15	2	8	17	2
14	3	20	2	2	20	2,5
15	1,5	16	2	8	16	1,25
16	2,5	17,5	2	8	16	1,5
17	2	10	3	13	15	2
18	1	11	2	5	13	2,5
19	2	3	2,5	7	15	2,5
20	3	14	2,5	7	9	1,5
21	2	20	2	4	11	1
22	1	13	2,5	5	22	2
23	1	13	3	7	22	2,5
24	2	6	1,5	4	15	1,9
25	1	15	3	5	32	1

Superficial longitudinal striations to the number of five near the nucleus. *Median type* darker staining, large oval or round blepharoplast, situated at or from 1 to 1,5 microns from the point. Flagellum longer than in small type. Nucleus round or oval, its long diameter at right angles to that

of the body and occupying the whole width of the parasite. Superficial longitudinal striations to the number of seven near the nucleus. *Long type* with tapering extremities, comparatively short flagellum, one to four vacuoles just behind the blepharoplast. Eight superficial longitudinal striations. Total length 34,5 ; 45 ; 61,5 respectively.

From the descriptions and the illustrations of the authors (their Plate XXX), our parasite is not the same as that of *Clarias angolensis* as it differs specially by the uniformity of its monomorphic appearance.

*Clarias anguillaris*.—*Trypanosoma toddi* Bouet 1909, Wenyon 1909, African Soudan.

We were not able to read the paper of Bouet and in Wenyon<sup>4</sup> we find only a record of this parasitism in *C. anguillaris*. Laveran and Mesnil state that it should be identified to the trypanosome of Dutton, Todd and Tobey.

*Clarias gariepinus*.—Trypanosome (unnamed). Fantham 1919, South Africa.

*Clarias macrocephalus*.—*Trypanosoma clarice* Montel 1905, Cochinchina, Mathis and Leger 1911, Tonkin.

The characters of this trypanosome are taken to Laveran and Mesnil<sup>5</sup> who say that the description of Montel has been completed by Mathis and Leger. Two varieties of this parasite have been found: *Var parva*—narrow, pointed ends, protoplasm not vacuolated, showing granulations, specially on the anterior part. Voluminous oval nucleus, situated on the middle; with its long axis parallel to the axis of the parasite, and constituted by irregularly disposed chromatic grains. Round blepharoplast near the anterior point. Free flagellum having nearly the length of a quarter of the total length of the parasite. Measurements: Total length 39, breadth 2,75, free flagellum 9. *Var magna*—posterior extremity gradually pointed, anterior one abruptly blunt before the blepharoplast, often bifid. Protoplasm irregularly vacuolated, a series of vacuoles behind the centrosomes being fairly constant. Longitudinal striation in the nuclear region. Chromophil granules on the posterior fifth; often disposed in parallel lines. Oval nucleus, central, with its long axis generally perpendicular to the long axis of the parasite. Blepharoplast staining deep rose. Free flagellum of the same size as in *Var parva*. Measurements: total length 64, breadth 5, free flagellum 11.

Laveran and Mesnil believe that this trypanosome is very similar to that of *Clarias angolensis*.

(*N.B.*—In the description the kintonuclear extremity is stated as posterior and the flagellate one as anterior, just the contrary of our designations.)

*Clarias* sp. Trypanosoma (unnamed). Zupitza 1909, Cameroon. In Laveran and Mesnil<sup>5</sup> we find: Trypanosomes have been found by Zupitza in two species of fishes: *Periophthalmus Kaelreuteri* and (probably) one *Clarias*. The author describes a series of forms 40-60 microns long, differing specially by their breadth which goes from 1,5 microns to 9, with all intermediate types. Blepharoplast almost terminal.

#### Discussion.

If we resume now the data, which we were able to collect, we see that fishes of the genus *Clarias* are parasitised by a trypanosome. That of *C. angolensis* shows three variations, that of *C. anguillaris* has been identified by Laveran to the former, despite the classification of Bouet who, having certainly seen the morphology described by Dutton, Todd and Tobey, found himself, however, authorised to create the sp. *T. toddy*. *T. clariæ* of Montel, much ressemblant to the trypanosome of Dutton, Todd and Tobey shows two varieties, the trypanosome of Zupitza is extremely polymorphic. The trypanosome we are describing now is characterised by its remarkable monomorphism.

On morphological grounds we believe that all those trypanosomes (excepting that of Fantham on which we have no information) are only varieties of a single species which, at most and only as varieties, could be described under special designations.

In our trypanosome the constancy of its morphology and staining reaction, the uniform constitution of the blepharoplast, the oval form of the macronucleus and the constancy of its situation on the limit of the middle and posterior third of the body as well as the different sizes of the free flagellum enable us to describe this trypanosome as *Trypanosome clariæ* Montel (1905) var. *batrachi* var. nov.

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