

SURVEY ON THE PROTOZOAN FAUNA OF NORTH BENGAL

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ABSTRACT

A total of 1233 cold-blooded vertebrates belonging to 37 species and 480 xylophagous termites belonging to 4 species were examined for haematozoa and symbiotic flagellates respectively. Eighty-nine fishes (28.5%) of 9 species, 125 anurans (14.9%) of 4 species and 89 reptiles (20.6%) of 6 species harbour one or more blood parasites. All the termites harbour symbiotic flagellates. The genera *Trypanosoma*, *Haemogregarina*, *Lankesterella* and *Pirhemoctyon* from cold-blooded vertebrates were recorded. All the parasites are reported herein for the first time from this region.

INTRODUCTION

Although some reports on the protozoan parasites of different animals have been published from North Bengal since 1949 (Ray, 1949) the results have unfortunately not followed any uniform pattern. In some cases, no attempt has been made to identify the various protozoan parasites as to species. Still another factor limiting the value of all surveys, is the relatively very small number of sampling of the host species examined, thus resulting in negative findings, or giving insufficient data for significant comparisons. The present survey was undertaken with a view to study the parasitic protozoan, especially the blood protozoans of fishes, amphibians and reptiles and the symbiotic flagellates of Wood-eating white ants from North Bengal.

MATERIAL AND METHODS

A total of 312 fishes, 834 amphibians and 87 reptiles belonging to 37 species and 480 termites comprising of 4 species have been examined for protozoan parasites from diffe-

rent localities of North Bengal during 1979-80. Termites were dissected and the living flagellates were studied in fresh smears of gut contents. For permanent preparations, thin and uniform smears of the gut contents mixed with 0.5% Normal Saline, were drawn on the slide, fixed in Schaudinn's fixative and stained with Heidenhain's hematoxylin.

For the blood protozoa, permanent preparations were made after capturing the live fishes, frogs and reptiles. The blood was obtained by cutting the finger tips or toes or tail tips of snakes, and sometimes the whole animal was sacrificed. Blood smears were made from each example on grease free slides and fixed in methanol. The blood smears were stained with Leishman's or Giemsa's stains. For detecting the parasites the stained slides were observed under a high resolution microscope.

RESULT AND DISCUSSION

Of the 312 fishes of 19 species, 834 amphibians of 8 species and 87 reptiles of 10 species

TABLE—1. Prevalence of Blood Parasites in cold-blooded vertebrates from North Bengal.

Host species	Total number		Parasite	Locality
	No.	Exam. Infected		
PISCES				
1. <i>Anabas testudineus</i> (Bloch.)	50	25	<i>Trypanosoma anabasi</i> Mandal	Berhampore
2. <i>Clarias batrachus</i> (Linn.)	50	20	<i>T. batrachi</i> Qudri	Dinhatah, Cooch-behar
3. <i>Heteropneustes fossilis</i> (Bloch.)	40	13	<i>T. danilewsky saccobranchi</i> Qudri	Berhampore
4. <i>Mastocembellus armatus</i> Lacépède	30	11	<i>T. armati</i> Mandal	"
5. <i>Mastocembellus punctatus</i> (Hamilton)	20	5	<i>T. punctati</i> Mandal	Malda
6. <i>Mystus vittatus</i> (Bloch.)	75	5	<i>T. vittati</i> Tandon & Joshi	Dinhata, Cooch-behar
7. <i>Nandus nandus</i> (Ham.)	10	3	<i>Trypanosoma</i> sp.	Malda
8. <i>Ophicephalus punctatus</i> (Bloch.)	12	3	<i>T. punctati</i> Hasan & Qusim	Raiganj
9. <i>Ophicephalus striatus</i> (Bloch.)	15	4	<i>T. striati</i> Qudri	Raiganj
* Uninfected species	10			
	Total	312	89(28.5%)	
AMPHIBIA				
10. <i>Bufo melanostictus</i> Schneider	205	45	<i>Haemogregarina nucleo-bisecans</i> Shortt <i>Trypanosoma rotatorium</i> (Mayer) <i>Pirhemocytos</i> sp.	Malda Berhampore Raiganj
11. <i>Rana cyanophlyctis</i> Schneider	465	25	<i>Trypanosoma rotatorium</i> (Mayer) <i>Pirhemocytos</i> sp.	Garumara, Jalpaiguri Sainthia, Birbhum
12. <i>Rana limnocharis</i> Wiegmann	105	30	<i>Trypanosoma rotatorium</i> (Mayer) <i>Haemogregarina berestneffi</i> Castellani & Willey	Rangpoo, Darjeeling Reang, "
13. <i>Rana tigrina</i> Daudin	55	25	<i>Trypanosoma rotatorium</i> (Mayer) <i>Haemogregarina magna</i> (Grassi & Feletti) <i>Haemogregarina berestneffi</i> Castellani & Willey	Garumara, Jalpaiguri " Berhampore
** Uninfected species	4			
	Total	884	125(14.9%)	<i>Lankesterella minima</i> (Chaussat) "

*PISCES: *Labeo bata* (Ham.) (20), *L. calbasu* (Ham.) (5); *L. rohita* (Ham.) (15); *Wallago attu* (Bl. & Sch.) (2); *Mystus tengara* (Ham.) (50); *M. guleo* (Ham.) (40); *Amphipnous cuchia* (Ham.) (2); *Ophicephalus gachua* Ham. (10); *Lepidocephalichthys guntea* (Ham.) (25); *Berbus (Puntius) dorsalis* (Jerdon) (100).

** AMPHIBIA: *Rana hexadactyla* Lesson (10); *Kafoula pulchra taprobatica* Parker (55); *Uperodon systoma* (Schneider) (10); *Rhacophorus maculatus* (Gray) (25).

TABLE 1. Concluded.

Host species	Total number		Parasite	Locality
	No. exam.	Infected		
REPTILIA				
14. <i>Calotes versicolor</i> (Daudin)	25	3	<i>Haemogregarina</i> sp.	Reang, Darjeeling
15. <i>Enhydryis enhydryis</i> (Schneider)	15	5	<i>Trypanosoma enhydryis</i> Sinha & Mandal	Coochbehar
16. <i>Hemidactylus flaviviridis</i> Rüppell	10	2	<i>Haemogregarina</i> sp.	Garumara, Jalpai- guri
17. <i>Natrix piscator</i> (Daudin)	10	2	<i>Haemogregarina mirabilis</i> Castellani & Willey	Coochbehar
18. <i>Natrix stolata</i> (Linn.)	8	1	<i>Haemogregarina</i> sp.	"
19. <i>Mabuya carinata</i> (Schneider)	15	5	<i>Haemogregarina</i> sp.	Raiganj, West Dinajpur
* Uninfected species		4		
Total	87	18 (20.6%)		

TABLE—2. Prevalence of Termite flagellates from North Bengal.

Host species	Total No. exam.	Total No. infected	Symbionts present	Locality
1. <i>Coptotermes heimi</i> (Wasm.)	200	200	<i>Holomastigotoides emersoni</i> Das <i>H. ogivalis</i> de Mello <i>H. bengalensis</i> Chakraborty & Banerjee <i>Pseudotriconympha indica</i> Chakra- borty & Banerjee <i>P. cordiformes</i> Karandikar & Vittal <i>Spirotrichonympha froilanai</i> Karandikar & Vittal <i>Spirotrichonympha roonwali</i> Das	Murshidabad " Raiganj Rangpoo " Balurghat Malda & Raiganj
2. <i>Heterotermes indicola</i> (Wasm.)	150	150	<i>Holomastigotoides hollandi</i> Das <i>Spirotrichonympha pyriformis</i> Chakraborty & Banerjee	Murshida- bad Balurghat
3. <i>Cryptotermes havilandi</i> (Sjöstedt)	80	80	<i>Holomastigotoides hollandi</i> Das <i>Devescovina glabra</i> Grassi <i>Stephanonympha pyriformis</i> Das & Choudhury	" Raiganj Coochbehar
4. <i>Neotermes bosei</i> Snyder	50	50	<i>Oxymonas bosei</i> Das <i>O. grandis</i> Cleveland <i>Stephanonympha minuta</i> Das & Choudhury <i>S. pyriformis</i> Das & Choudhury	Jalpaiguri " Coochbehar "
Total	480	480 (100%)		

* REPTILIA : *Lissemys punctata granosa* (Schopff) (10) ; *Typhlops braminus* (Daudin) (7), *Riopa albopunctata* Gray (5), *Ptyas mucosus* (Linn.) (2).

examined, 89 fishes (28.5%) belonging to 9 species 125 amphibians (14.9%) belonging to 4 species and 83 reptiles (20.6%) belonging to 6 species showed protozoan infection in their blood. All the 480 examples of termites belonging to 4 species showed 14 species of symbiotic flagellates in their gut. The results are presented in Table 1 & 2 respectively.

Infections with species of *Trypanosoma* in 89 fishes, 55 amphibians and 5 reptiles, *Haemogregarina* in 60 amphibians, 15 reptiles and *Lankesterella* in 8 amphibians, were recorded. The genus *Pirhemocytion* whose taxonomic position is doubtful even today, has been recorded from *Bufo melanostictus* (5 exs.) and *Rana cyanophlyctis* (15 exs.). Double and multiple infections were recorded in 85 amphibians. No fish showed haemogregarine infection in their blood. However, all the blood parasites are reported herein for the first time from this region of India.

A perusal of literature indicates that there are a few stray reports of protozoan infection in cold-blooded vertebrates from North Bengal. Sinha (1979) and Sinha *et al.*, (1978, 1979) restricted themselves in reporting some species of coccidia from Darjeeling only. Previously Das (1974), Das and Choudhury (1972) reported some species of *Oxymonas* and Calonymphid flagellates from the termites of Jalpaiguri & Coochbehar forest ranges.

In this present investigation the authors have surveyed almost all the districts of North Bengal during 1979-'80. As a result 8 species of piscine *Trypanosoma* viz., *T. anabasi*, *T. batrachi*, *T. d. saccobranchi*, *T. armati*, *T. punctali*, *T. vittati*, *T. punctati* and *T. striati* in addition to one undetermined species were detected. *Trypanosoma rotatorium* has been recorded from *Bufo melanostictus*, *Rana*

tigrina, *R. limnocharis* and *R. cyanophlyctis*. Three species of *Haemogregarina* viz., *H. nucleobisecans*, *H. magna* and *H. berestneffi* have been reported from amphibians. Two unnamed *Haemogregarina* are reported in garden-lizard, *Calotes versicolor* and *Mabuya carinata* for the first time from India. The termite flagellates reported herein constitute new records. The present survey reveals a higher incidence of *Trypanosoma* infection (28.5%) in fishes rather than amphibians and reptiles. The higher rate of parasitism is presumably a result of higher vector activity and density.

ACKNOWLEDGEMENT

The authors are thankful to the Director and to Drs. A. K. Mandal, Superintending Zoologist, T. D. Soota, Deputy Director, Zoological Survey of India, for facilities provided. Thanks are also due to the forest department, Govt. of West Bengal, for their kind co-operation and help during the survey.

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